

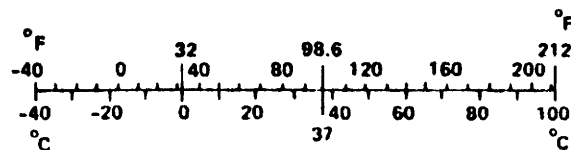
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures					Approximate Conversions from Metric Measures			
Symbol	When You Know	Multiply by	To Find	Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH								
in	inches	*2.5	centimeters	cm	mm	millimeters	0.04	inches
ft	feet	30	centimeters	cm	cm	centimeters	0.4	inches
yd	yards	0.9	meters	m	m	meters	3.3	feet
mi	miles	1.6	kilometers	km	m	meters	1.1	yards
					km	kilometers	0.6	miles
AREA								
in ²	square inches	6.5	square centimeters	cm ²	cm ²	square centimeters	0.16	square inches
ft ²	square feet	0.09	square meters	m ²	m ²	square meters	1.2	square yards
yd ²	square yards	0.8	square meters	m ²	km ²	square kilometers	0.4	square miles
mi ²	square miles	2.6	square kilometers	km ²	ha	hectares (10,000 m ²)	2.5	acres
	acres	0.4	hectares	ha				
MASS (weight)								
oz	ounces	28	grams	g	g	grams	0.035	ounces
lb	pounds	0.45	kilograms	kg	kg	kilograms	2.2	pounds
	short tons	0.9	tonnes	t	t	tonnes (1000 kg)	1.1	short tons
	(2000 lb)							
VOLUME								
tsp	teaspoons	5	milliliters	ml	ml	milliliters	0.03	fluid ounces
Tbsp	tablespoons	15	milliliters	ml	l	liters	2.1	pints
fl oz	fluid ounces	30	milliliters	ml	l	liters	1.06	quarts
c	cups	0.24	liters	l	l	liters	0.26	gallons
pt	pints	0.47	liters	l	m ³	cubic meters	35	cubic feet
qt	quarts	0.95	liters	l	m ³	cubic meters	1.3	cubic yards
gal	gallons	3.8	liters	l				
ft ³	cubic feet	0.03	cubic meters	m ³				
yd ³	cubic yards	0.76	cubic meters	m ³				
TEMPERATURE (exact)								
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C	°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature



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* 1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.25, SO Catalog No. C13.10:286.

LAND USE IMPACTS OF THE HOUSTON TRANSITWAY SYSTEM: THIRD YEAR UPDATE

by

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and

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Technical Report 1086-6
Land Use and Innovative Funding Impacts in a
Permanent Busway/Park-and-Ride Transit System
Study Number 2-10-85-1086

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The Texas A&M University System
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ABSTRACT

This report provides a third year update of research performed under Project 2-10-85-1086 between the State Department of Highways and Public Transportation and the Texas Transportation Institute. The data collection and analysis procedures are closely tied to the basic procedures used in other transit/land use impact studies. The research plan (Technical Report 1086-2) outlines how the work is to be performed and sets forth the basic framework for the data collection activities and anticipated results. This five year research effort examines transportation and land use impacts resulting from the implementation of an extensive priority system of busways (transitways) and park-and-ride facilities in Houston, Texas. Over the duration of this research, four high-occupancy vehicle (HOV) lanes with supporting park-and-ride facilities will be placed in operation in Houston's North (I-45N), Katy (I-10W), Gulf (I-45S) and Northwest (US 290) Freeway corridors. The impacts resulting from three of these HOV treatments (I-45N, I-45S, I-10W) are the object of this research. Preliminary results indicate that while the transportation impacts of those elements of the Houston Transitway system which are operational have been substantial, no substantial land use impacts can be identified at this time. It appears that a more definitive assessment of land use impacts may not be possible until the transitway system is fully operational and more fully integrated into the community's total transportation system.

Key Words: Land Use, Transitways, Busways, HOV Lanes, Park-and-Ride, Priority Treatment, Development, Bus Rapid Transit, Express Bus, Impact Studies, Economic Assessment, Land Use Impacts, Land Use Changes, Freeway Corridor, Transitway Corridor, Impact Area.

IMPLEMENTATION STATEMENT

This project is oriented toward assisting the Texas State Department of Highways and Public Transportation (SDHPT) in the planning and impact evaluation of high-occupancy vehicle (HOV) lanes or transitways. The study concentrates on the freeway corridors in Houston, Texas where priority facilities for HOVs are being constructed.

Identification of secondary data sources and a survey of relevant literature (Technical Report 1086-1) on similar impact studies provided the primary data bases for development of the study's work program (Technical Report 1086-2). An assessment of other HOV projects in the U.S. and Canada (Technical Report 1086-3) along with a pilot examination of Houston's North (I-45N) Transitway Corridor impacts (Technical Report 1086-4) and a second year update of the impacts of the North (I-45N), Gulf (I-45S) and Katy (I-10W) corridors (Technical Report 1086-5) were undertaken prior to the work presented herein. The results of this research, when completed, should assist the State Department of Highways and Public Transportation in evaluating potential land use and transportation impacts resulting from implementation of transitways and/or park-and-ride facilities.

This research may be applied nationwide by local, state and federal officials responsible for, or concerned with, busway/park-and-ride system development. Evaluation of land use impacts (if any) associated with permanent transitway facility construction will provide valuable guidance to transportation planners and policy makers in assessing alternative improvements.

The study findings will be of particular interest to the Texas State Department of Highways and Public Transportation, the Urban Mass Transportation Administration, the Federal Highway Administration, other State Departments of Transportation, local transit agencies, city planners, and various professional societies or organizations.

DISCLAIMER

The contents of this report reflect the views of the authors who are responsible for the opinions, findings and conclusions presented herein. The contents do not necessarily reflect the official views or policies of the Urban Mass Transportation Administration, U.S. Department of Transportation or of the Texas State Department of Highways and Public Transportation. This report does not constitute a standard, specification or regulation.

SUMMARY

This report is an update of the third-year of a study of the land use and transportation impacts resulting from implementation of HOV priority treatments in the North (I-45N), Katy (I-10W) and Gulf (I-45S) Freeway corridors in Houston, Texas.

Overall, the land use impacts of the North (I-45N) and Katy (I-10W) HOV priority treatments as well as the Gulf (I-45S) HOV facilities, currently under construction, appear to be relatively insignificant. Only a few possible examples of the potential land use impacts have appeared in the past year.

At two sites (North Shepherd and Kuykendahl Park-and-Ride lots) along the North (I-45N) Freeway corridor, recent changes in land use at a few parcels around the sites may have been partially influenced by the location of the park-and-ride facilities. At all other sites along the North Freeway corridor as well as the other freeway corridors under study, there appears to be no substantial land use impacts.

The results of this update of land use impacts are for the most part inconclusive. Only two of the seven sites studied show any land use changes that could possibly be related to the presence of the transitway and/or its support facilities. It appears that a more definite assessment of the land use impacts will not be possible until sometime after the transitway and associated support facilities have become fully operational and established as integral elements of the corridors' transportation systems. Both of the Katy Freeway corridor study sites and all but one of the North Freeway corridor study sites have substantial amounts of undeveloped land and should serve as excellent test sites for monitoring the long-term land use impacts of transitway facilities.

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1. INTRODUCTION

1.1 BACKGROUND

The tremendous growth experienced in urban areas of Texas in recent years has caused concern by State and local transportation officials over the declining level of service being provided by the urban transportation system. Future growth and economic vitality in the Texas metropolitan regions are in jeopardy unless major improvements are implemented in the existing urban transportation system. It is generally not economically nor physically possible to provide sufficient additional highway capacity through major cross section expansion or to expand transit services to accommodate anticipated demand (1). Therefore, new and innovative means of freeway system management have been examined as possible remedies.

One alternative to increase roadway capacity is to provide high-occupancy vehicle (HOV) priority treatments. The first major priority treatment effort in Texas, the Houston I-45N Contraflow Lane (CFL), proved operationally successful and received favorable public acceptance. Implementation of four, more permanent HOV projects on the Katy (I-10W), North (I-45N), Gulf (I-45S) and Northwest (US 290) Freeways in Houston began in 1982 and will continue through 1990.

The Houston Metropolitan area is implementing one of the most extensive HOV priority treatment networks in the nation. Over 20 miles of transitways are now operational. Another 20 miles are currently under construction and another 23 miles are in the final planning and design stages. The ultimate commitment to transitways may result in over 100 miles of these facilities in operation with a total capital cost in excess of one billion dollars (2).

Figure 1 shows the location and status of the transitway elements being monitored as part of this research effort.

The current status of the research effort is documented in the following research reports. The reader is referred to these reports for a more detailed background on the study.

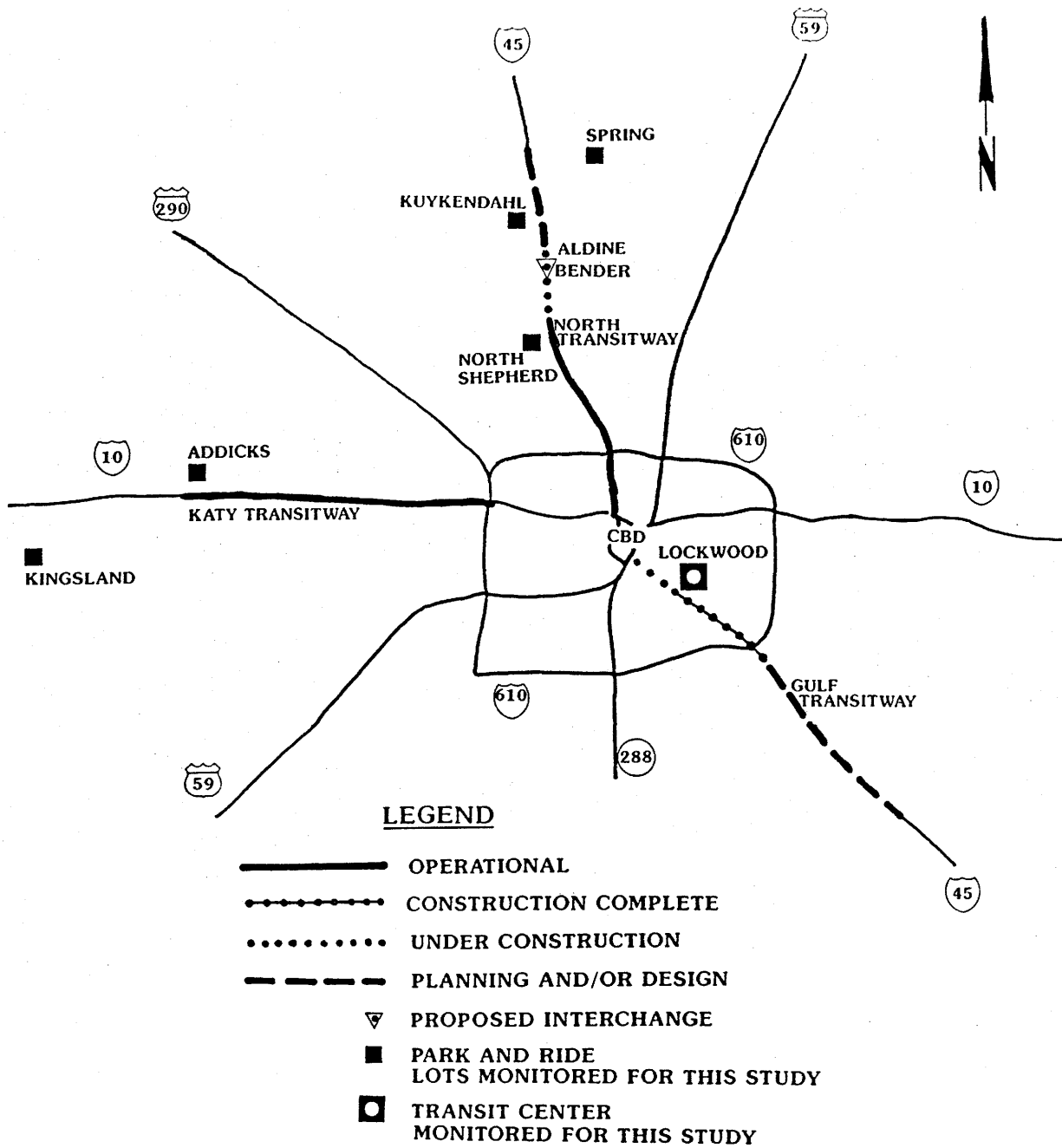


Figure 1. Elements of the Houston Transitway System Monitored for this Study

1. Land Use and Innovative Funding Impacts In A Permanent Busway/Park-and-Ride Transit System: An Annotated Bibliography, Technical Report 1086-1, December 1985.

2. Land Use and Innovative Funding Impacts In A Permanent Busway/Park-and-Ride Transit System: Work Program, Technical Report 1086-2, January 1986.

3. Land Use and Innovative Funding Impacts In A Permanent Busway/Park-and-Ride Transit System: Survey of Transitway Projects in the United States and Canada, Technical Report 1086-3, November 1986.

4. Land Use and Innovative Funding Impacts In A Permanent Busway/Park-and-Ride Transit System: Preliminary Assessment of Land Use Impacts in Houston's North (I-45N) Transitway Corridor, Technical Report 1086-4, January 1987.

5. Land Use and Innovative Funding Impacts In A Permanent Busway/Park-and-Ride Transit System: Land Use Data Base for Houston's Transitway Corridors and Second Year Summary, Technical Report 1086-5, March 1987.

6. Land Use and Innovative Funding Impacts In A Permanent Busway/Park-and-Ride Transit System: Turnkey Park-and-Ride Facility Investigation, Technical Report 1085-1 (Draft), (no date).

1.2 RESEARCH OBJECTIVES

This multi-year study has two primary objectives:

1. To measure, analyze, and evaluate the transportation and land use impacts resulting from the construction of permanent busways (transitways) and park-and-ride facilities in the Houston area; and,

2. To evaluate the "turnkey" procurement concept used by the Houston Metropolitan Transit Authority (METRO) and to determine its nationwide potential for park-and-ride facility development.

During the initial phase of the study, six secondary, supportive objectives were identified:

- To prepare a detailed work program compatible with other prior or ongoing impact evaluation studies;
- To conduct, based upon available data, case studies of transitway facilities in cities other than Houston for comparison of design and operational characteristics;
- To examine land use impacts of the contraflow lane in Houston's North (I-45 N) Freeway corridor;
- To develop a "before" or pre-busway land use data base in Houston's North (I-45 North), Gulf (I-45 South) and Katy (I-10 West) Freeway corridors;
- To project anticipated land use impacts, in the three Houston freeway corridors, which are likely to occur from implementing permanent busways and park-and-ride facilities; and,
- To document the study data and findings in one or more reports.

The evaluation of turnkey development for park-and-ride facilities by Houston METRO examined the key ingredients of the program. This portion, as well as the portion of the research dealing with the problems, opportunities and potential costs and benefits of the concept applied on a nationwide basis, is being conducted by Barry Goodman and Associates. Research Report (1085-1) presents documentation of this research and the reader is referred to this earlier report for further background on the turnkey development process.

1.3 SCOPE

Houston, Texas is in the process of implementing exclusive, physically separated HOV priority facilities along four major radial freeway corridors.

As can be seen in Figure 1, these facilities, referred to locally as Authorized Vehicle Lanes (AVLs) and more commonly as transitways or busways, are located in the following corridors:

- Katy Freeway (I-10W)
- North Freeway (I-45N)
- Gulf Freeway (I-45S)
- Northwest Freeway (US 290)

The Katy, North, Gulf and Northwest priority facilities have similar designs with a cross-section of approximately 20 feet. They are single, reversible lanes; traffic travels inbound toward downtown in the morning and outbound in the afternoon. These lanes are typically constructed within the existing median of the involved freeways and are protected from other freeway lanes by concrete barriers.

Adequate space is provided for emergencies and breakdowns within the transitway cross-section. Access points are limited and controlled. However, each facility differs slightly from the others in particular design, construction, and operational features.

The following facilities are being monitored as part of this research effort:

1. North (I-45N) Freeway Transitway
 - a. Proposed Aldine-Bender Interchange
 - b. Kuykendahl Park-and-Ride
 - c. North Shepherd Park-and-Ride
 - d. Spring Park-and-Ride
2. Gulf (I-45S) Freeway Transitway
 - a. Lockwood Transit Center
3. Katy (I-10W) Freeway Transitway
 - a. Addicks Park-and-Ride
 - b. Kingsland Park-and-Ride

This report presents the 1987 update of the land use impacts which have resulted in the past year from either the transitways or their associated park-and-ride facilities, transit center or proposed interchange area.

1.4 STUDY METHOD

1.4.1 General

The methodology used in the research for this project is referred to as the "before-after" study approach. Data from a time period prior to the transportation improvement are compared to similar data collected after the completion of the improvement in the affected area. Therefore, the effects of the transportation change are determined by comparing "before" period data to "after" period data which are collected and updated on an annual basis.

To satisfy the study objectives, land use data were obtained from 1) aerial photographs of study areas, 2) site visits, 3) Cole's City Directory, and 4) developer interviews. The use of each of these is described in the following subsections.

1.4.2 Aerial Photographs/Site Visits

Aerial photographs of the study areas were examined to identify land use changes in the vicinity of the study sites. The process of identifying land use changes consisted of taking the earliest available photos (between 1973-1975) and overlaying them with the next interval (time frame) photos. This procedure was repeated until the most current (1986) photos were examined.

Site visits were made to the study areas to verify and supplement the results obtained from the aerial photograph analysis. The visits were also used to assess the types of development and their approximate age.

Because the aerial photography analysis can identify only "new developments", changes in use of existing structures (prior to "before" time frame) had to be identified through the site visits and the city directory.

1.4.3 City Directory

Cole's City Directory contains information on each occupied address in the Greater Houston Area. Land use changes were identified by reviewing the addresses listed within the study area on an annual basis. The addresses listed for the first year of observation (1973) were compared to those for the following year (1974) and so on until the most current year of the study period available (1986). Also, any new addresses within the study area were listed and observed for the remainder of the study period.

For the Kuykendahl, North Shepherd and Kingsland sites, years one through eight (1973-1980) are the "before" data base while years nine through fourteen (1981-1986) provide the "after" data base. Additionally, for the Spring and Addicks sites the "before" and "after" dates are years one through ten (1973-1982) and years eleven through fourteen (1983-1986), respectively. All data are considered "before" data for the Aldine-Bender site, as it is a proposed interchange. Also, the Lockwood data are "before" data, as the transit center is not operational at this time.

1.4.4 Developer Interviews

As part of this research effort, it was decided that interviews with the developers of major office and commercial projects within the freeway corridors would be an expedient and direct method of assessment of the actual interaction between the transitway and its support facilities and the developer's decision concerning where, when, what, why and how much to develop. The information obtained from the interviews, combined with the other data should provide as complete a picture as possible with regard to the transitway and transit facilities impacts on the freeway corridors.

The interviews were initially conducted with developers of various projects along the North (I-45N) Freeway corridor. The conclusion drawn from the interviews conducted with the development community in the area is that neither the transitway nor its support facilities have influenced land use or development decisions over the last six years.

The extension of the interview process to developers of projects along the Katy (I-10W) and Gulf (I-45S) Freeway corridors is currently underway. These interviews, as well as interviews with some CBD developers, are being conducted by Barry Goodman and Associates and the results will be presented in a separate report.

1.5 ZONE OF INFLUENCE

The zone of influence or "impact area" is commonly an area of a specified dimension inside which may occur land use impacts as a result of a transit access site.

For this study, a distance of one-quarter mile was chosen as the limit for the impact area of all study locations. This distance was chosen in order to maintain consistency with prior rail and rapid transit impact studies. The one-quarter mile distance has become somewhat of a standard delimitation of the zone of influence of transit locations and is consistent with the general approach used in impact studies outlined in Technical Report 1086-1.

1.6 DATA PRESENTATION

For presentation purposes, both visual and tabular methods were developed for the data obtained through the analysis of aerial photos, the site visits and the city directory. The tabular format was developed to further detail the land use changes presented in the maps. This tabular presentation includes data not only for the update period but for the study period years 1973 to 1986, and represents the first time this type of presentation has been included in a report for this project. It is hoped that the presentation provides more insight into the "evolution" of uses around the various sites. For those sites with operational facilities, the tables are broken into "before" and "after" data based on the timing of the improvement.

2. THIRD-YEAR UPDATE OF LAND USE IMPACTS

2.1 NORTH (I-45N) TRANSITWAY CORRIDOR

As set forth in the research work program (Technical Report 1086-2), the North (I-45N) Transitway Corridor was used as a pilot for land use analyses resulting from the implementation of permanent transit facilities (i.e., busways and park-and-ride lots). The results of this initial effort were fully documented in Technical Report 1086-4.

The results of the 1987 update of land use changes at the four study sites along the North Transitway Corridor are presented in the following sections. Analyses of each area's changes in previous years is more fully documented in Technical Report 1086-5.

2.1.1 Proposed Aldine-Bender Interchange

The only land use change in the vicinity of the proposed interchange has been the closing of a hardware store and the vacating of that building. As can be seen from Figure 2, land uses in the area remain generally of the type that one might expect in the vicinity of a major transportation facility access point, with numerous apartment and office complexes, as well as a few commercial developments in the impact area. Table 1 indicates in detail the types and numbers of land use changes that have occurred in the vicinity of the proposed interchange. As can be seen, there had not been substantial change in the relative number of commercial and residential land uses from 1973 to 1984. Only in the past two years has the share of commercial uses declined somewhat. There was also a decline in the share of residential land use from 1973 to 1984. However, the combination of business closings and new residences has resulted in the rise in the share of residential land use since 1984. In 1985, the number of residential land uses more than doubled from 1984.

However, since the interchange is, at this time, only a proposed facility, it is difficult to link any of these changes to the presence of the transitway.

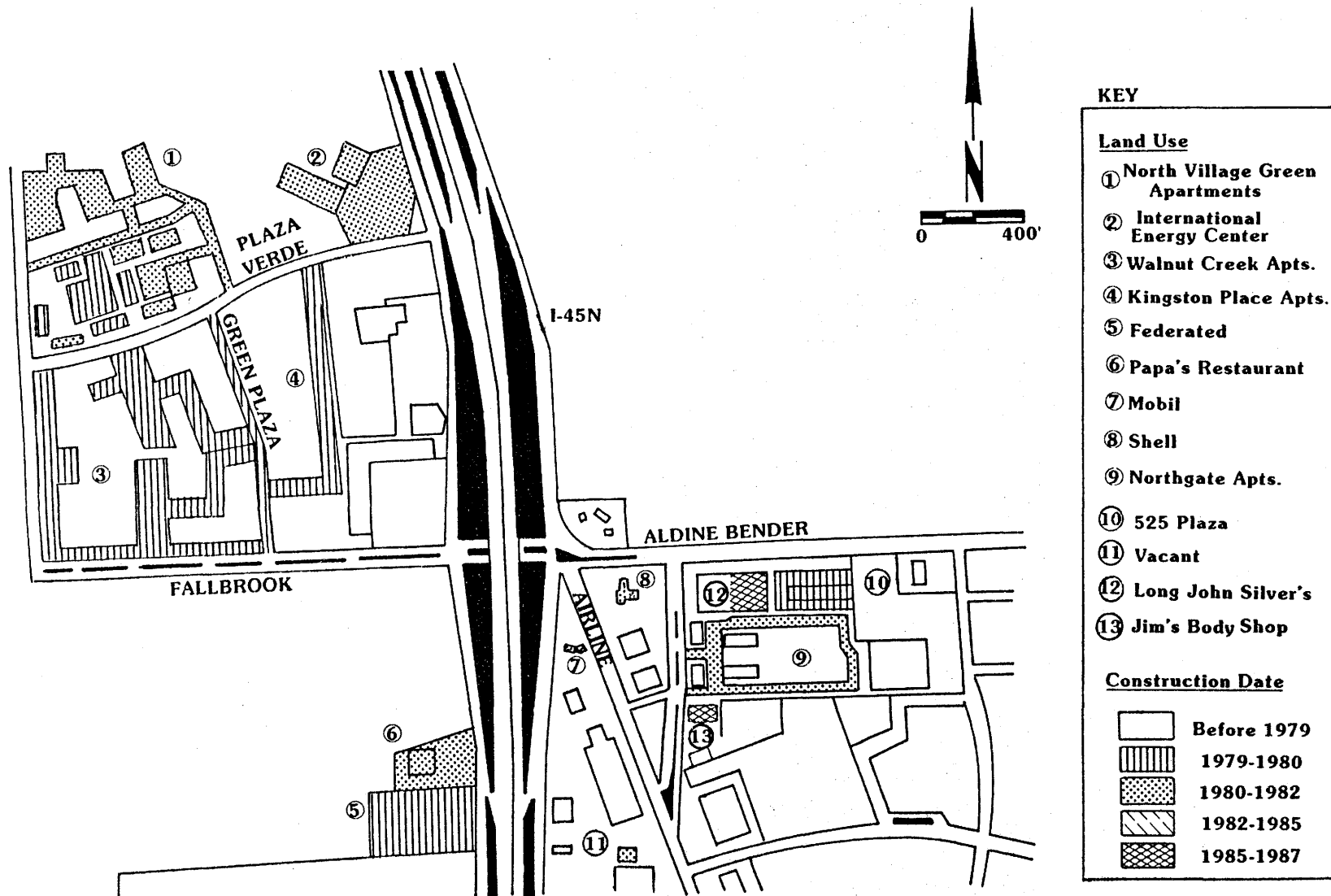


Figure 2. Land Use Trends in the Vicinity of the Proposed Aldine-Bender Interchange (1979-1987)

Table 1. Impact Area Development Assessment in the Vicinity of the Proposed Aldine-Bender Interchange: "Before" Period

Type of Use	Year													
	1973		1974		1975		1976		1977		1978		1979	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Commercial	22	76	29	83	27	90	28	90	34	92	49	91	58	95
Residential	7	24	6	17	3	10	3	10	3	8	5	9	3	5
Total	29	100	35	100	30	100	31	100	37	100	54	100	61	100

Table 1 (Cont.)

Type of Use	Year													
	1980		1981		1982		1983		1984		1985		1986	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Commercial	75	88	76	84	88	83	93	82	83	80	79	64	80	64
Residential	10	12	15	16	18	17	21	18	21	20	44	36	44	36
Total	85	100	91	100	106	100	114	100	104	100	123	100	124	100

Source: Cole's City Directory

There remains a considerable amount of vacant land in the area, especially in the Northeast and Southwest quadrants of the proposed interchange. This is evidenced by the fact that every new land use that occurred throughout the entire study period was previously a tract of undeveloped land. Consequently, the proposed interchange area should be an excellent site to continue to monitor any possible land use impacts of the North Freeway Transitway.

2.1.2 Kuykendahl Park-and-Ride

Figure 3 shows land use changes in the vicinity of the Kuykendahl Park-and-Ride lot. Within the past year, a car dealership has expanded onto a new location, a used car dealer, and a gas station have also opened in the vicinity of the park-and-ride lot. These new uses continue to follow the pattern of previous land use changes in the area, that is, almost exclusively auto sales establishments. While the location of the park-and-ride lot does not appear to be an important factor in the location of the car sales establishments, it may have influenced to a slight degree the location of the gas station.

As can be seen from Tables 2 and 3, there has been a change in the dominant type of land use in the vicinity of the Kuykendahl Park-and-Ride Lot. The apparent reversal in share of uses between residential and commercial must be tempered by pointing out that there was such a relatively small amount of developed land, that any change results in a dramatic percentage change.

However, the fact remains that there has been a considerable expansion in commercial uses and almost complete elimination of residential uses, although there does not appear to be any connection between either the transitway or the park-and-ride lot and these changes in uses. The fact that there is such a small amount of developed land in the impact area indicates that, like the situation at the proposed Aldine-Bender Interchange, the area surrounding the park-and-ride lot should continue to be an ideal site for monitoring land use impacts of the park-and-ride lot and the North Freeway Transitway.

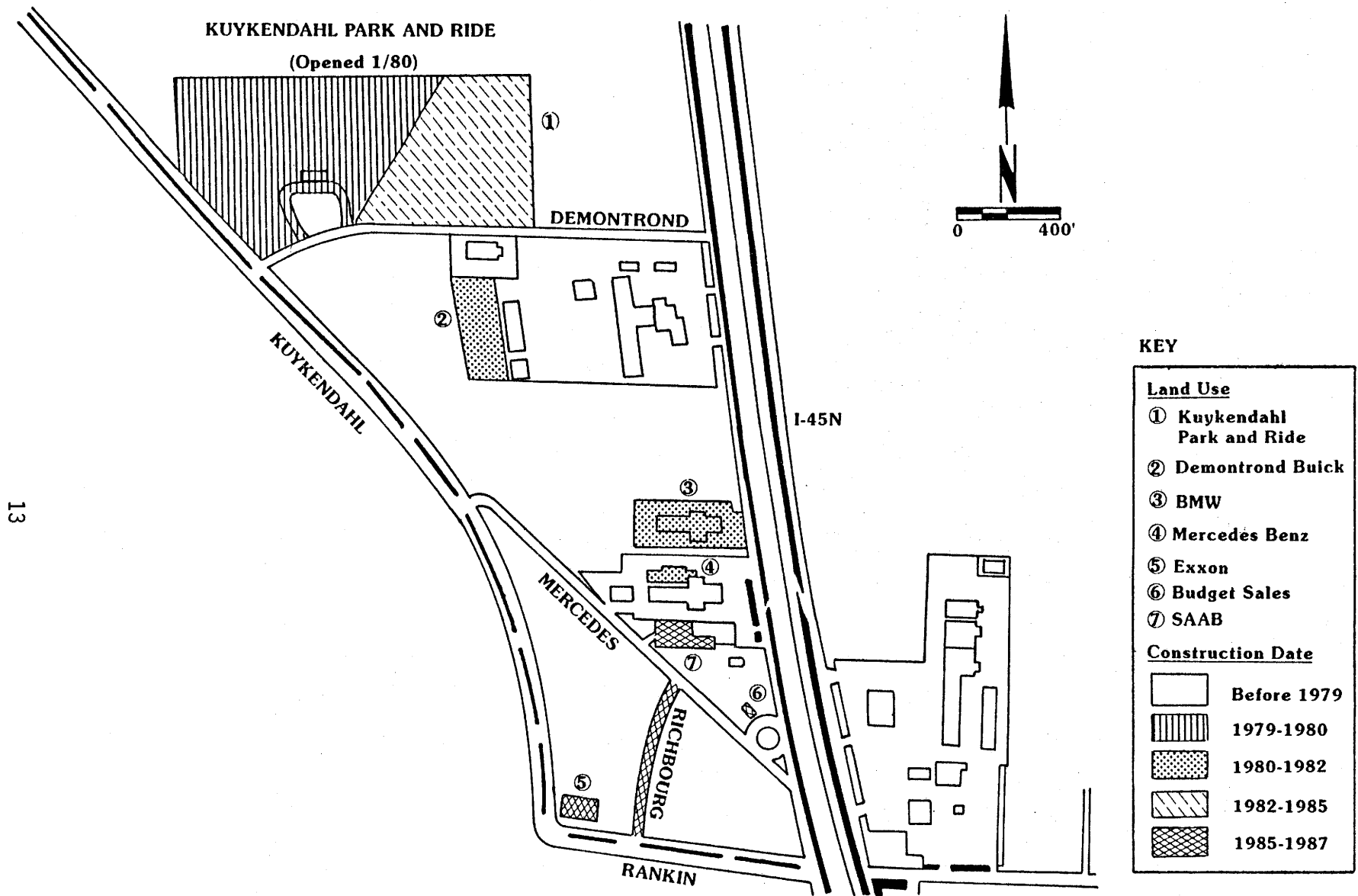


Figure 3. Land Use Trends in the Vicinity of the Kuykendahl Park-and-Ride Lot (1979-1987)

Table 2. Impact Area Development Assessment in the Vicinity of Kuykendahl Park-and-Ride:
"Before" Period

Type of Use	Year															
	1973		1974		1975		1976		1977		1978		1979		1980	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Commercial	3	30	5	42	6	40	7	50	10	62	10	62	13	76	14	82
Residential	7	70	7	58	9	60	7	50	6	38	6	38	4	24	3	18
Public/Quasi-Public	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	10	100	12	100	15	100	14	100	16	100	16	100	17	100	17	100

Source: Cole's City Directory

Table 3. Impact Area Development Assessment in the Vicinity of Kuykendahl Park-and-Ride Lot:
"After" Period

Type of Use	Year											
	1981		1982		1983		1984		1985		1986	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Commercial	16	89	18	100	20	95	22	92	20	87	20	87
Residential	2	11	0	0	1	5	1	4	2	9	2	9
Public/Quasi-Public	-	-	-	-	-	-	1	4	1	4	1	4
Total	18	100	18	100	21	100	24	100	23	100	23	100

Source: Cole's City Directory

2.1.3 North Shepherd Park-and-Ride

Changes in land use in the vicinity of the North Shepherd Park-and-Ride lot are shown in Figure 4. Land use changes in the area in the past year involved the opening of three auto repair services. There appears to be at least a partial impact of the park-and-ride on the location of these three establishments, as they are located immediately outside the park-and-ride lot and perform services of a nature that may benefit from being located adjacent to a facility such as a park-and-ride lot. Tables 4 and 5 show that the area surrounding the North Shepherd Park-and-Ride has become dominated by commercial land uses. A large portion of the remaining residential land uses are concentrated along Little York Road which also contains a substantial amount of the commercial uses. The data suggest that over the length of the study period, particularly after 1980, the character of the area began to change, resulting in large numbers of residential uses becoming vacant and commercial uses appearing in areas that had previously been vacant. However, other than the three auto repair establishments, there is little direct evidence of any land use impacts that can be attributed either to the North Shepherd Park-and-Ride lot or the North Freeway Transitway.

2.1.4 Spring Park-and-Ride

Recent land use changes in the vicinity of the Spring Park-and-Ride lot are shown in Figure 5. The only land use change to occur in the past year has been the opening of a savings and loan near the park-and-ride lot. As can be seen from Tables 6 and 7, there has been a relatively small amount of any type of land development occurring in the area around the Spring Park-and-Ride lot. Both residential and commercial land uses have experienced very little change from 1973 to 1980. However, beginning in 1980, both residential and commercial land uses began to increase in number. These changes are probably a result of the general economic growth experienced in the FM 1960 area in the early 1980's. Excluding the savings and loan, all changes occurred prior to construction of the lot and thus the influence of the lot on these establishments is questionable. It also appears that there was little or no influence of the park-and-ride with respect to the location of the savings and loan.

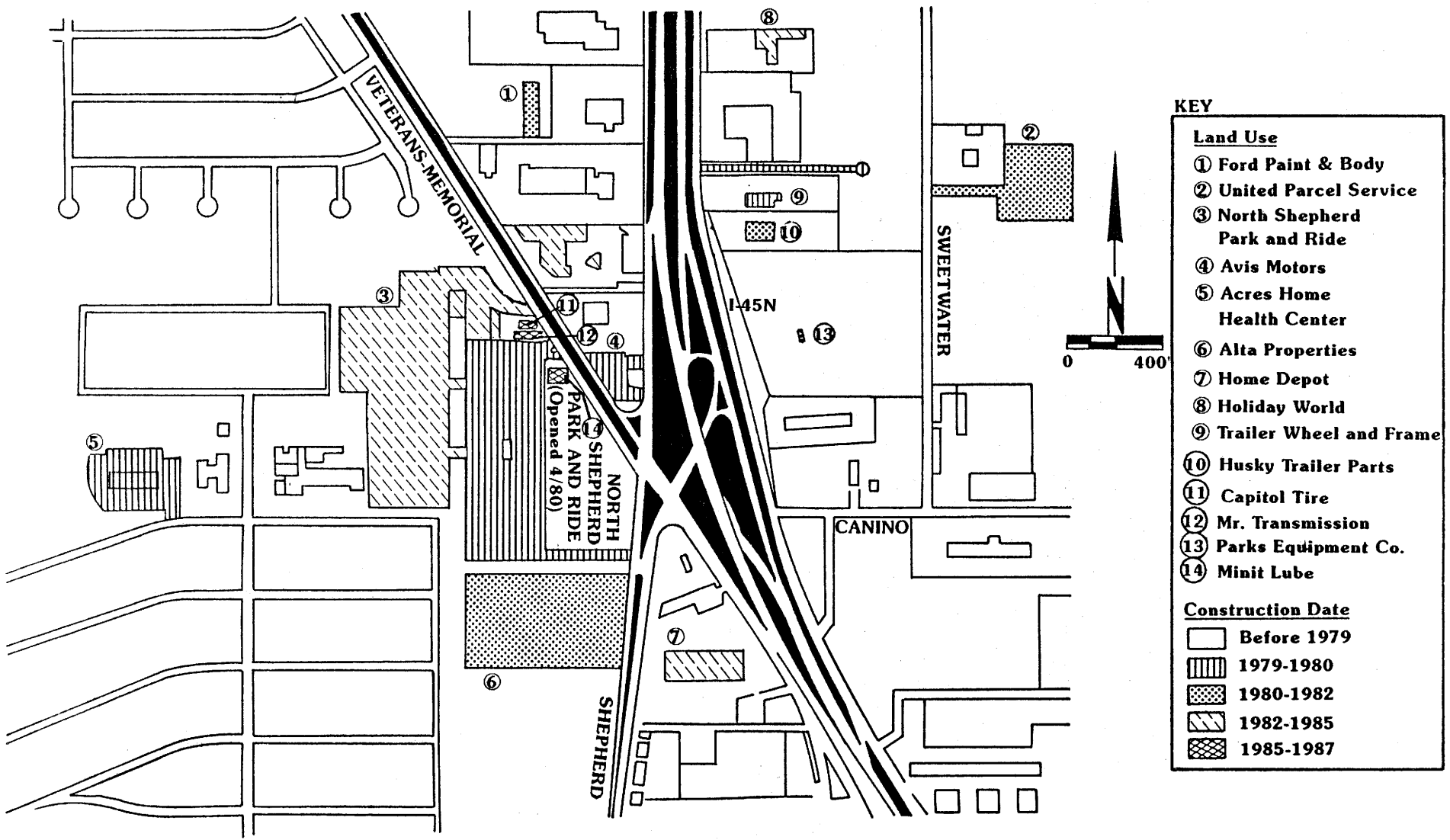


Figure 4. Land Use Trends in the Vicinity of the North Shepherd Park-and-Ride Lot (1979-1987)

Table 4. Impact Area Development Assessment in the Vicinity of North Shepherd Park-and-Ride Lot: "Before" Period

Type of Use	Year							
	1973	1974	1975	1976	1977	1978	1979	1980
	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %
Commercial	66 54	71 55	74 56	76 55	89 63	93 62	100 65	103 65
Residential	57 46	59 45	58 44	59 45	53 37	57 38	53 35	56 35
Total	123 100	130 100	132 100	135 100	142 100	150 100	153 100	159 100

Source: Cole's City Directory

Table 5. Impact Area Development Assessment in the Vicinity of North Shepherd Park-and-Ride Lot: "After" Period

Type of Use	Year					
	1981	1982	1983	1984	1985	1986
	No. %	No. %	No. %	No. %	No. %	No. %
Commercial	101 70	104 69	104 70	113 73	109 73	112 73
Residential	43 30	46 31	44 30	42 37	41 27	42 27
Total	144 100	150 100	148 100	155 100	150 100	154 100

Source: Cole's City Directory

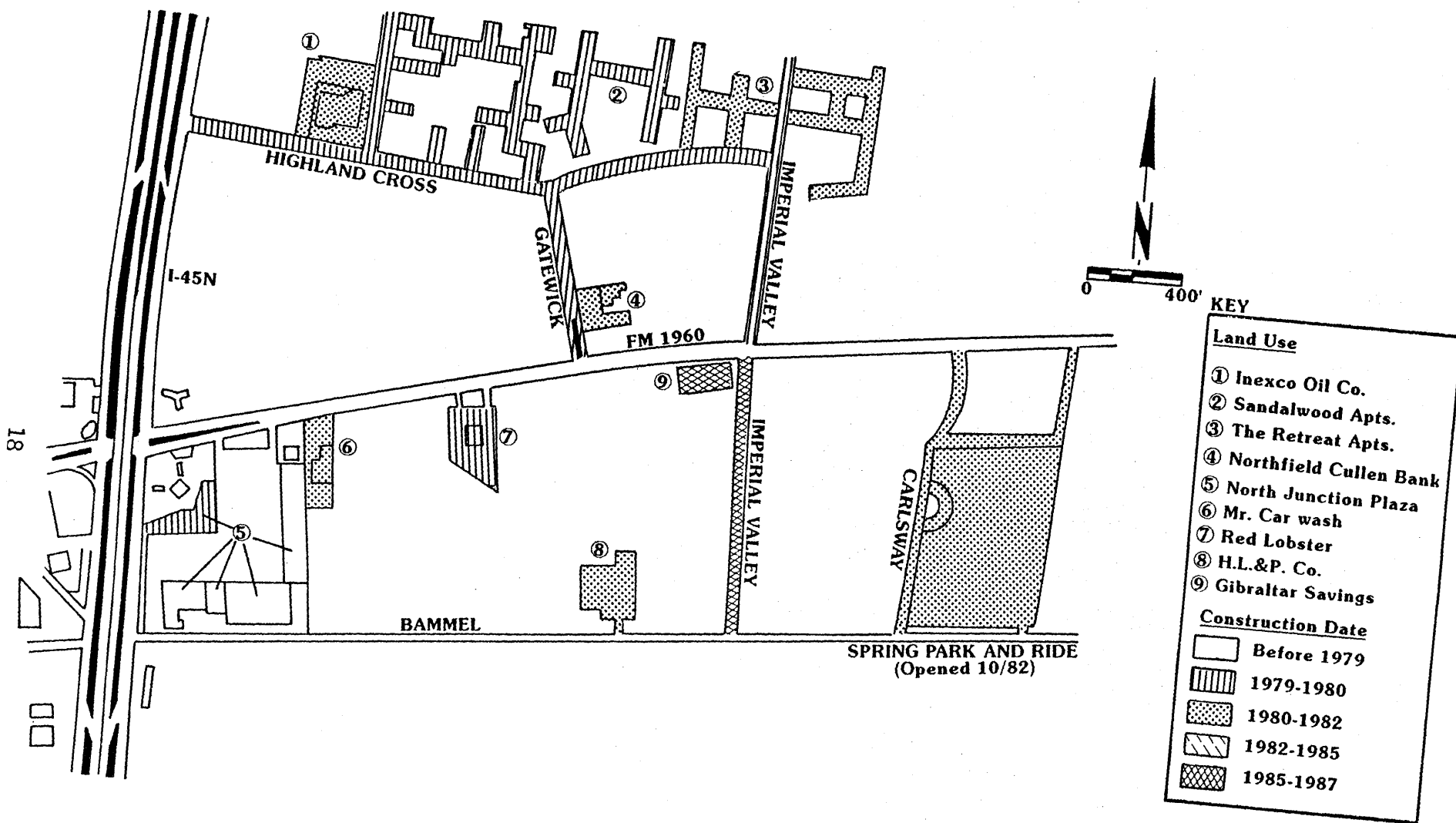


Figure 5. Land Use Trends in the Vicinity of the Spring Park-and-Ride Lot (1979-1987)

Table 6. Impact Area Development Assessment in the Vicinity of Spring Park-and-Ride Lot: "Before" Period

Type of Use	Year									
	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %
Commercial	8 73	8 73	5 71	5 71	5 71	5 50	5 83	4 57	4 33	10 50
Residential	3 27	3 27	2 29	2 29	2 29	5 50	1 17	3 43	8 67	10 50
Total	11 100	11 100	7 100	7 100	7 100	10 100	6 100	7 100	12 100	20 100

Source: Cole's City Directory

Table 7. Impact Area Development Assessment in the Vicinity of the Spring Park-and-Ride Lot: "After" Period

Type of Use	Year							
	1983		1984		1985		1986	
	No. %	No. %	No. %	No. %	# %	# %		
Commercial	12 57	14 58	16 64	13 59				
Residential	9 43	10 42	9 36	9 41				
Total	21 100	24 100	25 100	22 100				

Source: Cole's City Directory

The dominating factor in the area around the Spring Park-and-Ride lot, as at the Aldine-Bender and Kuykendahl sites, is the substantial amount of vacant land surrounding the site. Further monitoring of the area will be necessary to assess any land use impacts that may result from the presence of the Spring Park-and-Ride lot.

2.2 GULF (I-45S) TRANSITWAY CORRIDOR

2.2.1 Lockwood Transit Center

As can be seen in Figure 6, the only land use change in the vicinity of the transit center has been the construction of a new building on the University of Houston (U of H) campus. The area surrounding the center remains a well-established, predominantly residential area with some commercial activity. According to the data presented in Table 8, the area around the site has remained approximately 75 percent residential throughout the study period. There had been an increase in the number of both residential and commercial uses from 1973 until 1980. However, since 1980, the amount of commercial and residential land uses has decreased to levels that are below those of 1973. No land use changes of a nature which would appear to benefit from the transit center have been identified. However, since the transit center is still not operational, impacts may not occur until such time as the transit center comes on-line.

2.3 KATY (I-10W) TRANSITWAY CORRIDOR

Two sites in the Katy Corridor were chosen to assess land use impacts of the park-and-ride lots and the Katy Transitway. The impacts on the area surrounding each site are summarized below.

2.3.1 Addicks Park-and-Ride

Figure 7 presents land use changes that have occurred in the past year as well as less recent changes in the area surrounding the Addicks Park-and-Ride lot. The land use changes that have occurred most recently are the opening of a church, a bank and a restaurant, as well as the development of a

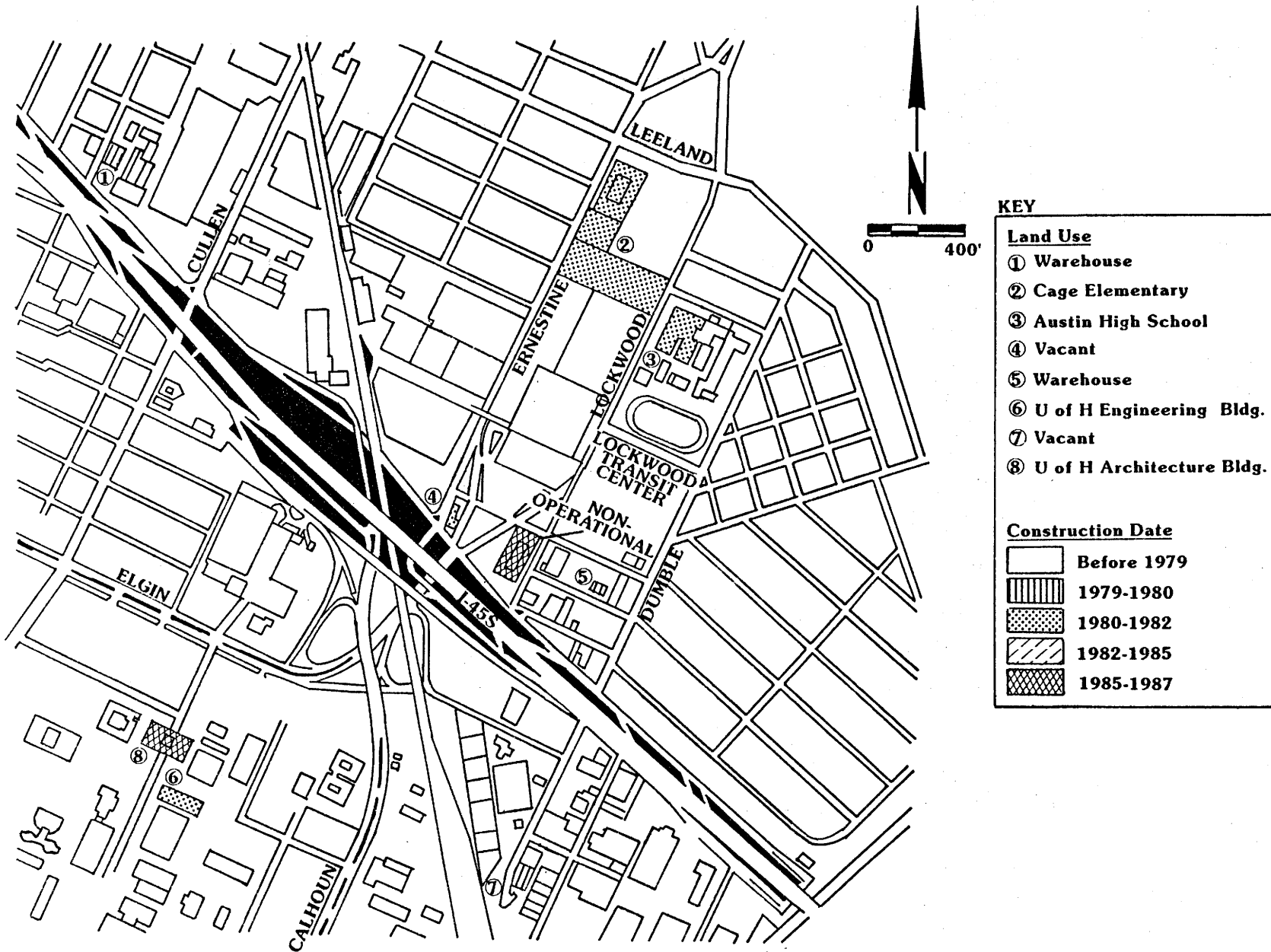


Figure 6. Land Use Trends in the Vicinity of the Lockwood Transit Center (1979-1987)

Table 8. Impact Area Development Assessment in the Vicinity of Lockwood Transit Center:
"Before" Period

Type of Use	Year													
	1973		1974		1975		1976		1977		1978		1979	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Commercial	72	25	72	22	72	22	71	22	72	22	75	23	72	23
Residential	218	75	253	78	252	78	248	78	248	78	250	77	246	77
Total	290	100	325	100	324	100	319	100	320	100	325	100	318	100

Table 8 (Cont.)

Type of Use	Year													
	1980		1981		1982		1983		1984		1985		1986	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Commercial	71	22	71	23	68	23	72	24	64	23	62	22	61	23
Residential	250	78	236	77	234	77	225	76	218	77	218	78	207	77
Total	321	100	307	100	302	100	297	100	282	100	280	100	268	100

Source: Cole's City Directory

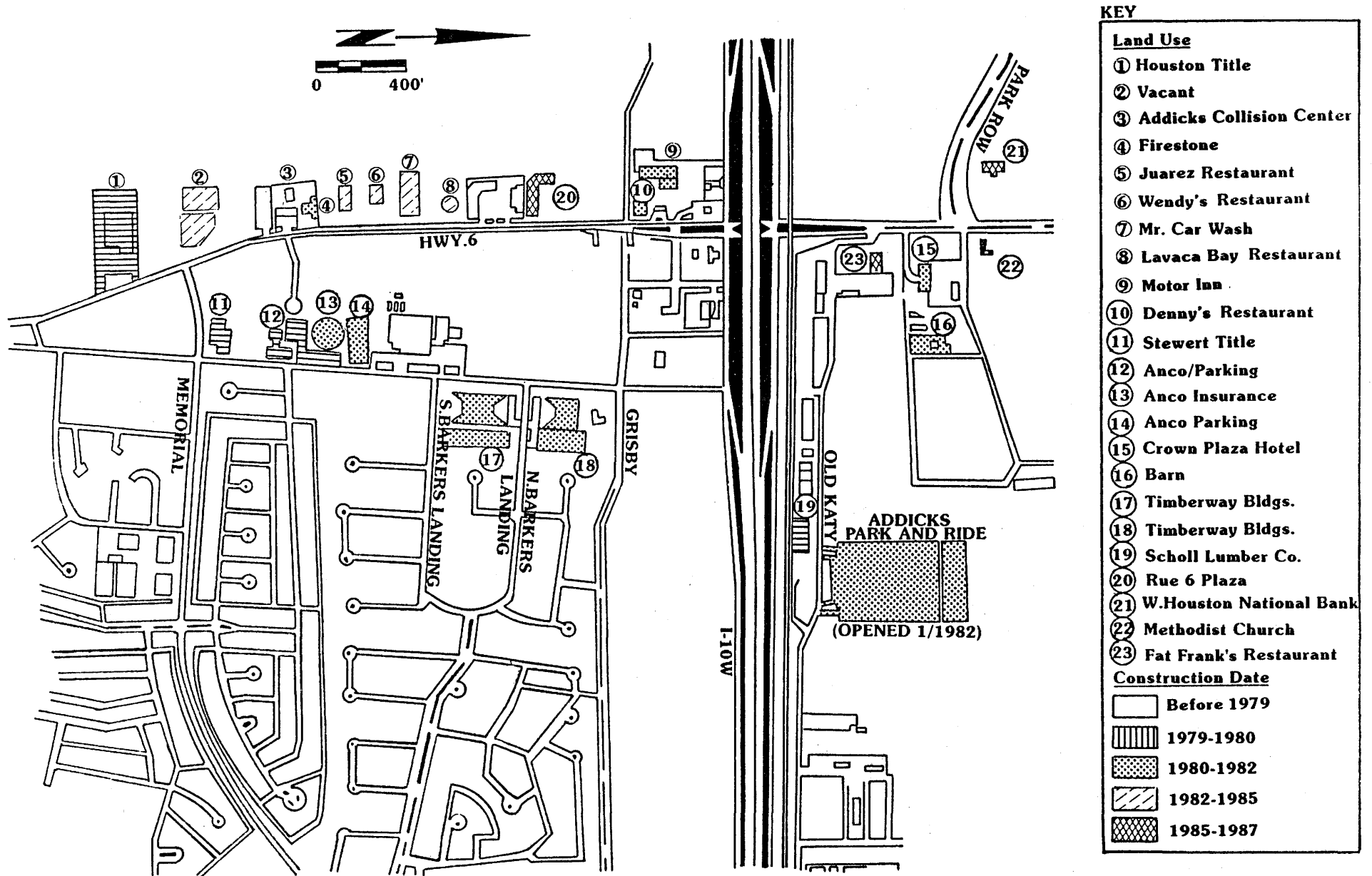


Figure 7. Land Use Trends in the Vicinity of the Addicks Park-and-Ride Lot (1979-1987)

new commercial strip center. These changes fit the general pattern of changes in the corridor (a pattern of changes involving office, commercial, and service uses as well as a locational pattern of land use changes predominantly on the south side of I-10W). This pattern of commercial land uses becoming the dominant feature in the area around the Addicks Park-and-Ride lot is documented in Tables 9 and 10.

The rapid decline in the number of residential land uses began in the late 1970's. This corresponded to an increase in the number of commercial uses, thus causing a reversal in dominant land use types. Since the early 1980's the number of commercial uses has risen slowly and stabilized while the number of residential land uses in the area has nearly doubled in the last four years. This is mainly due to the construction of a residential subdivision south of I-10W just off Memorial Drive, which occurred subsequent to the opening of the Addicks lot. However, there does not appear to be any influence of the transitway or the park-and-ride lot on the occurrence or location of these or any other land use changes in the impact area.

Figure 7 also shows that a considerable amount of vacant land remains around the site, particularly to the north. Therefore, the area around the park-and-ride lot should continue to be an excellent site to monitor the land use impacts of the Katy Transitway and its park-and-ride lots.

2.3.2 Kingsland Park-and-Ride

Recent land use changes in the area surrounding the Kingsland Park-and-Ride Lot are presented in Figure 8. Most of the land use changes involve commercial uses on what was previously vacant land. These commercial uses are mostly of a strip center or shopping center nature (grocery store, drug store, fast food). Details of the land use changes in the area around the Kingsland Park-and-Ride lot are shown in Tables 11 and 12. As can be seen from the data, the majority of the changes in the area have occurred since 1980. In fact, the area was almost completely vacant until the late 1970's when a newly constructed subdivision resulted in residential uses becoming the dominant land use. As residents moved in, commercial demands were

Table 9. Impact Area Development Assessment in the Vicinity of Addicks Park-and-Ride Lot: "Before" Period

Type of Use	Year									
	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %
Commercial	9 27	11 31	12 34	13 37	17 45	24 62	25 61	34 62	42 69	43 71
Residential	23 70	23 66	22 63	21 60	20 53	14 35	14 36	19 34	16 27	15 25
Public/Quasi-Public	1 3	1 3	1 3	1 3	1 2	1 2	1 2	1 2	1 2	1 2
Park or Recreational	- -	- -	- -	- -	- -	- -	1 2	1 2	1 2	1 2
Total	33 100	35 100	35 100	35 100	38 100	39 100	41 100	55 100	60 100	60 100

Source: Cole's City Directory

Table 10. Impact Area Development Assessment in the Vicinity of the Addicks Park-and-Ride Lot: "After" Period

Type of Use	Year			
	1983	1984	1985	1986
	No. %	No. %	No. %	No. %
Commercial	52 74	46 69	55 69	53 65
Residential	17 24	20 30	24 30	28 34
Public/Quasi-Public	1 1	1 1	1 1	1 1
Park or Recreational	1 1	- -	- -	- -
Total	71 100	67 100	80 100	82 100

Source: Cole's City Directory

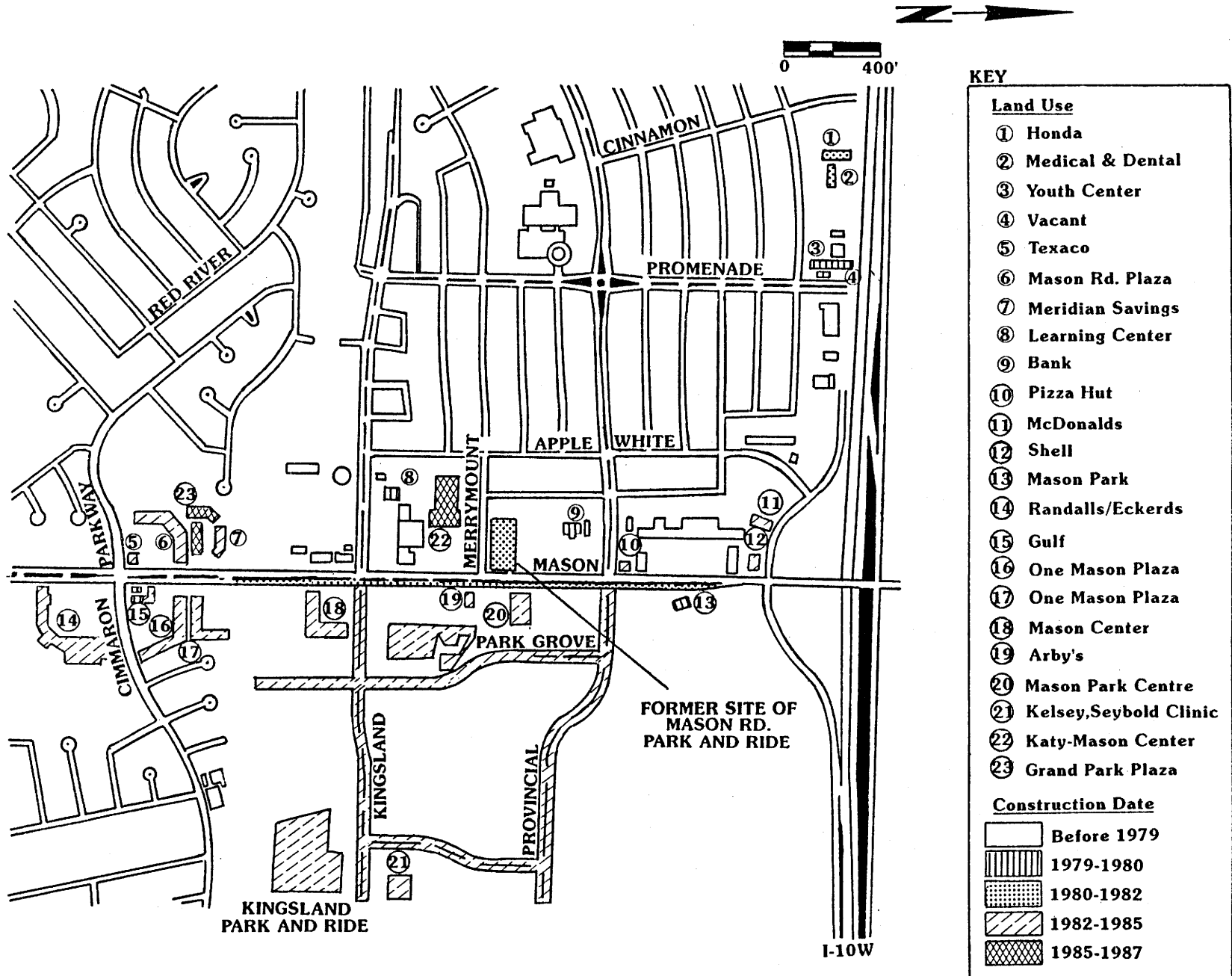


Figure 8. Land Use Trends in the Vicinity of the Kingsland Park-and-Ride Lot (1979-1987)

Table 11. Impact Area Development Assessment in the Vicinity of Kingsland Park-and-Ride Lot:
"Before" Period

Type of Use	Year							
	1973	1974	1975	1976	1977	1978	1979	1980
	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %
Commercial	- -	- -	- -	1 25	1 3	9 14	32 35	48 43
Residential	- -	2 100	2 100	3 75	38 97	55 86	60 65	63 57
Total	- -	2 100	2 100	4 100	39 100	64 100	92 100	111 100

Source: Cole's City Directory

Table 12. Impact Area Development Assessment in the Vicinity of Kingsland Park-and-Ride Lot:
"After" Period

Type of Use	Year					
	1981	1982	1983	1984	1985	1986
	No. %	No. %	No. %	No. %	No. %	No. %
Commercial	56 46	63 53	67 53	62 53	92 62	101 62
Residential	65 54	57 47	61 47	54 47	57 38	63 38
Total	121 100	120 100	128 100	116 100	149 100	164 100

Source: Cole's City Directory

created, resulting in a dramatic rise in the number of commercial land uses, causing them to become the dominant land use.

Based on this it is not surprising that the data shows that almost every land use change that occurred involved an improvement of an undeveloped tract of land. However, since the Kingsland Lot did not open until November 1985, there is doubt as to whether any of the changes can be attributed to either the Kingsland Lot or its predecessor, the Mason Road Lot which was in operation from September 1980 until its replacement by the Kingsland Lot.

3. CONCLUSIONS

This update suggests that the land use impacts of the HOV treatments along North (I-45N) and Katy (I-10W), as well as the Gulf (I-45S) HOV facilities currently under construction, have been relatively insignificant. Only two of the seven sites showed any change in land use that may have resulted from the HOV facilities. However, areas in two of the three corridors surveyed have substantial amounts of undeveloped land and it may prove necessary to wait until the transitways and associated support facilities become fully operational before a more definitive assessment of land use impacts will be possible. Continued monitoring of land uses and completion of the developer interview portions of the research should provide a reasonable assessment of the potential land use impacts of the Houston transitway system.

4. REFERENCES

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