BF 1960

Access Management Plan

October 2011

Kimley-Horn and Associates, Inc.

In association with

Kendig Keast Collaborative
The Lentz Group
CJ Hensch & Associates, Inc.

Project Partners:

Houston-Galveston Area Council (H-GAC)
Texas Department of Transportation
City of Humble
Harris County
City of Houston

BF 1960
Access Management Plan

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EXIT


TAMALES

Chapter 1 Introduction

Since 1974, the Houston-Galveston Area Council (H-GAC) has served as the metropolitan planning organization (MPO) for transportation planning in the eight-county Houston region, which encompasses Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties (see Figure 1-1). H-GAC functions to ensure that the region's transportation taxes are spent effectively to improve mobility, support economic progress, and safeguard the environment. Each year, H-GAC oversees the investment of more than $3 billion in transportation improvement projects and provides a forum for interagency cooperation and public input into funding decisions. H-GAC also sponsors and conducts studies, assists county and municipal planning agencies, and monitors compliance with national air quality standards. H-GAC's Transportation Policy Council approves the Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP).

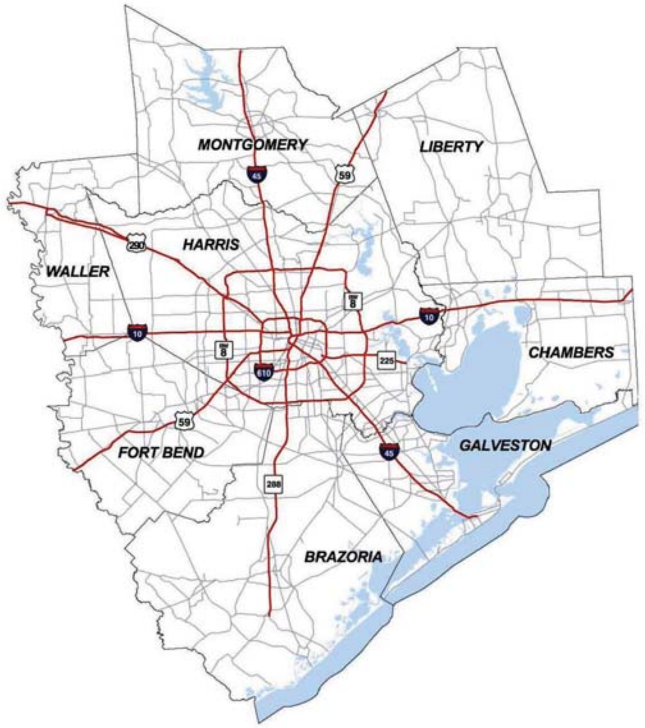


Figure 1-1: Metropolitan Planning Area

According to H-GAC's Regional Transportation Plan (RTP) — see Figure 1-2 — the Houston-Galveston region's population is expected to reach 8.8 million by 2035. Employment forecasts reflect similar growth with jobs reaching approximately 4 million by 2035 (source HGAC 2035 RTP). This provides

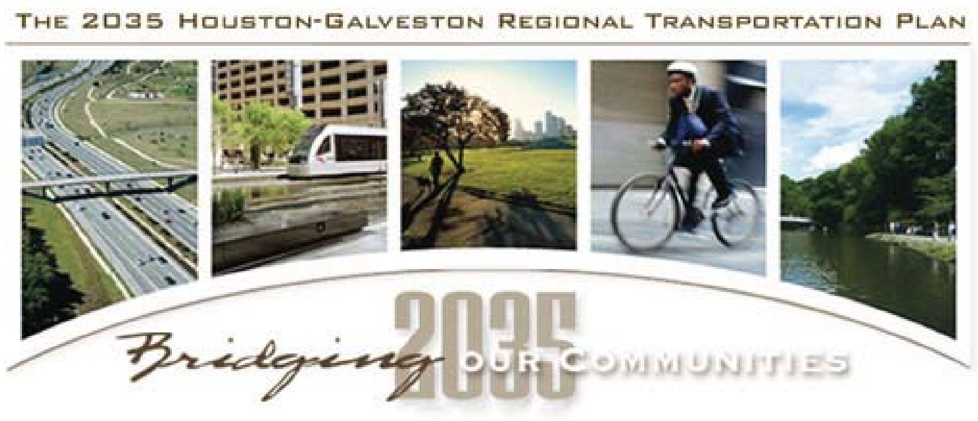


Figure 1-2: H-GAC Regional Transportation Plan located at www.h-gac.com/taq

potential for many opportunities for economic growth and diversification of the local economy, but in-turn, presents many challenges to the natural and built environment. The regional transportation network is one such challenge. If the transportation network cannot provide an acceptable level of service (LOS) along the main travel corridors, the economy, community, and environment will suffer.

Providing a viable transportation system to accommodate projected regional growth involves building new roadways, adding transit, encouraging mode-diverse corridors, and managing access and demands for system travel. "Access management" is a set of strategies designed to enhance transportation improvements while making best use of existing transportation facilities. Using strategies such as intersection capacity improvements, adequately spaced driveways, raised medians, encouragement of mode diversity and land-use planning, access management can significantly improve the level of efficiency, effectiveness, and most importantly, safety of the transportation system. H-GAC has studied and prepared recommendations tor the BF 1960 corridor for this purpose.

1.1 Purpose

The purpose of this corridor study is to identify transportation improvements along BF 1960 that reduce crashes, improve traffic flow, reduce motorist delay, and address multimodal / land use context. The corridor study area (Figure 1-3) is defined as the southern section of BF 1960 — from FM 1960 West (just west of Lee Road) to FM 1960 East (east of Humble) — and is approximately 4 miles in length. BF 1960 is a two-lane arterial that serves as an east / west route for access to area businesses and residences, and connects to major intersecting roadways, including FM 1960 and US 59. FM 1960 is a six-lane divided major arterial that functions as a bypass to the area and the primary east / west mobility option linking retail, commercial, and residential developments. US 59 is a major north / south freeway that connects commuters to downtown Houston, the airport, and other major facilities along the corridor.

Figure 1-3: Corridor Study Area

The BF 1960 study will collect sufficient information to measure and evaluate a range of viable short-, medium-, and long-term improvement concepts. These improvements will include a phased infrastructure enhancement plan by jurisdiction as well as long-term improvement recommendations such as a conceptual strategy for growth provide guidance without hindering future development. In addition, this study will provide estimated cost and address cost-benefit and cost-effectiveness of the proposed solutions.

1.2 Project Team

H-GAC partnered with the Texas Department of Transportation (TxDOT) to fund the study through Surface Transportation Program. The consultant team was selected December 2010, with the first kickoff meeting being held the following March. The agency and jurisdictional partners outlined below were invited to attend.

Agency and Jurisdictional Partners:	H-GAC TxDOT Harris County City of Humble City of Houston
Consultant Team:	Kimley-Horn and Associates, Inc. Kendig Keast Collaborative CJ Hensch & Associates, Inc. The Lentz Group

1.3 Study Process

The study process followed a context sensitive solutions (CSS) approach where broad ownership is built into the plan. Citizens and stakeholders are challenged, through a series of meetings, to assist in identifying issues, goals, and solutions. At appropriate stages during the process, public meetings, stakeholder meetings, and steering committee (defined in Chapter 2) meetings were conducted to help the team refine goals and options and give overall guidance. The project steering committee had a crucial role in providing the team with insightful guidance and review oversight. The study team used guidance from these various groups to identify and evaluate appropriate access management and mobility tools that best fit the public's issues and desires. The recommended solutions were balanced with regional mobility needs to achieve long-term community and regional goals. Figure 1-4 illustrates the study's general schedule.

Figure 1-4: Study's General Schedule

Chapter 2
Public Involvement Process

An important aspect of the project was actively engaging the public. To ensure a transportation planning process that supports early and continued public participation, H-GAC has developed a project-specific public involvement plan in accordance with their overall public involvement commitment to provide complete information, timely public notice, and full public access to key decisions (H-GAC Transportation Public Participation Process adopted by the Transportation Policy Council July 27, 2007).

The public involvement activities for BF 1960 Access Management Study provided ongoing information exchange. Arriving at consensus on short- and long-range alternatives during the study process enabled the next phase of programming improvements and design to focus on implementation details rather than big-picture issues. Below is a description of the various public participation activities and techniques used during the development of the study.

2.1 Public Involvement Initiatives

H-GAC actively engages the public in the decision-making process, in keeping with the Federal Highway Administration's (FHWA) five key initiatives for a successful public participation process:

1. ***Public involvement is more than simply following legislation and regulations.*** In a democratic society, people have opportunities to debate issues, frame alternative solutions, and affect final decisions. Knowledge is the basis of such participation. The public needs to know details about a plan or action in order to evaluate the relative importance and anticipated costs and benefits. Through continued interaction with the entire community, agencies and project sponsors can build support and assure that the public has the opportunity to help shape the substance of plans and actions.

2. ***Agency and non-agency partners need to be in continuous contact during transportation decision-making*** — from early problem identification and definition of purpose and need, through alternatives development, and to implementation of a particular solution.

3. ***Agencies and project sponsors should use a variety of public involvement techniques to target different groups or individuals*** in different ways, according to their varying agendas. A single, one-size-fits-all approach usually leaves some people out of the process.

4. ***Agencies and project sponsors should seek out the public and work hard to elicit comments***. It is true that resources are limited and agencies cannot make anyone participate. However, transportation agencies have repeatedly found that actively engaging the public and changing unsuccessful approaches bring greater results.

5. ***Agencies and project sponsors should focus on increasing public participation in decisions*** rather than conducting participation activities because they are required. Decision-making should include a continuous stream of informal decisions made by agency staff as well as less frequent formal decisions made by higher-level management. Timely agency response to ideas from the public and integration of those ideas into decisions shows the public that participation is worthwhile. Focusing on the wide range of possible decision points moves agencies past simply offering the public passive opportunities to comment on proposals just before formal decision-making.

H-GAC has outlined a public involvement process that achieves these initiatives and provides the team with invaluable guidance for future improvements within the BF 1960 corridor.

2.2 Public Participation Objectives

The public involvement process is driven by these primary objectives:

- Initiate citizen participation at the onset of the study and continued throughout the process
- Intensify efforts to solicit community views prior to major project decision points
- Provide public access to all relevant information
- Distribute regular reports of study findings to the public
- Provide orientation materials to accommodate new participants entering the process

- Maintain two-way communication between the study team and community participants to freely exchange information, ideas, and values
- Present transportation options in an objective manner
- Use a variety of techniques and approaches to reach a diverse group of persons potentially affected by the proposed project
- Revise and consider all suggestions from the community
- Respond with answers and information to citizen inquiries in a timely manner
- Document public involvement activities
- Incorporate small discussion groups to encourage a casual environment for discussions during public meetings
- Evaluate the public involvement plan's effectiveness

2.3 Targeted Groups

As part of the BF 1960 study's public participation plan, three primary groups were targeted: steering committee, stakeholders, and general public. Each group provided unique perspectives in relation to the project.

Steering Committee

The steering committee was comprised of a group of local technical and policy decision-makers, including representatives from TxDOT, H-GAC, Harris County, City of Humble, and City of Houston. The committee met at key milestones in the process to receive and assess reports on progress, comment on schedule, coordinate with their respective agencies, and provide oversight of major activities associated with the study. This group provided details on current and future plans as well as policies and standards used in the process. The committee extended technical guidance related to project goals, measures of effectiveness, and project tools employed in the corridor.

The steering committee met at the Lake Houston Chamber of Commerce on the following dates:

- March 9, 2011
- April 21, 2011
- May 3, 2011
- July 19, 2011

Stakeholders

The BF 1960 corridor has many stakeholders affected by transportation issues along the corridor, including the following:

- Residents
- Civic and homeowner organizations
- Businesses and chamber of commerce
- Schools and churches
- Police, fire, and ambulance service providers
- Landowners, developers, and real estate agents
- Environmental and historic preservation groups

The team held two meetings with stakeholders on access management, the overall study process, and recommendations. The primary function of these meetings was to ascertain individual concerns / issues and possibly incorporate those issues into the study recommendations. These stakeholder meetings focused on the citizenry affected daily by the corridor — the people that live and work in the corridor and have an intimate knowledge of the issues affecting the region. The stakeholder meetings were held at the Lake Houston Chamber of Commerce on the following dates:

- April 21, 2011
- June 7, 2011

General Public

The intent of the public involvement plan was to promote honest, active, two-way communication with the public — actively listening to their concerns and keeping them informed about the study's progress — so that all community groups had the opportunity to participate and felt as if their concerns were being addressed.

Public meetings were a major component of this two-way communications effort and were scheduled during key stages of the project. The first public meeting relayed the purpose, process, and progress of the study; engaged the public in providing specific input on corridor activities and characteristics; and presented initial recommendations. Short-, medium- and long-term recommendations were presented in the second public meeting.

The public meetings were held at the City of Humble Civic Center on the following dates:

- May 17, 2011
- August 2, 2011

2.4 Schedule of Activities

Public involvement activities were scheduled so that critical input was obtained at key stages of the study, keeping the project moving forward. Two public meetings, two stakeholder meetings, and four steering committee meetings were planned for this study.

2.5 Outreach Approach

H-GAC employs a variety of methods to reach people of all ethnic and socioeconomic backgrounds. Dynamic communication tools and comprehensive meeting notification techniques were used to provide education and awareness of the project and to maximize public input to direct future implementation.

Dynamic Communications Tools

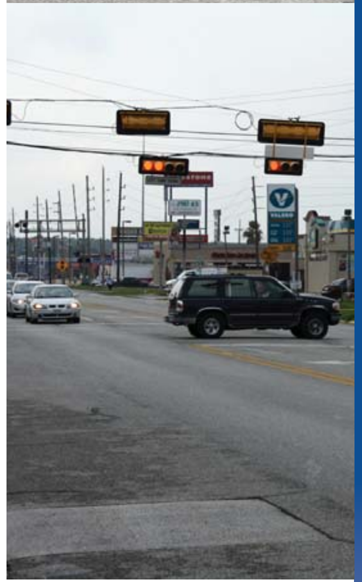
Presentation Materials. At the steering committee, stakeholder, and public meetings, presentation materials with clear, strong graphics were used to assist the public in understanding technical concepts. Graphics included presentation boards, PowerPoint presentations, handouts, and other communications tools. The materials explained overall access management concepts as well as corridor-specific topics such as the study process and goals, project schedule, and funding partners. The materials also conveyed technical results for each stage of the study. Team members knowledgeable of the project were available at meetings so that attendees could ask questions and receive direct responses regarding the project.

Project Maps. Another important technique used to engage the public was detailed aerial maps. These maps allowed the project team to gather specific comments on the public's knowledge of the corridor (locations of developments, high crash locations, problem intersections, etc.) and suggested improvements. Furthermore, these maps were documented as part of the public participation process and became a formal portion of the project record.

Comprehensive Meeting Notification

As part of their goal to make diligent efforts to involve the public, the federal government has set forth public involvement requirements (40CFR1506.6) in their Code of Federal Regulations of the National Environmental Protection Act (NEPA). BF 1960's outreach approach complied with the NEPA directives for publication and notification of public meetings. It also complied with TxDOT Houston's guidelines for the sequence and types of notices. The specific outreach components have included the following:

- Elected officials notification letter from Alan Clark, H-GAC's Director of Transportation as the first publicity item, in keeping with TxDOT Houston's preference for notifying elected officials about public meeting opportunities prior to any other advertisements or mailings
- Legal ad in The Houston Chronicle, the area's largest distribution daily newspaper, 30 days prior to the public meetings in accordance with TxDOT Houston's preferred time line
- Display ads in English and Spanish placed in *La Voz* and *The Humble Observer* 2 weeks prior to the meetings
- Postcard in English and Spanish mailed to property owners and stakeholder groups 2 weeks prior to the meetings; extra postcards available at City Hall and Lake Houston Chamber of Commerce reception desks
- Website posting on H-GAC's Transportation Public Information page and on Humble's Civic Center website.
- Limited English proficiency outreach recognizing that there are a good number of Spanish-speaking households in the corridor; a Spanish display ad placed in La Voz, the weekly Spanish newspaper distributed by *The Houston Chronicle*; and Spanish text on postcards mailed to households and businesses
- E-vites sent to the Lake Houston Chamber of Commerce's members who are business owners and residents along the corridor
- Dynamic messaging signs posted by TranStar on northbound and southbound lanes of US 59 and east- and westbound lanes on BF 1960 the day of the meeting
- Updated mailing list from the sign-in sheets of each stakeholder and public meeting (to make sure individuals who have expressed interested in the project receive ongoing updates of public involvement activities)

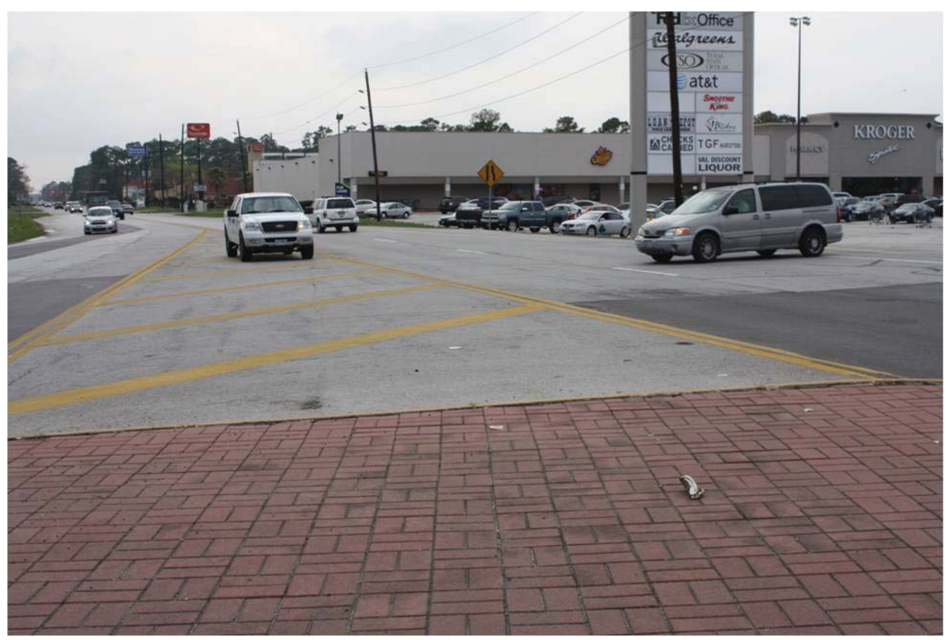


Chapter 3
Corridor Goals

The core principles of an open planning process in establishing ownership between the participants were transparency and collaboration. Through the practice of these core principles, a healthy environment for learning, communicating, and evaluating was maintained throughout the project. The project team worked with elected officials; local professionals; and a wide range of citizens, property owners, and developers early and often throughout the process. The first task in developing a corridor vision was to set clear goals. The steering committee helped define the following goals.

- **Improve safety for all modes of transportation.** Access management improves safety by reducing the frequency of injury and property damage crashes. These recommendations will target unsafe intersections and attempt to improve safety performance through evaluating crash reduction and crash cost-savings.

  Measure 1: Crash reduction — To quantify the safety improvements, the estimated reduction in the number of crashes for various roadway segments with the recommended improvements were calculated. The projected reduction was based on published research for a particular strategy.



  Measure 2: Crash cost-savings — The reduction in crashes resulted in a crash cost-savings. Crash costs refer to the economic value of damages or losses causes by collisions. The costs of various crash types were based on the FHWA's Highway Safety Improvement Program published in 2009.

- **Improve mobility.** Using a reduction in motorist delay and enhancement in travel time benefits, improved traffic flow was quantified for each of the upgrades. Based on discussions with the steering committee, the primary segment of needed mobility improvement is BF 1960 between FM 1960 (west) and US 59. Due to growing congestion on FM 1960 and the fact that US 59 can only be accessed via BF 1960, the western section of BF 1960 has a higher speed and greater need for mobility. While mobility will be measured for the entire corridor, the western segment serves as a priority.

  Measure 1: Travel time benefits — The proposed roadway segment and intersection improvements will result in reduced travel time throughout the corridor. The saving in travel time will be converted into cost savings based on an average driver's value of time.

- **Create a growth strategy for the corridor that provides guidance without hindering development.** The implementation strategy will provide recommended standards and design minimums for improved development. The strategy's highlights will make Humble a destination.
  - Improve entries into the City of Humble; lure visitors into downtown with better signs and street accents along BF 1960
  - Generally improve the curb appeal of BF 1960 in Humble through a combination of public investments and private incentives
  - Expand local employment and shopping opportunities for Humble residents and visitors
  - Encourage quality development that reflects favorably on the City

- **Create mode diversity in the corridor.** Include pedestrian, bicycle, and land use recommendations to improve mode diversity.

  Measure 1: Increased number of pedestrian accommodation miles — The study team has identified areas where vehicles and bicycles could share lanes and pedestrians can be accommodated through a continuous sidewalk system. The plan is tied into the existing bicycle paths identified by H-GAC (www.h-gac.com/community/qualityplaces/pedbike).

- **Maintain an open public process.** The process included a transparent and collaborative effort through two public meetings, four steering committee meetings, and two stakeholder meetings.

- **Implement a uniform access management policy.** Through the proposed phased implementation, the plan allows each jurisdiction to work with TxDOT in constructing priority segments.

Chapter 4
Existing Conditions

The following sections define existing traffic characteristics, roadway and access inventory, and current corridor conditions along BF 1960.

4.1 Existing Traffic Characteristics

Daily Traffic Volumes

The study team used average annual daily traffic (AADT) volumes — provided by TxDOT — to analyze each section of the corridor.

Table 4-1: Daily Traffic Volumes	
BF 1960 Corridor Section	**AADT**
FM 1960 to Whitaker Drive / McKay Boulevard	10,600
Whitaker Drive / McKay Boulevard to US 59	19,100
US 59 to Bender Avenue	17,100
Bender Avenue to Houston Avenue	11,600
Houston Avenue to FM 1960 East	11,900

Corridor Speed Limit

Current posted speeds along the corridor were recorded; they range from 30 to 45 miles per hour (MPH). The segment west of US 59 accommodates higher speeds because mobility is a higher priority, while the eastern segment's speeds are lower due to the main concern of access requirements. These speeds were used as part of the traffic operational analysis to compare before and after travel time savings.

Table 4-2: Corridor Speed Limits	
BF 1960 Corridor Section	**Speed Limit**
FM 1960 to 1000 feet east of Whitaker Drive / McKay Boulevard	45 MPH
1000 feet east of Whitaker Drive / McKay Boulevard to Avenue C	35 MPH
Avenue C to Humble Place Drive	30 MPH
Humble Place Drive to FM 1960	40 MPH

Crash Data and Crash Rates

Crash data was compiled by H-GAC for 2003 through 2009 and showed 561 reported crashes along the corridor as shown in Figure 4-1. The study team analyzed the crash data by location and severity. The 561 crashes involved a reported 1,708 drivers and passengers with a range of injury severity, including fatalities, incapacitation injury, non-incapacitating injury, possible injury, and non-injury (Figure 4-2). Less than 1% of crashes were fatal and more than 36% of the crashes had no injuries.

Figure 4-1: Accident Locations Along BF 1960 (2003-2009)

Houston-Galveston Area Council

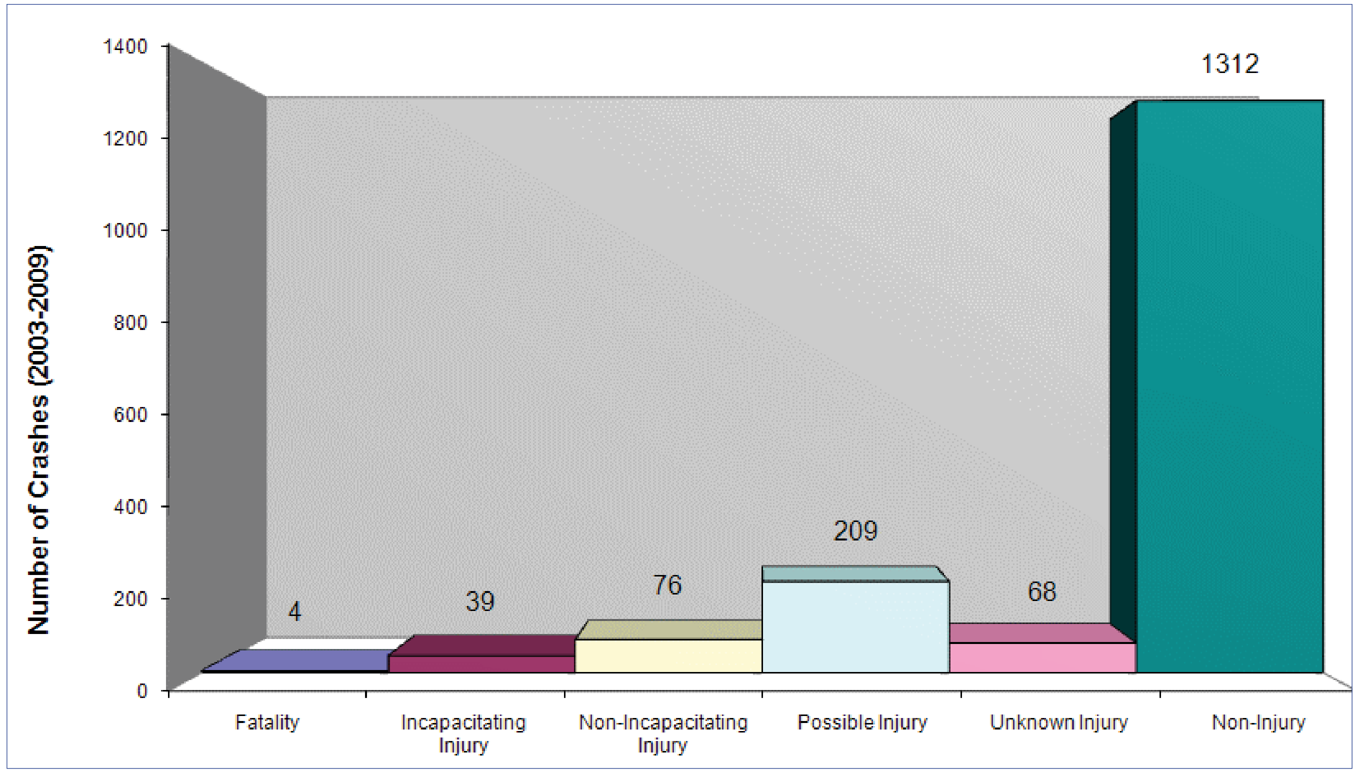


Figure 4-2: Injury Types

The crash rate in terms of number of crashes per million vehicle miles traveled (VMT) was calculated by segment.

Table 4-3: Crash Rate	
BF 1960 Corridor Section	**Crashes / MVMT**
FM 1960 to Townsen Boulevard	2.7
Townsen Boulevard to Charles Street	5.0
Charles Street to FM 1960	4.4

The study team used the 2009 average annual daily traffic volumes (provided by TxDOT) to calculate the VMT estimates. Figure 4-3 shows crash rate comparisons by segment. The study area's average crash rate was calculated as 4.0 crashes per MVMT (million VMT) while the 2009 statewide average for a similar roadway (farm-to-market roadways in an urban setting) according to TxDOT was 2.24 crashes per MVMT. As you can see, the highest crash rate occurred between Townsen Boulevard and Charles Street. This section includes the US 59 interchange as well as increased volume levels, density in development, and driveways.

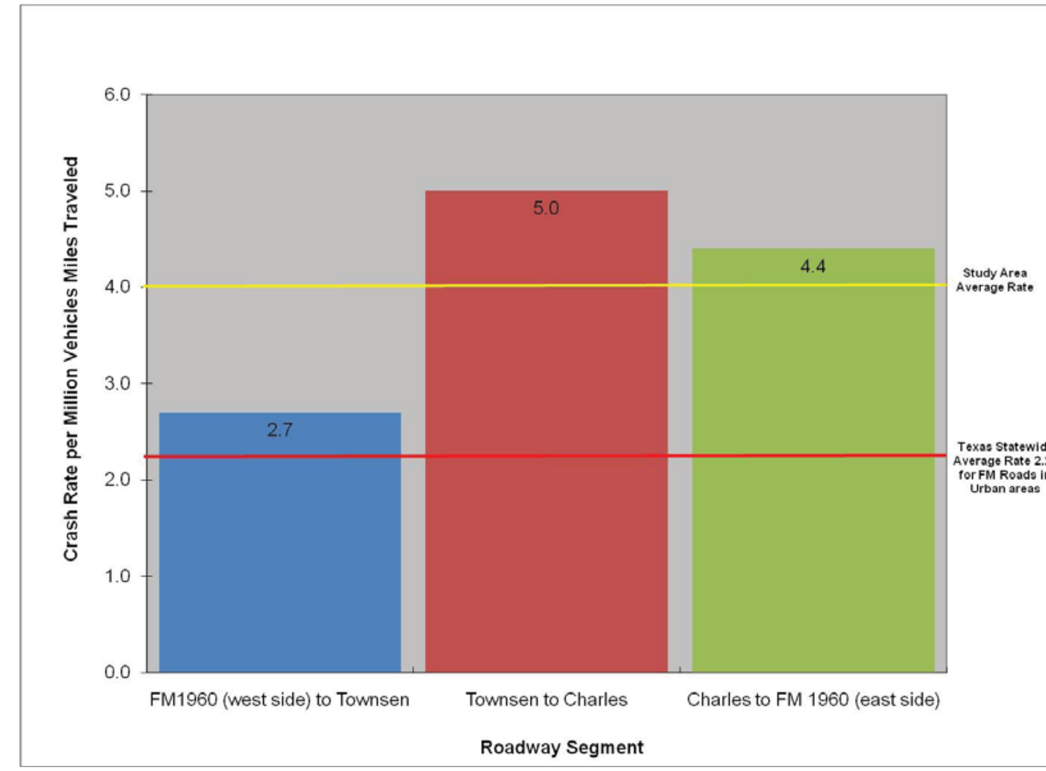


Figure 4-3: Crash Rates

Between 2003 and 2009, the estimated costs of accidents along BF 1960 was $50,059,700 (Table 4-4). Cost estimates are based on the FHWA *Highway Safety Improvement Program* published in 2009.

Table 4-4: Total Crash Costs (2003-2009) Before Improvements	
Injury Type	**Crash Costs**
Fatality	$16,035,600
Incapacitating Injury	$8,424,000
Non-Incapacitating Injury	$6,004,000
Possible Injury	$9,304,100
Unknown Injury	$503,200
Non-Injury	$9,708,800
Total	**$50,059,700**

4.2 Roadway and Access Inventory

Functional Classification

A complete functional design system provides a series of distinct travel movements: main, transition, distribution, collection, access, and termination. For example, the main movement of vehicles is generally uninterrupted, high-speed, longer-trip-length flow. When approaching destinations from the freeway, vehicles reduce speed on the ramps, which acts as a transition. Vehicles then enter a moderate-speed arterial, bringing them closer to their destination. Next, they enter collector roads that penetrate neighborhoods. And, finally, the vehicle enters local access roads that provide direct connections to individual residences or other terminations.

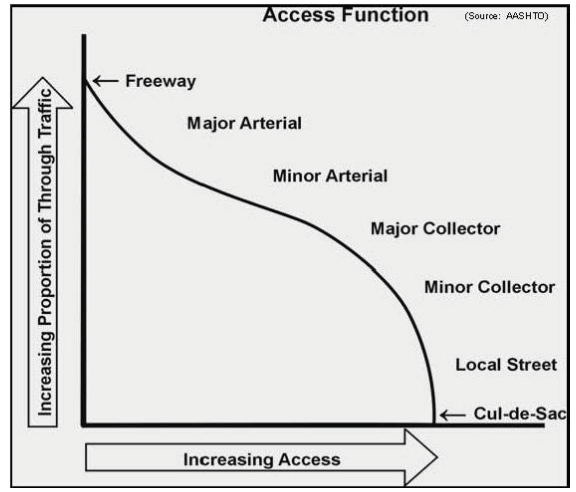


Figure 4-4: Functional Classification

Each of the six stages is handled by a separate facility designed specifically for its function. Additionally, functional classifications are generally identified by surrounding land use forms and degrees of access. Urban and rural areas, for example, have fundamentally different characteristics in regard to density and types of land use, density of street and highway networks, nature of travel patterns, and the relation of each of these elements. Figure 4-4 demonstrates the relationship of facility types to access.

While both BF 1960 and FM 1960 are classified as major arterials, FM 1960 is designed to accommodate higher vehicle volume levels due its six-lane divided roadway cross-section; BF 1960 only provides two lanes. FM 1960 is considered the bypass, which theoretically should minimize through traffic on BF 1960. Because of increasing congestion on FM 1960 and access ramps to US 59 being located just south of BF 1960, the study corridor has served as a major artery to US 59. As a result, BF 1960 has continued to serve as a major arterial for the area.

Roadway Cross-Section

The majority of the existing BF 1960 corridor provides two lanes with shoulders and an open drainage ditch system within a right-of-way width of 100 feet (Figure 4-5). However, two segments within the corridor accommodate only 60 feet of right-of-way, while another segment east of US 59 has four lanes. The 2000-foot segment between Carver Avenue and Borders Drive is in the City of Houston, approximately 1000 feet east of Kenswick Drive (Figure 4-6). The other segment of narrow right-of-way is located in Humble between Avenue C and Houston Street. The segment between Avenue C and Houston Street is a raised curbed section and provides two 18-foot-wide lanes and discontinuous sidewalks within 60 feet right-of-way. The remaining segments have 100 feet in right-of-way. The roadway segments on either side of the US 59 interchange have raised medians, while the section between Bender Avenue and Avenue C accommodate four lanes. See Figures 4-5 to 4-11 for existing roadway cross-sections by segment.

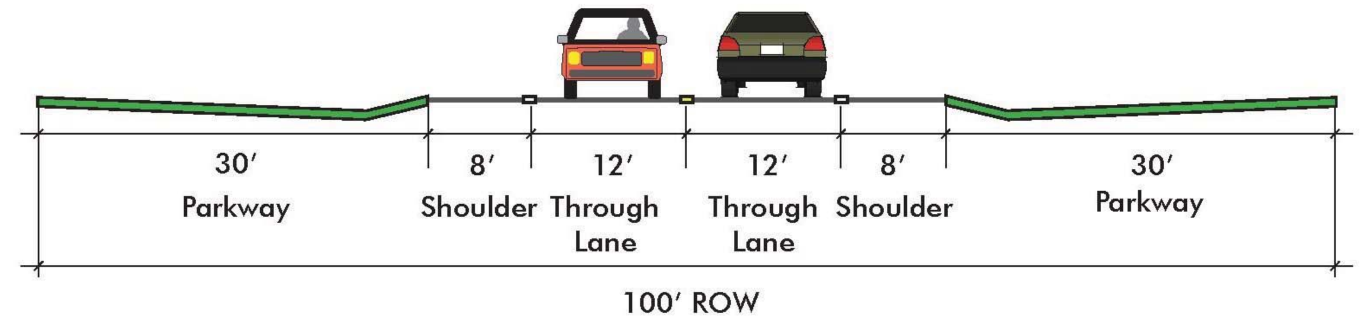


Figure 4-5: Lee Road to Whitaker Road (excluding Carver Avenue to Barders Drive)

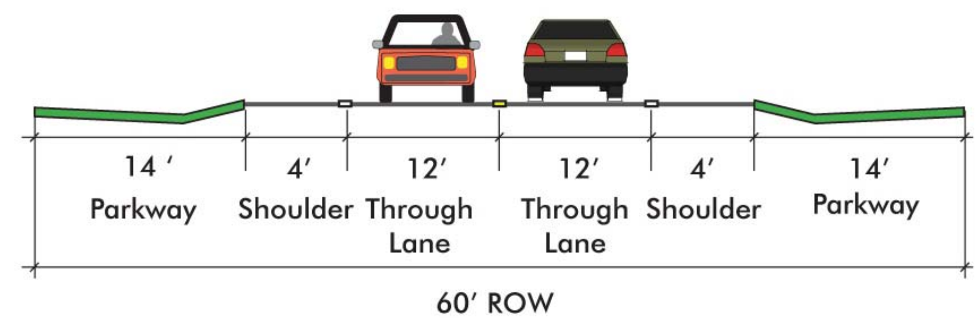


Figure 4-6: Carver Avenue to Borders Drive

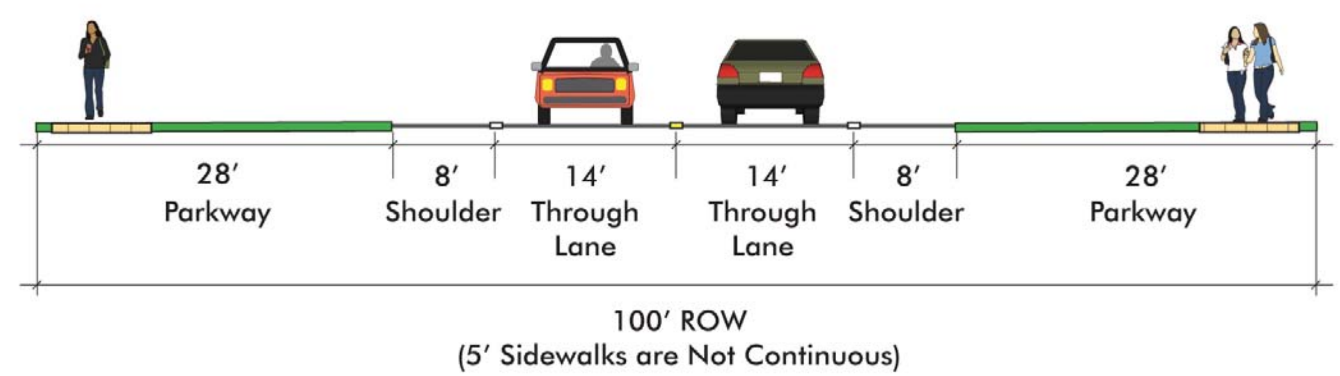


Figure 4-7: Whitaker Road to US 59

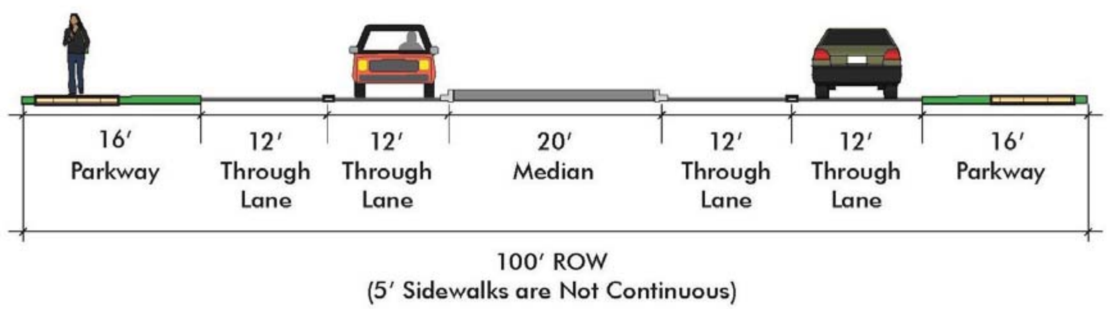


Figure 4-8: US 59 to Bender Avenue

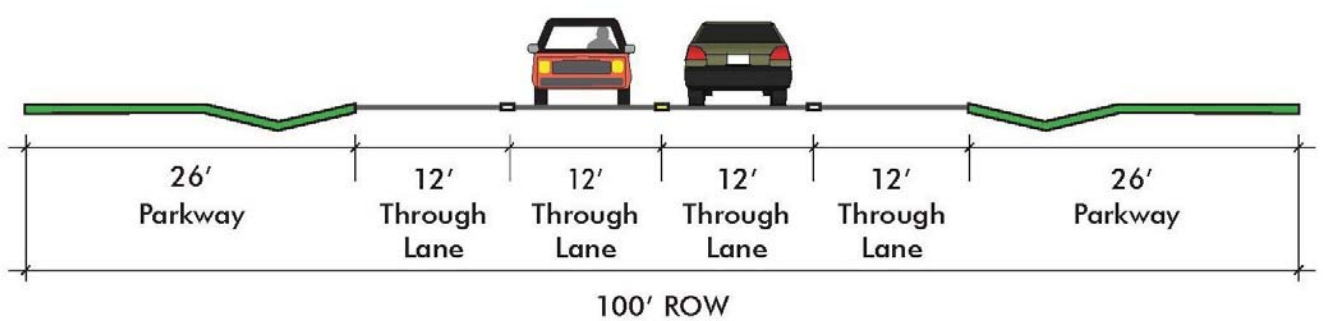


Figure 4-9: Bender Avenue to Avenue C

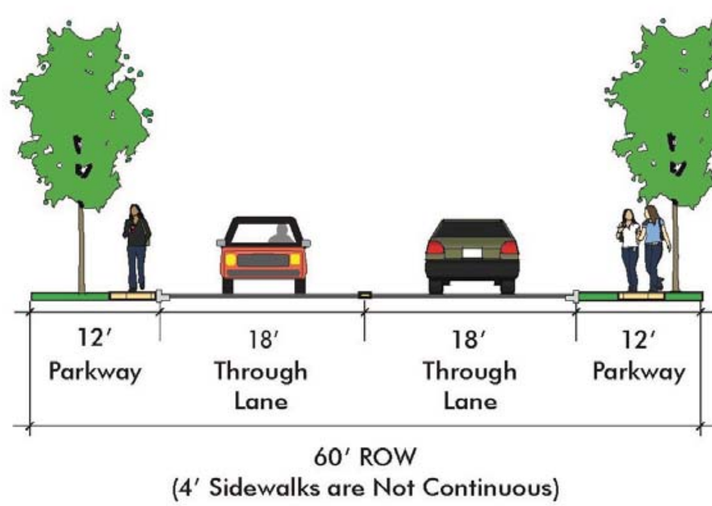


Figure 4-10: Avenue C to Houston Avenue

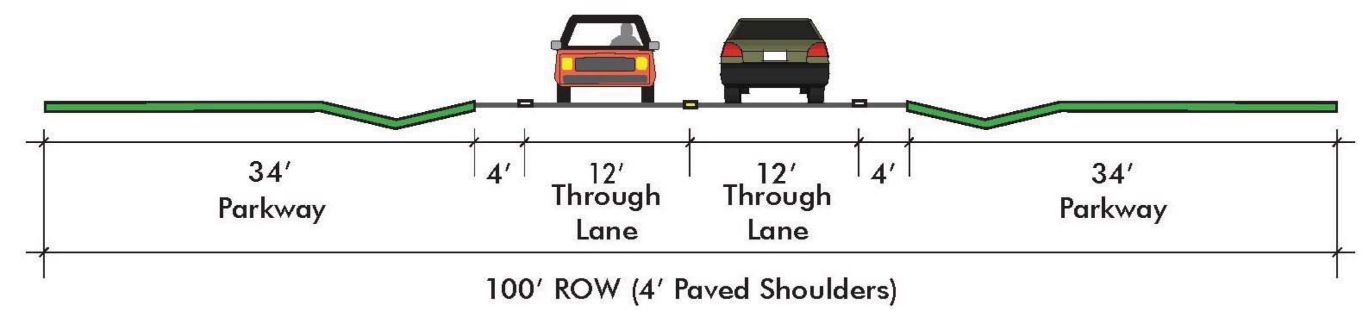


Figure 4-11: Houston Avenue to FM 1960 East

Traffic Signals

All 10 of the signalized intersections along BF 1960 are currently owned and maintained by TxDOT. The corridor traffic signals operate as an isolated or time-based, coordinated system. Isolated intersections are not coordinated with other signalized intersections de to spacing distance. Time-based coordination relies upon each individual traffic controller clock to maintain proper time in order to coordinate appropriately with other signalized intersections — rather than utilizing a “master traffic signal controller” that maintains the correct time for the entire set of intersections. In other words, the signalized intersections are not linked as part of a corridor communication system. If the internal traffic signal controller clocks become “out of sync” with each other, the coordination between signals worsen. Given the spacing between signalized intersections, communication will not provide significant benefit for signal coordination for the entire corridor. However, coordination for several of the intersections — specifically along Lee Road and between Whitaker and Charles Street that are more closely spaced — could improve traffic operations.

Railroad Crossings

There is only one at-grade railroad crossing east of US 59 and west of Charles. The railroad is owned and operated by Union Pacific Railroad, and it is estimated that approximately 12 trains per day travel the rail line. The length of each train varies, but the delay for BF 1960 vehicles is approximately 5 minutes per train. Grade separations for the rail line are available at FM 1960 and Will Clayton Parkway.

Transit Operations

Transit Demand. There are scattered pockets of residential development exhibiting strong growth potential and can be candidates for some form of fixed-route transit in the future. However, in the near-term, it will be difficult to support a fixed-route transit network along and within the BF 1960 corridor. As such, there are no transit routes, park-and-ride, carpooling / vanpooling options servicing the City of Humble, despite several fixed-route lines using US 59.

METRO is in the process of receiving public input on updating the long-range plan (METROVision) for the Houston area, and they conducted a public meeting on June 28th in the City of Humble. Attendees were informed of the study's process and given the opportunity to offer ideas on improving transit in the area. At the writing of this report, METRO staff were collecting and synthesizing citizen comments.

Existing Service. There are four fixed-transit routes utilizing US 59:

- Kingwood
- Eastex
- Townsen Park and Ride
- Kingwood / Townsen / Eastex Park-and-Ride

None of these lines stop along BF 1960; however, one of the lines stops at the Townsen Park-and-Ride center located at US 59 and Townsen Boulevard.

Access

Table 4-5 summarizes the approximate current number of driveways along the BF 1960 corridor.

Table 4-5: Driveways Along BF 1960		
Mile	Driveways	
	Eastbound	Westbound
1	3	18
2	14	16
3	21	28
4	34	30

This information assists in identifying potential reasons for high accident location. Research has shown that driveway density (number of driveways per mile) can impact speed. Figure 4-12 graphically shows driveway density, while Table 4-6 describes the impact to driveways have on the reduction in mobility.

Figure 4-12: Driveway Density along BF 1960

Table 4-6: Volume-to-Capacity Relation to Level of Service	
Access Points / Mile	Reduction in Flow (MPH)
0	0
10	-2.5
20	-5.0
30	-7.5
40>	-10.0

According to the National Cooperative Highway Research Program's (NCHRP) *Report 420: Impacts of Access Management Techniques*, as the number of driveways along the corridor increases, so will the number of accidents (Figure 4-13).

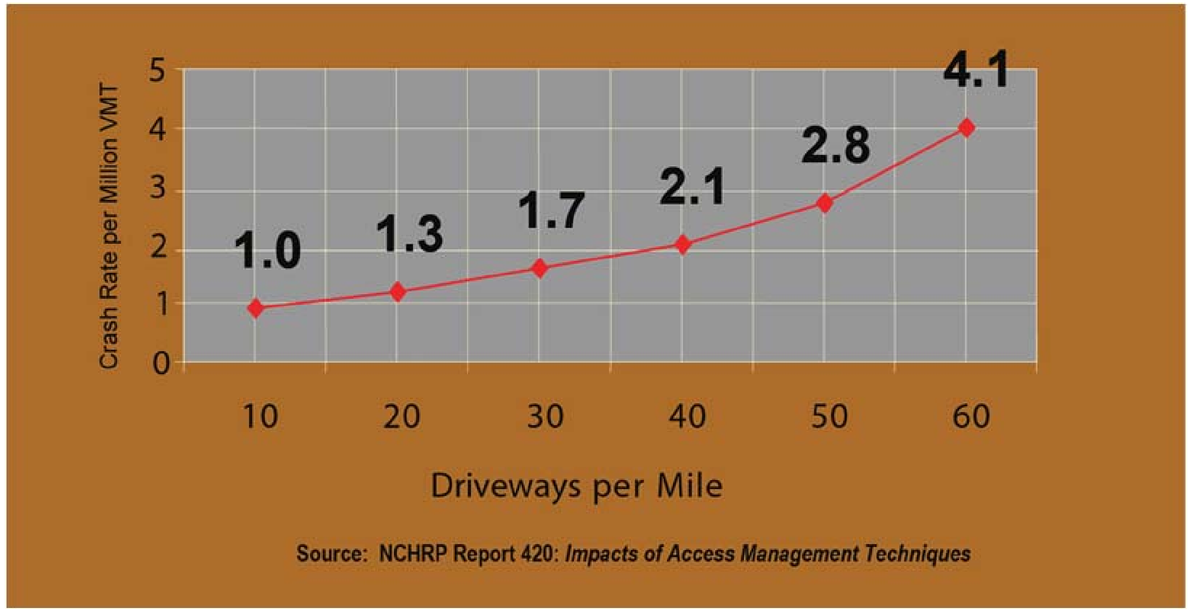


Figure 4-13: Driveway Density and Accident Correlation

Pedestrian and Bicycle Infrastructure

Pedestrian facilities along BF 1960 are limited, as discontinuous sidewalks exist sporadically throughout. Sections of sidewalks exist east of US 59 as well as between Avenue C and Houston Street.

Currently, there are no designated bike facilities along the BF 1960 corridor; however as Figure 4-14 illustrates, there are several proposed trails planned for the area. Bike trails are based upon information provided by H-GAC's Pedestrian / Bikeway Regional Plan, located at http://www.h-gac.com/community/qualityplaces/pedbike/default.aspx.

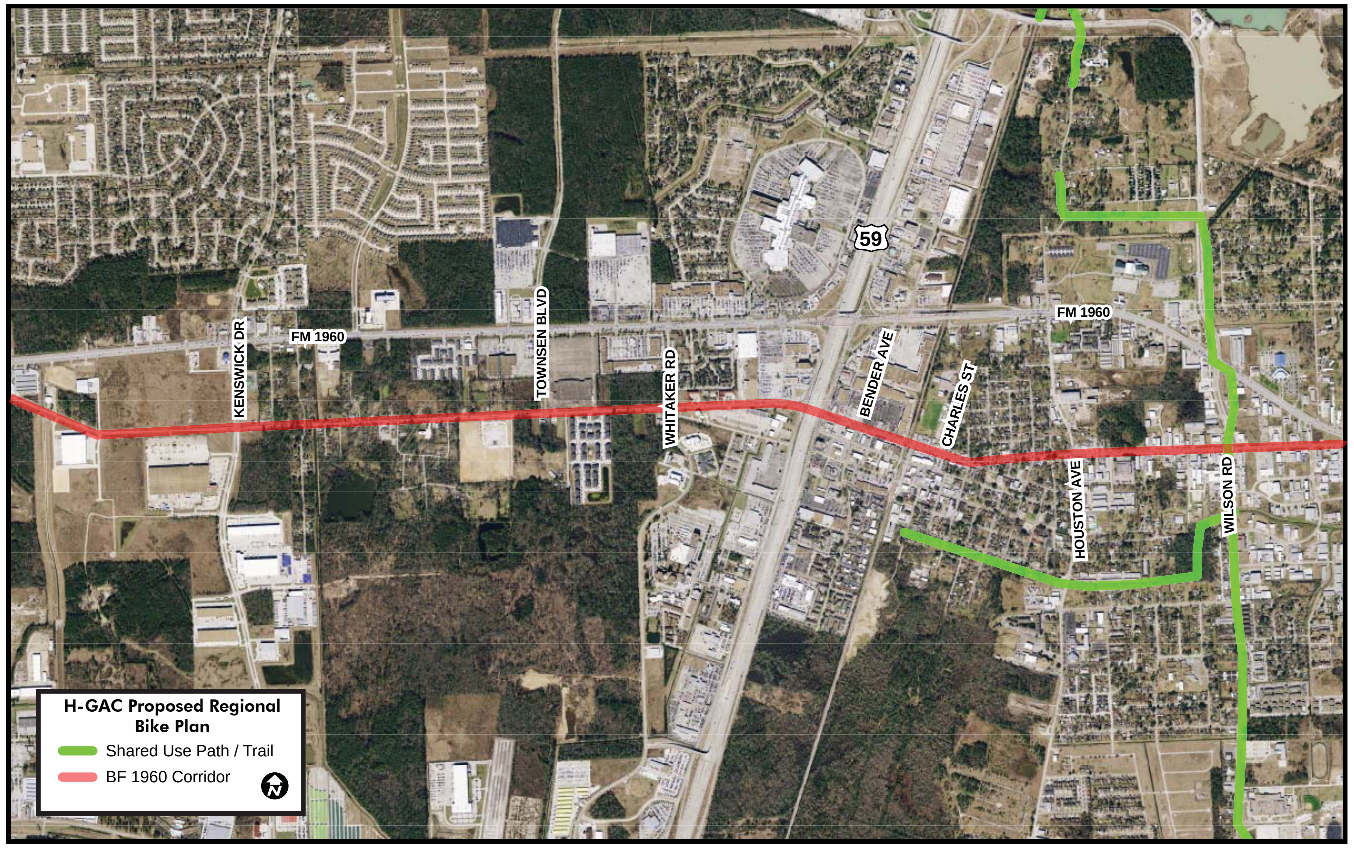


Figure 4-14: H-GAC's Proposed Regional Bike Plan

TxDOT recently adopted a statewide policy placing a stronger emphasis on multimodal transportation facilities. This policy includes guidelines for incorporating pedestrian and bicycle accommodations as part of new and upgraded facilities.

Median and Edge Treatment

Most of BF 1960 is a two-lane undivided roadway with shoulders and an open drainiage system. Within the City of Humble, segments of BF 1960 provide four lanes with a raised median and curbs (Figure 4-8). The section between Avenue C and Houston Street accommodates a curbed section with two wide lanes (Figure 4-12). A summary of all median and edge treatment information is shown in Figures 4-5 through 4-11

Land Use and Zoning

The study team collected existing land use and zoning ordinances along BF 1960 from H-GAC. Using geographical information systems (GIS), the study team identified residential, non-residential, parks, and special districts land uses along the corridor. Figure 4-15 illustrates the percentages of land use types in the corridor.

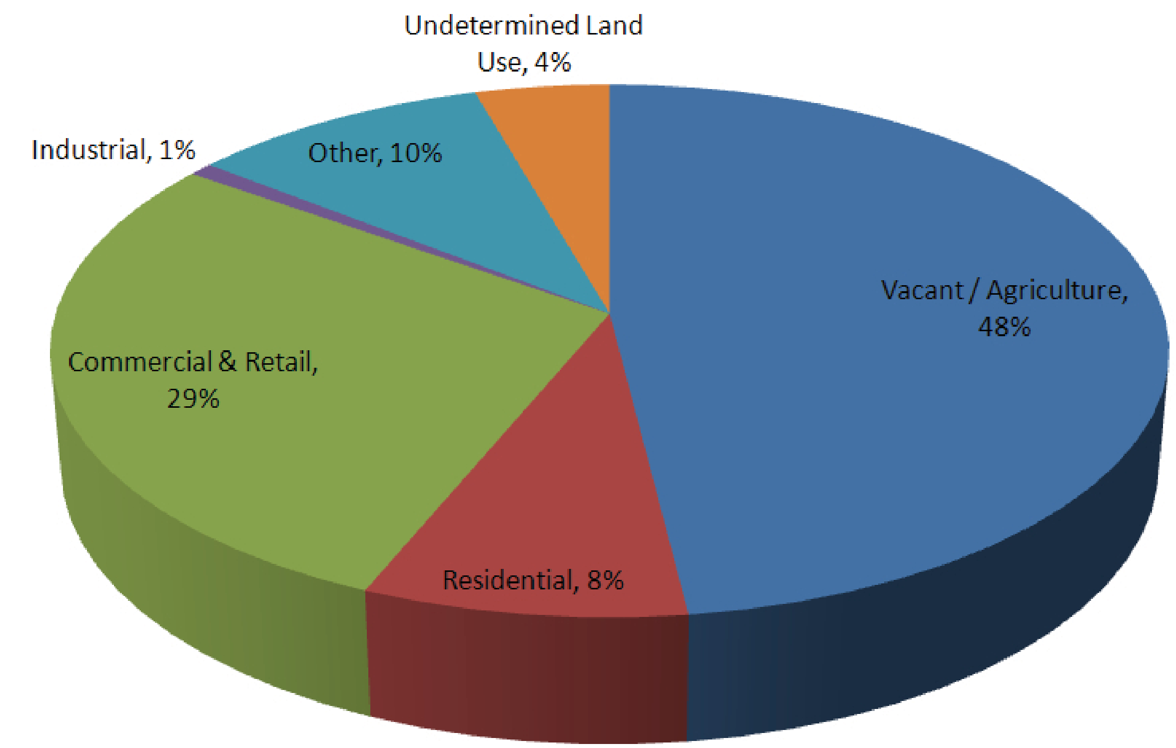


Figure 4-15: Land Use

The majority of the land use along the corridor is either vacant or agricultural (48%). Commercial/retail comprises 29%, while residential holds roughly 8% of BF 1960's land use. Industrial (1%), undetermined (4%), and other (10%) land uses are the remaining 15% of land use types along the corridor.

4.3 Current Corridor Conditions

Level of service (LOS) is a rough measure of traffic flow conditions on a certain link or intersection within a corridor. LOS measurements range from level A to F, where a measurement of A means free flowing traffic conditions. Conversely, an LOS of F means there are traffic jams along the corridor or intersection. The segment and intersection LOS was calculated for the BF 1960 corridor.

Segment Level of Service

H-GAC developed levels of capacity to better reflect travel patterns and roadway design characteristics. Levels of capacity include facility adjustments for signal green times, percentage of trucks, percent of left turns, directional factors, etc. For the BF 1960 corridor, the urban arterial capacity of 7,500 vehicles per day per lane was used to determine segment LOS. The calculated segment LOS should be used for general information only, as the intersection LOS often determines the overall performance of the corridor. The segment LOS was determined based on a calculated volume-to-capacity ratio that was then associated with the following LOS:

Table 4-7: Corridor Level of Service	
Corridor Segment	**LOS**
FM 1960 (West) to Whitaker Drive / McKay Boulevard	D
Whitaker Drive / McKay Boulevard to US 59	E
US 59 to Bender Avenue	C
Bender Avenue to Avenue C	C
Avenue C to Houston	D
Houston to FM 1960 (East)	D

Roadways with an LOS of D were assumed to be an acceptable mobility level for BF 1960. On the other hand, roadways with an LOS of E or F were classified as congested. Table 4-7 shows the corridor segments and their associated LOS.

Intersection Level of Service

The LOS for BF 1960 was determined using Synchro™ software, which uses methodology per the Highway Capacity Manual. The methodology calculates intersection delay (based on the average delay) for all approaches, then associates the appropriate LOS. The model incorporates intersection lane configuration, speed limit, volumes, traffic signal timing characteristics, and other model criteria for AM and PM time periods. Figure 4-16 summarizes LOS for all signalized intersections and corridor segments. As shown, the existing conditions operate at acceptable LOS during the peak periods. Table 4-8 describes the deficient traffic movement at each intersection.

The calculated intersection LOS for all existing intersections was acceptable. However, some were near the threshold of needing improvement and expected to deteriorate to an unacceptable level in the near future. In evaluating intersection operations, the study team analyzed the overall average delay as well as individual approach movements.

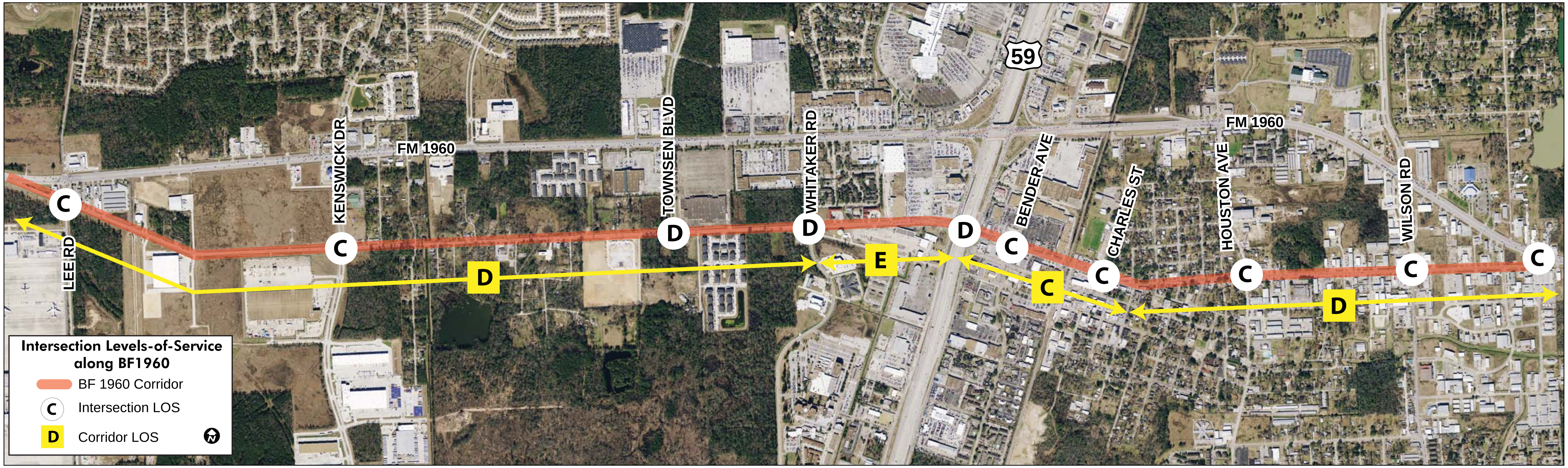


Figure 4-16: Intersection Levels of Service along BF 1960

Table 4-8a: Existing Intersection Operational Analysis							
Intersection	**Approach**	**Deficient Movement**	**Approach Existing LOS AM**	**Approach Existing LOS PM**	**Intersection Existing LOS AM**	**Intersection Existing LOS PM**	**Comments**
BF 1960 at Lee Road	NB	NB Thru	C	C	C	D	Significant queuing within 250' between BF1960 and FM 1960 as well as WB RT and NB Thru movements. Majority of traffic desiring to travel west on FM 1960.
	EB	-	D	E			
	SB	-	B	B			
	WB	WB Right Turn	D	F			
BF 1960 at Kenswick Drive	NB	-	B	B	C	C	Appears to be plenty of unimproved ROW to accommodate Right Turn Lanes
	EB	EB Right Turn	D	D			
	SB	-	B	B			
	WB	WB Right Turn	C	D			
BF 1960 at Townsen Boulevard	NB	-	-	-	E (worse approach)	F (worse approach)	Existing stop controlled intersection. Future volumes suggest a signal might be warranted. Appears to be sufficient ROW on north side of BF 1960 to accommodate a WB Right Turn Lane
	EB	-	-	-			
	SB	-	E	F: 182.7			
	WB	WB Right Turn	-	-			
BF 1960 and Whitaker Road	NB	NB Left Turn Storage Length	D	D	C	D	Exclusive lanes for all movements except SB Right Turn Lane. Storage length for NB Left Turn Lane limits capacity.
	EB		C	C			
	SB	-	D	D			
	WB		B	B			
BF 1960 at US 59 Southbound Frontage Road	NB	-	-	-	D	C	Heavy eastbound right-turn lane volume (579 vph in AM) accommodated by shared thru / right lanes
	EB	-	E	D			
	SB	-	C	D			
	WB	-	C	B			
BF 1960 at US 59 Northbound Frontage Road	NB	-	E	C	D	D	Heavy WB Right Turn Lane
	EB	-	A	B			
	SB	-	-	-			
	WB	-	E	E			
BF 1960 at Bender Avenue	NB		B	B	B	C	EB Right Turn Lane will assist lane balancing and traffic flow from US 59 interchange
	EB	EB Right Turn	C	C			
	SB	-	B	B			
	WB	-	B	D			
BF 1960 at Charles Street	NB		B	C	B	C	No infrastructure improvements required.
	EB	-	B	D			
	SB		B	A			
	WB	-	B	B			
BF 1960 at N. Houston Avenue	NB	-	B	C	B	C	ROW constricted.
	EB	-	B	C			
	SB	-	B	D			
	WB	-	B	B			

Table 4-8b: Existing Intersection Operational Analysis (cont.)							
Intersection	Approach	Deficient Movement	Approach Existing LOS AM	Approach Existing LOS PM	Intersection Existing LOS AM	Intersection Existing LOS PM	Comments
BF 1960 at Wilson Road	NB	-	C	C	C	C	EB Right Turn Lane would improve operation.
	EB	EB Right Turn Lane-	B	C			
	SB	-	C	C			
	WB	-	C	D			
BF 1960 at FM 1960	NB	-	E	E	C	C	TxDOT has planned improvements for this intersection that includes an EB free Right Turn Lane, additional NB Right Turn Lane, additional WB shared Thru/Right Turn Lane and additional WB Left Turn Lane.
	EB	-EB Right Turn	B	C			
	SB	-	D	D			
	WB	WB Left Turns	C	B			

BF 1960 at Lee Road — While FM 1960 / Lee Road was not part of this corridor study, field observations revealed significant vehicle queues occurring along Lee Road due to the short 250-foot distance between the two signalized intersections at BF 1960 and FM 1960. Vehicle delays appeared to be caused by a lack of capacity for those desiring to travel westbound onto FM 1960.

Vehicle queues also occurred along westbound BF 1960 for vehicles attempting to turn right onto Lee Road, then travel west on FM 1960 as well as northbound Lee Road traveling vehicles. The signal timing between the two closely spaced intersections can be optimized to improve vehicle progression. Also, Harris County is currently constructing improvements to Lee Road on the north side of FM 1960 such that the additional capacity can slightly improve the traffic operations between these two intersections. Figure 4-17 shows the issues of the two closely spaced intersections.

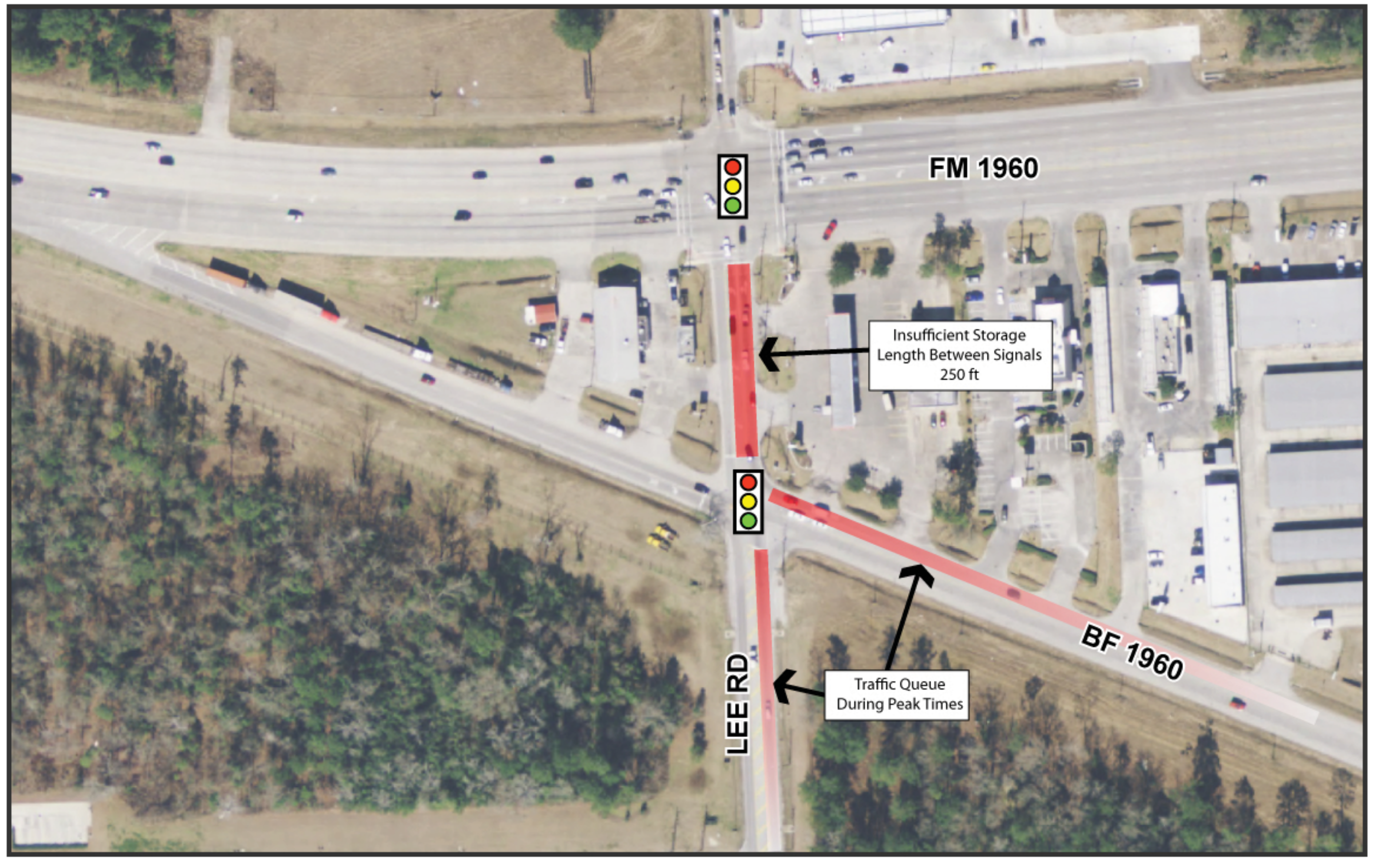


Figure 4-17: Lee Road at BF 1960 and FM 1960

West of US 59 — The area west of US 59 provides some unique challenges because of existing development access and geometric conditions (Figure 4-18). A retail shopping center, anchored by a grocery store and other retail / restaurant, is located on the northwest quadrant of the US 59 interchange. The shopping center is often used as a through-route to access Deerbrook Mall (on the northwest quadrant of FM 1960 and US 59). BF 1960 has two lanes leading to the US 59 interchange and widens to the interchange's geometry on a curve in a short distance. The driveway access points are also within short transition and result in potential safety and operational issues. There is a raised median approximately 285 feet from the interchange, preventing left-turning traffic into and out of the development for the driveway nearest US 59. Currently, two driveways are just west of the end of the raised median, allowing left turns into and out of the development. Due to traffic generated by the development, US 59 traffic, and roadway geometric conditions, this area becomes quite congested and presents potential safety issues.

Another contributing factor to the congestion near the BF 1960 / US 59 interchange is the location of access ramps. The southbound entrance and northbound exit ramps are south of BF 1960. Therefore, traffic to and from FM 1960 must travel through the BF 1960 / US 59 interchange to access US 59. This results in long queues along the northbound and southbound frontage road approaches.

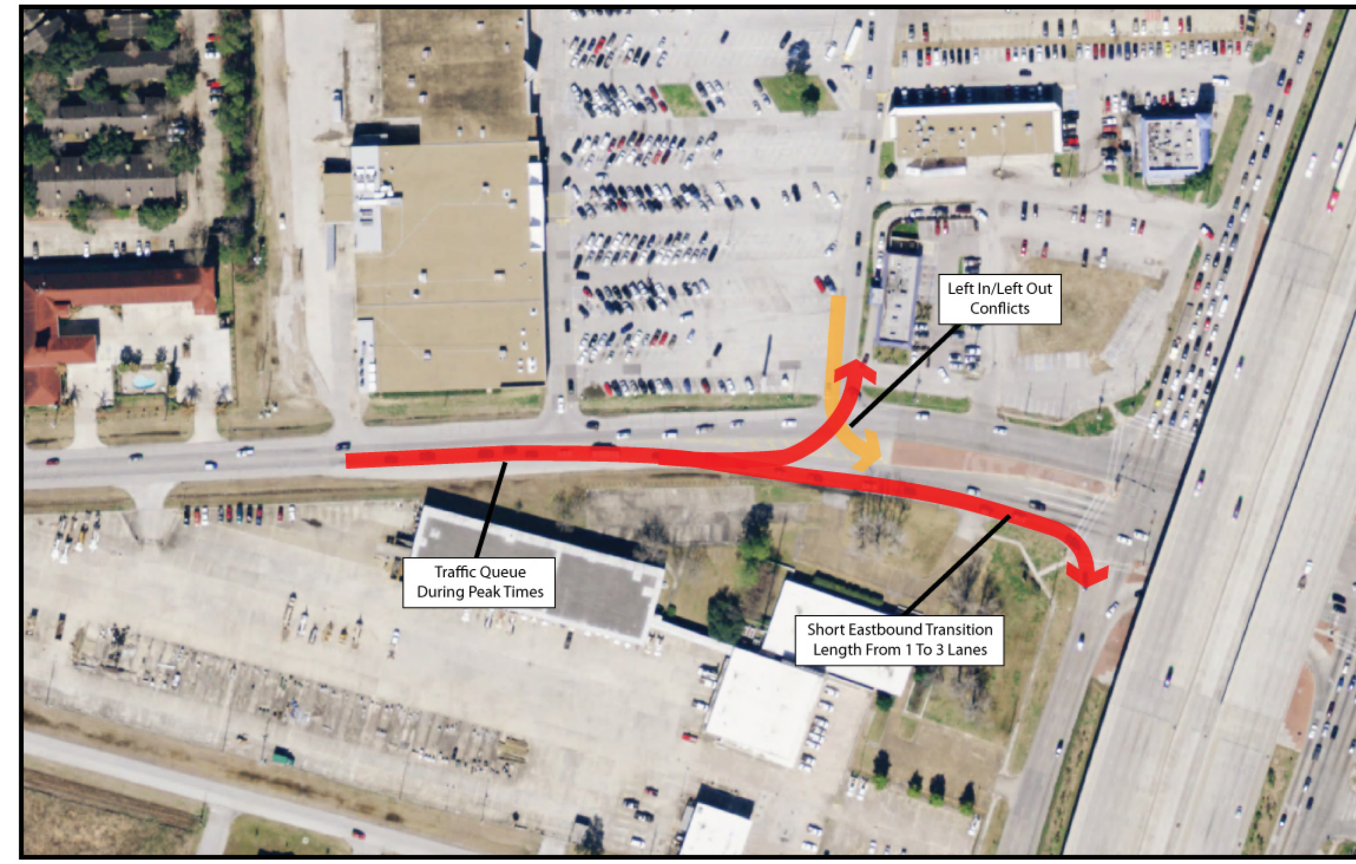
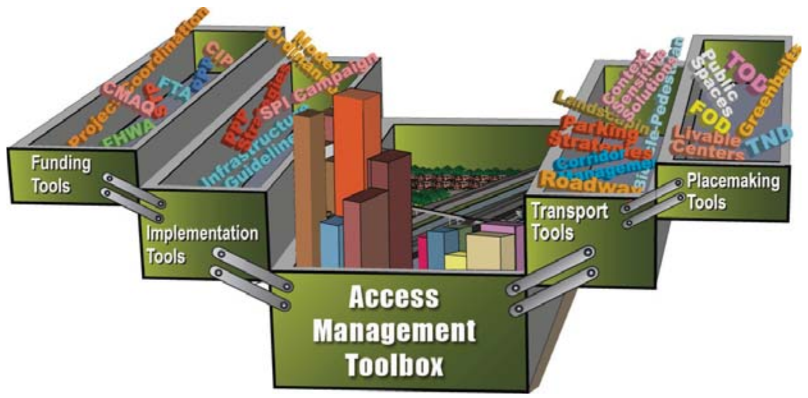


Figure 4-18: Existing Conditions West of US 59

Chapter 5
Toolbox

The study team created a mobility toolbox for the BF 1960 corridor to provide decision-makers with tools to help properly plan and manage the corridor. Tools may include the following physical measures, which are aimed to increase the capacity of the transportation facility / network:

- Street improvements
- Transit alternatives
- Technology systems
- Corridor management techniques



Though these policy instruments may increase the efficiency of new infrastructure and private developments, not all tools are aimed at the vehicle mode choice. Rather, effort was made to recommend traffic mitigation tools such as pedestrian and bicycle facilities and fixed-transit routes along the corridor, which in turn, will transform BF 1960 into a multimodal friendly atmosphere.

A multimodal transportation system is defined as “a network of facilities designed for joint use with connections between two or more modes of transportation.” This report document proposes a policy for developing livable, multimodal facilities to realize the goals of this study.

Many of the techniques outlined here have been used throughout the region and are currently under construction on such corridors as Westheimer, FM 518, FM 1960, and SH 6. Furthermore, H-GAC continues their commitment to funding access management corridor plans. Other initiatives — the Livable Centers Initiative, for example — creates the foundation for the use of these tools. To make BF 1960 a safer and pedestrian friendly corridor, these tools are strongly recommended for implementation.

5.1 Intersections

Intersections are one of the most significant factors when evaluating a corridor's mobility. Interaction between the main highway and its cross-streets can reduce speeds, increase accidents, and hinder access to adjacent properties. Properly planned intersections coupled with the type of intersection control will assist in preserving highway improvements.

Types of Intersections

Major. Major intersection road junctions accommodate major roads (arterials and collectors). They tend to be four-way and can have a number of configurations based upon the adjoining road. Major intersections use traffic signals and their timings as the main form of traffic control.

Signal timing is the sequence and duration of each phase of a traffic signal. Advanced traffic signal controllers provide greater flexibility in controlling the flow of traffic through an intersection. Having signal timing along a corridor can increase street efficiency by allowing the highest possible number of vehicles to pass in the shortest time span. Signal timing can also positively affect air quality because travel time and idling are reduced. This technique can be used to increase capacity on corridors and is a less expensive option than adding lanes.

Minor. Minor intersections accommodate minor roads (minor arterials, minor collectors, and local streets) and can be controlled or uncontrolled, depending upon traffic volume. Uncontrolled intersections do not have signs or signals as a form of stop control. Instead, priority rules apply. For example, at a four-way intersection, traffic on the right often has priority (also called the driver’s right-of-way). Similarly, at a three-way intersection, either traffic from the right has priority or traffic from the continuing road. For traffic going the same or in opposite directions, those vehicles that go straight have priority over those that turn off the road.

A stop-controlled intersection is a form of control. Two-way stops are common; however, four-way stops can be implemented if needed. Yield-controlled intersections may or may not have specific YIELD signs. For these intersections, right-of-way rules also apply.

Intersection Access

Because connectivity is a key factor in making certain people can walk or bike between neighborhoods, cul-de-sacs, and communities, street connectivity requirements are potentially important at the local neighborhood level. An interconnected local street system can promote orderly and safe development by making sure streets function in an interdependent manner, provide adequate access for emergency and service vehicles, enhance access through connected transportation routes, and provide continuous and comprehensible traffic routes.

Creating connectivity and street network requirements rather than specifying type of streets — a technique typical of thoroughfare plan designations in areas of suburban or rural residential development — can often lessen the burden on designated thoroughfares. Requiring interconnected local streets is gaining ground as a method of ensuring that transportation systems meet the needs of their surrounding communities while allowing credits for trail connectivity that meet local circulation needs.

A network is a structure of streets and highways that serves and connects multiple places and people via multiple modes of travel. Sustainable networks require local streets to be highly connected with the arterial system, and they represent a cost-effective alternative to expensive grade-separations, interchanges, and corridors that require extensive right-of-way purchases. The connectivity of sustainable networks increases the opportunities for and performance of other modes of travel such as walking, bicycling, and riding transit; it also improves emergency response times. Sustainable networks take a greater level of planning and creative design to build. However, their result is sustainable in terms of capital and maintenance costs.

5.2 Driveway Access Standards

Consolidating the number of driveways along a street can have positive benefits for the traveling public and property owners. Fewer driveways reduce the number of conflict points along the street, thereby increasing safety. In many commercial areas, the length of frontage available to each property owner is limited, and limited frontage exposure makes it difficult to provide properly designed driveways. Eliminating driveways and sharing access can improve overall access and increase the available area for parking and deliveries.

Reducing access locations is difficult because many property owners assume that the loss of access will result in a loss of customers. However, cross-access — that is, the movement of vehicles between two adjacent sites without having to enter the public street system — can be implemented along BF 1960 in select areas. The purpose of cross-access is to limit the number of driveways as well as VMT on busy roads surrounding commercial centers. With this method, trips between neighboring sites will not have to proceed onto the major road network.

Two-Way Left-Turn Lane

Two-way left-turn lanes (TWLTL) are typically used to reduce rear-end, head-on, and turning-related crashes occurring on two-lane roads. Implementing may reduce these types of crashes because turning vehicles are being removed from the primary travel lane while drivers wait for an acceptable gap in traffic to turn. Additionally, the buffer between opposing directions of travel contribute to the reduction of head-on crashes. Typically, TWLTLs can be an effective interim strategy until traffic volumes exceed the capacity and raised medians are potentially required.

5.3 Medians

Raised medians are typically used in urban settings; they provide a positive separation between opposing traffic streams and restrict the number of opportunities for left turns between intersections. Therefore, raised medians reduce conflict points. Locations where left turns are permitted can be channelized to include a left-turn bay where turning vehicles are protected and removed from the traffic stream. Including left-turn bays increases the efficiency of travel lanes. Also, adding raised median treatments to corridors has shown a reduction in crashes and an increase in safety. Raised medians can also be landscaped to enhance the aesthetics of the corridor.

5.4 Corridor Lighting

Pedestrian and street lighting can increase visibility and safety for users after dark. Furthermore, standard light fixtures help establish a design theme by providing a consistent architectural element that can be repeated throughout the corridor. Attachments such as seasonal banners or hanging baskets can be added to poles to highlight special events or areas.

5.5 Landscaping Elements

Landscaping and street trees can enhance a neighborhood's identity by establishing a consistent aesthetic for the corridor and increasing visibility of significant elements such as monuments, major intersections, or plazas. Street trees also aid in traffic calming and make for a more pleasant pedestrian experience by providing shade for sidewalks and a physical separation between pedestrians and moving traffic.

5.6 Pedestrian Amenities

Pedestrian amenities are valuable in giving any street a "sense of place" while creating aesthetics that are pleasing. They allow certain areas to become pedestrian-friendly, which in turn, increases social interaction in public spaces. Pedestrian amenities can be visual, textural, or both.

There are many pedestrian amenities from which to choose — from, informational to practical — and the number of combinations is limitless. Examples of pedestrian amenities include bollards, planters, decorative sidewalk paving, public restrooms, telephone booths, waste receptacles, clocks, benches, picnic tables, and water fountains.

Studies have shown that when amenities are properly planned and implemented, people will use their features. This is ideal for potential redevelopment and revitalization projects in high traffic areas such as east of the US 59 interchange in Humble.

5.7 Thoroughfare Planning

Proper network spacing, the distance between intersections, allows a connected network to handle a large capacity of traffic. Network spacing is important for increasing connectivity in a given area — the more connected a network, the more efficient.

A downtown area, for example, has smaller network spacing than a typical suburban development. The greater the spacing, the more traffic "loads up" on fewer streets, while smaller network spacing diffuses traffic and encourages increased pedestrian travel due to shorter walking distances.

Street Types

Properly planning for the size, alignment, and character of new roads and the retrofit of existing roads to compliment sustainable land development patterns and cultural, historical, and natural resources of the community is essential to realizing BF 1960's vision.

Currently, most roads are sized based on maximizing capacity for the automobile, and roads are aligned to meet the desired speed determined by functional classification. This offers little consideration to complementing adjacent land use. Requests for exceptions to current roadway design standards from neighborhoods and developers is handled on a case-by-case basis and are approved at the discretion of the local government's engineering department. Similar to the access management recommendation in the following chapter, a coordinated and consistent CSS policy is needed.

A policy framework developed around the concepts of context-sensitive streets aims to find the best street solution for a given area. This concept can lead to redesignating existing thoroughfare plans, which are typically focused on a hierarchy of streets to assign traffic patterns. CSS elements proposed in the Recommended Best Practice of the Institute for Traffic Engineers (ITE) and the Congress for the New Urbanism (CNU) alternatively stress the designation of streets based upon their character and the character of the uses and building forms adjacent to them. The new classifications are shown in Figure 6-1.

Thoroughfare Types							
Functional Classification	FREEWAY/ EXPRESS-WAY/PARK-WAY	RURAL HIGHWAY	BOULEVARD	AVENUE	STREET	RURAL ROAD	ALLEY/REAR LANE
Principal Arterial	■	■	■	■	■		
Minor Arterial		■	■	■	■		
Collector				■	■	■	
Local					■	■	■

Figure 6-1: CSS Thoroughfare Types
Source: ITE Context Sensitive Solutions for Major Urban Thoroughfares

A transition from traditional street classification to the proposed CSS classification system allows communities to focus on all modes of transportation needed within a given corridor. Additionally, broad guidelines are not enough to create a livable street environment. Good street design can be accomplished by allowing flexibility while working within a general acceptable design framework.

In anticipating the development of roadways within the region, the thoroughfare plan designations are intended to provide the greatest flexibility as traffic patterns dictate when a facility is upgraded to include more travel lanes. Coordinating CSS design principals with a citywide thoroughfare plan can create a properly planned, development-friendly strategy for any city.

Pedestrian / Bicycle Mobility and Linkages

Pedestrian Enhancements. As a tool, pedestrian enhancements become the primary transportation element connecting all travel modes. Increased pedestrian amenities and well-planned pedestrian connections introduce walking as a viable form of transportation. A pedestrian-friendly environment is essential to the success of many of the other concepts, including mixed-use centers, increased transit use, main streets, and park-once districts.

The multimodal and livable streets described in Chapter 7 must apply to everyone traveling along the road. A sidewalk without curb ramps is useless to someone using a wheelchair. And, a street with an awkwardly placed public transportation stop without safe crossings is dangerous for transit riders. Conversely, a road with heavy freight traffic must be planned with those vehicles in mind, and pedestrian access should be limited.

The future use of pedestrian enhancements will focus on improving non-vehicular access to new centers and existing destinations. Priority locations for enhancements should be transit stations and stops, routes from neighborhoods to schools, as well as along multimodal corridors and livable and main streets. These enhancements come in the form of better coordination between public works and private development to create a cohesive pedestrian environment, complete sidewalk connections, reduced neighborhood street speeds with traffic calming and slow speed design, and improved location and coordination of transit stops into new developments and public works projects.

Bicycle Enhancements. Bicycle enhancements provide a viable alternative to driving for commuter cyclists and facilitate bicycle travel for recreational cyclists. Successful enhancements emphasize adequate, well maintained, continuous, and secure facilities. Connecting the bicycle system to other modes of transportation involves linking the travel system to itself and to the end of the trip.

Many bicycle facilities, especially trails, have multiple commuter and recreational users and should be designed for multiple uses. A bicycle-friendly environment consists of significant regional trails linked to a network of major streets with striped bicycle lanes and/or signed bicycle routes. This kind of system maximizes connections to other modes (such as pedestrian routes and transit) and minimizes unsafe interactions with auto traffic at intersections.

There are a number of benefits of bicycling:

- Fewer vehicle miles traveled and less environmental pollution
- Reduced land and financial resources devoted to vehicle parking and travel lanes
- Improved health through exercise and stress reduction
- Reduced individual travel costs (auto maintenance, parking, fuel)

The H-GAC's planned bikeways was incorporated into this study as well as TxDOT's new policy requiring accommodation of bike and pedestrian facilities within the project implementation.

Parking Types

On-street parking is typically provided in business districts where commercial establishments are constructed on residential streets. On-street parking can provide greater accessibility for patrons using commercial districts and can be designed as angled or parallel parking. Redeveloping areas into walkable communities has reestablished the desire for on-street, parallel parking as part of the street design. Introducing on-street parking facilitates multimodal mobility by encouraging more pedestrian activity.

Placemaking Elements

General Mix of Uses. A general mix of uses refers to having a healthy balance of residential, commercial, industrial, office, institutional, or other land uses. Having a balance offers convenience for the public.

Development Orientation. The direction in which a development or project is oriented can affect potential solar gain. It also affects light penetration into the development as well as solar exposure for outdoor areas in the vicinity.

Scale / Intensity (Building Heights). Scale and intensity seem to always present planning and design issues. They arise in a variety of situations such as creating economically feasible development plans; developing zoning for a new district; guiding development in a historic district: evaluating shadow, wind, and other potential impacts; and reviewing proposals for consistency with community goals or compatibility with adjacent building or open space.

Pedestrian Accommodation. A sidewalk is a path for pedestrians that is situated alongside a road or footpath through a park. Sidewalk may accommodate moderate changes in grade. In the United States, most sidewalks are constructed of concrete and are usually 5 feet wide and 4 inches thick. Sidewalks can also be constructed of brick. Sidewalks should be provided near schools, parks, neighborhoods, or in other areas where pedestrian activity is observed. Sidewalks should be constructed according to current standards of the Americans with Disabilities Act of 1990 (ADA) as well.

Bike lanes are located on the edge of a street or between travel and parking lanes. Typically, bike lanes are 5 or 6 feet in width and give cyclists their own space on the street. Bike lanes help connect cyclists with important destinations and transit facilities. Having bicycle infrastructure also improves air quality by reducing the number of vehicular trips. As part of a TxDOT initiative to encourage construction of more bike lanes, shared-use lanes are required on most new construction projects. A shared-use lane accommodates motor vehicles and bicycles in the same lane. The TxDOT initiative requires that the shared-use lane be provided for the outside lane.

A multiuse path can be constructed on right-of-way provided for that purpose. Multiuse paths should be constructed a minimum of 10 feet wide, and most are hard surfaced to facilitate their variety of uses. Signed and striped to ensure they operate as designed, multiuse paths are used by walkers, joggers, and bicyclists. Properly designed and maintained paths will provide safe, efficient places for travel and recreation.

Neighborhood Linkages. Neighborhood linkages are a good way to bring two or more neighborhoods — which are usually closed off to each other — together, allowing these neighborhoods to interact with one another. Popular ways of doing this include bike trails, sidewalks, and adjoining community parks.

Building Types. A building type refers to the arrangement of individual dwelling units and their placement next to, above, or below each other. “Single-family detached” and “multifamily attached” are examples of residential building types. Other building types are:

- Multifamily low-rise
- Multifamily mid-rise
- Multifamily high-rise
- Manufactured housing
- Office buildings

Open / Civic Space Types. Open and civic spaces are public spaces meant to be enjoyed by the public. Open space broadly includes woodlands, fields, wetlands, stream banks, floodplains, and unique geologic formations. Alternatively, civic spaces are open areas within an urban setting, such as inner city parks, plazas, and outdoor auditoriums.

Chapter 6
Implementation

6.1 Improvement Options

Improvement options along BF 1960 include short-, medium-, and long-term recommendations. All improvements recommended in this section are conceptual and based upon a range of factors: accident data, right-of-way, number of intersections, lack of signage, safety concerns, and input from stakeholders and the general public. The purpose of conceptual recommendations is to aid city and state staff in designing and finalizing improvements along the corridor.

6.2 Planning Approaches

The planning approach to implementing improvements along the corridor is divided into three phases for each jurisdiction. The following describes the general characteristic of each phase:

Short-term (0-5 years)

- Implemented in 0-5 years
- No right-of-way required
- Typically include following improvements:
  - Intersection capacity improvements
  - Sidewalk connections
  - Re-striping on existing pavement
  - Landscaping

Medium-term (5-15 years)

- Implemented in 5-15 years
- No right-of-way required
- Typically include pavement widening

Long-term (15+ years)

- Implemented in greater than 15 years
- Can require additional right-of-way
- Policy changes
- Phased redevelopment
- Roadway widening

The study team divided corridor recommendations into the jurisdictional boundaries represented within the corridor. While TxDOT maintains the BF 1960 corridor and will ultimately be responsible for designing and constructing improvements, the following jurisdictions will work with TxDOT in prioritizing improvements within each of their boundaries.

- Harris County (FM 1960 West to just east of Kenswick Drive; west of FM 1960 East to FM 1960 East)
- City of Houston (just east of Kenswick Drive to west of Whitaker Drive
- City of Humble (west of Whitaker Drive to just west of FM 1960 East)

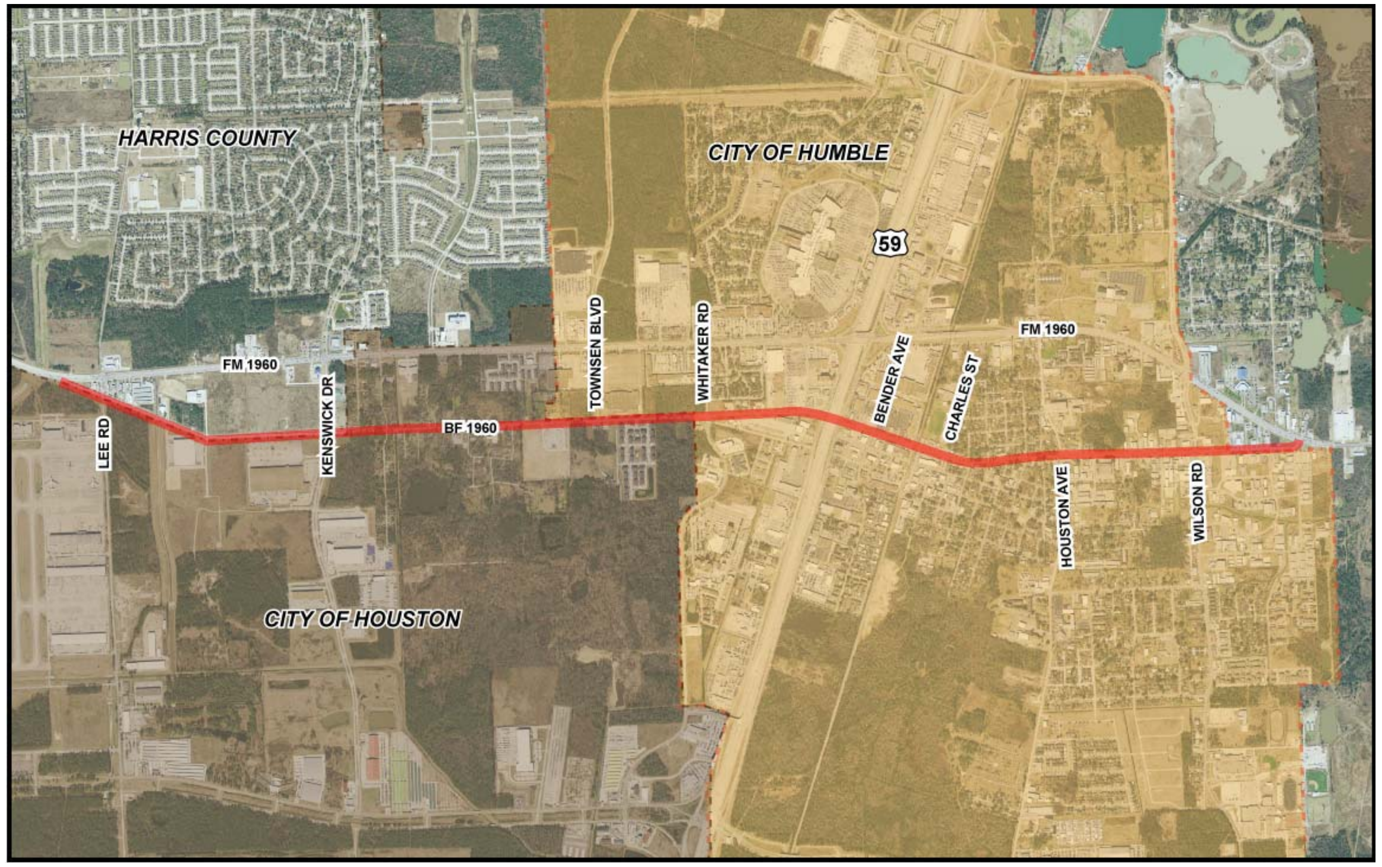


Figure 6-1: Jurisdictional Boundary Map

6.3 Harris County Implementation

Harris County's jurisdictional boundaries occur within two segments of the BF 1960 corridor (see Figure 6-1). While TxDOT maintains the BF 1960 corridor, Harris County maintains the cross streets of Lee Road and Kenswick Drive. Currently, the County is implementing a capacity improvement project for the southbound approach at FM 1960.

The improvements in this section include short-, medium-, and long-range summaries for each improvement. Design details and preliminary cost estimates are included in the Appendix.

Short-Term Improvements

Traffic Signal Improvements. Improved signal timing and traffic signal infrastructure improvements can have a significantly positive impact on safety and mobility within the corridor. Given the close proximity of BF 1960 to FM 1960 along Lee Road (approximately 250 feet), traffic signal coordination becomes a major component of corridor improvement. As previously described, traffic signal coordination occurs when two or more intersection traffic signal controllers are programmed such that a platoon of vehicles can progress smoothly through both intersections without stopping. For this to occur, the controller programming must account for parameters such as vehicle speed and distance between intersections. Additionally, the traffic signal controllers must maintain the same time clock so that the intersections do not become "out of step" with each other, which can cause poor signal coordination. Coordination can occur between these two intersections by several methods, including but not limited to the following:

- Time-based coordination
- Closed-loop system
- Utilizing one traffic signal controller for both intersections

Currently, the intersections operate with separate traffic signal controllers not linked together. When signal-controlled intersections are not linked, it is possible to provide sufficient coordination through time-based coordination. However, it is common that controllers may become "out of step" with each other, which can degrade coordination. A closed-loop system has local controllers at individual intersections and continuous communication with a field master. This connection allows the field master to supervise operation of local controllers to assure they are operating by proper timing plan. The third option for these intersections is to utilize one traffic signal controller for both intersections — essentially run them similar to a diamond interchange (like BF 1960 / US 59). Using one controller eliminates the issue of two controllers getting out of sync.

While the intersections along Kenswick Drive (between FM 1960 and BF 1960) are farther apart, improvements can enhance the signal timing of these intersections. Because TxDOT maintains all of the traffic signals along FM 1960 and BF 1960, they will determine the preferred method of maintaining proper traffic signal coordination between these two closely-spaced intersections as well as optimizing isolated intersection timing.

Intersection Improvements for Lee Road at BF 1960. Currently, the Lee Road / BF 1960 intersection operates at a LOS C in AM and PM peak hours. Congestion levels and geometry limit travelers from proceeding onto FM 1960 and completing left turns. Therefore, the study team recommends:

- Synchronizing signal timing between FM 1960 and BF 1960 (see previous section for discussion)

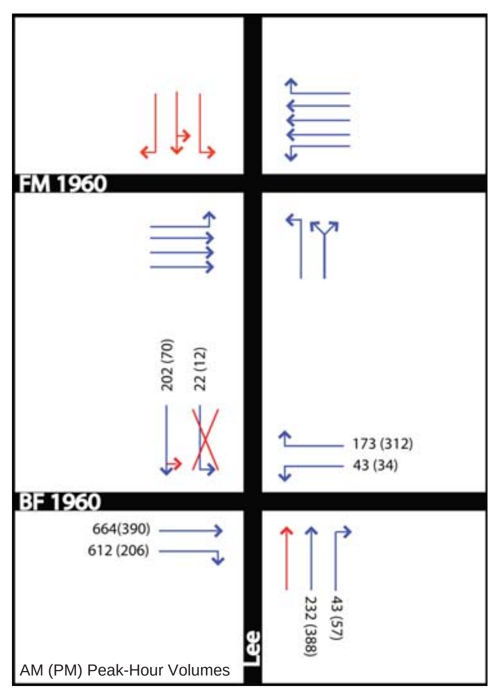


Figure 6-2: FM 1960 and West FM 1960 at Lee Road

- Restriping the northbound approach for two lanes
- Eliminating the southbound exclusive left turn lane

These improvements will reduce the queue for the northbound and westbound movements at BF 1960 as well as the northbound approach for FM 1960.

Medium-Term Improvements

The primary medium-term improvement for Harris County is widening the roadway section to include a two-way left-turn lane TWLTL as well as intersection improvements for Kenswick Drive.

Roadway Segment Improvements. The study team recommends improvements for the segment of BF 1960 within Harris County include a three-lane roadway section with continuous sidewalks and a shared-use lane (as shown in Figure 6-3). As traffic volumes are relatively low, the TWLTL will improve safety by reducing rear-end, head-on, and turning-related crashes. Additionally the buffer between opposing directions will contribute to reduced head-on crashes.

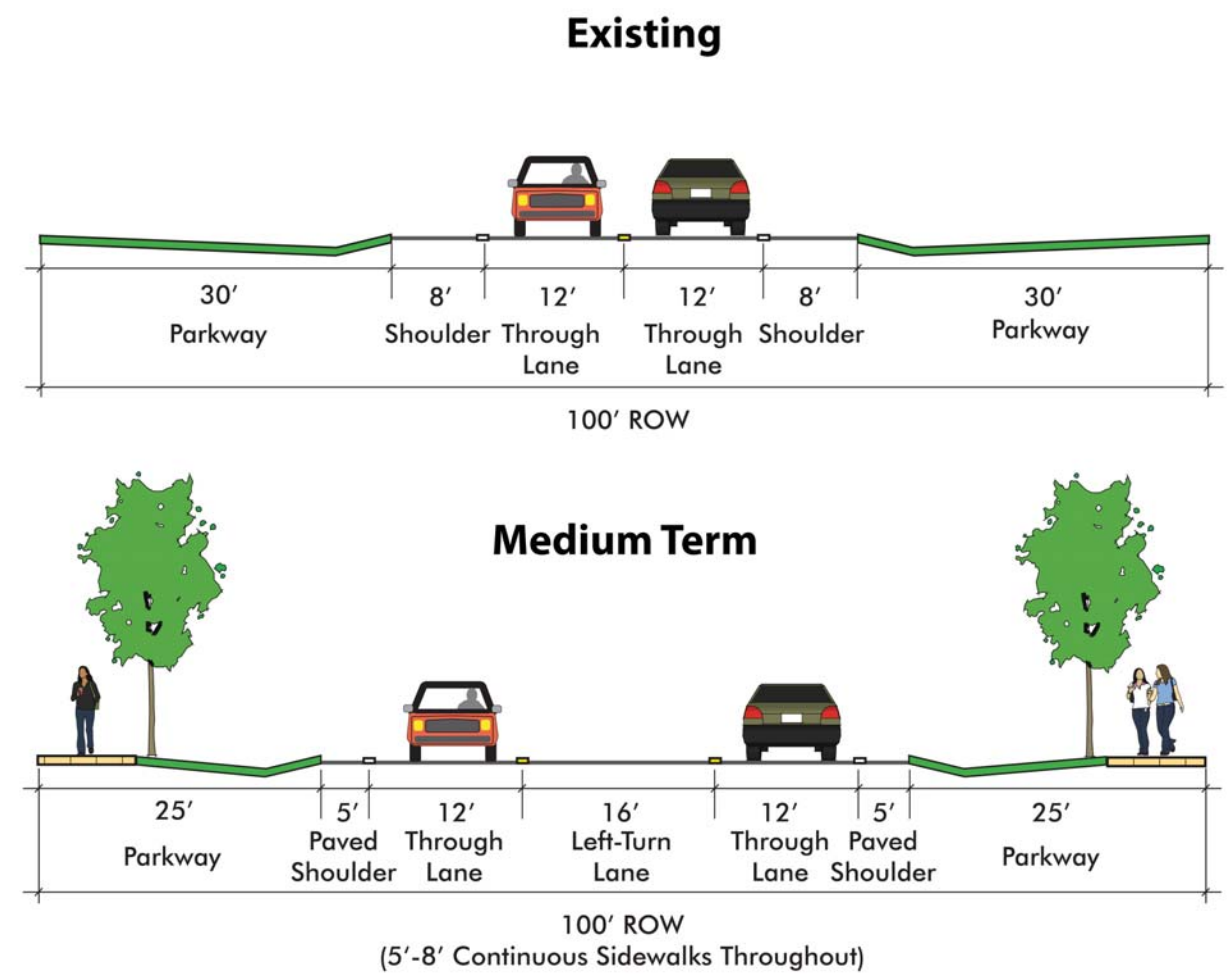


Figure 6-3: Typical Cross-Section from Lee Road to Kenswick Drive

Harris County has jurisdictional boundaries that include the far west and far east portions of the study corridor. While the roadway segments within Harris County do not currently have a significant number of driveways or turning locations due to the short segment distances, the three-lane segment will tie into adjoining jurisdictions that will benefit more prominently from the proposed improvement. The continuous sidewalks and shared-use lane will provide bike and pedestrian accommodations. Refer to pages 52-55 and 67 in Appendix A for a graphical description of the short- and medium-term recommendations in Harris County.

Intersection Improvements for BF 1960 at Kenswick Drive. The Kenswick Drive intersection currently operates at LOS C for AM and PM peak hours. However, deficient movements include the eastbound and westbound right turns. Therefore, the study team recommends exclusive eastbound and westbound right-turn lanes as part of the roadway segment construction.

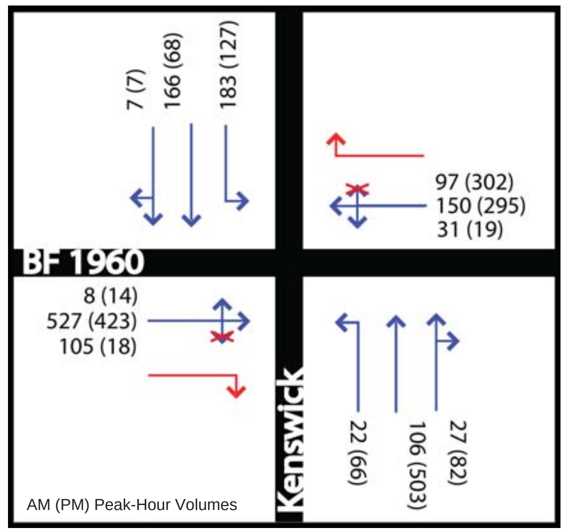


Figure 6-6: Kenswick at BF 1960

Long-Term Improvements

Harris County's long-term improvements include developing new thoroughfares as parcels are developed, improving existing roadway segments, and accommodating bicycle and pedestrian needs.

Thoroughfare Planning. The western portion of the study area is primarily industrial with available vacant land that is a potential development opportunity. In an effort to spur development on the northwest quadrant of BF 1960 and Kenswick Drive, the study team recommends street connections. Figure 6-7 provides a potential street network layout that provides necessary spacing from Kenswick Drive on BF 1960 and FM 1960.

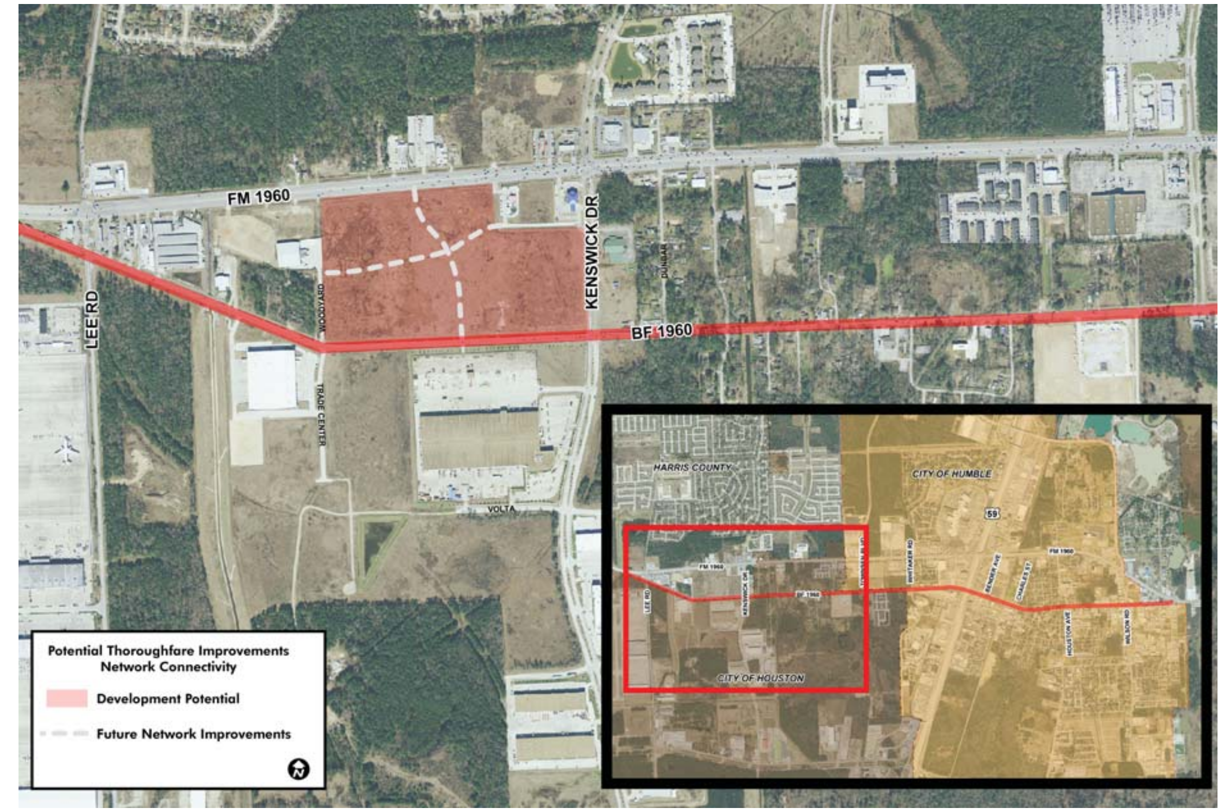


Figure 6-7: Potential Street Network Layout

Intersection Improvements for BF 1960 at FM 1960 East. The FM 1960 East intersection currently operates at LOS C for both AM and PM peak hours. The intersection has deficient movements for the eastbound right-turn and westbound left-turn lanes. TxDOT's improvement plans include an eastbound right-turn lane, an additional northbound right-turn lane, additional westbound shared through / right-turn lane, and an additional westbound left-turn lane.

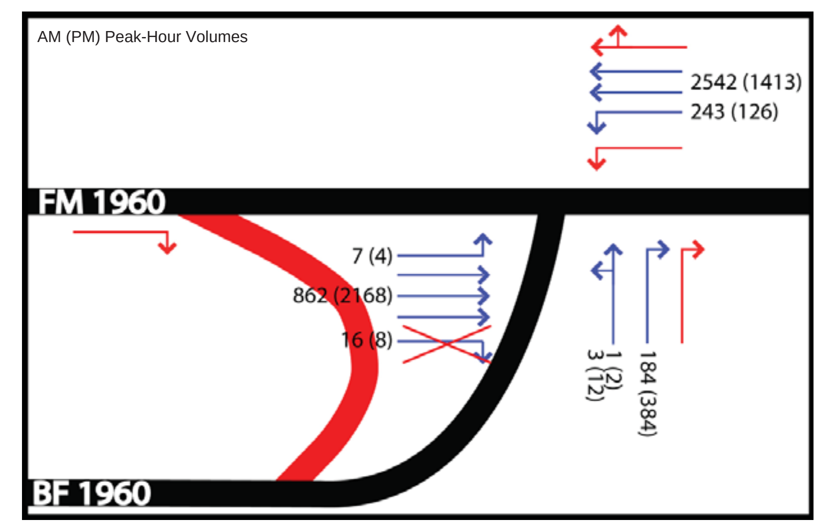


Figure 6-8: FM 1960 East at BF 1960

Roadway Segment Improvements. As development and traffic volumes grow, the TWLTL will not be a sufficient solution to maintain safety and mobility. It will be necessary to widen the roadway to accommodate more lanes along with positive separation between opposing traffic flows through the use of raised medians.

Lee Road — Lee Road, south of BF 1960, is a two-lane roadway with a flush median throughout a portion of the roadway (see Figure 6-9). Due to growing traffic volumes to and from George Bush International Airport, widening should be planned along Lee Road. The typical right-of-way along Lee Road is 86 feet. However, to transform the road into a four-lane divided section with pedestrian accommodations, additional right-of-way (up to 100 feet) is required. The regional master thoroughfare plan does not show an improvement; however the study team recommends incorporating a four-lane divided roadway with sidewalks into the thoroughfare plan.

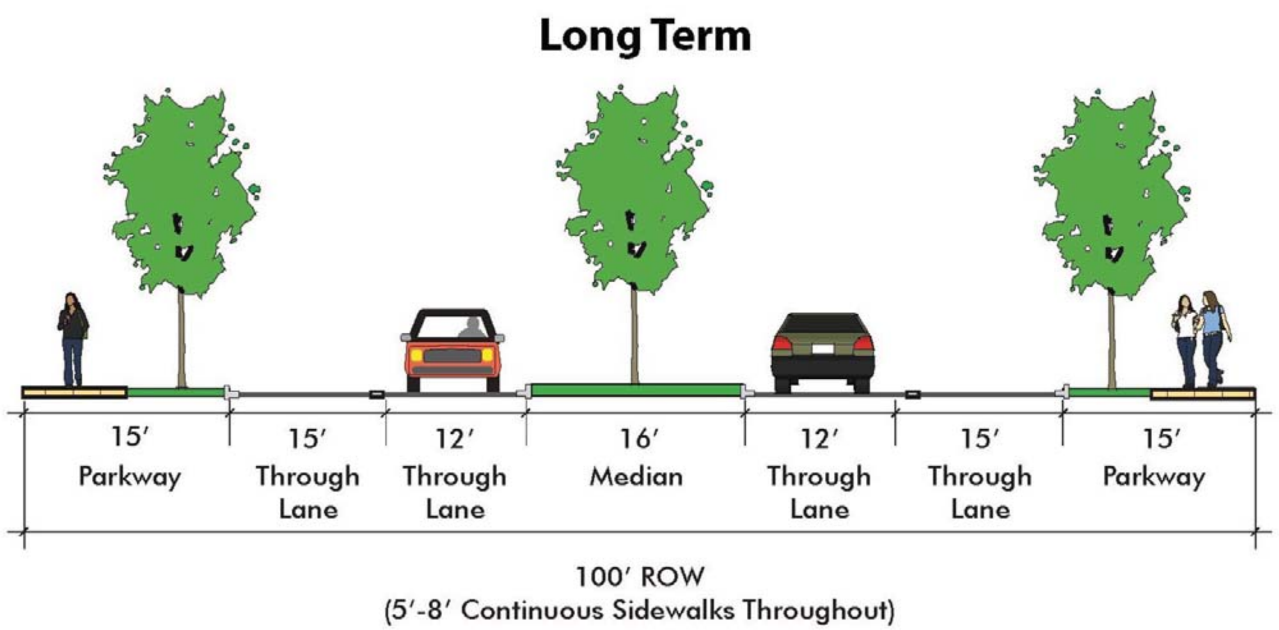


Figure 6-9: Long-Term Improvements for Lee Road (South of BF 1960)

BF 1960 — With future development, traffic growth will require an expanded roadway section along BF 1960. The study team recommends a four-lane divided roadway with pedestrian accommodations (Figure 6-10). The need for additional right-of-way is not anticipated, as the existing right-of-way of 100 feet should be sufficient.

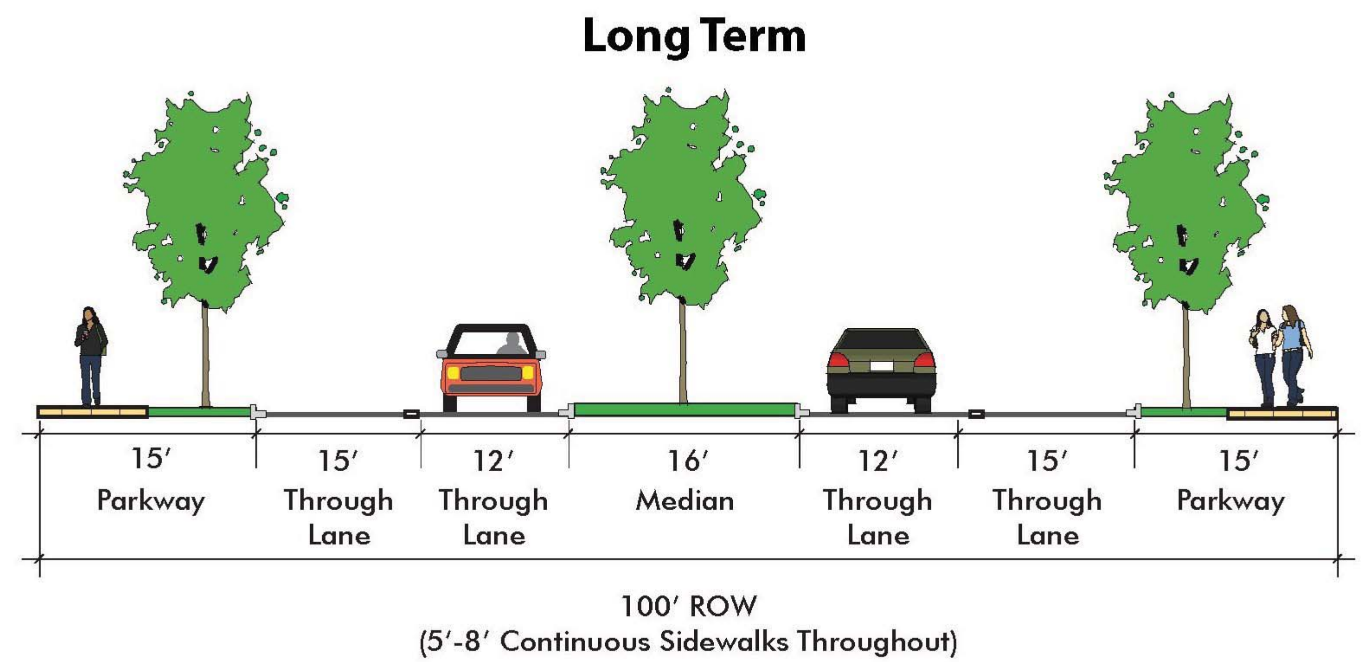


Figure 6-10: Long-Term Improvements for BF 1960

For graphical illustrations of long-term recommendations in Harris County, refer to pages 68-70 and 83 in Appendix A.

6.4 City of Houston Implementation

Houston"s jurisdictional boundary is between Kenswick Drive and Whitaker Road. While TxDOT maintains the BF 1960 corridor, the City of Houston maintains the cross-street of Townsen Boulevard. The improvements in this section include short-, medium-, and long-range summaries for each improvement. Design details and preliminary cost estimates are in the Appendix.

Short-Term Improvements

Short-term solutions for this section of the BF 1960 corridor include traffic signal and intersection improvements. The following descriptions describe more detail about each of the short-term improvements.

Traffic Signal Improvements for BF 1960 at Townsen Boulevard. Signal timing and traffic signal infrastructure improvements can have a significantly positive impact on safety and mobility within the corridor. The only major intersection within the City of Houston is Townsen Boulevard, and it is not signalized. Townsen Boulevard is a T-intersection that provides stop sign control for the southbound approach. It is recommended that Townsen Boulevard become signalized once warrants are met.

Based on peak-hour volumes collected for this study, it appears that the intersection is close to meeting the necessary warrant thresholds for installing a signalized intersection. Although the Townsen Boulevard intersection is listed as a short-term improvement, the plan recognizes that it may take more time for the intersection to meet the proper signal warrant standards. It's important to note that a detailed engineering study is needed to determine the appropriate installation date.

Intersection Improvements for BF 1960 at Townsen Boulevard. While a traffic signal will improve traffic operations, it was observed that the westbound right-turn movement is relatively heavy, specifically in the PM peak hour. The dominant direction of travel in the evening is westbound, and drivers utilize Townsen Boulvard to access FM 1960. Therefore, in addition to the traffic signal, it is recommended to add a westbound right-turn lane.

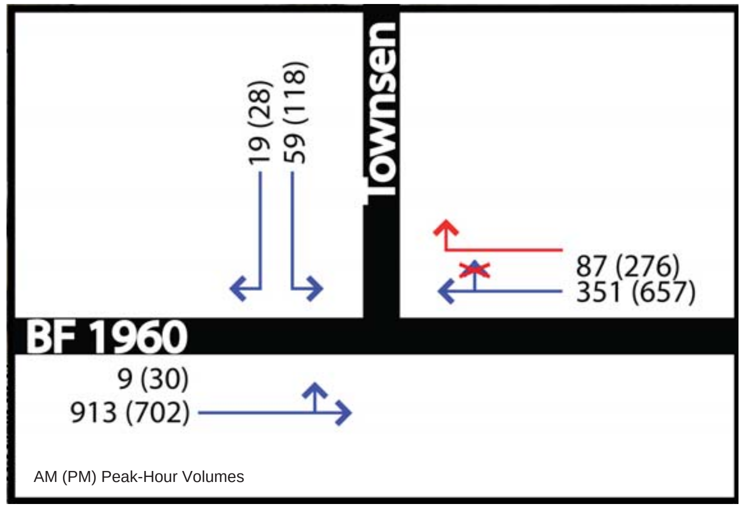


Figure 6-11: Townsen Boulevard and BF 1960

Medium-Term Improvements

The primary medium-term improvement is widening the roadway section to include a two-way left-turn lane TWLTL and pedestrian accommodations.

Roadway Segment Improvements. The recommended improvement for segment of BF 1960 within the City of Houston includes a three-lane roadway section with continuous sidewalks and a shared-use lane as shown in Figure 6-12. The continuous sidewalks and shared-use lane will provide bike and pedestrian accommodations. Additionally, the TWLTL will improve safety by reducing rear-end, head-on, and turning related crashes. The buffer between opposing directions of traffic contribute to the reduction of head-on crashes as well. The added capacity as a result of the TWLTL will benefit residences and businesses along the corridor.

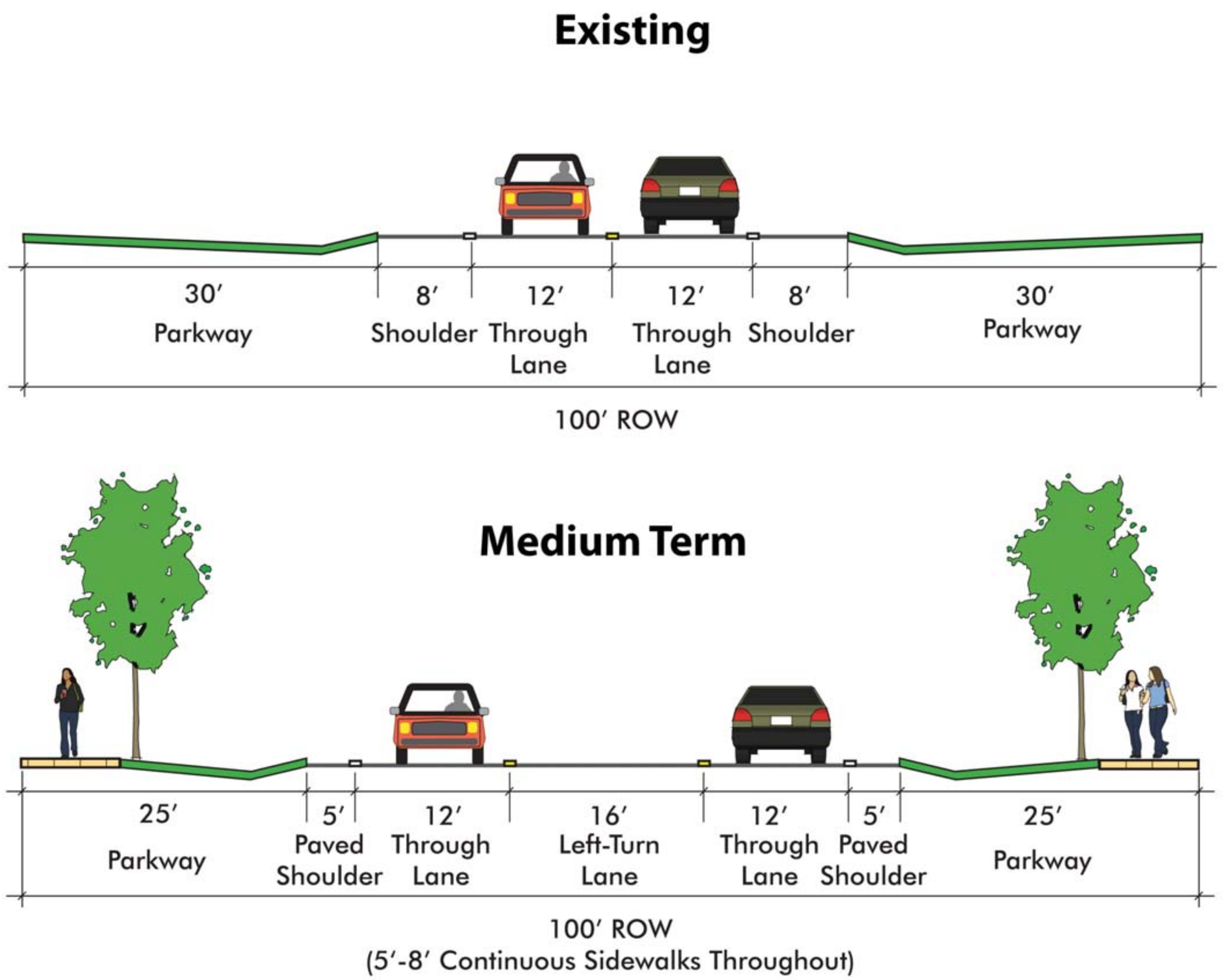
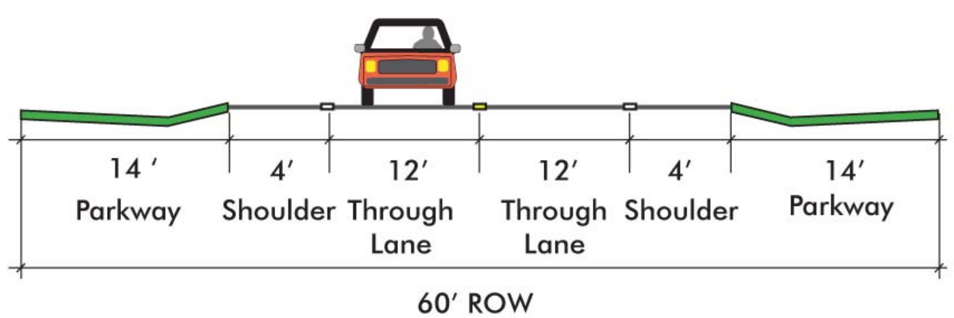


Figure 6-12: Roadway Segments within City of Houston

The existing right-of-way for the majority of the corridor is 100 feet — except the section between Carver Road and Borders Drive, which is only 60 feet (see Figure 6-16). The narrow right-of-way within the Bordersville community is not sufficient for the recommended improvements. Therefore, additional right-of-way will be required to construct the recommended three-lane section with pedestrian accommodations. In an effort to only acquire right-of-way once so that utilities, drainage, and sidewalk facilities will be constructed once, it is recommended that the necessary width of right-of-way (100 feet) be acquired to accommodate the long-term solution. As TxDOT maintains BF 1960, they will have to receive environmental documentation approval before finalizing a roadway design. The time line on this type of approval cannot be estimated as part of this plan.

Existing



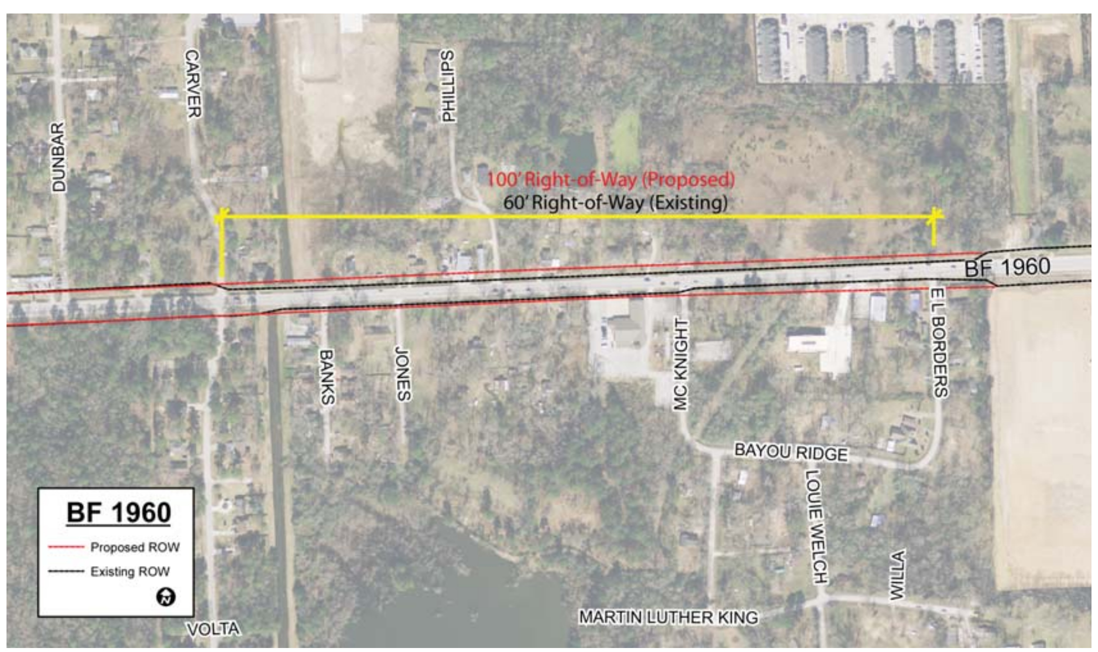


Figure 6-16: Carver Road to Borders Drive

Detailed graphical layouts of medium-term improvements in the City of Houston are on pages 56-60 in Appendix A.

Long-Term Improvements

The final sets of improvements within Houston are the long-term projects that require major construction dollars. These improvements consist of developing new thoroughfares, improving existing roadway segments, and accommodating bicycle and pedestrian needs.

Thoroughfare Planning. The regional thoroughfare plan shows an extension of Townsen Boulevard to the south. This improvement will help provide an alternative route for local and regional traffic.

Roadway Segment Improvements. As development and traffic volumes grow, the TWLTL will not be a sufficient solution to maintain safety and mobility. It will be necessary to widen the roadway to accommodate more lanes along with a positive separation between opposing traffic flows through the use of raised medians (refer to Figure 6-17). The necessary right-of-way acquired for the three-lane section as part of the medium-term improvement should also to accommodate the long-term four-lane divided section with pedestrian facilities.

Long Term

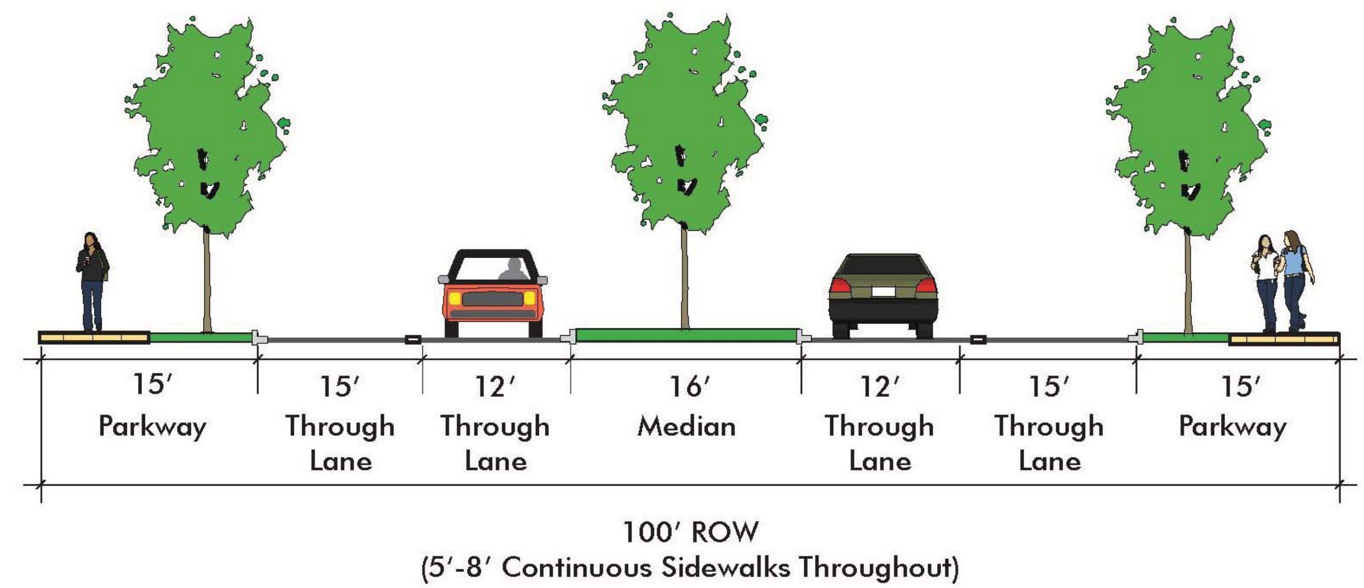


Figure 6-17: Kenswick Drive to Whitaker Road

Refer to pages 72-76 in Appendix A for graphical descriptions of long-term recommendations in the City of Houston.

6.5 City of Humble Implementation

The majority of the corridor is contained within the City of Humble's jurisdictional boundary. As previously pointed out, TxDOT maintains the BF 1960 corridor; however, all cross-streets are maintained by the City of Humble. Due to development opportunities near the US 59 interchange and downtown main street , the City of Humble has the potential to be more of a destination. The improvement plan will prepare for these future opportunities as well as alleviate existing concerns. The improvements in this section include short-, medium-, and long-range summaries for each improvement. Design details and preliminary cost estimates are included in the Appendix.

Short-Term Improvements

Short term solutions for Humble segments of BF 1960 include traffic signalization, intersection improvements, restriping, and median treatments. The following descriptions describe more detail about each of the short-term improvements.

Roadway Segment Improvements. The proposed roadway segment improvements vary within the City of Humble. Short-term roadway improvements are recommended for Whitaker Road to US 59, Bender Avenue to Avenue C, and Avenue C to Houston Street.

Whitaker Road to US 59 — Because of existing development access and geometric conditions, the area west of US 59 provides some unique challenges. A retail shopping center anchored by a grocery store and other retail / restaurant developments is on the northwest quadrant of the US 59 interchange. The shopping center is often used as a through-route to access the Deerbrook Mall, located on the northwest quadrant of FM 1960 and US 59. BF 1960 has two lanes leading up to the US 59 interchange and widens to the interchange geometry on a curve in a short distance. Driveway access points occur within the short transition and result in potential safety and operational issues. A raised median exists approximately 285 feet back from the interchange, which prevents left-turning traffic into and out of the development for the driveway nearest US 59. Currently, two driveways are just west of the end of the raised median such that left turns into and out of the development are allowed.

Another contributing factor to the congestion near the BF 1960 / US 59 interchange is the location of access ramps. The southbound entrance and northbound exit ramps are south of BF 1960. Therefore, traffic to and from FM 1960 must travel through the BF 1960 / US 59 interchange to access US 59. This results in long queues along the northbound and southbound frontage road approaches. Due to the development traffic, US 59 traffic and roadway geometric conditions in this area become congested and present safety issues.

In an effort to alleviate congestion and lessen safety concerns, a four-lane divided roadway section from Whitaker Road to US 59 is recommended. Whitaker Road was a logical point to begin the four-lane divided section to eliminate the short transition from the existing two-lane BF 1960 section to US 59 interchange geometry.

The section approximately 1,000 feet east of Whitaker Road will provide a two-way center left-turn lane while the section from the Kroger truck entrance (approximately 1000 feet east of Whitaker Road) to US 59. A full median opening will be provided for the grocery store while vehicles will only be allowed to turn left into the development at the driveway just to the east. Vehicles turning left out of the development at the driveway just west of the existing median will be distributed between the proposed median opening at US 59 southbound frontage road and FM 1960. Installing a traffic signal for the full median opening will be discussed in the Traffic Signal Improvements section (later in this document). Figure 6-18 shows the existing roadway cross-section, while Figures 6-19 and 6-20 show the proposed roadway layout. Figure 6-21 highlights the proposed layout.

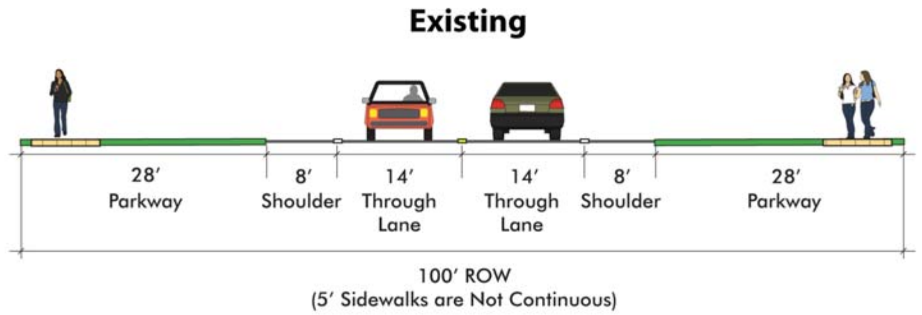


Figure 6-18: Whitaker Road to US 59

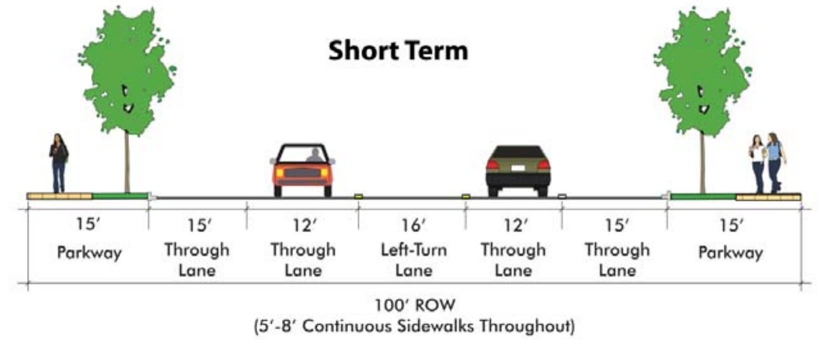


Figure 6-19: Whitaker Road to 1,000 Feet East

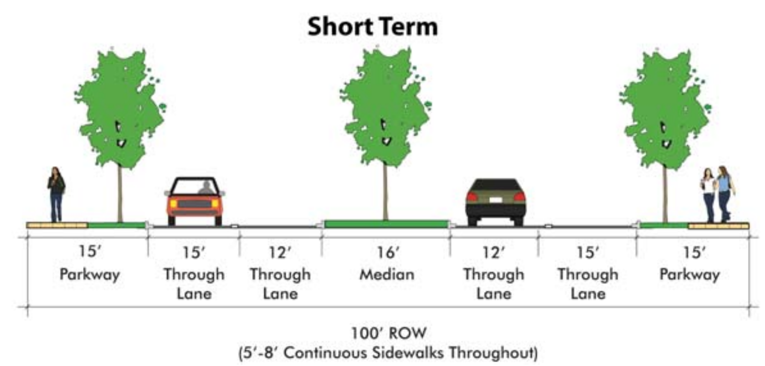


Figure 6-20: 1,000 Feet East of Whitaker Road to US 59

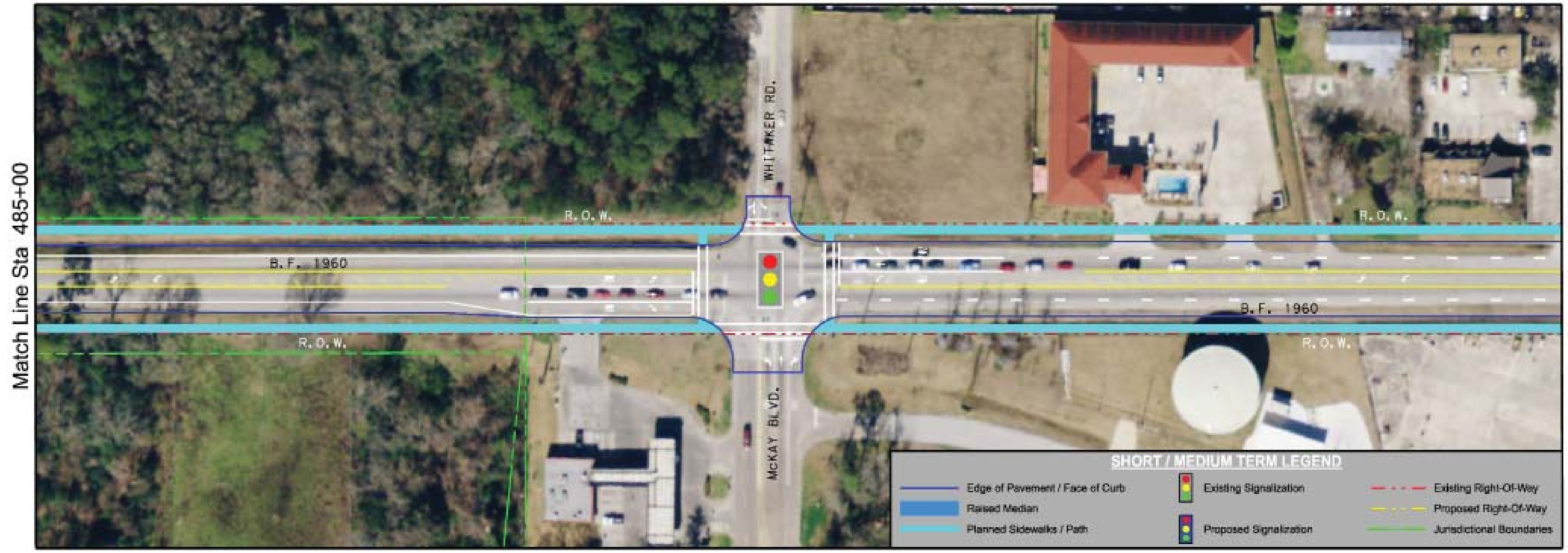
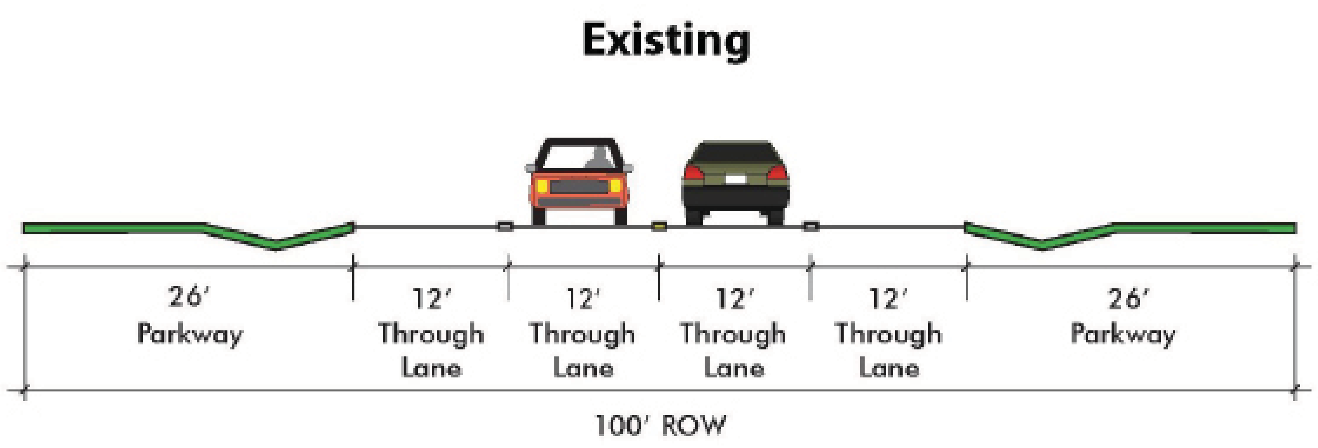


Figure 6-21: Medium-Term Roadway Improvement for Whitaker Road to US 59

Bender Avenue to Avenue C — Currently, the roadway segment between Bender and Avenue C is a four-lane undivided roadway. The recommended improvement for this segment of BF 1960 is a three-lane roadway with a two-way left-turn lane TWLTL, continuous sidewalks, and a shared-use lane as shown in Figure 6-22. The continuous sidewalks and shared-use lane will provide bike and pedestrian accommodations, and the TWLTL reduce rear-end, head-on, and turning related crashes. The buffer between opposing traffic will contribute to a reduction of head-on crashes as well. The existing pavement section is wide enough to accommodate the proposed improvement, so it will not be necessary to widen the roadway. Therefore, the improvement only requires restriping the three-lane section. While the improvement calls for the construction of sidewalks in the short-term, the plan recognizes that this might occur over a period of time.



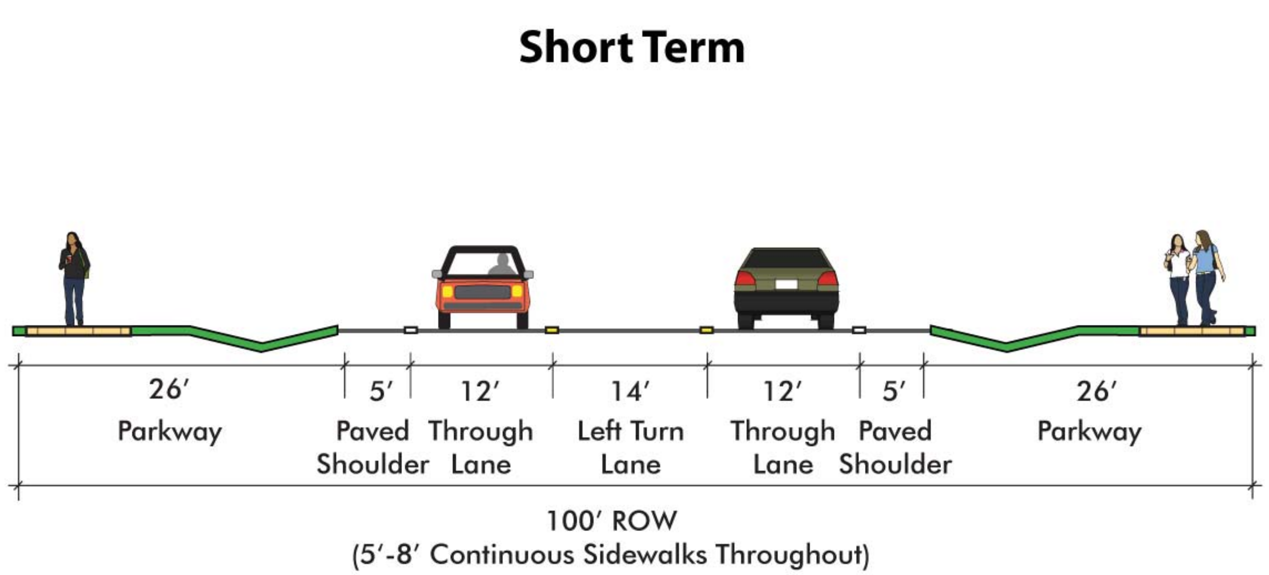
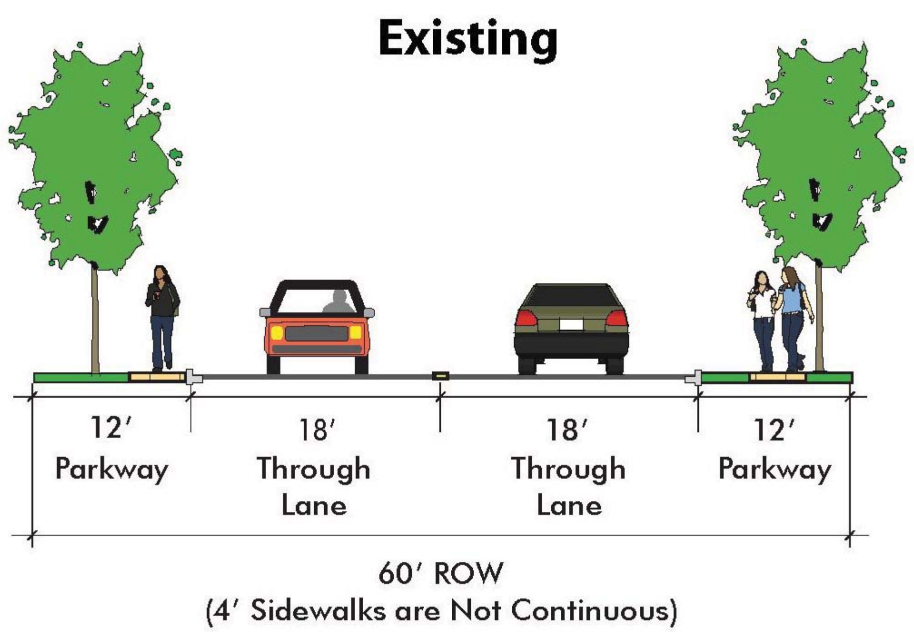


Figure 6-22: Bender Avenue to Avenue C

A***venue C to Houston Avenue*** — The existing right-of-way for most of the corridor in Humble is 100 feet — except for the section between Avenue C and Houston Avenue, which is only 60 feet. This section of the City accommodates local businesses and is viewed as a vital link to the downtown area (south of BF 1960). It is important to maintain full access to these businesses and provide a more continuous sidewalk system to accommodate pedestrian traffic.

The recommended improvement includes restriping to accommodate a three-lane roadway section with a continuous TWLTL and continuous sidewalks, as shown in Figure 6-23. The existing pavement section is wide enough for the proposed improvement; therefore it will not be necessary to acquire additional right-of-way. However, the pavement is not wide enough to accommodate shared-use lanes in the short-term. Bicyclists can utilize Herman Street, just south of BF 1960, to access the proposed regional bike plan route at Houston Avenue (Figure 6-24).



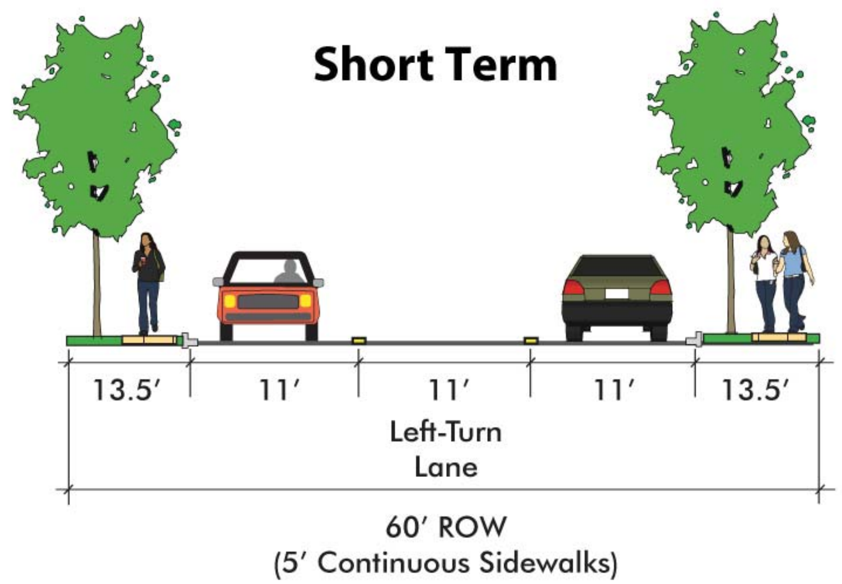


Figure 6-23: Avenue C to Houston Avenue

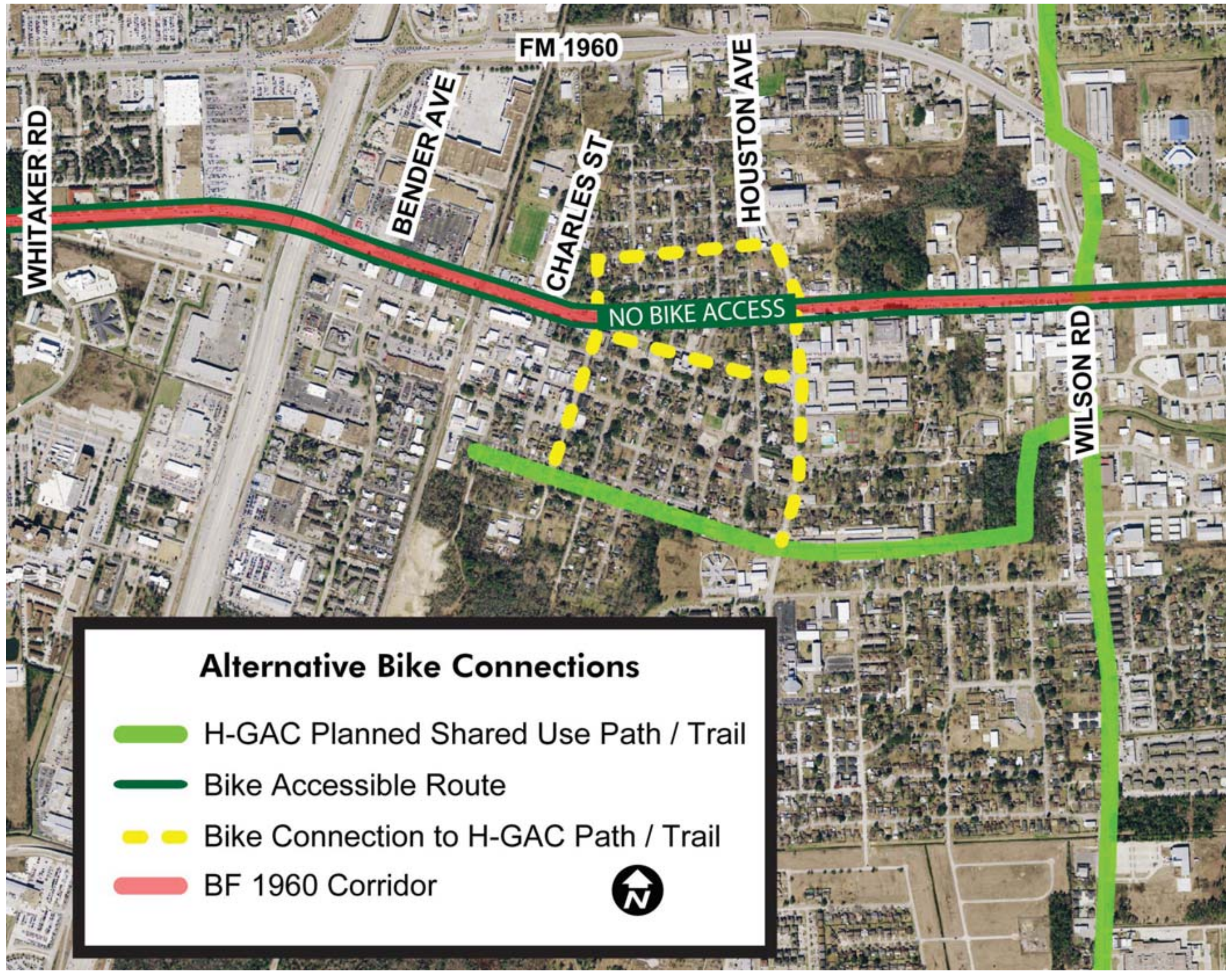


Figure 6-24: Alternative Bike Connections

While these improvements require construction of continuous sidewalks in the short-term, the plan recognizes that this might take place over an extended length of time. The north side of BF 1960 within this section provides a discontinuous sidewalk system; therefore, the short-term solution is to connect the sidewalks for this section.

Traffic Signal Improvements. Improved signal timing and traffic signal infrastructure can have a significantly positive impact on safety and mobility within the corridor. Seven of the ten signalized intersections are in Humble's city limits. TxDOT maintains the traffic signals throughout the corridor, and it is their responsibility to update any signal timing and improve progression. As part of the roadway segment improvements described in the section for Whitaker Road to US 59, a new traffic signal is recommended for the main grocery store driveway approximately 630 feet west of US 59. Based on peak-hour volumes collected for this study, it appears that the intersection is close to meeting the necessary warrant thresholds for installing a signalized intersection. Although this intersection is listed as a short-term improvement, the plan recognizes that it may take more time for the intersection to meet the proper signal warrant standards. It's important to note that a detailed engineering study will be needed to determine the appropriate date for installation.

Intersection Improvements. Short-term intersection improvements are recommended for US 59 at BF 1960, Bender Avenue at BF 1960, and Wilson Road at BF 1960.

US 59 at BF 1960 — Based on the study team's field observations and discussions with citizens, the lane designations for the US 59 interchange are unclear. Therefore, improved signing will better inform drivers of lane assignments as they travel through both sides of the interchange.

Bender Avenue at BF 1960 — The Bender Avenue intersection operates at LOS B for the AM and C for PM peak-hour. While the overall intersection operates acceptably, deficient movement include the eastbound right turn. Additionally, lane balancing issues coming from the interchange cause congestion and, at times, driver confusion. Currently, eastbound BF 1960 has three receiving lanes east of the US 59 interchange. The outside lane quickly merges with the other two lanes, causing congestion or confusion for the drivers. Therefore, it is recommended that the outside lane feed into an exclusive eastbound right turn-lane at Bender Avenue. It is important for advanced right-turn only lane signing to avoid lane designation confusion. While eastbound through-drivers traveling in the outside lane will still have to merge to the left, improved signing will alleviate confusion.

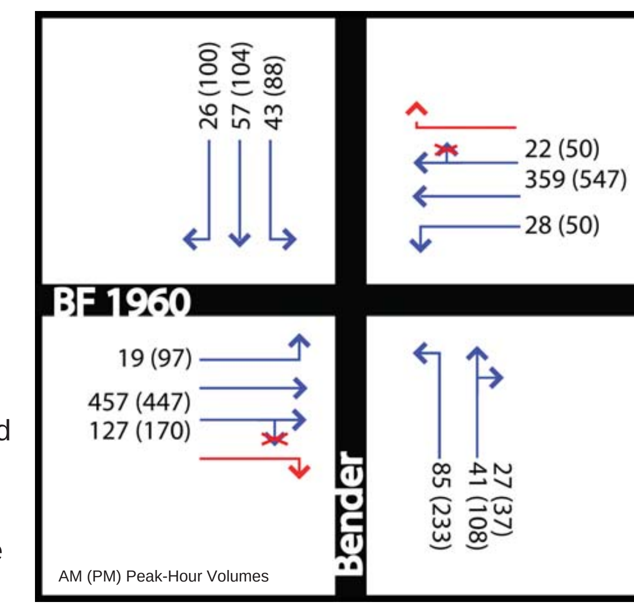


Figure 6-25: Bender Avenue and BF 1960

Wilson Road at BF 1960 — The Wilson Road intersection operates at LOS C for both AM and PM peak-hour. While the overall intersection operates acceptably an exclusive right turn lane for the eastbound approach is recommended.

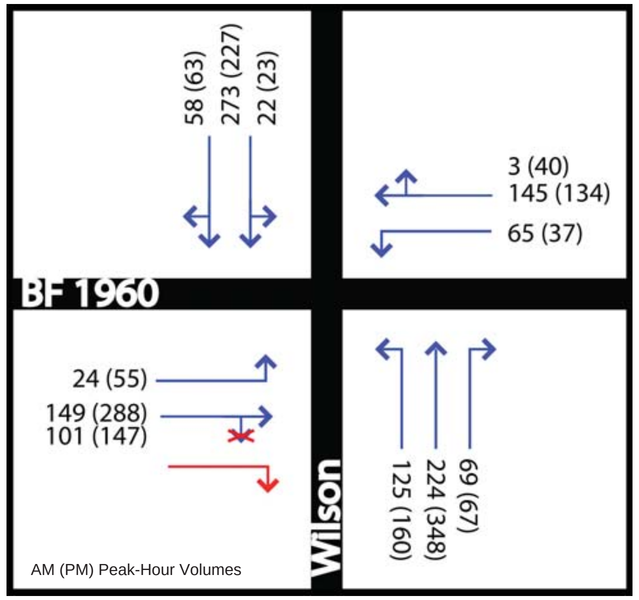


Figure 6-26: Wilson Road and BF 1960

Landmark and Aesthetic Features. Elsewhere along the corridor, special street accents (similar to what the City has designed for Avenue A at Main Street) should mark the key intersections of Bender Avenue, Avenue C / Herman, and North Houston Avenue along BF 1960. These intersections are major connection points between the corridor and the historic downtown area. They also mark breaks in sections of the City and cross-section design. Decorative accents will provide visual appeal to downtown and alert drivers that they are passing through “Old Town Humble”. Again, the intent is to shift downtown’s orientation northward to include both sides of BF 1960.

Figure 6-27: Example of possible landmark feature for Avenue C / Herman Avenue "5-points." This site commands driver's attention heading eastbound and marks an important transition point along the corridor.

Improvements such as those depicted in Figure 6-27 are intended to improve Humble’s image and sense of place. They are also intended to invite people in to linger and shop, not to rush them through.

Medium-Term Improvements

The primary medium-term improvement identified in Humble is providing a three-lane roadway section and a continuous sidewalk system. Pages 60-67 of Appendix A highlight medium-term recommendations in the City of Humble.

Roadway Segment Improvements. The recommended improvement for the segment of BF 1960 between Houston Avenue and FM 1960 East involves a three-lane roadway section with continuous sidewalks and a shared-use lane as shown in Figure 6-28. Because of the high number of driveways in this section, a TWLTL will improve safety by reducing rear-end, head-on, and turning related crashes. Furthermore, the buffer between opposing directions of traffic will aid in reducing head-on crashes. No additional right-of-way will be required as part of this improvement.

Additionally, it is recommended that the continuous sidewalks be completed for the roadway segment between US 59 and Houston Avenue as part of the medium-term improvements. Sidewalks will be constructed to accommodate the long-term solution.

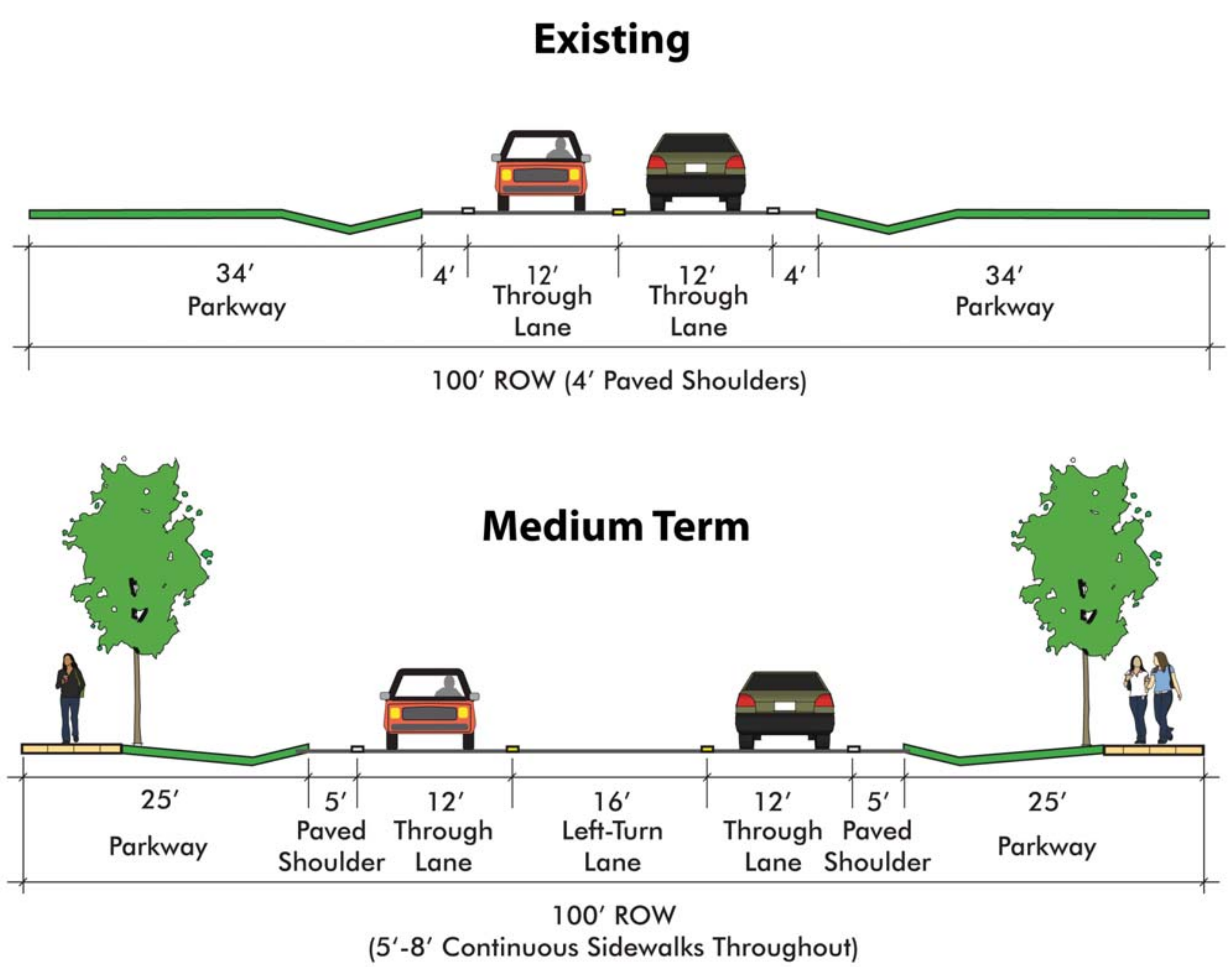


Figure 6-28: Houston Avenue and FM 1960 East

Long-Term Improvements

City of Humble long-term improvements consist of improving existing roadway segments and accommodating bicycle and pedestrian needs. Refer to pages 76-83 in Appendix for graphical illustrations of long-term recommendations in the City of Humble.

Roadway Segment Improvements. As development and traffic volumes grow, the TWLTL will not be a sufficient solution to maintain safety and mobility. It will be necessary to widen the roadway to accommodate more lanes and design raised medians between opposing traffic flows.

The long-term recommendation from US 59 to Avenue C and from Houston Avenue to FM 1960 East is a four-lane divided roadway with continuous sidewalks and a shared-use lane (Figure 6-29). As previously noted, the continuous sidewalks constructed as part of the medium-term solutions should accommodate long-term recommendations.

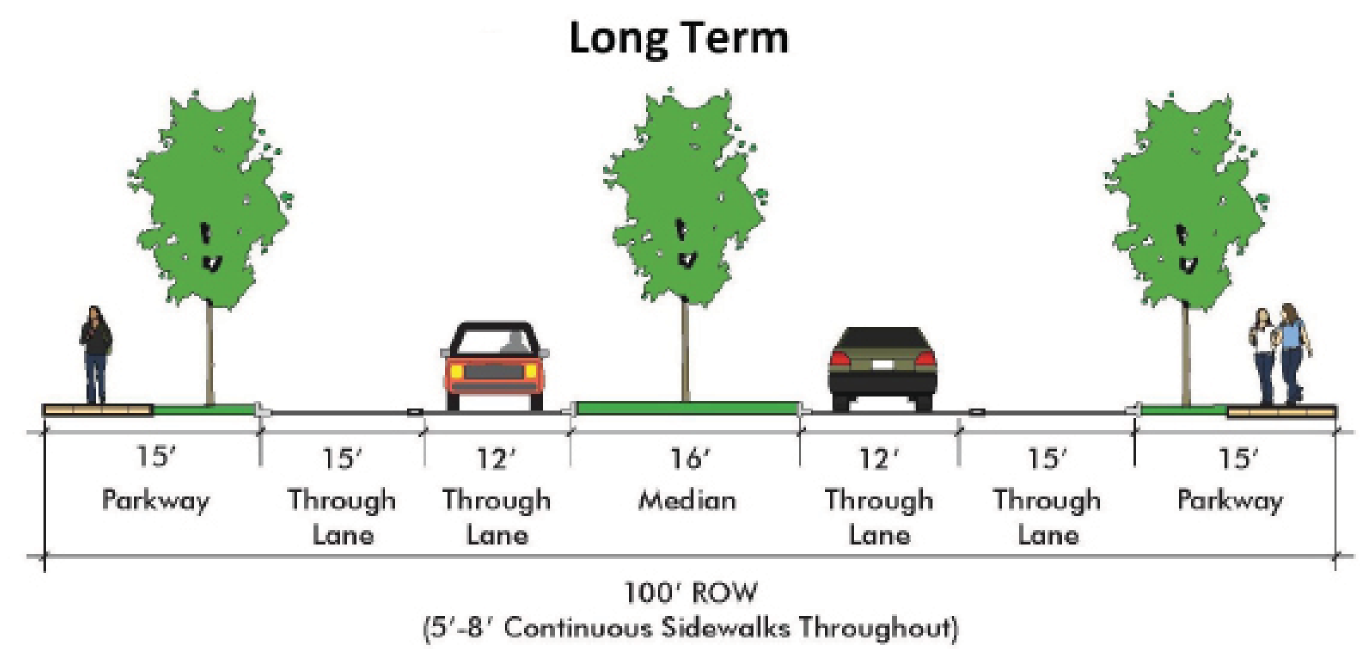


Figure 6-29: US 59 to Avenue C and from Houston Avenue to FM 1960 East

To maintain character, access, and linkage to downtown Humble between Avenue C and Houston Avenue, the three-lane roadway segment will be maintained as part of the long-term recommendations. However, the roadway pavement section will be widened to provide the necessary width for a shared-use lane. Additional right-of-way — approximately 11 feet — will be needed to implement the long-term solution between Avenue C and Houston Avenue. The continuous sidewalk system in this area will be constructed as part of the medium-term improvement and will accommodate the long-term solutions. Figure 6-30 shows the roadway typical section.

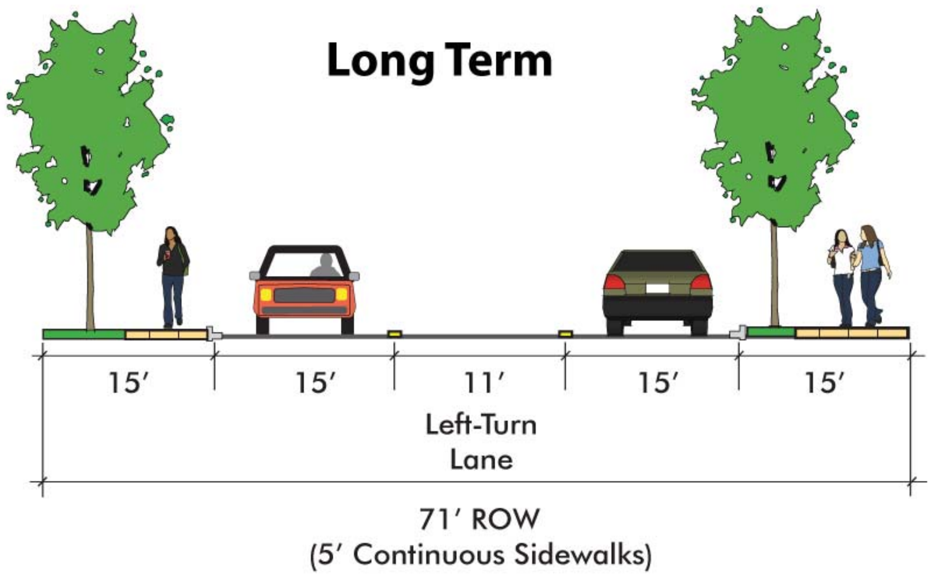


Figure 6-30: Avenue C to Houston Avenue (Existing 60-Foot Right-of-Way)

6.6 Projected Costs

The projected costs for the short-, medium-, and long-term improvements are presented in Table 6-1. It is noted that the BF 1960 corridor is maintained by TxDOT, making design and construction of the roadway segments TxDOT's responsibility. However, costs such as cross-street improvements and aesthetic treatments will be the responsibility of the respective jurisdictions.

Table 6-1: BF 1960 Access Management Plan Conceptual Improvements Cost Projections										
Responsible Agency			TxDOT		Harris County		City of Houston		City of Humble	
			Improvement	Cost	Improvement	Cost	Improvement	Cost	Improvement	Cost
Short Range (0-5 Years)	*Intersection*	Lee Road	Synchronize signal timing for FM 1960 and BF 1960.	$3,500						
					Restripe Northbound approach for 2 lanes. Eliminate Southbound exclusive left turn lane. Provide Southbound left/thru lane	$5,000				
		Townsen Blvd	Add Westbound right turn lane (250' Storage)	$37,500						
		Whitaker Road	None	$0						
		Kroger Driveway	Signal warrant study to determine need for traffic signal and construction of traffic signal	$180,000						
		Burger King Driveway	Hooded left only allowing Eastbound left turn into shopping center but not Southbound left turn out	*See Whitaker Road to US 59*						
		US 59 Interchange	Synchronize signal timing	$5,000						
			Improve lane designation signing	$1,000						
		Bender Avenue	Add Eastbound right turn lane (150' Storage)	$26,000						
		Charles Street	Curb ramps to be upgraded to meet ADA standards	$9,000						
		North Houston Street	None	$0						
		Wilson Road	Add Eastbound right turn lane (150' storage)	$26,000						
	Segment	FM 1960 West to Kenswick Drive							Landmark features (wayfinding signs, aesthetics, etc.) highlighting City of Humble	$5,000 – $30,000
		Kenswick Drive to Whitaker Road							Landmark features (wayfinding signs, aesthetics, etc.) highlighting City of Humble	$5,000 – $30,000

Table 6-1: BF 1960 Access Management Plan Conceptual Improvements Cost Projections										
Responsible Agency			TxDOT		Harris County		City of Houston		City of Humble	
			Improvement	Cost	Improvement	Cost	Improvement	Cost	Improvement	Cost
Short Range (0-5 Years)	*Segment*	Whitaker Road to US 59	4-lane divided section with continuous sidewalks between Whitaker Road and US 59 to improve merging area for US 59	$200,000						
			4-lane divided section with raised median and continuous sidewalks 1,000 feet east of Whitaker Road	$680,000					Landmark features (wayfinding signs, aesthetics, etc.) highlighting City of Humble	$5,000 – $30,000
		US 59 to Avenue C							Landmark features (wayfinding signs, aesthetics, etc.) highlighting City of Humble	$5,000 – $30,000
			Extend median from US 59 to Bender Avenue. Restripe 4-lane undivided to 3-lane roadway with center lane left turn lane and continuous sidewalks between Bender Avenue and Avenue C	$168,000						
		Avenue C to Houston Street	Restripe as 3-lane roadway section with center lane left turn lane. Continuous sidewalks on north side	$43,500						
		Houston Street to FM 1960 East							Landmark features (wayfinding signs, aesthetics, etc.) highlighting City of Humble	$5,000 – $30,000
		TOTAL FOR SHORT-TERM IMPROVEMENTS		$1,379,500		$5,000		$0		$15,000 – $90,000
Medium Range (5-10 Years)	*Intersection*	Kenswick Drive	Add eastbound and Westbound right turn lane (250' storage)	$67,500						
			Extend sidewalk on southwest corner to intersection							
		Townsen Blvd	Signal warrant study to determine need for traffic signal	$180,000						
		Bender Avenue	Add westbound right-turn lane (150' Storage)	$26,000						
		Charles Street	None	None						
		North Houston Street	None	None						

Table 6-1: BF 1960 Access Management Plan Conceptual Improvements Cost Projections										
Responsible Agency			TxDOT		Harris County		City of Houston		City of Humble	
			Improvement	Cost	Improvement	Cost	Improvement	Cost	Improvement	Cost
Medium Range (5-10 Years)	*Segment*	FM 1960 West to Kenswick Drive	3-lane roadway section with center lane left-turn lane and continuous sidewalks	$1,250,000						
		Kenswick Drive to Whitaker Road	3-lane roadway section with center lane left turn lane and continuous sidewalks between Kenswick and Carver as well as between Borders Drive and Whitaker	$1,325,000						
			3-lane roadway section with center lane left turn lane and continuous sidewalks; requires right-of-way acquisition between Carver and Borders to accommodate drainage improvements for long-term solution	$722,000						
		US 59 to Avenue C	Continuous sidewalks on both sides	$175,000						
		Avenue C to Houston Street	Continuous sidewalks on both sides	$160,000						
		Houston Street FM 1960 East	3-lane roadway section with center lane left-turn lane and continuous sidewalks	$2,160,000						
		TOTAL FOR MEDIUM-TERM IMPROVEMENTS		**$6,065,500**		**$0**		**$0**		**$0**
Long Range (10+ Years)	*Intersection*	Townsen Blvd	Add eastbound right-turn lane for future Townsen extension (250' storage)	$37,500						
		BF 1960 at FM 1960 East (TxDOT Planned Improvements)	FM 1960 upgraded to 6-lane section	TxDOT TBD						
			Eastbound free right-turn lane	$245,000						
			Northbound dual right-turn lane							
			Westbound dual left-turn lane							
	Segment	Lee Road South of BF 1960					4-lane divided with continuous sidewalks (approx. 1.2 miles)	$5,000,000		
		FM 1960 West to Kenswick Drive	4-lane divided with continuous sidewalks	$1,400,000						

Table 6-1: BF 1960 Access Management Plan Conceptual Improvements Cost Projections										
Responsible Agency			TxDOT		Harris County		City of Houston		City of Humble	
			Improvement	Cost	Improvement	Cost	Improvement	Cost	Improvement	Cost
Long Range (10+ Years)	Segment	Kenswick Drive to Whitaker Road	4-lane divided with continuous sidewalks	$2,580,000						
							Townsen to extend to the south per Regional Thoroughfare Plan	TBD		
		Whitaker Road to US 59	4-lane divided with continuous sidewalks 1,000 feet east of Whitaker Road	$55,000						
		US 59 to Avenue C	4-lane divided with continuous sidewalks	$885,000						
		Avenue C to Houston Street	Increase through-lanes to accommodate shared-use lanes and wider parkway	$300,000						
		Houston Street to FM 1960 East	4-lane divided with continuous sidewalks	$1,930,000						
		TOTAL FOR LONG-TERM IMPROVEMENTS		**$7,395,000**		**$0**		$5,000,000		**$0**
GRAND TOTAL				**$14,877,500**		**$5,000**		**TBD**		$15,000 – $90,000

6.7 Projected Results

The recommended improvements were compared to the existing conditions to analyze the impact of benefits in terms of safety and mobility.

Safety

According to the Transportation Research Board Access Management Manual, the addition of a TWLTL to an undivided facility reduces the number of crashes by 35%. The same document cites that raised medians are projected to decrease the number of crashes an additional 15% when converting from a TWLTL; and, that the crash reduction from an undivided facility to a non-traversable median could decrease crashes by 55%. These percentages were applied to the crash data for each segment of the BF 1960. Figure 6-33 compares the number of crashes for the short-, medium-, and long-term improvements with the existing conditions.

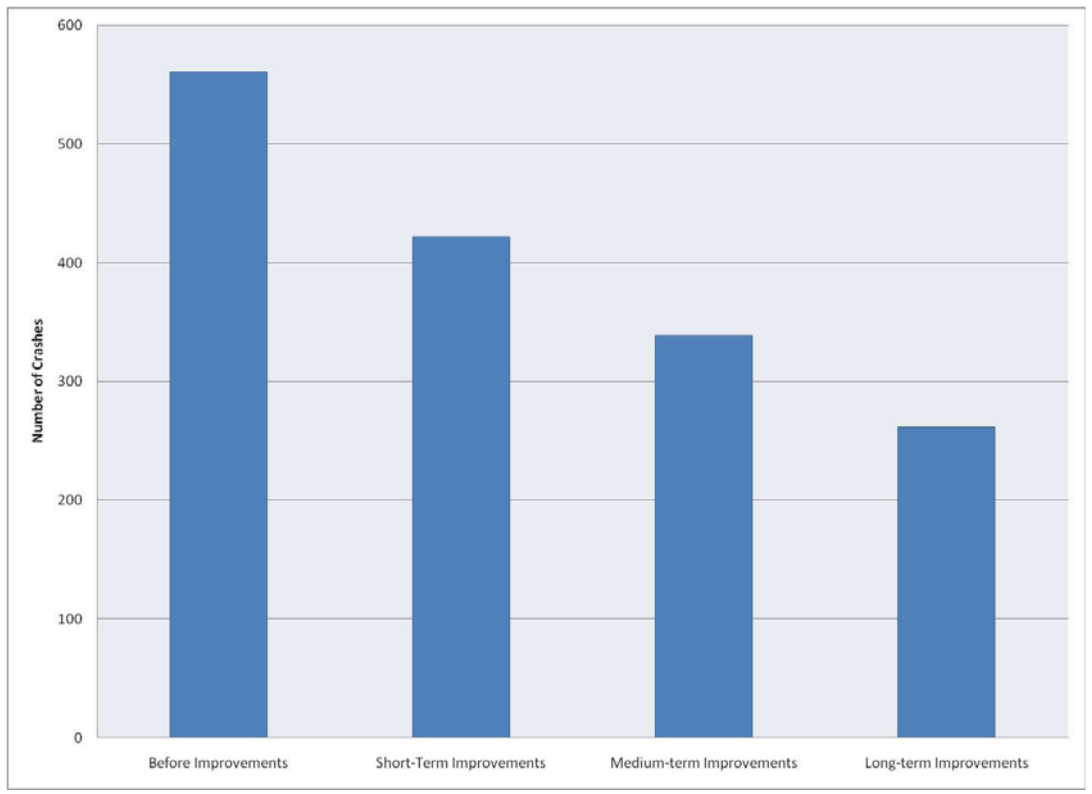


Figure 6-31: Estimated Crash Comparison (2003 – 2009)

The crash costs refer to the economic loss caused by collisions. Based on 2009 FHWA Safety Improvement cost estimates for various injury types (fatality, incapacitating injury, non-incapacitating injury, possible injury, unknown injury, and non-injury), the annual crash cost savings was estimated for each improvement scenario (Figure 6-34).

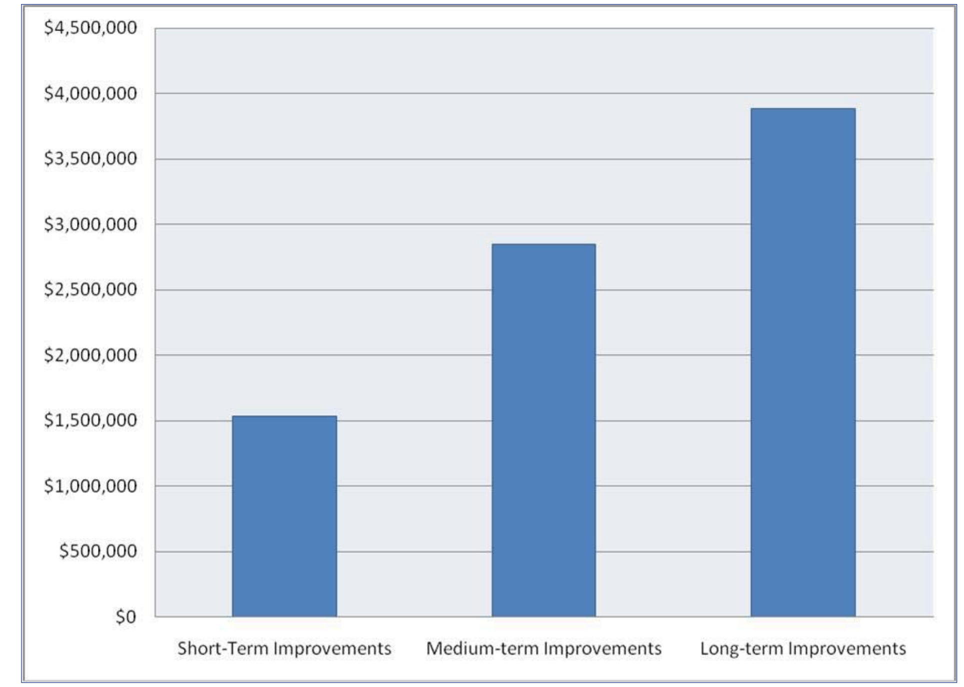


Figure 6-34: Estimated Annual Crash Cost Savings for Improvement Scenarios

Mobility

The recommended improvements were added to the existing traffic operations model to analyze mobility impacts / benefits. Figure 6-35 summarizes travel time savings was the key measure of effectiveness analyzed to evaluate the mobility benefits.

Travel time is the total travel time and delay incurred during travel along the corridor and is the product of the total travel time plus delay per vehicle (hours) and the total number of vehicles in the roadway network. Based on traffic simulation models and published research (Transportation Research Board Access Management Manual) showing the mobility benefit of TWLTLs and non-traversable medians, the recommended improvements would result in corridor-wide travel time savings of 104 hours in the morning peak-hour and 165 hours during evening peak-hour on a normal weekday. Assuming 260 weekdays a year, the annual peak-hour travel time savings is estimated at approximately 27,000 hours in the morning peak-hour and 43,000 hours in the evening peak-hour.

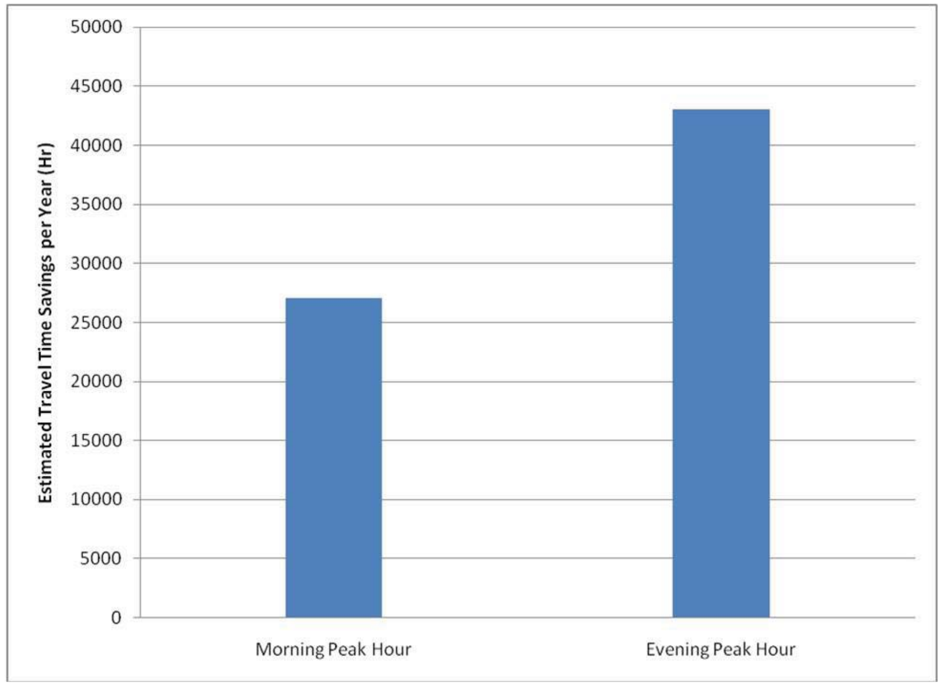


Figure 6-35: Travel Time Savings Per Year (hours) Comparison for Implementation of All Recommended Improvements

According to the *Houston TranStar 2009 Annual Report*, the value of time spent on congested roadways in the Houston area is $20 per hour. By applying this value to estimated travel time savings, the annual travel time cost savings will be approximately $541,000 in the AM peak-hour and $861,000 in the PM peak-hour (Figure 6-36). Additionally, Table 6-2 highlights the benefits of intersection improvements.

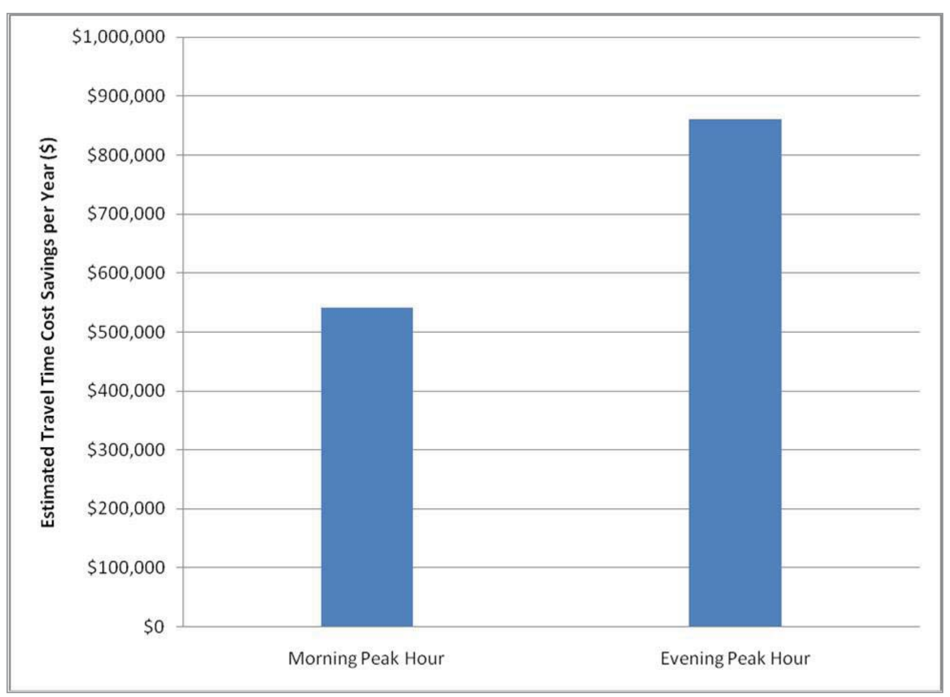


Figure 6-36: Travel Time Cost Savings per Year Comparison for Implementation All Recommended Improvements

Table 6-2: Benefits of Intersection Improvements										
			APPROACH				INTERSECTION			
Intersection	Approach	Proposed Improvement	Existing LOS (AM)	Proposed LOS (AM)	Existing LOS PM	Proposed LOS PM	Existing LOS AM	Proposed LOS AM	Existing LOS PM	Proposed LOS PM
BF 1960 at Lee Road	NB	NB Thru	C	B	C	B	C	B	C	D
	EB	-	D	C	E	E				
	SB	SB Thru/Left (Eliminate Left Only)	B	A	B	A				
	WB		D	D	F	F				
BF 1960 at Kenswick Drive	NB	-	B	A	B	A	C	C	C	C
	EB	EB Right Turn	D	C	D	D				
	SB	-	B	B	B	A				
	WB	WB Right Turn	C	B	D	C				
BF 1960 at Townsen Boulevard	NB	-	-	-	-	-	E (worse approach)	A	F (worse approach)	C
	EB	-	-	A	-	C				
	SB	-	E	C	F: 182.7	B				
	WB	WB Right Turn	-	A	-	B				
BF 1960 at Whitaker Road	NB	NB Left Turn Storage Length	D	D	D	D	C	C	C	C
	EB		C	C	C	C				
	SB	-	D	D	D	D				
	WB		B	B	B	B				
BF 1960 at US 59 Southbound Frontage Road	NB	-	-	-	-	-	D	D	C	C
	EB	-	E	E	D	E				
	SB	-	C	C	D	C				
	WB	-	C	C	B	C				
BF 1960 at US 59 Northbound Frontage Road	NB	-	E	E	C	E	D	D	D	D
	EB	-	A	A	B	A				
	SB	-	-	-	-	-				
	WB	-	E	E	E	E				
BF 1960 at Bender Avenue	NB		B	B	B	B	B	B	C	C
	EB	EB Right Turn	C	C	C	B				
	SB	-	B	B	B	B				
	WB	-	B	B	D	D				
BF 1960 at Charles Street	NB		B	B	C	C	B	B	C	C
	EB	-	B	B	D	D				
	SB		B	B	C	C				
	WB	-	B	B	B	B				

Table 6-2: Benefits of Intersection Improvements										
			APPROACH				INTERSECTION			
Intersection	**Approach**	**Proposed Improvement**	**Existing LOS (AM)**	**Proposed LOS (AM)**	**Existing LOS PM**	**Proposed LOS PM**	**Existing LOS AM**	**Proposed LOS AM**	**Existing LOS PM**	**Proposed LOS PM**
BF 1960 at N. Houston Avenue	NB	-	B	B	C	C	B	B	C	C
	EB	-	B	B	C	C				
	SB	-	B	B	D	D				
	WB	-	B	B	B	B				
BF 1960 at Wilson Road	NB	-	B	B	C	B	C	B	C	C
	EB	EB Right Turn	B	A	C	C				
	SB	-	C	B	C	C				
	WB	-	C	C	D	D				
BF 1960 at FM 1960	NB	-	E	E	E	E	C	B	C	C
	EB	EB Right Turn	B	B	C	B				
	SB	-	D	D	D	D				
	WB	WB Left Turns	C	B	C	B				

The majority of the intersection improvements recommended were right-turn lanes. Research has shown that there is a direct relationship between implementing right-turning vehicles in a through-lane and its delay to through-traffic. Table 6-3 demonstrates the exponential relationship by showing that each additional car that must wait for a right-turn will increase the delay more than the previous car. A dedicated right-turn lane separates these movements and increases roadway capacity.

Table 6-3: Right-Turn Lane Benefit

Right Turning Vehicle Per Hour	Through Vehicles Impacted (%)
Under 30	2.4
31 to 61	7.5
61 to 90	12.2
90 and up	21.8

FHWA Benefits of Access Management Brochure

Mode Diversity

The proposed improvements provide a significant increase in pedestrian accommodations through shared-use lanes, planned bike routes, and sidewalks. According to a questionnaire given to the general public during the first public meeting, safety — due to lack of pedestrian and bicycle facilities — was the major reason alternative modes were not used along the BF 1960 corridor.

While pedestrian accommodations are recommended throughout the corridor, the logical areas for pedestrian and bicycle accommodations should be prioritized within the City of Humble. Existing and potential development near US 59, including the downtown area, can make pedestrian accommodations a vital character piece and functional aspect of the City of Humble. Currently, there are sidewalks between US 59 and Bender Avenue as well as a discontinuous system along the north side of the corridor between Avenue E and Houston Avenue. And, the corridor does not specifically accommodate bicycles.

The proposed recommendations will result in more than 8 miles of shared-use lanes for motor vehicle and bicycles as well as 8 miles of sidewalks for walkers. Shared -use lanes will provide bikers access to planned bicycle routes in the area (Figure 6-37).

Currently, METRO is in the process of receiving public input on updating the long-range transit plan (METROVision) for the Houston area.

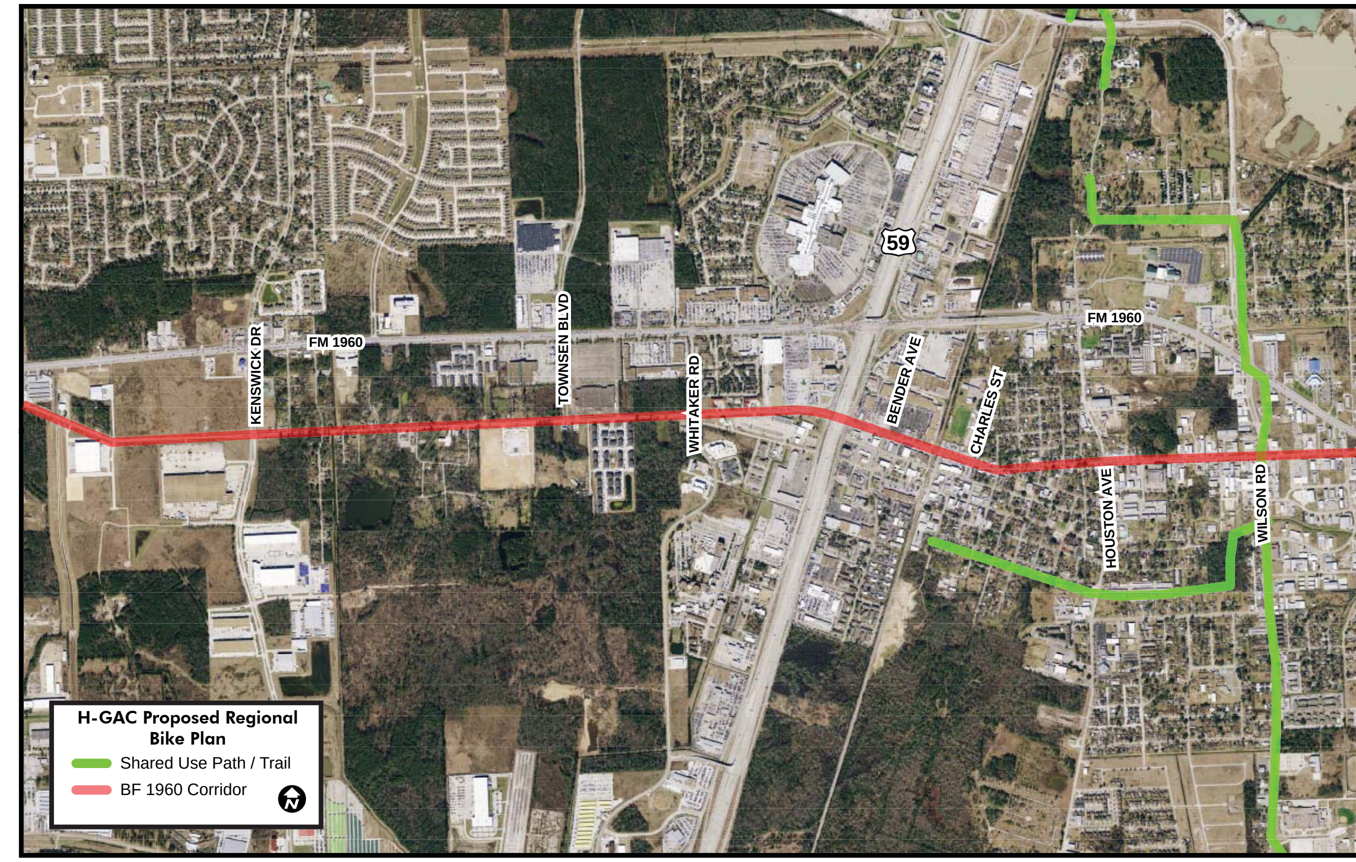


Figure 6-37: H-GAC's Proposed Regional Bike Plan

Air Quality

The recommended treatments proposed for the BF 1960 corridor will have a direct benefit to the region's air quality. These benefits will come in the form of reduced criteria pollutants (NOx and VOCs), which are a direct result of improvements in vehicle travel time delay, speeds, and vehicle stops. Simply, the proposed recommendations reduce unnecessary vehicle idling and allow vehicles to drive at optimal speeds.

The air quality benefits of this project also broaden the potential funding mechanisms. The measures taken to improve traffic flow and to reduce delay in the corridor are eligible for Congestion Mitigation and Air Quality (CMAQ) funding. H-GAC prioritizes these projects based upon daily emission reduction estimates.

The study team calculated travel time savings, and H-GAC used the Texas "MOSERS" methodology in combination with MOBILE 6 emission factors to estimate air quality benefits. Figure 6-38 reports the air quality analysis findings performed on the proposed recommended improvements. Emissions savings during the morning and evening peak hours were projected for 2011 and 2035. Fewer amounts of emissions are projected to be saved in year 2035 because it is anticipated that vehicles will be much cleaner by then, as compared to vehicles today.

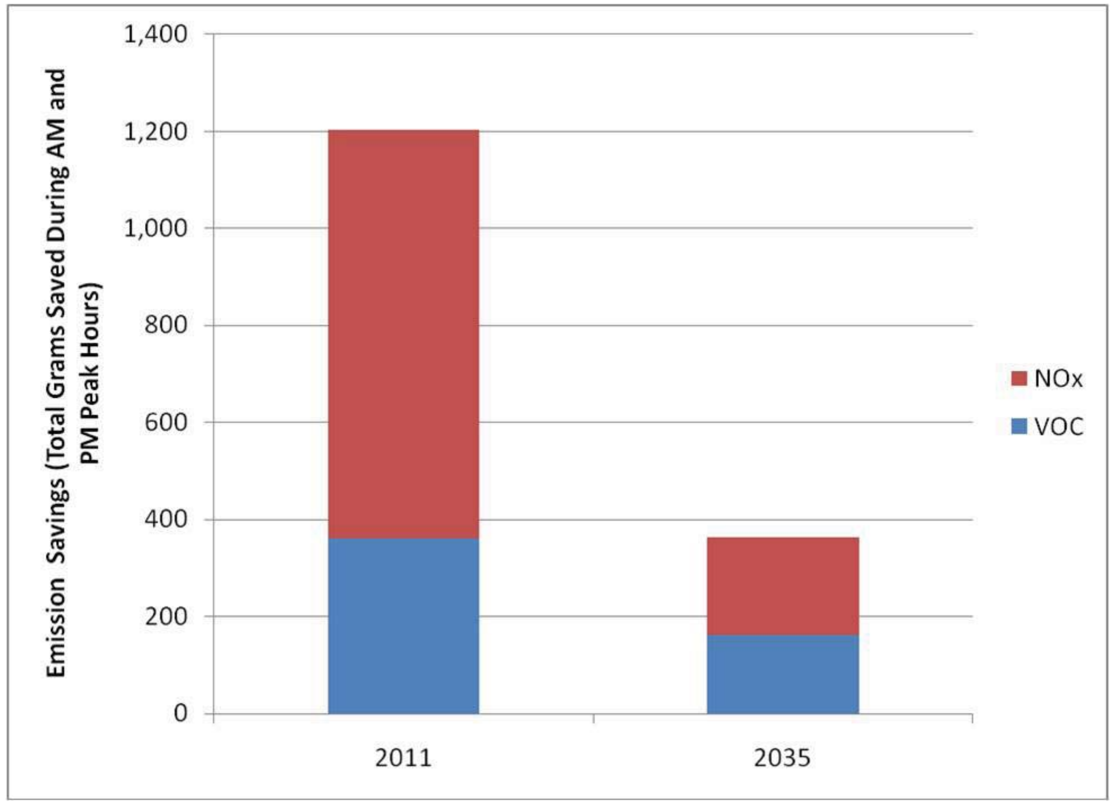


Figure 6-38: Emissions Savings

6.8 Benefit-Cost Analysis

A benefit-cost analysis compared all positive factors against estimated construction costs. The benefits, in terms of annual travel time savings and crash cost savings, were estimated over a 20-year period for the short-, medium-, and long-term improvements. Then, those figures were compared to the estimated construction costs in today's dollars. The total estimated benefit and total estimated construction costs over the 20-year period were compared in a ratio to estimate the desirability of the given recommendations. A lower benefit-to-cost ratio (less than one) would suggest that the proposed costs will exceed estimated benefits, making the recommendations undesirable. The resulting **estimated benefit-to-cost ratio of 3.00** was calculated for implementing all recommended improvements.

Short- and Medium-Term Prioritized Projects

Based on the analysis as well as public and stakeholder feedback, the following prioritized list of short- and medium-term roadway projects was developed. This list only includes short- and medium-term projects that can be constructed within the next 5 years, as funding becomes available. Due to the environmental clearance required to construct recommended improvements between Carver Avenue and Borders Drive, roadway section improvements west of Borders Drive were not included in this prioritized list. The list includes $10,000 in restriping and approximately $2 million in construction. Landmark features highlighting the City of Humble were not included in this list but should be completed as funds are available.

1. ***Bender Avenue to Houston Avenue.*** Transition from four and two lanes to a three-lane roadway section including a TLWTL by restriping within the existing pavement to improve mobility and safety. *Estimated Cost* (striping only): $10,000

   Additionally, construct continuous sidewalks on both sides of BF 1960. *Estimated Cost*: $335,000

2. ***Whitaker Road to US 59.*** Transition from two to four lanes with a TWLTL to restore mobility, reduce accidents, and improve safety in front of the shopping center. From 1000 feet east of Whitaker to US 59, widen facility from two lanes to four lanes with a 16-foot raised median create continuity of a four-lane facility that continues east of US 59. Additionally, construct continuous sidewalks along the entire section. Total construction length required from Whitaker to US 59 is approximately 2,000 feet. Perform signal warrant study for Kroger driveway to determine the need for a traffic signal. Recommend not implementing improvements without a traffic signal.
   Estimated Cost: $890,000

3. ***Lee Road at BF 1960.*** Synchronize signal timing along Lee Road between BF 1960 and FM 1960. Provide two through lanes for the northbound approach at BF 1960 / Lee Road and eliminate exclusive southbound left-turn lane. *Estimated Cost*: $10,000

4. ***Borders Drive to Whitaker Road.*** Construct additional pavement to accommodate a TWLTL and 5-foot shoulders. Also construct continuous sidewalks throughout this section. Should not affect conformity. *Estimated Cost*: $500,000

5. ***US 59 at BF 1960.*** Improve lane designation signing for the interchange with ground-mounted signs. *Estimated Cost*: $1,000

6. ***Bender Avenue at BF 1960.*** Construct an eastbound and westbound right turn-lane with 150 feet of storage. *Estimated Cost*: $52,000

7. ***Charles Street at BF 1960.*** Upgrade curb ramps to meet ADA requirements. *Estimated Cost*: $10,000

8. ***Wilson Road at BF 1960.*** Construct an eastbound right-turn lane with 150 feet of storage. *Estimated Cost*: $26,000

9. ***Townsen Boulevard at BF 1960.*** Construct a westbound right-turn lane with 250 feet of storage. Perform signal warrant study to determine need for a new traffic signal. *Estimated Cost*: $37,500 (right turn lane); $180,000 (traffic signal)

Chapter 7
Future Corridor Needs

7.1 Planning for Better Traffic Management

Road congestion is a direct function of how surrounding land is used and developed. Access management solutions that focus solely on engineering approaches typically treat symptoms (accidents and slowing) more than the root cause of traffic congestion (i.e., too many cars). Engineering approaches provide the necessary — but often only temporary — "patches" to improve traffic flow without addressing traffic volume.

Volume reduction — although difficult to achieve — usually occurs by creating opportunities for walking, biking, and transit and incorporating opportunities to disperse traffic away from major arterials. The latter is achieved through large-scaled "master planned" development that is more compact, self-contained, and internally connected and allows a mix of on-site activities — compared to the conventional single-use pattern where each building has its own driveway and parking lot. These types of changes manage overall traffic demand, rather than just access.

On the other hand, access management techniques are more narrow in scope. They include consolidating driveways; using access roads and cross-easements to connect parking lots across property lines; and limiting the number, spacing, design, and location of new driveway openings onto major arterials. Implementing access management techniques generally involves regulatory approaches and are enforced through zoning and subdivision ordinances as well as the design review process. More holistic approaches address "big-picture" use and transportation planning.

7.2 Regulatory Approaches

Humble is a relatively small city with a history of limited development regulation, like many of its peer cities in the Houston area. As a Home Rule Municipality, the City of Humble may use its local police authority to protect and enhance public health, safety, and welfare by adopting reasonable regulations to manage access to and from private properties along busy roadways such as BF 1960.

Most cities regulate by adopting local access management ordinances (or incorporating them into their overall development regulations):

- **Number of access points to a site.** Reducing the number of curb cuts results in fewer conflict points along a roadway. Access point quantity can be regulated based on a given number per site or the length of frontage. For example, each parcels can be permitted one curb cut, with an additional curb cut given to lots with more than 100 feet of frontage on the primary street. Internal access and circulation can be maximized through more deliberate parking design, cross-access easements, shared driveways, and side street or alley access.

- **Location of access points.** Where an access point is located relative to side streets, other access points, and structures has a significant impact on site safety and functionality. Location can be regulated by providing minimum clearance from these and other site elements to create a safer street environment and preserve critical sight lines on the development lot.

  It is also common to focus access points away from the primary corridor and onto less traveled streets. Corner lots or through-lots, for instance, may be required to provide access from side or back streets. (Or, where applicable, alleys can provide access in lieu of the primary roadway.) This technique can be applied along the south side of BF 1960 between US 59 and Avenue F in Humble. Higgins Street can provide rear site access for most of the through-lots facing the corridor.

When regulating the location of access points, it is important to consider other site requirements such as building location, required yards, landscaping, and pedestrian access:

- **Shared driveways.** Many times, adjacent lots provide their own curb cuts from the primary street. This results in multiple points of conflict. Some regulations require owners to consider shared curb-cut access to adjacent parking areas. Not only does the public street benefit from this requirement, but there is also an advantage for property owners. On-site circulation is enhanced by eliminating the need to enter the primary street to move from one lot to another, and the area that would have been dedicated for a curb cut can be used to provide parking, further optimizing development potential of the lot. This option can be incentivized through other regulations (e.g., a reduction in required on-site parking capacity).

- **Cross-access between sites.** Providing cross-access is a highly effective means of minimizing conflicts with the public street and optimizing on-site circulation. The basic concept is to connect parking areas of adjacent parcels with circulation aisles, eliminating the need to enter the public street to move between lots. This offers significant benefit to developers/businesses since it results in a more efficient site layout and provides an easily accessible location for overflow parking (depending upon the uses the adjacent parking areas serve).

- **On-site stacking and loading.** Drive-thru queue lanes, or stacking lanes, and loading areas are important to determining how non-parking vehicles impact site functionality and access. Stacking requirement for drive-thru facilities can regulate the capacity and location of queue and service windows. Additionally, implementing loading regulations can prohibit complex movements from blocking traffic on the public roadway or hindering on-site circulation and access to parking areas.

- **Multimodal access and safety.** Typically, access management focuses on automobiles. However, bicyclists and pedestrians should also be considered. Regulations can require a consistent pedestrian network that provides safe and direct access from public sidewalks to building entrances. These regulations can also dictate design treatments — unique pavers, cross-walk markers, signage, etc. — that optimize safety at unavoidable on-site pedestrian/vehicle conflict points. Bicycle storage facilities can also be required. Regulations can specify minimum on-site bicycle storage capacity (typically as a percentage of the on-site vehicular parking requirement), location of bicycle storage infrastructure relative to the primary structure and other site elements, and pedestrian linkages between the bicycle storage area and the primary building or public sidewalk.

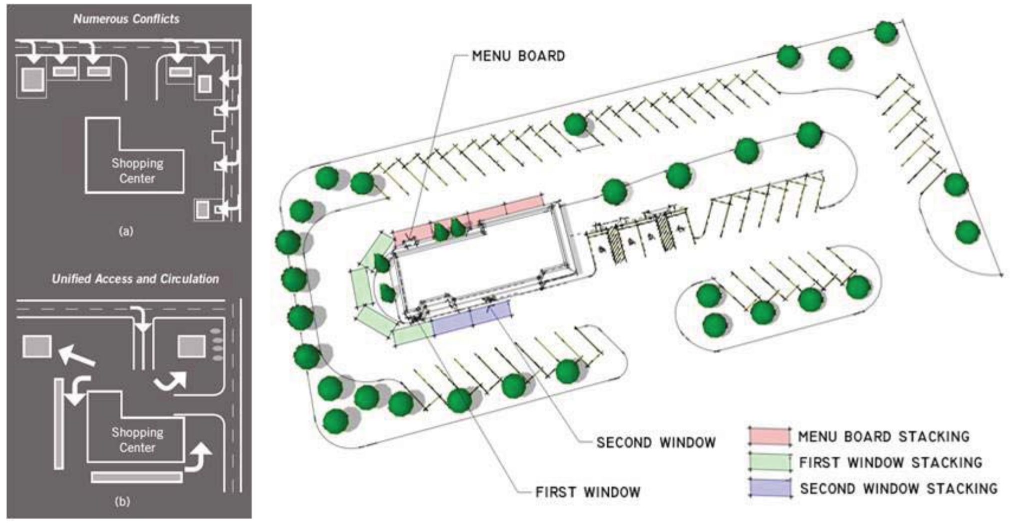


Figure 7-1: Sample Window Placement and Stacking Plan

Figure 7-1 compares the strategy of utilizing numerous driveways versus shared driveways and cross-access to provide increased safety and improved traffic operations. Additionally, the figure depicts the orientation and stacking plan for a drive-through establishment. These strategies can be effectively implemented to complement the proposed roadway recommendations to provide a safe and efficient driving environment.

7.3 Demand Management Versus Access Management

Unlike strict access management techniques, demand management examines overall land use, transportation systems, and user (dis)incentive structures to reduce automobile dependency as well as the number of auto trips. A basic principal of this broader review is to encourage compact, mixed-use development that supports walking and transit. To shepherd such a conversion, a larger commitment of time and financial resources is required. It frequently involves direct public facilitation of the development process through direct financial participation, patient land assembly, and construction of new infrastructure.

As a largely fully developed corridor, opportunities for new master planned development along BF 1960 will likely involve some amount of redevelopment. Land assembly, the process of "packaging" smaller sites into larger ones, can provides opportunities for driveway consolidation and shared parking. A prime location for a future master redevelopment effort exists at the Bender Avenue shopping center. This aging center has a high vacancy rate and is designed in a format that is increasingly disfavored by many major retailers. National trends suggest that, over the long-term, this center will continue to falter in the market (i.e., higher average vacancies, lower lease rates, and lower quality tenants) despite any cosmetic improvements designed to extend its life.

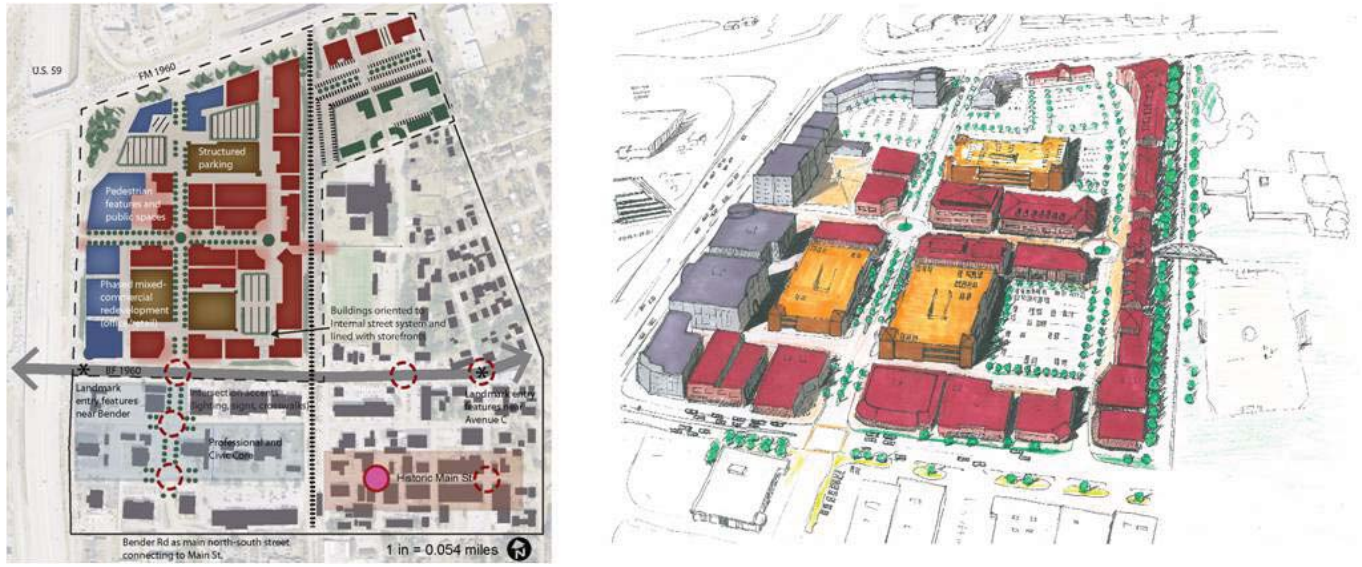


Figure 7-2: Hypotyhetical Master Plan for Bender Road shopping center.

As part of a larger revitalization effort for Downtown Humble, the Bender Avenue shopping center should be cast as a future opportunity to re-center and re-orient downtown Humble toward BF 1960 — the City's main thoroughfare (Figure 7-2). Redevelopment efforts should focus on re-inventing the site into a mixedcommercial development that is woven into the main section of Downtown by extending the street grid directly into the site; maximizing the site's frontage along US 59, BF 1960, and FM-1960; and adding aesthetic elements — stylized street lights, signs and special paving treatments — to Bender Road and BF 1960 between US 59 and Third Street. Access to the site from BF 1960 and other bordering roads, should be limited to a handful of key locations.

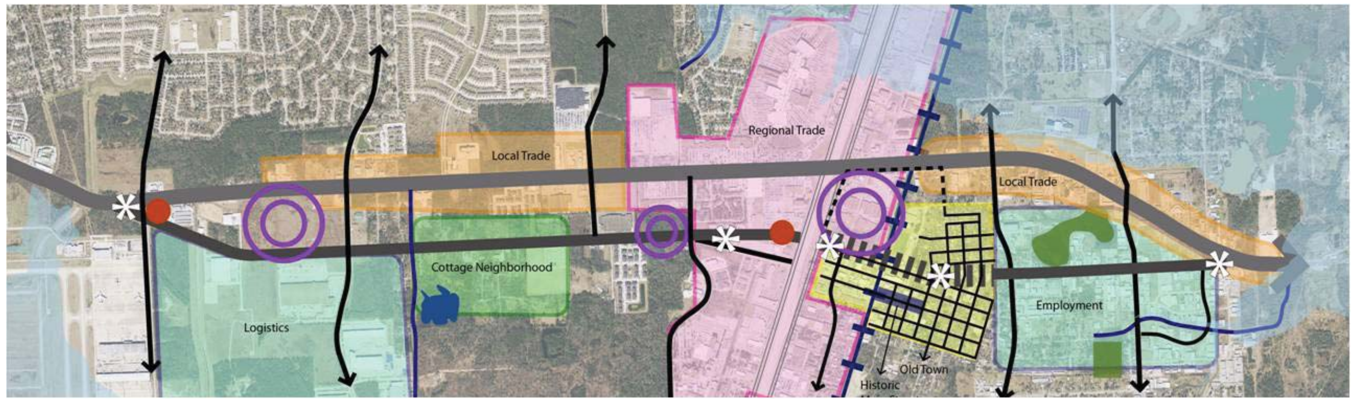


Figure 7-3: Corridor concept plan showing possible areas for concentrated mixed-use (re)development and selected design accents.

Annexing this area to downtown can be further achieved by internalizing circulation and parking as well as by creating opportunities for street and sidewalk connections that tie into the traditional downtown grid (see Figure 7-3). Prospects for the City's historic Main Street district would be improved in this scenario through coordinated directional signs and general market expansion and increased visitation. Potential market forces supporting such redevelopment include the growing medical services cluster on the opposite side of US 59 and the site's proximity to the airport.

Elsewhere along the corridor, special street accents — similar to what the City has designed for the Avenue A and Main Street intersection — should mark the key intersections of Bender Avenue, Avenue C / Herman, and North Houston Avenue along BF 1960. These intersections connect the corridor and the historic downtown area. They also separate City neighborhoods and cross-section design. Decorative accents will provide visual appeal to downtown and alert drivers that they are passing through "Old Town Humble." Again, the intent is to shift downtown's orientation northward to include both sides of BF 1960.

These improvements are geared toward mitigating traffic, providing potential opportunities for transit, and improving Humble's image and sense of place. They are intended to invite people in to linger and to shop, not rush them through.

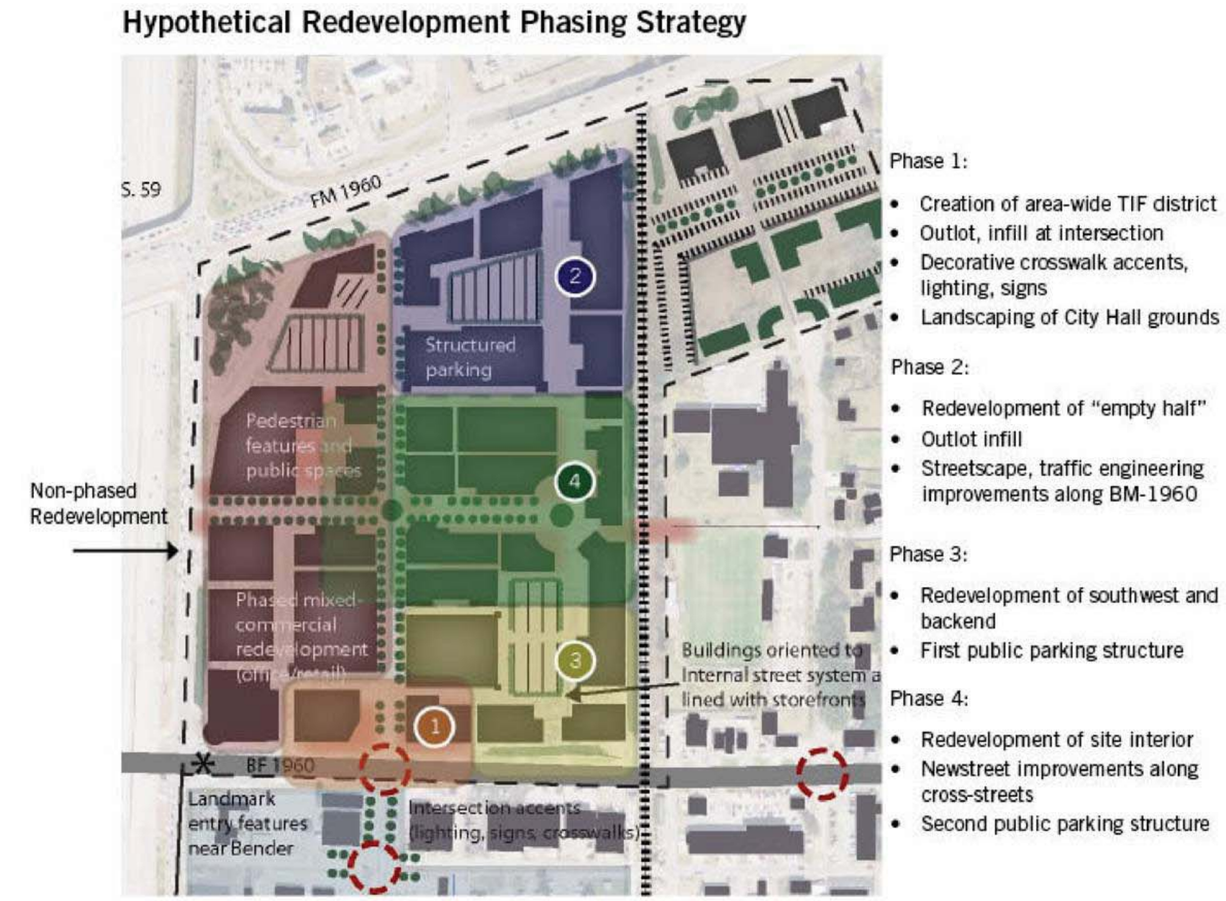


Figure 7-4: Potential redevelopment phasing scheme. The site will likely be rebuilt in phases over a period of years. Different project phases should involve new public amenities possibly funded through a Tax Increment Revenue Zone (TIRZ).

Chapter 8
Study Recommendations and Action Plan

The study team use traffic modeling software, crash analysis techniques, and field verifications to examine current conditions along BF 1960. The Corridor Steering and Stakeholder Committees approved a menu of access management treatments based upon the following goals:

- Improve safety for all modes of transportation
- Improve mobility
- Create a growth strategy for the corridor that provides guidance without hindering development
- Create mode diversity in the corridor

The study team then applied these access management techniques throughout the corridor. Conceptual improvements as well as associated benefits and costs were revised based on comments from the public. The following recommendations and action plan is the product of a comprehensive public involvement process, coordinated effort among all interested parties, and continuation of the partnerships needed for success. Table 8-1 summarizes the estimated the short-, medium-, and long-term costs for the corridor.

Table 8-1: Summary of Estimated Costs

	Responsible Agency			
Improvement Type	**TxDOT**	**Harris County**	**City of Houston**	**City of Humble**
Short-Term	$1,379,500	$5,000	$0	$15,000-90,000
Medium-Term	$6,065,500	$0	$0	$0
Long-Term	$7,395,000	$0	$5,000,000	$0
Total	**$14,877,500**	**$5,000**	**TBD**	**$15,000-90,000**

TBD (To Be Determined) – depends on landscaping, landmarks and development of future major thoroughfares such as Townsen Blvd and Lee Road.

8.1 Short-Term Recommendations

The short-term recommendations concentrate on improvements that do not require purchases of right-of-way, have a short construction period, and need only minor coordination with property owners.

8.2 Medium-Term Improvements

Medium-term improvements involve projects that can be implemented within 5 to 15 years. The primary medium-term improvement is widening the roadway section to include a TWLTL as well as pedestrian accommodations.

8.3 Long-Term Improvements

The final sets of improvements along the corridor are the long-term projects that require major construction dollars, and generally take 15 to 30 years to complete. These improvements consist of developing / improving existing roadway segments and accommodating bicycle and pedestrian needs.

The success of the BF 1960 Corridor Access Management Plan is dependent upon the formation or strengthening of partnerships among the variety of involved entities. This section seeks to clearly identify the roles and responsibilities of each agency in meeting the goals of this study.

Steps	**Agency**
1. Transportation Policy Council acceptance of BF 1960 study	H-GAC
2. Adopt BF 1960 Corridor Access Plan by ordinance	Cities
3. Implement system-wide signal retiming	TxDOT
4. Secure funding for short-term improvements	H-GAC and TxDOT
5. Coordinate with TxDOT for median aesthetics	Cities
6. Perform design for short-term improvements	TxDOT
7. Implement short-term improvements	TxDOT
8. Secure funding for medium-term improvements	H-GAC and TxDOT
9.Perform environmental documentation and schematic design	TxDOT
10. Perform detailed design of medium term improvements once environmental documentation approved	TxDOT
11. Implement medium-term improvements	TxDOT
12. Program long range thoroughfare improvements	Cities
13. Secure funding for long-term improvements	H-GAC and TxDOT
14. Perform environmental documentation and schematic design	TxDOT
15. Perform detailed design of long-term improvements once environmental documentation approved	TxDOT
16. Update comprehensive plans and subdivision standards	Cities

This corridor plan attempted to gain the input and concurrence of local business leaders, stakeholders, city officials, regional leaders, and the general public. It is clear from the technical analysis and public process that implementing the short-term intersection improvements, and system-wide signal retiming will provide the greatest relief in terms of operations. Additionally, installing the center TWLTLs will provide the safety and travel time savings benefits to the traveling public. The long-term improvements contained herein can be implemented as funding and need arises.

To begin developing the remainder of the corridor, it is critical that the policy recommendations contained in Chapter 6 be incorporated into each city's suite of development regulations. This will allow the corridor to develop in a more sustained manor. The fact is that incremental improvements will provide relief but long-lasting sustainable corridor success will only be achieved if some level of discipline is exercised to control access to developments.

Appendix A
Design Details

SHORT / MEDIUM TERM LEGEND

- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

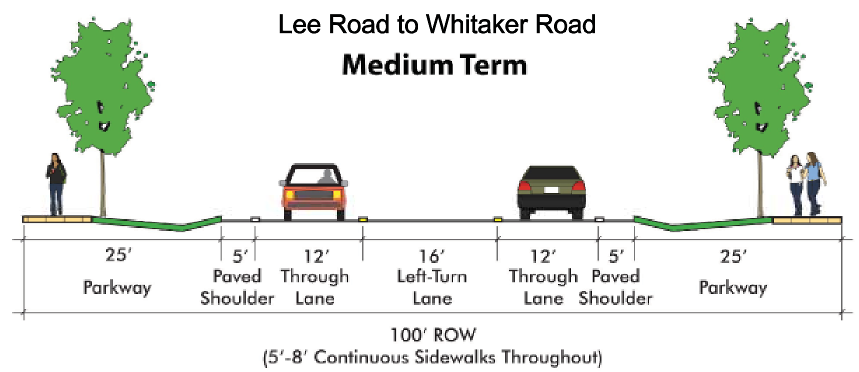
City Improvements
- Short Range
- Medium Range
- Long Range

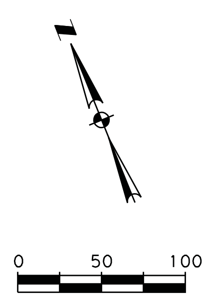
TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Lee Road to Whitaker Road

Medium Term

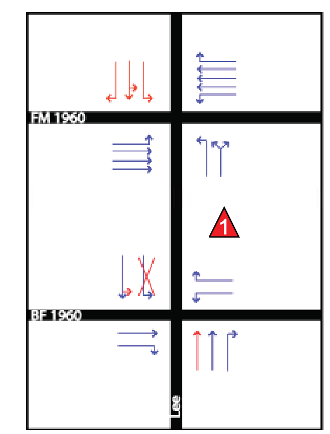




Improvements Shown:

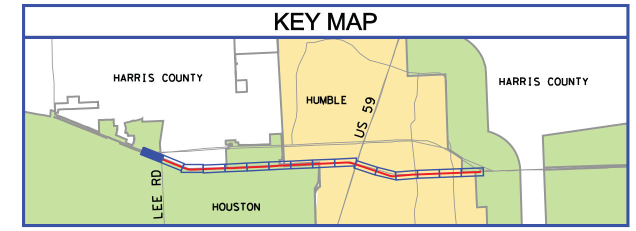
1 Thoroughfare improvement (3-Lane roadway section with center lane left turn lane and continuous sidewalks)

Intersection improvement (Restripe Northbound approach for 2 lanes. Eliminate Southbound exclusive left turn lane. Provide Southbound left/thru lane.) (Detail Right)



BF 1960 ACCESS MANAGEMENT PLAN
SHORT/MEDIUM TERM IMPROVEMENTS

KEY MAP



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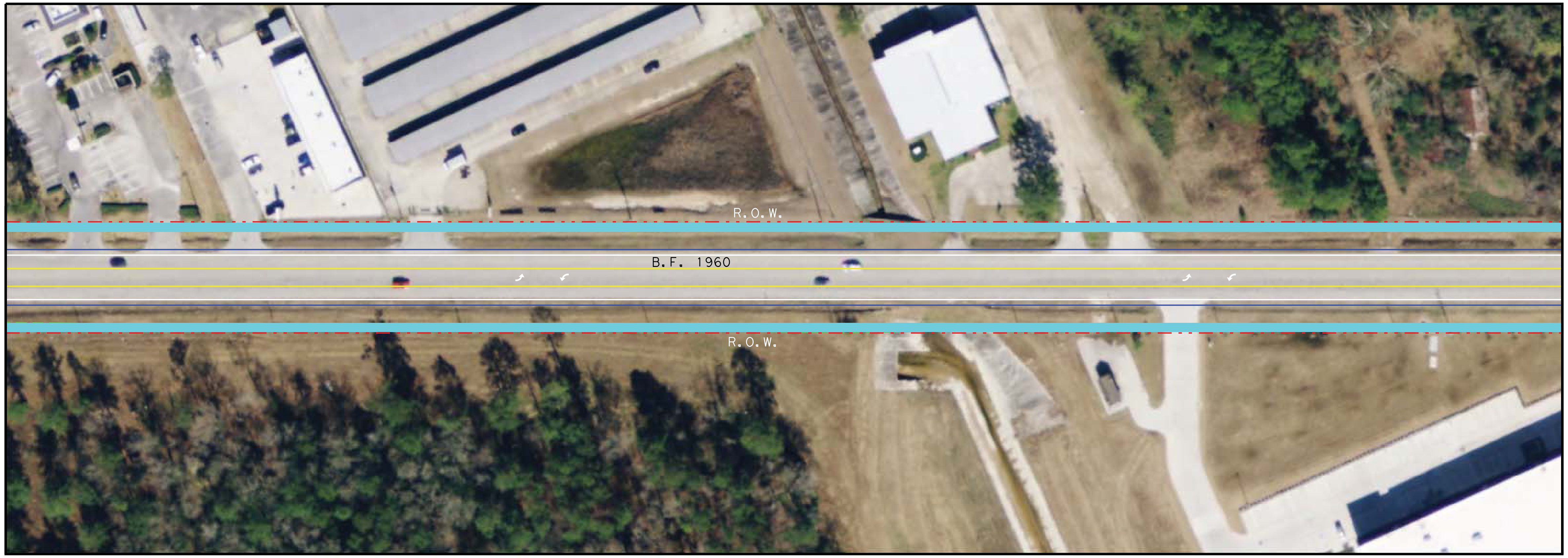

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SHORT / MEDIUM TERM LEGEND

- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

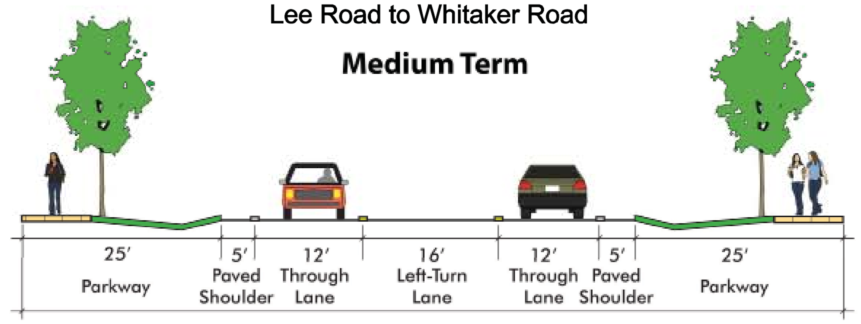
City Improvements
- Short Range
- Medium Range
- Long Range

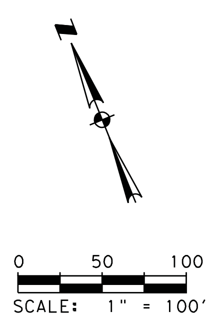
TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Lee Road to Whitaker Road

Medium Term



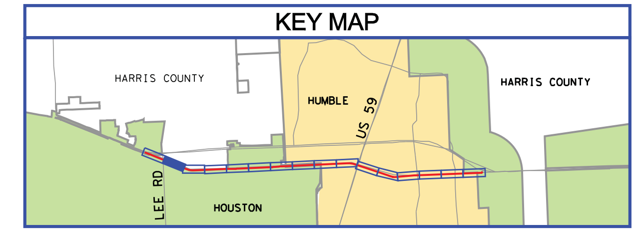


Improvements Shown:

1 Thoroughfare improvement (3-Lane roadway section with center lane left turn lane and continuous sidewalks)

BF 1960 ACCESS MANAGEMENT PLAN
SHORT/MEDIUM TERM IMPROVEMENTS

KEY MAP



Houston-Galveston Area Council

SHORT / MEDIUM TERM LEGEND

- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

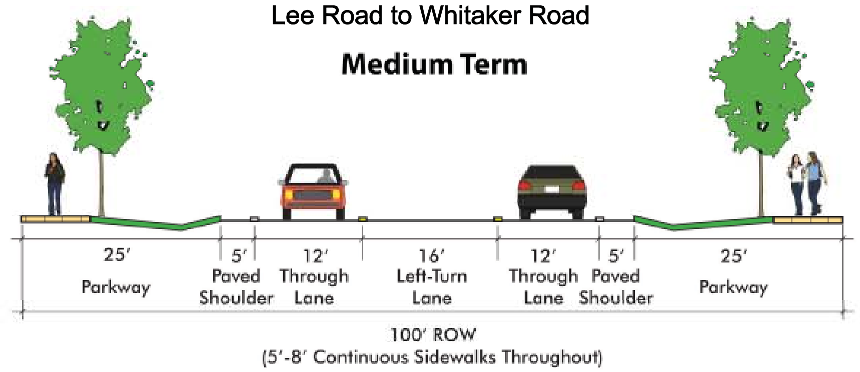
City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Lee Road to Whitaker Road

Medium Term



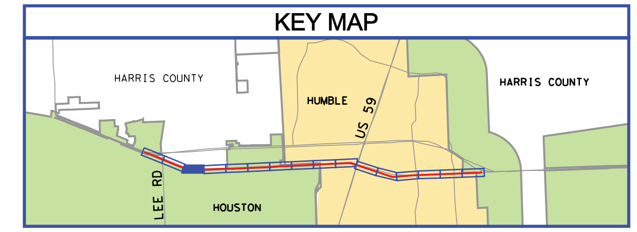
0 50 100
SCALE: 1" = 100'

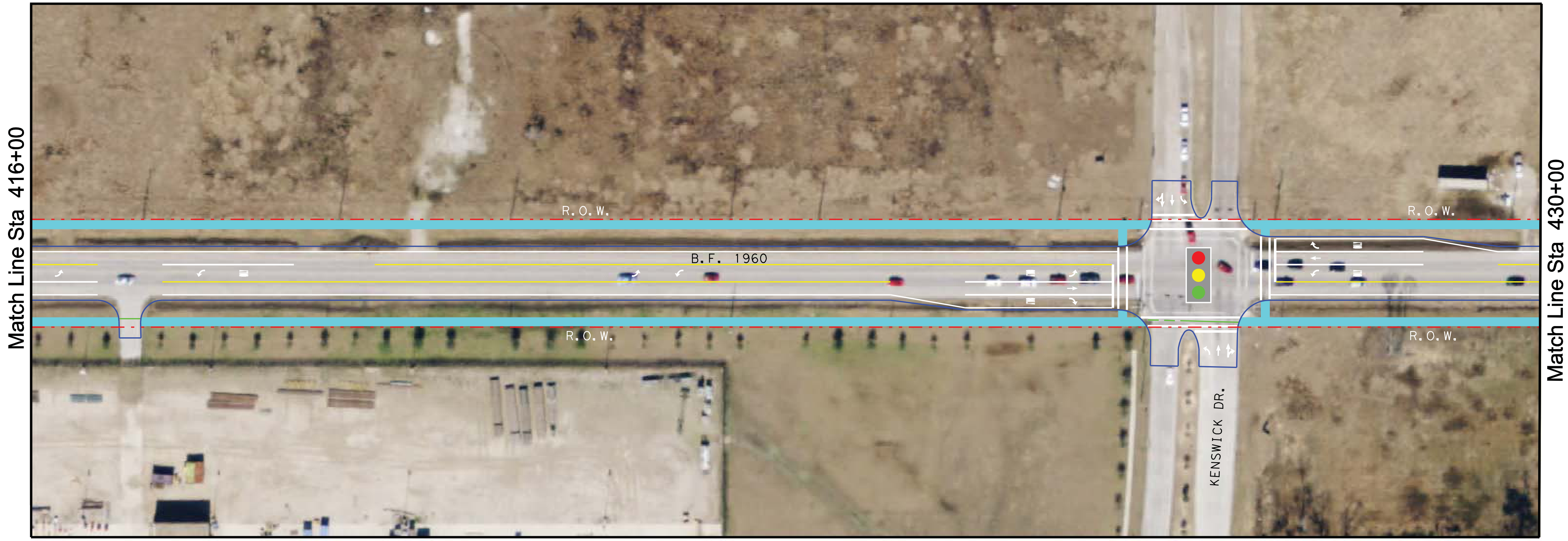
Improvements Shown:

1 Thoroughfare improvement (3-Lane roadway section with center lane left turn lane and continuous sidewalks)

BF 1960 ACCESS MANAGEMENT PLAN
SHORT/MEDIUM TERM IMPROVEMENTS

KEY MAP





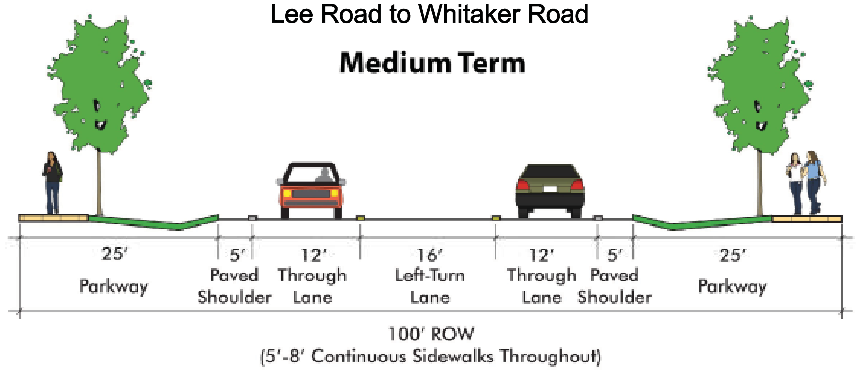
SHORT / MEDIUM TERM LEGEND

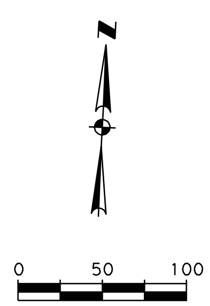
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

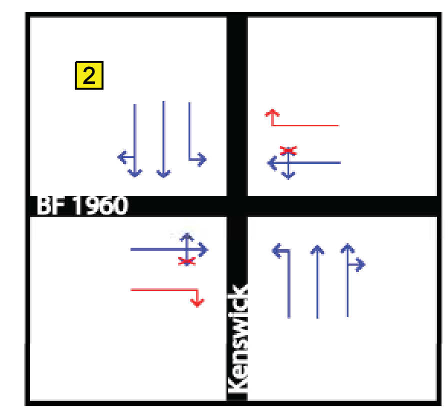




Improvements Shown:

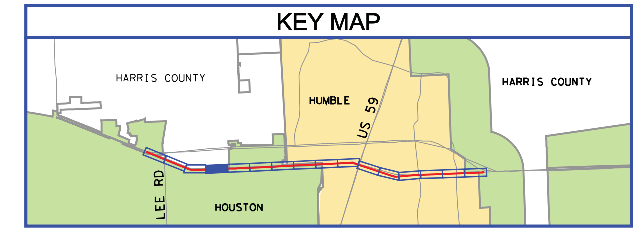
1 Thoroughfare improvement (3-Lane roadway section with center lane left turn lane and continuous sidewalks)

2 Intersection improvement (Add Eastbound and Westbound right turn lane, 250' Storage. Extend sidewalk on Southwest corner to intersection) (Detail Right)



BF 1960 ACCESS MANAGEMENT PLAN SHORT/MEDIUM TERM IMPROVEMENTS

KEY MAP



SHORT / MEDIUM TERM LEGEND

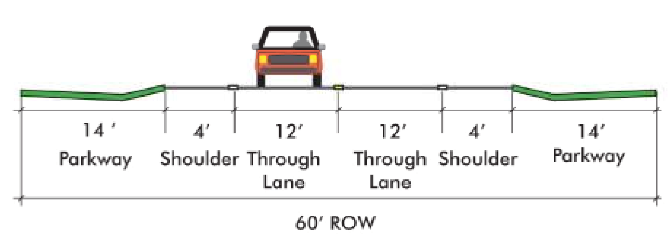
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

City Improvements
- Short Range
- Medium Range
- Long Range

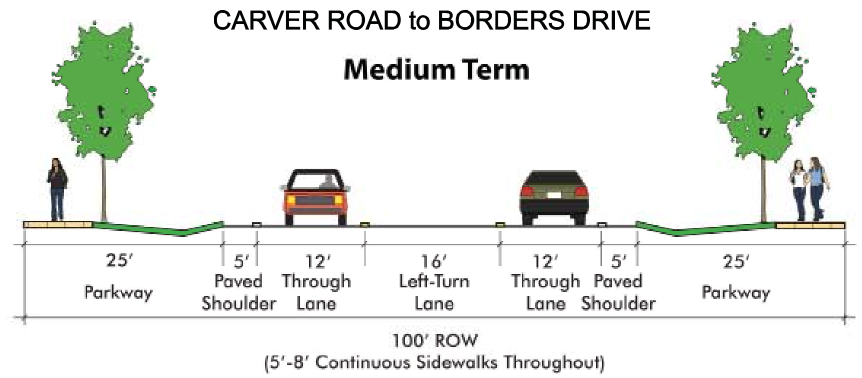
TxDOT Improvements
- Short Range
- Medium Range
- Long Range

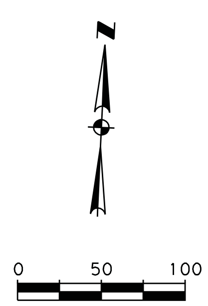
County Improvements
- Short Range
- Medium Range
- Long Range

CARVER ROAD to BORDERS DRIVE
Existing



CARVER ROAD to BORDERS DRIVE
Medium Term





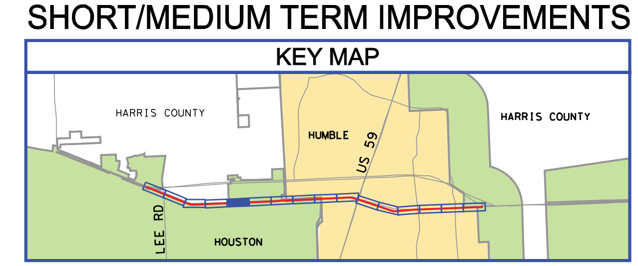
Improvements Shown:

1 Thoroughfare improvement (3-Lane roadway section with center lane left turn lane and continuous sidewalks between Kenswick Drive and Carver Avenue)

2 Thoroughfare improvement (3-Lane roadway section with center lane left turn lane and continuous sidewalks. Requires right-of-way acquisition between Carver Road and Borders Drive to accommodate drainage improvements for long term solution.)

BF 1960 ACCESS MANAGEMENT PLAN SHORT/MEDIUM TERM IMPROVEMENTS

KEY MAP



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SHORT / MEDIUM TERM LEGEND

- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

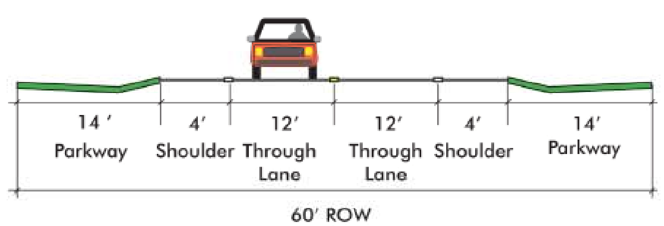
City Improvements
- Short Range
- Medium Range
- Long Range

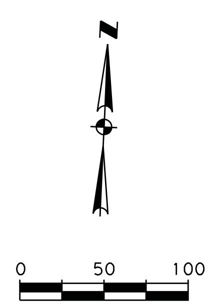
TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

CARVER ROAD to BORDERS DRIVE

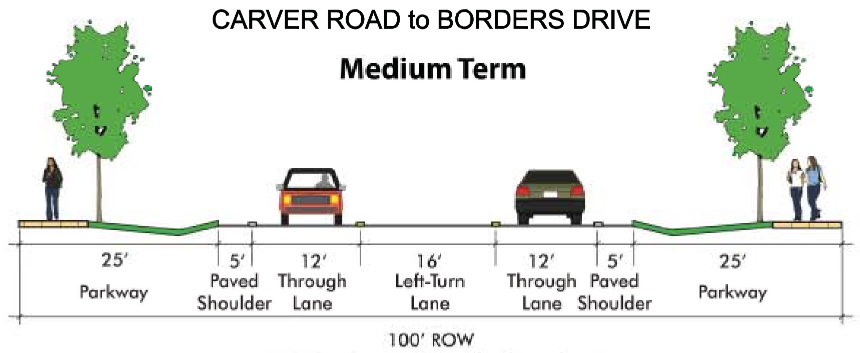
Existing





CARVER ROAD to BORDERS DRIVE

Medium Term

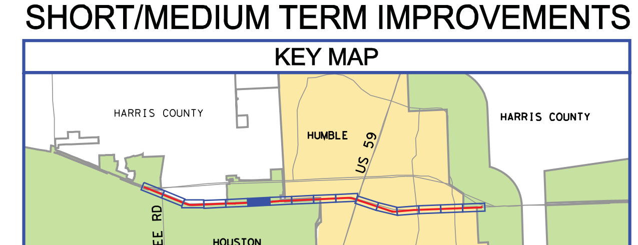


Improvements Shown:

1 Thoroughfare improvement (3-Lane roadway section with center lane left turn lane and continuous sidewalks. Requires right-of-way acquisition between Carver Road and Borders Drive to accommodate drainage improvements for long term solution.)

BF 1960 ACCESS MANAGEMENT PLAN SHORT/MEDIUM TERM IMPROVEMENTS

KEY MAP



SHORT / MEDIUM TERM LEGEND

- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

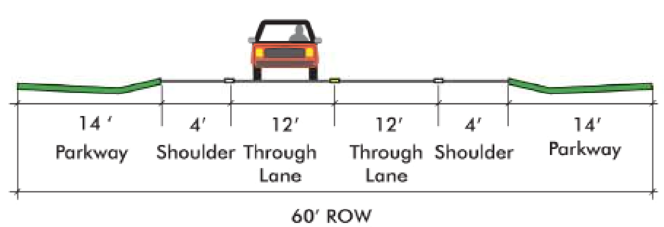
City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

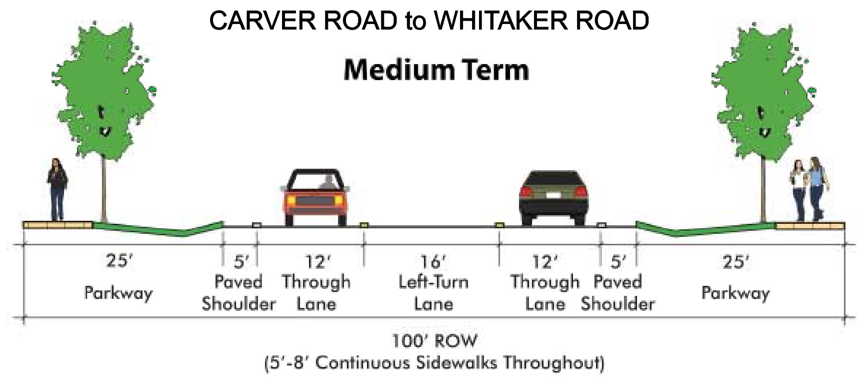
CARVER ROAD to BORDERS DRIVE

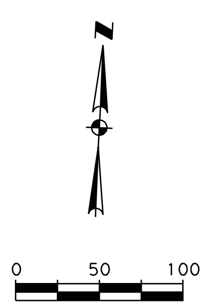
Existing



CARVER ROAD to WHITAKER ROAD

Medium Term



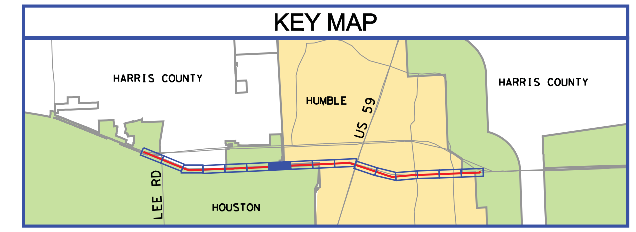


Improvements Shown:

1. Thoroughfare improvement (3-Lane roadway section with center lane left turn lane and continuous sidewalks. Requires right-of-way acquisition between Carver Road and Borders Drive to accommodate drainage improvements for long term solution.)
2. Thoroughfare improvement (3-Lane roadway section with center lane left turn lane and continuous sidewalks between Borders Drive and Whitaker Road)

BF 1960 ACCESS MANAGEMENT PLAN SHORT/MEDIUM TERM IMPROVEMENTS

KEY MAP



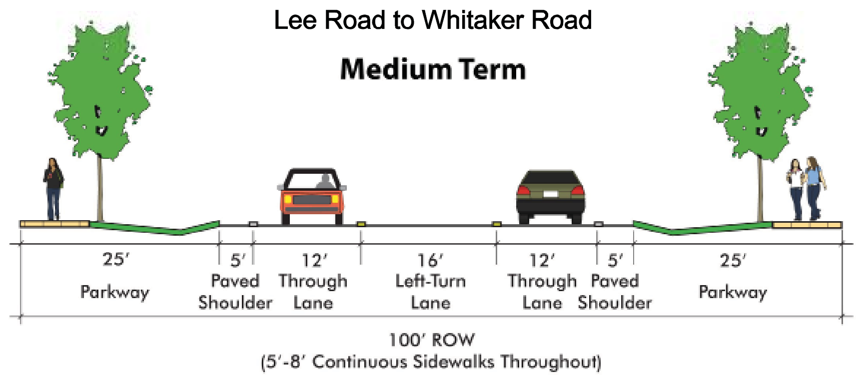
SHORT / MEDIUM TERM LEGEND

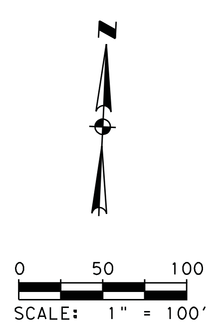
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

City Improvements
- Short Range
- Medium Range
- Long Range

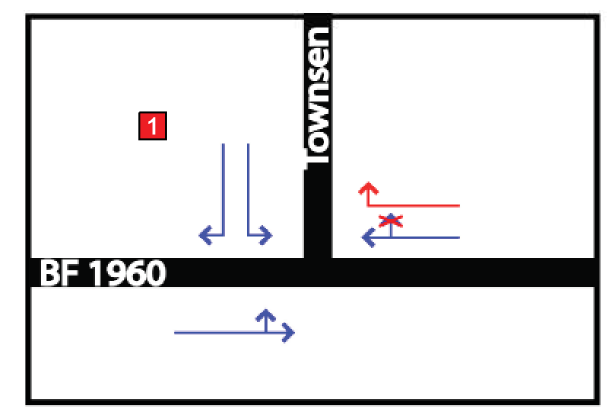
TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range



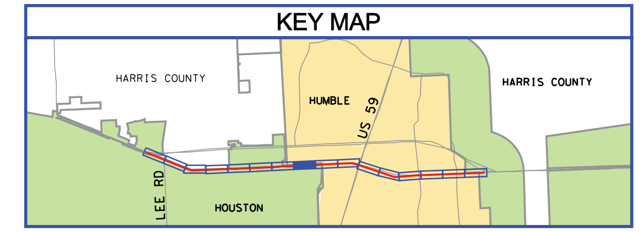


Improvements Shown:
- 1 Thoroughfare improvement (3-Lane roadway section with center lane left turn lane and continuous sidewalks)
- 1 Intersection improvement (Add Westbound right turn lane, 250' Storage, Proposed Signal) (Detail Right)



BF 1960 ACCESS MANAGEMENT PLAN SHORT/MEDIUM TERM IMPROVEMENTS

KEY MAP



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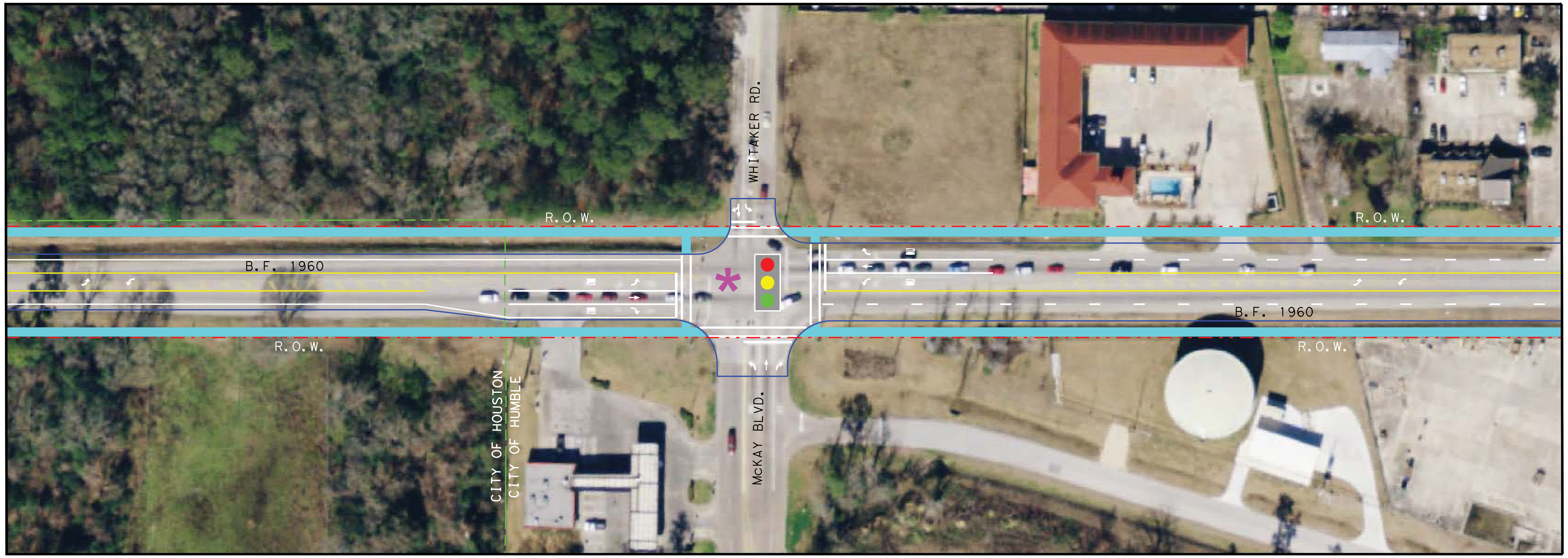

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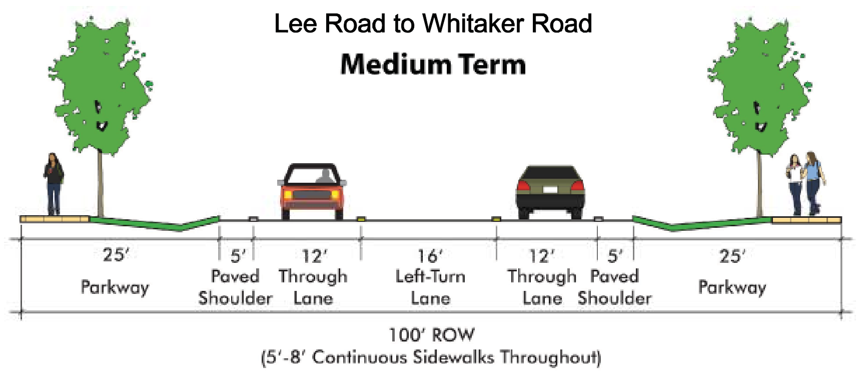
SHORT / MEDIUM TERM LEGEND

- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

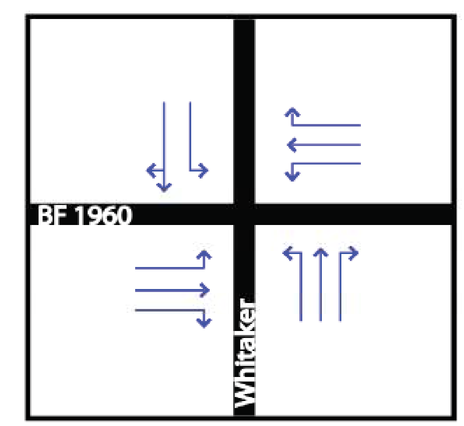
County Improvements
- Short Range
- Medium Range
- Long Range

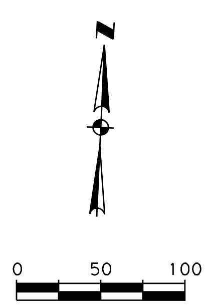


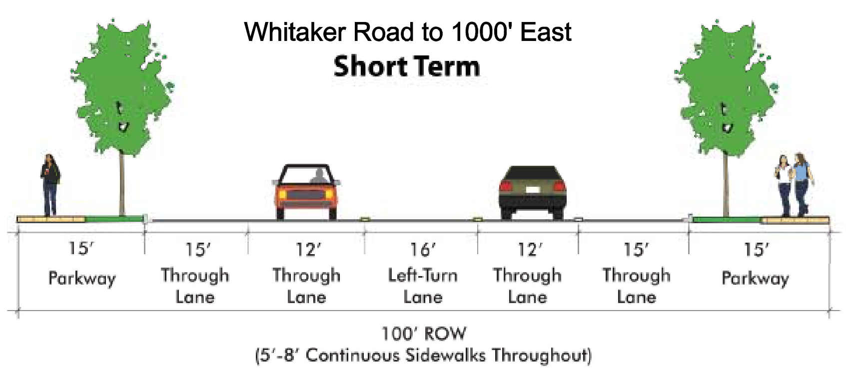
Improvements Shown:

1 Thoroughfare improvement (3-Lane roadway section with center lane left turn lane and continuous sidewalks between Borders Drive and Whitaker Road)

1 Thoroughfare improvement (4-Lane divided section with continuous center left turn lane from Whitaker Road to 1000' to the East to improve merging area)

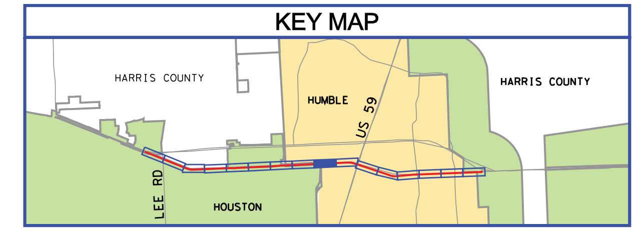






BF 1960 ACCESS MANAGEMENT PLAN SHORT/MEDIUM TERM IMPROVEMENTS

KEY MAP



Match Line Sta 499+00

SHORT / MEDIUM TERM LEGEND

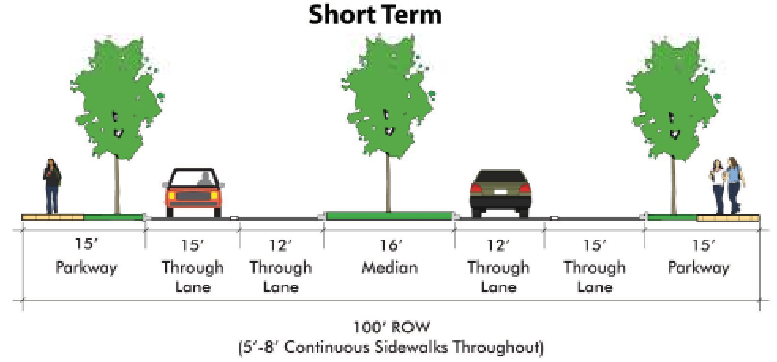
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- * Landmark Feature/Opportunity

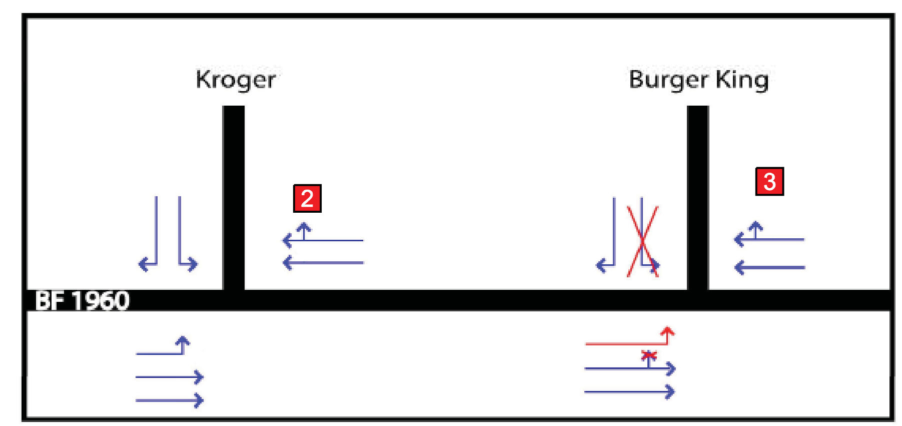
City Improvements
- Short Range
- Medium Range
- Long Range

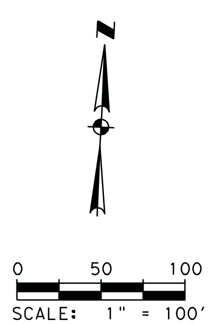
TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

1000' EAST of WHITAKER ROAD to US 59
Short Term







Improvements Shown:

1 Thoroughfare improvement (4-Lane divided section with continuous sidewalks)

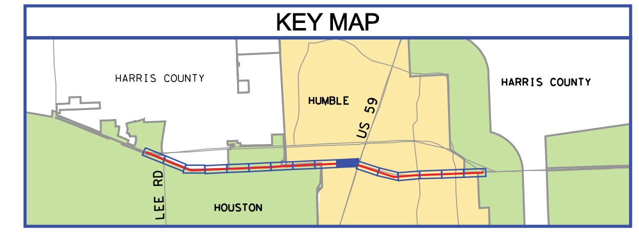
2 Intersection improvement (Proposed traffic signal) (Detail Right)

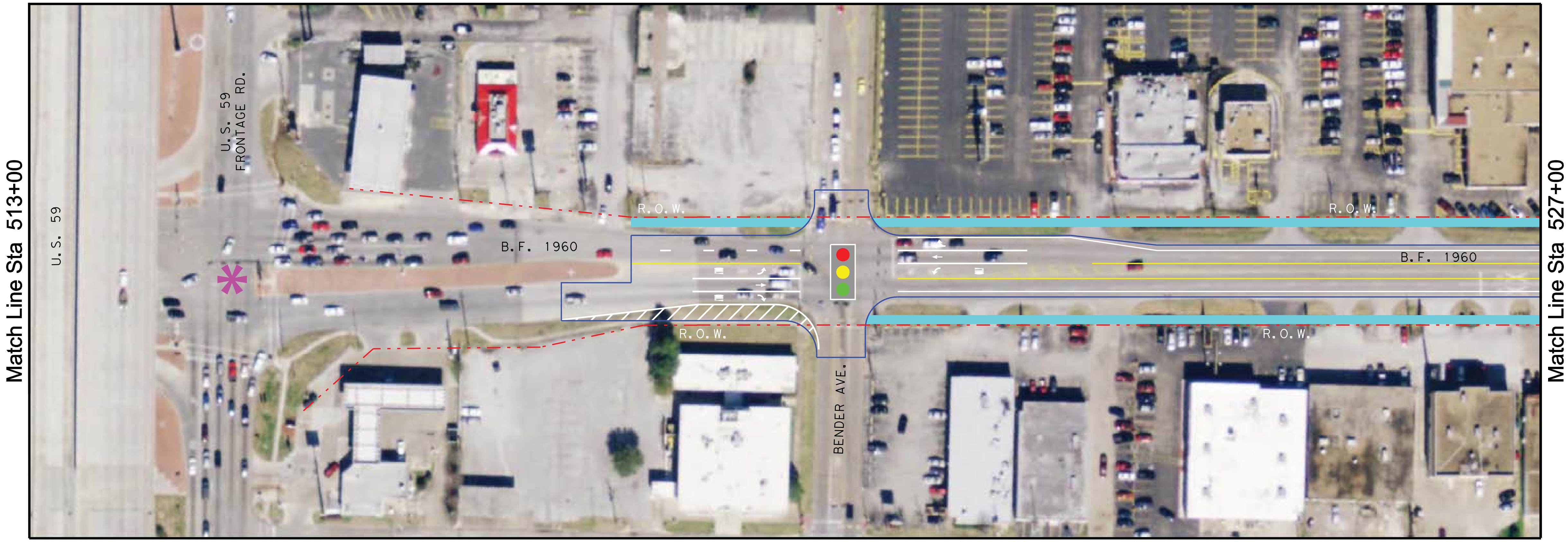
3 Intersection improvement (Hooded left only allowing Eastbound left turn into shopping center but not Southbound left turn out.) (Detail Right)

4 Intersection improvement (Provide ground mounted lane designation signing for US 59 interchange)

BF 1960 ACCESS MANAGEMENT PLAN SHORT/MEDIUM TERM IMPROVEMENTS

KEY MAP





SHORT / MEDIUM TERM LEGEND

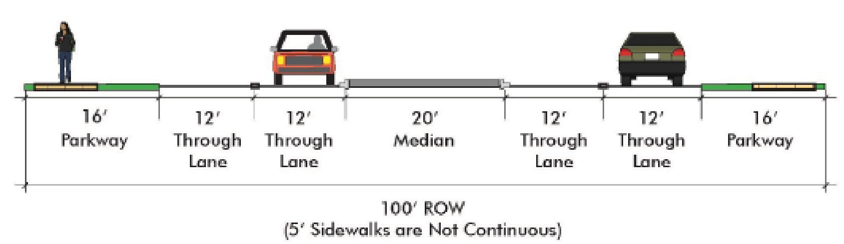
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

City Improvements
- Short Range
- Medium Range
- Long Range

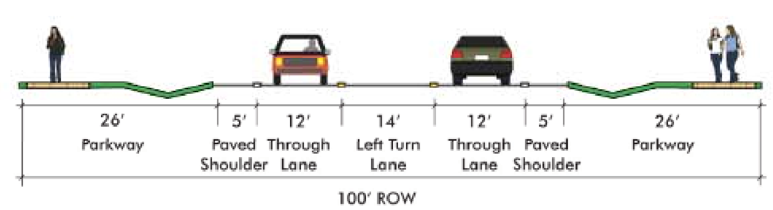
TxDOT Improvements
- Short Range
- Medium Range
- Long Range

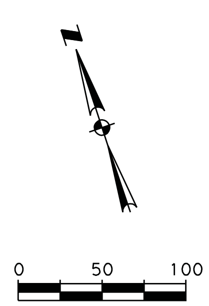
County Improvements
- Short Range
- Medium Range
- Long Range

US 59 to Bender Road
Existing / Short Term



Bender Road to Avenue C
Short Term





Improvements Shown:

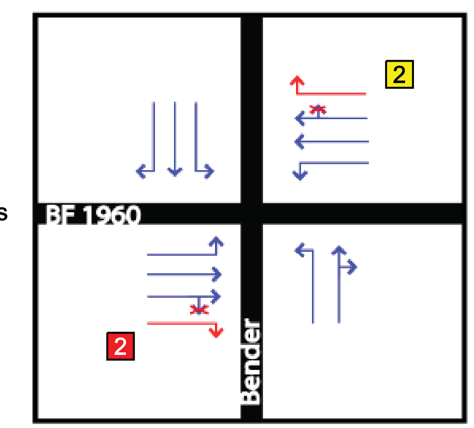
1 Thoroughfare improvement (Extend median from US 59 to Bender Avenue. Restripe 4-lane undivided to 3-lane roadway with center lane left turn lane between Bender Avenue and Avenue C.)

1 Thoroughfare improvement (Continuous sidewalks on both sides)

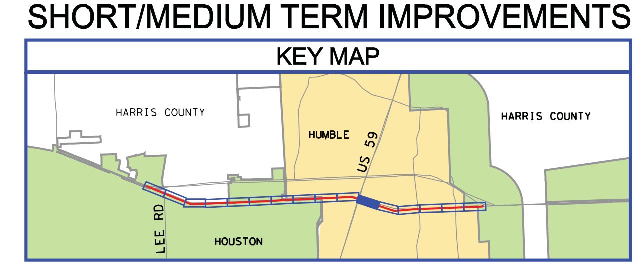
2 Intersection improvement (Add Eastbound right turn lane, 150' Storage) (Detail Right)

2 Intersection improvement (Add Westbound right turn lane, 150' Storage) (Detail Right)

3 Intersection improvement (Provide lane designation signing)



BF 1960 ACCESS MANAGEMENT PLAN
SHORT/MEDIUM TERM IMPROVEMENTS



SHORT / MEDIUM TERM LEGEND

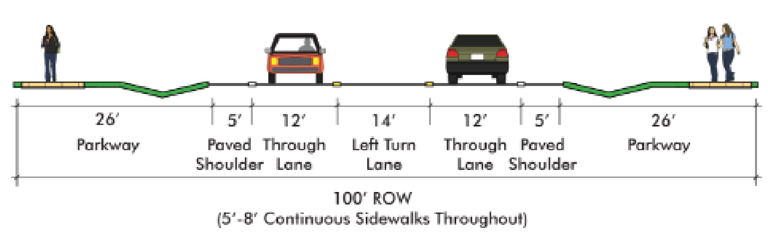
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

City Improvements
- Short Range
- Medium Range
- Long Range

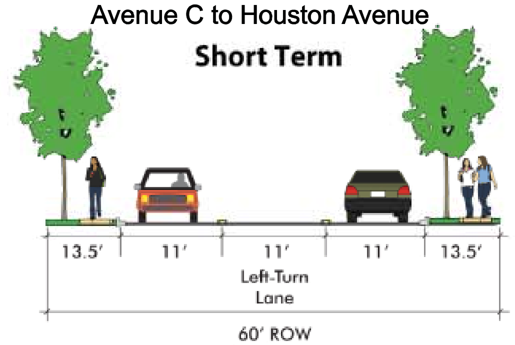
TxDOT Improvements
- Short Range
- Medium Range
- Long Range

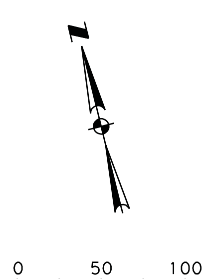
County Improvements
- Short Range
- Medium Range
- Long Range

Bender Road to Avenue C
Short Term



Avenue C to Houston Avenue
Short Term





Improvements Shown:

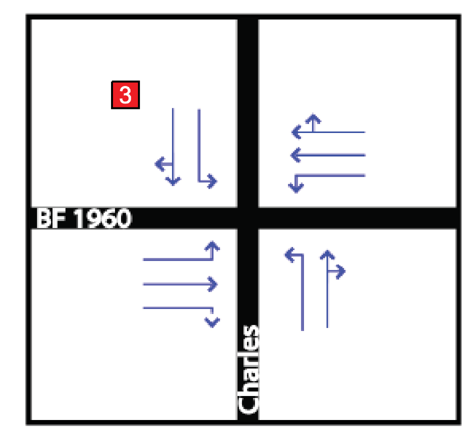
1 (red) Thoroughfare improvement (Restripe 4-lane undivided to 3-lane roadway with center lane left turn lane between Bender Avenue and Avenue C)

1 (yellow) Thoroughfare improvement (Continuous sidewalks on both sides)

2 (red) Thoroughfare improvement (Restripe as 3-lane roadway section with center lane left turn lane between Avenue C and Houston Avenue. Continuous sidewalks on North side)

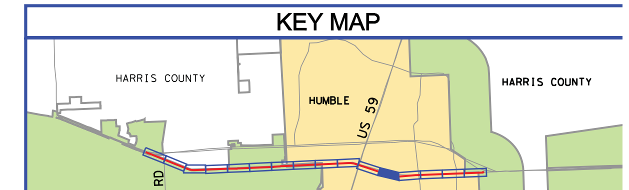
2 (yellow) Thoroughfare improvement (Continuous sidewalks on both sides)

3 (red) Intersection improvement (Curb ramps to be upgraded to meet ADA standards at Charles Street.)



BF 1960 ACCESS MANAGEMENT PLAN
SHORT/MEDIUM TERM IMPROVEMENTS

KEY MAP



H-GAC Houston-Galveston Area Council

Match Line Sta 541+00

Match Line Sta 555+00

SHORT / MEDIUM TERM LEGEND

- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

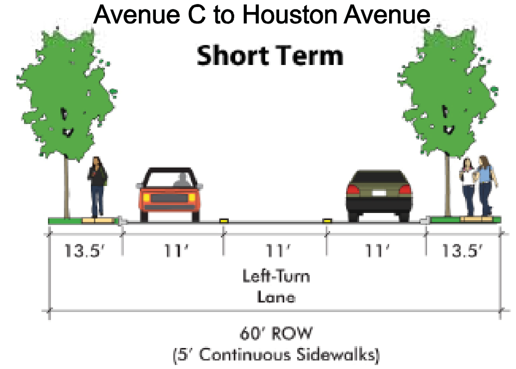
City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

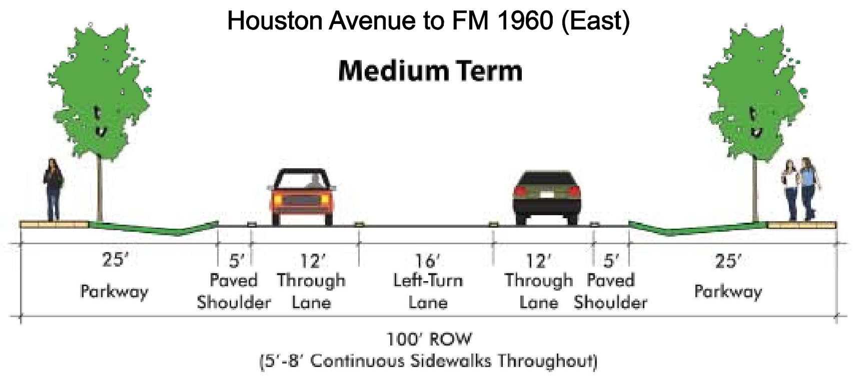
Avenue C to Houston Avenue

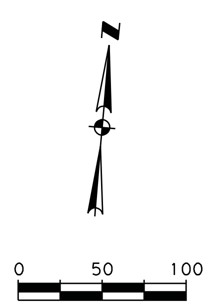
Short Term



Houston Avenue to FM 1960 (East)

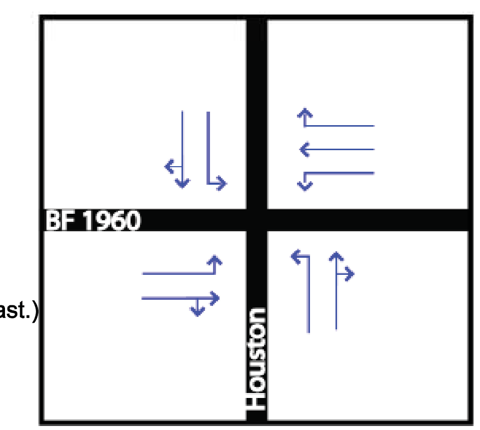
Medium Term



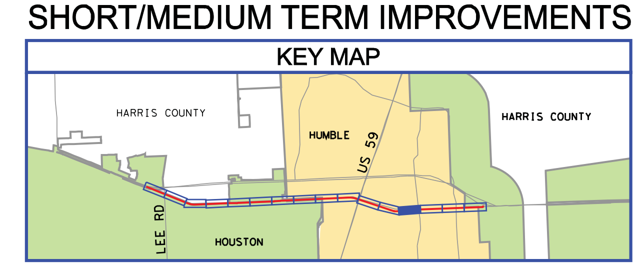


Improvements Shown:

1. Thoroughfare improvement (Restripe as 3-lane roadway section with center lane left turn lane between Avenue C and Houston Avenue. Continuous sidewalks on North side)
1. Thoroughfare improvement (Continuous sidewalks on both sides)
2. Thoroughfare improvement (3-lane roadway section with center lane left turn lane and continuous sidewalks between Houston Avenue and FM 1960 East.)



BF 1960 ACCESS MANAGEMENT PLAN SHORT/MEDIUM TERM IMPROVEMENTS



Match Line Sta 555+00

Match Line Sta 569+00

SHORT / MEDIUM TERM LEGEND

- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

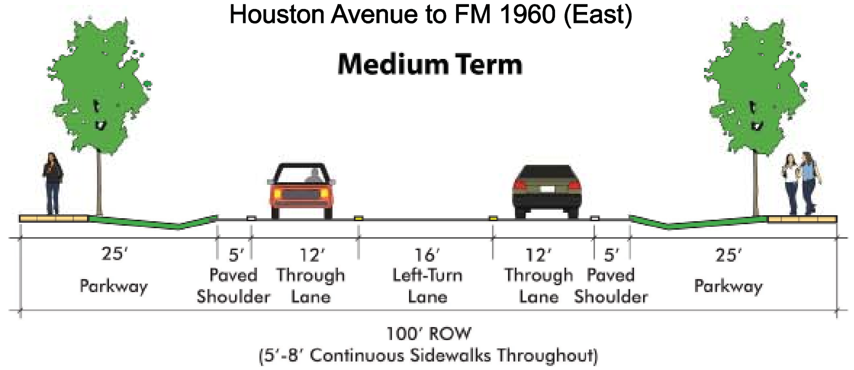
City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Houston Avenue to FM 1960 (East)

Medium Term



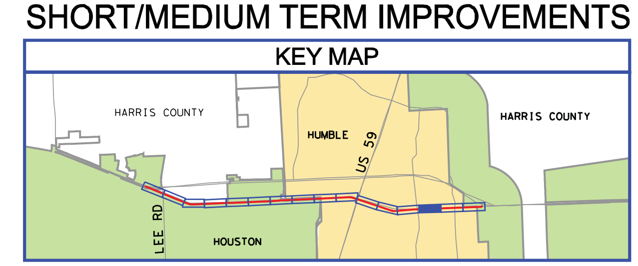
Improvements Shown:

1 Thoroughfare improvement (3-lane roadway section with center lane left turn lane and continuous sidewalks)

0 50 100
SCALE: 1" = 100'

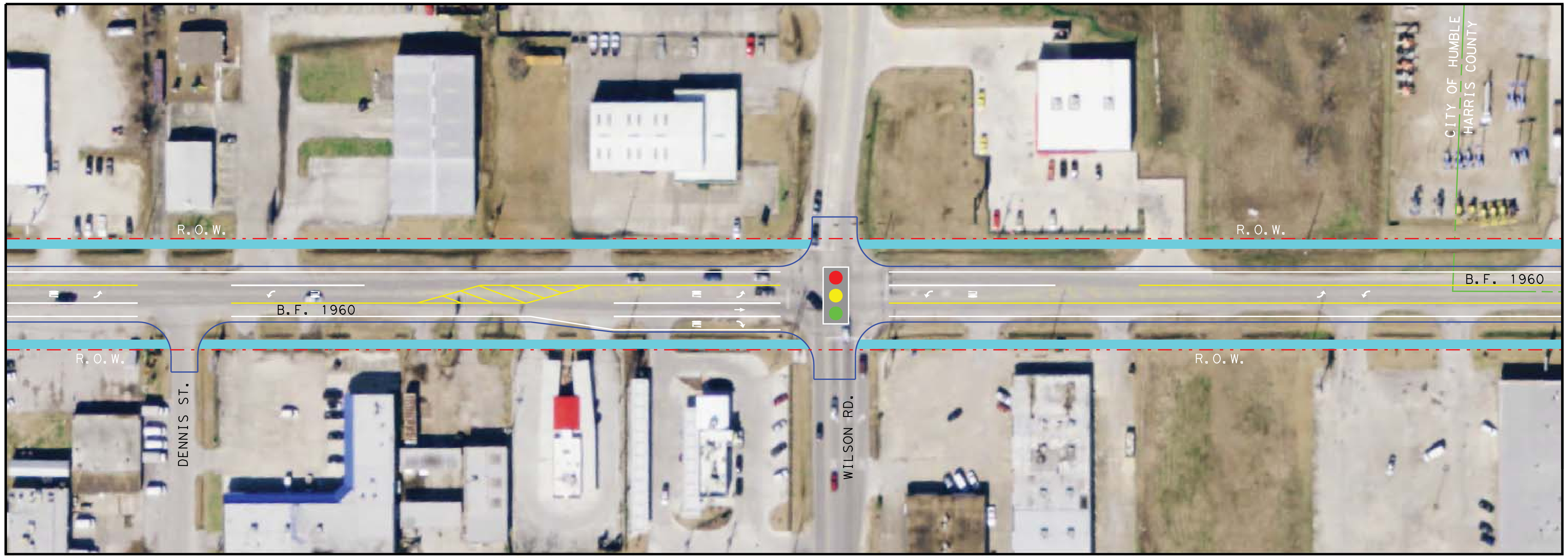
BF 1960 ACCESS MANAGEMENT PLAN SHORT/MEDIUM TERM IMPROVEMENTS

KEY MAP



Houston-Galveston Area Council

Match Line Sta 569+00



Match Line Sta 583+00

SHORT / MEDIUM TERM LEGEND

- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

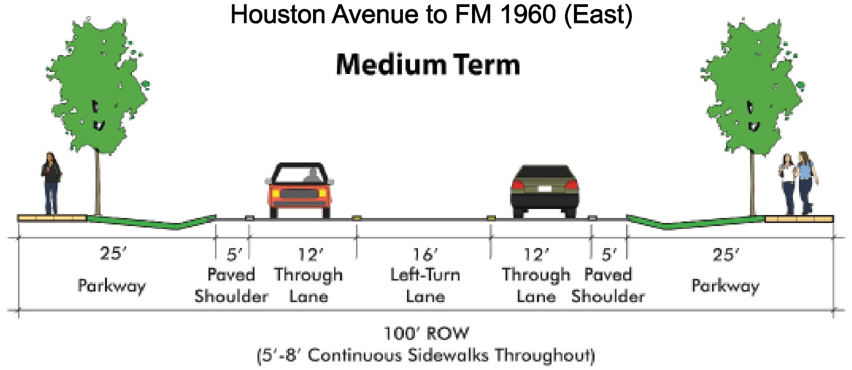
City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Houston Avenue to FM 1960 (East)

Medium Term

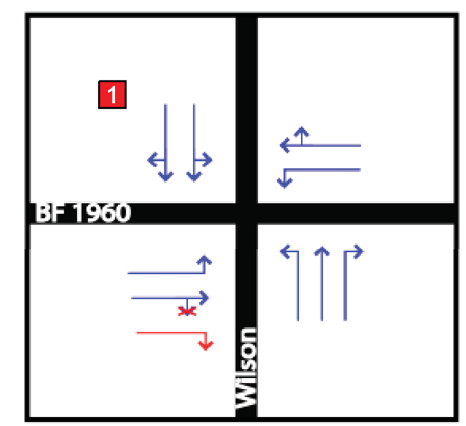


SCALE: 1" = 100'

Improvements Shown:

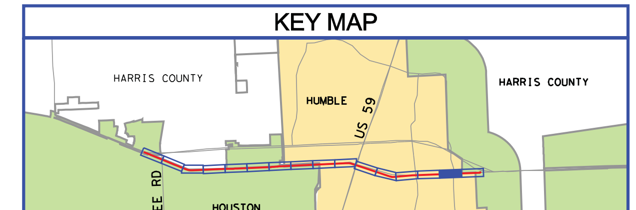
1 Thoroughfare improvement (3-lane roadway section with center lane left turn lane and continuous sidewalks)

1 Intersection improvement (Add Eastbound right turn lane, 150' Storage) (Detail Right)

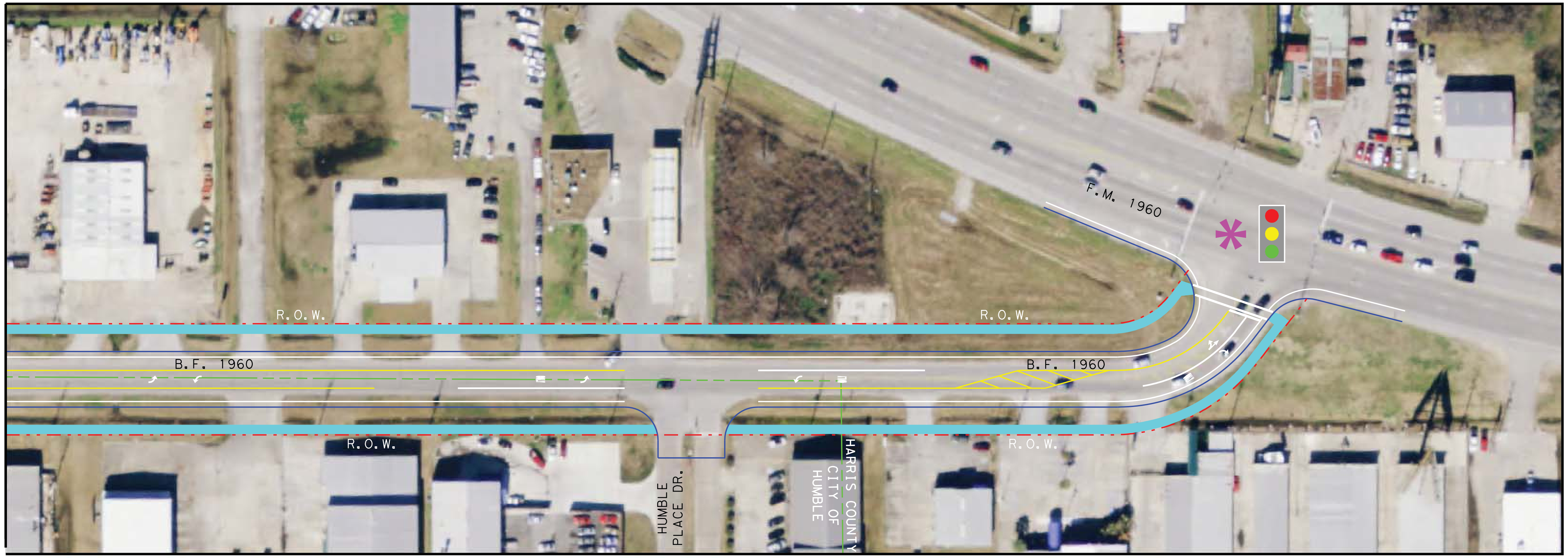


BF 1960 ACCESS MANAGEMENT PLAN SHORT/MEDIUM TERM IMPROVEMENTS

KEY MAP



Match Line Sta 583+00



SHORT / MEDIUM TERM LEGEND

- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

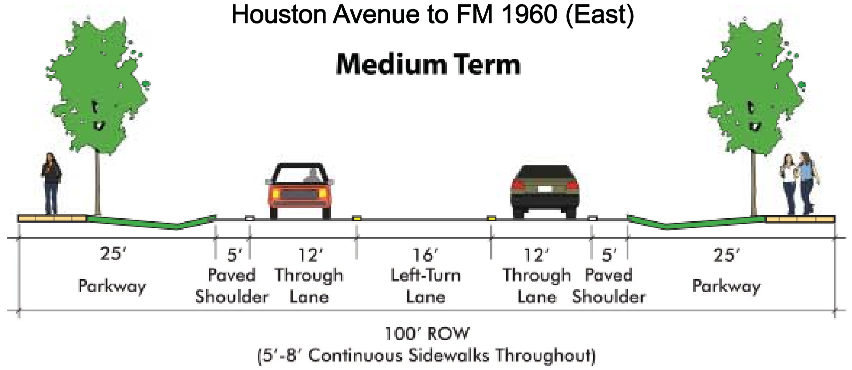
City Improvements
- Short Range
- Medium Range
- Long Range

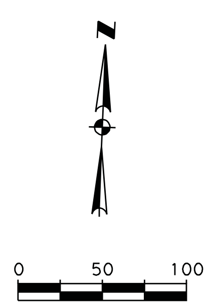
TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Houston Avenue to FM 1960 (East)

Medium Term



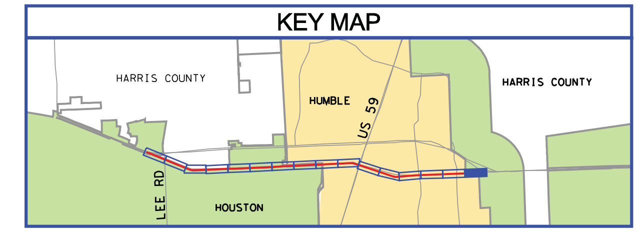


Improvements Shown:

1 Thoroughfare improvement (3-lane roadway section with center lane left turn lane and continuous sidewalks)

BF 1960 ACCESS MANAGEMENT PLAN
SHORT/MEDIUM TERM IMPROVEMENTS

KEY MAP



Match Line Sta 389+00

LONG TERM LEGEND

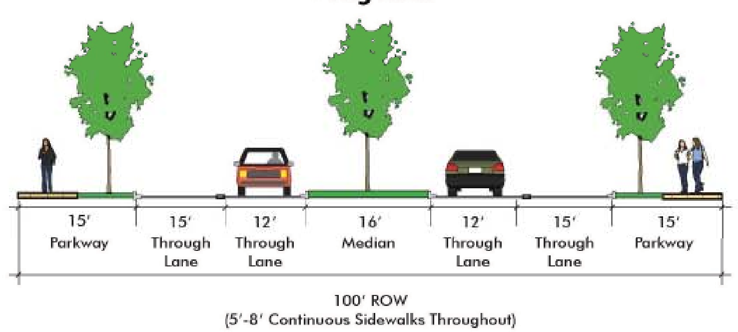
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

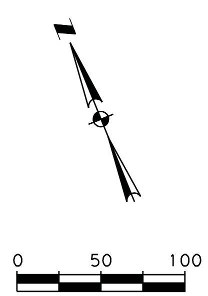
City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Lee Road (South of BF 1960) and
BF 1960 from Lee Road to Whitaker Road
Long Term





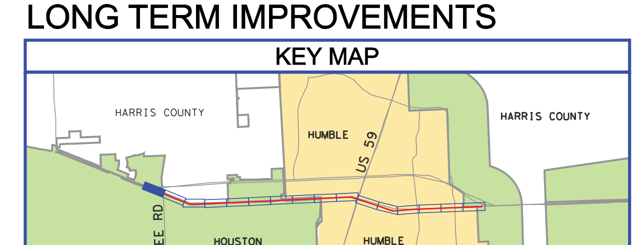
Improvements Shown:

1 Thoroughfare improvement (4-lane divided with continuous sidewalks along BF 1960)

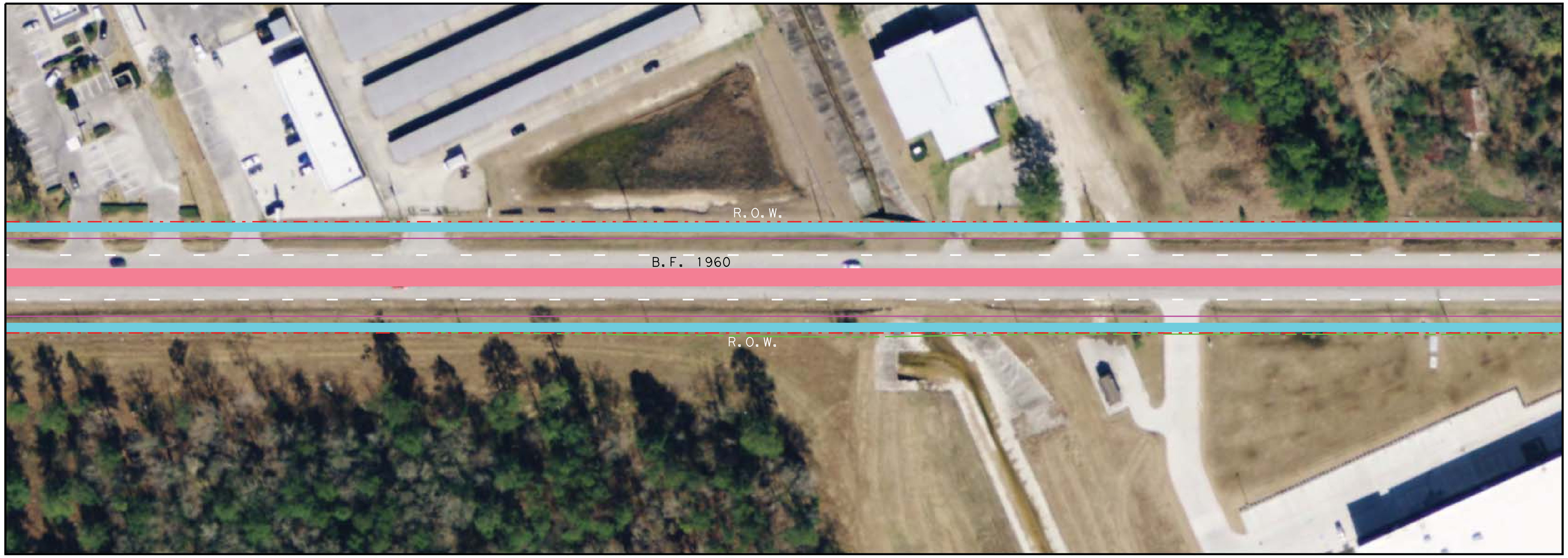
1 Thoroughfare improvement (4-lane divided with continuous sidewalks along Lee Road, south of BF 1960, approximately 1.2 miles)

BF 1960 ACCESS MANAGEMENT PLAN LONG TERM IMPROVEMENTS

KEY MAP



Match Line Sta 389+00



Match Line Sta 403+00

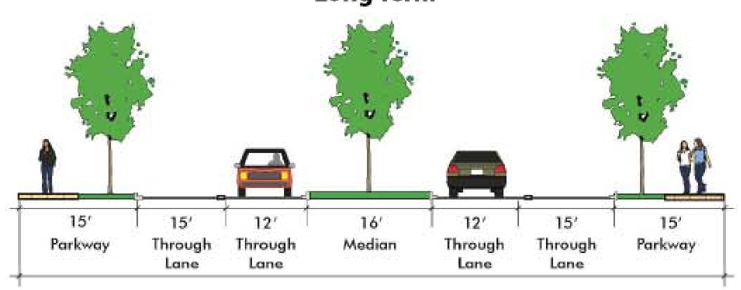
LONG TERM LEGEND	
	Edge of Pavement / Face of Curb
	Raised Median
	Planned Sidewalks / Path
	Existing Signalization
	Proposed Signalization
	Existing Right-Of-Way
	Proposed Right-Of-Way
	Jurisdictional Boundaries
*	Landmark Feature/Opportunity

City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Lee Road to Whitaker Road
Long Term

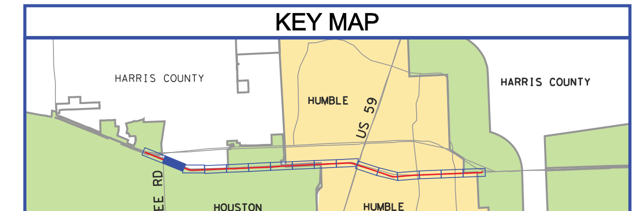


0 50 100
SCALE: 1" = 100'

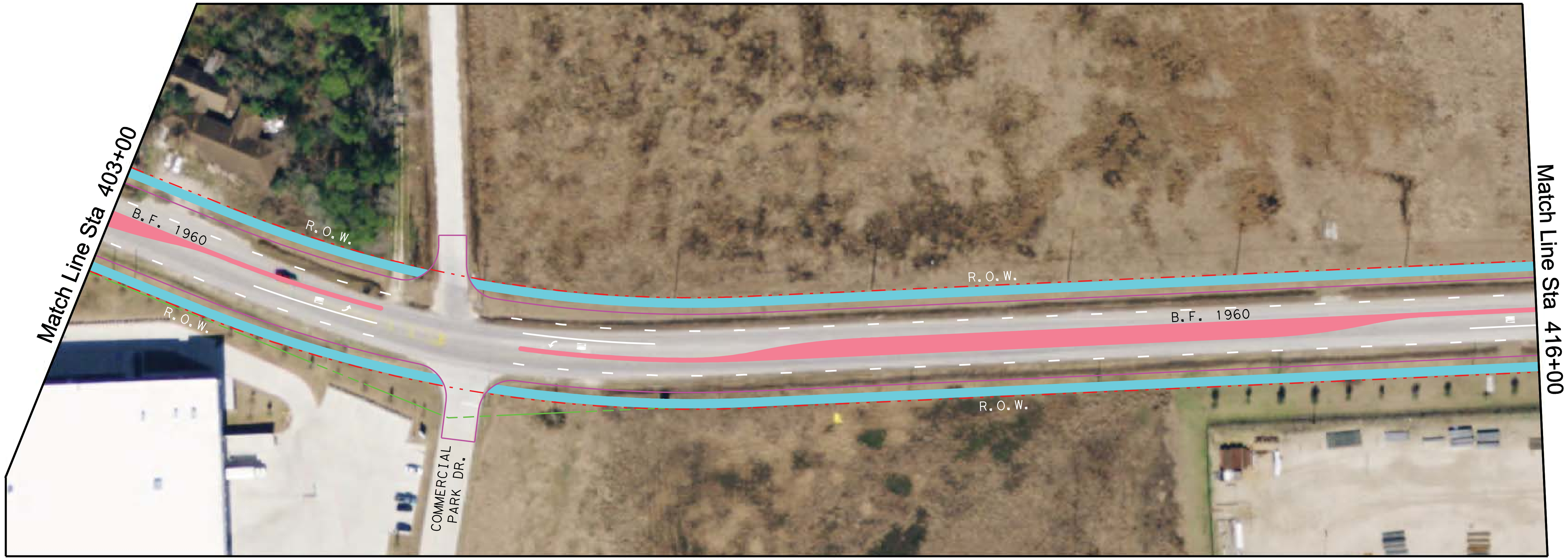
Improvements Shown:
1 Thoroughfare improvement (4-lane divided with continuous sidewalks)

BF 1960 ACCESS MANAGEMENT PLAN LONG TERM IMPROVEMENTS

KEY MAP



Houston-Galveston Area Council



LONG TERM LEGEND

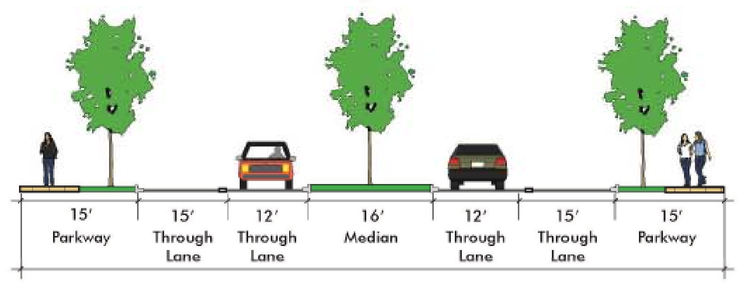
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

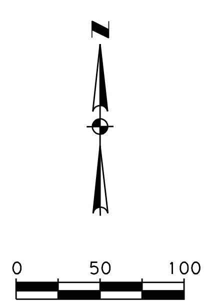
City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Lee Road to Whitaker Road
Long Term





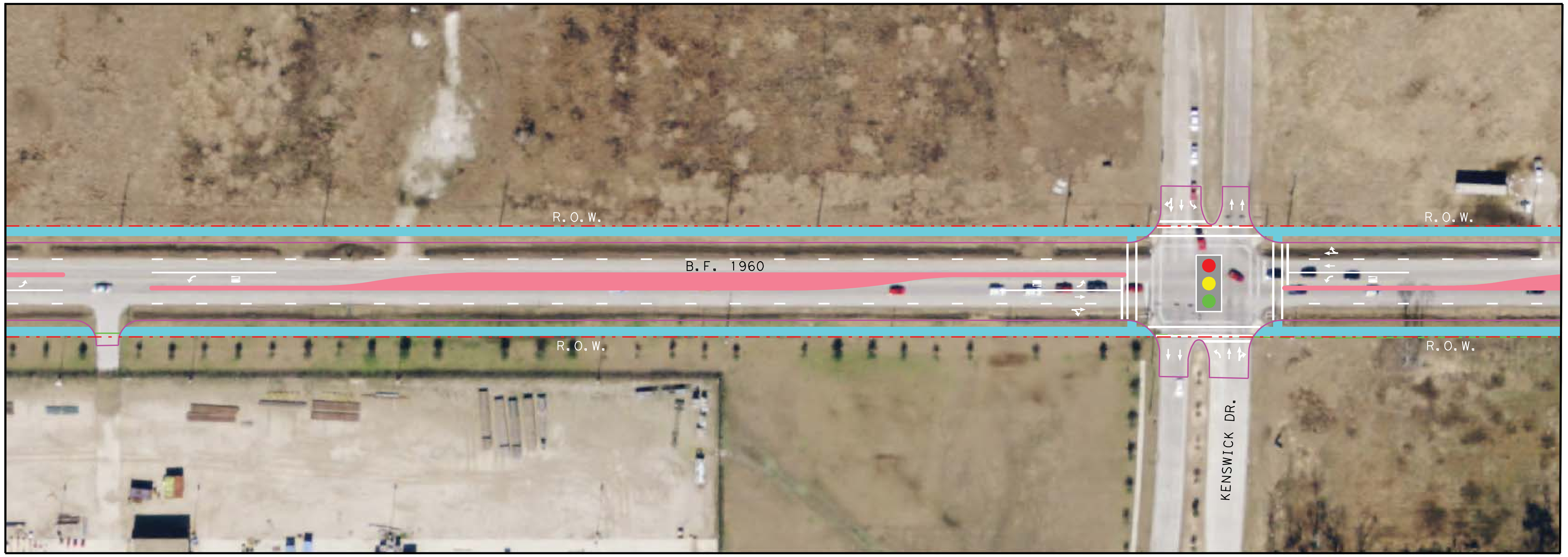
Improvements Shown:

1 Thoroughfare improvement (4-lane divided with continuous sidewalks)

BF 1960 ACCESS MANAGEMENT PLAN
LONG TERM IMPROVEMENTS

KEY MAP

Match Line Sta 416+00



Match Line Sta 430+00

LONG TERM LEGEND

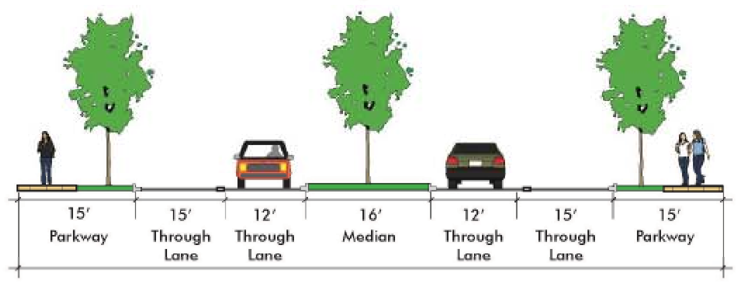
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- * Landmark Feature/Opportunity

City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Lee Road to Whitaker Road
Long Term

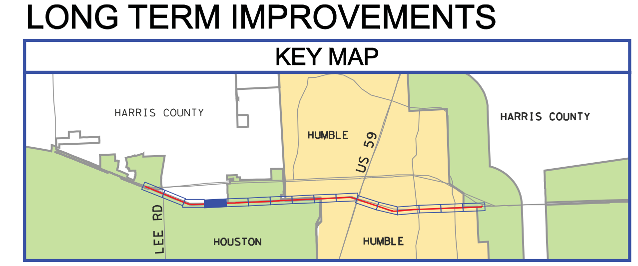


0 50 100
SCALE: 1" = 100'

Improvements Shown:
1 Thoroughfare improvement (4-lane divided with continuous sidewalks)

BF 1960 ACCESS MANAGEMENT PLAN LONG TERM IMPROVEMENTS

KEY MAP



Houston-Galveston Area Council

Match Line Sta 430+00

Match Line Sta 444+00

LONG TERM LEGEND

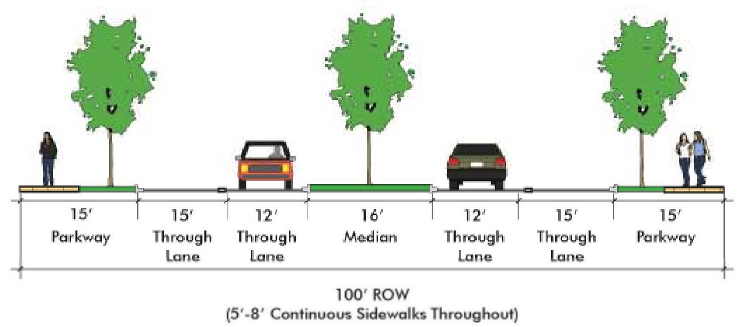
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

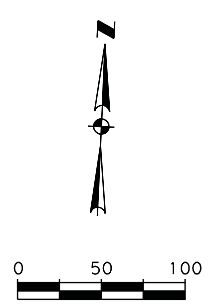
City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Lee Road to Whitaker Road
Long Term

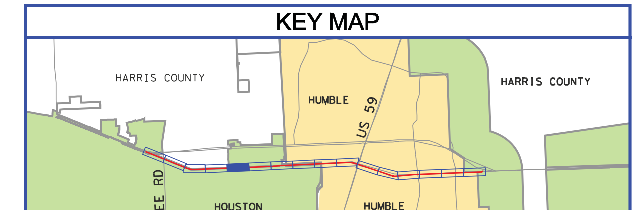


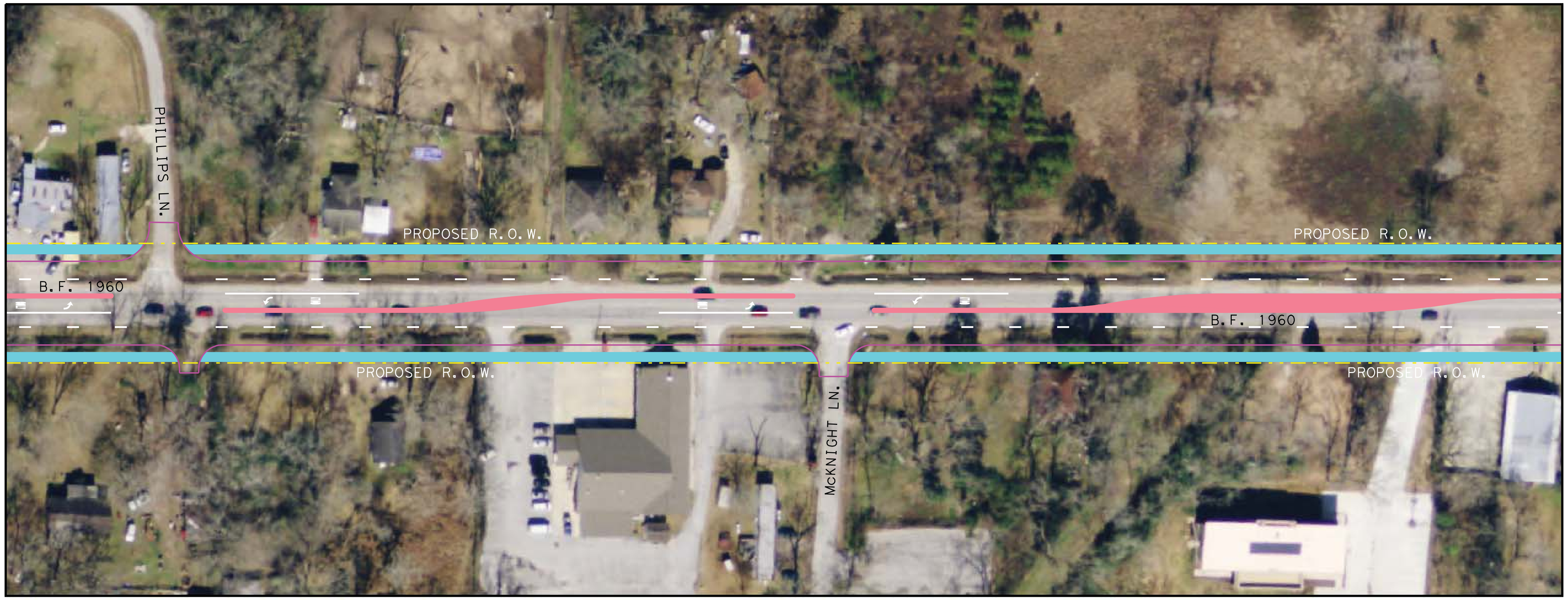


Improvements Shown:
1 Thoroughfare improvement (4-lane divided with continuous sidewalks)

BF 1960 ACCESS MANAGEMENT PLAN LONG TERM IMPROVEMENTS

KEY MAP





LONG TERM LEGEND

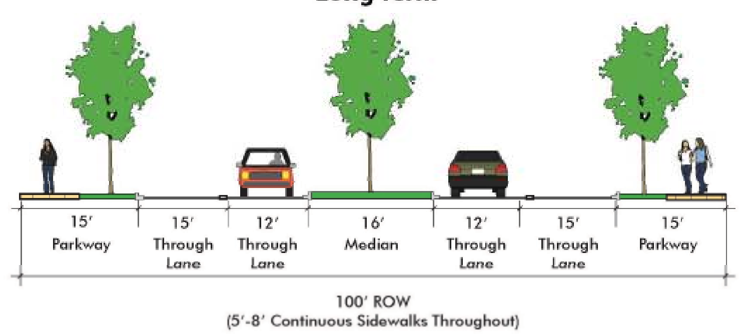
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- * Landmark Feature/Opportunity

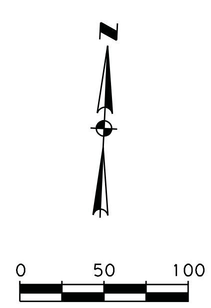
City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Lee Road to Whitaker Road
Long Term

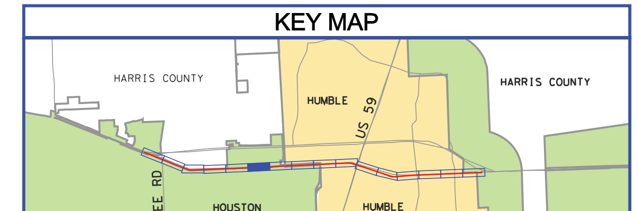




Improvements Shown:
1 Thoroughfare improvement (4-lane divided with continuous sidewalks)

BF 1960 ACCESS MANAGEMENT PLAN
LONG TERM IMPROVEMENTS

KEY MAP



Match Line Sta 457+00

Match Line Sta 471+00

LONG TERM LEGEND

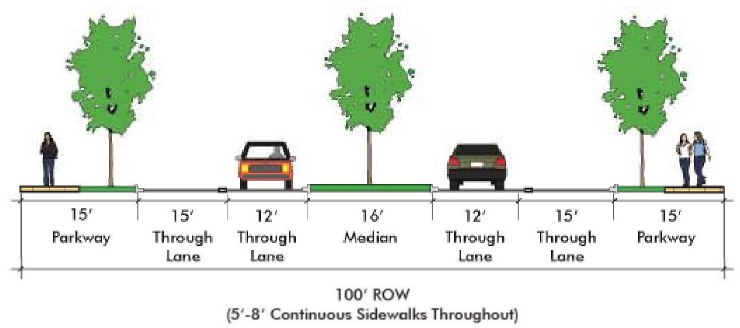
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

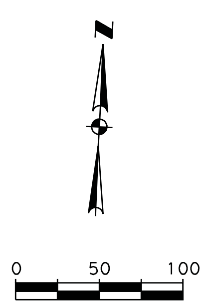
City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Lee Road to Whitaker Road
Long Term



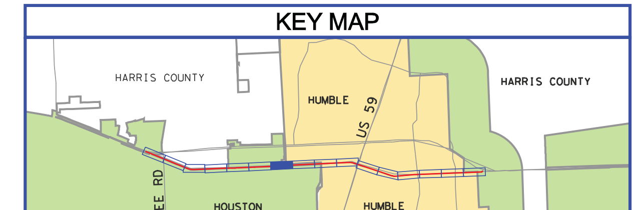


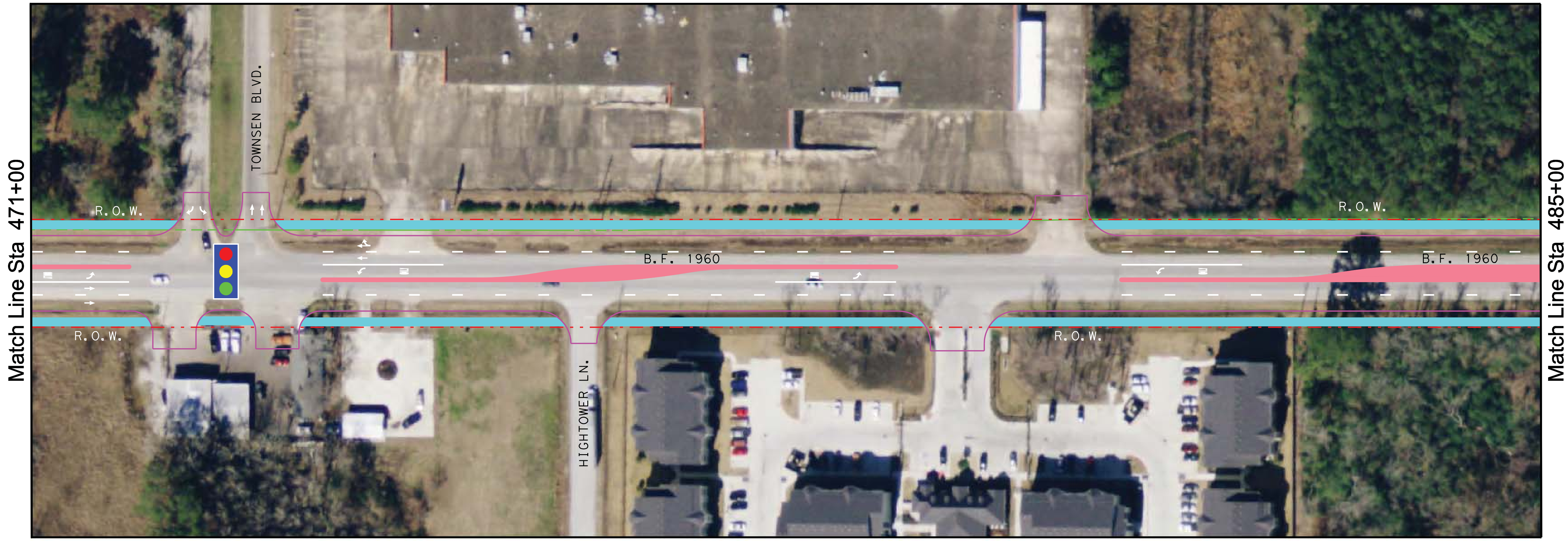
Improvements Shown:

1 Thoroughfare improvement (4-lane divided with continuous sidewalks)

BF 1960 ACCESS MANAGEMENT PLAN LONG TERM IMPROVEMENTS

KEY MAP





LONG TERM LEGEND

- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- * Landmark Feature/Opportunity

City Improvements

- Short Range
- Medium Range
- Long Range

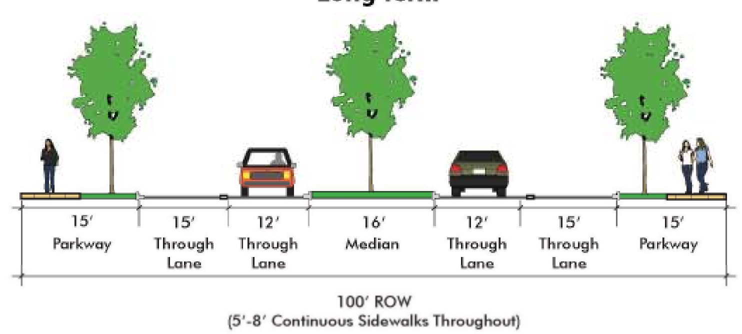
TxDOT Improvements

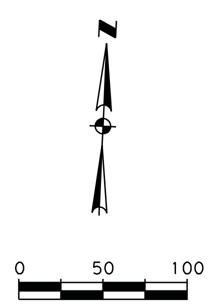
- Short Range
- Medium Range
- Long Range

County Improvements

- Short Range
- Medium Range
- Long Range

Lee Road to Whitaker Road
Long Term

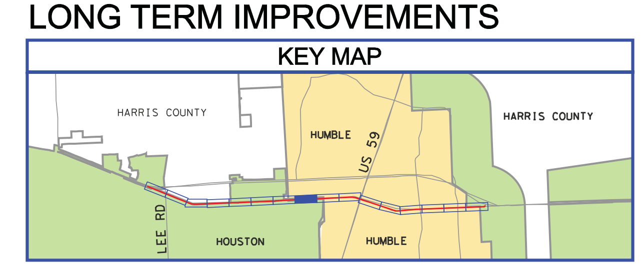


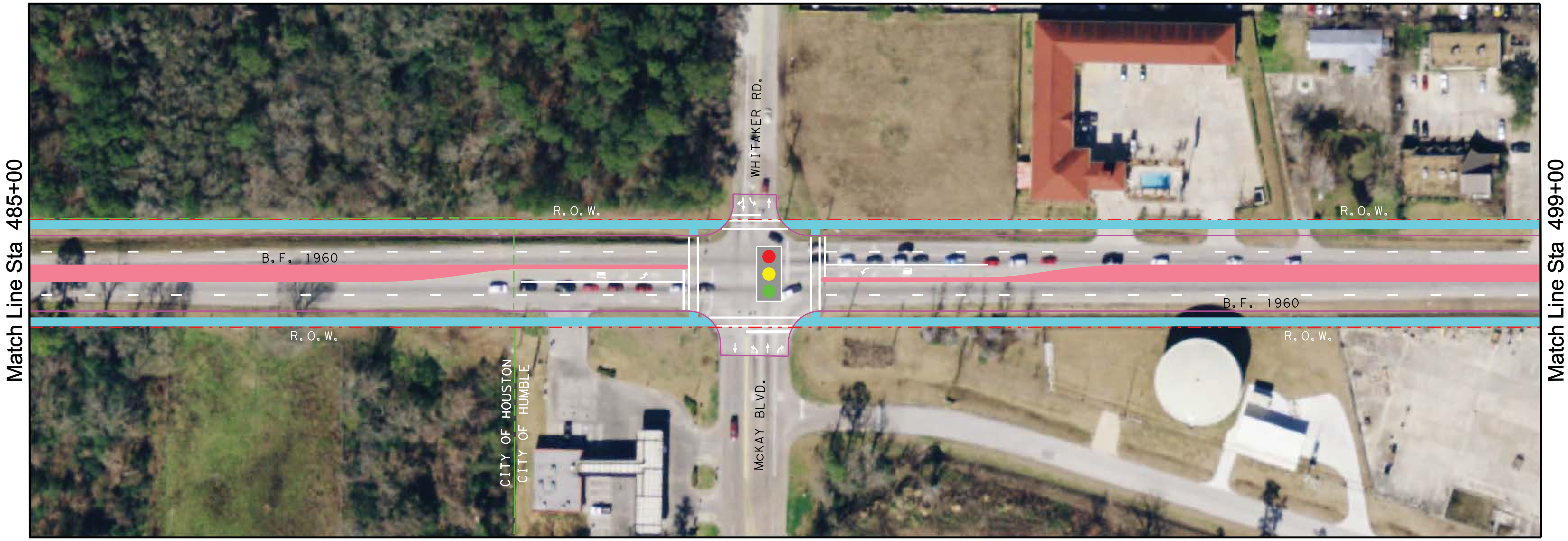


Improvements Shown:

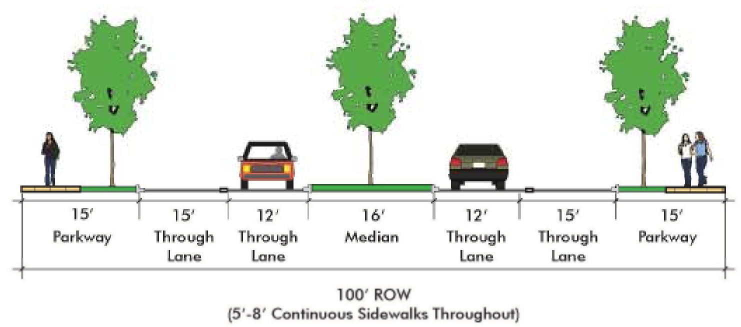
1. Thoroughfare improvement (4-lane divided with continuous sidewalks)
2. Thoroughfare improvement (Townsen Road to extend to the South per Regional Thoroughfare Plan)

BF 1960 ACCESS MANAGEMENT PLAN
LONG TERM IMPROVEMENTS





Lee Road to Whitaker Road
Whitaker Road to US 59
Long Term



Improvements Shown:

1 Thoroughfare improvement (4-lane divided with continuous sidewalks)

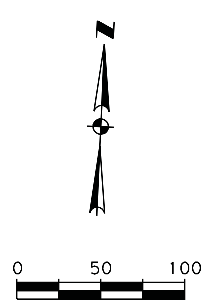
LONG TERM LEGEND

- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range



BF 1960 ACCESS MANAGEMENT PLAN
LONG TERM IMPROVEMENTS

KEY MAP

LONG TERM LEGEND

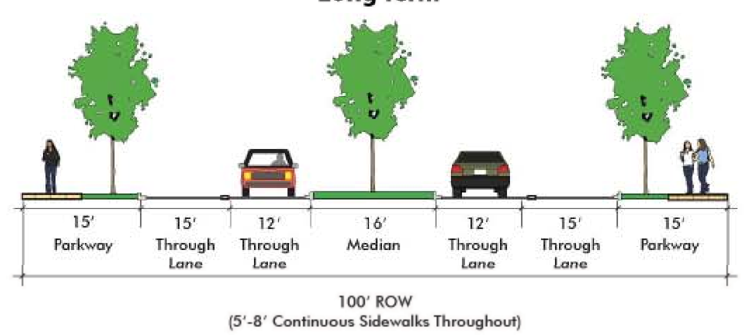
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- * Landmark Feature/Opportunity

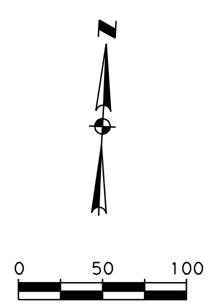
City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Whitaker Road to US 59
Long Term



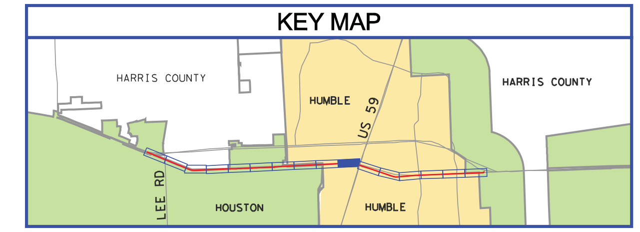


Improvements Shown:

1 Thoroughfare improvement from Whitaker to 1000' East (4-lane divided with continuous sidewalks). Improvements from 1000' East of Whitaker to US 59 constructed in short-term.

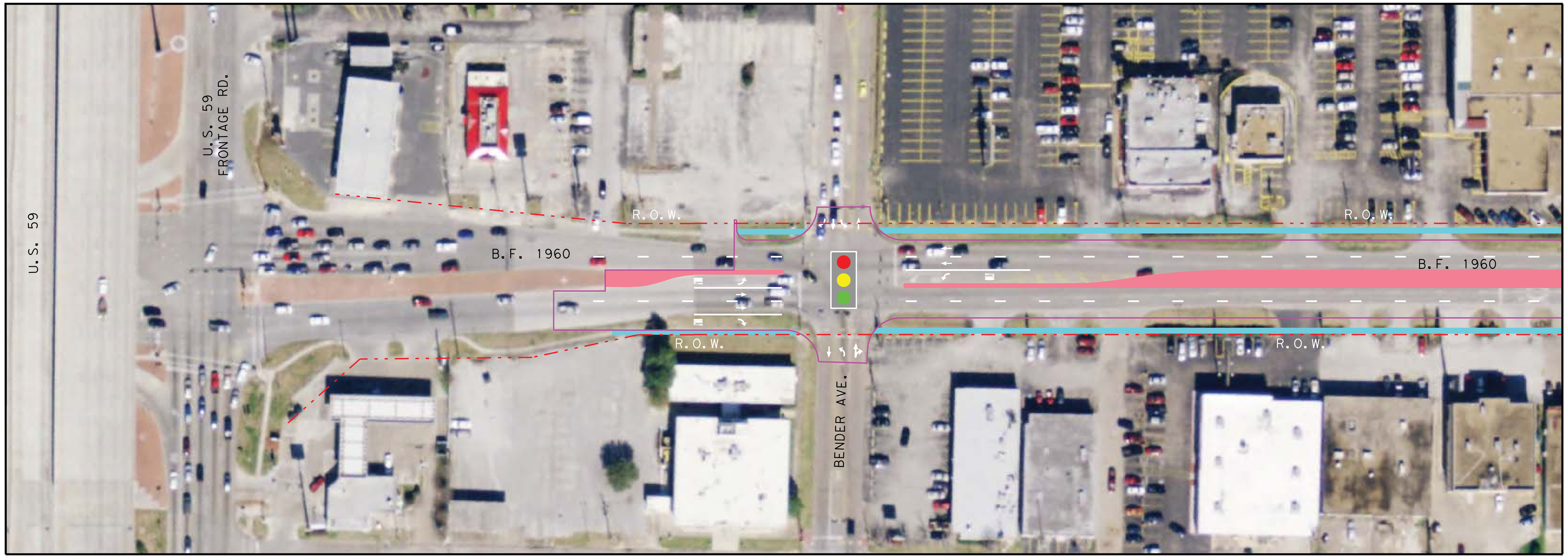
BF 1960 ACCESS MANAGEMENT PLAN LONG TERM IMPROVEMENTS

KEY MAP



Houston-Galveston Area Council

Match Line Sta 513+00



Match Line Sta 527+00

LONG TERM LEGEND

- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- * Landmark Feature/Opportunity

City Improvements

- Short Range
- Medium Range
- Long Range

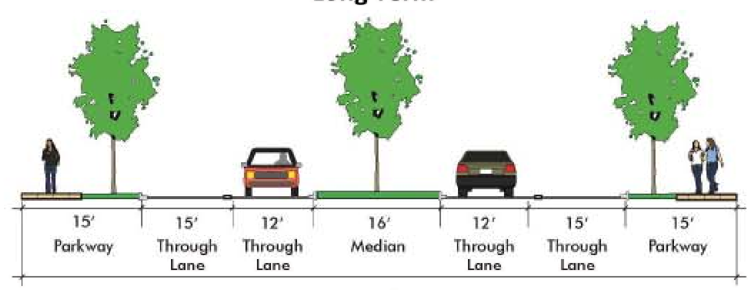
TxDOT Improvements

- Short Range
- Medium Range
- Long Range

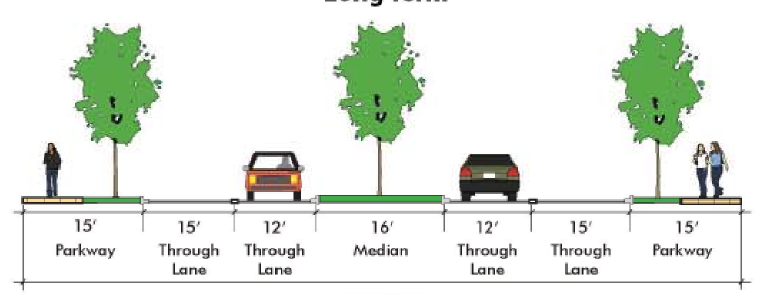
County Improvements

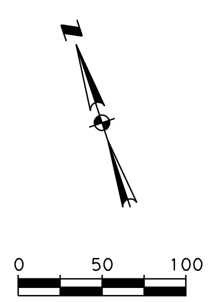
- Short Range
- Medium Range
- Long Range

US 59 to Bender Road
Long Term



Bender Road to Avenue C
Long Term



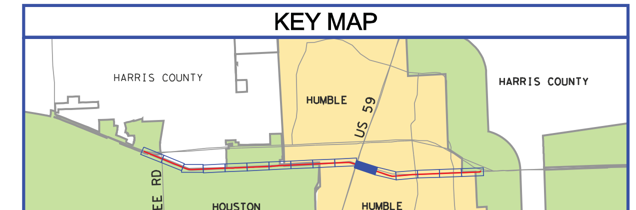


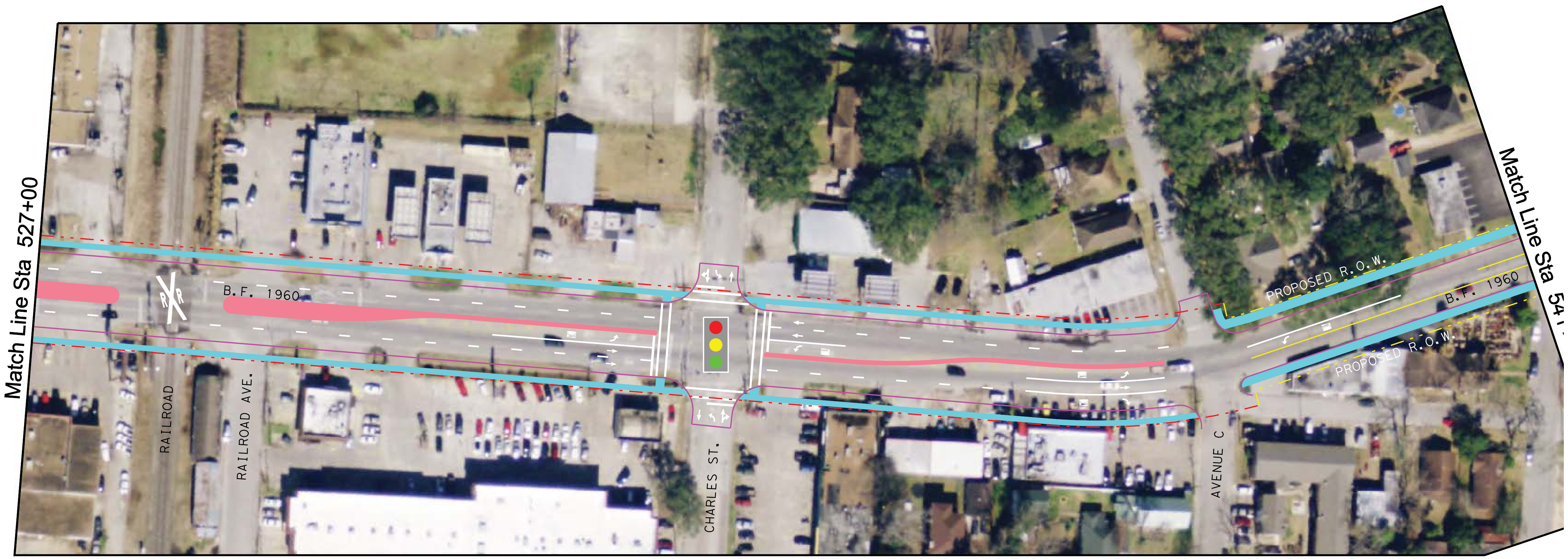
Improvements Shown:

1 Thoroughfare improvement (4-lane divided with continuous sidewalks)

BF 1960 ACCESS MANAGEMENT PLAN LONG TERM IMPROVEMENTS

KEY MAP





LONG TERM LEGEND

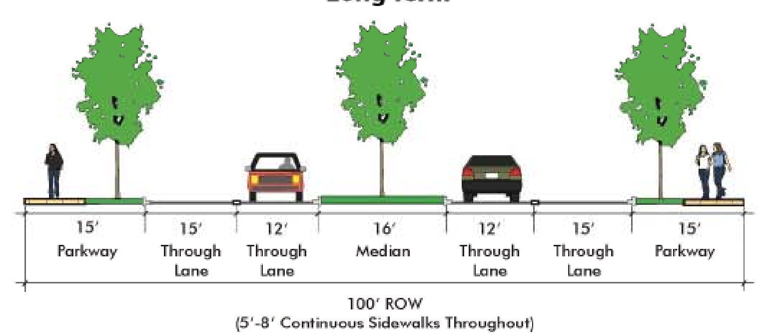
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

City Improvements
- Short Range
- Medium Range
- Long Range

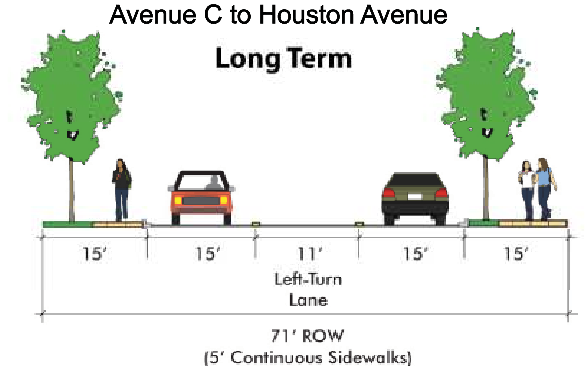
TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Bender Road to Avenue C
Long Term



Avenue C to Houston Avenue
Long Term



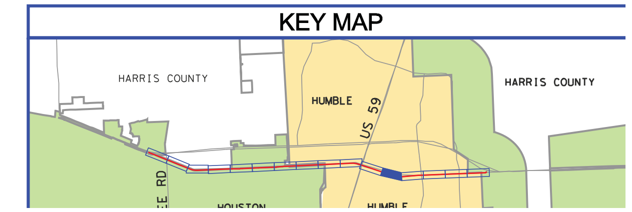
0 50 100

Improvements Shown:

1. Thoroughfare improvement from Bender to Avenue C (4-lane divided with continuous sidewalks)
2. Thoroughfare improvement from Avenue C to Houston Avenue (Increase through lanes to accommodate shared use lanes and wider parkway)

BF 1960 ACCESS MANAGEMENT PLAN
LONG TERM IMPROVEMENTS

KEY MAP



Match Line Sta 541+00

Match Line Sta 555+00

LONG TERM LEGEND

- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

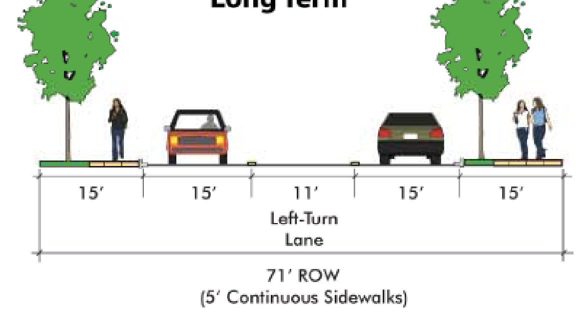
City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

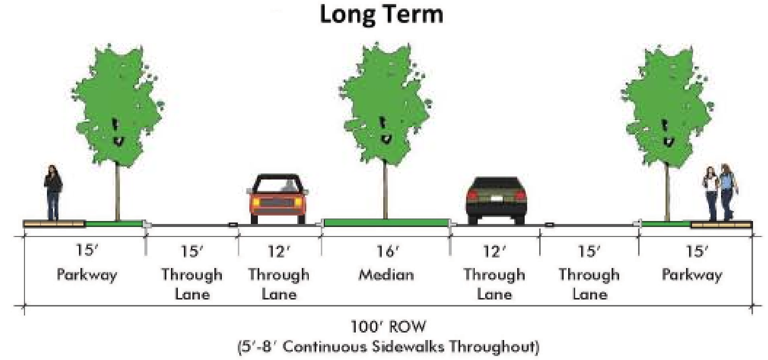
Avenue C to Houston Avenue

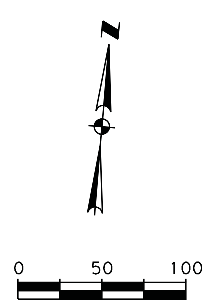
Long Term



Houston Avenue to FM 1960 (East)

Long Term



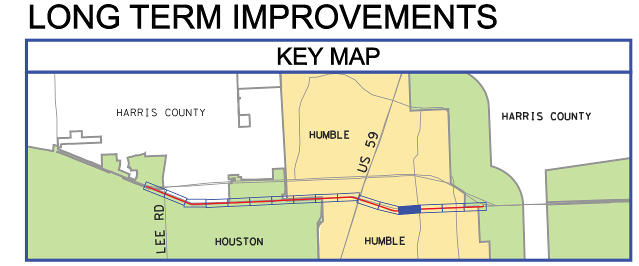


Improvements Shown:

1. Thoroughfare improvement from Avenue C to Houston Avenue (Increase through lanes to accommodate shared use lanes and wider parkway)
2. Thoroughfare improvement from Houston Avenue to FM 1960 East (4-lane divided with continuous sidewalks)

BF 1960 ACCESS MANAGEMENT PLAN LONG TERM IMPROVEMENTS

KEY MAP



Match Line Sta 555+00

Match Line Sta 569+00

LONG TERM LEGEND

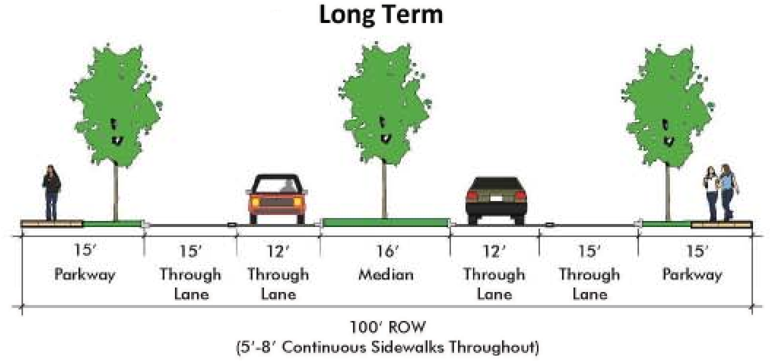
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Houston Avenue to FM 1960 (East)
Long Term

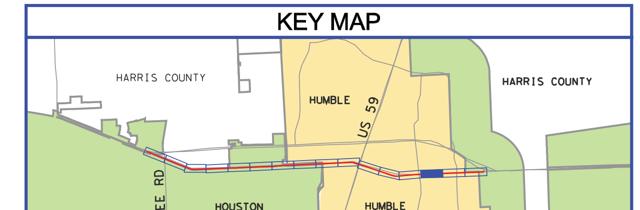


0 50 100
SCALE: 1" = 100'

Improvements Shown:
1 Thoroughfare improvement (4-lane divided with continuous sidewalks)

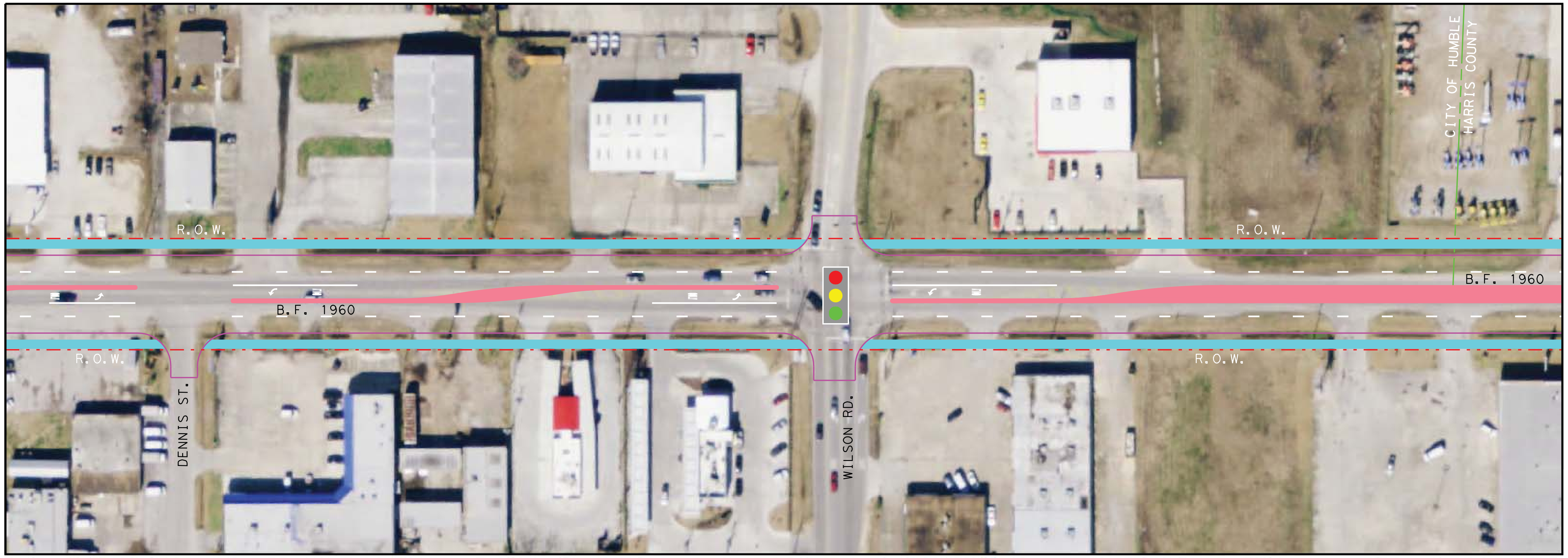
BF 1960 ACCESS MANAGEMENT PLAN
LONG TERM IMPROVEMENTS

KEY MAP



Houston-Galveston Area Council

Match Line Sta 569+00



Match Line Sta 583+00

LONG TERM LEGEND

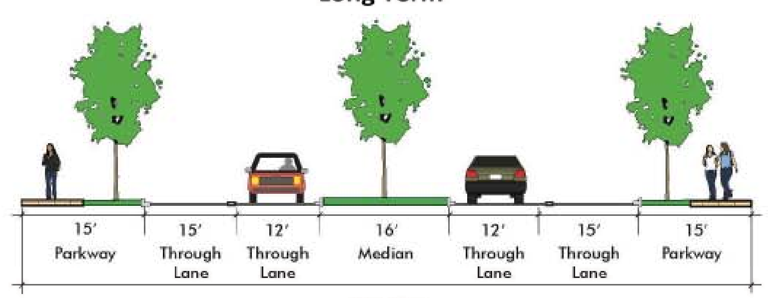
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- Landmark Feature/Opportunity

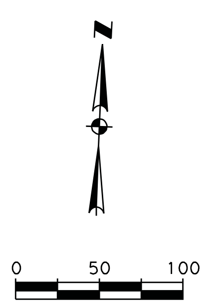
City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Houston Avenue to FM 1960 (East)
Long Term

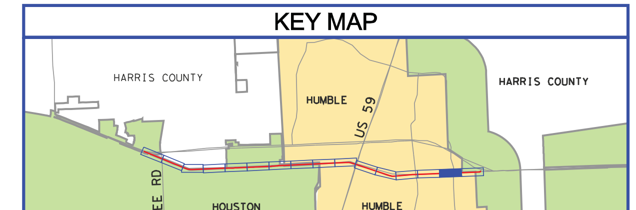




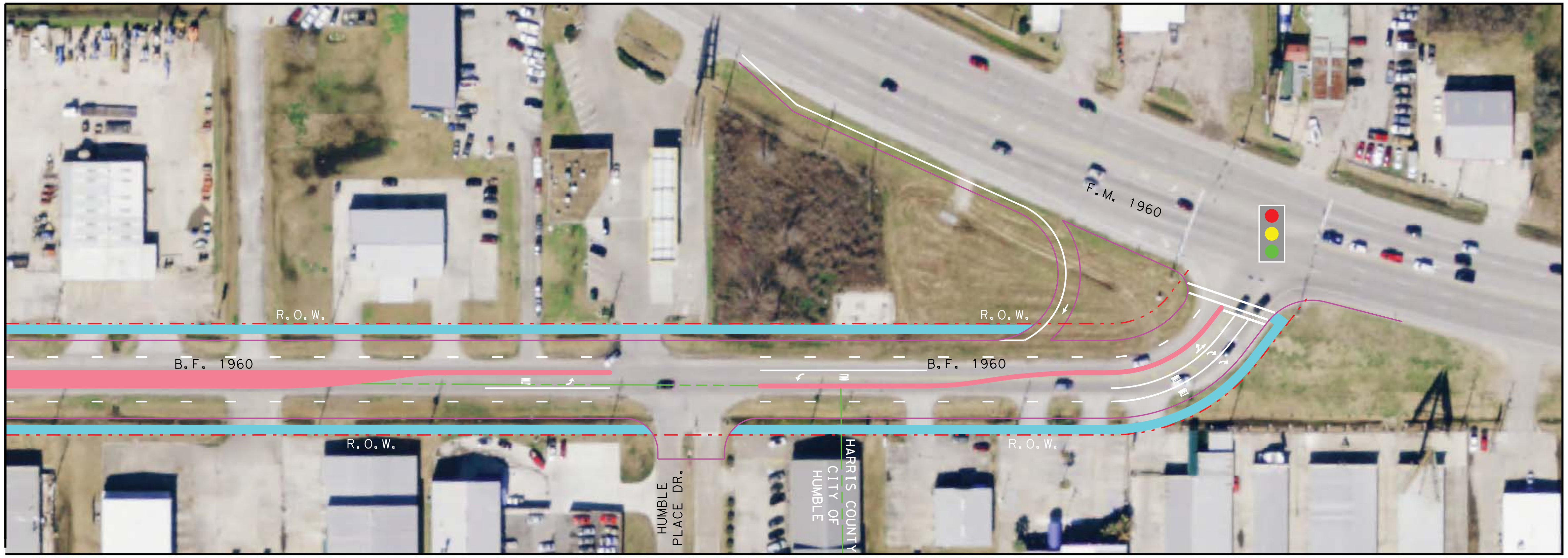
Improvements Shown:
1 Thoroughfare improvement (4-lane divided with continuous sidewalks)

BF 1960 ACCESS MANAGEMENT PLAN
LONG TERM IMPROVEMENTS

KEY MAP



Match Line Sta 583+00



LONG TERM LEGEND

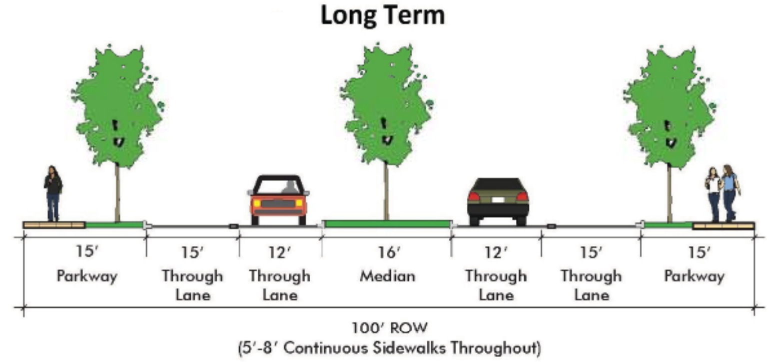
- Edge of Pavement / Face of Curb
- Raised Median
- Planned Sidewalks / Path
- Existing Signalization
- Proposed Signalization
- Existing Right-Of-Way
- Proposed Right-Of-Way
- Jurisdictional Boundaries
- * Landmark Feature/Opportunity

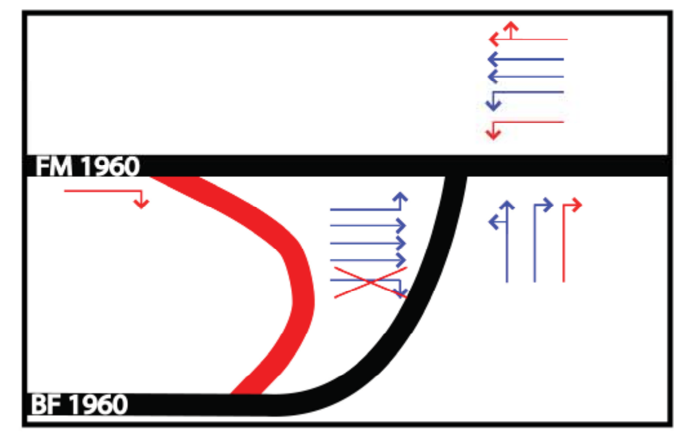
City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

Houston Avenue to FM 1960 (East)
Long Term





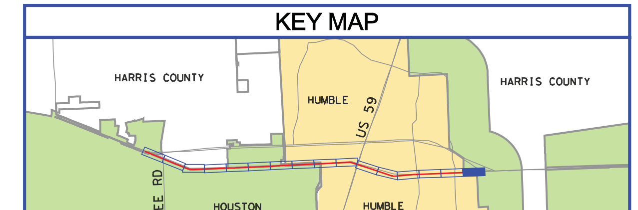
N

0 50 100
SCALE: 1" = 100'

Improvements Shown:
1. Thoroughfare improvement (4-lane divided with continuous sidewalks)
2. Intersection improvement (TxDOT planned upgrade of FM 1960 to 6-lane section)
   (Eastbound free right turn lane)
   (Northbound dual right turn lane)
   (Westbound dual left turn lane)

BF 1960 ACCESS MANAGEMENT PLAN LONG TERM IMPROVEMENTS

KEY MAP



Appendix B
Opinion of Probable Construction Cost

B.F. 1960 QUANTITY SUMMARY - HARRIS COUNTY AREA(SHORT TERM)						
NO.	TxDOT ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	PRICE PER UNIT	AMOUNT
1	0100 2002	PREPARING ROW	STA	0	$2,500.00	$0.00
2	0105 2014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	0	$2.50	$0.00
3	0110 2001	EXCAVATION (ROADWAY)	CY	0	$8.00	$0.00
4	0110 2002	EXCAVATION (CHANNEL)	CY	0	$8.00	$0.00
5	0132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	0	$5.00	$0.00
6	0162 2002	BLOCK SODDING	SY	0	$3.00	$0.00
7	0168 2001	VEGETATIVE WATERING	MG	0	$10.00	$0.00
8	0260 2002	LIME (HYDRATED LIME (SLURRY))(48#/SY)	TON	0	$150.00	$0.00
9	0260 2007	LIME TRT (NEW BASE)(6")	SY	0	$1.50	$0.00
10	0275 2019	CEMENT TREAT (SUBGRADE)(6")	SY	0	$8.00	$0.00
11	0341 2106	D-GR-HMAC(QCQA) TY-D PG64-22(115#/SY/IN)	TON	0	$65.00	$0.00
12	0360 2002	CONC PVMT (CONT REINF-CRCP)(9")	SY	0	$50.00	$0.00
13	0432 2001	RIPRAP (CONC) (4 IN)	CY	0	$300.00	$0.00
14	0464	RC PIPE (CL III)	LF	0	$60.00	$0.00
15	0467	END TREATMENTS	EA	0		
16	-	UTILITY ADJUSTMENTS	LS	0		$0.00
17	0500 2001	MOBILIZATION	LS	0	$500,000.00	$0.00
18	0502 2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	0	$6,000.00	$0.00
19	0506 2034	TEMPORARY SEDIMENT CONTROL FENCE	LF	0	$3.00	$0.00
20	0529 2006	CONC CURB (MONO) (TY II)	LF	0	$3.00	$0.00
21	0530 2010	DRIVEWAYS (CONC)	SY	0	$70.00	$0.00
22	0531 2010	CURB RAMPS (TY 7)	EA	0	$1,810.00	$0.00
23	0531 2015	CONC SIDEWALK (4")	SY	0	$50.00	$0.00
24	0666 2003	REFL PAV MRK TY I (W) 4" (BRK) (100MIL)	LF	100	$0.40	$40.00
25	0666 2036	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	400	$0.75	$300.00
26	0666 2042	REFL PAV MRK TY I (W) 12" (SLD) (100MIL)	LF	100	$2.25	$225.00
27	0666 2048	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	200	$11.00	$2,200.00
28	0666 2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	4	$85.00	$340.00
29	0666 2084	REFL PAV MRK TY I (W) (RR XING) (100MIL)	EA	0	$250.00	$0.00
30	0666 2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	1	$100.00	$100.00
31	0666 2105	REFL PAV MRK TY I (Y) 4" (BRK) (100MIL)	LF	0	$0.40	$0.00
32	0666 2111	REFL PAV MRK TY I (Y) 4" (SLD) (100MIL)	LF	800	$0.35	$280.00
33	0672 2015	REFL PAV MRKR TY II-A-A	EA	20	$4.00	$80.00
34	0672 2017	REFL PAV MRKR TY II-C-R	EA	20	$4.00	$80.00
					TOTAL	$3,645.00
					Contingency 20%	$729.00
					Traffic Signal Warrant Study	
					Signal timing	$4,000.00
					Total	$8,374.00

B.F. 1960 QUANTITY SUMMARY - HARRIS COUNTY AREA (MEDIUM TERM)						
NO.	TxDOT ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	PRICE PER UNIT	AMOUNT
1	0100 2002	PREPARING ROW	STA	44	$2,500.00	$110,000.00
2	0105 2014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	0	$2.50	$0.00
3	0110 2001	EXCAVATION (ROADWAY)	CY	1685	$8.00	$13,480.00
4	0110 2002	EXCAVATION (CHANNEL)	CY	0	$8.00	$0.00
5	0132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	1685	$5.00	$8,425.00
6	0162 2002	BLOCK SODDING	SY	15876	$3.00	$47,628.00
7	0168 2001	VEGETATIVE WATERING	MG	259	$10.00	$2,590.00
8	0260 2002	LIME (HYDRATED LIME (SLURRY))(48#/SY)	TON	113	$150.00	$16,950.00
9	0260 2007	LIME TRT (NEW BASE)(6")	SY	4687	$1.50	$7,030.50
10	0275 2019	CEMENT TREAT (SUBGRADE)(6")	SY	4687	$8.00	$37,496.00
11	0341 2106	D-GR-HMAC(QCQA) TY-D PG64-22(115#/SY/IN)	TON	582	$65.00	$37,830.00
12	0360 2002	CONC PVMT (CONT REINF-CRCP)(9")	SY	5053	$50.00	$252,650.00
13	0432 2001	RIPRAP (CONC) (4 IN)	CY	0	$300.00	$0.00
14	0464	RC PIPE (CL III)	LF	960	$60.00	$57,600.00
15	0467	END TREATMENTS	EA	16	$1,000.00	$16,000.00
16	-	UTILITY ADJUSTMENTS	LS	0		$0.00
17	0500 2001	MOBILIZATION	LS	0	$500,000.00	$0.00
18	0502 2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	0	$6,000.00	$0.00
19	0506 2034	TEMPORARY SEDIMENT CONTROL FENCE	LF	9405	$3.00	$28,215.00
20	0529 2006	CONC CURB (MONO) (TY II)	LF	0	$3.00	$0.00
21	0530 2010	DRIVEWAYS (CONC)	SY	1920	$70.00	$134,400.00
22	0531 2010	CURB RAMPS (TY 7)	EA	36	$1,810.00	$65,160.00
23	0531 2015	CONC SIDEWALK (4")	SY	7613	$50.00	$380,650.00
24	0666 2003	REFL PAV MRK TY I (W) 4" (BRK) (100MIL)	LF	0	$0.36	$0.00
25	0666 2036	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	762	$0.75	$571.50
26	0666 2042	REFL PAV MRK TY I (W) 12" (SLD) (100MIL)	LF	704	$2.25	$1,584.00
27	0666 2048	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	198	$11.00	$2,178.00
28	0666 2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	16	$85.00	$1,360.00
29	0666 2084	REFL PAV MRK TY I (W) (RR XING) (100MIL)	EA	0	$250.00	$0.00
30	0666 2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	10	$100.00	$1,000.00
31	0666 2105	REFL PAV MRK TY I (Y) 4" (BRK) (100MIL)	LF	1540	$0.40	$616.00
32	0666 2111	REFL PAV MRK TY I (Y) 4" (SLD) (100MIL)	LF	6891	$0.35	$2,411.85
33	0672 2015	REFL PAV MRKR TY II-A-A	EA	328	$4.00	$1,312.00
34	0672 2017	REFL PAV MRKR TY II-C-R	EA	70	$4.00	$280.00
					TOTAL	$1,227,417.85
					Contingency 10%	$122,741.79
					Traffic Signal Warrant Study	
					Traffic Signal and timing	
					Total	$1,350,159.64

B.F. 1960 QUANTITY SUMMARY - HARRIS COUNTY AREA (LONG TERM)						
NO.	TxDOT ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	PRICE PER UNIT	AMOUNT
1	0100 2002	PREPARING ROW	STA	45	$2,500.00	$112,500.00
2	0105 2014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	5200	$2.50	$13,001.11
3	0110 2001	EXCAVATION (ROADWAY)	CY	3130	$8.00	$25,040.00
4	0110 2002	EXCAVATION (CHANNEL)	CY	0	$8.00	$0.00
5	0132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	3130	$5.00	$15,650.00
6	0162 2002	BLOCK SODDING	SY	9077	$3.00	$27,229.50
7	0168 2001	VEGETATIVE WATERING	MG	148	$10.00	$1,480.00
8	0260 2002	LIME (HYDRATED LIME (SLURRY))(48#/SY)	TON	240	$150.00	$36,000.00
9	0260 2007	LIME TRT (NEW BASE)(6")	SY	9956	$1.50	$14,934.00
10	0275 2019	CEMENT TREAT (SUBGRADE)(6")	SY	9956	$8.00	$79,648.00
11	0341 2106	D-GR-HMAC(QCQA) TY-D PG64-22(115#/SY/IN)	TON	1081	$65.00	$70,265.00
12	0360 2002	CONC PVMT (CONT REINF-CRCP)(9")	SY	9389	$50.00	$469,450.00
13	0432 2001	RIPRAP (CONC) (4 IN)	CY	290	$300.00	$86,850.00
14	0464	RC PIPE (CL III)	LF	2243	$60.00	$134,580.00
15	0465	INLETS	EA	32	$3,000.00	$96,000.00
16	0465	MANHOLES	EA	17	$3,500.00	$59,500.00
17	-	UTILITY ADJUSTMENTS	LS	0		$0.00
18	0500 2001	MOBILIZATION	LS	0	$500,000.00	$0.00
19	0502 2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	0	$6,000.00	$0.00
20	0506 2034	TEMPORARY SEDIMENT CONTROL FENCE	LF	8075	$3.00	$24,225.00
21	0529 2006	CONC CURB (MONO) (TY II)	LF	18032	$3.00	$54,096.00
22	0530 2010	DRIVEWAYS (CONC)	SY	1800	$70.00	$126,000.00
23	0531 2010	CURB RAMPS (TY 7)	EA	2	$1,810.00	$3,620.00
24	0531 2015	CONC SIDEWALK (4")	SY	563	$50.00	$28,150.00
25	0666 2003	REFL PAV MRK TY I (W) 4" (BRK) (100MIL)	LF	2130	$0.40	$852.00
26	0666 2036	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	1485	$0.75	$1,113.75
27	0666 2042	REFL PAV MRK TY I (W) 12" (SLD) (100MIL)	LF	991	$2.25	$2,229.75
28	0666 2048	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	235	$11.00	$2,585.00
29	0666 2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	12	$85.00	$1,020.00
30	0666 2084	REFL PAV MRK TY I (W) (RR XING) (100MIL)	EA	0	$250.00	$0.00
31	0666 2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	9	$100.00	$900.00
32	0666 2105	REFL PAV MRK TY I (Y) 4" (BRK) (100MIL)	LF	0	$0.40	$0.00
33	0666 2111	REFL PAV MRK TY I (Y) 4" (SLD) (100MIL)	LF	0	$0.35	$0.00
34	0672 2015	REFL PAV MRKR TY II-A-A	EA	0	$4.00	$0.00
35	0672 2017	REFL PAV MRKR TY II-C-R	EA	544	$4.00	$2,176.00
					TOTAL	$1,489,095.11
					Contingency 10%	$148,909.51
					Total	$1,638,004.62

B.F. 1960 QUANTITY SUMMARY - CITY OF HOUSTON AREA (SHORT TERM)						
NO.	TxDOT ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	PRICE PER UNIT	AMOUNT
1	0100 2002	PREPARING ROW	STA	2	$2,500.00	$5,000.00
2	0105 2014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	0	$2.50	$0.00
3	0110 2001	EXCAVATION (ROADWAY)	CY	147	$8.00	$1,176.00
4	0110 2002	EXCAVATION (CHANNEL)	CY	0	$8.00	$0.00
5	0132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	147	$5.00	$735.00
6	0162 2002	BLOCK SODDING	SY	50	$3.00	$150.00
7	0168 2001	VEGETATIVE WATERING	MG	1	$10.00	$10.00
8	0260 2002	LIME (HYDRATED LIME (SLURRY))(48#/SY)	TON	0	$150.00	$0.00
9	0260 2007	LIME TRT (NEW BASE)(6")	SY	0	$1.50	$0.00
10	0275 2019	CEMENT TREAT (SUBGRADE)(6")	SY	0	$8.00	$0.00
11	0341 2106	D-GR-HMAC(QCQA) TY-D PG64-22(115#/SY/IN)	TON	51	$65.00	$3,315.00
12	0360 2002	CONC PVMT (CONT REINF-CRCP)(9")	SY	440	$50.00	$22,000.00
13	0432 2001	RIPRAP (CONC) (4 IN)	CY	0	$300.00	$0.00
14	0464	RC PIPE (CL III)	LF	0	$60.00	$0.00
15	0467	END TREATMENTS	EA	0		
16	-	UTILITY ADJUSTMENTS	LS	0		$0.00
17	0500 2001	MOBILIZATION	LS	0	$500,000.00	$0.00
18	0502 2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	0	$6,000.00	$0.00
19	0506 2034	TEMPORARY SEDIMENT CONTROL FENCE	LF	350	$3.00	$1,050.00
20	0529 2006	CONC CURB (MONO) (TY II)	LF	0	$3.00	$0.00
21	0530 2010	DRIVEWAYS (CONC)	SY	0	$70.00	$0.00
22	0531 2010	CURB RAMPS (TY 7)	EA	0	$1,810.00	$0.00
23	0531 2015	CONC SIDEWALK (4")	SY	0	$50.00	$0.00
24	0666 2003	REFL PAV MRK TY I (W) 4" (BRK) (100MIL)	LF	0	$0.36	$0.00
25	0666 2036	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	193	$0.75	$144.75
26	0666 2042	REFL PAV MRK TY I (W) 12" (SLD) (100MIL)	LF	0	$2.25	$0.00
27	0666 2048	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	0	$11.00	$0.00
28	0666 2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	1	$85.00	$85.00
29	0666 2084	REFL PAV MRK TY I (W) (RR XING) (100MIL)	EA	0	$250.00	$0.00
30	0666 2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	1	$100.00	$100.00
31	0666 2105	REFL PAV MRK TY I (Y) 4" (BRK) (100MIL)	LF	0	$0.40	$0.00
32	0666 2111	REFL PAV MRK TY I (Y) 4" (SLD) (100MIL)	LF	0	$0.35	$0.00
33	0672 2015	REFL PAV MRKR TY II-A-A	EA	0	$4.00	$0.00
34	0672 2017	REFL PAV MRKR TY II-C-R	EA	11	$4.00	$44.00
					TOTAL	$33,809.75
					Contingency 10%	$3,380.98
					Traffic Signal Warrant Study	$0.00
					Signal timing	$0.00
					Total	$37,190.73

B.F. 1960 QUANTITY SUMMARY - CITY OF HOUSTON AREA (MEDIUM TERM)						
NO.	TxDOT ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	PRICE PER UNIT	AMOUNT
1	0100 2002	PREPARING ROW	STA	60	$2,500.00	$150,000.00
2	0105 2014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	0	$2.50	$0.00
3	0110 2001	EXCAVATION (ROADWAY)	CY	2098	$8.00	$16,784.00
4	0110 2002	EXCAVATION (CHANNEL)	CY	0	$8.00	$0.00
5	0132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	2098	$5.00	$10,490.00
6	0162 2002	BLOCK SODDING	SY	12952	$3.00	$38,856.00
7	0168 2001	VEGETATIVE WATERING	MG	212	$10.00	$2,120.00
8	0260 2002	LIME (HYDRATED LIME (SLURRY))(48#/SY)	TON	161	$150.00	$24,150.00
9	0260 2007	LIME TRT (NEW BASE)(6")	SY	6672	$1.50	$10,008.00
10	0275 2019	CEMENT TREAT (SUBGRADE)(6")	SY	6672	$8.00	$53,376.00
11	0341 2106	D-GR-HMAC(QCQA) TY-D PG64-22(115#/SY/IN)	TON	725	$65.00	$47,125.00
12	0360 2002	CONC PVMT (CONT REINF-CRCP)(9")	SY	6291	$50.00	$314,550.00
13	0432 2001	RIPRAP (CONC) (4 IN)	CY	0	$300.00	$0.00
14	0464	RC PIPE (CL III)	LF	2700	$60.00	$162,000.00
15	0467	END TREATMENTS	EA	45	$1,000.00	$45,000.00
16	-	UTILITY ADJUSTMENTS	LS	0		$0.00
17	0500 2001	MOBILIZATION	LS	0	$500,000.00	$0.00
18	0502 2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	0	$6,000.00	$0.00
19	0506 2034	TEMPORARY SEDIMENT CONTROL FENCE	LF	14010	$3.00	$42,030.00
20	0529 2006	CONC CURB (MONO) (TY II)	LF	3782	$3.00	$11,346.00
21	0530 2010	DRIVEWAYS (CONC)	SY	5400	$70.00	$378,000.00
22	0531 2010	CURB RAMPS (TY 7)	EA	116	$1,810.00	$209,960.00
23	0531 2015	CONC SIDEWALK (4")	SY	8346	$50.00	$417,300.00
24	0666 2003	REFL PAV MRK TY I (W) 4" (BRK) (100MIL)	LF	0	$0.36	$0.00
25	0666 2036	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	1199	$0.75	$899.25
26	0666 2042	REFL PAV MRK TY I (W) 12" (SLD) (100MIL)	LF	0	$2.25	$0.00
27	0666 2048	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	0	$11.00	$0.00
28	0666 2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	11	$85.00	$935.00
29	0666 2084	REFL PAV MRK TY I (W) (RR XING) (100MIL)	EA	0	$250.00	$0.00
30	0666 2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	11	$100.00	$1,100.00
31	0666 2105	REFL PAV MRK TY I (Y) 4" (BRK) (100MIL)	LF	1280	$0.40	$512.00
32	0666 2111	REFL PAV MRK TY I (Y) 4" (SLD) (100MIL)	LF	8312	$0.35	$2,909.20
33	0672 2015	REFL PAV MRKR TY II-A-A	EA	420	$4.00	$1,680.00
34	0672 2017	REFL PAV MRKR TY II-C-R	EA	126	$4.00	$504.00
					TOTAL	$1,941,634.45
					Contingency 10%	$194,163.45
					Traffic Signal Warrant Study	$3,500.00
					Traffic Signal and timing	$180,000.00
					Total	$2,135,797.90

B.F. 1960 QUANTITY SUMMARY - CITY OF HOUSTON AREA (LONG TERM)						
NO.	TxDOT ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	PRICE PER UNIT	AMOUNT
1	0100 2002	PREPARING ROW	STA	66	$2,500.00	$165,000.00
2	0105 2014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	5465	$2.50	$13,663.61
3	0110 2001	EXCAVATION (ROADWAY)	CY	4246	$8.00	$33,968.00
4	0110 2002	EXCAVATION (CHANNEL)	CY	0	$8.00	$0.00
5	0132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	4246	$5.00	$21,230.00
6	0162 2002	BLOCK SODDING	SY	10760	$3.00	$32,280.00
7	0168 2001	VEGETATIVE WATERING	MG	175	$10.00	$1,750.00
8	0260 2002	LIME (HYDRATED LIME (SLURRY))(48#/SY)	TON	313	$150.00	$46,950.00
9	0260 2007	LIME TRT (NEW BASE)(6")	SY	13037	$1.50	$19,555.50
10	0275 2019	CEMENT TREAT (SUBGRADE)(6")	SY	13037	$8.00	$104,296.00
11	0341 2106	D-GR-HMAC(QCQA) TY-D PG64-22(115#/SY/IN)	TON	1466	$65.00	$95,290.00
12	0360 2002	CONC PVMT (CONT REINF-CRCP)(9")	SY	12736	$50.00	$636,800.00
13	0432 2001	RIPRAP (CONC) (4 IN)	CY	304	$300.00	$91,050.00
14	0464	RC PIPE (CL III)	LF	3574	$60.00	$214,410.00
15	0465	INLETS	EA	40	$3,000.00	$120,000.00
16	0465	MANHOLES	EA	20	$3,500.00	$70,000.00
17	-	UTILITY ADJUSTMENTS	LS	0		$0.00
18	0500 2001	MOBILIZATION	LS	0	$500,000.00	$0.00
19	0502 2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	0	$6,000.00	$0.00
20	0506 2034	TEMPORARY SEDIMENT CONTROL FENCE	LF	13220	$3.00	$39,660.00
21	0529 2006	CONC CURB (MONO) (TY II)	LF	23467	$3.00	$70,401.00
22	0530 2010	DRIVEWAYS (CONC)	SY	5520	$70.00	$386,400.00
23	0531 2010	CURB RAMPS (TY 7)	EA	12	$1,810.00	$21,720.00
24	0531 2015	CONC SIDEWALK (4")	SY	3794	$50.00	$189,700.00
25	0666 2003	REFL PAV MRK TY I (W) 4" (BRK) (100MIL)	LF	2700	$0.36	$972.00
26	0666 2036	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	1835	$0.75	$1,376.25
27	0666 2042	REFL PAV MRK TY I (W) 12" (SLD) (100MIL)	LF	0	$2.25	$0.00
28	0666 2048	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	0	$11.00	$0.00
29	0666 2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	21	$85.00	$1,785.00
30	0666 2084	REFL PAV MRK TY I (W) (RR XING) (100MIL)	EA	0	$250.00	$0.00
31	0666 2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	16	$100.00	$1,600.00
32	0666 2105	REFL PAV MRK TY I (Y) 4" (BRK) (100MIL)	LF	0	$0.40	$0.00
33	0666 2111	REFL PAV MRK TY I (Y) 4" (SLD) (100MIL)	LF	0	$0.35	$0.00
34	0672 2015	REFL PAV MRKR TY II-A-A	EA	0	$4.00	$0.00
35	0672 2017	REFL PAV MRKR TY II-C-R	EA	83	$4.00	$332.00
					TOTAL	$2,380,189.36
					Contingency 10%	$238,018.94
					Total	$2,618,208.30

B.F. 1960 QUANTITY SUMMARY - CITY OF HUMBLE AREA (SHORT TERM)						
NO.	TxDOT ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	PRICE PER UNIT	AMOUNT
1	0100 2002	PREPARING ROW	STA	24	$2,500.00	$60,000.00
2	0105 2014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	2028	$2.50	$5,069.61
3	0110 2001	EXCAVATION (ROADWAY)	CY	1086	$8.00	$8,688.00
4	0110 2002	EXCAVATION (CHANNEL)	CY	0	$8.00	$0.00
5	0132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	1086	$5.00	$5,430.00
6	0162 2002	BLOCK SODDING	SY	3469	$3.00	$10,407.00
7	0168 2001	VEGETATIVE WATERING	MG	57	$10.00	$570.00
8	0260 2002	LIME (HYDRATED LIME (SLURRY))(48#/SY)	TON	69	$150.00	$10,350.00
9	0260 2007	LIME TRT (NEW BASE)(6")	SY	2782	$1.50	$4,173.00
10	0275 2019	CEMENT TREAT (SUBGRADE)(6")	SY	2782	$8.00	$22,256.00
11	0341 2106	D-GR-HMAC(QCQA) TY-D PG64-22(115#/SY/IN)	TON	376	$65.00	$24,440.00
12	0360 2002	CONC PVMT (CONT REINF-CRCP)(9")	SY	3252	$50.00	$162,600.00
13	0432 2001	RIPRAP (CONC) (4 IN)	CY	226	$300.00	$67,800.00
14	0464	RC PIPE (CL III)	LF	600	$60.00	$36,000.00
15	0467	END TREATMENTS	EA	10	$1,000.00	$10,000.00
16	-	UTILITY ADJUSTMENTS	LS	0		$0.00
17	0500 2001	MOBILIZATION	LS	0	$500,000.00	$0.00
18	0502 2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	0	$6,000.00	$0.00
19	0506 2034	TEMPORARY SEDIMENT CONTROL FENCE	LF	2520	$3.00	$7,560.00
20	0529 2006	CONC CURB (MONO) (TY II)	LF	3782	$3.00	$11,346.00
21	0530 2010	DRIVEWAYS (CONC)	SY	1200	$70.00	$84,000.00
22	0531 2010	CURB RAMPS (TY 7)	EA	106	$1,810.00	$191,860.00
23	0531 2015	CONC SIDEWALK (4")	SY	4641	$50.00	$232,050.00
24	0666 2003	REFL PAV MRK TY I (W) 4" (BRK) (100MIL)	LF	600	$0.36	$216.00
25	0666 2036	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	2337	$0.75	$1,752.75
26	0666 2042	REFL PAV MRK TY I (W) 12" (SLD) (100MIL)	LF	621	$2.25	$1,397.25
27	0666 2048	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	152	$11.00	$1,672.00
28	0666 2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	34	$85.00	$2,890.00
29	0666 2084	REFL PAV MRK TY I (W) (RR XING) (100MIL)	EA	6	$250.00	$1,500.00
30	0666 2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	21	$100.00	$2,100.00
31	0666 2105	REFL PAV MRK TY I (Y) 4" (BRK) (100MIL)	LF	1070	$0.40	$428.00
32	0666 2111	REFL PAV MRK TY I (Y) 4" (SLD) (100MIL)	LF	6591	$0.35	$2,306.85
33	0672 2015	REFL PAV MRKR TY II-A-A	EA	30	$4.00	$120.00
34	0672 2017	REFL PAV MRKR TY II-C-R	EA	173	$4.00	$692.00
					TOTAL	$969,674.46
					Contingency 10%	$96,967.45
					Traffic Signal Warrant Study	$3,500.00
					Traffic Signal and timing	$180,000.00
					Total	$1,250,141.91

B.F. 1960 QUANTITY SUMMARY - CITY OF HUMBLE AREA (MEDIUM TERM)						
NO.	TxDOT ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	PRICE PER UNIT	AMOUNT
1	0100 2002	PREPARING ROW	STA	43	$2,500.00	$107,500.00
2	0105 2014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	0	$2.50	$0.00
3	0110 2001	EXCAVATION (ROADWAY)	CY	2944	$8.00	$23,552.00
4	0110 2002	EXCAVATION (CHANNEL)	CY	0	$8.00	$0.00
5	0132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	2944	$5.00	$14,720.00
6	0162 2002	BLOCK SODDING	SY	17527	$3.00	$52,581.00
7	0168 2001	VEGETATIVE WATERING	MG	285	$10.00	$2,850.00
8	0260 2002	LIME (HYDRATED LIME (SLURRY))(48#/SY)	TON	218	$150.00	$32,700.00
9	0260 2007	LIME TRT (NEW BASE)(6")	SY	9028	$1.50	$13,542.00
10	0275 2019	CEMENT TREAT (SUBGRADE)(6")	SY	9028	$8.00	$72,224.00
11	0341 2106	D-GR-HMAC(QCQA) TY-D PG64-22(115#/SY/IN)	TON	1016	$65.00	$66,040.00
12	0360 2002	CONC PVMT (CONT REINF-CRCP)(9")	SY	8829	$50.00	$441,450.00
13	0432 2001	RIPRAP (CONC) (4 IN)	CY	0	$300.00	$0.00
14	0464	RC PIPE (CL III)	LF	2940	$60.00	$176,400.00
15	0467	END TREATMENTS	EA	112	$1,000.00	$112,000.00
16	-	UTILITY ADJUSTMENTS	LS	0		$0.00
17	0500 2001	MOBILIZATION	LS	0	$500,000.00	$0.00
18	0502 2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	0	$6,000.00	$0.00
19	0506 2034	TEMPORARY SEDIMENT CONTROL FENCE	LF	14090	$3.00	$42,270.00
20	0529 2006	CONC CURB (MONO) (TY II)	LF	0	$3.00	$0.00
21	0530 2010	DRIVEWAYS (CONC)	SY	6720	$70.00	$470,400.00
22	0531 2010	CURB RAMPS (TY 7)	EA	238	$1,810.00	$430,780.00
23	0531 2015	CONC SIDEWALK (4")	SY	8202	$50.00	$410,100.00
24	0666 2003	REFL PAV MRK TY I (W) 4" (BRK) (100MIL)	LF	0	$0.36	$0.00
25	0666 2036	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	1536	$0.75	$1,152.00
26	0666 2042	REFL PAV MRK TY I (W) 12" (SLD) (100MIL)	LF	280	$2.25	$630.00
27	0666 2048	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	41	$11.00	$451.00
28	0666 2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	14	$85.00	$1,190.00
29	0666 2084	REFL PAV MRK TY I (W) (RR XING) (100MIL)	EA	0	$250.00	$0.00
30	0666 2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	13	$100.00	$1,300.00
31	0666 2105	REFL PAV MRK TY I (Y) 4" (BRK) (100MIL)	LF	740	$0.40	$296.00
32	0666 2111	REFL PAV MRK TY I (Y) 4" (SLD) (100MIL)	LF	5205	$0.35	$1,821.75
33	0672 2015	REFL PAV MRKR TY II-A-A	EA	264	$4.00	$1,056.00
34	0672 2017	REFL PAV MRKR TY II-C-R	EA	161	$4.00	$644.00
					TOTAL	$2,477,649.75
					Contingency 10%	$247,764.98
					Traffic Signal Warrant Study	
					Traffic Signal and timing	
					Total	$2,725,414.73

B.F. 1960 QUANTITY SUMMARY - CITY OF HUMBLE AREA (LONG TERM)						
NO.	TxDOT ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	PRICE PER UNIT	AMOUNT
1	0100 2002	PREPARING ROW	STA	75	$2,500.00	$187,500.00
2	0105 2014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	5685	$2.50	$14,213.06
3	0110 2001	EXCAVATION (ROADWAY)	CY	4183	$8.00	$33,464.00
4	0110 2002	EXCAVATION (CHANNEL)	CY	0	$8.00	$0.00
5	0132 2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	4183	$5.00	$20,915.00
6	0162 2002	BLOCK SODDING	SY	12172	$3.00	$36,514.50
7	0168 2001	VEGETATIVE WATERING	MG	201	$10.00	$2,010.00
8	0260 2002	LIME (HYDRATED LIME (SLURRY))(48#/SY)	TON	323	$150.00	$48,450.00
9	0260 2007	LIME TRT (NEW BASE)(6")	SY	13188	$1.50	$19,782.00
10	0275 2019	CEMENT TREAT (SUBGRADE)(6")	SY	13188	$8.00	$105,504.00
11	0341 2106	D-GR-HMAC(QCQA) TY-D PG64-22(115#/SY/IN)	TON	1435	$65.00	$93,275.00
12	0360 2002	CONC PVMT (CONT REINF-CRCP)(9")	SY	12448	$50.00	$622,400.00
13	0432 2001	RIPRAP (CONC) (4 IN)	CY	298	$300.00	$89,400.00
14	0464	RC PIPE (CL III)	LF	3515	$60.00	$210,900.00
15	0465	INLETS	EA	54	$3,000.00	$162,000.00
16	0465	MANHOLES	EA	25	$3,500.00	$87,500.00
17	-	UTILITY ADJUSTMENTS	LS	0		$0.00
18	0500 2001	MOBILIZATION	LS	0	$500,000.00	$0.00
19	0502 2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	200	$6,000.00	$1,200,000.00
20	0506 2034	TEMPORARY SEDIMENT CONTROL FENCE	LF	15660	$3.00	$46,980.00
21	0529 2006	CONC CURB (MONO) (TY II)	LF	24242	$3.00	$72,726.00
22	0530 2010	DRIVEWAYS (CONC)	SY	9481	$70.00	$663,670.00
23	0531 2010	CURB RAMPS (TY 7)	EA	23	$1,810.00	$41,630.00
24	0531 2015	CONC SIDEWALK (4")	SY	6321	$50.00	$316,050.00
25	0666 2003	REFL PAV MRK TY I (W) 4" (BRK) (100MIL)	LF	2620	$0.36	$943.20
26	0666 2036	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	2206	$0.75	$1,654.50
27	0666 2042	REFL PAV MRK TY I (W) 12" (SLD) (100MIL)	LF	455	$2.25	$1,023.75
28	0666 2048	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	72	$11.00	$792.00
29	0666 2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	26	$85.00	$2,210.00
30	0666 2084	REFL PAV MRK TY I (W) (RR XING) (100MIL)	EA	11	$250.00	$2,750.00
31	0666 2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	18	$100.00	$1,800.00
32	0666 2105	REFL PAV MRK TY I (Y) 4" (BRK) (100MIL)	LF	1180	$0.40	$472.00
33	0666 2111	REFL PAV MRK TY I (Y) 4" (SLD) (100MIL)	LF	5858	$0.35	$2,050.30
34	0672 2015	REFL PAV MRKR TY II-A-A	EA	108	$4.00	$432.00
35	0672 2017	REFL PAV MRKR TY II-C-R	EA	986	$4.00	$3,944.00
					TOTAL	$4,092,955.31
					Contingency 10%	$409,295.53
					Total	$4,502,250.84

Houston-Galveston Area Council