I. Introduction

In 2009 the City of Houston adopted the City Mobility Plan or CMP Phase I, which proposed a new process for developing mobility solutions. These solutions focused on enhancing the capitalized investment made in transportation infrastructure projects by identifying multi-modal system improvements that could be made at the time of corridor development or redevelopment (i.e. CIP, Rebuild Houston, TIP, etc.). The idea was that as the City invested in certain utility improvements – such as sewer or storm water upgrades – a systematic approach could also be made to increase the general capacity or number of users in a corridor via multi-modal considerations.

One of the outcomes of the CMP Phase 1 was a series of technical memorandums, one of which – Technical Memorandum 3: Functional Street Classification – highlighted and further illustrated corridor considerations as they pertained to bicycle, pedestrian, freight and transit considerations. The corridor considerations were eventually adopted into Appendix 2 of the City's Infrastructure Design Manual. Similarly, this also resulted in the Model Verification and Validation process as highlighted in Technical Memorandum 4, which today is used as one of the many analytical tools for sub-regional corridor evaluations.

The City wants to move the greatest number of people and goods in the most efficient manner along its corridors. CMP Phase II focuses on sub-regional studies located throughout the City in which multi-modal classifications can be further evaluated. Although not exhaustive, Figure 1.1 represents those studies which have either been completed or are pending completion in the near future.

In short, the purpose of CMP Phase II and the sub-regional studies is to take a deeper assessment of the corridor network to ensure those recommendations developed during Phase 1 of the CMP process are appropriate at not only the regional level, but the neighborhood level as well. The project team worked extensively with sub-regional stakeholders such as local agencies, management entities and other interest groups to ensure concerns and related visions for development within the area were fully understood before recommendations were formulated. The result is an intricate set of recommendations that look at both the individual corridor (See Chapter VI. A Balanced Approach), as well as the greater transportation network, as it pertains to individual systems such as bicycle and transit networks (See Chapter VII. Outcomes).

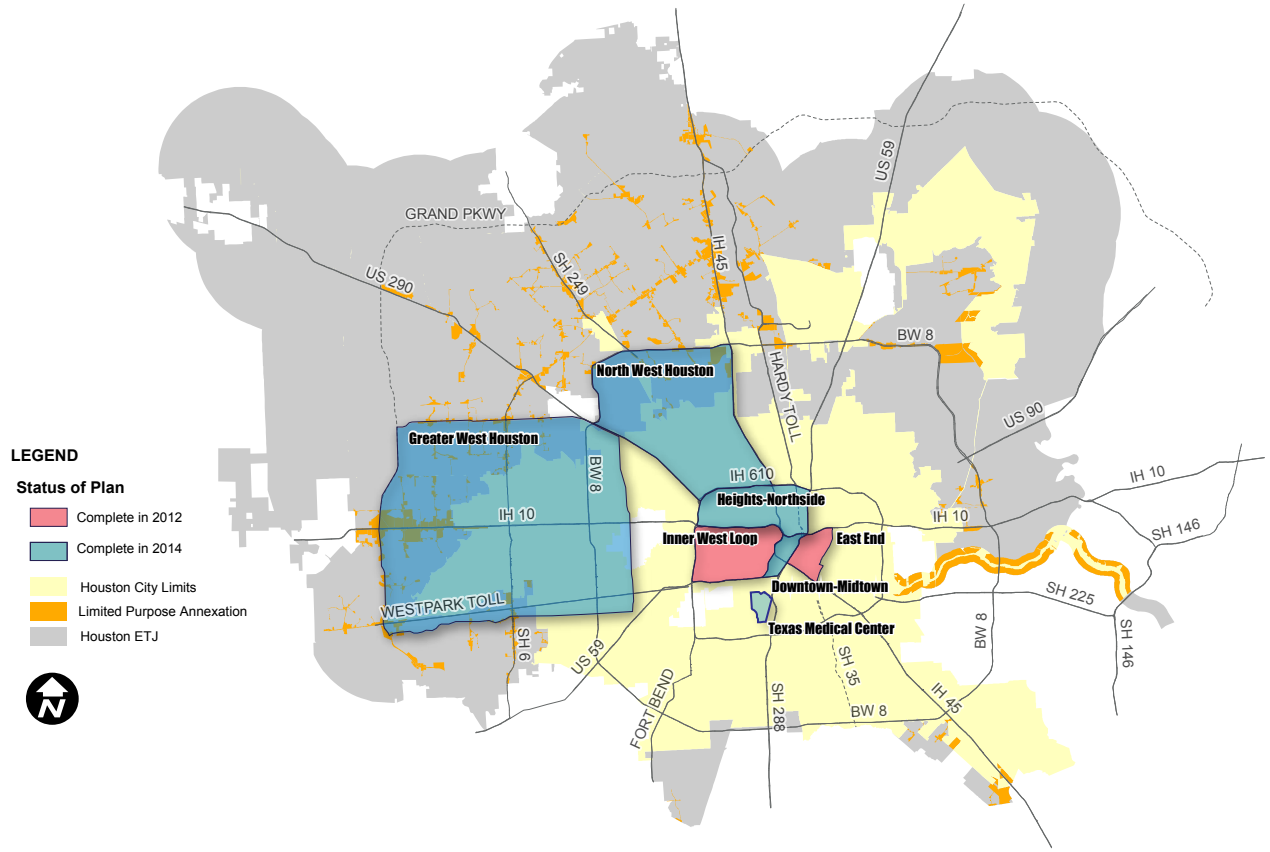


FIGURE 1.1: CMP II: SUBREGIONAL PLANS

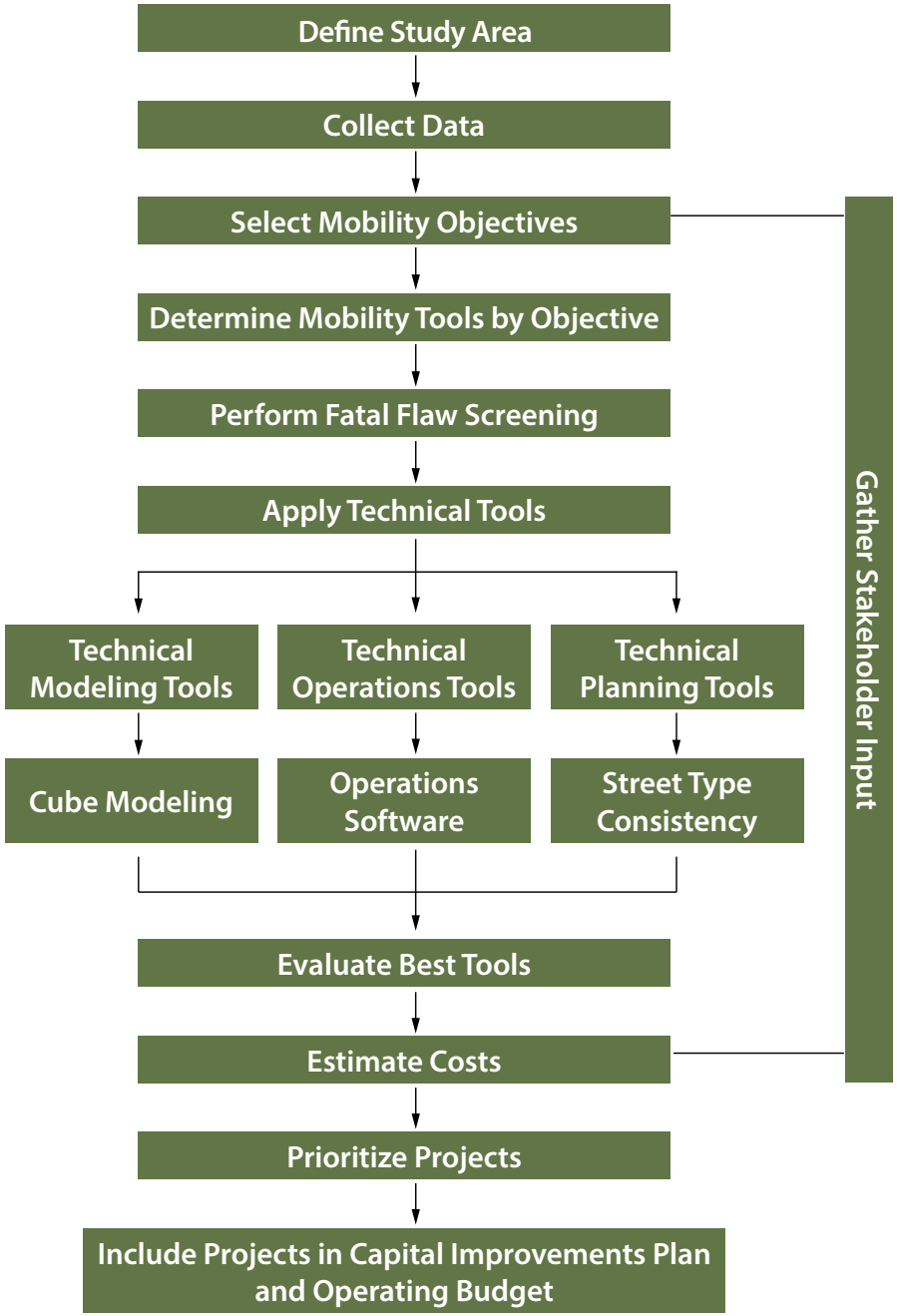


FIGURE 1.2

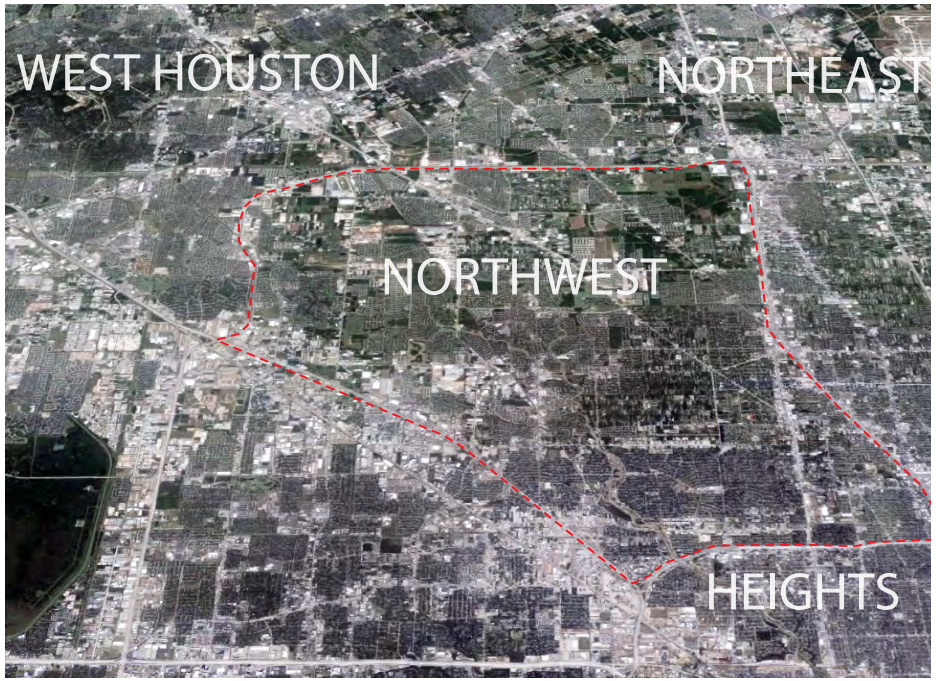
The flow chart on the left specifies the process that was undertaken to identify specific mobility projects within the Northwest Study Area. The process starts with defining the Study Area and moves to data collection. Once those steps are complete, the process continues to selecting mobility objectives and mobility tools. This is followed by performing a fatal flaw screening of the selected objectives and tools. Public and stakeholder input is gathered throughout all of these steps. Once the fatal flaw screening is complete, we will use technical modeling tools, technical operations tools, and technical planning tools to develop a series of mobility options. These tools provide an opportunity to evaluate the mobility needs in the sub-area and provide additional analysis that can be used to prioritize preliminary intersection projects with respect to cost and benefit. The direct output from this process is a prioritized list of intersection improvement projects and a vision of the major thoroughfares for the sub-area that can be integrated into the Capital Improvements Plan (CIP) and operating budget.

The overall project development process does not stop once funding is 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.

1.1 The Study Area

The boundary of the Northwest Study Area borders the historical Heights neighborhood to its south and is bounded on the east by Interstate Highway 45, on the west by U.S. Highway 290, on the north by Beltway 8, and on the south by Interstate Highway 610 (West Loop).

The Northwest Study Area represents one of the first sub-regional study areas that is more "suburban" in nature resulting in a thoroughfare and street network that is less grid-like and more separated than in an urban context. As expected, primary commercial uses are situated along many of these primary corridors, and residential developments are tucked away in largely disconnected residential cul-de-sacs (see section 5.5 Street Connectivity Considerations for more information). The Study Area is also home to many industrial and manufacturing uses that are dispersed throughout various neighborhoods. This pattern of development presents a unique transportation consideration where the movement of goods is constantly in conflict with the movement of people.



Given the lower residential density of the Study Area, many of the proposed thoroughfares have yet to be constructed resulting in a relatively disconnected network.

The Study Area is further complicated by the jurisdictional boundaries where the northern portion is located in Harris County and in the Houston's extraterritorial jurisdiction (ETJ), while the southern portion is located within the City's corporate limits. As a result, any recommendations resulting from this Study must consider implementation processes and considerations of not only the city of Houston, but Harris County as well.

Provided recommendations resulting from this study are intended to represent a provided vision of what the greater transporation system and related corridors could look like. Recommendations are not representative of what can be built today. Harris County restrictions of today include:

- Sidewalks are currently not encouraged along Major Thoroughfares, but are considered a priority in residential subdivisions and schools.
- Shared-use paths (defined in Section 5.5 Bicycle User and Facility) are currently not built within the County due to restricted right-of-way. Where appropirate the County encourages partnership with other agencies to build such facilities adjacent to the road right-of-way so ensure safe street crossings.
- Bike lanes are currently not constucted along roads within the County.

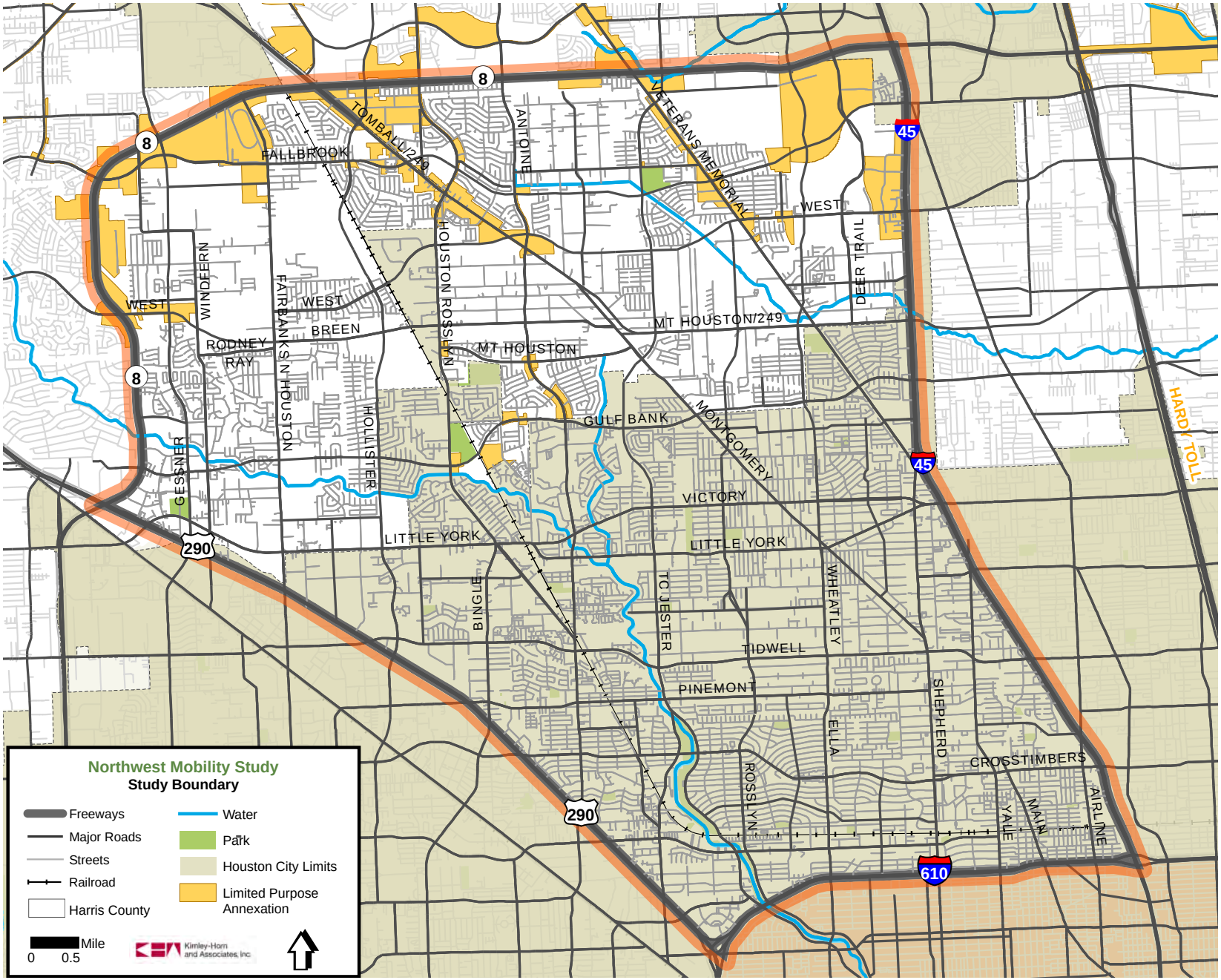

Northwest Mobility Study
Study Boundary
Freeways
Major Roads
Streets
Railroad
Harris County
Water
Park
Houston City Limits
Limited Purpose Annexation
Mile
0 0.5
Kimley-Horn and Associates, Inc.
8
45
290
610
TOMBALL/249
FALLBROOK
ANTOINE
VETERANS MEMORIAL
WEST
DEER TRAIL
WINDFERN
FAIRBANKS N HOUSTON
HOUSTON ROSSLYN
WEST
BREEN
RODNEY RAY
MT HOUSTON
MT HOUSTON/249
GULF BANK
MONTGOMERY
HOLLISTER
GESSNER
VICTORY
LITTLE YORK
LITTLE YORK
BINGLE
TC JESTER
WHEATLEY
TIDWELL
PINEMONT
ELLA
SHEPHERD
ROSSLYN
CROSSTIMBERS
YALE
MAIN
AIRLINE
HARDY TOLL

FIGURE 1.3

1.2 Study Area Objectives and Tools

A number of mobility objectives resulted from the 2009 City Mobility Plan (CMP) which provide the foundation for the assumptions and related tools used for the purpose of this study. CMP Goals and Objectives include:

- Increased access to transit facilities
- Increased access to pedestrian facilities
- Increased access to bicycle facilities
- Improved connectivity of the system
- Better accommodations for the movement of freight
- Cost efficiency
- Minimized travel times
- Reliable commuting options
- Reduction in congestion
- Minimized conflict points within the network
- Safe and secure environment for pedestrians and bicyclists
- Neighborhood traffic
- Air quality conformity to State standard
- Improved ability to maintain infrastructure
- Maintain a system that is energy efficient
- Improved corridor aesthetics
- Enhanced pedestrian amenities
- Pedestrian-scaled streets
- Facilitation of all modes of travel
- Accommodate the movement of freight (Truck and Rail)

The public outreach portion of the process identified several goals from various stakeholders:

- Enhance safety
  - » At intersections
  - » For pedestrians and bicyclists
- Increase multi-modal alternatives
- Improve and increase connections to destinations

Associated tools that related to the defined goals and objectives have been sorted into three categories below:

- 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.

Where appropriate, potential solutions may be geared for motorized, non-motorized, or alternative transport options such as mass transit. As list of these tool types can be seen in Figure 1.4

City Mobility Planning Toolbox

Motorized Tools

Traffic calming slows or reduces automobile traffic, improving the safety for pedestrians and cyclists. Techniques include speed humps, textured paving, curb extension, 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 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 separation between opposing traffic lanes. Medians eliminate cut-through traffic, change driving patterns, beautify streets with greenery, and increase pedestrian safety for crossing streets.

Non-Motorized Tools

Sidewalks are important to the pedestrian traveler. Wider sidewalks in commercial areas facilitate a mix of uses. 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 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 safety.

Commuter rail service connects the large master planned communities around the region, the surrounding 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 management refers to a set of strategies to reduce the use of city roadways to decrease congestion and the infrastructural 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.

FIGURE 1.4

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