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# City Mobility Planning

## Houston

### Inner West Loop Sub-Area Study

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## Inner West Loop Sub-Area Study
## December, 2012

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City of Houston

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# City Mobility Planning

## Inner West Loop Sub-Area Study

Special thanks to:

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# Introduction

In 2009 the City of Houston adopted the City Mobility Plan (CMP), which proposed a new process for developing mobility solutions. These solutions focus on capitalizing on current transportation infrastructure by emphasizing Mutli-Modal mobility options and system improvements with a higher than average benefit-cost ratio. Historically, we have addressed increased traffic by simply expanding our streets or network capacity. This methodology simply isn't sustainable given limited funding sources, quality of life factors, and constraints on land development.

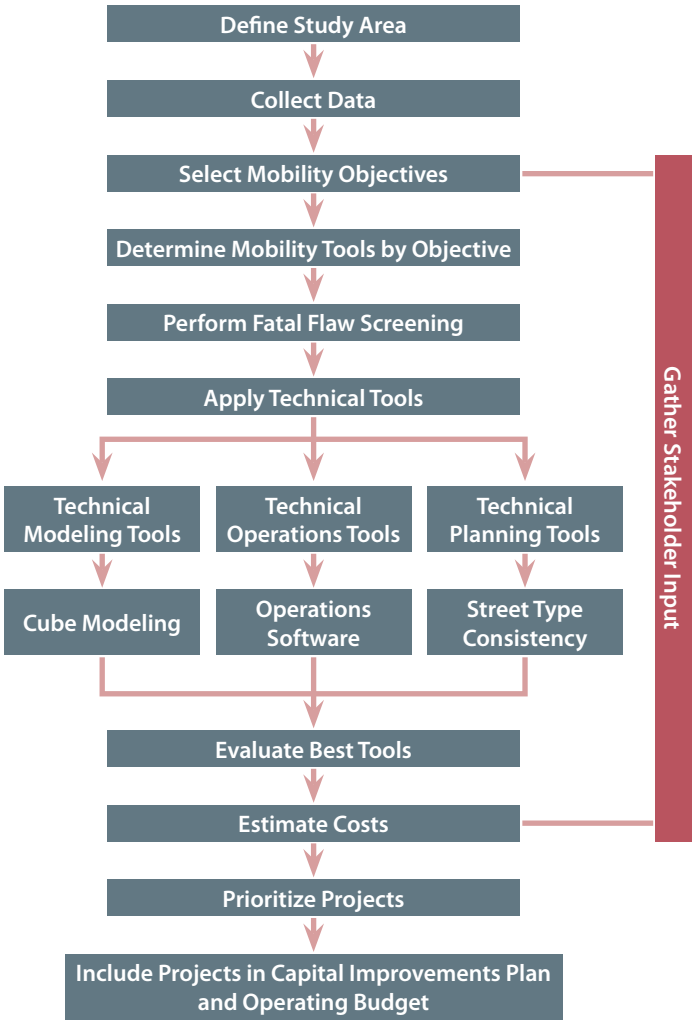
The City of Houston is taking the CMP process a step further by establishing sub-area analyses for several different locations in the City. The purpose is to determine the appropriate mobility solutions that are needed in the short and long-term. This analysis is looking specifically at the Inner West Loop area.

One of the largest challenges within the Study Area is the fact that the Right-of-Way (ROW) is significantly limited in many of the corridors. Several of the corridors will continue to see increased congestion within the next 25 years, and the limited ROW will preclude several corridors from increasing their through-put capacity by simply widening the street. As such, the City of Houston is taking a holistic approach to defining a vision for these corridors. All modes of travel will need to be accommodated in some form or fashion within the Inner West Loop, and by using the concepts defined within the Infrastructure Design Manual, Chapter 10, Appendix 2, the City is taking its first step in trying to create a Multi-Modal vision for the corridors within the Inner West Loop. The document that follows describes the process that was undertaken, the analysis that helped to form the basis of the recommendations, and a vision for the roadways that are currently designated within the Major Thoroughfare and Freeway Plan (MTFP).

Feedback was sought from various stakeholders throughout the planning process.

## Major Study Area Topics:

- Limited Right-of-Way
- Limited Funding Sources
- Congestion - Traffic Growth
- Multi-Modal Connectivity




The flow chart on the left specifies the process that was undertaken to identify specific mobility projects within the Inner West Loop Study Area. The process goes from defining the Study Area to data collection; once those are complete the process moves to selecting mobility objectives and mobility tools; this is followed up by performing a fatal flaw screening of the selected objectives and tools. This is all done with input from the public and stakeholders throughout the process. Once the fatal flaw screening is complete; technical modeling tools, technical operations tools and technical planning tools will be utilized to develop a series of mobility options. These tools provide an opportunity to evaluate the mobility needs in the sub-area as well as provide additional analysis that can be used to prioritize the mobility project with respect to cost and benefit. The direct output from this process is a prioritized list of projects for the sub-area that can be integrated into the Capital Improvements Plan and operating budget.

The overall project development process does not stop once funding has been programmed, rather a new process for design and construction of the corridor improvements takes control of the specifics for each project. That information is beyond the scope of this planning study, however, guidelines are established later in this document that demonstrate appropriate points of stakeholder involvement in that design process.

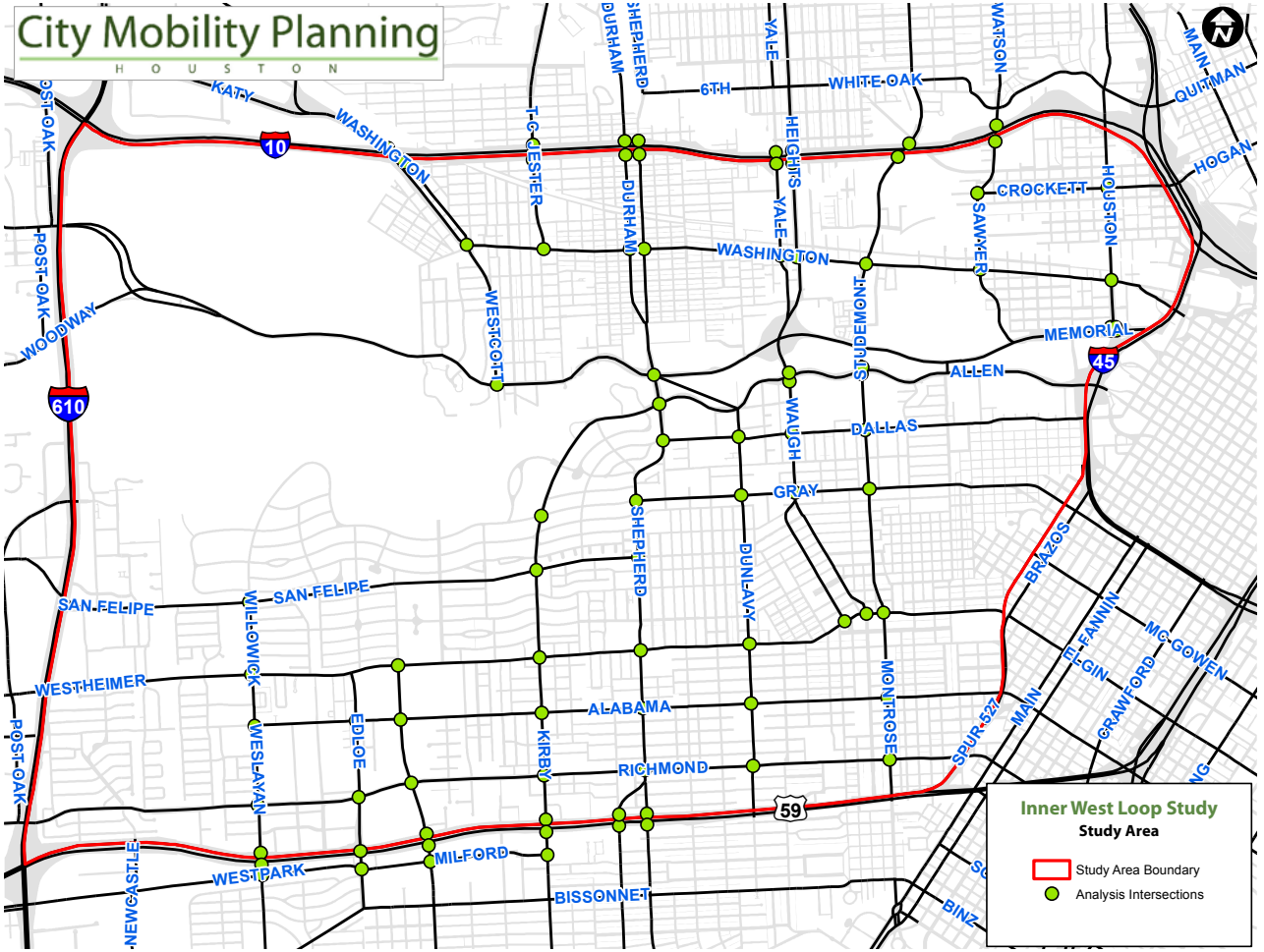
## Study Area

The Inner West Loop Study Area has a substantially built-out street network system. The acquisition of additional ROW for the purpose of increasing capacity within the Study Area is possible however, may be cost prohibitive since there is a substantial amount of existing development. In that regard, it is important to evaluate the overall system network to improve efficiency while addressing the current and future needs.

The area of focus to analyze short and long-term mobility improvements is located west of downtown Houston. As represented in **Figure 1**, the Study Area is bounded on the east by Spur 527 and Bagby Street, on the west by Interstate Highway 610 (West Loop), on the north by Interstate Highway 10 (Katy Freeway), and on the south by U.S. Highway 59 (Southwest Freeway).

Certain projects that were examined through the study process brought to light improvements outside of the Study Area. This was done to ensure that logical connections could be made within the various transportation networks that exist within the City of Houston. The most notable type of project that would require a broader purview was the implementation of more frequent transit services along several of the corridors including: Richmond, Westheimer, Washington, Shepherd, and Montrose.

Figure 1 – Study Area Map



## Study Area Objectives and Tools

There are a number of mobility objectives that resulted from the 2009 City Mobility Plan. Although not all of the objectives generated from the 2009 CMP will relate to the needs of the Inner West Loop Study Area, one of the first tasks of this planning process is to determine which ones relate here. **CMP Goals and Objectives** include:

- Increased access to transit facilities
- Increased access to pedestrian facilities
- Increased access to bicycle facilities
- Improve connectivity of the system
- Better accommodations the movement of freight
- Cost efficiency
- Minimize travel times
- Reliable commuting options
- Reduce increase in congestion
- Minimizing conflict points within the network
- Provide a safe and secure environment for pedestrians and bicyclists
- Neighborhood traffic
- Air quality conformity
- Ability to maintain infrastructure
- Maintain a system that is energy efficient
- Improve corridor aesthetics
- Expand pedestrian amenities
- Streets that are pedestrian scale
- Facilitate all modes of travel

During the outreach process undertaken as a component of the Inner West Loop Study, the following Goals were specifically mentioned several times by various stakeholder groups:

- Increased general mobility
- Increased safety
- Expanded Multi-Modal alternatives
- Improved access to amenities from the existing neighborhoods

By addressing the goals mentioned above, the choice regarding the appropriate tools for the Study Area becomes clearer. Not all mobility tools will be needed or appropriate to solve the mobility issues in the Inner West Loop Study Area and the list of relevant tools will be refined through the planning process.

The tools selected and utilized will be sorted into three separate categories:

- Technical Modeling Solutions – those that can be analyzed using the Regional Travel Demand Model,
- Technical Operations Solutions – those that can be analyzed using traffic analysis software such as SYNCHRO, and
- Technical Planning Solutions – those that are not represented well within either modeling platform whose results are often qualitative in nature.

The list of tools used in this analysis is selected from those displayed in **Figure 2.**

Figure 2 – City Mobility Planning Toolbox

# City Mobility Planning
HOUSTON

# TOOLBOX

## Motorized Tools

**Traffic calming** slows or reduces automobile traffic, improving safety for pedestrians and cyclists. Techniques include speed humps, textured paving, curb extensions, pedestrian crossing islands, traffic circles, and reduced turning radii.

**Intersection design** controls traffic movement where two or more streets cross. Improvements include left-turn bays, right-turn slip lanes, flared lanes to increase intersection capacity, reduced turning radii to increase intersection awareness, and protected bicycle turn spaces.


**Signal timing** is coordinating the sequence and timing of traffic signal phases. Signal timing can increase the efficiency of the street of by allowing for the greatest number of vehicles to cross the intersection in the shortest time.

**Access management** techniques help increase the mobility and safety of a particular corridor by consolidating driveways and controlling access to adjacent land uses by influencing access location, design, spacing and operation.

**Medians** are traffic islands installed to prevent or ensure certain turning movements at intersections. They also provide a seperation between opposing traffic lanes of traffic. Medians eliminate cut-through traffic, change driving patterns, beuatify streets with greenery and increase pedestrian saftey for crossing streets.

## Non-Motorized Tools

**Sidewalks** are important to the pedestrian traveler. Wider sidewalks in commercial areas facilitate a mix of uses, and the addition of streetscaping can promote pedestrian use.

**Bike Lanes** are located on the edge of a street or between the travel lanes and parking lanes. Typically, they are 5-6 feet wide and allow cyclist to have a protected space on the street.

**Streetscaping** refers to the use of planted areas and other beautifying techniques along transit corridors that can attract pedestrians and make pedestrian and bicycle use more pleasant.

**Pedestrian Crossings** connect neighborhoods and can be at intersections or mid-block. Signal timing and pedestrian "islands" can improve safety for walkers.


**Sharrows** are special lane markings for roads too narrow to accomodate a separate bike lane. These markings alert drivers to the likelihood of encountering bicyclists.

## Alternative Transport Tools

**Rapid Transit** comes in two forms: Light Rail Transit (LRT) and Bus Rapid Transit (BRT). Bus Rapid Transit has the unique ability to function in either an exclusive right-of-way (ROW) or in mixed traffic, however, the most common application assumes an exclusive ROW for operational efficiency and saftey.

**Communter Rail** service connects the large master planned communities around the region, the surrouding towns and even nearby cities with the urban core.

**Road space rationing or reallocation** reserves parking and other road uses for preferred modes such as carpools, vanpools, energy-efficient vehicles, and public transit vehicles.

**Travel Demand managment** refers to a set of strategies to reduce the use of of city roadways to decrease congestion and the infastructural burden of intense use, especially by single-occupancy vehicles.


**Park and Ride** lots encourage transit usage for people who are not within walking distance of a transit station. These lots typically adjoin suburban bus and rail stations to reduce the number of cars in the urban core.

# Existing Conditions

The purpose of this plan is to develop mobility solutions that address the challenges facing people that live, work and travel through the Inner West Loop. To determine the mobility needs and solutions in this area it is important to first identify the current conditions and challenges that are present. Through this study, the mobility needs and challenges have been determined by using quantitative data through travel demand modeling and intersection analysis, together with qualitative date acquired through community feedback. This section will focus on the empirical or quantitative data surrounding the mobility issues in the Inner West Loop area, while the following chapter will provide a summary of the stakeholder and community input (qualitative data) provided through the planning process.

## Major Thoroughfare and Freeway Plan

With regard to thoroughfares in the Study Area, the Inner West Loop Area consists of a number of Major Thoroughfares and Minor Collectors that bisect the sub-area. Buffalo Bayou and Memorial Park provide a divide in the area where only a few crossings are provided at Shepherd Drive, Waugh Drive, and Studemont Street/ Montrose Boulevard. It is important to note that these corridors are all within one mile of each other along Buffalo Bayou. This means, sections of the Study Area are without direct north/south connections between I-45 and I-610.

In the east/west direction, there are a number of thoroughfares that provide access within the area. Memorial Drive, Allen Parkway, and Washington Avenue provide important connections on the north side of the area, while Westheimer Road and Richmond Avenue provide connectivity on the south side of the area. These thoroughfares are extremely important for the area but have limited right-of-way that limits the tools that can be used to improve corridor capacity.

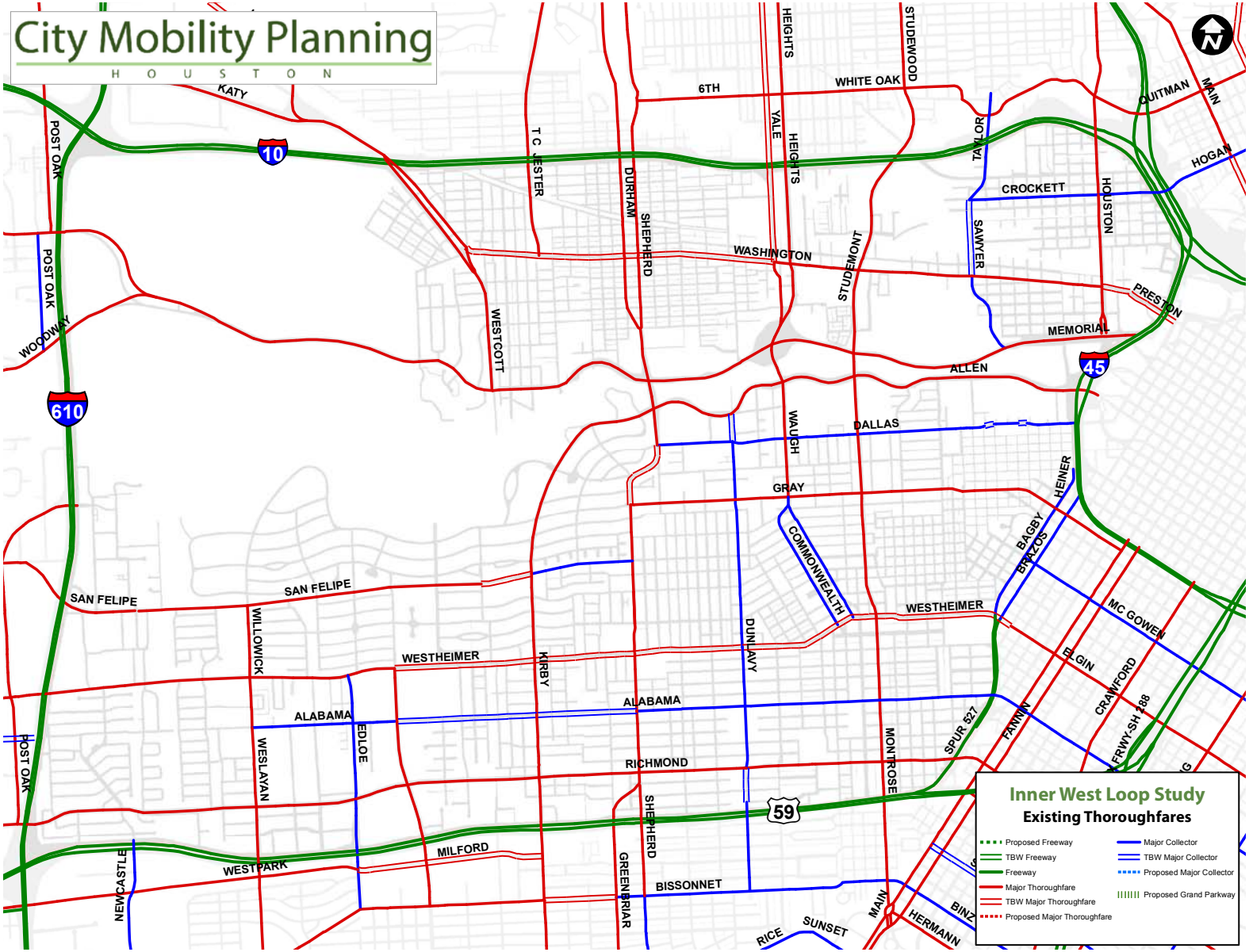
The City of Houston Thoroughfare Plan, as depicted in **Figure 3**, identifies the freeways, major thoroughfares and major collectors within the Inner West Loop Area that have sufficient width (solid line), need to be widened (double solid line), or need to be acquired (dashed). The majority of the thoroughfares in the area have sufficient widths, however a few roads require additional Right-of-Way including:

- **Westheimer**
- **Washington**
- **Alabama**

There are also a number of segments in the area requiring addition right-of-way including:

- **Yale**
- **Dunlavy**
- **San Felipe**
- **Sawyer**
- **Shepherd**
- **Dallas**

Figure 3 – City of Houston Thoroughfare Plan for the Inner West Loop Area



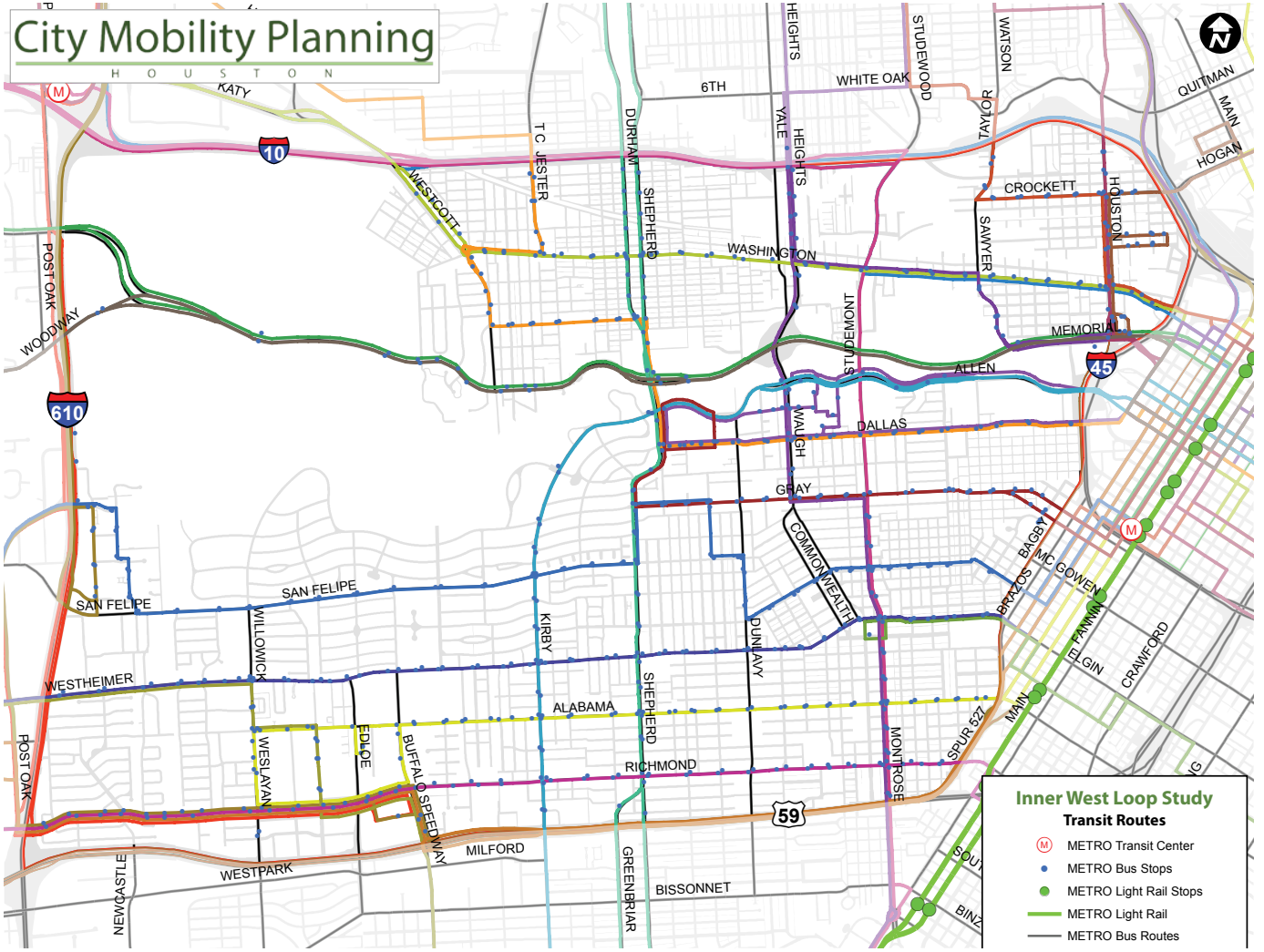
## Existing Transit Routes

The Metropolitan Transit Authority of Harris County (METRO) is the transit service provider for the Houston Metropolitan area. There are currently 27 bus routes that have bus stops within the Study Area of the Inner West Loop Area (**Figure 4**). These transit routes provide local service that primarily provide access to Downtown Houston and the METRO Rail transit service. The core bus routes in the Study Area utilize the Richmond, Washington, and Westheimer corridors.

Additionally, METRO has begun the process of building out a light-rail system that will serve the City of Houston through various sub-areas. A key component of that system is the implementation of the University Line. The University Corridor extends along Richmond Avenue in the southeastern quadrant of the Study Area and providing logical transit, bicycle, and pedestrian connections to that route is essential to helping create a modal shift that will lessen the peak period traffic concerns discussed later in this document.

While the construction of the University Line has been delayed, it is still a crucial element in the overall transportation network concepts that are presented in latter sections of this Report.

**Figure 4 – Existing Transit Service in Inner West Loop Area**



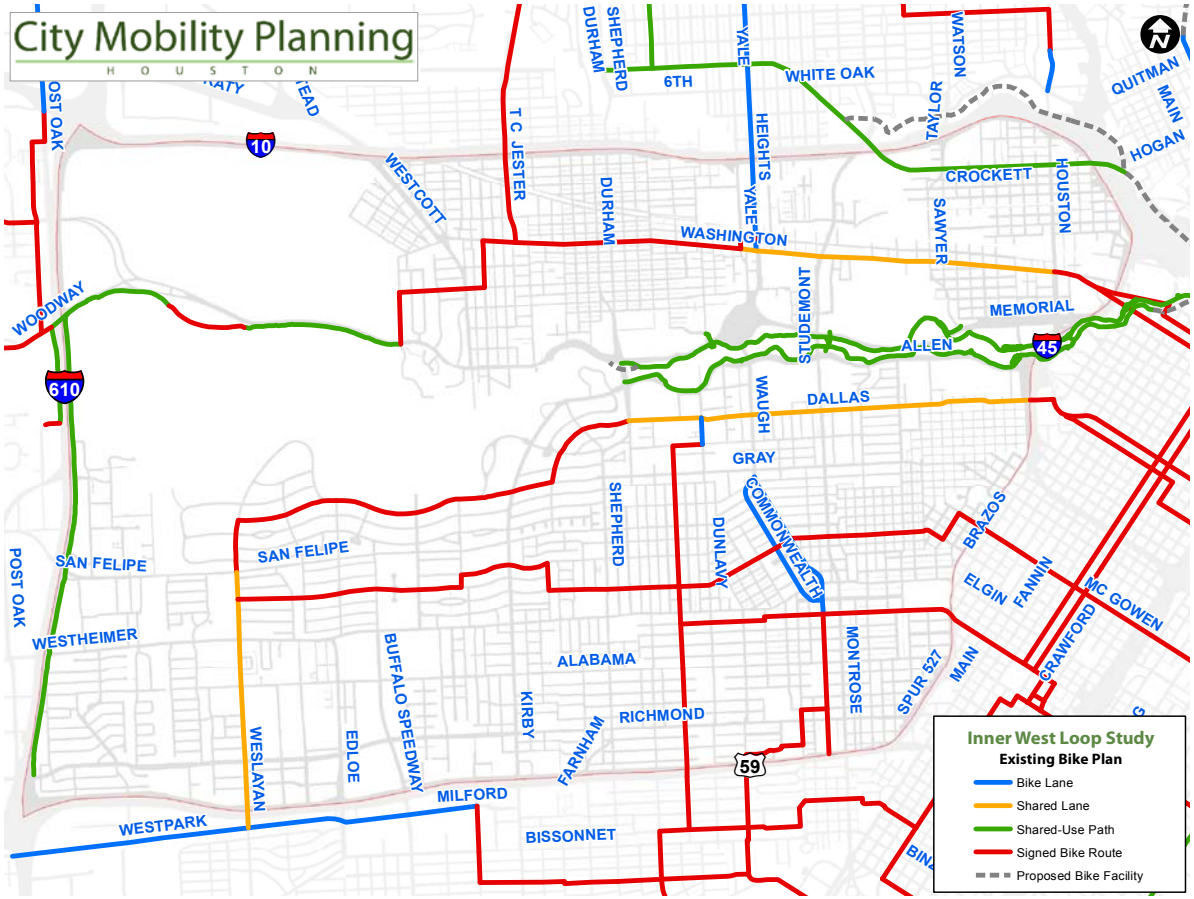
## Bicycle Facilities

The Inner West Loop Study Area has a variety of different bicycle facility types that connect cyclists throughout the area. A number of bike lanes, both existing and proposed, connect throughout the area with an extensive network of existing shared use paths that run adjacent to Buffalo Bayou and Memorial Park. These trails are home to recreational users, as well as commuters, as it provides excellent access to Downtown Houston.

Together with bike lanes and shared paths, shared lanes are also present along Dallas Street, Washington Avenue, and Weslayan Street. The on-street network will need to be expanded as the area continues to develop more multi-modal options, however, the current infrastructure provides a good sense of how and why people are using the facilities.

Most notable within the map at right is the fact that there are significant gaps within the on-street network for large portions of the Study Area. While gaps are prevalent, cyclists continue to use the facilities, but there is not a clearly defined route for those cyclists that are less experienced or comfortable.

Figure 5 – Planned Bikeways in the Inner West Loop Area



## Existing Travel Conditions by Period of Day (Intersection Congestion)

With the majority of the thoroughfares built out in this Study Area and with limited right-of-way, improving congestion does not have a simple solution. Utilizing current traffic counts and SYNCHRO traffic analysis software, 87 intersections within the Study Area were analyzed including signalized, stop-controlled and roundabout intersections. This analysis broke out the intersections into two periods during the day: the morning peak period and the evening peak period. **Figures 6 and 7** shows the AM and PM level of service (LOS) at each intersection. Level of service is a measurement scale that gauges congestion on a grading similar to scholastic grading; A is a good rating with little or no congestion and F is poor rating with high levels of congestion.

The existing level of service indicates that a number of intersections have higher than desired levels of congestion. **Congested intersections include**:

- Allen Parkway at Waugh Drive
- Allen Parkway at Montrose Boulevard
- I-10 Access Road @ Yale and Durham
- US 59 Access Road @ Kirby and Greenbriar
- Shepherd Drive at Memorial Drive
- Shepherd Drive at Allen Parkway
- Shepherd Drive at Alabama Street
- Shepherd Drive at Richmond Avenue
- San Felipe Street at Kirby Drive
- Memorial Drive at Westcott Street
- Richmond Avenue Corridor
- Washington Avenue west of Shepherd Drive

Figure 6 – AM Level of Service (LOS)

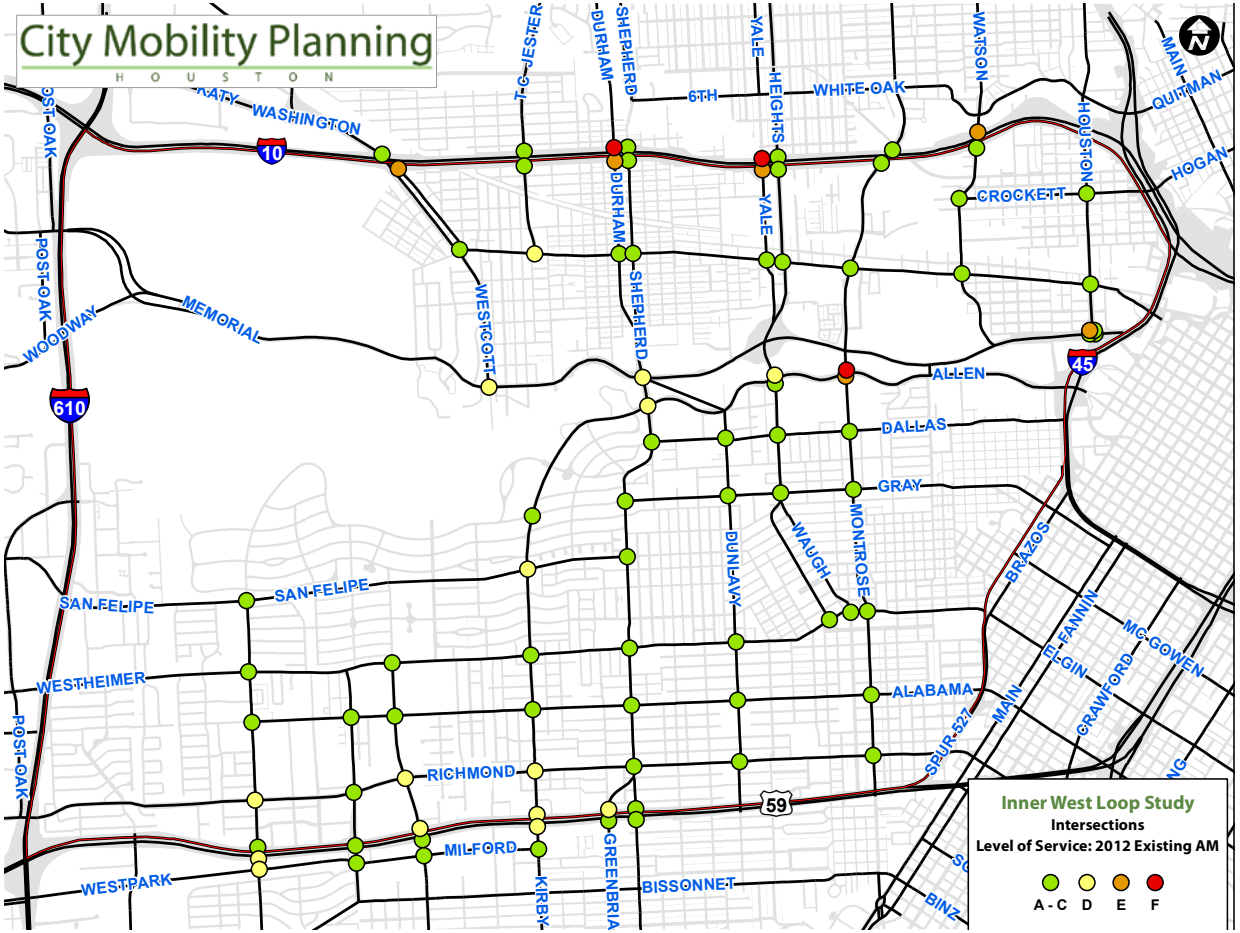
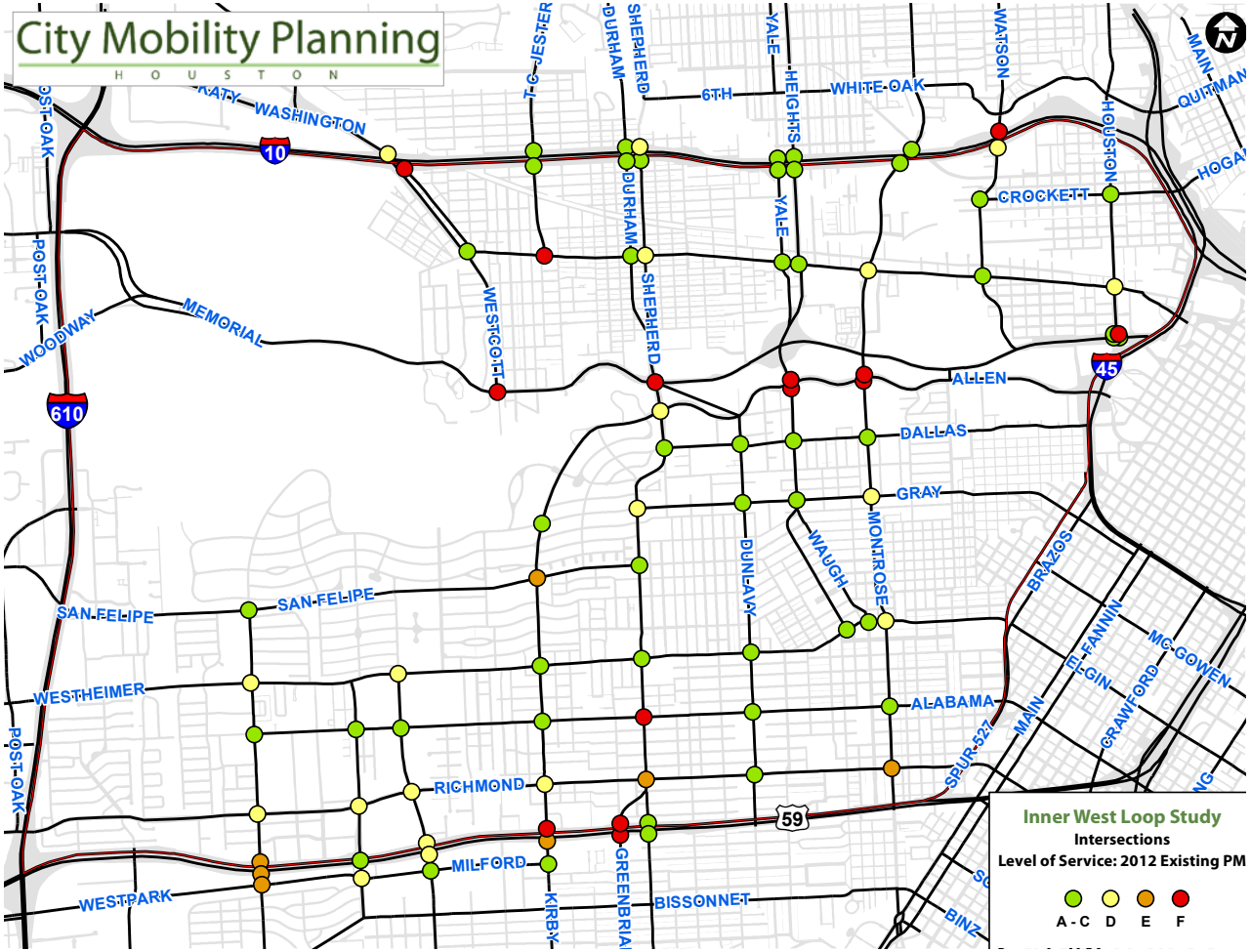


Figure 7 – PM Level of Service (LOS)




## Mitigating Near-Term Peak Hour Congestion

One of the most critical elements of conducting this study was the development of a series of projects that could help to alleviate congestion within the corridors. Excessive levels of vehicular congestion can actually exacerbate small problems that currently exist within the bicycle and pedestrian networks by making segments of the roadway untenable for non-automobile users. As such, intersection related improvements were examined throughout the Study Area for the base year, 2012, and the forecast year 2035.

The future conditions are described in a later section of this document, however, the next few pages are dedicated to specific projects that have been developed to **mitigate congestion that exists today**. While the improvements discussed are highlighted because of a specific need identified during one peak period or the other, these projects will provide a congestion relief benefit throughout the day.

Planning-level costs for these projects are are shwon along with the specific recommendations. While all intersections that have been identified as having congestion were analyzed for improvements, several locations had very limited right-of-way and improvements were not feasible in the short-term.

Another important policy discussion during this planning process was the necessity to **maintain all existing ROW at intersections,** and protect that ROW as redevelopment occurs.

## Mitigating Near-Term Peak Hour Congestion

The following intersection level projects have been identified as infrastructure improvements that can be constructed to improve the **peak period congestion** within the Study Area. These improvements will help to alleviate congested movements at the intersections, thereby improving the overall carrying capacity of the corridors. Specific projects include:

- I-10 eastbound frontage road @ Durham - Add one southbound right turn lane 150-feet - $58,000
- I-10 westbound frontage road @ Durham - Add one westbound right turn lane 150-feet - $35,000
- I-10 westbound frontage road @ Yale - Add one westbound right turn lane 150-feet - $58,000
- I-10 westbound frontage road @ Taylor - Add northbound right turn lane 100-feet - $25,000
- Allen Parkway @ Shepherd - Increase the westbound left storage to 250-feet - $25,000
- San Felipe @ Kirby - Add One north bound through lane on Kirby and add one northbound right turn lane 75-feet on San Felipe - $190,000
- Westheimer @ Buffalo Speedway - Increase: eastbound left to 125-feet and westbound left to 175-feet and northbound left to 175-feet - $65,000
- Westheimer @ Montrose - Increase: eastbound left to 125-feet, westbound left to 200-feet, and northbound left to 200-feet - $35,000
- Richmond @ Weslayan - Increase: eastbound left to 250-feet, westbound left to 200-feet, and southbound left to 200-feet - $80,000

Figure 8 – Mitigated AM Level of Service (LOS)

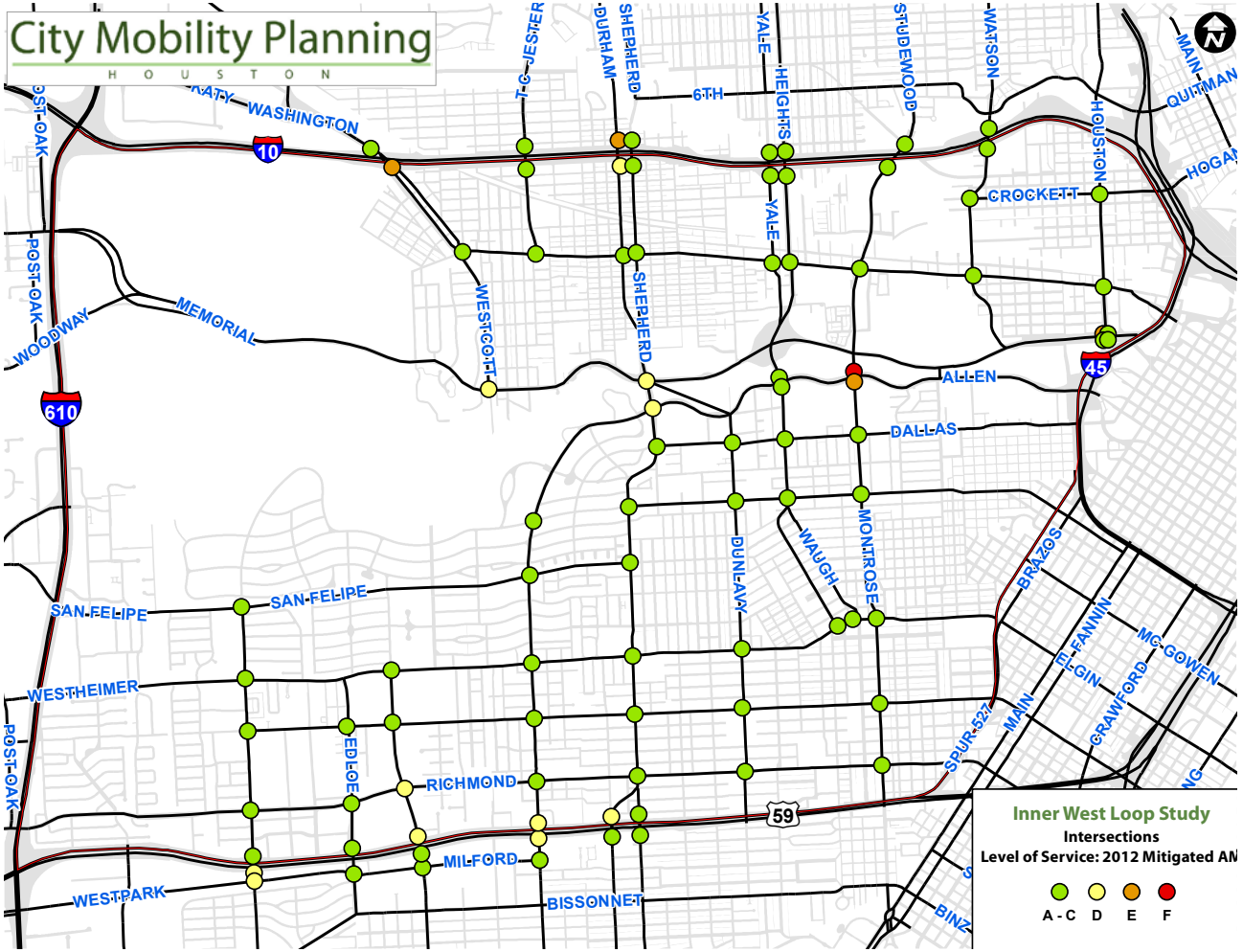





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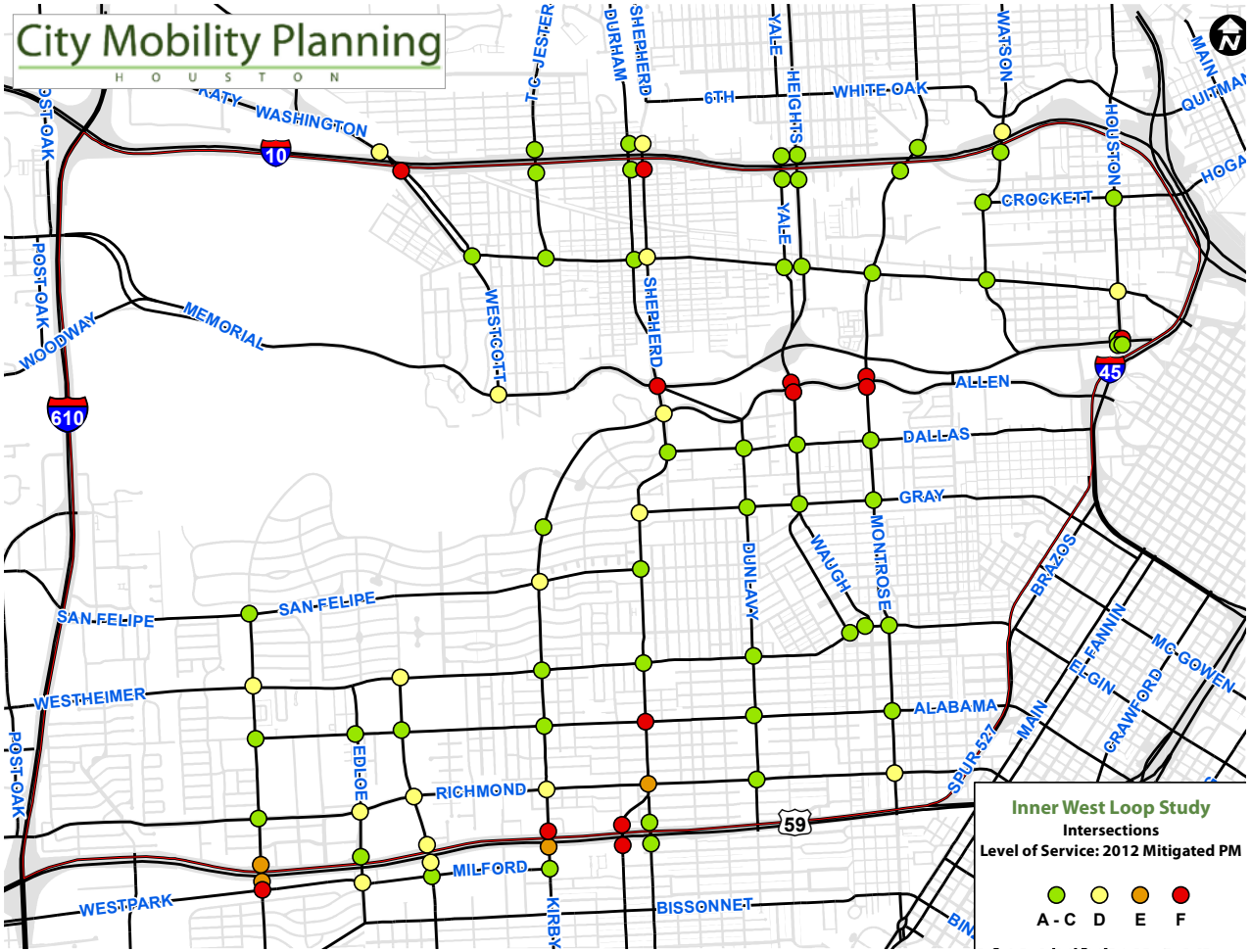
Figure 9 – Mitigated PM Level of Service (LOS)




- Richmond @ Weslayan - Increase: eastbound left to 250-feet, westbound left to 200-feet, and southbound left to 200-feet - $80,000
- Richmond @ Edloe - Increase: eastbound left to 200-feet and westbound left to 150-feet - $60,000
- Richmond @ Kirby - Increase: eastbound left to 200-feet and westbound left to 150-feet
- Westpark @ Weslayan - Increase westbound left to 175-feet and northbound left to 150-feet - $100,000
- Westcott @ Memorial - Add one right turn lane - 50-feet on westbound Memorial - $125,000

## A Long-Term Design Process

This document presents a hybrid between what the public wants, what the models are predicting, and what is possible given planning level costs and right-of-way constraints. It is intended to act as a platform for setting the **groundwork for a vision** that helps to guide the next steps in the **project delivery process**. As such, this outreach and engagement process will help to ensure continuing efforts are made to understand community desires and concerns as segments of this corridor are taken through preliminary design, engineering, programming and ultimately built.

The high-level nature of the study precluded certain elements from consideration when developing a vision for the transportation facilities that would ultimately be built within a given corridor. Some of these elements include:

- A topographic and boundary survey of the entire corridor,
- Detailed examination of sidewalk gaps, and
- An inventory of specific right-of-way needs.

These pieces of additional data will be instrumental to the next steps of any Corridor Studies, involving the completion of preliminary engineering plans that refine the Vision of the transportation facilities presented in this report. This refinement will be based upon engineering principles that are established throughout the City to ensure that the facilities designed for the corridor are safe, well-constructed, drain properly, and ultimately meet the needs of the traveling public.

The City of Houston has developed a **Capital Improvement Plan Process for Infrastructure Projects** that ultimately guides the development of all capital projects. This guiding document highlights the steps needed to move any of the project recommendations from this report forward. The preliminary engineering and environmental clearance phase of a given project, and subsequent detailed design phases for selected segments, will require additional efforts be taken to coordinate with landowners, businesses, and residents throughout the corridor. There are several discussion topics that should be included within this phase of effort, some of which are governed by local, state, and federal statutes depending upon the segment of the corridor that is being designed.

The governing laws and local regulations that encapsulate the regulatory environment associated with transportation facilities are constantly evolving, as new techniques and information pertaining to a project's impact become available. This document will not attempt to recreate the exact requirements that will be necessary for approvals during the preliminary engineering and environmental clearance phase of the project development process. Rather, this report will highlight additional coordination steps that will help to ensure that there is a common understanding of the benefits and drawbacks associated with the proposed design options. This will also serve to facilitate a discussion about project sequencing and construction.

Some of the items to be discussed during the **Design Phase** of the development process include:

- Site Specific design considerations such as Driveway Modifications/Closures
- Drainage and Ponding Considerations
- Median Opening Locations
- Trip Generation and Planned Redevelopment
- Cross and Shared Access Agreements
- Modifications to the Pedestrian Crossings
- Construction Sequencing

Ultimately, these topics will drive the recommendations that are designed as a part of the final design process, and a review of these elements is critical at each design stage for each segment of the corridor under consideration.

The final design process should take into account specific construction needs and phasing for the corridor, allowing for minimal disruption of local businesses and residents while maintaining a safe construction zone for the traveling public. In most cases, it will not be possible to completely work around the considerations of all of the local businesses. However, efforts to make accommodations should be reasonably attempted in order to minimize the construction impacts upon the local business fabric. Certain times of the year may prove better for construction than others for a significant portion of the corridor, and identifying those construction seasons early in the design process should help to set expectations and define alternatives.

Public open house #1

Public open house #1

# Community Involvement

Ongoing community and stakeholder involvement throughout the planning process was essential to ensure that the mobility goals and objectives considers the local values, preferences and desires. The community involvement included a combination of public meetings and stakeholder meetings to generate feedback on mobility issues and solutions within the Inner West Loop Study Area. Through this process, feedback was received from numerous citizens and stakeholders to guide and direct this Plan in the direction that it needed to go. The success of this plan is enhanced by the continued engagement by the citizens and stakeholders of the area.

A series of **5 meetings** occurred throughout the planning process:

- A community meeting at the beginning of the process to collect input regarding existing mobility issues within the Study Area,
- A stakeholder meeting at the beginning of the process to review the mobility issues expressed by the public and to refine the mobility objectives and solutions that are appropriate for the area,
- A second stakeholder meeting to discuss the outcomes of the specific mobility solutions, and lastly,
- A second community meeting to present the public with a draft recommendation and collect additional input

## Public Meeting #1: March 29, 2012

The first public meeting was held on March 29th, 2012 in which 42 attendees were present from the general area. A presentation was given to identify the purpose of the project to identify the role of the community in steering this project. A number of maps were presented to allow for specific area comments and comment cards were provided to allow for more general feedback on mobility issues in the area. A summary of the comments are shown in **Table 1**.

## Table 1: March 29 Public Comments



| Comment | Project Interest | Primary Area of Focus: | What Works Well | What Needs Improvement | What is Lacking | Additional comments |
|---|---|---|---|---|---|---|
| 1 | Property Owner/ Resident | Pedestrian | High Speed traffic on Montrose. | Sidewalks - reconstruct without roadway improvements. My neighborhood roads Kyle @ Woodrow | Independent assessment of sidewalk conditions in Montrose | Problems with commercial parking encroachment on sidewalk Timms Wine Bar Oakley & Kyle. Cut through traffic from east on Woodrow/& Oakley endanger walkers in neighborhood. |
| 2 | Property Owner/ Resident | Auto/ Pedestrian | Metro buses | Sidewalks - south side Westheimer between Mid Lane and West Loop | Traffic control - especially in Highland Village | Utility poles - visual pollution Centerpoint boxes impede ped. Traffic on /Mid / Westheimer (south) and Westheimer / Suffolk (north side) |
| 3 | Property Owner/ Business Owner/ Resident | Auto | There is no consistency<br>Go to Dallas and observe traffic signals | • Traffic signal upgrades - left turn signals needed at Willowick/San Felipe; Shepherd/San Felipe; Shepherd/Westheimer; Shepherd/Alabama; West Gray/Waugh<br>• Vermont St from Shepherd to Dunlavy: There is no need for 90% of the left turn signal to be green on arrow only.<br>• Southbound Shepherd @W. Gray is a perfect example of the continuous back-ups.<br>• Shepherd Dr. from US 59 to Memorial is a disaster.<br>• Left turn banned at Richmond, Alabama, Westheimer & Fairview- these should have allowable left turn in both directions.<br>• Traffic lights necessary on Waugh/Commonwealth between Westheimer & W. Gray<br>• Traffic Signal not timed on Westheimer between IH 610 & Montrose<br>• There is enough ROW to add left turn lanes on Shepherd between W. Dallas & US 59 and Westheimer between Kirby & Buffalo Speedway. | Dedicated left lane turn signals (cut into the esplanades on Richmond, Memorial Dr, Kirby north of San Felipe. Look at memorial at Ashbury near Starbucks in rush hour.<br>Houston is flat - most streets are straight and sightlines are evident. | No U-turns on Richmond - unnecessary at Newcastle |
| 4 | Property Owner/ Resident | Pedestrian | Transit, Alabama reverse lane, Kirby Drive, Alabama, Westheimer | San Felipe rail crossing median is ugly. Use Montrose over 59 as a model. Better standards for underground utility street patching | Sidewalks gaps Wheelchair ramps Bus pads in curb lanes or all concrete pavement curb to curb. | Put bike lanes on local & collectors not busy thoroughfares. Pavement condition map does not ring true. TIP map is very hard to read - redo legend |
| 5 | Bike Commuter | Bicycle | | Critical lack of connectivity across 610 to Uptown District and Tangelwood. Railroad crossings rough. Bridges over Bayou require extreme level biking skill and temprament. Waugh and Shepherd | | |
| 6 | Other | Pedestrian/ Transit | | Transit routes have good coverage but need greater frequency. Even if with smaller buses. | Need to do sidewalk assessment and fix and build where needed - separate from street work | |
| 7 | Other | Auto/ Bicycle | Bike lane | Bike lane | | |
| 8 | Property Owner/ Resident | Pedestrian | | Ped access to Buffalo Bayou from south Allen Pkwy is huge barrier. Allen Pkwy Village is fenced off. | | |
| 9 | Property Owner | | | The ability to see everyones comments/input and respond/agree/disagree to them | | Use Facebook to gather and post comments and let people like and comment on them |
| 10 | Resident | | Sunday morning @ 8:00a traffic flow is outstanding on Westheimer, Richmond & San Felipe - every day should be Sunday morning!! | Richmond Ave Weslayan to Railroad is in terrible condition. Train crossing on Richmond, Westheimer, San Felipe creates terrible traffic jams (east & west) at all hours of the day | | Traffic police @ Highland Village creates traffic jam late in afternoon & one day will cause a train/car accident |
| 11 | Resident | Bicycle/ Pedestrian/ Transit | Enjoy small stores, small parking lots, permitting density | Traffic calming & improved sidewalks so people feel SAFE taking advantage of the walkability of this area. Improved flooding management would be good - is my neighborhood an unofficial detention pond? | Speed humps; sidewalks; traffic calming; "NO THRU TRUCKS", SPEED, and parking (NO BLOCKED SIDEWALKS) enforcements | Thanks for your good work - |
| 12 | Property Owner/ Resident | Bicycle/ Pedestrian/ Transit | | City's interaction with CenterPoint should be improved to prevent placement of poles in middle of sidewalks and handicap ramps | Bike trail connection from Mkt into Memorial Park. Local transit option on Washington Avenue | I hope the outcome of this study will be to encourage the City to adopt a complete streets policy |
| 13 | Property Owner | | Since Mayor Parker is planning on promoting better mobility in the inner loop- I would like to know how much effort / resources will be placed on improving the current awful state of our roads. I believe this is a pivotal point because if you pay attention, many pot holes slow traffic considerable. We all want to go over them as slowly as possible to minimize damage to our cars and tires- thereby creating congestion. | | | |
| 14 | Property Owner | Pedestrian | During the times of day I travel the area streets, traffic flow along the major streets; e.g., Westheimer, West Alabama & Richmond, West Gray, all flow nicely. Seems like the no turn intersections coupled with well-timed signal lights is great. | I cannot access public transportation in my powerchair. The bus stops are within 2 blocks of my home. While there are ample handicap ramps from sidewalks to the streets, neither the sidewalks can be used nor can one get from the ramp to the street. Over the years, patching to the streets has caused a trough so deep between the sidewalk ramp and the street that no wheeled chair, powered or manual, can get across. Therefore, I must drive everywhere and haul my chair with me whereas, if even a small area were ADA accessible, I could do most of my errands via public transit. | | 1. Calling 311 doesn't work to report sidewalks. They insist that sidewalks are the owner's responsibility and report it to the HOA. There is no HOA. I live at 408 Avondale St. 77006.<br>2. You may be able to get handicap demographics by contacting Social Security<br>3. Making small maps available online and notifying everyone in the West Loop Study Area how to access them for printing would enable interested parties to print and pass out these proposed maps to pedestrians and bicyclists to mark with problems and return. |

## Stakeholder Meeting #1: May 9th, 2012

The first stakeholder meeting was held on May 9th to review the feedback on mobility issues and challenges that was gathered during the public meeting. The purpose of this meeting was to engage stakeholders in a conversation about the Study Area, existing conditions, future conditions, and potential solutions to help alleviate some of the anticipated congestion in the area which, today, is already at a degraded levels.

Feedback regarding the presentation given was not anticipated during the allotted time of the meeting, and instead was expected only after committee members had presented the provided materials to related constituents. To assist in conveying the overall purpose of the project, six questions were developed to help guide the conversation in a manner that is beneficial to the outcomes of the project.

These questions were:

1. Based on the current Houston Thoroughfare Plan, are roadways properly classified?
2. Where transit trips are most needed? How should transit trips be viewed?
3. What objectives should be carried forward and highlighted by this plan?
4. Where should truck routes be allotted? How can truck access be enhanced in terms of local streets?
5. Should we fix congestion issues if we are trying to encourage people to change the way they are doing things?
6. How should parking be evaluated in terms of congestion and transit use? Where is parking conceived as vital and why?

## Stakeholder Meeting #2: July 25th, 2012

The second stakeholder meeting was held on July 25th to review the mobility solutions that had been developed as a part of the Inner West Loop Study. The purpose of this meeting was to engage stakeholders in a conversation about the Study Area, future conditions, to develop a list of priorities for the corridors based on the projected traffic needs and non-motorized transportation options within the network.

Acknowledging that complete, innovative street treatments would not be ideal for many of the corridors throughout the Study Area because of the **costs associated with completely reconstructing the roadways,** participants were encouraged to think outside the box for corridors at highly degraded level of service, particularly corridors with right-of-way constraints.

Stakeholder meeting #2

Stakeholder meeting #2

The second stakeholder meeting also highlighted some of the big ideas that were developed throughout the planning process. Many ideas that were put forward by members of the public, the technical team, or the stakeholders were met with immediate fatal flaws, however, some of the ideas held significant merit and could be achieved over a long-term planning horizon. A few of those **Long-Term Planning Topics** include:

- Frequent High Capacity Transit on Westheimer
- Urban Interchange at Shepherd/Memorial/Allen
- Reconfigured West Alabama
- On-Street Bike connections to Bayou Trails

## Stakeholder Meeting #3: Nov. 27th, 2012

The third stakeholder meeting included a review of the draft Report and Recommendations that were going to be presented at the Public Meeting in December of 2012. The stakeholders provided commentary on the written report, reviewed the concepts for the project corridors, and provided feedback on the project findings.

## Public Meeting #2: Dec. 12th, 2012

The purpose of Public Meeting #2 was to illustrate the findings of the study and validate that the overall findings and project concepts that have been developed throughout this study. The participants were shown a variety of concepts ranging from:

- System-wide analysis of the transit, roadway, and bicycle options
- Design Concepts without the benefit of detailed survey and ROW constraints
- Specific needs that have been identified within the corridors such as sidewalk gaps and ADA compliant access ramps
- Intersection improvements for locations where preliminary level right-of-way analysis would allow it
- Intersection level improvements including costs and prioritization

These concepts were all validated with the Stakeholder Group in advance of being shown to the public, and are intended to be the ideas set forth by this plan. The information that follows describes

- The manner in which those concepts were developed.
- What the future needs will be for the overall transportation network.
- What the overall recommendations are to provide a Multi-Modal network of streets that meets the needs of the traveling public.

The following is a summary of the public comments that were received regarding the concepts presented.

**Additional Text/Images to be added after Public Meeting is held**

# Defining Future Mobility Conditions

## Travel Demand Forecasting

The City of Houston and the Houston-Galveston Area Council (H-GAC), through an inter-local agreement, conducted the travel demand forecasting within the Study Area. The Travel Demand Model (the model) is a useful tool for comparing alternative scenarios within a given planning horizon and understanding the manner in which future population and employment growth will cause traffic to grow. The City and H-GAC have undertaken several modeling initiatives similar to the activities undertaken during this study to better understand the dynamics of the overall network and the manner in which infrastructure modifications might affect the overall system.

The City, H-GAC's forecasters, and the consultant team determined that an update to the baseline demographic information would prove useful.. Additionally, modifications were made to the interim year, 2018, and forecast year, 2035, demographic forecasts based on information pertaining to existing building permits, development trends, and traffic studies as they relate to density and land value within the Study Area.

These updated demographic forecasts projected significantly more growth within the Inner West Loop Study Area than was previously forecasted. This type of redevelopment is not at all uncommon as the price of available land, and infrastructure continues to rise, the concentration of higher density development near a major Urban Center becomes more and more feasible from the market perspective.

This updated demographic information was then processed using a scenario approach within the existing H-GAC travel demand forecasting methodology, and results were produced based on the existing network assumptions for each of the model years. Each of the network scenarios developed utilized the same baseline demographic information to ensure that the comparison between the network alternatives would be an even comparison.

## Forecast Results - How to Apply the Projections

Travel Demand Forecasting is less science and more art. Interpreting the results of the model is subject to perspective and understanding of the overall network conditions. Another consideration within the travel demand model limitations, is the inability to assess the impacts of bicycle and pedestrian improvements.

In the case of the Inner West Loop Study, the study team created and reviewed a number of modeling scenarios of the network to determine what amount of congestion could be projected for each of the scenarios. The network alternatives included:

- Options for increased transit availability,
- Reconfigured regional highway connections, and
- The creation of a direct interchange at the Memorial/Allen Pkwy/Shepherd/Kirby intersection.

These improvements were analyzed individually to allow for a comparison between the different concepts. Ultimately, a combined scenario was developed that included greater transit availability and the revised urban interchange. The regional highway reconfiguration was found to not affect travel patterns within the Study Area, and therefore were precluded from further analysis in this study effort. That is not to say that they lacked validity, rather that their impact was broader in scope.

Given the saturation of congestion that is forecast to exist within the Study Area by 2035, it is important to examine the latent demand aspects of any alternative improvements that are analyzed. Latent demand exists throughout the regional network that bounds this Study Area by 2035, and as such capacity improvements that are made within the travel demand forecast seem to cause worse traffic than previously forecasted. This is not likely to occur in a broad sweeping fashion, but rather a result of the model's assessment of the overall need for additional capacity throughout the area and along the regional highway network that bounds the Study Area.

## Development of Future Intersection Conditions

The traditional traffic engineering approach for growing traffic volumes across a network of streets is to simply start from a point in time at which intersection-specific information is collected, and then grow the volumes at a consistent growth rate over the planning horizon. The largest challenge to this approach - within a study area of this larger size - is that over time redevelopment and traffic patterns shift causing the steady rate of growth to be over/under estimated for more localized conditions. By using the existing traffic counts as a baseline, and growing them based upon the growth witnessed in the travel demand model; this study attempts to estimate the future operating conditions at the intersections, which may allow for intersection improvements to be made to meet future needs.

## Analyzing Future Conditions

The general level of congestion within the larger corridors suggests that overall intersection level of service will be severely degraded by 2035. The analysis presented in the following pages (**Figures 10 and 11**) supports that conclusion and presents a few mitigation strategies that might provide limited relief. The map at right illustrates the intersection congestion levels for the AM peak in 2035 based on the growth factors described above.

Figure 10 – 2035 AM Level of Service (LOS)

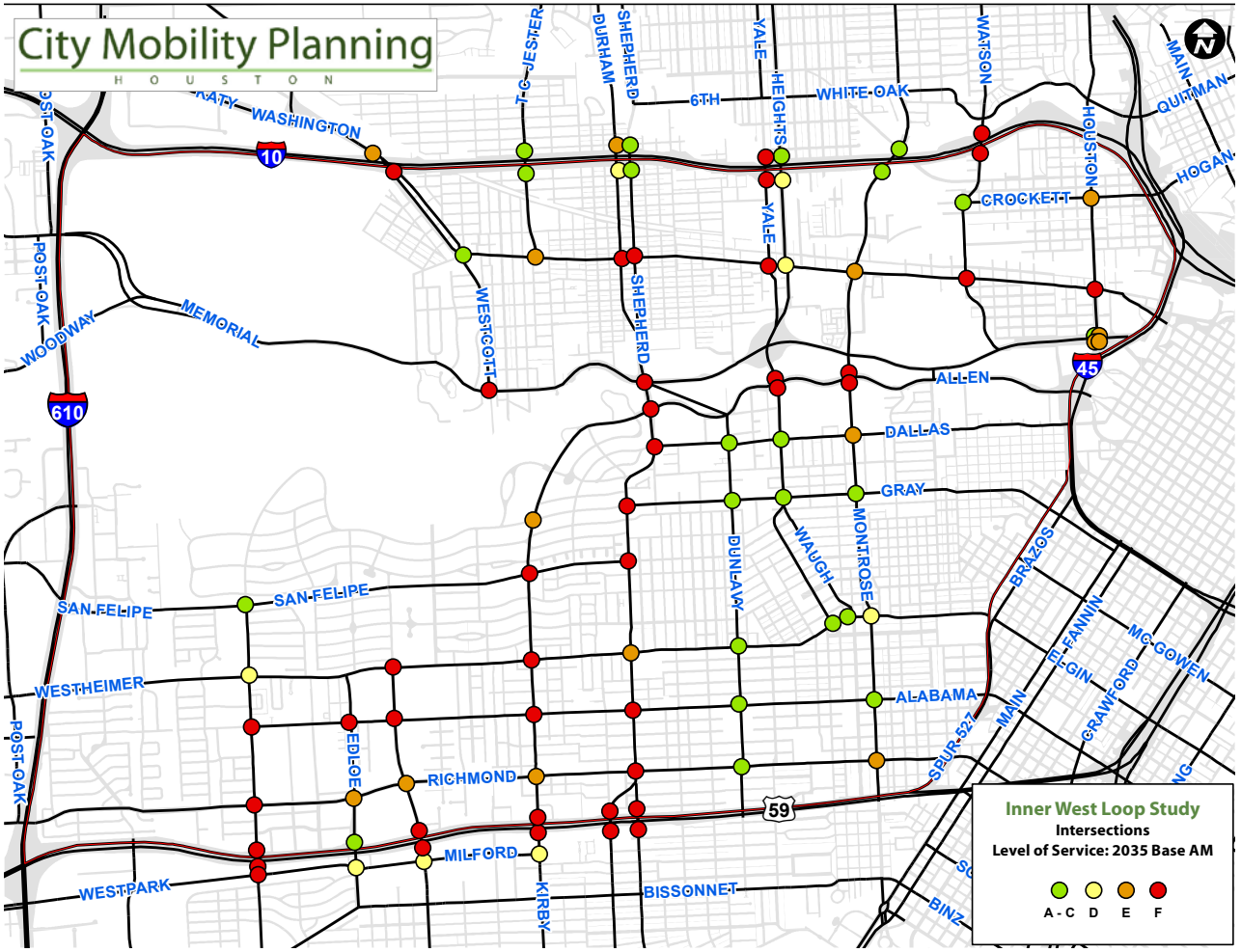
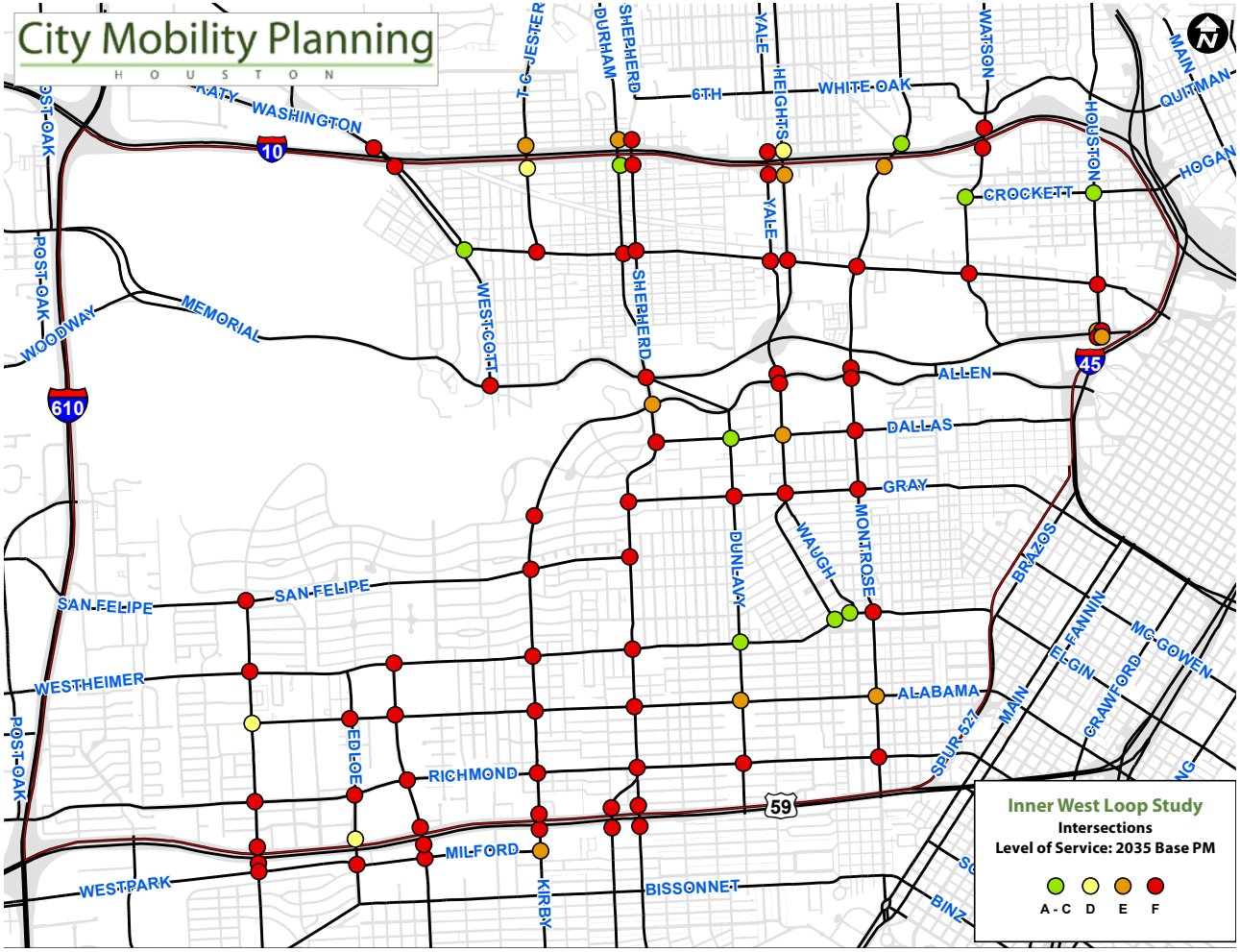


Figure 11 – 2035 PM Level of Service (LOS)




## Summarizing the Future Conditions

The PM peak period shows significantly worse congestion than the AM peak. This is as expected given the percent of daily trips that occur within the PM peak. Additionally, the congestion seems most concentrated around those regional routes that provide access to the Highway system. Interestingly, the areas that are more neighborhood related traffic such as Houston/Crockett and Dunlavy/Westheimer do not experience as much congestion. This is likely due to the nature of the trips, and the limited capacity available from the regional model's perspective.

## Mitigating the Future Conditions

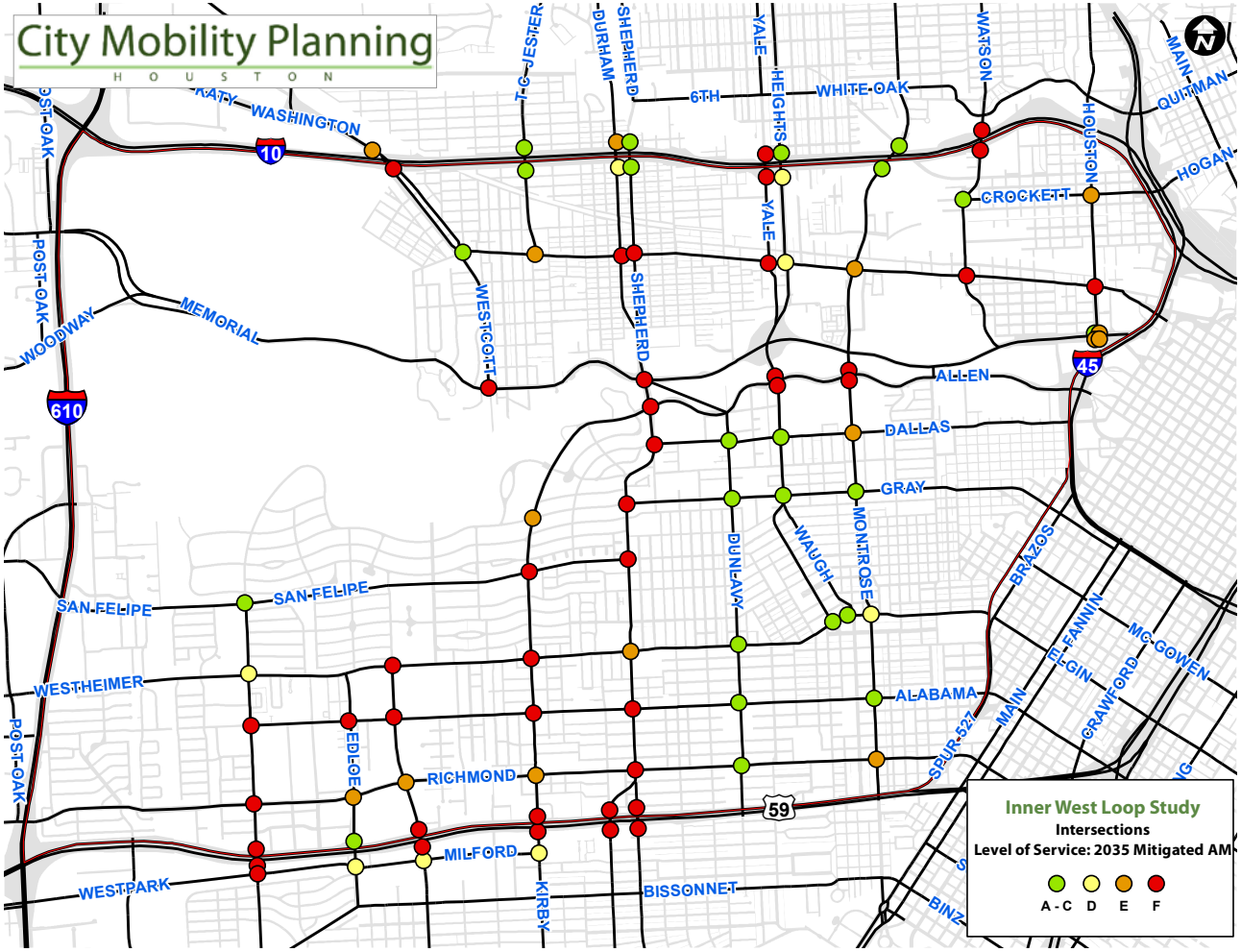
The mitigation opportunities for the 2035 scenario are very likely limited by the existing and proposed available Rights-of-Way for the Inner West Loop corridors. Therefore, it is more than likely that these improvements can be accomplished as part of a corridor-level improvement project with some degree of ROW modifications. Additionally, several of the corridors that are projected to experience peak hour congestion have been already discussed within the Base Year mitigation strategy, but without additional throughput, the intersections will not be able to improve from an operating Level of Service. Planning Level Cost Estimates have also been developed for the intersection improvements. It is worth noting that these costs will be refined in further studies as detailed surveys are conducted to verify the Right-of-Way needs.

## Mitigating the Long-Term Peak Hour Congestion

The intersection improvements listed below have been indicated to increase the operating efficiency during the peak period. The effects of those improvements are not limited to one time period, and as such they are combined for **both the AM and PM Peak Period**.

- I-10 westbound frontage road @ T.C. Jester - Add southbound right turn lane 250-feet - $50,000
- I-10 eastbound frontage road @ Heights - Add northbound right turn lane 150-feet - $30,000
- I-10 eastbound frontage road @ Studemont - Add northbound right turn lane 150-feet - $30,000
- Crockett @ Houston - Create a westbound through/right lane configuration. - $5,000
- Washington @ T.C. Jester - Add One westbound right turn lane 250-feet - $50,000
- Washington @ Heights - Add northbound dual left turn lanes - $75,000
- Washington @ Sawyer - Add southbound left turn lane 150-feet - $30,000
- Memorial @ Houston - Modify eastbound through to a shared through right - $5,000
- Memorial @ Houston - Add northbound right turn lane 250-feet - $50,000

Figure 12 – 2035 Mitigated AM Level of Service (LOS)



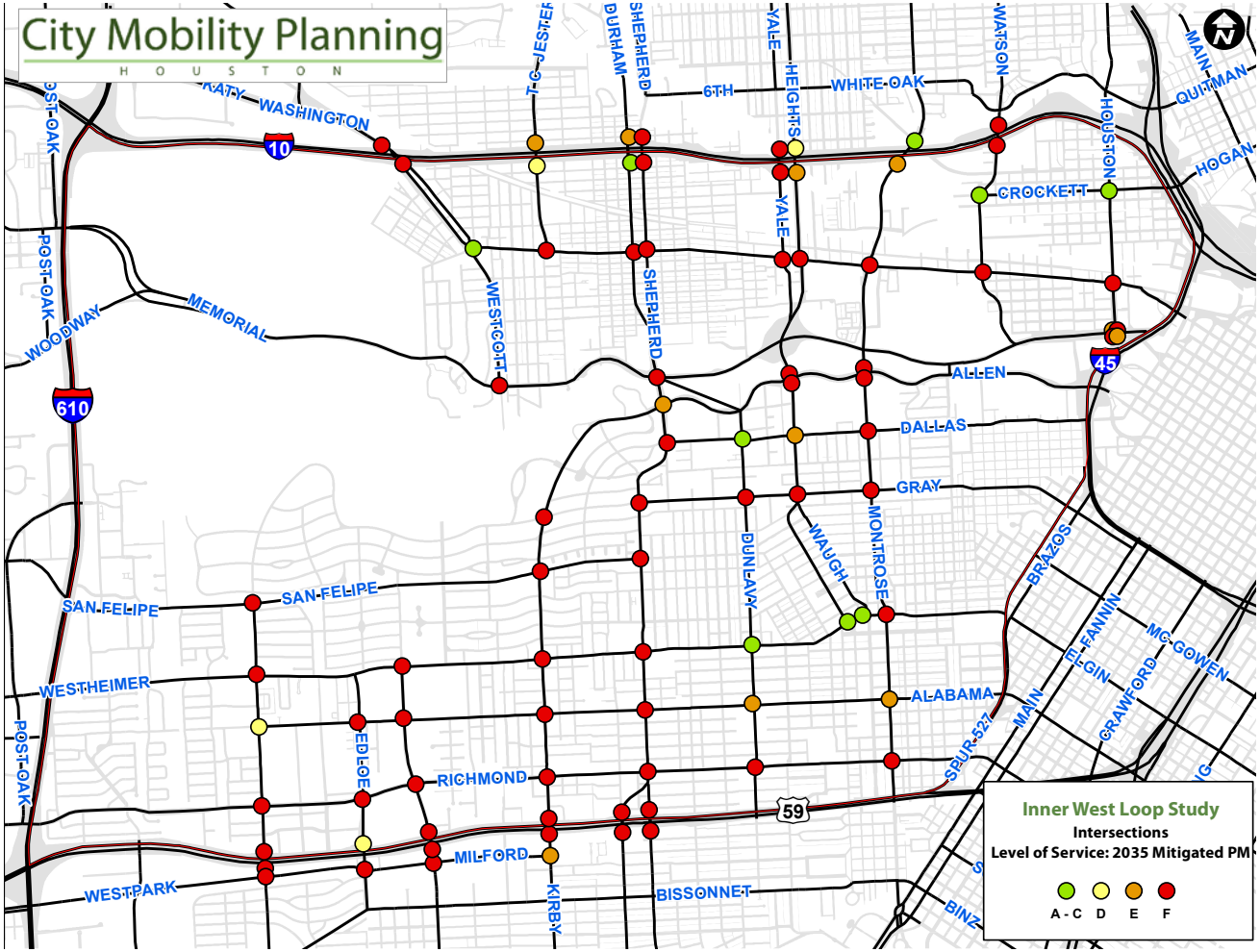



DRAFT

- Dallas @ Shepherd - Add northbound and southbound right turn lanes 150-feet - $60,000
- Dallas @ Waugh - Add eastbound left turn lane 150-feet and add westbound left turn lane 150-feet - $60,000
- Dallas @ Montrose - Add westbound right turn lane 150-feet - $30,000
- Inwood @ Kirby - Add northbound and southbound right turn lanes 150-feet - $60,000
- Cypresswood @ Kirby - Add southbound right turn lane 300-feet - $60,000
- Reconstruct the Interchange of Memorial/ Shepherd/Allen Pkwy./Kirby - Cost TBD

.

Figure 13 – 2035 Mitigated PM Level of Service (LOS)



# A Balanced Approach

## Considering All Users of the System

Given the limited Right-of-Way, the need for improvements in the pedestrian realm, the existing and projected traffic congestion, and the desire to create a Multi-Modal network of transportation options within the study area; the planning process for the Study Area blended the expressed desires, with engineering analysis, and transportation system analysis to provide the projects and corridor concepts that follow in the Report.

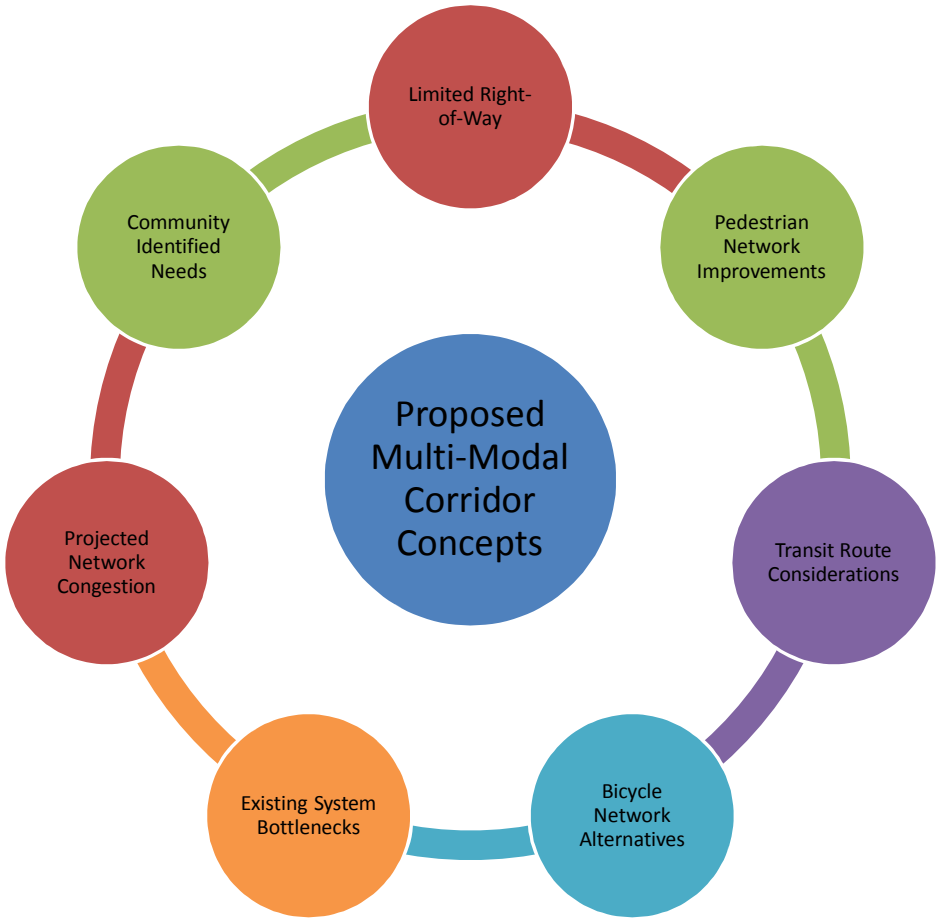
The following pages highlight a shift in the manner in which transportation can be viewed within the Study Area by promoting alternative transportation options, prioritizing improvements for specific corridors and locations, and examining the opportunities for connections to transportation options outside of the City's current Right-of-Way.

There are multiple components to planning for infrastructure needs within the Study Area. Those include but are not limited to:

- Understanding the needs of the community,
- Developing a plan that responds to development trends,
- Examining the travel demand model results,
- Prioritizing corridors for specific users,
- Correcting gaps within the transportation network, and
- Creating/Revising policies as appropriate.

These components were examined throughout the Inner West Loop Study, and the recommendations shown in the pages that follow are preliminary in nature. There has not been an examination of the engineering specifics for each of these solutions given the focus of this effort, however that will be needed moving forward.

The ideas presented will be refined through further analysis at the intersection, corridor, system-wide level before moving into final design and construction. The process for developing those more detailed plans has been discussed previously within this document and will follow the City of Houston's **Capital Improvement Plan Process for Infrastructure Programs**.



# A Changing Paradigm

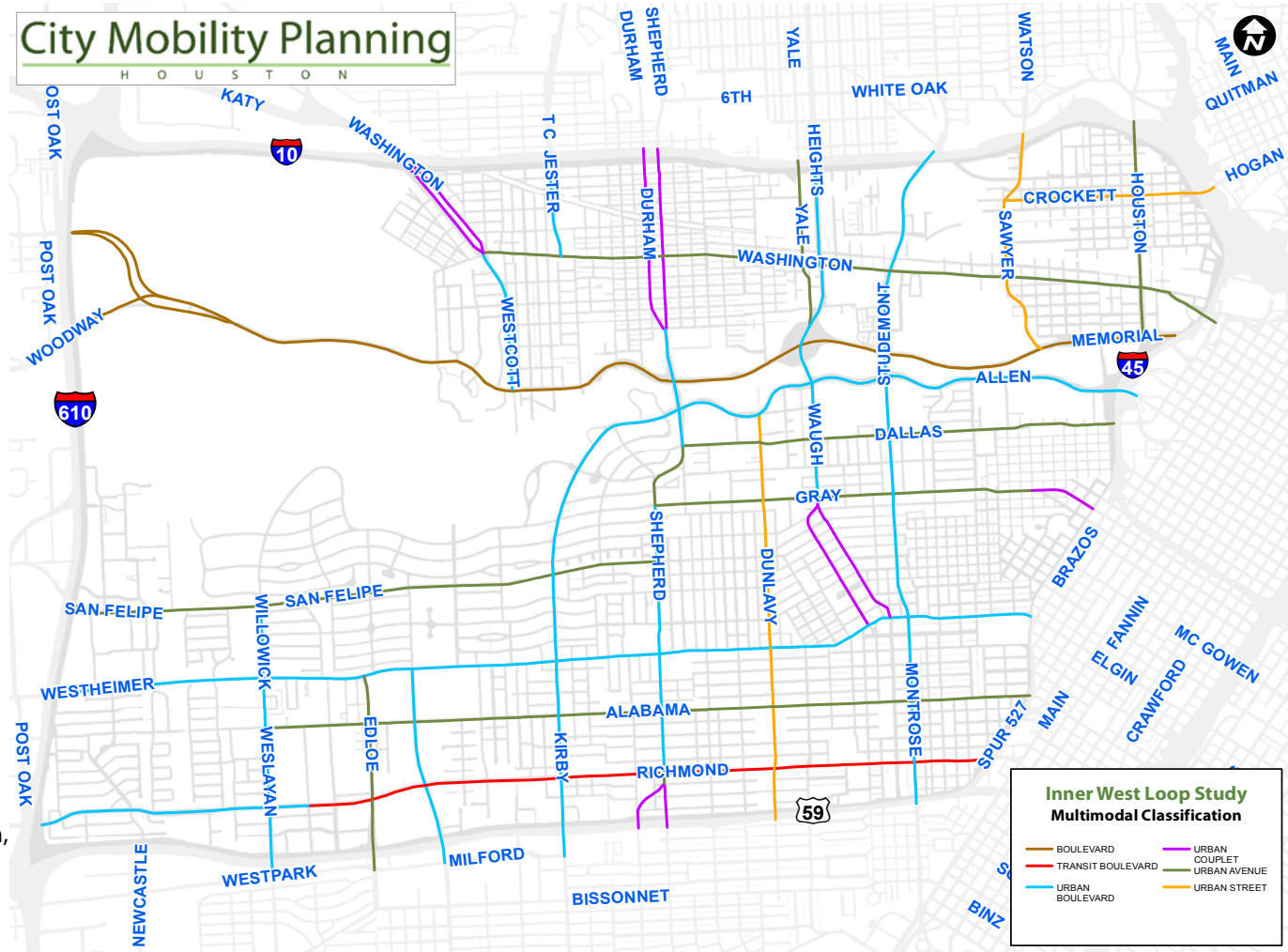
## Addressing the Mobility Challenge

During **Phase One** of the City Mobility Planning initiative, the City of Houston contemplated the concept of providing Multi-Modal transportation options within a corridor planning exercise. That conversation led to the development of the alternative design standards that are located within **Appendix 2 of Chapter 10** of the **Infrastructure Design Manual**. These alternative cross-sections provide for a myriad of design configurations, providing options within the transportation network other than an automobile.

The City recognizes that automobile travel will still continue to be a vital component of transportation within the region, and especially in areas with large clusters of jobs and population. However, there is a need to shift the approach for planning corridors in heavily congested sectors of the City. The Inner West Loop Study Area is projected to see severe congestion throughout various corridors, especially as more and more people try to access the regional highway network that surrounds the Study Area.

Increased density, population and employment growth, exacerbated by the continued need to provide viable access and circulation for continued growth, requires discussion of these corridor to move beyond Major and Minor Arterials, and into the definition of Multi-Modal Streets. The graphic at right (**Figure 14**), and the descriptions on the following pages highlight that transition within the Study Area.

Figure 14 – Proposed Multi-Modal Classification



## Defining the Priority Elements

The creation of a Multi-Modal Street network requires a balance of competing considerations throughout the entire network, rather than focusing on implementing all modes within a single corridor. Oftentimes, those streets that serve a heavy vehicular focus are not the best candidate for high-quality bicycle facilities given limited ROW and higher vehicle volumes/ speeds. Similarly, transit vehicles are often desired in context with bicycle facilities, however, providing complementary and intersecting routes often increases the reach of transit. Quality, continuous sidewalk facilities are critical throughout this densely developed area, however, the allocation of space needs to be in balance with the needs of the cycling community given the limited ROW

Recognizing the need for this balanced approach, the Inner West Loop Mobility Study examined the needs for each mode independently, and then overlayed those needs on one-another to identify gaps within the system, overlapping complementary concepts, and overlapping conflicts given the limited ROW. These concepts were then examined within the design concepts currently available within the Infrastructure Design Manual to arrive at the proposed Multi-Modal Street Classifications highlighted on the pages that follow.

The table on the next page provides a summary of each of the corridors that are currently classified under the existing MTFP. The table highlights several elements that were examined to fom the recommendations. A summary of those elements and how they were examined follows.

***Automobile***

The continued provision of adequate vehicular capacity continues to be paramount to providing access and mobility within the study area.

***Transit***

Promoting transit use will help to off-set some of the ROW constraints by increasing the person carrying capacity of the corridor.

***Pedestrian***

Promoting park-once areas, access to transit, and local trip options through pedestrian facilities helps to curb peak-hour traffic and provides connectivity within the transportation network.

***Bicycle***

Increases the reach of transit services, promotes non-motorized transportation options, can be used for reacreation and commuting alternatives.

***ADA Access***

Highlights corridors where additional attention to ramps and street crossings that are in compliance with the American with Disabilities Act.

***Existing MTFP Classification*** - examines the current functional use designation and the ROW.

***Existing Average Daily Traffic*** - details the daily traffic needs within the corridor.

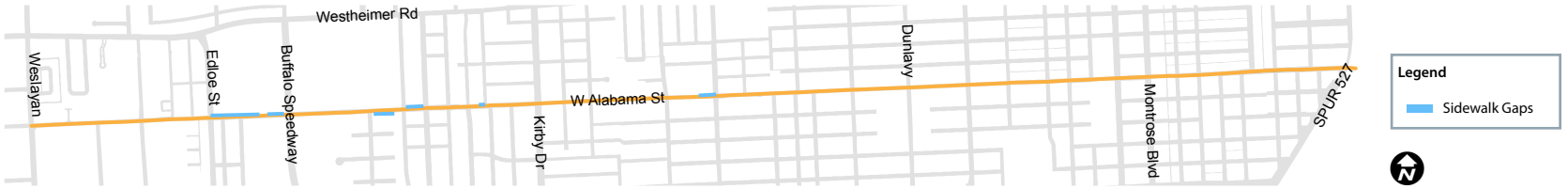
***Projected Average Daily Traffic*** - highlights anticipated needs for vehicular capacity.

***Proposed MMC*** - resulting proposed sub-classification based on all of the above inputs, and the facility types that were defined in **Phase 1 of the City Mobility Planning Process.**

| STREET NAME | FROM | TO | MTFP FUNCTIONAL CLASS | MTFP ROW | ADT | MMC | 2035 ADT | Bike Facility | Parking | Transit | Ped Realm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ALABAMA | SHEPHERD | WESLAYAN | MAJOR COLLECTOR | 70' | 10,500 | URBAN AVENUE | 25,800 | X | | | X |
| ALABAMA | SPUR 527 | SHEPHERD | MAJOR COLLECTOR | 60' | 8,900 | URBAN AVENUE | 24,000 | X | | | X |
| ALLEN | WAUGH | SHEPHERD | MAJOR THOROUGHFARE | 105' | 10,500 | URBAN BOULEVARD | 10,300 | | | | X |
| ALLEN | IH 45 | WAUGH | MAJOR THOROUGHFARE | 105' | 16,600 | URBAN BOULEVARD | 16,200 | | | | X |
| BUFFALO SPEEDWAY | WESTHEIMER | WESTPARK | MAJOR THOROUGHFARE | 100' | 17,400 | URBAN BOULEVARD | 31,200 | | | | X |
| COMMONWEALTH | GRAY | WESTHEIMER | MAJOR COLLECTOR | 80' | 5,800 | URBAN COUPLET | 15,500 | X | X | | X |
| CROCKETT | SAWYER | HOUSTON | MAJOR COLLECTOR | 70' | 3,000 | URBAN STREET | 11,900 | X | X | | X |
| CROCKETT | HOUSTON | IH 10 | MAJOR COLLECTOR | 70' | 6,300 | URBAN STREET | 12,300 | X | | | X |
| DALLAS | IH 45 | MONTROSE | MAJOR COLLECTOR | 60' | 9,100 | URBAN AVENUE | 13,800 | X | | | X |
| DALLAS | MONTROSE | SHEPHERD | MAJOR COLLECTOR | 60' | 10,000 | URBAN AVENUE | 15,500 | X | | | X |
| DUNLAVY | ALLEN | WESTHEIMER | MAJOR COLLECTOR | 60' | 13,600 | URBAN STREET | 22,500 | | X | | X |
| DUNLAVY | WESTHEIMER | US 59 | MAJOR COLLECTOR | 60' | 9,300 | URBAN STREET | 21,400 | | X | | X |
| DURHAM | IH 10 | DICKSON | MAJOR THOROUGHFARE | 60' | 23,900 | URBAN COUPLET | 33,900 | | | | X |
| EDLOE | WESTHEIMER | RICHMOND | MAJOR COLLECTOR | 80' | 7,100 | URBAN AVENUE | 16,500 | | | | X |
| EDLOE | RICHMOND | WESTPARK | MAJOR COLLECTOR | 105' - 200' | 11,900 | URBAN AVENUE | 35,000 | | | | X |
| FARNHAM/ SHEPHARD | SHEPHERD | 59 | MAJOR THOROUGHFARE | 80' | 23,500 | URBAN COUPLET | 40,300 | | | X | X |
| GRAY | MONTROSE | SHEPHERD | MAJOR THOROUGHFARE | 60 | 11,000 | URBAN AVENUE | 17,900 | | | | X |
| GRAY | TAFT | MONTROSE | MAJOR THOROUGHFARE | 70' | 8,000 | URBAN AVENUE | 12,300 | | X | | X |
| GRAY | BAGBY | WILSON | MAJOR THOROUGHFARE | 80' | 10,000 | URBAN COUPLET | 13,500 | | X | | X |
| HEIGHTS | WASHINGTON | ALLEN | MAJOR THOROUGHFARE | 130' | 26,900 | URBAN BOULEVARD | 26,200 | X | | | X |
| HEIGHTS | IH 10 | WASHINGTON | MAJOR THOROUGHFARE | 150' | 13,900 | URBAN BOULEVARD | 18,900 | X | | | X |
| HOUSTON | IH 10 | WASHINGTON | MAJOR THOROUGHFARE | 100' | 13,300 | URBAN AVENUE | 22,300 | X | X | | X |
| HOUSTON | WASHINGTON | MEMORIAL | MAJOR THOROUGHFARE | 100' | 13,100 | URBAN AVENUE | 20,000 | X | X | | X |
| KIRBY | WESTHEIMER | RICHMOND | MAJOR THOROUGHFARE | 100' | 14,600 | URBAN BOULEVARD | 36,600 | | | | X |
| KIRBY | SHEPHERD | SAN FELIPE | MAJOR THOROUGHFARE | 100' - 105' | 19,600 | URBAN BOULEVARD | 34,400 | | | | X |
| KIRBY | SAN FELIPE | WESTHEIMER | MAJOR THOROUGHFARE | 100' | 13,000 | URBAN BOULEVARD | 27,700 | | | | X |
| KIRBY | RICHMOND | WESTPARK | MAJOR THOROUGHFARE | 100' | 18,700 | URBAN BOULEVARD | 38,800 | | | | X |
| MEMORIAL | WOODWAY | IH 610 | MAJOR THOROUGHFARE | 60' | 14,500 | BOULEVARD | 14,000 | | | | |
| MEMORIAL | WESTCOTT | WOODWAY | MAJOR THOROUGHFARE | 120' | 23,000 | BOULEVARD | 28,100 | | | | X |
| MEMORIAL | SHEPHERD | DETERING | MAJOR THOROUGHFARE | 120' - 200' | 23,000 | BOULEVARD | 34,000 | | | | X |
| MEMORIAL | IH 45 | SHEPHERD | MAJOR THOROUGHFARE | 120' | 31,400 | BOULEVARD | 31,500 | | | | X |

| STREET NAME | FROM | TO | MTFP FUNCTIONAL CLASS | MTFP ROW | ADT | MMC | 2035 ADT | Bike Facility | Parking | Transit | Ped Realm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MEMORIAL | DETERING | WESTCOTT | MAJOR THOROUGHFARE | 120' - 200' | 20,800 | URBAN BOULEVARD | 28,000 | | | | X |
| MONTROSE | WESTHEIMER | US 59 | MAJOR THOROUGHFARE | 90' | 15,500 | URBAN BOULEVARD | 20,900 | | | X | X |
| MONTROSE | DALLAS | WESTHEIMER | MAJOR THOROUGHFARE | 100' | 14,800 | URBAN BOULEVARD | 9,000 | | | X | X |
| MONTROSE | ALLEN | DALLAS | MAJOR THOROUGHFARE | 80' | 10,000 | URBAN BOULEVARD | 9,700 | | | X | X |
| RICHMOND | SPUR 527 | KIRBY | MAJOR THOROUGHFARE | 80' | 14,700 | TRANSIT BOULEVARD | 44,300 | | | | X |
| RICHMOND | KIRBY | CUMMINS | MAJOR THOROUGHFARE | 120' | 19,000 | TRANSIT BOULEVARD | 69,400 | | | | X |
| RICHMOND | WESLAYAN | IH 610 | MAJOR THOROUGHFARE | 120' - 150' | 24,700 | URBAN BOULEVARD | 71,200 | | | | X |
| RICHMOND | CUMMINS | WESLAYAN | MAJOR THOROUGHFARE | 120' | 22,300 | URBAN BOULEVARD | 52,900 | | | | X |
| SAN FELIPE | KIRBY | WILLOWICK | MAJOR THOROUGHFARE | 60' | 11,800 | URBAN AVENUE | 26,600 | | | | X |
| SAN FELIPE | SHEPHERD | KIRBY | MAJOR COLLECTOR | 60' | 5,700 | URBAN AVENUE | 17,700 | X | | | X |
| SAN FELIPE | MID LANE | IH 610 | MAJOR THOROUGHFARE | 60' - 102' | 23,300 | URBAN AVENUE | 30,000 | | | | X |
| SAN FELIPE | WILLOWICK | MID LANE | MAJOR THOROUGHFARE | 60' - 102' | 20,200 | URBAN AVENUE | 28,900 | | | | X |
| SAWYER | IH 10 | MEMORIAL | MAJOR COLLECTOR | 50'-60' | 6,700 | URBAN STREET | 14,300 | | | | X |
| SHEPHERD | DALLAS | GRAY | MAJOR THOROUGHFARE | 80' | 15,200 | URBAN AVENUE | 24,700 | | | | X |
| SHEPHERD | GRAY | RICHMOND | MAJOR THOROUGHFARE | 80' | 15,400 | URBAN BOULEVARD | 28,300 | | | X | X |
| SHEPHERD | IH 10 | DICKSON | MAJOR THOROUGHFARE | 60' | 24,600 | URBAN COUPLET | 31,500 | | | X | X |
| SHEPHERD | DICKSON | MEMORIAL | MAJOR THOROUGHFARE | 110' | 2,800 | URBAN BOULEVARD | 38,000 | | | X | X |
| SHEPHERD | KIRBY | DALLAS | MAJOR THOROUGHFARE | 105' - 175' | 13,200 | URBAN BOULEVARD | 25,100 | | | X | X |
| SHEPHERD | MEMORIAL | KIRBY | MAJOR THOROUGHFARE | 185' | 3,700 | URBAN BOULEVARD | 46,500 | | | X | X |
| SHEPHERD | RICHMOND | FARNHAM | MAJOR THOROUGHFARE | 70' | 22,200 | URBAN AVENUE | 37,400 | | | X | X |
| SHEPHERD | PORTSMOUTH | US 59 | MAJOR THOROUGHFARE | 60' | 25,700 | URBAN COUPLET | 41,300 | | | X | X |
| STUDEMONT | WASHINGTON | ALLEN | MAJOR THOROUGHFARE | 100' | 16,600 | URBAN BOULEVARD | 26,400 | | | | X |
| STUDEMONT | IH 10 | WASHINGTON | MAJOR THOROUGHFARE | 100' | 10,200 | URBAN BOULEVARD | 15,900 | | | | X |
| T C JESTER | IH 10 | WASHINGTON | MAJOR THOROUGHFARE | 95' | 8,800 | URBAN BOULEVARD | 9,000 | X | | | X |
| WASHINGTON | DURHAM | WESTCOTT | MAJOR THOROUGHFARE | 60' - 70' | 11,900 | URBAN AVENUE | 19,700 | X | X | X | X |
| WASHINGTON | WESTCOTT | IH 10 | MAJOR THOROUGHFARE | 65' | 17,400 | URBAN COUPLET | 29,800 | X | | X | X |
| WASHINGTON | STUDEMONT | YALE | MAJOR THOROUGHFARE | 80' | 14,000 | URBAN AVENUE | 16,800 | X | X | X | X |
| WASHINGTON | HOUSTON | STUDEMONT | MAJOR THOROUGHFARE | 80' | 8,500 | URBAN AVENUE | 14,400 | X | X | X | X |
| WASHINGTON | YALE | DURHAM | MAJOR THOROUGHFARE | 60' | 11,600 | URBAN AVENUE | 14,700 | X | X | X | X |
| WASHINGTON | HOUSTON | IH 45 | MAJOR THOROUGHFARE | 80' | 3,000 | URBAN AVENUE | 8,000 | X | X | X | X |
| WAUGH | ALLEN | GRAY | MAJOR THOROUGHFARE | 100' | 14,500 | URBAN BOULEVARD | 25,400 | X | | | X |

| STREET NAME | FROM | TO | MTFP FUNCTIONAL CLASS | MTFP ROW | ADT | MMC | 2035 ADT | Bike Facility | Parking | Transit | Ped Realm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WAUGH | GRAY | WESTHEIMER | MAJOR COLLECTOR | 60' | 15,800 | URBAN COUPLET | 20,300 | X | X | | X |
| WAUGH | WASHINGTON | HEIGHTS | MAJOR THOROUGHFARE | 60' | 11,800 | URBAN AVENUE | 19,600 | | X | | X |
| WESLAYAN | WESTHEIMER | ALABAMA | MAJOR THOROUGHFARE | 80' | 13,900 | URBAN BOULEVARD | 17,800 | X | | | X |
| WESLAYAN | RICHMOND | WESTPARK | MAJOR THOROUGHFARE | 100' | 19,400 | URBAN BOULEVARD | 29,300 | X | | | X |
| WESTCOTT | WASHINGTON | MEMORIAL | MAJOR THOROUGHFARE | 100' | 6,800 | URBAN BOULEVARD | 19,700 | | X | | X |
| WESTCOTT | IH 10 | WASHINGTON | MAJOR THOROUGHFARE | 150' | 18,400 | URBAN COUPLET | 29,700 | X | | X | X |
| WESTHEIMER | WESLAYAN | IH 610 | MAJOR THOROUGHFARE | 80' | 27,200 | URBAN BOULEVARD | 66,400 | | | X | X |
| WESTHEIMER | BUFFALO SPEEDWAY | WESLAYAN | MAJOR THOROUGHFARE | 80' | 17,200 | URBAN BOULEVARD | 44,500 | | | X | X |
| WESTHEIMER | SHEPHERD | BUFFALO SPEEDWAY | MAJOR THOROUGHFARE | 70' | 11,800 | URBAN BOULEVARD | 36,600 | | | X | X |
| WESTHEIMER | MONTROSE | SHEPHERD | MAJOR THOROUGHFARE | 60' | 10,400 | URBAN BOULEVARD | 29,000 | | | X | X |
| WESTHEIMER | BAGBY | MONTROSE | MAJOR THOROUGHFARE | 60' | 13,000 | URBAN BOULEVARD | 26,800 | | | X | X |
| WILLOWICK | SAN FELIPE | WESTHEIMER | MAJOR THOROUGHFARE | 80' | 14,300 | URBAN BOULEVARD | 25,400 | X | | | X |
| WOODWAY | MEMORIAL | IH 610 | MAJOR THOROUGHFARE | 85' | 14,400 | BOULEVARD | 18,100 | | | | X |
| YALE | IH 10 | WASHINGTON | MAJOR THOROUGHFARE | 70' - 90' | 6,000 | URBAN AVENUE | 15,600 | | | | X |




## Existing Conditions

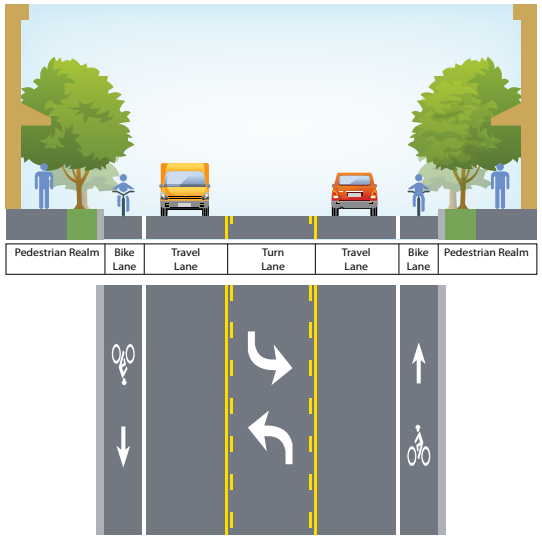
West Alabama currently is constructed as a 3-Lane travelway with sidewalks. The adjacent development orientation shifts from direct access onto the pedestrian realm to larger surface parking lots abutting the street. West Alabama includes an imbalanced lane cross section that allows 2 travel lanes in one direction and 1 travel lane in the opposing direction. West Alabama connects a residential neighborhood near the western edge of the study area, to the downtown grid in a consistent corridor. The travel speeds and volume tends to be less than either of the parallel routes, Westheimer and Richmond, and the overall context stays much more consistent throughout the length of the corridor. West Alabama is currently classified as a **Major Collector** that is in need of additional Right-of-Way between Buffalo Speedway and Shepherd.

## Identified Needs

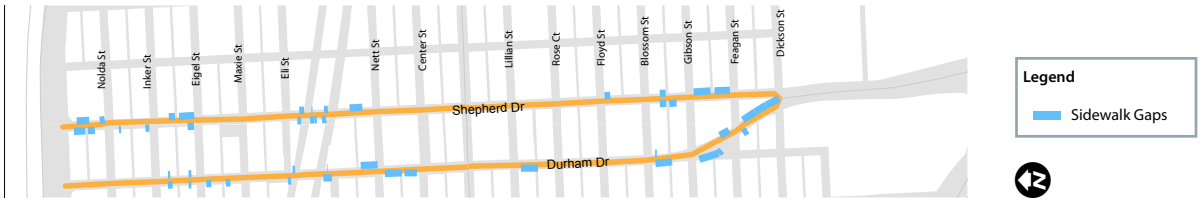
Comments received during the public outreach process suggested several topics for examination along West Alabama. Residents, business owners, and representatives from various governing agencies suggested that West Alabama could be improved through the implementation of bicycle lanes and creating a uniform cross section that allowed for a conversion to a standardized lane configuration. The corridor could also benefit from an improved pedestrian realm and completing the sidewalks where gaps currently exist. The graphics highlight some alternative considerations for West Alabama. Gaps within the sidewalk network have been noted in blue.

## Future Vision

The proposed Multi-Modal Street Classification for West Alabama is an **Urban Avenue**. The corridor is envisioned to serve a local transportation need with less emphasis on through traffic. Construction on an improved corridor that includes facilities for bicycles and completing/improving the pedestrian realm is essential to meeting the overall needs of the Multi-Modal Network within the study area. As redevelopment of smaller parcels occurs, the consolidation of some driveways would help traffic flow along the corridor. In addition, the creation of dedicated turn lanes will be very beneficial to the operation of the intersections.




**Key Factors**




## Existing Conditions

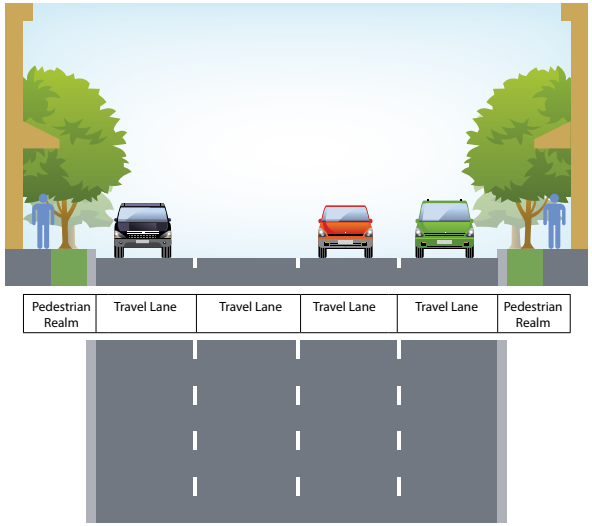
Shepherd and Durham are constructed as a one-way pair north of Memorial. This configuration continues to well beyond the northern limits of the Study Area and a large portion of the traffic within the corridor is regional in nature. As such, the designation as a **Major Arterial** is fitting. The one-way pair nature of this segment of these corridors also allows for additional consideration within the Infrastructure Design Manual pertaining to any on-street parking considerations and alternative cross section options. The current design allows for travel lanes in each direction during the peak hours, with certain areas allowing on-street parking during the off-peak hours for the local businesses. The current sidewalk network sees many interruptions throughout the Shepherd corridor, while the Durham corridor seems to have better overall connectivity. Neither corridor currently provides dedicated areas for cyclists within the travelway.

## Identified Needs

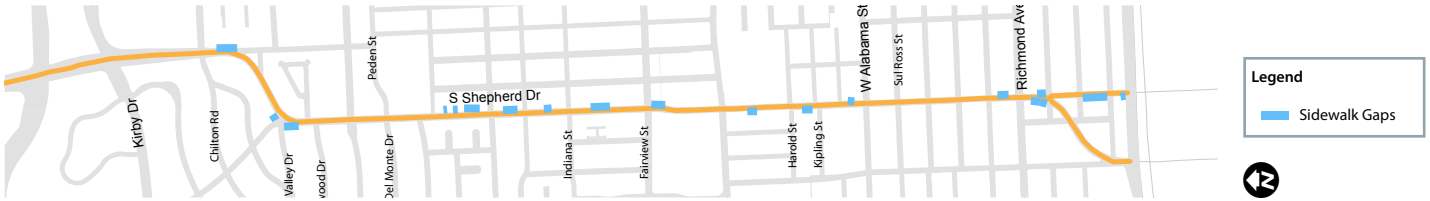
Comments received during the public outreach process suggested a need for improvements within the pedestrian realm, including completion of the entire sidewalk network. Additional improvements to bus stop areas within the corridor could help to facilitate increases in transit ridership within the corridor. The graphics on the following page highlight some alternative considerations for Shepherd and Durham. Gaps within the sidewalk network have been noted in blue. Of note within the Shepherd and Durham corridors is that several of the intersections at other Major Arterials are experiencing significant congestion today, and that congestion is projected to grow in the future. The one-way nature helps to minimize some of the delays, however, traffic volumes are projected to grow to such a level that congestion at intersections during the AM and PM peak are unavoidable.

## Future Vision

The proposed Multi-Modal Street Classification for Shepherd and Durham within this section is an **Urban Couplet**. The corridor is envisioned to serve a regional transportation needs while providing local access to businesses and the surrounding neighborhood. Construction of an improved corridor that includes completing/improving the pedestrian realm and provisions for **High Frequency Transit** is essential to meeting the overall needs of the Multi-Modal network within the Study Area. Finally, as redevelopment of smaller parcels occurs, the consolidation of some driveways with a focus on creating logical connections to the local street network would help traffic flow along the corridor.




### Key Factors




## Existing Conditions

Shepherd is constructed as a 4-Lane facility that carries upwards of 40,000 vehicles on a daily basis. The Shepherd corridor provides the first north/south connection that is west of the 610 loop within the Study Area and a large portion of the traffic within the corridor is regional in nature. As such, the designation as a **Major Arterial** is fitting. With few exceptions, the corridor generally has a Right-of-Way that is approximately 80-feet. The area of between Dallas and Gray has been identified as an area where additional Right-of-Way is needed. The current design allows for two travel lanes in each direction during the peak hours, with certain areas allowing the implementation of left-hand turn lanes at key intersections. Several segments of the corridor experience notable congestion and a limited availability of ROW to provide for additional lanes or multi-modal options. The current sidewalk network sees some interruptions throughout the Shepherd corridor; meanwhile the corridor is not a bike-friendly corridor in its current configuration.

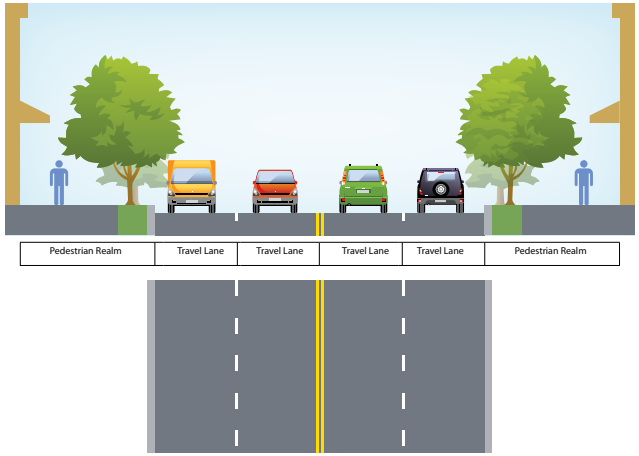
### Key Factors

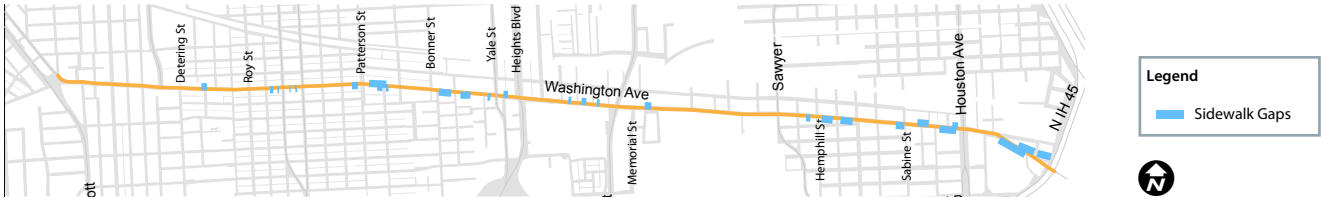
## Identified Needs

Comments received during the public outreach process suggested a need for improvements within the pedestrian realm, including completion of the entire sidewalk network. Additional improvements to bus stop areas within the corridor could help to facilitate increases in transit ridership within the corridor. The graphics on the following page highlight some alternative considerations for Shepherd. Gaps within the sidewalk network have been noted in blue. Of note within the Shepherd and corridor is that several of the intersections at other Major Arterials are experiencing significant congestion today, and that congestion is projected to grow in the future. Traffic volumes are projected to grow to such a level that congestion at intersections during the AM and PM peak are unavoidable. Additionally, there is a need to reexamine the manner in which Shepherd/Memorial/ Kirby/Allen Parkway interact with one another.

## Future Vision

The proposed Multi-Modal Street Classification for Shepherd this section is an **Urban Avenue** and an **Urban Boulevard with High Capacity Transit**. The corridor is envisioned to serve a regional transportation needs while providing local access to businesses and the surrounding neighborhood. Construction on an improved corridor that includes completing/improving the pedestrian realm is essential to meeting the overall needs of the Multi-Modal Network within the Study Area. Finally, as redevelopment of smaller parcels occurs, the consolidation of some driveways with a focus on creating logical connections to the local street network would help traffic flow along the corridor.






## Existing Conditions

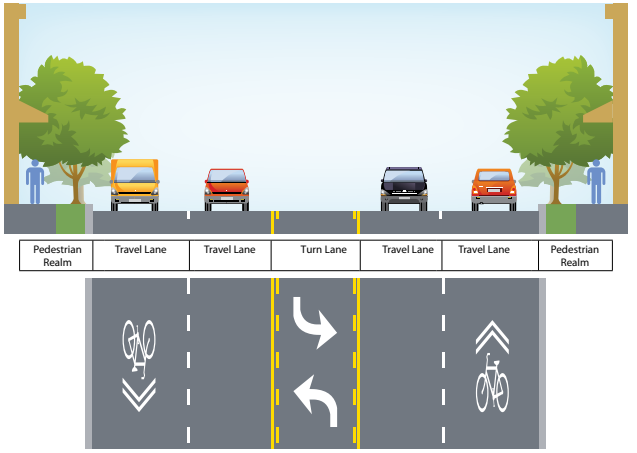
Portions of Washington Avenue are quickly redeveloping from older industrial uses to multi-story mixed use developments that include an active restaurant environment. Recently, a smaller segment within the corridor was resurfaced and during that activity the roadway was striped to include bicycle "sharrows" on the pavement and "Share the Road" signs along the corridor. The context and traffic patterns of the corridor change east and west of Studemont, but the corridor ultimately serves a large portion of regionally focused traffic and as such the designation as a **Major Arterial** is fitting. Several sections of the corridor have pedestrian infrastructure that isn't continuous, or changes from a wide sidewalk area to an area of lay-down curb where a business takes direct parking access through the entire pedestrian realm.

## Identified Needs

Washington Avenue has been the topic of several concurrent and ongoing studies. The Livable Centers Study examined the local needs of the corridor. The **City of Houston Parking Study** will be studying the needs of the larger commercial area in a future study. And the Inner West Loop Mobility Study has examined the needs as it related to the traveling public. Several studies and entities have noted a need for increased transit options along Washington Avenue. Those increased services would benefit from improvements to the pedestrian network that connects the residential neighborhoods to Washington Avenue, as well as connecting the uses along the corridor. Additionally, residents and employees have noted a desire for increased bicycling amenities similar to those that already exist within the corridor.

## Future Vision

By classifying Washington Avenue as an **Urban Avenue** with **High-Frequency Transit**, several components of the identified needs can be addressed during future reconstruction. The facility will need to accommodate larger transit vehicles, bicycles, and adequate sidewalks for larger volumes of pedestrians in what is likely to become an urban village. Designing the roadway to safely accommodate an increased volume of traffic, while balancing the multi-modal needs, is paramount to the future success of the corridor.




**Key Factors**


## Existing Conditions

Waugh and Commonwealth function as an **Urban Couplet** that serves primarily to access surrounding residential uses. A majority of both corridors allow on street parking along one side of the street and a bicycle lane along the other. The Commonwealth corridor has continuous sidewalks throughout the entire segment, while there are a few gaps in the Waugh corridor's sidewalk network. The couplet is appropriately designated as a **Major Collector** through this segment given the connections to the arterial system and the amount of local streets that access the facilities for trips to and from the surrounding housing.

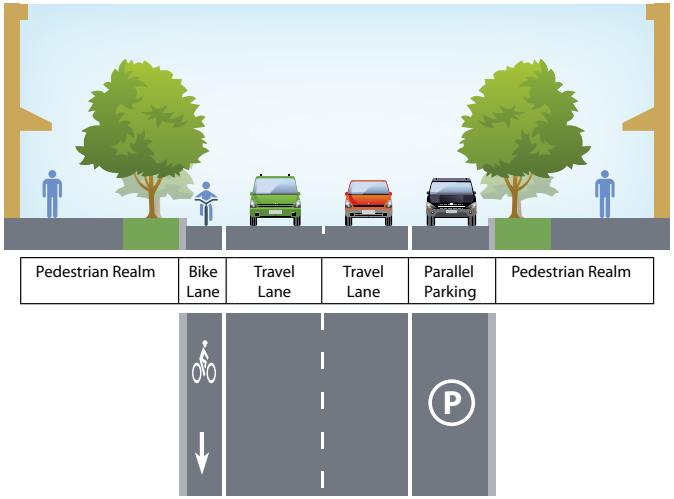
## Identified Needs

This section of Waugh and Commonwealth could benefit from a better definition of the pedestrian realm, including the completion of the sidewalk gaps along Waugh. Continuing to provide on-street parking and a bicycle facility that is on-street is desired for both of these corridors. The bike facility provides a greater connection into a larger regional network through Waugh to the north. There are several instances where the sidewalk network would benefit from the implantation of ADA compliant ramps, and as improvements are made to the sidewalks these projects will need to be programmed.

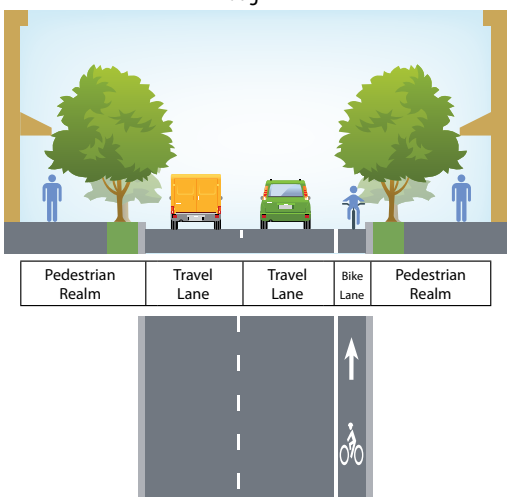
## Future Vision

The future corridors are very similar in nature to the existing facilities. Given the surrounding residential uses, and the character of the current roadways, these facilities are not likely to change very much in the future. The couplet will continue to act as a Major Collector but designation and an **Urban Couplet** is appropriate given the Multi-Modal Classification System.

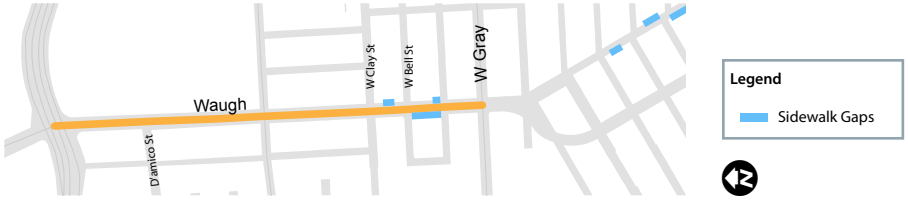
Commonwealth




Waugh




### Key Factors




## Existing Conditions

Waugh Drive between West Gray and Memorial is a 6-lane Major Arterial with medians in certain locations for traffic control purposes. Waugh provides regional access to several other Major Arterials, as well as logical connections into the surrounding neighborhoods. The classification of Waugh as a Major Arterial is fitting given this context.

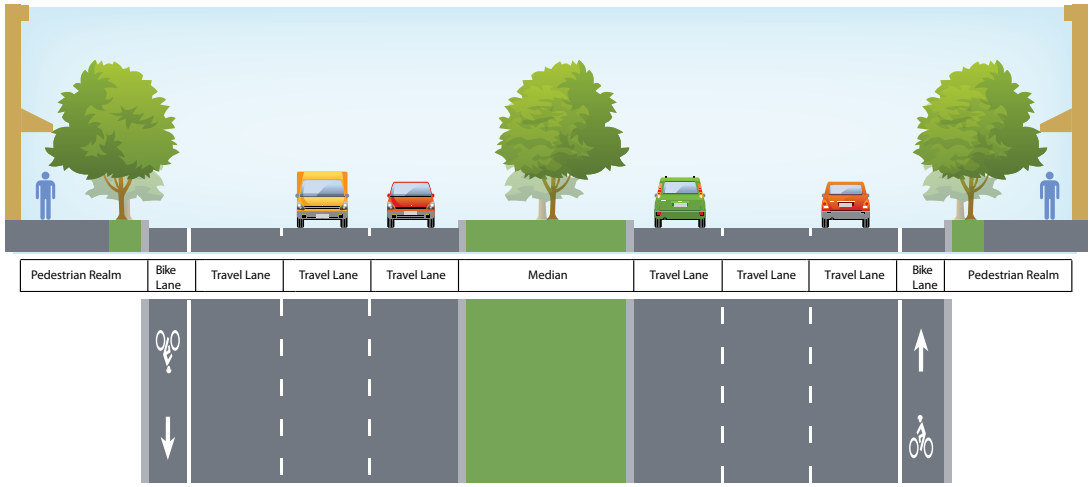
Waugh drive is lacking bicycle facilities for this section of the corridor and the gap is noticeable given the nature of the Waugh/Commonwealth couplet immediately south of this segment of the corridor. The context of Waugh along this portion is generally commercial uses that are set back from the travelway. The pedestrian realm is in need of some improvements in places; however the general space is allocated for pedestrian facilities.

## Identified Needs

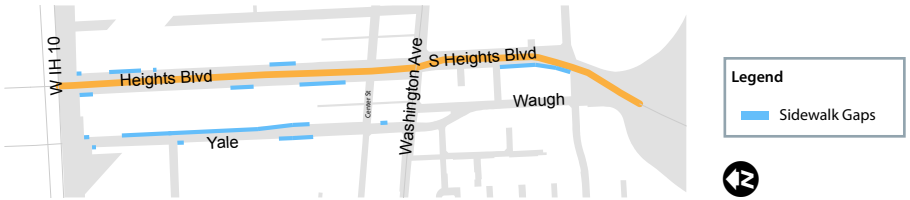
The most notable comments regarding Waugh during the first Public Meeting in March of 2012 were a few sidewalk gaps, the lack of bicycle facilities, and a need for improved transit service and amenities. Also of note within the corridor is the lack of ADA compliant sidewalk ramps at several locations. There is also a notable gap in the Bicycle network that could be completed using this section of Waugh. Implementation of that facility will require additional ROW.

## Future Vision

The implementation of a continuous bicycle facility within this section of Waugh, such as that currently under consideration by the Department of Public Works, would allow resident in the lower Westheimer and Waugh/Commonwealth areas to have a logical on-street connection to the Buffalo Bayou Trail System. That facility could be implemented through shared-use lanes along Waugh in conjunction with the **Urban Boulevard** Cross Section Standards. The graphic also highlights a sufficiently wide pedestrian realm to allow for improved transit stop amenities and continuous sidewalks.




### Key Factors




## Existing Conditions

Heights provides a significant north/south corridor that has access to I-10 and Memorial. The corridor has 150' of Right-of-Way that provides ample opportunity for providing facilities that can meet the needs of all users. The center esplanade provides a sense of place within the corridor that also provides for a more efficient movement of traffic by allowing for proper turn lane storage space.

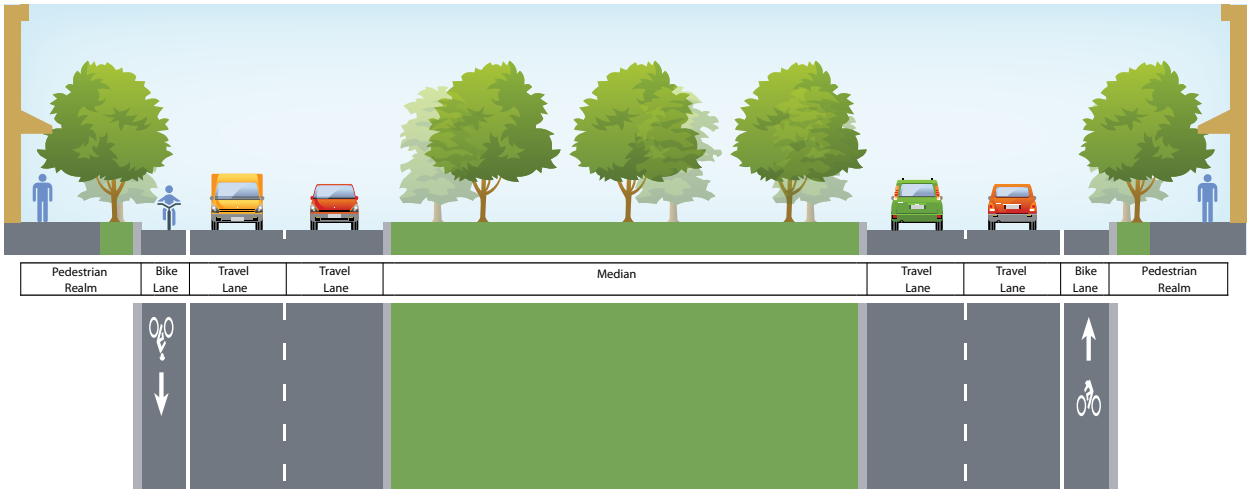
The corridor is currently designated and a **Major Arterial** and this classification is fitting given the regional nature of the traffic it serves and the large capacity available within the Right-of-Way.

## Identified Needs

The wide Right-of-Way had several stakeholders suggesting that the esplanade and the roadway could be reconfigured to promote non-motorized travel options within the corridor. Several segments of the corridor are currently undergoing significant redevelopment, and the implementation of a complete sidewalk network is critical to continuing to promote travel options and accessibility.

## Future Vision

By promoting multi-modal travel options within the Heights Corridor, regional connections can be made outside of the Study Area to the north, and users could access the bayou trails system to the south. It is this regional connectivity that frames the conversation about what and how Heights should function in the future. Continuing to provide automobile travel options, while enhancing the pedestrian and bicycle networks will allow Heights to continue to redevelop while help to shift the modal patterns of the corridor. Designating Heights as an **Urban Boulevard** is fitting given the context and desired travel options.




### Key Factors


## Existing Conditions

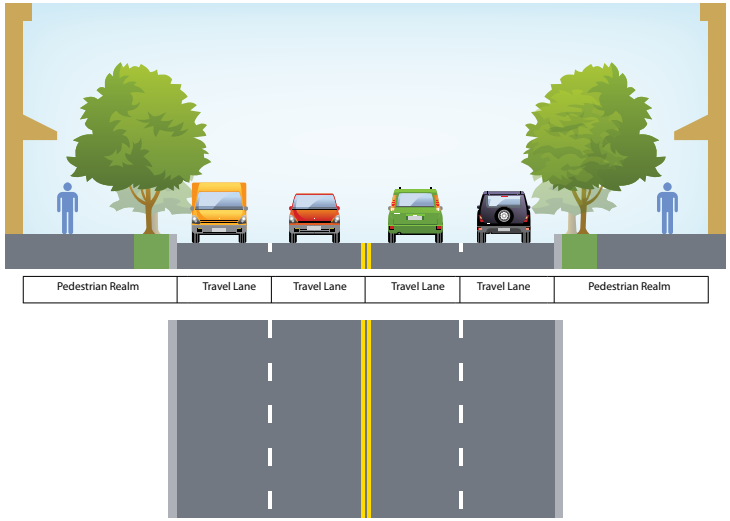
Yale is currently designated on the MTFP as a **Major Arterial** to be widened with the exception of a small segment from Washington to Memorial. The corridor provides another route for access to the neighborhood between I-10 and Memorial and would allow for another route to be programmed for improvements as Heights and the surrounding area continues to redevelop. Another key consideration for the Yale Corridor is the provision of on-street parking during the off-peak hours.

## Identified Needs

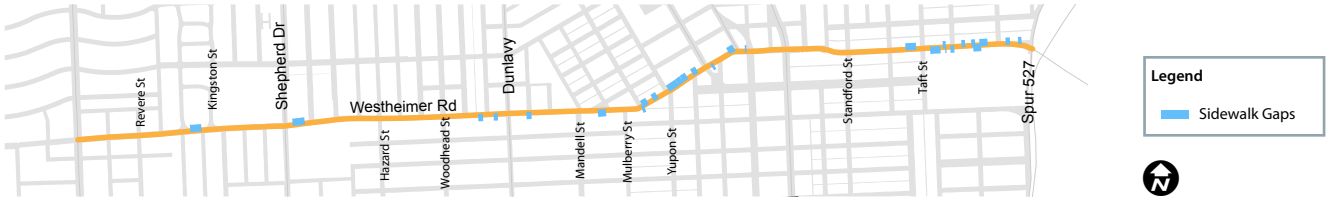
The pedestrian realm was the most noted area that would require improvements within the Yale corridor. Yale will likely continue to need to provide four lanes of vehicular traffic, but an improved network of pedestrian facilities, paired with the improvements made to Heights would make this pair of roadways that are closely spaced a very complete option for residents and visitors alike.

## Future Vision

Yale is classified as a **Major Arterial** on the MTFP, and providing a sub-classification as an **Urban Avenue**, improvements that are made within the corridor can help to complete the network of streets within this sector of the Study Area and pedestrians can have a clear corridor for use when making trips within the neighborhood. The focus of the corridor on vehicular and pedestrian trips fits within the context of the overall improvements recommended for Heights and Yale as a pair of corridors that function well together.




### Key Factors




## Existing Conditions

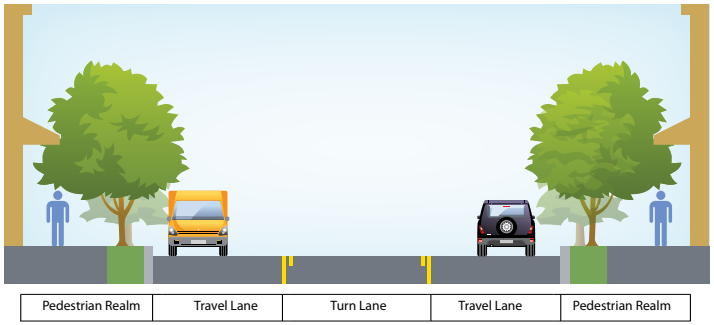
Lower Westheimer is currently designated as a **Major Arterial** that requires additional Right-of-Way. The corridor has several noteable sidewalk gaps, as well as a mix of uses immediately adjacent to the roadway that will make widening the corridor, even to provide a complete sidewalk network, very difficult. The corridor also has a mix of on-street parking and narrow lanes that degrade the operating conditions throughout the day depending on which vehicles are using the corridor and which parking areas are occupied. The corridor handles a significant amount of daily traffic, and the projected traffic volumes show a large amount of growth. This large volume of traffic validates the designation as a **Major Arterial**.

## Identified Needs

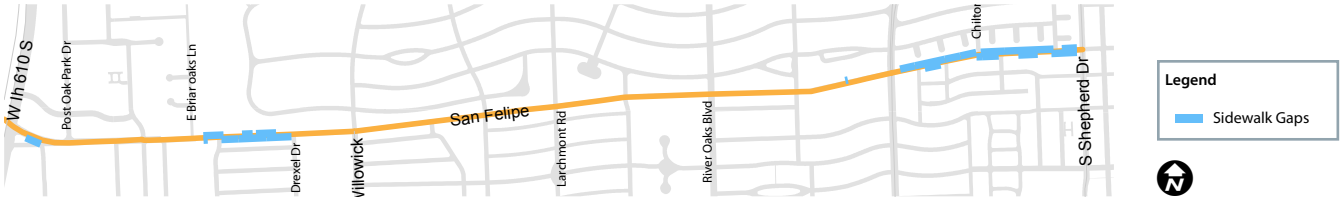
The existing conditions described suggest that there is a need to re-imagine the operating condition of the corridor. Without widening the existing corridor, the options for improvements are limited. Priorities identified by various stakeholders suggested a need for increased pedestrian connectivity, and an increase in transit services to help facilitate the movement of larger amounts of people. Within the existing pavement and Right-of-Way, the options for additional configurations are limited. As such, there is a need to study further the type of traffic and the development of the best operating configuration for the corridor.

## Future Vision

The future configuration of the Lower Westheimer corridor should promote several modes of travel. The optimal configuration maximizes the **High Frequency Transit** of the corridor, while providing a continuous pedestrian realm, and balancing the traffic operations needs of the large volume of automobile traffic. Designating Lower Westheimer as an **Urban Avenue** helps to meet these needs within the Infrastructure Design Manual Alternatives. Finally, the examination of off-street parking options in conjunction with redevelopment initiatives will be critical to the long-term success of this segment of Westheimer.




**Key Factors**




## Existing Conditions

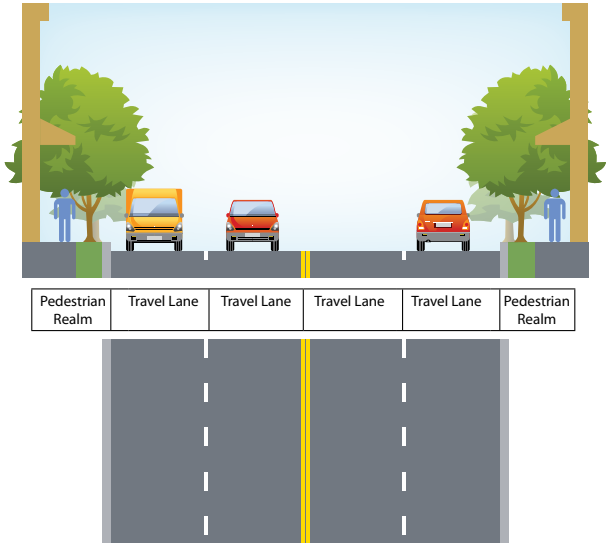
San Felipe is constructed as a 4-Lane undivided roadway with sidewalks along a large portion of the corridor. The MTFP designates San Felipe as a **Major Arterial** and a **Major Collector**, with a segment just east of Kirby needing additional Right-of-Way. There are many sidewalk gaps within the corridor especially near the at-grade railroad crossing and the area between Kirby and Shepherd. San Felipe serves both regional and local traffic needs given the access provided to Interstate-610; however, the corridor quickly shifts into a much more residential character east of the railroad crossing.

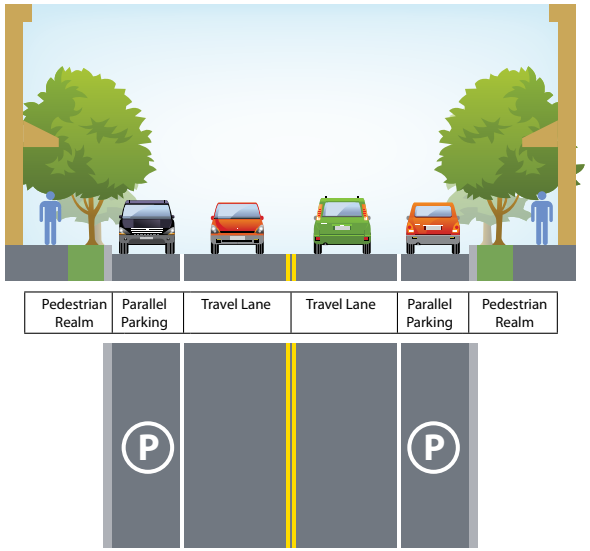
## Identified Needs

Beyond the sidewalk gaps noted in the map, the corridor generally did not see any specifically identified needs. Improving the crossing of the at-grade railroad is a concern throughout the Study Area; however, the potential improvements at this location would require very costly grade separations, which would exacerbate the limited connections across the rail, and potentially impact businesses and residences.

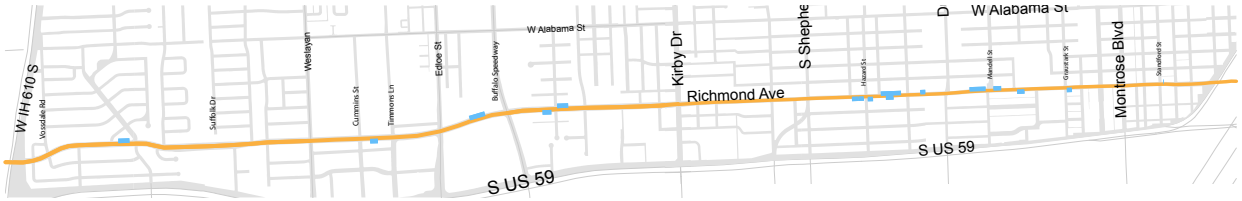
## Future Vision

The corridor transitions from a regional roadway, to one that serves a local traffic circulating need as it approaches Shepherd. Designating the corridor as an **Urban Avenue** allows for a transition between the 4-Lane section and a 2-Lane section with on street parking similar to the current operating conditions within the corridor. There may still be a need to evaluate the widening of the Right-of-Way within the corridor east of Kirby. This will need to be examined within further engineering studies as future traffic conditions are specifically developed for design year considerations.




### Key Factors




## Existing Conditions

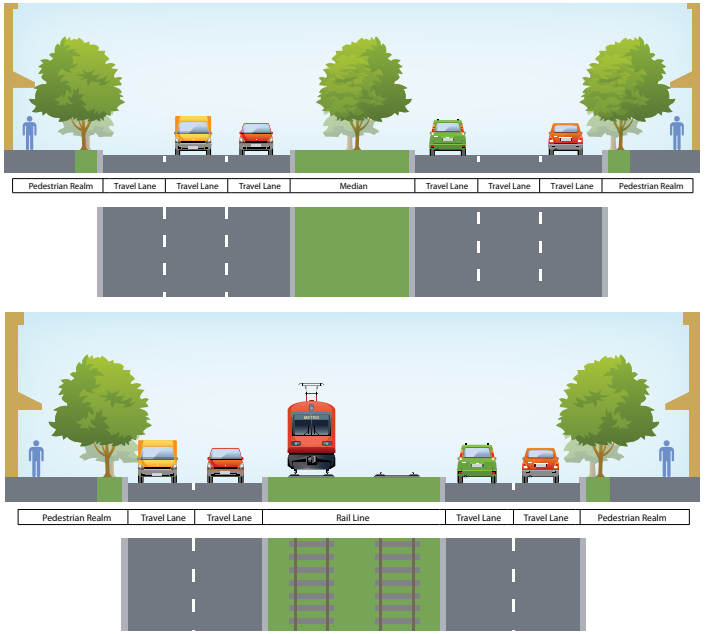
Richmond Avenue changes context and configuration several times throughout the Study Area. The roadway is classified as a Major Arterial and significant segments of the corridor have been studied for years as a part of the METRO University Line. Several sections of Richmond could benefit from the completion of the sidewalk network. A portion of the Richmond Corridor could be designated as a Transit Corridor, per the City of Houston MTFP, requiring additional details regarding sidewalk minimum width and development orientation as redevelopment occurs. There are also a few locations throughout the corridor that are lacking ADA compliant ramps within the cross-walk area.

## Identified Needs

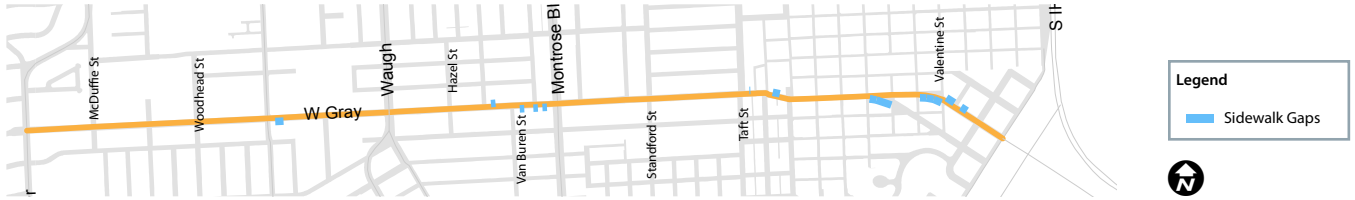
Traffic congestion along Richmond Avenue was a significant comment that was received through the public outreach process. Several potential improvements have been identified through this planning process, and several of those improvements could be completed in conjunction with the construction efforts for the University Line. The corridor has been analyzed throughout several studies and the design specifics should be coordinated with those efforts to ensure that the multi-modal carrying capacity of the corridor is considered as improvements are made.

## Future Vision

The Richmond Corridor has been envisioned as an **Urban Boulevard** and a **Transit Boulevard** throughout the Study Area given the changing dynamics as Rail turns south on Cummins. Wider sidewalks east of Weslayan are warranted given the nature of the Greenway Plaza District and moving east the Transit Corridor designation reinforces the need for improved pedestrian facilities. There is a need to evaluate additional pedestrian crossing amenities at high volume crossing locations.




### Key Factors




## Existing Conditions

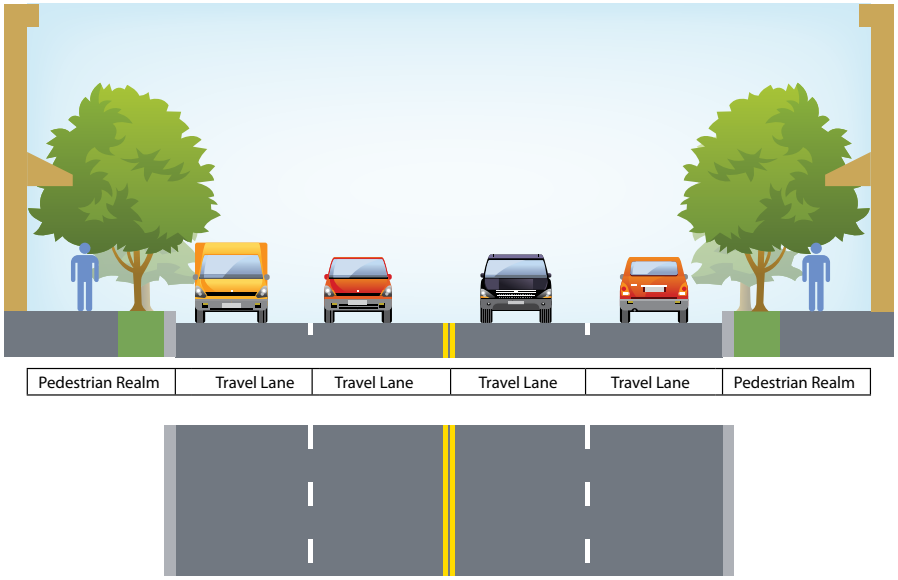
West Gray is a corridor in transition. Through the Fourth Ward, the corridor is dominated by vehicular considerations. Transitioning to the Montrose neighborhood, West Gray becomes a regional route that provides access to shopping and housing needs for an urban neighborhood. Approaching the commercial areas near Shepherd, the corridor becomes dominated by vehicular and pedestrian considerations for patrons at the shopping centers. There are a few locations within the eastern section of the corridor that need additional improvements within the sidewalk infrastructure. The designation as a **Major Arterial** is fitting given the vehicular volumes and regional nature of much of the traffic, especially leaving downtown.

## Identified Needs

Between Montrose and Bagby, the question of how to address the existing on-street parking considerations will continue to be a topic for further analysis. The gaps within the pedestrian realm in the eastern section of the corridor have also been mentioned as a topic for improvement. Overall the recommendations for this corridor involve dealing with small gaps within the system, rather than a complete change to the corridor.

## Future Vision

West Gray is a typical **Urban Avenue** within the Southeast quadrant of the Study Area. There are a few locations where minor modifications could be made; however, the larger long-term question surrounds the on-street parking considerations between Montrose and Taft. The local businesses rely on the non-peak hour parking options possible within the Right-of-Way, and the consideration of how best to implement a parking program will likely be another study.

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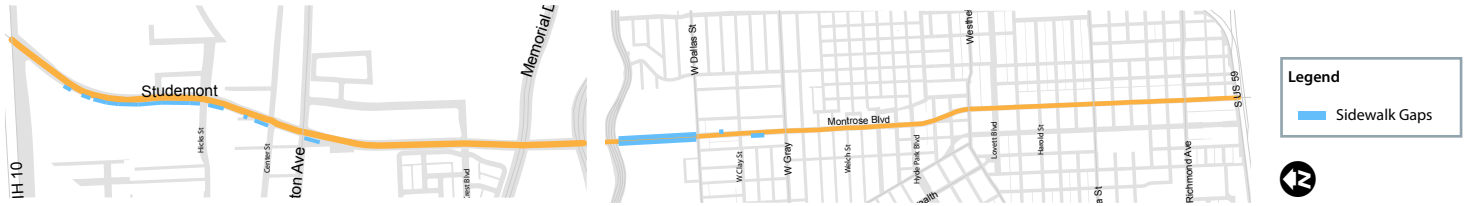



## Existing Conditions

Studemont and Montrose provide a continuous north/south route from I-10 to US 59. This corridor is one of two designated thoroughfares that are north-south routes in the Study Area that span the entire Study Area. As such, it is currently used for transit service, heavy vehicular traffic, and pedestrian travel as necessary and the **Major Arterial** status is valid. There are significant gaps within the sidewalk network along both streets, and the roadway will soon be in need of resurfacing.

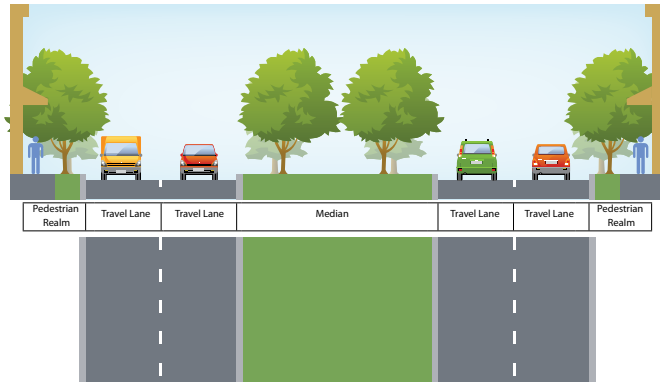
## Identified Needs

The **Washington Avenue Livable Centers Study** has identified a grid of streets that would rely on Studemont for regional access. Montrose continues to be a corridor that serves a regional purpose, while providing access to the neighborhoods that exist within this quadrant of the Study Area. The connections to the Museum District and Rice University from Montrose will continue to provide a need for multi-modal transportation options. There has also been an examination of an off-street bike trail to meet the needs of cyclists within the area.

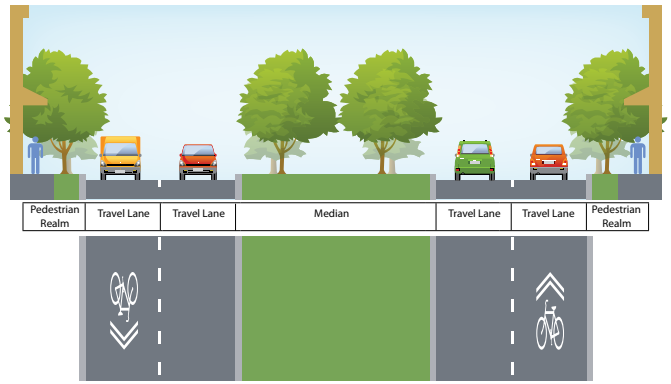
## Future Vision

Providing a complete pedestrian network with **High Frequency Transit** options is a key to the long-term viability of the corridor to handle the projected traffic volumes. An additional item for consideration south of the Bayou Trail network would provide an on-street option for cyclists to access the existing neighborhoods from the downtown area. Finally, by creating an Urban Boulevard that promotes a balance of users, the overall carrying capacity of the corridor can be increased within the existing Right-of-Way.

Studemont




Montrose

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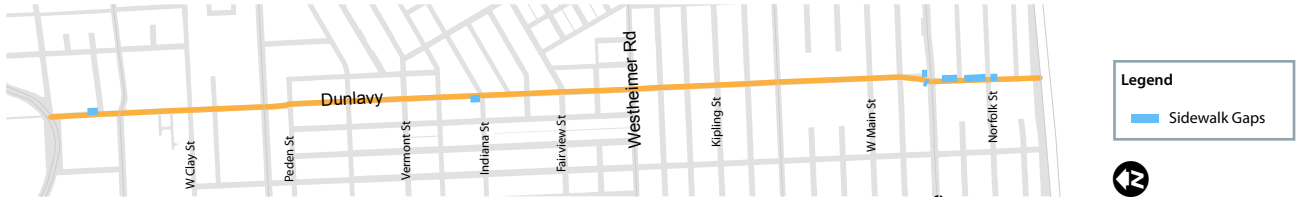
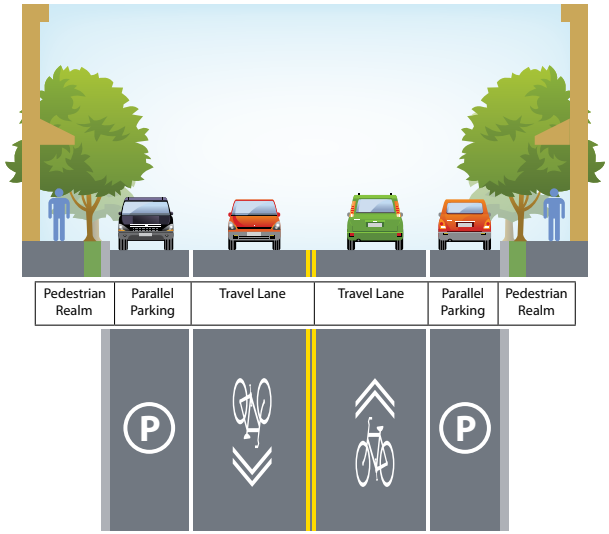



## Existing Conditions

Dunlavy provides north/south access within a series of neighborhoods in the southeastern quadrant of the Study Area. The connections to several Major Arterials make Dunlavy a logical Major Collector within the overall transportation network. Dunlavy has been identified as a corridor that will require additional Right-of-Way near the intersection with US-59 and the intersection with Allen Parkway.



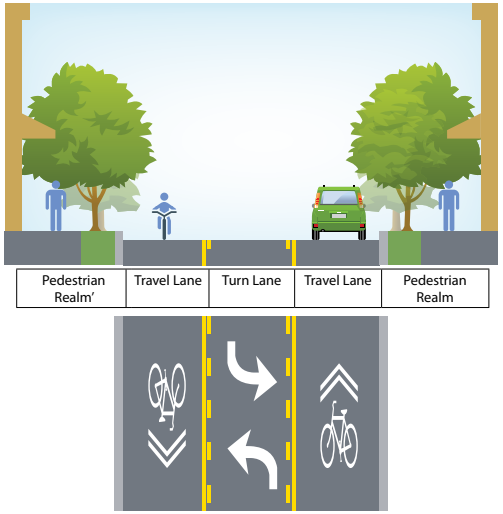

### Key Factors

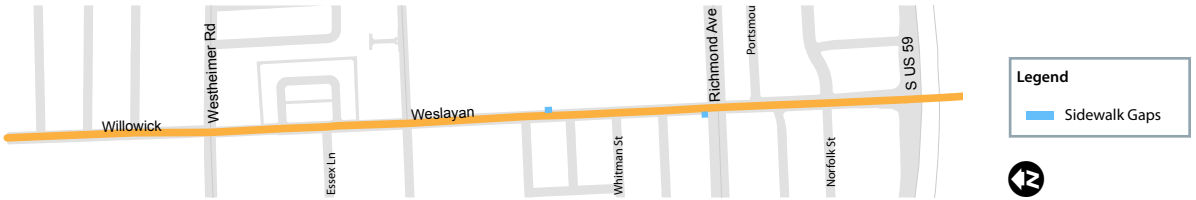
## Identified Needs

Given the more residential context along Dunlavy, there is a large existing network of on-street parking that provides transportation challenges near major intersections. In particular, the intersection near Westheimer has been identified as an area that will likely need a specific analysis of intersection treatments to minimize conflict points between turning traffic and parking/parked cars. A few small gaps in the sidewalk network exist along Dunlavy. Additionally, the lower speed nature of Dunlavy makes it an attractive Bike Route within this part of the Study Area, especially given the Right-of-Way constraints on the adjacent Major Arterials. The combination of on-street parking and intersection treatments for turning movements can create some confusion for a cyclist, and a clearly defined space would be ideal for creating a bike-friendly environment.

## Future Vision

Providing a complete bicycle and pedestrian network along Dunlavy helps to provide an alternative route within the larger transportation network. Slower vehicular speeds, and lower carrying capacity are a byproduct of the corridor focus, however, local access is maintained. The connection of Dunlavy at Allen Parkway will also need additional examination of the best way to get cyclists and pedestrians into the Bayou Trail network. As a Major Collector, Dunlavy would fit within the **Urban Street** designation within the Multi-Modal Street Classification System.






## Existing Conditions

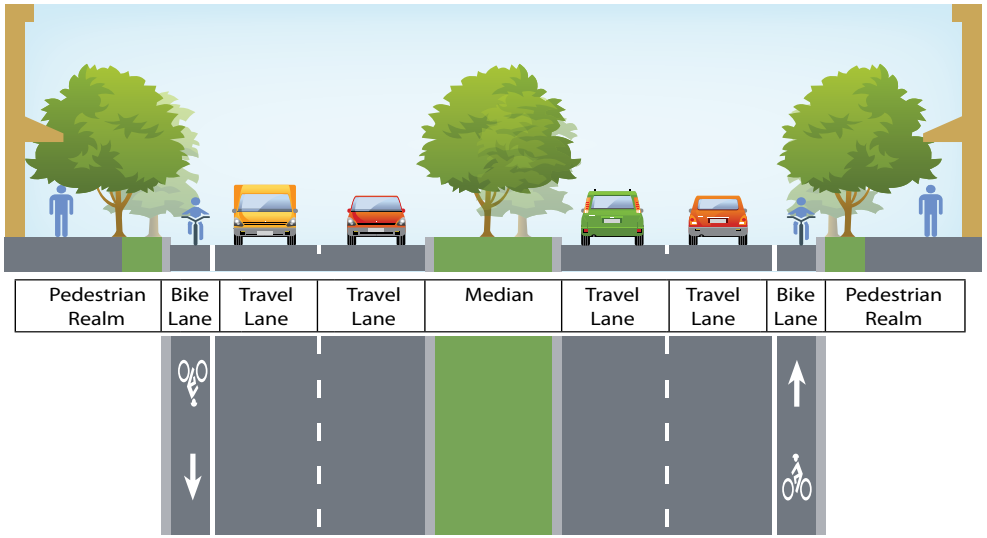
The Weslayan/Willowick corridor serves a regional access purpose for the majority of the corridor. At the northern edge, the corridor transitions into residential uses and is no longer classified on the MTFP. The existing corridor is a 4-lane section that allows for a median within the 100-foot ROW and no median in the 80' ROW. There is a small bike lane that has been striped on-street in both directions within the corridor. Given the regional trips that use this facility, the designation as a Major Arterial is fitting.

## Identified Needs

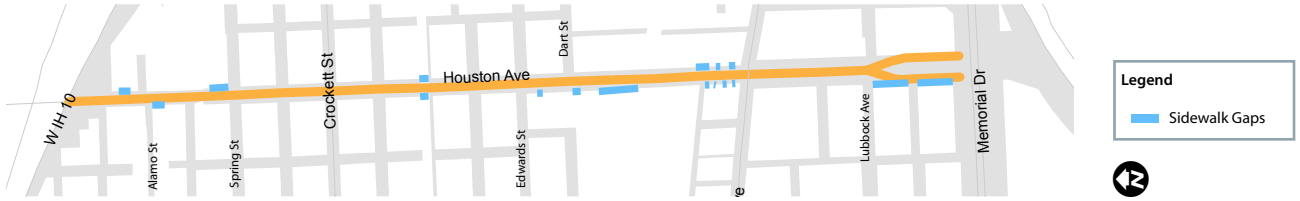
Several intersections along the Weslayan/Willowick corridor have been identified as having available Right-of-Way to allow for additional turn lane storage which will help to alleviate some of the existing peak hour traffic. A small gap within the sidewalk network was identified between Richmond and Alabama, and various stakeholders identified a desire for increased bicycle facilities within the existing corridor.

## Future Vision

Redefining the Urban Boulevard with a consistent bike lane, planted median that allows for access management controls, and improved intersections will allow this corridor to handle more traffic over the planning horizon. The corridor will continue to see increased pressure for vehicular traffic, and balancing the needs of other users will be important as any new projects within the Right-of-Way are considered.




### Key Factors




## Existing Conditions

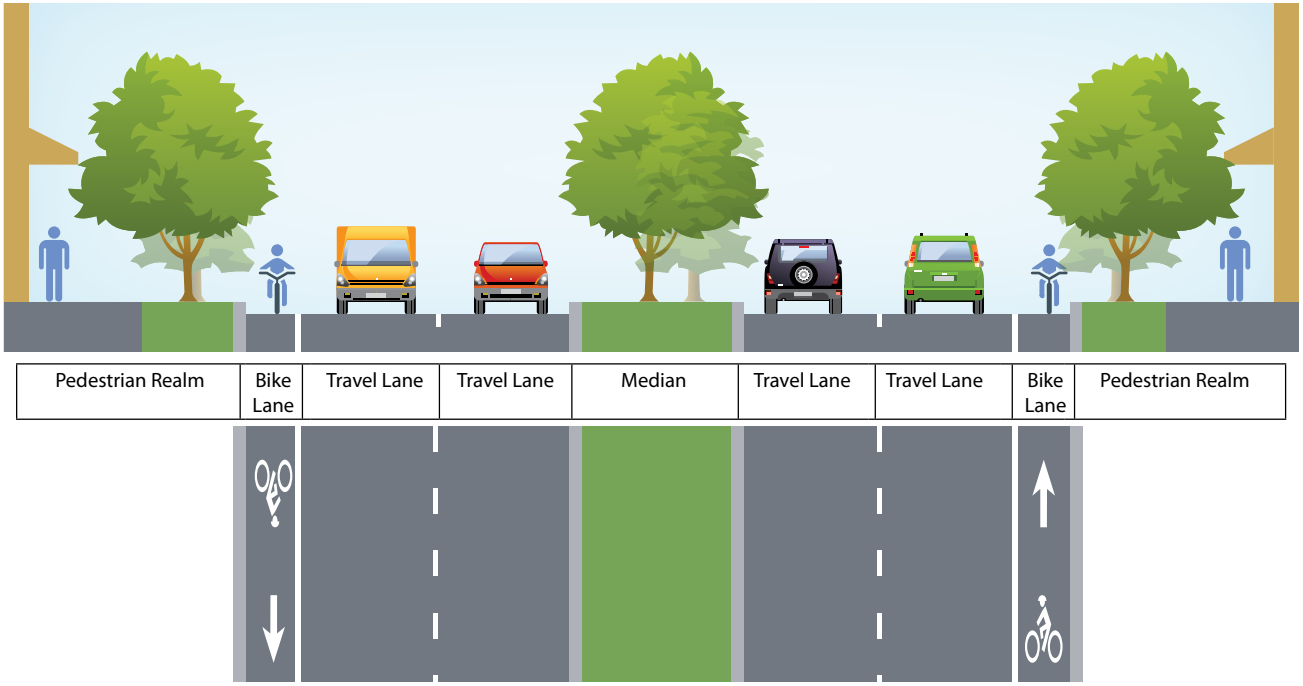
Houston Street provides direct access from I-10 to Memorial Drive and I-45. North of the Study Area, Houston intersects several other Major Arterials, and as such is classified as a Major Arterial. The corridor serves a regional traffic need, while providing access to the surrounding development. The grade separated crossing of the Terminal Subdivision Railroad, is one of a very few within the Study Area.

## Identified Needs

Very few needs were identified within the Houston Street Corridor. Continued access to the larger regional facilities, improved Bus Stops and transit amenities, and an improved pedestrian realm will help to strengthen the overall context of the corridor. Minor intersection improvements at Memorial and Lubbock will help to clarify traffic flow considerations within the corridor.

## Future Vision

The ROW for the Houston Corridor varies within the Study Area. By implementing a 4-Lane and 6-Lane **Urban Avenue** section within the existing Right-of-Way, the corridor can facilitate the movement of pedestrians, bicyclists, and automobiles. By maintaining the existing ROW, the corridor will be be better suited to handle future traffic volumes.

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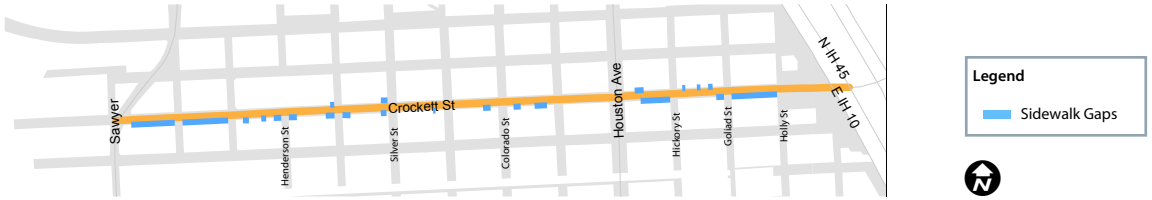



## Existing Conditions

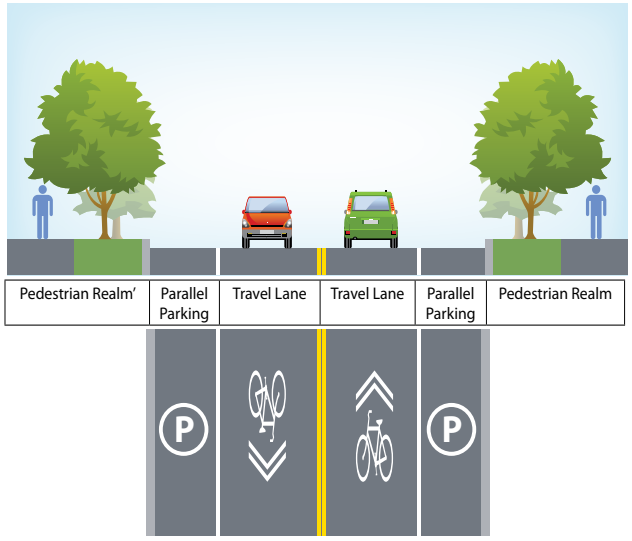
Crockett serves a primarily residential purpose; however, as one of a few roads with access across I-10/I-45 just north of Downtown the roadway is classified as a **Major Collector**. The section between Houston and Taylor allows for on-street parking, while the section east of Houston requires a 4-Lane configuration to match traffic demands.

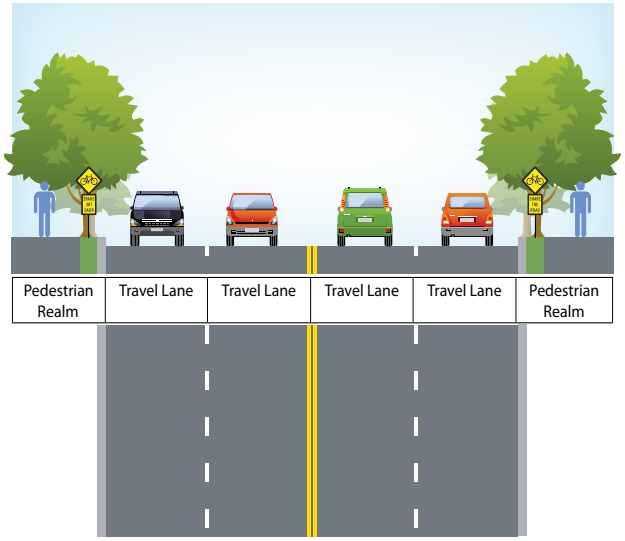
## Identified Needs

There are significant sidewalk gaps along the Crockett corridor. Given the slow pace of redevelopment in this area, the gaps are not unexpected; however, the area will continue to see increased development pressure as the surrounding neighborhood sees higher land values. The completion of the sidewalk network and implementation of bicycle facilities across I-10/I-45 will help to create additional connectivity within the non-motorized transportation network.

## Future Vision

Given the density of redevelopment likely to occur along Crockett, and the transition into the north side of Downtown, the designation as an **Urban Street** will allow for the transition between the two contexts, while preserving the existing Right-of-Way. On-Street parking within the residential area will continue to be a need, as such the roadway will need to transition between a 2 and 4-Lane section.

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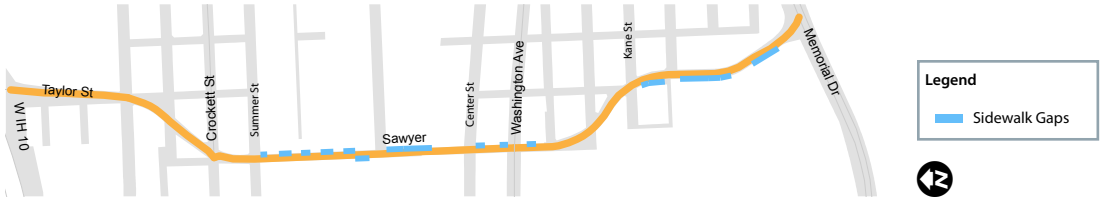



## Existing Conditions

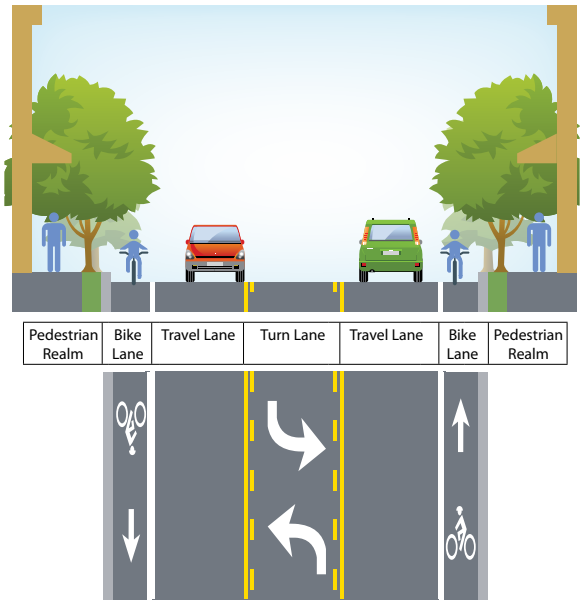
The Sawyer/Taylor corridor is currently designated as a **Major Collector**, with the segment between Washington and Crockett identified as an area the will need additional Right-of-Way. The corridor transitions quickly from commercial to industrial uses, and then as it approaches the Washington Corridor, the corridor again transitions to residential uses.

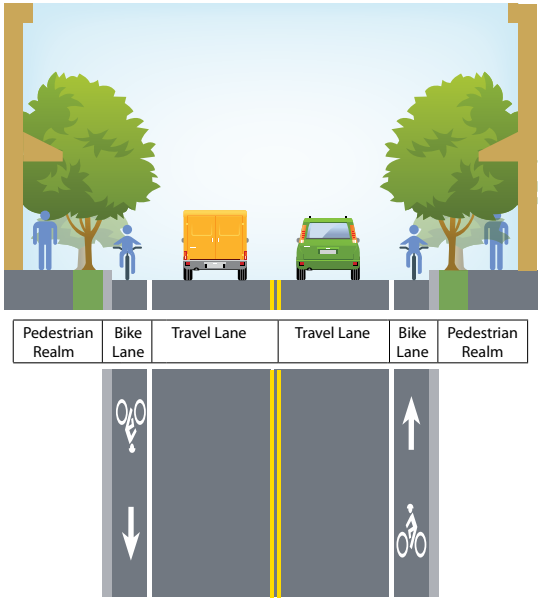
## Identified Needs

Several sidewalk gaps exist along the corridor, and there has been discussion of continuing the existing bicycle facility throughout the remainder of the corridor. As redevelopment occurs, there will be a need to widen the Right-of-Way to the designated 60' width to accommodate the planned cross section.

## Future Vision

Defining Sawyer/Taylor as an **Urban Street** will allow for the 60' Right-of-Way to promote the continuation of the bicycle and pedestrian facilities that are present in sections of the corridor, while still allowing the vehicle realm to manage the traffic demand. Continuing to provide connectivity to the local and regional networks will allow Sawyer/Taylor to meets the needs of the traveling public, while also addressing the needs for multi-modal transportation options within this sector of the Study Area.

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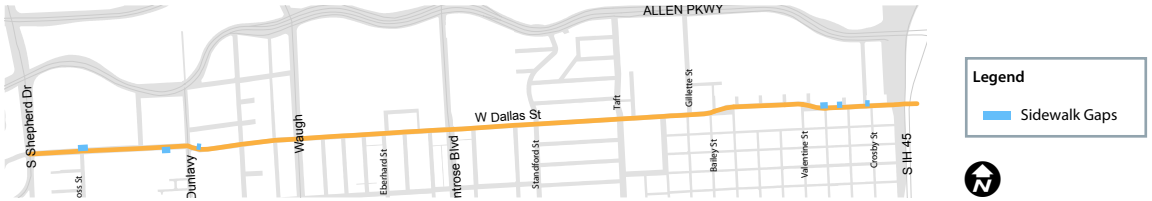



## Existing Conditions

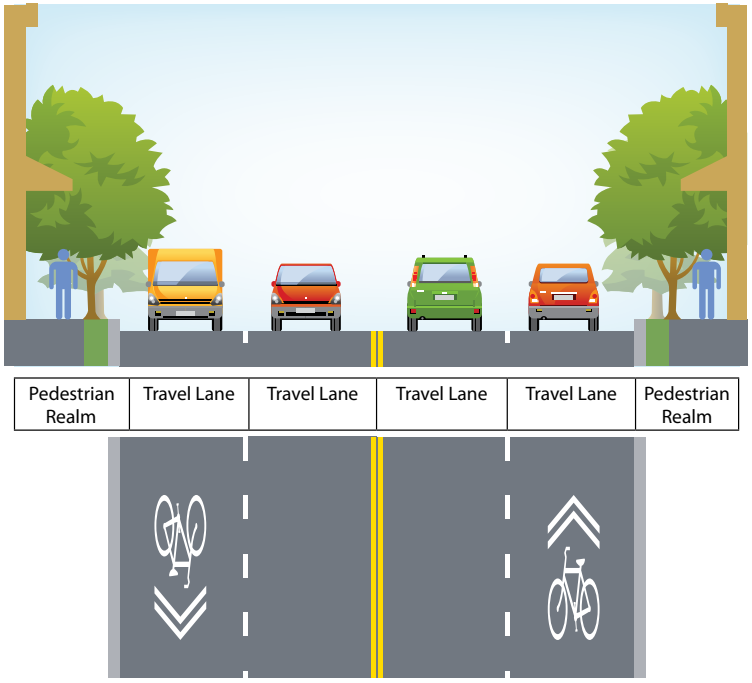
The Dallas corridor provides connections from Downtown to the center of the Study Area. A significant portion of the corridor was recently resurfaced and restriped to encourage on-street cycling through the use of a "sharrow" as shwon in the graphic below. This treatment fits within the context of the corridor as a **Major Collector**, and given the manner in which Dallas operates within the regional network the designation is appropriate. Segments of the corridor are designated as needing to be widened, these segments are small.

## Identified Needs

Comments received on the Dallas corridor mentioned the recent implementation of the shared lane markings, as well as a desire to see more of this application within the surrounding area. Additionally, there was a desire for improved bus stop amenities including the completion of the sidewalk network. The amount of available Right-of-Way was mentioned as a limiting factor within the corridor; as such decisions will need to be based on a network examination for provision of appropriate corridor elements.

## Future Vision

By completing the "sharrow" treatment and making improvements to the pedestrian network, the Dallas Corridor can provide a bicycle and pedestrian focused corridor on a street that has lower traffic volumes and lower speeds than the surrounding Arterials. The street would be defined as an **Urban Avenue**, with provisions for cycling and pedestrians balanced with those of the automobile traffic.

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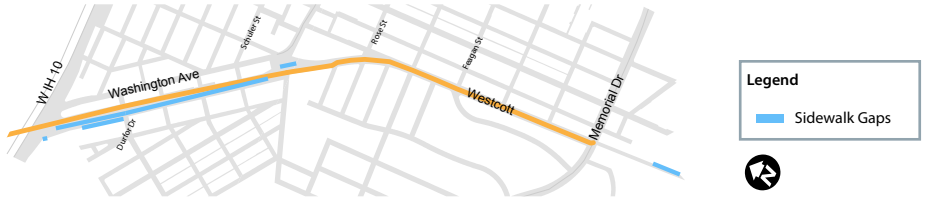



## Existing Conditions

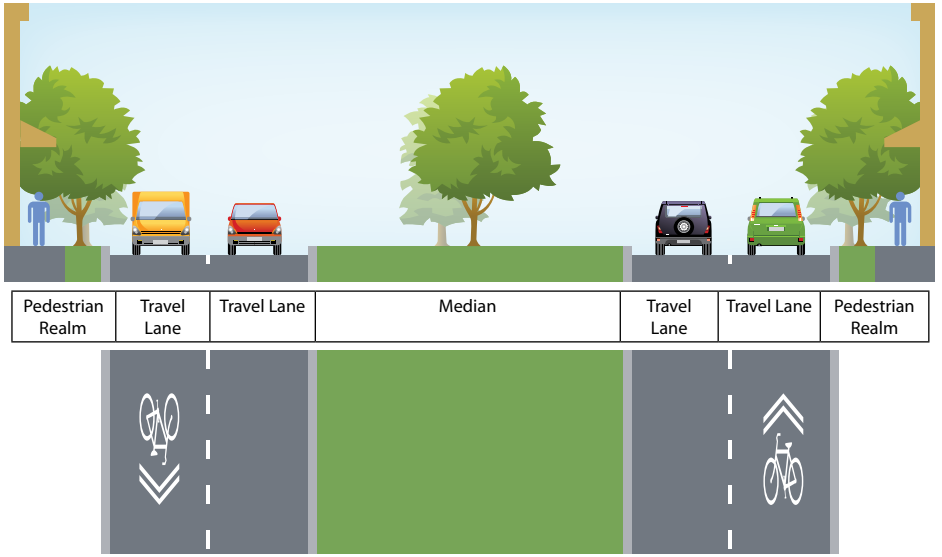
The Westcott corridor serves a regional purpose, while allowing for local access to the neighborhoods near Memorial Park. The corridor is designated as a **Major Arterial** and given the traffic volumes and regional nature of much of the peak hour traffic, this designation is valid. The corridor from Washington to Memorial has continuous sidewalks, a 4-Lane divided section, and a large enough Right-of-Way.

## Identified Needs

The intersection at Memorial has been identified as one location where an intersection improvement could help facilitate an easier movement of traffic during the peak hours.

## Future Vision

The completion of the pedestrian network and the development of a continuous on-street bicycle facility would promote additional modal options within the **Urban Boulevard**. The connections that could be made as the corridor approaches Memorial allow for larger regional travel to become a reality on a bicycle. The local businesses that operate within the northern section of the corridor benefit from the current on-street configuration, and studying the long-term parking needs will likely be necessary to ensure that any corridor reconstruction recognizes the balance of regional and local access that this road currently allows.

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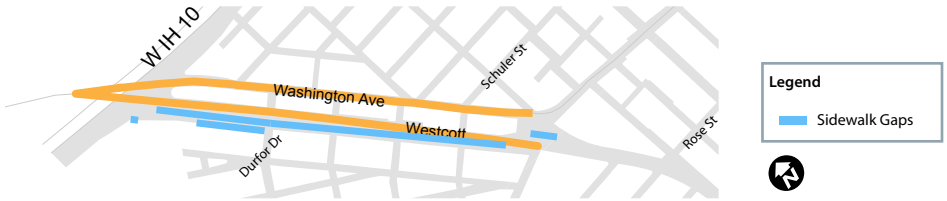



## Existing Conditions

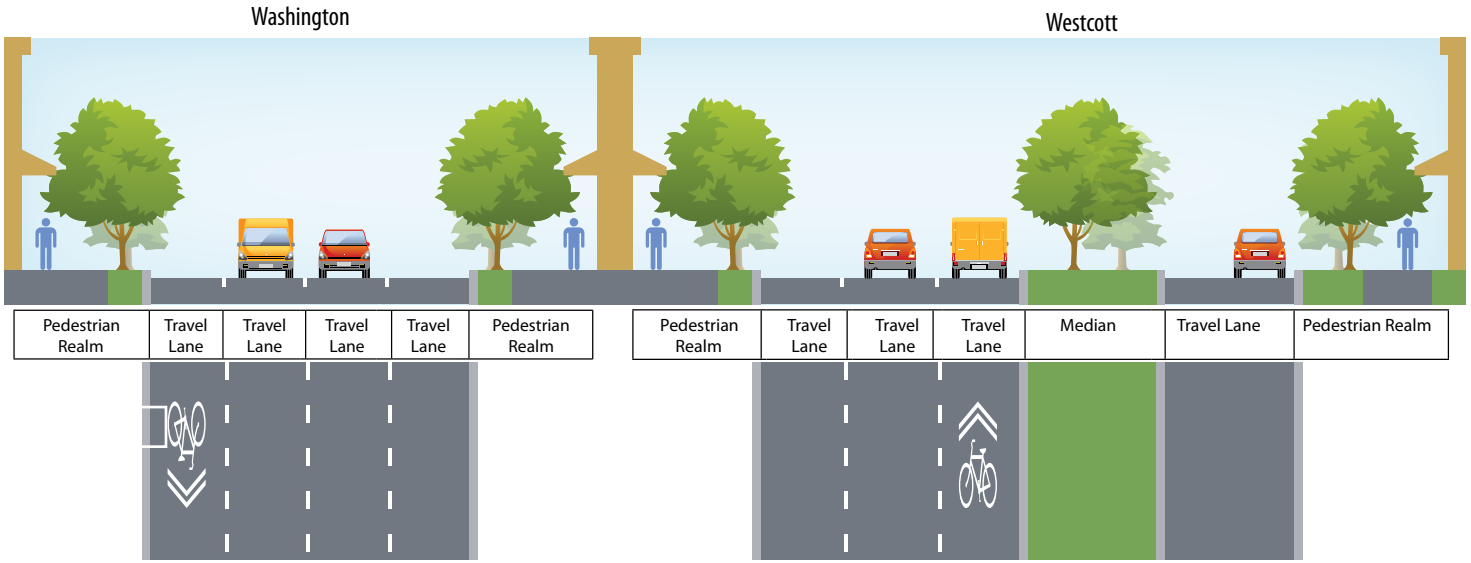
The Westcott corridor serves both regional and local activities in terms of automobile traffic and access to the neighborhoods near Memorial Park, respectively. The corridor is designated as a **Major Arterial** and given the traffic volumes and regional nature of much of the peak hour traffic, this designation is valid. North of the roundabout, the corridor shifts to a multi-lane boulevard with two one-way pairs and an access road. The segment north of the roundabout also lacks a continuous sidewalk throughout the entire length.

## Identified Needs

Sidewalks were the single largest comment received for this corridor. The lack of pedestrian connectivity approaching I-10 provides challenges in maximizing the effectiveness of the transit system, and also hinders overall mobility and recreational traffic.

## Future Vision

The completion of the pedestrian network and the development of a continuous on-street bicycle facility would promote additional modal options within the **Urban Boulevard**. The connections that could be made as the corridor approaches Memorial allow for commuter travel to downtown to become a reality on a bicycle. The local businesses that operate within the northern section of the corridor benefit from the current on-street configuration, and studying the long-term parking needs will likely be necessary to ensure that any corridor reconstruction recognizes the balance of regional and local access that this road currently allows.

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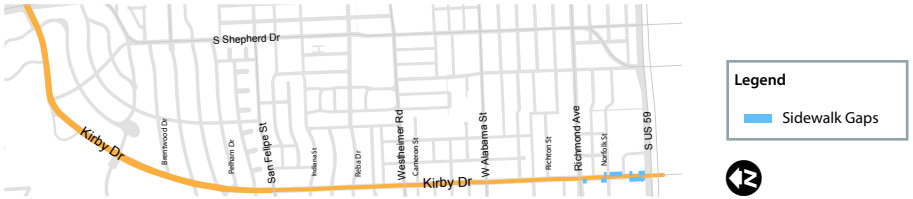



## Existing Conditions

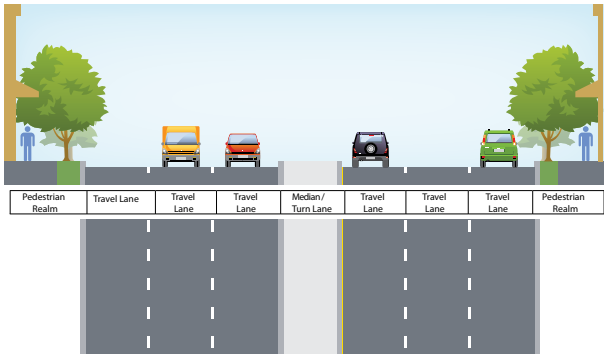
Kirby has recently been reconstructed from US-59 to San Felipe. This recent project provides the capacity available within the Right-of-Way and given the development context that is becoming prevalent within the corridor, it is unlikely that this segment will be widened in the future. The segment between San Felipe and Shepherd traverses a different context that is dominated by residential uses. The one point of congestion that will need to be addressed within the planning horizon is the combined Shepherd/Allen Pkwy/Kirby/Memorial Interchange. The corridor is currently classified as a **Major Arterial**.

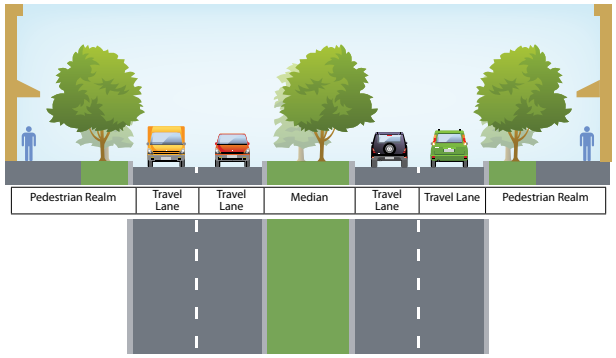
## Identified Needs

The single largest challenge within this segment of Kirby is the Urban Interchange at Allen Pkwy. and Shepherd. The traffic congestion during the PM peak is of particular concern given the projected increase in PM peak traffic.

## Future Vision

The future vision and the existing facility match one another and no additional projects are likely to occur as it relates to widening the corridor or dramatically changing the current configuration. Designating the corridor as an **Urban Boulevard** meets the overall context of the roadway as it is built.




### Key Factors

# Next Steps

## The Purpose of this Study

The City of Houston has undertaken this Planning Level Study to identify short- and long-term transportation system needs within the Inner West Loop Study Area. This study sets a vision for future transportation facilities within the Study Area through an examniation of multiple transportation modes and project concepts. This study examined projects and project concepts that can ultimately be fed into the City's Capital Improvement Program which includes a prescribed set of next steps, which are described in the next section.

Additionally, this study promotes several concepts that are policy oriented. These items can be addressed through the annual review process that several City documents undergo, this process is described in the following section as well.

Finally, these recommendations are not intended to be static. It is the intent of this study, as well as other studies in which the City is a partner to develop a set of project and policy recommendations that can be used in determining sub-regional priorities to be examined within the broarder citywide capital programming and pre-engineering process.

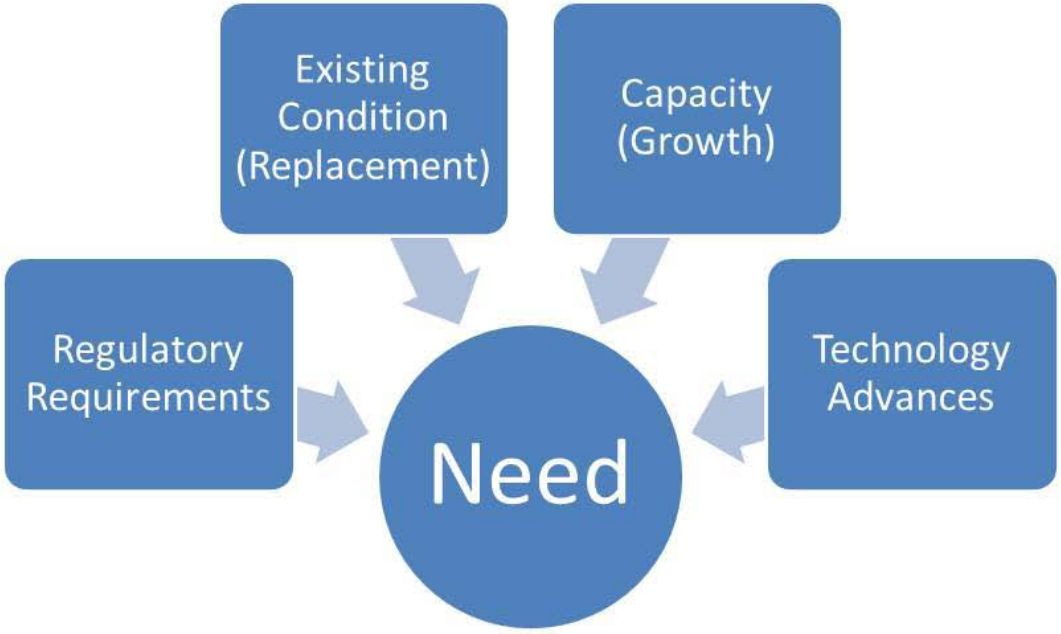
## Outcomes of this Study

The specific project concepts. Identified for both the short and long-term will be analzed through the lens of several different Departments within the City. The Planning and Development Services Department (PD) can use the recommendations to ensure that ROW is preserved where appropriate and will be the department responsible for defining the Multi-Modal Classification Process via the Major Thoroughfare and Freeway Plan (MTFP). The Traffic and Transportation Division of the Department of Public Works will work through their annual engineering process to develop further details regarding the solutions discussed in this report for specific intersections. The Capital Improvements Division within the Public Works Department will be responsible for analyzing the broader projects within the scope of their annual projects review process that is highlighted within the CIP Process Manual for Infrastructure Programs. Each of these items are discussed in more detail in the following sections. Given that the single largest funding pool available falls under the purview of the CIP Division, that process will be described first.

## CIP Process Manual Summary

The single largest program that will be used for the implementation of the Inner West Loop Study will be the **Rebuild Houston Initiative**. All of the departments and divisions play a role in defining projects for consideration during Rebuild Houston. Given the link between the street infrastructure concepts presented, Rebuild Houston provides a long-term funding source for the improvements discussed within this Report. The Process for Planning Capital Projects can be broken into two phases, The Programming Phase, those projects being constructed in the next five years, and the Planning Phase, those projects estimated to occur within the next six to ten years. Many of the Projects indentified through this Study will be examined within the Planning Phase which involves several additional steps before funding is programmed.

The following graphic provides an overview of the Planning Phase, however it is recommended that the most recent version of the **Capital Improvement Plan Process Manual** be examined for pertinent changes throughout the life of this document and the project concepts. The graphics shown are representative of graphics found in Version 3.0 of the above referenced manual. The Project Needs are then developed further through the process including: pre-engineering, project coordination and review, coordination with other entities, additional engineering, and programming the project within the CIP including funding for the construction of the project.



## Potential Policy Updates

During the planning process, discussions with City staff led to the realization that there may be a need to update some of the existing City Policies related to street definitions and the application of the Alternative Cross-Sections that are defined in Chapter 10, Appendix 2 of the Infrastructure Design Manual. Several gaps were identified through this planning process. Most notable consist of:

- Create additional cross section alternatives for 60 and 70-foot corridors that act as Urban Avenues,
- Create Transit Corridor Definitions that do not rely on exclusive lane treatments, and
- Define cross sections for Urban Streets that reflect a 50 and 60-foot ROW pattern for several streets that currently act as collectors but are not defined on the MTFP as such.

Additional public outreach will likely be warranted during the pre-engineering and final engineering phases of a specific project development process. These outreach activities and the level of detail covered should be governed by the complexity of the Project. That is to say, a sidewalk project that completes an identified gap in the network has a smaller sphere of additional outreach, likely to consist of only those property owners affected. Meanwhile, a corridor study to implement one of the corridor concepts identified above should have a detailed public involvement process, as defined previously in this Report.

## Updates to the MTFP

The **Major Thoroughfare and Freeway Plan** &KRDN' is another major policy that will be used by the City's Planning and Development Department to further the Multi-Modal transportation concepts that were developed during this planning effort. By ensuring that roadways within the Study Area are appropriately classified and designated within the MTFP, Planning staff at the City have the ability to secure Right-of-Way, coordinate projects of others, and include non-motorized connections within other planning and design activities. This tool also allows the staff to communicate the long-term vision of a corridor as redevelopment continues within the Study Area.

Additionally, there is a need to examine the appropriate policy revisions to define the proposed Multi-Modal Classification System. Revisions to the main body of policies that define the application of the MTFP would prove difficult given the use of the definitions contained within the MTFP throughout sections of the Local Development Code. As such, it is recommended that a sub-classification system be established within the existing MTFP ordinance so that as sub-regions are analyzed more thoroughly corridords can begin to utilize the Multi-Modal Classification System without adversely impacting the remaining elements of the code.

## Coordination with Other Entities

One of the most critical components of moving the concepts discussed in this document forward is the continued coordination of efforts between many groups. The Planning and Department is often a reviewing agency for several groups that are moving specific projects forward and as such, a review early and often by the Planning Department of project concepts - whether roads, transit, pedestrian, or bicycle related, will help to ensure that the overall direction of the concepts discussed herein.

Another important component of the coordination efforts that need to be enhanced throughout the Project development process related to the concepts discussed in the previous sections of this Report is the integration of these concepts into plans that are being developed by agencies other than the City of Houston. Most often, those projects would be under design by either a Management District, a TIRZ, or a Private Sector entity.

Ensuring that the plans and projects developed by these outside partners are in line with the ideas presented by this Report will help to ensure connectivity within the overall transportation system. Additionally, these coordination efforts will help to promote alternative modes of transportation within an area of the City that is currently experiencing a high rate of densification with expectations that this higher rate of density will continue throughout the planning horizon.

## Project Phasing

Given the pre-engineering level of detail associated with this effort, defining project phasing and costing beyond concepts of Near-Term and Long-Term is difficult. The City of Houston, through the Rebuild Houston Initiative, is in the process of developing and refining a city-wide project prioritization process, into which the project concepts defined through this effort will be entered.

In addition, the Department of Public Works has established criteria by which the intersections will be analyzed to move beyond the planning stages and into preliminary and final engineering. The final step for any of these projects will be to receive funding through either a Capital Improvements Plan, a coordinated project with one of the Management Districts or TIRZs within the Study Area, or outside funding source such as a Private Sector Partner or State and Federal funding opportunities.

The project concepts defined for Near-Term implementation are needed to help the existing transportation network to function better. There projects include intersection improvements listed on Pages 12 and 13 as well as the sidewalk gaps that were identified throughout many of the corridors. The Long-Term project list can be examined over the next twenty years to determine phasing that is appropriate given verified needs. Some of those projects are already under consideration including increased transit service along Westheimer. Others are in the design phase such as the University Corridor. Still more are just entering the beginning stages of the project development process and will be discussed again as further information is available.

Another programmatic need within the Study Area involves the definition of a funding source for the large amount of sidewalk gaps that currently exist. The corridor summary pages highlighted the missing segments within the corridor, however, the total amount of missing sidewalks throughout the Study Area is roughly 45,000 linear feet of sidewalk. Using conservative estimates for funding requirements, a program to **complete the sidewalk network** within the Inner West Loop would cost roughly **$4.5 Million dollars.**

As opportunities arise for coordinated projects, including projects such as utility replacements that already require the street to be reconstructed, the projects shown for Near and Long-Term Implementation will be examined as appropriate.

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# APPENDIX A

## Demographic Forecast Adjustments

The City of Houston, as a part of the Scenario Planning component of the Inner West Loop Study, examined the demographic assumptions contained within the H-GAC Regional Travel Demand Model dataset. Upon an examination of multiple years of data and projections; specifically for 2010, 2018, and 2035, the City and H-GAC agreed to evaluate additional levels of Population and Employment within the Study Area. The process for evaluating and in many cases increasing the assumed density was two-fold.

First, the City Staff examined the known developments that have occurred since 2010 and the developments for which a developer has indicated would be likely to occur within the next five years, and assumed that this would form the basis for the 2018 population and employment projections. This was compared to the Region's Travel Demand Forecast, and several locations were deemed to merit an increase in development density. In many cases the development community has already platted parcels or submitted a development plan with an accompanying Traffic Impact Analysis and those developments were included for the 2018 forecast year.

Second, City staff examined projected population and employment densities for the 2035 forecast year. When coupled with the analysis that was undertaken for the update to the 2018 forecasts, the City staff and Regional Demographic Forecasters at H-GAC agreed to increase the density of population and employment within specific locations in the Study Area base on land-values and existing densities. These increased values are simply a scenario for analysis within the overall framework of this study, however, the density assumptions were indicative of the pattern for redevelopment that is currently occurring within the Study Area. Maps can be found on the following four pages illustrating the assumed density levels for 2018 and 2035. A map of each scenario is shown on Pages 52-58.

## Travel Demand Model Scenario

Another component of the Scenario Planning activities undertaken in conjunction with this study, was the development of hypothetical transportation system improvements. The reasoning for this analysis was to test individual project concepts and their affect on the regional transportation network, and then determine projects which demonstrated some merit for further discussion with stakeholders and the general public.

**Scenario 1** examined a significant increase in the frequency of transit service along five routes within the study area. Service frequencies were increased to ten minute headways during the peak and fifteen minute headways during the off-peak period. Based on feedback received from Houston METRO, service headways were again decreased on Westheimer..

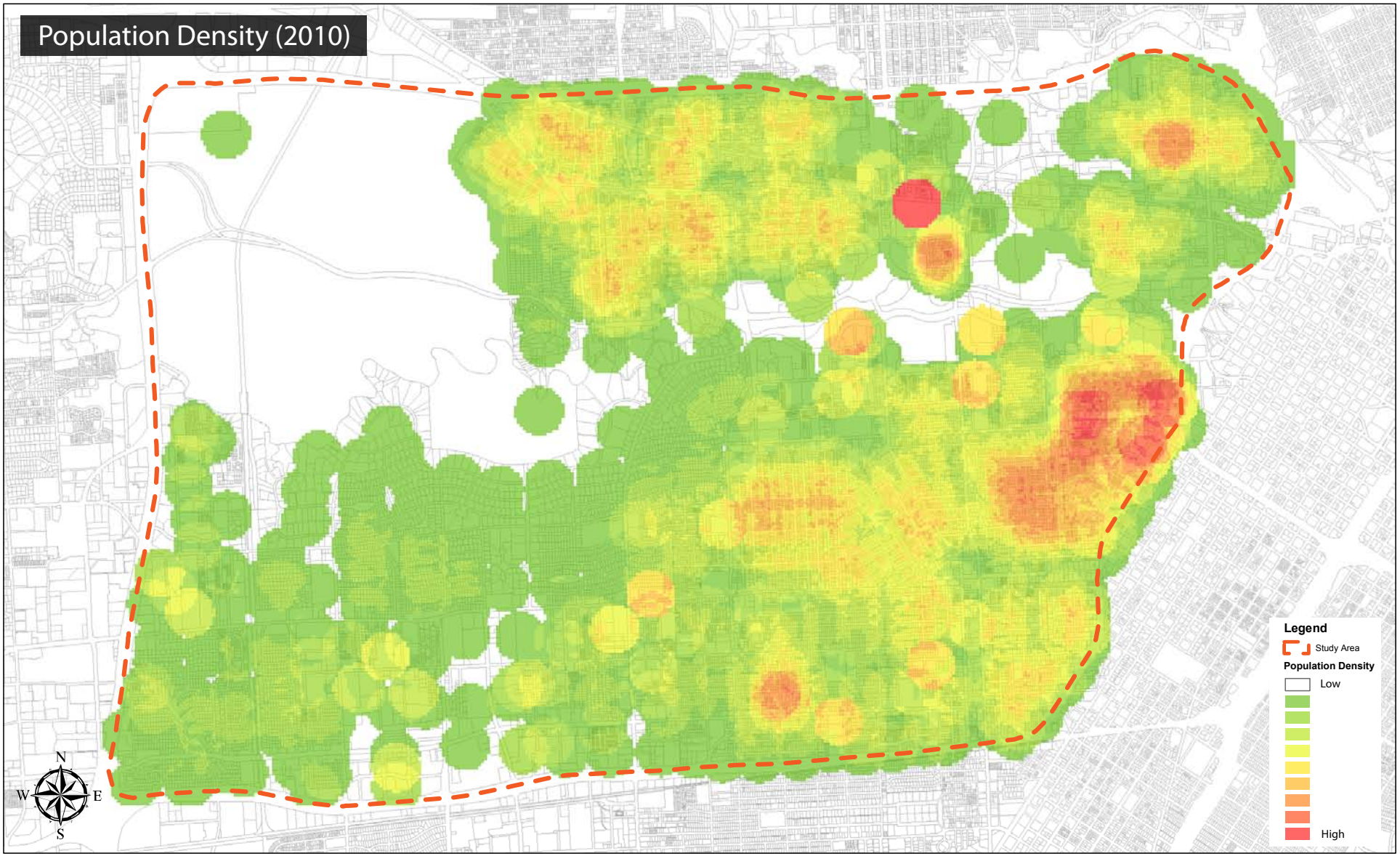
**Scenario 2** was developed in response to a project concept that would create one-way pairs along Richmond and Westheimer to increase the operating efficiency of the intersections along these corridors. The concept proved to have merit within the travel demand model comparison in that it alleviated some congestion, however the project concept still requires much more analysis before contemplating making this change to the regional and local roadway networks.

**Scenario 3** contemplated an improved Urban Interchange that would combine the current intersections of Memorial/Shepherd/Allen Pkwy./Kirby into a grade separated and at-grade facility. The project concept attempts to remove one or two of the signals from the intersections allowing the traffic to flow more freely within the overall intersection. This project demonstrated limited improvements within the travel demand model, however, that is likely due to significant latent demand within the sub-region..

**Scenario 4** was initially conceived as a way to potentially minimize the effect of regional trips within the local street network by making a connection between I-45 and US-59 along Spur-527. The grade separated connection would provide direct access on the southwest side of downtown from US-59 to I-45 rather than the current configuration that loops around downtown to the east.

A map of each scenario is shown on Pages 70-79.

## Insert Demographic Forecast Map - 2018



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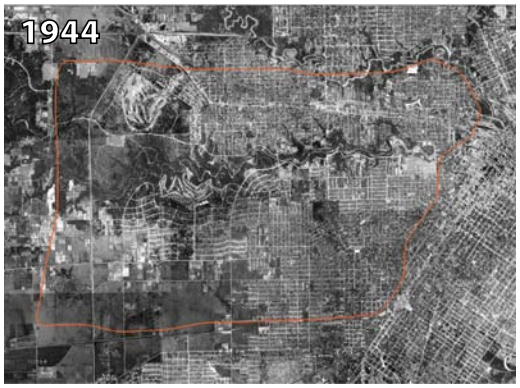
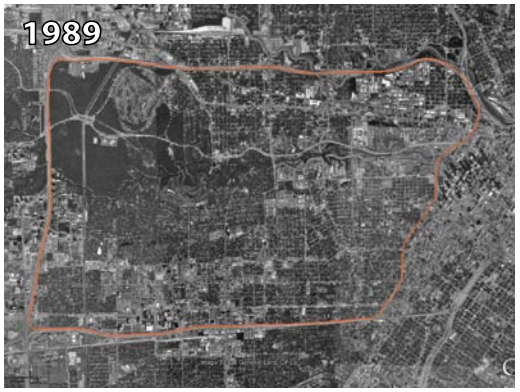
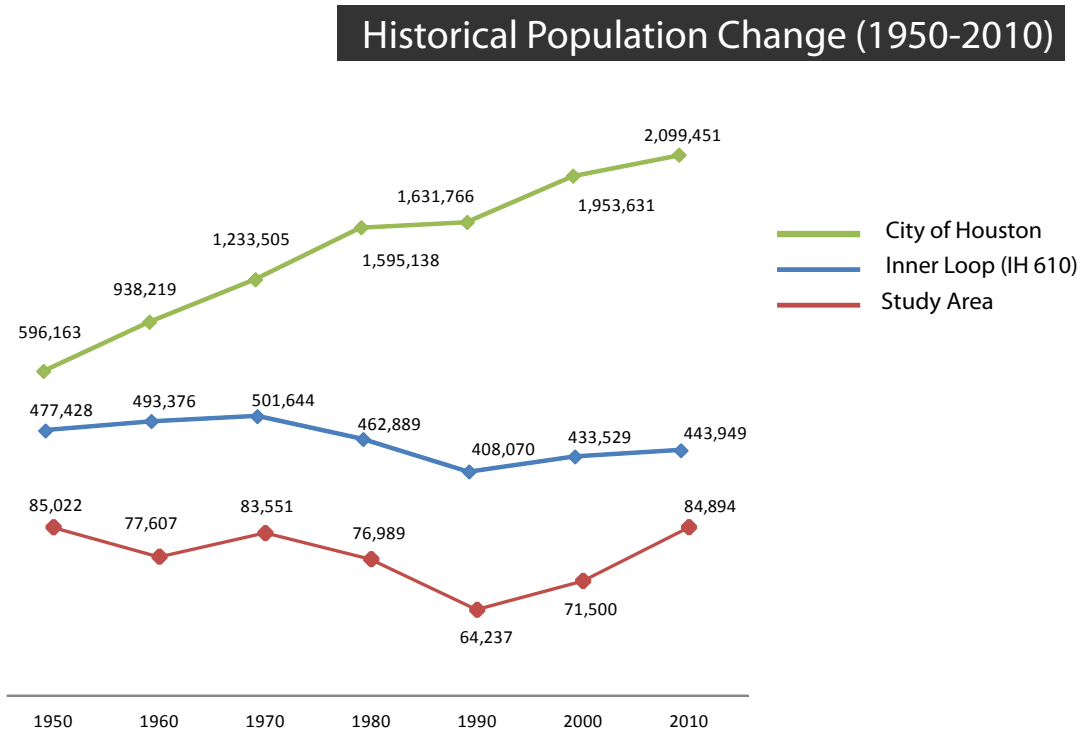
## Insert Demographic Forecast Map - 2018





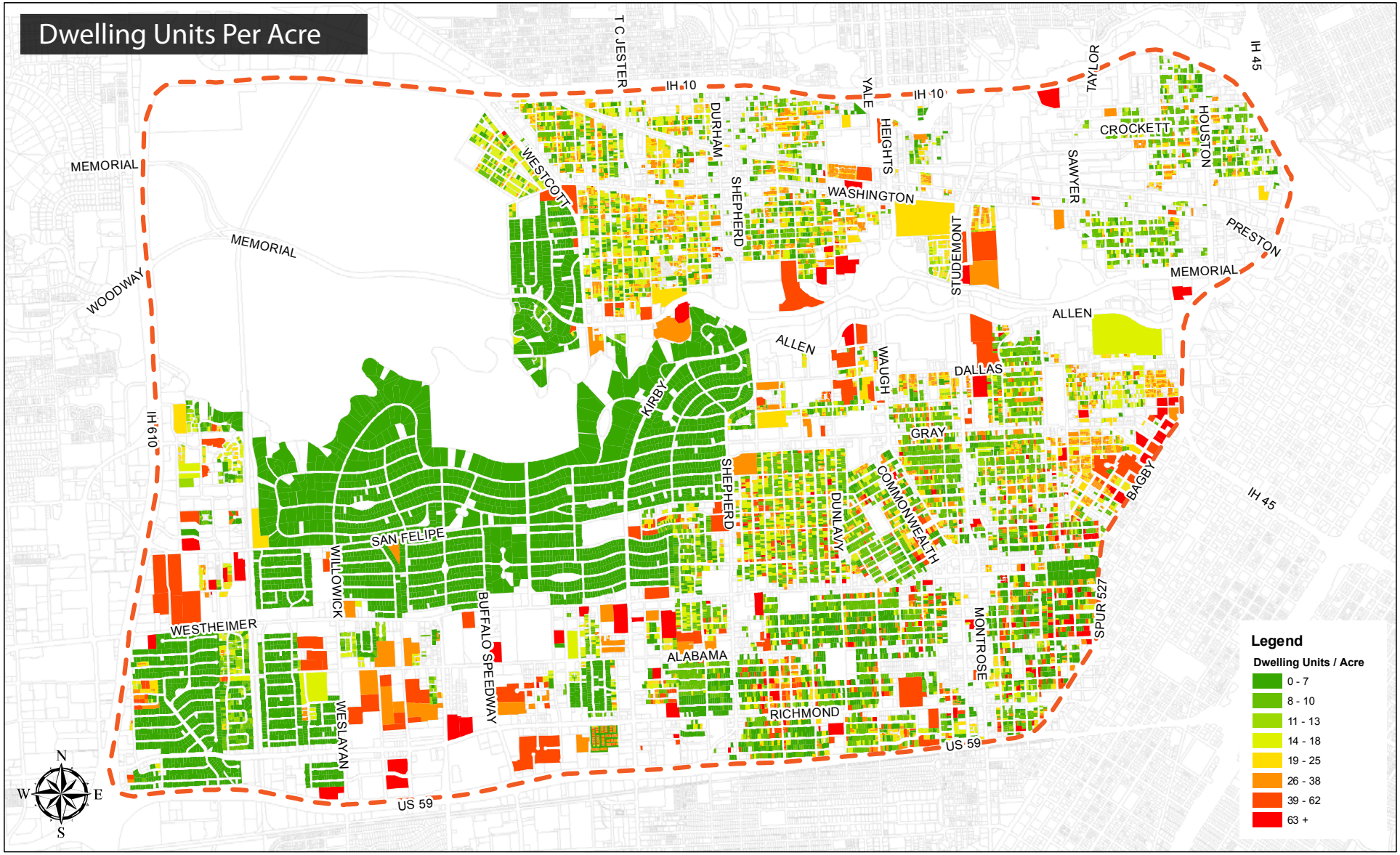








Planning & Development Department, City of Houston

## Insert Demographic Forecast Map - 2035



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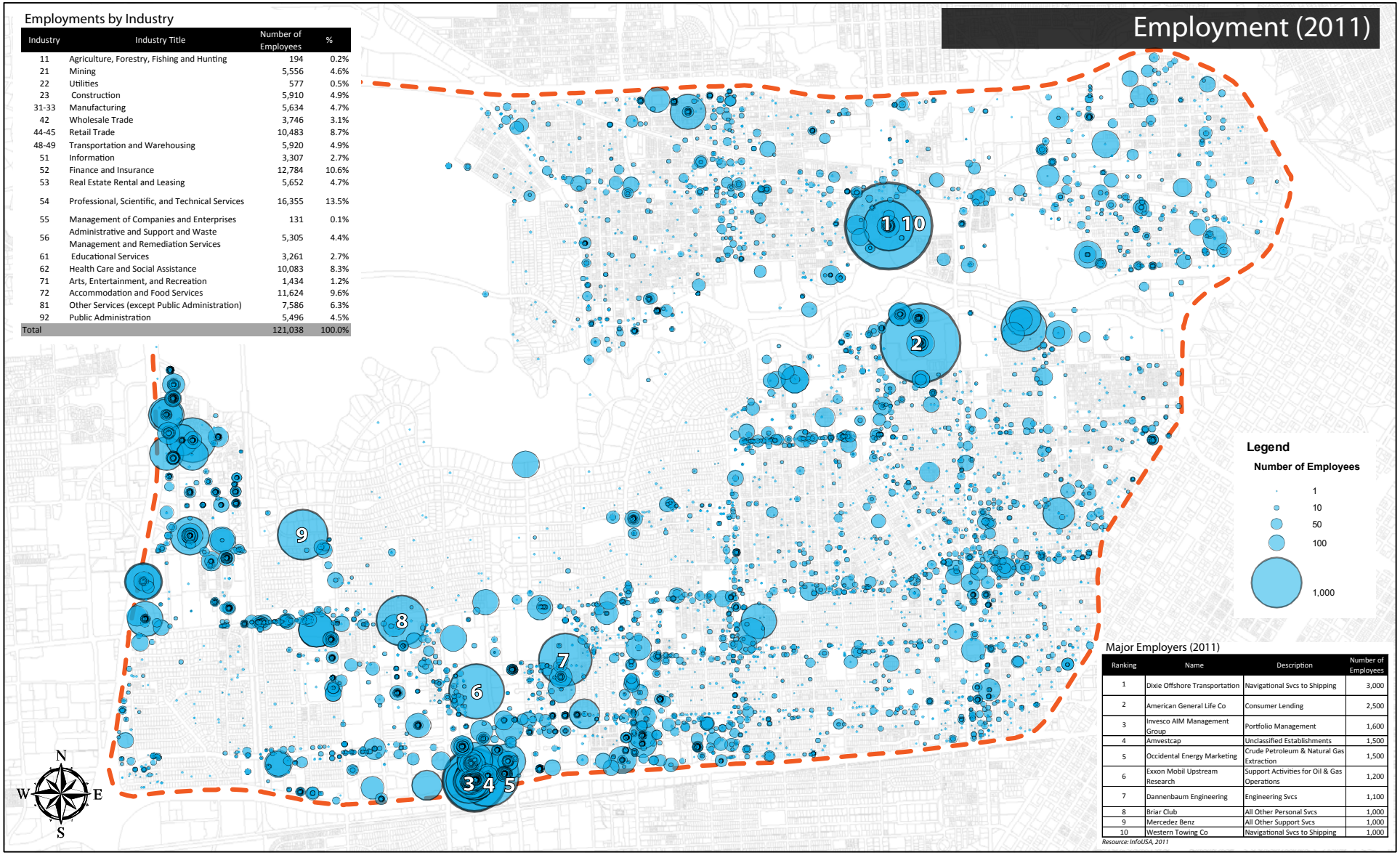
## Insert Demographic Forecast Map - 2035




Employments by Industry

| Industry | Industry Title | Number of Employees | % |
|---|---|---|---|
| 11 | Agriculture, Forestry, Fishing and Hunting | 194 | 0.2% |
| 21 | Mining | 5,556 | 4.6% |
| 22 | Utilities | 577 | 0.5% |
| 23 | Construction | 5,910 | 4.9% |
| 31-33 | Manufacturing | 5,634 | 4.7% |
| 42 | Wholesale Trade | 3,746 | 3.1% |
| 44-45 | Retail Trade | 10,483 | 8.7% |
| 48-49 | Transportation and Warehousing | 5,920 | 4.9% |
| 51 | Information | 3,307 | 2.7% |
| 52 | Finance and Insurance | 12,784 | 10.6% |
| 53 | Real Estate Rental and Leasing | 5,652 | 4.7% |
| 54 | Professional, Scientific, and Technical Services | 16,355 | 13.5% |
| 55 | Management of Companies and Enterprises | 131 | 0.1% |
| 56 | Administrative and Support and Waste Management and Remediation Services | 5,305 | 4.4% |
| 61 | Educational Services | 3,261 | 2.7% |
| 62 | Health Care and Social Assistance | 10,083 | 8.3% |
| 71 | Arts, Entertainment, and Recreation | 1,434 | 1.2% |
| 72 | Accommodation and Food Services | 11,624 | 9.6% |
| 81 | Other Services (except Public Administration) | 7,586 | 6.3% |
| 92 | Public Administration | 5,496 | 4.5% |
| Total | | 121,038 | 100.0% |

Major Employers (2011)

| Ranking | Name | Description | Number of Employees |
|---|---|---|---|
| 1 | Dixie Offshore Transportation | Navigational Svcs to Shipping | 3,000 |
| 2 | American General Life Co | Consumer Lending | 2,500 |
| 3 | Invesco AIM Management Group | Portfolio Management | 1,600 |
| 4 | Amvestcap | Unclassified Establishments | 1,500 |
| 5 | Occidental Energy Marketing | Crude Petroleum & Natural Gas Extraction | 1,500 |
| 6 | Exxon Mobil Upstream Research | Support Activities for Oil & Gas Operations | 1,200 |
| 7 | Dannenbaum Engineering | Engineering Svcs | 1,100 |
| 8 | Briar Club | All Other Personal Svcs | 1,000 |
| 9 | Mercedez Benz | All Other Support Svcs | 1,000 |
| 10 | Western Towing Co | Navigational Svcs to Shipping | 1,000 |

*Resource: InfoUSA, 2011*

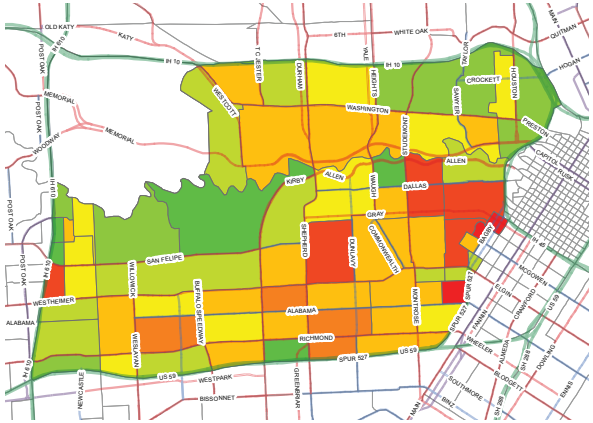
# PROJECTION BY TAZ

Inner West Loop Mobility Study

## Population Density by TAZ

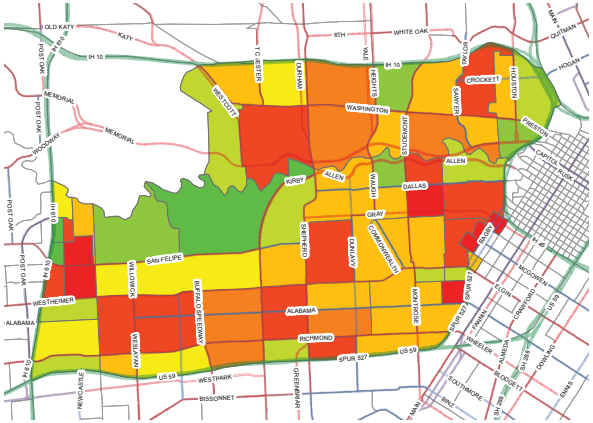
persons / acre

1 - 2 | 2 - 5 | 5 - 8 | 8 - 11 | 11 - 15 | 15 - 17 | 17 - 21 | 21 +



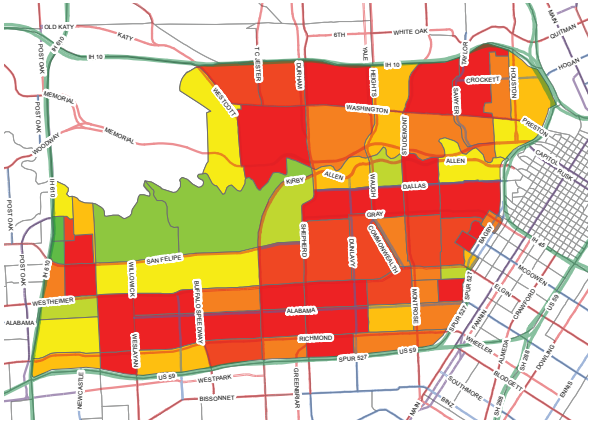
Average **9.8** persons/acre (without Memorial Park)

**2010**



Average **12.7** persons/acre (without Memorial Park)

**2018**



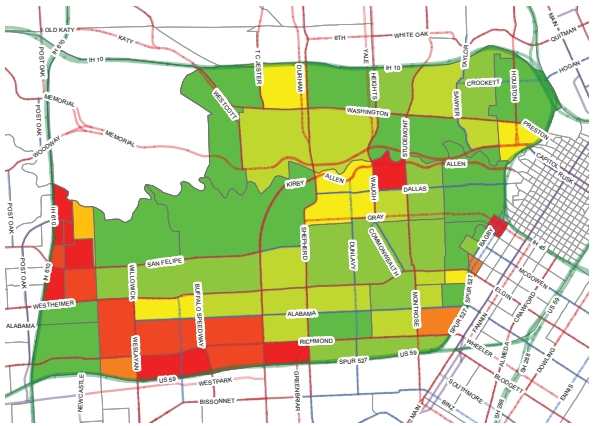
Average **16.9** persons/acre (without Memorial Park)

**2035**

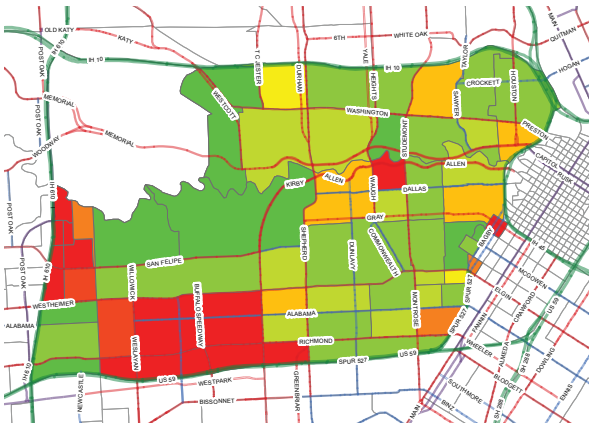
## Employment Density by TAZ

Jobs / acre

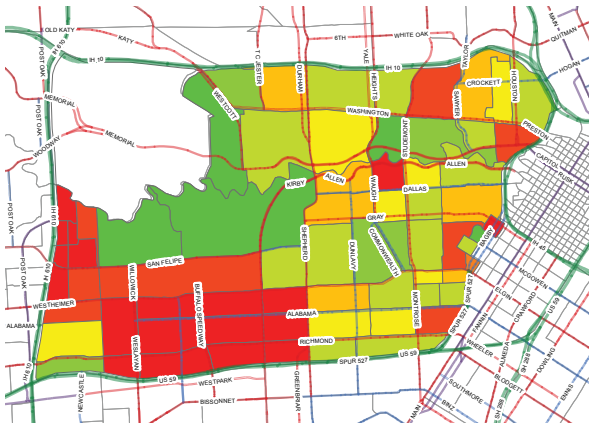
1 - 5 | 5 - 10 | 10 - 15 | 15 - 20 | 20 - 25 | 25 - 30 | 30 - 40 | 40 +



Average **15.1** jobs/acre (without Memorial Park)



Average **20.7** jobs/acre (without Memorial Park)



Average **33.7** jobs/acre (without Memorial Park)

June 14, 2012



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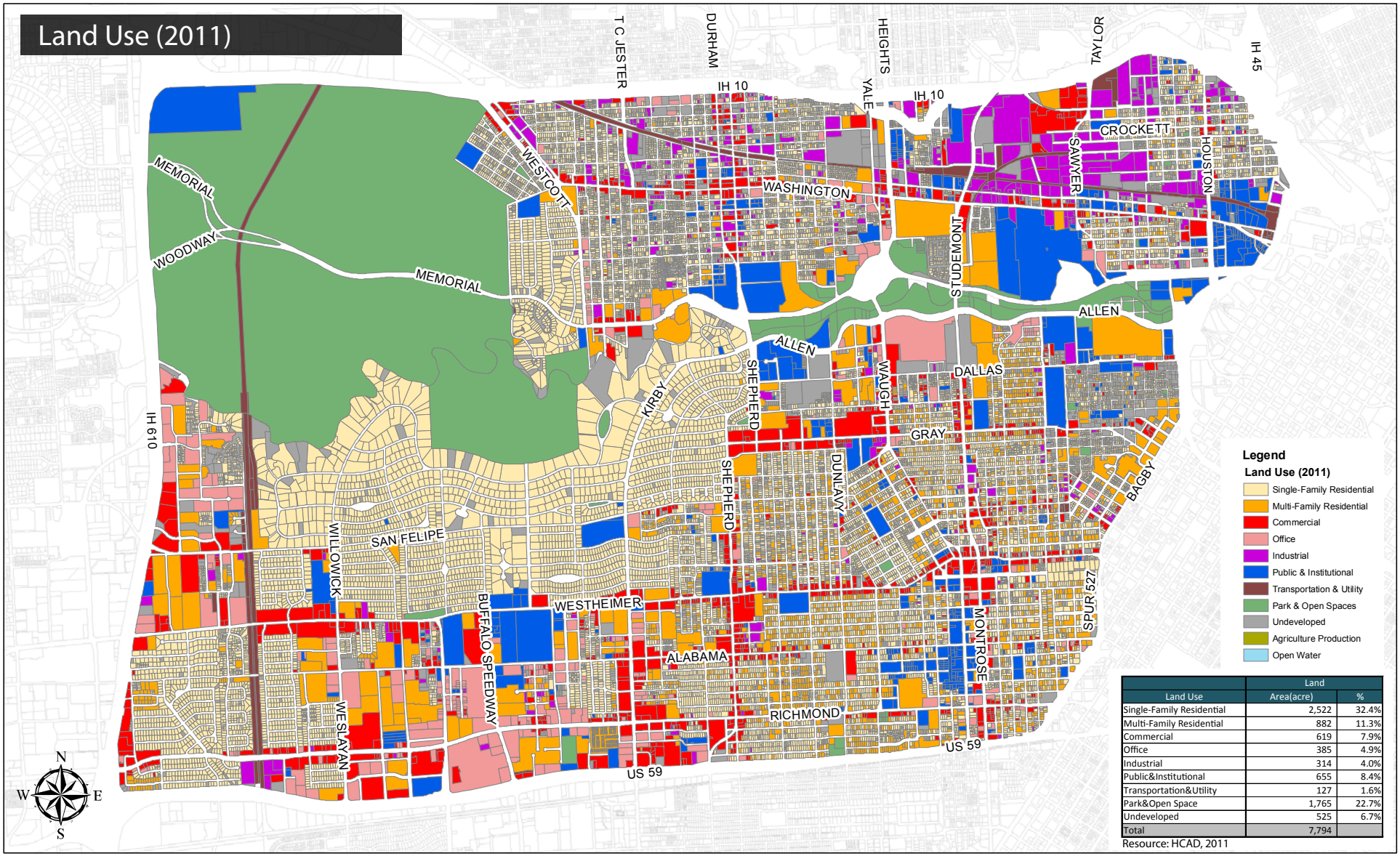



| Land Use | Land Area(acre) | Land % |
|---|---|---|
| Single-Family Residential | 2,522 | 32.4% |
| Multi-Family Residential | 882 | 11.3% |
| Commercial | 619 | 7.9% |
| Office | 385 | 4.9% |
| Industrial | 314 | 4.0% |
| Public&Institutional | 655 | 8.4% |
| Transportation&Utility | 127 | 1.6% |
| Park&Open Space | 1,765 | 22.7% |
| Undeveloped | 525 | 6.7% |
| Total | 7,794 | |

Resource: HCAD, 2011

Planning & Development Department, City of Houston

# POPULATION /EMPLOYMENT CHANGE & PROJECTION

Inner West Loop Mobility Study

Population Change (1950 - 2010) & Projection (2018 - 2035) * CAGR: Compound Annual Growth Rate

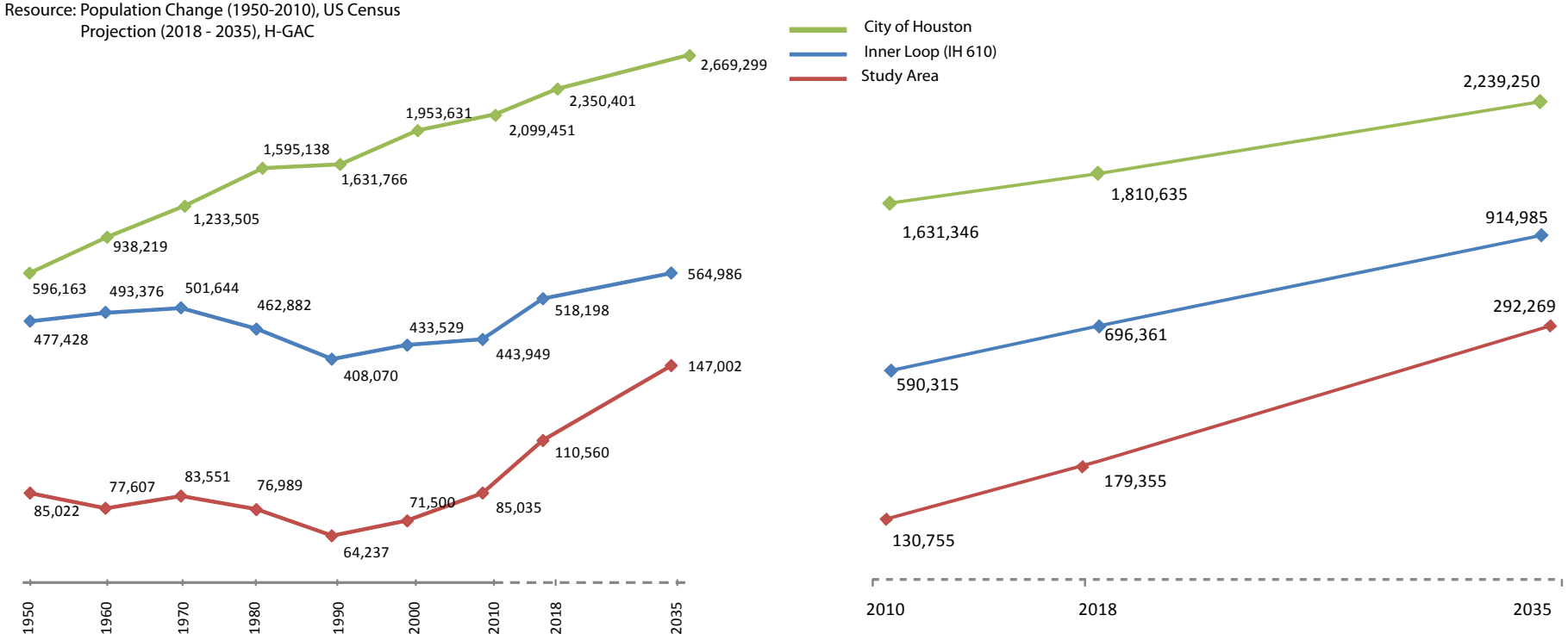
| Year | Study Area | CAGR* | Inner Loop (IH 610) | CAGR* | City of Houston | CAGR* |
|---|---|---|---|---|---|---|
| 1950 | 85,022 | | 477,428 | | 596,163 | |
| 1960 | 77,607 | -0.9% | 493,376 | 0.3% | 938,219 | 5.7% |
| 1970 | 83,551 | 0.8% | 501,644 | 0.2% | 1,233,505 | 3.1% |
| 1980 | 76,989 | -0.8% | 462,882 | -0.8% | 1,595,138 | 2.9% |
| 1990 | 64,237 | -1.7% | 408,070 | -1.2% | 1,631,766 | 0.2% |
| 2000 | 71,500 | 1.1% | 433,529 | 0.6% | 1,953,631 | 2.0% |
| 2010 | 85,035 | 1.9% | 443,949 | 0.2% | 2,099,451 | 0.7% |
| 2018 | 110,560 | 3.8% | 518,198 | 2.1% | 2,350,401 | 1.5% |
| 2035 | 147,002 | 1.9% | 564,986 | 0.5% | 2,669,299 | 0.8% |

Resource: Population Change (1950-2010), US Census
Projection (2018 - 2035), H-GAC

Employment Projection (2010 - 2035)

| Year | Study Area | CAGR | Inner Loop (IH 610) | CAGR | City of Houston | CAGR |
|---|---|---|---|---|---|---|
| 2010 | 130,755 | -0.4% | 590,315 | 0.4% | 1,631,346 | 2.2% |
| 2018 | 179,355 | 4.6% | 696,361 | 2.2% | 1,810,635 | 1.4% |
| 2035 | 292,269 | 3.7% | 914,985 | 1.8% | 2,239,250 | 1.4% |

Resource: Projection (2018 - 2035), H-GAC




June 14, 2012



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## Creating a Combined Scenario

Upon reviewing the results of the four independent scenarios, a group of stakeholders from the various agencies involved with this project met to discuss the need for the development of a preferred scenario on which to develop the future intersection conditions. The group discussed the merits and shortcomings of each of the scenarios and determined that a combined scenario would include two of the four components. First, the group determined that given the density and travel patterns within the Study Area transit was essential to any future transportation network within the Inner West Loop. As such, the components of Scenario 1 were included in the combined scenario. Second, the group analyzed the concept of the combined Urban Interchange and determine that this project should also be included in the combined scenario. The group elected to not include either of the other scenarios components given the need for significant amounts of analysis on both project concepts before any further consideration could be given.

The results for the combined scenario, or Scenario 5, are shown alongside the results for the other independent scenarios.

## Scenario Measures of Effectiveness

The travel demand model results are presented in Pages 62-66. These results highlight the typical Measures of Effectiveness that are used for scenario comparisons during travel demand forecasting. The interesting component of this comparison comes when considering the amount of trip diversion assumed within the results, and recognizing that increases in Vehicle Miles Traveled or Delay within the network can be influenced dramatically by additional trips within the network because of latent demand along the regional highways.

Additionally, it is worth noting that the combined scenario is projected to encounter more than 330,000 additional trips within the transportation system while reducing the impacts of travel for the four major Measures of Effectiveness as compared to the baseline forecast.

The Maps that conclude Appendix A provide a summary of the Level of Service calculations and the projected daily traffic volumes from the Travel Demand Model Scenario Results. This roadway link level of analysis is helpful for determining corridors that may need further consideration for a wide variety of transportation system enhancements.

## Limitations within the Analysis

It is again worth noting that the travel demand model is a useful tool for comparing the types of projects discussed within the last two pages. However, the current version of the travel demand model does not anticipate the impact that pedestrian and bicycle facilities would have upon the travel patterns given the limited amount of data currently available on those modes within the study area, and the broad reaching nature of the analysis platform.

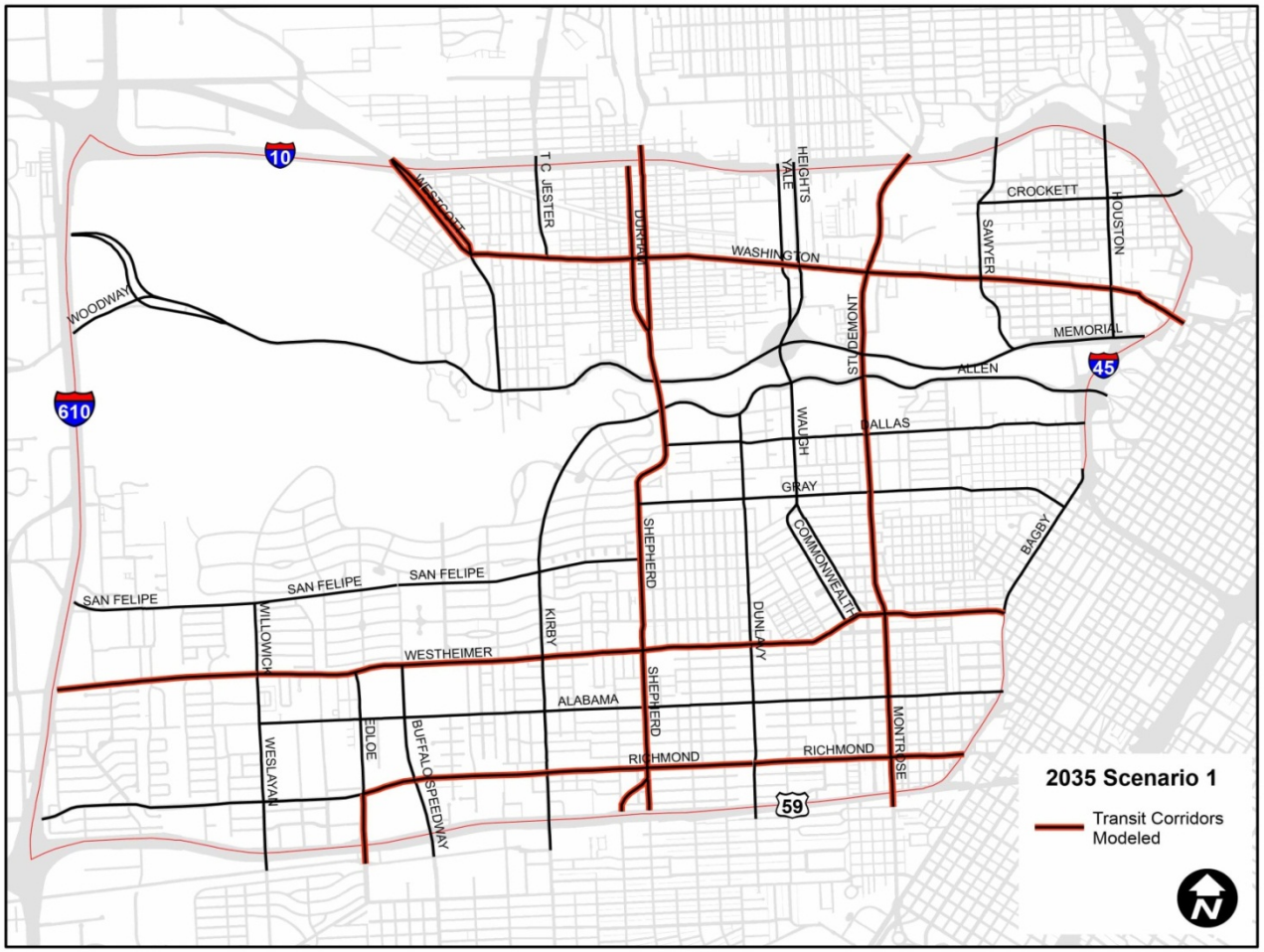
That is not to say that pedestrian and bicycle linkages within the transportation network do not merit further investigation and investment, rather that the tool applied in this section of the analysis is not appropriate for those considerations. The study process included an analysis of those alternative modes outside of the travel demand forecasting process, and the resulting project concepts have already been demonstrated..

# Modeling Scenarios – All Transit

Ten minute headways in peak, 15 off peak.

Routes include Westheimer from BW8 to Main Street, Washington from Post Oak to courts complex, Shepherd and Montrose

Richmond rail as planned for 2035



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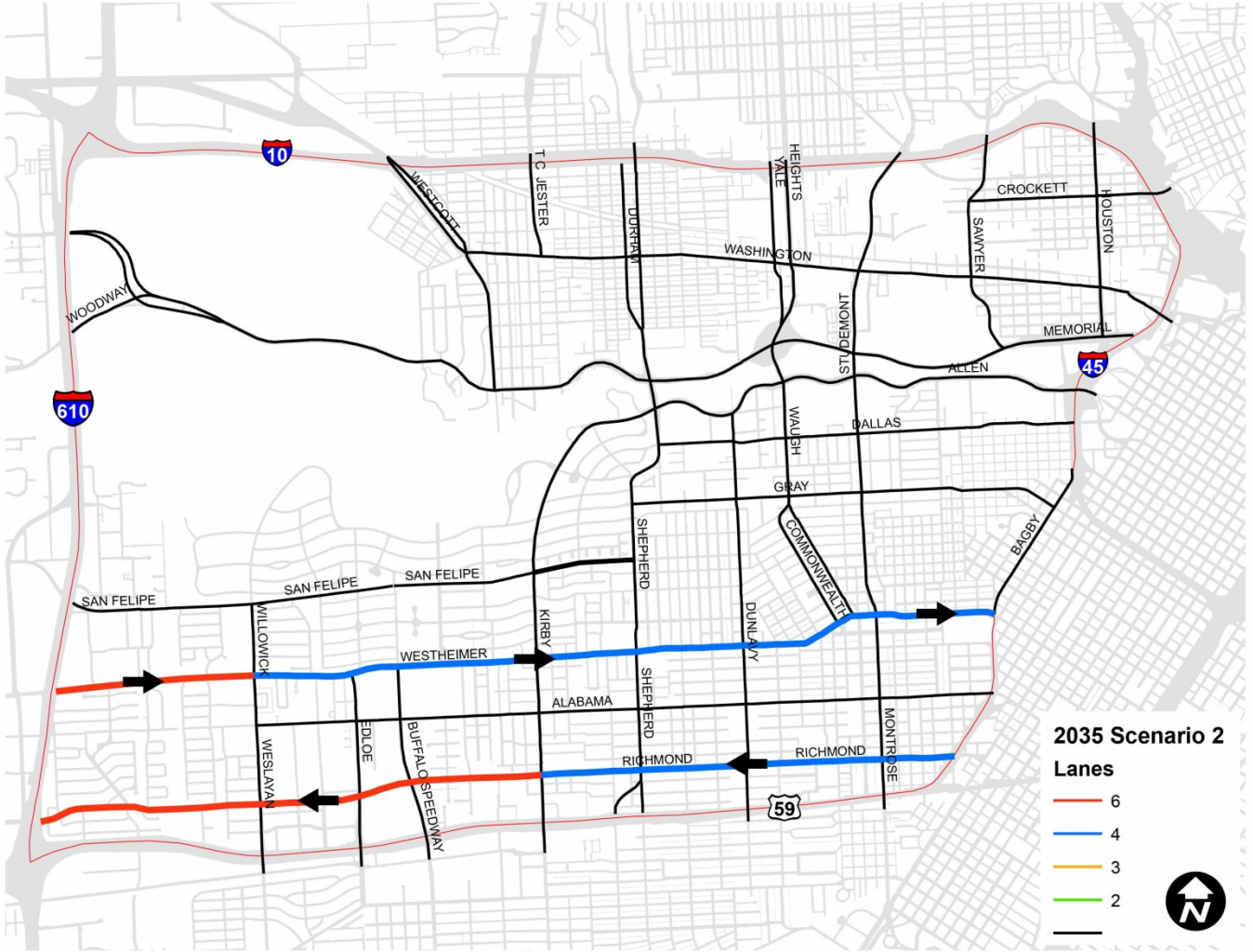
# Modeling Scenarios – All Roads

One-Way Pair concept for:

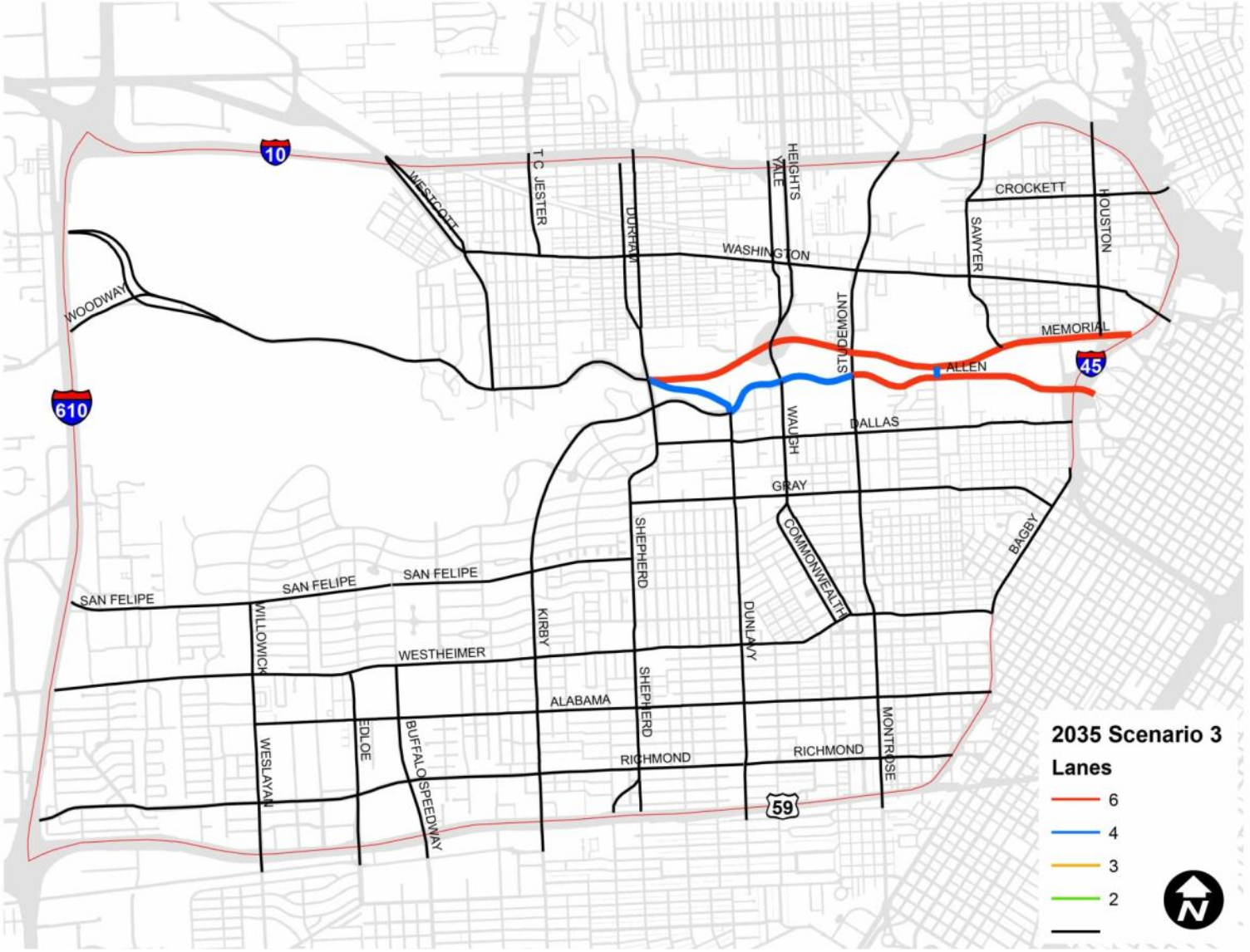
**Westheimer and Richmond**.



# Modeling Scenarios - Interchange

Urban Interchange Concept:

**Direct Connections for Allen Pkwy and Memorial.**



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# Modeling Scenarios – Spur 527

Highway Interchange Concept:

**Direct Connections for Spur 527 and IH-45**.

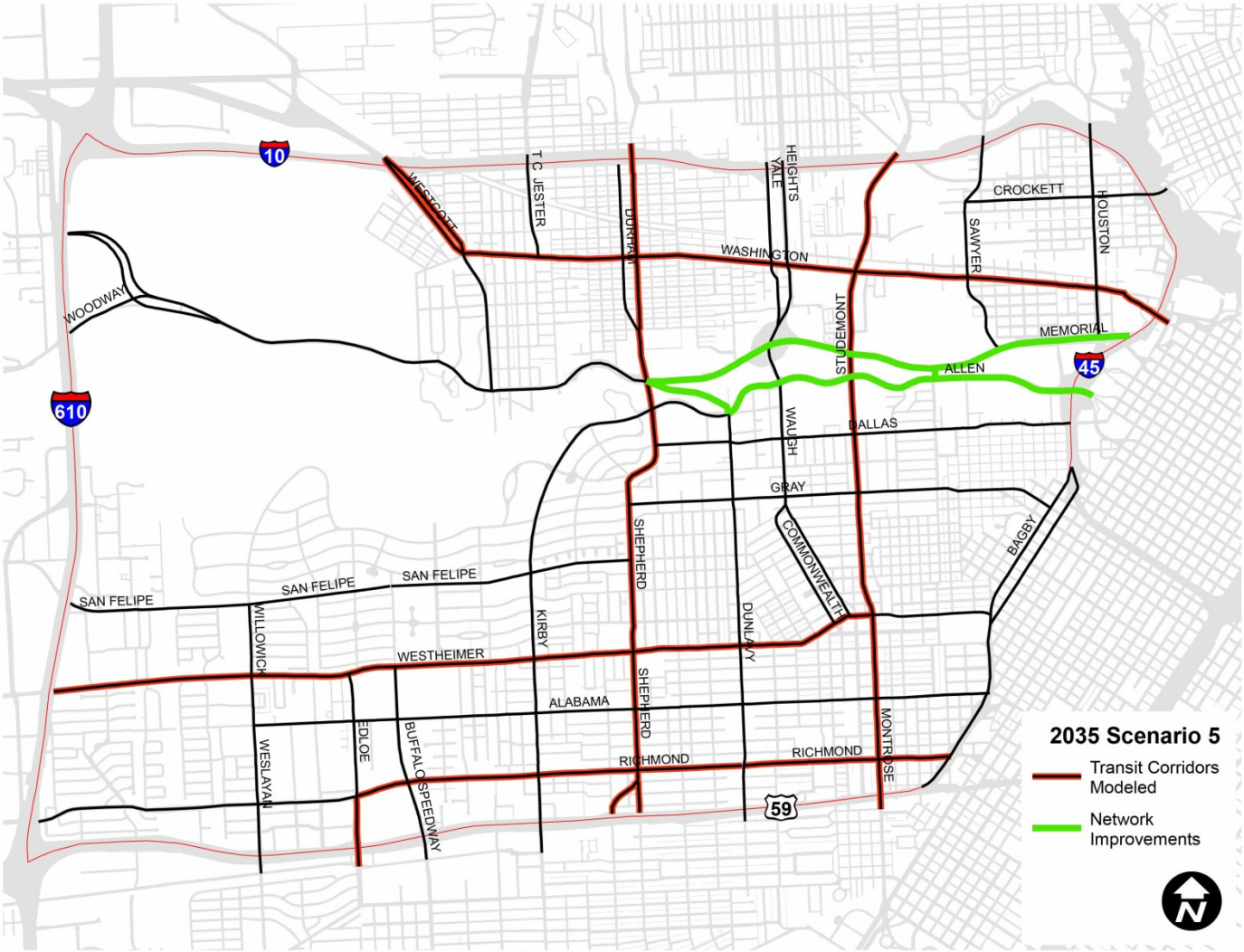
# Modeling Scenarios – Combined

Ten minute headways in peak, 15 off peak.

Routes include Westheimer from BW8 to Main Street, Washington from Post Oak to courts complex, Shepherd and Montrose

Richmond rail as planned for 2035

Combined Intersection of Allen Pkwy/Memorial/ Shepherd/Kirby.



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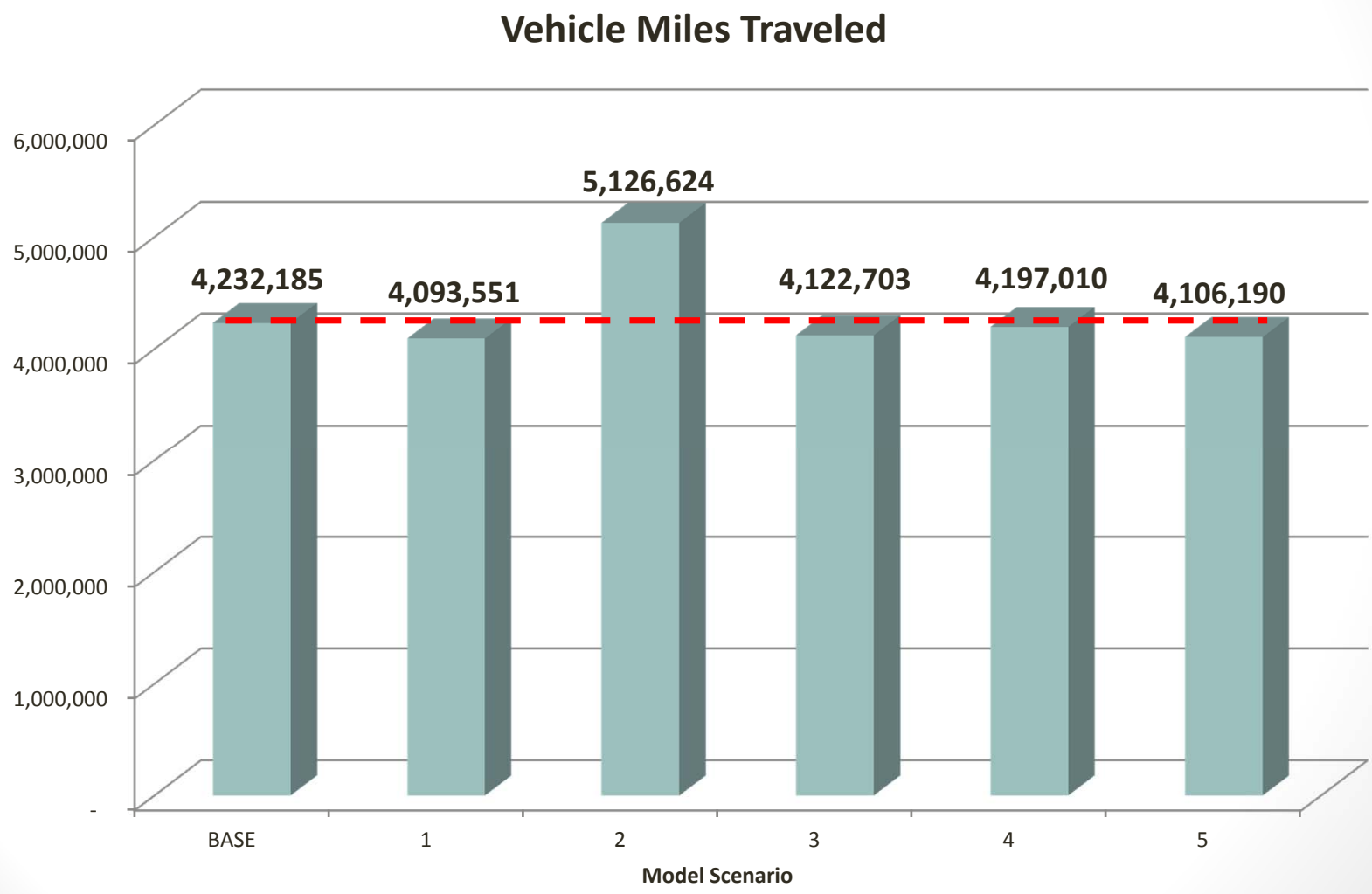
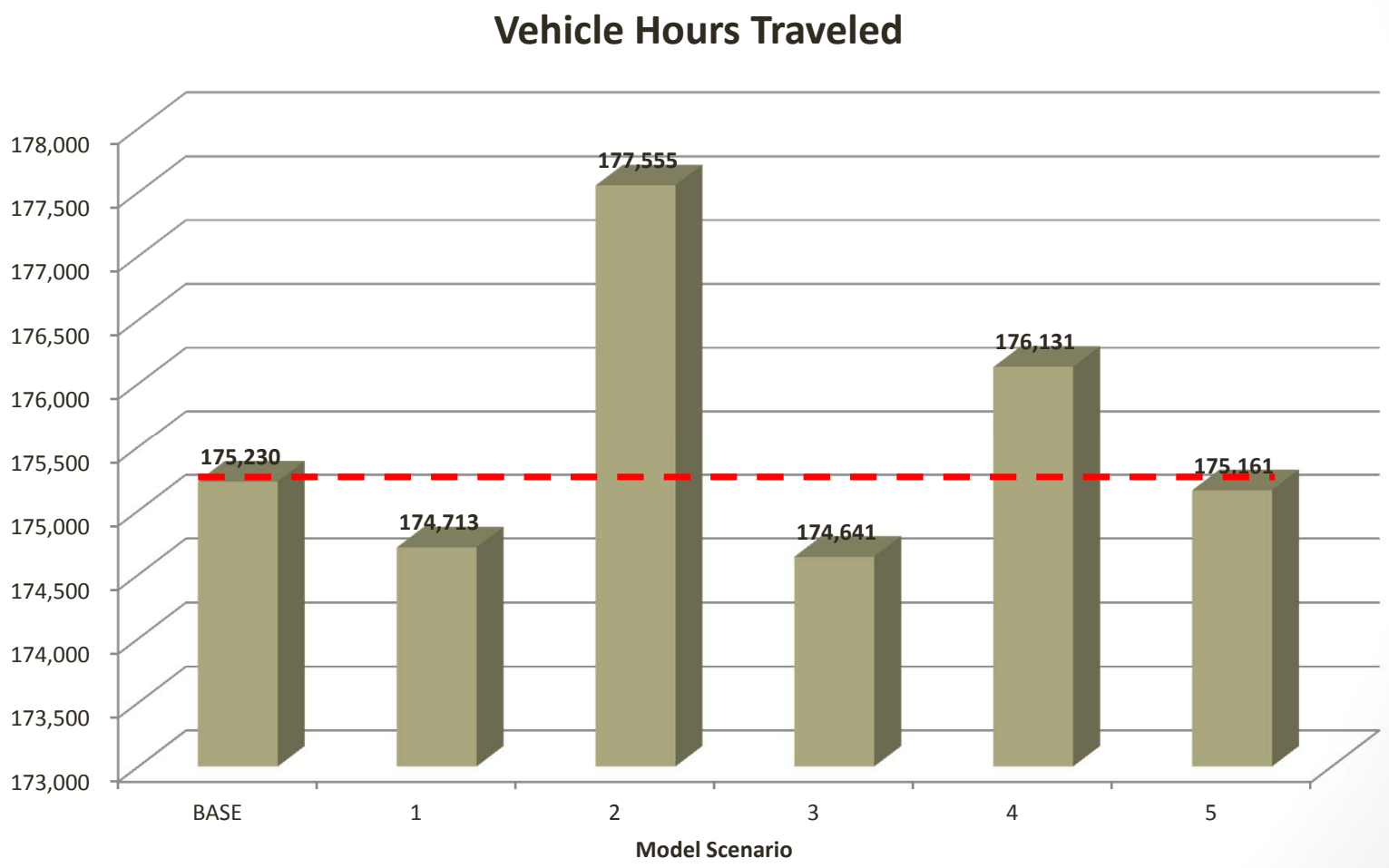
# Scenario Results - VMT



# Scenario Results - VHT



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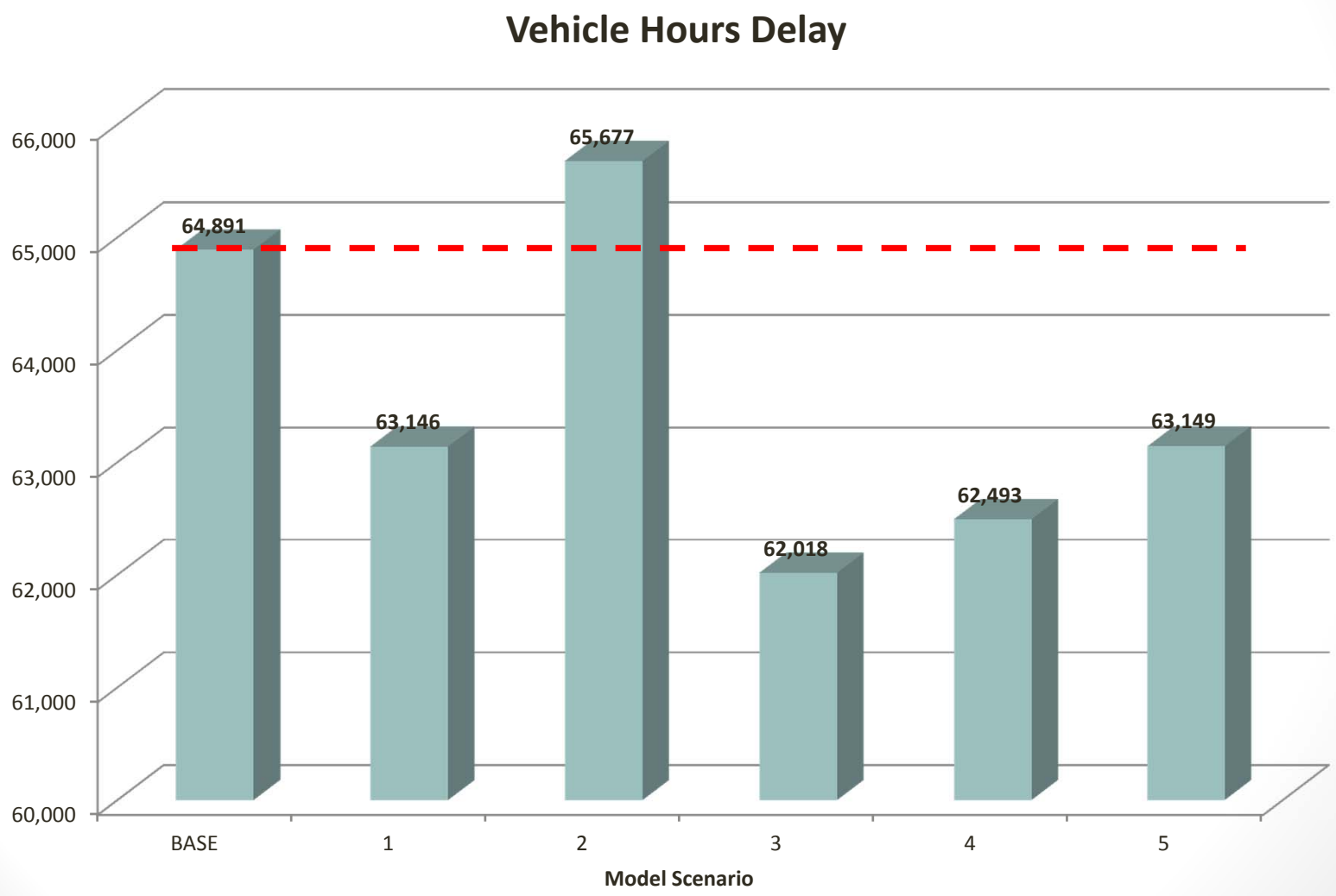
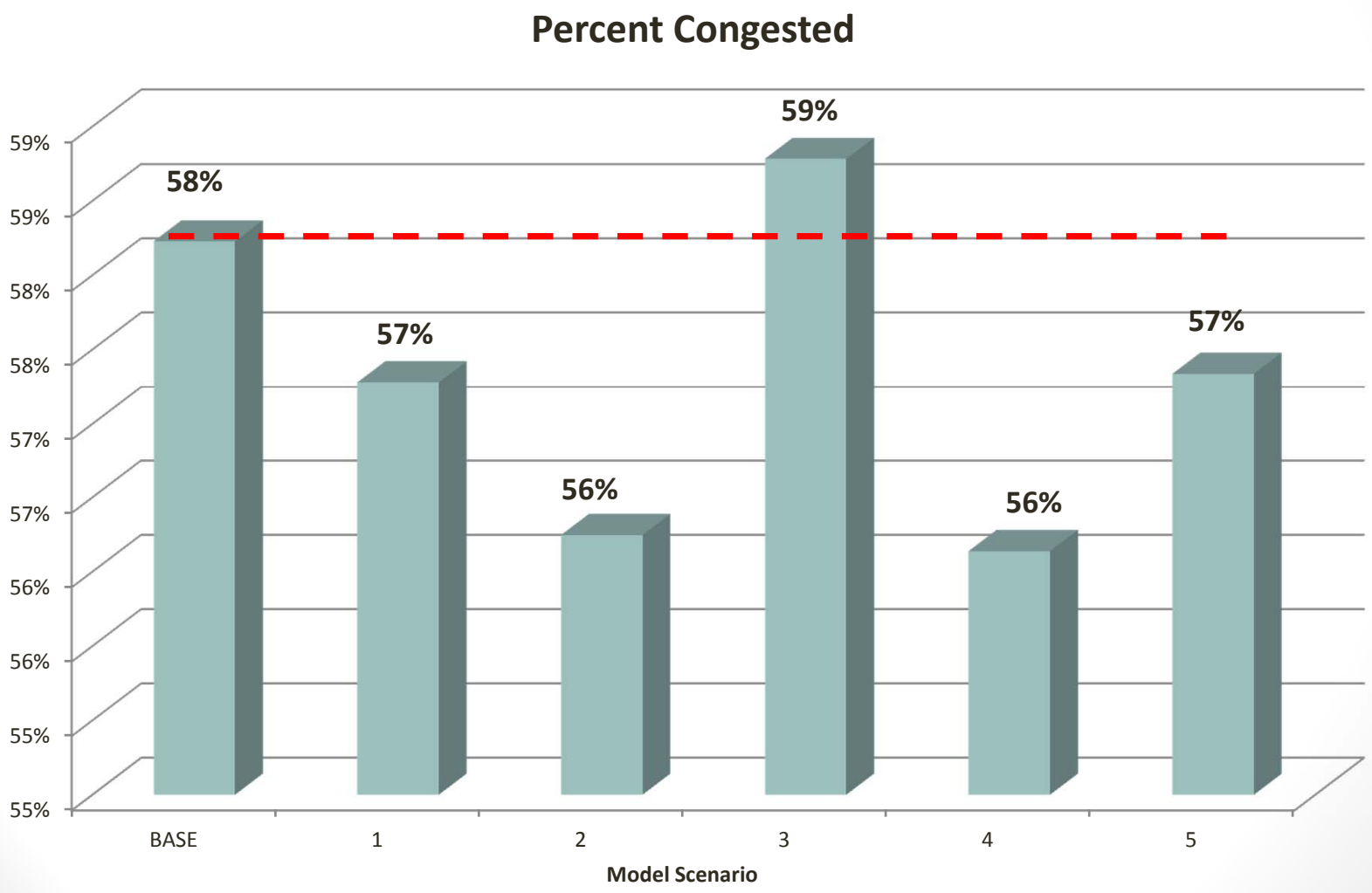
# Scenario Results – Delay



# Scenario Results – % Congested



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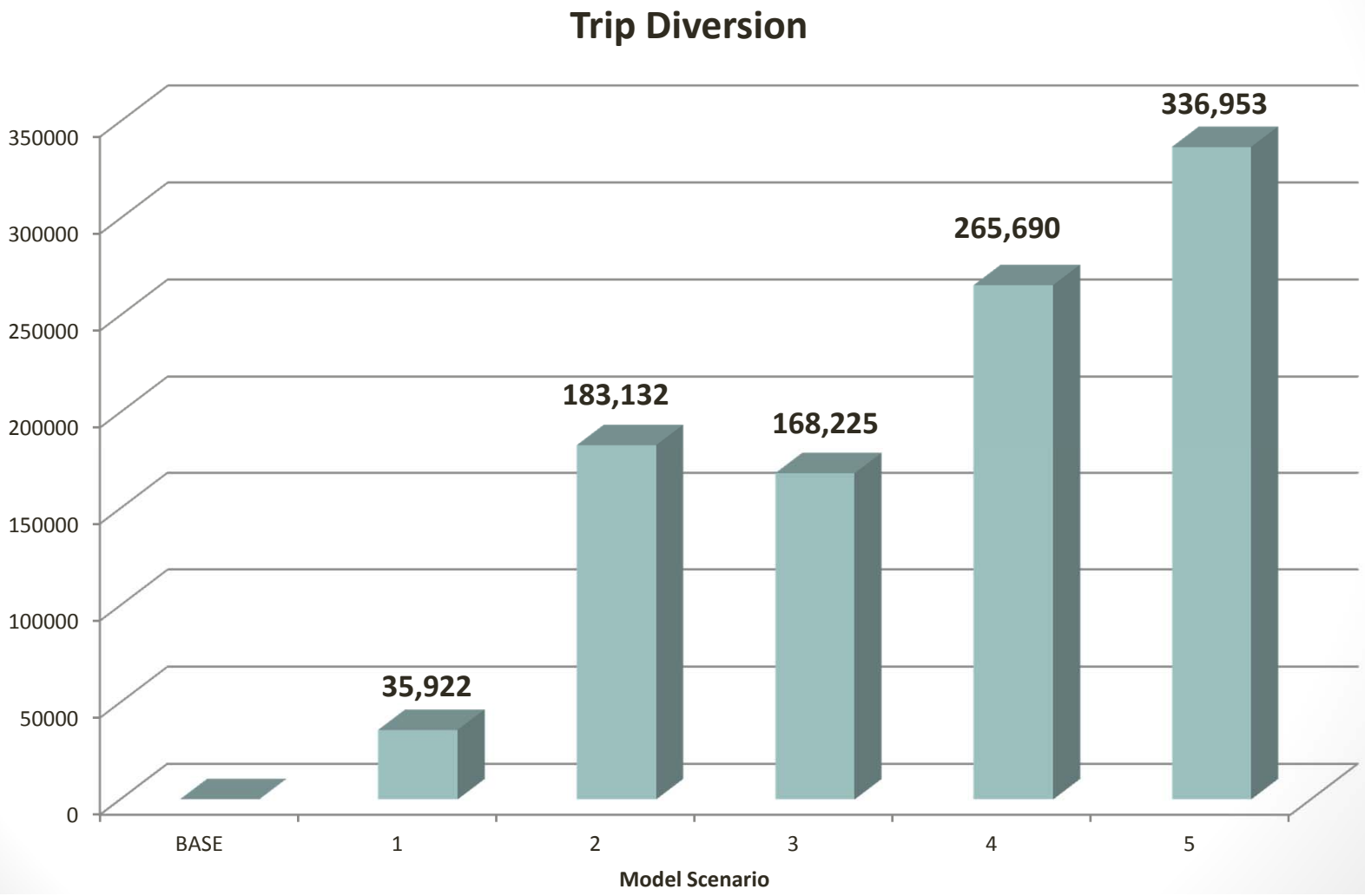
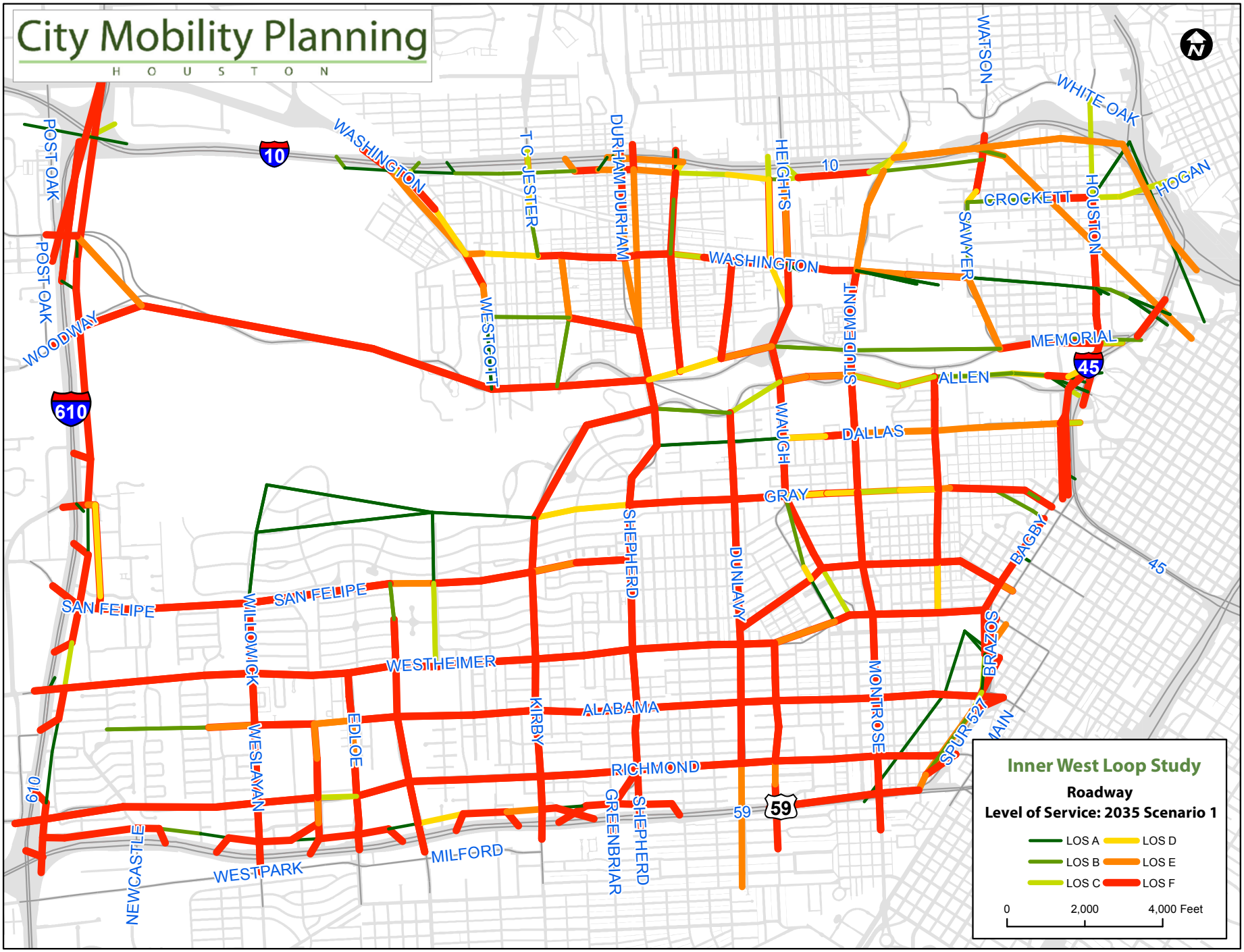
# Trip Diversion




City Mobility Planning
HOUSTON
POST OAK
WASHINGTON
T C JESTER
DURHAM
HEIGHTS
WATSON
WHITE OAK
HOGAN
HOUSTON
SAWYER
CROCKETT
WESTCOTT
WASHINGTON
TUAM
STUDEMONT
MEMORIAL
ALLEN
WOODWAY
610
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45
WAUGH
DALLAS
GRAY
SHEPHERD
DUNLAVY
BAGBY
SAN FELIPE
WILLOWICK
WESTHEIMER
ALABAMA
KIRBY
MONTROSE
SPUR 527
RICHMOND
WESLAYAN
EDLOE
GREENBRIAR
59
NEWCASTLE
WESTPARK
MILFORD
Inner West Loop Study
Roadway
Level of Service: 2035 Scenario 1
LOS A
LOS B
LOS C
LOS D
LOS E
LOS F
0
2,000
4,000 Feet



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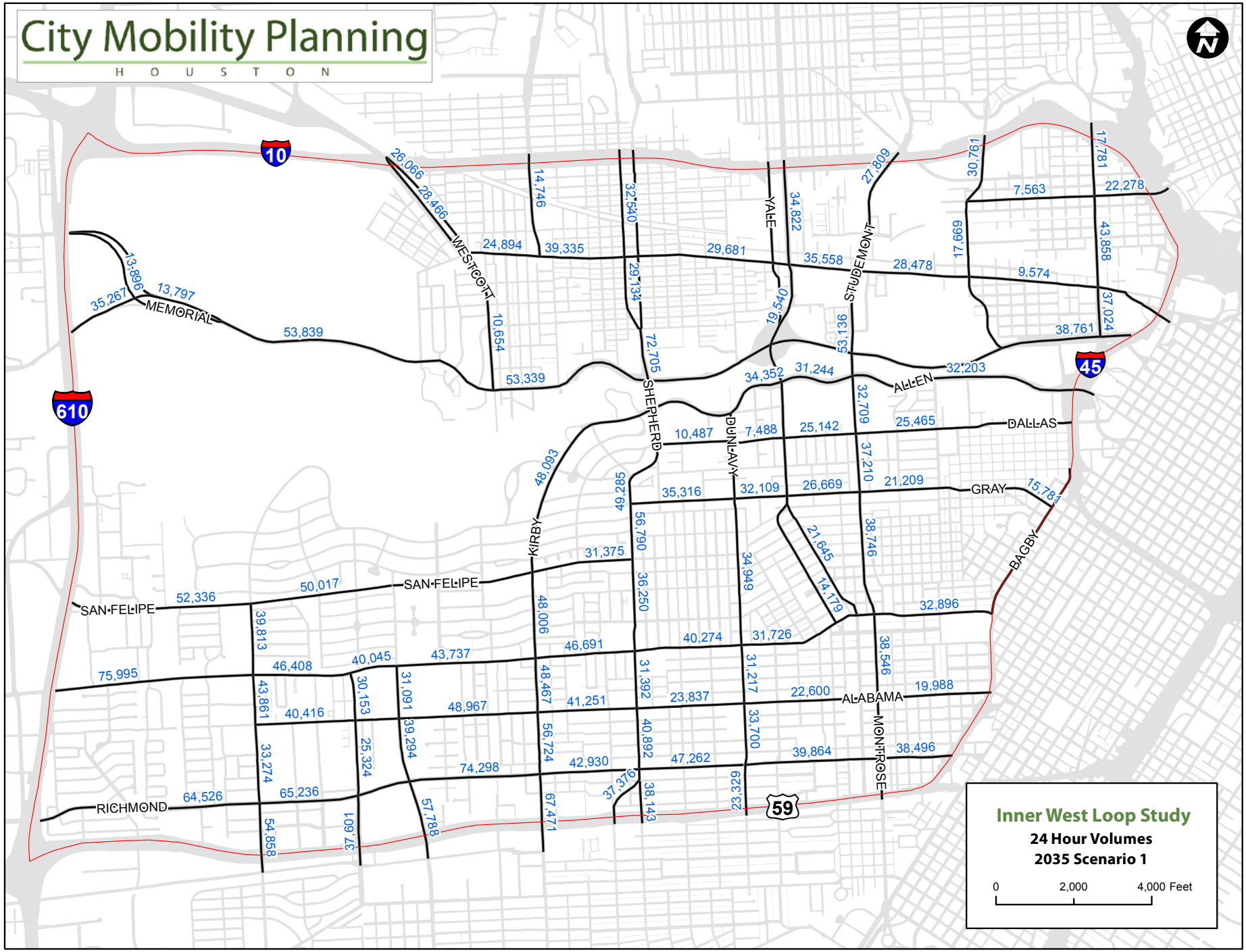
City Mobility Planning
HOUSTON
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MEMORIAL
WESTCOTT
SHEPHERD
DUNLAVY
YALE
STUDEMONT
KIRBY
ALLEN
DALLAS
GRAY
BAGBY
SAN FELIPE
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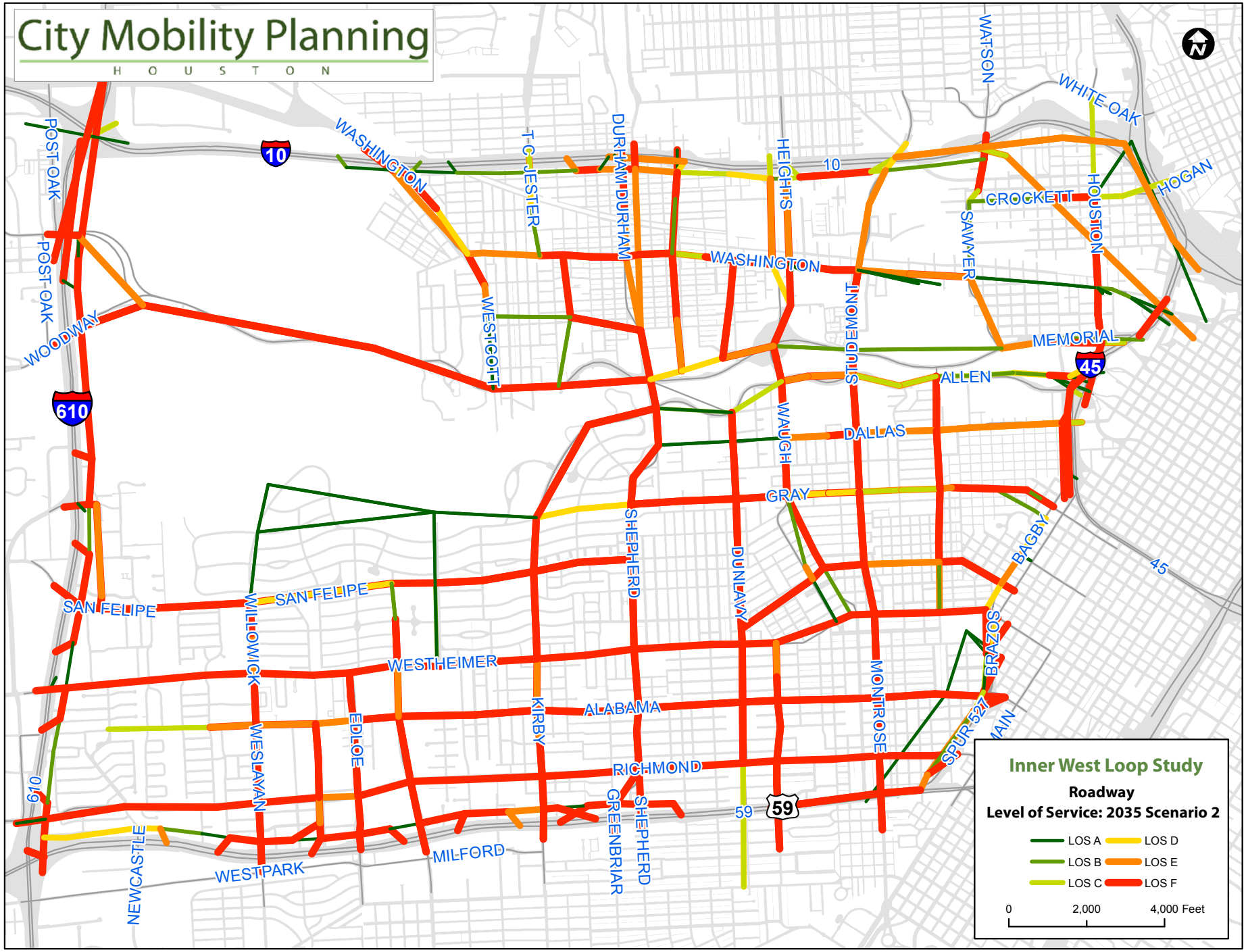
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WESLAYAN
EDLOE
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WESTPARK
MILFORD
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Roadway
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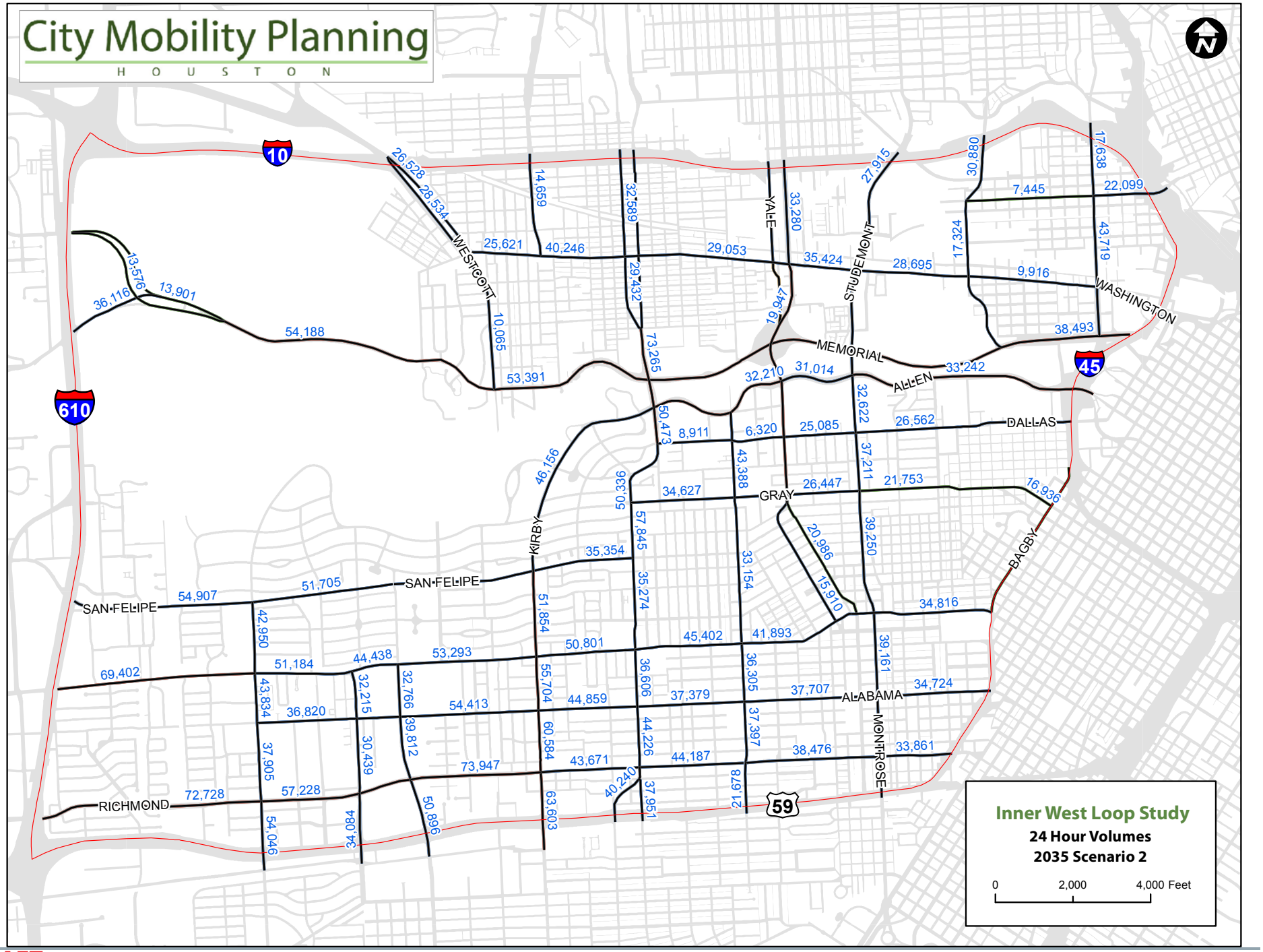
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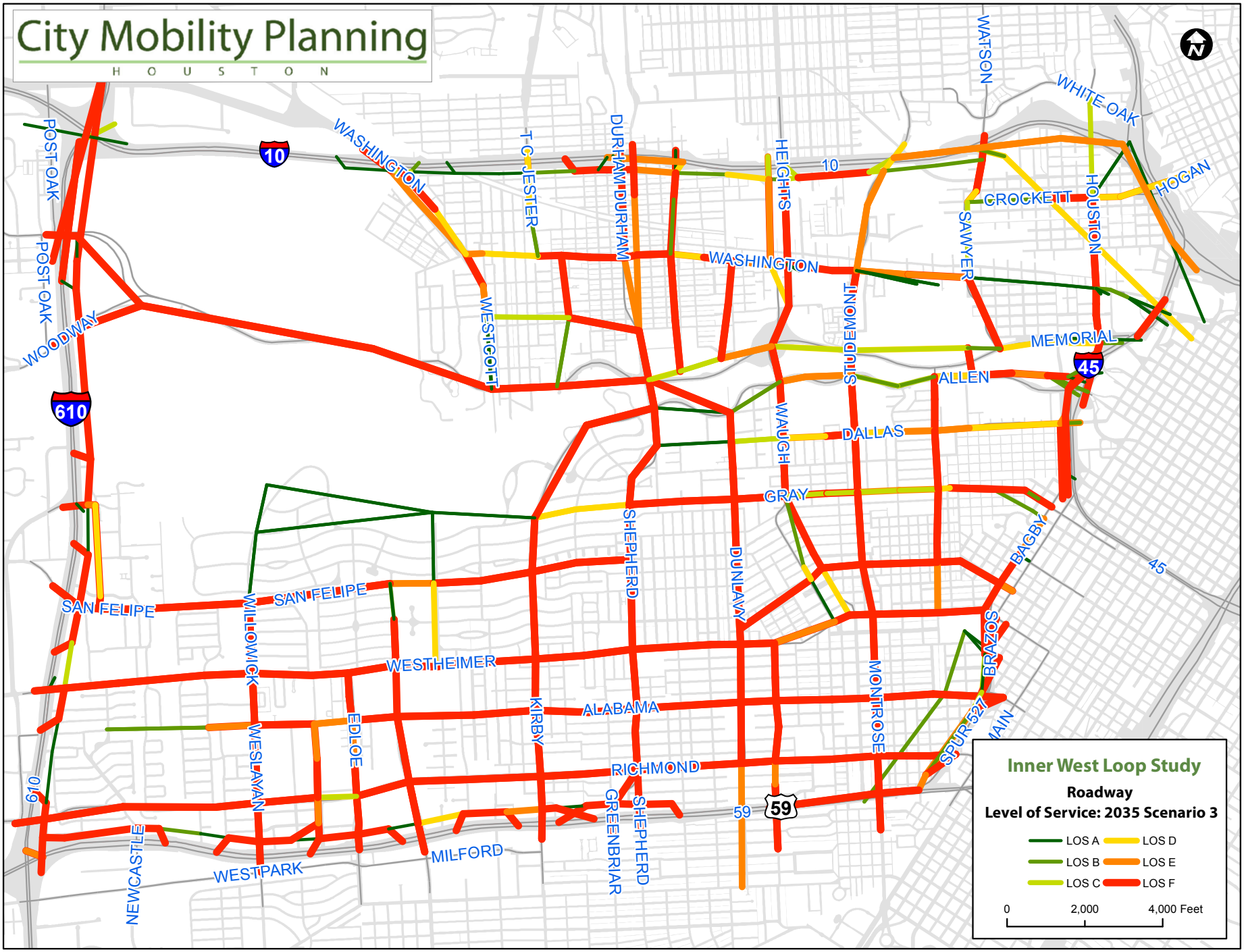
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RICHMOND
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NEWCASTLE
WESTPARK
MILFORD
Inner West Loop Study
Roadway
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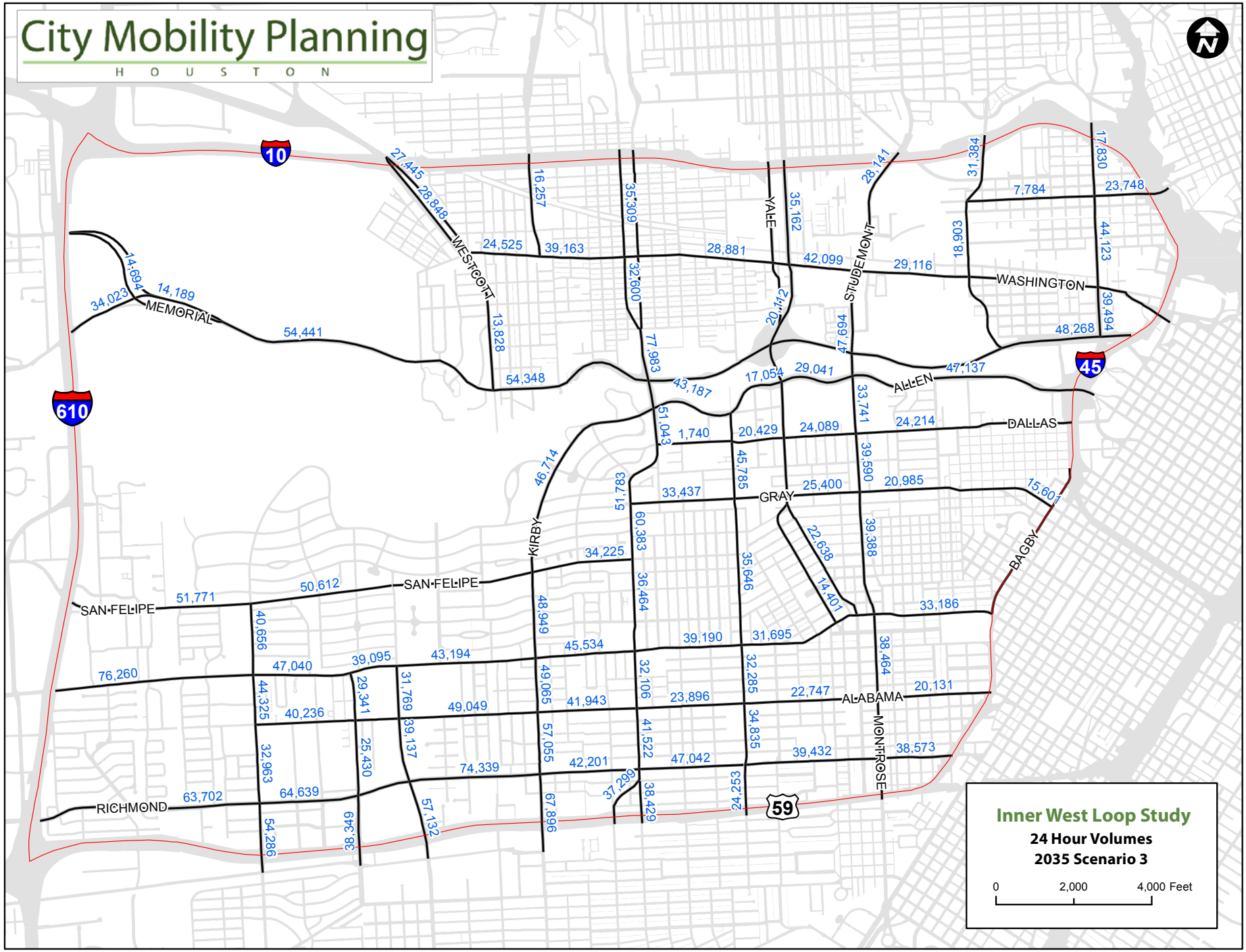
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24 Hour Volumes
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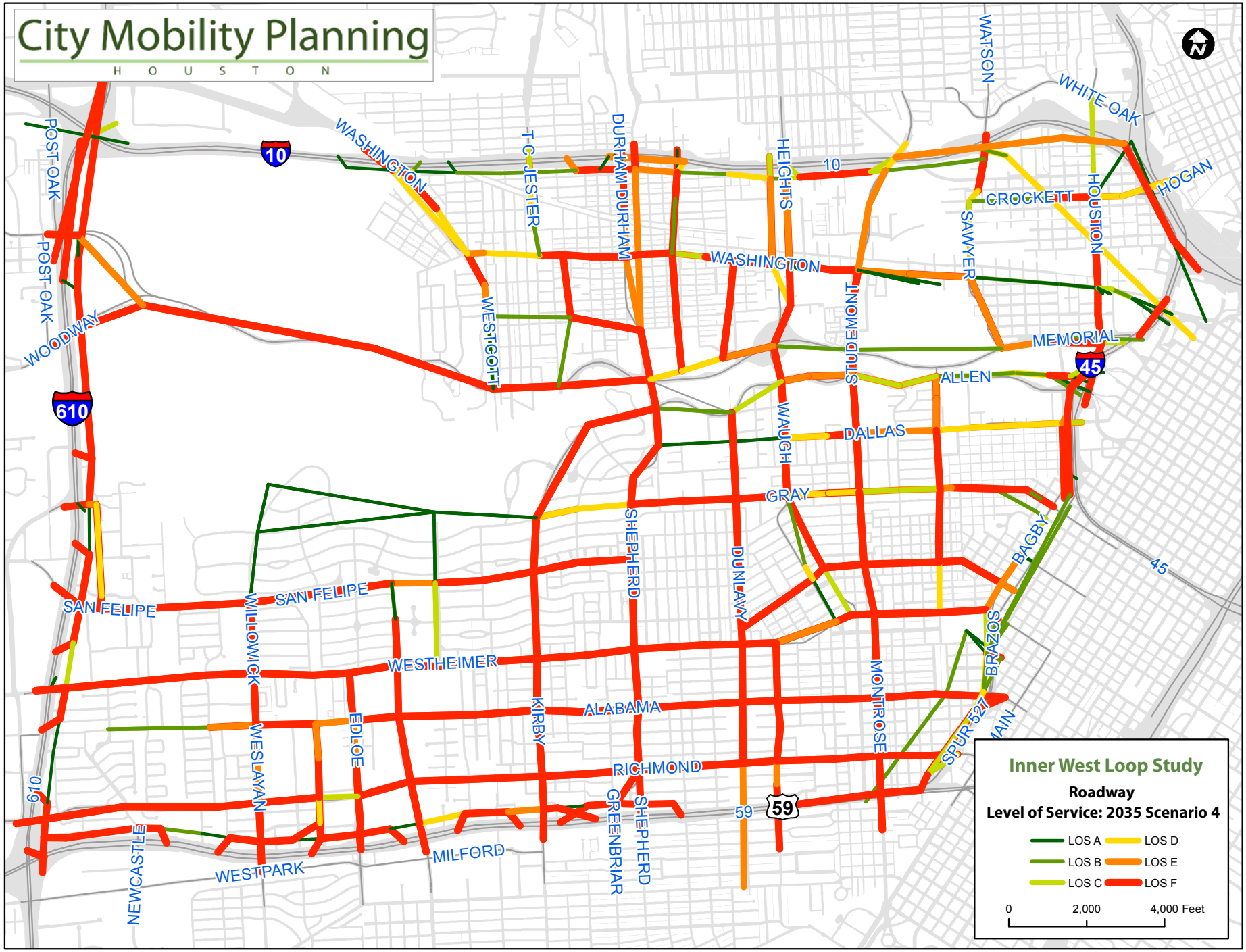
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NEWCASTLE
WESTPARK
MILFORD
Inner West Loop Study
Roadway
Level of Service: 2035 Scenario 4
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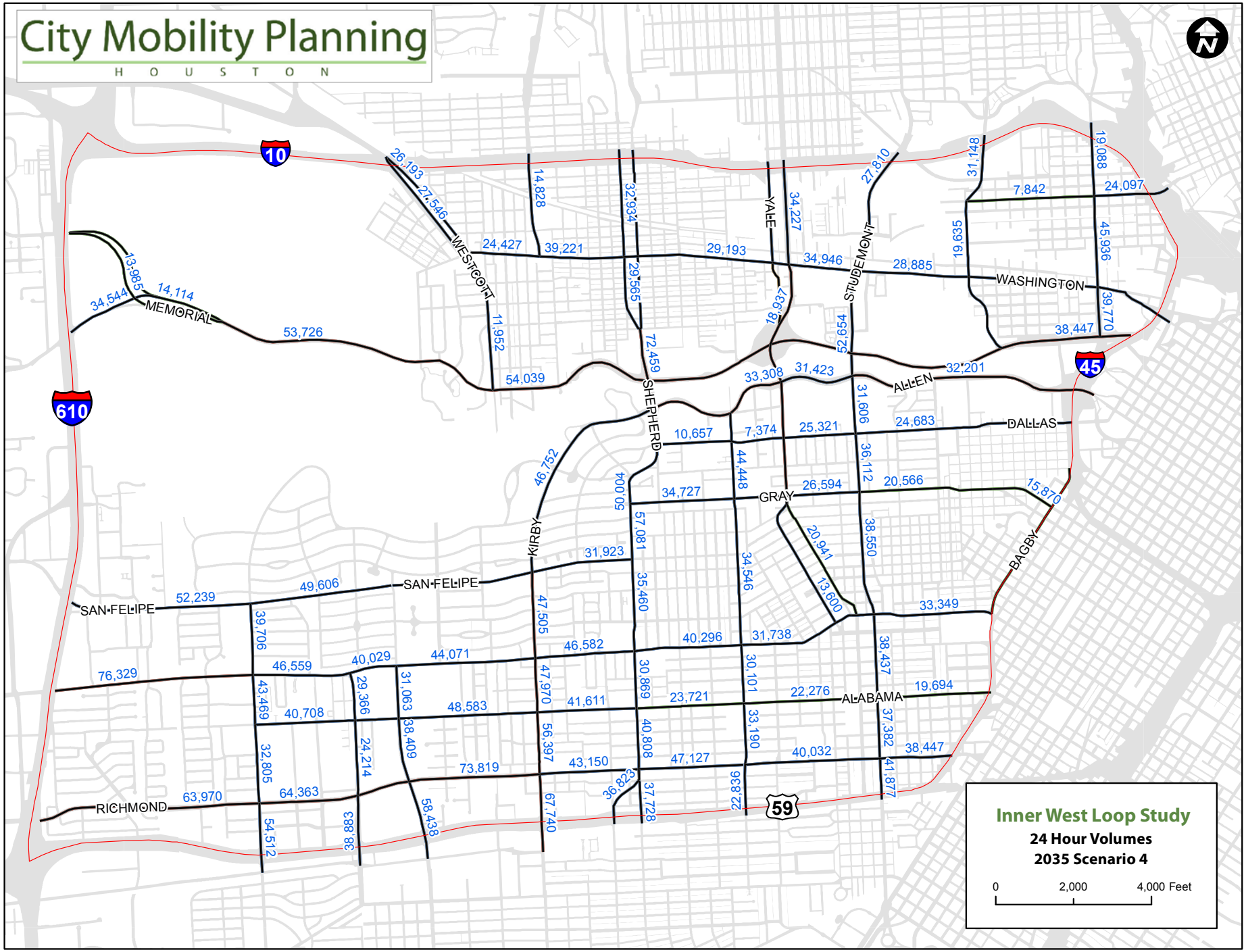
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Inner West Loop Study
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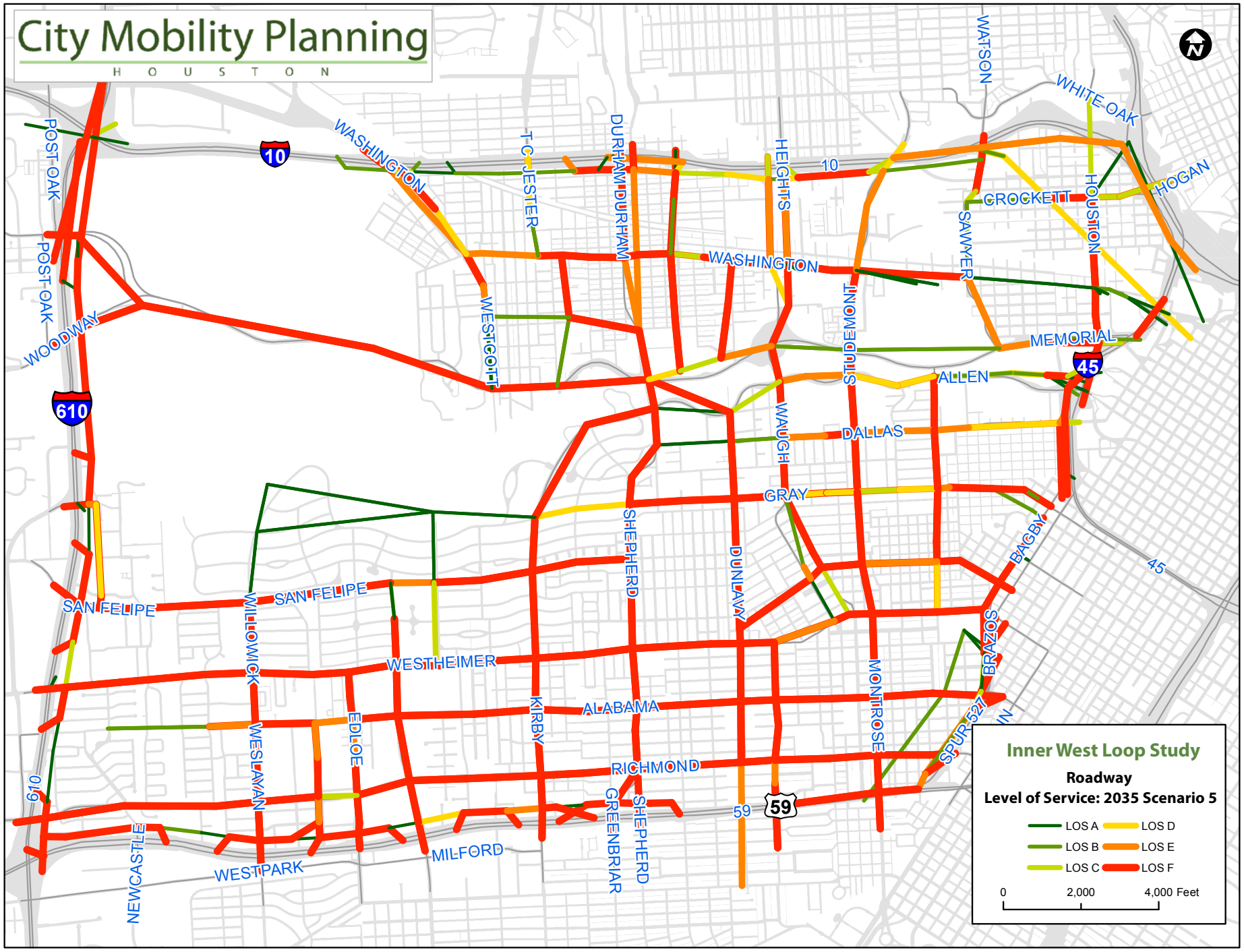
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SPUR 527
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NEWCASTLE
WESTPARK
MILFORD
Inner West Loop Study
Roadway
Level of Service: 2035 Scenario 5
LOS A
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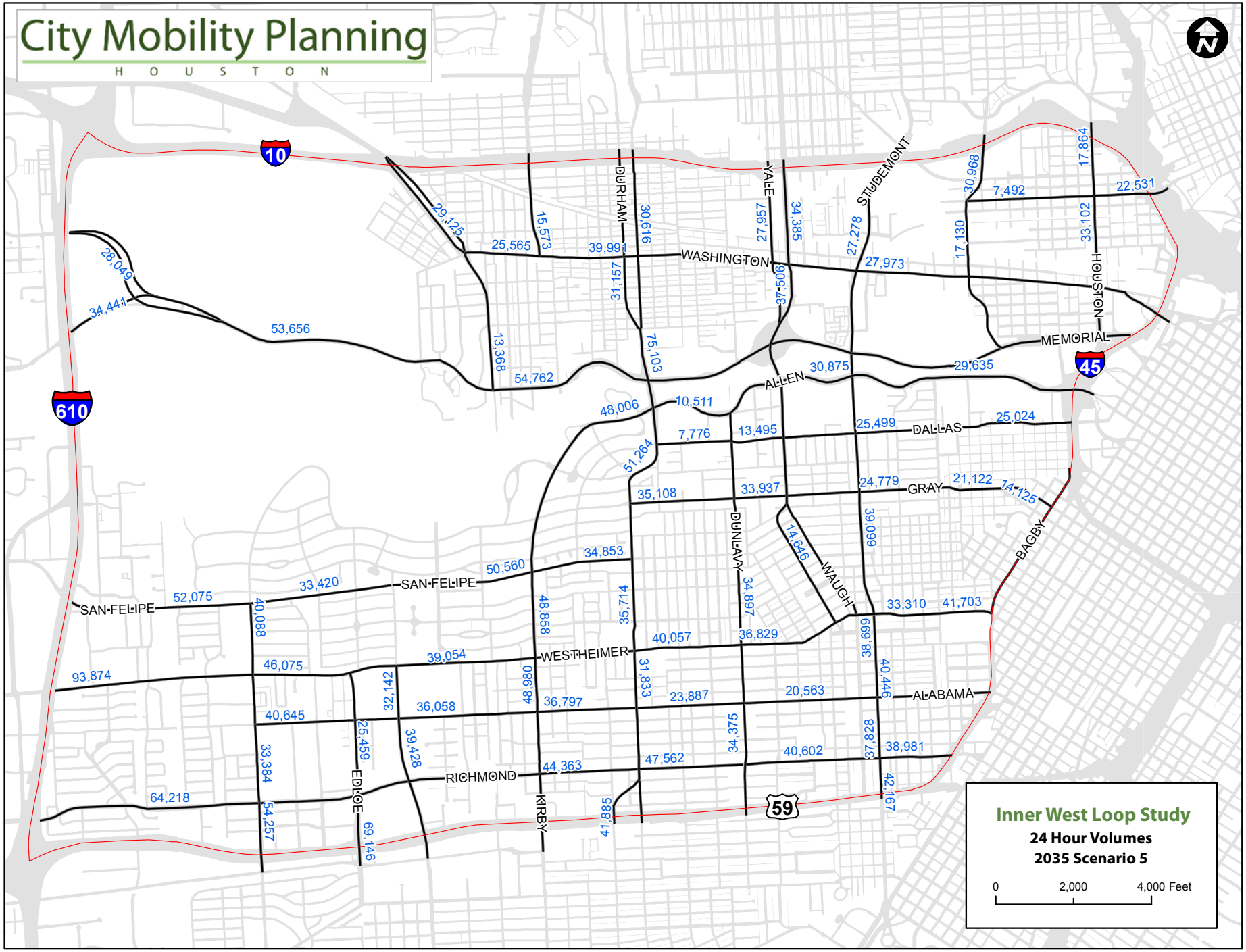
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40,602
38,981
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Inner West Loop Study
24 Hour Volumes
2035 Scenario 5
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# Appendix B: Thoroughfare Types

The following pages are provided as reference for the reader. This information was developed during Phase 1 of the City Mobility Planning exercise, and led to the development of the Alternative Cross Sections presented in **Chapter 10, Appendix 2** of the **Infrastructure Design Manual**. .This information is intended to clarify the distinction of Boulevards, Avenues and Streets, within the Urban and Suburban Areas. This nomenclature is less about street name or functional classification and is in regard to the context in which the corridor is intended to operate.

**Freeway/Expressway/Parkway**

Freeways are high speed (50 mph +), controlled-access thoroughfares with grade-separated interchanges and no pedestrian access. (Includes tollways) Expressways and parkways are high- or medium-speed (45 mph +), limited-access thoroughfares with some at-grade intersections. On parkways, landscaping is generally located on each side and have a landscaped median. Truck access on parkways may be limited. In most cases the freeways and tollways are TxDOT or HCTRA controlled facilities and the design elements of those roads are dictated by the State's Design Manual. The parkways are City facilities that function at high speeds. In many cases grade separated limited access facilities.

Allen Parkway

**Urban Boulevard**

Urban Boulevards are walkable, lower speed (35 mph or less) divided thoroughfare in urban environments designed to carry both through and local traffic, bicyclists and pedestrians. Urban Boulevards may be long corridors, typically 4 to 6 lanes, but are sometimes wider, serve longer trips and provide limited access to land. Boulevards may be high ridership transit corridors. Boulevards are primary goods movement and emergency response routes and use access management techniques. Urban Boulevards are different from Suburban Boulevards in that the pedestrian and context realms are oriented towards the pedestrian and building frontages. Most often the buildings are close to the street with wide sidewalks and tree wells forming space where a pedestrian feels comfortable and safe. The building height to street ratio often exceeds a 3:1 ratio which creates a comfort level for pedestrians to cross often wide thoroughfares.

Post Oak

**Suburban Boulevard**

Suburban Boulevards are high speed (40 to 45 mph) divided thoroughfare in suburban environment designed to carry primarily higher speed, long distance traffic and serve large tracts of separated single land uses (for example, residential subdivisions, shopping centers, industrial areas and business parks). High speed suburban boulevards may be long corridors, typically 4 to 8 lanes and provide very limited access to land. They may be transit corridors and accommodate pedestrians with sidewalks or separated paths, but some high speed boulevards may offer limited pedestrian facilities. Suburban boulevards emphasize traffic movement, and signalized pedestrian crossings and cross-streets may be widely spaced. In the context realm, buildings or parking lots adjacent to suburban boulevards typically have large landscaped setbacks. They are routes for primary goods movement and emergency response and widely use access management techniques.

Kirby

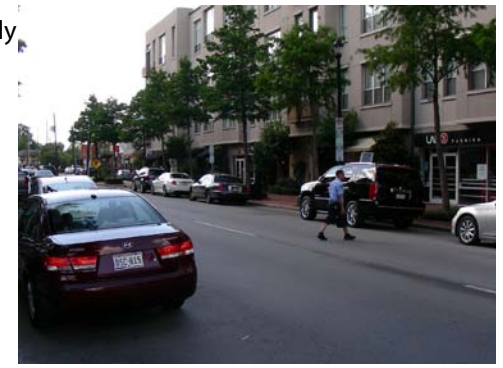
**Transit Boulevard/Avenue**

Much like the Urban Boulevards, Transit Boulevards are very walkable, lower speed (35 mph or less) divided thoroughfare in urban environments designed to carry both through and local traffic, pedestrians and bicyclists. Transit Boulevards may be long corridors, typically 4 to 6 lanes but sometimes wider, serve longer trips and provide limited access to land. Transit Boulevards are designed to provide space in the median for transit facilities. Transit Boulevards are extremely oriented towards providing the pedestrian with more space and building frontages. Most often the buildings are close to street with wide sidewalks and tree wells forming space where a pedestrian feels comfortable and safe. The building height to street ratio often exceeds a 3:1 ratio which creates a comfort level for pedestrians to cross often wide thoroughfares.

Main

**Urban Avenue**

Urban Avenues are walkable, low-to-medium speed (30 to 35 mph) urban arterials or collector thoroughfare, generally shorter in length than boulevards, serving access to abutting land. Urban Avenues serve as primary pedestrian and bicycle routes and may serve local transit routes. Urban Avenues do not exceed 4 lanes and access to land is a primary function. Goods movement is typically limited to local routes and deliveries. Some Avenues feature a raised landscaped median. Urban Avenues may serve commercial or mixed-use sectors and often provide curb parking. The pedestrian realm is normally a continuous sidewalk from the back of curb to the building face with tree wells spaced near the curb lines.



West Gray

**Suburban Avenue**

Suburban Avenues are walkable, low-to-medium speed (30 to 35 mph) suburban arterial or collector thoroughfare, generally shorter in length than boulevards, serving access to abutting land. Suburban Avenues serve as primary bicycle and pedestrian routes and may serve local transit routes. Suburban Avenues do not exceed 4 lanes and access to land is a primary function. Goods movement is typically limited to local routes and deliveries. Some Suburban Avenues feature a raised landscaped median. Suburban Avenues may serve commercial or mixed-use sectors and sometimes provide curb parking. The pedestrian realm is usually distinguished by a landscape buffer separating the street from the sidewalk with street trees located outside of the sidewalk area.

Yoakum

**Urban Street**

Urban Streets are walkable, low speed (30 mph) thoroughfare in urban areas primarily serving abutting property. A Urban Street is designed to connect residential neighborhoods with each other, connect neighborhoods with commercial and other districts, and connect local streets to arterials. Streets may serve as the main street of commercial or mixed-use sectors and emphasize curb parking. Goods movements are restricted to local deliveries only.

West Dallas

**Suburban Street**

Suburban Streets are walkable, low speed (30 mph) thoroughfare in suburban areas primarily serving abutting property. A Suburban Street is designed to connect residential neighborhoods with each other, connect neighborhoods with commercial and other districts, and connect local streets to thoroughfares. Suburban Streets may serve as the main street of commercial or mixed-use sectors and emphasize curb parking. The context realm is defined by a landscape buffer, trees with a separated sidewalk. Goods movements are often restricted to local deliveries only.

Dunlavy

**Industrial Boulevard and Avenue**

Industrial Boulevard and Avenues vary in speed from 30 to 45 mph in both urban and suburban areas. An industrial street is designed to connect heavy vehicles to and from major highways to industrial areas. These streets have wide travel lanes with large turning radii. Most often have limited pedestrian elements. Medians are optional for Industrial Boulevards.

Navigation

**One-Way Couplets**

One-Way Couplets are pairs of one-way streets that function as a single higher-capacity street. Couplets are usually separated by one city block, allowing travel in opposite directions. One-Way Couplets serve many different areas of Houston from higher-density commercial and mixed-use areas such as Downtown and regional centers to lower-density residential areas and Main Streets.

One –Way Couplets are designed to have a higher transportation capacity than an equivalent two-way street. Both parallel and angled parking are appropriate for these streets.

Prairie