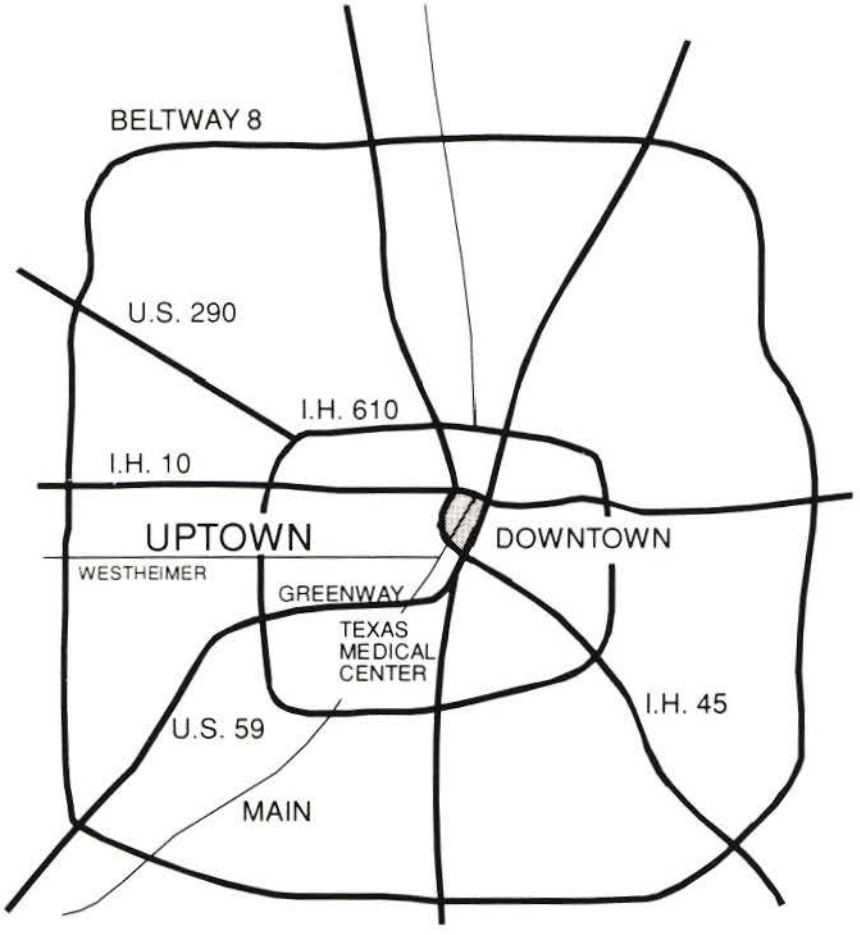
U.S. Department of Transportation

Uptown Houston Comprehensive Transportation Strategy

March 1991



UPTOWN
POST·OAK·GALLERIA
HOUSTON

Uptown Houston Comprehensive Transportation Strategy

Final Report
March 1991

Participating Agencies:

Harris County Improvement District #1
Houston-Galveston Area Council
Metropolitan Transit Authority
of Harris County
City of Houston
Texas Department of Transportation

Funded by:

Federal Transit Administration
Office of Grants Management
U.S. Department of Transportation
Washington, D.C. 20590

Distributed in Cooperation with

Technology Sharing Program
U.S. Department of Transportation
Washington, D.C. 20590

DOT-T-93-27

ABSTRACT

This report outlines the *Comprehensive Transportation Strategy* of the Uptown/Galleria area of Houston, Texas. The strategy addresses all modes of transportation serving this major suburban activity center, including arterial streets, freeways, transit, pedestrians and transportation demand management. The plan was developed by Harris County Improvement District #1, a special improvement district formed through the efforts of the private sector in the area, in cooperation with local transportation agencies.

The *Comprehensive Transportation Strategy* report describes the background behind formation of the improvement district, the District property owners' objectives and the actions taken to develop a consensus among the many property owners with diverse interests within the activity center. The report also describes how the transportation strategy and a consensus of support for the strategy was developed among the area's property owners and the implementing public agencies.

ACKNOWLEDGEMENTS

Funding:

The Uptown Houston *Comprehensive Transportation Strategy* study was funded by a grant from the **Federal Transit Administration (FTA)** to Harris County Improvement District #1, administered through the Houston-Galveston Area Council.

Participating agencies:

The following agencies participated jointly in development of the *Comprehensive Transportation Strategy*:

Harris County Improvement District #1
Houston-Galveston Area Council
Metropolitan Transit Authority of Harris County
City of Houston
Texas Department of Transportation

Prime Consultant:

Llewelyn-Davies Sahni, Inc.

Sub-consultants:

Zimmer, Gunsul & Frasca Partnership
Barton-Aschman & Associates
Walter P. Moore & Associates
Lockwood, Andrews & Newnam

PREFACE

The *Comprehensive Transportation Strategy* planning effort took place from 1988 through 1990. Events involving implementing agencies subsequent to the March, 1991 report date have superseded certain recommendations reflected in this report. Notably, METRO has discontinued plans for an inner city fixed guideway transit system, and the Texas Department of Transportation has downscaled preliminary schematic designs for improvements to the I.H. 610 West Loop. The *Comprehensive Transportation Strategy* report has not been significantly updated as of printing to reflect these developments. Notwithstanding these developments, the *Comprehensive Transportation Strategy* process has resulted in public agency and private sector commitments of over $50 million for capital improvements, operational improvements and services, and this report continues to serve as a valuable input into the ongoing planning process.

January, 1993

UPTOWN
POST·OAK·GALLERIA
HOUSTON

COMPREHENSIVE
TRANSPORTATION
STRATEGY

UPTOWN HOUSTON COMPREHENSIVE TRANSPORTATION STRATEGY PHASE I REPORT

Table of Contents

I. Executive Summary 1

II. Introduction and Process Overview:

A. Introduction 23
B. Assessment of Existing Transportation Deficiencies 31
C. Assessment of Future Growth and Transportation Demand 45
D. Uptown Mobility Goals and Objectives 57

III. Arterial Street Improvements Program:

A. Arterial Street Improvement Summary 61
B. Low Cost/TSM Arterial Street Projects 72
C. Major Capital Arterial Street Improvements 76

IV. Freeway Improvements Program:

A. Freeway Improvement Summary 87
B. Low Cost/TSM Freeway Improvements 88
C. Major Capital Freeway Improvements 88

V. Transit System Improvements Program:

A. Transit Improvements Program: Local and Commuter Bus Services .. 93
B. Transit Improvements Program: High Capacity Transit Corridor 115

VI. Pedestrian Improvements Program

A. Pedestrian Improvement Program Summary 131
B. Pedestrian Environment Design Concept 133
C. Implementation of Pedestrian Improvements 165

VII. Transportation Demand Management (TDM) Action Plan

A. TDM Action Plan Summary 179
B. Assessment of Unmet Transportation Demand and Policy Deficiencies 181
C. TDM Goals for HCID#1 188
D. TDM Action Plan 189

UPTOWN
POST·OAK·GALLERIA
HOUSTON

COMPREHENSIVE
TRANSPORTATION
STRATEGY

I.
EXECUTIVE SUMMARY

Uptown Houston is the nation's largest suburban activity center. It is located in Houston, Texas, approximately 5 miles west of downtown at the intersection of the city's two most heavily traveled and most congested freeways. Unfortunately, the success and size of Uptown Houston was never contemplated when the street and freeway system was formulated over 25 years ago. It is a typical suburban system with arterials on approximately one mile spacing and diamond interchanges averaging about one mile spacing.

After having experienced intense vehicular congestion for over a decade, property owners in the area obtained special state enabling legislation and formed a special improvement district with broad powers, including the ability to acquire right-of-way and make transportation improvements. The initial step upon creation of the district was to develop a Comprehensive Transportation Strategy.

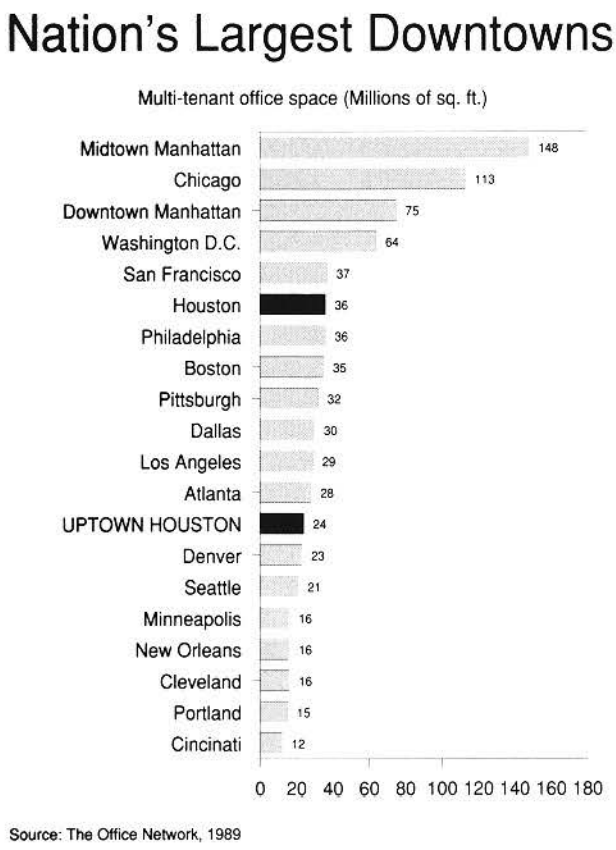
The Comprehensive Transportation Strategy report describes the background behind the formation of the improvement district, the District property owners' objectives and the actions taken to develop a consensus among the many property owners with diverse interests within the activity center. The report also describes how the transportation strategy and a consensus of support for the strategy was developed among the area's property owners and the implementing transportation agencies. The report outlines the elements of the strategy as follows:

- Arterial Street Improvements Program
- Freeway Improvements Program
- Transit Improvements Program
- Pedestrian Improvement Programs
- Transportation Demand Management (TDM) Action Plan.

WHAT IS UPTOWN HOUSTON?

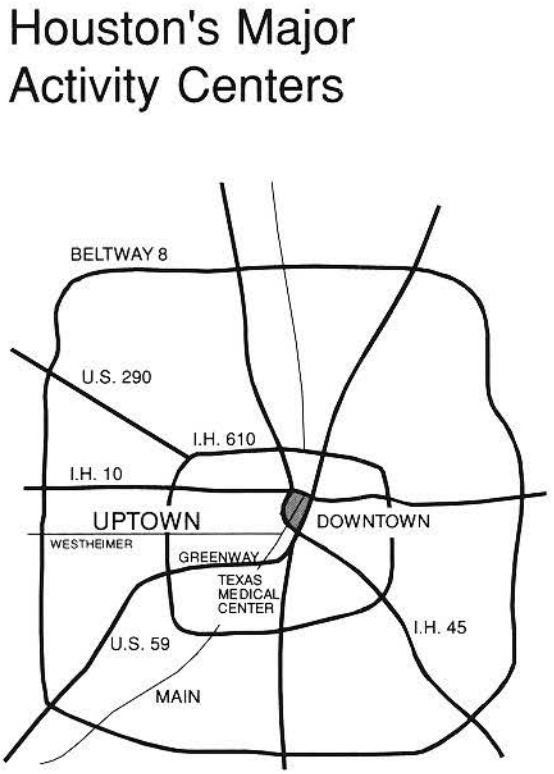
With almost 24 million square feet of multi-tenant office space, comparable in size to downtown Denver, Uptown Houston is the thirteenth largest business district in the nation (see Figure I-1). Uptown Houston has over 78,000 employees, 3.9 million square feet of retail space, 4,500 first class hotel rooms, over 100 restaurants, half of Houston's high rise condominium units and 4,000 apartment units. The hotels have a total of about 200,000 square feet of meeting space, making Uptown Houston a major meeting location. Recent surveys indicate that this area is visited by 64 percent of the city's tourists, twice as many as any other attraction in the region. Active both day and night, Uptown has an estimated daily population of about 220,000.

Figure I-1:



Source: The Office Network, 1989

Figure I-2:



EXISTING TRANSPORTATION SYSTEM AND CONDITIONS

Roadways

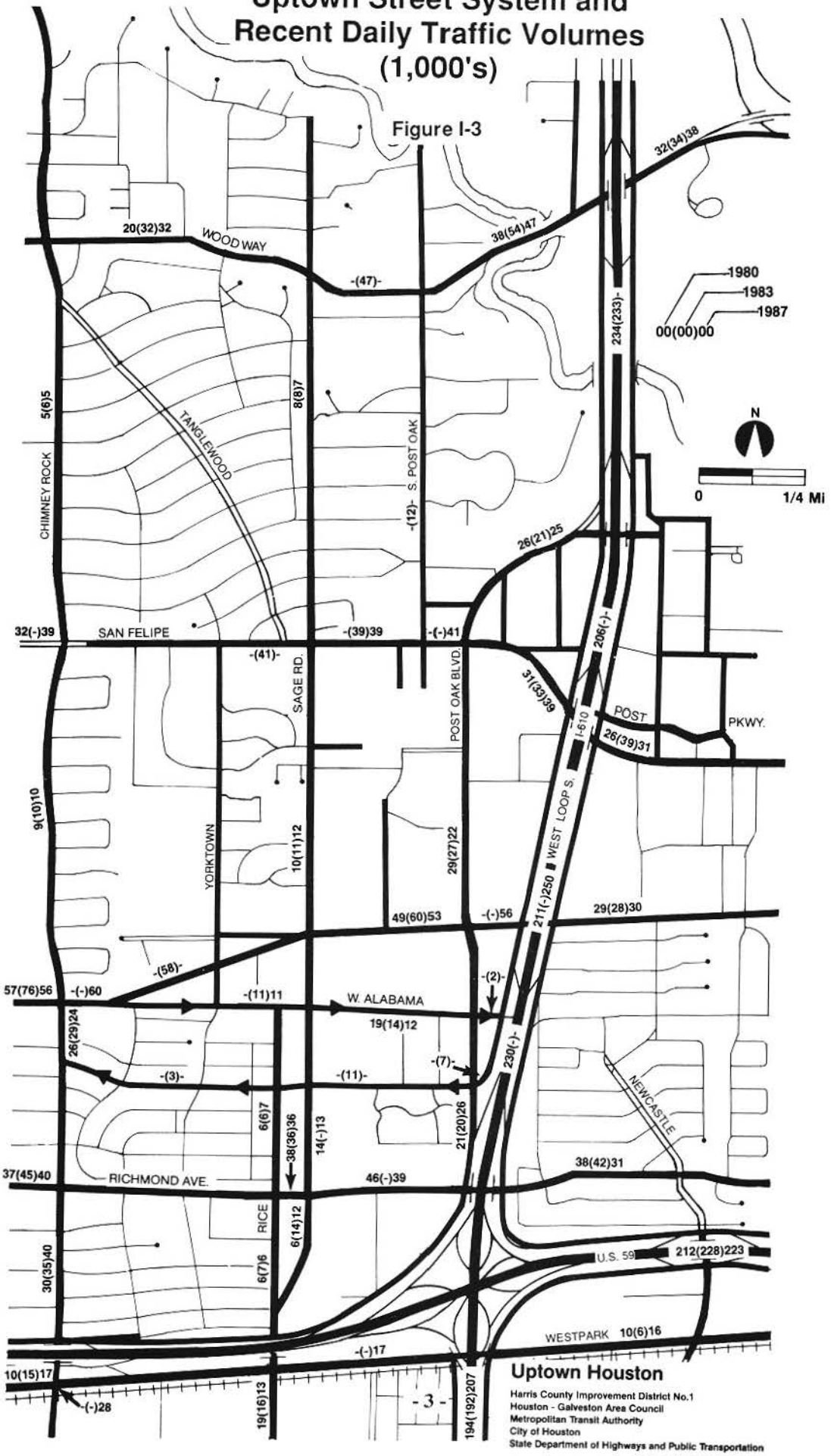
Uptown Houston is located at the intersection of the West Loop freeway (I.H. 610) and theSouthwest Freeway (U.S. 59). Westheimer Road (F.M. 1093), the most heavily traveled arterial in Houston, passes through the middle of Uptown Houston, as shown in Figure I-2. These three streets carry daily volumes of approximately 240,000, 225,000 and 60,000 vehicles, respectively, through Uptown Houston.

Figure I-3 shows the street system which serves Uptown Houston as well as recent daily traffic volumes. This roadway system was originally planned to serve an area which would be largely residential with some retail and scattered offices. As it became clear that Uptown Houston would become a major business district, existing and planned streets were widened or provided with more right-of-way for future widening. Private streets were developed, primarily within the superblocks, to augment the public road system.

By the late 1980's, the road system had been improved almost to the limit which available right-of-way could support; only a few segments remained to be improved. Unfortunately, traffic growth has outstripped the capacity of the street system. Traffic congestion is widespread during peak periods (see Figure I-4) and also during midday hours.

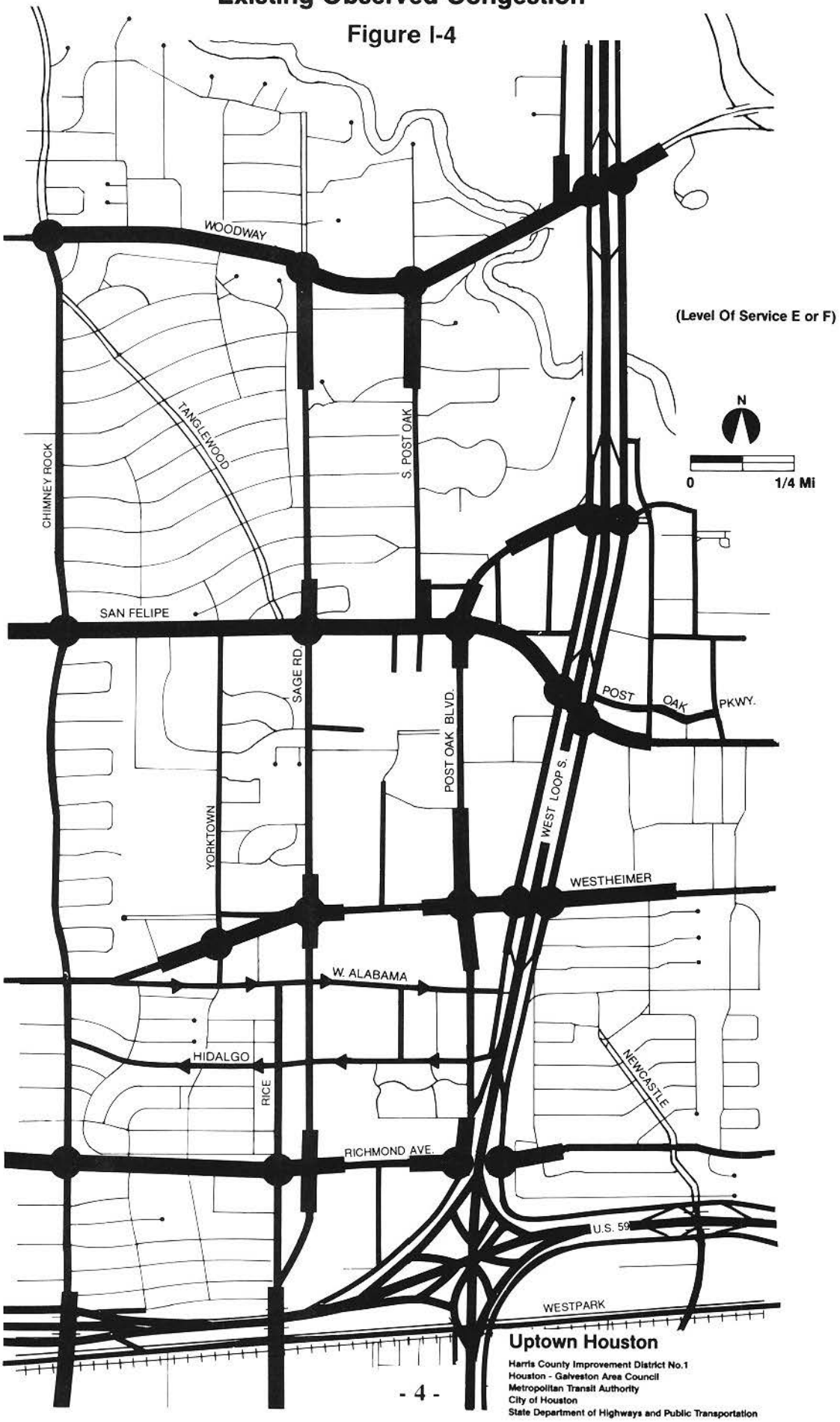
Uptown Street System and Recent Daily Traffic Volumes (1,000's)

Figure I-3



Existing Observed Congestion

Figure I-4



Transit

Uptown Houston is served by two Park & Ride, seven local, two limited and one crosstown route. Two peak period express shuttle routes to a major regional transit center have recently been added. However, most of the bus service is actually downtown-oriented, passing through Uptown Houston on the way. Headways vary substantially, ranging up to 40 minutes for park-and-ride service. Only about 1.5 percent of Uptown Houston's trips are by transit. This low split is at least potentially due to limited service, indirect service and excessive transfers required to reach the area.

Pedestrian Network

Sidewalks have been provided along several major streets, but not all. Several streets lack sidewalks or alternative pedestrian facilities. Almost all sidewalks are narrow, built to residential standards. Crossings at major intersections are difficult or dangerous due to complex signal phasing and wide street cross sections. The incomplete pedestrian system combined with limited transit service has resulted in most internal trips being made by automobile.

Other System Components

Approximately 65 employee vanpools operate to Uptown Houston. About one-third are by third-party operators and two-thirds by corporations in the Uptown area. The area also has airport bus service provided from a terminal within Uptown Houston.

Over 70,000 parking spaces exist in the Uptown area. All office buildings of over 200,000 square feet are served with garage parking as are three retail developments. The area has 31 garages. All parking is provided by the private sector, and curb parking is virtually non-existent.

Transportation demand management (TDM) is limited and voluntary. Vanpools and limited applications of flextime are the extent of existing TDM in Uptown Houston, although city-wide traffic conditions encourage employees to adjust their schedules to arrive early or late to miss the heart of the peak periods. Several employers, while not using flextime, have rescheduled work hours to start at 7:00 or 7:30 a.m. rather than the traditional 8:00 or 8:30 a.m.

A NEED FOR IMPROVEMENT

For years, the property and business owners in Uptown Houston have expressed a need for transportation improvements. Since as early as 1975, when the Uptown Houston Association was formed, area interests have tried to pursue transportation (and other) improvements as a group, presenting a consensus of agreement and support for various projects.

In several instances, developers have funded all or parts of transportation improvements, even though Houston has no zoning or other land use or development controls which typically are the basis for proffered developer participation. However, the rapid growth of Uptown Houston and the limited funding available from all sources have resulted in congestion worsening all the time.

In addition, the existing 78,000 employment level in Uptown Houston has been projected by the Houston-Galveston Area Council (H-GAC), a consortium of public agencies, to increase to as much as 147,000 in 2010. Total traffic entering the area, even when excluding freeway traffic, is expected to increase by over 40 percent. With 89 percent of the peak hour vehicle-miles currently operating in congestion, it became apparent that major transportation improvements had become necessary.

THREE KEY STRATEGIES

Property owners, with the support of local businesses, have taken three principal actions to better transportation conditions in the Uptown Houston area:

- Create a special improvement district;
- Develop and adopt a public/private plan of area transportation improvements;
- Solicit support from agencies to raise their priorities for improvement projects in the Uptown Houston area.

SPECIAL IMPROVEMENT DISTRICT

Without question, the greatest challenge facing the Uptown Houston Association was mobility. Throughout its history, the Association had undertaken a broad range of Transportation Systems Management (TSM) actions to enhance access to and circulation within the area. Through the Association's fourteen years of private sector leadership, these activities made a difference. However, the Association's efforts were at best a piecemeal solution to a comprehensive problem. As a non-profit corporation funded year-to-year by dues and other fundraising, the Association lacked an effective mechanism to implement long-term and comprehensive transportation solutions.

Before transportation system deficiencies could be adequately addressed, the Uptown area needed a funding and implementation mechanism which would be efficient in carrying out programs and projects required for the long term viability and success of the area. Uptown property owners sought to meet this need by forming a "downtown" improvement district to increase the area's competitiveness by creating a premier urban environment and providing a higher quality of life.

Special legislation addressing Uptown's unique needs was passed during 1987 by the Texas State Legislature due to the initiative of the Association. Through a combination of the powers of various provisions of the State's constitution, Harris County Improvement District #1 was empowered to conduct a broad range of functions related to the improvement of the area. The Houston City Council unanimously approved creation of the District. City controls include approval of an overall five-year capital budget, approval of annexations and approval of the plans and specifications of major projects by the Public Works Department.

Property owners in Uptown are able to assess themselves on an *ad valorem* or benefit basis for needed improvements and programs, as well as to finance long term improvements with bonds. The District has the authority to develop roads, transit facilities, utilities and other infrastructure as well as to provide operations and support services such as security, fire protection and maintenance of the area. The District is governed by a twelve member Board of Directors who must be landowners, long term tenants or residents within the District.

Benefits of Harris County Improvement District #1

The intent of the creation of the District was not to reduce public sector services and responsibilities, but to augment the public sector's commitment. Harris County Improvement District #1 (HCID#1) offers the following benefits to the Uptown area:

- Ensures long term commitment to essential areawide improvements and programs;
- Serves as a direct recipient of government grants and direct participant in joint

governmental projects and public/private partnerships;
- Permits low cost financing of improvements through issuance of bonds;
- Provides efficient and equitable revenue collection;
- Facilitates the development of improvement plans and programs, and accordingly increases the value of properties within the District;
- Enhances the sense of the area as a planned, well-managed, well-maintained district in a "non-planned" city.

Road Powers

The District may levy *ad valorem* and maintenance taxes, as well as issue bonds, for construction, maintenance and operation of roads. The District can also finance, construct and maintain improvements such as lighting, signs, sidewalks, crosswalks and landscaping where it can be demonstrated that these amenities support roads.

Improvement Powers

The District is authorized to levy assessments, based on the benefit conferred by the improvement, for the construction, acquisition, improvement, relocation, operation or maintenance of various services and facilities such as:

- Landscaping;
- Streets and sidewalks;
- Drainage improvements;
- Pedestrian malls;
- Off-street parking facilities, bus terminals, heliports, mass transit and people-mover systems;
- Acquisition of real property or any interest therein.

Beginning in mid-1988, the District began providing most of the special transportation management services previously provided by the Uptown Houston Association.

COMPREHENSIVE TRANSPORTATION STRATEGY STUDY

Uptown Houston's private sector interests then became one of the first recipients of a planning grant from the Urban Mass Transit Administration's Suburban Mobility Program in a joint effort with the local transportation agencies. Working cooperatively, public and private groups developed a Comprehensive Transportation Strategy for Uptown Houston – a common understanding between HCID#1 and the public agencies that access and circulation within the area, including transit, paratransit, automobiles and pedestrians, had to be considered as a whole.

The Planning and Consensus Building Process

HCID#1 took the lead role in developing the Comprehensive Transportation Strategy. Staff of the City of Houston, State Department of Highways and Public Transportation (SDHPT), Metropolitan Transit Authority of Harris County (METRO) and Houston-Galveston Area Council (H-GAC) – the coordinating and implementing agencies – were all involved from the beginning. More importantly,

the private sector was also involved, not only through the HCID#1 property owners, but also the Uptown Houston Association membership. The challenge faced by HCID#1 was to meld a very diverse range of interests – some historically competitive – into a consensus. Along each step of the process, all parties provided input and direction. This approach was adopted to gain a consensus of support for the resulting strategy.

A consultant team was hired by HCID#1 to prepare the technical component of the strategy. The team was composed of transportation engineers and planners, urban designers and architects to enable the consultants to address a full range of perceptions, concerns, objectives and needs.

Transportation Deficiencies

The first step was to achieve agreement on the problems and needs, and to develop a set of objectives. This required the participating entities to take a more global perspective than many had been previously applied typically. It also required participants to view the situation from the position of other participants so that agreement could be reached. This took extensive effort and patience on the part of all participants, but in the end, a consensus was reached and desired teamwork was initiated. The key was agreement and acceptance of the basic needs and the understanding that all participants were going to have to be actively involved if a successful strategy was to be developed.

The deficiencies which exist in the Uptown Houston area were similar to those in many suburban activity centers throughout the nation:

- Limited arterial continuity and access in two directions;
- Inadequate land area dedicated to streets (only 10 percent);
- Incomplete street network which forces most traffic to use relatively few roadways;
- Major pedestrian system deficiencies discouraging both pedestrian and transit travel;
- Free and plentiful parking and a lack of carpool and vanpool incentives;
- Congested freeways which force traffic to utilize the local street system;
- Arterial street congestion, part of which results in queues on the freeways near ramps;
- Limited opportunities to cross the freeway rights-of-way with area streets;
- A "superblock" 13 regular city blocks long with no effective internal street system;
- Inconvenient and indirect transit service and inefficient use of existing and planned HOV and transit center facilities.

Transportation Goals

It was agreed that all of these deficiencies would have to be resolved if Uptown Houston was to achieve an acceptable level of mobility. The participants adopted the following goals to be met with the transportation strategy:

- Enhance local access through arterial street improvements;
- Improve regional access through freeway improvements;
- Provide convenient and viable alternatives to driving alone;
- Create a safe and inviting pedestrian environment which reduces the need for automobile travel; and
- Develop policies and services which aid in the effective management of traffic.

Strategy Development

The process of developing a workable and effective strategy involved an evolution of attitudes on the part of both private and public sectors. The private sector's initial thought was that the public sector should solve the existing problems in a manner acceptable to area property owners – and that the agencies were a long way in arrears in doing this. The public sector attitude was that the developers had created the problem by over-developing and should not create any more dense developments. After much discussion about tax revenues generated in the area and long delayed transportation improvements previously to have been made by both sectors, all parties accepted responsibility for future action and mutual support.

At the same time, both METRO and the SDHPT asked HCID#1 for input to their design process for future improvements to I.H. 610 and METRO's proposed fixed guideway segment through Uptown Houston. A significant portion of the study effort was devoted to these two projects to help shape them to be both beneficial and acceptable to all parties. The process is still ongoing as of the completion of this report.

The Strategy

The resulting improvement strategy has five components: arterial streets, freeways, transit, pedestrian and transportation management. These are briefly outlined below and summarized in more detail following the outline.

UPTOWN HOUSTON COMPREHENSIVE TRANSPORTATION STRATEGY:

Arterial Streets

- 55 prioritized projects - mostly TSM
- Joint private and public sector funding (40% private, 60% public)
- $110 million cost
- Benefit/cost ratio of 38; cost $ 0.10 per vehicle-hour saved

Freeways

- TSM improvements - motorist information, ramp and intersection widening
- Improved access through "super frontage road" local lanes
- Additional capacity through express lanes
- Additional street crossings of I.H. 610 and U.S. 59

Transit

- Improved local bus service and patron amenities
- Enhanced pedestrian access
- High capacity transit corridor for collection/distribution within Uptown

Pedestrian Environment

- More and wider sidewalks and improved lighting
- Trees for shade along pedestrian corridors
- Improved pedestrian crossings of streets including signing and signalization

Transportation Management

- Mode shift marketing programs
- Modified work schedules
- Improved police traffic management
- Modified parking policy and land development guidelines

Arterial Street Improvements Program

In development of the Arterial Street Improvements Program, the full range of low cost arterial street improvements, including transportation systems management (TSM) actions, was explored first. Subsequently, major capital improvements required to develop the necessary street network were addressed.

Under the program, some fifty-five projects are proposed to be undertaken jointly by a combination of METRO, the State Department of Highways and Public Transportation (SDHPT), the City of Houston and area property owners. The projects consist of roadway extensions, widenings, intersection improvements, new roadways, realignments and signal system modernization and coordination. Figure I-5 illustrates the projects, together with some 20 additional projects recommended as part of the Freeway Improvements Program. A list of the complete program of projects is contained in Table III-4 in Section III of this report.

Table I-1 below lists the total estimated cost of the Arterial Street Improvements Program by proposed funding source. **The total recommended program is projected to cost $110.8 million. It is anticipated that $44.5 million, or 40 percent of the total cost, would be contributed by the Uptown private sector in the form of right-of-way contributions.**

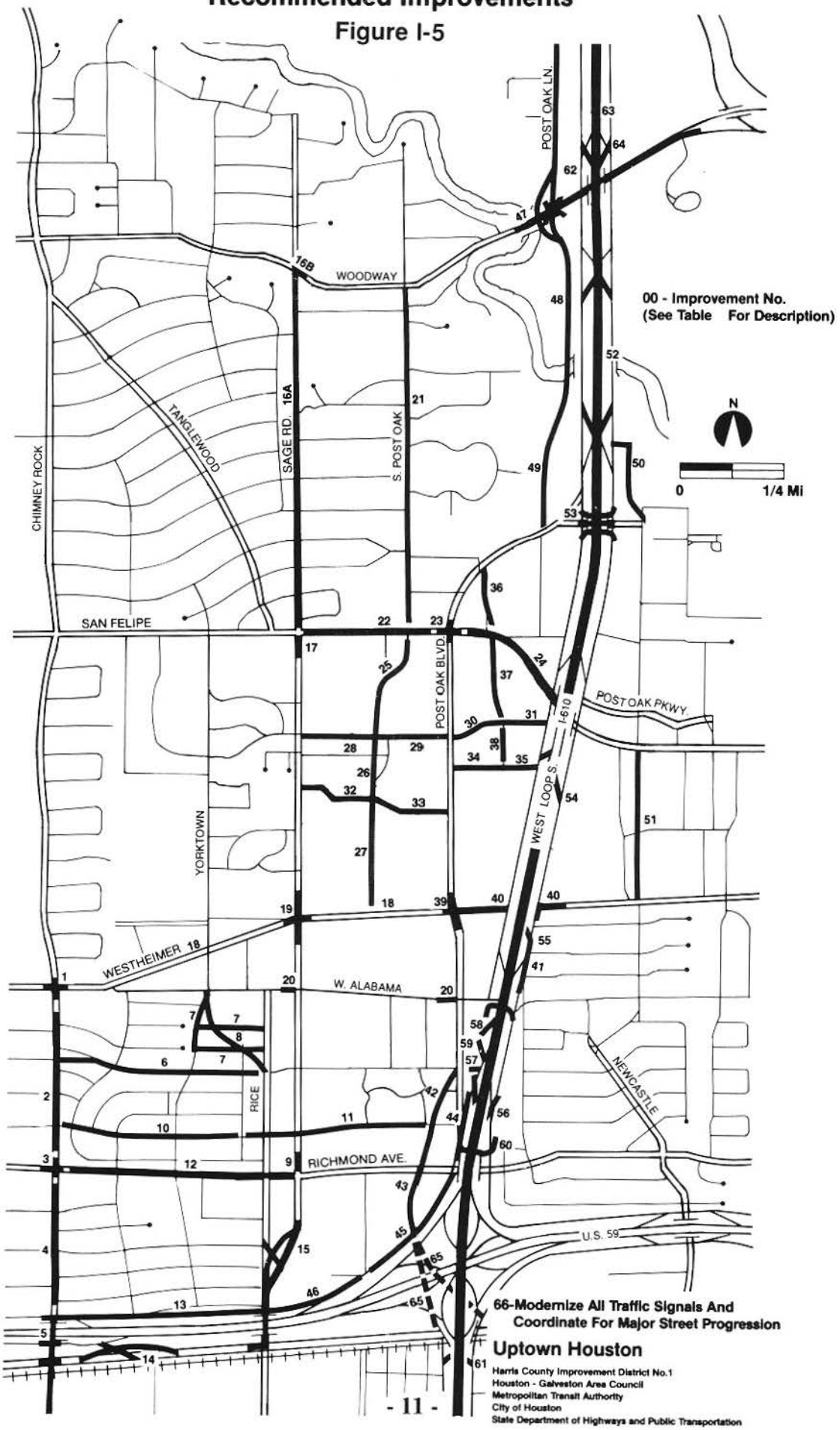
Table I-1:
ARTERIAL STREET IMPROVEMENTS PROGRAM
COSTS BY FUNDING SOURCE AND STATUS (dollars in millions)

	PROPOSED FUNDING SOURCE				
STATUS	**METRO**	**SDHPT[1]**	**PRIVATE[2]**	**TOTAL**	**% OF TOTAL**
APPROVED IN CONCEPT BY METRO:					
Construction	$30.4	—	—	$ 30.4[4]	
ROW	$14.4[3]	—	$41.0	$ 55.4[5]	
Subtotal	$44.8	—	$41.0	$ 85.8[6]	77%
ADDITIONAL RECOMMENDED PROJECTS:					
Construction	$ 4.8	$ 9.0	—	$ 13.8	
ROW	$ 2.2	$ 5.5	$ 3.5	$ 11.2	
Subtotal	$ 7.0	$14.5	$ 3.5	$ 25.0	23%
TOTAL PROGRAM:					
Construction	**$35.2**	**$ 9.0**	**$ --**	**$ 44.2**	
ROW	**$16.6**	**$ 5.5**	**$44.5**	**$ 66.6**	
Total	**$51.8**	**$14.5**	**$44.5**	**$110.8**	
Percent of Total	**47%**	**13%**	**40%**		**100%**

[1] Excludes U.S. 59 and I.H. 610 improvements to be included in freeway upgrades. Includes Post Oak Boulevard extension to Westpark.
[2] Private sector right-of-way acquisition by dedication.
[3] Includes $4.2 million for ROW acquisition for Uptown Parkway through Memorial Park.
[4] $9.7 million is for TSM and low capital cost projects.
[5] $5.0 million is for TSM and low capital cost projects.
[6] $14.7 million is for TSM and low capital cost projects.

Recommended Improvements

Figure I-5



Uptown Houston

Harris County Improvement District No.1
Houston - Galveston Area Council
Metropolitan Transit Authority
City of Houston
State Department of Highways and Public Transportation

Table I-2 shows the system total cost-effectiveness of the projects approved in concept by METRO using four measures – benefit/cost ratio, cost per vehicle-hour saved, cost per daily vehicle-mile traveled (VMT) and cost per VMT served. The benefit/cost ratio of the program implemented as a whole is 38.7. Table I-3 summarizes the total cost and cost-effectiveness of the recommended Arterial Street Program.

Table I-2:
INTEGRATED SYSTEM COST-EFFECTIVENESS
PROJECTS APPROVED IN CONCEPT BY METRO

		Cost-Effectiveness		
Project Type	**Benefit/ Cost Ratio[1]**	**Cost per Vehicle-Hour Saved**	**Cost per Daily VMT**	**Cost per VMT Served[2]**
Widenings	35.9[3]	$0.05	$ 52	$0.01
Extensions	29.0[3]	$0.21	$ 205	$0.03
TSM	58.8[4]	$0.07	--	--
Total Program	**38.7**	**$0.10**	**$ 120**	**$0.02**

[1] Total value of project benefits divided by total project costs to public agencies.
[2] Cost per VMT over 20 year life using 313 equivalent weekdays per year.
[3] 20 year project life.
[4] 10 year project life.

Table I-3:
ARTERIAL STREET IMPROVEMENTS PROGRAM SUMMARY

Construction cost	**$ 44.2 million**
ROW	**$ 66.6 million**
Total	**$110.8 million**
Likely Private Sector Contribution	**$ 44.5 million (40%)**

System program cost effectiveness measures[1]:

Benefit/Cost Ratio	**38.7**
Cost per vehicle hour saved	**$0.10**
Cost per daily vehicle mile traveled[2]	**$120**
Cost per daily vehicle mile traveled served[2]	**$0.02**

[1] Cost-effectiveness for projects approved in concept by METRO.
[2] Does not include TSM improvements.

Freeway Improvements Program

The primary focus of analysis for the Freeway Improvements Program was I.H. 610, since I.H. 610 provides the main access to Uptown Houston. As in the Arterial Street Improvement Program, the full range of low cost improvements, including transportation systems management (TSM) actions, was explored first. Subsequently, major capital improvements were addressed. More main lane and ramp capacity will be required to meet needs for regional mobility and access to Uptown Houston. U.S. 59 is currently undergoing major reconstruction and the I.H. 610 West Loop is planned to be improved beginning approximately 1995.

HCID#1 continues to work with the SDHPT on planning for the improvement of I.H. 610. The agencies recently completed the West Loop Task Force process, which helped to develop alternatives and select a design concept acceptable to affected parties and avoid any delays during the public review and environmental impact process. The task force consisted of property owners, transportation and parkland agency representatives, city planning officials and residential neighborhood association representatives, and was chaired by a State Highway Commissioner.

The Comprehensive Transportation Strategy recommendations regarding I.H. 610 and U.S. 59 listed in Tables IV-1 and IV-2 (located in Section IV of this report) were revised and updated following completion of the West Loop Task Force process. Four types of improvements to the freeways within Uptown Houston are recommended:

- **TSM and Low Capital Cost Freeway Improvements –**
  - Extensive information systems to alert area employees of anticipated construction activities and existing traffic conditions during reconstruction;
  - Ramp widenings, reversals and controls (e.g., part-time closures);
  - Intersection improvements to improve freeway operation; and
  - Signal timing optimization to improve freeway operation.

- **Improved access through "super frontage road" local lanes –** Construction of a collector/distributor roadway providing entrances and exits to the West Loop at each major arterial crossing. All local traffic would utilize the collector/distributor roadway, which would replace and enhance the existing frontage roads as well as a portion of the existing I.H. 610 mainlanes.

- **Additional capacity through express lanes** – Improved efficiency by separating through traffic from Uptown bound traffic. Express lanes in the center of the current mainlanes would be constructed connecting U.S. 290 and the I.H. 610 North Loop with I.H. 610 West Loop south of U.S. 59 and U.S. 59 southbound.

- **Additional street crossings of I.H. 610 and U.S. 59** – Improved West Alabama and Hidalgo continuity by extending West Alabama and Hidalgo across I.H. 610 to relieve Westheimer, Richmond, San Felipe and Post Oak Boulevard intersections with I.H. 610 and to complete the grid street system. Improved north/south continuity by connecting the I.H. 610 frontage roads across U.S. 59.

The West Alabama and Hidalgo crossings were not addressed in the West loop Task Force process and are not included in SDHPT's preliminary schematics. It is recognized that these recommendations and SDHPT's schematics are in a preliminary stage of development and will require refinement prior to acceptance by SDHPT, the Houston community and the Federal Highway Administration.

Transit System Improvements Program

Improved local and commuter bus service, coupled with development of a high capacity transit corridor along the Post Oak Boulevard spine of the area, are the key transit elements of the Uptown Houston Comprehensive Transportation Strategy.

Local and Commuter Bus Service

Improved bus service is needed in the near term to remedy current deficiencies in service and to increase transit mode split. In cooperation with METRO marketing and planning staff, the Comprehensive Transportation Strategy study developed recommendations regarding near term improvements to METRO local and commuter bus service to Uptown Houston. Worker origins were surveyed and existing service and patronage were evaluated. Unmet demand and opportunities to improve service were identified. In summary, the following recommendations are made:

- **Uptown Transportation Roundtable** – Establish a roundtable of major employers and property owners within the Uptown area to:
  - Define needed transit services;
  - Market transit services within Uptown at the company level;
  - Consider policy changes to promote transit ridership (e.g., parking pricing);
  - Address other Transportation Demand Management (TDM) issues.

- **Local bus** – Improve local service network by adding north/south crosstown routes to feed east/west trunk routes and by improving access to Bellaire and Northwest Transit Centers:
  - New crosstown routes for collection/distribution at Uptown employee origins;
  - New routes utilizing Briar Forest access across Buffalo Bayou to improve service and efficiency;
  - Modify existing routes to improve collection/distribution within Uptown area and provide express connections to the Northwest and Bellaire Transit Centers.

- **Commuter bus** – Establish direct express service to Uptown from Park & Ride facilities within the following corridors:
  - Southwest Freeway corridor
  - Katy Transitway
  - Northwest Transitway
  - North Transitway
  - Eastex Freeway

- **Carpooling and vanpooling** – Promote car and vanpools on transitway facilities serving highest Uptown employment concentrations:
  - Katy Transitway
  - Northwest Transitway
  - Southwest Transitway (when completed)

- **Facilities** – Plan and develop facilities supporting improved local and commuter bus service to Uptown:

  - Uptown Transportation Center
  - Post Oak Boulevard Transit Corridor (collection/distribution)
  - Southwest Freeway Transitway exclusive lane to Uptown
  - Hillcroft Transit Center (via shuttle service connection)
  - Uptown pedestrian improvements

Post Oak Boulevard Transit Corridor

METRO currently proposes to build a fixed guideway system aligned east/west along Richmond Avenue and Westpark Street, with one Uptown station located at Fairdale Street. Because employment within Uptown is distributed along the north/south axis of Post Oak Boulevard, a high capacity transit corridor along Post Oak Boulevard is needed to provide collection and distribution from this single station, as well as from Regional Transit Centers located adjacent to the existing and planned Northwest, North, Katy and Southwest Transitway facilities. The single proposed METRO fixed guideway station would be within walking distance of only 20% of projected Uptown area employment in 2010. In addition, there is no high capacity connection currently planned by METRO between the Regional Transit Centers and Uptown.

To address this need for a high capacity transit corridor connecting Uptown with Regional Transit Centers and the proposed fixed guideway station at Fairdale Street, the study evaluated the functional and spatial impacts of alternative alignments within the Uptown area. Six alternative horizontal alignments were considered for the corridor:

- Garretson extended;
- McCue Street;
- Post Oak Boulevard;
- I.H. 610 Frontage Road;
- "Loop" along Garretson extended, McCue and Sage;
- Sage Road.

Post Oak Boulevard was selected as the desired alignment primarily because the alignment supported the goals identified by HCID#1 and was projected to capture the greatest potential ridership of the alternatives considered. The study estimated that five stations along the Post Oak Boulevard alignment would potentially capture 69% of all commuters and 97% of all shoppers within the Uptown corridor. The recommended Post Oak Boulevard alignment, including proposed station locations, is shown on Figure I-6.

Pedestrian Environment Improvement Program

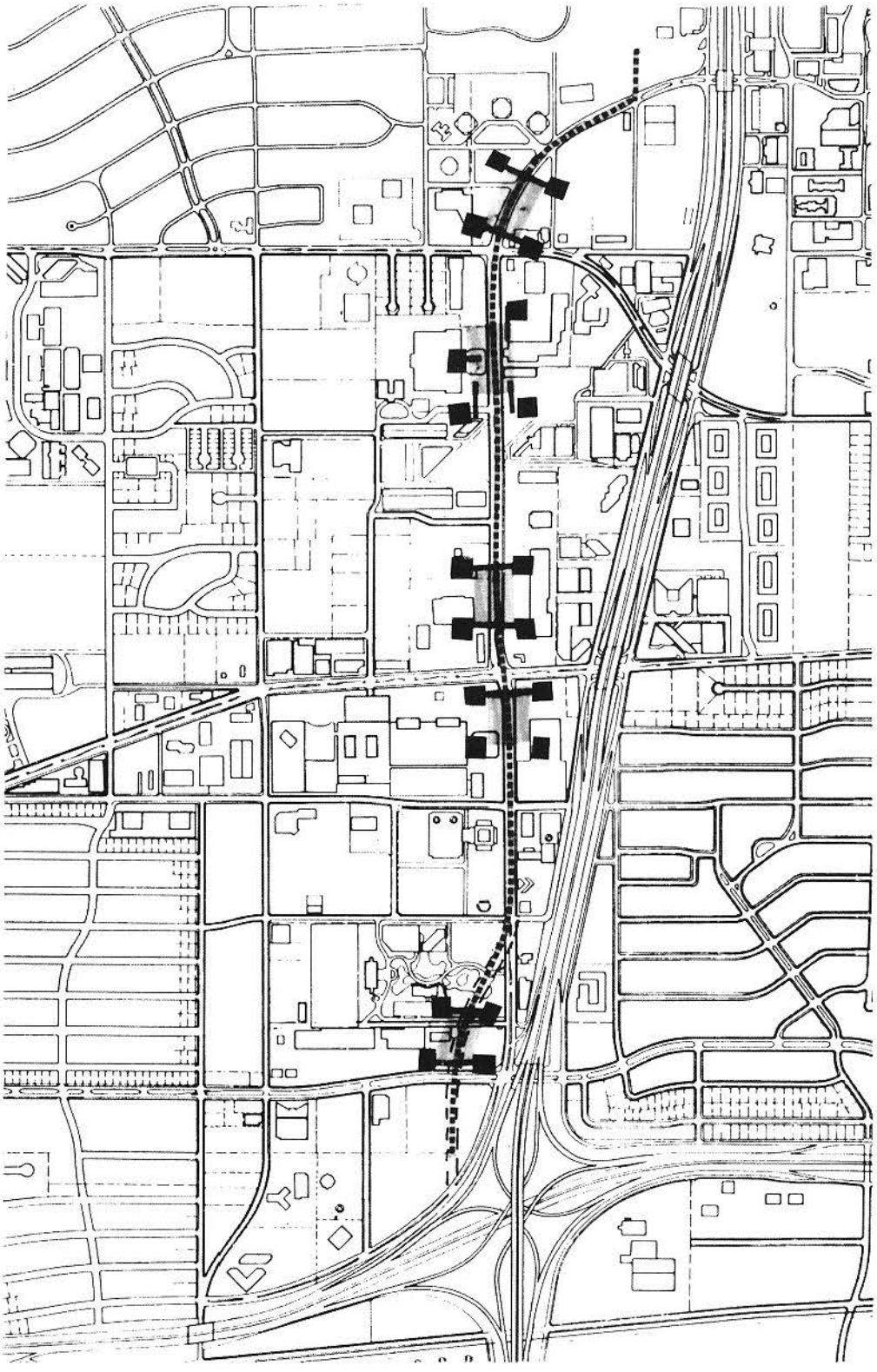
The Pedestrian Environment Improvements Program was developed in coordination with the arterial street, freeway and transit improvement programs within the Comprehensive Transportation Strategy. Pedestrian mobility will be critical to increasing transit utilization and allowing the choice of walking for intra-area trips, thereby reducing arterial street congestion.

Transit corridor

Stations

Access points

Pedestrian connections



0 1200′ 2400′ 3600′

Proposed High Capacity Transit Corridor Concept Plan

Figure I-6

As a foundation for recommending pedestrian mobility improvements within Uptown Houston, a Pedestrian Environment Design Concept was developed for the Uptown study area. Design concepts were detailed for Post Oak Boulevard and prototypical street cross sections were developed as general standards for pedestrian components of arterial streets throughout Uptown Houston. In summary, the Pedestrian Environment Design Concept includes the following elements:

- **Sidewalks** – Expansion of sidewalk widths generally to 11 feet along Post Oak Boulevard and 7 feet elsewhere throughout Uptown Houston to increase capacity.

- **Trees** – Single and double rows of trees for pedestrian shade and to give continuity to the Uptown district.

- **Pedestrian Lighting and Street Lighting** – Specially designed lighting for pedestrian and automobile safety, further providing continuity to the Uptown district.

- **Intersection Improvements** – Specially designed modular traffic standards to display signalization and signage for pedestrian and vehicular traffic. Paved pedestrian crossings (Post Oak Boulevard) and other pedestrian amenities.

- **High Capacity Transit Corridor Stations** – Designed and located to function as key points of activity along Post Oak Boulevard. Station and access locations carefully planned to optimize connections to adjacent development and accessibility by potential transit riders.

In order to implement the Pedestrian Environment Improvements Program as quickly as possible without installing any major improvements that would have to be removed for the construction of later improvements, an implementation strategy was developed which is coordinated between the Arterial Street Improvements Program and the reconstruction of Post Oak Boulevard associated with high capacity transit corridor construction. This implementation strategy for the Pedestrian Environment Improvements Program can be summarized as follows:

- **Post Oak Boulevard Improvements** – Proposed to be funded and implemented in association with construction of the METRO fixed guideway transit system or alternative development of Post Oak Boulevard as a major transit corridor.

  It is proposed that base improvements to the pedestrian system be made in advance of transit corridor construction in order to effectively manage traffic impacts during construction and effect improvement for pedestrian mobility as soon as is feasible.

- **Arterial Streets Improvements** – Proposed to be funded and implemented under the Arterial Street Improvements Program (refer to Section III). It is proposed that all streets extended or widened under the Arterial Street Improvements Program include improvement of pedestrian facilities to the level defined in the Pedestrian Environment Design Concept.

Transportation Demand Management Action Plan for HCID#1

Despite an aggressive arterial and freeway improvement program, the roadway system cannot meet all demand for travel to and through the area. This is shown by an evaluation of projected roadway system deficiencies that was developed for the recommended roadway system using anticipated 2010 traffic volumes. These volumes were based on projections by the Houston-Galveston Area Council from that agency's regional travel forecasting procedure. It is projected that despite implementation of the proposed Arterial Street and Freeway Improvements Programs, most of Uptown Houston will be congested to some extent in 2010 according to Greater Houston Chamber of Commerce Regional Mobility Plan criteria. Many of the same streets will be congested – both those with improvements and those without. A projected 91 percent of the peak hour vehicle-miles will operate in some degree of congestion in 2010. Approximately 70 percent of the peak hour vehicle-miles will be severely congested compared to today's 74 percent.

As a result, it can be concluded that the recommended Arterial Street and Freeway Improvements Program will accommodate nearly a doubling of Uptown Houston employment, but will not achieve better levels of service over the long term. To achieve Uptown's desired level and quality of access and mobility, a combination of improved public transportation services, pedestrian mobility improvements, parking supply/pricing management and transportation demand management (TDM) will be needed. Therefore, HCID#1 developed a TDM Action Plan to maximize the return of the transit and pedestrian investments, thereby reducing traffic congestion. The TDM Action Plan outlines a plan for implementing a complete program of TDM services and improvements including the following:

- **Mode Shift Programs –** Transit and paratransit services marketing, carpooling/ vanpooling, pedestrian commuting, land use policies that promote transit use, parking management and implementation of transportation services and facilities which support mode shift.

- **Traffic Management Programs –** Alternative working arrangements (e.g., flextime, staggered hours), peak period traffic management by off-duty police officers, incident management, public computer information terminals and facilities maintenance.

IMPLEMENTATION STATUS – Solicitation of Support

The directors of both the Uptown Houston Association and HCID#1 recognized the need to extend the consensus on strategy into the implementation process. This will require continuous work and coordination with the implementing agencies. Most components will require interagency efforts due to City of Houston ownership of most of the capital improvements. Continuing involvement of property owners within the District is also essential since they will be instrumental in pedestrian improvements, evolving new development concepts, and transportation management programs.

Arterial Street

METRO dedicates one-quarter of its 1% sales tax revenue to roadway improvements. To date, none have been made in the Uptown Houston area. However, in 1987 METRO estimated a need for at least $20 million for the area and in 1989 *Approved in Concept* almost $45 million worth of the $110

million Uptown Houston arterial street improvement program. Forty-one of the recommended projects were *Approved in Concept* by METRO for implementation under the agency's General Mobility Program. Map I-7 shows the projects approved in concept by METRO, which are listed in Table III-5 contained in Section III of this report. Only thirty-one projects are numbered within the METRO program due to consolidation of segments.

Among the projects *Approved in Concept* by METRO, the following projects, valued at $20.8 million, are committed in METRO's current improvement budget, the General Mobility Capital Improvements Program, for implementation within the next five years (see Figure I-8):

- **Westheimer** – Widening and intersection improvements from Sage to I.H. 610;
- **San Felipe** – Widening and intersection improvements from Sage to I.H. 610;
- **Richmond** – Widening from Sage to Chimney Rock;
- **Woodway** – Widening from Post Oak Lane to I.H. 610;
- **Chimney Rock** –Widening from Westheimer to U.S. 59;
- **Post Oak Lane** –Widening and intersection improvements San Felipe to Woodway;
- **Hidalgo** – Widening and intersection improvements South Rice to Chimney Rock.

In addition to the above projects, METRO has committed $1.1 million for a General Engineering Contractor (G.E.C.) to perform preliminary engineering on other Uptown area projects *Approved in Concept* by METRO for potential future funding under the METRO General Mobility Program. METRO has selected engineering consultants for each project as well as the General Engineering Contractor. Engineering work is scheduled to begin in spring, 1991 to ascertain specific right-of-way requirements satisfactory to METRO and the City of Houston, which will own the improvements.

Freeway

U.S. 59 improvements are currently under construction. HCID#1 continues to work with the SDHPT on planning for the improvement of I.H. 610. Preliminary schematics are currently being refined to address problems and reflect solutions identified during the West Loop Task Force process. The highly successful West Loop Task Force process is a prime example of commitment to public/private consensus building.

Transit

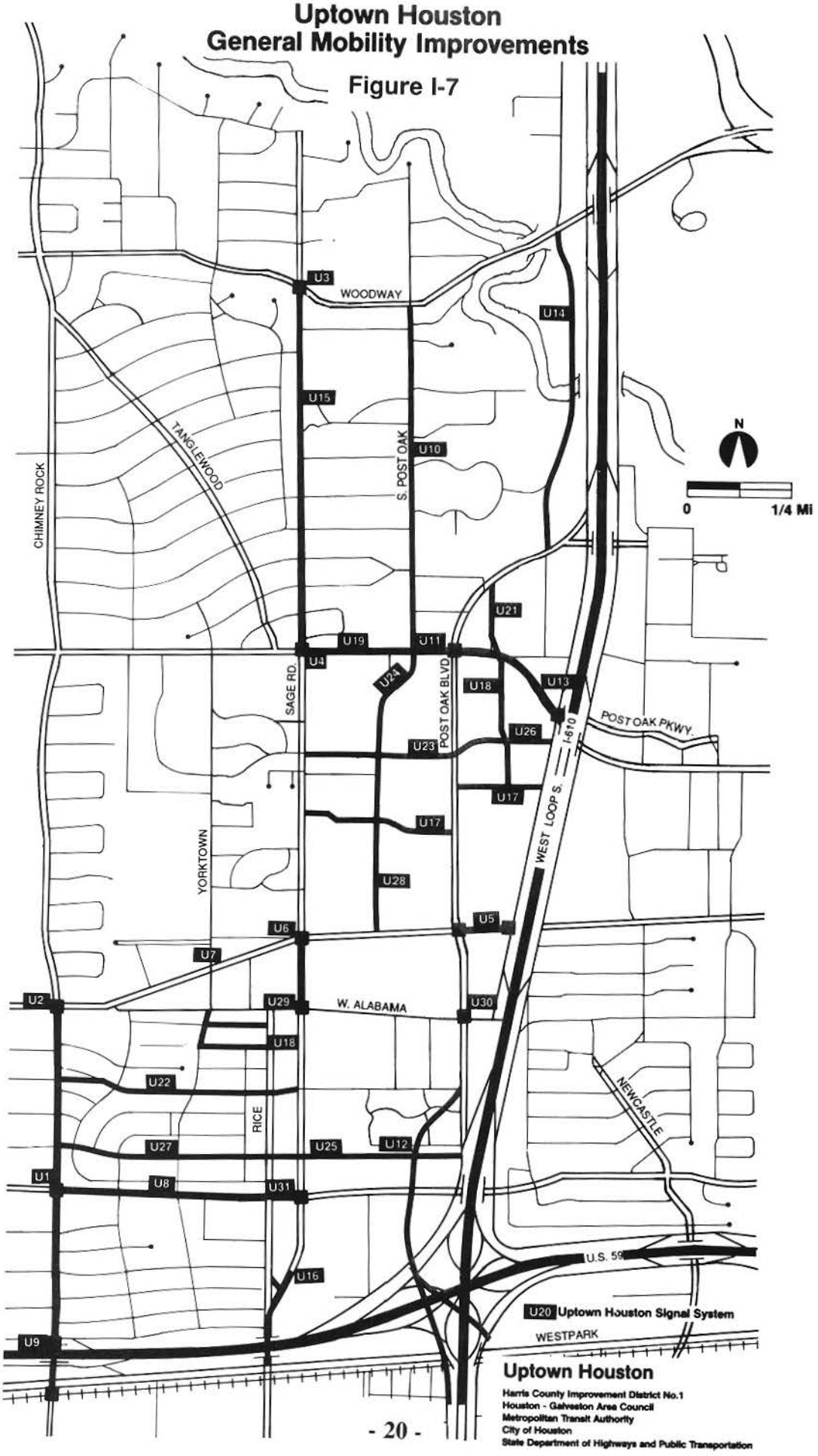
HCID#1 continues to work with the METRO on planning for the implementation of METRO's planned fixed guideway system. While the West Loop/Post Oak Boulevard leg of METRO's proposed fixed guideway system was dropped by METRO subsequent to completion of the study effort, METRO has included within its proposed system a Post Oak Boulevard high capacity transit corridor. The METRO/UMTA Alternatives Analysis/Draft Environmental Impact Statement proposed that the corridor operate as two-way exclusive bus lanes located in the median of Post Oak Boulevard. HCID#1 is investigating potential public/private means to develop a people-mover system along Uptown's main Post Oak Boulevard axis. HCID#1 is also working with METRO to enhance and market its bus services throughout the Uptown area.

Pedestrian

HCID#1 has assessed area property owners for funding during the current fiscal year to develop a site-specific pedestrian improvements design for Post Oak Boulevard, San Felipe and Westheimer,

Uptown Houston
General Mobility Improvements

Figure I-7



Uptown Houston

Harris County Improvement District No.1
Houston - Galveston Area Council
Metropolitan Transit Authority
City of Houston
State Department of Highways and Public Transportation

UPTOWN PROJECTS COMMITTED BY METRO

Figure I-8

PROJECT	TOTAL COST
Westheimer – Sage to West Loop Widen from Post Oak Boulevard to I.H. 610 – Add an additional eastbound lane between Post Oak Boulevard and I.H. 610 for right turns. Intersection of Westheimer and Post Oak Boulevard – Construct double left-turn lanes on east, south and west approaches at Post Oak Boulevard and triple left-turn lanes on the north approach. Intersection of Westheimer and I.H. 610 – Relocate south U-turn lane one lane to the south; Restripe Westheimer between the frontage roads for two through lanes in each direction; Construct double left-turn lanes westbound and triple left-turn lanes eastbound. Intersection of Westheimer and Sage – Construct double left-turn lanes at all approaches and widen the lanes at the south approach of Sage.	**$ 2,005,000**
San Felipe – Sage to West Loop Widen from Sage to I.H. 610 – Widen from a 5-lane concrete curb and gutter roadway to a 7-lane concrete curb and gutter roadway (0.73 mile). Intersection of San Felipe and Sage – Construct left-turn lanes at north and south approaches and a right-turn lane at the north approach. Intersection of San Felipe and Post Oak Boulevard – Construct double left-turn lanes at north, east and west approaches. Intersection of San Felipe and I.H. 610 – Relocate south U-turn one bay south. Relocate eastbound through lanes to existing south U-turn bay; Restripe for standard lane widths.	**$ 6,426,000**
Chimney Rock – Westheimer to U.S. 59 Widen from Sage to U.S. 59 – Widen from a 4-lane to a 6-lane concrete curb and gutter roadway (0.8 mile).	**$ 6,700,000**
Post Oak Lane – Woodway to San Felipe Widen from San Felipe to Woodway – Widen from a 2-lane undivided asphalt open-ditch roadway to a 4-lane undivided concrete curb and gutter roadway (0.81 mile).	**$ 2,220,000**
Richmond – Sage to Chimney Rock Widen from Sage to Chimney Rock – Widen from a 6-lane divided concrete curb and gutter roadway to an 8-lane divided concrete curb and gutter roadway (0.64 mile).	**$ 950,000**
Hidalgo – South Rice to Chimney Rock Widen from South Rice to Chimney Rock – Widen from a 2-lane to a 4-lane undivided concrete curb and gutter roadway and realign road at Chimney Rock; Convert to a one-way street westbound (0.5 mile).	**$ 1,359,000**
Uptown Houston Mobility Improvements Preliminary Engineering – A comprehensive program of road and street improvements within the Uptown area (31 projects) has been developed by the Uptown Houston Association and approved in concept by the METRO Board. Preliminary enginering funding for projects not explicitly included within the METRO General Mobility C.I.P.	**$ 1,100,000**
TOTAL VALUE OF COMMITTED PROJECTS:	**$20,760,000**

along with a strategic plan for funding and implementing the improvements. It is anticipated that construction of these improvements would ultimately be coordinated with implementation of a high capacity transit corridor along Post Oak Boulevard.

Transportation Demand Management

The Comprehensive Transportation Strategy report includes an HCID#1 Action Plan for implementation of a Transportation Demand Management program. It is anticipated that the resulting TDM program will focus on three TDM elements – transit mode shift, parking policy and traffic management associated with I.H. 610 West loop reconstruction. First, HCID#1 is currently working with METRO to enhance the current base level of transit services. Second, HCID#1 is studing the policy options for effecting parking supply and pricing to encourage transit mode shift and alleviate traffic congestion. Third, HCID#1 anticipates that information systems and demand management will become a major focus of district services leading up to and during improvement of the I.H. 610 West Loop.

CONCLUSION

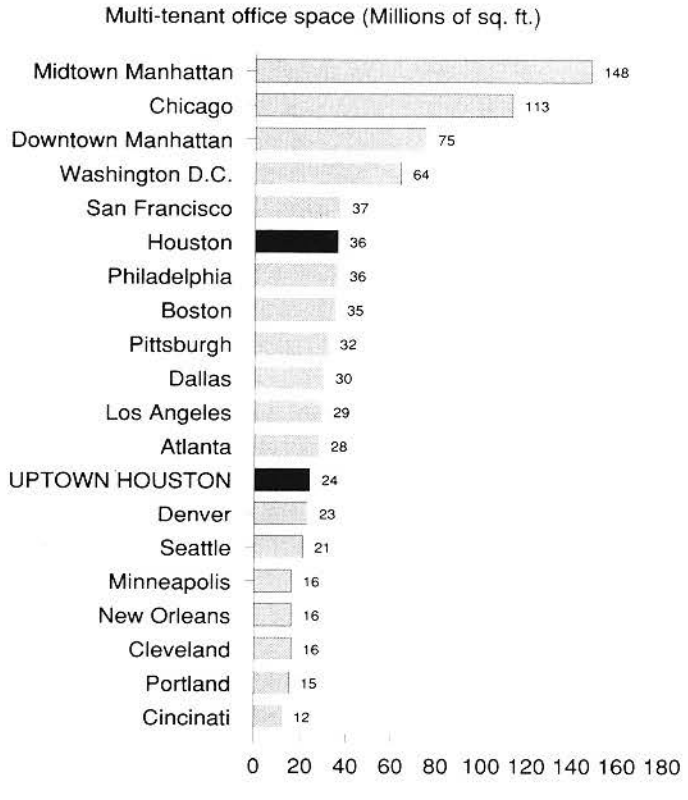
The process used by HCID #1 to develop its Comprehensive Transportation Strategy has been effective in starting a cooperative transportation improvement program for the nation's largest suburban business district. It is clear that support and participation by all parties, public and private, will be necessary if the entire program is to be implemented. It is also clear that the private sector will have to be involved, providing both leadership and reliable funding in the improvement program.

II-A.
INTRODUCTION

UPTOWN DEVELOPMENT HISTORY

Uptown Houston is the nation's largest suburban business district and a prototype of the nation's emerging suburban "downtowns." With 23.7 million net square feet of multi-tenant office space, Uptown is comparable in size to downtown Denver. Ranked by total office space, Uptown is the thirteenth largest business district in the nation and the third largest in Texas. Chart 2.1 ranks the nation's largest business districts by square footage of office space.

Chart 2.1: Nation's Largest Downtowns

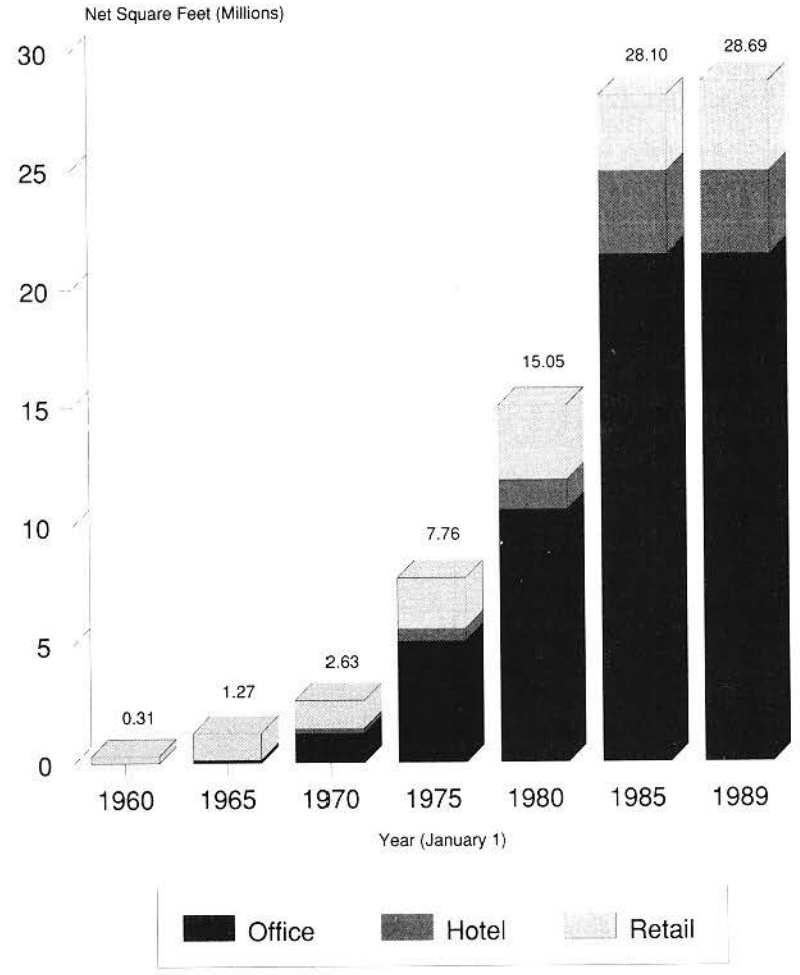


Source: The Office Network, 1989

More than office space, Uptown Houston is a diversified economic center, balancing office, retail and residential development. Transco Tower, the tallest office building in the world outside of a central business district, is adjacent to the Galleria, one of the nation's premier retail centers. With 3.9 million net square feet of retail space, Uptown Houston has the city's largest concentration of shops and department stores. Uptown's 4,500 first class hotel rooms offer visitors all the retail, restaurant and entertainment attractions of the Galleria area. Approximately half of Houston's high rise condominium units are located Uptown.

The rate of growth in Uptown Houston has been explosive. Approximately 78,000 individuals are currently employed within Uptown Houston. Within the area bounded by Woodway on the north, Chimney Rock on the west, U.S. 59 on the south and the Southern and Pacific Railroad on the east, over 28 million net square feet of office, retail and hotel space have been developed. 73 percent of this total development occurred since 1975; half occurred since 1980. Chart 2.2 summarizes historical development growth in Uptown Houston.

Chart 2.2: UPTOWN DEVELOPMENT GROWTH



Source: Kerr Real Estate Resource Center and Uptown Houston

UPTOWN HOUSTON ASSOCIATION

Originally known as the City Post Oak Association, the Uptown Houston Association was formed in 1975 to address the problems and opportunities arising from the area's rapid growth. Without question, the greatest challenge facing the area has been mobility. Because Uptown's transportation systems have not evolved with the growth of the area, the Association has undertaken a broad range of actions throughout its history to enhance access to and circulation within the area. These efforts have included:

Arterial Street Improvements:

- Transportation planning — The Association develops and works to implement mobility improvements programs.
- Traffic engineering — The Association has sponsored traffic engineering studies and design work to facilitate development of transportation improvements within and around the Uptown area.
- Street construction — Private developers within the area have funded millions of dollars worth of public and private street construction.

Pedestrian Improvements:

- Pedestrian crosswalk implementation — The Association has funded and managed installation of pedestrian crossing signalization at key intersections.

Transportation Management Activities:

- Off-duty policemen assisting peak period traffic operations — Throughout its history, the Association has provided a program of traffic control by off-duty police officers to manage traffic flow during peak periods. For the past fourteen years, the Association has provided thousands of person-hours of traffic control annually. The organization provided approximately 4,500 person-hours of service in 1990.
- Vanshare and carshare programs — The Association has served as a facilitator for vanpooling programs within the Uptown area. The Association has contracted for lease of vans and provided vanpool service on a subscription basis.
- Development of new bus stops and shelters — The Association works closely with METRO and private landowners to place new bus stops and shelters within the area as well as to improve existing shelters.
- Transit ticket sales and promotions — The Association office is a distribution point for transit system maps, schedules, promotions and other information as well as a sales outlet for METRO tickets and monthly passes.

Transit Improvements:

- Transit circulators — The Association worked closely with METRO to implement a circulator service for the Uptown area. Although the service was discontinued by METRO in 1986, demonstrated need still exists. Two new bus routes connecting the Uptown area with METRO's newly completed Northwest Transit Center (collector/distributor routes) have been designed to help address this deficiency.

Through the Association's fifteen years of private sector leadership, these activities have made a difference. **However, the Association's efforts have been at best a piecemeal solution to a comprehensive problem.** As a non-profit corporation funded year-to-year by dues and other fundraising, the Association lacked an effective mechanism to implement long-term and comprehensive transportation solutions. Before transportation system deficiencies could be adequately met, the Uptown area needed a funding and implementation mechanism which would be efficient in carrying out programs and projects required for the long term viability and success of the area.

FORMATION OF HARRIS COUNTY IMPROVEMENT DISTRICT #1

In early 1987, Uptown's private sector interests worked together to establish Harris County Improvement District #1 (HCID#1). Special legislation was drafted and passed in the 70th Texas State Legislature to create the District. Through a combination of the powers of various provisions of the State's constitution, HCID#1 was empowered to conduct a broad range of functions related to the improvement of Uptown Houston. The boundaries of HCID#1 are highlighted in the illustration (Illustration II-A-1) on the following page.

Property owners in Uptown may now assess themselves on an *ad valorem* or benefit basis for needed improvements and programs. The District may issue bonds supported by *ad valorem* taxes and/or assessments. The District has greatly enhanced Uptown's ability to spearhead development of new transportation facilities and services. HCID#1 has the authority to develop roads, sidewalks, transit services, utilities and other infrastructure as well as to enter into agreements for joint projects with other agencies. The District is also empowered to provide a wide variety of services, including transportation services.

The intent of the creation of HCID#1 was not to reduce public sector services and responsibilities, but to leverage public funds with coordinated private resources to improve services and facilities. The District is a key tool in implementing transportation facilities and services for the Uptown area. Harris County Improvement District #1 provides the following benefits to the Uptown area:

- Ensure long term commitment to essential area-wide improvements and programs as property ownership becomes increasingly diverse;
- Enable direct participation in joint governmental projects and public/private partnerships;
- Facilitate financing of improvements;

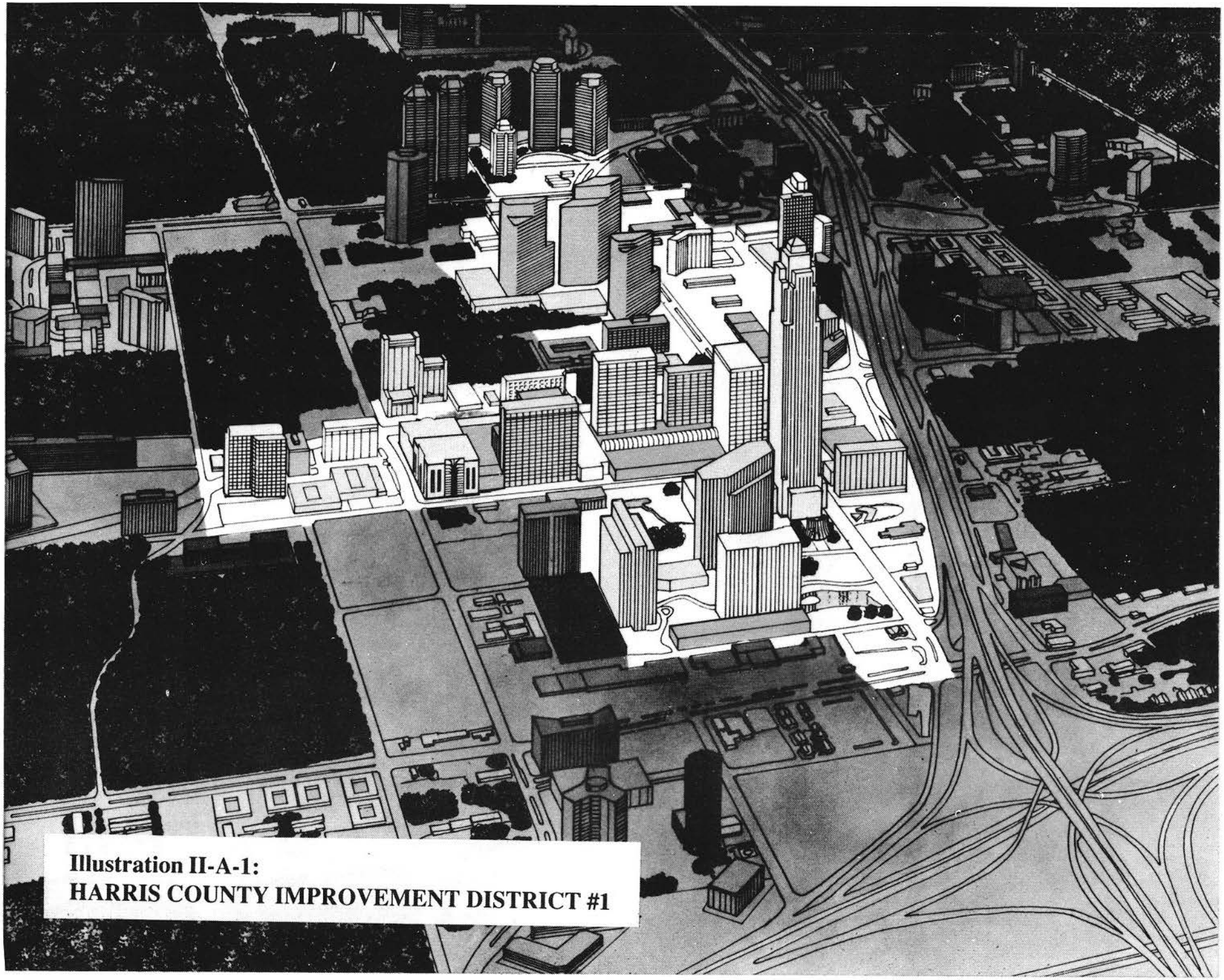


Illustration II-A-1:
HARRIS COUNTY IMPROVEMENT DISTRICT #1

- Provide an efficient and equitable revenue collection;
- Increase recognition of Uptown as an entity by public agencies and political interests;
- Enhance the development of improvement plans and programs, and accordingly increase the value of properties within the district; and
- Enhance the sense of the area as a planned, well-managed, well-maintained district in a "non-planned" city.

DEVELOPMENT OF A COMPREHENSIVE TRANSPORTATION STRATEGY

Using the establishment of Harris County Improvement District #1 as a catalyst, Uptown's private sector and local public sector agencies joined together to develop a Comprehensive Transportation Strategy for Uptown Houston. The effort was funded by a grant from the Urban Mass Transportation Administration (UMTA). The Comprehensive Transportation Strategy effort was the result of the common understanding of the following:

- Transportation systems in Uptown Houston are highly interrelated; and
- Although utilized extensively, low cost paratransit services, transportation management programs and TSM alone have not provided a basis on which Uptown Houston could grow and remain vital.

The following general examples illustrate how deficiencies in transportation systems in Uptown Houston are interrelated and must be addressed comprehensively:

- Due to the lack of north-south arterial access to the area, use of METRO's Katy Freeway Transitway and the I.H. 290 Transitway is impractical for Uptown commuters. North-south arterial access should be developed before effective utilization of these facilities for bus, carpool and vanpool access to Uptown Houston can be achieved.
- Lack of a street network directs all access and circulation traffic to major arterials such as Westheimer. A street network with viable alternate routes should be developed before construction of the Post Oak Boulevard transit corridor proceeds.
- Major deficiencies in the pedestrian environment must be addressed to make pedestrian access to transit convenient and appealing before transit (bus or fixed guideway) can play a major role.
- Policies regarding parking and promotion of carpools/vanpools currently impact the mode split between transit and private automobiles to the detriment of transit patronage.
- Freeway problems exacerbate arterial street congestion. For example, congestion due to weaving in the mainlanes of southbound I.H. 610 queues traffic on frontage

roads and arterial streets in the area because vehicles are unable to enter the freeway.

- Arterial problems exacerbate freeway congestion. For example, congestion on Westheimer westbound in the morning peak causes traffic to queue on northbound I.H.610 at the Westheimer exit because vehicles are unable to exit the freeway.

- North-south arterial street access to the Uptown area is almost non-existent. Drivers currently use I.H. 610 for trips that would normally be made on arterial streets. Planned reconstruction on I.H. 610 should not proceed until alternative arterial routes are developed.

HCID#1 and local public agencies agreed that access to and circulation within the area, including transit, paratransit, autos and pedestrians, had to be considered as a whole. To respond to interrelated transportation system deficiencies, the Comprehensive Transportation Strategy study addressed both short and long term improvements for all modes of transportation, as well as the interaction between transportation and land development. The comprehensive nature of the effort required the direct and cooperative participation of each of the following agencies:

- Harris County Improvement District #1;
- Houston-Galveston Area Council (H-GAC);
- City of Houston;
- Metropolitan Transit Authority (METRO); and
- State Department of Highways and Public Transportation (SDHPT).

II-B.

ASSESSMENT OF EXISTING TRANSPORTATION DEFICIENCIES

Uptown has grown to become a "downtown" without the infrastructure of a downtown. While Uptown's initial development was fueled by convenient access to the area, access and internal circulation have now become Uptown's main liabilities. Traffic congestion has become the greatest impediment to the quality of Uptown Houston.

Unlike Houston's downtown, Uptown Houston has never had the roadway infrastructure of a major business district. Having grown around a rural roadway system which became suburban, Uptown Houston still struggles to achieve the level of accessibility of most traditional downtowns in the nation.

This section will address deficiencies faced by Uptown Houston in each of the following areas:

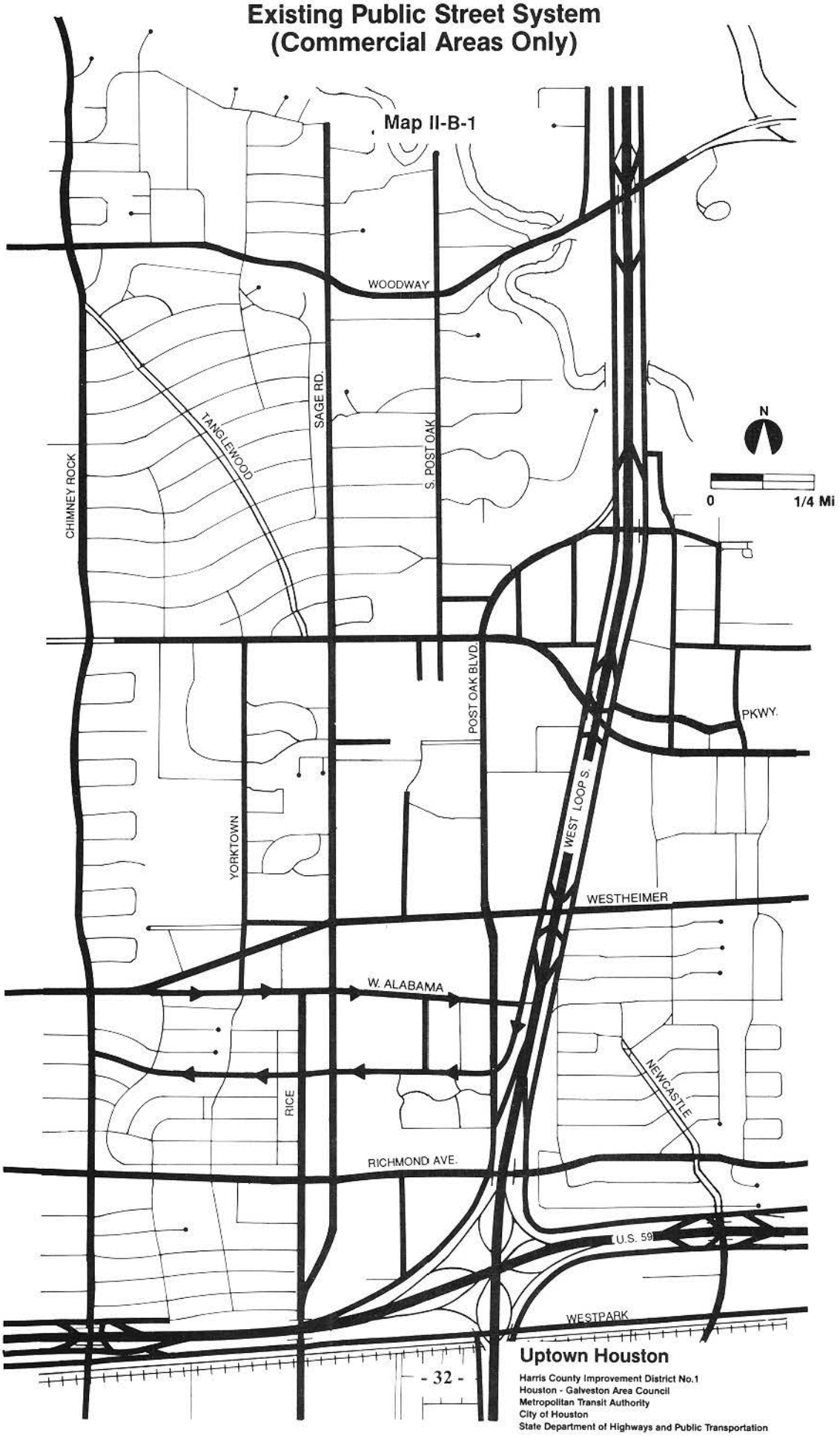
- Arterial street network;
- Freeway capacity and access;
- Transit circulation and access (commuter and local);
- Pedestrian network;
- Inconsistent policies affecting transportation.

ARTERIAL STREET NETWORK DEFICIENCIES

Map II-B-1 shows the existing public street system in Uptown Houston. Uptown is served by three of the most heavily traveled roads and freeways in Texas — Westheimer Road, U.S. 59 and I.H. 610. Westheimer carries over 55,000 cars per day through Uptown; I.H. 610 (West Loop) and U.S. 59 carry as many as 250,000 and 228,000 vehicles through the area in a 24 hour period, respectively. Each of these facilities carries the highest average daily traffic of any facility in its functional classification in the State of Texas.

Given the area's rural and suburban roots, Uptown Houston's internal street system suffers from having been developed for a typical combination of residential subdivisions, some retail, and other

Existing Public Street System
(Commercial Areas Only)



Uptown Houston

Harris County Improvement District No.1
Houston - Galveston Area Council
Metropolitan Transit Authority
City of Houston
State Department of Highways and Public Transportation

commercial development. Over the years, Uptown Houston development intensified greatly. At the same time, the area's streets were widened, but few additional streets were constructed. As a result, the area relies on a limited number of major streets to handle multiple functions, such as traffic going to or from Uptown Houston, through traffic or internal circulation.

Traffic congestion has increased together with the explosive development within the area. Map II-B-2 shows 1980 and 1987 traffic volumes. Growth in these daily volumes has generally ranged between five and sixty percent. This is in spite of severe constraints on roadway capacity which has caused peak traffic periods to extend from only an hour around 8:30 a.m. and 5:00 p.m. in the early 1970's to nearly all periods between 11:00 a.m. and 6:30 p.m. This is currently the case on Westheimer and I.H. 610.

Map II-B-3 shows current congestion ratings based on criteria used in the Greater Houston Chamber of Commerce Regional Mobility Plan. Table II-B-1 contains those criteria. In total, some 89 percent of today's peak period vehicle-miles within Uptown Houston are operating in congested conditions. Both freeways and all east-west major thoroughfares are congested through part or all of Uptown Houston. Portions of Chimney Rock, a north-south arterial on the western boundary of the Uptown area, are congested. Other north-south streets, most notably Post Oak Boulevard, are less congested when measured by vehicle miles traveled. However, this should be considered in light of two factors. First, these north-south streets do not provide access to or from the north or south of the Uptown area. Second, congestion exists during the peak period in spite of lower vehicle-miles traveled because of insufficient traffic signal green time for the north-south streets due to priority given to east-west streets.

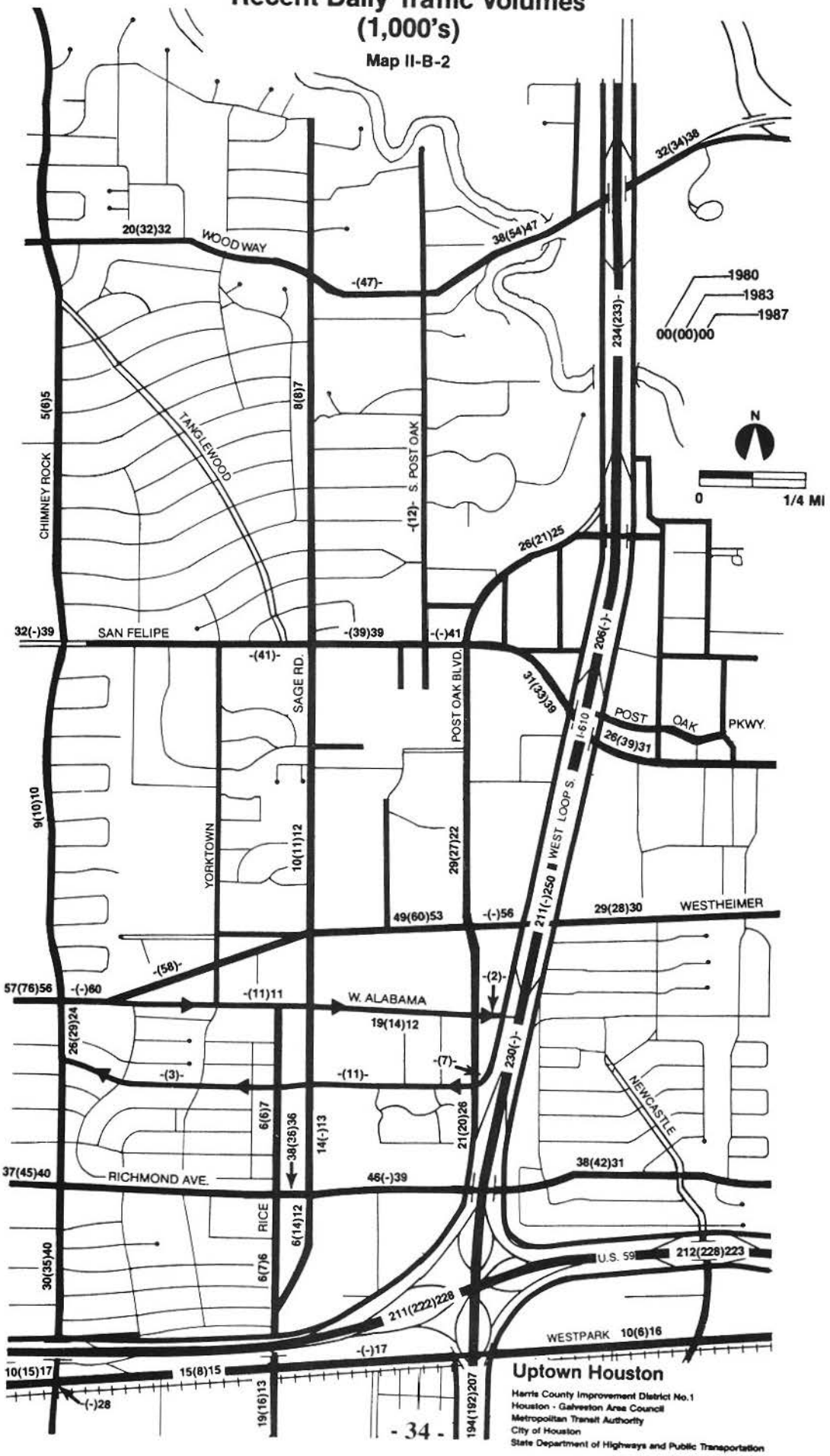
TABLE II-B--1

CONGESTION CRITERIA
HOUSTON REGIONAL MOBILITY PLAN

	Average Daily Traffic/Lane	
Congestion Level	Freeway	Arterial
Moderate	13,000-17,500	5,000-7,000
Heavy	17,500-20,000	7,000-8,500
Severe	20,000+	8,500+

Recent Daily Traffic Volumes (1,000's)

Map II-B-2

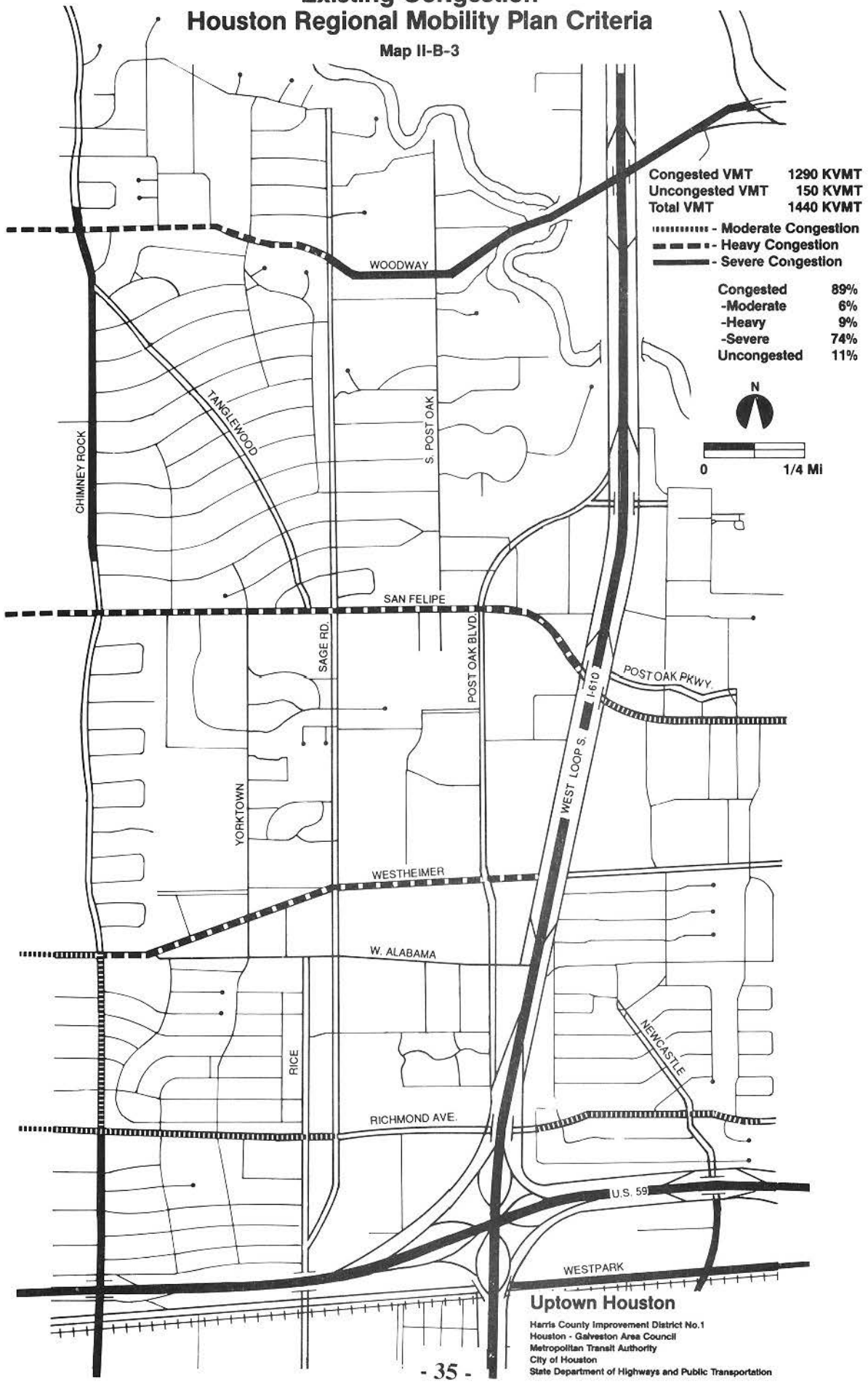


Uptown Houston

Harris County Improvement District No.1
Houston - Galveston Area Council
Metropolitan Transit Authority
City of Houston
State Department of Highways and Public Transportation

Existing Congestion
Houston Regional Mobility Plan Criteria

Map II-B-3



Map II-B-4 shows current peak hour congestion based on field surveillance. While the same east-west streets demonstrate congested conditions similar to those illustrated in Map II-B-3, intersection approaches of several north-south streets are also currently congested. However, even with extra green time given to east-west movements, the east-west streets are congested during peak periods. The primary reason for nearly the entire roadway system to be operating above capacity is the lack of a sufficient roadway system with adequate access and circulation capacities. The few major roadways in the area must not only provide access to the area and accommodate through trips, but also handle much of the internal circulation.

In summary, the following deficiencies exist in the Uptown arterial street system:

- **Inadequate area dedicated to streets** — Streets comprise only approximately 10% of the land use in Uptown Houston, compared to approximately 43% in downtown Houston. Uptown has 17.9 lane miles of arterials and principles per square mile of land area, compared to 41.0 in the central business district.

- **Limited thoroughfares must serve excessive through traffic in addition to local access and circulation** — Uptown experiences the internal traffic of a downtown environment as well as heavy east-west through traffic on Westheimer, San Felipe, Woodway and Richmond.

- **No continuous north-south major arterials** — There are presently no major arterial alternates to the West Loop for crossing Buffalo Bayou in Uptown Houston. Absence of these arterials necessitates use of I.H. 610 for local trips and severely limits the effectiveness of transit facilities located to the north of Uptown Houston for bus, carpool and vanpool access (e.g., the Katy Freeway and U.S. 290 Transitways).

- **Limited capacity** — Private alley streets (e.g., Ambassador Way and Chevy Chase) are underdeveloped but heavily traveled by the general public. Westheimer has been widened to the greatest extent right-of-way constraints will permit. Widening would significantly increase the capacity of other major arterials such as San Felipe.

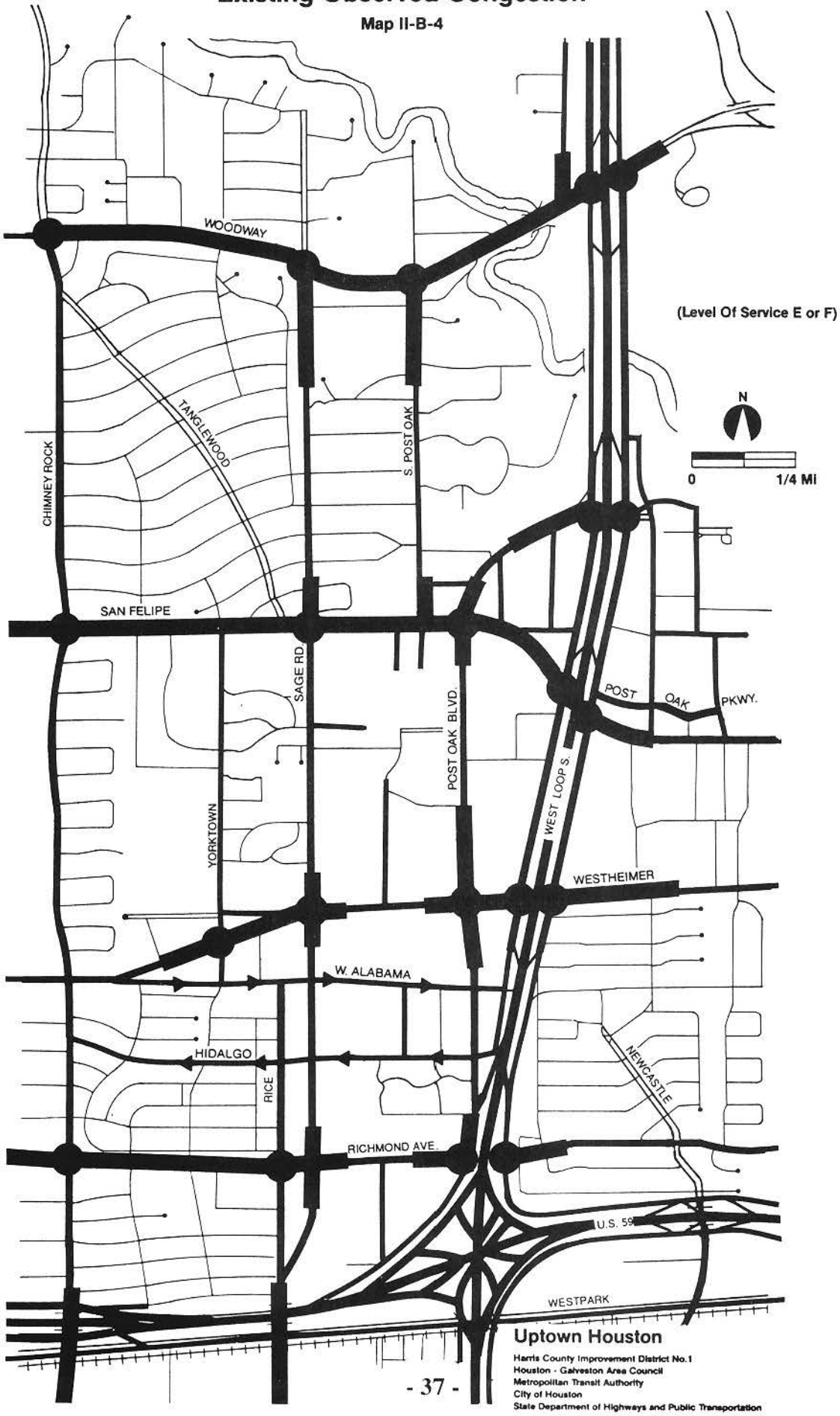
- **No secondary street network** — Lack of a network of secondary streets forces major arterial streets to handle 1) access to and from Uptown Houston, 2) through traffic and 3) intra-area circulation. Lack of network also fails to provide alternates to congested major arterials.

- **Limited opportunities to cross I.H. 610** — Freeway crossing opportunities are limited to Westheimer, San Felipe, Richmond, Woodway and Post Oak Boulevard, forcing traffic through a limited number of intersections.

- **Super Block** — The existing "superblock" street network in Uptown does not have the hierarchy of streets to serve present demand or anticipated growth. The block of Post Oak Boulevard between Westheimer and San Felipe stretches 3,400 feet without access from the east or west on any public street. This single superblock is the equivalent in length to over 13 blocks in downtown Houston. This block is penetrated on both sides by privately owned "alley" streets which do not provide east-west mobility across Post Oak Boulevard or connect to thoroughfares to the east and west of Post Oak Boulevard. Houston's Development Ordinance, passed in 1983, requires block lengths no longer than 1,800 feet for major thoroughfares. Thus, the ordinance would require that at a minimum one public east-west street be developed within this block.

Existing Observed Congestion

Map II-B-4



Uptown Houston

Harris County Improvement District No. 1
Houston - Galveston Area Council
Metropolitan Transit Authority
City of Houston
State Department of Highways and Public Transportation

FREEWAY DEFICIENCIES

I.H. 610 provides the only direct freeway access to the Uptown area. I.H. 610 has interchanges serving Woodway, Post Oak Boulevard (partial), San Felipe Road, Westheimer (partial) and Richmond Avenue (partial). Frontage roads along I.H. 610 provide access to the few additional east-west streets that extend to the freeway on the west side. I.H. 610 is the only north-south roadway for the stretch of over four miles between Chimney Rock and Shepherd which crosses Buffalo Bayou. As such, it is a necessary route for not only Uptown Houston traffic but also a substantial amount of regional traffic which must cross Buffalo Bayou.

U.S. 59 (the Southwest Freeway) also provides access to Uptown from the south and southwest. However, its interchanges serving the Uptown area are limited. Access to the Southwest Freeway is available at the Chimney Rock interchange. Indirect access is also currently available via the Newcastle interchange, three ramps of which will be removed when the Southwest Freeway is improved during the next several years.

The following summarizes deficiencies existing in the Uptown freeway system:

- **Constricted egress from freeways** — I.H. 610 freeway exits are constricted due to congestion at frontage road intersections, causing automobiles to queue on I.H. 610 (e.g., the Westheimer exit from northbound I.H. 610).

- **Congested main lanes** — Congestion on freeway main lanes causes traffic to queue on frontage roads, at intersections and on arterials (e.g., Post Oak Boulevard to northbound I.H. 610).

- **Excessive freeway weaving** — Weaving limits capacity and backs up traffic onto arterials. Movement from southbound I.H. 610 to southbound U.S. 59 is constricted due primarily to weaving, causing traffic to queue on frontage roads, at intersections and on arterials (e.g., Westheimer to southbound I.H. 610).

- **Excessive ramp loadings** — Entrance and exit ramps are loaded excessively due to limited freeway access points. The I.H. 610 northbound exit to Westheimer is constructed as a single lane exit, yet functions *de facto* as a double lane exit during peak periods.

- **No alternate routes to West Loop** — There are no continuous north-south arterials providing access into the Uptown area from the north. Absence of these arterials necessitates use of I.H. 610 for short trips.

- **Limited opportunities to cross I.H. 610** — All east-west traffic is forced to a few congested east-west arterials (Westheimer, San Felipe, Post Oak, Richmond and Woodway).

TRANSIT DEFICIENCIES

METRO's local transit service route system is designed radially projecting from downtown and is not well-suited to the polycentric city Houston has become. Uptown Houston is currently served by two commuter, two local, two limited, one crosstown and two rush-hour express routes, or less than 10% of METRO's bus routes. Downtown is served by a total of 83 routes, or over 90% of all METRO bus routes. Downtown has 5 times more transit stops than Uptown and over 10 times more transit routes than Uptown. However, employment in downtown is only approximately twice that of Uptown.

Commuter service to Uptown from suburban areas is, at best, token. Of METRO's total of 24 commuter routes serving downtown, only two serve Uptown. The two Park and Ride routes which serve Uptown each make only three trips to and from Uptown in the morning and evening. Headways on these trips are approximately 40 minutes. On the same two routes, downtown is served by 95 trips in the morning and evening with headways as short as two minutes. The Uptown commuter service is cumbersome because the trips are routed through downtown and another activity center, Greenway Plaza.

A Rice Center study prepared for the Houston-Galveston Area Council (H-GAC), *Houston's Major Activity Centers and Worker Travel Behavior: A Study of Downtown, Greenway, City Post Oak and the Energy Corridor* (January, 1987) found that 90% of all trips by Uptown employees are taken as a driver or passenger in a private vehicle, compared to only 47% downtown. Many of the trips in this survey are lunch and other intra-area trips. These results show that Uptown employees generally drive from their office locations to lunch or retail locations within the area, trips that would likely be pedestrian trips in the downtown environment. Asked to rank ten features on the basis of what they liked least about the activity center, Uptown workers chose "mobility within the area" as the most disliked feature.

The following summarizes the current deficiencies in local and commuter transit service to Uptown Houston:

- **Excessive transfers due to poor transit network design** — METRO's historically radial network design makes it difficult for transit patrons to access Uptown directly. 40% of bus patrons working in Uptown must transfer to get to work compared to 8.5% downtown, 29% in Greenway and 17% in the Energy Corridor.

- **Service is so inconvenient that only those with no other option use transit** — Rice Center's activity centers study shows that the downtown-oriented bus system provides higher service levels to downtown, Greenway Plaza and the Energy Corridor than to Uptown. Accordingly, transit patronage in Uptown is limited to transit dependent persons to a much greater degree than in any other activity center in Houston, as evidenced by the following statistics:

  - Household incomes of Uptown transit patrons are dramatically lower than in any other activity center studied. The average annual earnings of transit patrons working in Uptown is only 60% of the average annual earnings of transit patrons working downtown.

  - A high percentage of Uptown transit patron households have no vehicle. 45% of transit patrons working in Uptown have no vehicles in their household and 74% have no available vehicle. Only 24% of

transit patrons working downtown have no vehicle in their household and 53% have no available vehicle.

- **Inefficient utilization of existing and planned transit facilities** — The Katy Freeway Transitway is currently underutilized due at least in part to lack of north-south access to Uptown Houston for buses, carpools and vanpools. Improved access will be required to effectively utilize the U.S. 290 Transitway currently under construction and the Northwest Transit Center recently completed. In addition, there is no direct arterial connection between the Post Oak Boulevard core of Uptown Houston and the planned South Rice Transit Center.

- **Limited commuter service** — METRO provides only 12 trips per day total in Park and Ride commuter service to and from Uptown Houston, compared to some 700 serving downtown.

- **Bus network service handicapped by limited street network** — Transit operations are handicapped by congested conditions.

- **Lack of transit connection between Uptown hotels and regional convention center** — With 4,500 hotel rooms, compared to only 1,800 currently operating downtown, Uptown is Houston's hotel district. Uptown generates a quarter of all hotel room revenues in Houston. It is a major liability to the new George R. Brown Convention Center that there is no clear transit connection between the convention center and the city's most significant concentration of hotel rooms.

- **Poor pedestrian/transit connections** — Pedestrian/transit connections are weak or absent. Sidewalks are generally narrow and are absent in some locations. Pedestrian crossings of major thoroughfares are unsafe. Developments are generally internalized and favor automobile access. Pedestrian/automobile conflicts are common.

- **Lack of alternate street network for traffic management during construction of METRO high capacity transit corridor** — Due to lack of street network, all access and circulation traffic is directed to major through streets such as Post Oak Boulevard. A street network with viable alternate routes should be developed before construction on the METRO high capacity transit corridor guideway on Post Oak Boulevard proceeds.

PEDESTRIAN NETWORK DEFICIENCIES

The pedestrian environment in Uptown offers only minimal accommodation to walkers. Though Uptown has continuous sidewalks on both sides of Post Oak Boulevard, San Felipe, Westheimer, Alabama, Richmond and part of Sage, these are sized for residential neighborhoods and are too narrow to allow two individuals to conveniently pass each other in opposite directions. Conflicts between vehicular and pedestrian traffic in Uptown are common. Facilities such as crosswalks, shelters and amenities are generally inadequate.

The wide variety of activities characterizing the Uptown center could be expected to produce a similar pattern of internal pedestrian trip making to the downtown. However, the presence of free parking and inadequate street pedestrian crossings encourage auto rather than pedestrian travel. Many

downtown pedestrians undertake the average downtown walking trip of 1,500 feet (or five blocks), yet few pedestrians in Uptown are observed walking even much shorter distances out of doors. The 1,200 feet walk between two major developments — the Post Oak Central office complex and the Galleria retail center — is most often made by automobile in Uptown, where the same trip would be more often walked downtown.

The following summarizes pedestrian environment deficiencies within the Uptown area:

- **Limited sidewalks** – Sidewalks are sized for a single-family residential area and often are not adequately connected with internalized developments designed primarily for auto access.

- **Deficient pedestrian crossings of major thoroughfares** – Pedestrian crossings are non-existent or difficult to use.

- **Unsafe crossings at midblock points** – Pedestrians in most cases cross major thoroughfares in Uptown at midblock points. Block lengths are very long throughout the area, resulting in a high incidence of unsafe pedestrian crossings at unsignalized locations.

- **Internalized developments handicap pedestrian circulation** – Pedestrian amenities, such as benches and shade trees, are available in park spaces throughout the area. However, these pedestrian sub-environments are developed in conjunction with particular developments, which have been designed to favor auto access and are not connected with adjacent developments.

- **Lack of pedestrian system to support transit usage** – The inadequate pedestrian system provides poor walking access to the area's bus stops. This discourages transit use by potential choice riders.

- **Conflicts on sidewalks between vehicular and pedestrian traffic** — Numerous curb cuts in retail and office establishments interrupt pedestrian traffic along sidewalks.

INCONSISTENT/CONFLICTING POLICIES

A primary area where policy affects transportation systems is the development and promotion of a variety of paratransit services. Public paratransit activities in Uptown are very limited. Private sector paratransit plays a far more significant role than public services. Approximately 25 commuter vanpools to Uptown Houston are presently provided by private third party vanpool services. Approximately 40 additional vanpools are operated by corporations located in Uptown Houston. Taxi trips between Uptown and other major activity centers in Houston and the airports are in high demand. Uptown has a commercial airport bus station which has regular runs every 30 minutes to both Houston Intercontinental Airport and Hobby Airport. Uptown's twelve hotels also run limousine and convention bus services.

A second area where policy impacts transportation systems is utilization of a variety of Transportation System Management (TSM) techniques. TSM activities such as low cost facility improvements,

flexible work hours and computerized signalization have not been fully assessed or utilized for arterial street, freeway or transit systems in Uptown Houston.

A third area where policy impacts transportation systems is marketing and transportation information systems. The Uptown Houston Association functions as a sales and information outlet for METRO. Private developers have placed traffic information computer monitors in the lobbies of many Uptown office buildings. However, the potential for full-scale promotion of alternative transportation services or traffic management through information systems has not been addressed.

A fourth area where policy affects transportation systems is in the provision of parking. Uptown has over 70,000 parking spaces in retail and office developments. Uptown has 8% *more* off-street parking spaces than downtown Houston, which has 65,000 off-street spaces. This is due partly to the historic style of development in suburban activity centers and partly to Uptown's status as Houston's premier retail district. Uptown generally utilizes parking garages as part of each retail or office development. All office buildings over 200,000 square feet have parking garages, a total of 31 garages. Strip commercial, service and shopping centers in Uptown rely on surface parking, but larger retail developments such as the Galleria, Dillard's and Pavilion have their own parking garages.

According to the Rice Center activity center survey (1987), 74% of downtown employees pay for parking, compared to only 3% in Uptown. The Rice Center survey also reported that 86% of employees in Uptown parked in the same block as their place of employment, compared to only 25% downtown. The downtown average parking cost was $44 per month. The Uptown monthly parking cost to the individual was negligible, though companies do generally pay landlords for employees' parking.

In summary, the following inconsistent or underutilized policies are seen to aggravate the existing deficiencies in Uptown Houston transportation systems:

- **Transportation Demand Management (TDM) activities** – TDM techniques, such as flexible work hours and commuter information systems, have not been fully assessed or utilized.

- **Paratransit services** – Paratransit services such as vanpools, carshare and taxi service are in place but often offer conflicting or at best, non-coordinated services.

- **Marketing of non-automobile transportation services** – Marketing of transit services, vanpooling, carpooling and other paratransit services has not been addressed. Potential activities such as point of origin marketing, destination marketing (employer) and cooperative marketing have not been implemented adequately.

- **Information systems** – The METRO system lacks simplicity when traveling to a non-downtown activity center, making effective system communications vitally important to attracting new ridership. For example, there is no clear transit connection between the George R. Brown Convention Center and Uptown's concentration of 4,500 hotel rooms. Another example, 40% of transit patrons working Uptown must transfer, compared to 8.5% downtown.

- **Parking supply and pricing** – Free parking for Uptown employees impacts transit mode split negatively and reduces intra-area walk trips. However, in the absence of viable alternatives to driving alone, free parking is necessary to the economic viability of existing development.

As described in the introduction of this report, the Uptown Houston Association has undertaken many TDM activities to relieve traffic congestion in the area. This experience has shown that TDM can provide relief in some circumstances but cannot be utilized alone to address Uptown transportation deficiencies without improvements to the basic mobility infrastructure. Uptown currently experiences congestion not only in peak periods but at most periods during the day. This congestion is caused simply by lack of street network and inadequate area dedicated to streets. Once a basic transportation network is in place, TDM can be utilized more effectively to manage traffic problems during peak periods.

II-C.

ASSESSMENT OF FUTURE GROWTH AND TRANSPORTATION DEMAND

ANTICIPATED GROWTH

The Houston-Galveston Area Council (H-GAC), together with the Inter-Agency Data Base Task Force (IDBTF), has projected year 2010 population and employment in the Uptown Houston area. Current employment of approximately 78,000 people is anticipated to increase to 147,000 by 2010. Overall growth in employment of approximately 88 percent is projected between 1985 and 2010. This is equivalent to an annual growth rate of approximately 2.5 percent. This may be compared to the compounded annual employment growth rate of 16 percent experienced between 1970 and 1985.

As a result of the anticipated growth, total traffic entering and leaving the area is expected to increase 46 percent between 1980 and 2010, 66 percent if freeway traffic is excluded. These increases amount to average annual growth rates of 1.0 and 1.4 percent, respectively. With most of the area surrounding Uptown Houston developed with stable residential housing, Uptown Houston will account for most of the growth and traffic on the area's surface street system.

Prospective growth from 1990 to 2010 should be evaluated in light of growth achieved during the equivalent time period 1970 to 1990. Table II-C-1 compares the historical growth characteristics of the twenty year period 1970-1990 to the growth projected for the twenty-year period 1990-2010 consistent with the employment forecast. Table II-C-2 summarizes historical growth of office, retail and hotel development in Uptown Houston in five year increments, together with the year 2010 projected development consistent with the H-GAC employment forecast.

The employment estimates and projections used in the Comprehensive Transportation Strategy study are based upon an inventory of existing and projected development which allows for the development-based estimation of current employment at the block level as well as projection of the development implications of the H-GAC control total year 2010 employment forecast. The boundaries for the Uptown area utilized in these projections are Woodway on the north, Chimney Rock on the west, U.S. 59 (Southwest Freeway) on the south and the S&P Railroad on the east.

Harris County Improvement District #1 conducted interviews with developers and property owners to determine the probable location and type of anticipated development growth within the Uptown area. The projection of development growth constructed from information gathered at these interviews reflects the 2010 total employment growth projected by H-GAC and the IDBTF as well as the patterns and types of development and redevelopment expected by the Uptown development community. In summary, prime undeveloped sites in the area were projected to develop with

TABLE II-C-1 :

GROWTH IN UPTOWN HOUSTON
HISTORICAL AND PROJECTED

	1970	1988	2010
Total Employment	8,600	78,360	147,000
Cumulative Development (square feet)	2,630,000	28,690,000	43,650,000
Employment Density (employees per acre)	7	60	115

	Period 1970-1990	Period 1990-2010
EMPLOYMENT		
Employment growth during period	70,000	69,000
Average annual growth	3,500	3,450
Annual percentage growth	11.7%	2.9%
DEVELOPMENT		
Development growth during period (net square feet)	26,060,000	14,960,000
Construction:		
- Average annual construction (net square feet)	1,300,000	750,000
- Annual percentage growth of development	12.7%	2.1%
Absorption:		
- Average annual absorption (net square feet)	1,150,000	900,500
- Annual percentage growth of absorption	11.7%	3.0%

primarily office and some retail development. Currently underdeveloped sites, such as single-story retail centers at prime locations along Post Oak Boulevard, are anticipated to redevelop by 2010.

Using the H-GAC projections as an area control total, Harris County Improvement District #1, in conjunction with H-GAC and METRO, made detailed estimates by block or block group of projected office, retail, hotel and residential development and employment. All estimates were made within the H-GAC population and employment projection control totals. Maps II-C-1 through II-C-4 illustrate current and projected levels of employment and development by block group within the study area. Current and projected employment are listed by block level subzones in Table II-C-3. Map II-C-5 shows the subzones corresponding with Table II-C-3.

TABLE II-C-2
UPTOWN HOUSTON HISTORICAL AND PROJECTED DEVELOPMENT

NEW DEVELOPMENT ADDED IN FIVE YEAR PERIODS
(Net square feet)

	Office	Hotel	Retail
196[0]*	12,000	0	293,427
1965	119,725	0	841,073
1970	1,104,540	211,000	48,639
1975	3,875,301	311,125	945,546
1980	5,514,185	731,875	1,042,450
1985	10,775,294	2,233,049	37,200
1989	0	0	595,000
1990-2010	**12,270,000**	**940,000**	**1,750,000**

CUMULATIVE DEVELOPMENT
(Net square feet)

	Office	Hotel	Retail
1960	12,000	0	293,427
1965	131,725	0	1,134,500
1970	1,236,265	211,000	1,183,139
1975	5,111,566	522,125	2,128,685
1980	10,625,751	1,254,000	3,171,135
1985	21,401,045	3,487,049	3,208,335
1989	21,401,045	3,487,049	3,803,335
2010	**33,670,000**	**4,430,000**	**5,550,000**

* Years as of January 1

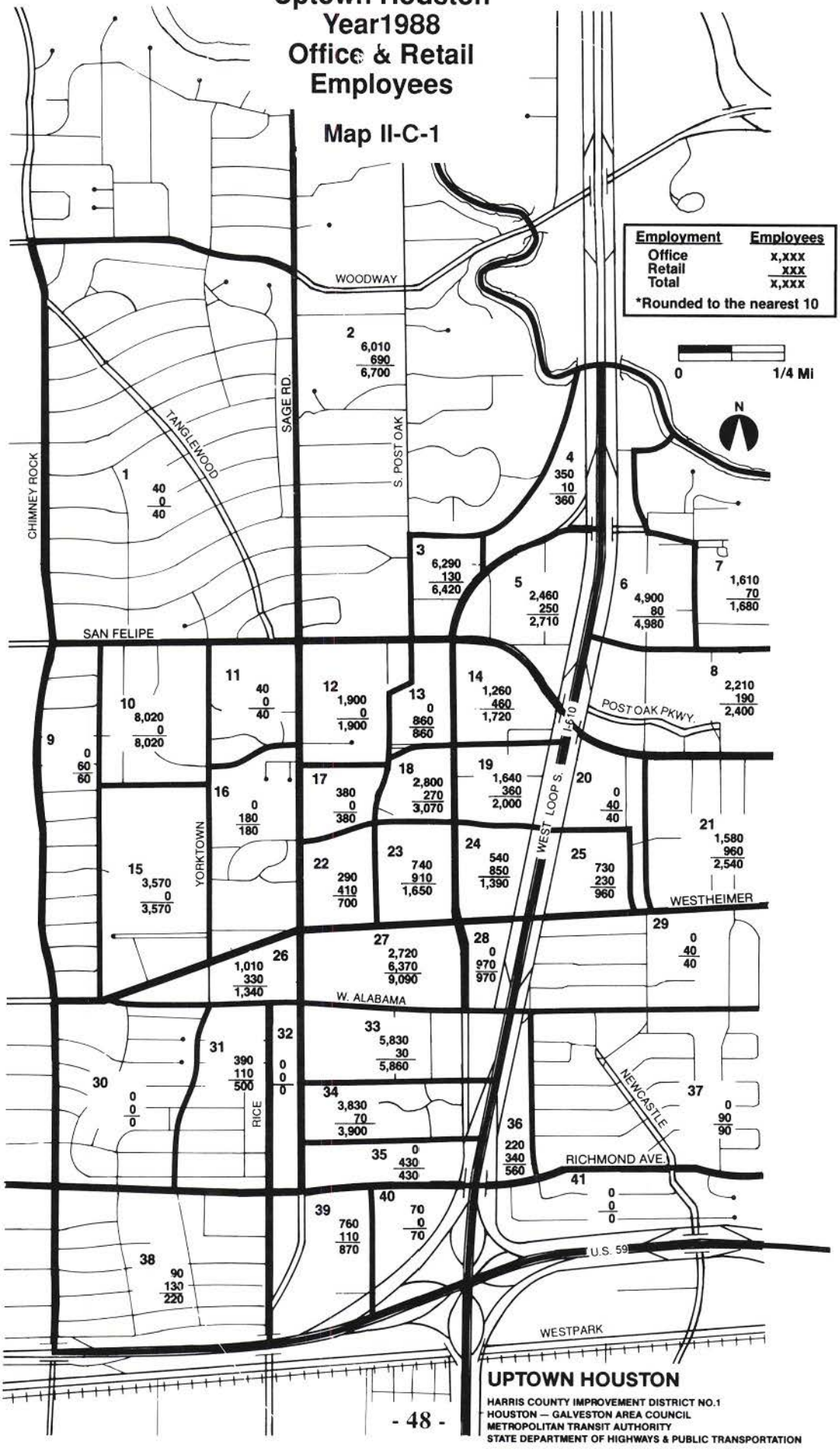
While the 2010 employment projection at the block level was developed from a complete inventory of projected development, 2000 and 1995 projections were made based on a complete inventory of existing development and an assumption of construction of limited additional development. This is consistent with the expectation that currently available office space will lease up significantly before new starts would occur.

CONCLUSION

Given that some 89 percent of the total vehicle-miles during the peak hour are currently operated in congestion (as defined by the Regional Mobility Plan criteria) and that employment within the area is projected to nearly double by 2010, it is apparent that major improvements in the arterial street, freeway and transit systems will have to be implemented to alleviate current deficiencies and accommodate future growth.

Uptown Houston
Year1988
Office & Retail
Employees

Map II-C-1

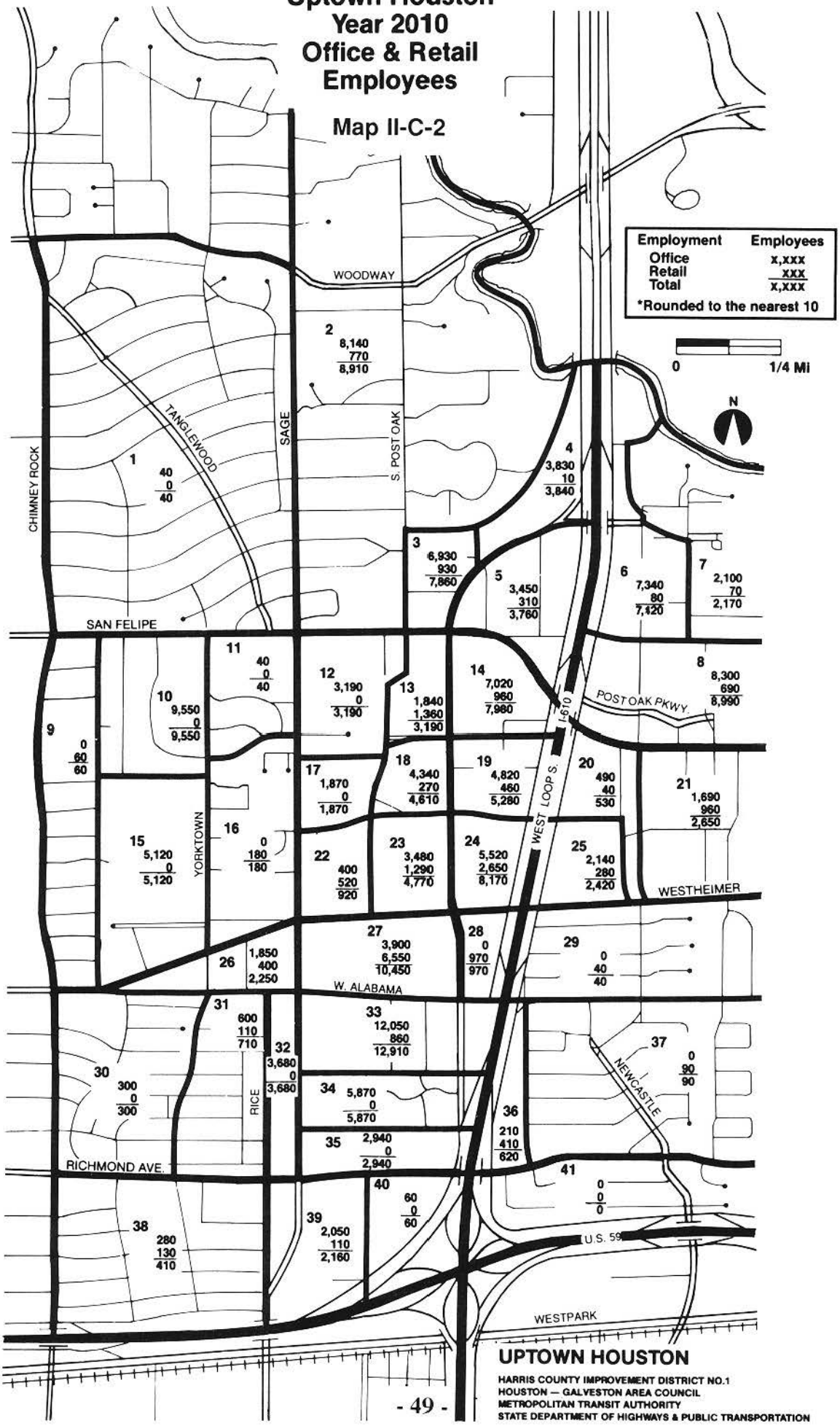


UPTOWN HOUSTON

HARRIS COUNTY IMPROVEMENT DISTRICT NO.1
HOUSTON — GALVESTON AREA COUNCIL
METROPOLITAN TRANSIT AUTHORITY
STATE DEPARTMENT OF HIGHWAYS & PUBLIC TRANSPORTATION

Uptown Houston
Year 2010
Office & Retail
Employees

Map II-C-2

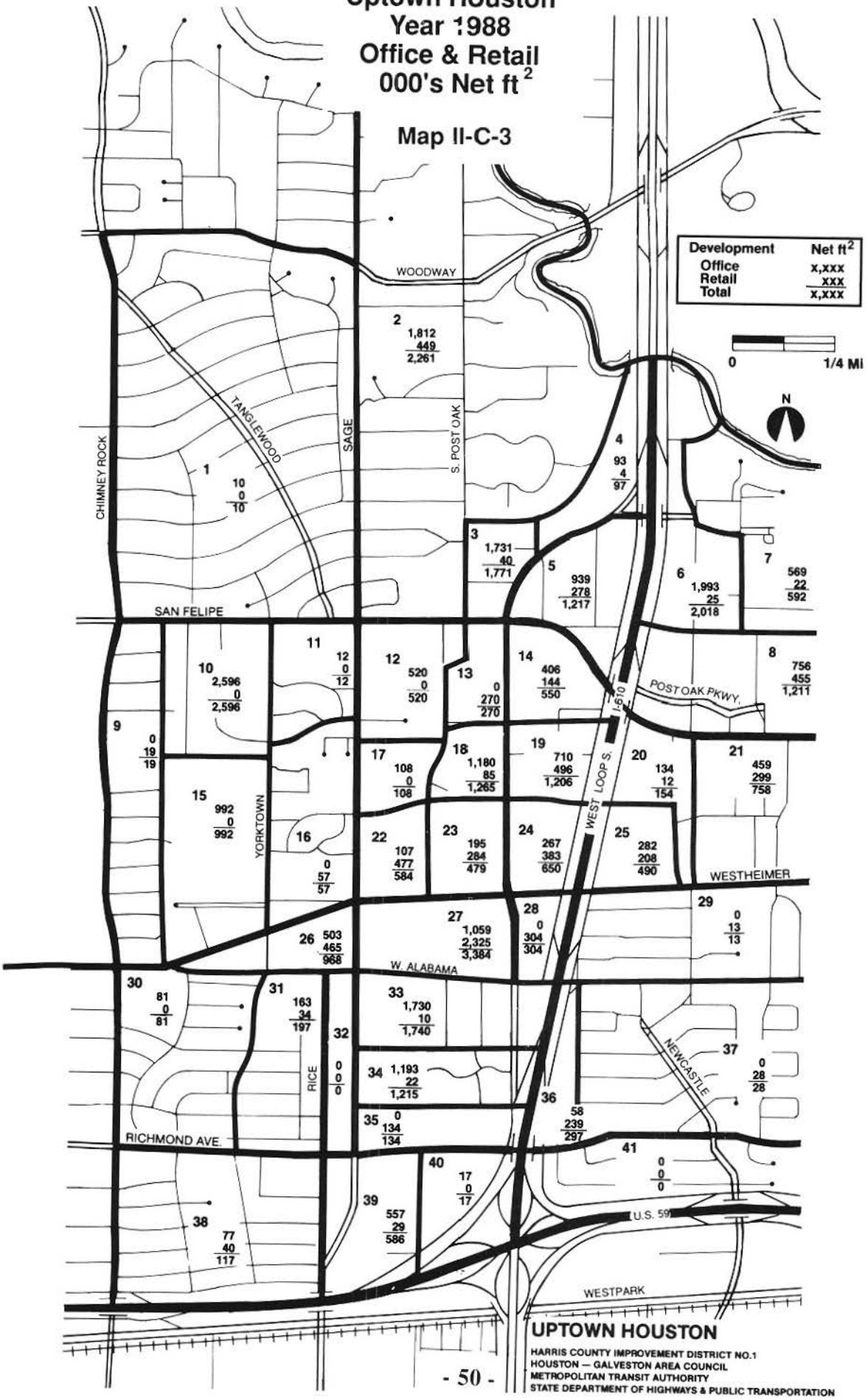


UPTOWN HOUSTON

HARRIS COUNTY IMPROVEMENT DISTRICT NO.1
HOUSTON — GALVESTON AREA COUNCIL
METROPOLITAN TRANSIT AUTHORITY
STATE DEPARTMENT OF HIGHWAYS & PUBLIC TRANSPORTATION

Uptown Houston
Year 1988
Office & Retail
000's Net ft^2

Map II-C-3

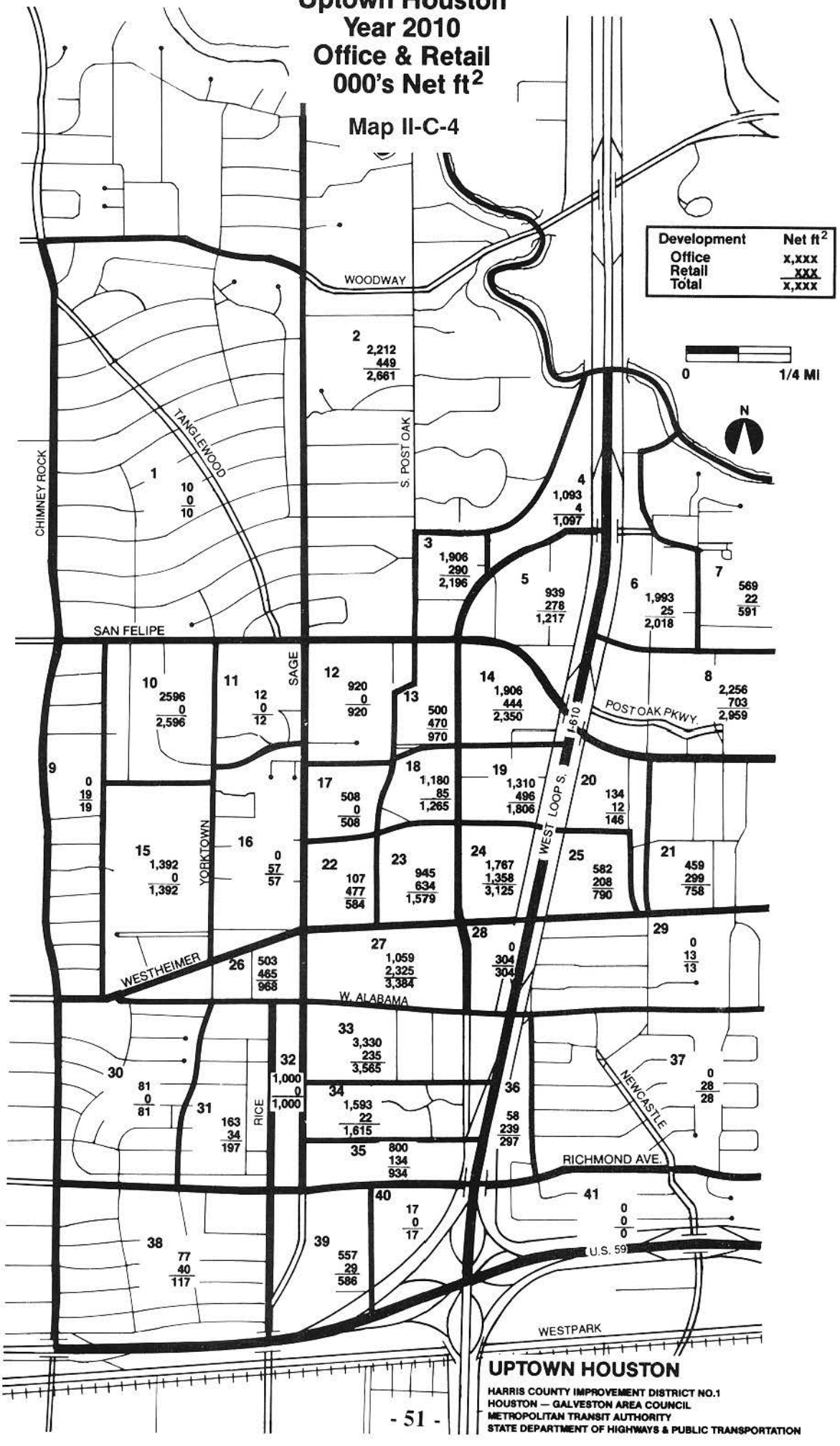


UPTOWN HOUSTON

HARRIS COUNTY IMPROVEMENT DISTRICT NO.1
HOUSTON — GALVESTON AREA COUNCIL
METROPOLITAN TRANSIT AUTHORITY
STATE DEPARTMENT OF HIGHWAYS & PUBLIC TRANSPORTATION

Uptown Houston
Year 2010
Office & Retail
000's Net ft²

Map II-C-4

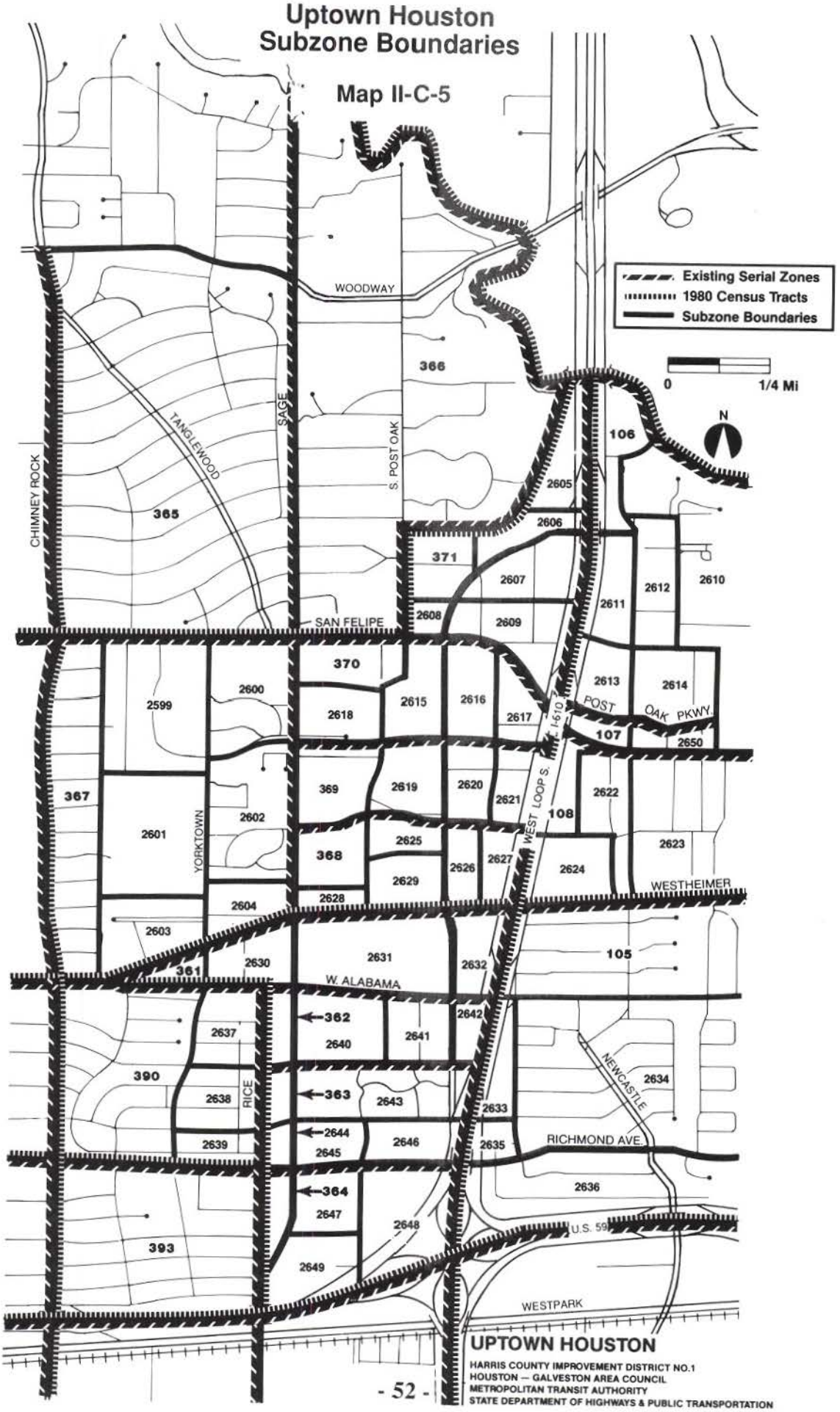


UPTOWN HOUSTON

HARRIS COUNTY IMPROVEMENT DISTRICT NO.1
HOUSTON — GALVESTON AREA COUNCIL
METROPOLITAN TRANSIT AUTHORITY
STATE DEPARTMENT OF HIGHWAYS & PUBLIC TRANSPORTATION

Uptown Houston
Subzone Boundaries

Map II-C-5



UPTOWN HOUSTON

HARRIS COUNTY IMPROVEMENT DISTRICT NO.1
HOUSTON — GALVESTON AREA COUNCIL
METROPOLITAN TRANSIT AUTHORITY
STATE DEPARTMENT OF HIGHWAYS & PUBLIC TRANSPORTATION

SUMMARY OF PROJECTED EMPLOYMENT BY SUBZONE

Table II-C-3

CENSUS TRACT	SERIAL ZONE	SUB-ZONE	SQUARE FEET	TOTAL EMPL.		OFFICE EMPL.		RETAIL EMPL.	
				1988	2010	1988	2010	1988	2010
419.02	105	105	12,500	40	40	0	0	40	40
419.02	105	2633	275,340	484	541	140	134	344	408
419.02	105	2634	28,000	90	90	0	0	90	90
419.02	105	2635	22,000	81	81	81	81	0	0
419.02	105	2636	0	0	0	0	0	0	0
420.02	106	106	1,088,053	2,840	4,004	2,840	4,004	0	0
420.02	106	2610	591,783	1,686	2,167	1,614	2,095	72	72
420.02	106	2611	383,429	672	1,399	592	1,319	80	80
420.02	106	2612	546,781	1,472	2,012	1,472	2,012	0	0
420.02	106	2613	1,000,000	0	3,680	0	3,680	0	0
420.02	106	2614	1,211,190	2,212	3,233	2,212	2,783	0	450
420.02	107	2650	747,958	194	2,082	0	1,840	194	242
420.02	108	108	145,873	38	531	0	493	38	38
420.02	108	2622	0	0	0	0	0	0	0
420.02	108	2623	299,229	2,535	2,648	1,579	1,691	957	957
420.02	108	2624	789,590	952	2,422	726	2,140	226	282
419.01	361	361	133,440	374	491	374	491	0	0
419.01	361	2630	833,677	970	1,759	636	1,358	334	401
419.01	361	2631	3,384,233	9,085	10,446	2,717	3,898	6,368	6,548
419.01	361	2632	300,000	973	973	0	0	973	973
419.01	362	362	600,000	0	2,208	0	2,208	0	0
419.01	362	2640	681,477	0	2,300	0	1,470	0	830
419.01	362	2641	2,753,529	5,554	10,137	5,554	10,137	0	0
419.01	362	2642	130,368	313	475	280	441	33	33
419.01	363	363	400,000	0	1,472	0	1,472	0	0
419.01	363	2643	1,615,665	3,905	5,872	3,834	5,872	71	0
419.01	363	2644	0	0	0	0	0	0	0
419.01	363	2645	394,920	304	1,100	0	1,100	304	0
419.01	363	2646	539,532	127	1,840	0	1,840	127	0
419.01	364	364	28,748	115	115	0	0	115	115
419.01	364	2647	288,999	763	1,064	763	1,064	0	0
419.01	364	2648	16,567	66	61	66	61	0	0
419.01	364	2649	268,124	0	987	0	987	0	0
420.01	365	365	10,000	37	37	37	37	0	0
420.01	366	366	2,661,406	6,704	8,907	6,014	8,140	690	767

SUMMARY OF PROJECTED EMPLOYMENT BY SUBZONE

CENSUS TRACT	SERIAL ZONE	SUB-ZONE	SQUARE FEET	TOTAL EMPL.		OFFICE EMPL.		RETAIL EMPL.	
				1988	2010	1988	2010	1988	2010
420.03	367	367	18,500	59	59	0	0	59	59
420.03	367	2599	2,596,403	8,024	9,555	8,024	9,555	0	0
420.03	367	2600	12,000	44	44	44	44	0	0
420.03	367	2601	0	0	0	0	0	0	0
420.03	367	2602	0	0	0	0	0	0	0
420.03	367	2603	1,392,364	3,569	5,122	3,569	5,122	0	0
420.03	367	2604	47,639	183	183	0	0	183	183
420.03	368	2625	132,715	512	488	512	488	0	0
420.03	368	2626	1,718,500	459	4,370	0	2,210	459	2,160
420.03	368	2627	1,406,935	928	3,800	536	3,310	392	490
420.03	368	2628	584,113	704	913	290	395	414	518
420.03	368	2629	1,446,158	1,139	4,279	230	2,989	909	1,290
420.03	369	369	507,973	380	1,867	380	1,867	0	0
420.03	369	2619	1,265,326	3,073	4,616	2,801	4,344	272	272
420.03	369	2620	1,096,000	364	2,663	0	2,208	364	455
420.03	369	2621	709,829	1,644	2,612	1,644	2,612	0	0
420.03	370	370	919,966	1,900	3,193	1,900	3,193	0	0
420.03	370	2615	969,500	862	3,200	0	1,840	862	1,360
420.03	370	2616	1,943,745	460	6,480	0	5,520	460	960
420.03	370	2617	406,427	1,262	1,496	1,262	1,496	0	0
420.03	370	2618	0	0	0	0	0	0	0
420.03	371	371	1,980,641	6,287	7,169	6,287	6,369	0	800
420.03	371	2605	600,000	0	2,208	0	2,208	0	0
420.03	371	2606	496,432	363	1,633	352	1,622	11	11
420.03	371	2607	180,105	258	661	248	652	10	10
420.03	371	2608	214,707	127	687	0	560	127	127
420.03	371	2609	1,036,491	2,455	3,104	2,214	2,802	242	302
423.04	390	390	81,368	0	299	0	299	0	0
423.04	390	2637	196,275	499	706	391	598	108	108
423.04	390	2638	0	0	0	0	0	0	0
423.04	390	2639	0	0	0	0	0	0	0
423.05	393	393	117,047	220	412	92	284	128	128
			44,259,570	78,360	146,992	62,306	125,435	16,054	21,557

SUMMARY OF PROJECTED EMPLOYMENT BY SUBZONE

CENSUS TRACT	SERIAL ZONE	SUB-ZONE	SQUARE FEET	TOTAL EMPL.		OFFICE EMPL.		RETAIL EMPL.	
				1988	2010	1988	2010	1988	2010
419.02	105		337,840	694	752	221	215	474	537
420.02	106		4,821,236	8,883	16,495	8,731	15,893	152	602
420.02	107		747,958	194	2,082	0	1,840	194	242
420.02	108		1,234,692	3,526	5,601	2,305	4,324	1,221	1,277
419.01	361		4,651,350	11,401	13,669	3,727	5,747	7,674	7,921
419.01	362		4,165,374	5,867	15,120	5,834	14,256	33	863
419.01	363		2,950,117	4,335	10,284	3,834	10,284	501	0
419.01	364		602,438	944	2,226	829	2,111	115	115
420.01	365		10,000	37	37	37	37	0	0
420.01	366		2,661,406	6,704	8,907	6,014	8,140	690	767
420.03	367		4,066,906	11,880	14,963	11,638	14,721	242	242
420.03	368		5,288,421	3,742	13,850	1,567	9,392	2,174	4,458
420.03	369		3,579,128	5,461	11,758	4,825	11,031	636	727
420.03	370		4,239,638	4,484	14,369	3,162	12,049	1,322	2,320
420.03	371		4,508,376	9,490	15,463	9,101	14,213	389	1,250
423.04	390		277,643	499	1,006	391	898	108	108
423.05	393		117,047	220	412	92	284	128	128
			44,259,570	78,360	146,992	62,306	125,435	16,054	21,557
419.02		Partial	337,840	694	752	221	215	474	537
420.02		Partial	6,803,886	12,602	24,178	11,036	22,057	1,566	2,121
419.01		Complete	12,369,279	22,548	41,298	14,224	32,399	8,324	8,900
420.01		Complete	2,661,406	6,741	8,944	6,051	8,177	690	767
420.03		Complete	21,682,469	35,057	70,403	30,293	61,406	4,764	8,997
423.04		Partial	277,643	499	1,006	391	898	108	108
423.05		Partial	117,047	220	412	92	284	128	128
			44,249,570	78,360	146,992	62,306	125,435	16,054	21,557

II-D.

UPTOWN MOBILITY GOALS AND OBJECTIVES

GOALS

The development of the Comprehensive Transportation Strategy for the Uptown area of Houston involved the cooperative participation of the local private sector interests and various public agencies involved in providing transportation services and facilities. This cooperative approach included assessment of existing area transportation deficiencies, projections of future growth which would further exacerbate existing deficiencies, identification of goals to improve mobility in the area and formulation of objectives which respond to existing and projected transportation deficiencies as well as the stated goals.

Analysis of existing transportation deficiencies and projected growth revealed that a comprehensive system of improvements was required to properly address the complex mobility problems facing the Uptown area. **Uptown's mobility problems cannot be addressed on a project basis but rather require a coordinated program of interrelated services and facilities that includes arterial street improvements, freeway improvements, transit improvements, pedestrian improvements and ongoing programs to aid in the effective management of traffic in the area.** The implementation of this comprehensive program will require a partnership between various public agencies and Uptown's proactive private sector.

Based on this extensive cooperative process, the following goals were adopted:

- **Enhance local access through arterial improvements;**
- **Improve regional access through freeway improvements;**
- **Provide convenient, viable alternatives to driving alone through improved local and commuter bus service, paratransit and implementation of regional transit access improvements;**
- **Create a safe and inviting pedestrian environment; and**
- **Develop policies and services which aid in the effective management of traffic.**

OBJECTIVES

Based on the assessment of area transportation deficiencies and in support of the adopted goals, the following objectives were formulated:

1. Enhance local access through arterial street improvements –

- Develop local grid street network;
- Develop and improve north-south arterials;
- Provide enhanced capacity and network continuity;
- Enhance movement of through traffic;
- Provide additional crossings of I.H. 610;
- Provide adequate local street network for bus transit service; and
- Provide alternate routes to congested major thoroughfares.

2. Improve regional access through freeway improvements –

- Increase freeway main lane capacity;
- Relieve excessive ramp loadings;
- Enhance local access and circulation by creating additional crossings of I.H. 610;
- Relieve excessive weaving on freeway main lanes; and
- Relieve conflicts between through traffic, local access traffic and freeway access/egress.

3. Provide convenient and viable alternatives to driving alone –

- Improve local bus service to and within Uptown;
- Provide workers viable alternatives to driving alone:

  carshare/vanshare,
  local bus service,
  commuter bus service,
  other paratransit options,
  implementation of METRO high capacity transit corridor;

- Provide viable alternatives to driving alone for non-work and intra-area trips:

  conventioneers,
  business travelers,
  shoppers,
  tourists;

- Enhance transit patron and pedestrian amenities.

4. Create a safe and inviting pedestrian environment which reduces the need for auto travel

- Fully integrate short and long term transit improvements with the pedestrian environment and individual developments;
- Avoid barriers to pedestrian travel and alleviate existing barriers where possible;
- Improve pedestrian crossing of major arterials;
- Enhance the pedestrian environment within private developments;
- Provide convenient and attractive linkages between developments as well as to and from transit services and facilities; and
- Enhance the pedestrian environment through information systems, facilities, safety features and amenities.

5. Develop policies and services which aid in the effective management of traffic –

- Promote alternatives to driving alone;
- Provide information systems to encourage increased vehicle occupancy, safety and convenience;
- Develop parking management policies to encourage more efficient use of resources;
- Develop an information sharing and education program to aid in the effective management of traffic;
- Develop an ongoing program to implement low cost improvements in the operation of transit services, arterial streets and freeways;
- Encourage flexible and varied work scheduling to reduce peak period traffic volume.

III.

ARTERIAL STREET IMPROVEMENTS PROGRAM

The Arterial Street Improvements Program has been developed as part of the Comprehensive Transportation Strategy to guide the growth and development of Uptown Houston. The recommended program is intended to systematically improve the arterial street system to alleviate existing deficiencies and meet future needs in a cost-effective and environmentally sensitive manner.

The Comprehensive Transportation Strategy study simultaneously developed programs to address the following elements of the complete transportation system:

- Arterial Streets;
- Freeways;
- Transit;
- Pedestrian Environment; and
- Transportation Demand Management (TDM) and Policies.

This comprehensive approach was designed to insure development of a balanced transportation system which will produce the maximum return for resources invested. The Arterial Street Improvements Program defined in this section and the Freeway Improvements Program defined in the following section have been integrated with the transit, pedestrian, TDM and policy elements. Long term resolution of Uptown's complex mobility problems will require implementation of the comprehensive program including every element of the transportation system. However, roadways will continue to carry the great majority of Uptown's employees, patrons and visitors. The future roadway system will be critical to the success and economic viability of Uptown Houston.

The arterial street system is the basic framework of the area roadway system. The Arterial Street Improvements Program has been developed to complete and enhance the arterial system to provide the needed local access and carry through traffic. The full range of low cost improvements, including transportation systems management (TSM) actions, was explored first. Subsequently, major capital improvements required to develop the necessary street network were addressed.

The existing roadway deficiencies in Uptown Houston are so substantial that taking no action in view of projected substantial future growth was considered unworkable. With some 89 percent of today's peak period vehicle-miles operating in congested conditions (74 percent under severe congestion), roadway system improvements were considered essential. For this reason, no analyses were performed for a "do nothing" scenario. Even after implementation of the aggressive plan recommended here, deficiencies similar to current congestion levels are projected in 2010 due to the near doubling of development and employment anticipated between 1990 and 2010 (refer to Section VII-A: *Assessment of Projected Deficiencies and Unmet Demand*).

ARTERIAL STREET IMPROVEMENTS PROGRAM SUMMARY

Under the Arterial Street Improvements Program, some fifty-five projects are proposed to be undertaken jointly by a combination of METRO, the State Department of Highways and Public Transportation (SDHPT), the City of Houston and area property owners. The projects were selected based on the concepts and criteria discussed later in this section. The projects consist of roadway extensions, widenings, intersection improvements, new roadways, realignments and signal system modernization and coordination. Map III-1 illustrates the complete recommended Arterial Street Improvements Program, together with projects recommended under the Freeway Improvements Program to be defined in the Section IV. Table III-4 identifies each project. In nearly all cases, each project can be implemented independently of other segment and realize significant mobility benefits.

Forty-one of the recommended project have received *Approval in Concept* by METRO for implementation as an integrated system of improvements. Map III-2 shows the projects approved in concept by METRO, which are listed in the accompanying Table III-5. Only thirty-one projects are listed within the METRO program due to consolidation of certain segments.

Table III-1 below lists the total estimated cost of the Arterial Street Improvements Program by proposed funding source.

Table III-1:
ARTERIAL STREET IMPROVEMENTS PROGRAM
COSTS BY FUNDING SOURCE AND STATUS (Dollars in Millions)

	PROPOSED FUNDING SOURCE				
STATUS	METRO	SDHPT[1]	PRIVATE[2]	TOTAL	% OF TOTAL
APPROVED IN CONCEPT BY METRO:					
Construction	$30.4	—	—	$ 30.4[4]	
ROW	$14.4[3]	—	$41.0	$ 55.4[5]	
Subtotal	$44.8	—	$41.0	$ 85.8[6]	77%
ADDITIONAL RECOMMENDED PROJECTS:					
Construction	$ 4.8	$ 9.0	—	$ 13.8	
ROW	$ 2.2	$ 5.5	$ 3.5	$ 11.2	
Subtotal	$ 7.0	$14.5	$ 3.5	$ 25.0	23%
TOTAL PROGRAM:					
Construction	**$35.2**	**$ 9.0**	**$ --**	**$ 44.2**	
ROW	**$16.6**	**$ 5.5**	**$44.5**	**$ 66.6**	
Total	**$51.8[3]**	**$14.5**	**$44.5**	**$110.8[3]**	
Percent of Total	**47%**	**13%**	**40%**		**100%**

[1] Excludes U.S. 59 and I.H. 610 improvements to be included in freeway upgrades. Includes Post Oak Boulevard extension to Westpark.
[2] Private sector right-of-way acquisition by dedication.
[3] Includes $4.2 million for ROW acquisition for Uptown Parkway through Memorial Park.
[4] $9.7 million is for TSM and low capital cost projects.
[5] $5.0 million is for TSM and low capital cost projects.
[6] $14.7 million is for TSM and low capital cost projects.

Table III-2 shows the system total cost-effectiveness of the projects approved in concept by METRO using four measures — benefit/cost ratio, cost per vehicle-hour saved, cost per daily vehicle-mile traveled (VMT) and cost per VMT served. The benefit/cost ratio of the program implemented as a whole is 38.7. Table III-3 summarizes the total cost and cost-effectiveness of the recommended Arterial Street Improvements Program.

Table III-2:
INTEGRATED SYSTEM COST-EFFECTIVENESS
PROJECTS APPROVED IN CONCEPT BY METRO

	Cost-Effectiveness			
Project Type	**Benefit/ Cost Ratio[1]**	**per Vehicle-Hour Saved**	**Cost per Daily VMT**	**Cost Cost per VMT Served[2]**
Widenings	35.9[3]	$0.05	$ 52	$0.01
Extensions	29.0[3]	$0.21	$ 205	$0.03
TSM	58.8[4]	$0.07	--	--
Total Program	**38.7**	**$0.10**	**$ 120**	**$0.02**

[1] Total value of project benefits divided by total project costs to public agencies.
[2] Cost per VMT over 20 year life using 313 equivalent weekdays per year.
[3] 20 year project life.
[4] 10 year project life.

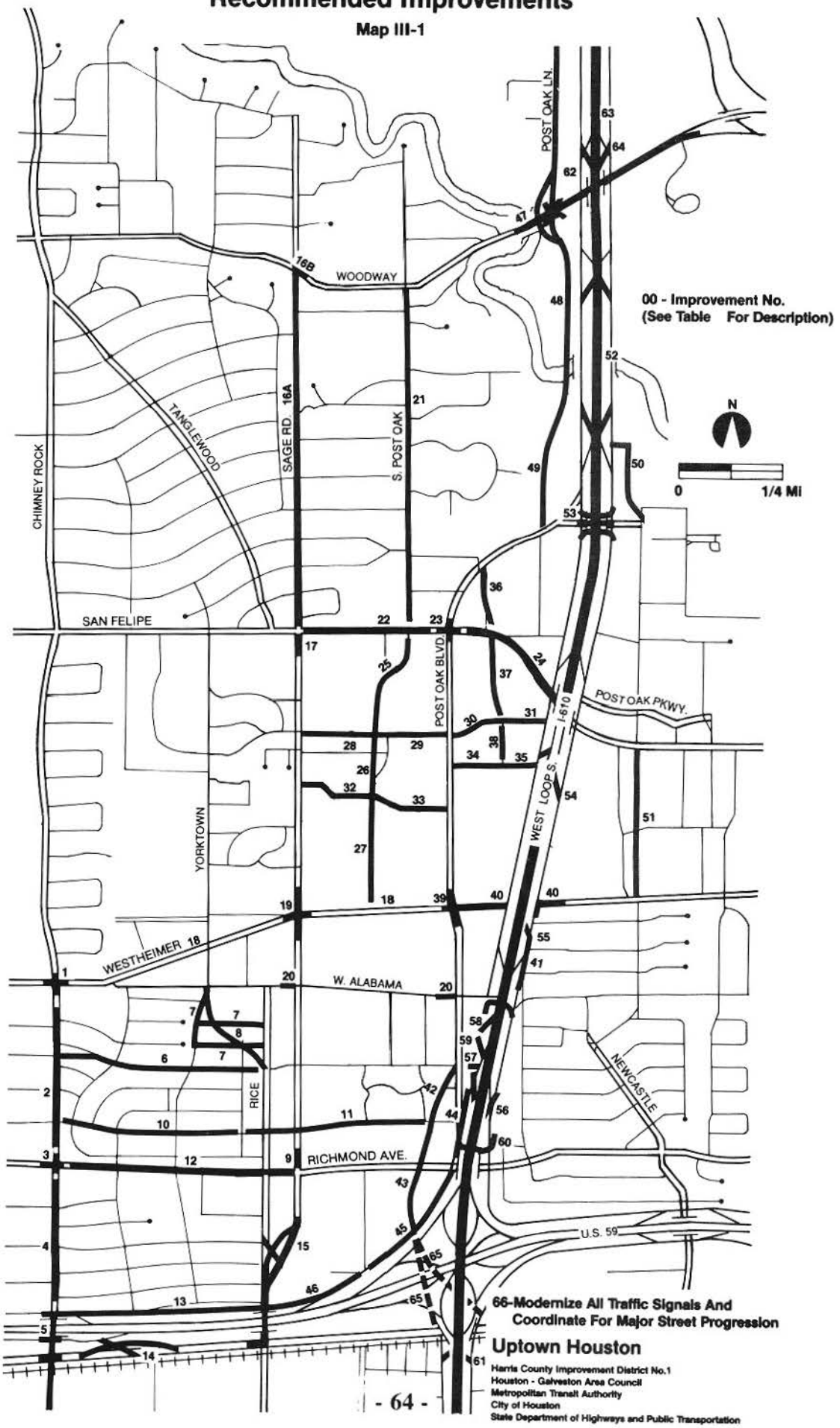
Table III-3:
ARTERIAL STREET IMPROVEMENTS PROGRAM SUMMARY

Construction cost	**$ 44.2 million**
ROW	**$ 66.6 million**
Total	**$110.8 million**
Likely Private Sector Contribution	**$ 44.5 million (40%)**
System program cost effectiveness measures[1]:	
Benefit/Cost Ratio	**38.7**
Cost per vehicle hour saved	**$0.10**
Cost per daily vehicle mile traveled[2]	**$120**
Cost per daily vehicle mile traveled served[2]	**$0.02**

[1] Cost-effectiveness for projects approved in concept by METRO.
[2] Does not include TSM improvements.

Recommended Improvements

Map III-1



Uptown Houston

Harris County Improvement District No.1
Houston - Galveston Area Council
Metropolitan Transit Authority
City of Houston
State Department of Highways and Public Transportation

Table III-4:
RECOMMENDED ROADWAY IMPROVEMENTS

Map #	Project	Limits	Improvement	Pavement Width Existing	Pavement Width Proposed	R-O-W Existing	R-O-W Proposed	Dedication Probability	Estimated R-O-W Sq.Ft.	Estimated Constr. ($000's)	Proposed Jurisdiction	METRO Approval in Concept
1	Westheimer and Chimney Rock	South, West, North	Add RT lanes					none	9,800	157	METRO	Y
2	Chimney Rock	Westheimer - Richmond	Widen to 6LD	2@24	2@33	80	100	none	47,916	583	METRO	N
3	Richmond and Chimney Rock	All approaches	Construct double LT lanes plus RT lane on south approach	11	20	100	100	none	2,500	280	METRO	Y
4	Chimney Rock	Richmond - US 59	Widen to 6LD	2@24	2@33	80	100	none	39,204	466	METRO	N
5	Chimney Rock	US 59 - Westpark	Widen to 6LD	2@24	2@33	80	120	none	12,000	385	METRO	Y
6	Hidalgo	South Rice - Chimney Rock	Widen to 4LU and realign @ Chimney Rock	27	44	60	60	none	24,200	875	METRO	Y
7	Yorktown-S. Rice Connector (Phase 1 = temporary connector)	Alabama - Kleberg	Widen Yorktown to 4LU; Widen Yorktwn to 3L Kleberg - Fayette; Resurface Kleburg and Fayette and convert to 1-way pair	27	33-44	60	60	—	—	350	METRO	Y
8	Yorktown-South Rice Connector (Phase 2 = direct connector)		Construct 4LD connector to replace 1-way pair	0	2@24	0	80	high	87,120	700	METRO	N
9	Sage & Richmond	North approach	Add RT lane	2@24	var	60	70	high	4,350	49	METRO	Y
10	Fairdale	South Rice - Chimney Rock	Widen to 4LU	27	44	60	60	none	300	1,037	METRO	Y
11	Fairdale	Post Oak Blvd. - South Rice	Construct 4LU	0	44	0	60	high	106,200	700	METRO	Y
12	Richmond	Chimney Rock - Sage	Widen to 8LD	2@33	2@44		140	none	600	933	METRO	Y
13	WB U.S. 59 frontage road	South Rice - Chimney Rock	Construct 3L	0	36	0	NA	none	178,596	583	SDHPT	N
14	U.S. 59 EB frontage extension	Chimney Rock EB on-ramp to Westpark	Elevate WB Westpark lanes and connect EB U.S. 59 frontage with EB Westpark	18	26	NA	NA	—	—	2,332	METRO	N
15	U.S. 59-South Rice-Westpark-Sage intersection area		Widen Westpark west approach for double LT lanes; Reconstruct Sage/Rice intersection and widen S. Rice to 6LD Sage to Westpark (8L underpass)	44	100	80	100-120	none	2,400	700	METRO	Y
16a	Sage	Woodway - San Felipe	Widen to 4LU	27	44	60	60	possible	3,460	1,445	METRO	Y
16b	Woodway & Sage	East approach	Add double LT lanes	60	70	80	90	possible	7,200	239	METRO	Y
17	San Felipe & Sage	North and south approaches	Widen for LT lanes and NB RT lane	44	60	60	80	possible	8,900	251	METRO	Y
18	Westheimer	Alabama - Post Oak Blvd.	Relocate median and convert to 5L WB and 2L EB	90	90			—	—	875	METRO	Y
19	Westheimer and Sage	All approaches	Widen for double LT lanes					limited	12,300	245	METRO	Y
20	Alabama at Sage and Post Oak Boulevard	2 intersections	Add RT lane on west approach					high	6,400	330	METRO	Y
21	Post Oak Lane	Woodway - San Felipe	Widen to 4LU	27	44	60	60	—	—	991	METRO	Y

Table III-4 (continued):
RECOMMENDED ROADWAY IMPROVEMENTS

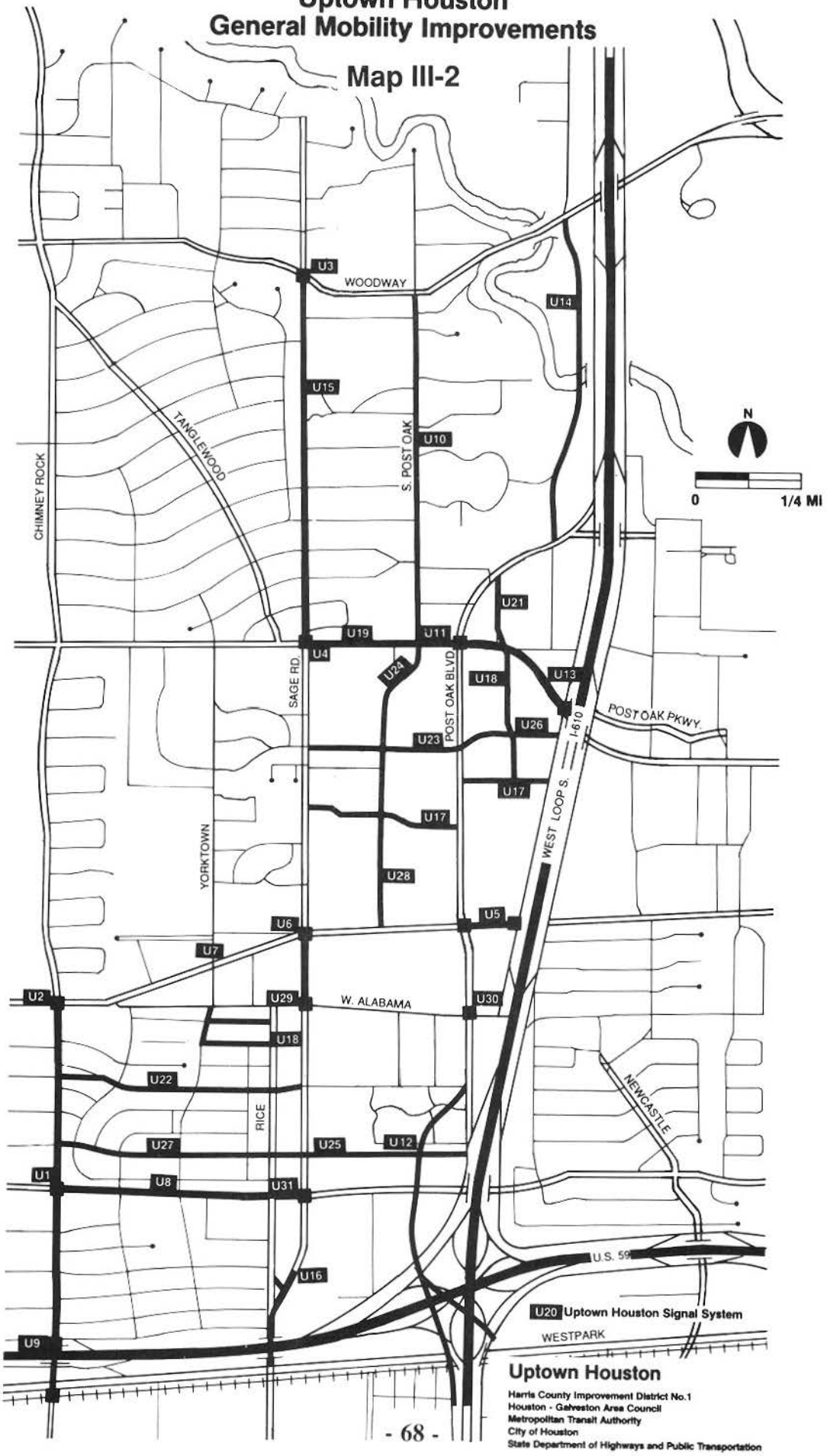
Map #	Project	Limits	Improvement	Pavement Width Existing	Pavement Width Proposed	R-O-W Existing	R-O-W Proposed	Dedication Probability	Estimated R-O-W Sq.Ft.	Estimated Constr. ($000's)	Proposed Jurisdiction	METRO Approval in Concept
22	San Felipe	Sage - Post Oak Blvd.	Widen to 6LD	60	2@33	80	100	halfhigh	33,400	1,340	METRO	Y
23	San Felipe & Post Oak Blvd.	All approaches	Construct double LT lanes	—	—	120		possible	15,750	519	METRO	Y
24a	I.H. 610 and San Felipe	Intersection (interim)	Relocate south U-turn lane 1 bay to south; Relocate EB through lanes to existing south U-turn bay; Restripe for standard width lanes	var	var	80	var	limited	1,600	478	METRO	Y
24b	San Felipe	Post Oak Blvd. - I.H. 610	Widen to 6LD	60	70	80	90	possible	15,560	431	METRO	Y
25	McCue	San Felipe - Ambassador Way	Construct 4LU	0	44	0	80	possible	88,000	550	METRO	Y
26	McCue	Ambassador Way - Guilford	Widen to 4LU	40	44	private	80	high	59,600	704	METRO	Y
27	McCue	Guilford - Westheimer	Reconstruct to 4LU	40	44	60	80	—	—	641	METRO	Y
28	Ambassador Way	McCue-Sage	Construct 4LU and eliminate jog	40	44	60	60	none	1,500	198	METRO	Y
29	Ambassador Way	McCue - Post Oak Blvd.	Widen to 4LU and eliminate jog	40	44	private	60	high	63,000	495	METRO	Y
30	Ambassador Way	Post Oak Blvd. - Garretson	Construct 4LU	0	44	0	60	high	44,100	341	METRO	Y
31	Ambassador Way	Garretson - I.H. 610 SB frontage road	Widen to 4LU	24	40	private	50	none	33,000	616	METRO	Y
32	Guilford	Sage - McCue	Construct 4LU	0	44	0	60	high	51,000	140	METRO	Y
33	Guilford	McCue - Post Oak Blvd	Realign as 4LU	2@18	44	private	60	high	55,000	466	METRO	Y
34	Guilford	Post Oak Blvd. - Garretson	Construct 4LU	0	44	0	60	high	37,800	237	METRO	Y
35	Guilford	Garretson - I.H. 610 SB frontage road	Construct 4LU	0	44	0	60	high	25,200	182	METRO	Y
36	Garretson	Post Oak Blvd. - San Felipe	Widen/construct to 4LU		44		60	high	7,000	292	METRO	Y
37	Garretson	San Felipe - Ambassador Way	Construct 4LU	0	44	0	60	high	73,400	437	METRO	Y
38	Garretson	Ambassador Way - Guilford	Widen to 4LU		44	private	60	high	28,200	169	METRO	Y
39	Westheimer and Post Oak Phase I interim improvement	All approaches	Widen for additional turn lanes	var	var	var	var	possible	8,700	400	METRO	Y
40a	Westheimer and I.H. 610 Phase I interim improvement	Westheimer	Relocate south U-turn lanes and EB through lanes 1 bay south; Add triple LT lanes and taper frontage road throats.	70	100	100	120	possible	34,850	400	METRO	Y
40b	Westheimer - Phase 2	Post Oak Blvd. - IH-610	Reconfigure to 7L westbound with bus lane eastbound	78	120	100	—	—	13,100	200	METRO	Y
41	I.H. 610 NB Frontage Road	Alabama-Westheimer	Widen to 4 lanes plus double RT lane	24-36	44-66	0	22	none	13,068	117	METRO	Y
42	Post Oak Blvd.	Hidalgo - Richmond	Relocate 6LD roadway	0	2@33	0	100	high	130,000	825	METRO	Y
43	Post Oak Blvd.	Richmond - SB U.S. 59 frontage road	Construct 6LD	0	2@33	0	100	high	104,300	638	METRO	Y
44	I.H. 610 SB Frontage Road	Hidalgc - Richmond	Extend as 3 lanes	0	36	0	NA	possible	43,560	175	SDHPT	N
45	I.H. 610 SB Frontage Road	Richmond - McCue	Widen to 3 lanes	24	36	+10	NA	possible	8,712	58	SDHPT	N

Table III-4 (continued):
RECOMMENDED ROADWAY IMPROVEMENTS

Map #	Project	Limits	Improvement	Pavement Width Existing	Pavement Width Proposed	R-O-W Existing	R-O-W Proposed	Dedication Probability	Estimated R-O-W Sq.Ft.	Estimated Constr. ($000's)	Proposed Jurisdiction	METRO Approval in Concept
46	WB U.S. 59 Frontage Road	McCue - South Rice	Construct 3L	0	36	0	NA	none		385	SDHPT	N
47	Woodway	IH-610 Buffalo Bayou	Widen underpass to 8 lanes; Widen to Buffalo Bayou bridge	78	100	100	120	none	13,068	350	SDHPT	N
48	Uptown Parkway	Woodway - Buffalo Bayou	Construct 4LD and Woodway grade separation	0	2@24	--	80	little	210,000	1,832	METRO	Y
49	Uptown Parkway	Buffalo Bayou -Post Oak Blvd.	Construct 4LD	0	2@24	--	80	high	210,000	880	METRO	Y
50	Post Oak Park	I.H. 610 NB frontage road - Post Oak Blvd.	Stripe for 4LU; Prohibit parking	40	40	60	60	—	—	12	METRO	N
51	Post Oak Park	San Felipe - Westheimer	Construct 4LU	0	44	0	60	possible	108,900	700	METRO	N
52	I.H. 610 ramps between Woodway and Post Oak Blvd.		Reverse ramps and widen frontage roads between ramps		SDHPT(2)					SDHPT	N	
53	I.H. 610 and Post Oak Blvd.	East, west approaches	Widen to add one lane	78	100	120	120	—	—	292	SDHPT	N
54	SB I.H. 610 exit to Westheimer and NB I.H. 610 on-ramp from Westheimer		Construct new ramps		SDHPT(2)					SDHPT	N	
55	NB I.H. 610 on-ramp from West Alabama	Replaces existing Richmond on-ramp	Relocate ramp		SDHPT(2)					SDHPT	N	
56	EB U.S. 59 exit to Alabama and Westheimer		Relocate ramp		SDHPT(2)					SDHPT	N	
57	NB I.H. 610 exit to Hidalgo		Construct new ramp		SDHPT(2)					SDHPT	N	
58	SB I.H. 610 exit to Hidalgo/Richmond	Replaces existing Richmond exit	Relocate ramp		SDHPT(2)					SDHPT	N	
59	SB I.H. 610/WB U.S. 59 on-ramp		Relocate ramp from Westheimer/Alabama		SDHPT(2)					SDHPT	N	
60	I.H. 610 and Richmond	SB to NB U-turn	Construct U-turn lane		SDHPT(2)					SDHPT	N	
61	I.H. 610 and Westpark	NB to SB U-turn	Construct U-turn lane		SDHPT(2)					SDHPT	N	
62	I.H. 610 SB frontage roads	Woodway - Richmond	Widen to 3 lanes		SDHPT(2)					SDHPT	N	
63	I.H. 610	I.H. 10 - U.S. 59	Widen to 10 LD		SDHPT(2)					SDHPT	N	
64	I.H. 610 NBfrontage roads	Woodway - Richmond	Widen to 3 lanes		SDHPT(2)					SDHPT	N	
65	Post Oak Boulevard	SB U.S. 59 frontage road - Westpark	Connect Post Oak Blvd. and I.H. 610	0	2@33	—	—	—	—	7,000	SDHPT	N
66	Traffic Signal System	All Uptown Houston signals	Modernize and coordinate for major street progression	—	—	—	—	—	—	4,664	METRO	Y

Uptown Houston
General Mobility Improvements

Map III-2



Uptown Houston

Harris County Improvement District No.1
Houston - Galveston Area Council
Metropolitan Transit Authority
City of Houston
State Department of Highways and Public Transportation

Table III-5

UPTOWN HOUSTON PROJECTS

SEQUENCE NUMBER	PROJECT	OPENING DAY ADT	PRIVATE SECTOR CONTRIBUTION	OTHER PUBLIC PARTICIPATION	METRO CONTRIBUTION	TOTAL ESTIMATED PUBLIC COST	TOTAL ESTIMATED COST	B/C RATIO WITH SALVAGE VALUE
U 1	RICHMOND AND CHIMNEY ROCK CONSTRUCT DOUBLE LEFT-TURN LANES AT ALL APPROACHES AND A RIGHT-TURN ON THE SOUTH APPROACH OF CHIMNEY ROCK. (METRO COST $0.33) INTERSECTION OPENING DAY ADT 79,000. RECOMMENDED BY UPTOWN HOUSTON.	79,000	$0	$0	$329,840	$329,840	$329,840	254.90
U 2	WESTHEIMER AND CHIMNEY ROCK CONSTRUCT RIGHT-TURN LANES AT SOUTH, WEST AND NORTH APPROACHES. (METRO COST $0.4 MILLION) INTERSECTION OPENING DAY ADT 87,500. RECOMMENDED BY UPTOWN HOUSTON.	87,500	$0	$0	$353,410	$353,410	$353,410	137.70
U 3	WOODWAY AND SAGE CONSTRUCT DOUBLE LEFT-TURN LANES AT EAST APPROACH. (METRO COST $0.4 MILLION) INTERSECTION OPENING DAY ADT 50,000. RECOMMENDED BY UPTOWN HOUSTON.	50,000	$0	$0	$419,030	$419,030	$419,030	132.20
U 4	SAN FELIPE AND SAGE CONSTRUCT LEFT-TURN LANES AT NORTH AND SOUTH APPROACHES AND A RIGHT-TURN LANE AT THE NORTH APPROACH. (METRO COST $0.3 MILLION, PRIVATE SECTOR $0.09 MILLION) INTERSECTION OPENING DAY ADT 57,500. RECOMMENDED BY UPTOWN HOUSTON.	57,500	$89,000	$0	$339,690	$339,690	$428,690	181.40
U 5	WESTHEIMER AND POST OAK BOULEVARD/IH-610 CONSTRUCT DOUBLE LEFT-TURN LANES ON EAST, SOUTH, AND WEST APPROACHES AT POST OAK AND TRIPLE LEFT- TURN LANES ON THE NORTH APPROACH; RELOCATE THE SOUTH U-TURN LANE AT IH-610 ONE LANE TO THE SOUTH; RESTRIPE WESTHEIMER BETWEEN THE FRONTAGE ROADS FOR TWO THROUGH LANES IN EACH DIRECTION; CONSTRUCT DOUBLE LEFT-TURN LANES WESTBOUND AND TRIPLE LEFT-TURN LANES EASTBOUND; ADD AN ADDITIONAL EASTBOUND LANE BETWEEN POST OAK AND IH-610 FOR RIGHT TURNS. (METRO COST $0.8 MILLION, PRIVATE SECTOR $0.6 MILLION) INTERSECTION OPENING DAY ADT 140,000. RECOMMENDED BY UPTOWN HOUSTON.	140,000	$576,000	$0	$815,420	$815,420	$1,391,420	96.00
U 6	WESTHEIMER AND SAGE CONSTRUCT DOUBLE LEFT-TURN LANES AT ALL APPROACHES AND WIDEN THE LANES AT THE SOUTH APPROACH OF SAGE. (METRO COST $0.5 MILLION, PRIVATE SECTOR $0.1 MILLION) INTERSECTION OPENING DAY ADT 80,000. RECOMMENDED BY UPTOWN HOUSTON.	80,000	$111,000	$0	$502,860	$502,860	$613,860	89.10
U 7	WESTHEIMER/ALABAMA PAIRING CONVERT TO ONE-WAY PAIR BETWEEN POST OAK AND IH-610; CONVERT WESTHEIMER TO 5 LANES WESTBOUND AND 2 EASTBOUND BETWEEN MCCULLOCH AND POST OAK, WITH EASTBOUND LANES FOR BUSES AND LOCAL CIRCULATION. WIDEN EAST IH-610 SERVICE ROAD TO 4 LANES BETWEEN ALABAMA AND WESTHEIMER AND PROVIDE DOUBLE RIGHT-TURN LANES ON SOUTH APPROACH TO WESTHEIMER. (METRO COST $1.4 MILLION) OPENING DAY ADT 45,000. RECOMMENDED BY UPTOWN HOUSTON.	45,000	$0	$0	$1,434,500	$1,434,500	$1,434,500	74.60
U 8	RICHMOND: SAGE TO CHIMNEY ROCK WIDEN FROM A 6-LANE DIVIDED CONCRETE CURB AND GUTTER ROADWAY TO AN 8-LANE DIVIDED CONCRETE CURB AND GUTTER ROADWAY - 0.64 MILE. (METRO COST $0.95 MILLION) OPENING DAY ADT 44,800. RECOMMENDED BY UPTOWN HOUSTON	44,800	$0	$0	$949,600	$949,600	$949,600	66.90
U 9	CHIMNEY ROCK AND US 59/WESTPARK WIDEN CHIMNEY ROCK TO 6-LANE DIVIDED ROADWAY (9 LANES UNDER THE FREEWAY) AND CONSTRUCT DOUBLE LEFT-TURN LANES ON WEST APPROACHES OF FRONTAGE ROAD AND WESTPARK. METRO COST $0.7 MILLION) INTERSECTION OPENING DAY ADT 72,500. RECOMMENDED BY UPTOWN HOUSTON	72,500	$0	$0	$684,780	$684,780	$684,780	59.50
U 10	POST OAK LANE: WOODWAY TO SAN FELIPE WIDEN FROM A 2-LANE UNDIVIDED CONCRETE CURB AND GUTTER ROADWAY TO A 4-LANE UNDIVIDED CONCRETE CURB AND GUTTER ROADWAY - 0.81 MILE. (METRO COST $ 0.1 MILLION) OPENING DAY ADT 20,000. RECOMMENDED BY UPTOWN HOUSTON	20,000	$0	$0	$991,100	$991,100	$991,100	55.70
U 11	SAN FELIPE AND POST OAK BOULEVARD CONSTRUCT DOUBLE LEFT-TURN LANES AT NORTH, EAST AND WEST APPROACHES. (METRO COST $0.76 MILLION, PRIVATE SECTOR $0.39 MILLION. INTERSECTION OPENING DAY ADT 75,000	75,000	$390,000	$0	$758,870	$758,870	$1,148,870	55.70

Table III-5, continued

UPTOWN HOUSTON PROJECTS

SEQUENCE NUMBER	PROJECT	OPENING DAY ADT	PRIVATE SECTOR CONTRIBUTION	OTHER PUBLIC PARTICIPATION	METRO CONTRIBUTION	TOTAL ESTIMATED PUBLIC COST	TOTAL ESTIMATED COST	B/C RATIO WITH SALVAGE VALUE
U 12	POST OAK BOULEVARD: HILDALGO TO US 59 RELOCATE EXISTING 6-LANE DIVIDED CONCRETE CURB AND GUTTER ROADWAY (HILDALGO - RICHMOND) AND CONSTRUCT A NEW 6-LANE DIVIDED CONCRETE CURB AND GUTTER ROADWAY (RICHMOND - US 59) - 0.5 MILE. (METRO COST $1.55 MILLION, PRIVATE SECTOR $5.99 MILLION) OPENING DAY ADT 30,000. RECOMMENDED BY UPTOWN HOUSTON.	30,000	$5,986,000	$0	$1,550,780	$1,550,780	$7,536,780	47.50
U 13	SAN FELIPE AND IH-610 RELOCATE SOUTH U-TURN LANE 1 BAY TO THE SOUTH AND RELOCATE EASTBOUND THROUGH LANES TO EXISTING SOUTH U-TURN BAY; RESTRIPE FOR STANDARD LANE WIDTHS. (METRO COST $0.8 MILLION, PRIVATE SECTOR $0.3 MILLION) INTERSECTION OPENING DAY ADT 66,000. RECOMMENDED BY UPTOWN HOUSTON.	66,000	$320,000	$0	$798,060	$798,060	$1,118,060	46.70
U 14	UPTOWN PARKWAY: WOODWAY TO POST OAK CONSTRUCT A NEW 4-LANE DIVIDED CONCRETE CURB AND GUTTER ROADWAY INCLUDING A GRADE SEPARATION AT WOODWAY - 0.92 MILE. (METRO COST $10.0 MILLION, PRIVATE SECTOR $4.2 MILLION) OPENING DAY ADT 30,000. RECOMMENDED BY UPTOWN HOUSTON.	30,000	$4,200,000	$0	$10,189,758	$10,189,758	$14,389,758	44.98
U 15	SAGE: WOODWAY TO SAN FELIPE WIDEN FROM A 2-LANE UNDIVIDED CONCRETE CURB AND GUTTER ROADWAY TO A 4-LANE UNDIVIDED CONCRETE CURB AND GUTTER ROADWAY - 0.87 MILE. (METRO COST $1.5 MILLION, PRIVATE SECTOR $0.02 MILLION) OPENING DAY ADT 20,000. RECOMMENDED BY UPTOWN HOUSTON	20,000	$25,950	$0	$1,523,690	$1,523,690	$1,549,640	39.40
U 16	RICE/SAGE AND US 59/WESTPARK WIDEN RICE TO 6-LANES DIVIDED BETWEEN SAGE AND WESTPARK (8 LANES UNDER US 59); BRAID SAGE-RICE INTERSECTION AT-GRADE; PROVIDE DOUBLE LEFT-TURN LANES ON WESTPARK WEST APPROACH. (METRO COST $1.2 MILLION) INTTERSECTION OPENING DAY ADT 75,000. RECOMMENDED BY UPTOWN HOUSTON.	75,000	$0	$0	$1,179,600	$1,179,600	$1,179,600	35.90
U 17	GUILFORD: SAGE TO IH-610 CONSTRUCT A NEW 4-LANE UNDIVIDED CONCRETE CURB AND GUTTER ROADWAY (0.36 MILE) AND WIDEN AND RECONSTRUCT A 2-LANE CONCRETE CURB AND GUTTER ROADWAY (0.17 MILE) (METRO COST $1.6 MILLION, PRIVATE SECTOR $4.8 MILLION) OPENING DAY ADT 10,000. RECOMMENDED BY UPTOWN HOUSTON	10,000	$4,765,000	$0	$1,649,400	$1,649,400	$6,414,400	33.73
U 18	YORKTOWN-RICE CONNECTOR CREATE TWO-WAY CONNECTOR BETWEEN YORKTOWN AND RICE BY WIDENING YORKTOWN TO 3/4 LANES BETWEEN KLEBURG AND FAYETTE; RESURFACE KLEBURG AND FAYETTE BETWEEN YORKTOWN AND RICE AND CONVERT TO A ONE-WAY PAIR. (METRO COST $0.35 MILLION) OPENING DAY ADT 20,000. RECOMMENDED BY UPTOWN HOUSTON.	20,000	$0	$0	$349,800	$349,800	$349,800	27.26
U 19	SAN FELIPE: SAGE TO IH-610 WIDEN FROM A 5-LANE CONCRETE CURB AND GUTTER ROADWAY TO A 7-LANE CONCRETE CURB AND GUTTER ROADWAY - 0.73 MILE. (METRO COST $2.72 MILLION, PRIVATE SECTOR $1.01 MILLION) OPENING DAY ADT 40,000. RECOMMENDED BY UPTOWN HOUSTON.	40,000	$1,014,880	$0	$2,715,840	$2,715,840	$3,730,720	24.80
U 20	UPTOWN HOUSTON SIGNAL SYSTEM UPGRADE AND CENTRALLY COORDINATE CONTROL OF ALL SIGNALS IN UPTOWN HOUSTON AREA. (METRO COST $4.7 MILLION) 1,800,000 VEHICLE MILES TRAVELED ON SIGNALIZED STREET IN UPTOWN HOUSTON (1995). RECOMMENDED BY UPTOWN HOUSTON	1,800,000 VMT	$0	$0	$4,664,000	$4,664,000	$4,664,000	20.90
U 21	GARRETSON: POST OAK TO GUILFORD WIDEN FROM A 2-LANE TO A 4-LANE UNDIVIDED CONCRETE CURB AND GUTTER ROADWAY (0.40 MILE) AND CONSTRUCT A NEW 4-LANE UNDIVIDED CONCRETE CURB AND GUTTER ROADWAY (0.23 MILE) (METRO COST $0.9 MILLION, PRIVATE SECTOR $4.2 MILLION) OPENING DAY ADT 10,000. RECOMMENDED BY UPTOWN HOUSTON.	10,000	$4,204,000	$0	$897,820	$897,820	$5,101,820	19.80
U 22	HILDALGO: SOUTH RICE TO CHIMNEY ROCK WIDEN FROM A 2-LANE TO A 4-LANE UNDIVIDED CONCRETE CURB AND GUTTER ROADWAY AND REALIGN ROAD AT CHIMNEY ROCK; CONVERT TO A ONE-WAY STREET WESTBOUND - 0.5 MILE. (METRO COST $1.4 MILLION) OPENING DAY ADT 11,000. RECOMMENDED BY UPTOWN HOUSTON	11,000	$0	$0	$1,358,500	$1,358,500	$1,358,500	16.90
U 23	AMBASSADOR WAY: SAGE TO POST OAK BOULEVARD WIDEN FROM A 2-LANE TO A 4-LANE UNDIVIDED CONCRETE CURB AND GUTTER ROADWAY AND ELIMINATE JOG IN EXISTING ROAD -0.37 MILE. (METRO COST $1.4 MILLION, PRIVATE SECTOR $1.9 MILLION) OPENING DAY ADT 10,000. RECOMMENDED BY UPTOWN HOUSTON	10,000	$1,890,000	$0	$1,394,580	$1,394,580	$3,284,580	13.90

Table III-5, continued

UPTOWN HOUSTON PROJECTS

SEQUENCE NUMBER	PROJECT	OPENING DAY ADT	PRIVATE SECTOR CONTRIBUTION	OTHER PUBLIC PARTICIPATION	METRO CONTRIBUTION	TOTAL ESTIMATED PUBLIC COST	TOTAL ESTIMATED COST	B/C RATIO WITH SALVAGE VALUE
U 24	MCCUE: SAN FELIPE TO AMBASSADOR WAY CONSTRUCT A NEW 4-LANE UNDIVIDED CONCRETE CURB AND GUTTER ROADWAY - 0.43 MILE. (METRO COST $ 2.6 MILLION, PRIVATE SECTOR $2.0 MILLION) OPENING DAY ADT 15,000. RECOMMENDED BY UPTOWN HOUSTON	15,000	$1,994,000	$0	$2,585,240	$2,585,240	$4,579,240	12.20
U 25	FAIRDALE: POST OAK TO S. RICE CONSTRUCT A NEW 4-LANE UNDIVIDED CONCRETE CURB AND GUTTER ROADWAY - 0.36 MILES. (METRO COST $1.7 MILLION, PRIVATE SECTOR $1.6 MILLION) OPENING DAY ADT 15,000. RECOMMENDED BY UPTOWN HOUSTON.	15,000	$1,605,000	$0	$1,749,600	$1,749,600	$3,354,600	10.80
U 26	AMBASSADOR WAY: POST OAK BOULEVARD TO IH-610 CONSTRUCT A NEW 4-LANE UNDIVIDED CONCRETE CURB AND GUTTER ROADWAY - 0.28 MILES. (METRO COST $2.8 MILLION, PRIVATE SECTOR $1.3 MILLION) OPENING DAY ADT 10,000. RECOMMENDED BY UPTOWN HOUSTON	10,000	$1,320,000	$0	$2,778,420	$2,778,420	$4,098,420	9.90
U 27	FAIRDALE: SOUTH RICE TO CHIMNEY ROCK WIDEN FROM A 2-LANE TO A 4-LANE UNDIVIDED CONCRETE CURB AND GUTTER ROADWAY - 0.5 MILE. (METRO COST $1.0 MILLION) OPENING DAY ADT 11,000. RECOMMENDED BY UPTOWN HOUSTON.	11,000	$0	$0	$1,043,740	$1,043,740	$1,043,740	9.70
U 28	MCCUE: AMBASSADOR WAY TO WESTHEIMER WIDEN FROM A 2-LANE TO A 4-LANE UNDIVIDED CONCRETE CURB AND GUTTER ROADWAY - 0.25 MILE (METRO COST $0.6 MILLION) OPENING DAY ADT 10,000. RECOMMENDED BY UPTOWN HOUSTON.	10,000	$0	$0	$641,300	$641,300	$641,300	9.00
U 29	ALABAMA AND SAGE CONSTRUCT A RIGHT-TURN LANE AT THE WEST APPROACH OF ALABAMA. (METRO COST $0.03 MILLION, PRIVATE SECTOR $0.1 MILLION) INTERSECTION OPENING DAY ADT 45,000. RECOMMENDED BY UPTOWN HOUSTON.	45,000	$99,000	$0	$27,984	$27,984	$126,984	7.80
U 30	ALABAMA AND POST OAK CONSTRUCT A RIGHT-TURN LANE AT THE WEST APPROACH OF ALABAMA. (METRO COST $0.03 MILLION, PRIVATE SECTOR $0.23 MILLION) INTERSECTION OPENING DAY ADT 50,000. RECOMMENDED BY UPTOWN HOUSTON.	50,000	$232,500	$0	$30,316	$30,316	$262,816	7.20
U 31	RICHMOND AND SAGE CONSTRUCT A RIGHT-TURN LANE AT THE NORTH APPROACH OF SAGE. (METRO COST $0.09 MILLION, PRIVATE SECTOR 0.04 MILLION) INTERSECTION OPENING DAY ADT 54,000. RECOMMENDED BY UPTOWN HOUSTON	54,000	$43,500	$0	$92,472	$92,472	$135,972	1.80
	SUMMATION		**$41,000,000#**	**$0**	**$44,800,000**	**$44,800,000**	**$85,800,000**	**38.70**

TOTAL IDENTIFIED PRIVATE SECTOR CONTRIBUTION IS $28.9 MILLION. THIS ESTIMATE AND THOSE RIGHT-OF-WAY COSTS NOT IDENTIFIED HAVE BEEN SUGGESTED BY UPTOWN TO BE VALUED UP TO $41.0 MILLION. NOTE VALUE OF RIGHT-OF-WAY DOES NOT INFLUENCE B/C CALCULATION BEYOND REMOVING ITS' VALUE FROM PUBLIC COST.

SUMMARY OF LOW CAPITAL COST AND TSM ARTERIAL IMPROVEMENTS — PROJECT DESCRIPTIONS AND COST EFFECTIVENESS

Houston area public agencies and property owners have a sizable investment in existing roadway facilities. Additional capacity, operational efficiency and safety can be squeezed from several of these facilities through utilization of low cost capital improvements and TSM techniques. In general, these include operational refinements and minor capital improvements, but may also include other actions.

Sixteen low cost and TSM improvements are recommended for the Uptown Houston arterial system. Those are listed in Table III-6 with a brief description of the project and intended benefits. Most improvements are intended to obtain improved efficiencies or utilization of existing or available physical roadway capacity or create significant additional capacity at low cost. Of particular importance are the additional turn lanes (better utilization of available traffic signal green time) and traffic signal control system for better coordination.

Table III-7 illustrates the estimated cost-effectiveness of each of the recommended low cost and TSM arterial street projects. All projects have a benefit/cost ratio greater than one. The estimated cost and cost-effectiveness of the 16 low capital cost and TSM recommended arterial street improvements projects is summarized in Table III-8 below.

Table III-8:
LOW CAPITAL COST AND TSM ARTERIAL STREET PROJECTS SUMMARY
PROJECTS APPROVED IN CONCEPT BY METRO

Construction cost	**$ 9.7 million**
ROW	**$ 5.0 million**
Total	**$14.7 million**
Likely Private Sector Contributibution	**$ 1.9 million**
Integrated program cost-effectiveness:	
Benefit/Cost Ratio	**59**
Cost per vehicle-hour saved	**$0.07**

Table III-7:
ARTERIAL TSM PROJECT COST-EFFECTIVENESS – PROJECTS APPROVED IN CONCEPT BY METRO

Project Number	Description	Benefit/ Cost[1]	Cost Per Veh-Hr Saved[2]
1	Westheimer & Chimney Rock	138	$0.07
3	Richmond & Chimney Rock	255	0.04
5	Chimney Rock & U.S. 59/Westpark	60	0.17
7	Yorktown-Rice Connector - Phase I	27	0.12
9	Richmond & Sage	2*	5.70*
15	Rice & Sage & U.S. 59 & Westpark	36	0.28
16b	Woodway & Sage	132	0.08
17	San Felipe & Sage	181	0.06
18&41	Westheimer/Alabama Pairing	75	0.05
19	Westheimer & Sage	89	0.11
20	Alabama & Sage	8*	1.31*
20	Alabama & Post Oak Blvd.	7*	1.42*
23	San Felipe & Post Oak	56	0.18
24a	San Felipe & I.H. 610	47	0.22
39&40	Westheimer @ Post Oak & I.H.610	96	0.11
66	Area Traffic Signal System	21	0.05*
	Total	**59**	**$0.07**

[1] 10 year project life
[2] 10 year cost recovery
* Right turn lane; METRO methodology not sensitive to improvement of this type.

Table III-6:
ARTERIAL STREET LOW CAPITAL COST AND TSM IMPROVEMENTS

Project #	Street or Intersection	Improvement	Benefit
1	**Westheimer & Chimney Rock intersection**	Add right turn lanes on north, south and west approaches.	Increase capacity and reduce delays for heavy turning movements.
3	**Richmond & Chimney Rock intersection**	Construct double left turn lanes on all approaches plus right-turn lane on south approach.	Increase utilization of available traffic signal green time to increase capacity and reduce delays to all vehicles.
5	**Chimney Rock intersection with eastbound U.S. 59 frontage road and Westpark**	Widen Chimney Rock to 6 lanes divided (9 lanes under U.S. 59) and provide double left-turn lanes on west approaches of frontage road and Westpark.	Increase capacity at congested location; Reduce delays.
7	**Yorktown-South Rice Connector-Phase 1**	Create two-way connector between Yorktown and Rice by widening Yorktown to 3 lanes between Kleburg and Fayette; Resurface Kleburg and Fayette between Yorktown and Rice and convert to one-way pair.	Create additional through thoroughfare between San Felipe and the Southwest Freeway by linking Yorktown and Rice.
9	**Richmond & Sage Intersection**	Add right-turn lane on north approach.	Increase capacity and reduce delays from heavy turning movements.
15	**Rice-Sage-U.S. 59-Westpark intersection area**	Widen Rice to 6 lanes divided between Sage and Westpark (8 lanes under U.S. 59); Braid Sage-Rice intersection at-grade; Provide double-left turn lanes on Westpark west approach and coordinate signal operation.	Increase utilization of Rice north of Sage; Increase intersection capacity in conjunction with U.S. 59 frontage road extension.
16b	**Woodway & Sage Intersection**	In conjunction with widening of Sage, construct double left-turn lanes on east approach.	Increase utilization of available traffic signal green time to increase capacity; Reduce delays to all vehicles.
17	**San Felipe & Sage Intersection**	Construct left turn lanes on north and south approaches and right turn lane on south approach.	Increase capacity and reduce delays on Sage.
18 41	**Westheimer and Alabama between McCulloch and east I.H. 610 frontage road.**	Convert to one-way pair between Post Oak and I.H. 610; Convert Westheimer to 5 lanes westbound and 2 eastbound between McCulloch and Post Oak, with eastbound lanes for buses and local circulation only; Widen east I.H. 610 service road to 4 lanes Alabama-Westheimer and provide double right-turn lane on south approach to Westheimer.	Increased intersection and corridor capacity through increased utilization of traffic signal green time; Reduced congestion and delay.
19	**Westheimer & Sage Intersection**	Construct double left turn lanes on all approaches; Provide wider lanes on south approach.	Increase utilization of available traffic signal green time to increase capacity and reduce delays; Increase operational efficiency and reduce sideswipe and turning accident potential on south leg.

Table III-6, continued:
ARTERIAL STREET LOW CAPITAL COST AND TSM IMPROVEMENTS

Project #	Street or Intersection	Improvement	Benefit
20	**Alabama & Sage Intersection**	Construct right turn lane on west approach.	Increase eastbound corridor capacity in conjunction with Westheimer-Alabama pairing.
20	**Alabama & Post Oak Intersection**	Construct right turn lane on west approach.	Increase eastbound corridor capacity in conjunction with Westheimer-Alabama pairing.
23	**San Felipe & Post Oak Intersection**	Construct double left turn lanes on north, east and west approaches.	Increase eastbound corridor capacity in conjunction with Westheimer-Alabama pairing.
24a	**San Felipe & I.H. 610 Intersection**	Increase east-west capacity under I.H. 610 by relocating south U-turn lane one bay to south, relocating eastbound through lanes to current south U-turn bay and restriping lanes to standard widths.	Increase east-west capacity and reduce sideswipe and turning accident potential.
39 40	**Westheimer intersection with Post Oak Blvd. and I.H. 610 (interim improvement)**	Widen Post Oak intersection to provide double left-turn lanes on east, south, and west approaches and temporary triple left-turn lanes on the north approach; Relocate the south U-turn lane at I.H. 610 one lane to the south; Restripe Westheimer between the frontage roads for two through lanes in each direction; Double left turns westbound and triple left turns eastbound; Add an additional eastbound lane between Post Oak and I.H. 610 for right turns and taper Westheimer on both sides of I.H. 610 as needed.	Increase utilization of available traffic signal green time and increase capacity and reduce delays to all traffic; Reduce sideswipe and turning potential due to existing narrow lanes at I.H. 610 intersection.
66	**Area Traffic Signal System**	Modernize signal installations and provide coordinated interconnected control of all area signals.	Increase progressive traffic flow along major routes and reduce delays.

SUMMARY OF MAJOR CAPITAL ARTERIAL IMPROVEMENTS — PROJECT DESCRIPTIONS AND COST EFFECTIVENESS

Major thoroughfares serving the area will only be able to operate effectively if locally circulating traffic is concentrated on other streets. As a result, it will be necessary to develop a local grid street system to provide internal circulation and local access. This street system will serve internal circulation and property access needs, alleviating congestion due to intersection bottlenecks which currently exist due to heavy concentration of turning movements at many locations. Diagram III-1 shows the conceptual form of the proposed system and potential benefits. Map III-3 depicts the recommended roadway system designed to build upon and complete the existing area roadway network. Diagram III-1 and Map III-3 represent the conceptual framework leading to the recommended arterial network improvements identified previously in Map III-1.

Table III-10 lists the major capital arterial street improvements included in the recommended program, together with a brief description of each project and intended benefits. These improvements include widenings, extensions, new roadways and other improvements. Map III-4 shows the recommended lanes for each of the area roadways. In addition to the basic lane configuration, approach lanes at intersections are also shown.

The benefit/cost ratios for the recommended major capital improvements are detailed in Table III-11 along with other measures of cost-effectiveness. The benefit/cost ratios were estimated using METRO's current procedures. All projects show benefit/cost ratios of greater than one, with a total B/C ratio for major capital projects of 31:1, as summarized in Table III-9 below.

Table III-9:
MAJOR CAPITAL ARTERIAL IMPROVEMENTS SUMMARY

Construction cost	**$ 34.5 million**
ROW	**$ 61.6 million**
Total	**$ 95.1 million**
Likely Private Sector Contribution	**$ 44.5 million (47 percent)**
System program cost effectiveness measures[1]:	
Benefit/Cost Ratio - Widenings	**36**
Benefit/Cost Ratio - Extensions	**29**
Benefit/Cost Ratio - Total	**31**
Cost per vehicle hour saved	**$0.12**
Cost per daily VMT	**$120**

[1] Cost-effectiveness for projects approved in concept by METRO.

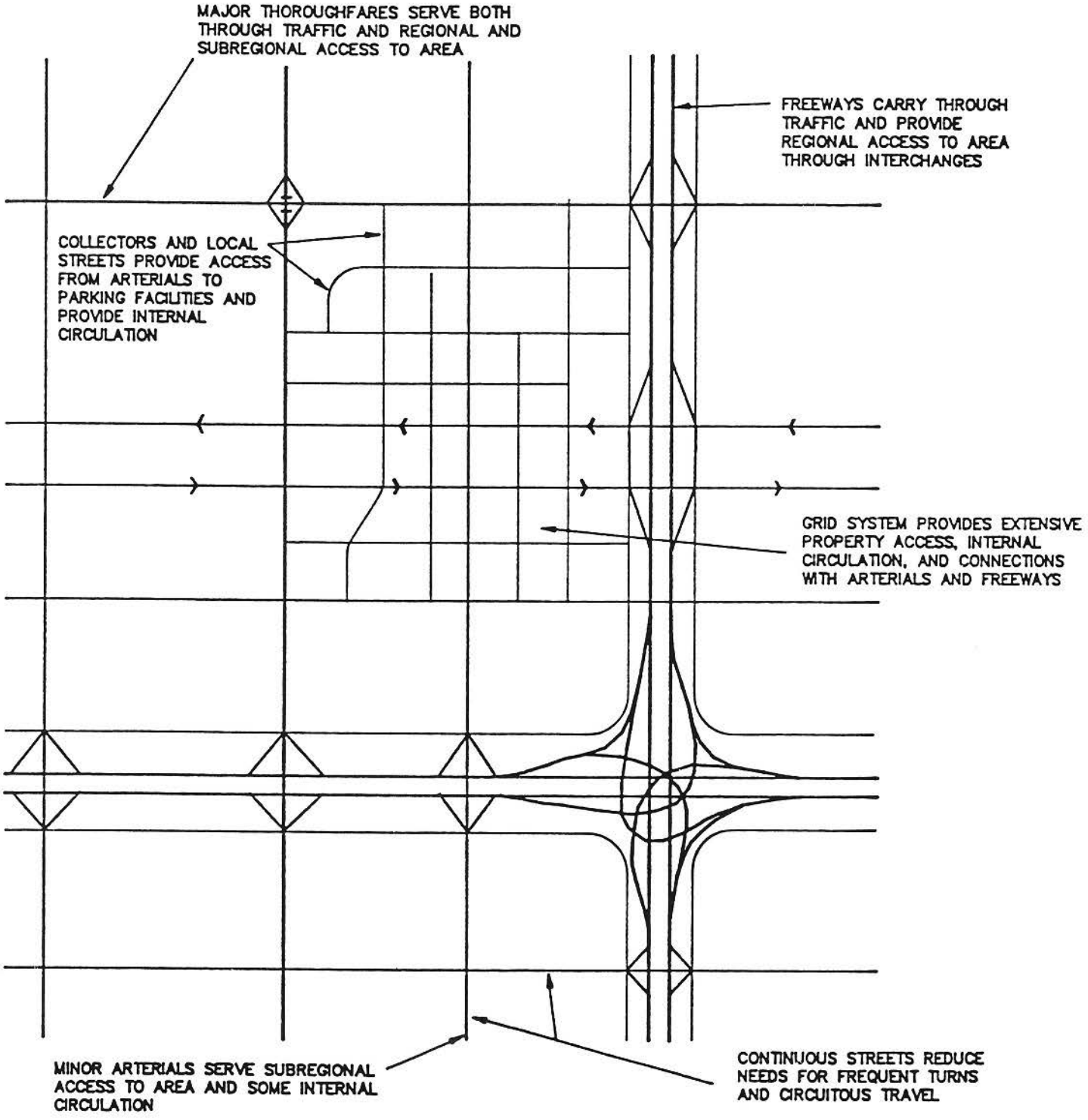
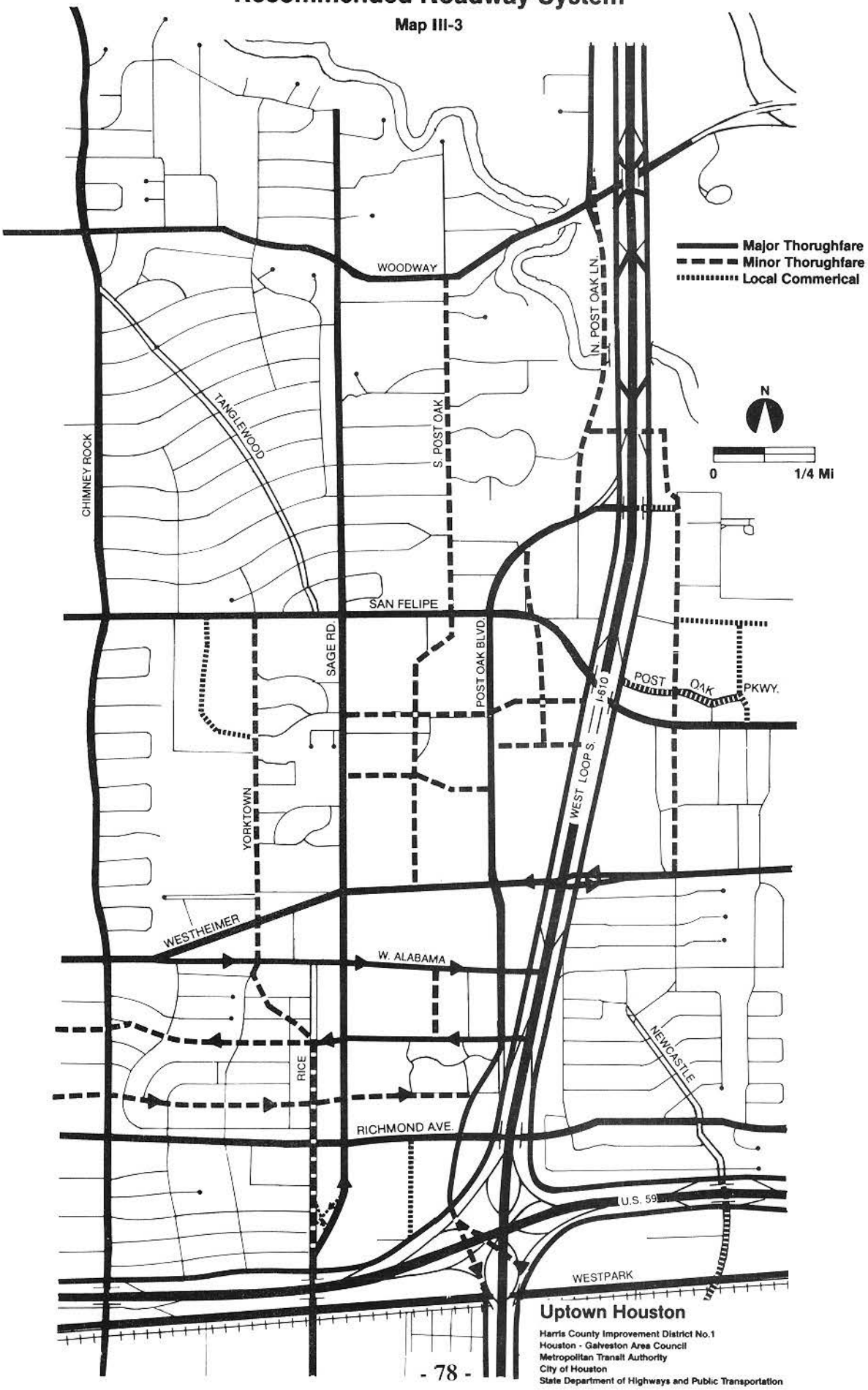


Diagram III-1:
UPTOWN HOUSTON
STREET SYSTEM CONCEPT

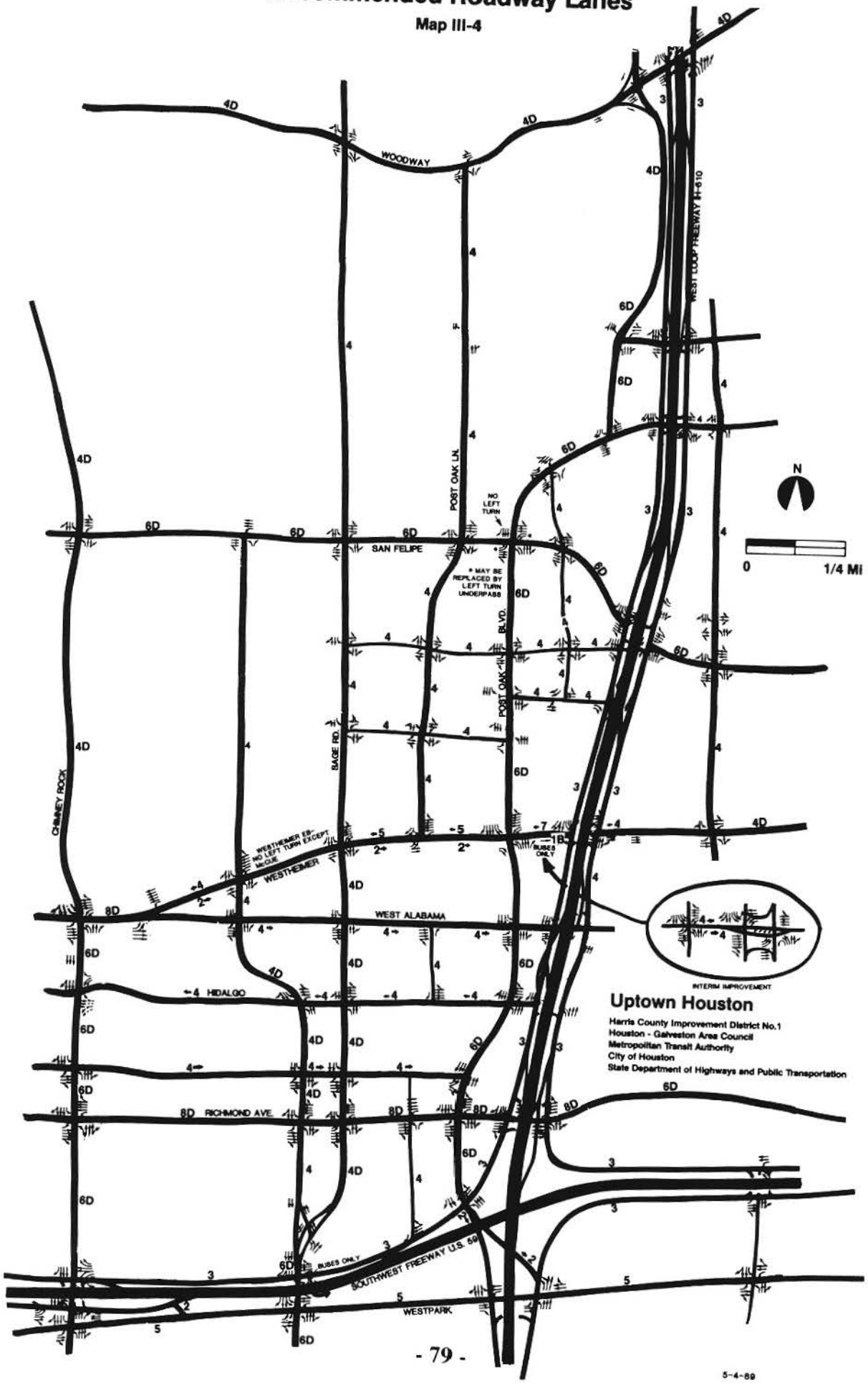
Recommended Roadway System

Map III-3



Recommended Roadway Lanes

Map III-4



5-4-89

Table III-10:
ARTERIAL STREET MAJOR CAPITAL IMPROVEMENTS:
PROJECTS APPROVED IN CONCEPT BY METRO

WIDENINGS

Project #	Street	Improvement	Benefit
6	**Hidalgo between Chimney Rock and Rice**	Widen to 4 lanes, realign at Chimney Rock to eliminate offset; Convert to one-way westbound.	Increase east-west corridor capacity by creating one-way pair with Fairdale.
12	**Richmond between Chimney Rock and Sage**	Widen to 8 lanes divided.	Increase east-west capacity.
16a	**Sage between Woodway and San Felipe**	Widen to 4 lanes	Increase north-south capacity.
21	**Post Oak Lane between Woodway and San Felipe**	Widen to 4 lanes.	Increase north-south capacity.
22 24b	**San Felipe between Sage and I.H. 610**	Widen to 6 lanes divided.	Increase east-west capacity and reduce delays.

Table III-10, continued:
ARTERIAL STREET MAJOR CAPITAL IMPROVEMENTS
PROJECTS APPROVED IN CONCEPT BY METRO

EXTENSIONS (PRIMARILY)

Project #	Street	Improvement	Benefit
10 11	**Fairdale between Chimney Rock and Post Oak.**	Widen to 4 lanes between Rice and Chimney Rock and extend east to Post Oak; Convert to one-way eastbound.	Increase east-west corridor capacity by creating one-way pair with Hidalgo.
25 26 27	**McCue between San Felipe and Westheimer**	Widen and extend as 4 lane street.	Extend continuity of Post Oak Lane, increase north-south capacity and establish a local grid street system in Uptown Houston core.
28 29 30 31	**Ambassador Way between Sage and I.H. 610**	Widen and extend as 4 lane street.	Establish local grid street system in Uptown Houston core to accommodate local circulation and reduce land service function of major thoroughfares.
32 33	**Guilford between Sage and Post Oak Boulevard**	Widen and extend as 4 lane street.	Establish local grid street system in Uptown Houston core to accommodate local circulation and reduce land service function of major thoroughfares.
34 35	**New street south of Doubletree Hotel between Post Oak Blvd. and I.H. 610**	Construct as 4 lane street.	Establish local grid street system in Uptown Houston core to accommodate local circulation and reduce land service function of major thoroughfares.
36 37 38	**Garretson between Post Oak and Doubletree Hotel**	Widen and extend as 4 lane street.	Extend continuity of Garretson, increase north-south capacity, and establish local grid street system in Uptown Houston core.
42 43	**Post Oak Blvd between Hidalgo and U.S. 59**	Realign Hidalgo-Richmond section to move Richmond intersection further from I.H. 610 and extend as 6 lane divided street to U.S. 59.	Improve Richmond-Post Oak-I.H. 610 intersection operation and capacity by separating intersections; Provide width needed for I.H.610 improvement; Extend Post Oak Blvd. and increase north-south capacity and continuity.
48 49	**Uptown Parkway between Woodway and Post Oak Blvd.**	Construct as 4 lane divided extension of Post Oak Lane/Post Oak Blvd. with grade separation at Woodway.	Increase north-south capacity and relieve congestion on I.H. 610; Increase north-south arterial continuity; Provide direct connection between Uptown Houston and Northwest Transit Center.

Table III-10, continued:
ARTERIAL STREET MAJOR CAPITAL IMPROVEMENTS
ADDITIONAL PROJECTS (NOT WITHIN CURRENT METRO PROGRAM)

WIDENINGS, EXTENSIONS AND OTHER IMPROVEMENTS

Project #	Street	Improvement	Benefit
2 4	**Chimney Rock between Westheimer and U.S. 59**	Widen to 6 lanes divided.	Provide additional capacity on north-south major city thoroughfare and increase capacity on street with nearest U.S. 59 interchange west of I.H. 610.
8	**Yorktown-Rice connector between Alabama and Fayette**	Construct connector as 4 lane divided street.	Provide convenient continuous connector and extend Rice Blvd's north-south arterial continuity north to San Felipe; Increase north-south capacity within Uptown Houston.
14	**Westpark and eastbound U.S. 59 on-ramp from Chimney Rock**	Elevate westbound Westpark lanes and make direct connection from eastbound frontage road to eastbound Westpark.	Extend continuity of eastbound in U.S. 59 corridor; Increase intersection capacity and avoid queues onto ramp.
50	**Post Oak Park Drive between I.H. 610 and Post Oak Boulevard**	Stripe existing Post Oak Park for four-lane undivided and prohibit parking.	Provide additional capacity.
51	**Post Oak Drive between San Felipe and Westheimer**	Construct 4 lane street.	Extend continuity of only north-south Uptown Houston street east of I.H. 610 to provide circulation without using frontage roads.
65	**Post Oak Boulevard between U.S. 59 and Westpark**	Extend Post Oak Boulevard across U.S. 59 to connect with Westpark or I.H. 610 frontage roads south of U.S. 59.	Extend continuity of Post Oak Boulevard to increase north/south capacity within Uptown Houston. Provide additional penetrations of freeway.

DESCRIPTION OF MAJOR CAPITAL ARTERIAL PROJECTS

The most significant recommended major capital arterial street improvements are described below:

- **One-Way Pairs**

  It is proposed that two one-way pairs be developed in the east-west direction – a Westheimer/Alabama "pair" between the Alabama/Westheimer intersection and the east side of I.H. 610 and an extended Hidalgo and Fairdale one-way pair.

  Westheimer - Alabama. It is recommended that Alabama remain one-way eastbound and be extended under I.H. 610 and tied in with Westheimer on the east side of I.H. 610.

Table III-11:
ARTERIAL SYSTEM MAJOR CAPITAL IMPROVEMENT COST-EFFECTIVENESS PROJECTS APPROVED IN CONCEPT BY METRO

Project Number	Description	Benefit/ Cost	Cost per Veh-Hr Saved	Cost per Daily VMT
	Widenings:			
6	Hidalgo (Rice - Chimney Rock)	16.9	$0.39	$ 164
12	Richmond (Sage - Chimney Rock)	69.9	0.02	23
16a	Sage (Woodway - San Felipe)	39.4	0.09	59
21	Post Oak Lane (Woodway -San Felipe)	55.7	0.07	41
22-24b	San Felipe (Sage - I.H. 610)	24.8	0.05	62
	Subtotal	**35.9**	**$0.05**	**$ 52**
	Extensions (Primarily):			
10	Fairdale (Post Oak - South Rice)	9.7	$0.20	$ 126
11	Fairdale (South Rice - Chimney Rock)	10.8	1.11	89
25-26	McCue (San Felipe - Ambassador)	12.2	1.00	166
27	McCue (Ambassador - I.H. 610)	9.0	0.41	170
28-31	Ambassador Way (Sage - I.H. 610)	13.9	0.94	421
32-35	Guilford (Sage - I.H. 610)	33.7	0.34	206
36-38	Garretson (Post Oak - Guilford)	19.8	0.40	117
42-43	Post Oak Blvd (Hidalgo - U.S. 59)	47.5	0.25	162
48-49	Uptown Parkway (Woodway-Post Oak Boulevard)	45.0	0.57	277
	Subtotal	**29.0**	**$ 0.21**	**$ 205**
	TOTAL	**30.7**	**$0.12**	**$ 120**

Westheimer, which has seven lanes between Post Oak and Alabama, would be converted to five lanes westbound and two lanes eastbound in that section. The two eastbound lanes would provide local access and circulation in the vicinity of the Galleria and adjacent retail and office facilities. Left turns would be limited in this area. Eastbound traffic reaching Post Oak would be required to turn onto Post Oak Boulevard rather than proceed westbound between the I.H. 610 southbound frontage road and Post Oak Boulevard. Eastbound lanes would be added to Westheimer under I.H. 610 to accommodate left turns from the southbound frontage road; Westheimer would remain a two-way street east of I.H. 610 where the eastbound Alabama traffic would be merged in. This change would accomplish two major objectives:

- Reduce the number of signal phases, and therefore increase operational efficiency at the Post Oak Boulevard and I.H. 610 intersections; and

- Provide more overall capacity in the most heavily traveled portion of the Westheimer corridor.

Hidalgo - Fairdale. The widening of Hidalgo between Rice and Chimney Rock and the construction and widening of Fairdale between Post Oak Boulevard and Chimney Rock would permit the development of a one-way pair of streets to supplement the capacity of Westheimer-Alabama and Richmond Avenue. Hidalgo and Fairdale would function as a pair of four lane streets in this section.

- **Grid Streets In Core**

Another major recommendation is the creation of an internal grid system of streets in the most dense part of Uptown Houston. It is proposed that a grid street system be created from existing private and public street segments. These include McCue, Garretson, Ambassador Way and Guilford. McCue would be connected directly to Post Oak Lane to provide access from Woodway. Other streets would extend as shown in Map 6-1. While Uptown Houston's street system need not necessarily be as closely spaced as the downtown grid street system, it must provide convenient access to development in the area.

With a few exceptions, it appears that right-of-way could be assembled for the development of all of these streets as four lane facilities. Dedication of currently private streets and use of alleys, driveways and other currently undeveloped space would provide most of the necessary right-of-way.

- **Increased Street Continuity**

Post Oak Boulevard - Uptown Parkway - Post Oak Lane. Proposed to enhance north-south movement in the Uptown Houston area would be a new roadway between Woodway and Post Oak Boulevard immediately west of I.H. 610, tenatively called Uptown Parkway. While no specific alignment has been developed at this point, it is recommended that this roadway connect Post Oak Boulevard with North Post Oak

Lane at Woodway. Thus, the new roadway would extend from approximately the existing intersection of Post Oak Boulevard and Hollyhurst north to the intersection of Woodway and Post Oak Lane. It is recommended that the Woodway-Uptown Parkway-Post Oak Lane intersection be substantially improved, with through movements being grade separated at Woodway.

The proposed Uptown Parkway would provide direct accessibility between METRO's recently completed Northwest Transit Center and Uptown Houston, and will extend the continuity of Post Oak Boulevard to Hempstead Road. It is anticipated that this arterial connection would be vital during the period of the proposed I.H. 610 reconstruction, when alternate vehicle routes and increased transit service will be relied upon heavily.

To further enhance the continuity and potential for transit utilization of Post Oak Boulevard, it is proposed that the southern terminus of Post Oak Boulevard be connected across U.S. 59 to Westpark and the frontage roads of I.H. 610 south of U.S. 59. This would be achieved by realigning the Hidalgo-Richmond section of Post Oak Boulevard to the west from I.H. 610 (permitting better intersection design following I.H. 610 reconstruction) and extending Post Oak Boulevard south to U.S. 59 and across. This would allow a clear arterial alternate to cross U.S. 59 from the heart of Uptown Houston, creating another freeway penetration and relieving congestion at Westheimer and South Rice freeway interchanges. Completion of both Uptown Parkway and the Post Oak Boulevard to Westpark connection would create an arterial connection between the Northwest Transit Center and heavily patronized bus routes along Bellaire Boulevard, the Bellaire Transit Center and other points south of U.S. 59.

Yorktown --South Rice. North-south continuity is proposed to be enhanced by the connection of Yorktown and South Rice south of Westheimer. This would be accomplished on a interim basis using Fayette and Kleberg as a one-way pair between Yorktown and South Rice (both streets being resurfaced to permit heavier use). As the area between South Rice and Yorktown redevelops, a direct connection could be provided to enhance this continuity. This will help to relieve both Chimney Rock and Post Oak Boulevard of north-south volumes. The specific alignment of the connector should be established as part of the area redevelopment plan.

IV.
FREEWAY IMPROVEMENTS PROGRAM

I.H. 610 and U.S. 59 provide essential freeway service to and through Uptown Houston. Like the Arterial Street Improvements Program, the proposed Freeway Improvements Program has been integrated with the transit, TSM and policy elements of the Comprehensive Transportation Strategy. Recommended freeway improvements were developed to meet the following objectives:

- Increase freeway capacity to accommodate through and subregional traffic;
- Improve regional access to Uptown Houston and the surrounding area.

As in the arterial plan, the freeway plan is composed of low capital cost and TSM improvements as well as major capital improvements. The primary focus was on I.H. 610, since I.H. 610 provides the main access to Uptown Houston. The full range of low cost improvements, including transportation systems management (TSM) actions, was explored first. Subsequently, major capital improvements were addressed.

Four types of improvements to the freeways within Uptown Houston are recommended:

- TSM and low capital cost improvements;
- Improved access through "super frontage road" local lanes;
- Additional capacity through express lanes;
- Improved street continuity through additional crossings of I.H. 610 and U.S. 59.

West Loop Task Force Process

More main lane and ramp capacity will be required to meet needs for regional mobility and access to Uptown Houston. U.S. 59 is currently undergoing major reconstruction, and the I.H. 610 West Loop is planned to be improved beginning in approximately 1995.

HCID#1 has worked closely with SDHPT on planning for the improvement of I.H. 610. The agencies recently completed the West Loop Task Force process which helped to develop alternatives and select a design concept acceptable to the parties involved. The Task Force consisted of property owners, transportation and parkland agency representatives, city planning officials and residential neighborhood association representatives, and was chaired by a State Highway Commissioner. Comprehensive Transportation Strategy recommendations regarding I.H. 610 reflect the status of the West Loop Task Force process as of the report date.

TSM and Low Capital Cost Freeway Improvements

Obtaining additional capacity from existing facilities and minimizing deterioration of corridor mobility during construction can be achieved through low capital cost or TSM actions. These recommendations include some actions intended to avoid congestion and incidents before they happen (e.g., construction activity publicity). The cost of these actions have not been estimated at this time. The following types of TSM programs and low cost improvements are recommended:

- Information systems to alert area employees of anticipated construction activities and existing traffic conditions;
- Ramp widenings, reversals and controls (e.g., part-time closures);
- Intersection improvements which improve freeway operation; and
- Signal timing optimization which improves freeway operation.

Table IV-1 describes recommended TSM and low capital cost actions regarding Uptown freeways.

Major Capital Freeway Improvements

Analyses of Uptown Houston area traffic conditions, both current and anticipated, indicate a need for the major improvements listed in Table IV-2. The recommended major capital improvements to I.H. 610 can be summarized as follows:

- **Improved access through "super frontage road" local lanes –** Construction of a collector/distributor (C/D) roadway is proposed to provide entrances and exits to the West Loop at each major arterial crossing. All local traffic would utilize the collector/ distributor roadway, which would replace the existing frontage roads as well as a portion of the existing I.H. 610 mainlanes. Vehicles would access the collector/ distributor roadway for all Uptown destinations at I.H. 10 for southbound traffic or at U.S. 59 for northbound traffic. The C/D roads would function like"super frontage roads", with at least four lanes in each direction overpassing each arterial street crossing, and at least two lanes in each direction exiting to interchange with the street and reentering. Elevations of overpasses would generally follow the profile of the existing facility. Intersections expand to a full cross section including turn-only lanes at the arterial street level.
- **Additional capacity through express lanes –** SDHPT proposes improving efficiency by separating through traffic from Uptown bound traffic. Construction of express lanes with at least five lanes in each direction between U.S. 290 and U.S. 59 is proposed. Express lanes would be constructed in the center of the existing mainlanes and would follow the elevation profile of the existing facility. The express lanes would not allow access to Uptown Houston. However, the lanes would help to relieve the mainlanes of the traffic desiring to proceed directly from the I.H. 610 North Loop or U.S. 290 to southbound I.H. 610 or southbound U.S. 59 (as well as the converse movements).

- **Additional street crossings of I.H. 610 and U.S. 59 –** Extensions of West Alabama and Hidalgo across I.H. 610 are recommended. The extensions of these two streets across I.H. 610 are needed to relieve Westheimer, Richmond, San Felipe and Post Oak Boulevard intersections with I.H. 610 and to complete the grid street system. In addition, connecting the I.H. 610 frontage roads across U.S. 59 is proposed to improve north/south continuity (refer to Section III: *Arterial Street Improvements Program*).

  Extensions of West Alabama and Hidalgo across I.H. 610 were not addressed by the West Loop Task Force and are not included in SDHPT's current preliminary schematics.

Conclusion

As of the report date, the SDHPT continues to develop and review a schematic design for the upgrading of I.H. 610. It is recognized that these recommendations and SDHPT's schematics are in a preliminary stage of development and are subject to refinement and change prior to acceptance by SDHPT, the Houston community and the Federal Highway Administration.

Table IV-1:
FREEWAY SYSTEM LOW COST/TSM IMPROVEMENTS

Project #	Street or intersection	Improvement	Benefit
	U.S. 59 and I.H. 610 during construction or major maintenance periods	Print flyers announcing upcoming closures, detours, etc. for placement on Uptown Houston (and other area) employee desks by janitorial staffs during evening office cleaning; Also provide ongoing construction and traffic conditions information feed to operators of closed circuit television monitors in office buildings.	Provide motorists with advance information to reroute or retime travel and to reduce congestion and delays through construction and maintenance zones.
	I.H. 610 ramps serving Richmond and Westheimer.	Close I.H. 610 ramps serving Richmond Avenue during periods of peak weaving movements between Westheimer and U.S. 59 ramps; Widen Westheimer ramps to two lanes each.	Reduce weaving-induced congestion and delays on I.H. 610; Increase capacity of Westheimer ramps consistent with demand.
	Post Oak Blvd. ramp to northbound I.H. 610	Add bus bypass ramp at Post Oak Boulevard entrance to northbound I.H. 610.	Improve commuter service to Uptown from Northwest Transit Center, Katy Transitway and U.S. 290 Transitway. Improve local bus service to and from north.
	I.H. 610 between I.H. 10 and U.S. 59.	Resurface or reconstruct shoulders to add one main lane in each direction where not already implemented.	Additional capacity and reduced delays.
39 40	**Westheimer between Post Oak. Blvd. and I.H. 610.**	Interim improvement of Westheimer intersections at I.H. 610 and Post Oak Boulevard.	Reduce congestion at Westheimer and Post Oak intersections; Reduce queuing on I.H. 610 caused by congestion at intersections.
52	**I.H. 610 ramps between Woodway and Post Oak Blvd.**	Reverse both northbound and southbound ramps to relocate weaving to three lanes between ramps.	Reduce freeway weaving and resulting congestion and delays; Increase queuing distances between ramp terminals and adjacent intersections.
66	**Frontage road and arterial street intersections**	Traffic signal system optimization, including both state and city signals, throughout the Uptown Houston area as part of expanded corridor management program.	Increase capacity of arterials and frontage roads.

Table IV-2:
FREEWAY SYSTEM MAJOR CAPITAL IMPROVEMENTS

Project #	Section	Improvement	Benefit
44 45 46 13	**I.H. 610/U.S. 59 Southbound frontage roads from Hidalgo to Chimney Rock**	Extend southbound frontage road.	Replace access to U.S. 59 to be lost due to closing of McCue ramp and increase corridor capacity.
47	**I.H. 610 at Woodway**	Widen Woodway to 8 lanes divided under I.H. 610 and to 6 lanes divided to Uptown Parkway; Ultimately construct 3-level interchange, if possible.	Increase capacity of congested intersection.
53	**I.H. 610 at Post Oak Blvd.**	Provide U-turn lanes.	Reduce traffic through Post Oak Blvd. signals; Increase utilization of available traffic signal green time.
54	**I.H. 610 between Westheimer and San Felipe**	Provide access to the collector/distributor local lanes from Westheimer to northbound I.H. 610 and from southbound I.H. 610 to Westheimer.	Provide direct freeway access to F.M. 1093: Reduce congestion on overloaded ramps and at I.H. 610 and San Felipe intersection.
55 56 58 59	**I.H. 610 existing ramps serving Westheimer and Richmond**	Reverse ramps.	Serve east-west system of Westheimer, Alabama and Hidalgo with freeway access to relieve Westheimer congestion and permit implementation of Westheimer-Alabama pair; Reduce accident potential.
57	**I.H. 610 at Alabama and Hidalgo**	Extend Alabama and Hidalgo to east frontage road; Provide U-turn lane on south side of West Alabama, if possible.	Reduce congestion at Westheimer and Richmond intersection; Permit establishment of Westheimer-Alabama pair; Increase east-west corridor capacity.
60	**I.H. 610 at Richmond**	Provide U-turn lane on north side of Richmond.	Reduce traffic through Richmond signals; Increase utilization of available traffic signal green time.
61	**I.H. 610 at Westpark**	Provide U-turn lane on south side of Westpark (south of rail line).	Reduce traffic through Westpark signals.
62 63 64	**C/D roadway and express lanes I.H. 610 between U.S. 290 and U.S. 59**	Construct Uptown collector/distributer and express roadways between I.H. 10 and U.S. 59. Widen to provide a basic section of 10 express lanes plus 8 grade separated collector/distributor lanes; Provide at least 2 lanes in each direction at arterial intersections for entrance and exit ramps.	Increase local access and continuity of capacity by separating local and through traffic.

Table IV-2, continued:
FREEWAY SYSTEM MAJOR CAPITAL IMPROVEMENTS — CONTINUED

Project #	Section	Improvement	Benefit
65	**I.H. 610 frontage roads between Westpark and north U.S. 59 frontage roads.**	Extend frontage roads north from Westpark to intersection of north U.S. 59 frontage road and Post Oak Boulevard extension.	Provide I.H. 610 frontage road continuity across U.S. 59 and relocate short trips across U.S. 59 from main lanes to the frontage road and Post Oak Blvd.

V-A.
TRANSIT IMPROVEMENTS PROGRAM: LOCAL AND COMMUTER BUS SERVICES

Improved local and commuter bus service is a key transit element of the Uptown Houston Comprehensive Transportation Strategy. Improved transit services will be vital to providing viable alternatives to driving alone, a primary goal of the C.T.S. effort. The Transit Improvements Program for Uptown Houston also includes a high capacity transit corridor element which is addressed in Section V-B.

In cooperation with METRO marketing and planning staff, recommendations regarding near term improvements to METRO local and commuter bus service to Uptown Houston were developed. Worker origins were surveyed and existing service and patronage were evaluated. Unmet demand and opportunities to improve service were identified.

In summary, the following recommendations are made:

- **Uptown Transportation Roundtable** – Establish a roundtable of major employers and property owners within the Uptown area to:
  - Define needed transit services;
  - Market transit services within Uptown at the company level;
  - Consider policy changes to promote transit ridership (e.g., parking pricing);
  - Address other Transportation Demand Management (TDM) issues.

- **Local bus** – Improve local service network by adding north/south crosstown routes to feed east/west trunk routes and by improving access to Bellaire and Northwest Transit Centers:
  - New crosstown routes for collection and distribution at Uptown employee origins;
  - New routes utilizing Briar Forest access across Buffalo Bayou to improve service and efficiency;
  - Modify existing routes to improve collection/distribution within Uptown area and provide express connections to the Northwest and Bellaire Transit Centers.

- **Commuter bus** – Establish direct express service to Uptown from Park & Ride facilities within the following corridors:
  - Southwest Freeway corridor
  - Katy Transitway
  - Northwest Transitway
  - North Transitway
  - Eastex Freeway

- **Carpooling and vanpooling** – Promote car and vanpools on transitway facilities serving highest Uptown employment concentrations:
  - Katy Transitway
  - Northwest Transitway
  - Southwest Transitway (when completed)

- **Facilities** – Plan and develop facilities supporting improved local and commuter bus service to Uptown:
  - Uptown Transportation Center
  - Post Oak Boulevard high capacity transit corridor (collection/distribution)
  - Southwest Freeway Transitway exclusive lane to Uptown
  - Hillcroft Transit Center (via shuttle service connection)
  - Uptown pedestrian improvements

UPTOWN POTENTIAL TRANSIT MARKET

Currently, there are approximately 4,000 bus boardings and 4,000 alightings per weekday within the Uptown area. According to the latest available ride check summaries, riders are currently alighting in the Uptown area from the following directions (see Table V-1):

- **Downtown transfers/central city** 2,048 passengers per day
- **South/southwest** 506 passengers per day
- **West/southwest** 1,088 passengers per day
- **Northwest Transit Center** 220 passengers per day
- **Southeast** 150 passengers per day
- **Commuter Park & Ride** No data available

Transit mode split within Uptown is low, less than 2% compared to 30% downtown. There is significant opportunity for growth within the Uptown market given the following considerations:

- Uptown has over half as many employees as downtown (employment of 78,000 and an additional daily population of 140,000 shoppers and visitors);
- Uptown experiences the same freeway congestion as downtown;
- A higher percentage of Uptown's current riders are transit dependent than downtown (i.e., few Uptown patrons are choice riders);
- Two of METRO's three busiest routes traverse Uptown.

While Uptown represents METRO's second largest potential transit market, disincentives for transit in Uptown have been cited:

- Low parking cost and high availability of parking
- Poor pedestrian environment

UPTOWN EMPLOYEE ORIGINS

As a basis for evaluating existing local and commuter bus services, a survey of Uptown employee origins was conducted in cooperation with METRO marketing staff. The results clearly show the following (see Map V-1):

- Uptown's largest concentration of employees resides in **west and southwest Houston** – the Westpark, Southwest Freeway and Katy corridors;

- Uptown's second largest concentration of employees resides in **northwest Houston**.

While Uptown's largest concentration of employees resides in the west and southwest, over half of current riders come from downtown transfers, the central city and the southeast. This could indicate an insufficient level of direct service to Uptown from west, southwest and northwest Houston.

TABLE V-1: CURRENT UPTOWN BUS PATRONAGE

According to the latest available ride check summaries, riders are currently alighting in the Uptown area from the following routes:

Downtown transfers and central city – 2,048 passengers/day

•	82 Westheimer	963
•	25 Richmond	522
•	63 San Felipe Ltd.	269
•	53 Westheimer Ltd.	125
•	17 Tanglewood	113
•	35 Fairview	30
•	84 Fountainview	26

South/Southwest – 506 passengers/day

•	33 Post Oak Crosstown	506

* Access from Bellaire and Hiram Clarke Transit Centers

West/Southwest – 1,088 passengers/day

•	82 Westheimer		451
•	25 Richmond	305	
•	53 Westheimer Ltd.	263	
•	63 San Felipe Ltd.	52	
•	84 Fountainview	17	

Northwest Transit Center – 220 passengers/day

•	33 Post Oak Crosstown	220

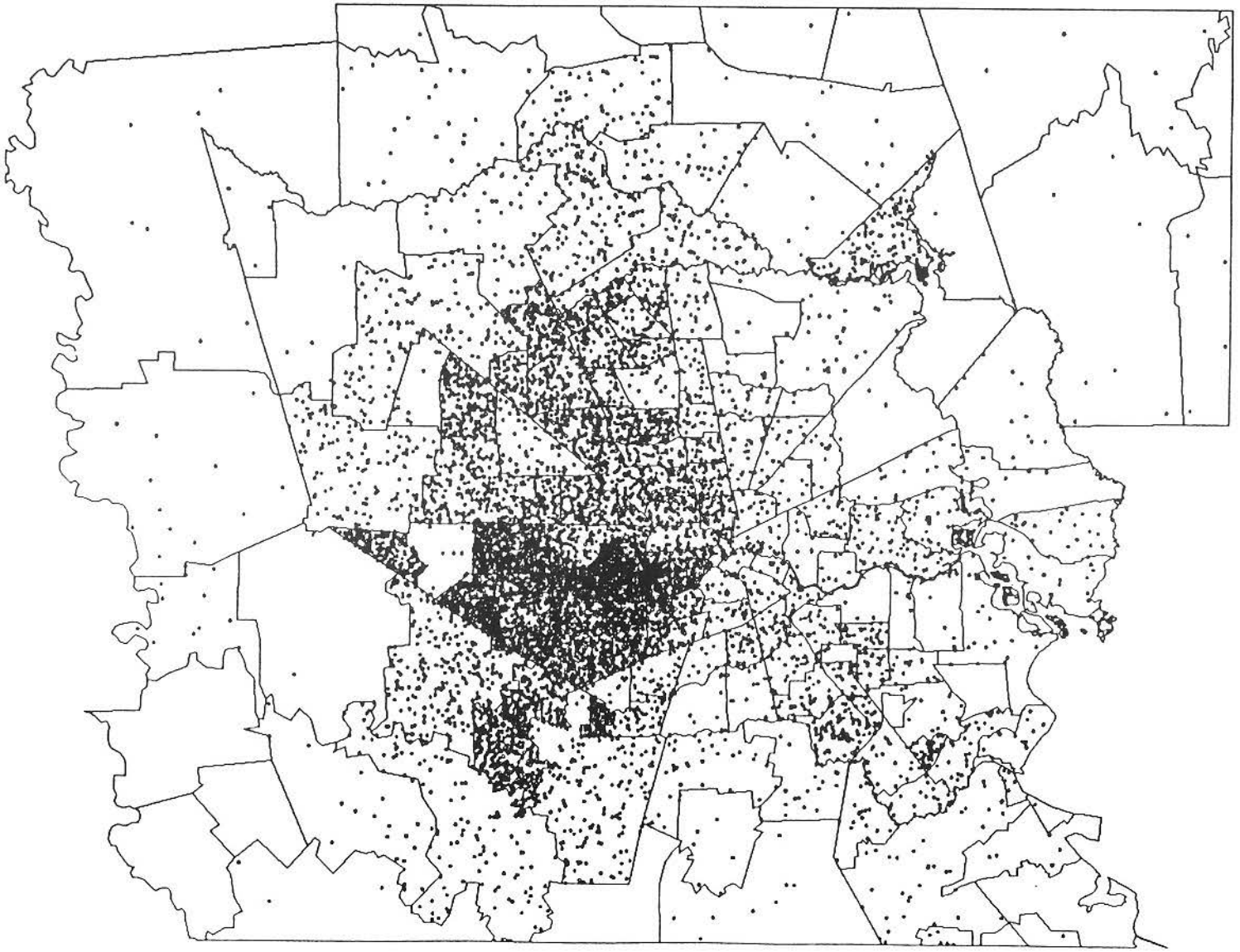
Southeast – 150 passengers/day

•	73 Bellfort	150

Commuter Park & Ride - unknown ridership

- 202 Kuykendahl Park & Ride
- 205 Kingwood Park & Ride
- 95 Uptown Post Oak from Addicks Park & Ride

Map 5
UPTOWN EMPLOYEE ORIGINS BY ZIP CODE



Employees Per Zip Code

1 Dot = 1

EVALUATION OF EXISTING LOCAL AND COMMUTER BUS SERVICES

The greater Uptown area is served by seven local, two limited, two express and two Park & Ride routes. Approximately 400 buses enter the greater Uptown area each weekday – 67 percent local, 30 percent limited or express and 3 percent suburban commuter buses. Table V-2 outlines the level of bus service offered and the most recent METRO ridership data for the Uptown area.

Local bus service

The most highly traveled local routes serving the Uptown area are east/west trunk routes running from downtown to far west Houston along Westheimer and Richmond – the *82 Westheimer*, the *25 Richmond* and the *53 Westheimer Ltd.* Another east/west route, the *63 San Felipe Ltd.*, runs from downtown to Uptown. Peak headways on the Westheimer and Richmond routes are 8 minutes, with average headways of approximately 15 minutes throughout the day. Together, the four east/west routes account for 71% of the daily boardings and alightings in Uptown, with an average of 25 patrons per bus boarding or alighting in Uptown.

While the east/west trunk routes bring a large number of transit patrons to and through the Uptown area, collection and distribution of patrons within Uptown is poor due to the north/south orientation of the area's development along Post Oak Boulevard. The *33 Post Oak Crosstown* does collect and distribute passengers along the Post Oak Boulevard spine of Uptown, as well as provide access to the Bellaire and Northwest Transit Centers. The *33 Post Oak Crosstown* accounts for 17% of patrons boarding or alighting in Uptown, with an average of 40 patrons boarding or alighting in Uptown for each bus that enters the area.

While Uptown patronage on this route is high, the peak headway for the *33 Post Oak Crosstown* is 14 minutes, with average headways of 30 minutes throughout the day. This level of service is probably not sufficient to encourage patrons on east/west routes to transfer to the *33 Post Oak Crosstown* to access employment locations along Post Oak Boulevard. Increasing the frequency of the *33 Post Oak Crosstown* service would not only improve north/south distribution and collection to feed the east/west trunk routes, but would also increase access to the Northwest and Bellaire Transit Centers and consequently to more patrons throughout northwest, west and southwest Houston.

The Uptown employment origin survey shows high concentrations of employees within multi-family housing west and southwest of Uptown Houston along Chimney Rock, Bering, Augusta, Fountainview and Hillcroft/Voss, both north and south of the Southwest Freeway. However, no north/south crosstown routes operate between the *33 Post Oak Crosstown* and the *46 Gessner Crosstown*. Additional north/south crosstown routes would enable Uptown employees to access existing east/west trunk routes for convenient transfers into Uptown Houston.

Commuter bus service

Suburban commuter service to Uptown is token compared to downtown. Six Park & Ride buses serve Uptown during each morning peak (three each from Kingwood and Kuykendahl Park & Rides), compared to over 350 Park & Ride buses traveling downtown in the morning peak. All six buses stop at downtown and Greenway Plaza before continuing to Uptown. Travel times of an hour to an hour and forty minutes do not make this service an attractive alternative to the automobile. Table V-3 outlines existing METRO service from Park & Ride facilities to Uptown and downtown.
The *95 Uptown Post Oak* route operates 7 commuter buses to Uptown in the morning peak. This

TABLE V-2:
METRO BUS SERVICE RIDE CHECK SUMMARY
PASSENGERS BOARDING/ALIGHTING WITHIN UPTOWN HOUSTON

RT #	ROUTE AND DATE OF RIDE CHECK	DIRECTION	PSGRS ON	PSGRS OFF	AVERAGE HEADWAY	SHORTEST HEADWAY	DAILY BUSES
82	WESTHEIMER 1/87	OUTBOUND	525	963	12 MIN	8 MIN	100
		INBOUND	850	451			
		TOTAL	1,375	1,414			
25	RICHMOND 4/89	OUTBOUND	288	522	18 MIN	8 MIN	63
		INBOUND	593	305			
		TOTAL	881	827			
33	POST OAK 3/89	SOUTHBOUND	465	220	28 MIN	14 MIN	35
		NORTHBOUND	195	506			
		TOTAL	660	726			
53	WESTHEIMER L 11/87	OUTBOUND	171	125	15 MIN	10 MIN	59
		INBOUND	139	263			
		TOTAL	310	388			
63	SAN FELIPE L 4/88	OUTBOUND	23	269	50 MIN	30 MIN	15
		INBOUND	276	52			
		TOTAL	299	321			
73	BELLFORT 10/87	EASTBOUND	121	13	35 MIN	24 MIN	23
		WESTBOUND	19	148			
		TOTAL	140	161			
17	TANGLEWOOD 4/89	OUTBOUND	18	113	19 MIN	5 MIN	42
		INBOUND	163	20			
		TOTAL	181	133			
95	UPTOWN P.O. NO DATA —	SOUTHBOUND	0	0	15 MIN	15 MIN	27
		NORTHBOUND	0	0	PEAK ONLY		
		TOTAL	0	0			
96	UPTOWN ST. JMS NO DATA —	SOUTHBOUND	0	0	15 MIN	15 MIN	26
		NORTHBOUND	0	0	PEAK ONLY		
		TOTAL	0	0			
84	FOUNTAINVIEW 4/87	OUTBOUND	9	26	30 MIN	30 MIN	11
		INBOUND	43	17	PEAK ONLY		
		TOTAL	52	43			
35	FAIRVIEW 3/88	OUTBOUND	11	30			
		INBOUND	33	1			
		TOTAL	44	31			
202	KUYKENDAHL METRO EST	OUTBOUND	40	0	30 MIN	20 MIN	6
		INBOUND	0	40	PEAK ONLY		
		TOTAL	40	40			
205	KINGWOOD METRO EST	OUTBOUND	40	0	30 MIN	20 MIN	7
		INBOUND	0	40	PEAK ONLY		
		TOTAL	40	40			
Total Boardings/Alightings			**4,022**	**4,124**			**414**

TABLE V-3: METRO COMMUTER PARK & RIDE SERVICE

ROUTE	FACILITY	Morning Peak Buses Direct to Downtown	Morning Peak Buses to Downtown w/NWTC stop and Transfer to Uptown	Morning Peak Buses w/NWTC stop Continuing to Uptown (Express)	Morning Peak Buses to Downtown Continuing to Greenway and Uptown	Morning Peak Buses Direct to Uptown	Total Downtown	Total w/Access to Uptown
263 Alief P&R	Southwest Freeway	14	0	0	0	0	14	0
262 Westwood P&R	Southwest Freeway	24	0	0	0	0	24	0
227 Katy/Fry P&R	Katy Transitway	2	0	0	0	0	2	0
221 Kingsland P&R	Katy Transitway	13	0	0	0	0	13	0
228 Addicks P&R	Katy Transitway	39	0	0	0	0	39	0
95 Uptown Post Oak	Katy Transitway	0	0	7	0	0	0	7
210 Katy/West Belt P&R	Katy Transitway	9	0	0	0	0	9	0
214 Northwest Station P&R	Northwest Transitway	25	6	0	0	0	31	6
216 West Little York P&R	Northwest Transitway	3	4	0	0	0	7	4
218 Pinemont	Northwest Transitway	4	4	0	0	0	8	4
212 Seton Lake P&R	North Transitway	28	0	0	0	0	28	0
204 Spring P&R	North Transitway	27	0	0	0	0	27	0
202 Kuykendahl P&R	North Transitway	38	0	0	3	0	38	3
201 N. Shepherd P&R	North Transitway	21	0	0	0	0	21	0
205 Kingwood P&R	Eastex Freeway	29	0	0	3	0	29	3
206 Eastex P&R	Eastex Freeway	16	0	0	0	0	16	0
246 Bay Area P&R	Gulf Transitway	25	0	0	0	0	25	0
245 Edgebrook P&R	Gulf Transitway	23	0	0	0	0	23	0
TOTAL MORNING PEAK BUSES		**340**	**14**	**7**	**6**	**0**	**354**	**27**

is a peak-only express route serving the Addicks Park & ride lot along the Katy Transitway. Patrons on this recently established route ride smaller buses, stop at the Northwest Transit Center and pay express fare instead of a Park & Ride fare. The *95 Uptown Post Oak* has been successful and represents a cost-effective means of providing direct or near-direct commuter service to Uptown Houston. Such service could be used to provide commuter services to Uptown from other Park & Ride facilities as an alternative to more costly Park & Ride service.

While no direct commuter buses serve Uptown from the Northwest Transitway, 14 Park & Ride buses in the morning peak bound for downtown from Park & Ride facilities along the Northwest Transitway stop at the Northwest Transit Center. From there, Uptown patrons can access the *95 Uptown Post Oak* or the *96 Uptown St. James*, a peak-only express connector with the Northwest Transit Center, for an express trip to the Uptown area. However, the fact that these patrons pay the full Park & Ride fare for the transfer trip makes this route incomparable in value to direct Park & Ride trips offered to downtown.

Express service to METRO transit centers

METRO's transit center concept addresses the challenge of efficiently serving a large and polycentric region. Uptown transit patrons are currently served by the Bellaire and Northwest Transit Centers. Beginning in 1993, the planned Hillcroft Transit Center will be a major pulse point for transit patrons within southwest Houston. It is anticipated that the vast majority of Uptown's employment base will be served by routes accessing these three transit centers.

To better serve Uptown patrons throughout southwest, west and northwest Houston, routes should be developed which provide express connections between Uptown and the Northwest, Bellaire and Hillcroft Transit Centers, as well as distribution and collection within the Uptown area. Currently, the *95 Uptown Post Oak* and *96 Uptown St. James* provide one-directional, peak-only connections with the Northwest Transit Center. However, all-day two-way service is needed because retail and hotel shifts do not conform to peak hours. The *33 Post Oak Crosstown* provides an all-day two-way connection with both the Bellaire and Northwest Transit Centers, but not on an express basis and on headways averaging 30 minutes.

Need for Uptown Transportation Center

Large volumes of HOV traffic exiting and entering the Southwest Freeway Transitway at South Rice are anticipated. The South Rice underpass at the Southwest Freeway is planned for only 5 lanes, compared to 10 lanes at Hillcroft and 10 at Fountainview. An Uptown Transportation Center with an exclusive lane connecting to the Southwest Transitway is needed to efficiently handle the anticipated volume of Southwest Transitway passengers.

METRO's Phase II construction program includes a transit street along Post Oak Boulevard to distribute and collect passengers using the proposed fixed guideway station located at Richmond and Post Oak Boulevard. Locating the Uptown Transportation Center adjacent to the Uptown fixed guideway station would efficiently serve both guideway and Southwest Transitway passengers. The facility would serve as a multi-modal hub and pulse-point for local, express and commuter transit serving the Uptown area.

A major challenge for Uptown transit service is to provide collection and distribution within Uptown for patrons coming from several transit centers and other routes. Using an Uptown Transportation Center as a central pulse point within the area would make intra-area collection and distribution more

efficient. None of the existing or planned METRO transit centers is close enough to serve as Uptown's main transit hub.

Summary of local and commuter bus network deficiencies

The following summarizes the evaluation of METRO's local and commuter bus service to Uptown Houston:

- **Local -** Local bus network is primarily oriented to downtown. East/west trunk routes passing through Uptown need improved network of north/south crosstown routes for collection and distribution throughout west and southwest Houston.
- **Commuter -** No significant commuter service is provided to Uptown from suburban Park & Ride facilities. Significant unmet demand exists at several Park & Ride facilities.
- **Facilities -** The proposed Hillcroft Transit Center is not close enough to serve as Uptown's main transit hub. An Uptown Transportation Center is needed to efficiently handle Southwest Transitway passengers as well as local and express passengers.

RECOMMENDED BUS SERVICE IMPROVEMENTS

After evaluating Uptown employment origins and existing service and patronage, the recommendations outlined below have been made to serve unmet demand for local and commuter bus service and to address opportunities to improve service.

Uptown *Transportation Roundtable*

METRO and Uptown Houston Association should establish a cooperative process to implement Uptown area transit service improvements. Uptown should form a *Transportation Roundtable* consisting of executives of major employers and property owners within the area. The roundtable would assist METRO and Uptown to:

- Define needed transit services;
- Market transit services within Uptown at the company level;
- Consider policy changes to promote transit ridership (e.g., parking supply and pricing); and
- Address other Transportation Demand Management (TDM) issues.

To spearhead the *Transportation Roundtable* process, it is recommended that METRO and Harris County Improvement District #1 jointly fund a staff position fully dedicated to addressing the issues defined above. The staff person would spend at least three days per week based in the HCID#1 offices, but would maintain a close relationship with key METRO marketing, planning and operations staff.

Recommended Local Bus Service Improvements

The following new or revised routes are recommended to improve local service both at Uptown employee origins and within the Uptown area:

- **North/south crosstown routes for collection and distribution at Uptown employee origins** – Addition of north/south routes in west and southwest Houston to provide collection and distribution to feed into existing east/west trunk routes. The potential Uptown employee market has been calculated and listed for each proposed route based on the employees residing within zip code areas served by the proposed route as determined in the employee origins survey.

  - **Chimney Rock Crosstown (*METRO Project #462*)** – Addition of a proposed north/south route serving southwest and northwest Houston along Chimney Rock and Wirt (see Figure V-1). It is recommended that the route design currently under consideration by METRO be revised to serve the Post Oak Boulevard core of Uptown, Westheimer and San Felipe, as illustrated in Figure V-1. A potential market of 10,700 Uptown employees is served by this proposed route.

  - **Hillcroft Crosstown (*METRO Project #430*)** – Addition of a proposed north/south route serving southwest Houston and the Hillcroft Transit Center (see Figure V-2). It is recommended that in addition to the current METRO proposal, an express connection to Uptown be provided by a shuttle operated on Westpark or the Southwest Freeway Transitway. A potential market of 4,700 Uptown employees is served by this proposed route.

  - **Buffalo Speedway Crosstown (*METRO Project #486*)** – Addition of a proposed crosstown route serving southwest Houston, Buffalo Speedway, Greenway Plaza and Uptown (see Figure V-3). It is recommended that the route design currently under consideration by METRO be revised to collect and distribute patrons within Uptown along Post Oak Boulevard. A potential market of 4,400 Uptown employees is served by this proposed route.

  - **84 Fountainview (*METRO Project #413*)** – Extend existing 84 Fountainview to serve southwest Houston (see Figure V-4). It is recommended that the route design currently under consideration by METRO be revised to serve Uptown along Westheimer and Post Oak Boulevard. A potential market of 4,700 Uptown employees is served by this proposed route (extension only).

  - **73 Bellfort Crosstown** – Extend existing route to serve Augusta and Bering and serve Uptown along Westheimer (see Figure V-5). A potential market of 3,800 Uptown employees is served by this proposed route extension (extension portion only).

FIGURE V-1: CHIMNEY ROCK CROSSTOWN
(METRO Project #462, Proposed)

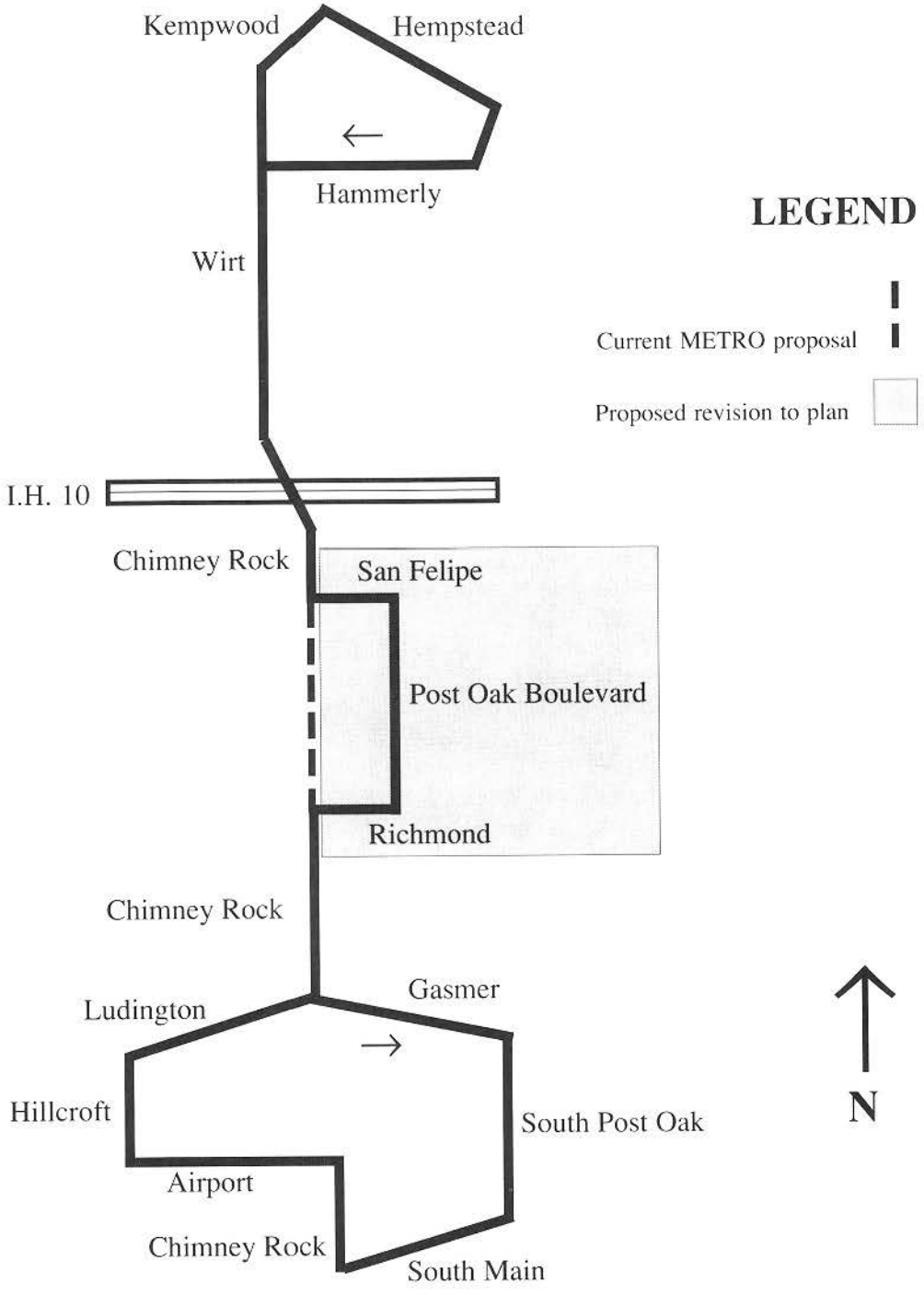


FIGURE V-2: HILLCROFT CROSSTOWN
(METRO Project #430, Proposed)

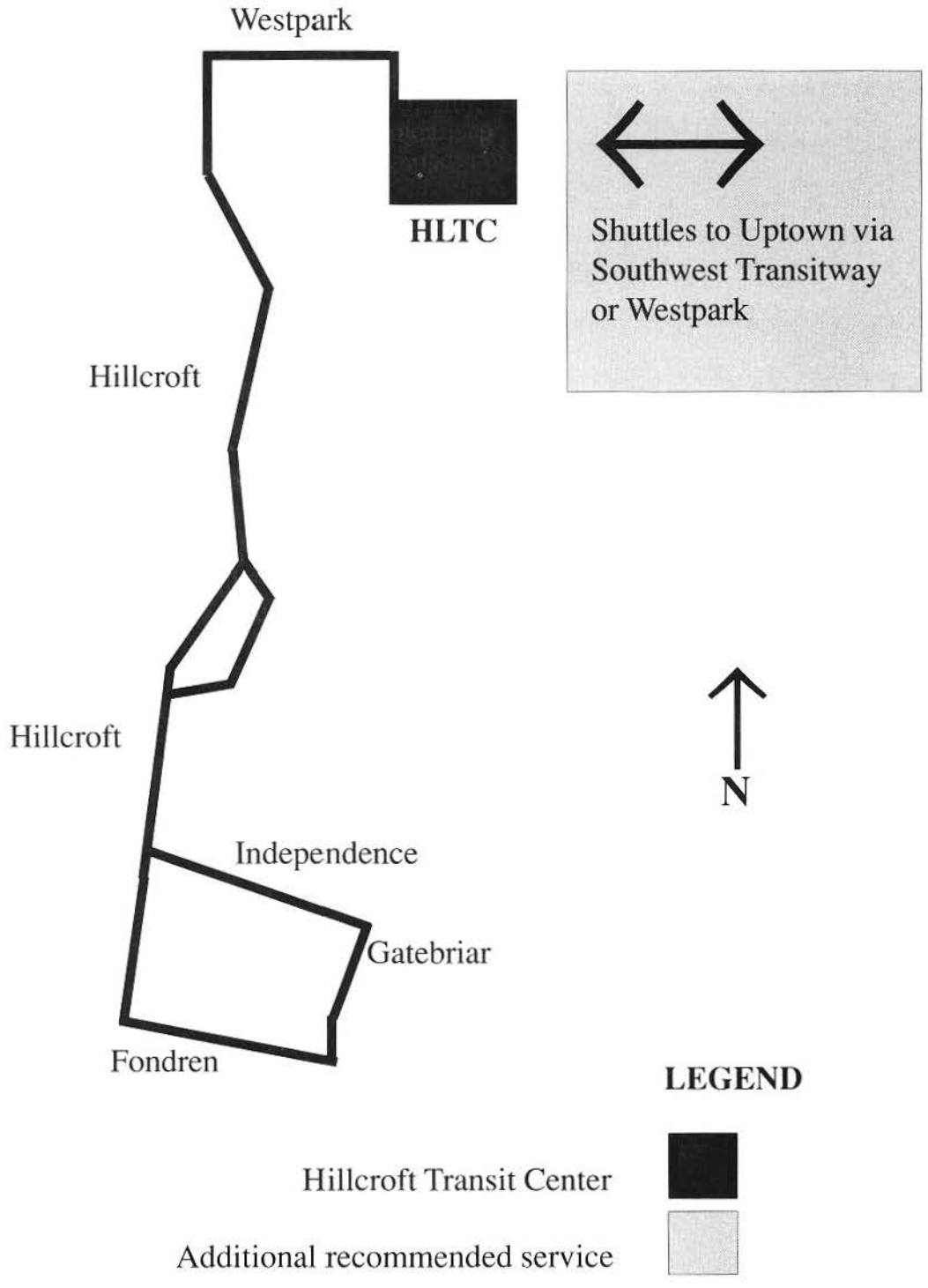


FIGURE V-3: BUFFALO SPEEDWAY CROSSTOWN (METRO Project #486, Proposed)

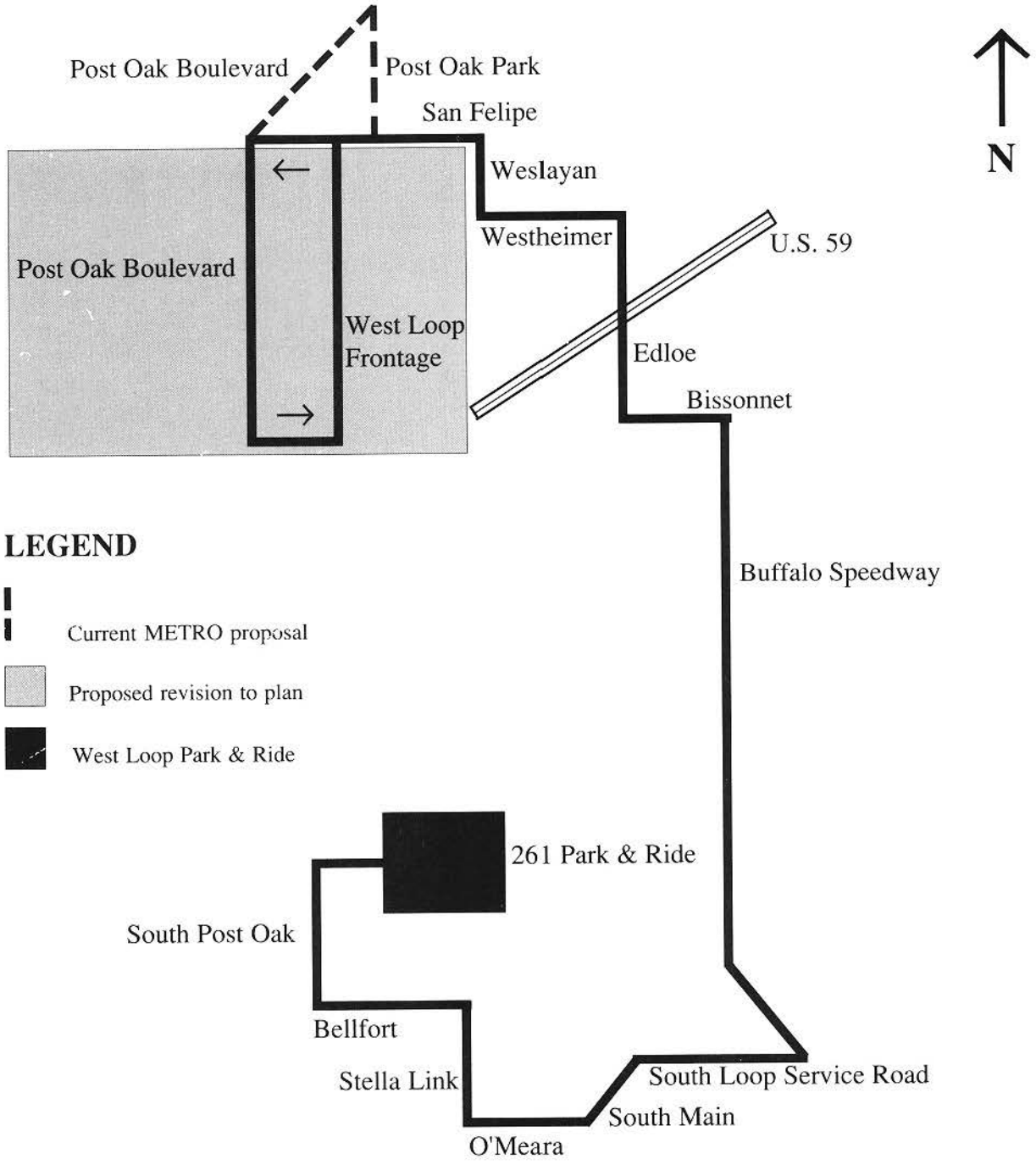


FIGURE V-4: 84 FOUNTAINVIEW EXTENSION
(METRO Project #413, Proposed)

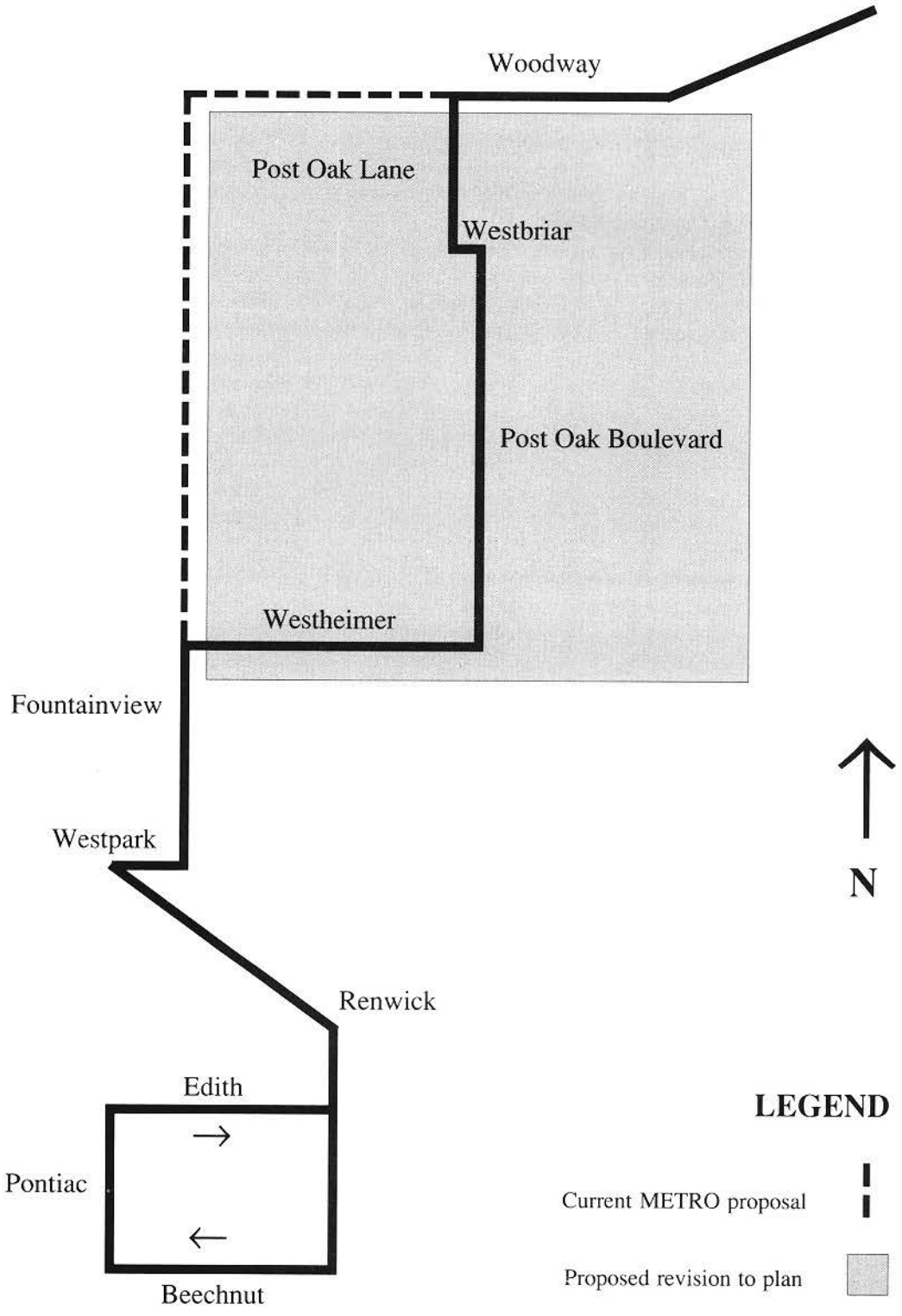
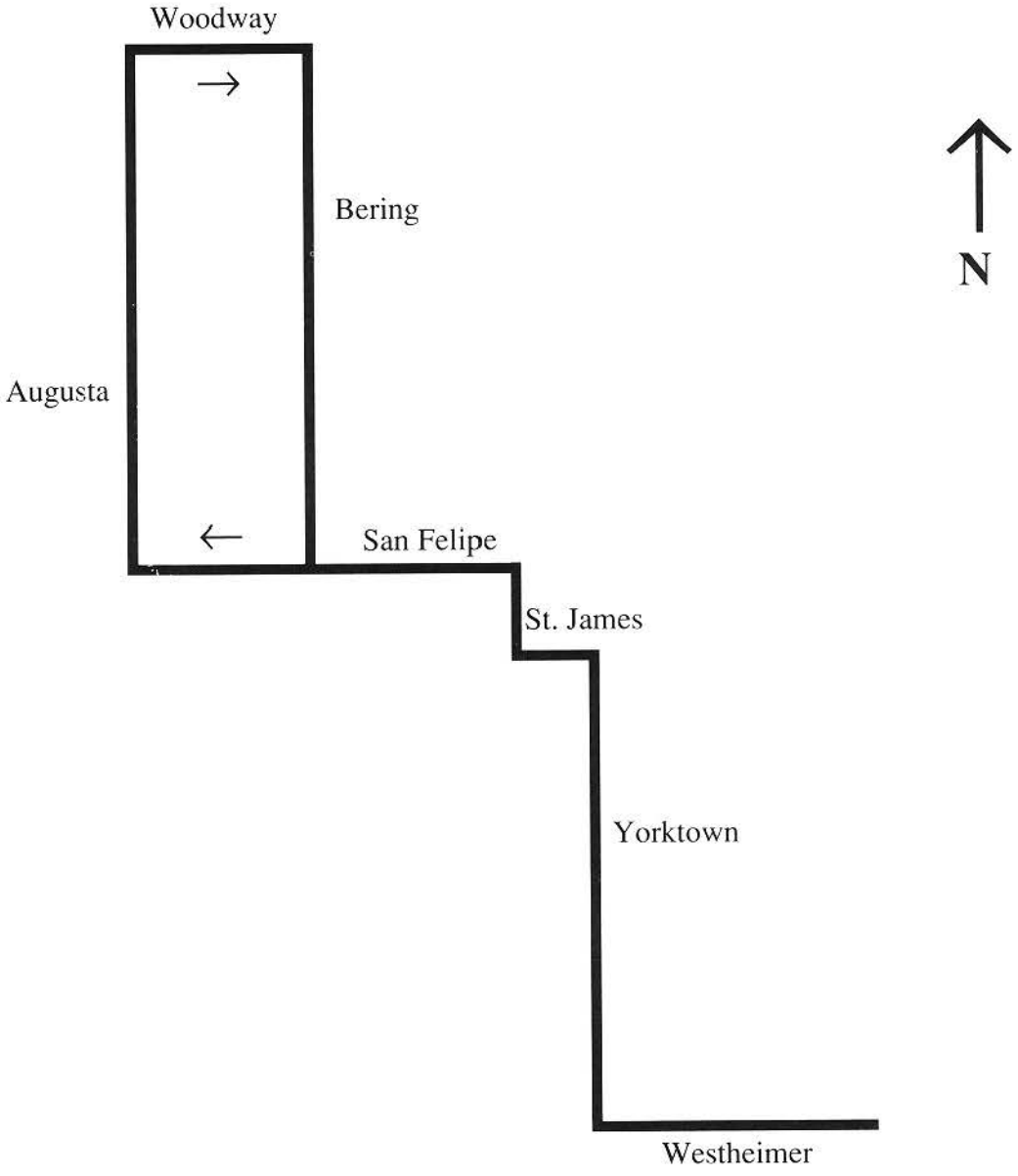


FIGURE V-5: 73 BELLFORT CROSSTOWN EXTENSION (METRO Project Proposed)



- **Collection/distribution within Uptown area and express connections with Northwest and Bellaire Transit Centers** – The following proposed route revisions are among the options for providing collection/distribution from Uptown and express trips to the transit centers:

  - **95 Uptown Post Oak** – Modify route to two-way all-day service with increased frequency during peak periods to provide express travel between Uptown and METRO's Northwest Transit Center with distribution and collection along the Post Oak Boulevard spine.

  - **96 Uptown St. James** – Modify the route to extend the service to the Bellaire Transit Center and eliminate the portion currently traveling east of the West Loop. Run service all day in both directions to provide express travel between Uptown and the Bellaire and Northwest Transit Centers with distribution and collection along Westheimer and San Felipe.

  - **33 Post Oak Crosstown** – Increase frequency of service to provide increased access between Uptown and the Bellaire and Northwest Transit Centers with distribution and collection along the Post Oak Boulevard spine.

- **Briar Forest access across Buffalo Bayou** – Enhanced service from west Houston and the Memorial area into the Uptown area via Briar Forest:

  - **Briar Forest Ltd. route (*METRO Project #444*)** – Addition of a proposed east/west route extending from downtown to past Dairy Ashford via San Felipe and Briar Forest (see Figure V-6). A potential market of 10,500 Uptown employees is served by this proposed route.

- **Traffic operations improvement** – Relocation of Westheimer bus stops between Post Oak Boulevard and the West Loop to west of Post Oak Boulevard to reduce severe traffic congestion.

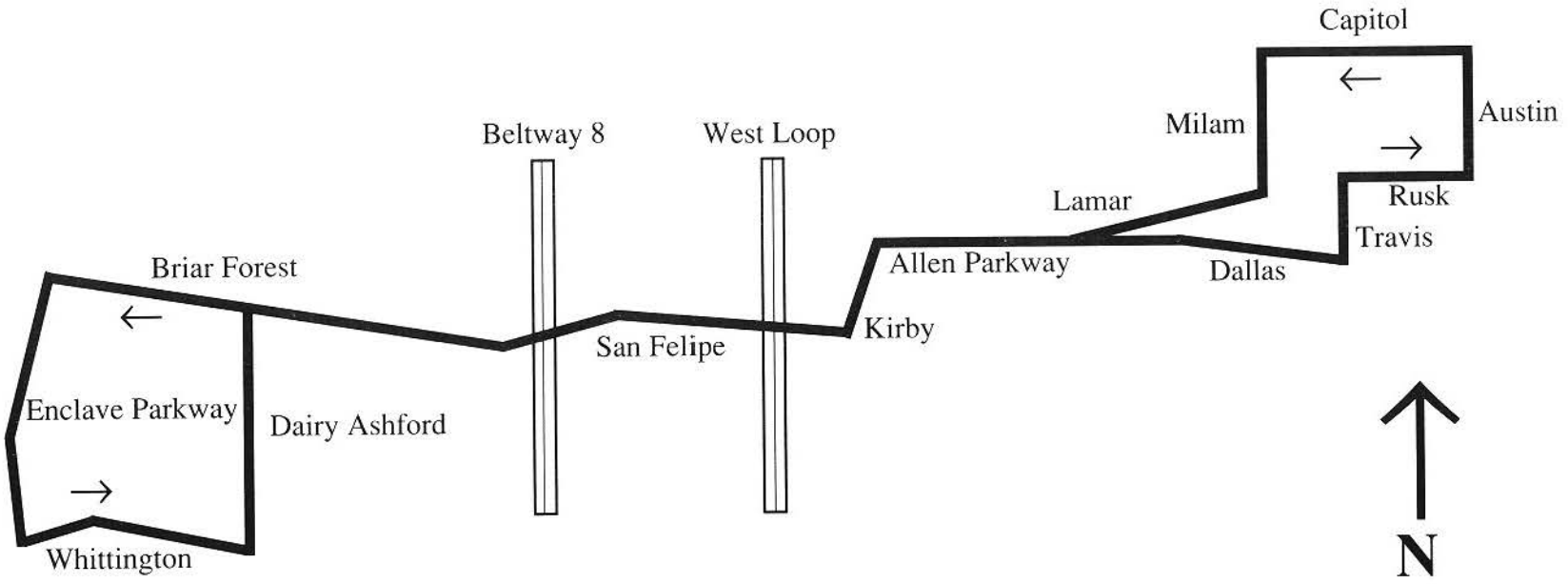
Recommended Commuter Bus Service Improvements

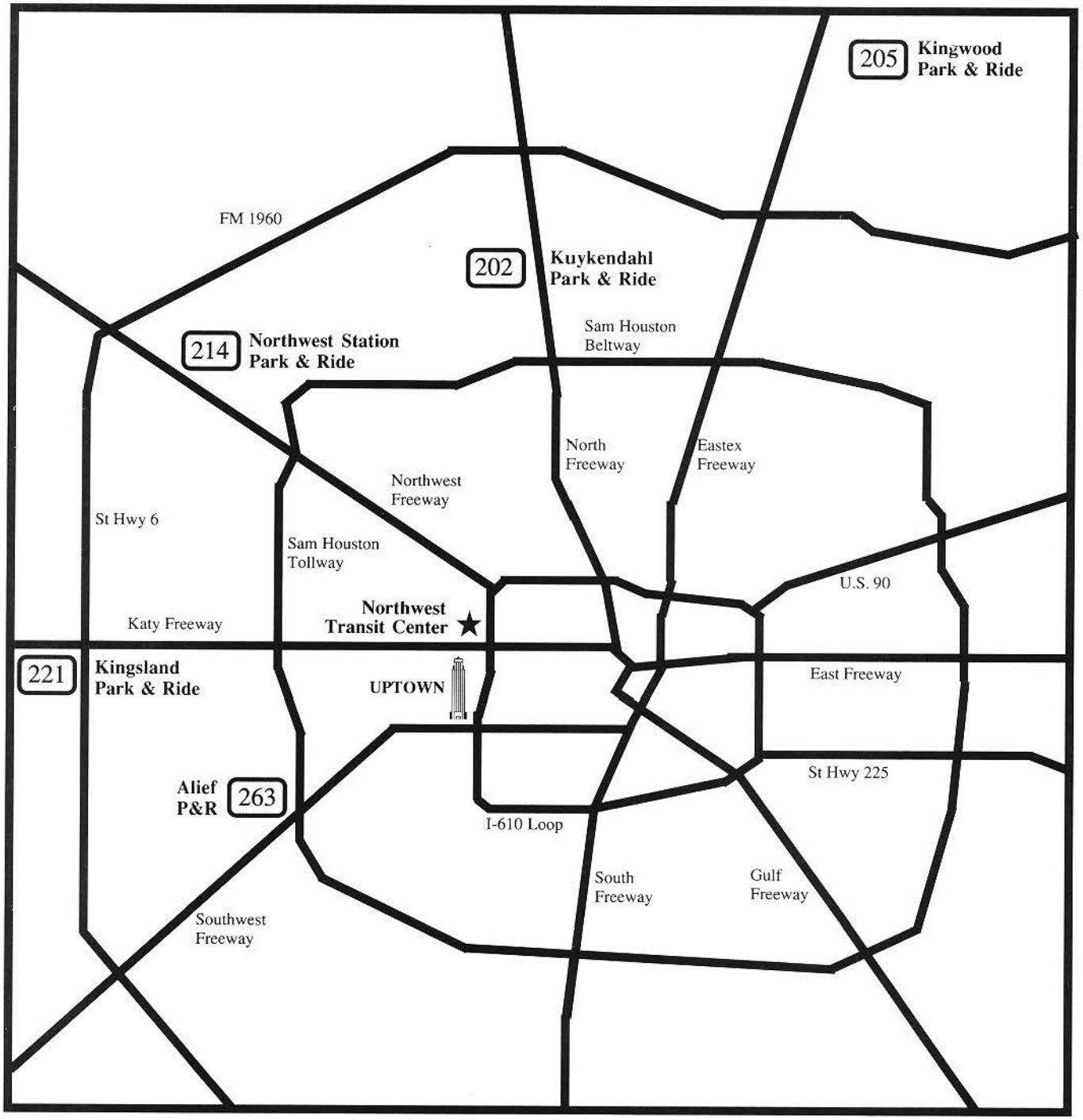
In response to data on employee origins and customer requests to METRO marketing staff, five Park & Ride locations were identified for which there is significant unmet demand for commuter bus service to Uptown (see Map V-2). Building upon the cost-effectiveness and marketing success of the *95 Post Oak* from the Addicks Park & Ride, it is recommended that smaller vehicles be used and express fares be charged for each of the following proposed routes:

- **Southwest Freeway corridor** – Provide direct express service to Uptown from Alief Park & Ride at 15 minute frequency during peak periods. A potential market of 3,900 Uptown employees is served by this proposed route.

- **Katy Transitway** – Provide express service to Uptown from Kingsland Park & Ride at 15 minute frequency during peak periods. Stop at Northwest Transit Center. A

FIGURE V-6: BRIAR FOREST LTD
(METRO Project #444, Proposed)





MAP V-2: PROPOSED UPTOWN COMMUTER EXPRESS ROUTES

- **Alief Park & Ride**
- **Kingsland Park & Ride *via* Northwest Transit Center**
- **Northwest Station Park & Ride *via* Northwest Transit Center**
- **Kuykendahl Park & Ride**
- **Kingwood Park & Ride**

potential market of 2,400 Uptown employees is served by this proposed route.

- **Northwest Transitway** – Provide express service to Uptown from Northwest Station Park & Ride at 15 minute frequency during peak periods. Stop at Northwest Transit Center. A potential market of 4,800 Uptown employees is served by this proposed route.

- **North Transitway** – Provide direct express service at 15 minute frequency to Uptown and continuing to Greenway Plaza from Kuykendahl Park & Ride lot. A potential market of 1,800 Uptown employees is served by this proposed route.

- **Eastex Freeway** – Provide direct express service at 15 minute frequency to Uptown and continuing to Greenway Plaza from Kingwood Park & Ride lot. A potential market of 1,000 Uptown employees is served by this proposed route.

When service is implemented, existing Park & Ride service to Uptown operating from the Kingwood and Kuykendahl Park & Rides via downtown and Greenway Plaza would be eliminated.

Carpooling and Vanpooling promotion

To reduce congestion, it is recommended that carpooling and vanpooling be aggressively promoted on transitway facilities serving the highest Uptown employment concentrations:

- **Katy Transitway** – Promotion of the Mason, Fry and Barker-Cypress free carpool parking lots along the Katy Transitway.

- **Northwest Transitway**

- **Southwest Transitway (when completed)**

Recommended Transit Facilities

To support improved local and commuter bus service to Uptown, planning and development of the following facilities is recommended:

- **Uptown Transportation Center** – A multi-modal transportation center within the Uptown area to serve as a hub and pulse-point for local, express and commuter routes serving the Uptown area. After Uptown Transportation Center is completed, establish collector/distributor service along Post Oak Boulevard Transit Street.

- **Post Oak Boulevard high capacity transit corridor** – Included in METRO's program for completion in conjunction with proposed fixed guideway transit system.

- **Southwest Freeway Transitway exclusive lane to Uptown** – Provide and exclusive reversible lane connecting the Southwest Freeway Transitway flyover at South Rice

and Westpark to the Uptown area and the Uptown Transportation Center. Facility would be open for use by buses, vanpools and carpools.

- **Hillcroft Transit Center shuttle service** – Provide express shuttle service via the Southwest Freeway Transitway or a priority bus lane on Westpark between Uptown and the Hillcroft Transit Center, when completed.

- **Uptown pedestrian improvements** – Improved street crossings, sidewalks and interconnections with private developments throughout the Uptown area. (See Section VI: *Pedestrian Environment Improvements Program*).

V-B.

TRANSIT IMPROVEMENTS PROGRAM: HIGH CAPACITY TRANSIT CORRIDOR

The *Uptown Houston Comprehensive Transportation Strategy* determined that a grade separated high capacity transit corridor aligned north/south along Post Oak Boulevard is the most effective way to serve the long-term transit needs of the Uptown area:

- **North/south corridor** – Development and employment concentrations within the Uptown area are distributed along the north/south axes of Post Oak Boulevard and the West Loop.

- **Grade separated system** – Grade level alternatives for the high capacity transit corridor were considered unacceptable due to adverse traffic impacts given Uptown's congested conditions and lack of street circulation network, problems of accommodating large volumes of left-hand turning movements at intersections and into retail developments and problems of pedestrian safety within the Uptown traffic environment.

- **Post Oak Boulevard alignment** – After studying six alternative north/south alignments within the Uptown area, Post Oak Boulevard was selected because it would serve a high percentage of Uptown employees, shoppers and visitors and would most effectively achieve the goals and objectives identified by the Uptown Houston Association.

  The following employment and development are projected to be located within 1,500 feet of the Post Oak Boulevard alignment in the year 2010:

  - Employment – 98,000 employees (67 percent of total Uptown employment);
  - Retail shoppers – 4.5 million net square feet of retail development (81 percent of total Uptown retail development);
  - Hotels – 4,500 first class hotel rooms.

The north/south Post Oak Boulevard alignment would serve both line haul and collection/distribution functions in support of regional access to Uptown Houston:

- **Express connection providing regional access** – The nearby Katy, Northwest and Southwest Transitways constitute approximately 35 miles of guideway penetrating Uptown's highest employee origin concentrations. The limited roadway facilities connecting these transit facilities to Uptown are so congested that carpool, vanpool and bus access to Uptown Houston are and will continue to be inferior. A high speed grade separated transit corridor is needed to provide express connections to the Northwest Transit Center, as well as to the Southwest Transitway.

- **Collection and distribution** – The Post Oak Boulevard line would provide transit access within walking distance for two thirds of Uptown employees, serving the collection/distribution function for east/west trunk bus routes and potential METRO fixed guideway stations, as well as nearby transit centers and transitways;

- **Intra-area circulation** – By serving the main density corridor of Uptown Houston, the Post Oak Boulevard line would provide an alternative to the private automobile for intra-area trips. Currently, 90% of all trips by Uptown employees are taken in a private vehicle, compared to only 47% downtown. (Rice Center, *Houston's Major Activity Centers and Worker Travel Behavior*, January, 1987.)

Travel Demand

Uptown Houston is a vital growth market from which METRO can attract new riders. Less that 2 percent of Uptown Houston's trips are currently made by transit. This low mode split is at least potentially due to limited service, indirect service and excessive transfers required to reach the area. Previous METRO planning and analysis on the West Loop/Post Oak Boulevard high capacity transit corridor indicated that the line had the greatest growth potential of all the legs of the System Connector in the Alternatives Analysis. It was projected that 7,000 passengers in the a.m. peak hour would travel the four mile long Post Oak leg in 2010 (both directions). It was projected that 5,500 peak hour passengers would travel Post Oak leg in 2000.

NORTH/SOUTH ORIENTATION OF UPTOWN DEVELOPMENT

Employment concentrations within the Uptown area run predominantly north/south along Post Oak Boulevard. Redevelopment of single-story strip shopping centers is projected along the entire length of Post Oak Boulevard, with the greatest density projected to occur between Westheimer and San Felipe. (Refer to Section II-C: "Assessment of Future Growth and Transportation Demand," Figures II-C-1 through II-C-4, which show existing and projected 2010 development and employment at the block level as developed jointly by H-GAC and the *Comprehensive Transportation Strategy* study team.)

The *Uptown Houston Comprehensive Transportation Strategy* identified existing and projected employment which would be located within 1,500 feet of the Post Oak Boulevard alignment compared to various east/west alignments through Uptown Houston. While potential station location and walk distances are analyzed in greater depth later in this section, the corridor of 1,500 feet in either direction of an alternative alignment gives an indication of the maximum number of employees which could be considered within potential walking distance of a proposed transit alignment.

The analysis concluded that the projected 2010 employment located within the north/south Post Oak Boulevard corridor is over twice that located within any east/west corridor evaluated (refer to Table V-B-1).

TABLE V-B-1: NORTH/SOUTH VERSUS EAST/WEST CORRIDORS

	Current Employees within Corridor	Percent of Total Uptown Employees	Projected 2010 Employees within Corridor	Percent of Total Uptown Employees
East/west lines:				
Westheimer	20,000	26%	39,000	27%
West Alabama	20,000	26%	36,000	24%
Hidalgo	19,000	24%	32,000	22%
Fairdale	10,000	13%	22,000	15%
Richmond	5,000	6%	16,000	11%
Post Oak Boulevard	**45,000**	**58%**	**98,000**	**67%**
Total Uptown*	**78,000**	**100%**	**147,000**	**100%**

* Total Uptown employment within boundaries of Woodway on the north, Chimney Rock on the west, the Southwest Freeway on the south and the S&P Railroad on the east.

NEED FOR GRADE SEPARATED TRANSIT CORRIDOR

With regard to vertical alignment, the *Uptown Houston Comprehensive Transportation Strategy* determined that grade level alternatives for the high capacity transit corridor would not provide an acceptable level of service due to adverse traffic impacts given Uptown's congested conditions and lack of street circulation network, problems of accommodating large volumes of left-hand turning movements at intersections and into retail developments and problems of pedestrian safety within the Uptown traffic environment.

Need for high speed and frequency to serve demand

Based on criteria used in the Greater Houston Chamber of Commerce's Regional Mobility Plan, some 89 percent of current peak period vehicle-miles within Uptown Houston are operated in congested conditions. In 2010, even despite implementation of extensive arterial street and freeway improvements programs, a projected 91 percent of peak period vehicle-miles within Uptown Houston will be operated in congested conditions. (Refer to Section VII, pages 181-187, "Assessment of Unmet Transportation Demand and Policy Deficiencies.")

While east/west thoroughfares through Uptown Houston are severely congested handling large volumes of through traffic during the afternoon peak, north/south thoroughfares and freeway frontage roads are even more congested in places due to priority given to east/west green-time over north/south green-time. During the afternoon peak period, queues at several intersections require motorists to wait through up to five signal cycles.

The West Loop corridor is the most congested corridor within Houston, carrying some 250,000 cars per day. There are presently no major arterial alternates to the West Loop for crossing Buffalo Bayou in Uptown Houston. Absence of these arterials necessitates use of the West Loop for local north/ south trips. Because the West Loop is the only north/south roadway crossing Buffalo Bayou within Uptown Houston, bus transit patrons, carpoolers and vanpoolers must cross the West Loop twice to travel from the Post Oak Boulevard core of Uptown Houston to the Northwest Transit Center in the afternoon peak. Freeway crossing opportunities are limited to Memorial, Woodway, Post Oak Boulevard, San Felipe, Westheimer and Richmond, forcing traffic through a limited number of intersections. Travel times from Uptown to the Northwest Transit Center can approach 30 minutes during the afternoon peak for an approximately 3 mile trip.
Because traffic conditions are so congested and roadway alternatives so limited, it was determined that the high capacity transit corridor would need to be grade separated in order to achieve acceptable travel times. Assuming that such a grade separated facility could carry 5,500 passengers in the afternoon peak hour in 2000, this facility would equal the capacity of approximately six arterial roadway lanes.

High volume of turning movements

A primary concern regarding a grade level high capacity transit corridor along Post Oak Boulevard is the hindrance to left turns into retail and office complexes fronting Post Oak Boulevard. While the unique role of Post Oak Boulevard as the primary arterial axis of Uptown makes the roadway the preferred transit alignment, the lack of secondary street network within Uptown Houston requires that large volumes of turning movements be made along the length of Post Oak Boulevard.

A grade level transit corridor along Post Oak Boulevard would eliminate up to 17 left hand turn opportunities. Given the nature of the retail environment, such a reduction and corresponding deterrent to circulation would negatively impact retail sales which anchor the Uptown economic base. Allowing left turns at selected points, appropriately signalized and protected, would permit a portion of the turns currently permitted, but would impact overall traffic operations negatively.

Grade crossings of major arterials

Another primary concern regarding development of a high capacity transit corridor at grade level is the traffic impacts caused by grade crossings at key intersections of Post Oak Boulevard with Westheimer and San Felipe. Lack of secondary street network overloads major intersections in Uptown Houston, forcing a few intersections to accommodate large volumes of through traffic and turning movements.

A grade level system would have to cross Westheimer and San Felipe with parallel auto traffic movements. Any restriction on auto turning movements to facilitate the transit corridor operation will degrade the overall traffic operations within the area. Similarly, transit operations would be degraded if transit vehicles were not given priority at intersections.

When previous transit proposals for Post Oak Boulevard included a grade level light rail transit line, the *Uptown Houston Comprehensive Transportation Strategy* study addressed the impacts of light rail at grade along Post Oak Boulevard on traffic operations within the Uptown area. Work sessions were held involving METRO, the City of Houston, the State Department of Highways and Public Transportation (SDHPT) and Harris County Improvement District #1.

The traffic impact of light rail transit would be similar to what would be expected from other technologies employed in a grade level configuration. **The analysis concluded that without significant constraints to both transit system design and operations, as well as limitations on certain turning movements for automobiles, traffic operations would be impeded to such a degree that the at-grade alignment should be considered undesirable.**

Specifically, the conclusions were the following:

- Numerous median openings along Post Oak Boulevard would be closed as a result of the construction of a high capacity transit corridor. Those which remain would need to be signalized to provide positive control on left turn vehicles from Post Oak Boulevard. Outbound left turns from driveways would also be restricted;

- Any prioritization given to vehicles within the transit corridor would detract from the level of service at the major intersections along Post Oak Boulevard such as Westheimer and San Felipe;

- In order to accomplish any improvement in the level of service at the major intersections on Post Oak Boulevard, the "grid system" of local streets would need to be implemented to provide alternate routes and improve circulation to land uses within the area (refer to Section III: "Arterial Street Improvements Program").

Pedestrian safety

An additional concern regarding development of a high capacity transit corridor at grade level along Post Oak Boulevard is pedestrian safety. Currently, pedestrian facilities in Uptown such as sidewalks, crosswalks and crossing signalization are generally inadequate. Conflicts between pedestrian an vehicular traffic in Uptown are common. In order to operate a grade-level transit system safely, major improvements to the Uptown pedestrian system would be required.

Uptown does not have the system of one-way streets which simplifies crossings within the typical downtown environment. Uptown thoroughfares are among the widest in the region. Crossings of major thoroughfares are poorly marked and difficult to use. Pedestrian crossing signalization for Westheimer at Post Oak Boulevard requires the pedestrian to cross in two signal cycles, waiting between cycles on a four foot concrete median amid 10 lanes of traffic.

Block lengths of Post Oak Boulevard are extremely long (e.g., 3,400 feet between Westheimer and San Felipe) resulting of a high incidence of unsafe pedestrian crossings at unsignalized locations. In most cases, pedestrians cross Uptown thoroughfares at mid-block points. In addition, numerous curb cuts in office complexes and retail establishments interrupt pedestrian traffic along sidewalks.

Grade separated pedestrian connections between the sidewalks and the transit located in the Post Oak Boulevard median and is clearly desirable. Grade level pedestrian crossings would require signalization and appropriate green-time for pedestrian crossings, with consequent detriment to north-south traffic operations along Post Oak Boulevard.

ASSESSMENT OF HORIZONTAL ALIGNMENT OPTIONS

Given the need to provide regional access along a north/south high capacity corridor, the *Comprehensive Transportation Strategy* evaluated the functional and spatial impacts of alternative alignments within Uptown Houston. Six alternatives were studied to establish the north/south horizontal alignment which would most effectively achieve the goals and objectives identified by the Uptown Houston Association. The following alignments were considered (illustrated in Figure V-7):

- **Alignment 1: Garretson extended;**
- **Alignment 2: McCue Street;**
- **Alignment 3: Post Oak Boulevard;**
- **Alignment 4: I.H. 610 Frontage Road;**
- **Alignment 5: "Loop" along Garretson extended, McCue and Sage;**
- **Alignment 6: Sage Road.**

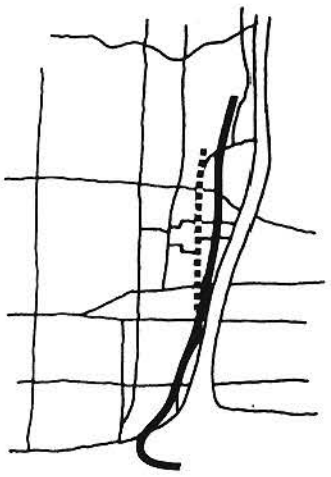
A goals/efficiency matrix was developed to test the extent to which alignment options supported goals and objectives identified by Uptown Houston. The primary goals identified to determine the desired alignment for a transit corridor within the Uptown area can be summarized as follows:

1) Contribute to making Post Oak Boulevard a "Great Street;"
2) Benefit center of existing and projected employment and development;
3) Improve METRO transit regional access and service;
4) Promote quality private sector development through realization of high quality public sector projects;
5) Provide a more convenient and attractive pedestrian system;
6) Improve internal circulation within Uptown Houston;
7) Integrate mass transit to support activities within the Uptown district;
8) Improve vehicular access to the Uptown area; and
9) Reinforce the Uptown district as a "special place."

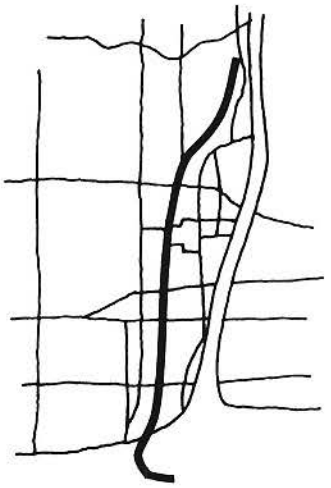
The following alignment alternatives were rejected because they did not sufficiently meet the primary goals and objectives:

- **Alignment 2: McCue -**
  - Insufficient access from West Loop properties;
  - Does not preserve and enhance existing land values;
  - Would not improve informal Uptown circulation;
  - Does not integrate mass transit with retail and support activities;
  - Would not reinforce Uptown as a "special place";
  - Does not enhance Post Oak Boulevard as a great street;
  - Physical limitations (McCue Street terminates at Galleria).

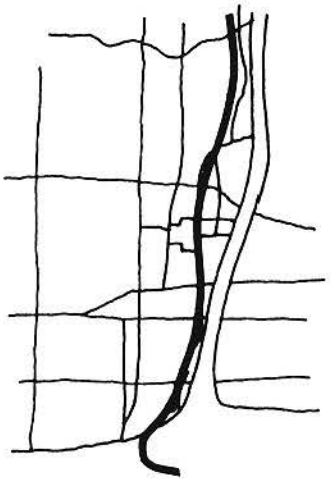
- **Alignment 4: I.H. 610 Frontage -**
  - Insufficient access from properties west of Post Oak Boulevard;
  - Would not improve METRO bus transit access and service;



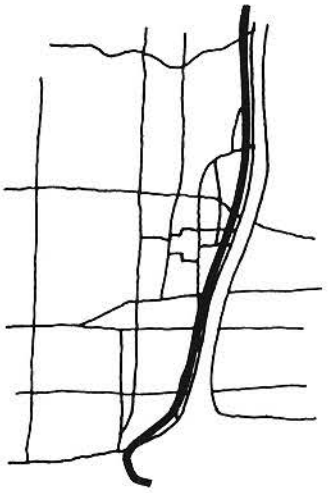
Alignment 1
Garretson



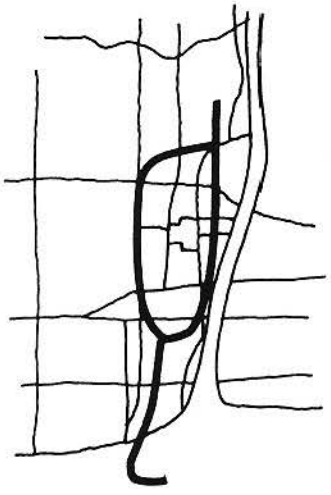
Alignment 2
McCue St.



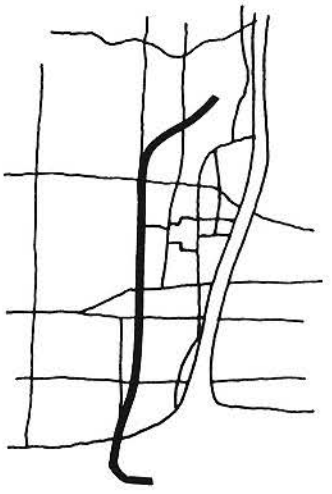
Alignment 3
Post Oak Blvd.



Alignment 4
IH 610



Alignment 5
Loop



Alignment 6
Sage Rd.

Horizontal Alignment Alternatives

Figure V-7

- Would not encourage the creation of a more attractive and convenient pedestrian system;
- Would not improve internal circulation within the Uptown district;
- Does not enhance Post Oak Boulevard as a great street; and
- Physical limitations (Proposed I.H. 610 express lanes utilize all available right-of-way).

- **Alignment 6: Sage -**

  - Insufficient access to West Loop and Post Oak Boulevard properties;
  - Long walk distance from density center of existing and planned employment within Uptown Houston;
  - Would not encourage the creation of a more convenient and attractive pedestrian system;
  - Would not integrate mass transit to support activities within the Uptown district;
  - Would not reinforce Uptown as a "special place"; and
  - Does not enhance Post Oak Boulevard as a great street.

The goals/efficiency matrix process identified three alignments for further consideration which would support HCID#1 goals:

- **Alignment 1: Garretson;**
- **Alignment 3: Post Oak Boulevard; and**
- **Alignment 5: "Loop".**

After further consideration, **Alignment 5: "Loop"** was also rejected. While the loop alignment satisfied the criterion of accessibility from existing and future development, the alternative was rejected on grounds of cost-effectiveness because it would require the near doubling of right-of-way requirements, stations and facilities within the Uptown area without a corresponding increase in service.

Alignment 1: Garretson was also ultimately rejected because of several potential problems not found in **Alignment 3: Post Oak Boulevard**:

- **Lower catchment of potential ridership** – Garretson alignment not located within employment center of projected development;

- **Problems with access through private property** – No public east/west streets currently exist along Garretson alignment between Westheimer and San Felipe. This would require transit patrons to traverse private property, potentially resulting in use conflicts; and

- **Need for separate circulator bus** – It was determined that the Garretson alignment would require a bus link between the transit corridor stations on Post Oak Boulevard in order to serve the greatest number of potential riders within 1,000 feet of the station portals. It was proposed that under the Garretson alternative, a separate circulator bus system on Post Oak Boulevard would connect key stations at Westheimer and Four Oaks Place to provide a collection and distribution function.

Alignment 3: Post Oak Boulevard was determined to be the preferred alignment because the alternative was most consistent with the established goals:

- Benefits existing center of employment and development density within Uptown Houston;
- Improves METRO transit access and service to the Uptown district;
- Offers potential for realization of a high quality public sector project within the spine corridor of the area;
- Complements pedestrian system;
- Improves circulation within Uptown district;
- Integrates mass transit with support activities;
- Reinforces Uptown as a special place; and
- Contributes to making Post Oak Boulevard a great street.

ANALYSIS OF STATION LOCATIONS AND POTENTIAL RIDERSHIP CATCHMENT OF POST OAK BOULEVARD ALIGNMENT

A study was undertaken to test the effect of alignment, station location and the number of stations on potential ridership catchment of the recommended **Post Oak Boulevard** alignment, as well as to achieve the goals to improve internal movement within Uptown and to provide service for non-commuter as well as commuter traffic. The study developed:

- Projections of future commercial and retail employment in existing and planned buildings within walking distance of transit;
- Projections of future retail development (existing and planned buildings) within walking distance of transit;
- Spatial models of the area served, based on walking distances from proposed station portals for alternative transit corridor alignments and station locations.

The following criteria were applied to analyze station location options and are described briefly in the following sections:

- Walking distance;
- Type and intensity of nearby activities;
- Safety issues;
- Transit operating speeds;
- Opportunities for bus rider interchanges; and
- Primary functions of transit (e.g., commuter, retail, circulation).

Walking Distance

The effective catchment of a high capacity transit corridor station is strongly influenced by the distance that potential riders are prepared to walk. This distance varies with the purpose of the trip. In Manhattan, for example, where a minority use private automobiles for local travel, the threshold walking distance is approximately 1,000 feet for work trips. In Portland, Oregon, threshold distances are 400 feet to 800 feet for work trips and 200 feet to 800 feet for shopping trips, depending on weather conditions and the nature of the shopping district. Within the Uptown area, most local trips are currently made by private car. Thus, the maximum tolerable walking distance would be shorter.

Shopping mall designers often use 300 feet to 350 feet as the greatest walking distance that patrons will tolerate between parking spaces and the mall entrance. This is probably an appropriate base value for off-peak transit catchment, notwithstanding the variability of the Houston climate. However, as transit use increases, the walking distance threshold may also increase. Therefore, a maximum 1,000 feet walk for commuters and 400 feet for shoppers was suggested for use in evaluating te Post Oak Boulevard alignment. This would suggest station spacing of approximately 1,500 feet. A system used only by commuters could tolerate a wider spacing than this, provided that a convenient and efficient pedestrian network existed.

Type and Intensity of Nearby Activities

Land use directly influences the numbers of potential transit patrons whose origin or destination lies within walking distance of a station. Potential ridership can therefore be maximized by locating stations close to established and planned population concentrations.

A further consideration is the type of transit patronage sought. Offices yield primarily peak-hour (commuter) ridership. Stores yield off-peak riders who would use a readily accessible transit system for short journeys within the Uptown district if it were at least as convenient and inexpensive as using their private cars.

The mix of office and retail uses existing and planned along Post Oak Boulevard provides an unusual opportunity to capture both commuter and off-peak ridership. Proximity to major pedestrian generators such as the Galleria, Pavilion, Transco Tower and Four Oaks Place will clearly maximize this capture rate.

Safety Issues

Climatic extremes have led Houstonians to assume that controlled environments are required for most urban activities. In downtown Houston, a system of tunnels has been developed between most of the principal buildings as an alternative to street sidewalks for pedestrians. Three important drawbacks have been observed to this solution:

- High capital cost of construction;
- Loss of storefront activities at street level; and
- Need for security forces to reassure tunnel users of their safety.

A consequence of the safety issue is that tunnels tend to be closed at the end of normal office hours. Weather-protected routes should, however, be widely visible at all times to deter crime and the perception of threatened safety.

Stations and their approaches should be as visible to passers-by as practicable, yet should provide at least some weather protection for waiting patrons. Locations close to primary building entrances would minimize exposure to the weather, and therefore minimize the need for special enclosures, with their concomitant safety risks.

Transit Operating Speeds

Stations should be spaced sufficiently far apart to permit operating speeds which compete effectively with automobile speeds. Optimum spacing of stations would balance this consideration with others such as maximum tolerable walking distance.

Opportunities for Bus Rider Interchanges

Currently, fewer than 2% of commuters to the Uptown district use transit. As development intensifies and transit service improves, this proportion is expected to increase dramatically. Proximity of stations to bus transfer points is clearly desirable.

Primary Functions of Transit

The mix and intensity of land uses within the Uptown district is capable of providing both commuter and off-peak ridership. Area goals relating to promotion of intensified activity would clearly be best served by a system capable of serving both functions effectively. The critical difference in system design to serve these two functions is that it will only perform as a people-mover for substantial numbers of off-peak trips if transit vehicles are convenient and comfortable to use for short trips between local origins and destinations. Shoppers are generally less tolerant of long walking distances than commuters where transit access is concerned. Closely spaced stations and vehicles with short headways would be most effective in capturing off-peak ridership, and would enhance transit as an attractive option for commuters.

Headways will vary over time with service demands. The spacing of stations will be fixed. Selection of a spacing which is consistent with tolerable walking distances for off-peak users would safeguard the opportunity to maximize ridership.

POTENTIAL RIDERSHIP CATCHMENT ANALYSIS

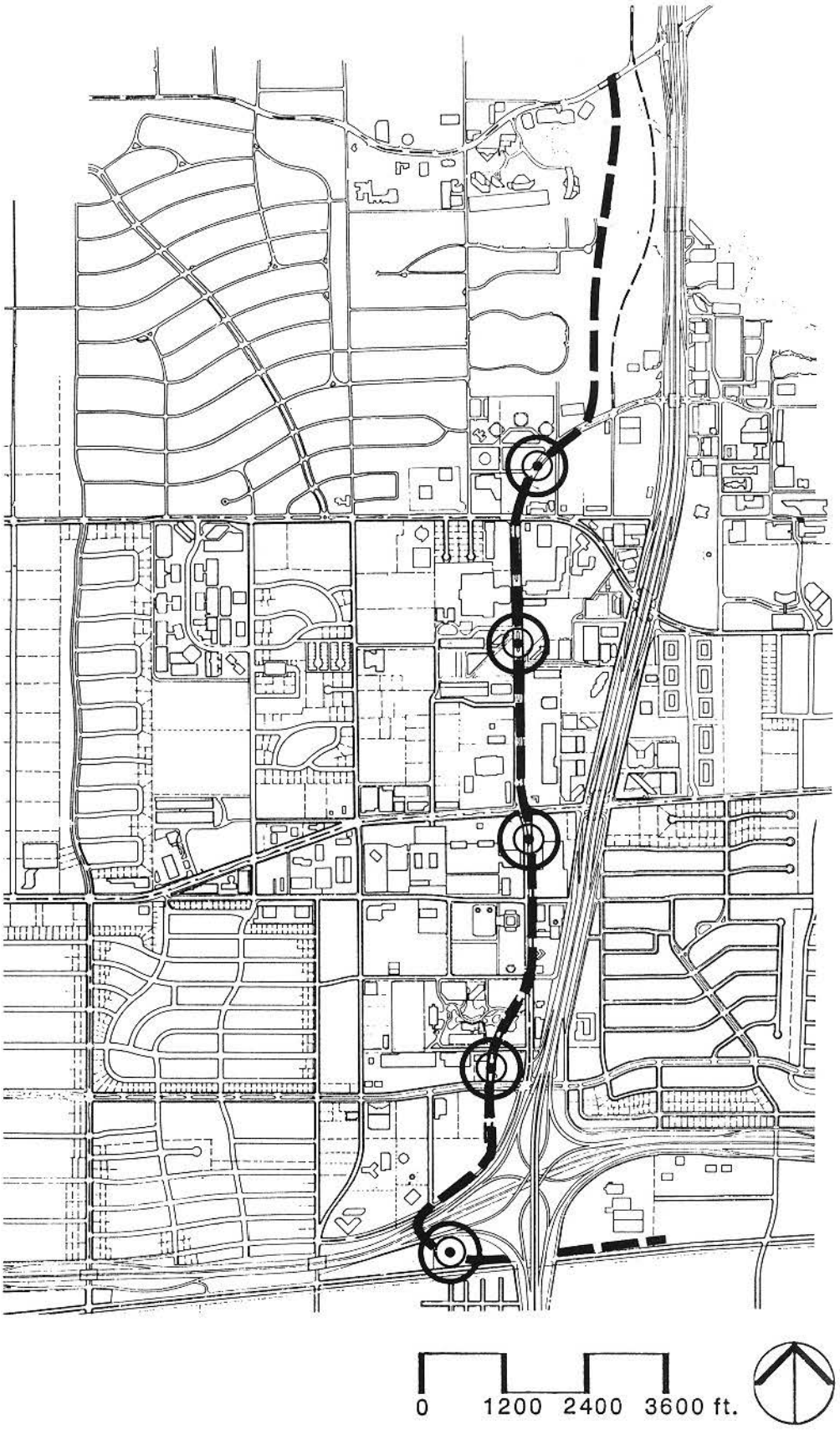
The *Uptown Houston Comprehensive Transportation Strategy* study utilized the criteria described above, along with HCID#1 and H-GAC projections of office and retail development and employment for the year 2010 at the sub-block level, to identify optimal station locations and determine potential catchment of commuter riders and off-peak (primarily shopper) riders for each station. It is projected that the current population of 78,000 employees within Uptown Houston will increase to 147,000 by 2010 (refer to Section II-C: "Assessment of Future Growth and Transportation Demand"). By 2010, retail floor area within Uptown is projected to increase to 5,550,000 square feet, from the current 3,800,000 square feet.

The study identified existing and projected employment as well as retail development which would be within walking distance of station access points under alternative alignments. Projections of potential catchment were mapped using both four and five stations along Post Oak Boulevard between Richmond and Garretson Street (see Figures V-8 and V-9). It should be noted that stations north of Garretson Street (e.g., Riverway) are not included and that potential potential ridership catchment from developments along Woodway and the West Loop is not included.

Total catchment potential assumed a 1,000 foot maximum walk from station exit to building entry for commuters, and 400 foot maximum walk from station exit to store or mall entry for shoppers. This analysis of specific developments and station locations provides a refinement of the 1,500 feet corridor analysis presented earlier which projected that 98,000 employees would be located within the Post Oak Boulevard corridor in 2010.

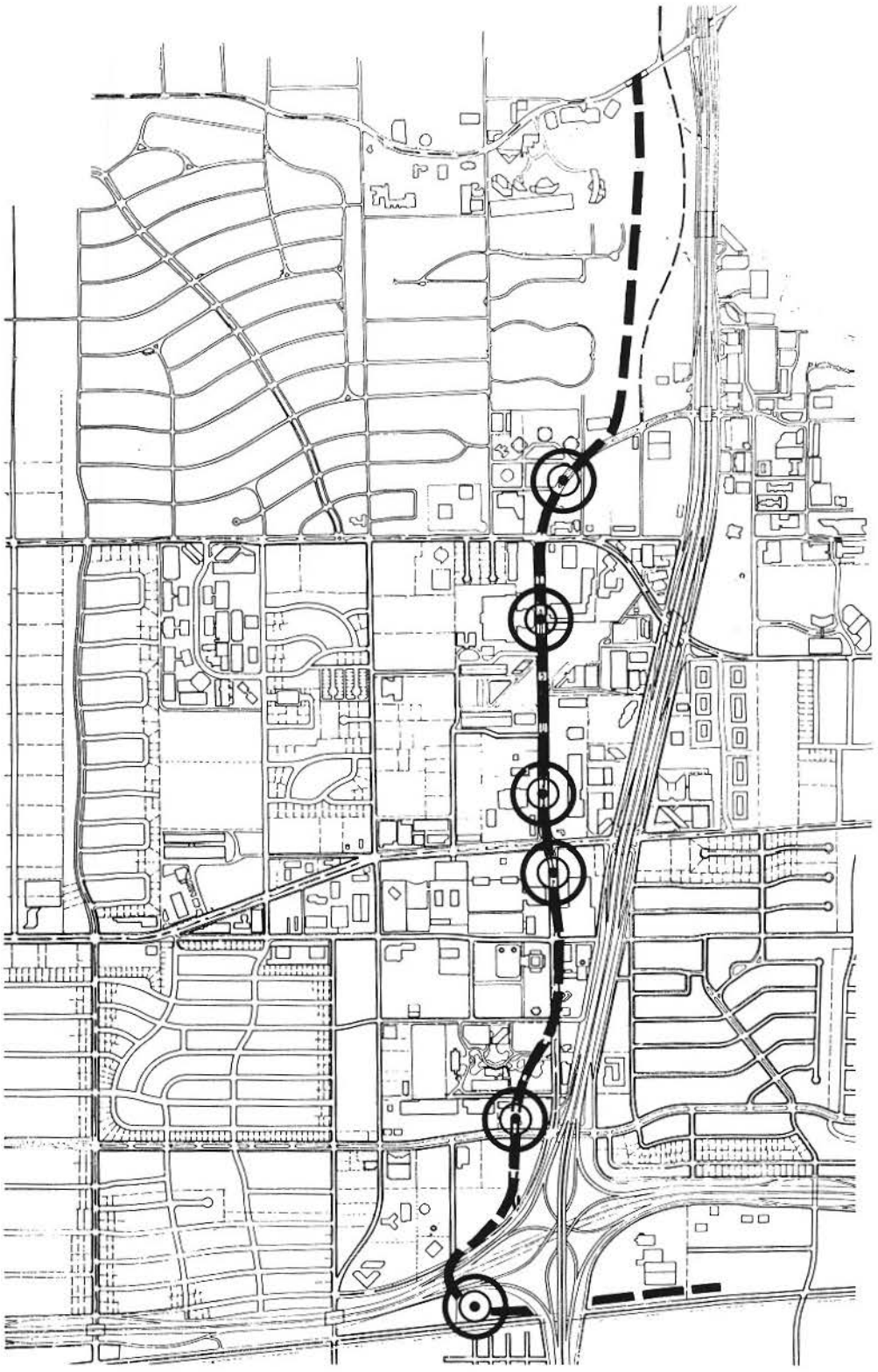
The study found that the four-station option achieved a total catchment of 37,000 employees and 3,065,000 square feet of retail space. The five-station option identified a total catchment of 53,000 employees and 4,493,000 square feet of retail space. Thus the additional station would support both commuter and shopper ridership, increasing commuter catchment by 43% and shopper catchment by 47%. Addition of a sixth station would increase catchments only marginally and is not expected to be a cost-effective option.

The finding that five stations along the Post Oak Boulevard alignment between Garretson and Richmond would potentially capture 53,000 Uptown commuters (59% of total Uptown area employment) and 81% of all shoppers confirms that this alignment is the most effective configuration in terms of ridership attraction for the high capacity transit corridor within Uptown Houston.



Proposed High Capacity Transit Corridor
4 Station Alternative

Figure V-8



Proposed High Capacity Transit Corridor
5 Station Alternative

Figure V-9

VI.
PEDESTRIAN ENVIRONMENT IMPROVEMENTS PROGRAM

SUMMARY

The Pedestrian Environmental Improvements Program has been developed in coordination with the arterial street, freeway and transit improvement programs within the Comprehensive Transportation Strategy. Pedestrian mobility will be crucial to increasing transit utilization in Uptown Houston, thereby reducing congestion of streets and freeways. An effective pedestrian system in Uptown Houston would further allow the choice of walking for intra-area trips, again reducing arterial street congestion. These effects have particular significance in the Uptown area since the current pedestrian system is so deficient that transit accessibility is seriously impeded and far fewer intra-area trips are made by walking than in the typical "downtown" environment (refer to Section II-B: *Assessment of Existing Transportation Deficiencies*). This section describes the following process for development and implementation of the Pedestrian Environmental Improvements Program:

- **Goals for Pedestrian Mobility**
- **Pedestrian Environment Design Concept:**
  - Area-wide Pedestrian Network
  - Post Oak Boulevard Pedestrian Environment
  - Arterial Street Pedestrian Environment
- **Implementation:**
  - Post Oak Boulevard
  - Arterial Streets

GOALS FOR PEDESTRIAN MOBILITY

The conceptual genesis for the Pedestrian Environmental Improvements Program was the development of goals described in Section IV: *Mobility Goals and Objectives*. The key goals regarding the pedestrian system and overall environmental quality within Uptown Houston were the following:

- **Fully integrate short and long term transit improvements with the pedestrian environment and individual developments;**
- **Avoid barriers to pedestrian travel and alleviate existing barriers where possible;**
- **Improve pedestrian crossings of major arterials;**
- **Enhance the pedestrian environment within private developments;**
- **Provide convenient and attractive linkages between developments as well as to and from transit services and facilities; and**
- **Enhance the pedestrian environment through information systems, facilities, safety features and amenities.**

PEDESTRIAN ENVIRONMENT DESIGN CONCEPT

As a foundation for recommending pedestrian mobility improvements within Uptown Houston, a Pedestrian Environment Design Concept was developed for the Uptown study area. Because the pedestrian system exists largely in the public space immediately adjoining the area's street, freeway and transit facilities, there is no clear division between pedestrian mobility improvements and amenities which generally enhance environmental quality. However, it is clear that specific amenities in addition to sidewalks are required to support pedestrian mobility, including pedestrian lighting, shelter, furniture, signage and, especially in Houston, shade.

The Pedestrian Environment Design Concept which follows consists of the following elements:

- **Area-wide Pedestrian Network** – Definition of the function and hierarchy of public and private pedestrian ways throughout Uptown Houston.
- **Post Oak Boulevard Pedestrian Environment** – A detailed treatment of the urban design of Post Oak Boulevard, addressing the pedestrian, transit, and automobile environment.
- **Arterial Streets Pedestrian Environment** – General standards for pedestrian facilities for roadways throughout Uptown Houston, consistent with the design concept detailed for Post Oak Boulevard and the overall pedestrian network hierarchy.

Area-wide Pedestrian Network

In designing a pedestrian system for Uptown Houston, it is critical to recognize environmental concerns relating to the climate of Houston:

- **Temperature and rainfall** – Houston's climate and sub-tropical rainfall underscore the need for covered walkways during much of the year;

- **Competition between indoor and outdoor environments** – The temperature and comfort level differentiation between internal and external environments is a significant concern in designing an attractive pedestrian environment. The Galleria, Houston's largest climate-controlled mall, is a significant "Main Street" in terms of pedestrian movement and is located at the heart of Uptown Houston. Any new commercial and retail development on Post Oak Boulevard very likely would provide a climate controlled pedestrian environment at street level;

- **Competition between pedestrian and vehicular travel** – The private vehicle is currently the main transportation mode for both external access to and egress from the Uptown area. However, short pedestrian trips, particularly from office buildings to nearby restaurants or between adjacent office and retail blocks are frequently made in Uptown Houston. As the METRO Phase II Mobility Construction Program is implemented, greatly enhancing transit service to the Uptown district, there will be greater pedestrian activity in the area and a greater need for adequate amenities. Intensification of development in Uptown Houston will also lead to increased pedestrian activity.

The pedestrian network proposed for Uptown Houston focuses on Post Oak Boulevard as the main activity spine and the preferred alignment of a future high capacity transit corridor. The network also relies on the finer mesh of the street grid created by the proposed arterial streets improvement program to provide:

- Shorter blocks;
- Greater pedestrian access to buildings; and
- More intersections where pedestrian needs are accommodated.

This closer weave of connecting sidewalks, adequately designed and landscaped to give shade and shelter, will encourage more pedestrian movement in the future. The use of the ground floors of adjacent buildings for retail or recreational use will encourage pedestrians to use the sidewalk connections between them. All retail businesses at the street level will benefit from the increased trade opportunities which pedestrian activity supports.

The proposed pedestrian network has a two level hierarchy:

- **Formal or street-based pedestrian system —** To be formed by a new linking sidewalk network of north/south and east/west streets through implementation of the Arterial Streets Improvements Program;

- **Informal or internal pedestrian system —** To be created within private developments to link the buildings with street systems and transit access, as well as create links between buildings. This system, a nucleus of which already exists, will form over time, providing a more intimate and private network, particularly for building users.

Figure VI-1 illustrates the proposed network of pedestrian routes in Uptown. Figure VI-2 is an enlargement of Figure VI-1 and indicates in greater detail the relationships between the two pedestrian systems and access points to the proposed METRO high capacity transit corridor.

The formal or street-based pedestrian system will consist of the following hierarchy of thoroughfares:

- **Post Oak Boulevard** – Expanded sidewalks would be constructed along both sides of the full length of Post Oak Boulevard. Streetscape elements which would enhance the district's principal pedestrian spine would include the following:

  - Pedestrian amenities,;
  - Landscaping to provide shade and protection;
  - Street furniture and materials defining public spaces;
  - Crossings; and
  - Access to the METRO transit corridor.

- **Major Feeder Streets (e.g., Westheimer or San Felipe) –** New sidewalks shaded with trees on both sides on the improved and new east/west streets feeding into Post Oak Boulevard will focus pedestrian movement on the Boulevard.

- **Connectors (e.g., Garretson or Guilford) –** Tree-lined sidewalks on new or improved north/south connector streets would provide pedestrian links parallel to Post Oak Boulevard, completing the circuit with the feeder street sidewalks.

The internal pedestrian system will consist of:

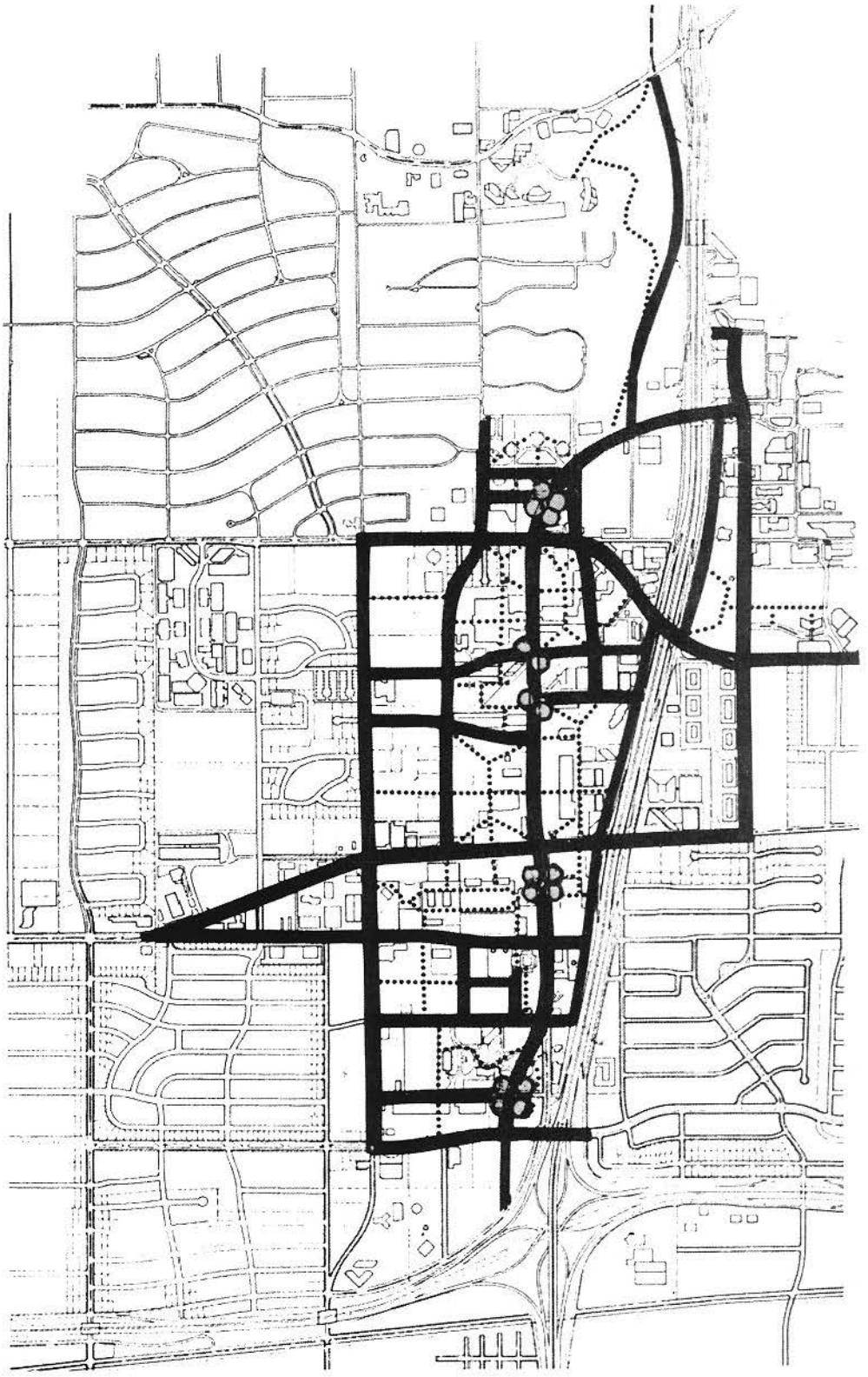
- **Existing Internal Pedestrian Routes –** The arcaded facades or internal malls of existing buildings and the major existing pedestrian mall of the Galleria complex. While some existing pedestrian routes may be eliminated in redevelopment, the opportunity for a linked internal pedestrian system should be encouraged.

- **Potential Internal Pedestrian Routes –** The future pedestrian system linking buildings and points of destination with improved sidewalks and access to the METRO stations. While this internal system cannot be mandated, it will be strongly influenced by actions taken within the right-of-way of the street system. In any plans for future development or redevelopment, the private sector should be encouraged to strengthen the internal pedestrian system.

Public street system

Private internal system

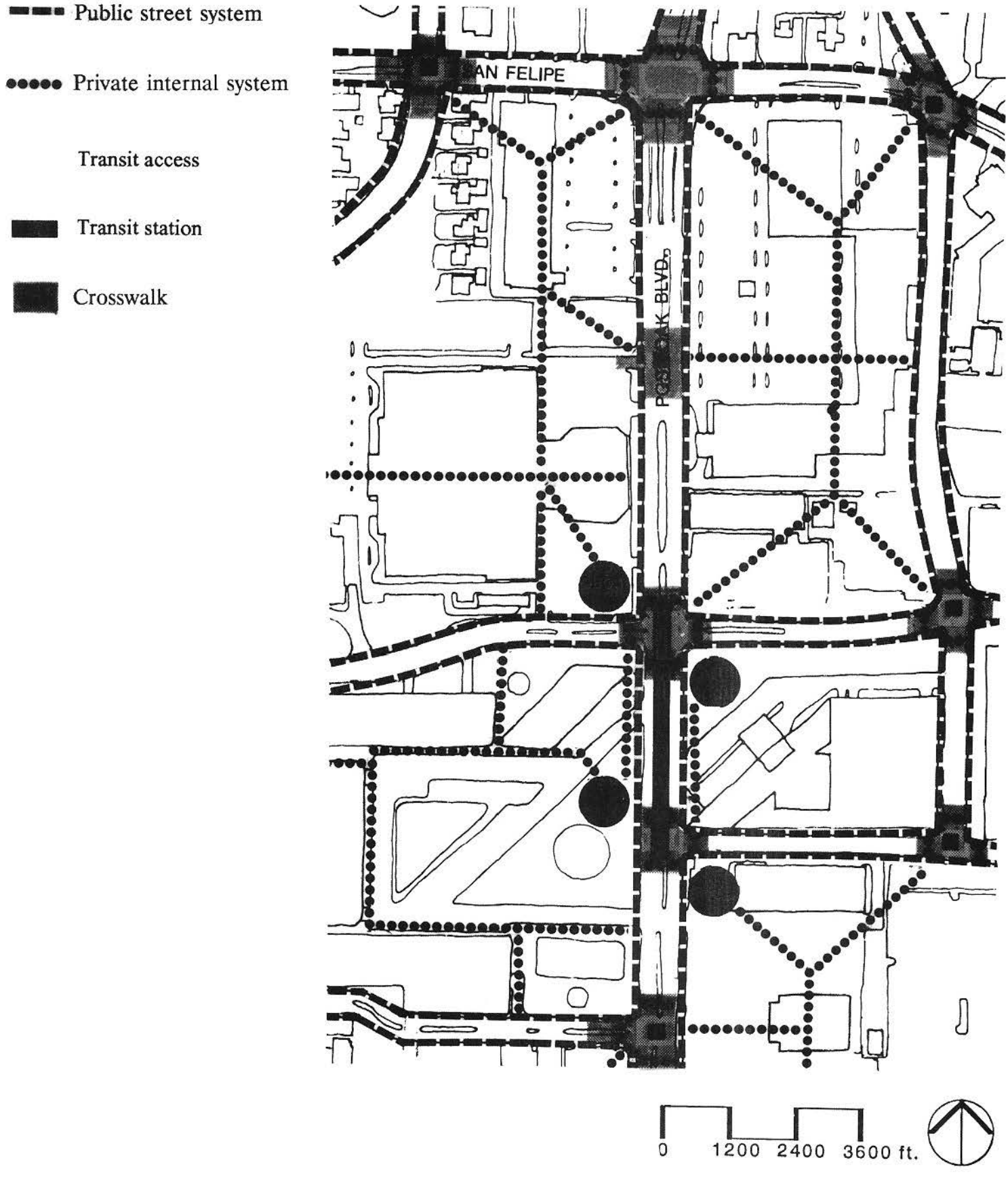
Transit access



0 1200 2400 3600 ft.

Pedestrian Systems

Figure VI-1



Pedestrian Systems Diagram

Figure VI-2

Post Oak Boulevard Pedestrian Environment

Post Oak Boulevard is the density center of existing and proposed development within Uptown Houston (refer to Section I-C: *Anticipated Growth*), as well as the preferred alignment of METRO's proposed high capacity transit corridor within Uptown Houston (refer to Section V: *Transit Improvements Program*). Thus, Post Oak Boulevard would serve as the main pedestrian spine within the Uptown Houston pedestrian network.

In summary, the Pedestrian Environment Design Concept for Post Oak Boulevard includes the following elements:

- **Sidewalks** – Expansion of sidewalk widths generally to 11 feet to increase capacity.

- **Trees** – Single and double rows of trees for pedestrian shade and for continuity within the Uptown district. Hedge and groundcover to complete the landscaping. Banner standards and banners installed at retail areas and other zones of high pedestrian traffic.

- **Lighting (Pedestrian and Street)** – Specially designed lighting for pedestrian and automobile safety, further providing continuity to the Uptown district.

- **Intersection Improvements** – Specially designed modular traffic standards to display signalization and signage for pedestrian and vehicular traffic. Paved pedestrian crossings and other pedestrian amenities.

- **High Capacity Transit Corridor Stations** – Designed and located to function as key points of activity along Post Oak Boulevard. Station locations carefully planned to optimize connections to adjacent development and improve accessibility of potential transit riders. While the conceptual design of Post Oak Boulevard proposes the ultimate implementation of a grade separated fixed guideway system, the design is configured to accommodate a grade level high capacity bus transit corridor as the initial system. All streetscape and landscape improvements have been designed to enhance the function and quality of vehicular and pedestrian systems even if a transit corridor is not developed or if a system is built using a different vertical or horizontal alignment.

Figures VI-3 through VI-7 illustrate the proposed pedestrian environment design concepts for Post Oak Boulevard. It should be noted that the diagrams are intended to indicate an area-wide design concept and are not site specific. For example, the trees and banners are shown to occur with a regular rhythm and frequency, while in reality their placement would be interrupted by driveways and other existing conditions.

- **Sidewalks, Trees and Open Spaces (Figure VI-3)**

  Continuous eleven foot sidewalks along the lengths of both sides of Post Oak Boulevard are proposed. For pedestrian shade, trees would be planted. It is proposed that a double row of trees be planted along Post Oak Boulevard south of Westheimer and north of San Felipe. These would consist of a fast growing shade species, such as a water oak or sweet gum, close to the street and slower growing live oaks on the outside edge of the sidewalk. In the central zone between Westheimer and San Felipe, a single row of the fast growing species would be planted, trimmed at twelve feet above ground level to allow good visibility into adjacent developments. The regular rhythm of tree planting would be interrupted at locations of significant open space, such as Post Oak Central, the Doubletree Hotel and Transco Tower Park. Median planting would be designed to contribute color, texture and variety to the environment, without impairing safe visibility.

  Future private development would be encouraged to expand sidewalk widths even further, integrate public pedestrian facilities with private ones and open plazas and retail amenities to the street.

- **Lights and Banners (Figure VI-4)**

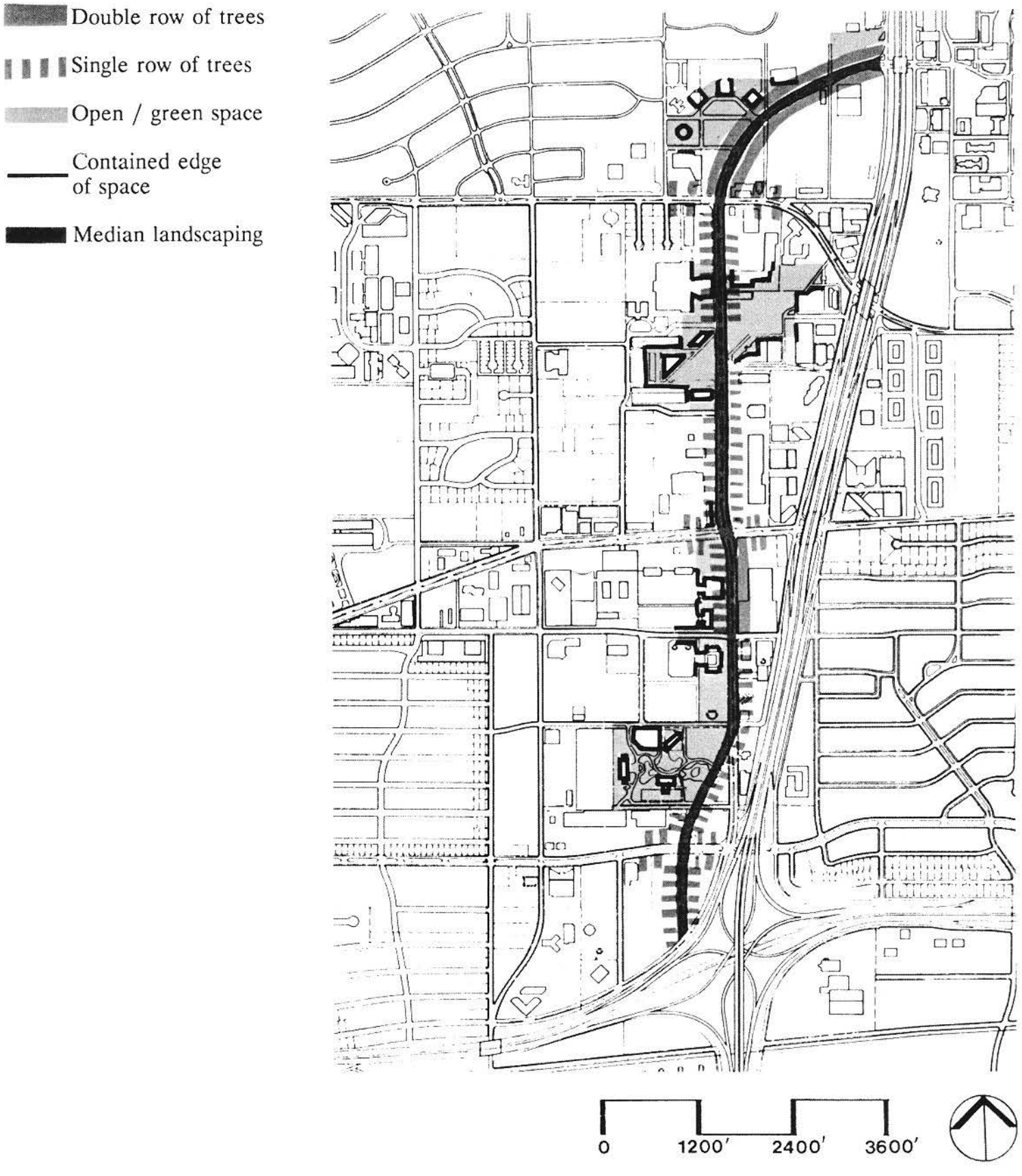
  South of Westheimer and north of San Felipe, special lighting standards and banners would be located only at major intersections. Between Westheimer and San Felipe, lights and banners would be concentrated to highlight the retail orientation of the street. The actual location of the poles would be closely coordinated with the desires of adjacent property owners, to not only help define the street, but to highlight the locations of entries to developments.

- **Intersection Enhancements (Figure VI-5)**

  All arterial street intersections with Post Oak Boulevard would be improved with new, specially designed traffic standards, paved pedestrian crossings, banners, pedestrian lighting and landscaping in order to strengthen the image of the district, help orient visitors, improve the pedestrian environment and emphasize points of concentrated pedestrian activity.

- **High Capacity Transit Corridor (Figures VI-6 and VI-7)**

  The public transit stations would be developed as key points of activity and interest along Post Oak Boulevard. Figure VI-6 shows the four station alternative. Figure VI-7 shows the five station alternative. The locations of the access points would be carefully planned to optimize connections to adjacent development and also to maximize opportunity for joint development of stations.

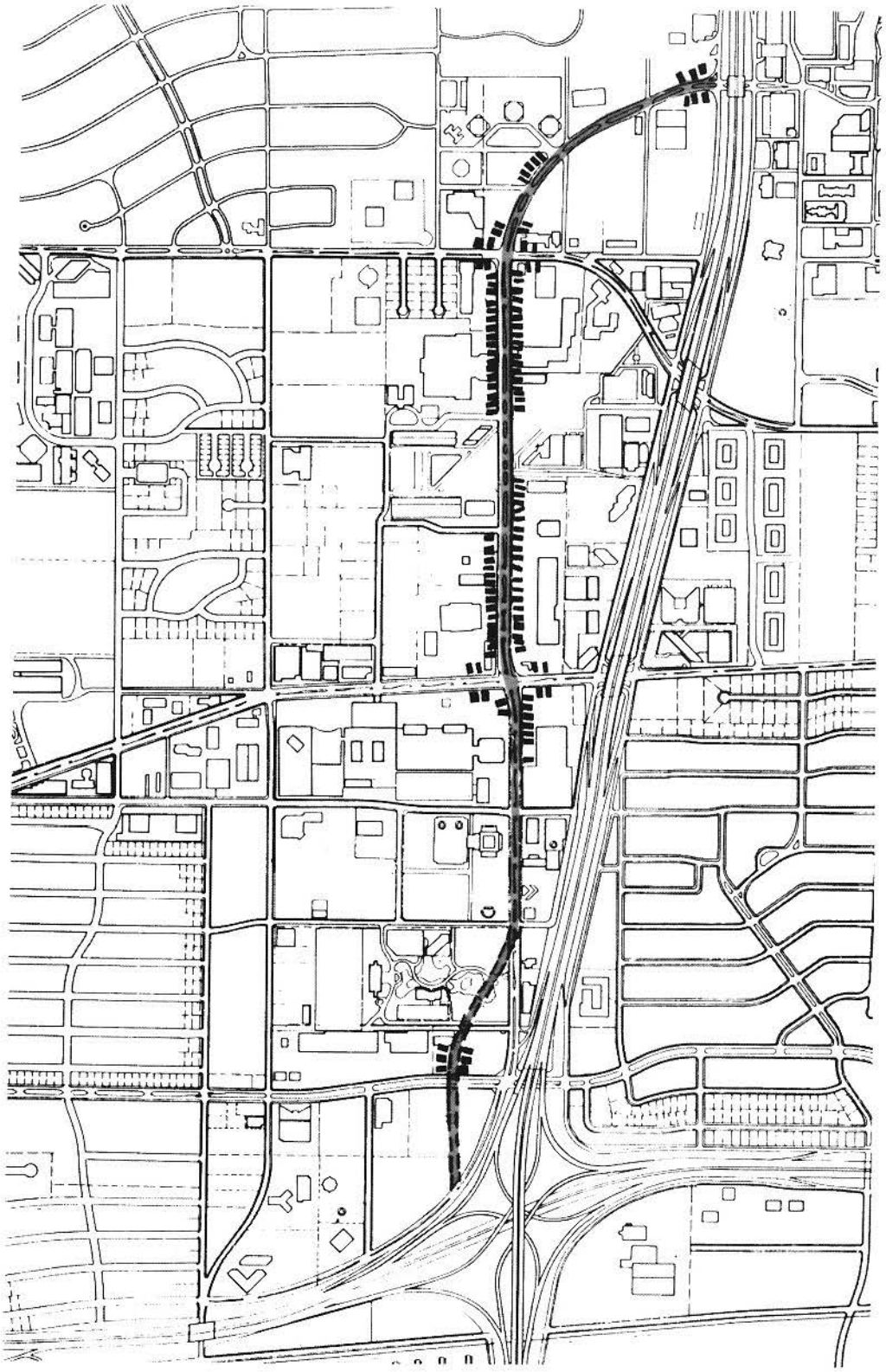


Trees and Open Space Concept Plan

Figure VI-3

Lights (street and pedestrian)

Banners (potential locations)



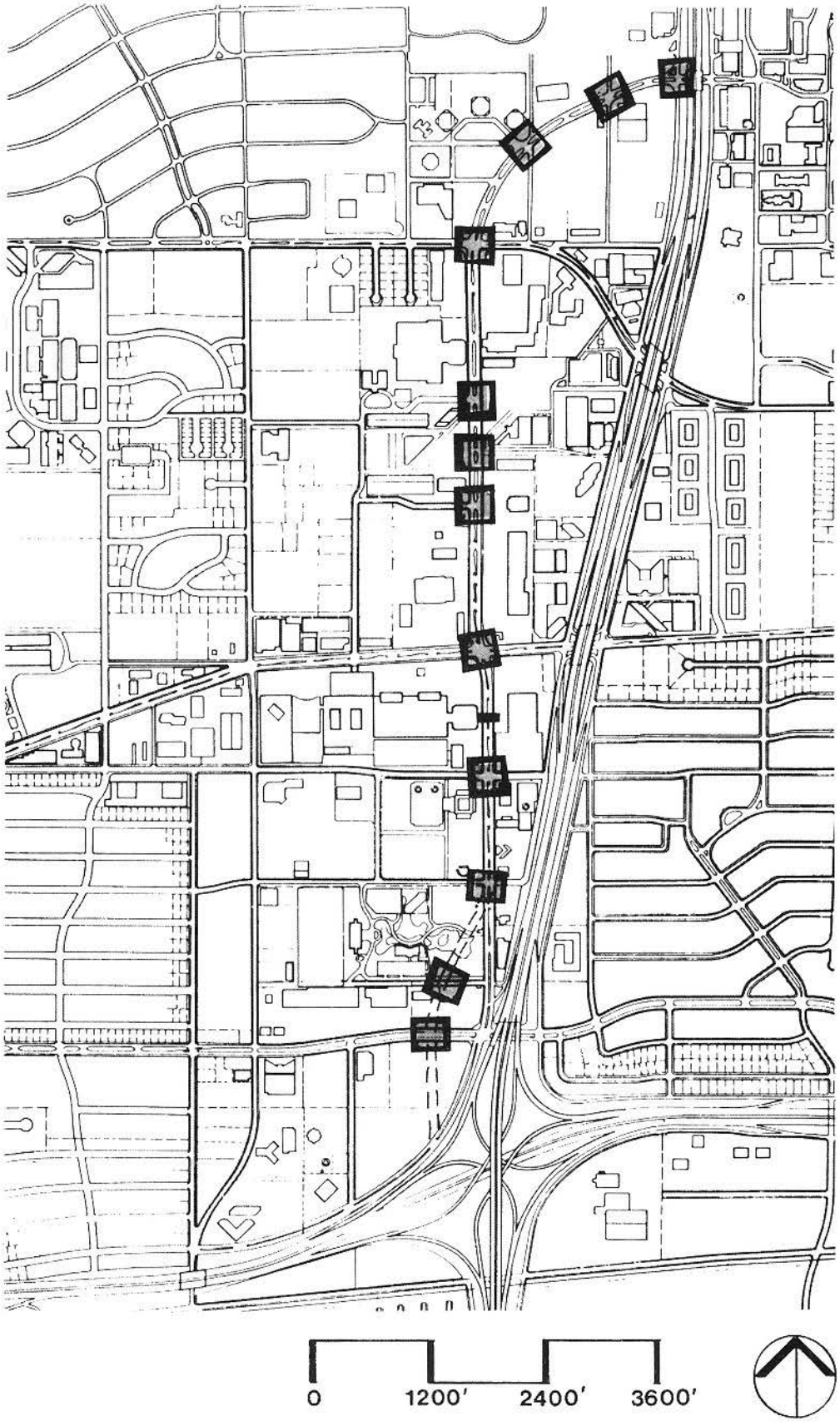
0 1200′ 2400′ 3600′

Lights and Banners Concept Plan

Figure VI-4

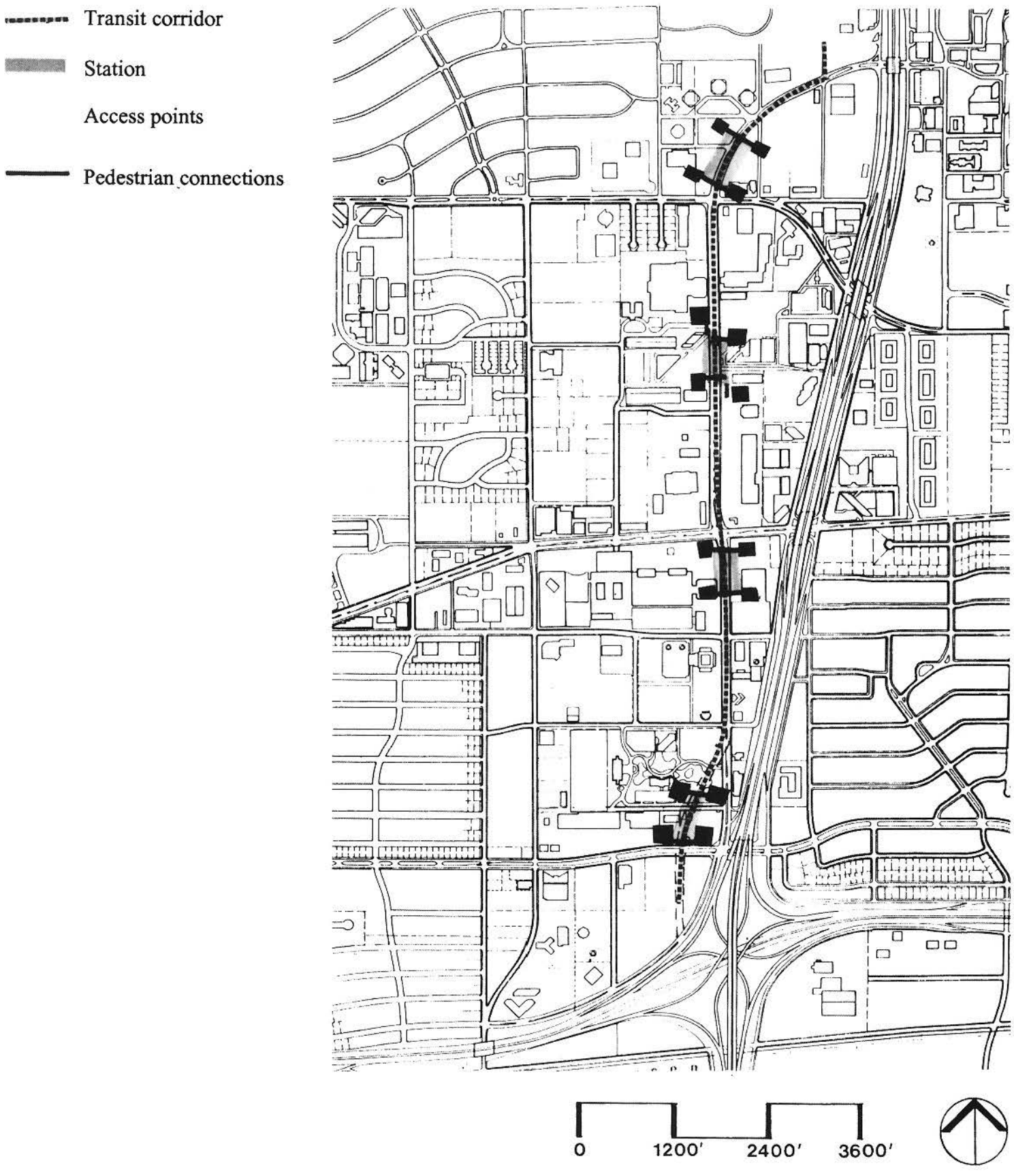
Intersections and signals

Crosswalks and signals



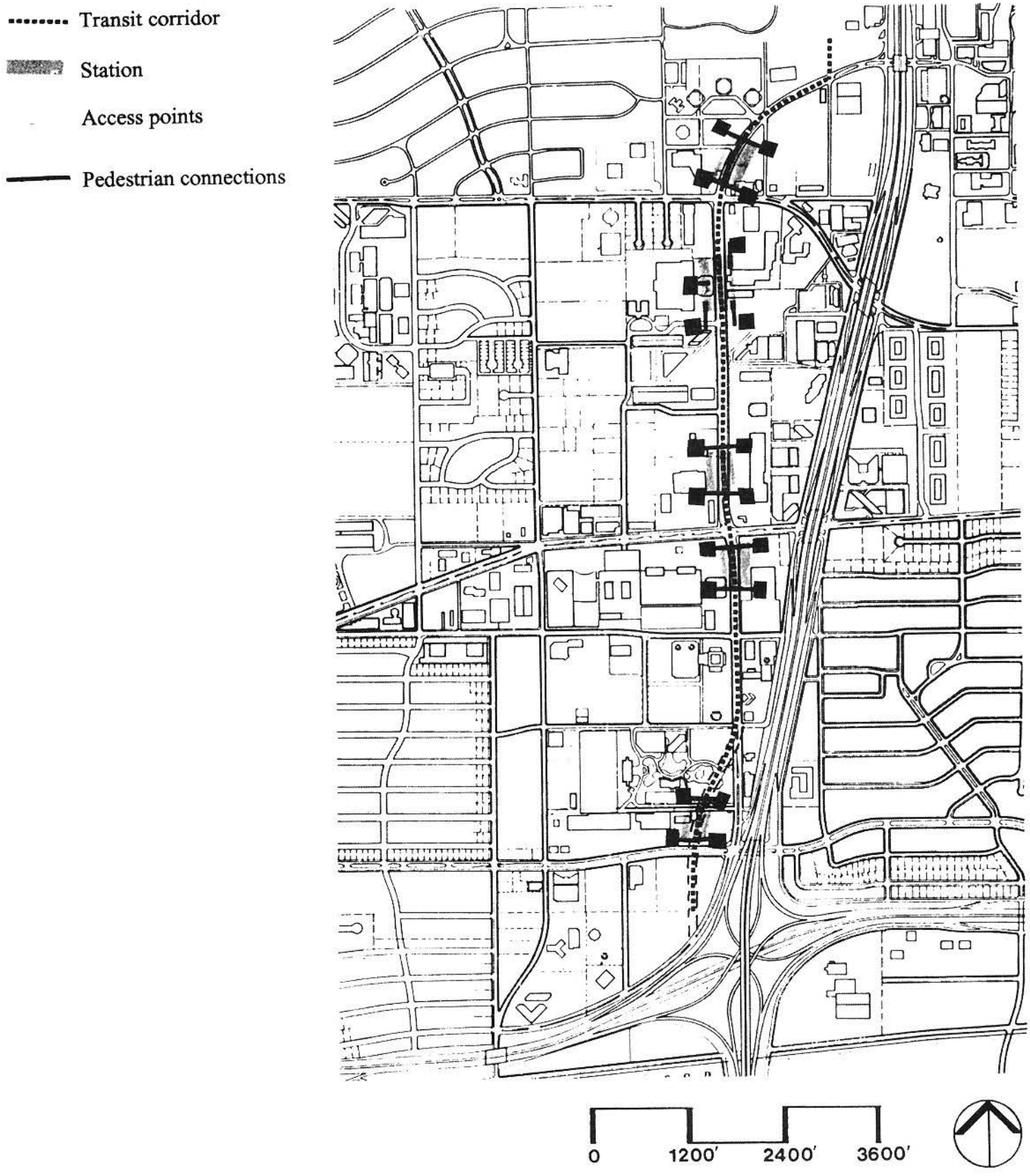
Intersection Enhancements Concept Plan

Figure VI-5



High Capacity Transit Corridor: 4 Station Alternative Concept Plan

Figure VI-6



High Capacity Transit Corridor: 5 Station Alternative Concept Plan

Figure VI-7

Design of Proposed Streetscape Improvements

The pedestrian environmental improvements proposed for Post Oak Boulevard are based upon the repetition of specially designed streetscape elements that not only improve pedestrian and vehicular mobility within the Uptown area, but also improve safety and strengthen the identity of the area as a distinct district within the city.

This study does not provide a detailed design for the proposed family of streetscape elements. Rather, the design would be undertaken together with implementation of the Pedestrian Environment Improvements Program. The streetscape elements requiring design are outlined as follows:

- **Pavement:**
  - Vehicular lanes. Improved traffic lanes, curbs and gutters;
  - Sidewalks. Widened, re-paved sidewalks; and
  - Intersections. Clearly identified pedestrian crossings, in some cases specially paved.
- **Signalization:**
  - Traffic signals. A visually coordinated system consisting of specially selected poles, arms and lights;
  - Pedestrian crossing signals. Activated by user, the system would be visually and operationally coordinated with traffic signal system.
- **Signage:**
  - Vehicular and pedestrian. A visually and spatially coordinated system of vehicular and pedestrian signs intended to promote safe operation of pedestrian and vehicular transportation systems, minimize clutter in the streetscape and help define the district.
- **Landscaping:**
  - Trees, hedge and groundcover. A visually and spatially coordinated system of street tree and accent vegetation plantings. The type and intensity of plantings are intended to provide shade for pedestrian comfort, help define the street corridor and communicate information about the role and scale of the street within the hierarchy of the Uptown street system. Plantings are the most intense along Post Oak Boulevard. Throughout the Uptown area, trees are planted, hedges are either filled in or created and groundcover is installed.
  - Tree grates. Tree grates would be utilized where sidewalk width and tree line must coexist within the same space.
  - Irrigation. Irrigation systems are installed wherever planting areas have been created.

- **Lighting:**

  - Street and pedestrian. A coordinated system of street luminaires and pedestrian level lights are installed as another element of the district-wide streetscape environment. The new lighting is intended not only to improve visibility, safety and security but also to enhance the visual appeal of the streetscape and to provide a unified image for the district.

- **Transit shelters and stations:**

  - Access points to and from the transit system designed compatibly and integrated with streetscape elements.

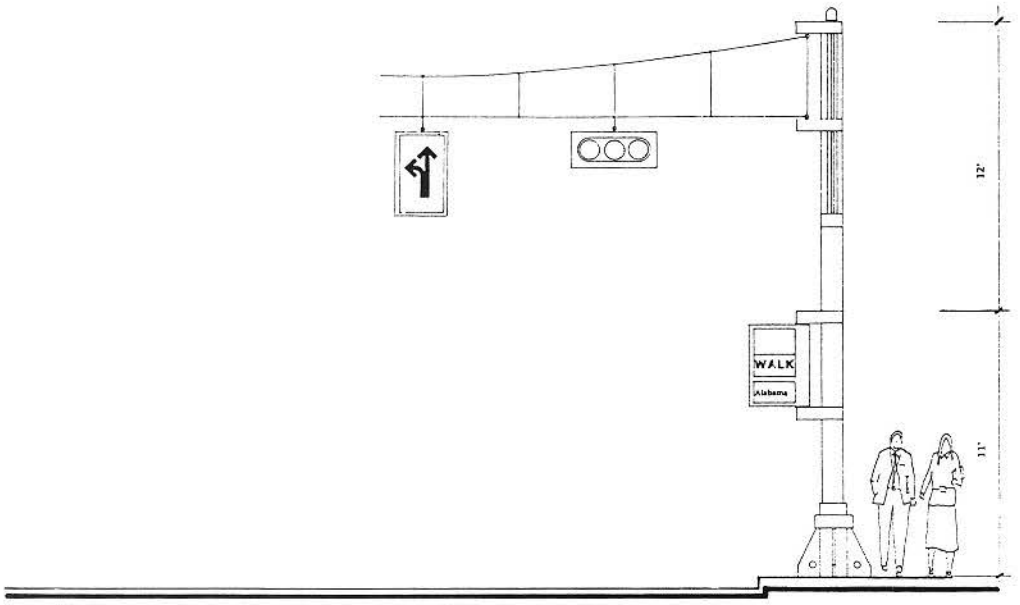
- **Amenities:**

  - Amenities to promote the comfort, safety and attractiveness of the pedestrian environment, including such items as benches, trash receptacles, banners, information kiosks and drinking fountains.

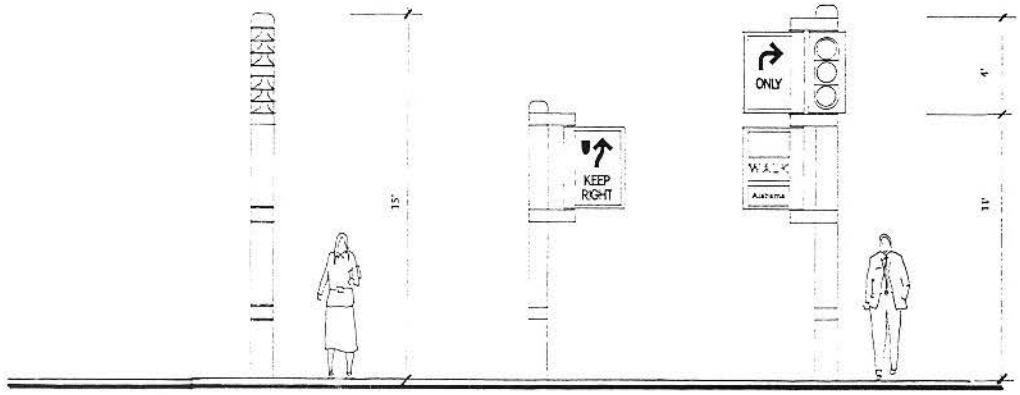
Suggested concepts for streetscape components are provided as a basis for future design. Figures VI-8, VI-9 and VI-10 illustrate the vertical fixtures of a modular street fixture system, including traffic standards, street and pedestrian lighting, banner poles and street trees. The scale of streetscape elements should be related to the grand scale of Post Oak Boulevard.

Figures VI-11 and VI-12 provide typical paving and median details, respectively, intended to reinforce the continuity of the Boulevard that is initially established by the more visible street fixtures.

Signal poles, catenary



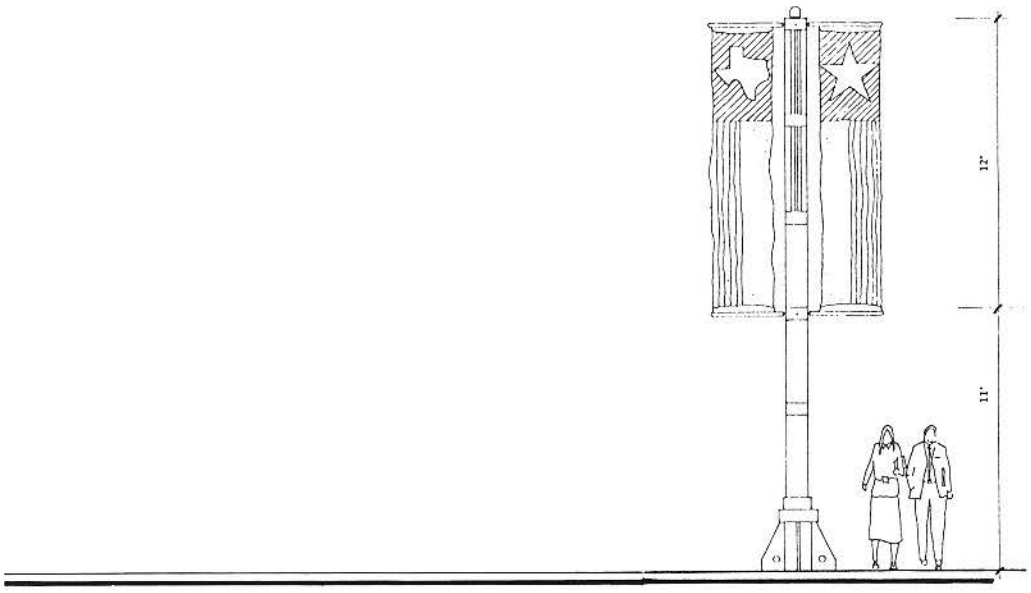
Pedestrian light
Signal poles,
vertical standards



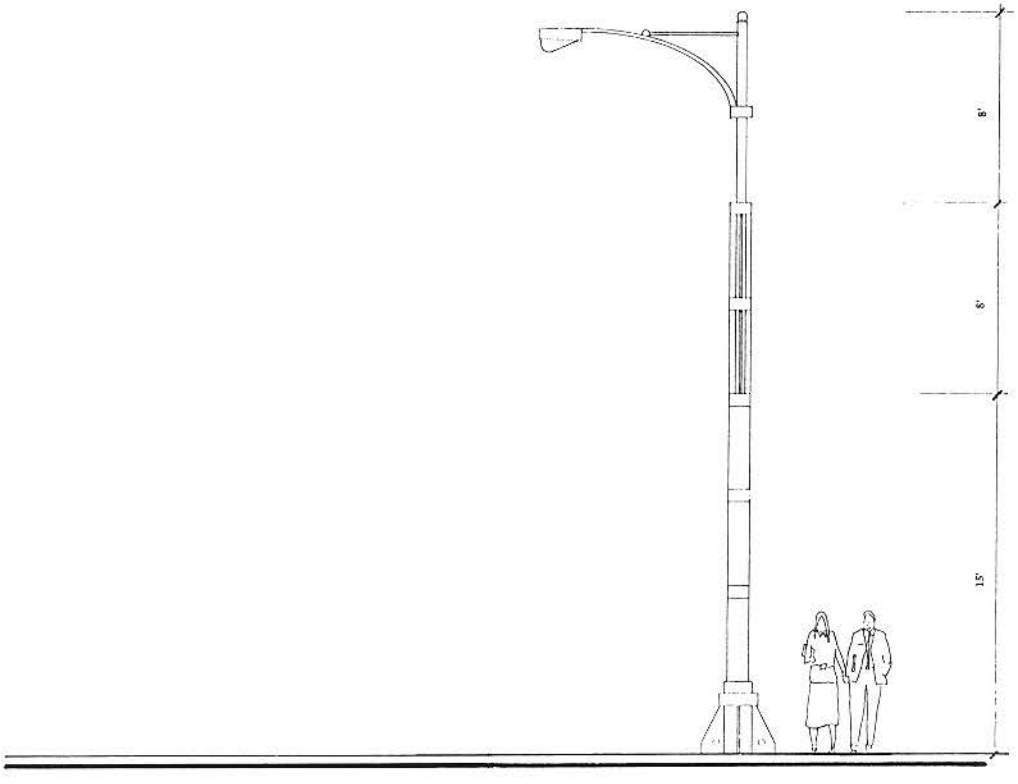
Streetscape Lighting and Banner Details

Figure VI-8

Banner pole



Light standard

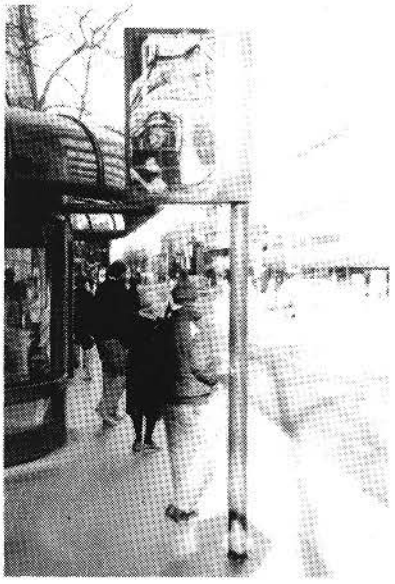


Streetscape Lighting and Banner Details

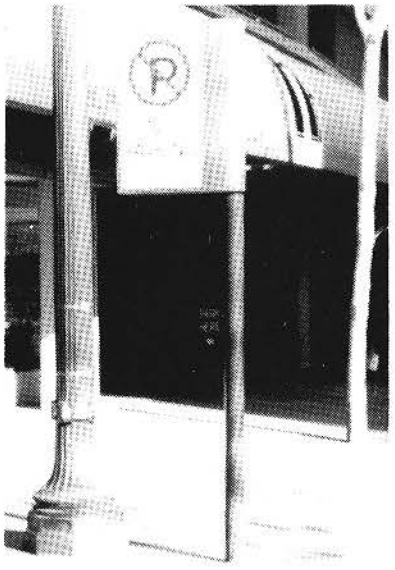
Figure VI-9

Traffic signage, signal
& crosswalk signal

Crosswalk signal
& transit signage



Transit signage

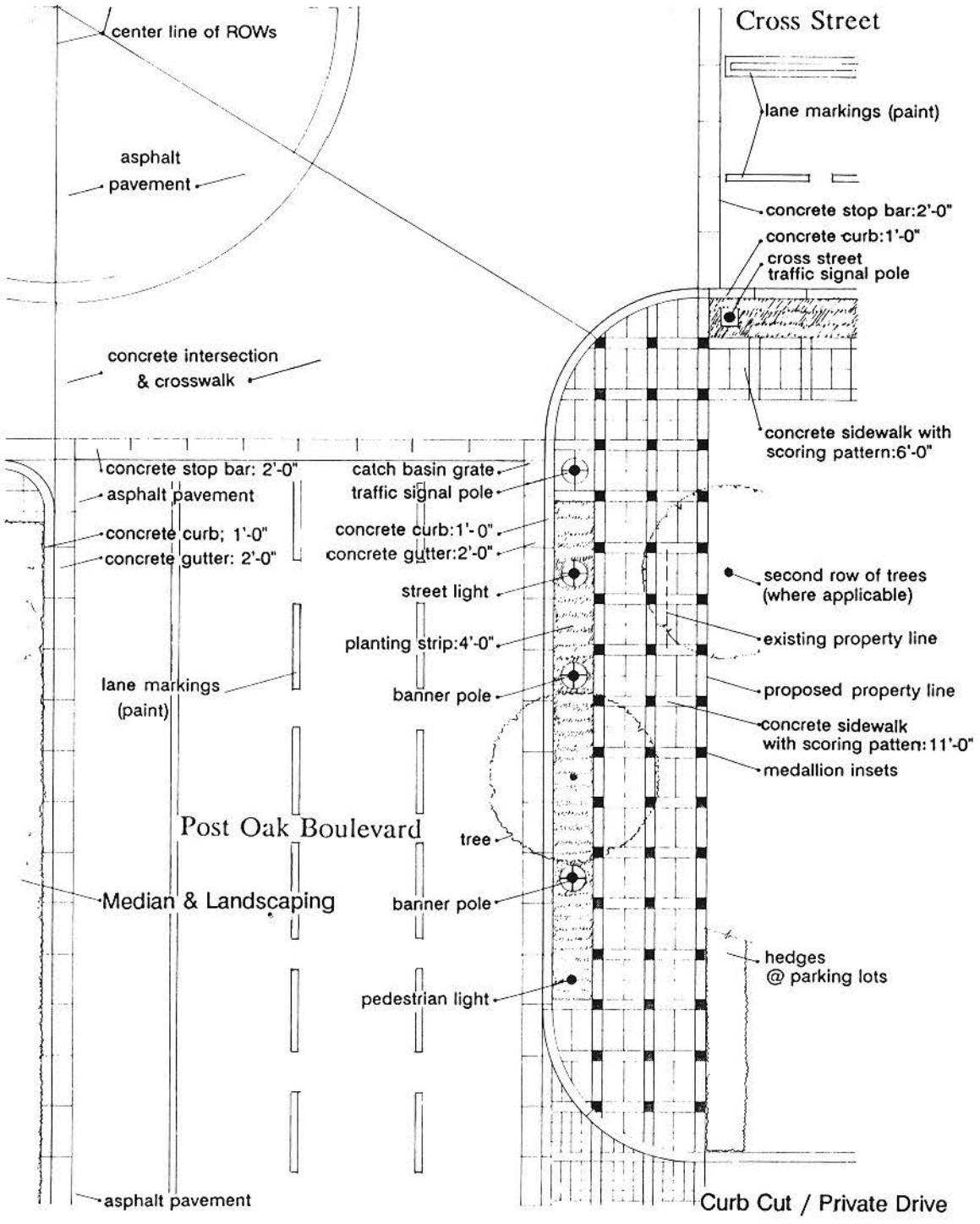


Traffic signage

Example of Modular Street Fixture System

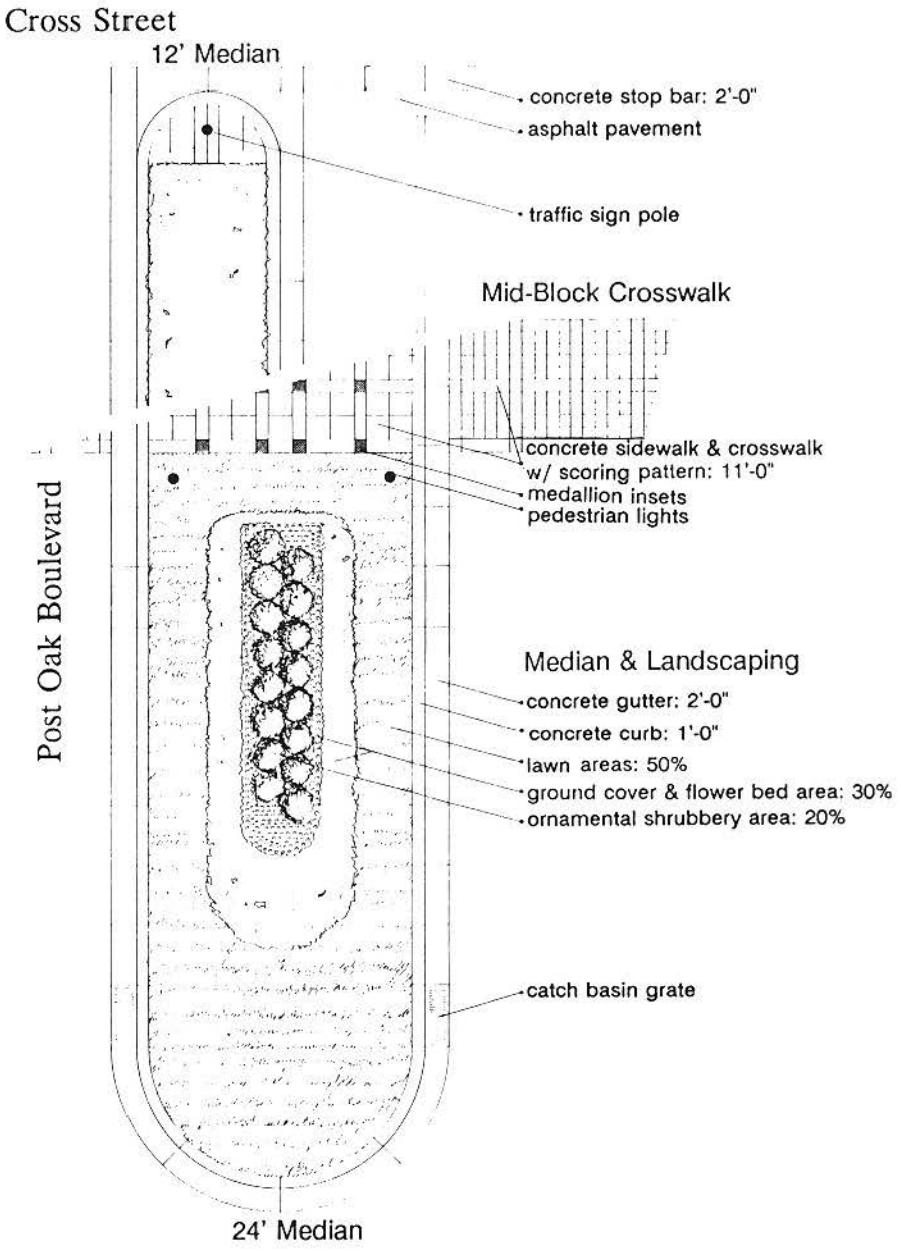
(Portland Oregon Transit Mall Illustrated)

Figure VI-10



Typical Paving

Figure VI-11



Median Treatment

Figure VI-12

Prototypical Plans and Elevations

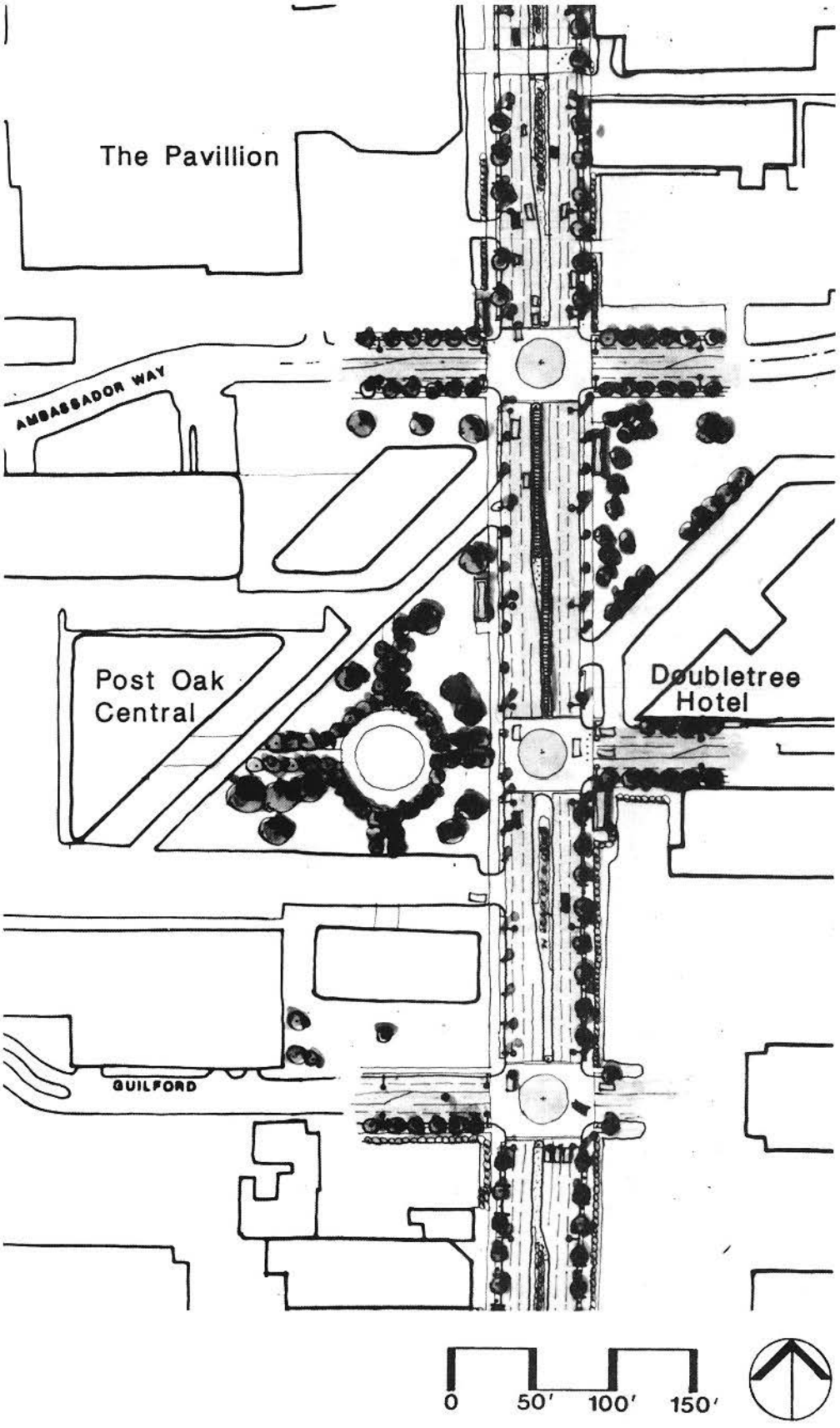
Figure VI-13 is a composite plan view of the design concepts, focusing on the section of Post Oak Boulevard in the vicinity of Post Oak Central. Figure VI-14 is a perspective of how these concepts might appear at street level. This drawing depicts the streetscape in the vicinity of Post Oak Central, looking north.

The cross section of the proposed concept requires the acquisition of four to eight feet of additional right-of-way on one or both sides of the existing street. Within this right-of-way, a transit tunnel or other vertical alignment for a high capacity transit corridor may be constructed after base street improvements are made. The initial improvements to Post Oak Boulevard would be configured so that the transit corridor could be subsequently implemented with minimum disruption to traffic, access or previously completed improvements. However, it is proposed that when the transit improvements are made, substantial corollary improvements to grade level pedestrian crossings and adjacent sidewalks will also be constructed.

The area affected by improvements to Post Oak Boulevard extends along Post Oak Boulevard, from south of Richmond to the north intersection with I.H. 610. Between Richmond and Westheimer, the existing right-of-way is 100'. An increase to 112', and in some cases 128', is proposed to accommodate wider sidewalks and tree planting. Between Westheimer and I.H. 610, the existing right-of-way is 120'. An increase to 128' is proposed to accommodate wider sidewalks, banner poles, new lighting and trees.

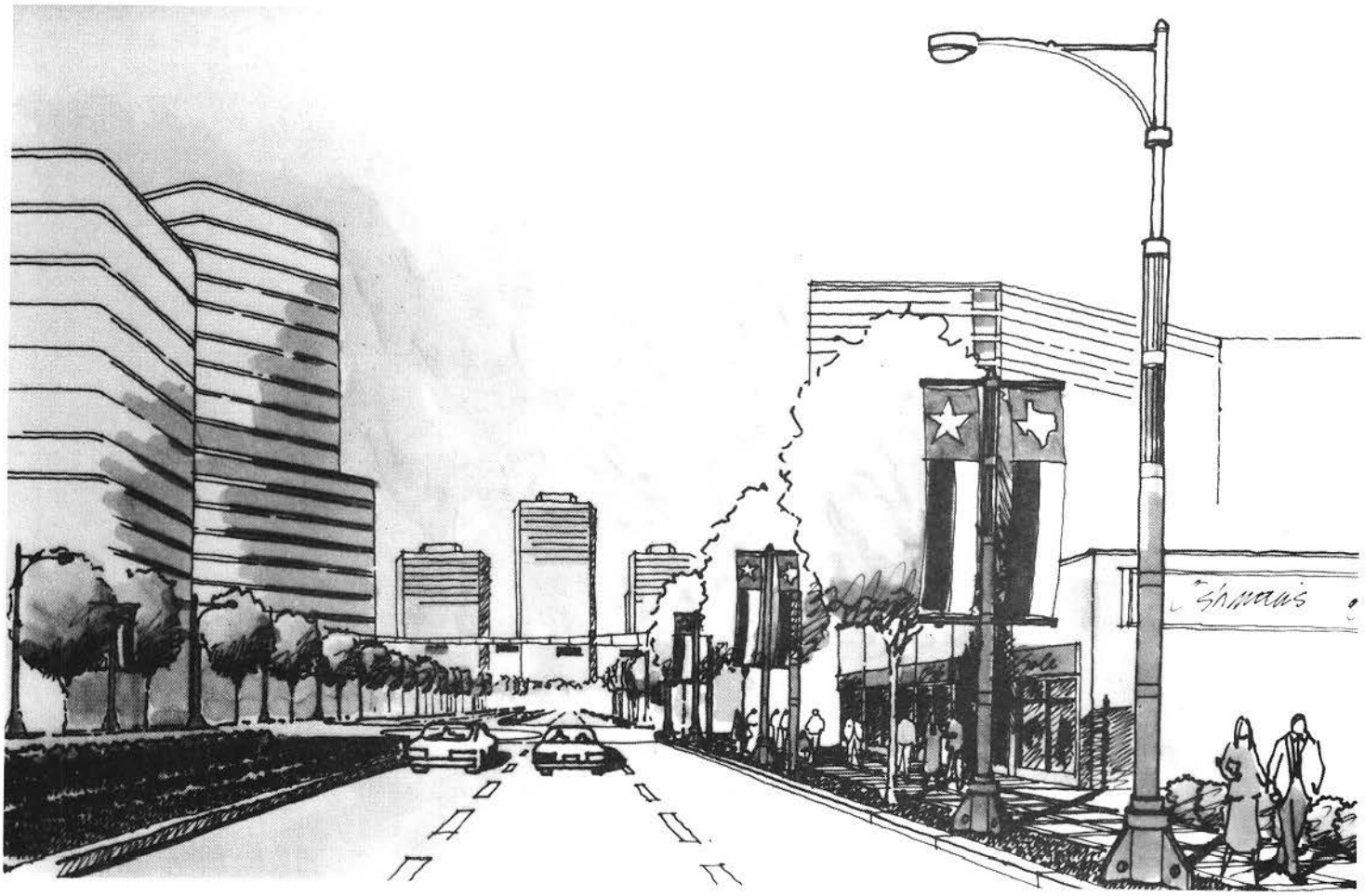
Figure VI-15 illustrates a prototypical arrangement of streetscape elements on three sections of Post Oak Boulevard. "Retail Section" illustrates a section of Post Oak Boulevard between Westheimer and San Felipe. "Option" illustrates a section south of Westheimer, where a significant number of live oaks are already in place. "Curve at Four Oaks Place" illustrates a typical section of Post Oak Boulevard north of San Felipe.

The trees in the retail sections of Post Oak Boulevard should be fast growing street trees that do not block views from the street into adjacent development, and would be planted 40' on center. In the northern section only, a row of slower growing live oaks would be planted behind the row of fast growing trees located closer to the street. Street lighting is proposed to be 120' on center. Pedestrian lighting is proposed to be 40' on center. Banners on 40' centers would be located only in the vicinity of retail development, concentrated along Post Oak Boulevard between Westheimer and San Felipe. Banners would also be used to highlight major intersections and gateways.



Post Oak Reconstruction Concepts Overlay

Figure VI-13



Perspective Looking North from Post Oak Central

Figure VI-14

Fast growing street tree with head above 12'

Live oak

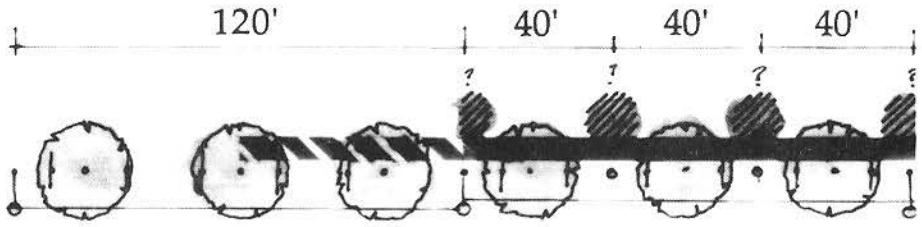
Banners

Street light (modified cobra)

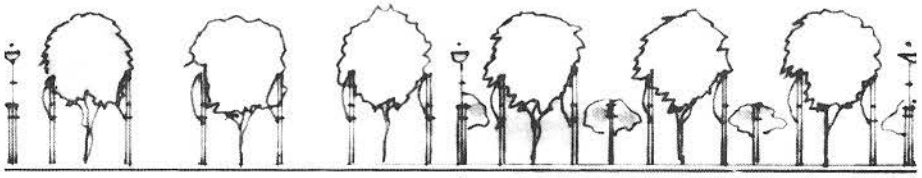
Pedestrian light

Sidewalk

Sidewalk at some locations

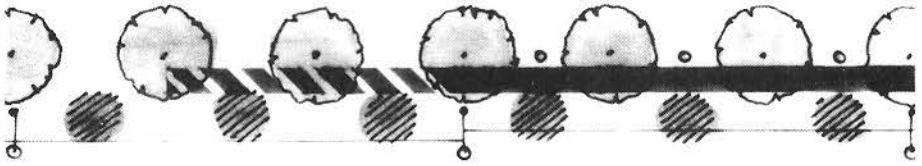


Plan

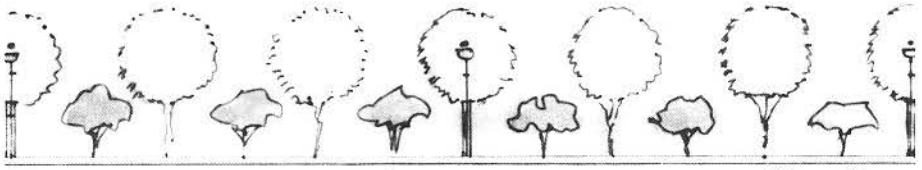


Elevation

Retail Section

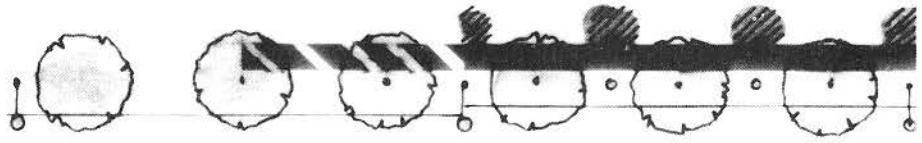


Plan

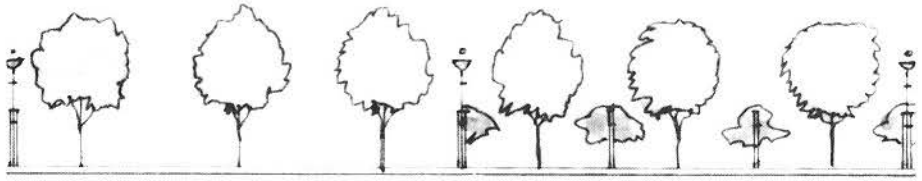


Elevation

Option



Plan



Elevation

Curve at Four Oaks Place

Phase 1
Immediate (0-3 years)

Phase 2
P.O.B. Reconstruction

Figure VI-15

Arterial Street Pedestrian Environments

Consistent with the concepts detailed for Post Oak Boulevard, the Pedestrian Environment Design Concept includes general standards for pedestrian facilities along roadways throughout Uptown Houston. It is recommended that arterial street pedestrian environments throughout Uptown Houston include streetscape elements within the same family of design as those utilized along Post Oak Boulevard, realized at a relative scale. It is anticipated that improvement of arterial street pedestrian environments to the standards defined in the Pedestrian Environment Design Concept would result in completion of the public or formal pedestrian system within the proposed area-wide pedestrian network.

A series of street cross sections have been developed which illustrate design concepts and criteria for both prototypical and specific improvements to the pedestrian environment of arterial streets throughout Uptown Houston. The range of street cross sections was developed to address the following requirements:

- Compatibility with front yard or edge conditions for abutting development;
- Appropriateness of sidewalk width for projected pedestrian volumes;
- Adequate zone between sidewalk and curb to accommodate desired street trees, landscaping, furnishings, signage and signals; and
- Width and profile of roadway consistent with intended vehicle operations.

The proposed cross sections recognize that many pedestrian trips in Uptown Houston may be made via a system of pedestrian ways linking individual developments, thereby reducing potential pedestrian volumes along many streets. Conversely, the proposed standards also recognize that even with the proposed increase in roadways internal to Uptown Houston, vehicular demands will quickly approach the capacity of the street system. This will have the effect of deterring short vehicular trips within the Uptown Houston area and promoting public transit and pedestrian traffic. Implementation of the METRO Phase II Mobility Construction Program will increase pedestrian activity in the area. Proposed concepts are designed to provide a balance between pedestrian and vehicular demands, to co-exist in a manner complementary to adjacent development.

The proposed street cross sections generally consist of the following elements:

- One foot wide concrete curbs;
- Four foot wide planting strips or sidewalk zones containing tree grates and street furniture;
- Widened pedestrian sidewalks; and
- A landscaped median, where feasible.

The width of the sidewalk varies as a result of different right-of-way widths, but should be a minimum of seven feet. Where this is not possible within existing right-of-way constraints, it is proposed that additional land be sought from adjacent owners upon redevelopment of their property. In addition to outright dedication or right-of-way acquisition, there is the potential for private property owners to grant easements for sidewalk area.

The street cross sections listed below have been developed to function as general standards for arterial streets within Uptown Houston. They are illustrated in Figures VI-16 through VI-22. The prototypical cross sections, when applied to individual street improvement projects, should be understood to be somewhat flexible to the extent that pedestrian capacity, shade and other attributes of the prototypical designs are maintained.

Street Cross Sections:

- **Cross section 1 (Figure VI-16)** – 44' pavement width and 60' right-of-way with no median. This design does not require extra right-of-way, but clear sidewalk width is limited to 2 feet in some situations.

- **Cross section 2 (Figure VI-17)** – 44' pavement width and 60' right-of-way with no median. This streetscape design would require an additional 6 to 10 feet of right-of-way for widened sidewalks.

- **Cross section 3 (Figure VI-18)** – 44' pavement width and 80' right-of-way with no median.

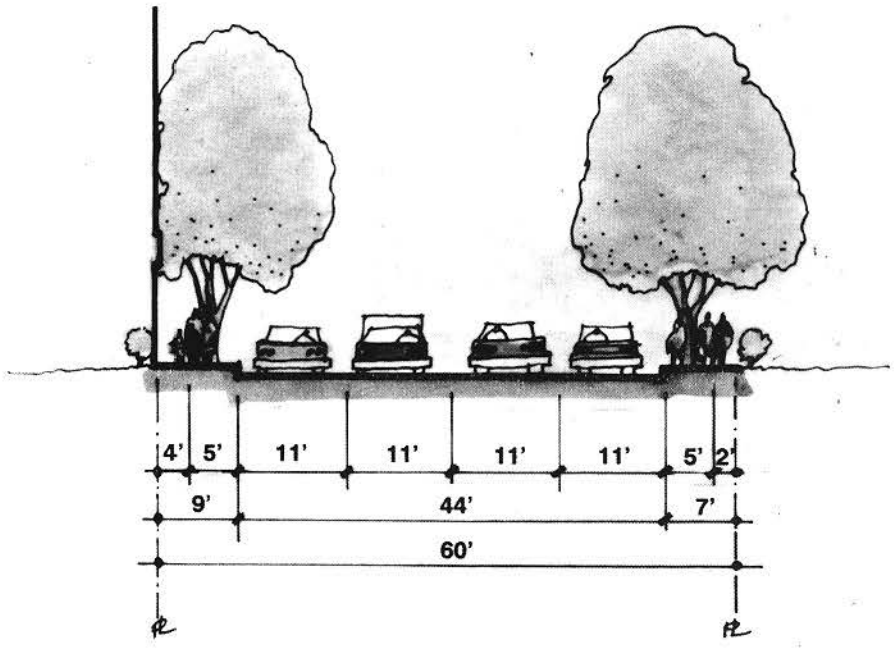
- **Cross section 4 (Figure VI-19)** – Two 24' pavement lanes and 80' right-of-way with median.

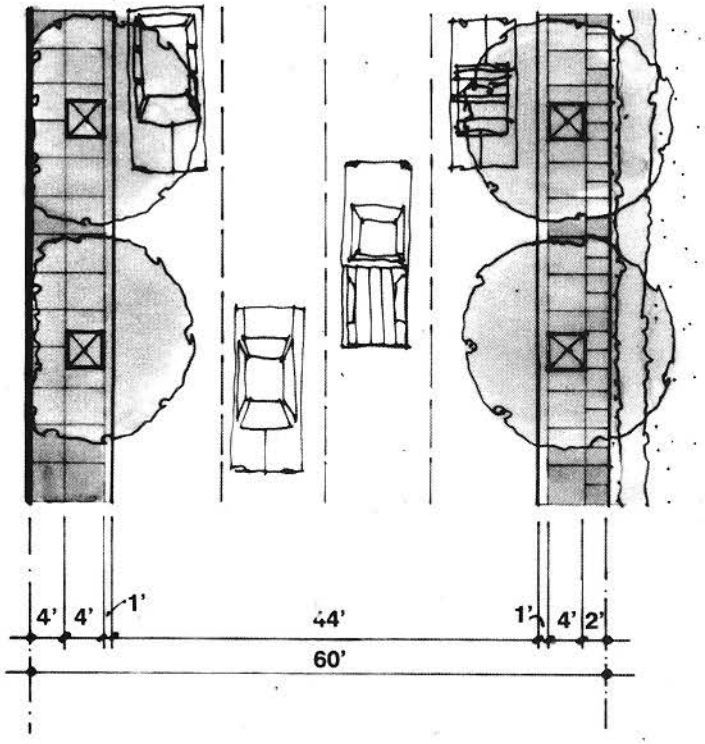
- **Cross section 5 (Figure VI-20)** – Two 33' pavement lanes within 100' right-of-way, with median. Due to the restricted right-of-way width, sidewalks are in some cases limited to 6 feet of clear width.

- **Cross section 6 (Figure VI-21)** – Two 33' pavement lanes within 108' right-of-way, with median. This is proposed as an alternative to Configuration 5, allowing for wider sidewalk, but also requiring additional right-of-way.

- **Cross section 7 (Figure VI-22)** – Two 24' pavement lanes and 109' or 118' right-of-way with medians. Figure 37 represents potential cross sections for the proposed Uptown Parkway.

Cross section 1

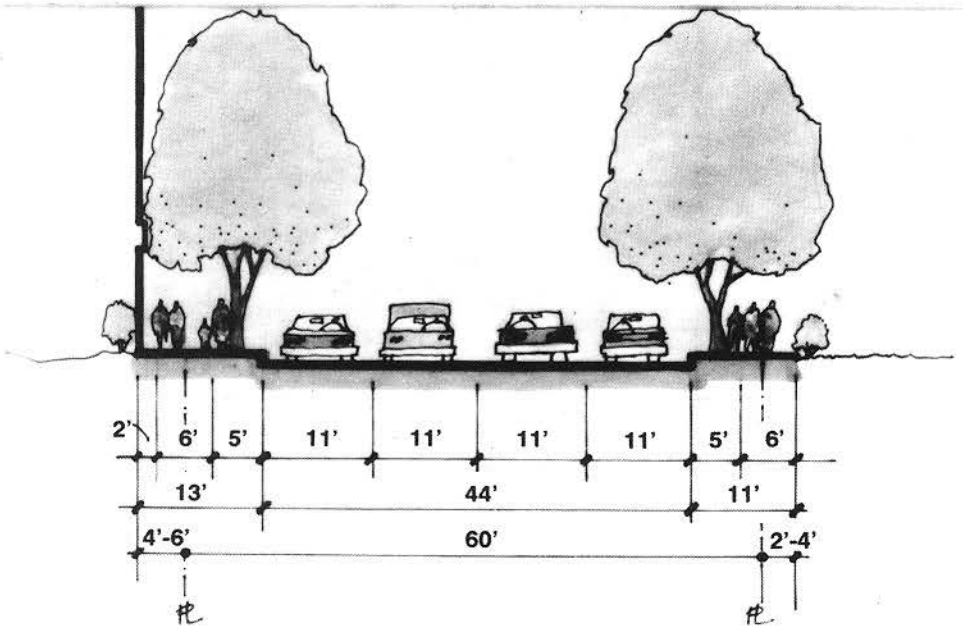


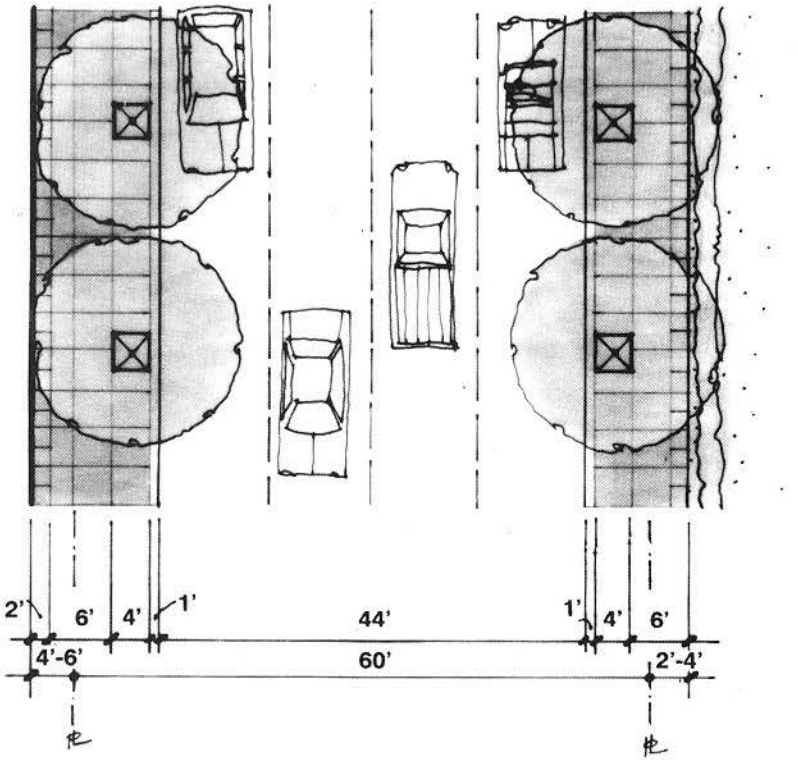


44' PW/60' ROW – No Median Within Existing ROW

Figure VI-16

Cross section 2

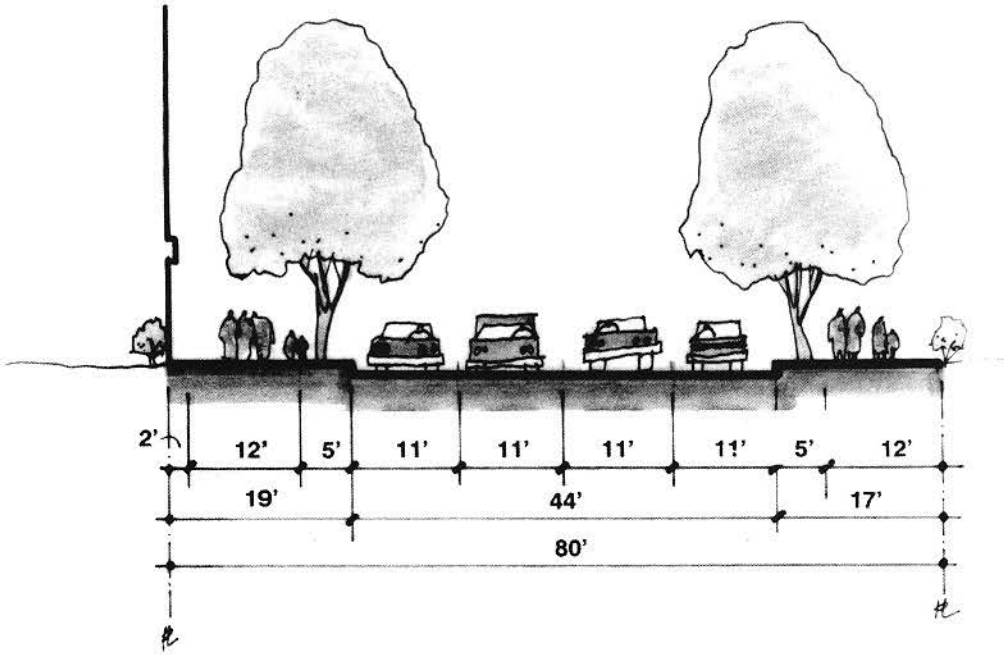


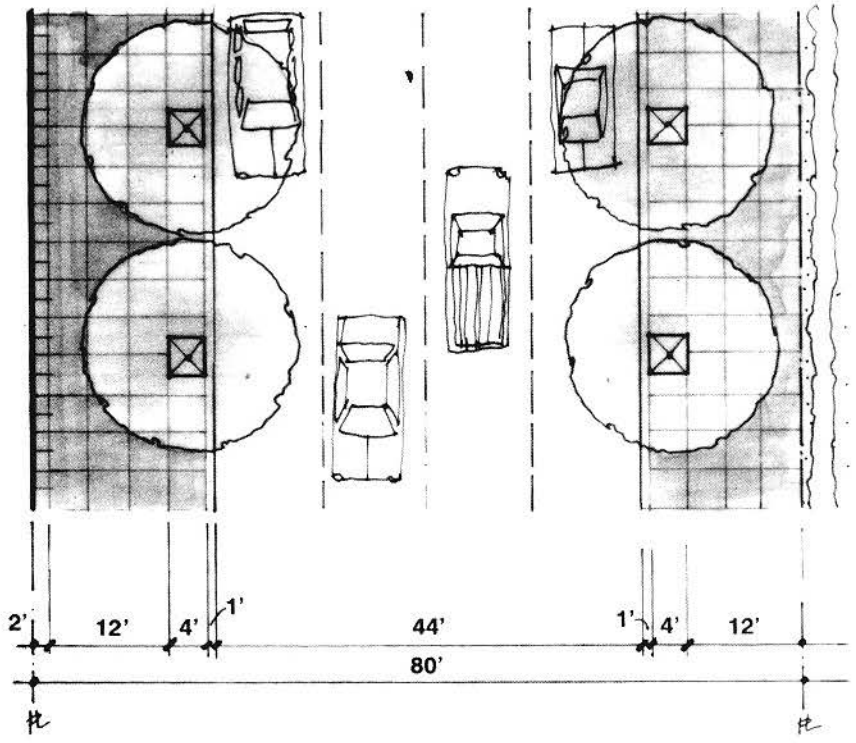


44' PW/60' ROW – no median

Figure VI-17

Cross section 3

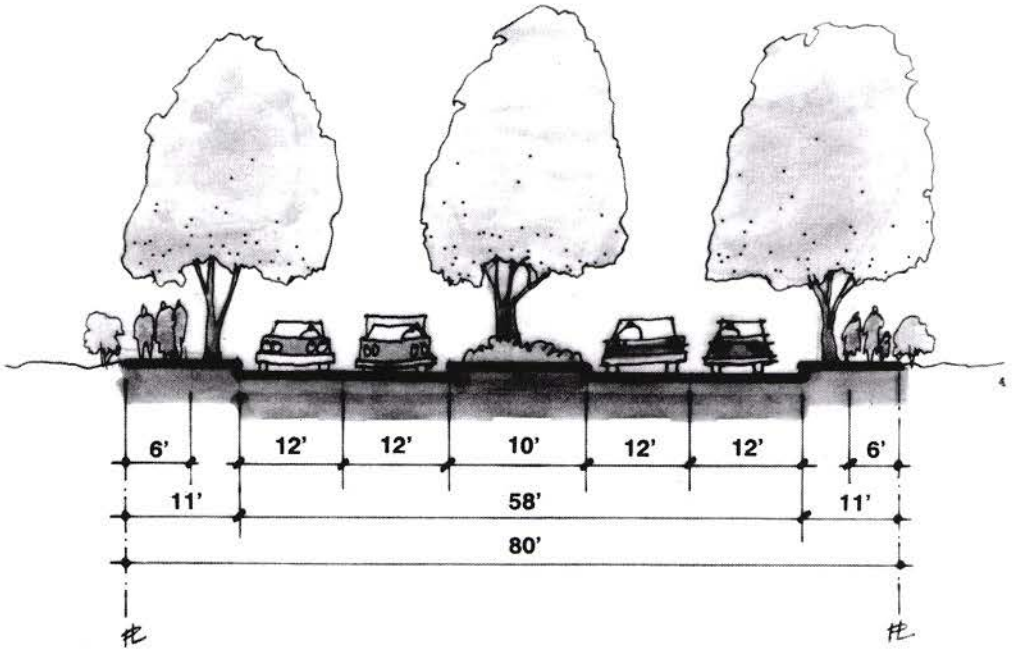


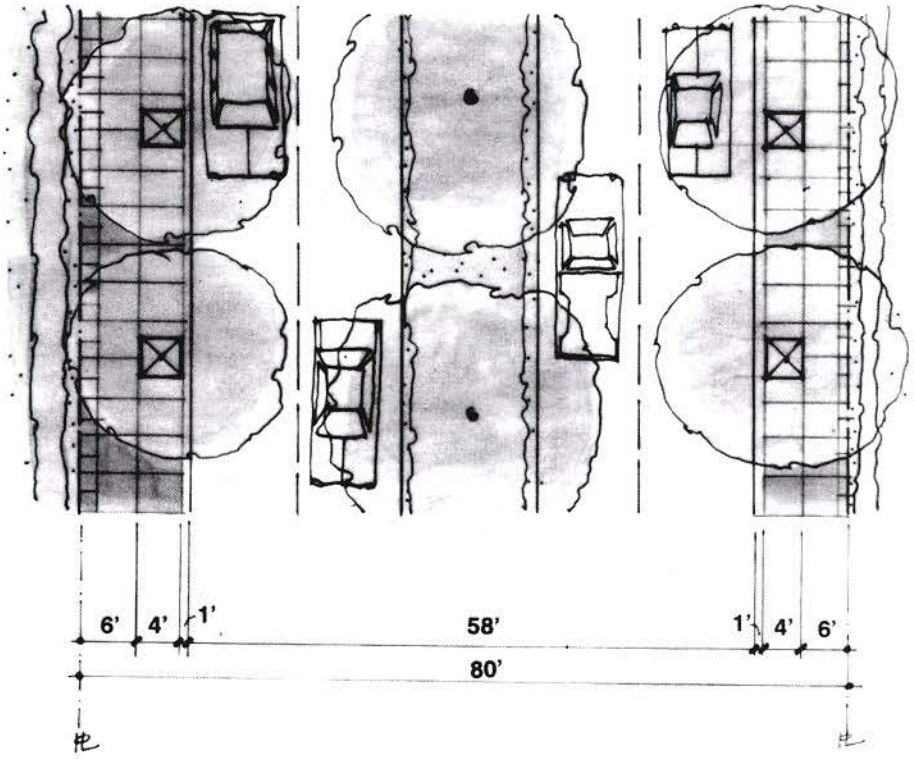


44' PW/80' ROW – no median

Figure VI-18

Cross section 4

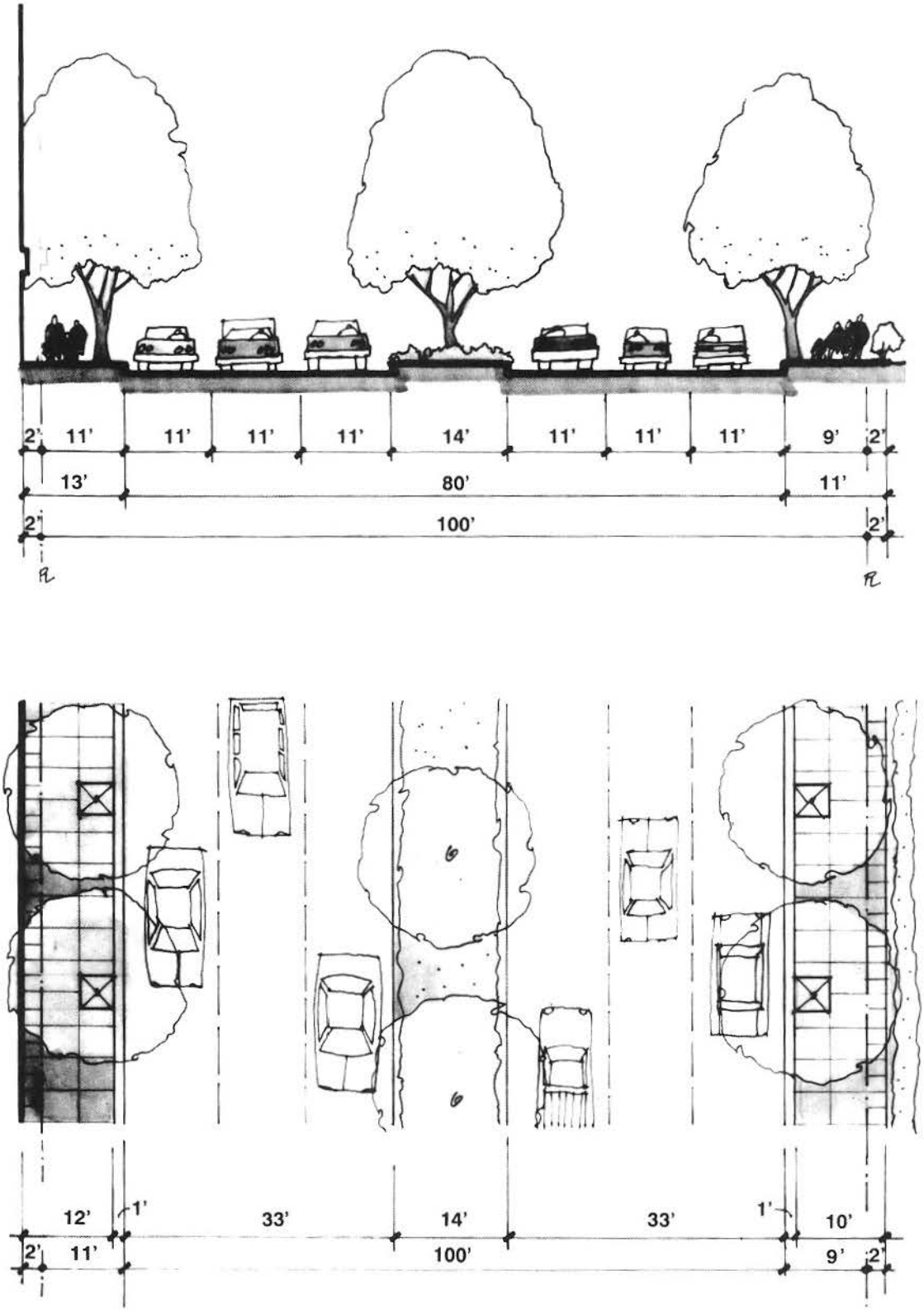




2x24' PW/80' ROW – with median

Figure VI-19

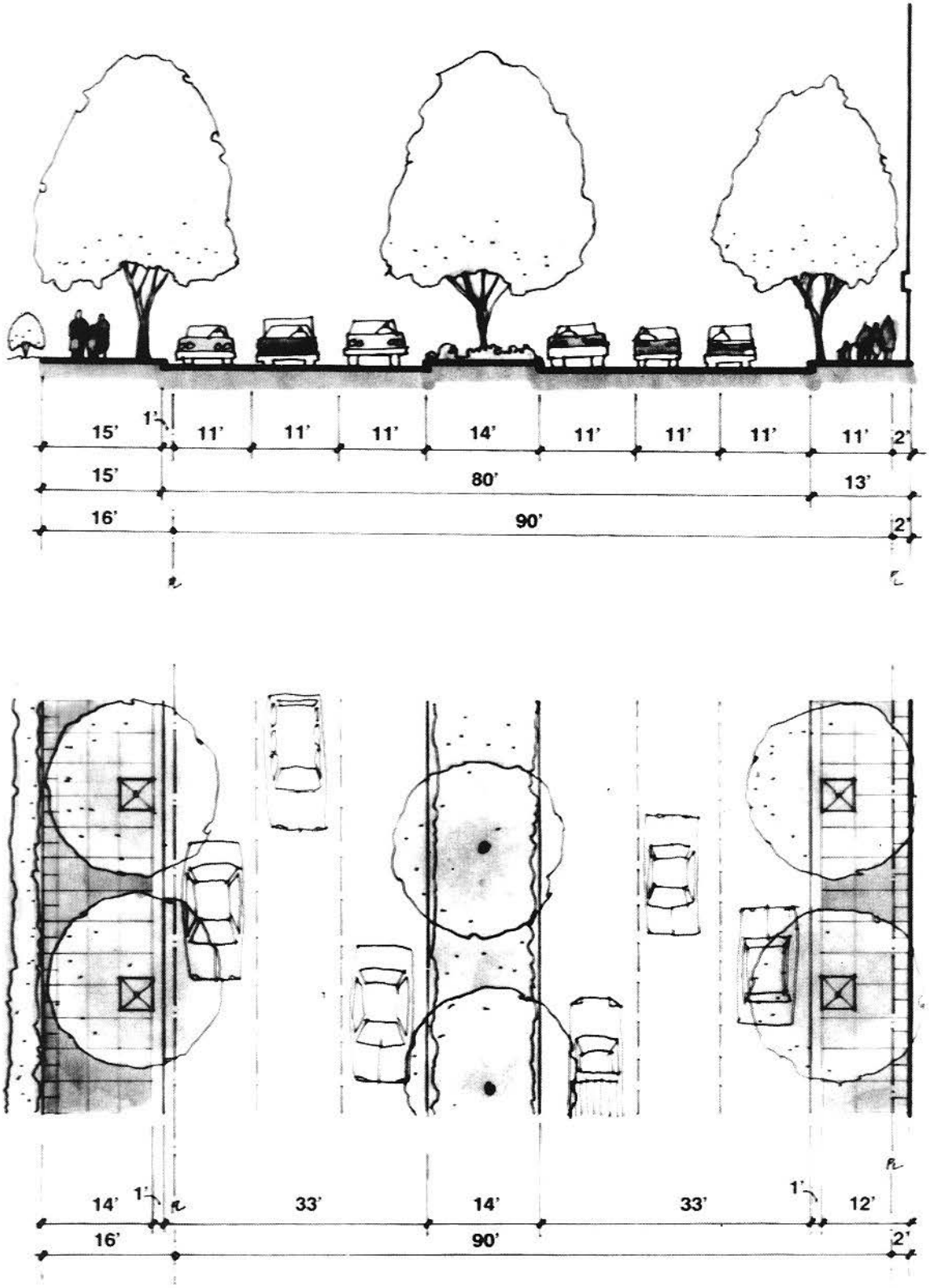
Cross section 5



2x33' PW/100' ROW – with median

Figure VI-20

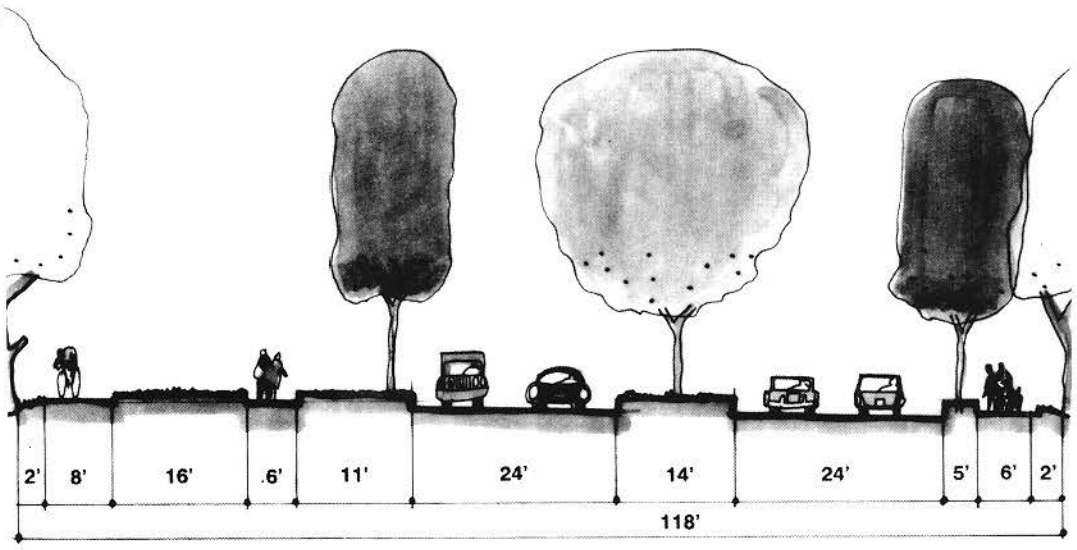
Cross section 6

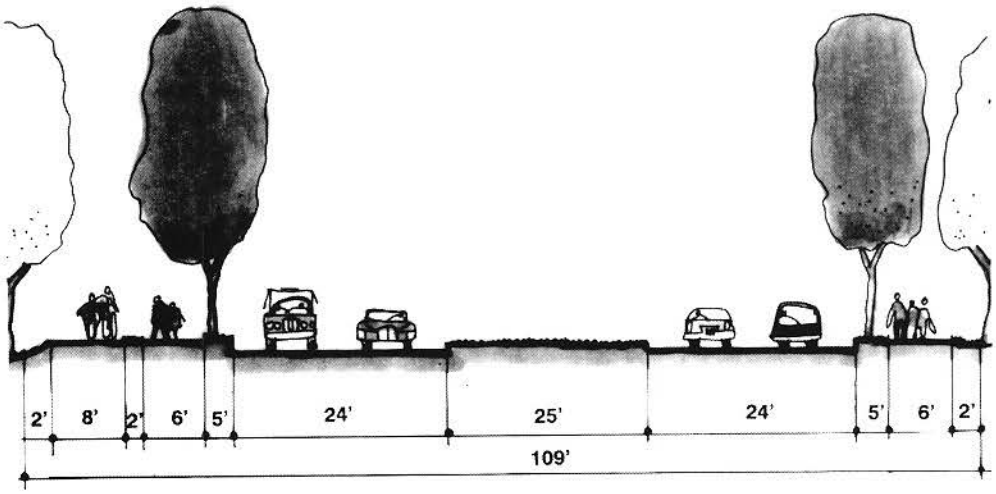


2x33' PW/108' – with median

Figure VI-21

Cross section 7





Parkway Options

Figure VI-22

IMPLEMENTATION OF PEDESTRIAN ENVIRONMENT IMPROVEMENTS PROGRAM

Numerous major capital improvements to arterial street, freeway, transit and pedestrian facilities throughout the Uptown area are proposed in the Comprehensive Transportation Strategy. It is recommended that pedestrian mobility improvements be implemented in conjunction with major street and transit improvements within Uptown Houston.

In order to implement the Pedestrian Environment Improvements Program as quickly as possible without installing any major improvements that would have to be removed for the construction of later improvements, an implementation strategy has been developed which is coordinated between the Arterial Street Improvements Program and the reconstruction of Post Oak Boulevard associated with METRO's proposed high capacity transit corridor construction or other transit improvements.

This implementation strategy for the Pedestrian Environment Improvements Program can be summarized as follows:

- **Post Oak Boulevard Improvements –**

  Proposed to be funded and implemented in association with construction of the proposed METRO high capacity transit corridor along Post Oak Boulevard.

- **Arterial Streets Improvements –**

  Proposed to be funded and implemented under the Arterial Street Improvements Program (refer to Section III).

Implementation of Post Oak Boulevard Pedestrian Improvements

Due to the overriding impact of construction of the proposed METRO high capacity transit corridor on Post Oak Boulevard, as well as the dependence of the transit corridor on effective pedestrian interconnections, it is clear that implementation of the Pedestrian Environment Improvements Program for Post Oak Boulevard should be implemented in conjunction with the proposed METRO transit corridor. It is anticipated that reconstruction of the Post Oak Boulevard traffic lanes and pedestrian system would be required to accommodate the proposed METRO transit corridor.

In the Comprehensive Transportation Strategy, it is proposed that base improvements to the Post Oak Boulevard traffic lanes and pedestrian system be made in advance of construction of the METRO transit corridor in order to effectively manage traffic impacts during construction and effect improvement for pedestrian mobility as soon as is feasible. Once reconstruction of the base street alignment is completed, construction of the transit corridor would require use of only the two inside lanes of Post Oak Boulevard during construction.

The Pedestrian Environment Design Concept could still be implemented under the contingency that METRO does not build the transit corridor along the Post Oak Boulevard alignment. Regardless of when or whether the high capacity facility is built, implementation of the Pedestrian Environment Improvements Program on Post Oak Boulevard would be of immediate benefit and would be recommended for a fully integrated transportation system.

To implement the Pedestrian Environment Improvements Program within the earliest possible time frame without installing improvements which would have to be removed during later construction, elements of the total project are grouped in the following three phases:

- **Near Term –** Pedestrian environment improvements to be implemented prior to street reconstruction.

  Pedestrian environmental improvements were identified which could be installed in their ultimate location before the major pavement widening of Post Oak Boulevard. These improvements include significant tree planting and sidewalk widening. Implementation of these improvements would have immediate impact on pedestrian mobility and environmental quality. Further, tree plantings, where feasible, would have the opportunity to commence growth immediately. The estimated cost of proposed near term Post Oak Boulevard improvements $4.5 million.

- **Pre-transit corridor –** Improvements implemented during reconstruction of traffic lanes, utilities and pedestrian system.

  Construction of the base street and pedestrian system infrastructure to accommodate the METRO transit corridor would improve pedestrian facilities to the level set forth in the Pedestrian Environment Improvements Program. Following this stage, Post Oak Boulevard would assume its final appearance with the exception of the transit facilities and access points. The estimated cost of the proposed Post Oak Boulevard reconstruction is $9.4 million.

- **Transit corridor –** Construction of the proposed transit corridor and access points.

Near Term Post Oak Boulevard Improvements

Initially, work undertaken to improve Post Oak Boulevard will include only those projects that can remain in place, relatively undisturbed, during construction of the proposed METRO transit corridor. This would include:

- **Sidewalks** – Replacement of approximately 50% of the sidewalks along Post Oak Boulevard, mainly on the east side, to allow for permanent location of street-side fixtures and trees.
- **Street cross section** – Post Oak Boulevard is reconstructed 100 feet to either side of any cross streets where intersections are improved as part of the Arterial Street Improvements Program.
- **Street trees** – Permanent installation of live oaks along 50% of the frontage between Hidalgo and Westheimer. The other 50% has existing trees or no trees planned.
- **Signalization** – Installation of pedestrian and traffic signal poles north of Westheimer.
- **Lighting** – Installation of pedestrian and street lighting at approximately 50% of potential locations, primarily on the east side of Post Oak Boulevard.
- **Banners** – Installation of banners at approximately 50% of potential locations, primarily on the east side of Post Oak Boulevard.

Sidewalks are improved only in some sections during the near term phase of improvements, phased according to the location of tree plantings and installation of street and pedestrian lighting. Where new trees can be located outside of the future pavement width for Post Oak Boulevard, but inside the existing right-of-way, the sidewalk may be moved and improved to accommodate the tree in its ultimate location during the near term phase of improvements. Near term improvements on Post Oak Boulevard would allow for replacement of approximately 50% of existing sidewalks in order to permanently locate trees and street/pedestrian lighting.

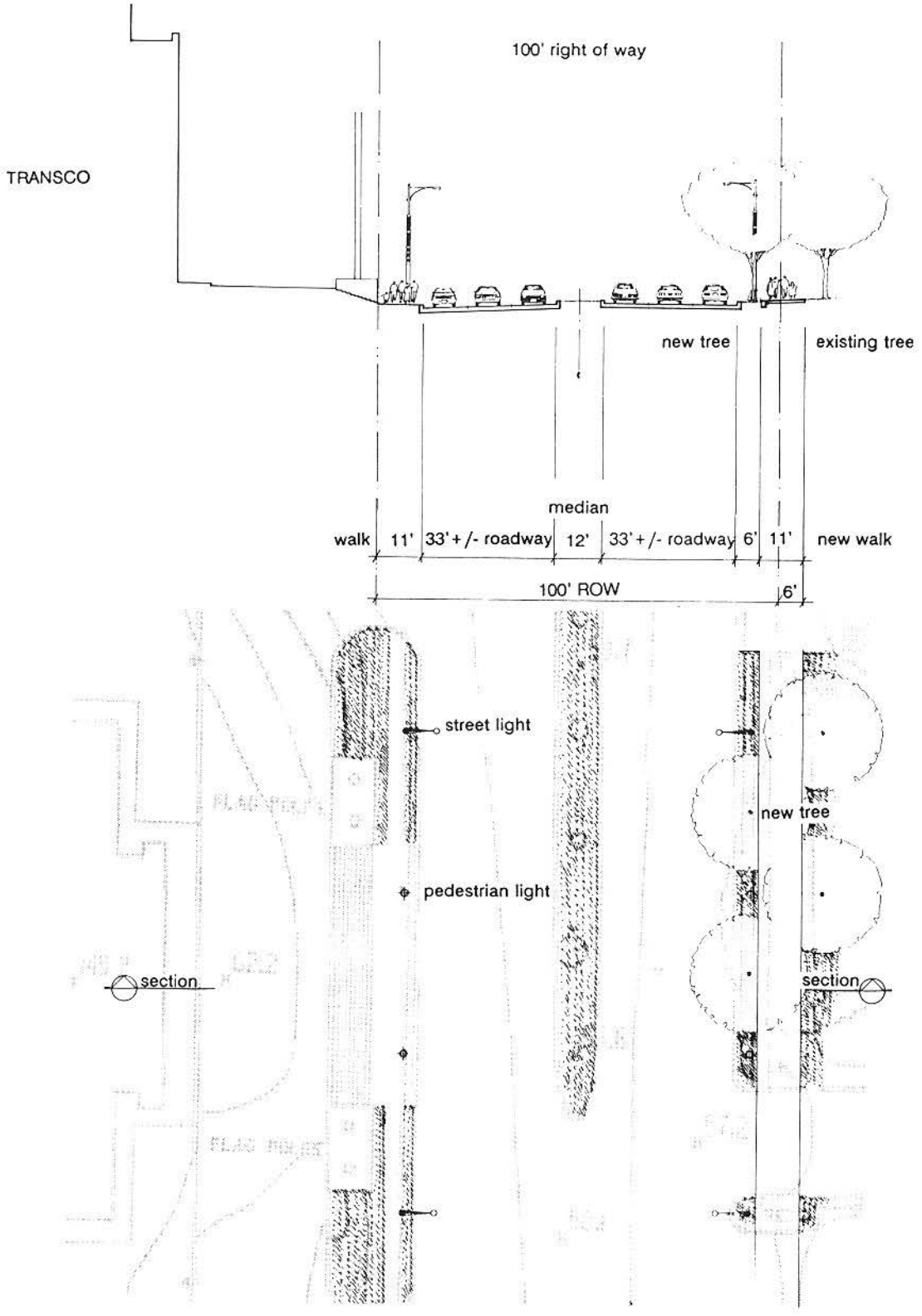
To illustrate phasing of improvements to Post Oak Boulevard in the near term and in association with METRO fixed guideway construction, two prototypical sections of Post Oak Boulevard were chosen. The two sections, Transco Tower/Galleria and Post Oak Central, were selected for illustration in cross section and plan view because they offered the most limiting right-of-way constraints of any section of the Boulevard. The Pedestrian Environment Design Concept would be applicable to the other sections of Post Oak Boulevard without major limitations.

The following are recommended near term improvements to the prototypical sections:

- **Transco/Galleria (Figure VI-23):**
  - Lighting. Street and pedestrian lighting is added on both sides of the street in locations that will not be disturbed during construction of the proposed METRO transit corridor.
  - Street trees. New trees are planted on the east side of Post Oak Boulevard between the street and sidewalk.
  - Sidewalk. The sidewalk on the east side is widened to 11', requiring 6' of additional right-of-way.

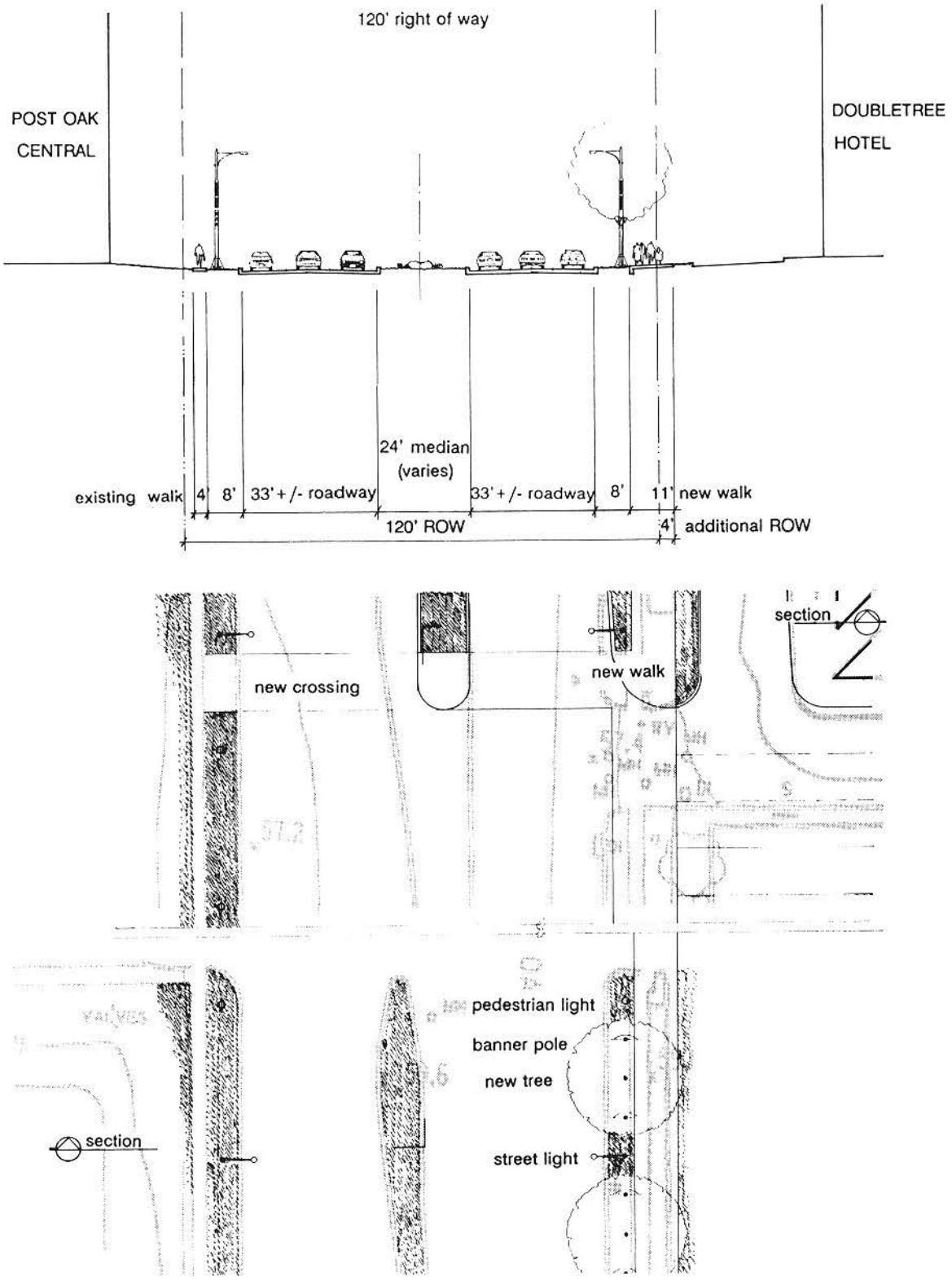
- **Post Oak Central (Figure VI-24):**
  - Lighting. Street and pedestrian lighting is added on both sides of the street, again where future construction of the proposed METRO transit corridor will not cause removal.
  - Street trees. Street trees are planted on the east side of the street with canopies beginning above 12'.
  - Sidewalk. New 11' sidewalk is installed on the east side of the street, requiring an additional 4' of right-of-way.
  - Crossing. A new pedestrian crossing is delineated on Post Oak Boulevard.
  - Banners. Banners are installed on the east side of the street at locations approved by adjacent landowners.

At both locations, the planting of new trees on the east side of the street in their permanent location requires removal of the existing sidewalk. Because no new trees are to be planted on the west side of Post Oak Boulevard, the existing sidewalks are not upgraded until the next phase of construction. Estimated costs of the recommended near term Post Oak Boulevard improvements are shown in Table VI-1.



Near Term Improvements
Transco

Figure VI-23



Near Term Improvements
Post Oak Central

Figure VI-24

Table VI-1:
Estimated Costs for Near Term Post Oak Boulevard Improvements

ITEM	QUANTITY	UNIT COST	COST
Concrete demolition:			
Sidewalks and medians	69,000 sf	$0.70/sf	$ 48,300
Streets and intersections	158,000 sf	$1.00/sf	$ 158,000
Concrete Roadway:			
Post Oak Blvd. typical	1,400 lf	$375/lf	$ 525,000
Intersections	55,000 sf	$8.00/sf	$ 440,000
Sidewalks	84,000 sf	$8.00/sf	$ 672,000
Trees:			
Live Oaks - 6" cal.	50	$675/unit	$ 33,750
Other - 8" caliper	250	$825/unit	$ 206,250
Landscape/irrigation:			
Lawn	20,800 sf	$3.50/sf	$ 72,800
Median, typical	17,000 sf	$7.00/sf	$ 119,000
Banner poles	175	$1,750/unit	$ 306,250
Signal poles (catenary)	8	$21,000/ intersection	$ 168,000
Lighting (120' o.c.)	130	$6,300/unit	$ 819,000
SUBTOTAL			**$3,568,350**
General Conditions	6.5%		
Contractor's Fee	3.5%		
Contingency	15.0%		
Total Markup	25.0%		$ 892,000
TOTAL			$4,460,350

Improvements Associated with Post Oak Boulevard Reconstruction and METRO Transit Corridor Construction

It is anticipated that reconstruction of Post Oak Boulevard will take place in order to accommodate the proposed METRO transit corridor. It is recommended that work during this phase include the following elements:

- **Traffic lanes and sidewalks –** Reconstruction of Post Oak Boulevard to augment near term improvements and provide for major street reconstruction and the installation of lights, trees, improved sidewalks and permanent location of banners. Post Oak Boulevard will assume its final appearance, with the exception of the METRO transit corridor, during this phase of construction.

- **Transit corridor and stations –** Construction of the transit corridor along Post Oak Boulevard with stations and access points. The design concept for Post Oak Boulevard assumes the ultimate development of a fixed quideway, but is configured to accommodate a grade level bus transit corridor in the near term.

- **Boulevard relocation and extension –** Relocation of Post Oak Boulevard south of Hidalgo and extension to US 59 (refer to Section VI: *Arterial Street Improvements Program*).

Estimated costs for pedestrian improvements recommended for implementation during reconstruction of Post Oak Boulevard associated with construction of the proposed METRO transit corridor are shown in Table VI-2. The following are recommended improvements to the prototypical sections of Post Oak Boulevard in conjunction with the construction of the METRO transit corridor:

- **Transco/Galleria (Figure VI-25):**

  - Sidewalks. Sidewalks are widened to the greatest extent feasible given the right-of-way constraints, with a goal of 11'.

  - Median. The median is widened 2'.

  - Transit Corridor. The transit corridor is constructed and the median re-landscaped.

    * The total additional right-of-way required for improvements is 12', averaging 6' on either side.

- **Post Oak Central (Figure VI-26):**

  - Sidewalk. The sidewalk is widened to 11' on the west side of the street and any street trees in this proposed sidewalk zone are deleted. (This requires an additional 4' of right-of-way.)

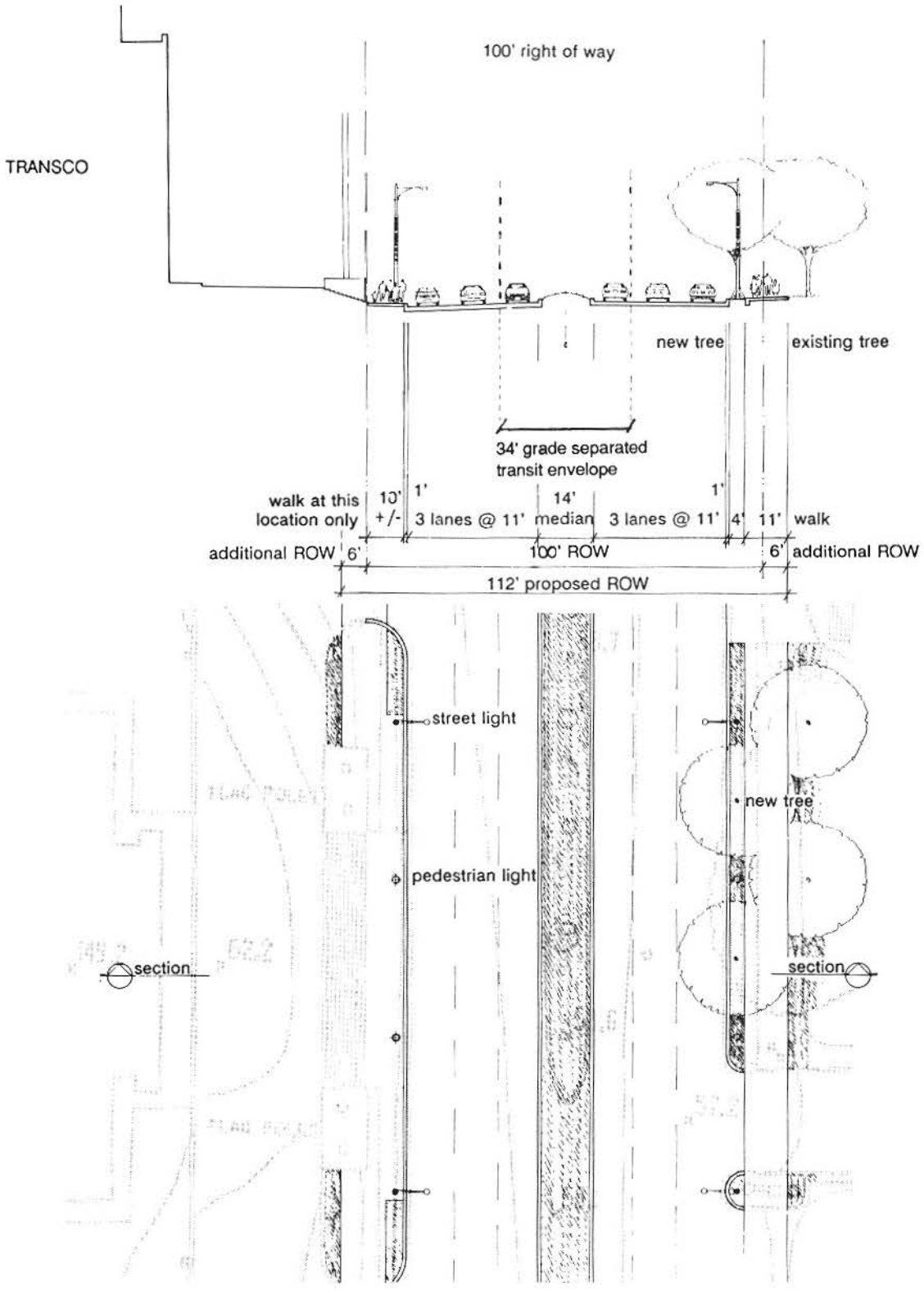
  - Transit Corridor. The METRO transit corridor is constructed, requiring an enlargement of the median to 24', with associated re-landscaping.

– Traffic lanes. The pavement width in this section of Post Oak Boulevard is also widened, to allow for three 12' lanes in each direction.

* There are no additional changes to the east side of the street during reconstruction of Post Oak Boulevard. The total additional right-of-way required for Phase 1, 2 and 3 improvements is 8', averaging 4' on either side.

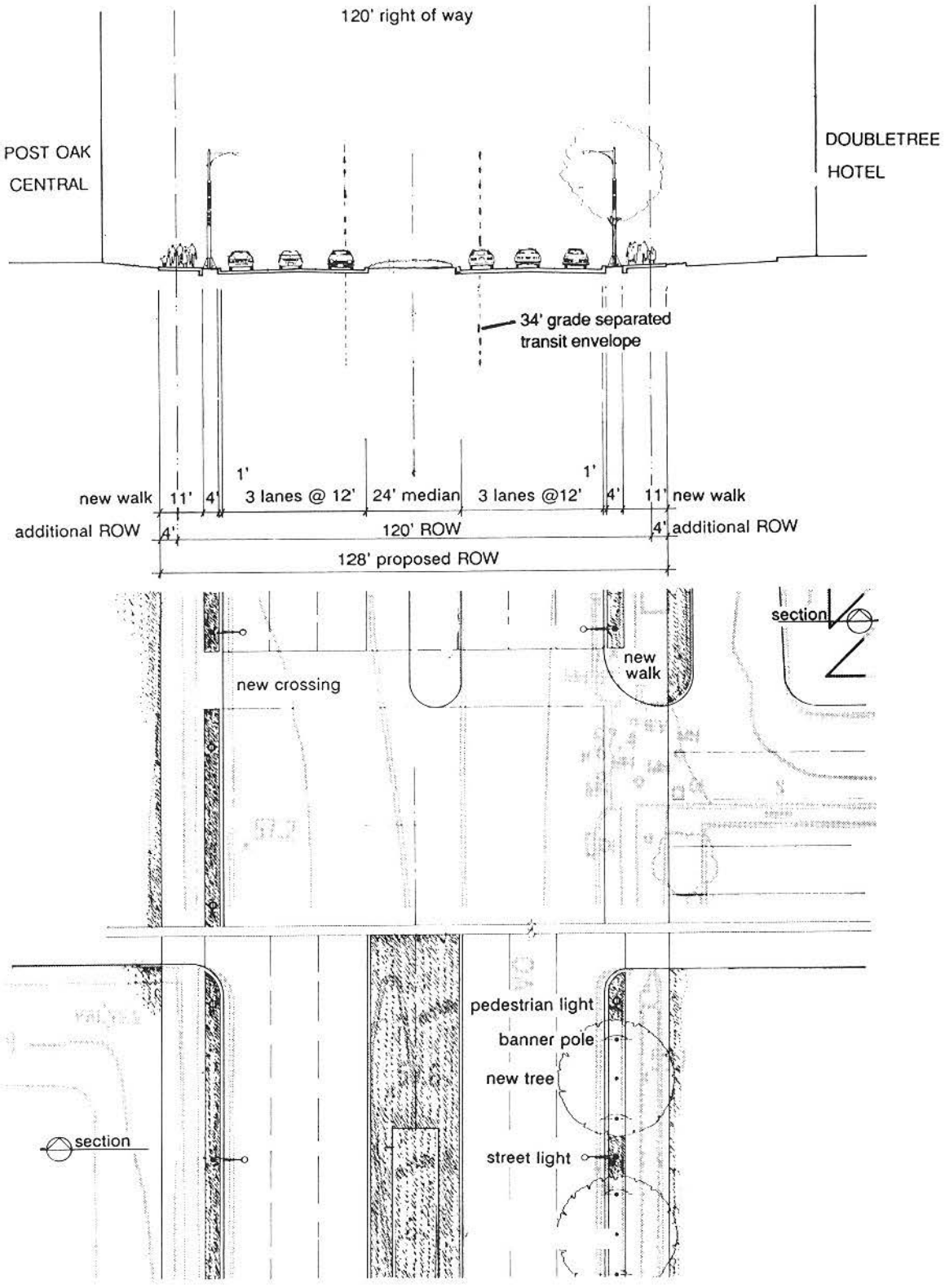
Table VI-2:
Estimated Costs for Post Oak Boulevard Improvements (Reconstruction)

ITEM	QUANTITY	UNIT COST	COST
Concrete demolition:			
Sidewalks and medians	107,000 sf	$0.70/sf	$ 74,900
Streets and intersections	393,000 sf	$1.00/sf	$ 393,000
Concrete Roadway:			
Post Oak Blvd. typical	5,600 lf	$375/lf	$2,100,000
Intersections	6,000 sf	$8.00/sf	$ 48,000
Sidewalks	110,000 sf	$8.00/sf	$ 880,000
Trees:			
Live Oaks-6" cal.	115	$675/unit	$ 77,625
Other-8" caliper	145	$825/unit	$ 119,625
Landscape/irrigation:			
Lawn	69,000 sf	$3.50/sf	$ 241,500
Median, typical	172,000 sf	$7.00/sf	$1,204,000
Signal poles (catenary)	4	$21,000/ intersection	$ 84,000
Lighting:			
Street (120' o.c.)	50	$6,300/unit	$ 315,000
Pedestrian (40' o.c.)	500	$4,000/unit	$2,000,000
SUBTOTAL			$7,537,650
General Conditions	6.5%		
Contractor's Fee	3.5%		
Contingency	15.0%		
Total Markup	25.0%		$1,884,400
TOTAL			**$9,422,100**



Post Oak Boulevard Transit Corridor Improvements
Transco

Figure VI-25



Post Oak Boulevard Transit Corridor Improvements
Post Oak Central

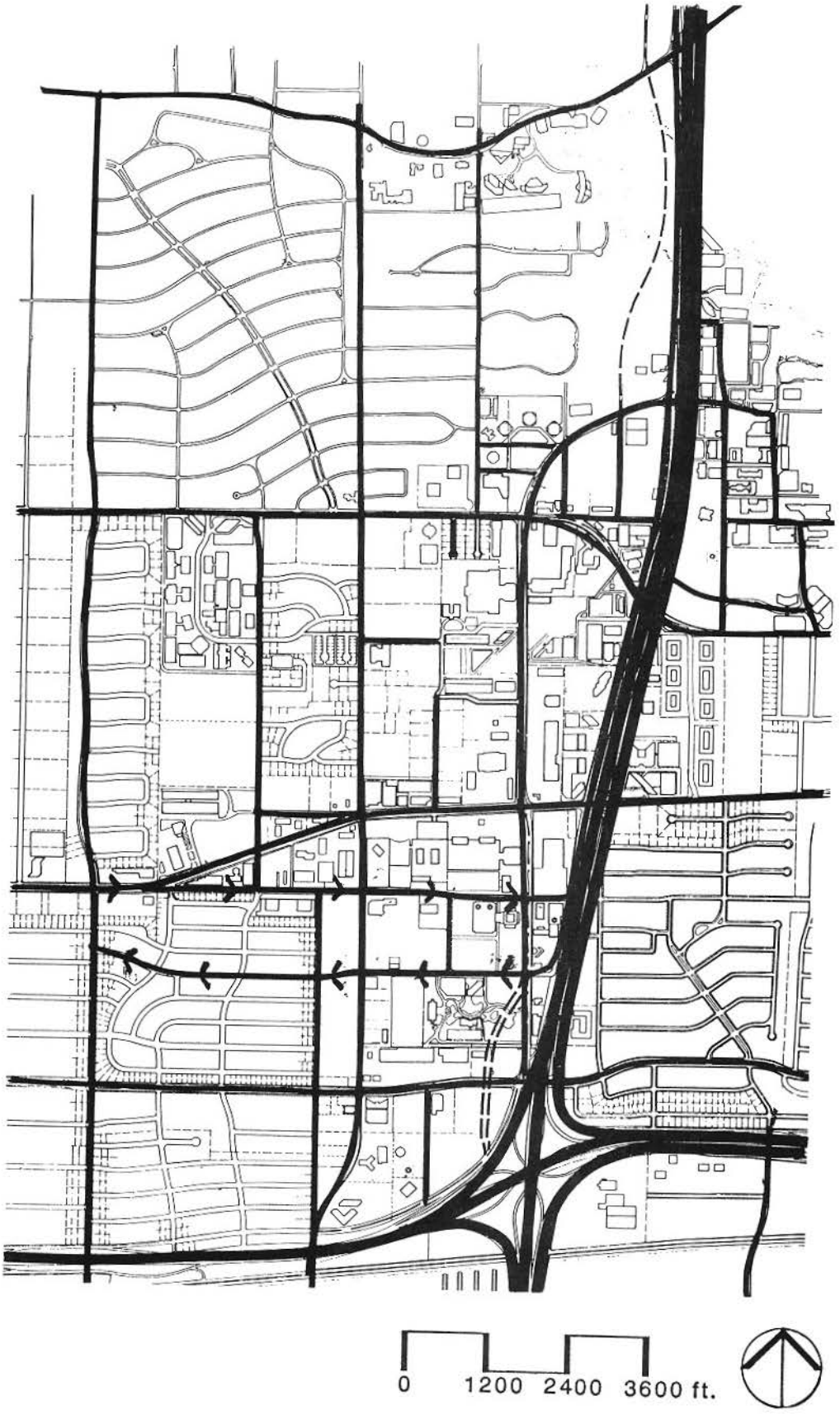
Figure VI-26

Implementation of Arterial Street Pedestrian Improvements

It is proposed that design and construction of all streets extended or widened under the Arterial Street Improvements Program include improvement of pedestrian facilities to the level defined in the Pedestrian Environment Design Concept. Streetscape improvements associated with the Arterial Streets Improvements Program are included in the cost estimates for that program. The total cost of Phases I and II of the Arterial Streets Improvements Program is estimated to be $85.8 million.

The Pedestrian Environment Design Concept addresses sidewalks, pedestrian signalization, special treatment of pedestrian crossings and other pedestrian improvements such as lighting, shade trees and street furniture. Pedestrian improvements at intersections would be coordinated between the individual street projects as well as the area-wide signalization improvement project (refer to Section III: *Arterial Street Improvements Program*).

The existing public street system in Uptown is diagrammed in Figure VI-27. Currently, no street within the area has more than a three foot (residential neighborhood sized) sidewalk. Figure VI-28 illustrates the arterial streets proposed to be improved under the Arterial Street Improvements Program. It is proposed that the pedestrian portions of these roadways be improved consistent with the street cross sections and streetscape elements defined in the Pedestrian Environment Design Concept. Specifically, Table VI-3 lists projects within the Arterial Street Improvements Program together with the corresponding cross section recommended for implementation.



Existing Public Street System

Figure VI-27

Table VI-3:
ARTERIAL STREET IMPROVEMENTS PROGRAM

Widenings, Extensions and Intersection Improvements

Proj. Num.	Description	Proposed ROW	Applicable Cross Section	Figure Numbers
Widenings:				
6	Hidalgo (Rice - Chimney Rock)	60' (44' PW)	1 or 2	VI-16 or 17
12	Richmond (Sage - Chimney Rock)	140' (2@44')	6	VI-21 (modified)
16a	Sage (Woodway - San Felipe)	60' (44' PW)	1 or 2	VI-16 or 17
21	Post Oak Lane (Woodway -San Felipe)	60' (44' PW)	1 or 2	VI-16 or 17
22-24b	San Felipe (Sage - I.H. 610)	100'-90' (var.)	5	VI-20 (modified)
Extensions:				
10	Fairdale (Post Oak - South Rice)	60' (44' PW)	1 or 2	VI-16 or 17
11	Fairdale (South Rice - Chimney Rock)	60' (44' PW)	1 or 2	VI-16 or 17
25-26	McCue (San Felipe - Ambassador)	60' (44' PW)	1, 2 or 3	VI-16, 17 or 18
27	McCue (Ambassador - Westheimer)	60' (44' PW)	1, 2 or 3	VI-16, 17 or 18
28-31	Ambassador Way (Sage - IH-610)	60' (44' PW)	1 or 2	VI-16 or 17
32-35	Guilford (Sage - I.H. 610)	60' (44' PW)	1 or 2	VI-16 or 17
36-38	Garretson (Post Oak - Guilford)	60' (44' PW)	1 or 2	VI-16 or 17
42-43	Post Oak Blvd (Hidalgo - U.S. 59)	100' (2@33)	5 or 6	VI-20 or 21
48-49	Uptown Parkway (Woodway-Post Oak Boulevard)	80' (2@24)	4 or 7	VI-19 or 22
Intersections:				
1	Westheimer & Chimney Rock	* Include pedestrian elements		
3	Richmond & Chimney Rock	* Include pedestrian elements		
5	Chimney Rock & U.S. 59/Westpark	* Include pedestrian elements		
7	Yorktown-Rice Connector - Phase I	* Include pedestrian elements		
9	Richmond & Sage	* Include pedestrian elements		
15	Rice & Sage & U.S. 59 & Westpark	* Include pedestrian elements		
16b	Woodway & Sage	* Include pedestrian elements		
17	San Felipe & Sage	* Include pedestrian elements		
18&41	Westheimer/Alabama Pairing	* Include pedestrian elements		
19	Westheimer & Sage	* Include pedestrian elements		
20	Alabama & Sage	* Include pedestrian elements		
20	Alabama & Post Oak Blvd.	* Include pedestrian elements		
23	San Felipe & Post Oak	* Include pedestrian elements		
24a	San Felipe & I.H. 610	* Include pedestrian elements		
39&40	Westheimer @ Post Oak & I.H. 610	* Include pedestrian elements		
66	Area Traffic Signal System	* Include pedestrian signalization		

NOTE: For further description of individual street projects, refer to Section III: *Arterial Street Improvements Program*

VII.

TRANSPORTATION DEMAND MANAGEMENT ACTION PLAN FOR HCID#1

Despite implementation of the aggressive Freeway and Arterial Street Improvements Programs defined in the Comprehensive Transportation Strategy, it is projected that the roadway system cannot meet all demand for travel to and through the Uptown area. On the basis of anticipated 2010 traffic volumes projected by the Houston-Galveston Area Council (H-GAC), it was concluded that the recommended arterial street and freeway improvements would accommodate nearly a doubling of Uptown Houston employment, **but would not achieve better levels of service over the long term.** Current congestion levels are projected to persist as the area continues to grow.

To enable Uptown Houston to achieve its desired level and quality of access and mobility, a combination of improved public transportation services, pedestrian mobility improvements, parking management and transportation demand management (TDM) will be needed in addition to roadway improvements. To meet this challenge, it is recommended that HCID#1 implement a Transportation Demand Management (TDM) program to reduce traffic congestion by maximizing the return on transit, paratransit and pedestrian investments and managing traffic flow on roadways.

FUNCTIONS OF HCID#1 TDM PROGRAM

The following are recommended to be the primary functions of the HCID#1 TDM program:

- **Plan for long-range transportation needs of the Uptown area;**
- **Represent the interests of the Uptown area in development of public sector transportation improvements and participate in public/private partnerships;**
- **Promote travel demand management (TDM) among Uptown businesses, corporations and property owners, as well as government transportation agencies; and**
- **Organize and establish area-wide transportation policies, services and facilities which manage transportation demand.**

HCID#1 TDM ACTION PLAN

HCID#1 developed an Action Plan for implementation of a Transportation Demand Management (TDM) program. The plan will be outlined in this section as follows:

- **Assessment of unmet transportation demand and policy deficiencies;**
- **TDM goals for HCID#1;**
- **HCID#1 TDM Action Plan (detail).**

The TDM Action Plan can be summarized as follows:

I. Implement Comprehensive Transportation Strategy projects.

II. Maximize capacity of existing and planned facilities through Transportation Systems Management (TSM) actions.

III. Develop and plan new TDM initiatives:

- **A. Conduct market research and travel behavior studies.**
- **B. Develop services and programs to promote mode shift.**
- **C. Develop traffic management services and programs.**
- **D. Develop parking policy.**
- **E. Develop land use guidelines to promote mode shift.**

IV. Establish program funding and inter-governmental agreements.

V. Implement employer-based program to promote mode shift and traffic management programs and services.

VI. Summary of public and private responsibilities.

VII. Establish ongoing process to set goals, monitor results and publicize achievements.

ASSESSMENT OF UNMET TRANSPORTATION DEMAND AND POLICY DEFICIENCIES

An evaluation of roadway system deficiencies was developed for the complete system recommended in the Arterial Street and Freeway Improvements Programs utilizing anticipated 2010 traffic volumes. Map VII-1 shows the projected daily traffic volumes on the recommended roadway system for year 2010. These volumes were based on projections by the Houston-Galveston Area Council from that agency's regional travel forecasting procedure. For this study, H-GAC's procedure was refined to more accurately estimate Uptown Houston's roadway needs by including a zone structured at the block level and including all commercial streets in the area. Between the present and 2010, the overall traffic entering and leaving the Uptown Houston area is expected to increase by 46 percent over current levels. This is based on comparisons of cordon line volumes, including both internally generated trips and through trips.

ARTERIAL STREET PROJECTED TRAFFIC VOLUMES

Volumes are expected to remain heavy and even increase on most roadways within the area. Most of the area volume increases will be absorbed by newly developed, extended or widened roadways. Volumes will typically range between 40,000 and 55,000 vehicles per day on major east-west thoroughfares and 25,000 to 50,000 on major north-south thoroughfares. Most local streets will carry volumes ranging from 10,000 to 20,000 vehicles per day.

Despite implementation of the 70 recommended roadway improvements, Map VII-2 shows that most of the Uptown Houston will be congested to some extent in 2010 according to Regional Mobility Plan criteria. Many of the same streets will be congested as are currently congested — both those with improvements and those without. Table VII-1 illustrates that a projected 91 percent of the peak hour vehicle-miles will operate in some degree of congestion in 2010. Approximately 70 percent of the peak hour vehicle-miles will be severely congested compared to today's 74 percent.

Map VII-3 shows the projected daily traffic volumes on the recommended roadway system for 1995, the generalized opening day for projects *Approved in Concept* by METRO within the Arterial Street Improvements Program. Map VII-4 shows the projected 1995 levels of congestion in Uptown Houston using Regional Mobility Plan criteria.

Table VII-1:

PROJECTED CONGESTION LEVELS - RECOMMENDED ROADWAY SYSTEM

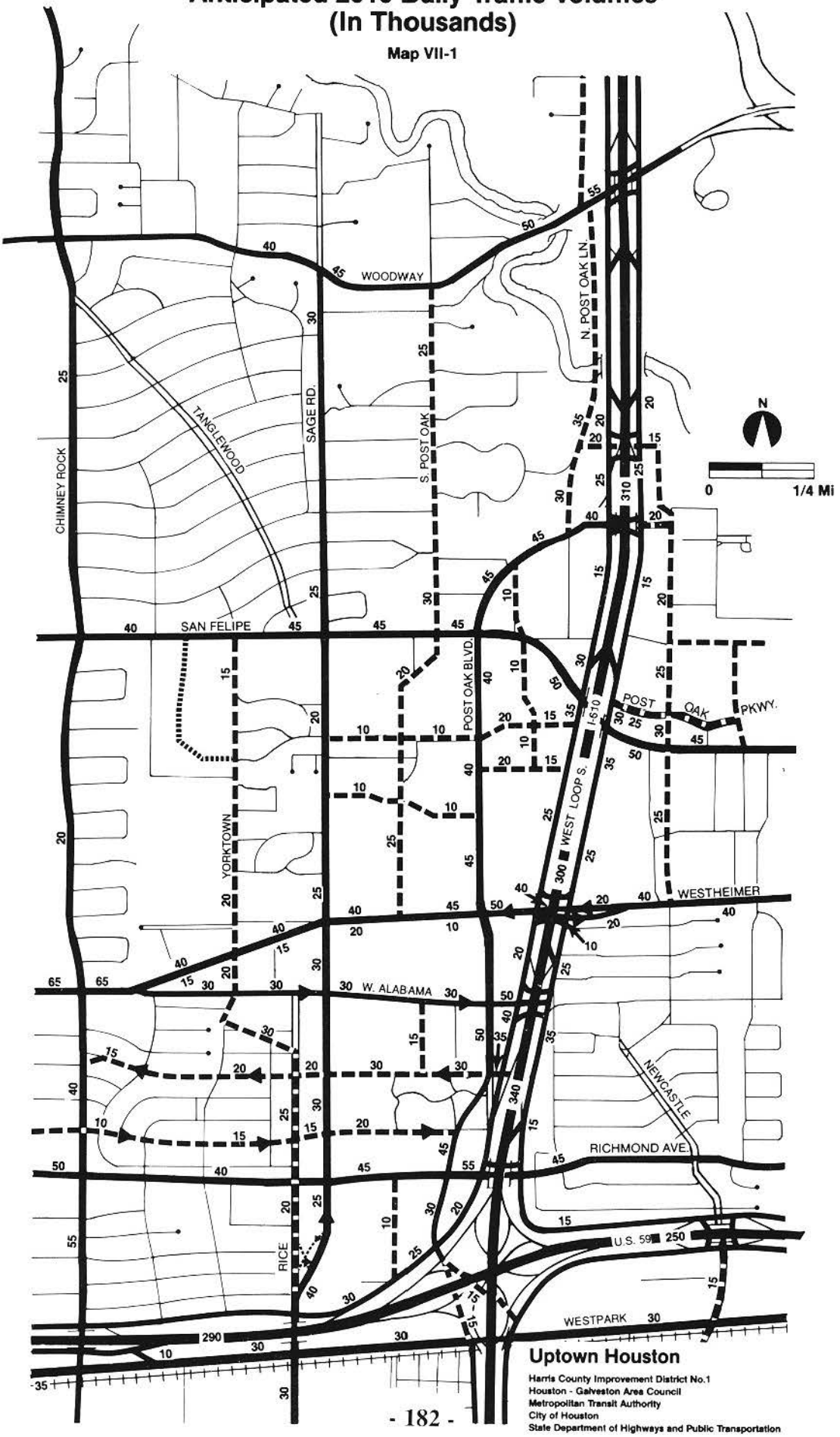
% Vehicle-Miles Traveled

Congestion Level	Current	1995*	2010
Moderate	6	10	11
Heavy	9	7	10
Severe	74	68	70
Total	89	85	91

*** Most congestion projected on IH-610 and other unimproved streets in 1995.**

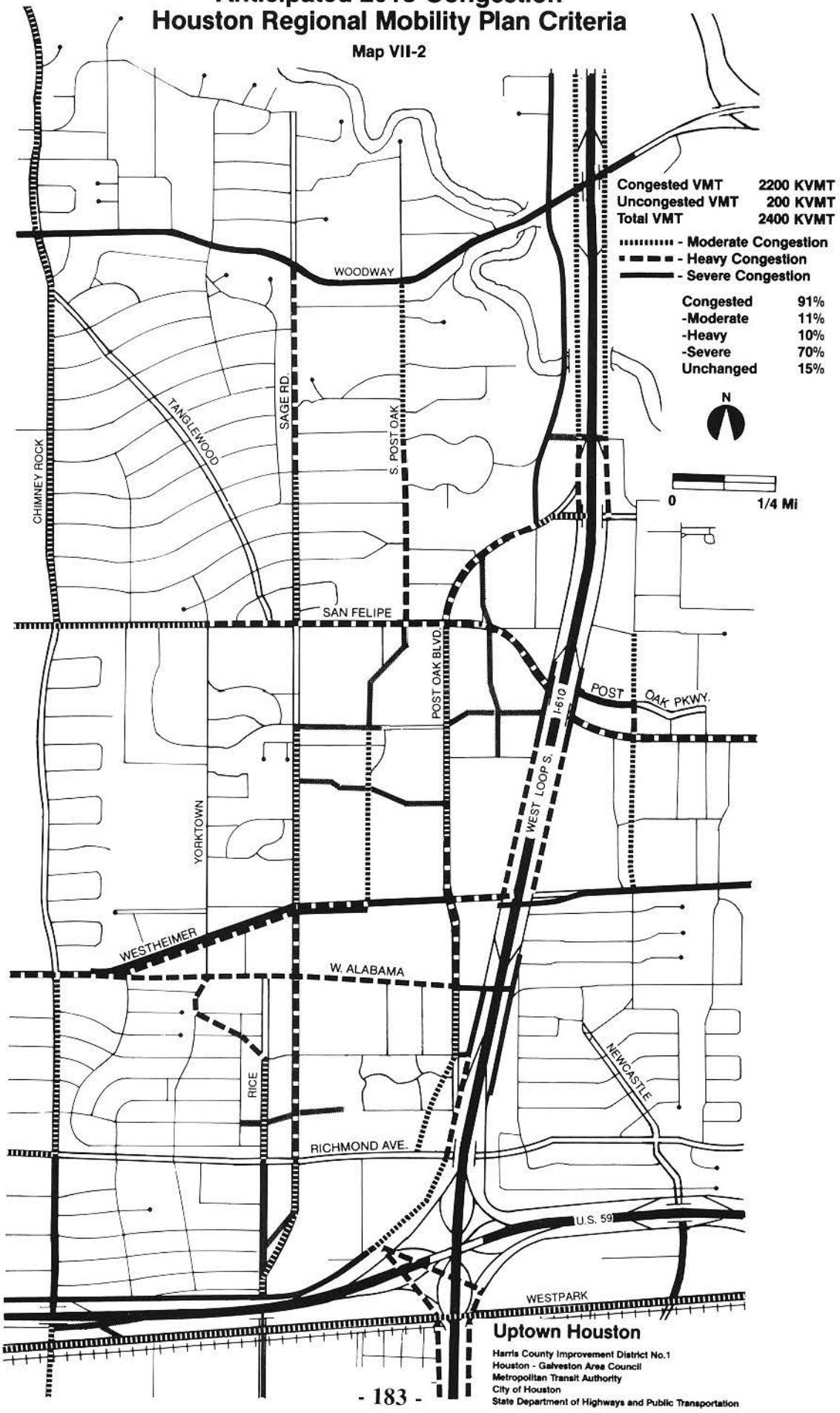
Anticipated 2010 Daily Traffic Volumes (In Thousands)

Map VII-1



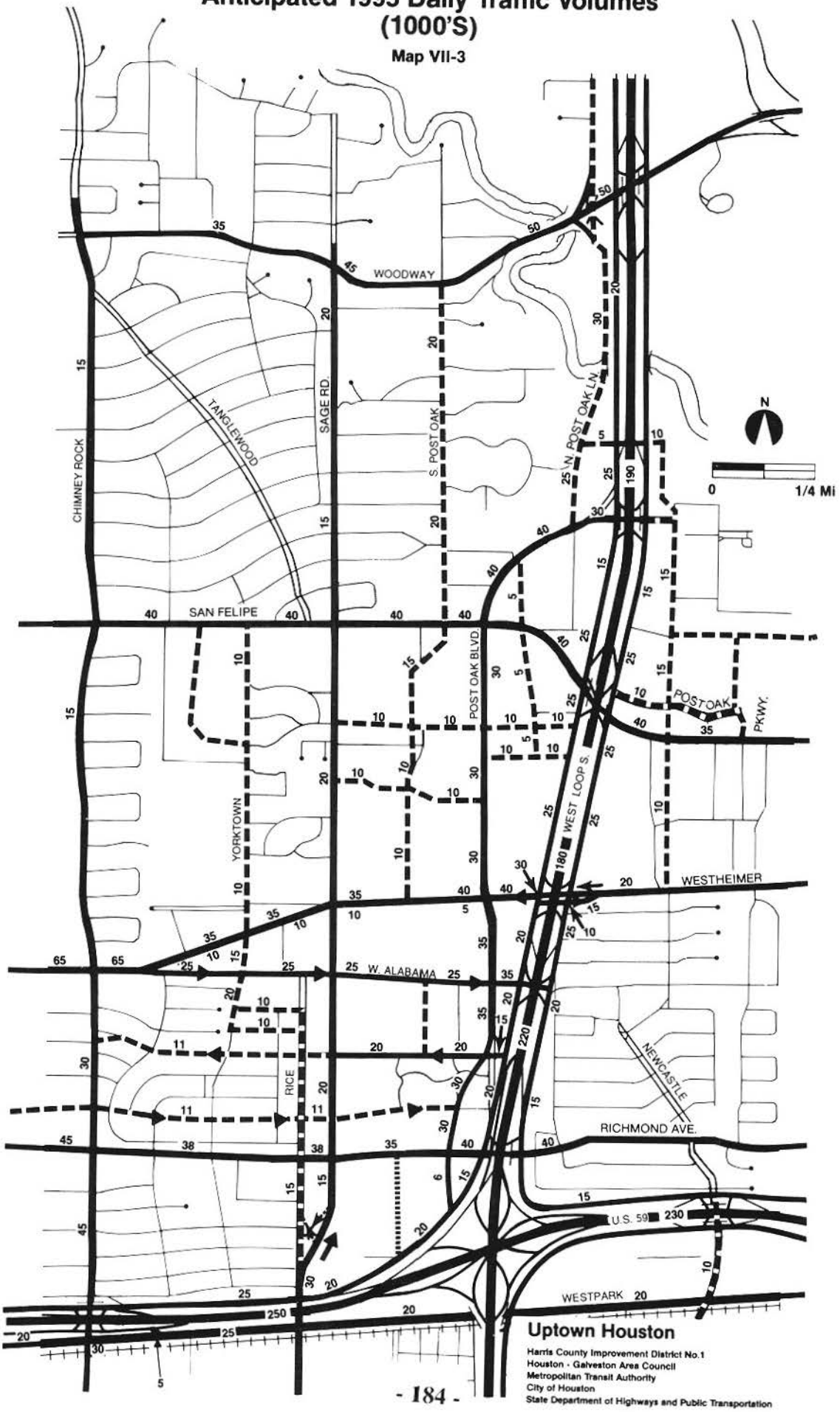
Anticipated 2010 Congestion
Houston Regional Mobility Plan Criteria

Map VII-2



Anticipated 1995 Daily Traffic Volumes (1000'S)

Map VII-3

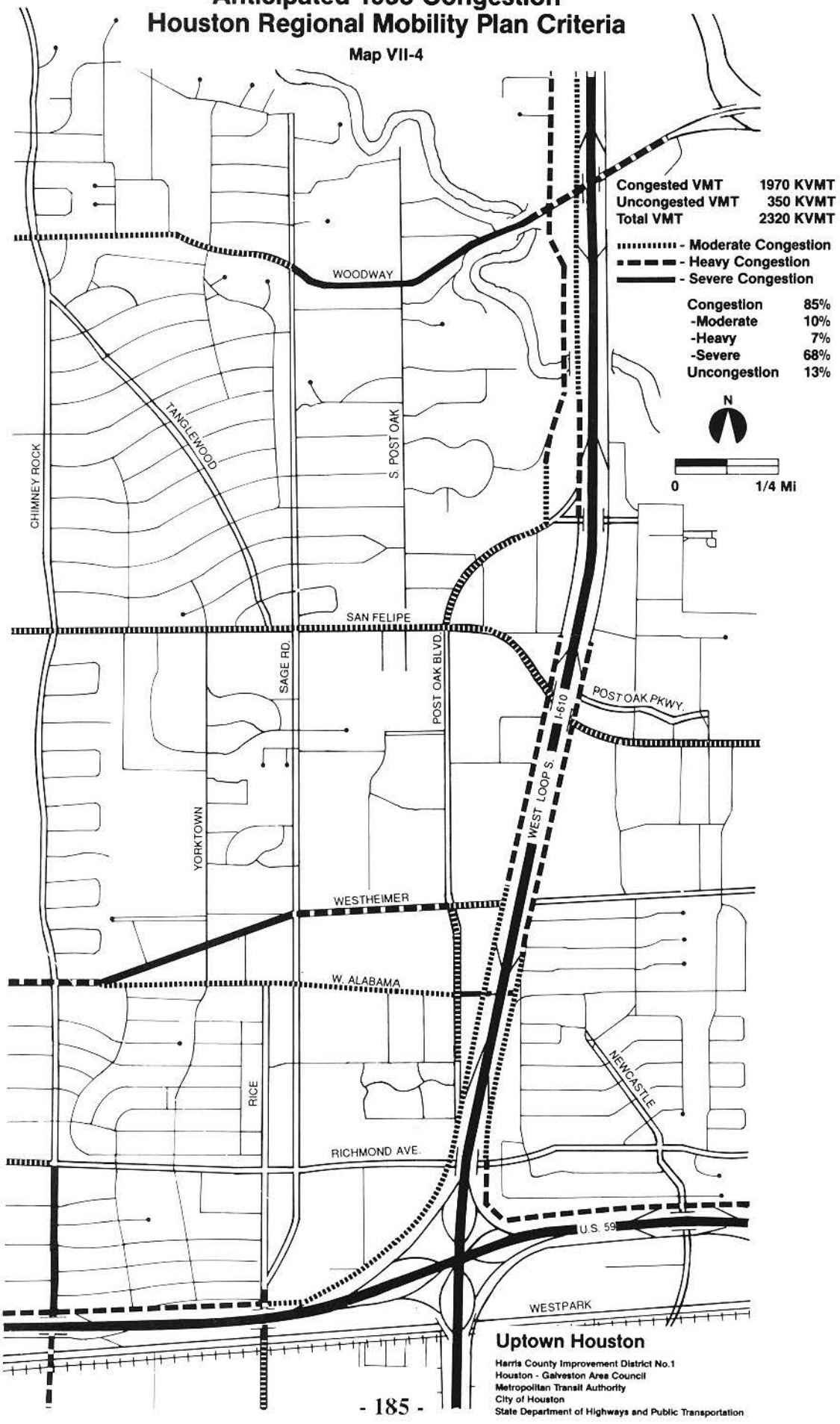


Uptown Houston

Harris County Improvement District No.1
Houston - Galveston Area Council
Metropolitan Transit Authority
City of Houston
State Department of Highways and Public Transportation

Anticipated 1995 Congestion
Houston Regional Mobility Plan Criteria

Map VII-4



FREEWAY PROJECTED TRAFFIC VOLUMES

Traffic volumes will be heaviest on I.H. 610 and U.S. 59. Freeway corridor volumes (main lanes plus frontage roads) will increase from 230,000 per day to 290,000 per day on U.S. 59 and from 230,000 to 340,000 on I.H. 610. On these facilities, traffic will continue to absorb all capacity which can be provided. This includes additional capacity gained through anticipated improvements to both freeways.

The State Department of Highways and Public Transportation (SDHPT) and the Houston-Galveston Area Council (H-GAC) project 2010 demand of 340,000 cars per day on I.H. 610. To meet 2010 demand with Level of Service C would require 20 to 25 lanes. SDHPT is currently proposing an expansion of one lane in each direction on the mainlanes, two lanes in each direction on express lanes, frontage road expansions and numerous ramp improvements. This major construction would provide a total of 18 continuous lanes on the I.H. 610 West Loop, still short of the lanes required to meet 2010 demand. Thus, SDHPT is unable to meet projected 2010 demand for travel on the I.H. 610 West Loop only by means of constructing additional lanes. SDHPT proposes to meet the remainder of 2010 demand through freeway system management techniques.

CONCLUSION REGARDING ROADWAY DEMAND

Thus, it can be concluded that the recommended Freeway and Arterial Street Improvements Programs will accommodate nearly a doubling of Uptown Houston employment, but will not achieve better levels of service over the long term. However, it should be emphasized that the roadway system will be more convenient and comprehensible and will support a substantially greater economic base.

EFFECT OF PARKING POLICY ON CONGESTION LEVELS

Free parking for Uptown employees impacts transit mode split negatively and reduces intra-area walk trips. However, due to the current lack of viable alternatives to driving alone, free parking is necessary to the economic viability of existing development. Creation of viable alternatives to driving alone would allow the opportunity for property owners and businesses within the Uptown area to implement a parking policy which promotes mode shift to transit and other alternatives to driving alone.

There are some 41,000 parking spaces at office, retail and hotel developments within Harris County Improvement District #1. Throughout greater Uptown Houston, there are estimated to be some 70,000 parking spaces. This compares to approximately 65,000 spaces in all of the Houston CBD. (Refer to Section I-B: *Transportation System Deficiencies* for discussion of existing parking supply and pricing in Uptown Houston.)

Whereas parking costs are a disincentive to driving within most downtowns, almost all parking costs are paid by employers and not passed directly to employees within the Uptown area. Uptown employees perceive that parking is free, even though the cost is paid by the employer and may actually be passed through indirectly to the employee in the form of lower wages within Uptown compared to the Houston CBD.

During the course of the study, the City of Houston adopted an Off-Street Parking Ordinance. The

Uptown private sector played a major role in development of the ordinance. Although the ordinance sets minimum standards for parking throughout the city, property owners within the Uptown area effectively argued that allowances should be made for areas in which the existing or planned availability of transit services and the desired goal of achieving higher transit mode split reduced the parking supply demanded or desirable from a policy perspective.

Under the new ordinance, the boundaries of HCID#1 constitute a *Parking Management Area (PMA)* within which lower parking ratios may be adopted than for other areas of the city under a parking management plan adopted by the PMA and the City of Houston. Two other non-CBD activity centers within Houston were also designated as PMA's. In addition to reduced parking requirements in general, individual property owners within the PMA's will be allowed to share parking among themselves to fulfill the requirements.

Beyond the authority for HCID#1 to operate as a PMA under the City of Houston ordinance, the state legislation creating HCID#1 gives the District the authority to develop and operate public parking garages financed by *ad valorem* taxation or benefit based assessments. Finally, individual property owners and employers have the ability to implement parking pricing policy on an area-wide basis.

Thus, HCID#1 and the Uptown private sector currently have statutory authority and other mechanisms for implementing a broad range of parking management and policy options. Parking policy has not been addressed within Uptown Houston because viable alternatives to driving alone have not been considered sufficient to successfully implement a policy to reduce parking supply of increase direct parking pricing. Developing an initial parking policy and parking management plan will be an important part of the HCID#1 TDM program to promote ridership on alternative modes.

EFFECT OF TRANSPORTATION CONSTRUCTION ON CONGESTION LEVELS

An unprecedented level of transportation construction is planned within and around the Uptown area between 1990 and 2000. Reconstruction of U.S. 59 is in progress. Reconstruction of the I.H. 610 West Loop is proposed for completion by 2000. The proposed Arterial Street Improvements Program would impact almost every arterial street within Uptown Houston. Finally, construction of the proposed METRO fixed guideway system and Post Oak Boulevard transit corridor would impact automobile travel within and through the area. Capacity of existing facilities will be reduced while construction is in progress, increasing the need for alternative modes and traffic management.

UNMET TRANSPORTATION DEMAND ON ROADWAYS AND THE NEED FOR TRANSPORTATION DEMAND MANAGEMENT

Thus, despite aggressive freeway and arterial improvement programs, the roadway system cannot meet all demand for travel to and through the Uptown area. A combination of public transportation, transportation demand management (TDM) and parking management is needed to enable Uptown Houston to achieve its desired level of access and mobility.

The recommended Transit and Pedestrian Improvements Programs will increase capacity of non-automobile transportation systems (refer to Sections V and VI). However, in addition to these improvements, an aggressive TDM Action Plan has been recommended to maximize the return on the transit and pedestrian investments and help manage traffic congestion.

TRANSPORTATION DEMAND MANAGEMENT GOALS FOR HCID#1

The primary goal of the HCID#1 Comprehensive Transportation Strategy regarding transportation demand management was the following:

- **Develop and implement policies and services which aid in effective management of traffic.**

The following objectives were further identified:

- **Provide alternatives to driving alone;**
- **Provide information systems to encourage increased vehicle occupancy, safety and convenience;**
- **Develop parking management policies to encourage more efficient use of resources;**
- **Develop an information sharing and education program to aid in the effective management of traffic;**
- **Develop an ongoing program to implement low cost improvements in the operation of transit services, arterial streets and freeways;**
- **Encourage flexible and varied work scheduling to reduce peak period traffic volume.**

HCID#1 TDM ACTION PLAN

I. SPEARHEAD IMPLEMENTATION OF COMPREHENSIVE TRANSPORTATION STRATEGY PROJECTS

As a foundation for transportation management activities, a primary and immediate function of HCID#1 will be to spearhead implementation of projects proposed within the Comprehensive Transportation Strategy (CTS). Through implementation of the CTS projects and continued planning, HCID#1 will demonstrate vision for the future and a credible basis for promoting mode shift, traffic management and parking management programs.

A. **TSM Projects** – Work with METRO, the City of Houston and SDHPT to implement 16 TSM projects within the Arterial Street Improvements Program and 8 projects within the Freeway Improvements Program (refer to Sections III and IV). Includes signal system modernization and optimization through area-wide computer controlled timing control system.

B. **Arterial Streets** – Work with METRO and the City of Houston to implement 33 major capital improvements (refer to Section III).

C. **Freeways** – Work with SDHPT to implement 18 major capital improvements (refer to Section IV).

D. **Transit** – Work with METRO to implement the Transit System Improvements Program (refer to Section V).

E. **Pedestrian** – Work with the appropriate public agencies and property owners to implement the recommended pedestrian environment improvements (refer to Section VI).

II. MAXIMIZE CAPACITY OF EXISTING AND PLANNED FACILITIES THROUGH TRANSPORTATION SYSTEMS MANAGEMENT (TSM) ACTIONS

An on-going function of the HCID#1 transportation management program would be to work with transportation agencies to maximize capacity of existing facilities through implementation of additional TSM improvements. The following types of TSM services and improvements would be identified and spearheaded by the HCID#1 TDM program:

A. Facilities improvements – Identify and implement low capital cost improvements which increase capacity of existing facilities:

1. Ramp metering
2. Re-striping and channelization
3. Intersection redesign
4. Signage improvements
5. Signal system optimization

B. Network development – Maximization network efficiencies continuously as new street extensions, widenings and TSM improvements are completed. Improve signage, fine-tune signal timing, etc.

C. Facilities maintenance – Work with the City of Houston, SDHPT and METRO to develop a maintenance program which would help to maximize capacity of existing facilities. Analyze existing practice and plan the program as follows:

1. Existing practice - Document existing maintenance schedules for facilities of all modes in cooperation with the City of Houston, SDHPT and METRO.

2. Benefits and costs - Evaluate potential benefits and costs of providing the following additional and improved maintenance services for transportation facilities:

   a. *Signals* - Maintain signals to minimize failures and maintain signal timing to optimize performance.

   b. *Signage* - Improve and maintain signage to improve traffic flow;

   c. *Cleaning* - Sweep streets, control litter, maintain bus stops, clean undersides of freeway overpasses, etc.

   d. *Lighting* - Maintenance lighting (e.g., lights under freeways) for safety and to improve traffic flow.

   e. *Paint* - Paint lane markings and pedestrian crossings.

3. Plan and goals - Develop plan and goals among HCID#1 and responsible agencies for implementation of a facilities maintenance program sufficient to realize the full transportation benefit of capital investments.

III. DEVELOP AND PLAN NEW TDM INITIATIVES

A. CONDUCT TRAVEL BEHAVIOR AND MARKET RESEARCH STUDY

Building new transportation facilities and maximizing their capacity will allow continued Uptown development growth. However, it has been shown that to mitigate automobile congestion, HCID#1 and other public transportation agencies would have to manage transportation demand through mode shift strategies and traffic control services.

In order to design effective mode shift and traffic control programs, a comprehensive understanding of travel behavior of Uptown employees and visitors should be developed. It is proposed that HCID#1 conduct market research to identify commuter and other travel demand to and from Uptown Houston. Initial research would include a combination of employee surveys, field surveys and data gathered from employers. The data would then be analyzed to develop new or improved transit and paratransit services as well as to identify marketing opportunities, set goals and target specific markets.

1. **Employee survey –** Work through Uptown employers to comprehensively survey office, retail and hotel employees to determine the information listed below:

   a. Journey to work:

      - Origin and destination
      - Mode
      - Travel time
      - Arrival and departure times
      - Commuting cost burden (e.g., parking)
      - Automobile availability
      - Quality and availability of public transportation

   b. Socio-economic characteristics:

      - Income
      - Occupation
      - Company size
      - Male/female
      - Marital status/Spouse commute trip

   c. Intra-area trips:

      - Lunch/dining
      - Shopping
      - Recreation

d. Attitudes and preferences:

- Interest in alternate modes (e.g., Park & Ride, local bus, vanpooling and carpooling)
- Satisfaction with mode currently taken

2. **Shopper/visitor survey** – Develop a shortened survey (primarily oral survey) for shoppers and visitors to determine the following:

a. Origin and destination
b. Trip purpose
c. Mode taken
d. Travel time
e. Arrival and departure times
f. Intra-area travel
g. Satisfaction with mode currently taken

3. **Employer data** – Cross examine survey data regarding origins and destinations with employee home address data at the hundred-block level supplied by major employers.

4. **METRO data** – Cross examine reported travel mode, travel time and arrival/ departure times with data on operations and patronage of different transit lines supplied by METRO.

5. **Property owner data** – Cross examine reported travel mode and arrival/ departure time data with parking volume data supplied by property owners.

6. **Trip generation rates and peak travel times** – Using the above data, current employee, shopper and visitor counts, current traffic volumes and transit patronage data, identify trip generation rates and peak travel times for the following uses:

a. Employees (office, retail, hotel and other)
b. Retail shopping
c. Hotel visitors and guests
d. Periods of peak demand
e. Conflicts and/or mixed use efficiencies among peak periods for different uses

7. **Identify and quantify target markets –** Using the information above, identify and quantify the prospective target market(s) for existing services which promote mode shift and identify markets for potential new services which would support mode shift:

a. Local bus service - Identify major existing and potential transit corridors where Uptown employees reside. Quantify potential markets.

b. Commuter bus service - Identify major suburban developments where Uptown employees reside along existing or planned transitways. Quantify potential markets.

c. Circulator service and commuter collection/distribution - Identify potential demand for intra-area (e.g., lunch) travel and commuter collection/distribution by circulator bus service or fare-free zone within Uptown Houston.

d. Vanpool and carpool programs - Identify target areas for vanpooling and carpooling promotion and quantify potential market size:

- Household vanpoolers and carpoolers (related individuals);
- External poolers (individuals who share transportation with unrelated individuals and either share driving responsibilities or drive always);
- Pool riders (individuals who commute with unrelated workers but ride only and never provide a vehicle).

e. Major Activity Center (MAC) connector - Identify and quantify potential market for activity center express connector service linked with circulator service, commuter services and the local bus network.

f. Shuttles or feeder buses from Regional Transit Centers, satellite parking or fringe lots - Identify target areas and quantify potential market sizes for shuttle or feeder bus service from parking spaces at Regional Transit Centers, satellite lots or fringe lots.

g. Private reserved commuter parking - Identify target areas and quantify potential market sizes for privately and/or publicly owned spaces at Park and Rides, Regional Transit Centers or satellite lots connected by shuttle bus service.

h. Hotel shuttle service - Identify demand for hotel shuttle service to retail complexes, the George R. Brown Convention Center and other visitor destinations within the region.

i. Subscription bus service - Identify target areas and quantify potential market sizes for subscription bus services where Park & Ride service is unavailable.

B. DEVELOP SERVICES AND PROGRAMS TO PROMOTE MODE SHIFT

Once an understanding of travel demand and behavior for Uptown employees and visitors is reached, services and programs to effectively achieve mode shift from single occupant automobiles can be planned.

In order to attract transit ridership and achieve the desired level of mode shift, local, commuter and intra-area transit services will have to be significantly improved within Uptown Houston. Vanpooling, carpooling and specialized transit services should also be considered. Current transit services in Uptown are considered deficient, especially when compared to METRO service to the CBD (refer to Section I-B: "Transportation System Deficiencies"). Vanpooling and commuter bus service to Uptown is practically non-existent.

It is proposed that HCID#1 analyze the cost effectiveness and develop operating plans for each of the following services and improvements outlined below to promote mode shift from single occupancy automobiles.

1. Local bus service –

a. Existing system - Evaluate existing local bus transit service and patronage.

b. New/improved services - Evaluate costs and potential mode shift benefits (potential for increase in market share) of providing additional and improved local bus services:

- Identify local route corridors to serve employee residence concentrations;
- Reconfigure METRO local route structure to more effectively utilize METRO Regional Transit Centers;
- Address future fixed guideway and Post Oak Boulevard transit corridor interface;
- Coordinate service with Major Activity Center (MAC) connector, feeder buses and other specialized transit services.

c. Plan and goals - Work with METRO to restructure local bus service within the Uptown area to optimize utilization of regional transit centers and integrate with other specialized transit services identified within the study. Set realistic patronage goals according to the marketing analysis.

2. **Commuter bus service –**

a. Existing system - Evaluate existing commuter bus service and patronage.

b. New/improved services - Evaluate potential mode shift benefits (potential for increase in ridership) and costs of providing additional and improved commuter bus services.

- Provide Park and Ride service;
- Reconfigure METRO express and commuter service to more effectively utilize METRO Regional Transit Center concept;
- Address future fixed guideway and Post Oak Boulevard transit corridor interface;
- Coordinate service with MAC connector, feeder buses and other specialized transit services.

c. Plan and goals - Work with METRO to plan to provide commuter bus service which optimizes utilization of regional transit centers and integrates with other specialized transit services identified within the study. Set realistic patronage goals according to marketing analysis.

3. **Circulator service –**

a. Existing system - Evaluate circulation patterns utilized on existing local bus service.

b. New service - Evaluate potential mode shift benefits (potential for increase in ridership) and costs of providing circulator bus services.

- Serve demand for intra-area circulation and shuttling between complexes;
- Patron distribution and collection for commuter services and specialized transit services;
- Address future fixed guideway and Post Oak Boulevard transit corridor interface;
- Coordinate service with MAC connector, feeder buses and other specialized transit services.

c. Plan and goals - Work with METRO to develop a plan to provide intra-area circulator service integrate with local, commuter and specialized transit services identified within the study. Set realistic patronage goals according to marketing analysis.

4. Vanpooling and carpooling –

a. Current status - Evaluate existing vanpooling/carpooling programs and participation levels.

b. New programs - Using market study results, quantify potential transportation system benefits and costs of providing vanpool services and incentives. Examine the feasibility for HCID#1 and/or individual Uptown employers to provide the following promotion and potential subsidization of vanpooling and carpooling:

- *Marketing by HCID#1 and employer* - Market and promote vanpooling and carpooling to individual employees through employee orientations, newsletters, bulletin boards, matchmaking services, etc.;
- *Preferential parking* - Reserved parking in preferred locations for vanpool or carpool vehicles;
- *Free gasoline program* - Fuel for vans or cars used in pools;
- *Vehicle purchase or lease* - Vanpool vehicles owned or leased by HCID#1 or employer;
- *Personal use* - Allow for vanpool driver to use vehicle for personal purposes;
- *Insurance* - Insurance for vans used in pools under a corporate or combined insurance policy;
- *Cost-sharing* - Direct subsidization of vanpool costs;
- *Guaranteed ride home* - Guaranteed ride home for workers who miss van or car pools due to working late;
- *Rideshare "finders fee"* - Incentive bonus to individuals who recruit riders for van or carpools;
- *Prizes and other promotions* - Miscellaneous promotions for program participants.

c. Matchmaking systems - Develop, integrate and maintain systems for matching potential carpoolers and vanpoolers:

- METRO
- HCID#1
- Individual companies

d. Plan and goals - Work with METRO to develop a plan to provide and/or promote vanpooling/carpooling services and incentives. Set realistic participation goals according to marketing analysis.

5. **METRO fare-free zone –** Analyze the feasibility, cost and potential mode shift benefit of establishing a fare-free zone for all *intra-area* local bus, circulator bus and future Post Oak Boulevard transit corridor trips.

6. **Specialized transit services –** Analyze costs, mode shift benefits and feasibility of the enhanced transit services and facilities listed below. Examine interrelationships among different transit services and with other modes of transportation. If feasible and cost-effective, plan for implementation:

   a. Feeder bus - Frequent feeder bus service between major transit facilities within Uptown Houston and Regional Transit Centers, Park and Ride lots or remote parking facilities owned by METRO, HCID#1 or private owners;

   b. Major Activity Center connector - Activity center express connector service (Uptown, downtown, Greenway and the Texas Medical Center) linked with circulator service, commuter services and the local bus network;

   c. Hotel shuttle - Shuttle services between hotels, transportation centers, retail attractions, the George R. Brown Convention Center and other visitor destinations within the region;

   d. Subscription bus service - HCID#1, employer or privately sponsored subscription services where METRO commuter services are not available.

7. **Multi-modal transportation center –**

   a. Current status - Evaluate existing interfaces between transportation systems of every mode, public and private.

   b. New facility - Evaluate feasibility, cost and potential mode shift benefit of an Uptown multi-modal transportation center to integrate the following services:

      - Local bus
      - Commuter bus
      - Intra-area circulator
      - Regional Transit Center feeder buses
      - Vanpool parking
      - Shuttles from reserve/satellite/fringe parking
      - Subscription services
      - Airport shuttle
      - Hotel shuttle
      - Taxi
      - Future fixed guideway
      - Future Post Oak Boulevard transit corridor

c. Plan and goals - If feasible and cost-effective, work with METRO, the City of Houston the Greater Houston Convention and Visitors Bureau (GHCVB) and other interested parties to develop a plan for implementing an Uptown multi-modal transportation center.

8. **Transit information systems –** Evaluate costs, mode shift benefits and feasibility of installing convenient and informative transit information systems (preferably electronic) in building lobbies, retail center common areas and at transit stops and shelters. The system would inform patrons of transit options and schedules at points of access to transit.

9. **Walking, jogging and cycling –** Encourage Uptown employees to cycle, walk and jog to work by promoting health benefits, cost savings and other benefits.

10. **Private facilities supporting mode shift –** Encourage private developers to provide enhancements which facilitate transit access by developing and promoting conceptual guidelines for the following:

a. Transit - New or improved stops for commuter bus, local bus, vanpool and circulator stops within or adjacent to private developments.

b. Pedestrian/cycling - Improved pedestrian facilities, sidewalks, shade, bicycle racks, air pumps, lockers, showers and other improvements which promote walking or cycling to work.

*U.S. Government Printing Office: 1993 — 343-120/85921