Fifth Ward Pedestrian and Bicyclist Special District Study

5th Ward Community Redevelopment Corp.®

September 2011

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Roberta F. Burroughs & Associates
Urban Planning Consultants

Nelson Nygaard

Executive Summary

Introduction

The Houston-Galveston Area Council (H-GAC) is a voluntary association of local governments and local elected officials in the 13-county Gulf Coast Planning Region, an area of 12,500 square miles that contains more than 6 million people. H-GAC also serves as the Metropolitan Planning Organization (MPO) for transportation planning in the eight-county Houston-Galveston area. This area includes Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties. H-GAC's Transportation Policy Council approves the Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP) which identify priority transportation projects for the region.

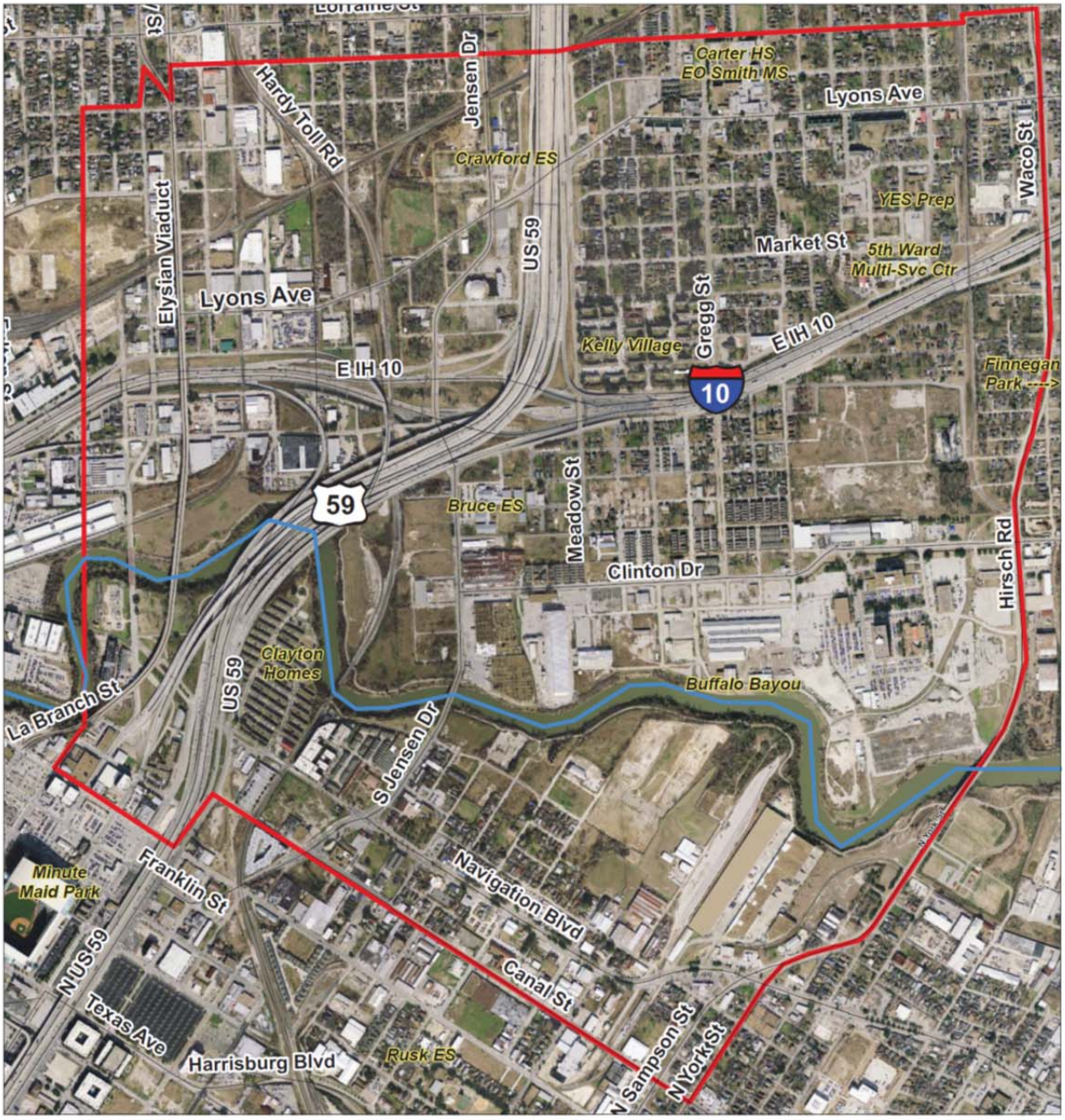
H-GAC conducted a study in 2004 and again in 2010 to identify districts where there were high levels of existing or potential pedestrian and bicyclist activity, and where there were significant opportunities to replace vehicle trips with pedestrian or bicycle trips, and to improve pedestrian and bicyclist safety. One of these districts was the historic Fifth Ward area northeast of Downtown Houston. The map on the following page shows the study area, which is bounded approximately by McKee Street on the west, Waco Street / Hirsch Road / York Street on the east, Oats Street on the north and Canal Street on the south.

The main focus of this study is the southeastern Fifth Ward and its connections to Downtown. Although the historic Fifth Ward extends further to the north and east, the study area includes several schools, a City of Houston Multi-Service Center, and three Houston Housing Authority communities. This study seeks to improve the safety of pedestrians and bicyclists, provide greater connectivity within the study area, and reinforce the linkages to Downtown and other destinations such as Buffalo Bayou.

Outline of Activities

• Stakeholder Interviews	May through July 2011
• Needs Assessment	June and July 2011
• Initial Public Meeting	June 21, 2011
• Field Observations	July 2011
• Conceptual Plan Development	August 2011
• H-GAC Pedestrian/Bicyclist Subcommittee Presentation	August 18, 2011
• Public Input Workshops	August 25, 29, and 30, 2011 September 10, 2011
• Agency Input Workshop	September 8, 2011
• Meetings with Management Districts and Other Stakeholders	September 15, 21, and 22, 2011
• Final Presentation to Public	October 1, 2011

Study Area Map and Aerial Photo



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Fifth Ward Study Area
2010 Aerial Photography

0 500 1,000 2,000 3,000 Feet

Source: Houston-Galveston Area Council

Legend

- Bayous
- 5th Ward Study Area
- *Selected Points of Interest*

Study Process Description

As part of collecting needs assessment data and statistics, the project team compiled the following information:

- Existing City of Houston traffic count data (mostly 2009)
- Field survey of signalized intersections and conditions (details in Appendix A)
- Traffic crash data from the Texas Department of Public Safety, through H-GAC.

It should be noted that the two locations exhibiting multiple pedestrian or bicycle crashes, Runnels Street at US 59, and Waco Street at IH 10, correspond to the two locations identified by the public as "dangerous."

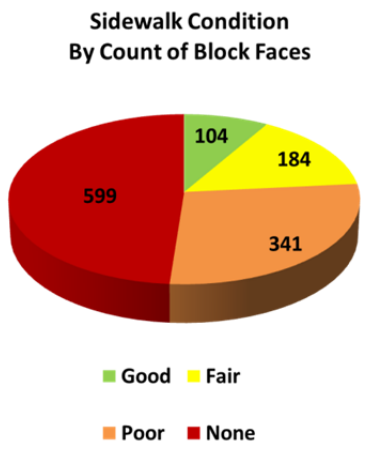
Sidewalks Assessment

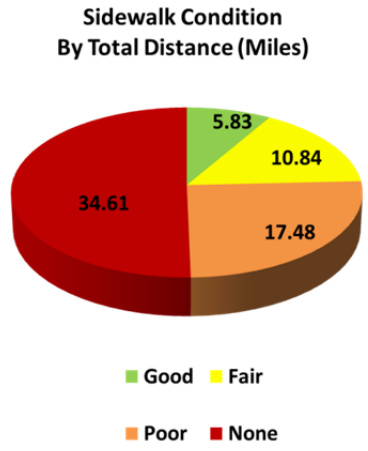
The project team conducted a series of field assessments in July 2011 of the presence and condition of sidewalks in the study area, along all public rights-of-way. The results of that field assessment are noted on the map on the following page.

"Good condition" means there are no noticeable problems with the sidewalk. "Fair condition" means there are minor noticeable problems with the sidewalk, such as cracks, slightly overgrown landscaping, and some surface deterioration. "Poor condition" means that the sidewalks were extensively cracked, uneven, had tilted/upended concrete, or were damaged or mostly obstructed by surrounding vegetation. In general, roughly half of study area streets had no sidewalks at all, and of the existing sidewalks, roughly half were in poor condition. Only one-eighth of study area sidewalks ranked "good." The table and graphs below illustrate these conditions

Sidewalk Condition by Block Face Count and Total Distance

	By Block Faces		By Total Distance		
Sidewalk Condition	Count	Percent	Feet	Miles	Percent
Good	104	8.5%	30,802	5.83	8.5%
Fair	184	15.0%	57,236	10.84	15.8%
Poor	341	27.8%	92,295	17.48	25.4%
None	599	48.8%	182,731	34.61	50.3%
TOTAL	***1,228***	***100.0%***	***363,064***	***68.76***	***100.0%***





Map of Sidewalk Conditions

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Fifth Ward Study Area Sidewalk Conditions

0 500 1,000 2,000 3,000 Feet

Data collected on field visit, July 2011

Legend

- Bayous

Sidewalk Condition

- Good
- Fair
- Poor
- None

Selected Points of Interest

Summary of Public Process

An extensive and inclusive public outreach process was employed for the Fifth Ward Pedestrian/Bicyclist Special District Study. The process featured meetings of the Study Steering Committee, public meetings and workshops with stakeholders, defined as study area residents and service providers, written surveys completed by stakeholders; and a meeting with public, quasi-public, and nonprofit entities that have the potential to be affected by the study's recommendations, or are potential implementing partners.

The public input process was fine-tuned after an initial public meeting that was characterized by low turnout. After that meeting, emphasis was placed on meeting with stakeholders "in place," e.g., the team attended the regularly scheduled meetings of several groups, as well as events that were likely to draw a crowd. Ultimately, this approach proved more effective than organizing community-wide meetings.

- Stakeholder Interviews — May through July 2011
- Initial Public Meeting — June 21, 2011
- H-GAC Pedestrian/Bicyclist Subcommittee Presentation — August 18, 2011
- Public Input Workshops — August 25, 29, and 30, 2011
September 10, 2011
- Agency Input Workshop — September 8, 2011
- Final Presentation to Public — October 1, 2011

Public input was solicited throughout the study process, through meetings with stakeholder organizations, through public surveys, and at public input workshops specifically focusing on project prioritization (four with the general public and one with stakeholder agencies).

Development of Potential Improvements

Using the information from the stakeholder interviews, public surveys, needs assessment, and field observations, a series of recommendations was developed. These projects included sidewalk construction, additional signage and signalization, crosswalk striping, additional on-street bike routes, as well as hike-and-bike trails. Twenty physical projects developed from the public input were presented to the project sponsors and the City of Houston on August 10, 2011, to H-GAC's Pedestrian / Bicyclist Subcommittee on August 18, 2011, and to a selection of other public agencies and organizations on September 8, 2011.

The goals and objectives of the study are listed below, as they were presented to the public when soliciting input on their prioritization of the recommendations.

- Improve access to schools and parks in the neighborhood
- Improve access to Fifth Ward Multi-Service Center and other community centers
- Enhance connections to public transportation
- Improve access to Buffalo Bayou Trail (existing and future sections)
- Improve connectivity throughout the study area
- Facilitate walking and bicycling by enhancing safety and security

The goal of the project team in developing the recommendations was to address all of these conceptual goals; investigate all the specific locations named by the public as "problem areas" or perceived as dangerous; and create a logical grid of improvements that served both short-distance trips to destinations within the study area and longer-distance connections to Downtown, Buffalo Bayou, and other regional attractions.

The project team took the conceptual plan detailed above, and created twenty proposed improvements that reflect the goals and objectives of the conceptual plan, as well as addressing the needs and concerns of the community as expressed in the public input process.

Map of Recommendations

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Fifth Ward Study Area
Project Recommendations

0 500 1,000 2,000 3,000 Feet

*Existing Bikeways from City of Houston

Legend

- Safety Improvements
- Bicycle Improvements
- New Sidewalk Corridors
- Bayous
- New Sidewalk Zones
- Other Streets
- 5th Ward Study Area
- 5 Code for Description of Improvement
- Selected Railroads

Existing Bikeways*

- Bike Trail
- Bike Route
- Bike Lane
- Shared Lane
- Bike Trail Planned

Cost Estimates

The total, shown below, is for all priced projects. If federal funds are used to implement the Pedestrian and Bicycle Districts improvements, the sponsoring agency (in this case the Fifth Ward Tax Increment Reinvestment Zone) must contribute 20% of the cost of improvements. It is also acceptable for the sponsoring agency to secure financial commitment from other government agencies (such as the City of Houston, TxDOT, Harris County, or other management districts or TIRZs). In-kind services are not countable towards this total; contributions must be in actual dollars.

Fifth Ward Special District Pedestrian/Bicyclist Plan
Overall Cost Estimates

Code #	Description	Estimate
1	Lyons Avenue Bicycle Lane Coloration	$ 412,300
2	Gregg Street - Sidewalk and Parking Improvements	$ 268,200
3	Market Street - Sidewalk and Street Improvements (Option 2)	$ 354,800
4	North - South Bike Trail along Benson and Rail Track	$ 558,200
5	Finnegan Park Bike Trail Connector	$ 57,200
6	East-West Baron Street "Bike Boulevard"	$ 160,200
7	Jensen and Buffalo Bayou Bike Connector (New Sidewalks from Baron to Lyons)	$ 178,700
8	Rail Bridge under US 59 (By Others) and New Bike Trail from bridge to Jensen	$ 79,500
9	McKee and Hardy Street Bike Improvements	$ 12,800
10	New Sidewalk Under US 59 from Commerce to Runnels	$ 25,300
11	Waco Street (IH 10 overpass) Sidewalk Widening	$ 52,800
12	Runnels Street Crosswalk (near US 59) with Median Extension	$ 35,300
13	Bruce Elementary School New Sidewalks	$ 81,900
14	Crawford Elementary School New Sidewalks	$ 98,400
15	South Jensen Drive New Sidewalks - not priced (implemented by others)	$ -
16	Multi-Service Center & YES Prep. School New Sidewalks	$ 148,000
17	Pedestrian (Hawk) Signal at Lyons Avenue and Pannell Street	$ 112,000
18	New Sidewalks along Meadow Street/US 59 Feeder Road	$ 29,600
19	Hare Street and IH 10 EB Feeder New Sidewalks	$ 89,400
20	Additional Wayfinding Signage - not priced	$ -
GRAND TOTAL		**$ 2,754,600**
FEDERAL SHARE (80%)		$ 2,204,000
LOCAL MATCH (20%)		**$ 551,000**

These cost estimates are intended for planning purposes only. If H-GAC or the TIRZ moves forward on the implementation of these improvements, construction drawings and engineering plans would be required. Further detail on the cost estimates for each improvement is provided on the following pages. The funding of the potential improvements identified in this report, is up to the TIRZ board, with the potential involvement of other public entities such as the City of Houston.

Project Prioritization

The prioritization was done in terms of the relative ease and expense of projects, the necessity in terms of which would have the most beneficial effect on pedestrian and bicyclist conditions, and the public's prioritization.

Project Number	Improvement Description	Selection by Public	Estimated Cost	Ease of Implementation	Demand Satisfied	OVERALL PRIORITY
1	Lyons Avenue Bike Lane Coloration	**Best**	Good	Good	Good	Good
2	Sidewalks and Reconfiguration of Gregg Street	**Best**	Good	Better	Better	Better
3	Sidewalks and Reconfiguration of Market Street	Good	Good	**Best**	Better	Better
4	North-South Rail Trail	**Best**	Good	Good	Better	Better
5	Connections from New Trail to Finnegan Park	**Best**	Better	Good	**Best**	**Best**
6	East-West Baron Street "Bike Boulevard"	Good	Good	**Best**	Better	Better
7	Jensen Drive Sidewalks and Connection to Bayou	**Best**	Good	Better	Better	Better
8	Rail Bridge near Clayton Homes and Connections to Jensen Drive	**Best**	Better	Good	Better	Better
9	McKee and Hardy Streets Bicycle Improvements	Better	**Best**	**Best**	Good	**Best**
10	Walkway under US 59 north of Minute Maid Park	**Best**	**Best**	Better	Better	**Best**
11	Widened Sidewalks on Waco Street Overpass	Better	Better	Better	**Best**	**Best**
12	Median Changes and New Crosswalks on Runnels Street	Good	**Best**	Better	**Best**	**Best**
13	New Sidewalks near Bruce Elementary School	**Best**	Better	**Best**	Better	**Best**
14	New Sidewalks near Crawford Elementary School	Good	Better	**Best**	Good	Better
15	Sidewalks and Reconfiguration of South Jensen Drive	Better	Better	**Best**	Better	**Best**
16	New Sidewalks near Multi-Service Center and YES Prep School	Better	Better	**Best**	Better	**Best**
17	New HAWK Signal and Study of Potential New Traffic Signal at Lyons and Pannell	Better	Better	**Best**	**Best**	**Best**
18	New Sidewalks on Meadow Street / US 59 feeder	Good	**Best**	**Best**	Good	Better
19	New Sidewalks on Hare Street / IH 10 feeder	Good	Better	**Best**	Good	Better
20	Additional Wayfinding Signage throughout Study Area	Good	Better	Better	Good	Good

Public Interest: 0-15 votes = Good, 16-20 votes = Better, 21+ votes = Best.

Cost Category: Less than $50,000 = Best, $50,000 - $150,000 = Better, More than $150,000 = Good.

Ease of Implementation: subjective assessment based on agency coordination required.

Demand Satisfied: subjective assessment based on number of potential users benefiting.

Table of Prioritized Projects

It should be emphasized that the entire selection of projects is recommended for implementation. Even the lowest-ranking overall has been vetted by the community and the stakeholder organizations, benefits the pedestrian / bicyclist experience in the study area, and should move forward. The overall ranking is intended as a guide for H-GAC and the Fifth Ward for future activities.

Project Number	Improvement Description	OVERALL PRIORITY
5	Connections from New Trail to Finnegan Park	**Best**
9	McKee and Hardy Streets Bicycle Improvements	**Best**
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3	Sidewalks and Reconfiguration of Market Street	Better
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1	Lyons Avenue Bike Lane Coloration	Good
20	Additional Wayfinding Signage throughout Study Area	Good

Table of Contents

Chapter 1
Study Overview

Introduction

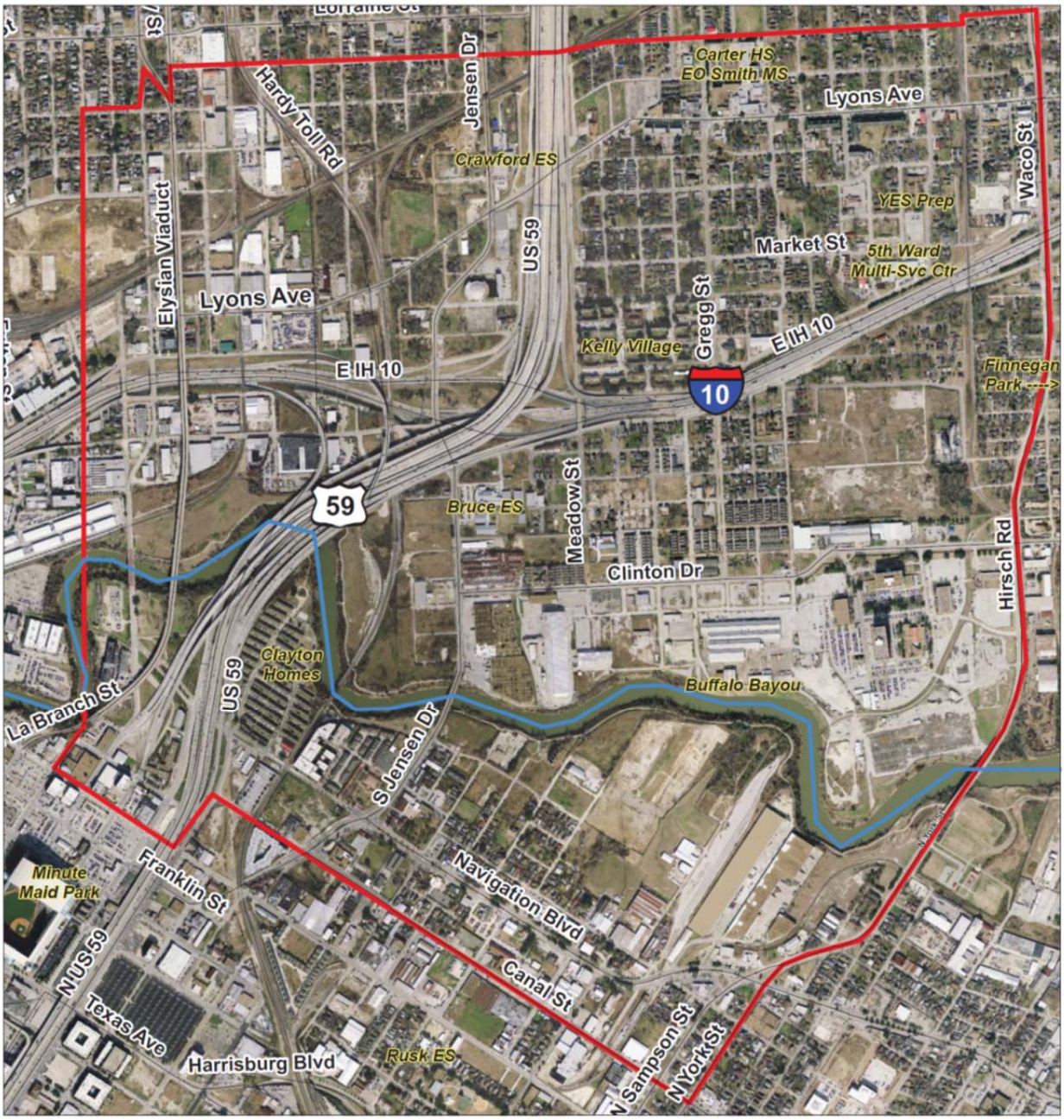
The Houston-Galveston Area Council (H-GAC) is a voluntary association of local governments and local elected officials in the 13-county Gulf Coast Planning Region, an area of 12,500 square miles that contains more than 6 million people. H-GAC also serves as the Metropolitan Planning Organization (MPO) for transportation planning in the eight-county Houston-Galveston area. This area includes Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties. H-GAC's Transportation Policy Council approves the Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP) which identify priority transportation projects for the region.

H-GAC conducted a study in 2004 and again in 2010 to identify districts where there were high levels of existing or potential pedestrian and bicyclist activity, and where there were significant opportunities to replace vehicle trips with pedestrian or bicycle trips, and to improve pedestrian and bicyclist safety. One of these districts was the historic Fifth Ward area northeast of Downtown Houston. The map on the following page shows the study area, which is bounded approximately by McKee Street on the west, Waco Street / Hirsch Road / York Street on the east, Oats Street on the north and Canal Street on the south.

H-GAC selected consultant Lockwood, Andrews & Newnam, Inc. (LAN), in association with sub-consultants Nelson\Nygaard Consulting Associates and Roberta F. Burroughs and Associates, to develop a conceptual master plan for comprehensive pedestrian and bicyclist improvements in the Fifth Ward Study Area. The consultant team worked closely with the community to define the best possible overall plan that fits the needs of the residents, businesses and visitors.

The purpose of this pedestrian / bicyclist study is to improve neighborhood access and infrastructure, by identifying key links to Downtown and other neighborhoods to the south and west, as well as prioritizing bikeway and sidewalk improvements around important neighborhood destinations such as transit stops and schools. The main focus of this study is the southeastern Fifth Ward and its connections to Downtown. The historic Fifth Ward extends further to the north and east; however, this area of the Fifth Ward was selected for this study because it represents an area of future growth and also includes several schools, a City of Houston Multi-Service Center, and three Houston Housing Authority communities. A map of the study area is located on the following page. Further information on land use and other statistics is presented in Appendix A.

Study Area Map



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Fifth Ward Study Area
2010 Aerial Photography

0 500 1,000 2,000 3,000 Feet

Source: Houston-Galveston Area Council

Legend

- Bayous
- 5th Ward Study Area
- *Selected Points of Interest*

Study Area Characteristics

Houston's original civic divisions from 1839 were four wards, divided in a grid with Main and Congress Streets the dividing lines. The Fifth Ward, across Buffalo Bayou to the northeast, was defined in 1866 to accommodate urban growth. Much of the early settlement was by newly-freed slaves, and the area became predominately African-American by the turn of the 20th Century. Like many other inner-city neighborhoods, Fifth Ward had a thriving business community until the mid-century, when it began to lose population. After desegregation, many middle-income residents left for other parts of the City, and the loss of population led to a decline in the neighborhood's economic standing, leaving an absence of not only businesses, but many City services as well.

Today, the median income is considerably lower than the City average, and the area continues to suffer from a lack of business investment and poor infrastructure. There is, however, new development occurring, especially in the neighborhood's southwest, attracted by the proximity of Downtown Houston. The Fifth Ward TIRZ and Fifth Ward Community Redevelopment Corporation have succeeded in constructing over 600 units of new housing, as well as providing economic and educational assistance to prospective homeowners.

The area shows above-average dependence on transit; workers commute on transit at more than twice the rate of the City as a whole (11% vs. 5%). Bicycling and walking to work occur at rates near the City average. More detail on demographics and other statistics is available in Appendix A.

Fifth Ward Organizations

In July 1999, the Fifth Ward Redevelopment Authority was created and later ordinances were approved to expand the boundaries of the Tax Increment Reinvestment Zone by the City of Houston. The Authority is organized as a public non-profit corporation for the purpose of aiding, assisting, and acting on behalf of the City in the performance of its governmental function to promote the common good and general welfare of Reinvestment Zone Number Eighteen (the "Zone") and neighboring areas and to promote, develop, encourage and maintain housing, educational facilities, employment, commerce and economic development in the City.

Fifth Ward Community Redevelopment Corporation (CRC), a 501(c)(3) nonprofit Texas Corporation, was organized in April 1989 by Fifth Ward residents, business owners, ministers, educators and civic leaders. Fifth Ward CRC's mission was established by the people of the Fifth Ward in a series of community town hall meetings. Fifth Ward CRC's greatest strengths flow from its roots in the Fifth Ward - conceived, organized and governed by a broad cross-section of community leadership. Revitalization in 5th Ward is a planned event. Fifth Ward CRC continues to work with community partners to define the roles of the partners as it relates to the redevelopment of 5th Ward and to improve metrics and measurements to ensure accountability to the community and its partners.

Fifth Ward CRC works primarily in the area bounded by Kelley Street/Loop 610 on the north, Hardy Street/Southern Pacific Railroad (SPRR)/White Oak Bayou on the west, Buffalo Bayou on the south, and SPRR/Sakowitz Street/Hunting Bayou tributary on the east. The corporation concentrates its work along the Lyons Avenue corridor bounded by the Englewood Yard SPRR Line, Jensen, Clinton/SPRR and Sakowitz. Fifth Ward CRC is broadly recognized as a national leader and is frequently cited as a model for community redevelopment. We have concentrated our efforts to revitalize Houston's historic 5th Ward into a thriving inner city comprehensive neighborhood, which can effectively compete with communities within Houston on an economic and social basis. Fifth Ward CRC has a long history of providing quality development projects and services.

In order to complete the task of reshaping 5th Ward back into a sustainable community, TIRZ 18 and its community development partners including Fifth Ward CRC must include pedestrian and bike trail in the plans, as transportation is currently ranked #5 by a survey of 282 respondents as to what they like about 5th Ward and what's important and evidenced in the Housing Study completed in February 2011 by TIRZ 18 and the CRC.

The recommendations resulting from Bike and Pedestrian study allows and support trails and pathways that will connect to the existing trail path along Buffalo Bayou and extend throughout the southern portion of 5th Ward. To assist with the "going green" efforts, greenery will map out the trail and connect the community with the parks. The intended outcome is to compliment the redevelopment efforts and unite the community with a desired amenity. The primary objectives of the study are to:

- Improve circulation and mobility within the community
- Establish direct connectivity to Downtown Houston and Buffalo Bayou
- Attract commercial development along major nodes that would support increased traffic and walkability
- Encourage citizens to walk or ride their bikes, which decreases exhaust emissions and is more eco-friendly

Whether by necessity or choice, pedestrian travel is important for Study Area residents. The quality of pedestrian infrastructure varies widely from street to street, however. According to City of Houston code, sidewalks, the key element of pedestrian infrastructure, are the responsibility of the property owner, not the owner of the public right of way. For several decades, sidewalks were not required of new development. Thus sidewalk prevalence and continuity is highly inconsistent over much of Houston, including the Study Area.

Study Area residents use bicycles not only for recreation but also for commuting and errands. Limited bicycle infrastructure does exist in the Study Area to accommodate this demand. Three streets have curbside bike lanes – Cavalcade, Waco / Hirsch, and Lyons Avenue. There are also off-street trails available for biking in two locations along Hunting Bayou as well as along Buffalo Bayou in the far southwestern corner of the Study Area. A designated bicycle route, indicating streets where motorists and bicyclists are expected to share the roadway, connects Finnegan Park with southern portion of Denver Harbor. Despite these infrastructure elements, however, many schools and parks in the Study Area lack designated bicycle connections.

Lastly the study identifies cost effective strategies and implementation projects that will improve safety and mobility for pedestrians and bicyclist in 5th Ward.

Finally, the goal of the plan is to improve mobility and connectivity in and through 5th Ward. As such, we will work with others entities such as TXDOT, Buffalo Bayou, Metro, Harris County, neighboring management districts. and the City of Houston to ensure that this plan is one that has overall consensus and support of all which can ensure timely implementation and maximum use by the intended audiences.

Relationship to Adjacent Neighborhoods

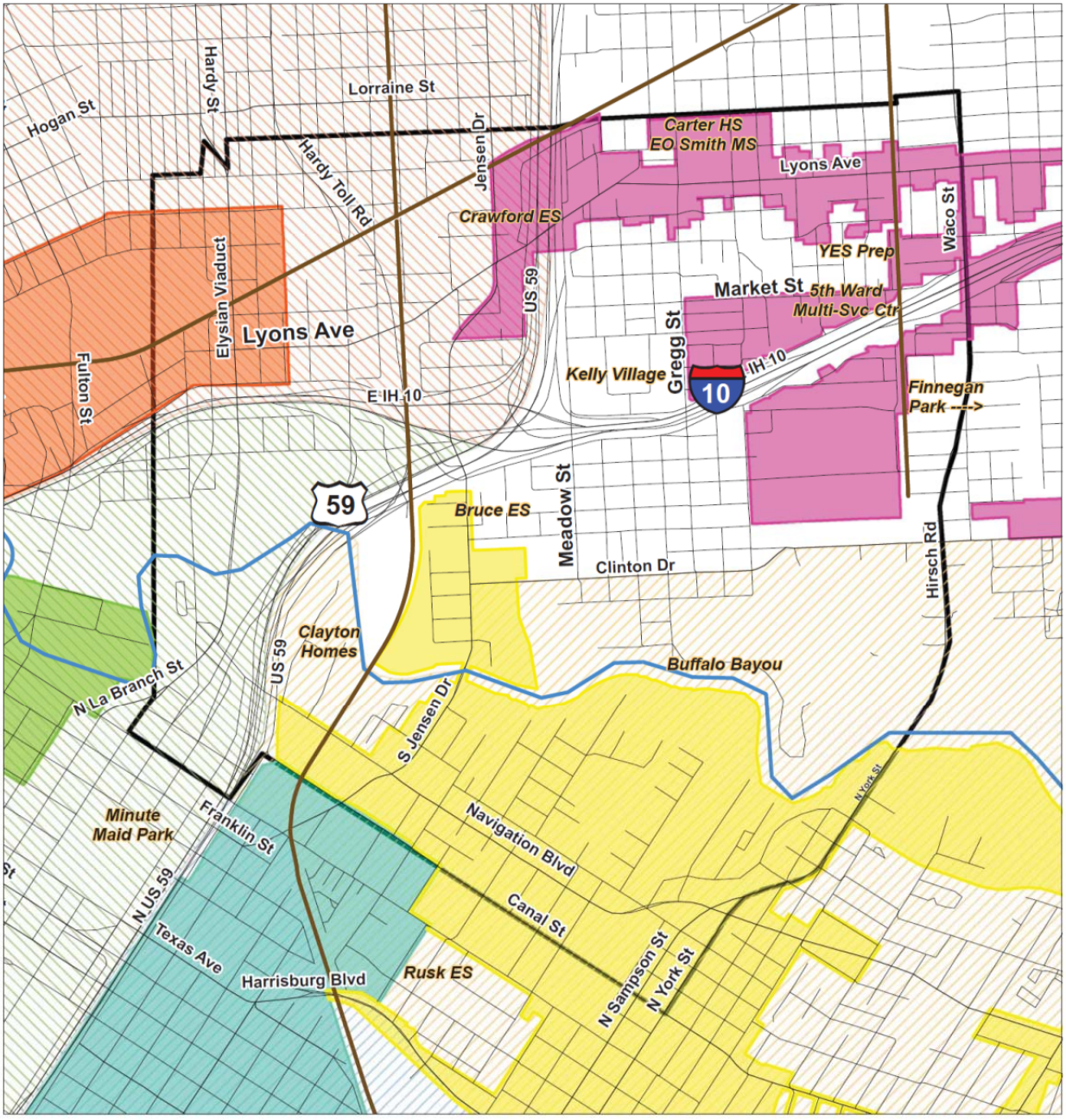
In addition to the historic Fifth Ward, a portion of the historic Second Ward neighborhood is also situated within the study area; the section south of Buffalo Bayou encompasses this neighborhood. In addition, a small portion of the Near Northside neighborhood is within the boundaries; the western section of the study area contains a small portion of this neighborhood. The boundaries of the study area take into account the growth that is occurring in its eastern quadrant, as well as the potential to connect to Downtown Houston.

There are portions of several municipal management districts within the boundaries of the study area. These are Houston Downtown, East Downtown, East End, and Greater Northside. According to the City of Houston, municipal management districts are created either by a special act of the State Legislature or through petition to the Texas Commission on Environmental Quality (TCEQ). Property owners within these districts are authorized to assess and, in some instances, tax themselves to fund specific improvements including those related to quality of life issues such as beautification, security, mobility, transit, traffic control, and marketing. Also, these districts can operate and maintain infrastructure through services such as landscape maintenance and street and sidewalk sweeping. Lastly, municipal management districts have the ability to provide long-term

maintenance to improvements supporting transit-oriented development such as sidewalks, crosswalks, transit stops, and public plazas

There are two tax increment reinvestment zones (TIRZs) within the study area. Tax increment reinvestment zones are economic development mechanisms created by cities to help finance the cost of developing or redeveloping a specified geographic area that would not otherwise attract large private investment. These are the Fifth Ward TIRZ #18 and Hardy/Northside TIRZ #21. The Market Square TIRZ #3 and the East Downtown TIRZ #15 are nearby but not within the study area. The Greater East End Management District is currently in negotiations with the City of Houston to implement an additional TIRZ. The map on the following page depicts the TIRZs and Management Districts in the vicinity of the study area.

Map of Management Districts and Existing and Proposed TIRZs



Development Trends

This study is part of ongoing efforts to revitalize the Fifth Ward neighborhood, which is a historic neighborhood. Since its inception in 1989, the Fifth Ward Community Redevelopment Corporation, which is closely aligned with Tax Increment Reinvestment Zone #18 has constructed numerous new single family units in the study area. The Fifth Ward Community Redevelopment Corporation is also active in the multi-family residential arena, having constructed Pleasant Hill Village, a multi-story independent living facility for seniors.

A housing study initiated by TIRZ #18 was completed in February 2011. The study describes the forces that are affecting housing supply and demand in a geographic area that extends into the historic Denver Harbor neighborhood. The study concludes with recommendations for actions, investments, and policies that will enhance and enlarge the market, diversify housing product types, increase the stability and desirability of the neighborhood, and position the neighborhood to capture a share of the new housing that is being constructed in Houston's core.

In recent years, private sector development activity has included the construction of new townhome developments that have sprung up among the older, one-story single-family homes that characterized the area for many years. These new developments occur mostly near US 59 North and IH-10 East.

The Houston Housing Authority owns several multi-family developments in the study area, including Clayton Homes, Kelly Village, and Kennedy Place. At Kelly Village, a modernization project started in 1997 is nearing completion. Modernization of Clayton Homes has been completed in phases and includes the construction of a new community building. Kennedy Place was recently redeveloped with $7.8 million in federal stimulus funds and other funds.

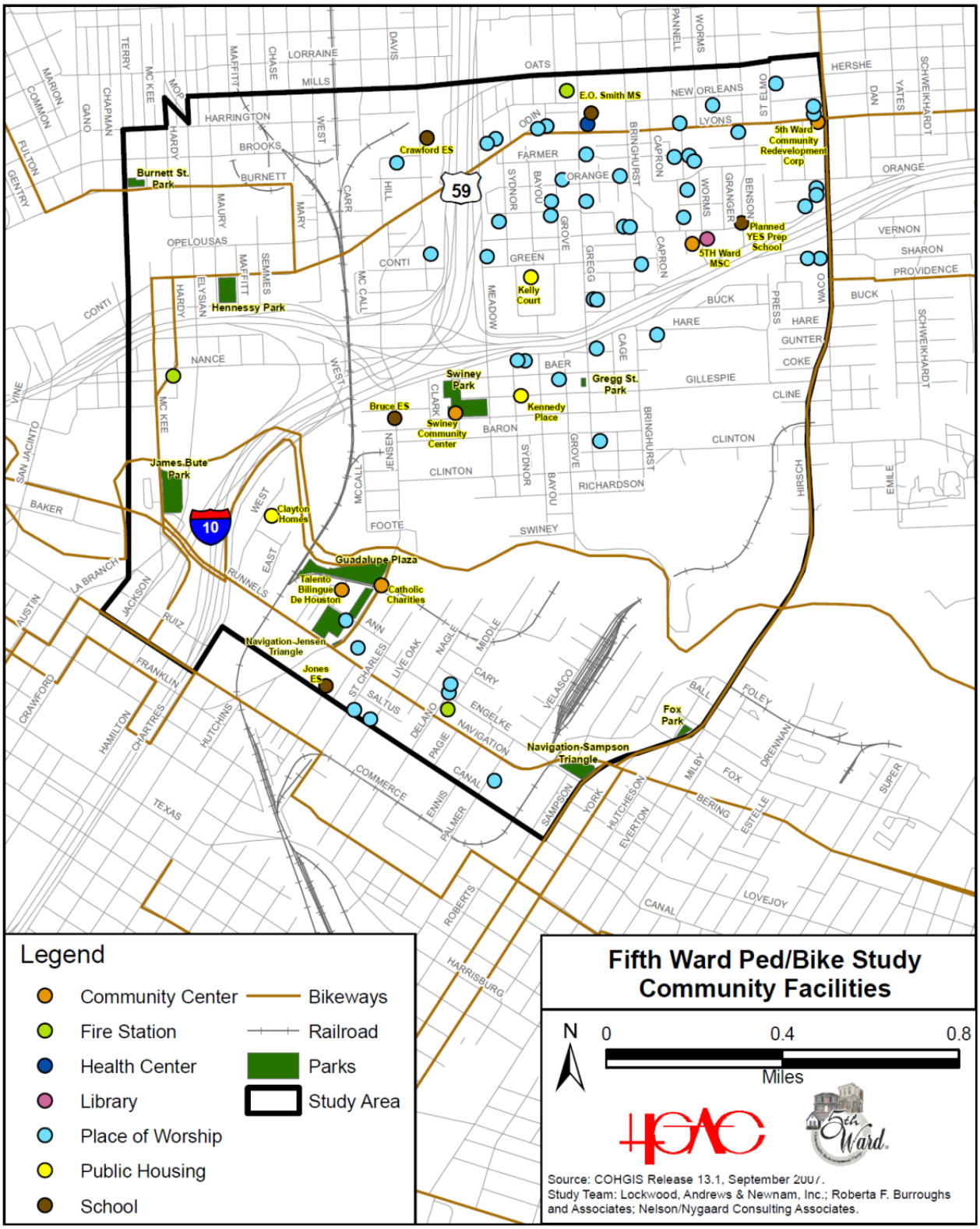
Recent non-residential activity includes the adaptive re-use of a building to house St. Arnold's Brewery. KBR Brown & Root, a large office and industrial complex in the area along Clinton Drive, is making plans to relocate. The KBR parcel has over a mile of frontage on the north shore of Buffalo Bayou and will mark a significant change in the study area when it is redeveloped for other uses.

Community Facilities

The study area is home to a number of parks, the largest of which are Swiney Park, James Bute Park, and Burnett Street Park. Finnegan Park, a large regional park located just outside of the study area, is heavily used by study area residents. Public schools within the study area boundaries include Anson Jones, Joseph H. Crawford and Blanche Kelso Bruce Elementary Schools and E. O. Smith Middle School. YES Preparatory Academy, a charter school, opened in the fall of 2011.

The Fifth Ward Multi-Service Center, which is owned and operated by the City of Houston, is a prime community gathering place. It contains meeting rooms, a gymnasium, and an auditorium. A number of nonprofit organizations have office space in the facility. The nearby J. W. Peavy Senior Center is owned by the City of Houston and operated by Neighborhood Centers, Inc. This center provides services for elderly citizens. The map on the following page depicts the location of various community facilities in the study area.

Community Facilities Map



Roadways

The study area is bisected in both directions by major freeways. IH 10 runs east to west, and US 59 runs north to south. These facilities are under the jurisdiction of the Texas Department of Transportation (TxDOT). The Hardy Toll Road, owned and operated by the Harris County Toll Road Authority, currently ends at IH 610 North, but design is underway to extend it to the US 59 / IH 10 interchange, where ramps have been constructed to tie into it.

All other study area roadways are owned and maintained by the City of Houston, including local streets and "major thoroughfares." "Major Thoroughfares" have special status in the City's infrastructure and affect the development code for adjacent parcels, as well as having stricter standards for their design and configuration. Not all "major streets" in the study area are on the City's Major Thoroughfare and Freeway Plan; the City does not designate major thoroughfares within the "Downtown" area, defined as the area northeast of IH 45, west of US 59, and south of IH 10. This includes the southwest quadrant of the study area. Also, Market Street, Meadow Street, and Gregg Street are not designated as major thoroughfares. This allows more flexibility in their design and what modifications may be made. Designated Major Thoroughfares and their classifications are shown in the table below.

City of Houston Major Thoroughfares in Study Area

Roadway	Classification	Number of Lanes	Minimum ROW
Lyons Avenue	Thoroughfare	2	60
Clinton Drive	Thoroughfare	4	60
Navigation Boulevard	Principal	4	120
Canal Street	Collector	2	65
Elysian Viaduct	Thoroughfare	4	60
Jensen Drive	Thoroughfare	4	60-80*
Hirsch Road / Waco Street	Thoroughfare	4	100

**60' north of Lyons; 70' from Lyons to Buffalo Bayou; 80' south of Buffalo Bayou*

Transit

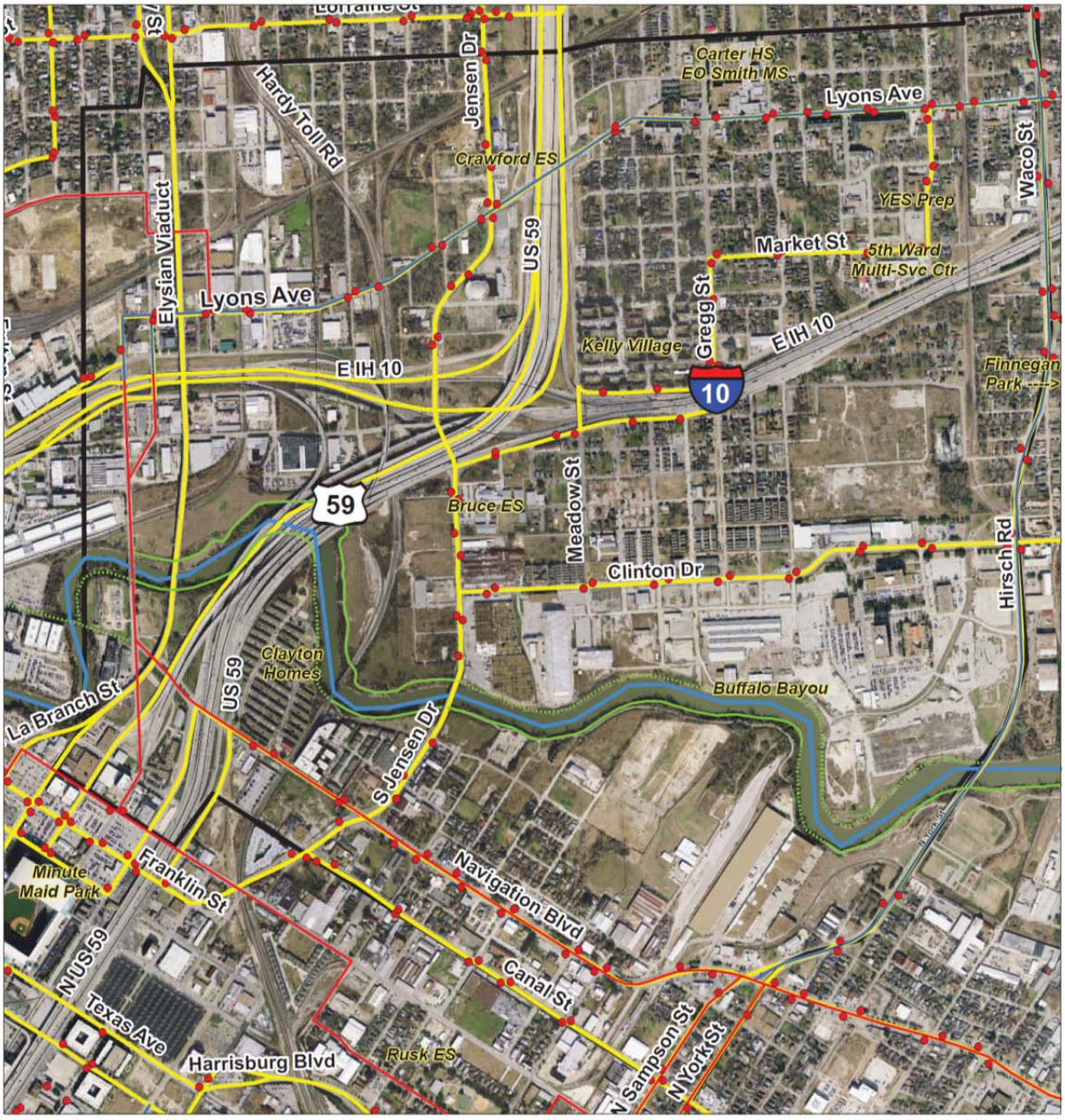
The Fifth Ward is part of the METRO service area. Numerous commuter routes use IH 10 or US 59 but have their terminus Downtown and do not stop in the study area. Routes #1 and #3 use the Elysian Viaduct and also do not stop in the study area. The local bus routes listed below serve the study area; they and their stop locations are shown on the map on the following page:

- Route 6 – Jensen Drive
- Route 11 – Nance Street (also uses Jensen, Gregg, Market, and Benson)
- Route 20 – Canal Street
- Route 29 – Waco Street
- Route 30 – Clinton Drive
- Route 37 – El Sol Crosstown (uses Jensen Drive and Navigation Boulevard)
- Route 48 – Navigation Boulevard
- Route 77 – Liberty Road (uses Jensen Drive)
- Route 80 – Lyons Avenue

Bikeways

Striped bicycle lanes are present on Lyons Avenue and Waco Street / Hirsch Road / York Street. Signed on-street routes are present on McKee / Hardy Streets, Runnels Street / Navigation Boulevard, Commerce Street, and a route connecting Lyons Avenue to the Near Northside using various streets around the western terminus of Lyons. The map on the following page shows bike lanes in blue and designated routes in red.

Existing Transit and Bikeways Map



N

Fifth Ward Study Area
Existing Transit and Bikeways

0 500 1,000 2,000 3,000 Feet

Source: METRO and City of Houston

Legend

- METRO Local Buses
- Bus Stops
- Bayous
- Other Streets
- 5th Ward Study Area

Area Bikeways

- Bike Trail
- Bike Route
- Bike Lane
- Shared Lane
- Bike Trail Planned

Chapter 2
Needs Assessment, Public Input, and Project Selection

Traffic Counts

Traffic counts were compiled from existing City of Houston data. Average daily traffic counts were documented for available streets in the study area, the majority of the available data being collected in the year 2009.

In general traffic volumes in the study area are light. Only North Main Street (outside the study area to the west) and Waco Street (the eastern study area boundary) exceeded 10,000 vehicles per day. Lyons Avenue within the study area served fewer than 5,000 vehicles per day. Further detail on these traffic counts is provided in Appendix A.

Except for a few roadway segments near the freeways, traffic in the study area is generally light.

Most study area intersections, like Jensen Drive at IH 10 westbound, shown here, provide all essential infrastructure, though it is in fair condition at best.

Signalized Intersection Survey

In July 2011, the project team conducted a field survey of the signalized intersections in the study area. Some locations were found to have curb ramps that did not meet current ADA standards, and stop bars, crosswalks, and pedestrian signalization, though provided at virtually all traffic signals, were frequently in poor condition. Throughout the study area, it is recommended that these issues be corrected. Details of the field survey are shown in Appendix A.

Crash Data

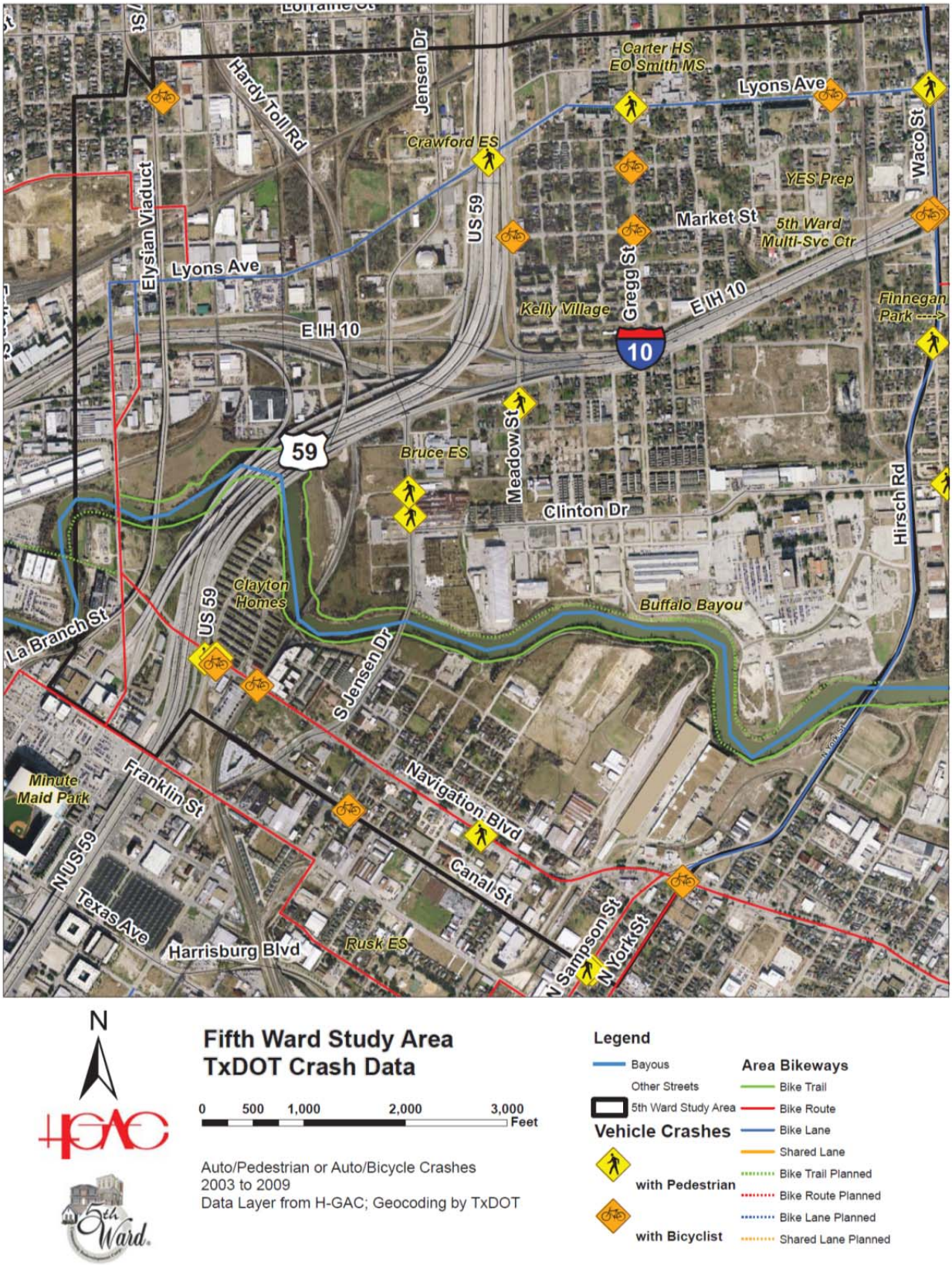
Traffic crash data was obtained from H-GAC, who compiles data from the Texas Department of Public Safety. The data requested was for selected streets in the study area, including major arterials, streets with traffic signals, and streets leading to major destinations such as schools.

Benson Street
Bringhurst Street
Canal Street
Cline Street
Clinton Drive
Elysian Street
Gregg Street
Hirsch Road
Jensen Drive
Lyons Avenue
Market Street
McKee Street
Meadow Street
Mills Street
Nance Street
Navigation Boulevard
Oats Street
Runnels Street
Waco Street

Data covers only *reported* crashes which involved injury and/or property damage, for the years of 2003-2009 (data for 2010 had not yet been compiled).

Pedestrian and bicycle crashes occurring in the studied timeframe are shown on the map on the following page. It should be noted that the two locations exhibiting multiple pedestrian or bicycle crashes, Runnels Street at US 59, and Waco Street at IH 10, correspond to the two locations identified by the public as "dangerous."

Pedestrian and Bicyclist Crash Locations Map



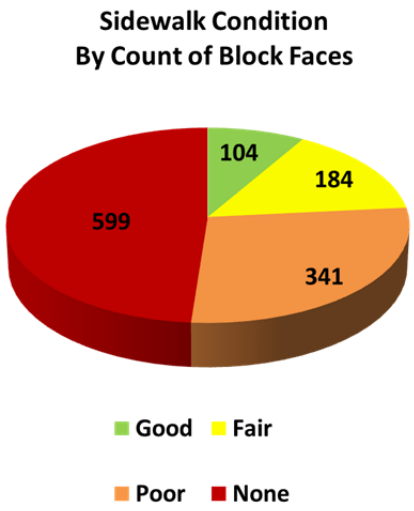
Sidewalks Assessment

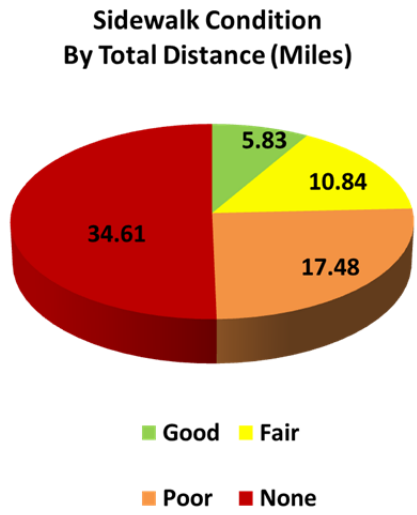
The project team conducted a series of field assessments in July 2011 of the presence and condition of sidewalks in the study area, along all public rights-of-way. The results of that field assessment are noted on the map on the following page.

"Good condition" means there are no noticeable problems with the sidewalk. "Fair condition" means there are minor noticeable problems with the sidewalk, such as cracks, slightly overgrown landscaping, and some surface deterioration. "Poor condition" means that the sidewalks were extensively cracked, uneven, had tilted/upended concrete, or were damaged or mostly obstructed by surrounding vegetation. In general, roughly half of study area streets had no sidewalks at all, and of the existing sidewalks, roughly half were in poor condition. Only one-eighth of study area sidewalks ranked "good." The table and graphs below illustrate these conditions

Sidewalk Condition by Block Face Count and Total Distance

	By Block Faces		By Total Distance		
Sidewalk Condition	Count	Percent	Feet	Miles	Percent
Good	104	8.5%	30,802	5.83	8.5%
Fair	184	15.0%	57,236	10.84	15.8%
Poor	341	27.8%	92,295	17.48	25.4%
None	599	48.8%	182,731	34.61	50.3%
TOTAL	***1,228***	***100.0%***	***363,064***	***68.76***	***100.0%***





The sidewalk areas in the best condition are in and around Kelly Village, near the new housing constructed between IH-10 and Clinton Drive, and in the southwest corner of the study area closest to Downtown. Although most major streets do have continuous sidewalks (unlike most of the minor streets), their condition is mostly fair to poor.

Clinton Drive's sidewalks are mostly in good condition where they exist, which is mostly at the western end of the street. Lyons Avenue's sidewalks vary widely, from some short good-condition areas near the Pleasant Hill development to fair-to-poor elsewhere, with some missing sections west of US 59. Jensen Drive's sidewalks are continuous but in mostly poor condition between Buffalo Bayou and Lyons Avenue and in fair condition elsewhere.* Hirsch Road/Waco Street's sidewalks are continuous but mostly in poor condition, with the exception of the good-condition area immediately adjacent to IH-10.

*It should be noted that in the June 15, 2011 interview with City of Houston Councilmember Jarvis Johnson (whose District B covers most of the study area), he expressed the opinion that it was not worthwhile to focus on improving Jensen Drive, since most of the land was held in large parcels by real estate speculators, and when those blocks are released for development, new sidewalks would be required as a condition of redevelopment approval.

Note that, along IH 10 west of US 59, there are some sidewalks present between the freeway mainlanes and the feeder roads. LAN does not encourage the construction of sidewalks in these locations when the freeway is at or below grade, and current freeway design standards would not include them. These sidewalks likely remain from when the feeder roads were City streets, before the freeway was constructed in 1972. They are not included in the sidewalk statistics.

The intersection of Lyons Avenue and Gregg Street shows good sidewalk design. Although the striping is worn, crosswalks, ped signals and buttons, and ramps are provided in all directions. The sidewalks are wide and smooth.

This stretch of Jensen Drive near IH 10 shows sidewalks more typical of the study area—narrow, too close to the travel lanes, and not well maintained.

Map of Sidewalk Conditions

N

Fifth Ward Study Area
Sidewalk Conditions

0 500 1,000 2,000 3,000 Feet

Data collected on field visit, July 2011

Legend

- Bayous

Sidewalk Condition

- Good
- Fair
- Poor
- None

Selected Points of Interest

Summary of Public Process

An extensive and inclusive public outreach process was employed for the Fifth Ward Pedestrian/Bicyclist Special District Study. The process featured meetings of the Study Steering Committee, public meetings and workshops with stakeholders, defined as study area residents and service providers, written surveys completed by stakeholders; and a meeting with public, quasi-public, and nonprofit entities that have the potential to be affected by the study's recommendations.

The public input process was fine-tuned after an initial public meeting that was characterized by low turnout. After that meeting, emphasis was placed on meeting with stakeholders "in place," e.g., the team attended the regularly scheduled meetings of several groups, as well as events that were likely to draw a crowd. Ultimately, this approach proved more effective than organizing community-wide meetings.

- Stakeholder Interviews — May through July 2011
- Initial Public Meeting — June 21, 2011
- H-GAC Pedestrian/Bicyclist Subcommittee Presentation — August 18, 2011
- Public Input Workshops — August 25, 29, and 30, 2011
September 10, 2011
- Agency Input Workshop — September 8, 2011
- Final Presentation to Public — October 1, 2011

Public input was solicited throughout the study process, through meetings with stakeholder organizations, through public surveys, and at public input workshops specifically focusing on project prioritization (four with the general public and one with stakeholder agencies). The public input process unfolded in three general phases. A description of activities undertaken in each phase follows.

Phase I: Stakeholder Interviews and Initial Public Meeting

The purpose of public outreach activities conducted in Phase I was to introduce the study and afford stakeholders an opportunity to identify alternative transportation needs and deficiencies, barriers to access, desired connections, and exemplary alternative transportation facilities and improvements. A concerted effort was made to ensure the inclusion of stakeholders who traditionally are intensive users of alternative modes of transportation.

An important aspect of this effort was an extensive notification process for public meetings. Meetings were publicized via the distribution of flyers at public gathering places, on the H-GAC and Fifth Ward TIRZ #18 websites, and correspondence and telephone calls directed to key contacts.

A series of interviews with stakeholder organizations, as well as an initial public meeting in June, was conducted at the beginning of the project, to gather general input and solicit opinions on particular issues and physical locations of importance to the community. This helped inform the needs assessment and field observations which were to occur. For example, community members pointed out intersections and overpasses perceived to be dangerous. A listing of activities and organizations involved is provided below. Full detail of the comments from these meetings is provided in Appendix B.

- Facilitated an initial meeting of the Fifth Ward Pedestrian/Bicyclist Special District Study Steering Committee to discuss goals and objectives, geographic focus, and the project schedule.
- Conducted interviews with civic leaders and service providers, during the months of June and July, 2011
- Facilitated an interactive session with E. O. Smith Middle School eighth graders.

- Convened a public meeting at The Victual Restaurant on Lyons Avenue.
- Facilitated a focus group session with residents of the Kelly Village housing development.
- Facilitated a focus group session with residents of the Clayton Homes housing development.
- Facilitated a focus group session with residents of the Pleasant Hill Village senior housing development.
- Conducted surveys with individuals present at an open house at YES Preparatory Academy.
- Secured completed surveys from individuals in attendance at the July 2011 Fifth Ward Super Neighborhood Council meeting and obtained verbal input at the August 2011 Fifth Ward Super Neighborhood Council meeting.

As part of this phase of public involvement, a printed survey was distributed at the various events, as well as mailed to persons on the distribution lists used for invitations to the meetings. In general, respondents walked to more places than rode bicycles or used public transit. Health care facilities, parks, and shopping areas were the most frequently-named destinations. Numerous comments were made about sidewalks being in poor condition or missing. Some respondents noted they were interested in bicycling, but had no bicycle. The full results of the survey are shown in Appendix B.

Phase II: Project Prioritization and Public Input Workshops

The primary intent of Phase II public outreach was to provide citizens with an opportunity to identify their top priorities among a list of draft recommendations compiled by the study team. This draft list was influenced by the public input received during Phase I.

A concerted effort was made to involve stakeholders who participated in Phase I so that they could be made aware that their input mattered. In addition, an equally concerted effort was made to reach out to stakeholders whom the team did not reach during the first phase, especially stakeholders south of Buffalo Bayou. These efforts included meeting with key contacts, placing a meeting announcement on the H-GAC website, distributing flyers in English and Spanish, telephoning key contacts, and direct mail.

A series of seven public input workshops were held on August 25, 2011 through September 10, 2011, to update the community on the project's status and to solicit their input on how to prioritize the recommendations in the plan. The workshops were held at the locations and on the dates as follows (each workshop in the afternoon or evening except for J. W. Peavy Senior Center, held on a Saturday morning):

- Clayton Homes Community Room — Thursday, August 25, 2011
- The Victual Restaurant, Monday — August 29, 2011
- Kelly Village Community Room — Tuesday, August 30, 2011
- Second Ward Superneighborhood Council Meeting — Tuesday, September 6, 2011
- Fifth Ward Superneighborhood Council Meeting — Wednesday, September 7, 2011
- Finnegan Park Community Room, Thursday — September 8, 2011
- J. W. Peavy Senior Center — Saturday, September 10, 2011

A total of eighty-two people attended the workshops. Stakeholders that participated during this phase were asked to identify their top preferences among the draft recommendations. The team asked attendees to select the five improvements they felt were the highest priority. After reviewing the draft recommendations, they were asked to "vote" for a maximum of five projects.

For the benefit of stakeholders who desired to add a project to the list of recommendations, an opportunity was provided to "vote" for an improvement not shown. A number of stakeholders took advantage of this opportunity, although some provided general comments as opposed to recommending a new project. Full detail of the comments from these workshops is located in Appendix C; discussion of the project recommendations and the public votes thereon is located in Chapter 4.

Phase III: Public Presentation

In recognition of the value of making stakeholders aware of how their input influenced the Fifth Ward Pedestrian/Bicyclist Special District Study, a final open house session was conducted on October 1, 2011. The Fifth Ward CRC wanted to showcase the plan at a planned event with the Kinder Institute for Urban Research of Rice University, who hosted a "training class" for interns beginning work with community organizations. The interns received a morning of training, information, and assistance on their volunteer efforts. The agenda featured a presentation of the plan by the study team, followed by questions and answers.

Later that afternoon, the plan was also presented as part of "Fifth Ward Jam," a music and poetry festival to celebrate the new pocket park at the corner of Lyons Avenue and Pannell Street. The festival featured "the unveiling of a temporary public sculpture taking its inspiration from the many jam sessions associated with the musical history of the Fifth Ward that occurred throughout the neighborhood's zydeco, blues, R &B, soul, and hip hop communities" and was presented with the assistance of the Folklife and Traditional Arts Program of the Houston Arts Alliance. The plan is an important component of what is going on in the community, and making the presentation part of these events was an innovative way to present the plan to the public in an interactive, fun environment of a community event. Citizens and other stakeholders who participated in Phases One and Two of the public participation process, were also sent notices of this event.

Development of Potential Improvements

Using the information from the stakeholder interviews, public surveys, needs assessment, and field observations, a series of recommendations was developed. These projects included sidewalk construction, additional signage and signalization, crosswalk striping, as well as hike-and-bike trails. Twenty physical projects developed from the public input were presented to the project sponsors and the City of Houston on Wednesday, August 10, 2011, to H-GAC's Pedestrian / Bicyclist Subcommittee on Thursday, August 18, 2011, and to a selection of other public agencies and organizations on Thursday, September 8, 2011.

This project has generated a list of ideas to improve the pedestrian and bicyclist environment around the Fifth Ward and between it and Downtown. The project team endeavored to flesh out the ideas and capture them in the conceptual plan. The recommendations are listed in the following chapter.

Chapter 3
Background and Planning Basis

Benefits to Safety

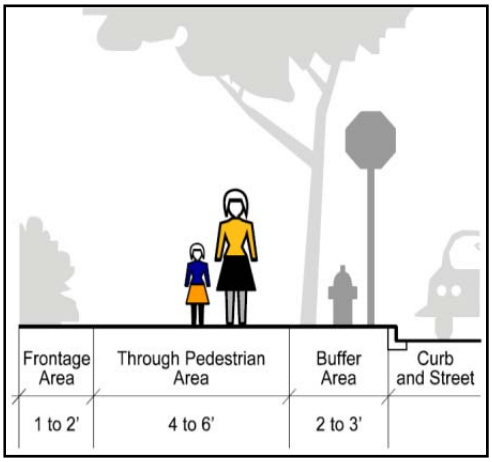
Development of a comprehensive bicycle and pedestrian plan is essential to increasing bicycling and walking within the study area. Research shows that "where, or when, more people walk or bicycle, the less likely any of them are to be injured by motorists. There is safety in numbers" (Jacobsen: Injury Prevention 2003;9:205–209). Developing policies and programs that increase walking and bicycling mode share are effective ways to improve the safety of those walking and bicycling, and vice versa. Focusing walking and bicycling in specific locations through the development of bicycle and pedestrian amenities is not likely to significantly decrease safety in other locations. This is because addressing the needs of these modes will cause the overall mode share of biking and walking to increase.

In addition, developing safe networks for walking and bicycling should be priorities in the Fifth Ward study area as a means of improving the overall public health of local residents. Walking is one of the best ways to maintain health and well being of all populations. Many towns around the country, especially those with high populations of senior citizens, are making an effort to create environments that encourage walking. As the population ages and people give up their driver's licenses, it is crucial to have well established pedestrian amenities to ensure independence in mobility. If there is the general perception that an area is unfriendly for walking and bicycling people will use other means of getting to destinations. In turn, when sidewalks are installed, paths and bridges created, bicycle lanes and parking developed in key areas, people will walk and bicycle more.

Proposed Facility Types

Sidewalks

All new sidewalks planned throughout the study area are standard five- and six-foot wide sidewalks. They are to be constructed of concrete, and must conform to all geometric standards imposed by the Americans with Disabilities Act, as codified in the Texas Accessibility Standards (TAS). Curb ramps in particular, when proposed in Chapter 4, Recommendations, follow the new standard adopted in the TAS in 2006. In addition to the length, width, and slope requirements previously in force, a "detectable warning strip" shall be installed at the street (lower) end of the ramp. These detectable warnings shall be 24" deep and extend the full width of the ramp, with the near edge 6" to 10" from the curb line. They shall comply with TAS 4.29.2, which required a profile of truncated domes. Previous standards required grooves or other tactile patterns.



Typical Sidewalk Section

(Adapted from Pedestrian Master Plan, Portland, Oregon)

Shared-Use Paths

Multi-use paths, often called hike-and-bike trails, are off-street facilities for non-motorized vehicles and pedestrians. They provide the highest level of service for bicyclists because they are completely separate from vehicular traffic. Off-street paths are best located where there is little cross traffic, so as to minimize conflicts. Paths should be seen as complements to the on-street network; not as a substitute, as they are typically found in parkland or other less-developed areas. As such, they may not provide direct connectivity to schools, places of business, or entertainment facilities, unless adequate on-street connections are provided.

Currently, there are hike-and-bike trails in the study area along portions of Buffalo Bayou, which are being extended eastward through a series of projects of the Buffalo Bayou Partnership, the City of Houston, and TxDOT. While located in parkland, these trails do provide connectivity to Downtown, which will increase as local-street connections like those proposed in this study, are developed. There are marked bicycle lanes on Waco Street / Hirsch Road / York Street, Lyons Avenue, and signed routes along McKee Street, Hardy Street, Navigation Boulevard / Runnels Street, and Leona Street (and others, connecting to the Near Northside).

Bicycle oriented signage

There are three types of bicycle oriented signage:

- Numbered bicycle route signage should be used on all bikeways for designation and identification. These are essentially the bicycle equivalent of numbered highway systems. Some examples from California are shown in the photo at right.

Examples of bicycle route signage with route names and numbers.

- Signage directed towards drivers with instructions related to bicycles. These may include signs such as "Share the Road," "Bicycles Allowed Use of Full Lane," or "Yield to Bicycles." These should be used sparingly in key locations. Overuse of warning signs such as these lead motorists to eventually ignore them.
- Wayfinding signage provides directions for bicyclists to key destinations such as business districts, schools, parks, and civic buildings, and historic and cultural sights, with the option to include distances for improved information. Wayfinding information can be included as part of the numbered bike route signage system. The study area recommendations include further study of wayfinding needs, to determine the type, size, and number of signs desirable.

The Five "E"s of Planning

Education, encouragement, enforcement, evalation and good **engineering** are the foundation for pedestrian and bicycle planning. Combined, they take the concept from mere theory to good practice. **Education** provides pedestrians and potential riders with substantial knowledge of network usage. It provides the when, where, and how of the network. **Encouragement** increases the usage of the network by providing incentives and programs that promote safe and well informed usage. **Enforcement**, often thought of as pointing out bad cycling and pedestrian behavior ensures safe riding habits, understanding of the signage, personal responsibility as well as abiding by the rules are taught and maintained. It also includes motorist behavior that disregards cycling and pedestrian activity. This often causes a dangerous potential for conflict. **Evaluation** is the measurement of the effect of the other "E's" through measurement, analysis and research using rigorous, statistically sound methodologies.

Most important of all the "five E's" is **engineering**. It supports education, encouragement and enforcement with good design. Good design can educate people to bicycle properly with traffic, cross streets safely, encourage people to walk in the public right-of-way and provides a physical framework for proper enforcement.

Many engineering and design practices have been tried and tested throughout the country successfully. The most frequently used are pedestrian corridors, pedestrian signals, unsignalized pedestrian crossing treatments, ADA requirements and on-road bicycling.

Pedestrian Corridors

The most common pedestrian corridors are sidewalks. Sidewalks are also the preferred method of choice in an urban environment to accommodate pedestrian activity. However, in many areas of the City, traffic volumes and speeds are so low pedestrians share the street with motor vehicles, especially where discontinuous sidewalks make it simpler to walk in the street. In areas of high traffic volumes, buffers along sidewalks should be used to protect pedestrians from moving traffic. Furniture zones, planter strips, on-street parking, or a bike lane can also act as buffers; this increases pedestrian comfort and some buffers such as, planter strips help meet ADA cross-slope requirements at ramps, around posts and at other designations.

Sidewalks must meet minimum ADA standards, but should also be modified based on traffic conditions. Separated sidewalks should be 5 feet wide or greater, and 6 feet is desirable for curbside sidewalks. Along commercial streets with planters, seating areas, or other furniture within the sidewalk, curbside sidewalks should be at least 10 feet wide. Obstructions should be placed behind the sidewalk (away from the street) if this cannot be achieved. Continuous, connected and well maintained sidewalks are generally needed along both sides of the street to prevent unnecessary crossing.

Pedestrian Signals

Pedestrian signals provide safety and security from motor vehicles in the form of pedestrian signal heads, marked crosswalks, a WALK signal and push buttons. High volume multi-lane thoroughfares may benefit from a signal mid-block or at an existing unsignalized intersection for pedestrian crossing. High pedestrian crossing counts are needed for the MUTCD (Manual on Uniform Traffic Control Devices) to warrant a signal installation. Pedestrians are more likely to cross when there is a signal, as they are afforded a protected gap in traffic. Estimating these counts will make it easier to meet MUTCD requirements. Signal operation and safety concerns must also be addressed as well as the distance to adjacent traffic signals.

This ladder-style crosswalk leads to a pedestrian refuge in the median.

Pedestrian signal heads and an appropriate signal timing plan give time to cross the street within a signal cycle. Without these signals, pedestrians may have a difficult time determining when to safely cross the street, especially at busy intersections, unusual geometry, or with complex signal phasing like split phasing. Pedestrian signals ensure a timely crossing before conflicting traffic proceeds.

Marked crosswalks on each approach leg of the intersection help warn motorists of possible pedestrian crossing and keep the crossing clear of vehicles. Closing a crosswalk to improve traffic flow can degrade pedestrian safety. Pedestrians crossing without a signal not only increase endangerment but also actually increase exposure and delay. To enhance visibility, crosswalks can be marked with ladder markings; spacing these to avoid the wheel paths of vehicles reduces wear and thus future maintenance needs.

A WALK signal can provide pedestrians with a long enough clearance interval to get pedestrians started and crossed.

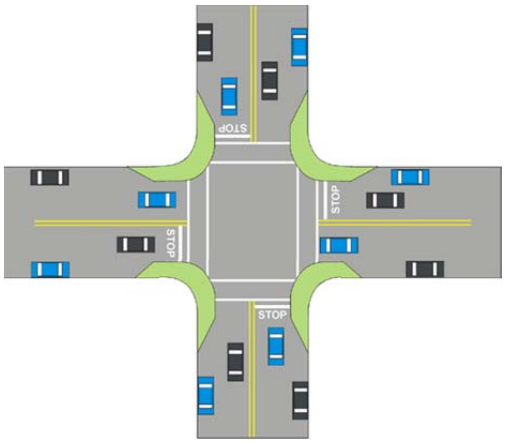
Push buttons placed where all pedestrians can access them, including those with disabilities should clearly indicate which crosswalk the button regulates. Mounting push buttons on separate pedestals is often necessary to achieve proper placement, rather than on the signal poles themselves.

In areas of high pedestrian use such as downtowns and central business districts, push buttons are rarely needed except as part of an audible pedestrian signal; the pedestrian phase of the signal should occur every cycle. Traffic delays can be reduced by using a median island or other

pedestrian refuge, and a 2-stage pedestrian crossing where the push button stops only one direction of traffic.

Even with the above safety crossing measures, pedestrian crashes can occur at signalized intersections, most often when vehicles turn right on red as pedestrians are crossing the intersection. The following is a list of timing techniques and other treatments to reduce pedestrian-traffic conflict.

- Protected-only left-turn phasing allows pedestrians to cross without conflicts from left-turning drivers. Red arrows are displayed that prohibit left turns during the pedestrian WALK and clearance intervals.
- 1-2 second all red interval can help prevent crashes caused by red light runners, as they are given a chance to clear the intersection before opposing traffic (and pedestrians) begin to cross.
- Leading pedestrian intervals provide WALK indication 2 to 5 seconds prior to the concurrent green indication; this allows pedestrians to enter the crosswalk before drivers. This increases the visibility of pedestrians and reduces conflicts with turning vehicles.
- Countdown Pedestrian Signals tell pedestrians how much time is left in the pedestrian clearance interval. Studies show that countdown signals reduce the number of pedestrians remaining in the street when conflicting traffic receives a green indication. A study by the City of San Francisco, California, found that replacing older pedestrian signals with countdowns reduced the percentage of pedestrians crossing on "Don't Walk" from 14% to 9%, and reduced vehicle/pedestrian conflicts from 6% of crossings to 4%.



Curb extensions (shown in green) can reduce pedestrian crossing distance while delineating where on-street parking is allowed.

This pedestrian signal in Sugar Land features a timer to indicate how much crossing time remains.

Unsignalized Pedestrian Crossings

Crossing at unsignalized locations can present difficulties for pedestrians, especially at multi-lane corridors. Pedestrians will cross at locations where there is an opportunity regardless of the location of the nearest signal. It is necessary to provide alternatives to assist pedestrians in safely crossing unsignalized intersections.

- Continuous raised medians or pedestrian crossing islands on two-way streets have been shown to reduce crashes up to 40%. The medians allow pedestrians to "cross and wait then cross again" instead of waiting for a gap in traffic long enough to clear the lanes. At intersections the median or median nose should extend past the crosswalk to provide a refuge for pedestrians as left turning vehicles are approaching.
- Curb extensions can be used where there is on-street parking to reduce the total crossing distance and improve visibility between motorist and pedestrians waiting to cross. These should extend the full width of the parking lane to ensure that sight lines are not obstructed. At intersections, curb extensions can be used to bring the crosswalk closer to the intersection, improve accessibility with additional space, and slow right turning vehicles on tight corners.

- Pedestrian crashes occur predominately at dusk and night. Illumination at crosswalks significantly increases the driver's and pedestrian's visibility.
- An advance yield sign is recommended at unsignalized crosswalks on multi-lane streets to reduce the occurrence of "multiple-threat" crashes. These are the most common and often fatal pedestrian crashes. It occurs when a driver in the outside lane stops to let a pedestrian cross unaware of the blocked sight line he has caused between the pedestrian and the driver in the next lane. The 2nd driver, without adequate time to react, strikes the pedestrian at high speed. The advance yield sign should be placed 20 to 50 feet from the crosswalk; this encourages drivers to stop further back, maintaining better sight lines and giving the 2nd driver and pedestrian time to react if necessary. Advance warning signs should also be installed at mid-block crosswalks.
- At designated unsignalized crossings, high-visibility crosswalk marking is strongly recommended since there is no active control to stop motor vehicles. Longitudinal lines (ladder or continental style crosswalk markings) are preferred and the markings should be spaced to avoid the wheel paths of vehicles, significantly reducing maintenance needs.
- Intersections are safest for pedestrians when they are close to a right angle. Skewed intersections result in longer crosswalks, longer walking distance with more exposure to traffic, poor visibility for both pedestrians and motorists, and allow drivers to turn at high speeds.
- Small corner radii shorten the pedestrian crossing distance, allow for well-placed crosswalks, slow right turning vehicles and increase visibility of pedestrians. The size of the corner radius is determined by the appropriately-chosen design vehicle, and the street designation (residential, collector, or arterial). An appropriate radius for each intersection corner should be designed even if this results in different size radii at the same intersection.

These sample channelized islands from Georgia Department of Transportation illustrate the system of crosswalks.

- A channelized island where an exclusive right-turn lane is provided shortens the distance across the through lanes. There is less pedestrian exposure and improved signal timing. The island between the right turn lane and the through lanes allows pedestrians and drivers to negotiate one conflict separate from another. A channelized island is asymmetrical with a longer tail pointing upstream toward the approaching driver turning right.
- Crosswalk placement can accomplish several pedestrian-related goals: short crosswalks, crosswalks as close as possible to the intersection for better visibility by turning vehicles, and the need to properly locate two sidewalk ramps. Good crosswalk placement can be difficult, especially at intersections with large corner radii. Sidewalk ramps must be contained within the marked crosswalk area. Poorly placed sidewalk ramps and design can make a street crossing difficult since they may require wheelchair users to make long detours while crossing or where drivers do not expect them.

Americans with Disabilities Act (ADA) Requirements

The Americans with Disabilities Act (ADA) was passed in 1990, and "gives civil rights protections to individuals with disabilities similar to those provided to individuals on the basis of race, color, sex, national origin, age, and religion. It guarantees equal opportunity for individuals with disabilities in public accommodations, employment, transportation, State and local government

services, and telecommunications," according to www.ada.gov, the U. S. Depart of Justice's ADA website. The ADA's provisions on "public accommodations" include public buildings as well as sidewalks, streets, and other public pedestrian routes. States may establish stricter standards than the Federal requirements; in Texas the standards are enforced and administered by the Texas Department of Licensing and Regulation, and are known as the Texas Accessibility Standards.

ADA requirements ensure the safety and convenience of travel by all pedestrians. The particular requirements that present challenges for this area are smooth surfacing, clear width, maximum cross slope, and proper ramp design and placement. These are absolute requirements of the ADA; they are not suggestions, recommendations, or guidelines.

ADA requires a smooth surface, with vertical changes in the level not exceeding 1/4". New concrete sidewalks are the best way to ensure this. Decorative surfaces such as brick or stamped concrete can be used, but may be difficult to maintain a smooth surface overtime. If decorative surfaces are requested, it is best to place them out of the primary walking area of the sidewalk, in the "furniture zone" near the curb, or in the "frontage zone" at the back of the sidewalk.

ADA standards currently require a minimum clear width of 3 feet but future requirements may add an additional foot. To provide the maximum convenience, a clear width of 5 feet is the recommended dimension. This ensures that all pedestrians, including those with disabilities, can walk side-by-side or pass each other with little interaction. Sidewalks that include a planter strip or furnishing zone make it easier to meet clear width requirements by providing a place where pools, posts, mailboxes, trees, and other obstructions can be placed.

Any cross-slope, such as for drainage, may not exceed 2% (1:50) across the required clear width of the entire accessible route, including all driveways, sidewalk ramps, and intersections. Separated sidewalks that allows sloped driveway apron and sidewalk ramps to be placed in the planter are the easiest way to achieve this requirement. Sidewalks directly adjacent to curbs require special techniques to maintain a level passage across driveways.

Maximum grade in the direction of travel cannot be steeper than 5% (1:20). Sidewalk ramps cannot exceed a maximum slope of 8.3% (1:12) and a 5x5 foot level (2% maximum slope) landing must be provided at the top of every ramp. At the bottom of each ramp truncated domes must be placed at a 2-foot depth, 6-8 inches from the face of the curb, and extending the full width of the ramp. The enables blind pedestrians to determine where the sidewalks ends and the street begins.

Each ramp must be placed completely within the crosswalk at intersections. Two ramps placed at each corner, one for each crosswalk, are generally recommended. This is easiest to achieve when the corner radius is relatively small. On large radius corners of 30 feet and above, placing 2 ramps may be disadvantageous. It will move the crosswalk too far from the intersection itself, forcing disabled pedestrians to make a detour and cross at locations where drivers may not expect them. Designing an intersection with good crosswalk placement is foremost; then decide the necessity of one or two ramps.

On-Road Bicycling

Bicyclists are considered roadway users, and are required to obey motor vehicle laws; this helps motorists anticipate predictable bicyclist behavior. In urban environments with low traffic volumes and speeds, shared bicyclist and motor vehicle roadways are acceptable. There are no specific dimensions; there is also no special signage or road marking. However, local streets have a significant disadvantage for bicyclists when crossing major arterial streets with no protection or warnings such as islands and traffic signals. Signed shared roadways can be created by adding bike route signs but to be more effective, signage must include

An example of an on-street bicycle lane in Palo Alto, California.

destination signing or named and numbered bike route destinations.

Bike lanes are an effective way to travel with faster moving traffic. They also allow bicyclists to move at a constant speed when traffic is congested and moves at a stop and go pace. They are often developed on existing streets by narrowing travel lanes or removing a lane. They should be 5-6 feet wide with a minimum clear width of 5 feet from the center of the lane stripe to the curb or edge of pavement. In areas where bike lane continuity can not be provided, a wide outside lane of 13 to 15 feet will generally suffice. TxDOT standards specify a 14-foot lane; this allows motorists to pass cyclists without changing lanes.

Bicycle boulevards accommodate bicyclists by providing an alternative to arterial streets and turn a local street into a thoroughfare for bicyclists without encouraging motorists to use it as a through route. Bicycle boulevards work best in a system of connected streets such as a grid pattern. Existing bike routes can be converted into bike boulevards, or bike boulevards can be created on other streets as an alternative. Traffic calming techniques can be used to reduce motor vehicle speeds and through traffic. Priority is given to through bicycle movement at intersections with local streets. Special signage is used to increase street usage. Arterial streets are marked with traffic signals for bicyclist, median islands and other measures.

Shoulders are good locations for bicycling, provided they are kept reasonably free of debris. Shoulders provide a continuous pathway further out of the way of motor vehicles, a benefit when bicycling along high-speed or rural roadways.

If traffic or signal timing requires pedestrians to cross the roadway one side at a time, median refuges provide a sense of safety. Cut-throughs can be at grade, or have a ramp at either end.

Other General Planning Recommendations

In addition to the study-area-specific recommendations described in Chapter 4, the project team offers the following best management practices, as general suggestions to improve the pedestrian experience:

- The Americans with Disabilities Act requires sidewalks to be at least five feet wide to allow two people in wheelchairs to pass each other. This also allows two people pushing strollers to walk together.
- Make sidewalks continuous across driveways; the driveway should ramp up. Cross slope of the sidewalk is limited to 2% (1:50).
- Do not block continuous paths of travel with hedges, fences or other obstacles which block walkways. Formal links should be created where people already walk.
- Install crosswalks on all legs of all intersections; they must be straight (no bends at medians) and aligned with the sidewalk. Sidewalks should not bend to meet the crosswalks or pedestrian ramp.
- All medians should extend through crosswalks to protect waiting pedestrians. Narrow medians should be cut at the crosswalk. Some examples are shown at right.

- Where significant sustained pedestrian flows exist, the City should consider having signal timing plans include a pedestrian phase each cycle. Priority then could be given to pedestrians via leading pedestrian intervals.
- Provide crossings for pedestrians according to their desire lines, not the vehicle network. Mid-block crossings should be provided if necessary to facilitate pedestrian travel. The design of the crossing (marked crosswalk, signal, refuge island) is dependent on vehicle speed and volume and roadway width.
- Sidewalks should take priority over driveways as drivers are legally required to yield to pedestrians on sidewalks. The driveway should ramp up to sidewalk level at the curb; the sidewalk should not ramp down to meet the driveway.
- Research has shown that drivers turn into driveways at about the same speed, regardless of driveway configuration.[1] Driveways should be as small as possible and never wider than the entrance.

1 Committee on Access Management (2003). Access Management Manual. Washington, DC: Transportation Research Board, 2003, p. 169.

Chapter 4
Recommendations

Conceptual Plan

The goals and objectives of the study are listed below, as they were presented to the public when soliciting input on their prioritization of the recommendations. These goals were developed by the project team through a combination of the objectives of the original H-GAC study which selected the various study areas; the input of stakeholders including the Fifth Ward CRC, the City of Houston and its sub-agencies; and the wishes of the general public as documented in the initial informational meetings.

- Improve access to schools and parks in the neighborhood
- Improve access to Fifth Ward Multi-Service Center and other community centers
- Enhance connections to public transportation
- Improve access to Buffalo Bayou Trail (existing and future sections)
- Improve connectivity throughout the study area
- Facilitate walking and bicycling by enhancing safety and security

The goal of the project team in developing the recommendations was to address all of these conceptual goals; investigate all the specific locations named by the public as "problem areas" or perceived as dangerous; and create a logical grid of improvements that served both short-distance trips to destinations within the study area and longer-distance connections to Downtown, Buffalo Bayou, and other regional attractions.

Description of Recommendations

The proposed improvements are presented below. The project team has taken the conceptual plan detailed above, and created twenty proposed improvements that reflect the goals and objectives of the conceptual plan, as well as addressing the needs and concerns of the community as expressed in the public input process. The map on the following page illustrates the recommended improvements, with the subsequent narrative explaining the rationale behind each selection.

Map of Recommendations

Fifth Ward Study Area
Project Recommendations

0 500 1,000 2,000 3,000 Feet

*Existing Bikeways from City of Houston

Legend

- Safety Improvements
- Bicycle Improvements
- New Sidewalk Corridors
- Bayous
- New Sidewalk Zones
- Other Streets
- 5th Ward Study Area
- 5 Code for Description of Improvement
- Selected Railroads

Existing Bikeways*

- Bike Trail
- Bike Route
- Bike Lane
- Shared Lane
- Bike Trail Planned

#1: Lyons Avenue Bicycle Lane Coloration

Lyons Avenue is the heart of the Fifth Ward, with the most activity of any of the main corridors in the study area. Lyons Avenue was reconstructed in 2009 to include bike lanes and is a designated bike route into Downtown (via McKee and Hardy Streets), with a connection to the Heights. Outside the study area towards the east, the route provides access to the Fifth Ward / Denver Harbor Transit Center. Within the study area, the route passes by Crawford Elementary, E. O. Smith Middle and Carter High Schools, the historic Deluxe Theatre, and the St. Arnold's Brewery.

The project team suggests accentuating this corridor's prominence as a neighborhood cycling spine by painting the bike lanes green, which will also contrast against the light surface of the road. Having such a highly visible route will provide clear guidance to cyclists pursuing an on-street link through the neighborhood, across the Bayou and into Downtown.

Lyons Avenue at Pleasant Hill complex, facing west. Bike lane is difficult to discern at the edge of the roadway, although it is in good condition.

Grand Street in New York City, showing solid green bicycle lane. Note its high visibility, even with heavy shade and dirt in the roadway.

#2: Gregg Street - Sidewalk and Parking Improvements

Gregg Street is an important north-south connector within the study area. South of IH 10, Gregg Street has four travel lanes in addition to a 20-foot median. North of IH 10, the median tapers off. North of Lyons the street has only two lanes. The street does not cross the Bayou; however long-term plans by the Greater East End Management District call for a potential crossing in the vicinity. While Gregg Street has a junction with IH 10, one can only access it from the east (exit westbound and entry eastbound).

It appears that the width of Gregg Street stems from its proximity to the industrial sites along the Bayou to the south, and connections to IH 10. These parcels are now vacant and/or being redeveloped as housing or mixed use – thus the need for intensive truck traffic has decreased. The traffic volumes are low enough that the City of Houston does not even include Gregg in the schedule of traffic counts. Vehicles currently park in the curb lane along most sections of Gregg, and it is recommended this arrangement be formalized with signage. This creates a buffer between pedestrians and moving traffic, and makes it clearer and safer for bicycles to operate in the remaining travel lane. By reducing the number of through lanes to one in each direction, plus a turn lane at certain intersections, it is easy to create a more comfortable space for pedestrians and bicyclists, in the existing right-of-way and without negatively impacting vehicle circulation.

Sidewalk improvements on Gregg will enhance access between two important cultural resources in the neighborhood. Near the intersection of Gregg and Lyons, the historic Deluxe Theatre is planned for refurbishment.

Gregg Street ends one block south of Clinton Drive at Richardson Street. Between here and the Bayou lies KBR property. It appears that Gregg is mapped to the Bayou; nevertheless, there is a building atop it. In the event of redevelopment of the KBR property, it would be preferable to extend Gregg Street straight on to the Bayou, perhaps in conjunction with the aforementioned bridge crossing. In the short term, Grove Street, one block west of Gregg, can be used for access to the Bayou and the proposed trail extensions, via Swiney Street and other existing streets south of Clinton Drive.

Just outside the study area to the north is a park about 2 blocks east of Gregg Street. The sidewalks should be improved in this area to connect to this park via the streets along the RR tracks.

Gregg Street—four lanes south of Lyons Avenue.

Gregg Street—four lanes and median south of IH 10

Gregg Street—two lanes north of Lyons Avenue.

Individual using electric wheelchair on Gregg Street due to lack of sidewalk, and car parked where the sidewalk would be.

Unpaved section of Rawley Street leading from Gregg Street to park north of study area

Grove Street, between Clinton Drive and Buffalo Bayou

#3: Market Street - Sidewalk and Street Improvements

Market Street is a relic of the pre-freeway Houston street pattern. Although it remains a major corridor further east, the section in the study area has been cut off by IH 10 and US 59. While it is no longer a major thoroughfare for automobile traffic, several major destinations are situated along it, including the Fifth Ward Multi-Service Center, a public library, and the new YES Academy. Market Street is also a METRO local route with five bus stops between Waco and Gregg Streets. Currently, the sidewalks along Market are in poor condition and routinely blocked by telephone poles. People who use wheelchairs or motorized scooters use the road instead.

The sidewalks clearly need to be either widened or the telephone poles removed. The project team recommends that the pavement on Market St. between US 59 and the railroad tracks (at Press St) be narrowed from the existing 36 feet wide to 34 feet. This enables wider, improved sidewalks, while still allowing a 10-foot travel lane and 7-foot parking lane in each direction. Although the City of Houston generally prefers 11- or 12-foot lanes, the project team believes 10 feet is acceptable on Market Street due to it being a local street with only limited vehicle traffic. Market is not on the Major Thoroughfare and Freeway Plan, and like Gregg Street, traffic volumes are so low on Market Street in the study area that the City does not include these segments on the program of routine traffic counts.

Market Street near Gregg Street. Note very wide pavement section.

New driveway and sidewalk section leading into telephone pole.

#4: North - South Bike Trail ("Rail Trail") along Benson and Rail Track

An exciting resource in the neighborhood exists in its multiple railroad corridors. Some are still intermittently active, though several are abandoned completely. The track that intersects Lyons Avenue west of Featherstone Street runs south across a trestle over IH 10 and south, almost reaching Clinton Drive. Using a gravel section of Baron Street at the western side of the Hirsch/Waco and Clinton intersection, this track right of way continues – without actual track – south of Clinton Drive through KBR property to the Bayou. This track could be activated as an off-street north-south trail connector for the neighborhood to access the Bayou and the important corridor of Lyons Street. That it parallels the Waco/Hirsch corridor is key, in that the street, while designated a bike route, is designed for high speed, high volume auto traffic.

Existing railroad right of way north of Clinton Drive, looking southwest towards Clinton Drive from Hirsch Road

The trestle over IH 10 is already utilized by residents as a crossing alternative to the Hirsch/Waco overpass crossing, which is perceived as dangerous and has poor pedestrian and cycling facilities (discussed below in recommendation #11). Since trains do still use this trestle, a path could be cantilevered off the western side of the trestle, where there is currently approximately 100 feet of right of way. (Note: Cantilevered bridges can be constructed as lightweight aluminum modular paths, such as the Make A Bridge system by the MAADI Group.)

Other options include cast-in-place concrete or prefabricated steel bridge. Although this bridge is expected to be relatively expensive compared to other recommended improvements, the cost is considerably reduced by not needing ramps; as the freeway is sunken, the bridge is at the same level as the trail and requires no additional abutments to achieve ADA-compliant grades.

Existing railroad trestle and right of way over IH 10

Existing railroad right of way in KBR property south of Clinton Drive

An example of a cantilevered bridge alongside existing facilities - a modular pedestrian bridge over the Tar River in Rocky Mount, North Carolina. Source: MAADI Group

Another example on the Page Avenue Extension bridge over the Missouri River in St. Louis, Missouri.

This 100-foot wide right of way, with the tracks in the eastern 50 feet, exists along most of the stretch between Lyons and Clinton Drive, with the exception of a few buildings along Press Street which narrow the right of way to 50 feet for a short distance south of Lyons Avenue. To avoid these existing buildings, the Rail Trail would shift west along Market Street, then north along Benson Street to connect to the Lyons Avenue bike lanes and points further north. The project team recommends constructing these sections along Market and Benson as on-street bicycle lanes.

Existing railroad crossing on Lyons Avenue near Featherstone Street

Existing railroad right of way facing south from Lyons – note the two houses very close to the tracks

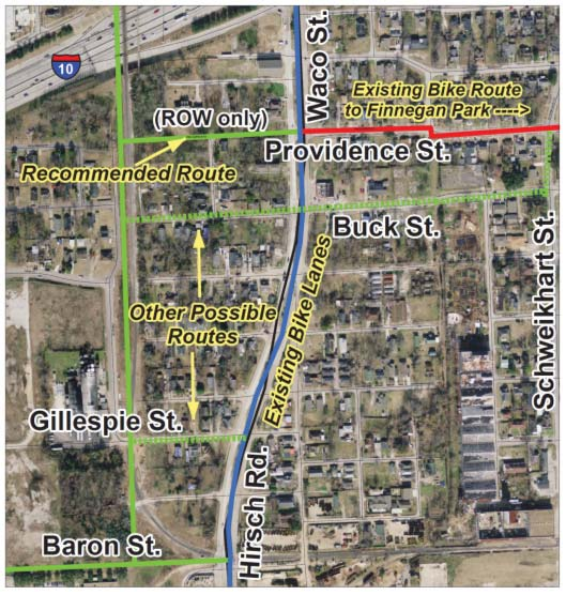
As KBR continues to diminish its presence along Buffalo Bayou, the old rail right of way that snakes through the Bayou-front property could be negotiated to provide the critical Bayou-access portion of this Rail Trail. There is an old spur between this line and the Hirsch Road bridge over the Bayou, which is currently an internal circulation road. The project team suggests using this to link to the bridge from the Rail Trail. The Rail Trail also connects to the proposed Baron Bike Boulevard, discussed below as well as to the Our Mother of Mercy Church and Academy to the north. The proposed limits in the study area are an on-street facility from Market Street north to the study area boundary, and an off-street trail from Market Street south to Baron Street. This project will require coordination with Union Pacific Railroad and the Gulf Coast Rail District for utilization of the right-of-way.

#5: Finnegan Park Bike Trail Connector

Finnegan Park, though outside the study area to the east, is a major destination for residents of the Fifth Ward. Phyllis Wheatley High School is on the north side of the park and Henderson Elementary is to the west. Children in the study area that live between the railroad tracks and Waco Street are zoned for this school.

With the sole exception of Providence Street, no street connects the study area with Finnegan Park, and Providence does not continue west of Waco Street; all other roads are truncated by railroads or multi-parcel industrial developments. Clinton Drive continues east, but all north-south connections from Clinton to the park are also cut off by a railroad.

Three options exist for creating a safe and direct connection to and from the Finnegan Park area.



1. Providence Street is the most direct option. It forms the northern border of Finnegan Park. West of Waco Street there is an unimproved right-of-way, approximately 25 feet wide, which would be the extension of Providence Street. A traffic signal is recommended to cross Waco Street, and a new crossing would be needed at the railroad tracks. This is the recommended improvement, as it is the most direct.
2. Buck Street is parallel to and one block south of Providence. From Providence the route could turn south on Schweikhardt Street then west on Buck. Buck extends west of Waco Street to the railroad tracks where an informal crossing already exists leading to Buck Street on the west side of the tracks. A traffic signal is recommended to cross Waco Street. There is some commercial activity at this corner, so a signal would probably be welcome.
3. Given that both Providence and Buck Streets do not cross the railroad tracks, the project team wanted to find an existing crossing to serve as an interim route. Gillespie Street, 5 blocks to the south of Providence, does cross and connects to Press Street. A traffic signal is recommended to cross Hirsch Road, then the route would continue to Waco Street and north to Buck or Providence.

Providence Street right-of-way west of Waco Street

Informal railroad crossing at Buck Street

Buck Street at Waco Street

Gillespie Street crossing railroad tracks west of Hirsch

#6: East-West Baron Street "Bike Boulevard"

Clinton Drive is the major traffic thoroughfare for the neighborhood south of Lyons and north of the Bayou. Trucks traveling to industrial businesses along the waterfront utilize this corridor heavily, making it an undesirable candidate for a bicycle route. One block north of Clinton Drive is Baron Street, a 20' wide road which used to have railroad tracks. It is barely used by cars, abutting many newly developed properties and extending west to Jensen, terminating by the new Bruce Elementary School site. Currently, Baron extends eastward only to Bringhurst Street. However, the street is still present as an open corridor through the properties east of Bringhurst through to the railroad tracks and then to Waco Street.

Clinton Drive – wide, 35 mph speed limit, many trucks and driveways

Baron Street – narrow pavement, almost an alley

Because of its size and location, Baron is ideal for transformation into a bike boulevard. Bike boulevards are typically low-traffic residential streets with limited motor vehicle access. Bike lanes are not delineated, but rather pavement markings and signage indicate bicycle prioritization; bike boulevards can be carried through major intersections with crossing improvements such as signalization and curb extensions. Traffic diversion measures, such as turning stop signs to favor the bicycle boulevard and discouraging motor vehicle entry with the use of bollards, may also be utilized to keep vehicular traffic to a minimum.

New multi-family development on Baron Street

Baron Street right-of-way east of Bringhurst Street

Berkeley, CA, Bicycle boulevard signage (Source: Jumana Nabti)

Berkeley, CA, Bicycle boulevard markings (Source: Jumana Nabti)

In the short term, the project team recommends the construction of a multi-use trail in the section of Baron Street east of Bringhurst. This will likely require some sort of right-of-way or easement negotiation. The remainder of the current Baron Street pavement is very narrow and does not meet City of Houston standards for vehicular traffic at the current time. While it would be difficult to convert this to a bicycle-only facility, given existing driveways, it is not possible to add shared pavement striping when the total width remains only 16'. The project team recommends adding bicycle route signage to the existing roadway, and conducting a further design effort to incorporate "Bike Boulevard" elements. This may include one-way car traffic but two-way bicycle traffic, widening the pavement to accommodate shared lanes, or other treatments.

#7: Jensen and Buffalo Bayou Bike Connector (New Sidewalks from Baron to Lyons)

At the western terminus of the Baron Street Bike Boulevard, Jensen Drive currently provides the only street access to the Buffalo Bayou Trail in the Fifth Ward. This access point, currently a small path west of the northern side of the Jensen Drive bridge, could be activated by a bidirectional bike path connecting the Bayou Trail to the Baron Bike Boulevard near Bruce Elementary. There is sufficient right of way along the western side of Jensen, off-street, to allow for a bidirectional path, although there is one property north of Bryan Street with a fence.

Proceeding north from Bruce Elementary, the sidewalks along Jensen Drive are in generally poor condition. This roadway crosses IH 10 and Lyons Avenue and continues out of the study area to

the north. It is proposed that the sidewalks in this stretch be reconstructed. Note that project #15 continues this corridor to the south; this extension is planned to be implemented by the Greater East End District.

Jensen Drive (Historic Hill Street) Bridge and Buffalo Bayou Trail entrance

West side of Jensen Drive – undeveloped properties and plenty of room for a trail

#8: Rail Bridge under US 59 (By Others) and New Bike Trail from bridge to Jensen

Jensen Drive does not, however, provide an ideal crossing for people walking or cycling over the Bayou. An off-street crossing west of Jensen could be provided by the Bayou Bridge, an old railroad trestle slated for reconstruction by the Buffalo Bayou Partnership, TxDOT, and the City of Houston. Access to this crossing – and to the northern section of the Bayou Trail – can be created in two ways. Both routings continue the bidirectional bike path along Jensen Drive northward from the Baron Bike Boulevard. Both options require a short Bayou Trail connector from the southern end of Rothwell Street (also labeled West Street) to the trail.

Jensen Bridge over Bayou – no cycling facilities and sidewalk in disrepair

Grayson Street between Bruce Elementary at Jensen Street and the railroad tracks

1. The first option directs bike traffic west along Grayson Street and connects to the southern terminus of Rothwell Street via a crossing or bridge over the existing railroad, which is still somewhat active. From there, the trail continues west to the Buffalo Bayou trail and the reconstructed bridge. This is the improvement which is priced in the cost estimates.
2. The second option directs bike traffic further north along Jensen Drive to the freeway overpasses. At this point a unpaved road leads to the northwest, parallel to the I-10 off

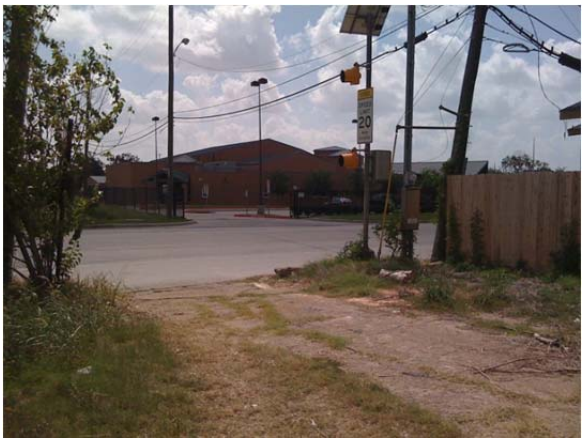
ramp, and Nance Street. There is a railroad crossing at Nance, then one can continue south on Rothwell Street or directly under the freeway overpasses to the Bayou Bridge.

The existing Buffalo Bayou Trail connects to the railroad trestle, which crosses the Bayou underneath US 59. This crossing is currently being restored, as a joint project between TxDOT (the bridge owner), the City of Houston, and the Buffalo Bayou Partnership. At this crossing, Clayton Homes lies on the southern bank of the Bayou. The Bayou trail is also being extended behind Clayton Homes to continue further east.

1912 Houston Belt & Terminal Railway bridge over Buffalo bayou, currently under US 59

Trestle was renovated for bicycle and pedestrian use, but a fire has destroyed part of the facility

Unpaved roadway parallel to the IH 10 off ramp to Jensen Street under US 59



Bruce Elementary at Jensen Street looking from the unpaved road

In addition to the improvement described above, a potential additional link to the recommendations in this vicinity (not included in the cost estimates) would be along Nance Street westward from Jensen Drive to McKee Street. This corridor would provide an east-west link south of IH 10 and north of Buffalo Bayou, and connect to the warehouse area along Nance Street. Whether this is a bicycle route, improved sidewalks, or some other treatment could be an additional study topic.

End of Rothwell/West Street – bayou path is just beyond the grass

#9: McKee and Hardy Street Bike Improvements

Lyons Avenue provides the most visible east-west on-street bicycle link to Downtown Houston. This route turns southward along McKee and Hardy Streets to cross IH 10 and Buffalo Bayou. Bike lanes currently exist along portions of the McKee / Hardy one-way pair, but their implementation is not consistent. Some sections have missing striping and signage, so it is recommended that this section be striped to City of Houston standards. Special attention should be paid to how these lanes connect into Downtown as they proceed further south out of the study area. Currently, the US 59 on- and off-ramps interrupt the striped bike lanes. Long-term, it is also possible that the green bike lanes along Lyons, proposed in project #1, could be continued to the north-south Downtown bike route connectors, further delineating them. Sharp turns in bicycle routes, as well as complicated intersections or interchanges, are ideal locations for full-color bike lanes.

Cyclist riding south on McKee Street, south of the Bayou. Note bike route sign.

This solid green bike lane on Broadway in New York City cuts across the road to enter Madison Square Park

The number of travel lanes along McKee and Hardy is likewise inconsistent. There are 2 lanes in each direction on the bridge over the Bayou. Between the Bayou and the McKee/Hardy split there is only one lane in each direction. McKee and Hardy both have 2 lanes, except at the bridge where they have 3 each. Lyons has only 1 lane in each direction. All told, the lanes goes from 2 to 1 to 3 to 2 to 1 in each direction. The project team suggests streamlining this to 1-2 lanes in each direction and converting the extra space to bike lanes.

As the Elysian Street Viaduct reconstruction is planned and the southern intersection of McKee, Runnels and Elysian Street is designed, bike lanes along McKee/N Jackson and Chenevert connecting north to Lyons Avenue could be prioritized and continued into Downtown in order to provide safe and convenient access from the Fifth Ward and Near North Side. The intersection of McKee, Elysian, Runnels, and LaBranch will be completely reconfigured to include an at-grade Elysian Street, additional sidewalks along McKee and Runnels, and connections to the Heritage East bicycle trail to the Heights and the Buffalo Bayou trails heading west to Allen's Landing and east to Clayton Homes. Regardless of the ultimate configuration of the Elysian viaduct, strong bicycle and pedestrian accommodations should be made in the new design, whether on Elysian itself, or along McKee/N Jackson and Hardy/Chenevert.

McKee bridge over the Bayou – note 2 lanes each direction and no bike lane

McKee Street north of the Bayou – note 1 lane in each direction and faded bike lanes

McKee Street over IH 10 – note 3 lanes and no bike lane

McKee at IH 10 westbound frontage road – note McKee has stop sign

The intersections of McKee Street and the IH 10 frontage roads pose an interesting challenge for cyclists (recall that McKee has bike lanes). In both instances traffic on one-way southbound McKee has a stop sign, while traffic on the frontage lanes does not. The same exists at the IH 10 off ramp to Nance Street (one block south). Driver confusion was observed at these locations – some drivers coming from the freeway stopped while others did not. Conversely, traffic on one-way northbound Hardy has priority with the stop signs on the frontage roads.

It is suggested that the traffic control be switched so that traffic on McKee has priority, as Hardy does. This will ensure that high-speed traffic exiting the interstate yields to cyclists along this designated bike route.

#10: New Sidewalk Under US 59 from Ruiz to Runnels

An additional Downtown Connector can be constructed from the intersection of Runnels and Highway 59 under the overpass. The distance between this intersection and Minute Maid Park by this path would be less than 1/2 mile. An existing allée of trees under the highway outlines the potential corridor.

This walkway would provide a direct connection from Runnels Street / US 59 to Ruiz Street / Hamilton Street and the sidewalks on the west side of US 59. It would tie the residents of Clayton Homes and surrounding areas more directly to the economic opportunities downtown. Presently the only walking or cycling route is via the Jensen/Franklin underpass (which is difficult because of the grade) or via Runnels and McKee (which is much less direct). Part and parcel to this would be safety improvements at the US 59 – Runnels intersection, listed as project #12.

Minute Maid Park, as seen from Runnels Street under the US 59 viaduct

Shell station at Runnels Street as seen from Minute Maid Park under the US 59 viaduct

The allée of trees among the US 59 sections, between Runnels and Ruiz Streets

#11: Waco Street (IH 10 overpass) Sidewalk Widening

Waco Street crosses IH 10 near the northeastern corner of the study area, creating two intersections that are perceived as unsafe by residents who cross here. This stretch of Waco has two lanes and a bike lane in each direction, with a generous median. As it crosses IH 10, the median is replaced by double left turn lanes in each direction. Consequently there are 8 lanes on the bridge, plus the bike lane and sidewalks, which are both about 4' wide.

To improve the walking and cycling conditions, two design features are suggested:

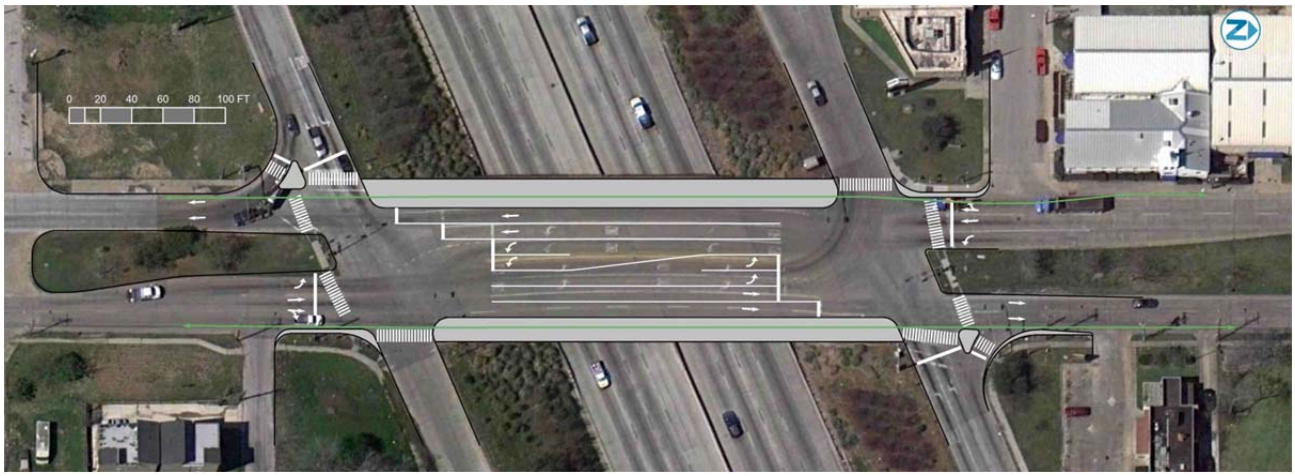
1. Reorganize the 4 left turn lanes so there are a total of 3 in width, but still 2 on each approach. See rendering below.
2. Use the width saved to widen the sidewalk for both pedestrians and cyclists. This would add 6' to both sidewalks, making a 10' wide bike-walk path. Although this is not ideal, given the on-street bike lanes continue to the north and south, there is precedent for this in Houston. At the Studemont Street overpass of Allen Parkway and the angled intersection of Fulton Street and Irvington Boulevard, similar raised shared spaces have been constructed and serve to separate heavy pedestrian/bicyclist flows from vehicle traffic.

The lanes of Waco Street would have to be slightly realigned to meet the wider sidewalks, but this could be accomplished by narrowing the median slightly. Coordination with TxDOT will be required for modifications to the overpass and IH 10 intersection.

Waco Street facing south from IH 10

Pedestrian / bicyclist view of IH 10 overpass

Oblique view to the northwest of the Waco Street overpass of IH 10



Proposed reconfiguration of the Waco Street overpass of IH 10

#12: Runnels Street Crosswalk (near US 59) with Median Extension

The intersection of the US 59 frontage road and Runnels Road is particularly precarious for people walking or cycling. There are 3 distinct issues:

1. The intersection is not signalized. To cross the frontage road, people must watch northbound traffic coming around a curve for a gap in traffic. During rush hour the gaps would be sparse, causing people to take more risks.
2. Drivers turning from the frontage lane to Runnels have a slip lane designed for high speed turns. While this is problematic from a pedestrian safety point of view in and of itself, the issue is exacerbated by the fact that Runnels to the east quickly narrows to 1 lane in each direction. This is a classic example of highway-style engineering in a non-highway environment.
3. On the north side of Runnels are the Clayton Homes and other residential properties. On the south side is a Shell station (with other stores) that is the commercial destination in the area. People walk (or sprint) back and forth across Runnels to shop. The bus stops here as well, and discharged passengers need to cross.

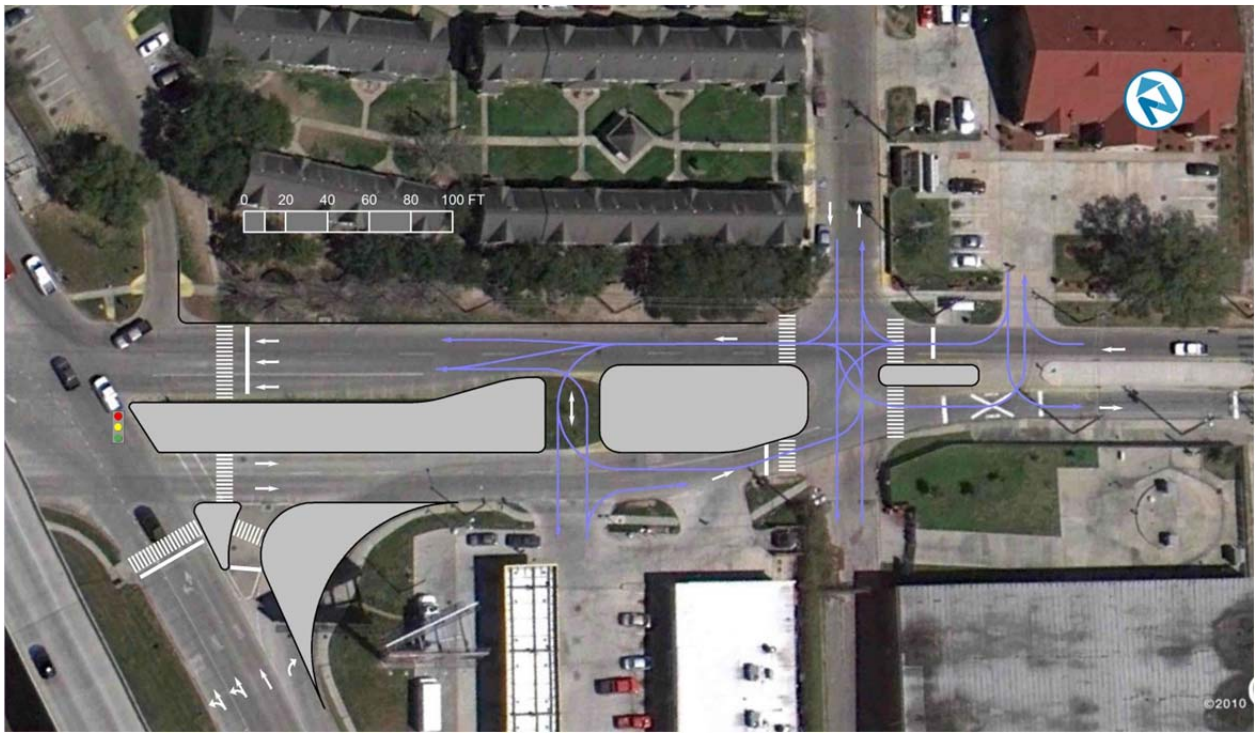
The solution to these issues are threefold:

1. Signalize the Runnels/59 intersection.
2. Convert the slip lane to a standard right turn lane.
3. Install a pedestrian crossing and additional medians on Runnels west of the US 59 intersection. Runnels already has a median, but it is not continuous here. By extending the medians and coordinating with the driveways, traffic flows could be better managed and an additional crosswalk installed.

North sidewalk of Runnels Street crossing US 59 northbound frontage road – no signal

East sidewalk of US 59 northbound frontage road crossing Runnels Street – note the slip lane designed for high speed turns at the crosswalk

Pedestrian running across Runnels from Shell station (out of view to right)



Drawing of proposed crosswalks and medians on Runnels

#13: Bruce Elementary School New Sidewalks

Sidewalks leading to Bruce Elementary School are generally in fair condition at best. Sidewalk improvements along Jensen Drive and the IH 10 feeder are part of project #7 and #19, respectively. Winter, Gillespie, Cline, and other streets connecting to the new housing to the east, should also be reconstructed, as well as improvements to the school access point from the north, along the East Freeway access road. Among recommendations discussed for this study, the creation of a Baron Bike Boulevard and a bidirectional bike path along Jensen provides two safe access points from different parts of the neighborhood. For students and parents coming from Clayton Homes, the Clayton Homes Connector over the Bayou provides a much quicker and safer route to school than does the Jensen Drive Bridge.

#14: Crawford Elementary School New Sidewalks

In contrast to Bruce Elementary's relatively safe access points, Crawford Elementary poses more challenges. Crawford is bound on the east side by the elevated US 59 and on the north by a railroad. Another railroad exists two blocks west of the school, and the IH 10 is four blocks south. The school attendance zone is to the north and west, so children need not cross US 59 or IH 10; however they need to walk under the railroad tracks or around via Lyons.

The sidewalks immediately surrounding Crawford are primarily in fair condition, with some in good condition (See Sidewalk Inventory). However, sidewalks are nonexistent for most access points beyond the immediate perimeter of the school.

Crawford Elementary viewed from the south along Lyons Avenue

#15: South Jensen Drive New Sidewalks – (implemented by others)

South of the bridge over the Bayou, Jensen Drive leads to the intersection with Navigation Boulevard and Runnels Street, and eventually into Downtown. No road space is available for a bike lane on Jensen or Navigation, but this connection is currently used by cyclists to access points west and south of the Fifth Ward. Navigation is also a designated bike route for the City. Sharrows* could be placed in the curb lanes to alert drivers to the presence of cyclists and indicate the presence of a bike route. The sidewalks along Jensen Drive, while not new, are in fair condition and are not proposed for replacement as part of this study. This project #15 is included mainly for route continuity; it is expected that the streets and infrastructure needs in this area will be addressed by the Greater East End Management District, who does show South Jensen Drive as a pedestrian/bicyclist improvement corridor. (See the Implementation section later in this chapter).

*"Sharrows," or "sharing arrows," denote that a lane is used by both vehicles and bicyclists, and calls attention to the presence of bicycles using a non-exclusive facility. This photo shows an example on a narrow roadway in Asheville, North Carolina.

#16: Multi-Service Center & YES Prep. School New Sidewalks

The 5th Ward Multi-Service Center is a major destination in the neighborhood. Across the street is the new YES Preparatory School. Sidewalks along the perimeter of YES Prep and the Multi-Service Center are currently in fair condition; however, access routes leading to these intersections have either no sidewalks or sidewalks in poor condition. The revamping of Market Street to create a safer design will enhance the primary access road, but sidewalks on the side streets should also be

addressed. Other enhancements of the pedestrian environment include ensuring all the pedestrian access gates to the Multi-Service Center remain open during operating hours—there are numerous access points to the complex besides the parking area.

Market Street entrance to Fifth Ward Multi-Service Center. Note existing bike racks.

YES Preparatory Academy from Market and Benson. Project #4, the north-south trail, would also use Benson Street here.

#17: Pedestrian (Hawk) Signal at Lyons Avenue and Pannell Street

The study team recommends a signal warrant study be conducted at the intersection of Lyons and Pannell. The new multi-family facilities on the corner have generated more pedestrian and motor vehicle traffic. In addition, a highly publicized crash occurred in the summer of 2011, resulting in the death of a pedestrian - a neighborhood resident. This is an intersection of concern for the community. The project team recommends an immediate study to establish the justification for a pedestrian-actuated crosswalk (a "HAWK" signal), with a determination of an appropriate date to study the justification for a full traffic signal.

Lyons Avenue facing west towards Pannell Street

A HAWK signal installed in Ann Arbor, Michigan (photo by Michigan Department of Transportation)

#18: New Sidewalks along Meadow Street/US 59 Feeder Road

Meadow Street, in addition to serving as the US 59 feeder road from Market Street to Lyons Avenue, also is the western boundary of Kelly Village, provides an overpass of IH 10, and connects to Bruce Elementary and the proposed Baron Street Bike Boulevard (project #6) to the south. The project team recommends sidewalk construction where needed, including the

reconstruction of all sidewalks ranked in poor condition. (See Sidewalk Inventory.) This corridor also serves to complete a grid of improvements throughout the study area, ensuring no location is more than a few blocks from a pedestrian or bicycle corridor.

Meadow Street facing south from IH 10. Note high-visibility crosswalk.

#19: Hare Street and IH 10 EB Feeder New Sidewalks

Portions of this corridor serve the #11 METRO local bus (Nance Street), which travels to the Multi-Service Center and other locations. Bruce Elementary and Jensen Drive are at the west end of the corridor, and the east end passes by a large vacant property with redevelopment potential, to end at the proposed north-south multi-use trail (project #4). The project team recommends sidewalk construction where needed, including the reconstruction of all sidewalks ranked in poor condition. (See Sidewalk Inventory.) This corridor also serves to complete a grid of improvements throughout the study area, ensuring no location is more than a few blocks from some sort of recommended improvement.

IH 10 eastbound feeder, facing east from Meadow Street. Note fair-condition sidewalk but lack of curb ramp and crosswalk.

#20: Additional Wayfinding Signage

In addition to the physical improvements described above, the project team recommends a wayfinding study to determine the appropriate level of additional directional signage in the area. There exist a few vehicle-oriented signs identifying Downtown and the Multi-Service Center, but as the area continues to redevelop and new residents and businesses locate in the Fifth Ward, there will be a need to more comprehensively identify routes to parks, schools, historic and cultural sights, and other community destinations. Some of this signage may be added to trails and other pedestrian / bicyclist routes, in addition to vehicle-oriented signage on streets. This study would examine the size, location, style, and content of wayfinding materials, possibly including maps and kiosks in addition to signs.

IH 10 westbound feeder at Jensen Drive. The blue sign reads "Downtown Destinations."

Development of Estimated Costs for Proposed Improvements

Planning-level cost estimates were developed for the potential improvements, based on the TxDOT Construction Average Unit Prices, compiled August 2011. The project team evaluated sidewalks, crosswalks, curb ramps, signage, and striping at locations identified during the study. The cost estimates are based on installing curb ramps where they are missing, constructing new sections of sidewalks where they are missing or in poor condition, providing additional signage and/or striping, and constructing new sections of multi-use trails. All improvements are priced based on construction to current ADA / TAS standards.

All improvements were priced according to TxDOT District 12 (Houston) Average Low-Bid Unit Prices, compiled in July 2011. The specific construction element bid items used in each improvement are included in its cost estimate; a full list of the elements referenced in included in Appendix E. This may be used in the future to recalculate the construction cost estimates if materials costs change substantially.

The total, shown in the table on the following page, is for all priced projects. If federal transportation funds are used to implement the recommended improvements, the sponsoring agency (in this case the Fifth Ward Tax Increment Reinvestment Zone) must contribute 20% of the cost of improvements. It is also acceptable for the sponsoring agency to secure financial commitment from other government agencies (such as the City of Houston, TxDOT, Harris County, or other management districts or TIRZs). In-kind services are not countable towards this total; contributions must be in actual dollars.

Following the summarized cost estimates are the individual details for each recommendation.

Summary of Cost Estimates for Proposed Improvements

The total, shown below, is for all priced projects. If federal funds are used to implement the Pedestrian and Bicycle Districts improvements, the sponsoring agency (in this case the Fifth Ward Tax Increment Reinvestment Zone) must contribute 20% of the cost of improvements. It is also acceptable for the sponsoring agency to secure financial commitment from other government agencies (such as the City of Houston, TxDOT, Harris County, or other management districts or TIRZs). In-kind services are not countable towards this total; contributions must be in actual dollars.

Fifth Ward Special District Pedestrian/Bicyclist Plan
Overall Cost Estimates

Code #	Description	Estimate
1	Lyons Avenue Bicycle Lane Coloration	$ 412,300
2	Gregg Street - Sidewalk and Parking Improvements	$ 268,200
3	Market Street - Sidewalk and Street Improvements (Option 2)	$ 354,800
4	North - South Bike Trail along Benson and Rail Track	$ 558,200
5	Finnegan Park Bike Trail Connector	$ 57,200
6	East-West Baron Street "Bike Boulevard"	$ 160,200
7	Jensen and Buffalo Bayou Bike Connector (New Sidewalks from Baron to Lyons)	$ 178,700
8	Rail Bridge under US 59 (By Others) and New Bike Trail from bridge to Jensen	$ 79,500
9	McKee and Hardy Street Bike Improvements	$ 12,800
10	New Sidewalk Under US 59 from Commerce to Runnels	$ 25,300
11	Waco Street (IH 10 overpass) Sidewalk Widening	$ 52,800
12	Runnels Street Crosswalk (near US 59) with Median Extension	$ 35,300
13	Bruce Elementary School New Sidewalks	$ 81,900
14	Crawford Elementary School New Sidewalks	$ 98,400
15	South Jensen Drive New Sidewalks - not priced (implemented by others)	$ -
16	Multi-Service Center & YES Prep. School New Sidewalks	$ 148,000
17	Pedestrian (Hawk) Signal at Lyons Avenue and Pannell Street	$ 112,000
18	New Sidewalks along Meadow Street/US 59 Feeder Road	$ 29,600
19	Hare Street and IH 10 EB Feeder New Sidewalks	$ 89,400
20	Additional Wayfinding Signage - not priced	$ -
GRAND TOTAL		**$ 2,754,600**
FEDERAL SHARE (80%)		$ 2,204,000
LOCAL MATCH (20%)		**$ 551,000**

These cost estimates are intended for planning purposes only. If H-GAC or the TIRZ moves forward on the implementation of these improvements, construction drawings and engineering plans would be required. Further detail on the cost estimates for each improvement is provided on the following pages. The funding of the potential improvements identified in this report, is up to the TIRZ board, with the potential involvement of other public entities such as the City of Houston.

Detail of Cost Estimates for Proposed Improvements

Key to Units: CY = Cubic Yard, EA = Each, LB = Pound, LF = Linear Foot, LS = Lump Sum, SF = Square Foot, SY = Square Yard

#1: Lyons Avenue Bicycle Lane Coloration

The extents of the project are from McKee Street in the west to Waco Street (the study area boundary) in the east.

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Remove Existing Pavemarking (4" Wide)	677 2001	14,500	LF	$0.27	$3,915.00
Remove Existing Pavemarking Symbols	677 2015	15	EA	$46.00	$690.00
5' Wide Bike Lane Color	6473 2021	72,500	SF	$4.26	$308,850.00
Pavement Markings 4" wide Edge Line	666 2012 666 2145 678 2001	14,500	LF	$0.42	$6,090.00
Pavement Markings Bike Symbols	668 2132	29	EA	$85.00	$2,465.00
Street Bike Sign & Pole	644 2001 636 2001	48.00	EA	$450.00	$21,600.00
				Subtotal	**$343,610.00**
				20% Contingency	$68,722.00
				Total	**$412,332.00**

For the solid coloration of the bicycle lane, epoxy 6473 2021 is recommended. Although it is less durable than thermoplastic (expected life of 4 years vs. 5), it is slightly cheaper per square foot when used in a large area (thermoplastic striping would have to be laid in multiple side-by-side strips which may create a traction problem in wet weather) and works out to less expense per year.

Material Type	TxDOT #	Cost / SF	Durability (yrs)	Cost / SF / yr
Thermoplastic	666 2012 666 2145 678 2001	$ 5.55	5	$ 1.11
Water-Based Paint	662 2016	$ 1.25	1	$ 1.25
Epoxy	6473 2021	$ 4.26	4	$ 1.07

If the solid-color bicycle lane proves popular and useful, and the community desires it to remain, it is recommended that this calculation be revisited, as material prices do fluctuate over time. Note that for other applications, standard thermoplastic is proposed. The quantity of this material used for standard striping allows a low unit cost.

#2: Gregg Street - Sidewalk and Parking Improvements

The extents of the project are from Oats Street (the study area boundary) in the north, to ther southern terminus of Gregg Street at Richardson Street, then west on Richardson one block to Grove Street, then south on Grove to Buffalo Bayou. Only missing and poor-condition areas are included in sidewalk construction.

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Remove Existing Lane Pavemarkings	677 2001	7,771	LF	$0.27	$2,098.17
Remove Sidewalk	104 2015	1,589	SY	$7.34	$11,662.44
Concrete Sidewalk, 5' Wide 4" Thick	531 2035	5,638	LF	$18.65	$105,148.70
ADA Compliant Ramps	531 2010	64	EA	$1,200.00	$76,800.00
Pavement Markings 4" wide Edge Line	666 2012 666 2145 678 2001	7,771	LF	$0.42	$3,263.82
Remove Existing Sign	644 2060	10	EA	$60.54	$605.40
No Parking Sign & Pole	644 2001 636 2001	64	EA	$373.21	$23,885.44
				Subtotal	**$223,463.97**
				20% Contingency	$44,692.79
				Total	**$268,156.77**

#3: Market Street - Sidewalk and Street Improvements

The extents of the project are from US 59 in the west to Benson Street in the east.

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Remove Curb	104 2021	6,980	LF	$2.00	$13,960.00
Remove Pavement	105 2013	1,551	SY	$5.00	$7,755.56
Curb	529 2004	6,980	LF	$11.00	$76,780.00
Driveway	530 2010	43	SY	$42.00	$1,820.00
Remove Sidewalk	104 2015	1,867	SY	$7.34	$13,701.33
Concrete Sidewalk, 6' Wide 5" Thick	531 2043	5,990	LF	$23.00	$137,770.00
ADA Compliant Ramps	531 2010	12	EA	$1,200.00	$14,400.00
Drainage	465 2001 496 2002	10	EA	$2,950.00	$29,500.00
				Subtotal	**$295,686.89**
				20% Contingency	$59,137.38
				Total	**$354,824.27**

The ideal improvement for Market Street is to widen the sidewalks by moving the curbs outward and narrowing the roadway. This requires moving 10 drop inlets, included in the “Drainage” line item above. The approximately $350,000 for this project is included in the overall total, to be conservative, although pricing is also listed below for the sidewalk widening without the curb relocation. In this case, only 5’ sidewalks are priced.

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Remove Sidewalk	104 2015	1,867	SY	$7.34	$13,701.33
Concrete Sidewalk, 5' Wide 4" Thick	531 2035	5,990	LF	$18.65	$111,713.50
				Subtotal	**$125,414.83**
				20% Contingency	$25,082.97
				Total	**$150,497.80**

#4: North - South Bike Trail along Benson and Rail Track

The extents of the project are on-street along Benson Street from Oats Street (the study area boundary) south to Market Street, then east on Market one block to the railroad, and south along the railroad right-of-way to Baron Street.

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Pavement Markings 4" wide Edge Line	666 2012 666 2145 678 2001	3,220	LF	$0.42	$1,352.40
Pavement Markings Bike Symbols	668 2132	33	EA	$85.00	$2,833.33
Street Bike Sign & Pole	644 2001 636 2001	33	EA	$450.00	$15,000.00
Concrete Bike Trail, 10' Wide	531 2004 260 2014	2,667	SY	$58.50	$156,000.00
Pedestrian Overpass*	-	3,000	SF	$80.00	$240,000.00
Pedestrian Overpass Installation*	-	1	EA	$50,000.00	$50,000.00
				Subtotal	**$465,185.73**
				20% Contingency	$93,037.15
				Total	**$558,222.88**

Pedestrian overpass of IH 10 estimated at $80/square foot, according to American Trails in 2007. According to the Federal Highway Administration's Highway Construction Cost Index, construction costs have declined approximately 15% since 2007, but the higher figure is still used here, to be conservative.

"Construction costs for bikeway and pedestrian bridges are influenced by many external factors, especially the number and workload of local contractors. Bridge construction costs in northern California generally range between $65-$80 per square feet for cast in place concrete, to $70-$90 sf for prefabricated bridges. This would translate into a 200 feet long by 8 feet wide bridge costing between $100,000 and $140,000."

Source: http://www.americantrails.org/resources/structures/ChooseBridgeBuild.html

Cost Index Source: http://www.fhwa.dot.gov/policyinformation/nhcci.cfm

Similarly, the MAADI Group, an example of whose bridges was shown in the project description on page 44, estimated $250,000 for a two-span, 300' bridge, plus $25,000 for delivery.

Source: Phone conversation September 19, 2011, with Alex de la Chevrotière of the MAADI Group.

#5: Finnegan Park Bike Trail Connector

The extents of this project are from the railroad right-of-way in the west to Waco Street (the study area boundary) in the east.

	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Pavement Markings Bike Symbols	668 2132	4	EA	$85.00	$340.00
Street Bike Sign & Pole	644 2001 636 2001	4	EA	$450.00	$1,800.00
Concrete Bike Trail, 10' Wide	531 2004 260 2014	778	SY	$58.50	$45,500.00
				Subtotal	**$47,640.00**
				20% Contingency	$9,528.00
				Total	**$57,168.00**

The preferred route calculated above uses the Providence Street right-of-way to line up with the existing signed route east of Waco Street, and to provide a section of off-street trail. The

approximately $57,000 for this version of the project is included in the overall total, to be conservative, although pricing is also listed below for a route using existing Buck Street, with an off-street trail only for the section from the Buck Street dead-end west to the new north-south trail.

	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Street Bike Sign & Pole	644 2001 636 2001	4	EA	$390.00	$1,560.00
Concrete Bike Trail, 10' Wide	531 2004 260 2014	111	SY	$58.50	$6,500.00
				Subtotal	**$8,060.00**
				20% Contingency	$1,612.00
				Total	**$9,672.00**

The cost estimates for this improvement do not include the cost of implementing a traffic signal to cross Hirsch Road / Waco Street. This would be preferred but not required.

#6: East-West Baron Street "Bike Boulevard"

The extents of the project are from Jensen Drive in the west to Waco Street (the study area boundary) in the east. Note that the short-term project only includes trail construction where no roadway exists and signage along the existing (substandard) street. Further study will be needed to determine the design characteristics of the "bike boulevard."

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Pavement Markings Bike Symbols	668 2132	6	EA	$85.00	$510.00
Street Bike Sign & Pole	644 2001 636 2001	16	EA	$390.00	$6,240.00
Concrete Bike Trail, 10' Wide	531 2004 260 2014	2,167	SY	$58.50	$126,750.00
				Subtotal	**$133,500.00**
				20% Contingency	$26,700.00
				Total	**$160,200.00**

#7: Jensen and Buffalo Bayou Bike Connector (New Sidewalks from Grayson to Lyons)

The extents of the project are a multi-use trail from Buffalo Bayou north to Grayson Street (connecting to project # 6 at Baron Street and project #8 at Grayson, then sidewalks from Grayson Street north to Lyons Avenue. Only missing and poor-condition areas are included north of Grayson Street.

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Remove Sidewalk	104 2015	1,444	SY	$7.34	$10,602.22
Concrete Sidewalk, 5' Wide 4" Thick	531 2035	3,170	LF	$18.65	$59,120.50
Pavement Markings Bike Symbols	668 2132	6	EA	$85.00	$510.00
Street Bike Sign & Pole	644 2001 636 2001	6	EA	$450.00	$2,700.00
Concrete Bike Trail, 10' Wide	531 2004 260 2014	1,600	SY	$58.50	$93,600.00
				Subtotal	**$166,532.72**
				20% Contingency	$33,306.54
				Total	**$199,839.27**

#8: Rail Bridge under US 59 (By Others) and New Bike Trail from bridge to Jensen

The extents of the project are from the reconstructed rail bridge over Buffalo Bayou in the west, to Jensen Drive in the east (via Grayson Street).

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Bridge Rehab	-	-	LS	$0.00	$0.00
Pavement Markings Bike Symbols	668 2132	4	EA	$85.00	$340.00
Street Bike Sign & Pole	644 2001 636 2001	2	EA	$450.00	$900.00
Concrete Bike Trail, 10' Wide	531 2004 260 2014	1,111	SY	$58.50	$65,000.00
				Subtotal	**$66,240.00**
				20% Contingency	$13,248.00
				Total	**$79,488.00**

For this improvement, the bridge rehabilitation has not been included in the cost estimate, as this element is already underway by the City of Houston, TxDOT, and the Buffalo Bayou Partnership.

#9: McKee and Hardy Street Bike Improvements

The extents of the project are from Lyons Avenue in the north along McKee Street and Hardy Street until they merge together south of IH 10, then along McKee Street to the intersection with the Elysian Viaduct (to be brought down to ground level at that point).

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Remove Existing Pavemarking	677 2001	1,500	LF	$0.27	$405.00
Pavement Markings 4" wide Edge Line	666 2012 666 2145 678 2001	6,230	LF	$0.42	$2,616.60
Pavement Markings Bike Symbols	668 2132	16	EA	$85.00	$1,323.88
Street Bike Sign & Pole	644 2001 636 2001	14	EA	$450.00	$6,300.00
				Subtotal	**$10,645.48**
				20% Contingency	$2,129.10
				Total	**$12,774.57**

#10: New Sidewalk Under US 59 from Ruiz to Runnels

The extents of the project are from Ruiz Street in the south to Runnels Street in the north.

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Concrete Sidewalk, 5' Wide 4" Thick	531 2035	750	LF	$18.65	$13,987.50
ADA Compliant Ramps	531 2011	2	EA	$1,200.00	$2,400.00
				Subtotal	**$16,387.50**
				20% Contingency	$3,277.50
				Total	**$19,665.00**

#11: Waco Street (IH 10 overpass) Sidewalk Widening

The extents of the project are the limits of the overpass, from south of Stonewall Street in the north to north of Vernon Street in the south. Estimates include widening the sidewalk areas and restriping the travel lanes.

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Remove Existing Pavemarking	677 2001	3,200	LF	$0.27	$864.00
Remove Existing Pavemarking Symbols	677 2008 677 2018	8	EA	$56.00	$448.00
Pavement Markings 4" wide Lane Line	666 2012 666 2145 678 2001	3,200	LF	$0.42	$1,344.00
Pavement Markings Turn Arrow & Only	666 2054 666 2007 678 2001	8	EA	$163.00	$1,304.00
Crosswalk Striping 24" wide	666 2048 666 2157 678 2006	560	LF	$7.20	$4,032.00
Remove Curb	104 2021	720	LF	$2.00	$1,440.00
Curb	529 2004	720	LF	$11.00	$7,920.00
Concrete Sidewalk, 6" Thick	531 2004	450	SY	$37.00	$16,650.00
ADA Compliant Ramps	531 2011	8	EA	$1,200.00	$9,600.00
Pavement Markings 4" wide (Yellow)	666 2111 666 2178 678 2001	600	LF	$0.64	$384.00
				Subtotal	**$43,986.00**
				20% Contingency	$8,797.20
				Total	**$52,783.20**

#12: Runnels Street Crosswalk (near US 59) with Median Extension

The extents of the project are along Runnels Street from the northbound US 59 feeder in the west to the easternmost Clayton Homes entryway in the east (just west of the active railroad track).

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Remove Curb	104 2010	100	LF	$2.00	$200.00
Remove Pavement	105 2013	415	SY	$5.00	$2,075.00
Curb	529 2004	410	LF	$11.00	$4,510.00
Concrete Sidewalk, 5' Wide 4" Thick		20	LF	$18.65	$373.00
ADA Compliant Ramps	531 2011	2	EA	$1,200.00	$2,400.00
Crosswalk Striping 24" wide	666 2048 666 2157 678 2006	140	LF	$7.20	$1,008.00
Topsoiling	160 2004	415	SY	$3.00	$1,245.00
Bermuda Sod	162 2002	415	SY	$2.00	$830.00
Right Turn Lane Reconfiguration*	104 2010 104 2001 104 2011 536 2002 531 2035 360 2001 531 2011	1	LS	$16,800.00	$16,800.00
				Subtotal	**$29,441.00**
				20% Contingency	$5,888.20
				Total	**$35,329.20**

* Priced separately as it could be implemented separately: Remove Curb, 300 LF*$2=$600; Remove Conc. Road, 220 SY *$3.85=$847; Remove Conc. Median, 125 SY*$8.50=$134; Conc. Median, 40 SY*$34=$1,360; Curb, 260 LF*$11=$2,860; Sidewalk, 110 LF*$18.65=$92; Conc. Pavement, 140 SY*$52=$7,280; ADA ramps, 3 EA*$1200=$3,600

#13: Bruce Elementary School New Sidewalks

The extents of the project are along Baer, Winter, Gillespie, and Cline Streets from Jensen Drive in the west to Meadow Street in the east, and along Schwartz and Clark Streets from the IH 10 feeder to Baron Street. Only missing sidewalks along constructed roadways (no paper streets) and poor-condition areas are included in the sidewalk construction.

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Remove Sidewalk	104 2015	596	SY	$7.34	$4,371.38
Concrete Sidewalk, 5' Wide 4" Thick	531 2035	1,910	LF	$18.65	$35,621.50
ADA Compliant Ramps	531 2010	8	EA	$1,200.00	$9,600.00
				Subtotal	**$49,592.88**
				20% Contingency	$9,918.58
				Total	**$59,511.45**

#14: Crawford Elementary School New Sidewalks

The extents of the project are along Brooks Street from Hill Street to Jensen Drive, Hill from Brooks to Lyons Avenue, Lyons from Hill to Jensen Drive, and Jensen from Lyons Avenue to the railroad (the north study area boundary). Only missing sidewalks along constructed roadways and poor-condition areas are included in the sidewalk construction.

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Remove Sidewalk	104 2015	644	SY	$7.34	$4,730.22
Concrete Sidewalk, 5' Wide 4" Thick	531 2035	3,500	LF	$18.65	$65,275.00
ADA Compliant Ramps	531 2010	10	EA	$1,200.00	$12,000.00
				Subtotal	**$82,005.22**
				20% Contingency	$16,401.04
				Total	**$98,406.27**

#15: South Jensen Drive New Sidewalks - not priced (implemented by others)

This project is not included in the overall cost estimate summary, as it is anticipated that the design and construction will be done by others, such as the Greater East End Management District. See the Implementation discussion for further information and a map of other East End-area projects.

#16: Multi-Service Center & YES Prep. School New Sidewalks

The extents of the project are along Curtis, Orange, and Stonewall Streets from Pannell Street in the west to Benson Street in the east, and Benson, Granger, and Worms Streets from Lyons Avenue in the north to the IH 10 westbound feeder in the south. Only missing and poor-condition areas are included in the sidewalk construction.

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Remove Sidewalk	104 2015	1,529	SY	$7.34	$11,222.04
Concrete Sidewalk, 5' Wide 4" Thick	531 2035	5,340	LF	$18.65	$99,591.00
ADA Compliant Ramps	531 2010	13	EA	$1,200.00	$15,600.00
				Subtotal	**$126,413.04**
				20% Contingency	$25,282.61
				Total	**$151,695.65**

#17: Pedestrian (Hawk) Signal at Lyons Avenue and Pannell Street

The extents of the project are limited to the Lyons / Pannell intersection.

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Concrete Sidewalk, 5' Wide 4" Thick	531 2035	20	LF	$18.65	$373.00
ADA Compliant Ramps	531 2010	2	EA	$1,200.00	$2,400.00
Crosswalk Striping 24" wide	666 2048 666 2157 678 2006	80	LF	$7.20	$576.00
Present-Day Traffic Signal Warrant Study	-	1	LS	$5,000.00	$5,000.00
Pedestrian Hawk Signal (if warranted)	-	1	LS	$80,000.00	$80,000.00
Future Traffic Signal Warrant Study*	-	1	LS	$5,000.00	$5,000.00
				Subtotal	**$93,349.00**
				20% Contingency	$18,669.80
				Total	**$112,018.80**

*follow-up study after a number of years (time frame to be determined in initial study)

#18: New Sidewalks along Meadow Street/US 59 Feeder Road

The extents of the project are along Meadow Street / US 59 feeder (east side only) from Lyons Avenue in the north to IH 10 in the south, then along Meadow Street (both sides) from IH 10 in the north to Baron Street in the south. Only missing and poor-condition areas are included in the sidewalk construction.

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Remove Sidewalk	104 2015	89	SY	$7.34	$652.44
Concrete Sidewalk, 5' Wide 4" Thick	531 2035	900	LF	$18.65	$16,785.00
ADA Compliant Ramps	531 2010	6	EA	$1,200.00	$7,200.00
				Subtotal	**$24,637.44**
				20% Contingency	$4,927.49
				Total	**$29,564.93**

#19: Hare Street and IH 10 EB Feeder New Sidewalks

The extents of the project are along the IH 10 eastbound feeder (south side only) from Jensen Drive in the west to Bringhurst Street in the east, then along Hare Street (both sides) from Bringhurst Street in the east to the proposed north-south trail (project #4) in the east. Only missing and poor-condition areas are included in the sidewalk construction.

Item	TxDOT Bid Items	Quantity	Unit	Unit Cost	Item Total
Remove Sidewalk	104 2015	133	SY	$7.34	$978.67
Concrete Sidewalk, 5' Wide 4" Thick	531 2035	4,300	LF	$18.65	$80,195.00
ADA Compliant Ramps	531 2010	10	EA	$1,200.00	$12,000.00
				Subtotal	**$93,173.67**
				20% Contingency	$18,634.73
				Total	**$111,808.40**

#20: Additional Wayfinding Signage - not priced

This project is not priced because it requires further study to determine the number, size, style, and location of signage. The demographic analysis in Appendix A noted approximately one-third of study area residents speak Spanish at home, and approximately one in ten speaks English less than "very well." The wayfinding study should take this into account in its needs assessment.

Project Prioritization Criteria

The prioritization was done in terms of the relative ease and expense of projects, the necessity in terms of which would have the most beneficial effect on pedestrian and bicyclist conditions, and the public's prioritization.

Selection by Public

The vote totals for each projects come from the public input workshops conducted in August and September. Vote totals are listed in Appendix C and ranged from a low of 7 to a high of 37. Projects were rated as "good" if they received up to 15 votes, "better" if they received 16 to 20 votes, or "best" if they received 21 or more votes.

Estimated Cost

Cost scores were based on the estimated expense of each improvement, as detailed above, with less expensive improvements being preferred. Striping and signage are typically low-cost. Pedestrian improvements can be moderately expensive, because of the linear distance of missing sidewalks and number of missing or substandard curb ramps. Multi-use trails can also be moderately expensive, due to quantity of pavement required to provide a 10'-wide facility over long distances. Projects were rated as "good" if they were estimated to cost $150,000 or more,

"better" if they cost between $50,000 and $150,000, and "best" if they cost less than $50,000. Unpriced improvements were assigned a middle grade of "better."

Ease of Implementation

This is a subjective assessment of the complexity of project approval and administration, design and construction time, and required coordination with other entities, agencies, and organizations. Improvements along state highways, for instance, although similar in specifications to other pedestrian improvements, will require coordination between the City of Houston, TxDOT, and the Texas Department of Licensing and Review (for ADA compliance). This additional coordination implies a longer time frame. The Fifth Ward CRC has expressed a desire to have improvements that can be quickly implemented, in order to show progress to the community, and this criterion is also an assessment of the likely speed of implementation. Projects were assigned a ranking of "good," "better," or "best," based on the project team's assessment of the potential speed and ease of accomplishment.

The default rating of this criterion is "Best," as infrastructure improvements related to pedestrians and bicyclists tend to be more easily implemented than other roadway elements. In particular, sidewalk construction occurs in existing rights-of-way and designs are quite standardized so as to comply with ADA.

Recommendations that run alongside or across active railroads are classified as the lowest rating, "Good," as the improvement will require coordination with Union Pacific and possibly further safety-related considerations, in addition to the standard implementation process. This affects projects #4, 5, and 8. The Lyons Avenue bicycle lane coloration, project #1, is also assigned a rating of "Good." Although the City of Houston has expressed interest in implementing this project on an experimental basis, initial support may be limited to intersections. Further coordination, approvals, and maintenance agreements for the solid color will be required before the project can move forward, hence the lower rating.

Projects along or across TxDOT property or facilities are classified as the middle rating, "Better," as approvals and design coordination will have to occur with TxDOT, as well as with the City of Houston and the implementing agency. This affects projects #10 and 11. Projects #18 and 19 are deemed not affected this way and are given the default rating of "Best," as these follow along sidewalks only, not overpasses or freeway crossings.

Projects #2 and 12 are also assigned a medium rating of "Better," as these projects require moving curbs and reallocating roadway space, as well as standard sidewalk construction. Project #7 is assigned a medium rating of "Better," since, though the infrastructure is simple, the off-street trail along Jensen Drive may require negotiating a right-of-way easement. Project #20 is assigned a medium rating, as it will be simple to implement but requires further study first.

Demand Satisfied

This is a subjective assessment of the number of community members that will benefit from it. This is distinct from the public voting, as this is the project team's professional opinion of the degree of community benefit based on the expressed preferences of the public during meeting events.

Projects with the lowest ranking of "Good" are those deemed to benefit only a limited number of area users. These include the bicyclist-only improvements of #1 and 9, as pedestrian concerns seemed to outnumber bicycle-related issues; #18 and 19, since sidewalks along a freeway typically only serve properties on one side of the roadway; and #20, since wayfinding, while useful, does not improve the physical infrastructure conditions in the study area.

Projects with the highest ranking of "Best" are those responding to specific, repeated concerns of the public. These include #5, as Finnegan Park was by far the most-frequently mentioned out-of-area destination; #11 and 12, which address specific safety issues identified by the public as well as in H-GAC's own crash data; and #17, which again addresses a specific public safety concern. The remaining projects received a medium ranking of "Better."

Table of Projects with Evaluation Criteria

Project Number	Improvement Description	Selection by Public	Estimated Cost	Ease of Implementation	Demand Satisfied
1	Lyons Avenue Bike Lane Coloration	**Best**	Good	Good	Good
2	Sidewalks and Reconfiguration of Gregg Street	**Best**	Good	Better	Better
3	Sidewalks and Reconfiguration of Market Street	Good	Good	**Best**	Better
4	North-South Rail Trail	**Best**	Good	Good	Better
5	Connections from New Trail to Finnegan Park	**Best**	Better	Good	**Best**
6	East-West Baron Street "Bike Boulevard"	Good	Good	**Best**	Better
7	Jensen Drive Sidewalks and Connection to Bayou	**Best**	Good	Better	Better
8	Rail Bridge near Clayton Homes and Connections to Jensen Drive	**Best**	Better	Good	Better
9	McKee and Hardy Streets Bicycle Improvements	Better	**Best**	**Best**	Good
10	Walkway under US 59 north of Minute Maid Park	**Best**	**Best**	Better	Better
11	Widened Sidewalks on Waco Street Overpass	Better	Better	Better	**Best**
12	Median Changes and New Crosswalks on Runnels Street	Good	**Best**	Better	**Best**
13	New Sidewalks near Bruce Elementary School	**Best**	Better	**Best**	Better
14	New Sidewalks near Crawford Elementary School	Good	Better	**Best**	Good
15	Sidewalks and Reconfiguration of South Jensen Drive	Better	Better	**Best**	Better
16	New Sidewalks near Multi-Service Center and YES Prep School	Better	Better	**Best**	Better
17	New HAWK Signal and Study of Potential New Traffic Signal at Lyons and Pannell	Better	Better	**Best**	**Best**
18	New Sidewalks on Meadow Street / US 59 feeder	Good	**Best**	**Best**	Good
19	New Sidewalks on Hare Street / IH 10 feeder	Good	Better	**Best**	Good
20	Additional Wayfinding Signage throughout Study Area	Good	Better	Better	Good

Public Interest: 0-15 votes = Good, 16-20 votes = Better, 21+ votes = Best.
Cost Category: Less than $50,000 = Best, $50,000 - $150,000 = Better, More than $150,000 = Good.
Ease of Implementation: subjective assessment based on agency coordination required.
Demand Satisfied: subjective assessment based on number of potential users benefiting.

Overall Priority

This is a consolidated rating of all the evaluation criteria listed above. “Good” rankings received one point, “better” rankings received two points, and “best” rankings received three points. Since there are four criteria each scored one to three, the highest possible overall score is twelve and the lowest possible is four. “High” priority projects are those with an overall score of nine or better, “medium” priority projects are those with an overall score of seven or eight, and “low” priority” projects (although they are still part of the recommended work plan) are those with an overall score of six or lower.

Table of Projects with Scoring and Overall Priority

Project Number	Improvement Description	Selection by Public	Estimated Cost	Ease of Implementation	Demand Satisfied	Computed Score	OVERALL PRIORITY
1	Lyons Avenue Bike Lane Coloration	3	1	1	1	6	Good
2	Sidewalks and Reconfiguration of Gregg Street	3	1	2	2	8	Better
3	Sidewalks and Reconfiguration of Market Street	1	1	3	2	7	Better
4	North-South Rail Trail	3	1	1	2	7	Better
5	Connections from New Trail to Finnegan Park	3	2	1	3	9	**Best**
6	East-West Baron Street "Bike Boulevard"	1	1	3	2	7	Better
7	Jensen Drive Sidewalks and Connection to Bayou	3	1	2	2	8	Better
8	Rail Bridge near Clayton Homes and Connections to Jensen Drive	3	2	1	2	8	Better
9	McKee and Hardy Streets Bicycle Improvements	2	3	3	1	9	**Best**
10	Walkway under US 59 north of Minute Maid Park	3	3	2	2	10	**Best**
11	Widened Sidewalks on Waco Street Overpass	2	2	2	3	9	**Best**
12	Median Changes and New Crosswalks on Runnels Street	1	3	2	3	9	**Best**
13	New Sidewalks near Bruce Elementary School	3	2	3	2	10	**Best**
14	New Sidewalks near Crawford Elementary School	1	2	3	1	7	Better
15	Sidewalks and Reconfiguration of South Jensen Drive	2	2	3	2	9	**Best**
16	New Sidewalks near Multi-Service Center and YES Prep School	2	2	3	2	9	**Best**
17	New HAWK Signal and Study of Potential New Traffic Signal at Lyons and Pannell	2	2	3	3	10	**Best**
18	New Sidewalks on Meadow Street / US 59 feeder	1	3	3	1	8	Better
19	New Sidewalks on Hare Street / IH 10 feeder	1	2	3	1	7	Better
20	Additional Wayfinding Signage throughout Study Area	1	2	2	1	6	Good

It should be emphasized that the entire selection of projects is recommended for implementation. Even the lowest-ranking overall has been vetted by the community and the stakeholder organizations, benefits the pedestrian / bicyclist experience in the study area, and should move forward. The overall ranking is intended as a guide for H-GAC and the Fifth Ward for future activities.

Table of Prioritized Projects

Project Number	Improvement Description	OVERALL PRIORITY
5	Connections from New Trail to Finnegan Park	**Best**
9	McKee and Hardy Streets Bicycle Improvements	**Best**
10	Walkway under US 59 north of Minute Maid Park	**Best**
11	Widened Sidewalks on Waco Street Overpass	**Best**
12	Median Changes and New Crosswalks on Runnels Street	**Best**
13	New Sidewalks near Bruce Elementary School	**Best**
15	Sidewalks and Reconfiguration of South Jensen Drive	**Best**
16	New Sidewalks near Multi-Service Center and YES Prep School	**Best**
17	New HAWK Signal and Study of Potential New Traffic Signal at Lyons and Pannell	**Best**
2	Sidewalks and Reconfiguration of Gregg Street	Better
3	Sidewalks and Reconfiguration of Market Street	Better
4	North-South Rail Trail	Better
6	East-West Baron Street "Bike Boulevard"	Better
7	Jensen Drive Sidewalks and Connection to Bayou	Better
8	Rail Bridge near Clayton Homes and Connections to Jensen Drive	Better
14	New Sidewalks near Crawford Elementary School	Better
18	New Sidewalks on Meadow Street / US 59 feeder	Better
19	New Sidewalks on Hare Street / IH 10 feeder	Better
1	Lyons Avenue Bike Lane Coloration	Good
20	Additional Wayfinding Signage throughout Study Area	Good

Implementation and Coordination with Other Entities

H-GAC and the Fifth Ward CRC convened additional meetings with the Downtown Management District, Greater East End Management District, and Near Northside Management District on Thursday, September 15, 2011, and Wednesday, September 21, 2011, to discuss future coordination between the Fifth Ward and the adjacent districts. The project team was not required to attend these meetings, but provided copies of study materials and other information for H-GAC's use. A member of the project team also met with the executive directors of the Houston Parks Board and the East Downtown Management District to obtain their feedback on project recommendations an discuss project recommendations relevant plans and projects with which they are involved. It will be particularly important for the Fifth Ward to coordinate with the Greater East End Management District going forward, as the study area for this project overlaps with the proposed TIRZ boundaries of the East End.

The map on the following page illustrates proposed bicycle trails and improvements in the Greater East End, being implemented by a combination of the management district, the City of Houston, the Houston Parks Board, and the Buffalo Bayou Partnership.

Map of Other Nearby Bicycle / Pedestrian Projects

This map above is an excerpt of one provided by the Houston Parks Board to the project team on September 14, 2011. Note in particular the green "proposed" trail along South Jensen Drive from Buffalo Bayou to Navigation Boulevard, corresponding to Fifth Ward recommendation #15, and the purple trail along the north side of Buffalo Bayou, whose eastern terminus at the existing street rights-of-way is near the end of Fifth Ward recommendation #2. The US 59 crossing of Buffalo Bayou is the location of the railroad trestle featured in recommendation #8.

The management districts, other TIRZs, and organizations such as the Buffalo Bayou Partnership (BBP) have a number of projects scheduled in the area. In addition to those shown on the map above, which are being implemented by the BBP and the Greater East End Management District (GEEMD), the BBP is constructing additional trails east and west of the study area, with the eventual goal of having continuous multi-use trails on the north and south sides of the Bayou from the Ship Channel to Shepherd Drive and beyond. TIRZ #3 has contracted with Lockwood, Andrews & Newnam, Inc., to design a connection from the Buffalo Bayou trail up to North Main Street, in the vicinity of Hogan Street.

The Northside Management District is developing pedestrian, bicycle, and streetscape improvements west of the study area, in conjunction with the recommendations of the Livable Centers study surrounding the North line of METROSolutions light rail. Similarly, the GEEMD, following the recommendations of the Livable Centers study in that area, are implementing pedestrian, bicycle, and streetscape improvements along Navigation Boulevard, Canal Street, York / Sampson Streets, and Harrisburg Boulevard (this last street in coordination with the Harrisburg line of METROSolutions light rail).

It will be necessary for the Fifth Ward to coordinate with these other area organizations to implement many of the recommendations, as no one TIRZ or management district covers the entire study area. In addition to the required coordination with the City of Houston, TxDOT, and/or Union Pacific Railroad, many of the projects will require cost-sharing agreements for implementation. For example, with Recommendation #1, the Lyons Avenue solid-color bicycle lane, the City of Houston expressed interest in applying this treatment on an experimental basis at major intersections. The Fifth Ward TIRZ encompasses Lyons Avenue east of Jensen Drive, the North/Hardy TIRZ covers Lyons Avenue west of Maffitt Street, and the Northside Management District covers the space in between with some overlap. All of these entities would have to coordinate to implement any improvement along the full length of Lyons Avenue in the study area.

Community Bicycle Shop Recommendation

At several public input workshops, the discussion included the lack of bicycle availability as a contributing factor to low bicycling activity. In addition, many community members cited the lack of knowledge of basic bicycle maintenance and repair, so when bicycles have a damaged tire, for example, they cease to be used. This is compounded by the stated lack of any repair facilities in the immediate area.

Workshop Houston is a local nonprofit organization whose vision and mission are to "lay the groundwork for a just society by creating a community that provides youth with support, expanded opportunities and alternative definitions of success," by "providing youth with creative, technical, and educational resources." Along with other facilities devoted to music, fashion, graphic design, and industrial arts such as welding and metal fabrication, they operate the Third Ward Bike Shop. It offers do-it-yourself bike repair facilities staffed by volunteer mechanics, after school and summer activities for kids, and bike-related events. One of their programs is called Earn-A-Bike, which is described below.

Reference: http://www.workshophouston.org/programs/bike-shop/

During Earn-A-Bike participants can get a bike through a work exchange that benefits themselves, the Bike Shop, and the community. To earn a bike, participants must salvage working parts from an unusable bike and wheel, learn to patch a tube, and then fix a bike that is donated to a local charity. They then choose a bike to repair for themselves. Adults who can afford it are asked to make a $35 contribution to the Bike Shop to participate in Earn-a-Bike. Youth under 7 must have an older friend or adult help them with Earn-a-Bike.

The project team recommends that the TIRZ and CRC work with Workshop Houston or a similar organization to develop a Fifth Ward version of the Third Ward Bike Shop. Its establishment will serve as a way to help the community learn about maintenance and repairs of bicycles.

WORKSHOP HOUSTON

Reference:
http://www.workshophouston.org/programs/bike-shop/

THE BIKE SHOP is a community bike education resource. The shop has all the tools and resources of a professional bike shop which participants use to learn about bikes and bike repair in a dynamic cooperative learning environment.

Appendix A
Background Statistics and Demographics

Demographics and Employment

The study area consists of portions of the historic Fifth Ward community northeast of Downtown Houston, and adjacent areas to the south and west, located wholly within the City of Houston and Harris County.

The study area contains substantial portions of census tracts 2102, 2113, and 3101. A portion of census tract 1000 is within the boundaries of the study area, but its inclusion would significantly distort any analysis, as tract 1000 covers most of Downtown Houston, a neighborhood significantly different than the study area. Similarly, tract 2101 has been excluded; although it contains 6,407 residents, all but 66 of these are inmates at the Harris County Jail, whose inclusion would significantly skew the demographic data. The map on the following page illustrates study area census tract boundaries.

The above-named census tracts were in effect when the five year 2005-2009 American Community Survey was conducted. Although limited data from the 2010 Census was available at the time of this study, most of the data that is relevant to this analysis is only available from the American Community Survey, including income levels. Also, as the census tract boundaries changed between 2009 and 2010, using 2010 data would not only result in a less complete demographic picture, but require a major effort to reconcile two different sets of geographic boundaries.

Population

The American Community Survey counted approximately 17,737 persons in the study area. (This number is not exact because the study area boundaries do not precisely conform to census tract boundaries, as shown on the census tract map.) **Table A-1** depicts population counts, as well as the gender composition of each census tract in the study area and Citywide.

Table A-1: Population and Gender

Geography	Population	Males	Percent	Females	Percent
Census tract 2102	625	330	52.8	295	47.2
Census tract 2113	5,629	2,943	52.3	2,686	47.7
Census tract 3101	5,076	2,558	50.4	2,518	49.6
Study area	**11,330**	**5,831**	**51.5**	**5,499**	**48.5**
Houston	**2,099,451**	**1,053,517**	**50.2**	**1,045,934**	**49.8**

Source: American Community Survey, Data Set: 2005-2009 American Community Survey 5-Year Estimates; U. S. Census Bureau; compiled by Houston-Galveston Area Council and Roberta F. Burroughs & Associates.

As shown, the percentage of males in the study area is roughly comparable to Citywide: 51.5 percent versus 50.2 percent.

2005-2009 American Community Survey Census Tract Map

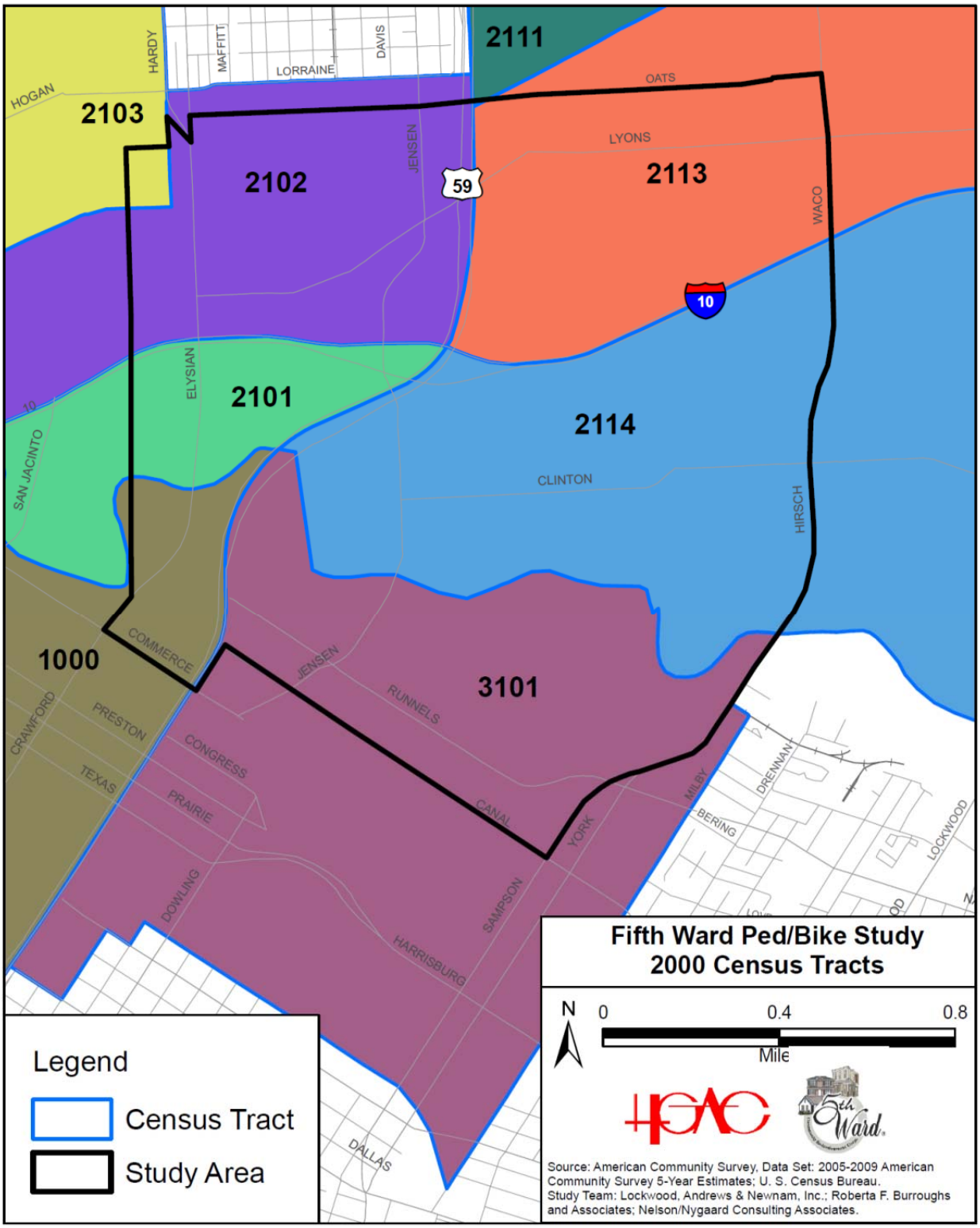


Table A-2 contains detailed data regarding household types. Data is presented for study area census tracts, as well as for Houston in its entirety.

Table A-2: Household Type

Geography	Total households	Family households (families)	Percent	Nonfamily households	Percent
Census tract 2102	237	133	56.1	104	43.9
Census tract 2113	1,953	973	49.8	980	50.2
Census tract 3101	1,910	760	39.8	1,150	60.2
Study area	**4,100**	**1,866**	**45.5**	**2,234**	**54.5**
Houston	**782,643**	**481,570**	**61.5**	**301,073**	**38.5**

Source: American Community Survey, Data Set: 2005-2009 American Community Survey 5-Year Estimates; U. S. Census Bureau; compiled by Houston-Galveston Area Council and Roberta F. Burroughs & Associates.

As shown in Table A-2, nonfamily households in the study area are more prevalent than family households; slightly more than half (54.5 percent) of households are non- family households. Family households comprise about 45.5 percent of households in the study area.

With respect to age, as shown on **Table A-3**, the median age reported for two of the three analyzed census tracts is lower than the figure reported for Houston. The largest proportion of study area residents fall within the 20-64 age category. This is also true Citywide.

Table A-3: Age Breakdown

Geography	Under 5		5-19	
	#	%	#	%
Census tract 2102	88	14.1	160	25.6
Census tract 2113	332	5.9	1,093	19.4
Census tract 3101	612	12.1	825	16.3
Study area	**1,032**	**9.1**	**2,078**	**18.3**
Houston	**171,026**	**8.1**	**430,892**	**20.5**

Geography	20-64		65 and over		Median Age
	#	%	#	%	
Census tract 2102	377	60.3	0	0.0	29.9
Census tract 2113	3,462	61.5	742	13.2	41.2
Census tract 3101	3,231	63.7	408	8.0	30.1
Study area	**7,070**	**62.4**	**1,150**	**10.2**	
Houston	**1,307,591**	**62.3**	**189,942**	**9.0**	**32.1**

Source: American Community Survey, Data Set: 2005-2009 American Community Survey 5-Year Estimates; U. S. Census Bureau; compiled by Houston-Galveston Area Council and Roberta F. Burroughs & Associates.

Income and Employment

Median household income reported for study area census tracts is lower than the Citywide figure of $42,797, sometimes by more than half. The unemployment rate reported for census tract 2102 is very similar to the Citywide figure - 7.8 percent, compared to 7.7 percent. The unemployment rates reported for census tracts 2113 and 3010 are higher than the Citywide figure. At 15 percent, the unemployment rate for the study area as a whole is higher than the Citywide rate. Table A-4 below contains additional data related to income and employment.

Table A-4: Income and Employment

Geography	Median Income	# of Persons in Civilian Labor Force	Civilian Labor Force - # Unemployed	Civilian Labor Force - Percent Unemployed
Census tract 2102	$18,083	295	23	7.8
Census tract 2113	$15,858	1,761	285	16.2
Census tract 3101	$28,264	2,443	341	14.0
Study area		**4,499**	**687**	**15.3**
Houston	**$42,797**	**1,130,274**	**86,893**	**7.7**

Source: American Community Survey, Data Set: 2005-2009 American Community Survey 5-Year Estimates; U. S. Census Bureau; compiled by Houston-Galveston Area Council and Roberta F. Burroughs & Associates.

Race and Ethnicity

The predominant racial group in the study area is African-Americans; approximately one-half (46.8 percent) of the population is African-American. Hispanics of any race comprise 35 percent of the population. Although this figure is lower than the Citywide figure of 43.8 percent, it is still substantial, representing about one-third of the study area population. This reflects a trend whereby study area census tracts that have traditionally been primarily populated by African-Americans are becoming more racially diverse.

Table A-5: Racial and Ethnic Distribution

Geography	One Race						Two or More Races	Hispanic/ Latino of Any Race
	White Alone	Black/ African Amer-ican Alone	Ameri-can Indian/ Alaska Native Alone	Asian Alone	Native Hawaii-an/ Other Pacific Islander Alone	Some Other Race Alone		
Census tract 2102	405 64.8%	155 24.8%	0 0.0%	10 1.6%	0 0.0%	55 8.8%	0 0.0%	413 66.1%
Census tract 2113	883 15.7%	4,396 78.1%	11 0.2%	14 0.2%	0 0.0%	325 5.8%	0 0.0%	914 16.2%
Census tract 3101	3,044 60.0%	750 14.8%	4 0.1%	304 6.0%	0 0.0%	922 18.2%	52 1.0%	2,646 52.1%
Study area	**4,332 38.2%**	**5,301 46.8%**	**15 0.0%**	**328 2.9%**	**0 0.0%**	**1,302 11.5%**	**52 0.0%**	**3,973 35.0%**
Houston	**1,060,491 50.5%**	**498,466 23.7%**	**14,997 0.7%**	**126,378 6.0%**	**1,153 0.1%**	**329,436 15.7%**	**68,530 3.3%**	**919,668 43.8%**

Source: American Community Survey, Data Set: 2005-2009 American Community Survey 5-Year Estimates; U. S. Census Bureau; compiled by Houston-Galveston Area Council and Roberta F. Burroughs & Associates.

Language Spoken at Home

An analysis of languages spoken at home has been conducted because one of the final recommendations focuses on signage. The analysis demonstrates that, in keeping with the substantial representation of individuals of Hispanic heritage in the study area, 18.9 percent of individuals over five years of age speak Spanish at home.

Study area census tracts with the highest percentages of individuals five years of age and older are census tract 2102, where 57.5 percent of individuals five years of age and older speak Spanish at home and census tract 3101, where 44.3 percent of individuals five years of age and older speak Spanish at home.

Table A-6: Language Spoken at Home, Population 5 years and over

Population 5 years of age and over	Census Tracts			Study Area	Houston
	2102	2113	3101		
	537	5,297	4,464	**10,298**	**1,997,974**
English only	218 40.6%	4,406 83.2%	2,169 48.6%	**6,793** **40.7%**	**1,105,904** **55.4%**
Language other than English	319 59.4%	891 16.8%	2,295 51.4%	**3,505** **21.0%**	**892,070** **44.6%**
Speak English less than "very well"	202 37.6%	469 8.9%	782 17.5%	**1,453** **8.7%**	**311,819** **15.6%**
Spanish	309 57.5%	873 16.5%	1,976 44.3%	**3,158** **18.9%**	**729,776** **36.5%**
Speak English less than "very well"	202 37.6%	469 8.9%	727 16.3%	**1,398** **8.4%**	**284,355** **14.2%**
Other Indo-European languages	0 0.0%	3 0.1%	122 2.7%	**125** **0.1%**	**60,256** **3.0%**
Speak English less than "very well"	0 0.0%	0 0.0%	20 0.4%	**20** **0.0%**	**4,946** **0.2%**
Asian and Pacific Islander languages	10 1.9%	0 0.0%	197 4.4%	**207** **1.2%**	**80,390** **4.0%**
Speak English less than "very well"	0 0.0%	0 0.0%	35 0.8%	**35** **0.0%**	**20,862** **1.0%**
Other languages	0 0.0%	15 0.3%	0 0.0%	**15** **0.0%**	**21,648** **1.1%**
Speak English less than "very well"	0 0.0%	0 0.0%	0 0.0%	**0** **0.0%**	**1,656** **0.1%**

Source: American Community Survey, Data Set: 2005-2009 American Community Survey 5-Year Estimates; U. S. Census Bureau; compiled by Houston-Galveston Area Council and Roberta F. Burroughs & Associates.

As **Table A-6** illustrates, most study area individuals who speak Spanish (and other languages) at home also speak English. Degrees of proficiency vary, as shown.

Vehicle Availability

In the study area, nearly one in ten workers that are 16 years of age and over lack access to a vehicle. This compares to 5.2 percent of workers in this age group Citywide.

The most limited access to a vehicle occurs in census tract 2113, where 13.7 percent of workers do not have access to a vehicle. **Table A-7** further illustrates conditions with respect to vehicle access in the study area, including Citywide data.

Table A-7: Vehicle Availability

Geography	Workers 16 years and over in households: Total (Estimate)	Workers 16 years and over in households: No vehicle available (Estimate)	Percent
Census tract 2102	272	18	6.6
Census tract 2113	1,412	193	13.7
Census tract 3101	2,081	164	7.9
Study area	**3,765**	**375**	**9.9**
Houston	**1,014,208**	**52,450**	**5.2**

Source: American Community Survey, Data Set: 2005-2009 American Community Survey 5-Year Estimates; U. S. Census Bureau; compiled by Houston-Galveston Area Council and Roberta F. Burroughs & Associates.

Educational Attainment

Nearly one-fourth (24.0 percent) of persons 25 years and over have a high school diploma or equivalent. This is slightly higher than the comparable figure for Houston, which is 23.3 percent.

Table A-8 contains additional information regarding educational attainment levels in the study area; the table includes Houston data for comparison purposes.

Table A-8: Educational Attainment

Level of Educational Attainment	Census Tracts				Houston
	2102	2113	3101	Study area	
Population 25 years of age and over	33	3,823	3,163	**7,321**	**197,379**
Less than 9th grade	95 28.4%	522 13.7%	782 24.7%	**1,399** **19.1%**	**3,549** **14.4%**
9th to 12th grade, no diploma	35 10.4%	1,511 39.5%	432 13.7%	**1,978** **27.0%**	**159,349** **11.6%**
High school graduate (includes equivalency)	89 26.6%	1,111 29.1%	556 17.6%	**1,756** **24.0%**	**319,598** **23.3%**
Some college, no degree	46 13.7%	372 9.7%	451 14.3%	**869** **11.9%**	**245,110** **17.9%**
Associate's degree	33 9.9%	30 0.8%	145 4.6%	**208** **2.8%**	**60,978** **4.4%**
Bachelor's degree	32 9.6%	109 2.9%	472 14.9%	**613** **8.3%**	**243,984** **17.8%**
Graduate or professional degree	5 1.5%	168 4.4%	325 10.3%	**498** **6.8%**	**144,488** **10.5%**

Source: American Community Survey, Data Set: 2005-2009 American Community Survey 5-Year Estimates; U. S. Census Bureau; compiled by Houston-Galveston Area Council and Roberta F. Burroughs & Associates.

As the table illustrates, the Citywide percentage of persons 25 years and over that have attained some level of post-secondary education is higher than in any component of the study area.

Journey to Work

Nearly eleven percent (10.8 percent) of workers in the study area take transit to work; this is more than double the Citywide figure of 4.8 percent.

Table A-9 contains additional information regarding journey to work in the study area; the table includes Houston data for comparison purposes.

Table A-9: Journey to Work

Geography	Drove Alone	Carpool	Public Transit	Bicycle	Walked	Taxi/ Motor-cycle/ Other	Worked at Home	Total
Census Tract 2102	147	112	7	-	6	-	-	272
Census Tract 2113	804	294	296	51	-	-	15	1,460
Census Tract 3101	1,518	198	109	28	44	80	119	2,096
Study Area	**2,469**	**604**	**412**	**79**	**50**	**80**	**134**	**3,828**
Houston	**755,369**	**140,359**	**48,653**	**3,762**	**21,840**	**17,069**	**31,597**	**1,018,649**

Geography	Drove Alone	Carpool	Public Transit	Bicycle	Walked	Taxi/ Motor-cycle/ Other	Worked at Home	Total
Census Tract 2102	54.0%	41.2%	2.6%	0.0%	2.2%	0.0%	0.0%	100.0%
Census Tract 2113	55.1%	20.1%	20.3%	3.5%	0.0%	0.0%	1.0%	100.0%
Census Tract 3101	72.4%	9.4%	5.2%	1.3%	2.1%	3.8%	5.7%	100.0%
Study Area	**64.5%**	**15.8%**	**10.8%**	**2.1%**	**1.3%**	**2.1%**	**3.5%**	**100.0%**
Houston	**74.2%**	**13.8%**	**4.8%**	**0.4%**	**2.1%**	**1.7%**	**3.1%**	**100.0%**

Source: American Community Survey, Data Set: 2005-2009 American Community Survey 5-Year Estimates; U. S. Census Bureau; compiled by Houston-Galveston Area Council and Lockwood, Andrews & Newnam, Inc.

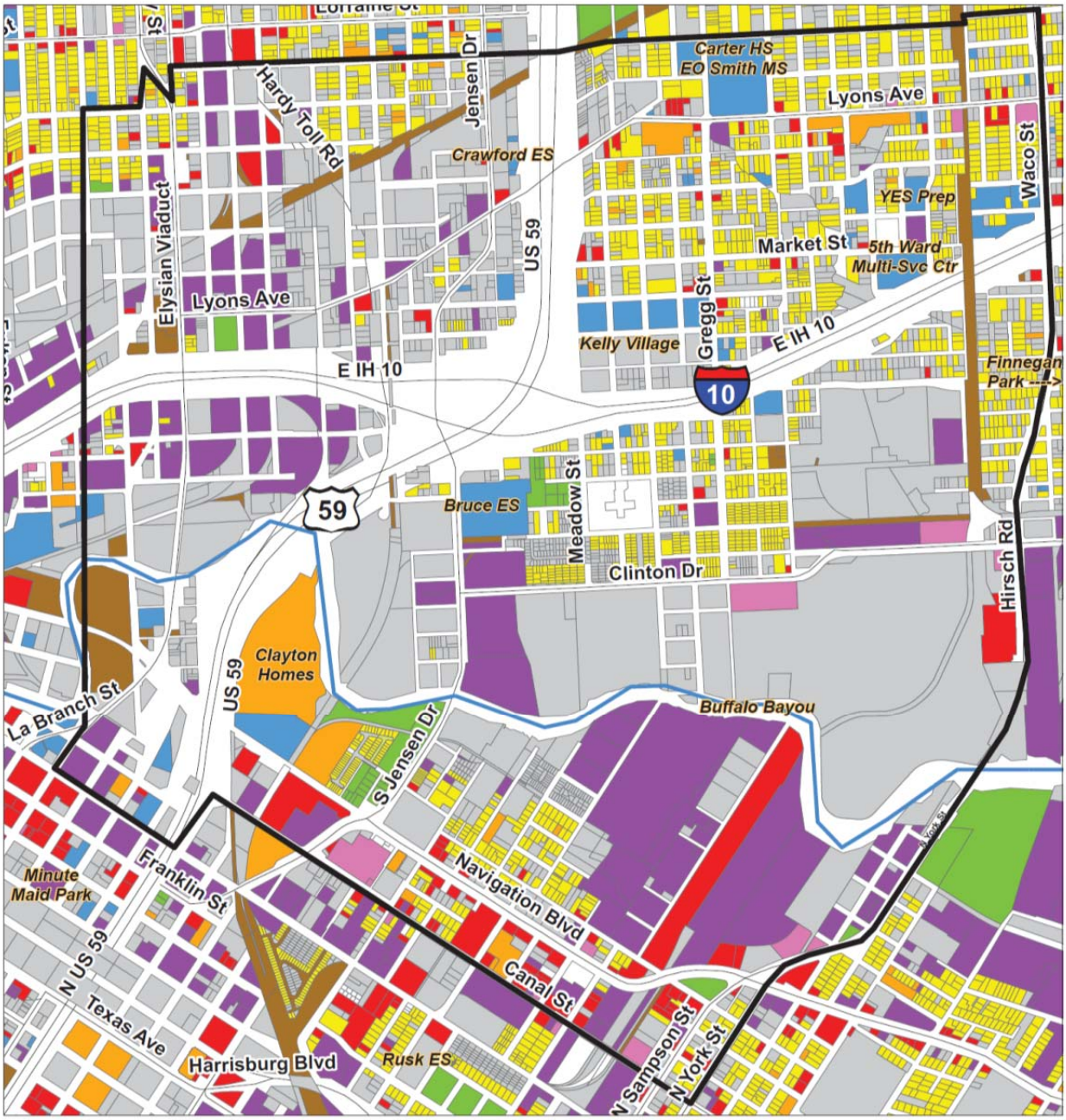
Land Use

Land uses, as coded by the City of Houston Department of Planning and Development, are presented on the map on the following page. The predominant land use in the study area is vacant land, while the historic Fifth Ward area (roughly the upper right quadrant of the map) is mostly single-family residential, interspersed with vacant lots. New single-family construction on small lots (townhouses) has been occurring in the area near Gregg Street and Clinton Drive and is visible Along Buffalo Bayou and west of US 59, there are a number of industrial parcels. Multi-family uses exist along Lyons Avenue; other multi-family properties include the Houston Housing Authority's Kelly Village (coded incorrectly in the City of Houston's data) and Clayton Homes. The white area to the right of the Meadow Street label, vacant at the time of data collection, is also now a multi-family residential complex.

Required Disclaimer:

The information on this map was provided by the Harris County Appraisal District. It appears to represent property boundaries, but was not produced using information from an on-the-ground survey conducted by or under the supervision of a registered professional land surveyor or land surveyor authorized to perform surveys under laws in effect when the survey was conducted

Land Use Map



The information on this map was provided by the Harris County Appraisal District. It appears to represent property boundaries, but was not produced using information from an on-the-ground survey conducted by or under the supervision of a registered professional land surveyor or land surveyor authorized to perform surveys under laws in effect when the survey was conducted

Traffic Signals

The traffic signals in the Fifth Ward study area are owned and operated by the City of Houston. In July 2011, the project team conducted a field inventory of the condition of traffic signals in the study area. The information is compiled below and is shown on the map following the traffic volumes table.

Intersection	Condition of Signal	Condition of Luminaires	Condition of Pavement Markings	Condition of Stop Bar	Condition of Crosswalks	Type of Layout	Condition of Ped Heads and Push Buttons	Curb Ramps Present ?	Ramps have Truncated Domes ?
Jensen / IH 10 (South)	Fair	Fair	Poor	Poor	Poor	Mast Arm	Fair	Yes	No
Jensen / IH 10 (North)	Fair	Fair	Poor	Poor	Poor	Span Wire	Fair	Yes	No
Jensen / Lyons	Fair	Fair	Poor	Poor	Poor	Span Wire	Fair	Yes	No
Lyons / US 59 (West)	Fair	Fair	Poor	Poor	Poor	Mast Arm	Fair	Yes	No
Lyons / US 59 (East)	Fair	Fair	Poor	Poor	Poor	Mast Arm	Fair	Yes	No
Lyons / Gregg	Fair	Fair	Poor	Poor	Poor	Mast Arm	Fair	Yes	No
Lyons / Bringhurst	Fair	Fair	Poor	Poor	Poor	Mast Arm	Fair	Yes	No
Lyons / Benson	Fair	Fair	Poor	Poor	Poor	Mast Arm	Fair	Yes	No
Lyons / Waco	Fair	Fair	Poor	Poor	Poor	Mast Arm - Waco Span Wire - Lyons	Fair	Yes	No
Market / Benson	No signal								
Gregg / IH 10 (South)	No signal								
Gregg / IH 10 (North)	No signal								
Clinton / Jensen	Fair	Fair	Poor	Poor	N/A	Span Wire	N/A	Yes	No
Clinton / Gregg	Fair	Fair	Poor	Poor	N/A	Span Wire	N/A	Yes	No
Clinton / Hirsch	Fair	Fair	Poor	Poor	N/A	Mast Arm - Hirsch Span Wire - Clinton	N/A	Yes - West of Hirsch	No
Navigation / Runnels / Jensen	Fair	Fair	Poor	Poor	Poor	Mast Arm	Fair	Yes	No
Navigation / Canal	Fair	Fair	Poor	Fair	Fair	Mast Arm	Fair	Yes	No
Runnels / US 59	No signal								
Canal / Sampson	Fair	Fair	Poor	Poor	Poor	Mast Arm	Fair	Yes	No
Canal / York	Fair	Fair	Poor	Poor	Poor	Mast Arm	Fair	Yes	No
Navigation / Sampson / York	Fair	Fair	Poor	Poor	Poor	Mast Arm	N/A	Yes	No
Canal / St Charles	Fair	Fair	Fair	Fair	Poor	Mast Arms	Fair	Yes	No
Commerce / Crawford	Fair	Fair	Poor	Poor	Poor	Off Light Poles	Fair no PB	Yes	No
Commerce / Jackson	Fair	Fair	Poor	Poor	Poor	Off Light Poles	Fair no PB	Yes	No
Commerce / Chenevert	Fair	Fair	Poor	Poor	Poor	Off Light Poles	Fair no PB	Yes	No
Commerce / Hamilton	Fair	Fair	Poor	Poor	Poor	Off Light Poles	Fair no PB	Yes	No
Waco / IH 10 (North)	Fair	Fair	Poor	Poor	Poor	Mast Arms	Fair no PB	Yes	No
Waco / IH 10 (South)	Fair	Fair	Poor	Poor	Poor	Mast Arms	Fair no PB	Yes	No

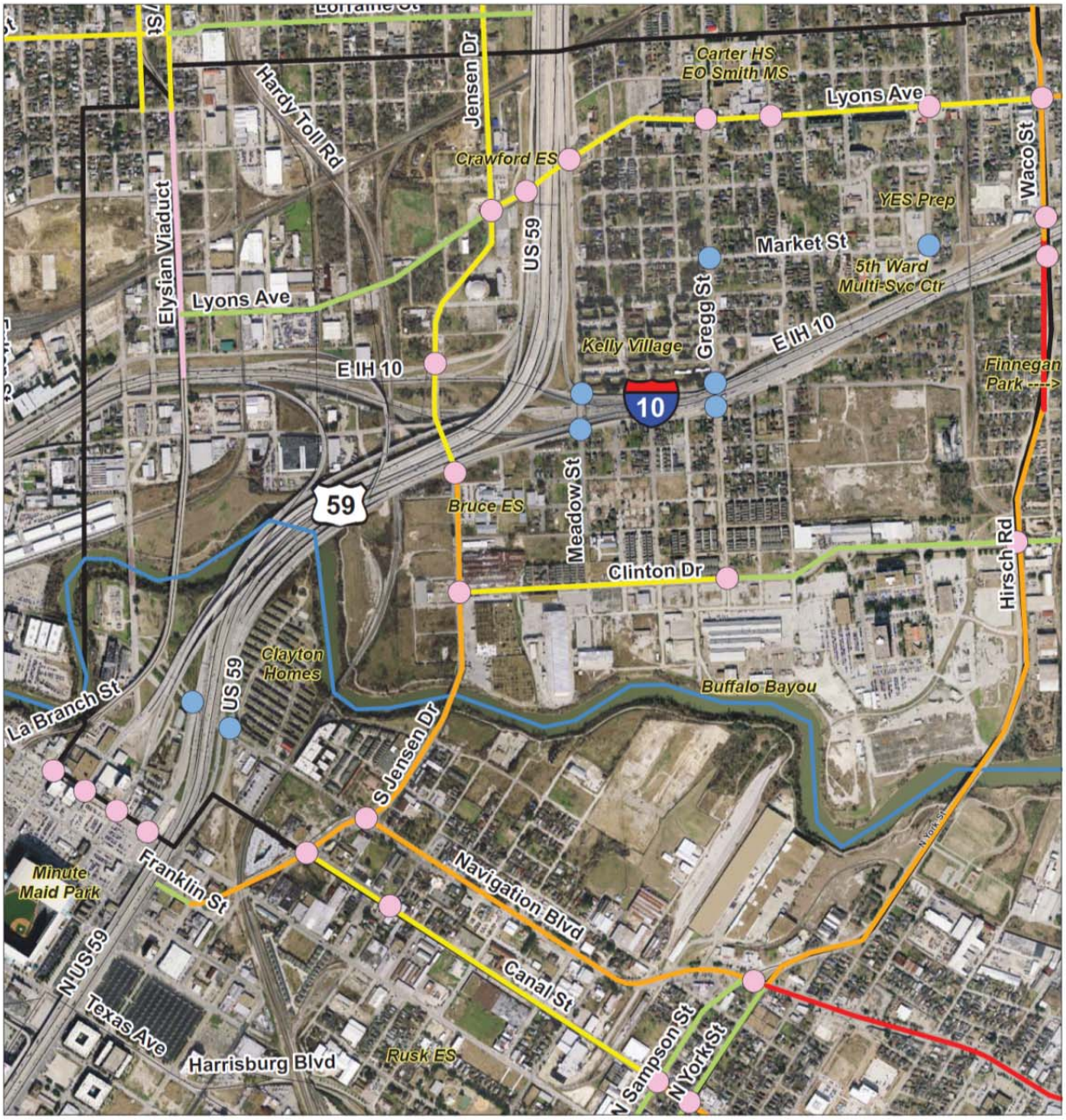
Traffic Volumes

Average daily traffic counts were collected from City of Houston data, published in April 2011. Most counts were conducted in 2009 and 2010. These counts are listed in the tables below and shown on the map on the following page.

STREET	FROM	TO	ADT	Year
Canal	Navigation	Sampson	3,730	2009
Canal	Sampson	Lockwood	6,190	2009
Clinton	Jensen	Gregg	3,172	2009
Clinton	Gregg	Hirsch	2,532	2009
Clinton	Hirsch	Lockwood	2,866	2009
Elysian	IH 10	Harrington	-	2010
Elysian	Harrington	Quitman	4,032	2010
Franklin	Chartres	Navigation	1,050	2011
Fulton	Hogan	Quitman	5,717	2009
Hardy	Harrington	Quitman	4,517	2009
Hogan	N. Main	Cochrane	5,363	2009
Jensen	Navigation	Buffalo Bayou	6,212	2009
Jensen	Buffalo Bayou	Clinton	6,423	2009
Jensen	Clinton	IH 10	7,701	2010
Jensen	IH 10	Lyons	3,786	2010
Jensen	Lyons	Quitman	4,097	2009
Liberty	Quitman	Waco	7,343	2009
LIberty	Waco	Lockwood	3,821	2009
Lorraine	Cochrane	Hardy	4,721	2009
Lorraine	Hardy	Elysian	4,199	2009

STREET	FROM	TO	ADT	Year
Lorraine	Elysian	Jensen	2,654	2009
Lorraine	Jensen	US 59	1,796	2009
Lyons	Crawford	Jensen	2,654	2009
Lyons	Jensen	US 59	3,875	2009
Lyons	US 59	Waco	4,593	2009
Lyons	Waco	Lockwood	7,440	2009
Main	Quitman	Hogan	10,881	2009
Main	Hogan	IH 10	11,774	2009
Sampson	Navigation	Commerce	2,804	2009
Sampson	Commerce	McKinney	2,955	2009
Hirsch	Buffalo Bayou	Gunter	6,202	2011
Waco	Gunter	IH 10	11,604	2009
Waco	IH 10	Lyons	8,236	2009
Waco	Lyons	Liberty	8,871	2009
York	McKinney	Commerce	2,903	2009
York	Commerce	Navigation	2,723	2009
York	Navigation	Buffalo Bayou	6,734	2009
Navigation	Franklin	Jensen	7,155	2009
Navigation	Jensen	York	7,316	2009
Navigation	York	Lockwood	9,941	2009

Traffic Signals and Traffic Volumes Map



N

Fifth Ward Study Area
Traffic Volumes

0 500 1,000 2,000 3,000 Feet

Data provided by City of Houston, April 2011
Most counts dated 2009; some are 2010

Legend

- 5th Ward Study Area
- Bayous
- Major Intersections
  - No Signal
  - Traffic Signal
- Average Daily Traffic
  - Listed but no data
  - 1 - 1,000
  - 1,001 - 3,000
  - 3,001 - 6,000
  - 6,001 - 9,000
  - 9,001 - 12,000
- *Selected Points of Interest*

Appendix B
Phase I Public Process Comment Summary—June 2011

In Phase I of the public input process, the project team interviewed representatives of various area organizations as well as hosted a number of public presentations alone and in conjunction with other scheduled events. These presentations explained the purpose of the project and gathered general input. The representatives are listed below, followed by the dates and locations of public presentations.

- Kathy Payton, Fifth Ward Tax Increment Reinvestment Zone #18
- Luz Navarro, YES Preparatory Academy
- Jennifer Holmes, Fifth Ward Super Neighborhood Council and Executive Director, Julia C. Hester House
- Woody Jones, Respect Houston
- Wiley Henry, Department of Health and Human Services, City of Houston
- Anne Olson, Buffalo Bayou Partnership
- Dorothy Howard
- Yolanda Navarro Black

- Wednesday, May 25, 2011, 12:30 p.m.
  - E. O. Smith Middle School, 1701 Bringhurst Street
- Tuesday, June 21, 2011, 6:30 p.m.
  - The Victual Restaurant, 3814 Lyons Avenue
- Thursday, June 23, 2011, 5:30 p.m.
  - Kelly Village, 3118 Green Street
- Thursday, June 30, 2011, 6:00 p.m.
  - Clayton Homes, 1919 Runnels Street
- Wednesday, August 3, 2011, 4:00 p.m.
  - YES Preparatory Academy, 1305 Benson Street
- Wednesday, August 3, 2011, 6:00 p.m.
  - Fifth Ward Super Neighborhood Council, Fifth Ward Multi-Service Center, 4014 Market Street
- Wednesday, August 10, 2011, 3:00 p.m.
  - Fifth Ward Pedestrian/Bicyclist Special District Study Steering Committee, Fifth Ward TIRZ #18 Offices, 4300 Lyons Avenue
- Thursday, August 11, 2011, 10 a.m.
  - Pleasant Hill Village, 3814 Lyons Avenue

The study team learned that alternative means of travel used by the population of the study area include walking, bicycling (to a lesser extent), and taking advantage of public transportation. Participants expressed that "everyone" needs ways to walk and bicycle within the study area and to locations outside of the study area.

The primary barriers to full access identified by stakeholders are:

- A perception that it is not safe to walk, bicycle, or take the bus, due to loitering, harassment, and the absence of street lights
- A perception that it is not safe to bicycle due to an absence of bike lanes and also due to traffic in existing bike lanes
- The generally poor condition of sidewalks and walking trails, and less frequently, bus stops
- Limited access to locations outside of the study area via bus transportation and infrequent buses
- The difficulty of acquiring bicycles and maintaining them in good condition

A printed survey was distributed at the various events, as well as mailed to persons on the distribution lists used for invitations to the meetings. Results of the printed survey are detailed below. With respect to desired connections, connections to parks and among parks were cited with a high degree of frequency. In addition, both intra-neighborhood and inter-neighborhood connections are desired. Desired intra-neighborhood linkages include connections to the Fifth Ward Multi-Service Center, schools, senior centers, places of worship, and health care facilities. A desired inter-neighborhood connection that was mentioned frequently was a desire to connect to Finnegan Park.

Because Buffalo Bayou, a major hike and bike amenity, traverses the study area, participants in the group sessions were asked whether they use the trail and where they would like to connect to the trail. Most do not use the trail due to its condition and a gap in the trail. A desire for connections from major streets to Buffalo Bayou, especially at Clinton Drive, was cited with some frequency.

Public Survey Results

1. Do you ever walk to places that you need to go?

Yes **16**

No **8**

2. If yes, for what purpose do you walk? (circle all that apply)

- To work **1**
- To doctor, hospital, clinic, or other health care facility **5**
- To park or other recreational facility **7**
  Japhet Creek Park
  Finnegan Park
  Unnamed (5)
- To senior center **2**
- To community center *other than senior center* **2**
- Other (please name a place or places):
  I walk most places
  Farmer St. Garden
  School (2)
  To exercise (2)
  Library
  Store (4)— Fiesta (1), Corner store (1), Unnamed (2)
- Many other places

3. If you answered "no," to #1, please use the space below to explain why you do not walk to places to which you want to travel.

- Because all of these places are far away from my house.
- It's too hot

- Distance and weather
- I'd rather drive; it's too hot outside.
- Sidewalks are in poor condition going from Waco/Rawley up to Lyons; after you cross New Orleans, trees hang over the sidewalk and you have to walk in the street.
- Sidewalks on Rawley are deteriorating, also standing water
- No sidewalk on right hand side going to Hester House
- Cars parked on sidewalk
- No sidewalk on Oates
- Sidewalks are messed up; the best sidewalk is on Solo, Lyons, and near Atherton School.

4. Do you ever take the bus, METROLift, or other public transportation to places that you need to go?

Yes **5**

No **18**

5. If you answered "yes" to #4, where do you travel by bus, METROLift, or other public transportation? (circle all that apply

- To work
- To doctor, hospital, clinic, or other health care facility **3**
- Texas Medical Center (1)
- Unnamed (2)
- To park or other recreational facility **1**
- To senior center **1**
- To community center other than senior center
- Other (please name a place or places):
  Downtown
  To donate blood
  City Hall
  Church
  YMCA
  Buffalo Bayou
  Finnegan Park

6. If you answered "no" to #5, please explain why you don't travel by bus, METROLift, or other public transportation.

- Because I have my own transportation
- Own a car
- I drive my own car.
- Car

7. Do you bicycle to places to which you want to go? (Please circle only one response)

Yes **8**

No **13**

8. If you answered "yes" to #7, to which places do you bicycle? (Please circle all that apply)

- To work **3**
- To doctor, hospital, clinic, or other health care facility
- To park or other recreational facility **6**

Moody Park 1)
Discovery Green (1)
Finnegan Park
Japhet Creek Park
Herman Brown Park
Denver Harbor Park

- To senior center **1**
- To community center other than senior center **2**
  Fifth Ward MSC
  Lindale Park Civic Club
  Ripley House
- Other (please name a place or places):
  Grocery Store
  To exercise
  Restaurants
  Shopping
  Around corner to see friends

9. If you answered "no" to #8, please use the space below to explain why you don't bicycle to places to which you want to go.

- No bicycle (2)
- Bad eyesight
- Drive
- Too far
- Still, I drive to parks and do bicycle.
- In my car
- I'd rather drive.

10. Please state where you would like to see improvements to sidewalks, bike lanes, walking trails, and other transportation facilities in your neighborhood. (Please be as specific as possible, for example, provide block numbers of streets, intersections, and names of other facilities, such as Buffalo Bayou.

- Sidewalks are in poor condition going from Waco/Rawley up to Lyons; after you cross New Orleans, trees hang over the sidewalk and you have to walk in the street.
- Sidewalks on Rawley are deteriorating, also standing water
- No sidewalk on right hand side going to Hester House
- Would like to have METRORail **2**
- Improvement needed at the intersection of Gillespie & Bayou, Baer & Bayou, Buffalo Bayou by Navigation, and all the way through Clinton Drive. to get to Downtown.
- Safer bridge crossings: Buffalo Bayou at Jensen, Hirsch, Lockwood and Wayside.
- I would like a bike trail on the street side of the railroad tracks from Wallisville to Waco.
- 6600 block of Eagle Pass in Denver Harbor, no sidewalks on streets for kids walking to and from school; still have ditches.
- Widen resident streets by getting rid of ditches and adding sidewalks.
- Need more sidewalks.
- Need a sidewalk all around the school to Denver Harbor neighborhoods.
- Maintain heavy traveled streets.

11. What are favorite gathering places in the neighborhood? (Please list below.)

- I would like to go to work (Downtown) every day by bicycle.
- Japhet Creek Park
- Ninfa's
- Fifth Ward Multi-Service Center (2)
- Park (2)
- Parks, museums and schools
- Not sure
- Grandmother's house
- Pleasant Hill Church
- None; I am basically at home. I don't go to a senior center

12. Please use the space below to make any additional comments. If necessary, you may also use the other side of the page to continue your comments.

- Need improvements in the area for every walkway access to downtown. We are so close, but still feel unsafe.
- All people would benefit from sidewalks and bike trails. If they were available, I would use them.
- Well, I scarcely use sidewalks, but I think it is good to have these sidewalks for protection for people or children who ride bicycles or just walk to any place. I think sidewalks are useful to drop or pick up students from schools or bus stops.
- Lot of crime; used to walk to Atherton School by Hester House. The sidewalk is messed up around Atherton. Abandoned houses breed places for crime; that is why I stopped walking.
- Not sure

The map on the following page depicts the general public input and concerns expressed prior to the development of specific project recommendations.

Map of Initial Public Input Summary

N

Fifth Ward Study Area
Public Input Summary

0 500 1,000 2,000 3,000 Feet

Based on public comments June-August 2011

Legend

- Dangerous Areas
- Park Access
- Other Destinations
- Desired Connections
- Bayous
- 5th Ward Study Area

Selected Points of Interest

Appendix C
Public Input Workshops—August and September 2011

Purpose and Location

The consultant team conducted seven public input workshops in August and September 2011, both standalone activities and in conjunction with other community meetings. It should be noted that greater turnout and more enthusiastic responses were gained by scheduling workshops as part of already-planned events, for example, the regularly-scheduled meetings of the Second and Fifth Ward Superneighborhood Councils.

Notifications and Attendance

Meeting notice flyers were mailed to all persons on the project mailing list, including attendees of the June project kickoff, and approximately 700 residents and property owners adjacent to the proposed improvements (collected from Harris County Appraisal District records).

A total of eighty-two people attended the workshops, from a low of two at the J. W. Peavy Senior Center to a high of twenty at Kelly Village.

Meeting Format and Voting Summary

Each workshop was conducted in an open house format, where attendees were shown display boards consisting of the goals and objectives of the study, a map of the project recommendations, and lists of the improvements with descriptions. They were given five adhesive dots and asked to place the dots next to the descriptions for the improvements they felt were the highest priority. The total votes by event are tallied below.

	Votes by Public Meeting Location/Date								
Improvement Number	Clayton Homes 8/25/2011	The Victual 8/29/2011	Kelly Village 8/30/2011	Second Ward 9/6/2011	Fifth Ward 9/7/2011	Finnegan Park 9/8/2011	Peavy Center 9/10/2011	Sent Via Fax 9/13/2011	Total Votes
1	3	5	12	1	4	10	2	0	**37**
2	2	4	10	1	3	5	0	0	**25**
3	3	1	3	0	2	2	2	1	**14**
4	3	7	2	0	2	9	0	1	**24**
5	4	1	7	1	4	18	0	1	**36**
6	3	2	0	1	0	0	1	0	**7**
7	2	5	8	4	1	6	2	0	**28**
8	4	6	2	6	1	5	0	0	**24**
9	2	0	3	3	2	5	1	1	**17**
10	8	0	6	6	1	1	0	0	**22**
11	1	3	3	0	2	10	0	0	**19**
12	4	0	4	5	0	2	0	0	**15**
13	10	1	11	0	0	6	0	0	**28**
14	1	1	4	0	1	8	0	0	**15**
15	6	3	2	7	1	1	0	0	**20**
16	3	6	1	2	4	0	1	0	**17**
17	1	8	4	1	1	2	1	0	**18**
18	1	0	8	0	0	2	0	0	**11**
19	1	2	1	0	3	0	0	0	**7**
20	1	1	5	1	1	0	0	1	**10**
21*	1	6	3	3	0	3	0	0	**16**
							Total Votes		**410**
*something not listed							**Total Participants**		**82**

(A) = Improve safety of bayou crossings, especially Jensen and Hirsch/York

(B) = Better Continuity of Buffalo Bayou Trail at McKee Street (will be addressed with planned trail extensions)

Reference List of Recommendations

1. Lyons Avenue Bike Lane Coloration
2. Sidewalks and Reconfiguration of Gregg Street
3. Sidewalks and Reconfiguration of Market Street
4. North-South Rail Trail
5. Connections from New Trail to Finnegan Park
6. East-West Baron Street "Bike Boulevard"
7. Jensen Drive Sidewalks and Connection to Bayou
8. Rail Bridge near Clayton Homes and Connections to Jensen Drive
9. McKee and Hardy Streets Bicycle Improvements
10. Walkway under US 59 north of Minute Maid Park
11. Widened Sidewalks on Waco Street Overpass
12. Median Changes and New Crosswalks on Runnels Street
13. New Sidewalks near Bruce Elementary School
14. New Sidewalks near Crawford Elementary School
15. Sidewalks and Reconfiguration of South Jensen Drive
16. New Sidewalks near Multi-Service Center and YES Preparatory School
17. New Crosswalks and Study of Potential New Traffic Signal at Lyons Avenue and Pannell Street
18. New Sidewalks on Meadow Street / US 59 feeder
19. New Sidewalks on Hare Street / IH 10 feeder
20. Additional Wayfinding Signage throughout Study Area
21. Something Else Not Listed

Other Comments Received

Participants were given the option of selecting a #21, "Other," on the list of recommendations, with index cards available to write further details. Sixteen participants took advantage of this opportunity. The list below itemizes what they added, as well as other general comments received at the workshops.

- Improve safety of bayou crossings, especially Jensen and Hirsch/York.
- Better continuity of Buffalo Bayou Trail at McKee Street (is needed).
- Need to have more study about the traffic system.
- (Desire for) McKee Bridge bike path connecting east and west Bayou bike paths
- I would like a trail for walking or cycling; something safe for seniors in this area (vicinity of Pleasant Hill Village)
- If improvements can be done, an excellent opportunity exists to connect from Wallisville Road to Jensen Drive by the railroad crossing. The only large Fiesta store is impossible to access if there is a train. Also, need a pedestrian crossing at the Lyons/Waco/Benson railroad crossing.
- On Lyons between Shotwell @ Sakowitz, a railroad crossing is needed for pedestrians or on Wallisville @ Sakowitz. The only large store – Fiesta □ is impossible to access if there is a train. Also, we need a pedestrian crossing at the Lyons@Waco and Benson/Railroad crossing. All bike trails need to be wide enough for electric wheelchairs.
- Bike ramp (is needed).
- Need protected left turn light near Bruce Elementary (on Nance Street). It's hard to pick up children.
- (Need) a well marked bike lane on Lyons Avenue *(this would be addressed with project #1, the lane coloration)*

- Need better access for motorized scooters (to get from Pleasant Hill Village to Multi-Service Center, to Market @ Gregg, and to churches near Pleasant Hill Village
- There needs to be a completed sidewalk on Sydnor Street from 1500 Sydnor to the Kelly Village apartments (no sidewalk that is good enough for pedestrians.)
- Need more inclusive learning classes (most people have no clue of bike laws).
- Review lighting to see where repairs are needed, especially on Lyons and Gregg.
- I really like the option of colored bicycle lanes.
- It is extremely important to connect with Downtown through Canal Street. There is an underpass with a sidewalk in front of the beautiful town homes that lead to railroad tracks.
- Please consider the cross modal option from Fifth Ward through Second Ward to UH and TSU (on Sampson/York/Lockwood etc.)

Appendix D
Public Agency Input Workshop—September 2011

Purpose and Location

As part of the series of meetings aimed at gathering input on the draft recommendations, the consultant team hosted an informational meeting for public agencies and non-profit organizations working in and around the study area. The purpose was to inform these entities of the study progress, brief them on the project recommendations, and spur interest among the various agencies and organizations to work together to aid implementation of the recommendations. The meeting was held at H-GAC offices, on Thursday, September 8, 2011, at 10:00 am.

Notifications and Attendance

Representatives of the organizations listed below were contacted by e-mail and phone to invite them to the meeting.

- Avenue Community Development Corportation
- BetterHouston.org
- Buffalo Bayou Partnership
- City of Houston Planning & Development Department
- City of Houston Public Works Department
- East Downtown Management District
- Greater East End Management District
- Houston Habitat for Humanity
- Houston Housing Authority
- Houston Parks Board
- Houston Quality of Life Coalition
- METRO
- Near Northside Management District
- Tax Increment Reinvestment Zone #18
- Texas Department of Transportation

Meeting Format and Comments

The meeting was conducted as a presentation of the project recommendations followed by open discussion of the various organizations' comments, suggestions, and related project efforts. Comments from the participants are listed below.

- Maintenance is an issue for green striping and condensation is a factor in the type of material that is optimum.
- With respect to the Gregg Street shared roadway recommendation, easement has been received.
- Citizens are concerned about the security aspects of constructing new sidewalk under US 59 from Runnels Street to Ruiz Street.
- Structural changes cannot be made to the Jensen Drive Bridge because of its historic nature, but cosmetic changes are acceptable. The Waugh Drive bridge over White Oak Bayou was cited as an example of a situation where this was resolved by placing a new rail on the inside.
- The HAWK signal proposed for Lyons @ Pannell is a short-term recommendation; in the long term, a traffic signal is recommended. It may be difficult to obtain a traffic signal at that location, but the fact that a senior housing facility is located there may help.
- The Studemont/Allen Parkway bridge and the Fulton/Irvington intersection are prototypes for the Waco Street bridge changes.

- The East End District likes the rail trail proposal (Recommendation #4) because they have plans to improve York/Sampson
- A Japhet Creek Park/Finnegan Park/Buffalo Bayou connection would be beneficial
- Community Development Block Grant funds are allocated for Houston HOPE Area and a project in the vicinity of the Elysian Viaduct has been funded.
- Federal, state, and local guidelines differ, so TXDOT needs more dialogue about the bridge that crosses TXDOT right-of-way to determine the feasibility of Recommendation #8).
- Fifth Ward TIRZ wants a concentration of projects selected for the final plan so that the study's results are visible.
- It is important that some of the projects reflect priorities identified by participants in Phase II of the citizen input process.
- The display map needs to show more of the surrounding vicinity to demonstate area impact.
- It would be a good idea to display the sidewalk conditions and the recommendations on the same map.

Appendix E
TxDOT Construction Cost Bid Items

TxDOT - AVERAGE LOW BID UNIT PRICES - DISTRICT 12 (HOUSTON) as of 7/28/11			
ITEM NO	DESCRIPTION	UNITS	UNIT PRICE ($)
104 2015	REMOVING CONC (SIDEWALKS)	SY	7.33952
104 2017	REMOVING CONC (DRIVEWAYS)	SY	6.26221
104 2021	REMOVING CONC (CURB)	LF	2.09689
105 2013	REMOVING STAB BASE & ASPH PAV (9")	SY	5
110 2001	EXCAVATION (ROADWAY)	CY	2.69618
160 2004	FURNISHING AND PLACING TOPSOIL (6")	SY	1.03589
162 2002	BLOCK SODDING	SY	1.9
260 2014	LIME TRT (SUBGR)(DC)(6")	SY	2.226
464 2022	RC PIPE (CL IV)(24 IN)	LF	30
465 2001	INLET (COMPL)(TY C)	EA	2373.69624
529 2004	CONC CURB & GUTTER (TY II)	LF	10.91624
530 2010	DRIVEWAYS (CONC)	SY	42.14658
531 2004	CONC SIDEWALKS (6") - used for multi-use trail (with lime subgrade)	SY	56.17378
531 2011	CURB RAMPS (TY 8)	EA	1203.52941
531 2035	CONCRETE SIDEWALKS (5')(4")	LF	18.64968
531 2043	CONC SIDEWALKS(6' wide)(5")	LF	22.98426
636 2001	ALUMINUM SIGNS (TY A)	SF	19.06685
644 2001	INS SM RD SN SUP&AM TY 10BWG(1) SA(P)	EA	331.82501
644 2060	REMOVE SM RD SN SUP & AM	EA	60.53606
662 2004	WK ZN PAV MRK NON-REMOV (W) 4" (SLD)	LF	0.1448
662 2016	WK ZN PAV MRK NON-REMOV (W) 24" (SLD)	LF	1.25609
662 2032	WK ZN PAV MRK NON-REMOV (Y) 4" (SLD)	LF	0.15544
666 2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF	0.28928
666 2046	REFL PAV MRK TY I (W) 24"(SLD)(060MIL)	LF	2.95
666 2048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	LF	4.79721
666 2111	REFL PAV MRK TY I (Y) 4" (SLD)(100MIL)	LF	0.29467
666 2132	REFL PAV MRK TY I (Y) 24"(SLD)(100MIL)	LF	3.72044
666 2145	REF PAV MRK TY II (W) 4" (SLD)	LF	0.1202
666 2157	REF PAV MRK TY II (W) 24" (SLD)	LF	2.5
666 2185	REF PAV MRK TY II (Y) 24" (SLD)	LF	1.7
668 2132	PREFAB PAV MRK TY C (W) (BIKE SYMBOL)	EA	85
677 2001	ELIM EXT PAV MRK & MRKS (4")	LF	0.26845
677 2015	ELIM EXT PAV MRK & MRKS (SYMBOL)	EA	46.15385
678 2001	PAV SURF PREP FOR MRK (4")	LF	0.01062
678 2006	PAV SURF PREP FOR MRK (24")	LF	0.10334
6473 2001	MULTIPOLYMER PAV MRK (W)(4")(SLD)	LF	0.81642
6473 2011	MULTIPOLYMER PAV MRK (Y)(4")(SLD)	LF	2.00831
6473 2021	MULTIPOLYMER PAV MRK (W)(24")(SLD)	LF	4.24641
6473 2022	MULTIPOLYMER PAV MRK (Y)(24")(SLD)	LF	5.65809
6920 2001	CCTV FIELD EQUIPMENT	EA	8851.66647
6986 2007	PREFB PV MK W/WNTY TY B(W)9"(BRK)CNTST	LF	5.81862

TxDOT - AVERAGE LOW BID UNIT PRICES - DISTRICT 12 (HOUSTON) as of 7/28/11 (continued)			
ITEM NO	DESCRIPTION	UNITS	UNIT PRICE ($)
6986 2017	PREFAB PV MK W/WNTY TY B(W)12"(BRK)CNS	LF	7.5249
7288 2001	FIBER REINFORCED POLYMER PATCH MATERIA	LB	1.9341
7590 2001	REMOVE AND REPLACE WOODEN BOLLARD	EA	200
8020 2003	REF PROF PAV MRK TY I(W)4"(SLD)(100MIL	LF	0.86446
8020 2005	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL	LF	0.8
8048 2001	RADAR VEHICLE SENSING DEVISE	EA	4900.76143
8067 2001	CAMERA POLE STRUCTURE	EA	7587.94
8260 2001	LED COUNTDOWN PEDESTRIAN MODULE	EA	328.98406
8317 2001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA	5670
8368 2003	CONDUIT (PREPARE)	LF	0.90633
8445 2001	F O VIDEO DAT TX (S/M)	EA	1015.33217
8445 2002	F O VIDEO DAT RX (S/M)	EA	665.36267
8519 2001	INS DEC ILLUM ASSM 40T-8	EA	300
8519 2002	INS DEC ILLUM ASSM 40T-8-8	EA	350
8519 2003	INS DEC ILLUM ASSM 30S-8	EA	300
8530 2001	DECORATIVE POLE LIGHTING ASSEMBLY	EA	2575
8544 2001	SATELLITE CONTROL BUILDING	LS	490115.24
8545 2001	SPECIAL GROUND BOX	EA	973.76403
8577 2001	INSTALL DYNAMIC MSG SIGN	EA	4460.22
8630 2001	CONCRETE LIGHT POLES (25 FT)	EA	1400
8630 2002	CONCRETE LIGHT POLES (35 FT)	EA	1400
8631 2001	POLE MOUNTED LIGHT FIXTURES (TY A)	EA	700
8631 2002	POLE MOUNTED LIGHT FIXTURES (TY A1)	EA	700
8631 2003	POLE MOUNTED LIGHT FIXTURES (TY A2)	EA	700
8631 2004	POLE MOUNTED LIGHT FIXTURES (TY A3)	EA	700
8668 2001	REMOVE CAMERA POLE STRUCTURE	EA	4000
8703 2001	ACCESSIBLE PEDESTRIAN SIGNAL UNITS	EA	960.98048
8719 2001	REMOVE HIGH MAST ILLUMINATION POLES	EA	2019.33
8720 2001	LED UNDERPASS LIGHT ASSEMBLY	EA	1024.47
8721 2001	CTMS RELOCATION (DMS)	EA	13000
8721 2002	CTMS RELOCATION (ELEC CONDR)	LF	2
8721 2003	CTMS RELOCATION (CCTV)	EA	3050.08
8721 2004	CTMS RELOCATION (HUB BUILDING)	EA	20000
8721 2005	CTMS RELOCATION (COMM CABLE)	LF	2
8721 2006	CTMS RELOCATION (FIBER OPTIC CABLE)	LF	5
8722 2001	DATA FIBER OPTIC TRANSCEIV (SINGLEMODE	EA	1438.32
8728 2001	UNDERWATER CONTROL CABLE REPLACEMENT	LS	50000
8731 2001	LED AREA TYPE LIGHTING FIXTURE AND POL	EA	4000
8739 2001	CAMERA POLE STRUCTURE WITH CABINET	EA	11312.6425
8756 2001	INSTLN OF DYM MSG SIGN SYS(POLE MTD)	EA	11874.20857
8777 2001	LED RDWY LUMINAIRE (.25KW EQ)	EA	945.86
8780 2001	6-PORT HARDENED ETHERNET SWITCH W/VDSL	EA	1740
8781 2001	9-PORT HARDENED ETHERNET SWITCH	EA	1620
8782 2001	19-PORT HARDENED GIGABIT ETHERNET SWCT	EA	9450

Appendix F
Air Quality Benefits

Premise of Benefits

The objective of the overall Pedestrian/Bicyclist Special Districts Program is to fund strategic investments in walk/bike facilities to improve safety and mobility. Several of the project recommendations are to provide attractive and functional sidewalks in the areas in which they are most needed, namely where sidewalks do not exist, or where existing sidewalks have deteriorated and are in poor condition. Other improvements enhance pedestrian safety, through illumination, signalization, signage and striping. These improvements in the pedestrian environment will make this travel mode more attractive. It will also increase the attractiveness of transit as a travel mode, as transit patrons typically access the transit on foot. Additionally, the recognition of bicycle travel through bicycle rack installation at visible locations near destinations, will make this travel mode more visible and more attractive. The net result anticipated is a modest decrease in automobile trips, vehicle miles traveled, and associated vehicle emissions.

Key Data and Assumptions

- 28,407 vehicle trips in Traffic Analysis Zones (see Table F-1)
- 10.31 miles per vehicle trip
- 0.9% reduction in vehicle trips due to projects
- intrazonal vehicle type mix appropriate to local streets

Results

- VOC reduced: 1.318 kg/day
- NOx reduced: 2.715 kg/day

Calculations

There are very few studies on the effect of microscale pedestrian improvements on travel patterns. The "Making the Land Use, Transportation, Air Quality Connection" (LUTRAQ) demonstration project is one such study (1,000 Friends of Oregon (1993). Making the Land Use Transportation Air Quality Connection—The Pedestrian Environment—Volume 4A. Available at: http://ntl.bts.gov/DOCS/tped.html) Special attention was given to the quality of the pedestrian environment as gauged by the Pedestrian Environment Factor (PEF), a composite measure of "pedestrian friendliness". The four variables included in the PEF are: ease of street crossings, sidewalk continuity, local street characteristics (grid vs. cul-de-sac) and topography. Each of these is given a score of 1-3, resulting in a maximum PEF score of 12. Most significant to this project was the finding that a higher PEF score for a zone was accompanied by a lower automobile mode share for that zone. A one-point increase in PEF was accompanied by a decrease in automobile mode share of 1.8 percent.

The sidewalk improvements proposed here will increase sidewalk and bicycle trail continuity along approximately 20,000 linear feet of neighborhood streets in the study area. Although PEF was not field-verified, this improvement is expected to increase the PEF score by 1 based on sidewalk continuity benefits. While the Portland study would suggest a 1.8 percent decrease in automobile mode share, H-GAC estimates a more conservative 0.9 percent decrease.

H-GAC's travel demand model uses Traffic Analysis Zones (TAZs) bounded by major streets and physical features. The TAZs approximating the study area, and the total number of vehicle trips in those TAZs, are shown in Table F-1 on the following page.

Table F-1: TAZs approximating Fifth Ward study area					
TAZ	**North boundary**	**South boundary**	**West Boundary**	**East Boundary**	**Vehicle Trips**
182	Buffalo Bayou	Ruiz Street	Elysian Street	US 59	118
183	Buffalo Bayou	Ruiz Street	Buffalo Bayou	Elysian Street	-
266	Lyons Avenue	IH 10	US 59	Waco Street	2,522
267	US 59	Buffalo Bayou	Buffalo Bayou	Jensen Drive	799
268	Melva Street	Buffalo Bayou	Jensen Drive	Hirsch Road	3,442
269	IH 10	Melva Street	Jensen Drive	Hirsch Road	3,294
285	Southern Pacific RR	Lyons Avenue	US 59	Waco Street	3,239
646	Buffalo Bayou	Commerce Street	US 59	Jensen Drive	835
647	Navigation Boulevard	Commerce Street	Jensen Drive	Milby Street	5,273
648	Buffalo Bayou	Navigation Boulevard	Jensen Drive	Milby Street	2,829
1471	IH 10	Southern Pacific RR	San Jacinto Street	Elysian Street	1,771
1473	Southern Pacific RR	Buffalo Bayou	San Jacinto Street	Elysian Street	426
1474	IH 10	Buffalo Bayou	Elysian Street	US 59	1,071
1477	Lorraine Street	Lyons Avenue	Hardy Street	US 59	2,232
1478	Lyons Avenue	IH 10	Hardy Street	US 59	556
Total Vehicle Trips in Study Area TAZs					**28,407**

The total number of automobile trips generated by these zones is 28,407 per day according to data from the regional travel model, provided by David Gao of H-GAC on September 21, 2001. The average vehicle trips distance for the region is 10.31 miles, from the same source.

VMT reduced are calculated to be 2,636 per day based on multiplication of the average trip distance (10.31), number of vehicle trips in the zone (28,407) and the percentage of trips reduced by the project (0.9%).

10.31 x 28,407 = 292,876

292,876 x 0.009 = 2,636 mi/day

Vehicle emissions are calculated by multiplying VMT by the weighted average emission rates by vehicle type (average emission rates by vehicle type multiplied by the fraction of such vehicles measured regionally on the Local (intrazonal) road type as shown in Table F-2 below).

Table F-2: Vehicle Mix and Average Emission Rates by EPA Vehicle Type									
Vehicle Type	**LGDV**	**LDGT1**	**LDGT2**	**HDGV**	**LDDV**	**LDDT**	**HDDV**	**MC**	**All Vehicles**
Local Road Mix	59.0%	24.2%	7.2%	3.2%	0.2%	0.3%	5.9%	0.1%	**100%**
Emissions									
VOC (g/mile)	0.40	0.47	0.45	1.36	0.06	0.10	1.12	4.65	**0.50**
NOx (g/mile)	0.62	0.66	0.77	3.87	0.50	0.54	5.58	0.97	**1.03**

VOC = 2,636 mi/day x 0.5 g/mi = 1,318 g/day = 1.318 kg/day

NOx = 2,636 mi/day x 1.03 g/mi = 2,715 g/day = 2.715 kg/day

Appendix G
Glossary

Acronyms

ADA	Americans with Disabilities Act
CMAQ	Congestion Mitigation and Air Quality
COH	City of Houston
GEEMD	Greater East End Management District
HCTRA	Harris County Toll Road Authority
H-GAC	Houston-Galveston Area Council
HHA	Houston Housing Authority—owner/operator of public housing in the study area, including Clayton Homes, Kelly Village, and Kennedy Place
HISD	Houston Independent School District
METRO	Metropolitan Transit Authority of Harris County, Texas—transit agency providing service throughout the Houston metro area
TAS	Texas Accessibility Standards—local interpretation of ADA
TDLR	Texas Department of Licensing and Regulation—administers ADA/TAS in Texas
TIRZ	Tax Increment Reinvestment Zone
TxDOT	Texas Department of Transportation—owns and maintains all numbered state highways, including US 59 and IH 10
USDOJ	United States Department of Justice—administers ADA nationwide

Terms/Names

Median	A landscaped area between two sets of travel lanes on a roadway
Ped	Abbreviation for pedestrian
Ped Button	A push button on a pole or other surface near a traffic signal; pushing it indicates to the traffic signal the presence of pedestrians desiring to cross the roadway.
Road Buttons	A glass, plastic, metal or hard rubber reflector mounted on the roadway surface; generally larger, taller, or more prominent than standard lane markings; some models contain lights. They are used to provide visual delineation and tactile feedback about lane edges or crosswalks.
Speed Bump	A device affixed to or part of the roadway; generally 3-4 inches in height and width; intended to slow traffic almost to a halt.
Speed Hump	A larger and more gentle version of a speed bump, a hump is typically 4-5 feet or more in width and less abrupt than a bump; intended to slow but not stop traffic.
Stop Bar	A wide stripe across the travel lanes of a roadway to indicate where traffic should stop while the traffic signal is red. It is placed behind any crosswalks.

Credits

Houston-Galveston Area Council

Gina Mitteco, AICP

Fifth Ward Tax Increment Reinvestment Zone (TIRZ 18)

Harvey Clemons, Jr.

Richard Farias

Kathy Flanagan Payton

Eleanor Jones

Edwina Loche

Fifth Ward Community Redevelopment Corporation

Rosalind Walton

Gregory Austin

City of Houston

Ralph De Leon—Finance & Economic Development

Diana Ponce de Leon—Planning & Development

Anna Sedillo—Planning & Development

Daniel Raine, AICP—Public Works & Engineering

Lockwood, Andrews, & Newnam, Inc.

David Manuel, AICP

Michael Feeney, PE

Charles "Chip" Taylor, PE

Thomas Duncan, PE

Thomas Gerrity, PE

Joseph Bates, EIT

Pamela Gutierrez

Roberta F. Burroughs & Associates

Roberta Burroughs, FAICP

Darnetta Nelson

Isaac Ramirez

Nelson\Nygaard Consulting Associates

Michael King, RA

Ellen Oettinger, AICP

Will Sherman