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16. Abstract Within the Houston metropolitan area, a major commitment has been made to develop physically separated transitways in the medians of the existing freeway system. These lanes are reserved for the exclusive use by high-occupancy vehicles. Portions of the first two transitways to be completed are located on the Katy Freeway in west Houston and on the North Freeway serving north Houston. This report presents the results of transitway user and nonuser surveys performed in the Katy and North Freeway corridors. In addition to obtaining socioeconomic, demographic and travel information, the surveys were designed to: 1) determine perceptions of the level of utilization of the transitways; 2) identify why individuals have chosen their present travel mode; and 3) assess attitudes and impacts pertaining to the transitways. The data in this report cover the time period from April 1985 through October 1987.					
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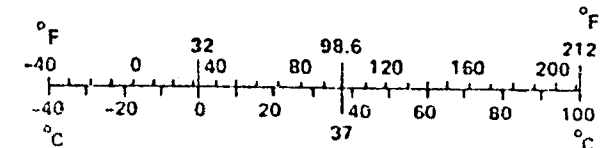
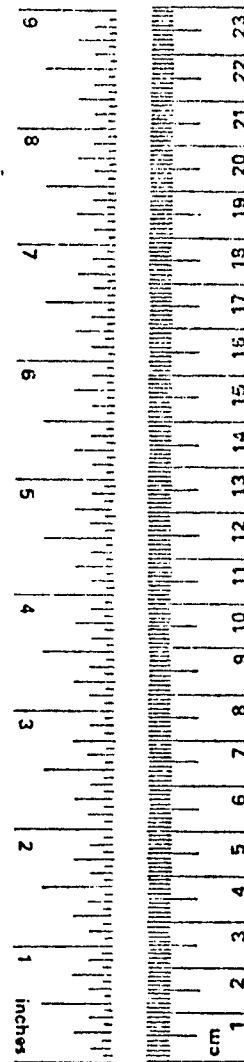
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
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

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



* 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, SD Catalog No. C13.10:286.

**AN ANALYSIS OF SURVEY DATA FROM THE KATY AND NORTH TRANSITWAYS
APRIL 1985 THROUGH OCTOBER 1987**

By

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Research Report 484-8

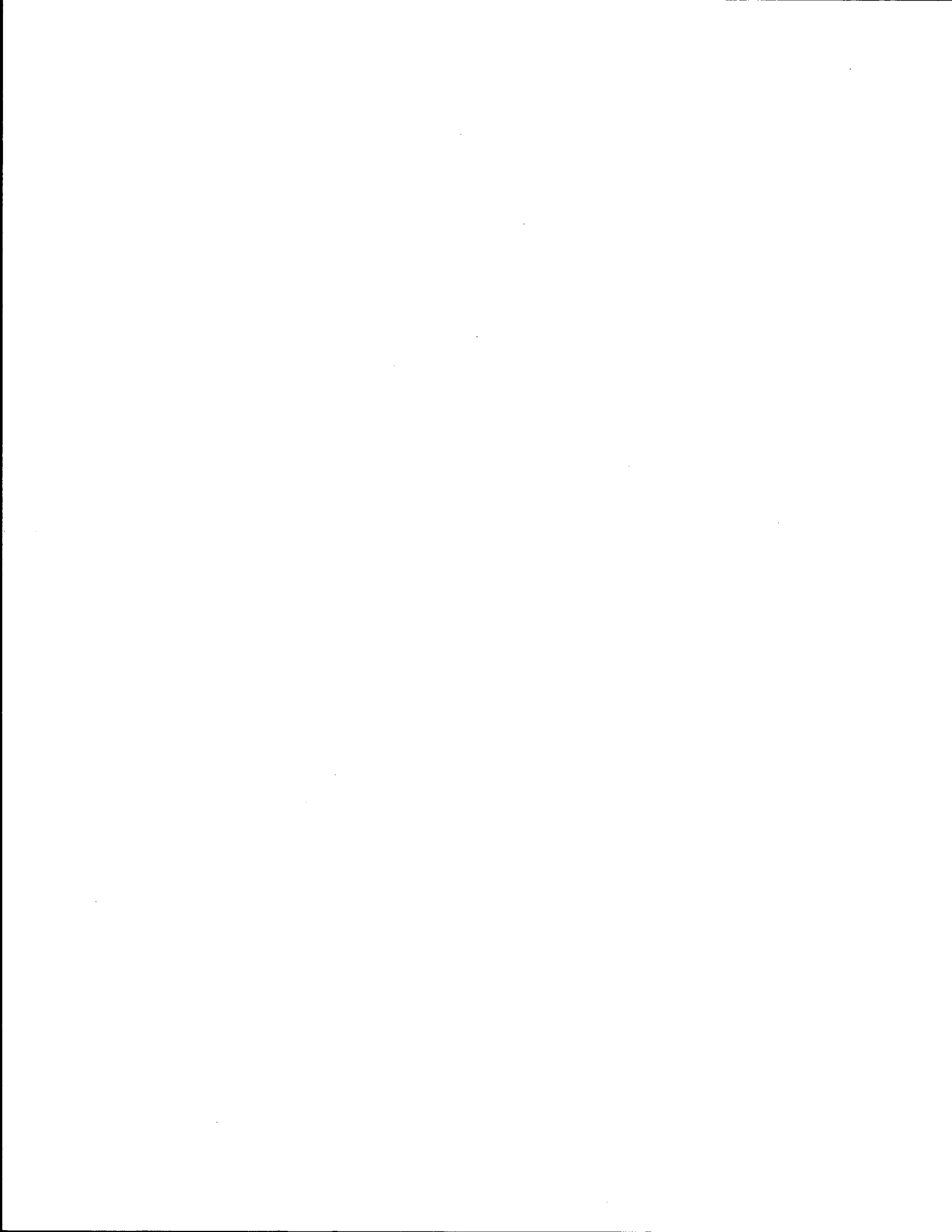
An Evaluation of the Impact of Permitting Carpools
to Use the Katy Transitway
Research Study 2-10-85-484

Sponsored by the
Metropolitan Transit Authority of Harris County
and the
Texas State Department of Highways and Public Transportation

In Cooperation with the
U.S. Department of Transportation
Federal Highway Administration

Texas Transportation Institute
The Texas A&M University System
College Station, Texas 77843-3135

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ABSTRACT

Within the Houston metropolitan area, a major commitment has been made to develop physically separated transitways in the medians of the existing freeway system. These lanes are reserved for the exclusive use by high-occupancy vehicles. Portions of the first two transitways to be completed are located on the Katy Freeway in west Houston and on the North Freeway serving north Houston. This report presents the results of transitway user and nonuser surveys performed in the Katy and North Freeway corridors. In addition to obtaining socioeconomic, demographic and travel information, the surveys were designed to: 1) determine perceptions of the level of utilization of the transitways; 2) identify why individuals have chosen their present travel mode; and 3) assess attitudes and impacts pertaining to the transitways. The data in this report cover the time period from April 1985 through October 1987.

Key Words: Transitways, High-Occupancy Vehicle Lanes, Busways, Transit, Park-and-Ride, Vanpools, Carpools, Priority Treatment.

IMPLEMENTATION STATEMENT

Relatively little experience with operating exclusive, reversible high-occupancy vehicle lanes exists. As a result, many of the operating procedures and approaches to be used in Houston are being developed through experience. This study was undertaken to assist the Metropolitan Transit Authority of Harris County and the Texas State Department of Highways and Public Transportation in the implementation and operation of the transitway system.

DISCLAIMER

The contents of this report reflect the views of the author who is responsible for the opinions, findings, and conclusions presented herein. The contents do not necessarily reflect the official views or policies of the Texas State Department of Highways and Public Transportation, the Metropolitan Transit Authority of Harris County, or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

SUMMARY

Within the Houston metropolitan area, a major commitment has been made to develop physically separated transitways in the median of the existing freeway network. These lanes are reserved for high-occupancy vehicles. Portions of the first two transitways to be completed opened on the I-10 Katy Freeway in west Houston and on the I-45 North Freeway in north Houston. This report presents the results of transitway user and nonuser surveys performed in the Katy and North Freeway corridors. In addition to obtaining socio-economic, demographic and travel information, the surveys were designed to: 1) determine perceptions of the level of utilization of the transitways; 2) identify why individuals have chosen their present mode of travel; and 3) assess attitudes and impacts pertaining to the transitways. The data in this report cover the time period from April 1985 through October 1987.

The Katy Transitway was opened to authorized buses and 8+ vanpools in October 1984. To encourage increased vehicular utilization of the facility, authorized 4+ carpools were allowed to begin using the transitway in April 1985. A few months later (October 1985), authorized 3+ carpools were permitted to use the transitway. In August 1986, the minimum passenger requirement for vehicles was lowered to 2+ persons and all authorization requirements were eliminated.

In addition to changes in the types of vehicles which have been permitted to use the transitway, there have also been changes in the Katy Transitway configuration. When the transitway opened in October 1984, it extended from Post Oak to Gessner, a distance of 4.7 miles. The only access point on the western terminus was at Gessner. In May 1985, the transitway was extended 1.7 miles from Gessner to West Belt, and an additional access point was temporarily provided at West Belt. By June 1987, the transitway had been extended from West Belt to State Highway 6, a distance of 5.1 miles. The West Belt access point was closed and two additional access points were opened -- a flyover ramp which provided a direct link to/from the Addicks Park-and-Ride Lot and an access point located just west of SH 6.

Because of the changing conditions on the Katy Transitway and the changes in the types of vehicles which were permitted to use the facility, several survey efforts were performed in order to assess the impacts of these changes. Specifically, comprehensive Katy Transitway user and nonuser surveys were performed in:

- March 1985 - 5 months after the opening of the transitway and 1 month before carpools were allowed on the facility.
- April 1986 - 18 months after transitway operation began; 1 year after carpools were allowed; approximately 7 months after the carpool passenger requirement was lowered to 3 persons.
- October 1987 - Approximately 3 years after the transitway opened; 2.5 years after carpools were allowed; 14 months after unauthorized 2+ carpools were permitted.

In addition to the major survey efforts described above, a special Katy Transitway carpool survey was performed in October 1985 and special transitway carpool and freeway motorist surveys were conducted in April 1987.

In the North Freeway Corridor, the North Transitway replaced the North Freeway contraflow lane in September 1984. The North Transitway extends from downtown to North Shepherd, a distance of 9.1 miles. Access from the north is via one of two points. Since the North Transitway opened, usage has been restricted to buses and authorized 8+ vanpools. Because the operating conditions have remained relatively stable on the North Transitway, no additional surveys have been performed since the January 1986 effort (approximately 18 months after the transitway had opened).

Some of the more important data from these surveys (that which relate to trip destination, choice of commuting mode and perceptions of the transitways) are summarized on the following pages.

Trip Destinations

During the peak period, less than half of the total trips (transitway user and nonuser) are destined to downtown Houston (Table S-1). Yet, essentially all bus service caters to trips downtown. Vanpools and carpools demonstrate more capability to serve trips to destinations other than downtown. In fact, 61% of the 1987 Katy Transitway vanpool and carpool trips were destined to locations other than the downtown.

Mode Choice Considerations

Previous Mode of Travel

In looking at previous travel modes of the transitway users in the Katy and North Freeway corridors, a significant percentage previously drove alone (Table S-2). In the Katy Freeway corridor, the park-and-ride and express bus service (which utilizes the transitway) also attracted 9% of its 1985 ridership and 11% of its 1986 and 1987 ridership from carpools or vanpools.

The vanpools attracted 22% of their 1985 ridership, 17% of their 1986 ridership and 14% of the 1987 ridership from carpools. An additional 15% of the 1985 and 1986 ridership was attracted from buses. Of special interest is the high percentage (43%) of the vanpoolers surveyed in 1987 which stated they had vanpooled even before the transitway had opened. This high percentage may be a result of the fact that only vanpool drivers were surveyed in 1987 and they may have been realizing other benefits for driving which made vanpooling attractive even without the benefits of the transitway.

Katy Transitway carpools attracted between 2% and 9% of their members from buses and between 2% and 4% from vanpools. Thus, opening the transitway to carpools does not appear to have resulted in a significant percentage of persons being attracted away from other transitway modes.

In the North Freeway corridor, transit service had attracted 17% of its ridership from carpools or vanpools. The vanpools had attracted 14% of their members from transit and 21% from carpools.

Table S-1. Trip Destination of Katy and North Freeway Corridor Commuters, 1985-1987

Trip Destination	1985	1986	1987
<u>Katy Transitway Bus Users</u>	(n=367)	(n=575)	(n=632)
Downtown	96%	95%	94%
Galleria	---	0%	1%
Texas Medical Center	1%	1%	1%
Greenway Plaza	0%	0%	1%
Other	3%	4%	3%
<u>Katy Transitway Vanpoolers</u>	(n=64)	(n=58)	(n=13)
Downtown	70%	60%	39%
Galleria	11%	12%	15%
Texas Medical Center	5%	7%	---
Greenway Plaza	3%	5%	---
Other	11%	16%	46%
<u>Katy Transitway Carpoolers</u>	(n=31)	(n=65)	(n=573)
Downtown	29%	49%	39%
Galleria	13%	15%	22%
Texas Medical Center	3%	3%	6%
Greenway Plaza	13%	---	6%
Other	42%	33%	27%
<u>Katy Freeway Motorists</u>	(n=302)	(n=728)	(n=1418)
Downtown	38%	33%	23%
Galleria	24%	10%	13%
Texas Medical Center	9%	3%	3%
Greenway Plaza	8%	4%	5%
Other	21%	50%	56%
<u>North Transitway Bus Users</u>	---	(n=1252)	---
Downtown	---	94%	---
Galleria	---	1%	---
Texas Medical Center	---	1%	---
Greenway Plaza	---	2%	---
Other	---	2%	---
<u>North Transitway Vanpoolers</u>	---	(n=199)	---
Downtown	---	61%	---
Galleria	---	7%	---
Texas Medical Center	---	8%	---
Greenway Plaza	---	4%	---
Other	---	20%	---
<u>North Freeway Motorists</u>	---	(n=421)	---
Downtown	---	31%	---
Galleria	---	7%	---
Texas Medical Center	---	4%	---
Greenway Plaza	---	4%	---
Other	---	54%	---

Table S-2. Previous Travel Mode of Katy and North Transitway Users,
Current Mode of Katy and North Freeway Motorists, 1985-1987

Previous Travel Mode	1985	1986	1987
<u>Katy Transitway Bus Users</u>	(n=355)	(n=573)	(n=630)
Drove Alone	24%	35%	34%
Carpool	5%	5%	9%
Vanpool	4%	6%	2%
Bus	54%	34%	33%
Didn't Make Trip	12%	18%	21%
<u>Katy Transitway Vanpoolers</u>	(n=461)	(n=433)	(n=13)
Drove Alone	34%	36%	36%
Carpool	22%	17%	14%
Vanpool	13%	12%	43%
Bus	15%	15%	---
Didn't Make Trip	16%	19%	7%
<u>Katy Transitway Carpoolers</u>	(n=88)	(n=191)	(n=564)
Drove Alone	50%	46%	50%
Carpool	24%	18%	29%
Vanpool	4%	4%	2%
Bus	2%	8%	9%
Didn't Make Trip	20%	18%	6%
<u>Katy Freeway Motorists¹</u>	(n=445)	(n=738)	(n=1424)
Drove Alone	88%	90%	85%
Carpool	8%	6%	12%
Vanpool	1%	1%	0%
Other	3%	3%	3%
<u>North Transitway Bus Users</u>	---	(n=1240)	---
Drove Alone	---	35%	---
Carpool	---	10%	---
Vanpool	---	7%	---
Bus	---	22%	---
Didn't Make Trip	---	25%	---
<u>North Transitway Vanpoolers</u>	---	(n=1622)	---
Drove Alone	---	30%	---
Carpool	---	21%	---
Vanpool	---	12%	---
Bus	---	14%	---
Didn't Make Trip	---	21%	---
<u>North Freeway Motorists¹</u>	---	(n=423)	---
Drove Alone	---	87%	---
Carpool	---	8%	---
Vanpool	---	1%	---
Other	---	4%	---

¹For the motorists, this is the current mode they normally use.

Impacts of the Transitways on Mode Choice

The Katy and North Transitways have had an effect on mode choice (Table S-3). While sizable percentages of the transitway users indicated that they would be using their current mode even if there was no transitway, 8% of the current Katy Transitway vanpoolers, 20% of the bus users and 37% of the carpoolers said they would not. On the North Transitway, 27% of the vanpoolers and 41% of the bus riders stated they would not be using their current mode if not for the transitway. Accordingly, it follows that the transitways can be credited with encouraging individuals to switch travel modes.

Table S-3. Use of Current Mode by Katy and North Transitway Users If Transitway Had Not Opened, 1985-1987

Would You Use Your Current Mode If Transitway Had Not Opened	1985	1986	1987
<u>Katy Transitway Bus Users</u>	(n=356)	(n=575)	(n=629)
Yes	69%	43%	52%
No	15%	26%	20%
Not Sure	16%	31%	28%
<u>Katy Transitway Vanpoolers</u>	(n=461)	(n=463)	(n=13)
Yes	87%	72%	84%
No	6%	12%	8%
Not Sure	7%	16%	8%
<u>Katy Transitway Carpoolers</u>	(n=90)	(n=197)	(n=565)
Yes	70%	59%	50%
No	16%	25%	37%
Not Sure	14%	16%	13%
<u>North Transitway Bus Users</u>	---	(n=1247)	---
Yes	---	23%	---
No	---	41%	---
Not Sure	---	36%	---
<u>North Transitway Vanpoolers</u>	---	(n=1632)	---
Yes	---	43%	---
No	---	27%	---
Not Sure	---	30%	---

Perceived Transitway Travel Time Savings

One of the primary reasons for implementing the transitways was to offer riders of high-occupancy vehicles both a travel time advantage and travel time reliability over traveling in the regular freeway lanes. Transitway users generally do perceive a travel time savings as a result of being able to use the priority lane (Table S-4).

Table S-4. Perceived Transitway Travel Time Savings, 1985-1987

Transitway Travel Time Savings (minutes)	1985	1986	1987
Perceived Katy Transitway Travel Time Savings			
<u>Katy Transitway Bus Users</u>	(n=328)	(n=530)	(n=590)
a.m. (50th Percentile)	9	15	15
p.m. (50th Percentile)	13	20	15
<u>Katy Transitway Vanpoolers</u>	(n=417)	(n=401)	(n=13)
a.m. (50th Percentile)	6	10	20
p.m. (50th Percentile)	10	15	20
<u>Katy Transitway Carpoolers</u>	(n=90)	(n=187)	(n=569)
a.m. (50th Percentile)	9	15	20
p.m. (50th Percentile)	17	20	20
Actual Katy Transitway Travel Time Savings ¹			
a.m. (6:00-9:00 a.m.)	6.8	3.0	4.4
p.m. (3:30-6:30 p.m.)	5.5	4.0	1.0
Perceived North Transitway Travel Time Savings			
<u>North Transitway Bus Users</u>	---	(n=1147)	---
a.m. (50th Percentile)	---	20	---
p.m. (50th Percentile)	---	25	---
<u>North Transitway Vanpoolers</u>	---	(n=199)	---
a.m. (50th Percentile)	---	20	---
p.m. (50th Percentile)	---	20	---
Actual North Transitway Travel Time Savings ²			
a.m. (6:00-9:00 a.m.)	---	4.2	---
p.m. (4:00-7:30 p.m.)	---	8.0	---

¹Source: TTI Research Report 484-7

²Source: TTI Research Report 339-12

In the Katy Freeway corridor, the median travel time savings reported by current bus users is 15 minutes in both the a.m. and p.m. Carpoolers and vanpoolers responding to the most recent survey perceive an even greater travel time savings (20 minutes in both the a.m. and p.m.). North Transitway users also perceive significant travel time savings. Median travel times reported by bus users were 20 minutes in the a.m. and 25 minutes in the p.m. Vanpoolers generally perceived a 20-minute savings in both the a.m. and p.m. It is interesting to note the extent to which perceived travel time savings exceed actual transitway travel time savings.

Motorists' Attitudes Concerning the Transitways

In the North Freeway corridor, only 26% of the motorists operating in the freeway mainlanes (non transitway users) felt the North Transitway was moving a sufficient number of vehicles to justify the project (Table S-5).

Table S-5. Motorists' (Non Transitway Users) Attitudes Toward the North Transitway, 1986

Attitude	Survey Date January 1986 ¹
Is the transitway sufficiently utilized in terms of vehicles being moved?	(n=413)
Yes	26%
No	56%
Not Sure	18%
North Transitway a.m. Peak Period Vehicle Volumes	393
Is the transitway sufficiently utilized in terms of persons being moved?	(n=422)
Yes	23%
No	57%
Not Sure	20%
North Transitway a.m. Peak Period Person Volumes	6647
Is the transitway a good transportation improvement?	(n=417)
Yes	62%
No	20%
Not Sure	18%

¹Authorized buses and vanpools

In the Katy Freeway corridor, as transitway utilization has increased, acceptance of the transitway by the motorists has also increased significantly. In 1985 (before carpools were allowed on the transitway) and again in 1986 (when authorized 3+ carpools were permitted on the lane), only 3% of the non transitway motorists felt the transitway was carrying a sufficient number of vehicles to justify the project; only 4% felt the transitway was moving a sufficient number of persons (Table S-6).

Table S-6. Motorists' (Non Transitway Users) Attitudes Toward the Katy Transitway, 1985-1987

Attitude	Survey Date			
	March 1985 ¹	April 1986 ²	April 1987 ³	October 1987 ³
Is the transitway sufficiently utilized in terms of vehicles being moved?	(n=451)	(n=742)	(n=948)	(n=1420)
Yes	3%	3%	36%	44%
No	90%	92%	55%	42%
Not Sure	7%	5%	9%	14%
Katy Transitway a.m. Peak Period Vehicle Volumes	138	256	2412	2854
Is the transitway sufficiently utilized in terms of persons being moved?	(n=451)	(n=741)	(n=950)	(n=1426)
Yes	4%	4%	30%	36%
No	85%	86%	58%	46%
Not Sure	11%	10%	12%	18%
Katy Transitway a.m. Peak Period Persons	2465	3156	7769	8599
Is the transitway a good transportation improvement?	(n=441)	(n=733)	(n=949)	(n=1423)
Yes	41%	36%	56%	64%
No	35%	43%	29%	20%
Not Sure	24%	21%	15%	16%

¹Authorized buses and vanpools (before carpools were allowed)

²Authorized buses, vanpools and 3+ carpools

³2+ vehicles, no authorization

However, by October 1987 (after 2+ unauthorized carpools were permitted), 44% of the motorists surveyed felt the transitway was sufficiently utilized in terms of the number of vehicles being moved; 36%

felt it was sufficiently utilized in terms of the number of persons being moved. Furthermore, 64% also stated the transitway was a good transportation improvement (Table S-6). Thus, it appears that permitting 2+ carpools on the Katy Transitway has greatly increased both the actual and perceived utilization of the priority facility.

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I. INTRODUCTION

In order to provide increased mobility in the Houston metropolitan area, the Texas State Department of Highways and Public Transportation and the Metropolitan Transit Authority of Harris County have joined together to implement an extensive system of transitways on the city's freeway network. Approximately 26 miles of transitways are currently in operation. Another 19 miles of transitways are under construction, and 25 miles are in the final planning and design stages. The current status of Houston's transitway system is illustrated in Figure 1.

The "typical" transitway in Houston is located in the freeway median, is one-lane reversible, is approximately 20 feet wide, and is separated from the general purpose freeway lanes by concrete median barriers. This design differs in several respects from the design of permanent busways implemented in other cities. As a result, it has been necessary to develop planning and design guidelines as the Houston transitway project progresses.

One important issue that is currently being addressed is the determination of the types of vehicles that will be permitted to use the transitways. Based on the successful operating experience of the I-45 North Freeway contraflow lane, the Katy Transitway opened in October 1984 with only buses and authorized 8+ vanpools allowed to be eligible users. Although this method of operation offered the potential to move large volumes of people, it did not result in moving large volumes of vehicles and the transitway, therefore, appeared to be underutilized. To increase the perception of utilization, the decision was made to permit carpools to use the Katy Transitway on a test basis. This study was established to assess the impacts of allowing carpools on the transitway.

Chronology of Events and Survey Activities on the Transitways

A chronology of major events and survey activities pertaining to the Katy Transitway to date is outlined on the following pages.

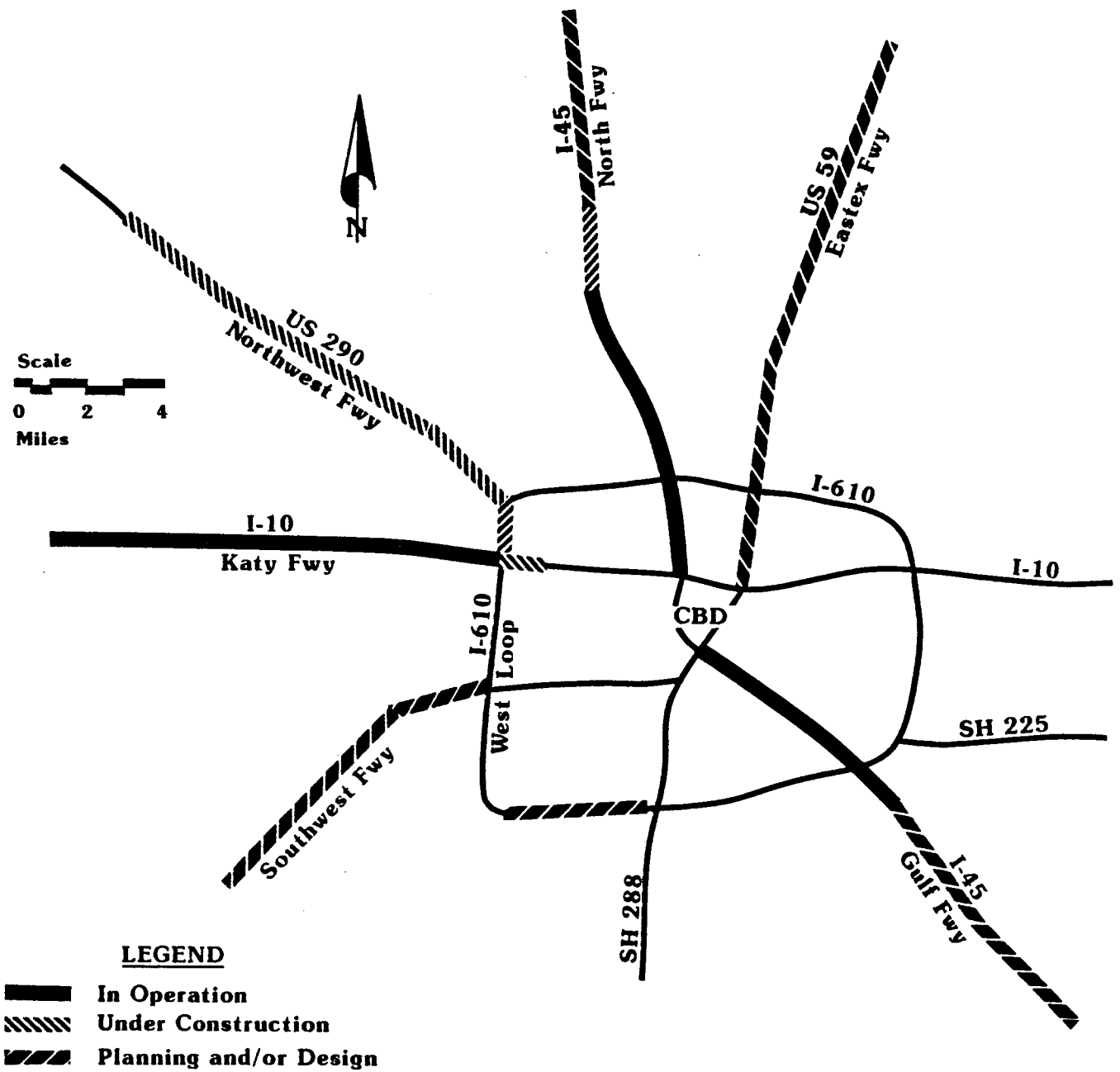


Figure 1. Current Status of the Committed Transitway System, Houston

- October 1984 - Katy Transitway opened for operation from Post Oak to Gessner; buses and authorized 8+ vanpools were designated as eligible users.
- March 1985 - Vehicle utilization of the transitway was low and the transitway appeared to be underutilized; decision was made to allow carpools on the transitway on a test basis. A major "before carpools" evaluation (which included transitway user and nonuser surveys) was performed; the results are documented in TTI Research Report 484-1.
- April 1985 - Authorized 4+ carpools were allowed to use the transitway.
- May 1985 - Operation of Katy Transitway extended from Gessner to West Belt.
- October 1985 - A major 6-month "after carpools" evaluation (similar in scope to the "before carpools" evaluation) originally scheduled for this month was postponed until the spring of 1986 due to the relatively low carpool volumes present (less than 50 carpools per peak period). In order to have some data on carpool utilization at an earlier date, a special survey of carpools using the transitway was performed. The results are documented in TTI Research Report 484-2. Immediately after the survey, the passenger requirement for eligible carpools was lowered to 3 persons to encourage increased vehicular utilization of transitway.
- April 1986 - A major "after carpools" evaluation (which included transitway user and nonuser surveys) was performed; the results are documented in TTI Research Report 484-4.
- August 1986 - Passenger requirement on the transitway was lowered to 2 persons and the authorization requirement was dropped.

- April 1987 - A special survey of Katy Transitway carpool drivers and Katy Freeway motorists was performed; the results are documented in a technical memorandum.
- June 1987 - Operation of Katy Transitway was extended from West Belt to State Highway 6.
- October 1987 - Second major "after carpools" evaluation (which included transitway user and nonuser surveys) was performed. A special survey of persons who utilize the park-and-pool lots adjacent to the Katy Freeway/Katy Transitway was also performed.

This research report documents the results of the October 1987 surveys and compares them to the results of previous surveys conducted in 1985, 1986 and 1987.

In addition to the carpool evaluation surveys being performed periodically on the Katy Transitway, surveys of users and nonusers of the North and Gulf Transitways are also being undertaken. These evaluations are designed to complement other research efforts by collecting pertinent information on transitway user and nonuser characteristics, travel patterns and attitudes.

Phase I of the North Transitway, which replaced the North Freeway contraflow lane, became operational in September 1984. A major "after" transitway implementation survey effort was performed in January 1986, approximately 18 months after the opening of the North Transitway. The results of that survey, documented in Research Report 484-4, are also presented in this report for comparative purposes.

The Katy and North Freeway study corridors are illustrated in Figure 2.

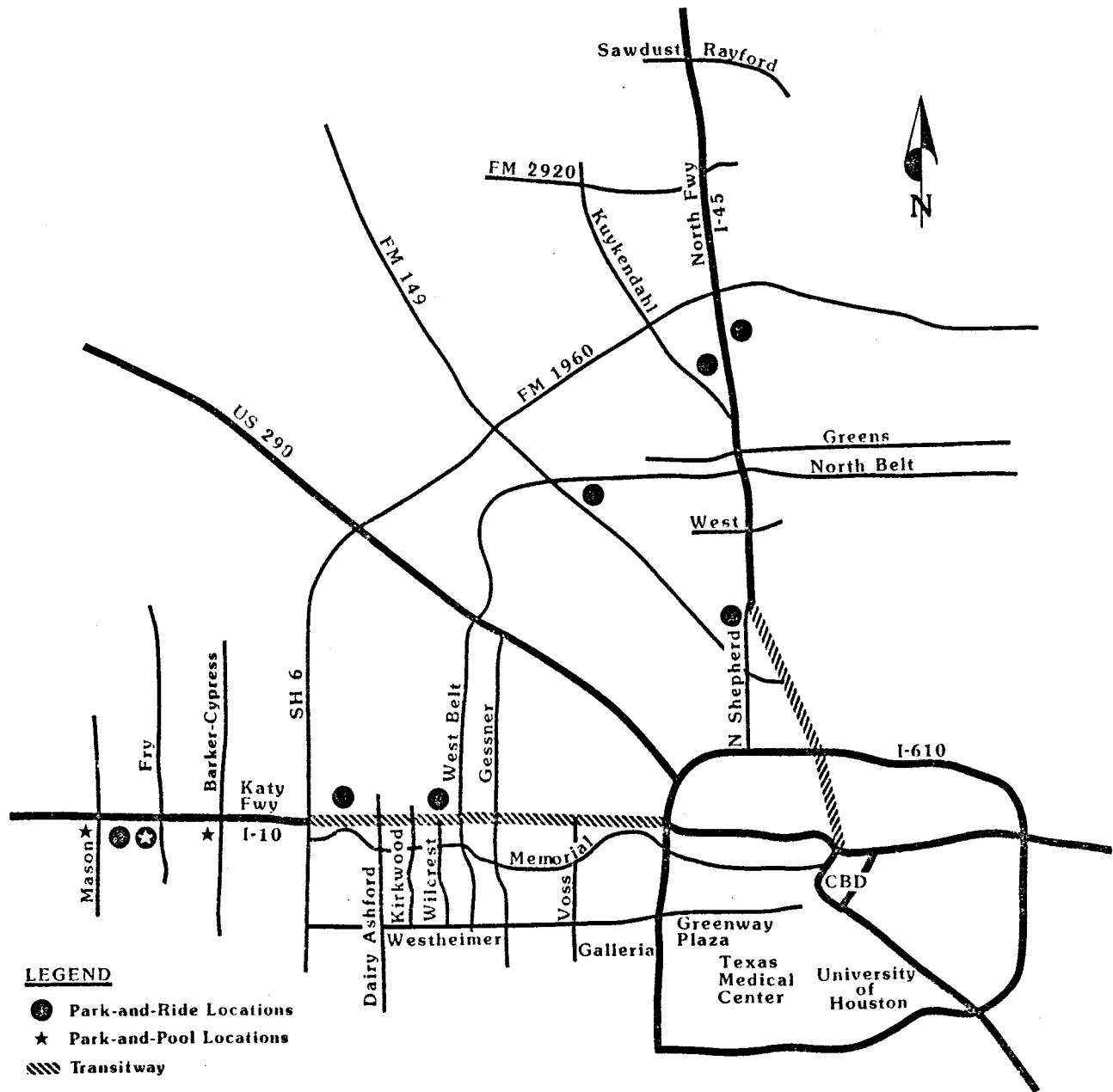


Figure 2. Katy and North Freeway Study Corridors

Surveys of Transitway Users and Nonusers

Surveys of both users and nonusers of the transitways were undertaken including:

- Patrons on transit buses using the Katy and North Transitways;
- Vanpoolers using the Katy and North Transitways;
- Carpoolers using the Katy Transitway; and
- Motorists on the Katy and North Freeways not using the transitways.

These surveys were primarily intended to: 1) determine perceptions of the level of transitway utilization; 2) identify why individuals have chosen their present travel mode; and 3) assess attitudes and impacts pertaining to the transitways. Data concerning general travel characteristics and demographic data were also collected as part of the major survey efforts.

All survey data were collected by TTI personnel. As indicated previously, comprehensive Katy Transitway data were collected in:

March 1985 - 5 months after the opening of the transitway and 1 month before carpools were allowed on the facility.

April 1986 - 18 months after transitway operation began; 1 year after carpools were introduced; approximately 7 months after the carpool passenger requirement was lowered to 3 persons.

October 1987 - Approximately 3 years after the transitway opened; 2.5 years after carpools were introduced; 14 months after unauthorized 2+ carpools were permitted.

A special carpool survey was also undertaken in October 1985 and special carpool and motorist surveys were performed in April 1987. North Transitway data were collected in January 1986, approximately 18 months after the North Transitway replaced the North Freeway contraflow lane.

Transitway User Surveys

Bus Mode. On-board transit user surveys were conducted on all METRO bus routes using the Katy and North Transitways during the a.m. operating period. For each route, the objective was to survey 100% of the passengers on approximately 30% of the bus runs. Katy Transitway bus service was provided on one express route (two in 1987) and from 3 park-and-ride lots; North Transitway bus service was provided by one express route and from 4 park-and-ride-lots. TTI staff were present on all buses surveyed to distribute and collect the surveys. Survey response rates by route are summarized in Table 1. Examples of survey instruments used are included in the Appendix.

Carpool and Vanpool Modes. For the 1985 and 1986 surveys, vanpools and carpools were surveyed during the p.m. transitway operating period. All vehicles were stopped at the entrances to the transitways by METRO police. TTI staff distributed surveys to all carpools and vanpools on the Katy Transitway and to all vanpools using the North Transitway. One survey was given to each driver and a different survey was given to each passenger. The driver survey requested more detailed data than did the passenger survey. Postage-paid return envelopes were included with the surveys and respondents were requested to return the completed questionnaire by mail.

For the 1987 surveys, however, it became necessary to modify the survey procedures. Carpool/vanpool volumes on the Katy Transitway during the p.m. peak period were approaching 2,000 vehicles. Hence, for safety and operational reasons, it was no longer feasible to distribute surveys by stopping vehicles as they entered the transitway.

Instead, license plates of carpools and vanpools traveling inbound on the Katy Transitway during the a.m. operating period were recorded by TTI staff. The SDHPT Motor Vehicle Division license plate files were accessed to obtain addresses. A survey was mailed to each address (excluding corporate addresses and leasing agencies). A postage-paid envelope was included with each of the surveys. Carpool and vanpool drivers were asked to complete the survey and return it to TTI.

Table 1. On-Board Transit User Survey Distribution, Katy and North Transitway Routes

Bus Route	Number of Surveys Distributed	Number of Surveys Completed	Response Rate
<u>Katy Transitway, March 1985</u>			
Katy-Mason Park-and-Ride	81	73	90%
Addicks Park-and-Ride	96	94	98%
West Belt Park-and-Ride	55	55	100%
Memorial Limited Express	<u>137</u>	<u>136</u>	<u>99%</u>
Total	369	358	97%
<u>North Transitway, January 1986</u>			
Kuykendahl Park-and-Ride	582	557	96%
North Shepherd Park-and-Ride	212	208	98%
Spring Park-and-Ride	246	234	95%
Seton Lake Park-and-Ride	151	144	95%
FM 1960 Express	<u>104</u>	<u>104</u>	<u>100%</u>
Total	1295	1247	97%
<u>Katy Transitway, April 1986</u>			
Katy-Mason (1985)/Kingsland (1986-7) Park-and-Ride	106	104	98%
Addicks Park-and-Ride	219	211	96%
West Belt Park-and-Ride	100	99	99%
Memorial Limited Express	<u>169</u>	<u>167</u>	<u>99%</u>
Total	594	581	98%
<u>Katy Transitway, October 1987</u>			
Kingsland Park-and-Ride	101	101	100%
Addicks Park-and-Ride	204	193	95%
West Belt Park-and-Ride	56	55	98%
Memorial Limited Express	175	173	99%
Wilcrest Express	<u>112</u>	<u>112</u>	<u>100%</u>
Total	648	634	98%

Note: The Kingsland Park-and-Ride replaced the Katy-Mason Park-and-Ride.

Examples of the instruments used for the carpool and vanpool surveys are included in the Appendix. Response rates to the surveys are presented in Table 2.

Table 2. Carpool and Vanpool Survey Distribution, Katy and North Transitways

Survey Group	Number of Surveys Distributed	Number of Surveys Completed	Response Rate
<u>Katy Transitway, March 1985</u> Vanpool Drivers and Passengers	689	465	67%
<u>Katy Transitway, October 1985</u> Carpool Drivers and Passengers	121	81	67%
<u>North Transitway, January 1986</u> Vanpool Drivers and Passengers	2,323	1,637	70%
<u>Katy Transitway, April 1986</u> Vanpool Drivers and Passengers	683	439	64%
Carpool Drivers and Passengers	<u>294</u>	<u>198</u>	<u>67%</u>
Total	977	637	65%
<u>Katy Transitway, April 1987¹</u> Carpool Drivers	1,603	607	38%
<u>Katy Transitway, October 1987²</u> Vanpool and Carpool Drivers	1,536	605	39%

¹For this survey, 2,459 license plates were read, 1,603 surveys were mailed, 147 surveys were returned address unknown and 607 surveys were returned completed.

²For the October survey, 2,502 license plates were read, 1,536 surveys were mailed, 111 surveys were returned address unknown and 605 surveys were returned completed.

Non Transitway User Surveys

During the 6:00-9:00 a.m. peak period, license plates of motorists traveling inbound on the Katy and North Freeway mainlanes were recorded by TTI observers. The survey procedures followed were essentially identical to those described above for 1987 vanpool and carpool surveys.

SDHPT Motor Vehicle Division license plate files were accessed to obtain addresses. A survey was mailed to each address (excluding corporate addresses and leasing agencies). Motorists were asked to complete the survey and return it to TTI in the postage-paid envelope provided. Response rates to the motorist surveys are presented in Table 3. An example of the survey questionnaire used is included in the Appendix.

Table 3. Motorist (Non Transitway User) Survey Distribution, Katy and North Freeways

Motorists	Number of License Plates Read (6-9 a.m.)	Number of Surveys Mailed	Number Returned Address Unknown or Vehicle Not on Freeway	Number of Completed Surveys	Response Rate (% of Surveys Mailed)
Katy Freeway, Mar. 85	2,090	1,435	121	454	32%
North Freeway, Jan. 86	2,470	1,585	154	422	27%
Katy Freeway, Apr. 86	2,817	1,714	106	744	43%
Katy Freeway, Apr. 87	3,220	2,030	154	910	45%
Katy Freeway, Oct. 87	5,118	3,241	221	1,436	44%

Comparison to Previous Data

Some of the questions used in the Katy and North Transitway user and nonuser surveys are similar to those used in surveys of park-and-ride users and nonusers along the Katy and North Freeway conducted by TTI in 1981 and 1984. When possible, for comparative purposes, the 1981 and 1984 data are also presented. During the 1981 and 1984 survey efforts, no priority treatment of any form was available along the Katy Freeway. On the North Freeway, however, a contraflow lane was available for authorized buses and vanpools at the time of the 1981 and 1984 surveys.

II. TRANSITWAY BUS USER SURVEYS

In most instances, the responses from the patrons at the park-and-ride lots along each freeway corridor are similar. The responses from the express route(s) surveyed in each corridor differ in some respects from the park-and-ride responses and are, therefore, presented separately.

The questions contained on the Katy and North Transitway transit user surveys generally fall into one of 3 subject areas: 1) personal characteristics; 2) travel patterns and trip characteristics; and 3) attitudes and impacts pertaining to the transitways.

Personal Characteristics

Questions concerning age, sex, occupation and last year of school completed were asked.

Age

The median age of the park-and-ride patrons surveyed is in the mid 30s (Table 4). These data are consistent with previous on-board transit park-and-ride surveys conducted in 1981 and 1984. The median ages for the patrons on the express routes which utilize the Katy and North Transitways are 4 to 9 years higher.

Sex

Between 53% and 64% of the ridership on the park-and-ride routes is female (Table 4). Again, this is in general agreement with previous park-and-ride survey data. By contrast, between 49% and 74% of the ridership on the express routes is male.

Occupation

The greatest number of riders on all routes serving both transitways are classed as "professional." A significant ridership component is also drawn

Table 4. Personal Characteristics of Transitway Transit Users,
Katy and North Transitway Transit User Surveys

Characteristic	Total Sample			Park-and-Ride Routes			Express Routes		
	1985	1986	1987	1985	1986	1987	1985	1986	1987
Age (years)									
<u>Katy Transitway</u>	(n=351)	(n=568)	(n=613)	(n=219)	(n=409)	(n=341)	(n=132)	(n=159)	(n=272)
50th Percentile	33	32	35	33	31	34	37	37	37
<u>North Transitway</u>	--	(n=1226)	--	--	(n=1129)	--	--	(n=97)	--
50th Percentile	--	34	--	--	33	--	--	42	--
Sex									
<u>Katy Transitway</u>	(n=351)	(n=565)	(n=607)	(n=218)	(n=402)	(n=332)	(n=133)	(n=163)	(n=275)
Male	49%	44%	42%	47%	40%	36%	53%	54%	49%
Female	51%	56%	58%	53%	60%	64%	47%	46%	51%
<u>North Transitway</u>	---	(n=1203)	---	---	(n=1105)	---	---	(n=98)	---
Male	---	44%	---	---	41%	---	---	74%	---
Female	---	56%	---	---	59%	---	---	26%	---
Occupation									
<u>Katy Transitway</u>	(n=343)	(n=550)	(n=603)	(n=215)	(n=391)	(n=334)	(n=128)	(n=159)	(n=269)
Professional	56%	46%	44%	57%	47%	47%	54%	45%	41%
Managerial	13%	20%	14%	13%	20%	11%	14%	22%	19%
Clerical	21%	26%	27%	22%	28%	31%	20%	19%	22%
Sales	4%	4%	6%	4%	3%	5%	4%	4%	8%
Student	3%	3%	3%	1%	1%	5%	5%	6%	5%
Other	3%	1%	6%	3%	1%	1%	3%	4%	5%
<u>North Transitway</u>	---	(n=1140)	---	---	(n=1092)	---	---	(n=98)	---
Professional	---	38%	---	---	38%	---	---	41%	---
Managerial	---	23%	---	---	22%	---	---	34%	---
Clerical	---	30%	---	---	32%	---	---	12%	---
Sales	---	3%	---	---	3%	---	---	6%	---
Student	---	1%	---	---	0%	---	---	3%	---
Other	---	5%	---	---	5%	---	---	4%	---
Education (years)									
<u>Katy Transitway</u>	(n=346)	(n=570)	(n=591)	(n=215)	(n=409)	(n=326)	(n=131)	(n=161)	(n=265)
Average	15.6	15.4	15.4	15.4	15.4	15.3	16.0	15.5	15.5
<u>North Transitway</u>	----	(n=1214)	----	----	(n=1112)	----	----	(n=102)	----
Average	----	14.9	----	----	14.9	----	----	15.8	----

from "managerial" and "clerical" job positions (Table 4). More than half of the total ridership is "professional" or "managerial."

Education

As has been found in previous park-and-ride surveys, users of this type of bus service are highly educated. The average transitway transit patron has completed at least 2.9 years of college.

Travel Patterns and Trip Characteristics

Questions were asked concerning trip purpose, days per week the trip is made, trip origin, trip destination, whether the employer pays for part of the bus fare, and whether a car was available for the trip.

Trip Purpose

The overwhelming majority of all the transit trips surveyed are work trips (Table 5).

Trip Frequency

As would be expected for a transit service catering to work trips, virtually all the trips are made 5 days a week or more (Table 5).

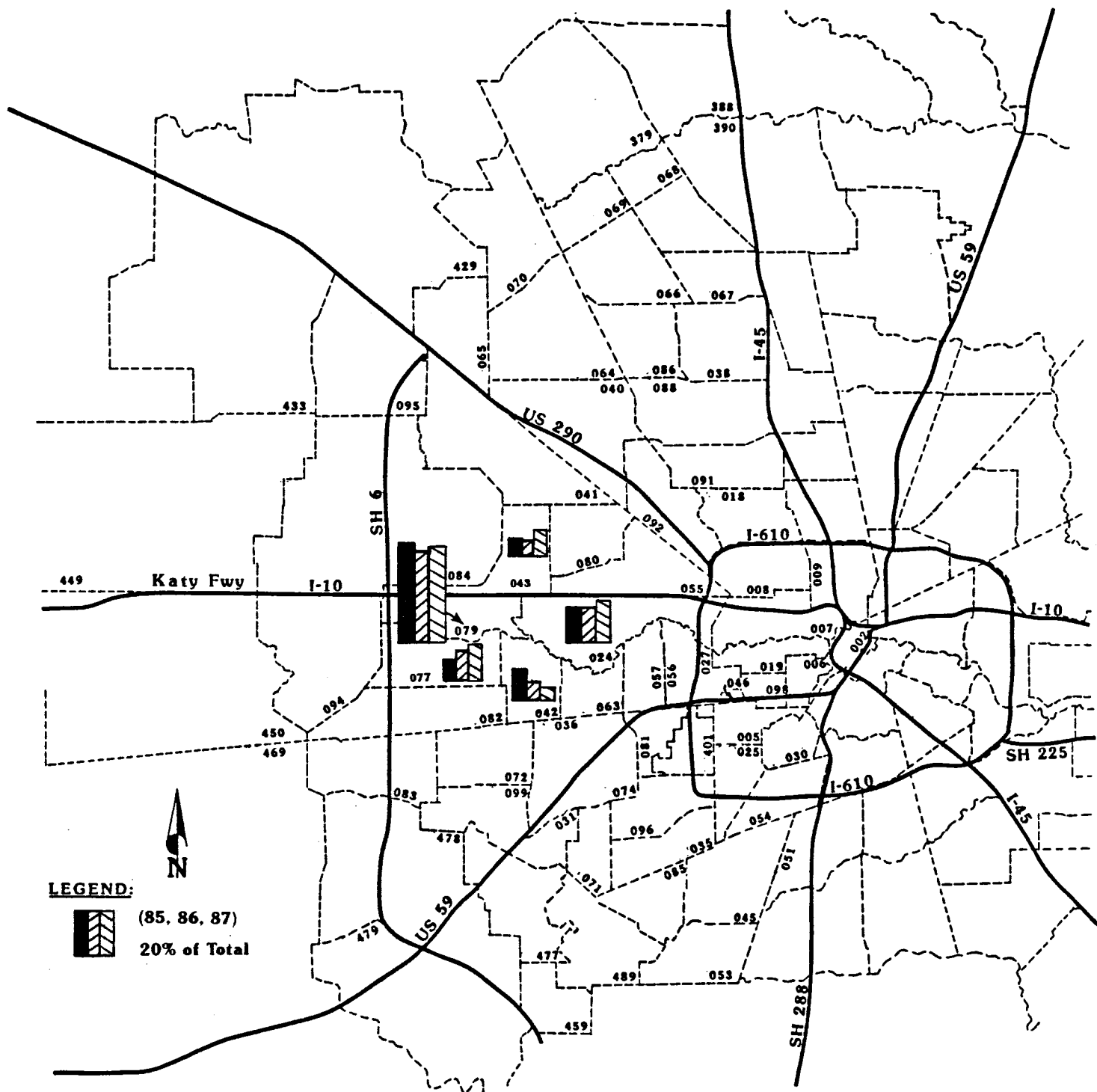
Trip Origin

The origin of the trip, by zip code, was requested. Data for the Katy Transitway routes are illustrated in Figures 3-7 and summarized in Table 6; data for the North Transitway routes are presented in Figures 8-12 and summarized in Table 7. The park-and-ride route origin data are consistent with market areas as defined in previous surveys.

Katy Transitway Routes. Both the West Belt and Addicks Park-and-Ride Lots are located north of the Katy Freeway. In 1985, approximately 60% of the ridership for the West Belt Lot originated north of the freeway. In

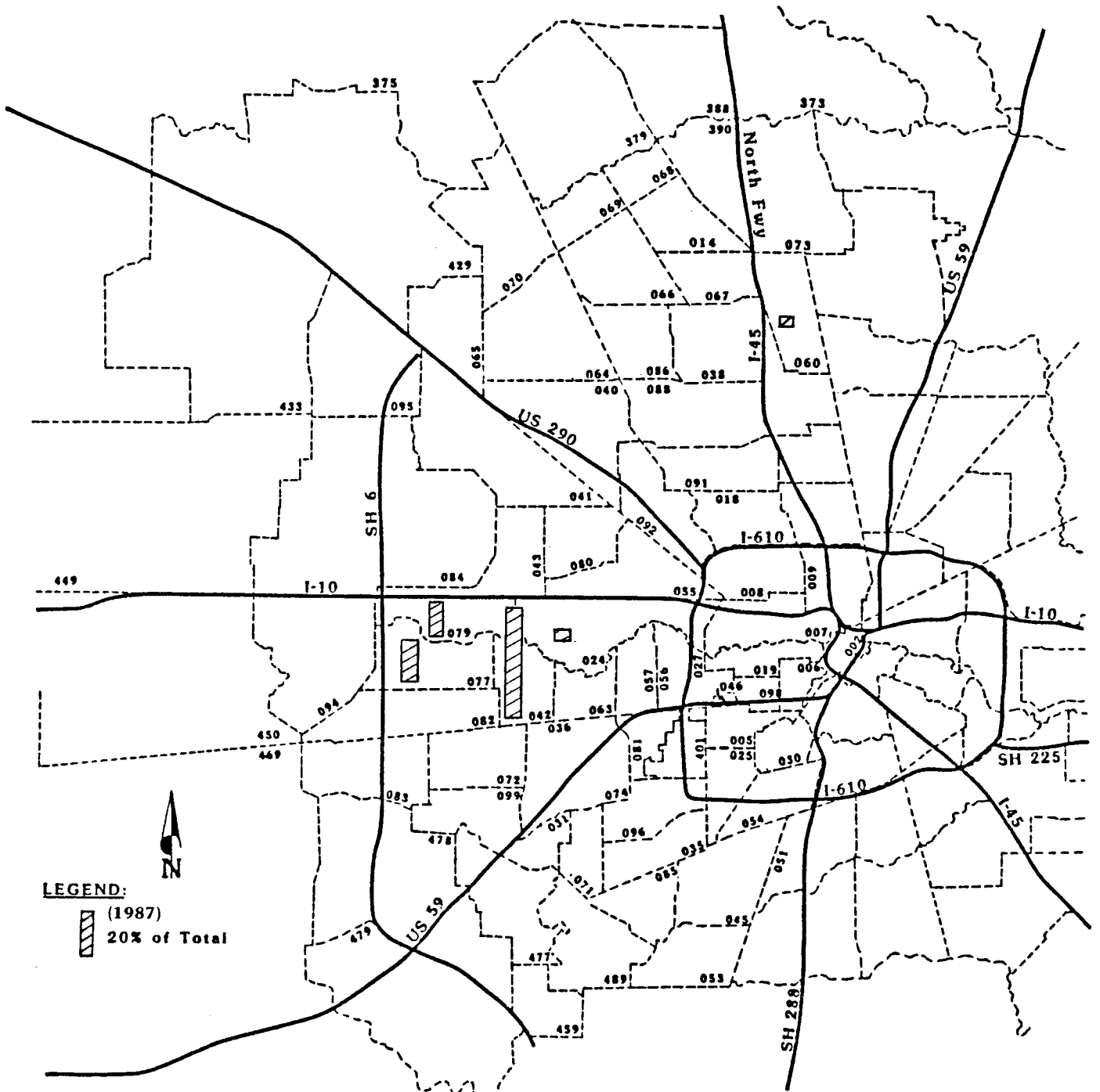
Table 5. Trip Characteristics of Transitway Transit Users,
Katy and North Transitway Transit User Surveys

Characteristic	Total Sample			Park-and-Ride Routes			Express Routes		
	1985	1986	1987	1985	1986	1987	1985	1986	1987
Trip Purpose									
<u>Katy Transitway</u>	(n=358)	(n=580)	(n=634)	(n=222)	(n=412)	(n=349)	(n=136)	(n=168)	(n=285)
Work	99%	97%	98%	100%	98%	100%	96%	96%	96%
School	1%	2%	1%	0%	2%	0%	3%	3%	3%
Other	0%	1%	1%	0%	0%	0%	1%	1%	1%
<u>North Transitway</u>	---	(n=1256)	---	---	(n=1152)	---	---	(n=104)	---
Work	---	99%	---	---	99%	---	---	97%	---
School	---	1%	---	---	1%	---	---	3%	---
Trip Frequency (days per week)									
<u>Katy Transitway</u>	(n=355)	(n=579)	(n=631)	(n=219)	(n=411)	(n=348)	(n=136)	(n=168)	(n=283)
0-1	1%	1%	2%	1%	1%	1%	0%	1%	3%
2	1%	2%	1%	1%	2%	1%	2%	2%	2%
3	2%	3%	4%	1%	3%	5%	2%	3%	3%
4	5%	5%	5%	5%	4%	5%	6%	7%	5%
5 or more	91%	89%	88%	92%	90%	88%	90%	87%	87%
<u>North Transitway</u>	---	(n=1251)	---	---	(n=1147)	---	---	(n=104)	---
0-1	---	1%	---	---	1%	---	---	2%	---
2	---	0%	---	---	0%	---	---	1%	---
3	---	1%	---	---	1%	---	---	1%	---
4	---	3%	---	---	3%	---	---	4%	---
5 or more	---	95%	---	---	95%	---	---	92%	---
Trip Destination									
<u>Katy Transitway</u>	(n=357)	(n=575)	(n=632)	(n=222)	(n=409)	(n=349)	(n=135)	(n=166)	(n=283)
Downtown	96%	95%	94%	97%	96%	96%	94%	90%	91%
Galleria	---	0%	1%	---	0%	---	---	1%	2%
Texas Med. Ctr.	1%	1%	1%	1%	1%	1%	1%	2%	2%
Greenway Plaza	0%	0%	1%	---	---	1%	1%	1%	---
Univ. of Houston	3%	1%	1%	2%	1%	1%	4%	1%	1%
Other	---	3%	2%	---	2%	1%	---	5%	4%
<u>North Transitway</u>	---	(n=1252)	---	---	(n=1149)	---	---	(n=103)	---
Downtown	---	94%	---	---	95%	---	---	91%	---
Galleria	---	1%	---	---	1%	---	---	1%	---
Texas Med. Ctr.	---	1%	---	---	1%	---	---	1%	---
Greenway Plaza	---	2%	---	---	2%	---	---	---	---
Other	---	2%	---	---	1%	---	---	7%	---



NOTE: All Zip Codes Begin with 77.

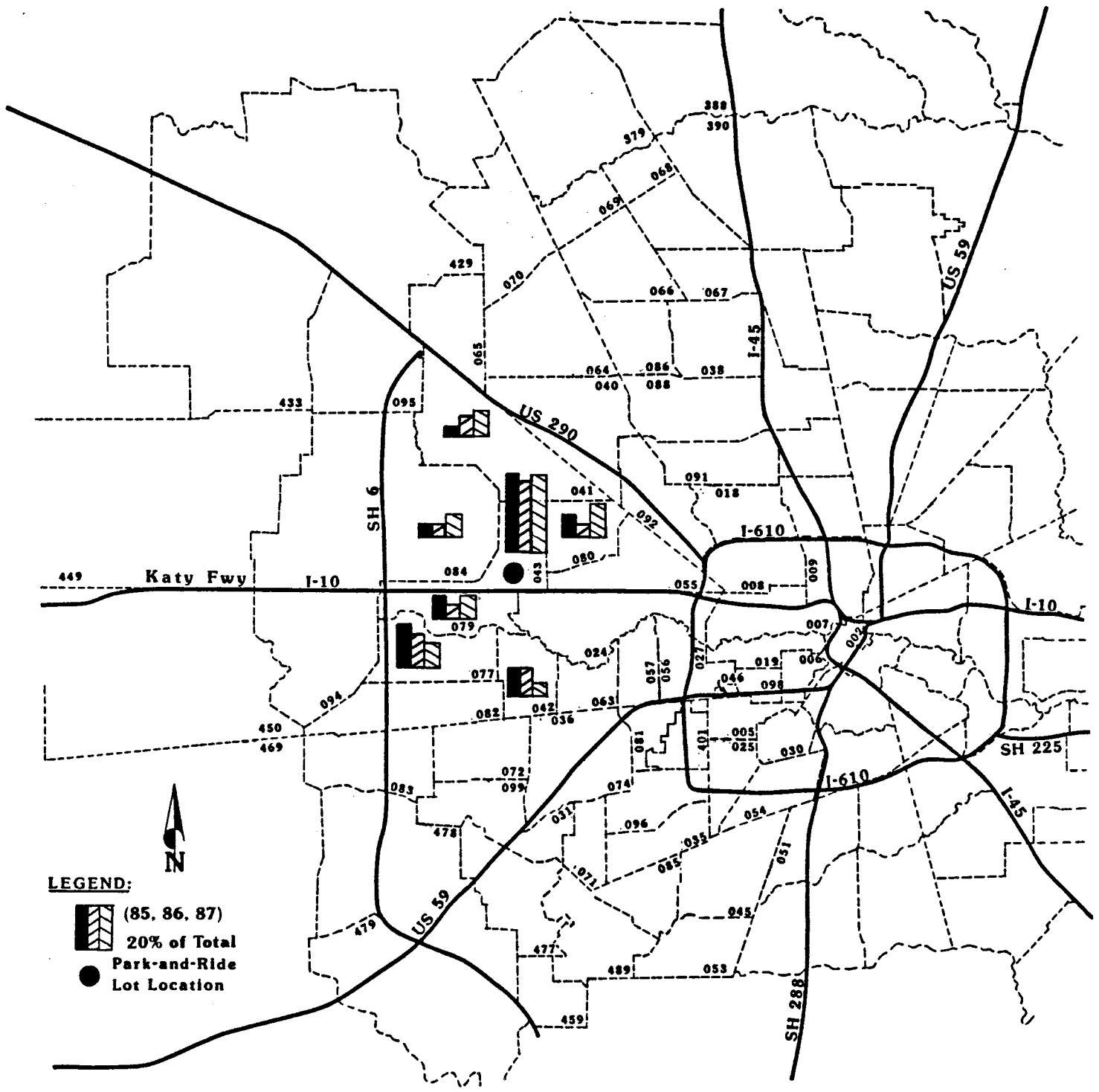
Figure 3. Home Origins of Patrons of the Memorial Limited Express Bus Route





LEGEND:
 (1987)
 20% of Total

NOTE: All Zip Codes Begin with 77.

Figure 4. Home Origins of Patrons of the Wilcrest Express Bus Route



LEGEND:
 (85, 86, 87)
 20% of Total
 Park-and-Ride
 Lot Location

NOTE: All Zip Codes Begin with 77.

Figure 5. Home Origins of the West Belt Park-and-Ride Lot

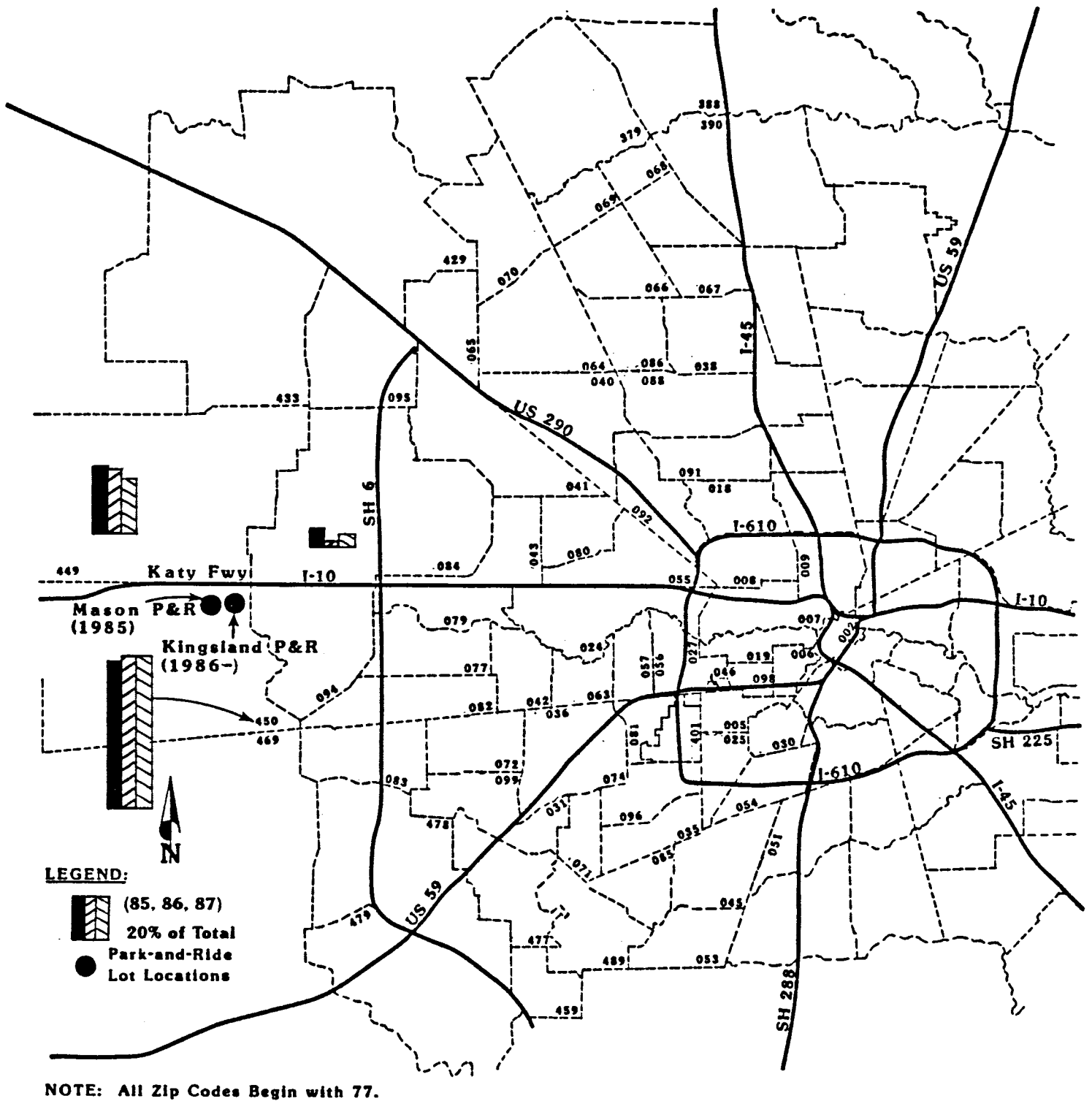
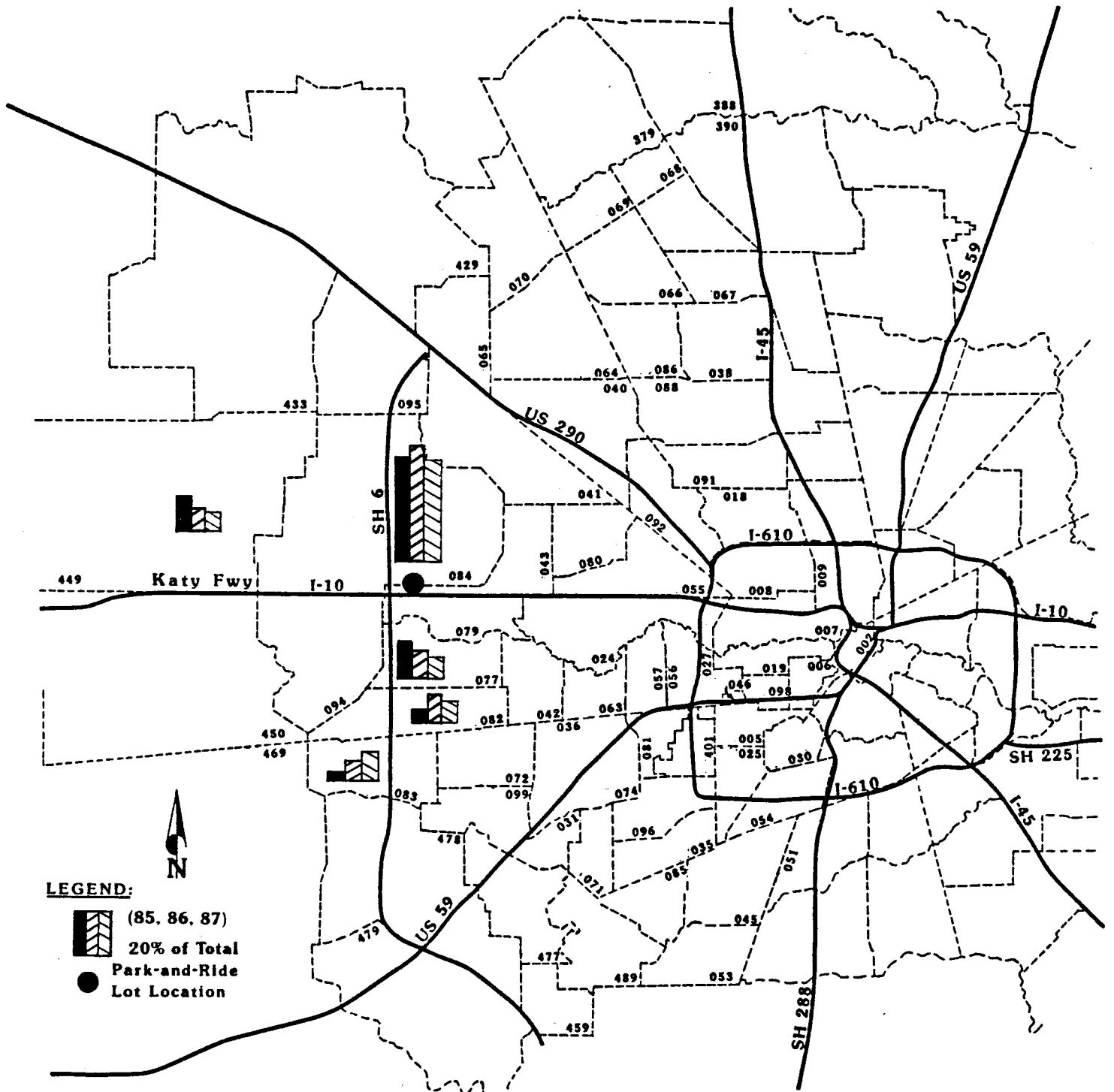





Figure 6. Home Origins of Patrons of the Mason Road/Kingsland Park-and-Ride Lot



LEGEND:

-  (85, 86, 87)
-  20% of Total
-  Park-and-Ride Lot Location

NOTE: All Zip Codes Begin with 77.

Figure 7. Home Origins of Patrons of the Addicks Park-and-Ride Lot

Table 6. Zip Codes of Origin for Katy Transitway Transit Trips,
Katy Transitway Transit User Surveys

Katy Transitway Bus Route	Zip Code	Location Relative to Katy Freeway	% of Total Origins		
			1985	1986	1987
Memorial Express	77079	---	41%	38%	39%
	77024	---	15%	15%	19%
	77042	---	13%	8%	4%
	77077	---	9%	12%	14%
	77043	---	7%	6%	9%
	Other	---	15%	21%	15%
Wilcrest Express	77042	---	---	---	51%
	77077	---	---	---	22%
	77079	---	---	---	16%
	77024	---	---	---	5%
	Other	---	---	---	6%
West Belt Park-and-Ride	77043	North	33%	29%	30%
	77077	South	18%	14%	9%
	77042	South	13%	13%	4%
	77041	North	4%	8%	9%
	77079	South	10%	6%	11%
	77080	North	9%	5%	17%
	77084	North	5%	5%	7%
	Other	---	8%	20%	13%
Katy-Mason Park-and-Ride (1985); Kingsland Park- and-Ride (1986, 1987)	77450	South	62%	64%	64%
	77449	North	29%	28%	24%
	77084	North	8%	3%	4%
	Other	---	1%	5%	8%
Addicks Park-and-Ride	77084	North	43%	47%	42%
	77077	South	15%	12%	10%
	77449	North	14%	10%	9%
	77082	South	6%	12%	7%
	77083	South	3%	8%	9%
	Other	---	19%	11%	23%

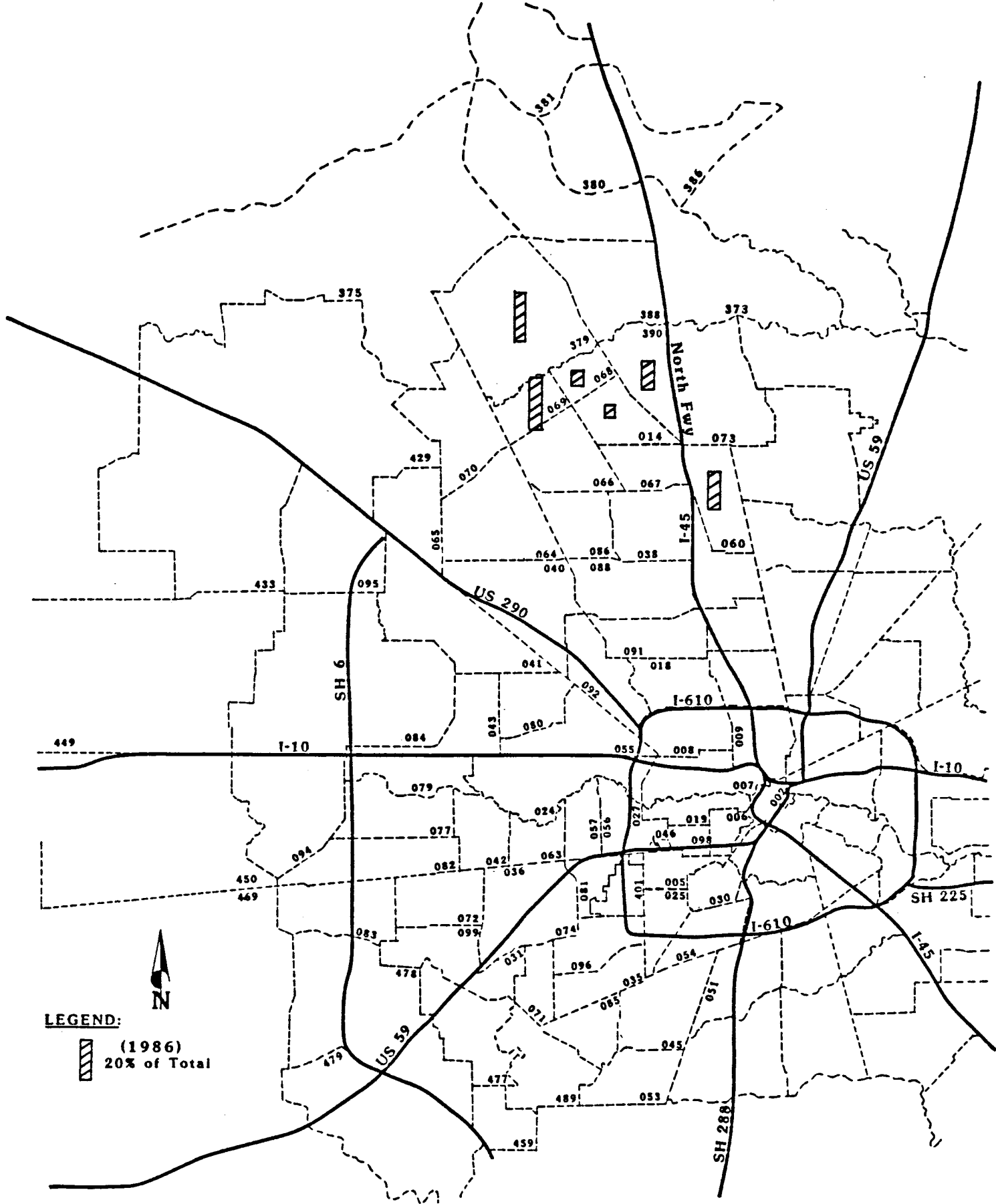


Figure 8. Home Origins of Patrons of the FM 1960 Express Route

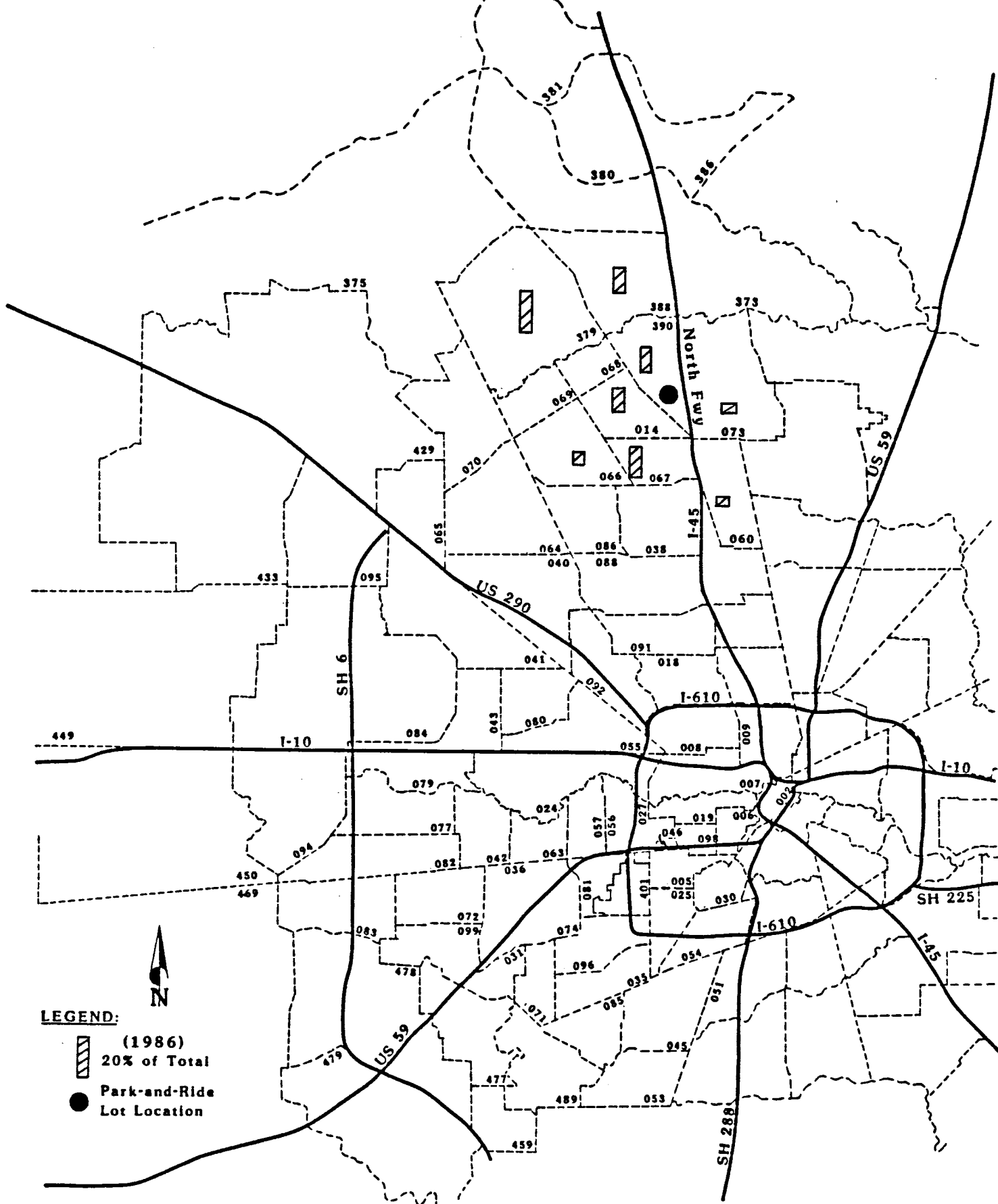


Figure 9. Home Origins of Patrons of the Kuykendahl Park-and-Ride Lot

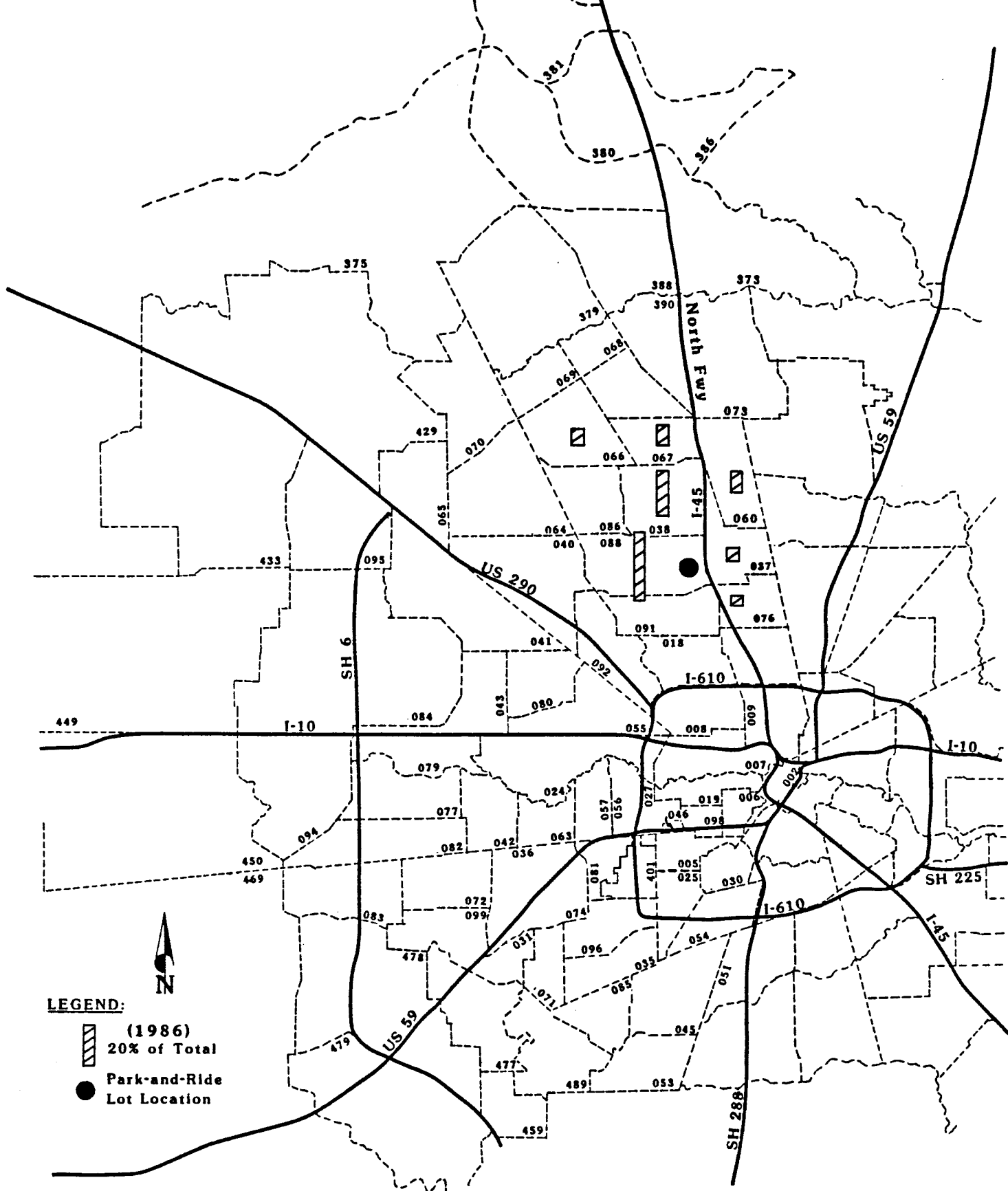


Figure 10. Home Origins of Patrons of the N. Shepherd Park-and-Ride Lot

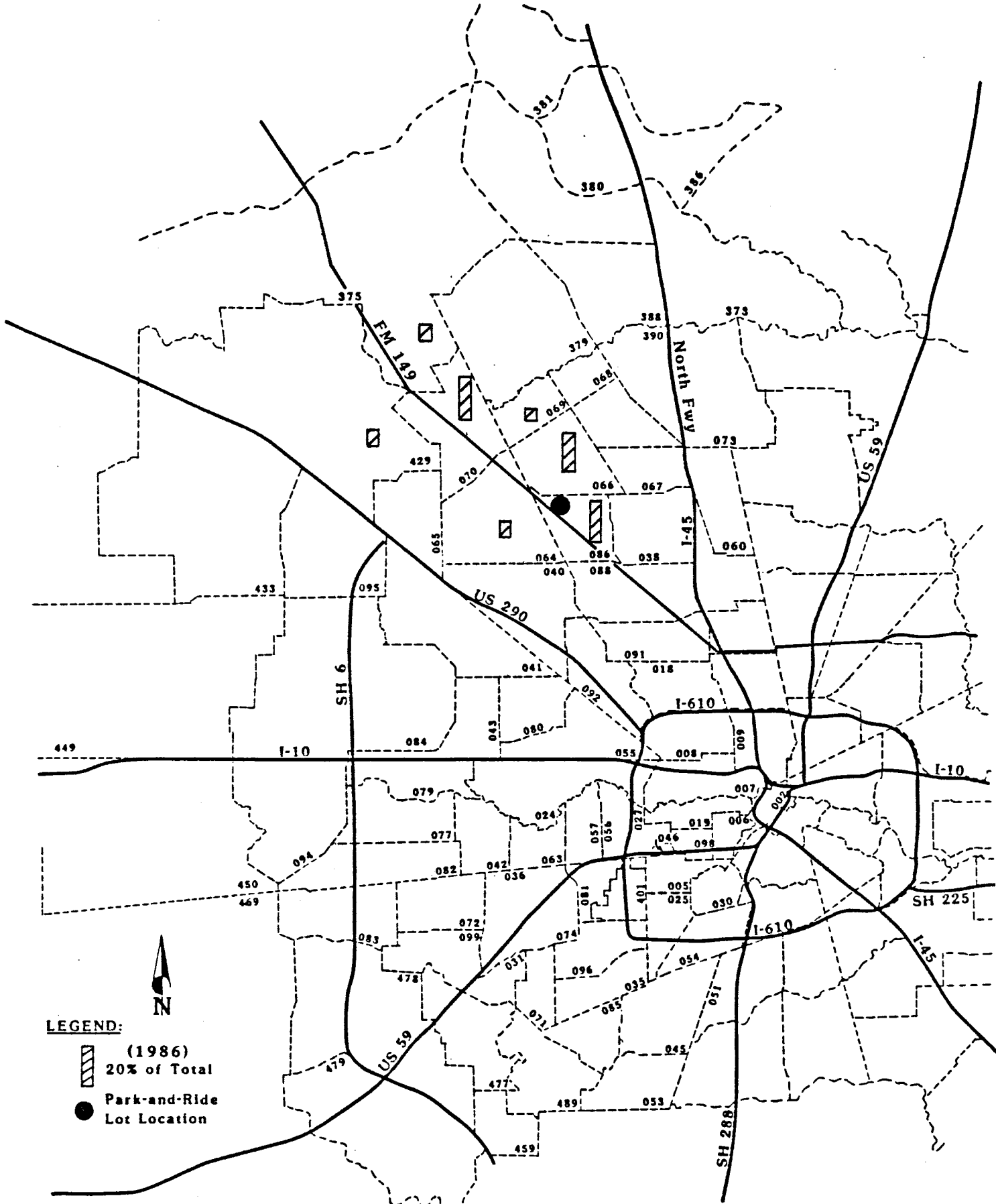


Figure 11. Home Origins of Patrons of the Seton Lake Park-and-Ride Lot

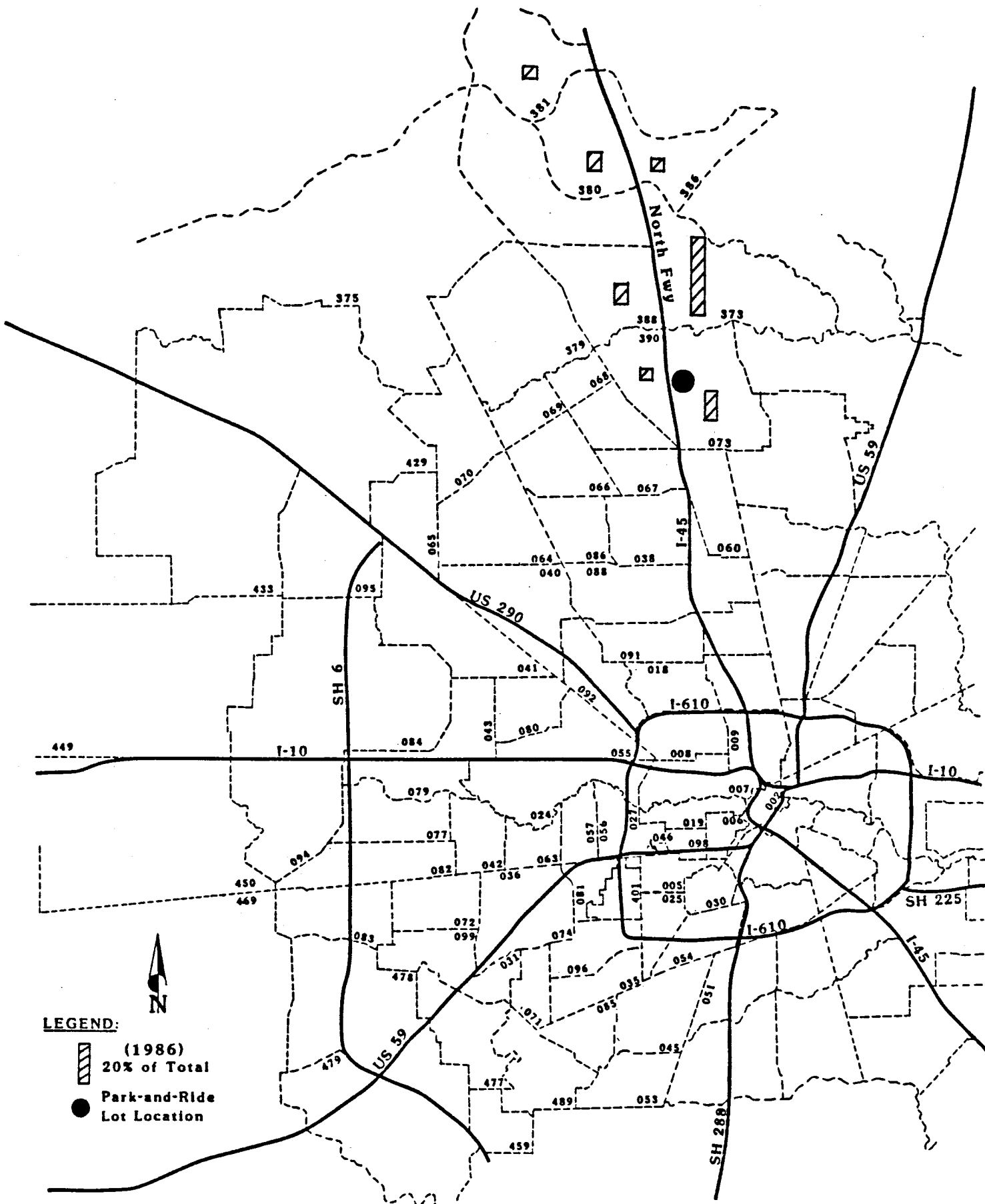


Figure 12. Home Origins of Patrons of the Spring Park-and-Ride Lot

Table 7. Zip Codes of Origin for North Transitway Transit Trips,
North Transitway Transit User Survey

North Transitway Bus Route	Zip Code	Location Relative to North Freeway	% of Total Origins
FM 1960 Express	77069	----	23%
	77379	----	22%
	77060	----	18%
	77090	----	13%
	77068	----	7%
	77014	----	6%
	Other	----	11%
Kuykendahl Park-and-Ride	77379	West	18%
	77067	West	14%
	77090	West	12%
	77388	West	11%
	77014	West	11%
	77066	West	5%
	77060	East	4%
	77073	East	4%
Other	----	21%	
North Shepherd Park-and-Ride	77088	West	30%
	77038	West	20%
	77060	East	9%
	77067	West	9%
	77066	West	7%
	77037	East	7%
	77076	East	5%
Other	----	13%	
Spring Park-and-Ride	77373	East	36%
	77073	East	13%
	77380	West	8%
	77388	West	8%
	77386	East	6%
	77090	West	6%
	77381	West	5%
Other	----	18%	
Seton Lake Park-and-Ride	77070	West	21%
	77086	West	21%
	77066	West	18%
	77064	West	7%
	77375	West	6%
	77429	West	6%
	77069	West	5%
Other	----	16%	

1986, however, the north/south ridership split was 50%-50%. In 1987, trip origins shifted once again; about 65% of the ridership originated from north of the freeway. The most recent shifts in trip origins may be due, in part, to the roadway construction activities in the immediate vicinity of the West Belt Lot (on both West Belt and the Katy Freeway) which has made access to lot from the south more difficult.

For the Addicks Lot, 70% of the 1985 ridership and 64% of the 1986 and 1987 ridership originated from north of the freeway.

Both the Katy-Mason Lot and the Kingsland Lot (which replaced the Katy-Mason Lot) are located south of the Katy Freeway. More than 60% of the 1985, 1986 and 1987 ridership from this area originated from south of the freeway.

The 1985, 1986 and 1987 ridership on the Memorial Limited Express route primarily originates from Zip Codes immediately adjacent to Memorial Drive. The 1987 ridership on the Wilcrest Express route primarily originates from Zip Codes immediately adjacent to Wilcrest.

North Transitway Routes. The Kuykendahl, North Shepherd and Seton Lake Park-and-Ride Lots are located west of the North Freeway; and the majority of the transit ridership originates from Zip Codes west of the freeway. In fact 100% of the Seton Lake ridership; more than 70% of the North Shepherd ridership and at least 75% of the Kuykendahl ridership originates from the west side of the freeway.

The Spring Park-and-Ride Lot is located on the east side of the North Freeway and more than 62% of its ridership originates from east of the freeway.

The ridership on the FM 1960 Express route primarily originates from Zip Codes immediately adjacent to FM 1960.

Trip Destinations

The only destination served directly by the Katy Transitway bus operation is the downtown; virtually all Katy Transitway bus trips being served are downtown trips (Table 5). Although the North Transitway primarily serves the downtown, limited service is also provided to the Texas Medical Center, the Galleria area and Greenway Plaza. Nevertheless, more than 90% of all transit trips being served by the North Transitway are downtown trips.

Auto Availability

The riders of the Katy and North Transitway transit routes are "choice" riders; the vast majority have an auto available for the trip, but choose to ride a bus instead (Table 8).

Table 8. Travel Characteristics of Transitway Transit Users,
Katy and North Transitway Transit User Surveys

Trip Characteristic	Total Sample			Park-and-Ride Routes			Express Routes		
	1985	1986	1987	1985	1986	1987	1985	1986	1987
Auto Available for Trip									
<u>Katy Transitway</u>	(n=354)	(n=575)	(n=622)	(n=220)	(n=410)	(n=343)	(n=134)	(n=165)	(n=279)
No	7%	7%	10%	5%	5%	7%	11%	12%	14%
Yes, inconvenient	10%	7%	8%	8%	6%	5%	13%	11%	11%
Yes, but prefer bus	83%	86%	82%	87%	89%	88%	76%	77%	75%
<u>North Transitway</u>	---	(n=1246)	---	---	(n=1142)	---	---	(n=104)	---
No	---	5%	---	---	5%	---	---	10%	---
Yes, inconvenient	---	5%	---	---	4%	---	---	17%	---
Yes, but prefer bus	---	90%	---	---	91%	---	---	73%	---
Employer Payment of Bus Fare									
<u>Katy Transitway</u>	(n=355)	(n=574)	(n=628)	(n=221)	(n=408)	(n=347)	(n=134)	(n=166)	(n=281)
Pays all	19%	15%	13%	21%	18%	18%	17%	7%	6%
Pays part	38%	41%	43%	45%	46%	52%	26%	31%	33%
Pays none	43%	44%	44%	34%	36%	30%	57%	62%	61%
<u>North Transitway</u>	---	(n=1247)	---	---	(n=1144)	---	---	(n=103)	---
Pays all	---	17%	---	---	18%	---	---	9%	---
Pays part	---	46%	---	---	47%	---	---	39%	---
Pays none	---	37%	---	---	35%	---	---	52%	---

Employer Contribution to Transit Fare

For approximately 13% of the ridership on the Katy Transitway and almost one-fifth of the ridership on the North Transitway, the employer pays the entire cost of the transit fare (Table 8). On the park-and-ride routes, approximately two-thirds of the riders have all or part of their fares paid by the employer; less than half of the ridership on the express routes has all or part of its fare paid by the employer.

Attitudes and Impacts Pertaining to the Transitways

Slightly more than half of the survey questions focused on data concerning the transitways. For presentation purposes, these responses can be grouped into the following four categories: 1) travel time savings and duration of transitway use; 2) modal selection and prior mode; 3) impacts of the transitway on mode choice; and 4) perception of the level of transitway utilization.

Time Savings and Duration of Transitway Use

Travel Time Savings. The transit users perception of time saved by using the Katy or North Transitway is presented in Table 9. As indicated by this table, Katy Transitway park-and-ride users perceived a greater time savings in 1986 than 1985. This may be attributed to the fact that the western terminus of the transitway was extended 1.7 miles from Gessner to West Belt after the 1985 survey. Thus, park-and-ride users on the transitway during the 1986 survey were able to bypass a section of severe congestion on the freeway. After the 1986 survey, the Katy Transitway was extended an additional 5.1 miles from West Belt to State Highway 6. This extension did not increase the median travel time savings reported by park-and-riders during the 1987 survey, however.

Due to the "backtracking" required in the route, users of the Memorial Limited Express route do not perceive the same p.m. savings as do the park-and-ride patrons (in 1985, 1986 or 1987). Because there is not sufficient distance available to safely maneuver from the Gessner exit of the transitway

Table 9. Characteristics of Transitway Utilization and Previous Mode of Travel, Katy and North Transitway Transit User Surveys

Characteristic	Total Sample			Park-and-Ride Routes			Express Routes		
	1985	1986	1987	1985	1986	1987	1985	1986	1987
Perceived Transitway Time Savings (minutes)									
<u>Katy Transitway</u>	(n=328)	(n=530)	(n=590)	(n=208)	(n=388)	(n=334)	(n=120)	(n=142)	(n=256)
a.m. (50th percentile)	9	15	15	10	15	15	8	15	10
p.m. (50th percentile)	13	20	15	15	20	20	7	15	15
<u>North Transitway</u>	--	(n=1147)	--	--	(n=986)	--	--	(n=94)	--
a.m. (50th Percentile)	--	20	--	--	20	--	--	25	--
p.m. (50th Percentile)	--	25	--	--	25	--	--	20	--
Duration of Transitway Use									
<u>Katy Transitway</u>	(n=352)	(n=562)	(n=618)	(n=222)	(n=405)	(n=345)	(n=130)	(n=157)	(n=273)
% of riders using transitway since open	71%	40%	31%	68%	35%	28%	75%	51%	35%
<u>North Transitway</u>	---	(n=1240)	---	---	(n=1138)	---	---	(n=102)	---
% of riders using transitway since open	---	75%	---	---	77%	---	---	76%	---
Previous Travel Mode									
<u>Katy Transitway</u>	(n=355)	(n=573)	(n=630)	(n=222)	(n=409)	(n=348)	(n=133)	(n=164)	(n=282)
Drove alone	24%	35%	34%	30%	37%	34%	14%	30%	33%
Carpooled	5%	5%	9%	4%	5%	8%	6%	6%	10%
Vanpooled	4%	6%	2%	6%	7%	3%	1%	3%	2%
Park-and-ride bus	23%	18%	16%	36%	23%	25%	1%	5%	6%
Regular/express bus	31%	16%	17%	9%	6%	5%	66%	42%	31%
Did not make trip	12%	18%	21%	14%	19%	23%	11%	13%	18%
Other	1%	2%	1%	1%	3%	2%	1%	1%	---
<u>North Transitway</u>	---	(n=1240)	---	---	(n=1137)	---	---	(n=103)	---
Drove alone	---	35%	---	---	35%	---	---	34%	---
Carpooled	---	10%	---	---	9%	---	---	19%	---
Vanpooled	---	7%	---	---	8%	---	---	1%	---
Park-and-ride bus	---	18%	---	---	19%	---	---	13%	---
Regular/express bus	---	4%	---	---	3%	---	---	8%	---
Did not make trip	---	25%	---	---	25%	---	---	25%	---
Other	---	1%	---	---	1%	---	---	0%	---

(across three mainlanes) to the Gessner exit of the Katy Freeway, Memorial Limited patrons must exit the transitway at Gessner, exit the Katy Freeway at West Belt and then "backtrack" to Gessner.

In general, users of the North Transitway perceive a greater time savings than do users of the Katy Transitway, even though the Katy Transitway is now 1.9 miles longer than North Transitway.

Frequency distributions of perceived time savings along the Katy and North Transitways are presented in Figures 13 and 14.

Duration of Transitway Use. In 1985, approximately 71% of the Katy Transitway transit ridership had used the transitway since it opened (it had been open 5 months at the time of this survey). In 1986, only 40% had used the transitway since it opened (it had been open 18 months at the time of the 1986 survey). In 1987 the percentage dropped once again to 31% (after the transitway had been open 36 months).

Approximately 75% of the North Transitway transit patrons have used the lane since it opened (it had been open 18 months at the time of the survey).

Previous Travel Mode

Transit riders using the Katy and North Transitways were asked to identify how they normally made the trip prior to riding a bus on the transitway. Their responses are summarized in Table 9. On the Katy Transitway routes, approximately 33% of 1985 ridership and 46% of the 1986 and 1987 ridership either drove alone, carpooled or vanpooled. An additional 54% of 1985 ridership and about one-third of the 1986 and 1987 ridership rode either a park-and-ride, express route or regular route bus. (Note: Park-and-ride service was available in the Katy Freeway Corridor prior to the opening of the Katy Transitway).

On the North Transitway, slightly more than half of the transit patrons had previously driven alone, carpooled or vanpooled. Twelve percent reported that they traveled by transit, and 25% did not previously make the trip.

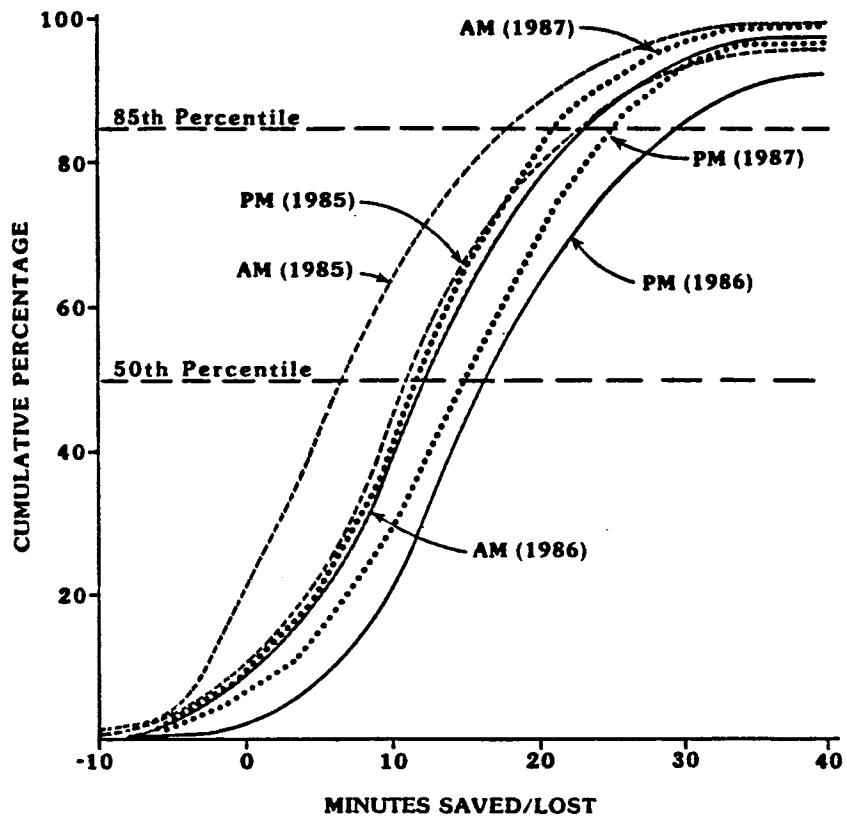


Figure 13. Perceived Katy Transitway Travel Time Savings, Katy Transitway Transit User Surveys

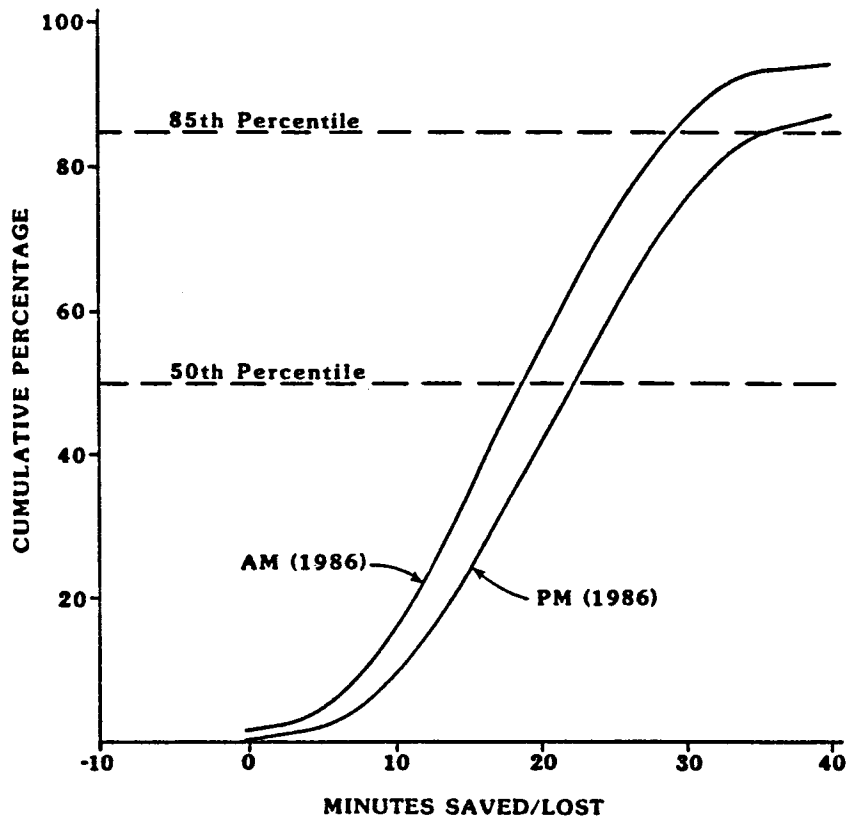


Figure 14. Perceived North Transitway Travel Time Savings, North Transitway Transit User Surveys

(Note: Park-and-ride service in the North Freeway Corridor did not exist prior to the opening of the North Freeway contraflow lane.)

Reasons for Choosing the Bus Mode

On the 1985 and 1986 surveys, transit users were asked why they chose to ride a bus on the transitway. They were able to check more than one reason. The major reasons listed by bus riders on both transitways were freeway traffic congestion, time to relax, saves time, reliable travel schedule and costs less (Table 10).

Bus riders were also asked to specify why they selected the bus rather than a vanpool (or carpool in the case of the Katy Transitway). Again, more than one reason could be checked. The convenience of riding a bus was cited as the overwhelming reason by both the Katy and North Transitway bus users.

Another question was intended to determine whether the individuals would be riding a bus if the transitway was not available. Their responses are included in Table 11. In 1985, 69% of the Katy Transitway bus riders said yes. This is consistent with their responses to the previous question in which more than half reported they rode a bus prior to the opening of the transitway. In 1986, however, only 43% said yes, indicating that the transitway had become more important to them. In 1987, 52% responded yes, which suggests that the transitway's role was somewhat less important.

On the North Transitway, 41% of the bus riders stated that they would not ride the bus if the transitway had not opened, and an additional 36% were not sure.

Table 10. Reasons for Selecting the Bus Mode on the Transitway,
Katy and North Transitway Transit User Surveys

Reasons	Total Sample			Park-and-Ride Routes			Express Routes		
	1985	1986	1987	1985	1986	1987	1985	1986	1987
Why Use Bus on Transitway ¹									
<u>Katy Transitway</u>	(n=1175)	(n=1945)	---	(n=747)	(n=1424)	---	(n=428)	(n=521)	---
Freeway too congested	18%	20%	---	21%	22%	---	13%	16%	---
Saves time	14%	16%	---	15%	16%	---	13%	15%	---
Time to relax	17%	18%	---	18%	19%	---	15%	16%	---
Reliable travel schedule	14%	14%	---	14%	13%	---	14%	15%	---
Costs less	15%	14%	---	13%	12%	---	19%	18%	---
Dislike driving	13%	11%	---	12%	12%	---	14%	10%	---
Someone else use car	4%	3%	---	3%	3%	---	5%	5%	---
Carpool/vanpool broke up	2%	1%	---	1%	1%	---	4%	1%	---
No other way available	1%	1%	---	1%	1%	---	1%	2%	---
Other	2%	2%	---	2%	1%	---	2%	2%	---
<u>North Transitway</u>	---	(n=4407)	---	---	(n=4030)	---	---	(n=377)	---
Freeway too congested	---	23%	---	---	24%	---	---	22%	---
Saves time	---	20%	---	---	20%	---	---	16%	---
Time to relax	---	15%	---	---	15%	---	---	15%	---
Reliable travel schedule	---	15%	---	---	14%	---	---	16%	---
Costs less	---	12%	---	---	12%	---	---	11%	---
Dislike driving	---	10%	---	---	10%	---	---	11%	---
Someone else use car	---	2%	---	---	2%	---	---	5%	---
Carpool/vanpool broke up	---	1%	---	---	1%	---	---	1%	---
No other way available	---	1%	---	---	1%	---	---	2%	---
Other	---	1%	---	---	1%	---	---	1%	---
Why Bus Rather Than Other Transitway Mode(s) ¹									
<u>Katy Transitway</u>	(n=417)	(n=755)	(n=823)	(n=237)	(n=508)	(n=435)	(n=180)	(n=247)	(n=388)
More convenient	63%	54%	60%	72%	59%	65%	51%	44%	55%
Costs less	18%	16%	24%	11%	10%	18%	28%	30%	30%
Carpool not available ²	---	12%	5%	---	13%	5%	---	10%	5%
Vanpool not available	16%	11%	8%	15%	10%	7%	16%	11%	8%
Other	3%	7%	3%	2%	8%	5%	5%	5%	2%
<u>North Transitway</u>	---	(n=1526)	---	---	(n=1400)	---	---	(n=126)	---
More convenient	---	61%	---	---	62%	---	---	56%	---
Costs less	---	13%	---	---	13%	---	---	10%	---
Vanpool not available	---	13%	---	---	12%	---	---	19%	---
Flexible schedule	---	8%	---	---	8%	---	---	10%	---
Other	---	5%	---	---	5%	---	---	5%	---

¹On these questions, it was possible to check more than one reason. Thus, the "n" value is the total number of reasons checked, not the number of surveys completed.

²Carpools were not allowed on the Katy Transitway at the time of the 1985 survey.

Table 11. Perceived Impacts of Transitway on Mode Choice,
Katy and North Transitway Transit User Surveys

Attitude	Total Sample			Park-and-Ride Routes			Express Routes		
	1985	1986	1987	1985	1986	1987	1985	1986	1987
Ride bus if no transitway									
<u>Katy Transitway</u>	(n=356)	(n=575)	(n=629)	(n=221)	(n=410)	(n=345)	(n=135)	(n=165)	(n=284)
Yes	69%	43%	52%	62%	37%	52%	79%	56%	53%
No	15%	26%	20%	22%	31%	24%	5%	14%	15%
Not sure	16%	31%	28%	16%	32%	24%	16%	30%	32%
<u>North Transitway</u>	---	(n=1247)	---	---	(n=1145)	---	---	(n=102)	---
Yes	---	23%	---	---	22%	---	---	34%	---
No	---	41%	---	---	42%	---	---	28%	---
Not sure	---	36%	---	---	36%	---	---	38%	---
How important was transitway in decision to ride bus									
<u>Katy Transitway</u>	(n=357)	(n=573)	(n=626)	(n=222)	(n=409)	(n=345)	(n=135)	(n=164)	(n=281)
Very important	39%	57%	54%	47%	62%	57%	25%	44%	50%
Somewhat important	26%	27%	24%	27%	25%	24%	24%	30%	25%
Not important	35%	16%	22%	26%	13%	19%	51%	26%	25%
<u>North Transitway</u>	---	(n=1250)	---	---	(n=1146)	---	---	(n=104)	---
Very important	---	76%	---	---	76%	---	---	72%	---
Somewhat important	---	17%	---	---	17%	---	---	12%	---
Not important	---	7%	---	---	7%	---	---	16%	---

A related question asked how important the transitway is in their decision to ride a bus. Their responses to this question (Table 11) are consistent with their responses to the previous question. In 1985, 39% of the Katy Transitway bus riders indicated that the transitway was "very important" in their decision; in 1986 and 1987, this percentage increased to more than 50%. For the North Transitway, 76% stated that the lane was "very important."

Perception of Transitway Utilization

One of the most important issues of the transit user surveys (and also the vanpool, carpool and motorist surveys) involves commuter perception of transitway utilization. One of the main reasons for permitting carpools on the Katy Transitway was to increase the perception of utilization. Transit patrons were asked whether they felt the transitway was sufficiently utilized to justify the project. Their responses are presented in Table 12.

Table 12. Perception of Transitway Utilization, Katy and North Transitway Transit User Surveys

Is transitway sufficiently utilized to justify project	Total Sample			Park-and-Ride Routes			Express Routes		
	1985	1986	1987	1985	1986	1987	1985	1986	1987
<u>Katy Transitway</u>	(n=348)	(n=567)	(n=618)	(n=218)	(n=404)	(n=339)	(n=130)	(n=163)	(n=279)
Yes	49%	66%	77%	55%	71%	81%	37%	53%	72%
No	33%	14%	7%	26%	11%	5%	46%	21%	10%
Not sure	18%	20%	16%	19%	18%	14%	17%	26%	18%
<u>North Transitway</u>	---	(n=1230)	---	---	(n=1129)	---	---	(n=101)	---
Yes	---	81%	---	---	81%	---	---	79%	---
No	---	6%	---	---	6%	---	---	5%	---
Not sure	---	13%	---	---	13%	---	---	16%	---

In considering their responses, it must be noted that the typical bus rider sees the transitway from inside a crowded bus. He does not have a clear idea of the number of vehicles utilizing the lane, and he is more likely to think in terms of the number of persons moved per bus.

About half of the Katy Transitway bus riders surveyed in 1985 felt the transitway was sufficiently utilized. When surveyed again in 1986 (one year after carpools were permitted on the transitway), 66% of the transit patrons felt the use of the Katy Transitway was sufficient to justify the project. That percent increased to 77% in 1987 (18 months after the carpool passenger requirement had been lowered to two persons).

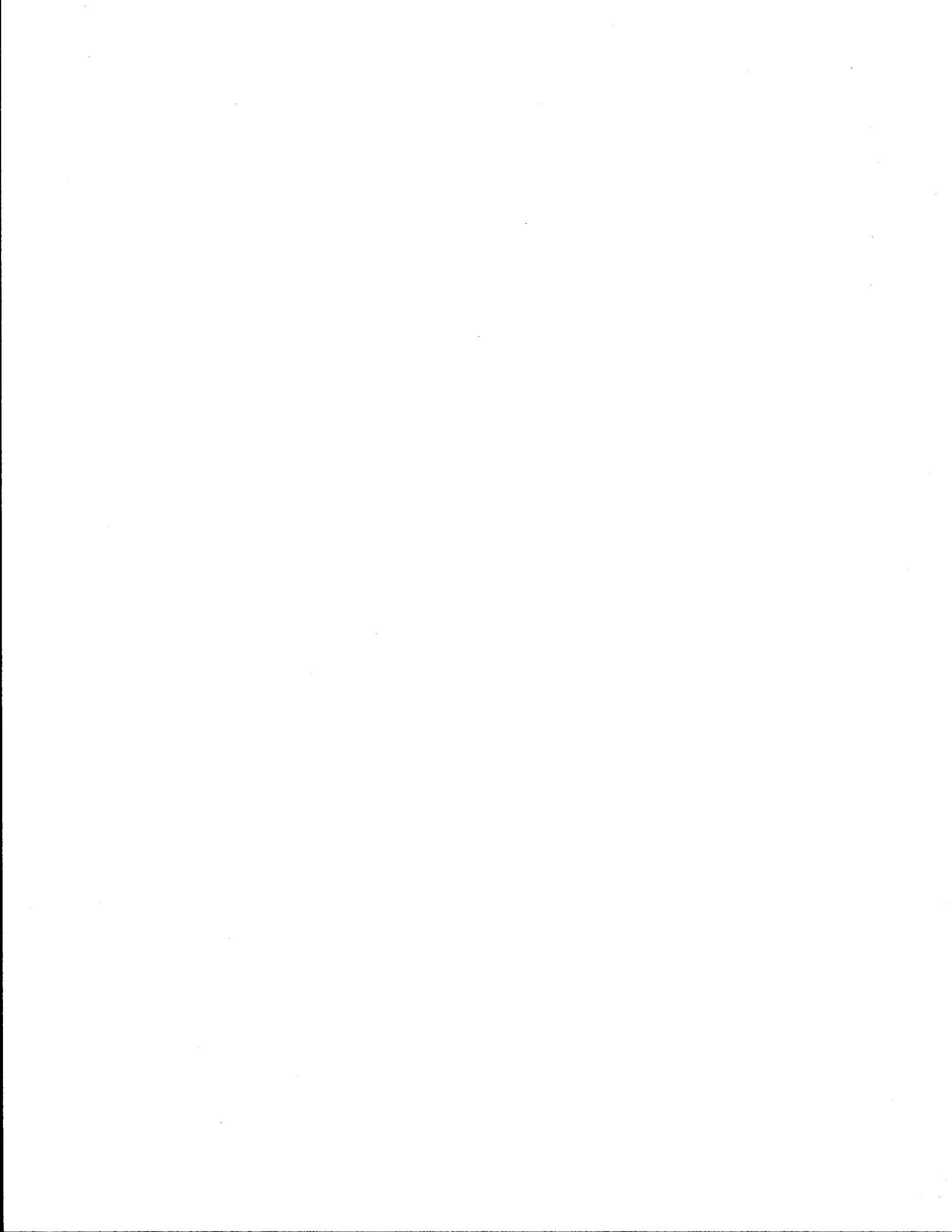
More than 80% of the North Transitway bus riders surveyed felt their transitway was sufficiently utilized.

Comments

Survey participants were encouraged to use the back of the forms for additional comments. Approximately 20-25% of the participants did provide comments. Their comments are summarized in Table 13.

Table 13. Additional Comments, Katy and North Transitway Transit User Surveys

Comment	Percent of Total Comments		
	1985	1986	1987
<u>Katy Transitway</u>			
Extend the transitway	22%	5%	1%
Provide more peak buses	16%	13%	11%
Poor transitway entry/exit design	16%	7%	10%
Lose time doubling back (Memorial Route)	8%	7%	2%
Bus fare too high	7%	2%	1%
Good job METRO/transitway is great	3%	13%	26%
Transitway too crowded with 2+ carpools	---	---	30%
Other	28%	53%	19%
<u>North Transitway</u>			
Extend transitway	---	23%	---
Provide more p.m. buses	---	14%	---
Open transitway more hours	---	10%	---
Transitway/park-and-ride is great	---	7%	---
Good job METRO	---	7%	---
Dislike old buses	---	5%	---
Bus fare too high	---	4%	---
Other	---	30%	---



III. TRANSITWAY VANPOOL USER SURVEYS

As was the case with the transit user surveys, the vanpool user surveys primarily addressed: 1) personal characteristics; 2) travel characteristics; and 3) attitudes and impacts pertaining to the transitways.

In general, the responses from the drivers and passengers show strong similarities. The responses from the Katy Transitway vanpoolers and the North Transitway vanpoolers are also generally similar.

As noted previously, the surveys of transitway vanpoolers performed in 1985 and 1986 included both vanpool drivers and passengers, while the 1987 survey included vanpool drivers only.

Personal Characteristics

Transitway vanpoolers were asked questions concerning their age, sex, occupation and level of education. Their responses are presented in Table 14.

Age

The average age of both Katy and North Transitway vanpoolers is in the upper 30s.

Sex

In 1985 and 1986, almost two-thirds of the Katy Transitway vanpool drivers were male, while about half of the passengers were male. In 1987, however, only 46% of the vanpool drivers are male.

More than 75% of the North Transitway vanpool drivers are male, whereas 52% of the passengers are male.

Table 14. Personal Characteristics of Transitway Vanpoolers,
Katy and North Transitway Vanpool Surveys

Personal Characteristic	Total Sample		Vanpool Drivers			Vanpool Passengers	
	1985	1986	1985	1986	1987	1985	1986
Age (years)							
<u>Katy Transitway</u>	(n=449)	(n=442)	(n=64)	(n=57)	(n=13)	(n=385)	(n=365)
50th Percentile	36	37	33	36	38	37	37
<u>North Transitway</u>	--	(n=1532)	--	(n=197)	--	--	(n=1335)
50th Percentile	--	39	--	40	--	--	39
Sex							
<u>Katy Transitway</u>	(n=452)	(n=420)	(n=63)	(n=59)	(n=13)	(n=389)	(n=363)
Male	52%	51%	65%	67%	46%	50%	49%
Female	48%	49%	35%	33%	54%	50%	51%
<u>North Transitway</u>	---	(n=1538)	---	(n=196)	---	---	(n=1342)
Male	---	55%	---	77%	---	---	52%
Female	---	45%	---	23%	---	---	48%
Occupation							
<u>Katy Transitway</u>	(n=446)	(n=417)	(n=63)	(n=57)	(n=13)	(n=383)	(n=360)
Professional	55%	58%	46%	60%	54%	56%	58%
Managerial	21%	14%	30%	21%	8%	19%	13%
Sales	2%	3%	0%	5%	---	3%	3%
Clerical	20%	23%	19%	12%	15%	20%	25%
Operative	1%	---	2%	---	8%	1%	---
Laborer	1%	---	3%	---	---	0%	---
Other	0%	2%	0%	2%	16%	1%	1%
<u>North Transitway</u>	---	(n=1512)	---	(n=195)	---	---	(n=1317)
Professional	---	45%	---	41%	---	---	45%
Managerial	---	24%	---	39%	---	---	22%
Sales	---	7%	---	5%	---	---	7%
Clerical	---	23%	---	13%	---	---	24%
Operative	---	0%	---	---	---	---	0%
Laborer	---	0%	---	1%	---	---	0%
Other	---	1%	---	1%	---	---	2%
Education (years)							
<u>Katy Transitway</u>	(n=445)	(n=421)	(n=63)	(n=57)	(n=13)	(n=382)	(n=364)
Average	15.4	15.3	15.2	15.5	14.9	15.4	16.0
<u>North Transitway</u>	----	(n=1523)	----	(n=197)	----	----	(n=1326)
Average	----	15.0	----	15.1	----	----	15.0

Occupation

Between 62% and 81% of the vanpoolers surveyed are employed in professional or managerial positions.

Education

The average vanpooler has completed at least 2 years of college.

Travel Patterns and Trip Characteristics

As part of the 1985 and 1986 survey efforts, vanpool drivers and passengers were asked a series of questions pertaining to the formation and operation of the vanpool on the transitways. Other questions asked in the 1985, 1986 and 1987 surveys related to travel patterns and transitway trip characteristics.

Formation of the Vanpool

The majority of the vanpools operating on the Katy and North Transitways were formed by the employer, and the employer is also the primary provider of the vans (Table 15).

Vanpool Staging Points

Between 87% and 90% of the vanpool drivers pick up passengers at common vanpool staging points (Table 15). At least 70% of the vanpool passengers drive their cars to the pickup points. Therefore, no additional auto is typically left at home. Even when an auto is left at home due to vanpooling, it is not commonly used.

Transitway Trip Frequency

Virtually all vanpools use the Katy/North Transitway five days per week (Table 15).

Table 15. Characteristics of Vanpools Traveling on the Katy and North Transitways, 1985 and 1986

Vanpool Characteristic	Katy Transitway Vanpools		North Transitway Vanpools
	1985	1986	1986
How Was Vanpool Organized	(n=64)	(n=59)	(n=201)
By Employer	78%	61%	58%
I Found the Riders	11%	24%	21%
METRO VanShare	3%	3%	5%
Residential Developer	0%	---	9%
Other	8%	12%	7%
Who Owns/Leases Vans	(n=66)	(n=59)	(n=201)
Employer Provides Van	80%	70%	60%
Third Party Provides Van	17%	27%	32%
I Own Van	2%	3%	3%
Other	1%	---	5%
Do Drivers Pick Up Passengers	(n=61)	(n=53)	(n=200)
At Home	10%	8%	13%
At Common Staging Point(s)	90%	92%	87%
Do Passengers Drive Car to Pick Up Point	(n=397)	(n=377)	(n=1431)
Yes	76%	78%	76%
No, Dropped Off	6%	9%	6%
No, Picked Up at Their Door	18%	13%	18%
When Passengers Leave Car at Home,			
Is It Used by Others	(n=391)	(n=371)	(n=1416)
Yes	14%	14%	17%
No	40%	41%	37%
Not Applicable (car left at pickup point)	46%	45%	46%
Transitway Trip Frequency	(n=66)	(n=59)	(n=202)
% Vanpools Using Daily	100%	98%	100%
Percent Vanpools Using Transitway	(n=66)	(n=59)	(n=202)
a.m.	83%	86%	97%
p.m.	100%	98%	99%
Duration of Transitway Use	(n=66)	(n=59)	(n=199)
% Vanpools Using Transitway Since Opening Day	89%	70%	94%

Percent of Vanpools Using the Transitway by Time Period

Vanpool volume counts have revealed that vanpool utilization of both transitways is slightly higher in the afternoons than in the mornings. This was confirmed by the surveys. Between 83% and 86% of the Katy Transitway vans and 97% of the North Transitway vans surveyed in the p.m. indicated that they used the transitway in the a.m. Of the vans that do not use the transitway during both peak periods, their most frequently listed reasons for not doing so was because: 1) the transitway takes more time or is inconvenient in the morning (the regular freeway lanes are faster); and 2) the transitway does not open soon enough in the afternoon.

Duration of Transitway Use

In 1985, approximately 89% of the Katy Transitway vanpools reported using the transitway since it opened (it had been open 5 months at the time of the 1985 survey). In 1986, 70% had used the lane since opening day (it had been open 18 months at the time of the 1986 survey).

In 1986, about a year and a half after the North Transitway replaced the contraflow lane, 94% of the North Transitway vanpoolers reported using the lane since opening day.

Trip Length

Vanpoolers were asked how long their round trip would be if they drove alone and how much longer their round trip is because they vanpool. Trip length frequencies for the Katy and North Transitway vanpoolers are illustrated in Figures 15 and 16, respectively. The 50th percentile responses are presented in Table 16. The average one-way vanpool trip along the Katy Transitway is in excess of 20 miles; the average one-way vanpool trip along the North Transitway is more than 30 miles.

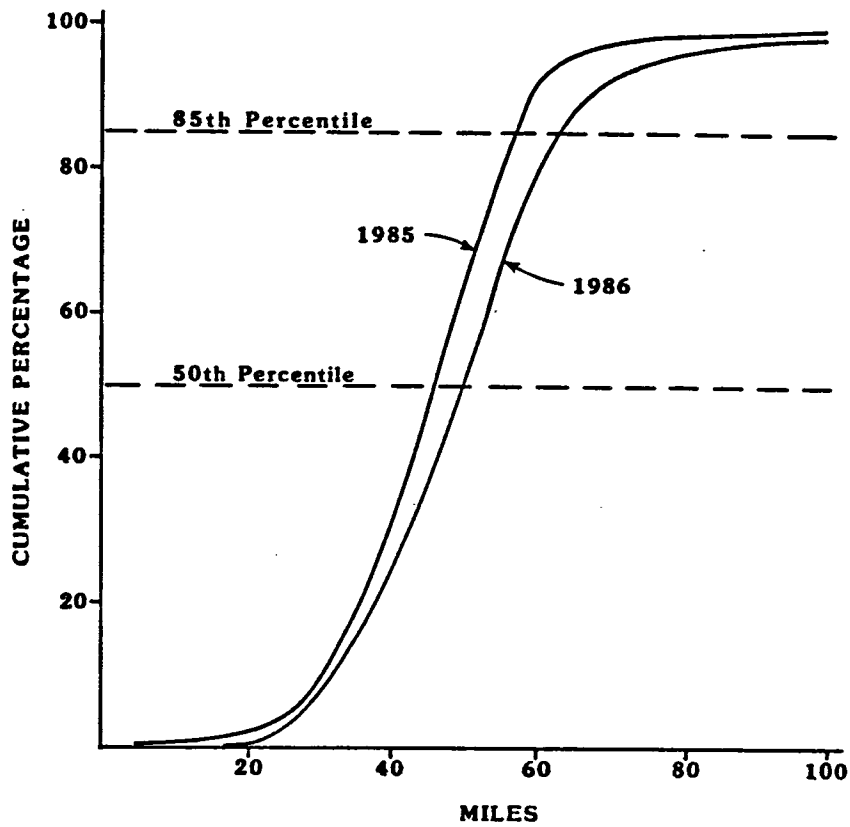


Figure 15. Round Trip Mileage for Katy Transitway Vanpools

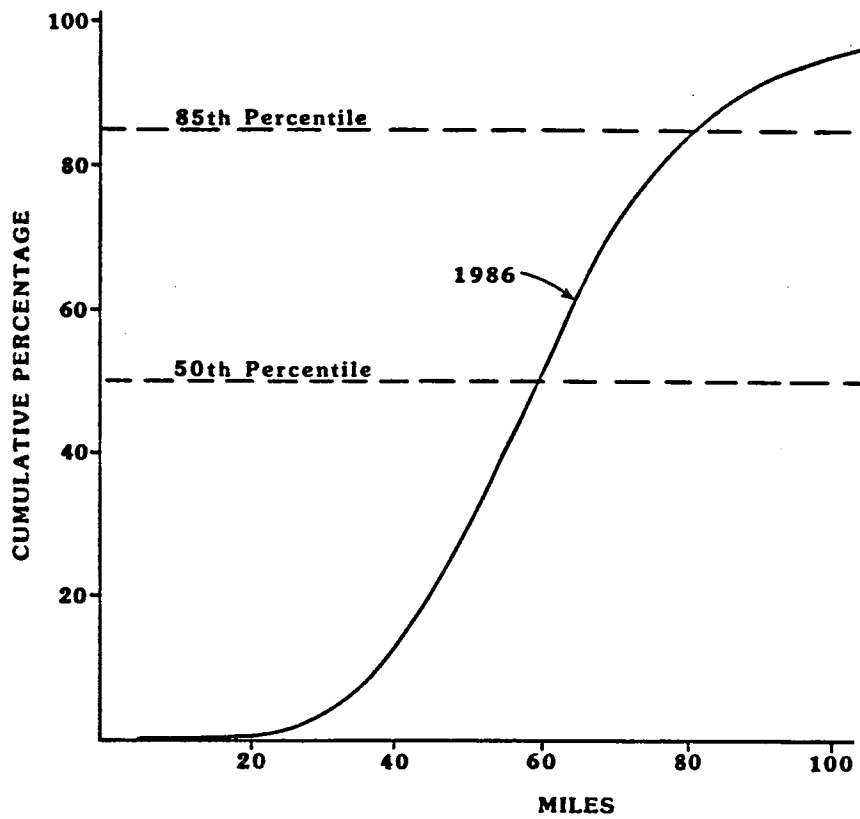


Figure 16. Round Trip Mileage for North Transitway Vanpools

Table 16. Impacts of Vanpooling on Trip Length, Katy and North Transitway Vanpool Surveys

Characteristic	Total Sample		Vanpool Drivers		Vanpool Passengers	
	1985	1986	1985	1986	1985	1986
Round Trip Distance if Drove Alone (miles)						
<u>Katy Transitway</u>	(n=450)	(n=435)	(n=64)	(n=58)	(n=386)	(n=377)
50th Percentile	45	50	49	50	44	50
Average	44	49	46	49	44	49
<u>North Transitway</u>	--	(n=1617)	--	(n=198)	--	(n=1419)
50th Percentile	--	58	--	60	--	58
Average	--	60	--	62	--	59
Extra Miles to Vanpool						
<u>Katy Transitway</u>	(n=428)	(n=428)	(n=61)	(n=58)	(n=367)	(n=370)
50th Percentile	0	0	1	3	0	0
Average	2.2	2.3	4.6	4.4	1.8	2.0
<u>North Transitway</u>	---	(n=1601)	---	(n=198)	---	(n=1403)
50th Percentile	---	0	---	1.5	---	0
Average	---	2.5	---	3.5	---	2.3

Year Joined Vanpool

The year Katy and North Transitway vanpoolers joined their present vanpool is presented in Table 17. The "average" Katy Transitway vanpooler has been traveling in his/her vanpool 2 years; the average North Transitway vanpooler has been in his/her present vanpool 3 years.

Table 17. Year Joined Vanpool, Katy and North Transitway Vanpool Surveys

Characteristic	Total Sample		Vanpool Drivers		Vanpool Passengers	
	1985	1986	1985	1986	1985	1986
Year Joined Vanpool						
<u>Katy Transitway</u>	(n=439)	(n=433)	(n=60)	(n=59)	(n=379)	(n=374)
Before 1980	9%	6%	17%	14%	7%	5%
1980	10%	7%	12%	14%	10%	5%
1981	10%	6%	18%	10%	9%	5%
1982	14%	5%	16%	3%	14%	5%
1983	15%	10%	8%	15%	16%	10%
1984	32%	14%	27%	17%	33%	14%
1985	10%	39%	2%	20%	11%	42%
1986	---	13%	---	7%	---	14%
<u>North Transitway</u>	---	(n=1600)	---	(n=191)	---	(n=1409)
Before 1980	---	11%	---	16%	---	9%
1980	---	9%	---	22%	---	8%
1981	---	11%	---	16%	---	10%
1982	---	10%	---	14%	---	10%
1983	---	10%	---	9%	---	10%
1984	---	14%	---	8%	---	15%
1985	---	32%	---	15%	---	35%
1986	---	3%	---	0%	---	3%

Why Joined Vanpool

When vanpoolers were asked why they began vanpooling, the most common responses were more economical, convenience, dislike driving and moved to either a new job or a new residential location where vanpooling became possible (Table 18).

Employer Contribution to Vanpool Costs

The majority of the Katy Transitway vanpool drivers have all or part of their vanpooling costs paid by their employer (Table 18). Conversely, the majority of Katy Transitway vanpool passengers and the majority of the North Transitway vanpool drivers and passengers have none of their vanpooling expenses paid by their employer.

Table 18. Reasons for Joining Vanpool and Employer Contribution Toward Vanpool Cost, Katy and North Transitway Vanpool Surveys

Characteristic	Total Sample		Vanpool Drivers		Vanpool Passengers	
	1985	1986	1985	1986	1985	1986
Why Joined Vanpool ¹						
<u>Katy Transitway</u>	(n=642)	(n=577)	(n=90)	(n=77)	(n=552)	(n=500)
More Economical	27%	24%	31%	30%	27%	23%
Convenience	12%	14%	17%	18%	11%	14%
New Job or Residential						
Location	12%	19%	2%	9%	13%	21%
Dislike Driving	9%	13%	0%	9%	11%	13%
Saves Auto Wear	7%	5%	10%	5%	7%	5%
No Traffic on Transitway	4%	1%	4%	4%	3%	0%
Co. Started Vanpool	3%	4%	4%	3%	2%	4%
Carpool Broke Up	3%	2%	2%	1%	3%	2%
To Save Time	2%	2%	2%	0%	2%	3%
Only Own 1 Car	1%	1%	6%	0%	1%	1%
Other	20%	15%	22%	21%	20%	14%
<u>North Transitway</u>	---	(n=2218)	---	(n=302)	---	(n=1916)
More Economical	---	24%	---	32%	---	22%
Convenience	---	15%	---	10%	---	16%
New Job or Residential						
Location	---	17%	---	10%	---	18%
Dislike Driving	---	15%	---	6%	---	16%
Saves Auto Wear	---	4%	---	3%	---	4%
No Traffic on Transitway	---	1%	---	6%	---	1%
Co. Started Vanpool	---	8%	---	6%	---	8%
Carpool Broke Up	---	1%	---	2%	---	1%
To Save Time	---	6%	---	10%	---	5%
Only Own 1 Car	---	1%	---	2%	---	1%
Other	---	8%	---	13%	---	8%
Employer Portion of Vanpool Cost						
<u>Katy Transitway</u>	(n=461)	(n=425)	(n=65)	(n=57)	(n=396)	(n=368)
Pays All	8%	4%	25%	16%	5%	2%
Pays Part	42%	35%	40%	39%	42%	35%
Pays None	50%	61%	35%	45%	53%	63%
<u>North Transitway</u>	---	(n=1623)	---	(n=200)	---	(n=1423)
Pays All	---	4%	---	13%	---	3%
Pays Part	---	35%	---	32%	---	35%
Pays None	---	61%	---	55%	---	62%

¹ Respondents were able to check more than one reason. Thus "n" refers to the number of reasons checked, not the number of surveys completed.

Vanpool Occupancies

At the time of 1985 Katy Transitway survey and the 1986 North Transitway survey, vanpool utilization of the transitways was restricted to authorized vans carrying 8 or more registered persons. In order to become authorized, vanpools had to have:

- Certified drivers;
- A valid Texas vehicle inspection sticker no more than 6 months old;
- The minimum state insurance coverage;
- Some familiarity with the transitway geometrics before actually driving the facility, and
- Pass a visual inspection of the vehicle by METRO.

At the time of the 1986 Katy Transitway survey, authorized 4+ carpools were allowed to use the transitway and the minimum passenger requirement for authorized vanpools had been lowered to 4 persons, also. By the 1987 Katy Transitway survey, vanpool/carpool minimum occupancies had been lowered to 2 persons and all authorization procedures were eliminated.

The actual occupancies of the vanpools entering the Katy and North Transitways in 1985 and 1986 are shown in Table 19, along with the number of registered vanpool members. Average occupancy of Katy Transitway vans was 8.1 members in 1985 and 9.0 members in 1986. There was an average of 11.5 registered members per van in 1985 and 11.4 registered members in 1986. Actual occupancy was 70% of registered members in 1985, and 79% in 1986. In 1987, actual vanpool occupancy averaged 4.7 persons.

Average occupancy of North Transitway vanpools was 9.7 members and there was an average of 11.9 registered members per van. Actual North Transitway occupancy was almost 82% of registered members.

Authorized Vanpool Drivers

As noted previously, drivers of vanpools operating on the Katy Transitway had to be certified up until August 1986. North Transitway vanpool drivers also had (and still have) to be certified to operate a vanpool on the transitway. In order to be certified, driver training is required and the driver must carry a license authorizing him or her to drive on the lane. The number of persons authorized to drive on the Katy and North Transitways is shown in Table 19. On the Katy Transitway, authorized drivers per vanpool averaged 2.6 in 1985 and 2.7 in 1986. North Transitway authorized drivers per van averaged 3.2.

Table 19. Vanpool Occupancy, Katy and North Transitway Vanpool Surveys

Characteristic	Katy Transitway Vanpools			North Transitway Vanpools
	1985	1986	1987	1986
Registered Vanpool Members ¹	(n=66)	(n=57)	---	(n=202)
Less Than 7	---	5%	---	1%
7	3%	2%	---	2%
8	3%	12%	---	8%
9	11%	9%	---	6%
10	20%	16%	---	8%
11	12%	9%	---	12%
12	21%	11%	---	22%
More Than 12	30%	36%	---	41%
Actual Vanpool Occupancy	(n=66)	(n=58)	(n=13)	(n=202)
Less Than 6	9%	12%	69%	3%
6	14%	10%	15%	7%
7	14%	7%	8%	9%
8	23%	17%	---	14%
9	21%	7%	---	13%
10	3%	12%	---	16%
11	8%	12%	---	9%
12	6%	10%	8%	17%
More Than 12	2%	13%	---	12%
Authorized Vanpool Drivers ²	(n=66)	(n=59)	---	(n=202)
1	3%	9%	---	3%
2	36%	24%	---	19%
3	50%	56%	---	45%
4	11%	10%	---	22%
5	---	1%	---	8%
More Than 5	---	---	---	3%

Home Zip Code

When asked for their home Zip Code, Katy Transitway vanpoolers listed 30 different Zip Codes in 1985, 15 in 1986 and 10 in 1987. Almost 90% of the Katy Transitway vanpoolers in 1985 and 1986 and more than 75% of the vanpoolers in 1987 reside in one of 9 Zip Code areas (Table 20, Figure 17).

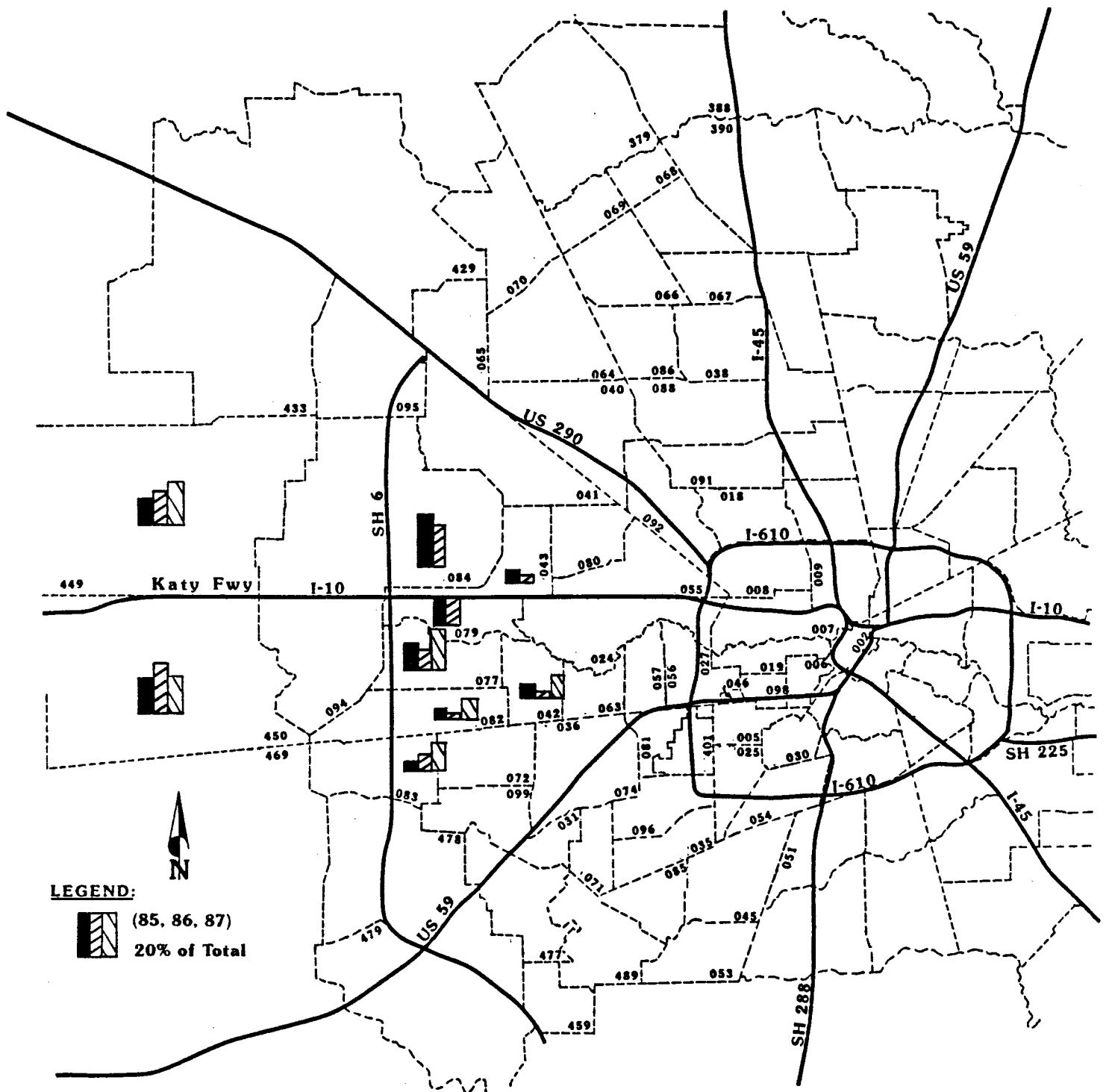
North Transitway vanpoolers listed 75 different Zip Codes. Nearly 60% of the North Transitway vanpoolers reside in one of 8 Zip Code areas (Table 20, Figure 18).

Table 20. Home Zip Codes of Vanpoolers, Katy and North Transitway Vanpool Surveys

Home Zip Codes	Total Sample		Vanpool Drivers			Vanpool Passengers	
	1985	1986	1985	1986	1987	1985	1986
<u>Katy Transitway</u>	(n=454)	(n=426)	(n=64)	(n=59)	(n=13)	(n=390)	(n=367)
77084	22%	18%	20%	17%	---	23%	18%
77450	15%	22%	17%	22%	15%	15%	22%
77079	12%	12%	9%	12%	---	13%	11%
77077	11%	9%	8%	12%	23%	12%	9%
77449	10%	14%	13%	10%	15%	10%	14%
77042	6%	3%	5%	2%	8%	6%	4%
77043	5%	3%	8%	---	---	4%	3%
77082	4%	2%	5%	5%	8%	4%	2%
77083	4%	6%	6%	7%	8%	3%	5%
Other	11%	11%	9%	13%	23%	10%	12%
<u>North Transitway</u>	---	(n=1554)	---	(n=198)	---	---	(n=1356)
77373	---	11%	---	10%	---	---	11%
77380	---	10%	---	12%	---	---	10%
77379	---	9%	---	11%	---	---	9%
77381	---	8%	---	6%	---	---	8%
77388	---	8%	---	8%	---	---	7%
77090	---	5%	---	3%	---	---	5%
77066	---	4%	---	5%	---	---	4%
77073	---	3%	---	3%	---	---	3%
Other	---	42%	---	42%	---	---	43%

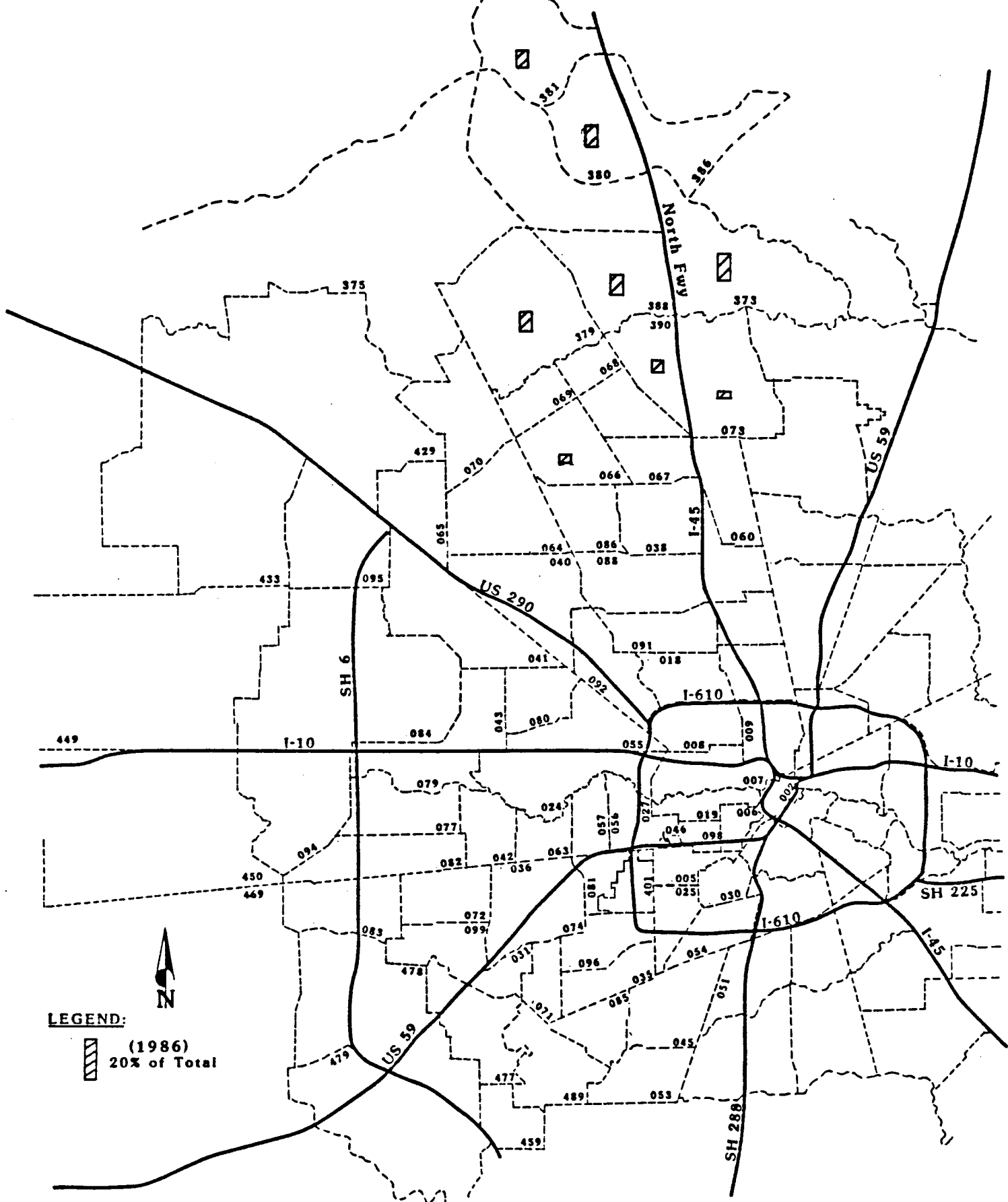
Vanpool Trip Destinations

While 39% to 70% of the Katy and North Transitway vanpool destinations are in the downtown, the downtown is not as dominant of a destination as it was in the transit user surveys. As summarized in Table 21, several other




NOTE: All Zip Codes Begin with 77.

Figure 17. Home Origins of Vanpoolers Using the Katy Transitway



LEGEND:


 (1986)
 20% of Total



NOTE: All Zip Codes Begin with 77.

Figure 18. Home Origins of Vanpoolers Using the North Transitway

destinations also attract vanpool trips. This is particularly true for Katy Transitway vanpools in 1987.

Table 21. Vanpool Destinations, Katy and North Transitway Vanpool Surveys

Characteristic	Katy Transitway Vanpools			North Transitway Vanpools
	1985	1986	1987	1986
Vanpool Destination (a.m.)	(n=64)	(n=58)	(n=13)	(n=199)
Downtown	70%	60%	39%	61%
Galleria/City Post Oak	11%	12%	15%	7%
Texas Medical Center	5%	7%	---	8%
Greenway Plaza	3%	5%	---	4%
Other	11%	16%	46%	20%

Previous Mode of Travel

Before joining their present vanpool, the majority of the vanpoolers surveyed in 1985 and 1986 previously drove alone or carpoled (Table 22). However, majority of vanpool drivers surveyed in 1987 previously used a different vanpool or drove alone.

Table 22. Previous Travel Mode, Katy and North Transitway Vanpool Surveys

Previous Travel Mode	Total Sample		Vanpool Drivers			Vanpool Passengers	
	1985	1986	1985	1986	1987	1985	1986
<u>Katy Transitway</u>	(n=461)	(n=433)	(n=66)	(n=59)	(n=13)	(n=395)	(n=374)
Drove Alone	34%	36%	36%	36%	36%	33%	36%
Carpool	22%	17%	17%	27%	14%	22%	15%
Vanpool	13%	12%	21%	8%	43%	12%	13%
Bus	15%	15%	16%	22%	---	15%	14%
Didn't Make Trip	16%	19%	9%	7%	7%	18%	21%
Other	0%	1%	1%	0%	---	0%	1%
<u>North Transitway</u>	---	(n=1622)	---	(n=202)	---	---	(n=1420)
Drove Alone	---	30%	---	30%	---	---	30%
Carpool	---	21%	---	35%	---	---	19%
Vanpool	---	12%	---	9%	---	---	12%
Bus	---	14%	---	11%	---	---	14%
Didn't Make trip	---	21%	---	13%	---	---	22%
Other	---	2%	---	2%	---	---	3%

Attitudes and Impacts Pertaining to the Transitways

Approximately one-third of the survey questions were intended to collect data concerning attitudes and travel patterns as impacted by the transitways.

Modal Selection

The primary reasons for selecting the vanpool mode on the transitways was: 1) the level of congestion on the Katy and North Freeways; 2) to save time; 3) to save money; and 4) to have time to relax. Vanpooling was selected instead of the bus primarily because: 1) vanpooling is more convenient; 2) vanpooling costs less; and 3) no bus service is available to the destination. These data are summarized in Table 23.

Impacts of the Transitways on Mode Choice

A question was asked to determine whether individuals would be vanpooling if the transitways had not opened. The majority of Katy Transitway vanpoolers responded "yes" (Table 23). This is consistent with the previous finding that the majority of the vanpools were operating at the time the transitway opened.

Conversely, the majority of North Transitway vanpoolers responded either "no" or "not sure" (Table 23). This response is to be expected since North Transitway vanpoolers were able to take advantage of the North Freeway contraflow lane for 4 years prior to the opening of the Transitway; the majority of North Transitway vanpools were formed after the opening of the contraflow lane.

Perceived Transitway Travel Time Savings

In 1985 and 1986, the perceived transitway travel time savings in the a.m. are less than in the p.m. for both Katy and North Transitway vanpoolers (Table 24). On the Katy Transitway, many of the vans that enter at Gessner in the a.m. perceive they lose more time by backtracking to use the transitway than they gain by using the transitway. The remaining Katy

Table 23. Reasons for Vanpooling on the Transitway, Katy and North Transitway Vanpool Surveys

Reason	Total Sample		Vanpool Drivers		Vanpool Passengers	
	1985	1986	1985	1986	1985	1986
Reasons for Vanpooling ¹						
<u>Katy Transitway</u>	(n=1667)	(n=1656)	(n=192)	(n=177)	(n=1475)	(n=1479)
Freeway Too Congested	18%	19%	23%	28%	17%	18%
Saves Time	17%	20%	26%	29%	16%	18%
Costs Less	16%	14%	18%	10%	15%	15%
Time to Relax	14%	14%	0%	0%	15%	15%
Reliable Schedule	13%	12%	18%	16%	12%	12%
Dislike Driving	12%	9%	0%	0%	13%	11%
No Bus to Destination	3%	5%	4%	9%	3%	5%
Car Used by Others	3%	3%	3%	1%	3%	3%
Carpool Broke Up	1%	1%	1%	1%	1%	1%
No Other Way Available	1%	1%	1%	0%	1%	1%
Other	2%	2%	6%	6%	4%	1%
<u>North Transitway</u>	---	(n=7036)	---	(n=740)	---	(n=6296)
Freeway Too Congested	---	20%	---	23%	---	19%
Saves Time	---	20%	---	25%	---	19%
Costs Less	---	15%	---	20%	---	15%
Time to Relax	---	13%	---	0%	---	15%
Reliable Schedule	---	13%	---	17%	---	12%
Dislike Driving	---	8%	---	0%	---	9%
No Bus to Destination	---	5%	---	6%	---	5%
Car Used by Others	---	3%	---	6%	---	3%
Carpool Broke Up	---	1%	---	1%	---	1%
No Other Way Available	---	1%	---	0%	---	1%
Other	---	1%	---	2%	---	1%
Why Vanpool Rather Than Other Transitway Mode(s) ¹						
<u>Katy Transitway</u>	(n=282)	(n=805)	(n=115)	(n=100)	(n=667)	(n=705)
More Convenient	42%	39%	42%	39%	42%	39%
Costs Less	29%	27%	36%	27%	28%	28%
No Bus to Destination	13%	12%	11%	13%	13%	12%
Too Far to Park-and- Ride Lot or Bus Stop	8%	6%	3%	6%	8%	6%
Carpool Not Available	---	9%	---	4%	---	10%
Other	8%	7%	8%	11%	9%	5%
<u>North Transitway</u>	---	(n=3114)	---	(n=385)	---	(n=2724)
More Convenient	---	38%	---	40%	---	38%
Costs Less	---	27%	---	29%	---	27%
No Bus to Destination	---	14%	---	10%	---	14%
Too Far to Park-and- Ride Lot or Bus Stop	---	17%	---	16%	---	17%
Other	---	4%	---	5%	---	4%

¹On these questions, it was possible to check more than one reason. Thus, the "n" value is the total number of reasons checked, not the number of surveys completed.

Transitway vans and North Transitway vans apparently do not perceive a.m. freeway traffic congestion is as severe as p.m. traffic congestion and, therefore, do not perceive as great a time savings in the a.m. as in the p.m.

Table 24. Perceived Impacts of the Transitway On Mode Choice and Time Savings, Katy and North Transitway Vanpool Surveys

Impact	Total Sample		Vanpool Drivers			Vanpool Passengers	
	1985	1986	1985	1986	1987	1985	1986
How Important Was Transitway in Decision to Vanpool							
<u>Katy Transitway</u>	(n=457)	(n=435)	(n=64)	(n=59)	---	(n=393)	(n=376)
Very Important	25%	41%	27%	46%	---	24%	40%
Somewhat Important	16%	20%	8%	12%	---	18%	22%
Not Important	59%	39%	65%	42%	---	58%	38%
<u>North Transitway</u>	---	(n=1618)	---	(n=200)	---	---	(n=1418)
Very Important	---	68%	---	73%	---	---	67%
Somewhat Important	---	18%	---	15%	---	---	18%
Not Important	---	14%	---	12%	---	---	15%
Would You Vanpool if No Transitway							
<u>Katy Transitway</u>	(n=461)	(n=436)	(n=65)	(n=58)	(n=13)	(n=396)	(n=378)
Yes	87%	72%	92%	71%	84%	86%	73%
No	6%	12%	6%	14%	8%	6%	11%
Not Sure	7%	16%	2%	15%	8%	8%	16%
<u>North Transitway</u>	---	(n=1632)	---	(n=202)	---	---	(n=1430)
Yes	---	43%	---	42%	---	---	44%
No	---	27%	---	30%	---	---	26%
Not Sure	---	30%	---	28%	---	---	30%
Perceived Transitway Time Savings (minutes)							
<u>Katy Transitway</u>	(n=417)	(n=401)	(n=55)	(n=51)	(n=13)	(n=362)	(n=350)
a.m. (50th Percentile)	6	10	6	10	20	5	10
p.m. (50th Percentile)	10	15	12	15	20	10	17
<u>North Transitway</u>	--	(n=1595)	--	(n=199)	--	--	(n=1396)
a.m. (50th Percentile)	--	20	--	20	--	--	20
p.m. (50th Percentile)	--	30	--	25	--	--	30

In 1987, however, Katy Transitway vanpool drivers generally perceived the time savings in the a.m. equal to that in the p.m. Also of interest is that vanpool drivers surveyed in 1987 (after the transitway was extended to SH 6) reported saving an additional 10 minutes in the a.m. and 5 minutes in the p.m. over what was reported in the 1986 survey.

Frequency distributions of perceived travel time savings by Katy and North Transitway vanpoolers are presented in Figures 19 and 20, respectively.

Perception of Transitway Utilization

Vanpoolers on both the Katy and North Transitways were asked whether they felt the special priority lane they used was sufficiently utilized to justify the project. Their responses are summarized in Table 25.

Table 25. Perception of Transitway Utilization, Katy and North Transitway Vanpool Surveys

Is Transitway Sufficiently Utilized to Justify Project	Total Sample		Vanpool Drivers		Vanpool Passengers	
	1985	1986	1985	1986	1985	1986
<u>Katy Transitway</u>	(n=448)	(n=429)	(n=62)	(n=59)	(n=386)	(n=370)
Yes	30%	41%	47%	46%	27%	40%
No	51%	34%	35%	32%	54%	34%
Not Sure	19%	25%	18%	22%	19%	26%
<u>North Transitway</u>	---	(n=1616)	---	(n=198)	---	(n=1418)
Yes	---	84%	---	94%	---	82%
No	---	7%	---	2%	---	8%
Not Sure	---	9%	---	4%	---	10%

Katy Transitway. In 1985 (before carpools were allowed on the transitway), there were significant differences in the responses between the vanpool drivers and passengers. More drivers, those responsible for the operation of the vehicle on the transitway, felt the lane was sufficiently utilized than felt it was not. Conversely, twice as many passengers indicated that they felt it was not sufficiently utilized as compared to those stating they felt it was sufficiently utilized.

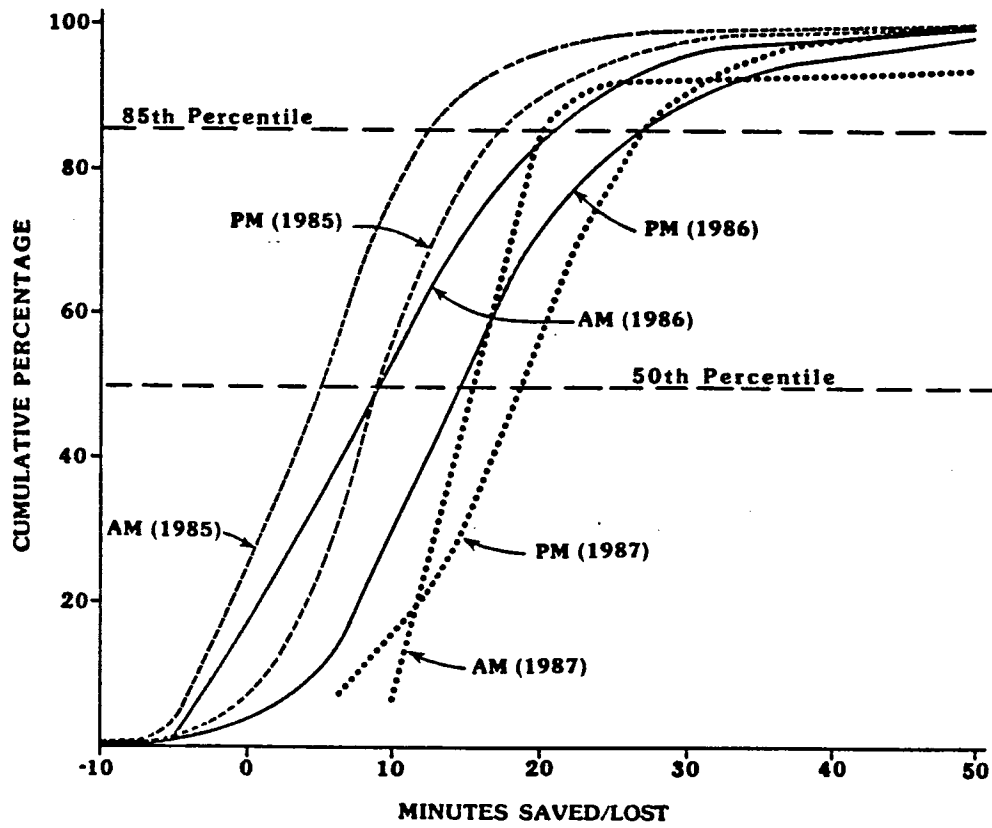


Figure 19. Perceived Transitway Travel Time Savings, Katy Transitway Vanpool Surveys

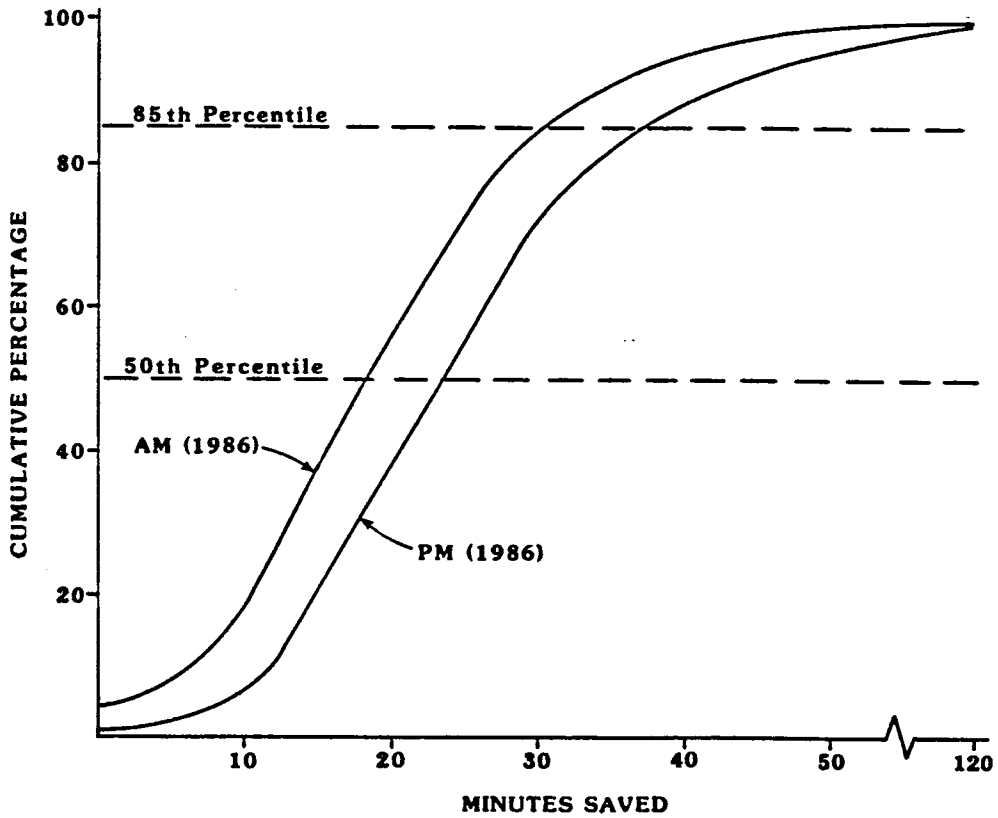


Figure 20. Perceived Transitway Travel Time Savings, North Transitway Vanpool Surveys

One of the main reasons for allowing carpools to use the transitway is to increase the perception of utilization. In 1986, one year after carpools were permitted to use the facility, the driver's perception of transitway utilization was virtually identical to their perception of utilization before carpools were allowed. However, the number of vanpool passengers who perceived the transitway was sufficiently utilized increased from 27% in 1985 to 40% in 1986.

North Transitway. Approximately 94% of the vanpool drivers and 82% of the passengers felt the North Transitway was sufficiently utilized to justify the project.

Additional Data Pertaining to the Katy Transitway

At the time of the 1985 Katy Transitway survey, the transitway extended from Post Oak to Gessner (4.7 miles) and a.m. peak period volumes were 138 vehicles. During the 1986 survey, the Katy Transitway extended from Post Oak to West Belt (6.4 miles) and carried 256 vehicles during the a.m. peak period. By the time of the 1987 survey, the transitway had opened to SH 6 (11.5 miles) and a.m. peak period volumes were in excess of 2,800 vehicles. In 1987, it was also possible to access the transitway (in the morning) at three different locations (as opposed to 2 locations in 1986 and 1 in 1985). The extension of the transitway coupled with the dramatic increase in transitway utilization has resulted in several operational concerns. For this reason, the 1987 vanpool surveys contained an additional series of questions on vanpool operation on the transitway, problems encountered and attitudes pertaining to transitway congestion.

Transitway Entrance Ramp

The Katy Transitway can be accessed via 3 different ramps. Approximately 46% of the vanpools enter the transitway from the I-10 ramp just west of SH 6 (Table 26). Another 39% enter via the flyover ramp which provides direct access to the transitway from the Addicks Park-and-Ride Lot. Only 15% of the vanpools enter the transitway at Gessner.

Table 26. Travel Characteristics of Katy Transitway Vanpools,
1987 Katy Transitway Vanpool Drivers Survey

Travel Characteristics/Perception	Vanpool Drivers 1987
Transitway Entrance Ramp	(n=13)
I-10 West of SH 6	46%
Addicks Park-and-Ride Flyover Ramp	39%
Gessner	15%
Time Normally Enter Transitway (a.m.)	(n=13)
6:30 - 6:59	46%
7:00 - 7:29	23%
7:30 - 7:59	23%
8:00 - 8:29	---
8:30 - 8:59	---
9:00 or after	8%
Average	7:13 a.m.
Perception of Transitway Congestion	(n=13)
Too Congested	46%
No Problems	46%
Too Little Traffic	8%
Encountered Any Difficulties in Using Transitway ¹	(n=17)
No	24%
Yes, at the a.m. Gessner entrance	6%
Yes, at the a.m. exit	29%
Yes, a.m. on the lane	29%
Yes, at the p.m. entrance	6%
Yes, at a p.m. exit ²	6%
Yes, p.m. on the lane	---
Acceptable Action(s) That Could Be Taken to Reduce Transitway Traffic Volumes to Maintain 55 mph Operation ¹	(n=14)
Require carpools to have 3 or more occupants	36%
Require vehicles to have permits	29%
Selectively close entrance ramps	7%
Enforce 55 mph minimum speed limit	14%
Take no action	14%

¹On these questions, it was possible to check more than one reason. Thus, the "n" value is the total number of difficulties checked, not the number of surveys completed.

²Name of the p.m. exit was not specified.

Time Normally Enter Transitway

On the average, vanpools enter the Katy Transitway at 7:13 a.m. (Table 26).

Perception of Transitway Congestion

When asked how congested is the Katy Transitway, slightly less than half (46%) of the vanpool drivers responded "too congested." On the other hand, 46% indicated that there were "no problems" and an additional 8% felt there was still "too little traffic" on the transitway (Table 26).

Difficulties in Using the Transitway

A subsequent question asked if vanpoolers had encountered any difficulties in using the transitway. Approximately 64% of the problems listed concern the a.m. operation of the priority lane: 6% at the Gessner entrance; 29% on the lane; and 29% at the exit (Table 26). Only 12% indicated problems during the p.m. operation and 24% reported no problems at all.

Acceptable Actions to Reduce Transitway Traffic

In October 1987, 1,437 vehicles used the Katy Transitway during the a.m. peak hour. This value approaches the capacity of the transitway, which is estimated to be approximately 1,500 vehicles per hour. Should vehicle volumes reach or exceed capacity, actions will have to be taken to limit the use of the transitway. For this reason, vanpoolers were asked which action(s) they would find most acceptable. Responses to this question are presented in Table 26. As to be expected, the highest percentage of vanpoolers (36%) favored raising the carpool occupancy requirement from 2 persons to 3 persons; an additional 29% favored requiring vehicles to have permits.

Comments

During all survey efforts, vanpoolers were encouraged to offer additional comments. More than half of the Katy and North Transitway vanpoolers did provide additional comments. Their comments are highlighted in Table 27.

Table 27. Additional Comments, Katy and North Transitway Vanpool Surveys

Comment	Percent of Total Comments		
	1985	1986	1987
<u>Katy Transitway</u>			
Extend the transitway	28%	15%	---
Poor entry/exit design	13%	10%	22%
Carpools on transitway good idea	6%	2%	---
Transitway good idea	5%	17%	29%
Open transitway earlier in p.m.	4%	7%	7%
Transitway is underutilized	4%	10%	---
Transitway is too crowded	---	---	7%
Encourage users to drive 55 mph	---	---	14%
Other	40%	39%	21%
<u>North Transitway</u>			
Extend the transitway	---	29%	---
Transitway good idea	---	16%	---
Keep transitway open longer hours	---	10%	---
Need concrete median barriers the entire length of transitway	---	8%	---
Enjoy vanpooling	---	8%	---
Allow carpools on transitway	---	5%	---
Other	---	24%	---

IV. TRANSITWAY CARPOOL USER SURVEYS

The forms used for the surveys of Katy Transitway carpoolers are similar to those used for the Katy and North Transitway vanpoolers. Katy Transitway carpooler surveys primarily addressed the following 3 areas: 1) personal characteristics; 2) travel patterns and trip characteristics; and 3) attitudes and impacts pertaining to the transitway.

As was the case with the Katy Transitway vanpool surveys, the surveys of Katy Transitway carpoolers performed in 1985 and 1986 included both carpool drivers and passengers, while the 1987 surveys included carpool drivers only.

Personal Characteristics

Questions were asked to identify the age, sex, occupation and educational level of the carpoolers.

Age

The median age of persons in Katy Transitway carpools is 41 in 1985 and 40 in 1986 (Table 28). The median age of carpool drivers in 1987 is 36.

Sex

The majority of the persons in carpools are male (Table 28).

Occupation

Approximately 78% of the carpoolers surveyed in 1985, 68% of those surveyed in 1986, and 63% of the drivers surveyed in 1987 are employed in "professional" or "managerial" positions (Table 28).

Education

The average carpooler has completed 3 to 4 years of college (Table 28).

Table 28. Personal Characteristics of Transitway Carpoolers,
Katy Transitway Carpool Surveys

Personal Characteristic	Total Sample		Carpool Drivers			Carpool Passengers	
	1985	1986	1985	1986	1987	1985	1986
Age (years)	(n=90)	(n=193)	(n=31)	(n=63)	(n=545)	(n=59)	(n=130)
50th Percentile	41	40	43	39	36	40	40
Sex	(n=90)	(n=192)	(n=31)	(n=63)	(n=543)	(n=59)	(n=129)
Male	71%	62%	58%	60%	58%	78%	63%
Female	29%	38%	42%	40%	42%	22%	37%
Occupation	(n=87)	(n=192)	(n=28)	(n=63)	(n=535)	(n=59)	(n=130)
Professional	58%	45%	50%	45%	44%	61%	45%
Managerial	20%	23%	21%	27%	19%	18%	21%
Clerical	11%	15%	14%	13%	16%	10%	17%
Sales	2%	6%	4%	3%	8%	2%	7%
Homemaker	2%	1%	7%	3%	2%	0%	---
Student	1%	8%	4%	7%	5%	0%	9%
Craftsman	---	---	---	---	3%	---	---
Operative	5%	---	0%	---	0%	7%	---
Service Worker	---	1%	---	2%	1%	---	---
Retired	---	1%	---	---	2%	---	1%
Unemployed	1%	---	0%	---	---	2%	---
Education (years)	(n=90)	(n=194)	(n=31)	(n=63)	(n=536)	(n=59)	(n=131)
Average	16.1	15.3	15.8	15.5	15.6	16.4	15.2

Travel Patterns and Trip Characteristics

As part of the 1985 and 1986 survey efforts, carpool drivers and passengers were asked a series of questions pertaining to the formation and operation of the carpool on the transitway. Other questions asked during the 1985, 1986 and 1987 surveys related to travel patterns and transitway trip characteristics.

Formation of the Carpool

In most instances, the persons in the carpool formed the carpool with no assistance from any person or agency (Table 29).

Table 29. Characteristics of Carpools Traveling on the Katy Transitway, 1985 and 1986

Carpool Characteristic	Katy Transitway Carpools	
	1985	1986
How Was Carpool Organized	(n=31)	(n=64)
I Found the Riders	95%	78%
METRO CarShare	0%	3%
Residential Developer	5%	---
Employer	---	2%
Other	---	17%
Do Drivers Pick Up Passengers	(n=31)	(n=59)
At Home	52%	41%
At Common Pickup Point(s)	48%	59%
Do Passengers Drive to Pickup Point	(n=59)	(n=132)
Yes	42%	36%
No, Dropped off by Someone Else	4%	4%
No, Picked Up at My Door	54%	60%
When Passengers Leave Car at Home, Is It Used by Others	(n=58)	(n=128)
Yes	9%	23%
No	69%	55%
Not Applicable (Car Left at Pickup Point)	22%	22%
Are There Employer Incentives for Passengers to Carpool	(n=59)	(n=129)
Yes	25%	21%
No	75%	79%
Transitway Trip Frequency	(n=31)	(n=64)
% Carpools Using Daily	100%	97%
Percent Carpools Using Transitway	(n=31)	(n=65)
a.m.	94%	89%
p.m.	100%	100%
Duration of Transitway Use	(n=26)	(n=65)
% Carpools Using Transitway Since It Opened to Carpools (April 1985)	42%	22%

Carpool Staging Points

Slightly less than half of the drivers surveyed in 1985 and almost 60% of those surveyed in 1986 reported that they pick up passengers at common carpool staging points (Table 29). The majority of passengers reported that

they are picked up at their door (either by the carpool driver or another passenger). Even when passengers leave a car at home, it is frequently not used.

Employer Incentive to Carpool

Between 21% and 25% of the carpool passengers surveyed reported that their employer provided some sort of incentive for them to carpool (Table 29). The incentives provided include: 1) subsidized parking; 2) share in car and/or gasoline costs; and 3) permit flexible working hours.

Transitway Trip Frequency

As would be expected for a mode that primarily serves work or school trips, almost all carpools use the transitway five days per week (Table 29).

Percent of Carpools Using the Transitway by Time Period

Most all carpools use the transitway in both the a.m. and p.m. (Table 29). Those which do not use the transitway in the a.m. indicated that they left before the transitway opened in the morning or that they used a different travel route in the morning.

Duration of Transitway Use

In 1985, approximately 42% of the Katy Transitway carpools reported using the priority lane since it opened to carpools (Table 29). In 1986, only 22% reported using the transitway since carpools were first allowed.

Trip Length

In 1985 and 1986, carpoolers were asked how long their round trip would be if they drove alone and how much longer their round trip is because they carpool. Trip length frequencies for the carpoolers are illustrated in Figure 21; 50th percentile responses are presented in Table 30. The average one-way trip is in excess of 20 miles.

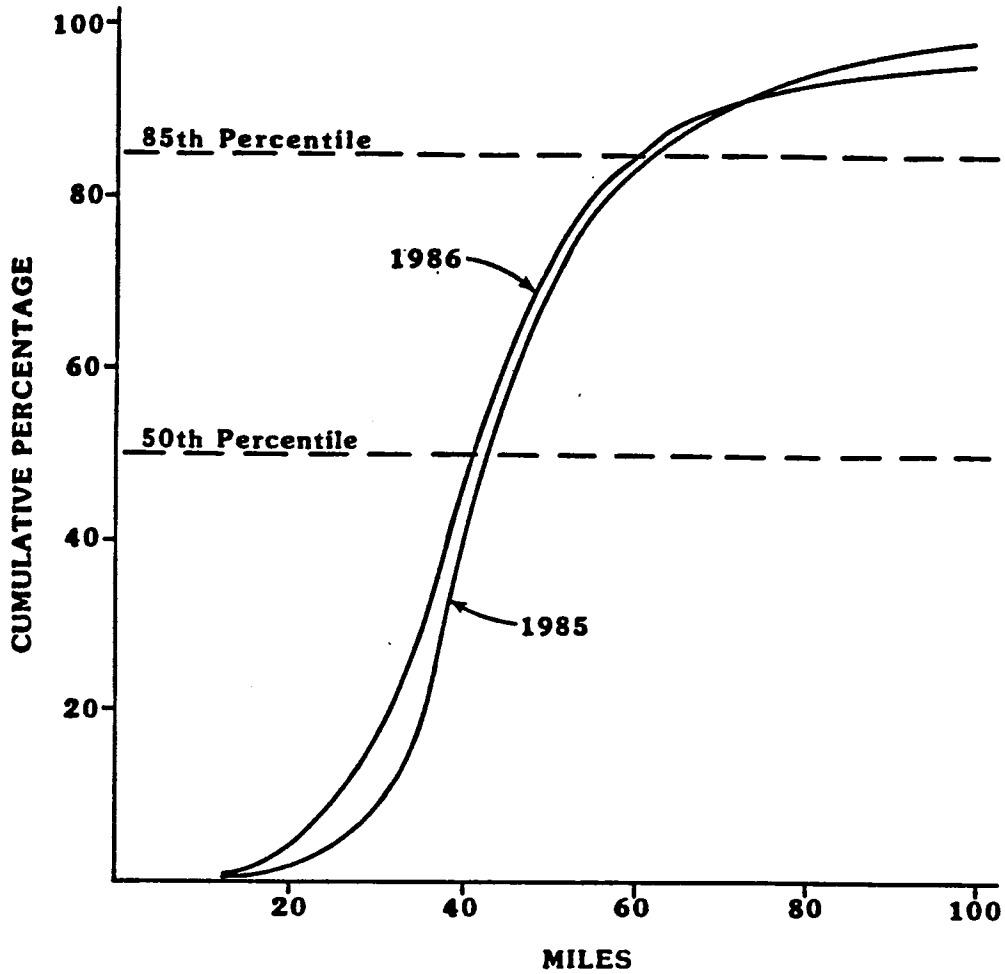


Figure 21. Round Trip Mileage for Katy Transitway Carpoolers

Year Joined Carpool

The year Katy Transitway carpoolers joined their present carpool is presented in Table 30. The "average" carpooler in 1985 had been traveling in his/her current carpool less than one year; the "average" carpooler in 1986 has been with his/her carpool about 2 1/2 years.

Table 30. Year and Reasons Joined Carpool and Impacts of Carpooling on Trip Distance, Katy Transitway Carpool Surveys

Characteristic	Total Sample		Carpool Drivers		Carpool Passengers	
	1985	1986	1985	1986	1985	1986
Year Joined Carpool	(n=88)	(n=195)	(n=30)	(n=63)	(n=58)	(n=132)
Before 1970	5%	5%	3%	8%	5%	4%
1970-1975	10%	8%	14%	6%	9%	9%
1976-1980	7%	6%	3%	3%	8%	8%
1981-1984	23%	13%	13%	11%	30%	14%
1985	55%	38%	67%	35%	48%	38%
1986	---	30%	---	37%	---	27%
Why Joined Carpool ¹	(n=101)	(n=257)	(n=34)	(n=81)	(n=67)	(n=176)
Saves Time or Money	38%	40%	41%	37%	37%	41%
More Convenient	12%	12%	9%	11%	13%	12%
Share Driving	9%	8%	9%	5%	9%	9%
Take Advantage of Transitway	7%	6%	6%	5%	8%	7%
Traffic Congestion	5%	5%	6%	9%	5%	3%
Started Working	5%	7%	6%	2%	5%	9%
Take Children to School	4%	1%	12%	2%	0%	0%
Other	20%	21%	11%	29%	23%	19%
Before Carpooling, Did You Use Transitway	(n=90)	(n=197)	(n=31)	(n=65)	(n=59)	(n=132)
Yes, Bus	3%	7%	0%	3%	5%	9%
Yes, Van	2%	7%	0%	8%	3%	7%
No	95%	86%	100%	89%	92%	84%
Did Carpool Size Increase to Able to Use Transitway	(n=90)	(n=194)	(n=31)	(n=65)	(n=59)	(n=129)
Yes	44%	42%	48%	45%	42%	41%
No	56%	58%	52%	55%	58%	59%
Round Trip Distance if Drove Alone (miles)	(n=87)	(n=189)	(n=30)	(n=61)	(n=59)	(n=128)
50th Percentile	42	40	39	40	42	40
Average	44	45	42	43	45	46
Extra Miles to Carpool	(n=87)	(n=184)	(n=30)	(n=58)	(n=59)	(n=126)
50th Percentile	0	0	0	1	0	0
Average	1.2	1.4	0.9	1.8	1.4	1.6

¹For this question, it was possible to check more than one reason. Thus, the "n" value is the total number of reasons checked, not the number of surveys completed.

Why Joined Carpool

When asked why they began carpooling, the most common responses involved saving time or money, convenience and sharing the task of driving (Table 30).

Carpool Occupancies

At the time of the 1985 survey, carpool utilization of the Katy Transitway was restricted to authorized carpools carrying 4 or more registered persons. During the 1986 survey, the minimum occupancy for authorized carpools had been lowered to 3 persons. By the time of the 1987 survey, the passenger requirement had been lowered to 2 persons and all authorization procedures were eliminated.

The actual occupancies of the carpools entering the Katy Transitway on the days of the 1985 and 1986 surveys are shown in Table 31, along with the number of registered carpool passengers. The average occupancy of Katy Transitway carpools was 3.5 persons in 1985 and 3.4 persons in 1986. There was an average of 4.2 registered members per car in 1985 and 3.6 registered members in 1986. Actual occupancy was 83% of registered members in 1985 and 94% in 1986.

In 1987, actual carpool occupancies averaged 2.3 persons for both the April and October surveys (Table 31).

Authorized Carpool Drivers

At the time of 1985 and 1986 surveys, driver training was required to operate a carpool on the transitway. The driver was also required to carry a license authorizing him or her to drive on the lane. Most carpools rotate the car that is used as well as the driver. As a result, most carpools had numerous authorized drivers (Table 31).

Table 31. Carpool Occupancy, Katy Transitway Carpool Surveys

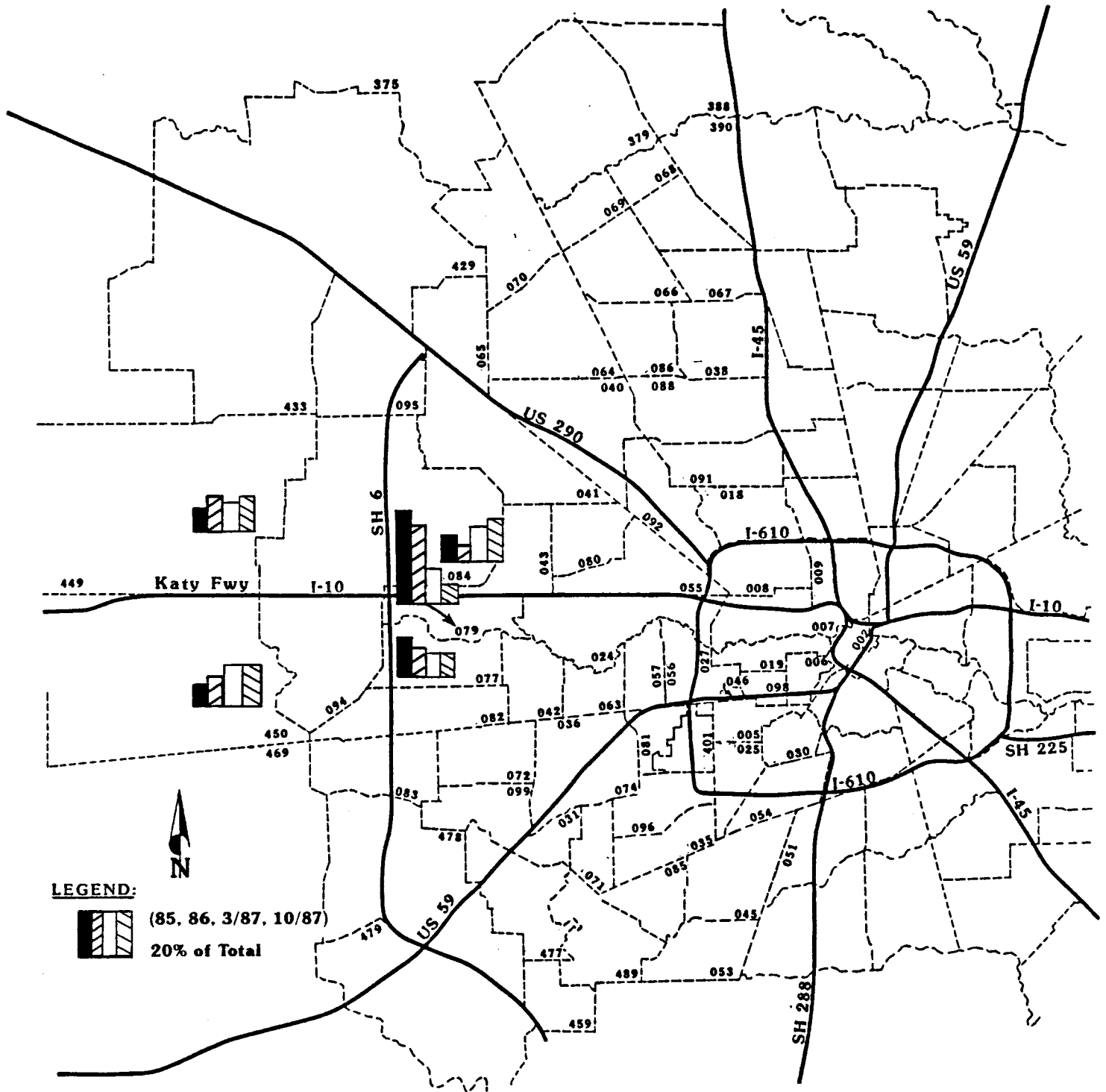
Characteristic	Katy Transitway Carpools			
	1985	1986	Apr 1987	Oct 1987
Registered Carpool Members	(n=31)	(n=65)	---	---
3	7%	44%	---	---
4	71%	48%	---	---
5	19%	8%	---	---
6	3%	---	---	---
Actual Carpool Occupancy	(n=31)	(n=65)	(n=629)	(n=571)
1	3%	---	1%	1%
2	0%	3%	78%	78%
3	52%	55%	14%	15%
4	39%	39%	6%	4%
5	3%	3%	1%	1%
6	3%	---	0%	1%
Authorized Carpool Drivers	(n=31)	(n=65)	---	---
1	23%	32%	---	---
2	13%	25%	---	---
3	6%	17%	---	---
4	52%	21%	---	---
5	6%	5%	---	---

Home Zip Codes

The majority of the Katy Transitway carpoolers reside in one of 5 Zip Code areas. These are illustrated in Figure 22 and summarized in Table 32.

Table 32. Home Zip Codes of Carpoolers, Katy Transitway Carpool Surveys

Home Zip Code	Total Sample		Carpool Drivers				Carpool Passengers	
	1985	1986	1985	1986	Apr 1987	Oct 1987	1985	1986
Zip Code	(n=90)	(n=195)	(n=31)	(n=64)	(n=631)	(n=274)	(n=59)	(n=131)
77079	37%	33%	29%	33%	17%	11%	41%	33%
77077	16%	13%	23%	14%	10%	10%	12%	12%
77084	11%	7%	13%	8%	14%	16%	10%	7%
77449	10%	15%	10%	14%	12%	15%	10%	15%
77450	9%	11%	3%	11%	13%	13%	12%	11%
Other	17%	21%	22%	20%	34%	35%	15%	22%



NOTE: All Zip Codes Begin with 77.

Figure 22. Home Origins of Katy Transitway Carpoolers

Freeway Entrance Ramp

In 1985 and 1986, the vast majority of the carpools entered the Katy Freeway at either West Belt, Wilcrest or Gessner. In 1987, the majority of carpools were entering the Katy Freeway at either Gessner, SH 6 or Fry Road (the West Belt entrance to the freeway was closed at the time of the 1987 survey).

Carpool Trip Destinations

As was the case with the transitway vanpoolers, the destinations of the transitway carpools are dispersed. The single largest attractor is the downtown (Table 33).

Table 33. Freeway Entrance Ramp Used by Carpools and Carpool Destinations, Katy Transitway Carpool Surveys

Carpool Operation Characteristic	1985	1986	1987
Katy Freeway Entrance Ramp (a.m.)	(n=29)	(n=60)	(n=547)
West Belt	69%	65%	*
Wilcrest	17%	17%	8%
Gessner	11%	8%	14%
Sealy	3%	---	---
Fry Road	---	3%	15%
SH 6	---	2%	19%
Barker Cypress	---	3%	9%
Mason Road	---	2%	14%
Dairy Ashford	---	---	7%
Other	---	---	14%
Carpool Destination (a.m.)	(n=31)	(n=65)	(n=573)
Downtown	29%	49%	39%
Galleria/City Post Oak	13%	15%	22%
Greenway Plaza	13%	---	6%
Post Oak School	10%	---	---
Texas Medical Center	3%	3%	6%
Other	32%	33%	27%

* The West Belt entrance ramp to the Katy Freeway was closed at the time of the 1987 survey.

Previous Mode of Travel

Before joining their present carpool, the majority of the carpoolers previously drove alone or traveled in a different carpool (Table 34).

Table 34. Previous Travel Mode and Prior Use of Transitway,
Katy Transitway Carpool Surveys

Travel Characteristic	Total Sample		Carpool Drivers			Carpool Passengers	
	1985	1986	1985	1986	Oct 1987	1985	1986
Previous Travel Mode	(n=88)	(n=191)	(n=30)	(n=61)	(n=564)	(n=58)	(n=130)
Drove Alone	50%	46%	50%	52%	50%	50%	42%
Other Carpool	24%	18%	27%	20%	29%	22%	18%
Didn't Make Trip	20%	18%	23%	10%	6%	19%	21%
Vanpool	4%	4%	0%	3%	2%	5%	5%
Bus	2%	8%	0%	2%	9%	4%	11%
Other	---	6%	---	13%	4%	---	3%
Use Transitway Before Carpooling	(n=90)	(n=197)	(n=31)	(n=65)	(n=564)	(n=59)	(n=132)
Yes, bus	3%	7%	0%	3%	9%	5%	9%
Yes, van	2%	7%	0%	8%	1%	3%	7%
No	95%	86%	100%	89%	90%	92%	84%
Did Carpool Size Increase to be Able to Use Transitway	(n=90)	(n=194)	(n=31)	(n=65)	---	(n=59)	(n=129)
Yes	44%	42%	48%	45%	---	42%	41%
No	56%	58%	52%	55%	---	58%	59%

Prior Use of the Transitway

Carpoolers were asked whether they used another transitway mode prior to carpooling on the transitway. At least 84% of those surveyed responded "no" (Table 34).

Increase in Carpool Occupancy

Approximately 44% of those surveyed in 1985 and 42% of those questioned in 1986 indicated that the size of the carpool increased after the transitway opened in order to be eligible to use the facility (Table 34). (Note: The minimum occupancy for carpools was 4 persons in 1985 and 3 persons in 1986.)

Attitudes and Impacts Pertaining to the Transitways

A number of questions were intended to collect information concerning attitudes toward and impacts of implementing the transitway. These responses can be categorized as follows: 1) modal selection; 2) impacts of the transitway on modal selection; 3) perceived time savings as a result of using the transitway; and 4) perception of transitway utilization.

Modal Selection

As indicated by Table 35, the carpool was selected as a travel mode primarily because: 1) carpooling saves time; 2) the freeway is too congested; and 3) carpooling costs less. Convenience and cost were also cited as the primary reasons for selecting the carpool mode rather than a vanpool or bus.

Table 35. Reasons for Selecting the Carpool Mode on the Transitway, Katy Transitway Carpool Surveys

Reason	Total Sample		Carpool Drivers		Carpool Passengers	
	1985	1986	1985	1986	1985	1986
Why Carpool on the Transitway ¹	(n=328)	(n=969)	(n=104)	(n=210)	(n=224)	(n=486)
Saves Time	27%	26%	29%	28%	26%	25%
Freeway Too Congested	26%	25%	29%	29%	25%	23%
Costs Less	16%	10%	17%	3%	16%	14%
Reliable Schedule	13%	10%	14%	14%	12%	9%
Time to Relax	6%	7%	0%	3%	9%	9%
No Bus to Destination	5%	7%	4%	11%	5%	5%
Car Used by Others	4%	6%	5%	7%	4%	5%
Other	3%	9%	2%	5%	3%	10%
Why Carpool Rather than Bus or Van ¹	(n=151)	(n=363)	(n=45)	(n=121)	(n=106)	(n=242)
More Convenient	47%	39%	47%	40%	46%	39%
Cost Less	23%	19%	20%	18%	25%	19%
No Bus to Destination	14%	13%	13%	12%	14%	13%
No Vanpool Available	11%	13%	16%	12%	9%	14%
Too Far to Park-and-Ride or Bus Stop	5%	8%	4%	8%	6%	8%
Other	0%	8%	0%	10%	0%	7%

¹On these questions, it was possible to check more than one reason. Thus, "n" value is the total number of reasons checked, not the number of surveys completed.

Impacts of the Katy Transitway on Mode Choice

A question was asked to determine whether individuals would be carpooling if the transitway had not opened operation to carpools. Seventy percent of those surveyed in 1985 and 59% of those surveyed in 1986 said "yes" (Table 36). In 1987, however, 43% of the carpool drivers surveyed in April and 37% of those questioned in October responded "no."

Table 36. Perceived Impacts of the Transitway on Mode Choice and Time Savings, Katy Transitway Carpool Surveys

Impact	Total Sample		Carpool Drivers				Carpool Passengers	
	1985	1986	1985	1986	Apr 1987	Oct 1987	1985	1986
Would You Carpool if No Transitway	(n=90)	(n=197)	(n=31)	(n=65)	(n=621)	(n=565)	(n=59)	(n=132)
Yes	70%	59%	71%	57%	43%	50%	69%	60%
No	16%	25%	13%	28%	43%	37%	17%	24%
Not Sure	14%	16%	16%	15%	14%	13%	14%	16%
How Important Was Transitway in Decision to Carpool	(n=90)	(n=197)	(n=31)	(n=65)	---	---	(n=59)	(n=132)
Very Important	47%	56%	58%	63%	---	---	41%	53%
Somewhat Important	10%	8%	13%	5%	---	---	8%	10%
Not Important	43%	36%	29%	32%	---	---	51%	37%
Perceived Transitway Travel Time Savings (minutes)	(n=90)	(n=187)	(n=31)	(n=62)	---	(n=569)	(n=59)	(n=125)
a.m. (50th Percentile)	9	15	12	15	---	20	7	10
p.m. (50th Percentile)	17	20	14	20	---	20	17	20

A related question on the 1985 and 1986 surveys asked how important the Katy Transitway was in the decision to carpool. While most respondents indicated that they would be carpooling even if the transitway had not opened to carpools, 57% of those surveyed in 1985 and 64% of those surveyed in 1986 said the transitway was either "very important" or "somewhat important" in their decision to carpool (Table 36).

Perceived Transitway Travel Time Savings

In 1985 and 1986, Katy Transitway carpoolers perceived a greater travel time savings in the afternoon than in the morning (Table 36). In 1987, however, travel time savings in the morning more closely approximated that of the afternoon. Frequency distributions of carpooler perceived travel time savings are presented in Figure 23.

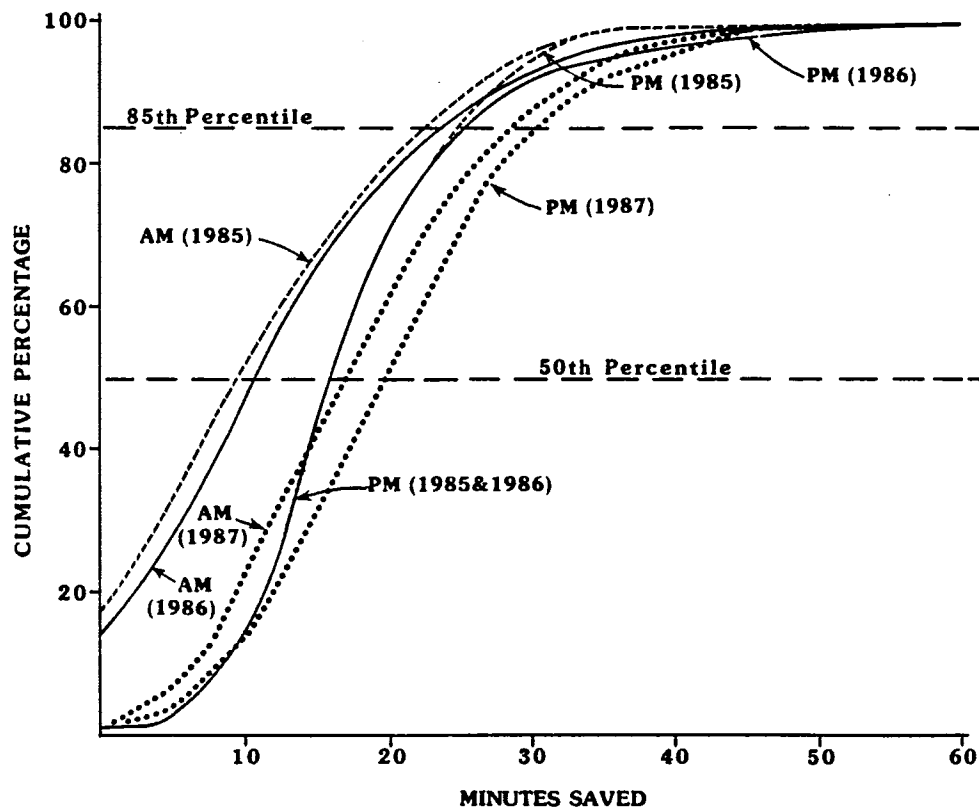


Figure 23. Perceived Transitway Travel Time Savings, Katy Transitway Carpool Surveys

As to be expected, perceived travel time savings in 1986 (after the transitway was extended to West Belt) are greater than those of 1985. In addition, perceived travel time savings in 1987 (after the transitway was extended to SH 6) are greater yet. Median travel time savings in 1987 were 20 minutes for both the a.m. and p.m.

Perception of Transitway Utilization

One of the primary reasons for allowing carpools to use the Katy Transitway is to increase the perception of utilization. Carpoolers were asked whether they felt the transitway was sufficiently utilized to justify the project. In 1985, more responses (43%) indicated that the transitway was not sufficiently utilized than felt it was sufficiently utilized (34%). In 1986, however, just the opposite was true; 45% felt the transitway was sufficiently utilized, while 32% felt it was not. By 1987, more than 80% of the carpool drivers questioned stated that the transitway was sufficiently utilized to justify the project. These data are presented in Table 37.

Table 37. Perception of Transitway Utilization, Katy Transitway Carpool Surveys

Attitude	Total Sample		Carpool Drivers			Carpool Passengers	
	1985	1986	1985	1986	1987	1985	1986
Is the Transitway Sufficiently Utilized to Justify the Project	(n=86)	(n=193)	(n=29)	(n=63)	(n=606)	(n=57)	(n=130)
Yes	34%	45%	35%	44%	82%	33%	45%
No	43%	32%	41%	35%	9%	44%	31%
Not Sure	23%	23%	24%	21%	9%	23%	24%

Additional Data Pertaining to the Katy Transitway

As mentioned in the previous chapter, the extension of the Katy Transitway coupled with the significant increase in transitway vehicle volumes has resulted in some operational concerns. For this reason, the 1987 Katy Transitway carpool surveys (like the 1987 vanpool surveys) contained additional questions on carpool operation on the transitway, problems encountered and attitudes pertaining to transitway congestion.

Transitway Entrance Ramp

As indicated in Table 38, almost half of the carpools surveyed in 1987 enter the transitway from the I-10 ramp just west of SH 6. An additional 28%

Table 38. Transitway Travel Characteristics and Attitudes Pertaining to Transitway Operation, Katy Transitway Carpool Surveys

Travel Characteristic/Perception	Carpool Drivers 1987
Transitway Entrance Ramp	(n=576)
I-10 West of SH 6	47%
Addicks Park-and-Ride Flyover Ramp	25%
Gessner	28%
Time Normally Enter Transitway (a.m.)	(n=564)
Before 6:00	1%
6:00-6:29	9%
6:30-6:59	22%
7:00-7:29	34%
7:30-7:59	17%
8:00-8:29	11%
8:30-8:59	4%
9:00 or after	2%
Average	7:14
Perception of Transitway Congestion	(n=565)
Too Congested	23%
No Problems	71%
Too Little Traffic	6%
Encountered Difficulties in Using Transitway ¹	(n=720)
No	38%
Yes, at the a.m. I-10 entrance	2%
Yes, at the a.m. Addicks P & R flyover entrance ramp	1%
Yes, at the a.m. Gessner entrance	7%
Yes, at the a.m. exit	13%
Yes, a.m. on the lane	12%
Yes, at the p.m. entrance	9%
Yes, at the p.m. Gessner exit	3%
Yes, at the p.m. Addicks P & R flyover exit ramp	3%
Yes, at the p.m. I-10 exit	3%
Yes, p.m. on the lane	9%
Acceptable Action(s) That Could Be Taken to Reduce Transitway Traffic Volumes to Maintain 55 mph Operation ¹	(n=607)
Require vehicles to have permits	26%
Require carpools to 3 or more occupants	12%
Enforce 55 mph minimum speed limit	10%
Selectively close entrance ramps	8%
Adjust signal timing at Post Oak	5%
Other	7%
Take no action	32%

¹On these questions, it was possible to check more than one answer. Thus, the "n" value is the total number of answers checked, not the number of surveys completed.

enter at Gessner and the remaining 25% enter via the flyover ramp which provides direct access to the transitway from the Addicks Park-and-Ride Lot.

Time Normally Enter Transitway

On the average, carpools enter the Katy Transitway at 7:14 a.m. (Table 38).

Perception of Transitway Congestion

When asked how congested is the Katy Transitway, more than 70% of the carpool drivers responded "no problems." On the other hand, 23% indicated that the transitway is "too congested" and an additional 6% felt there was still "too little traffic" on the transitway (Table 38).

Difficulties in Using the Transitway

A subsequent question asked if carpoolers had encountered any difficulties in using the transitway. Their responses are presented in Table 38. As this table indicates, the largest percentage of problems (35%) occur during the a.m. operation.

Acceptable Actions to Reduce Transitway Traffic

Should vehicle volumes on the Katy Transitway reach or exceed capacity, actions will have to be taken to limit the use of the transitway. Carpoolers were, therefore, asked which action(s) they would find most acceptable. Responses to this question are presented in Table 38. The most frequently listed response was "take no action" (32%) followed by "require vehicles to have permits" (26%).

Comments

Carpoolers were encouraged to offer additional comments and many did so. Their comments are summarized in Table 39.

Table 39. Additional Comments, Katy Transitway Carpool Surveys

Comment	Percent of Total Comments		
	1985	1986	1987
Transitway is convenient and a good improvement	23%	25%	34%
Extend transitway to the west	16%	11%	---
Transitway is underutilized	8%	8%	0%
3-person carpools a good move	5%	2%	---
Reduce carpool passenger requirements	5%	16%	---
Poor transitway entry/exit design	5%	4%	21%
Encourage users to drive 55 mph	---	---	17%
Keep carpool requirement at 2+	---	---	4%
Other	38%	34%	24%

V. KATY FREEWAY CORRIDOR PARK-AND-POOL USER SURVEYS

At the same time the second major Katy Transitway "after carpools" evaluation was performed in October 1987, a special survey of persons who utilize the three park-and-pool lots adjacent to the Katy Freeway/Katy Transitway was also performed. The location of the Barker-Cypress, Mason Road and Fry Road Park-and-Pool Lots is illustrated in Figure 2 (Page 5). All three of these lots are staging points for carpools and vanpools. The Fry Road Lot is also served by a METRO park-and-ride bus route.

For the survey of park-and-pool lot users, TTI staff left a survey packet on the windshield of all vehicles parked at each of the three lots. Each packet contained a cover letter, a questionnaire and a business-reply envelope. Park-and-poolers were asked to complete the survey and return it to TTI in the postage-paid envelope provided. Survey response rates by lot are presented in Table 40. An example of the survey instrument used is included in the Appendix.

Table 40. Katy Freeway Corridor Park-and-Pool Survey Distribution

Park-and-Pool Lot	Number of Surveys Distributed	Number of Surveys Completed	Response Rate
Fry Road	107	63	59%
Mason Road	60	28	47%
Barker-Cypress Road	<u>37</u>	<u>26</u>	<u>70%</u>
Total	204	117	57%

Generally speaking, the responses as categorized by park-and-pool lot are similar. However, the responses by survey group (i.e. carpools, vanpools, buspools) differ in some respects and are, therefore, presented separately.

The questions contained on the Katy Freeway Corridor park-and-pool lot user surveys generally fall into 3 areas: 1) personal characteristics; 2) travel patterns and trip characteristics; 3) use of and impacts pertaining to the Katy Transitway.

Personal Characteristics

Park-and-poolers were asked questions concerning their age, sex, occupation and education. Their responses to these questions are presented in Table 41.

Table 41. Personal Characteristics of Park-and-Pool Lot Users,
Katy Freeway Corridor Park-and-Pool Survey

Personal Characteristic	Total Sample	Carpoolers	Vanpoolers	Buspoolers
Age (years)	(n=111)	(n=62)	(n=25)	(n=23)
50th Percentile	37	37	39	35
Sex	(n=110)	(n=62)	(n=24)	(n=23)
Male	47%	52%	46%	39%
Female	53%	48%	54%	61%
Occupation	(n=109)	(n=62)	(n=24)	(n=22)
Professional	50%	47%	62%	45%
Managerial	21%	21%	21%	23%
Clerical	17%	18%	17%	18%
Sales	6%	6%	---	9%
Student	4%	4%	---	5%
Craftsman	1%	2%	---	---
Operative	1%	2%	---	---
Education (years)	(n=109)	(n=60)	(n=25)	(n=25)
Average	15.3	15.3	15.2	15.5

Age

The median age of the park-and-pool patrons is in the mid to late 30s.

Sex

Slightly less than half of the carpoolers, 54% of the vanpoolers and 61% of the buspoolers surveyed are female.

Occupation and Education

Approximately 71% of the park-and-poolers are employed in occupations that can be classified as either "professional" or "managerial." The average park-and-pooler has completed at least three years of college.

Travel Patterns and Trip Characteristics

Home Zip Codes

When asked their home Zip Codes, Katy Freeway corridor park-and-poolers listed 13 different Zip Codes. Fifty-four percent of the Mason Road Lot poolers, 42% of the Fry Road Lot users and 31% of the Barker-Cypress Lot poolers reside in the 77450 Zip Code area (Table 42 and Figures 24-26).

Table 42. Home Zip Codes of Park-and-Pool Lot Users, Katy Freeway Corridor Park-and-Pool Surveys

Home Zip Code	Total Sample	Fry Road Lot	Mason Road Lot	Barker-Cypress Lot
Zip Code	(n=112)	(n=60)	(n=26)	(n=26)
77450	42%	42%	54%	31%
77449	28%	32%	23%	23%
77084	19%	20%	4%	31%
77474	3%	3%	4%	---
77042	2%	---	4%	4%
Other	6%	3%	11%	11%

Trip Destinations/Trip Purpose

As expected, the downtown area is the destination for the majority of the vanpoolers (74%) and buspoolers (92%) surveyed (Table 43). The downtown area is also the destination of approximately 31% of the carpoolers. More than 90% of all Katy Freeway corridor park-and-poolers are traveling to work (Table 43). The remaining are pooling to school locations.

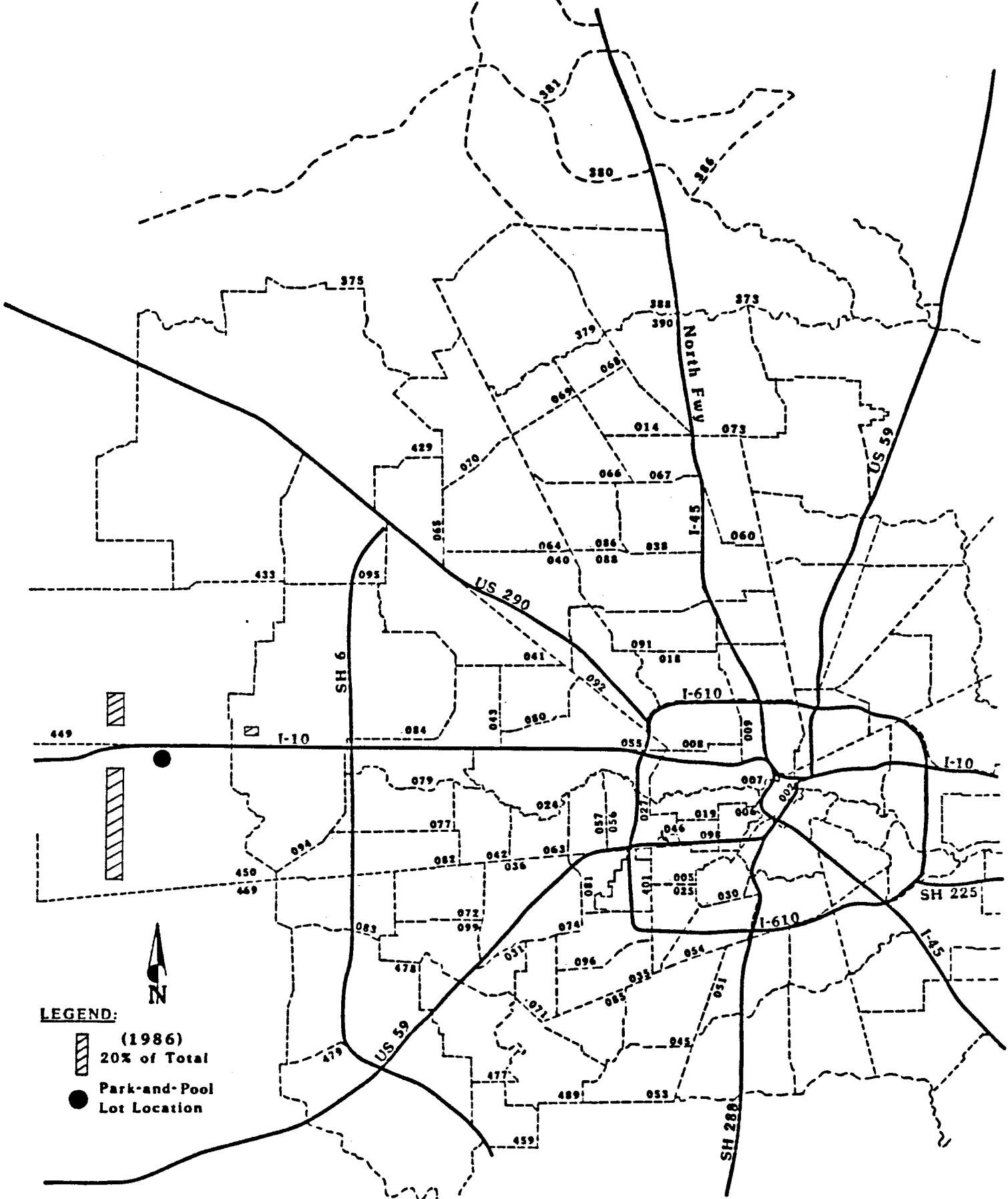
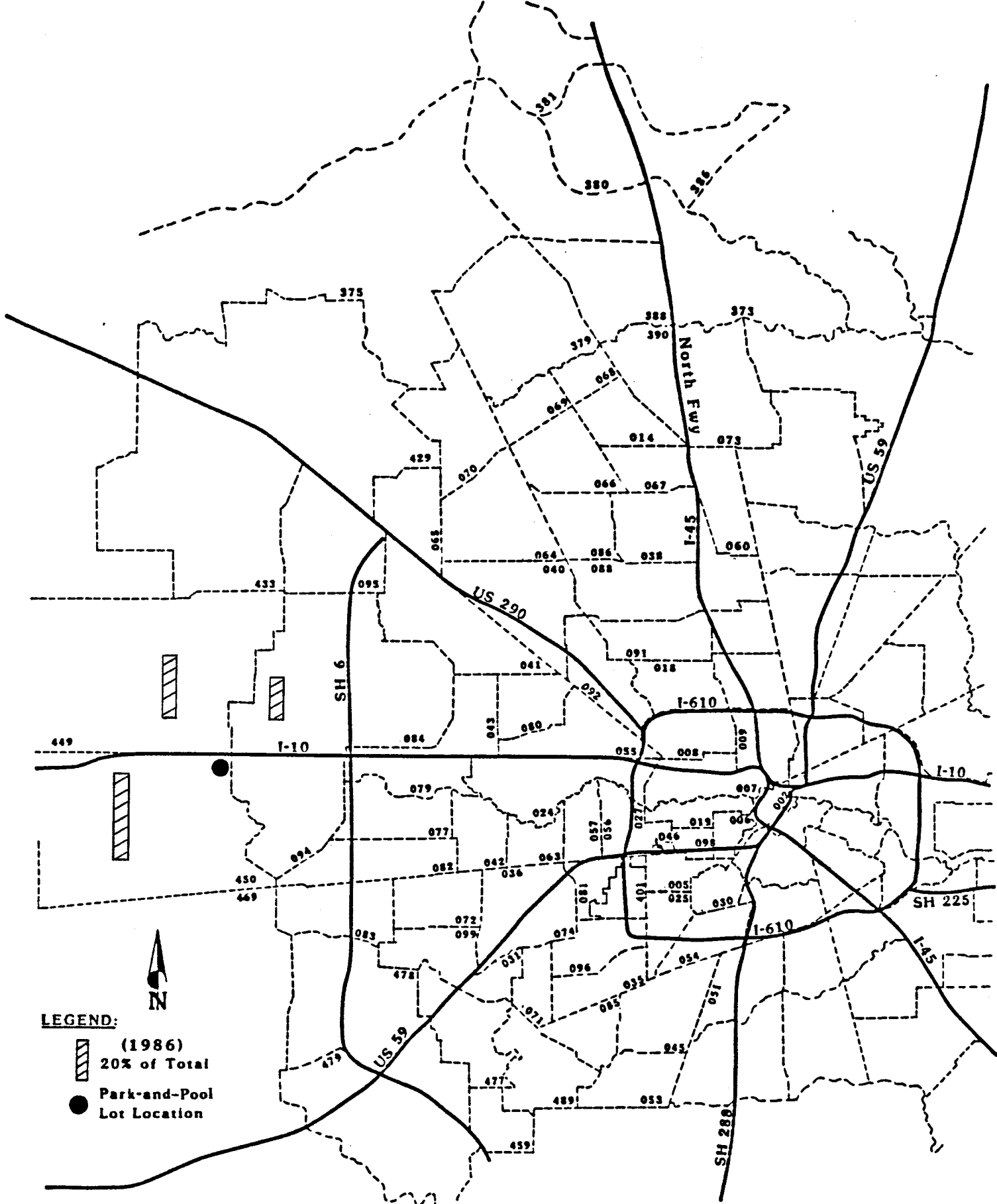




Figure 24. Home Origins of Patrons of the Mason Road Park-and-Pool Lot



LEGEND:

-  (1986)
20% of Total
-  Park-and-Pool
Lot Location

NOTE: All Zip Codes Begin with 77.

Figure 25. Home Origins of Patrons of the Fry Road Park-and-Pool Lot

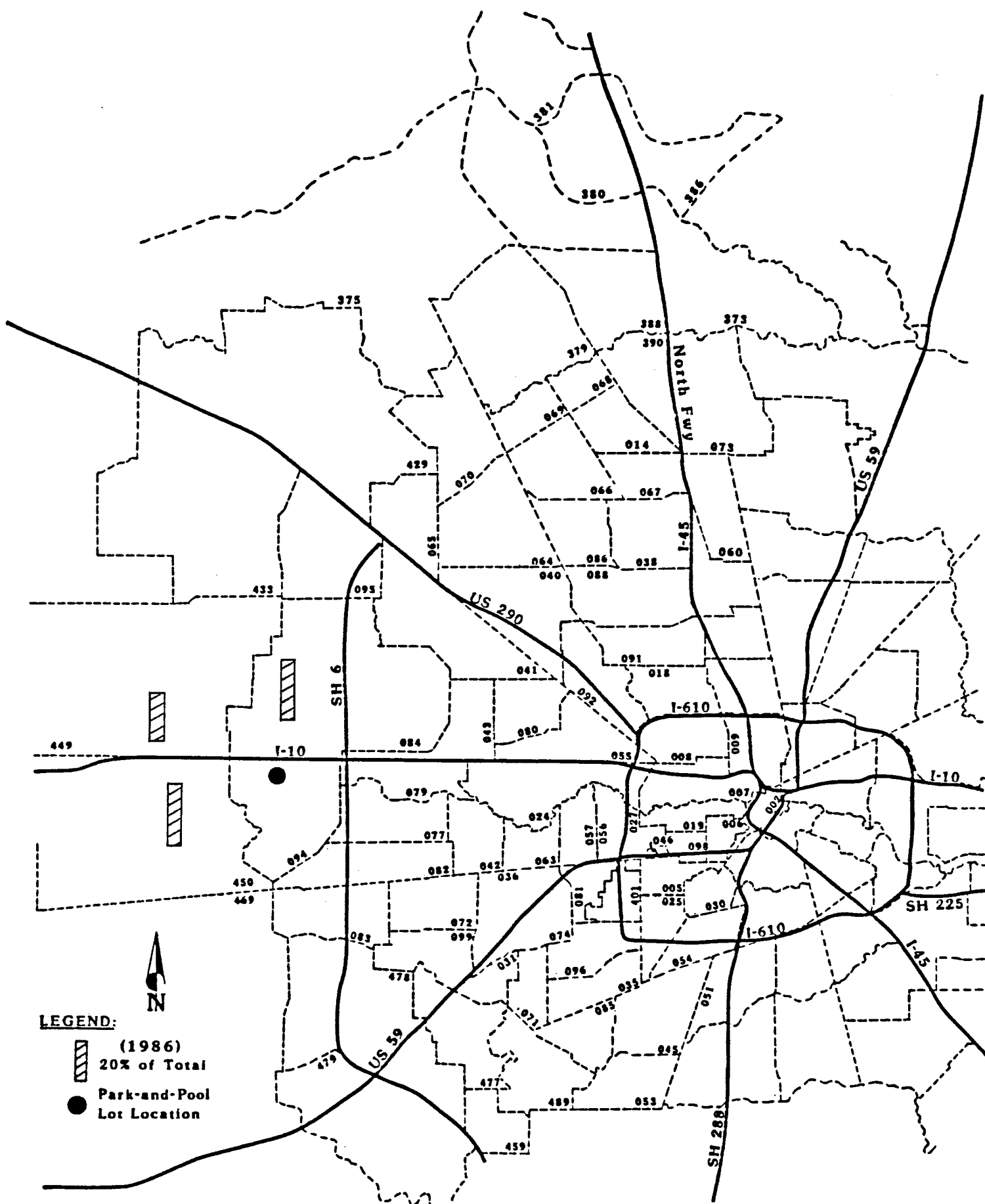


Figure 26. Home Origins of Patrons of the Barker-Cypress Park-and-Pool Lot

Table 43. Trip Destination and Trip Purpose of Park-and-Poolers,
Katy Freeway Corridor Park-and-Pool Survey

Trip Characteristic	Total Sample	Carpoolers	Vanpoolers	Buspoolers
Destination	(n=116)	(n=64)	(n=27)	(n=24)
Downtown	54%	31%	74%	92%
Galleria/Post Oak	15%	20%	15%	---
Greenway Plaza	6%	10%	---	4%
Texas Medical Center	3%	3%	7%	---
Other	22%	36%	4%	4%
Trip Purpose	(n=117)	(n=65)	(n=27)	(n=24)
Work	94%	91%	100%	96%
School	6%	9%	---	4%

Home-to-Lot Travel Distance/Travel Time/Vehicle Occupancy

The vast majority of the park-and-poolers surveyed travel from home to the park-and-pool lot alone; only a very small percentage carry an extra passenger (Table 44).

Table 44. Home-to-Lot Travel Distances, Travel Times and Vehicle Occupancies, Katy Freeway Corridor Park-and-Pool Surveys

Travel Distance/Time	Total Sample	Carpoolers	Vanpoolers	Buspoolers
Home-to-Lot Travel Distance (miles)	(n=114)	(n=64)	(n=26)	(n=23)
Mean	5.4	6.8	5.4	1.8
Median	3.5	4.0	4.0	2.0
Range of Travel Distance:				
Low	1	1	1	1
High	52	52	27	5
Home-to-Lot Travel Time (minutes)	(n=111)	(n=61)	(n=26)	(n=23)
Mean	10.4	12.0	9.9	6.9
Median	8.0	10.0	9.0	6.0
Range of Travel Time:				
Low	2	5	2	2
High	50	50	30	13
Vehicle Occupancy from Home to Lot (persons)	(n=117)	(n=65)	(n=27)	(n=24)
1	97%	98%	96%	96%
2	3%	2%	4%	4%

The average distance park-and-poolers travel from home to the lot they use ranges from 1.8 miles for the buspoolers to 6.8 miles for the carpoolers (Table 44 and Figure 27). The average time it takes park-and-poolers to travel this distance ranges from 6.9 minutes for the buspoolers to 12.0 minutes for the carpoolers (Table 44 and Figure 28).

Lot-to-Destination Travel Distance/Travel Time/Vehicle Occupancy

The average Katy Freeway corridor park-and-pool patron travels in excess of 20 miles from the lot to his/her final destination; the average travel time for this trip is in excess of 35 minutes (Table 45; Figures 29 and 30).

Table 45. Lot-to-Destination Travel Distances/Travel Times and Vehicle Occupancies, Katy Freeway Corridor Park-and-Pool Surveys

Travel Characteristic	Total Sample	Carpoolers	Vanpoolers	Buspoolers
Lot-to-Destination Travel Distance (miles)	(n=113)	(n=64)	(n=26)	(n=22)
Mean	24.0	22.7	26.4	25.0
Median	25.0	22.0	25.5	25.0
Range of Travel Distance:				
Low	2	2	7	20
High	45	45	40	30
Lot-to-Destination Travel Time (minutes)	(n=109)	(n=61)	(n=23)	(n=24)
Mean	37.0	36.6	34.9	39.8
Median	35.0	35.0	35.0	40.0
Range of Travel Time				
Low	10	10	15	15
High	80	80	45	60
Vehicle Occupancy from Lot to Destination (persons)	(n=107)	(n=65)	(n=27)	(n=14)
2	39%	62%	4%	---
3	13%	20%	4%	---
4	8%	12%	4%	---
5-10	8%	3%	25%	---
11-15	18%	3%	63%	---
16-20	---	---	---	---
21-30	3%	---	---	21%
31-40	6%	---	---	43%
41-50	5%	---	---	36%
Average	9.9	2.9	10.9	40.6

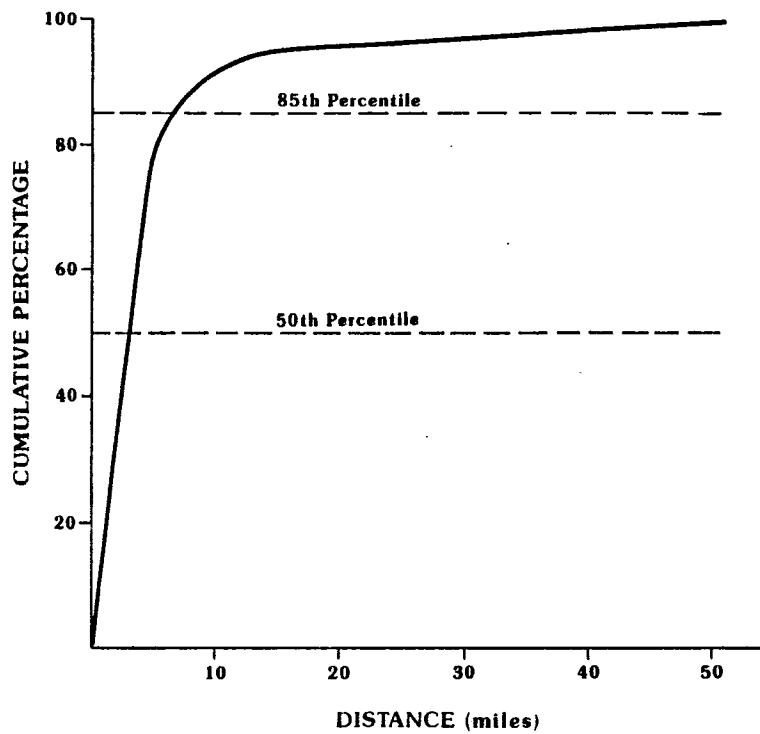


Figure 27. Travel Distance from Home to Park-and-Pool Lot, Katy Freeway Corridor Park-and-Pool Surveys

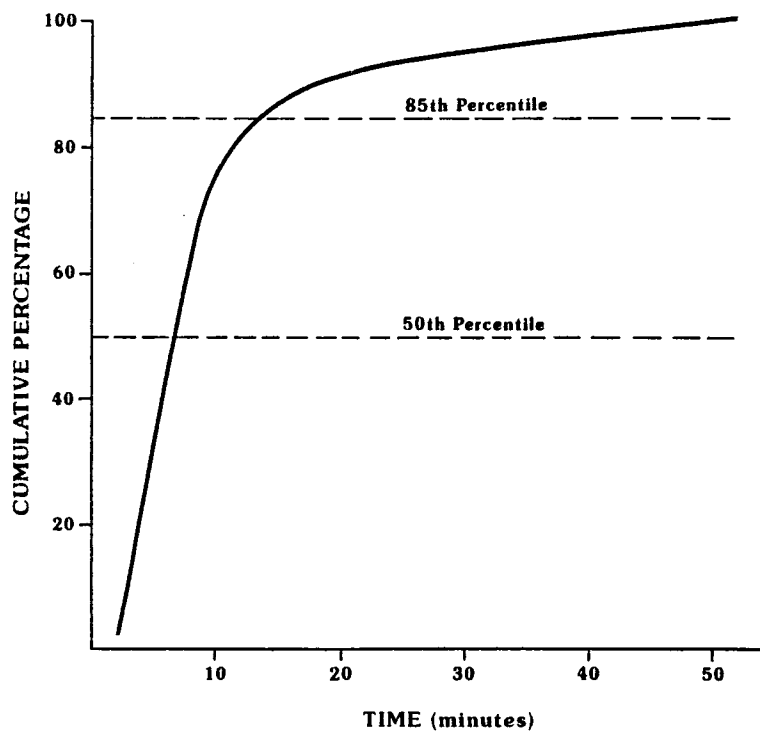


Figure 28. Travel Time from Home to Park-and-Pool Lot, Katy Freeway Corridor Park-and-Pool Surveys

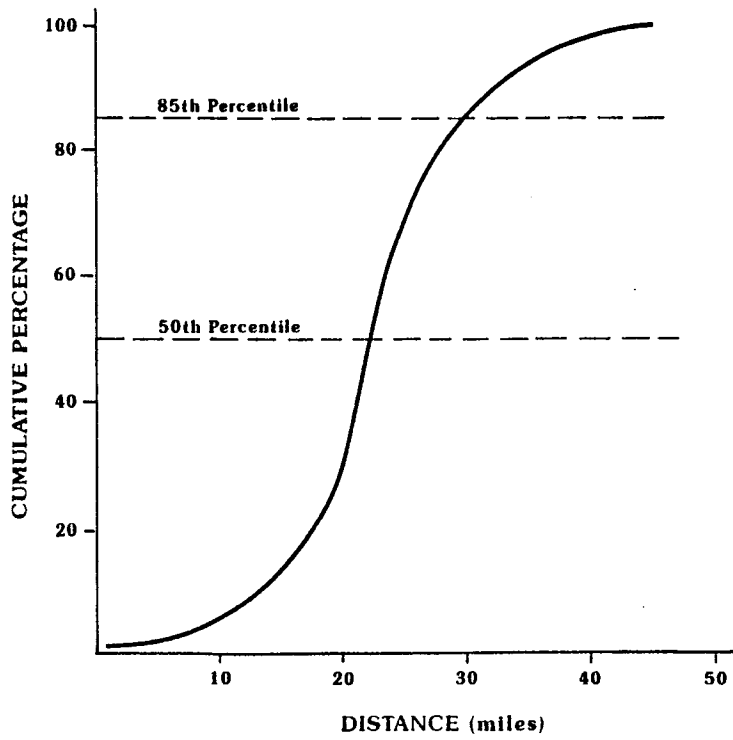


Figure 29. Travel Distance from Park-and-Pool Lot to Final Destination, Katy Freeway Corridor Park-and-Pool Surveys

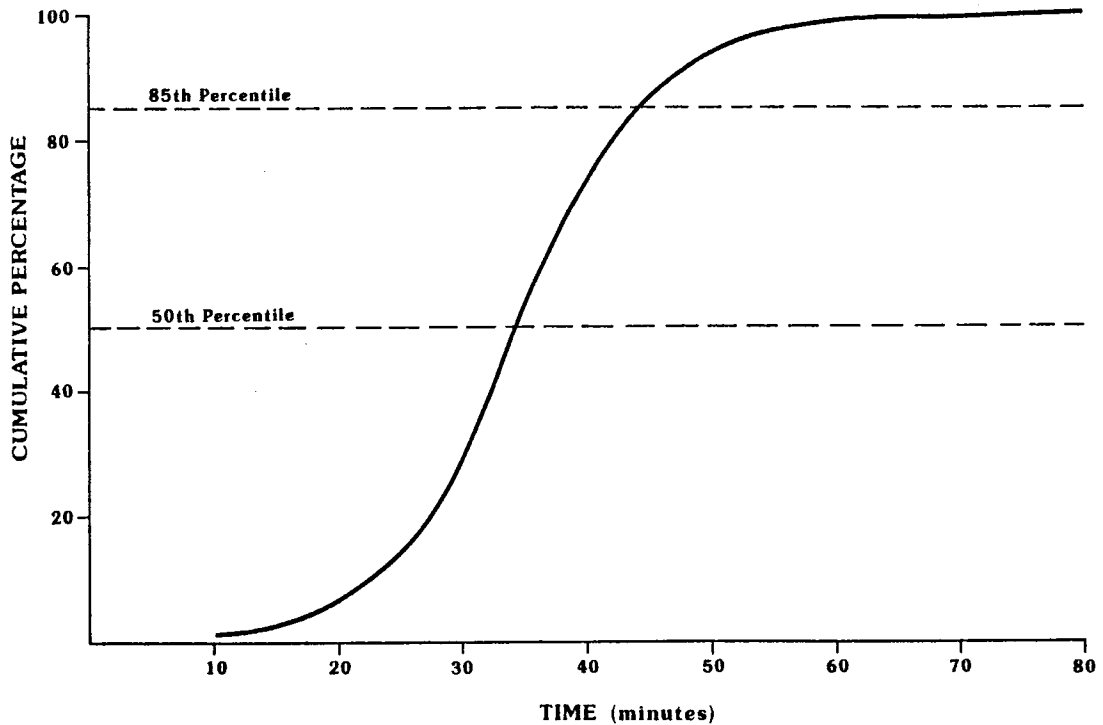


Figure 30. Travel Time from Park-and-Pool Lot to Final Destination, Katy Freeway Corridor Park-and-Pool Surveys

Carpool occupancies typically average 2.9 persons; vanpool occupancies average 10.9 persons; and bus occupancies average 40.6 persons (Table 45).

Previous Mode of Travel

Prior to using the park-and-pool lot, 58% of the buspoolers and 66% of the carpoolers typically drove alone from home to their destination. Fifty percent of the vanpoolers, however, reported vanpooling even before they began using the park-and-pool lot (Table 46).

Table 46. Previous Mode of Travel and Current Use of Lot, Katy Freeway Corridor Park-and-Pool Surveys

Characteristic	Total Sample	Carpoolers	Vanpoolers	Buspoolers
Previous Mode of Travel	(n=116)	(n=65)	(n=26)	(n=24)
Drove Alone	56%	66%	31%	58%
Vanpool	16%	6%	50%	4%
Didn't Make Trip	9%	8%	11%	13%
Carpool	9%	14%	---	---
Bus	8%	3%	8%	21%
Other	2%	3%	---	4%
Length of Time Using Lot	(n=114)	(n=64)	(n=26)	(n=23)
6 Months or Less	51%	64%	27%	43%
7-12 Months	26%	23%	46%	13%
13-18 Months	3%	4%	---	5%
21 Months	20%	9%	27%	39%
Average	9.0	6.8	11.7	11.7
Days Per Week Use Lot	(n=115)	(n=64)	(n=26)	(n=24)
2	3%	1%	---	8%
4	3%	5%	4%	---
5	94%	94%	96%	92%

Note: The Fry Road Lot had been open 21 months at the time of the survey; the Barker-Cypress and Mason Road Lots had been open 12 months.

Length of Time and Days Per Week Use Lot

At the time of the park-and-pool survey, the Fry Road Lot had been open for 21 months; the Barker-Cypress and Mason Road Lots had been open 12 months each. It was not surprising then that the majority of the park-and-poolers surveyed have been using their present lot for less than one year (Table 46).

On the average, carpoolers had been using their lot 6.8 months, while vanpoolers and buspoolers had been using their lots 11.7 months.

As to be expected for trips to work or school, corridor park-and-poolers typically use the lot 5 days per week (Table 46).

Arrival Time at and Departure Time from Lot

On the average, Katy Freeway corridor park-and-poolers arrive at their lot each morning at 6:43 a.m. and depart from the lot in the evening at 5:28 p.m. Cumulative frequency distributions for pooler arrival and departure times are illustrated in Figures 31 and 32.

Effect of Lot on Decision to Park-and-Pool

When asked what effect the existence of the park-and-pool lot had on their decision to ride in a carpool/vanpool/bus, 11% of the vanpoolers, 13% of the carpoolers and 17% of the buspoolers stated that they would not be pooling if not for the lot (Table 47).

Table 47. Factors Influencing Decision to Park-and-Pool, Katy Freeway Corridor Park-and-Pool Surveys

Factor	Total Sample	Carpoolers	Vanpoolers	Buspoolers
Effect of Lot on Decision to Park-and-Pool	(n=116)	(n=64)	(n=27)	(n=24)
Would Not be Pooling if not for Lot	13%	13%	11%	17%
Lot Was One of Several Factors in Decision	62%	70%	37%	66%
Lot Had No Effect on Decision	25%	17%	52%	17%
Single Most Important Reason to Park-and-Pool	(n=115)	(n=64)	(n=27)	(n=23)
Save Time	35%	48%	15%	22%
Save Money	31%	30%	41%	17%
Avoid and/or Share Driving	30%	19%	41%	52%
Other	4%	3%	3%	9%
Is It Safe to Leave Your Vehicle Parked at Lot	(n=116)	(n=64)	(n=27)	(n=24)
Yes	88%	88%	81%	96%
No	12%	12%	19%	4%

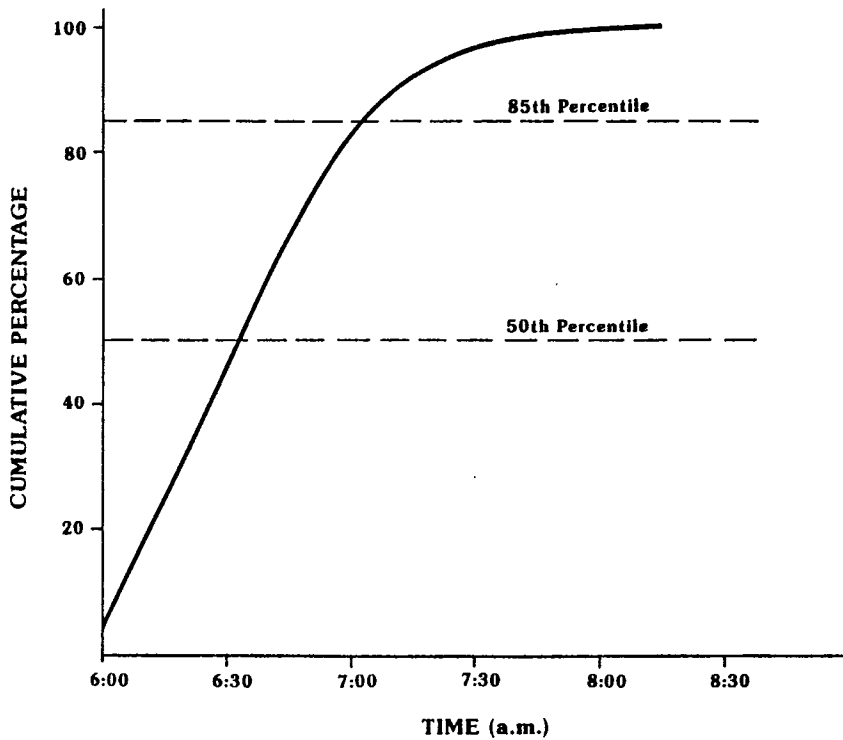


Figure 31. Time of Arrival at the Park-and-Pool Lot in the Morning, Katy Freeway Corridor Park-and-Pool Surveys

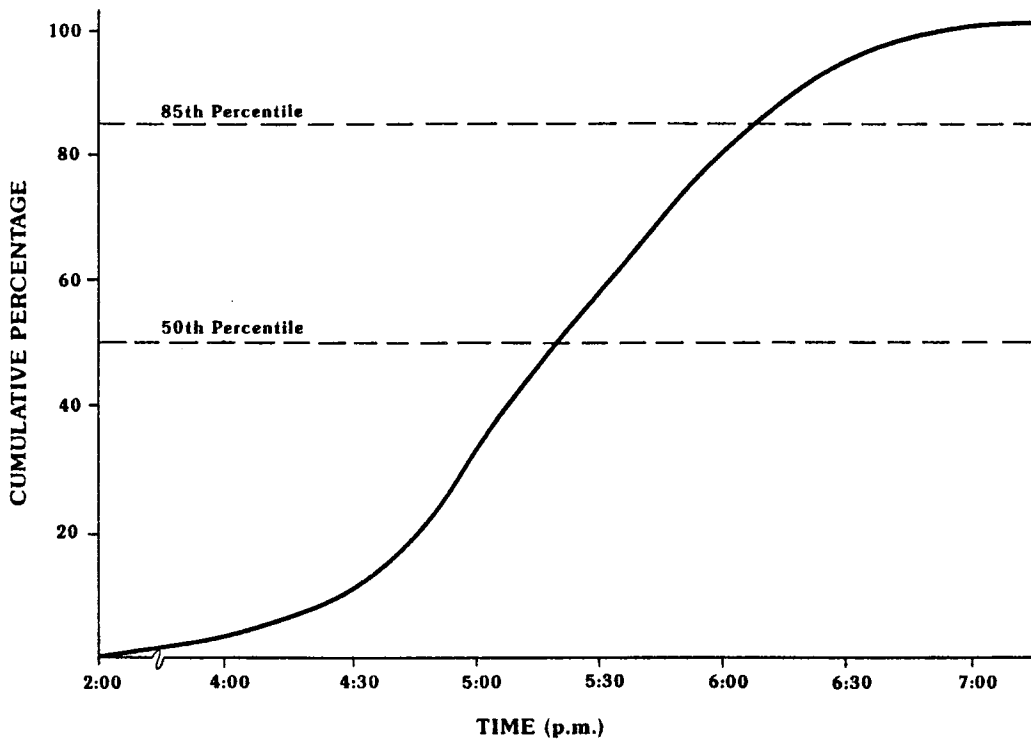


Figure 32. Time of Departure from the Park-and-Pool Lot in the Evening, Katy Freeway Corridor Park-and-Pool Surveys

An additional 66% of the buspoolers and 70% of the carpoolers stated that the lot was one of several factors in their decision (Table 47). On the other hand, 52% of the vanpoolers indicated that the lot had no effect whatsoever on their decision to vanpool (Table 47).

Most Important Reason to Park-and-Pool

Slightly less than half of the carpoolers stated that the single most important reason to carpool was to save time. For the vanpoolers surveyed, 41% indicated that saving money was the most important reason to vanpool and an additional 41% stated that they vanpool to avoid or share driving. Avoiding driving was the single most important reason selected by 52% of the buspoolers surveyed (Table 47).

Lot Security

As indicated in Table 47, at least 80% of those surveyed feel it is safe to leave their vehicle parked at the park-and-pool lot during the day. On a lot-by-lot basis, 85% of those who use the Barker-Cypress Lot, 87% who use the Fry Road Lot and 93% of the users of the Mason Road Lot feel their vehicles are safe.

Flexible Work Hours

Park-and-poolers were asked if their company has flexible work hours and if so, are they able to alter their trip time if it would help ease traffic congestion. Responses to these questions are presented in Table 48. In general, slightly less than one-fourth of the total poolers are employed by companies which have flexible work hours and would be able to alter their trip time if it would help ease traffic congestion.

Add Members to Pool

A subsequent question asked if it is practical for park-and-poolers to add another person to their pool. Half of those responding indicated that it was (Table 48).

Table 48. Flexible Work Hours and Practical to Increase Carpool Size, Katy Freeway Corridor Park-and-Pool Surveys

Question	Total Sample	Carpoolers	Vanpoolers	Buspoolers
Company Have Flexible Work Hours	(n=109)	(n=60)	(n=25)	(n=23)
Yes	36%	28%	48%	39%
No	61%	70%	52%	52%
Not Sure	3%	2%	---	9%
If "Yes," Are You Able to Alter Trip Time If It Would Help Ease Traffic Congestion	(n=37)	(n=16)	(n=11)	(n=9)
Yes	68%	81%	46%	78%
No	24%	13%	36%	22%
Not Sure	8%	6%	18%	---
Is It Practical to Add Another Person to Carpool	(n=92)	(n=61)	(n=22)	(n=8)
Yes	50%	41%	82%	25%
No	34%	39%	9%	63%
Not Sure	16%	20%	9%	12%

Use of and Impacts Pertaining to the Transitway

Several questions were asked in order to collect information concerning park-and-poolers use and impacts of the Katy Transitway. Responses to these questions are presented in Table 49.

Use of Transitway

As to be expected, 100% of the buspoolers who park-and-pool (from the Fry Road Lot) use the transitway. Also of interest is that 92% of the carpoolers and 100% of the vanpoolers from all three lots surveyed also use the transitway.

Impacts of the Katy Transitway on Mode Choice

When asked whether individuals would be riding in a carpool/vanpool/bus if the transitway had not opened, 88% of the vanpoolers, 44% of the buspoolers and 41% of the carpoolers said "yes" (Table 49). A related question asked how important the Katy Transitway was in their decision to

carpool, vanpool, or buspool. Although most respondents indicated that they would be pooling even if the transitway had not opened, 70% of the carpools and buspoolers and 40% of the vanpoolers stated that the transitway was "very important" in their decision to park-and-pool.

Table 49. Use of and Impacts Pertaining to the Katy Transitway, Katy Freeway Corridor Park-and-Pool Surveys

Use/Impact	Total Sample	Carpoolers	Vanpoolers	Buspoolers
Does Your Carpool/Vanpool/Bus Use the Katy Transitway	(n=111)	(n=62)	(n=25)	(n=23)
Yes	96%	92%	100%	100%
No	4%	8%	----	----
How Important Is the Transitway in Your Decision to Use Your Current Mode	(n=108)	(n=59)	(n=25)	(n=23)
Very Important	63%	70%	40%	70%
Somewhat Important	19%	15%	32%	17%
Not Important	18%	15%	28%	13%
If Transitway Had <u>Not</u> Opened, Would You Use Your Current Mode	(n=107)	(n=59)	(n=24)	(n=23)
Yes	52%	41%	88%	44%
No	28%	39%	4%	26%
Not Sure	20%	20%	8%	30%
Perceived Transitway Time Savings (minutes)	(n=105)	(n=56)	(n=25)	(n=23)
a.m. (50th Percentile)	18	20	10	18
p.m. (50th Percentile)	20	20	20	15

Perceived Transitway Time Savings

Generally speaking, park-and-poolers who use the Katy Transitway estimate they save approximately 18 minutes in the morning and 20 minutes in the evening as a result of using the transitway (Table 49 and Figure 33). The time savings reported by park-and-poolers in this survey very closely approximates the time savings reported by transit users, carpools and vanpoolers in the Katy Transitway user surveys reported in the previous 3 sections of this report.

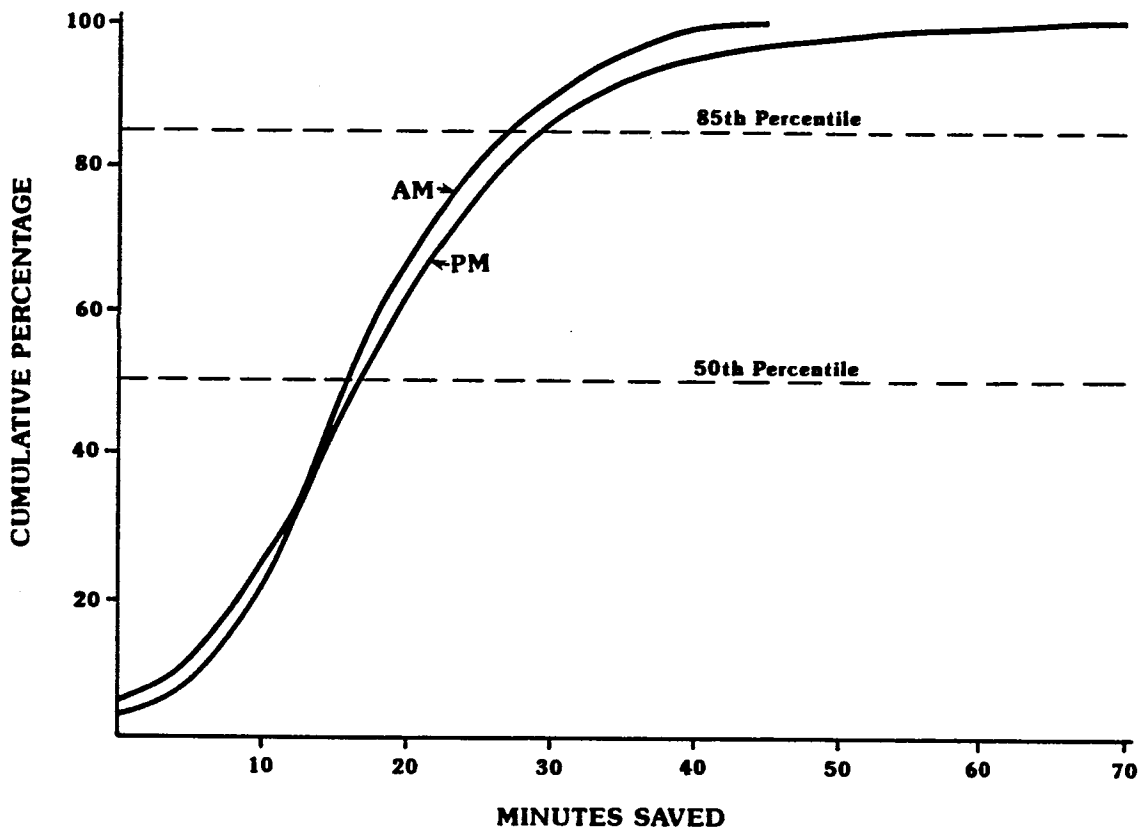


Figure 33. Perceived Katy Transitway Travel Time Savings, Katy Freeway Corridor Park-and-Pool Surveys

Comments

Park-and-poolers were encouraged to offer additional comments. A total of 82 different comments were received. These comments are summarized in Table 50. In general, the most frequently listed comment from poolers at all three lots was that better access to the lots from the north is needed (all 3 of the park-and-pool lots are located just south of the Katy Freeway).

Table 50. Additional Comments, Katy Freeway Corridor Park-and-Pool Surveys

Comment	Percent of Total Comments
Need better access to lot from the north	28%
Transitway is great	12%
Appreciate lot	10%
Need better security at lot	10%
Enjoy riding the bus	6%
Ban trucks from using the lot	4%
Clean up broken glass	4%
2 person carpools great idea	2%
Other	24%

VI. NON TRANSITWAY USER (MOTORIST) SURVEYS

Surveys were conducted of motorists using the Katy and North Freeway mainlanes during the a.m. transitway operating periods. As was the case with the other surveys discussed previously, the motorist surveys were designed to address 3 primary areas: 1) personal characteristics; 2) travel patterns and trip characteristics; and 3) attitudes and impacts pertaining to the transitways.

Personal Characteristics

Questions were asked to identify age, sex, occupation and last year of school completed. The responses to these questions are summarized in Table 51. Also summarized in Table 51 are data collected from previous motorist surveys conducted before the Katy and North Transitways were opened. In most instances the "before" and "after" data are similar.

Age

The median Katy Freeway motorist's age was 40 in 1985 and 1986 and 39 in 1987; the median age of the North Freeway motorist is 36.

Sex

The majority of the Katy and North Freeway motorists are male.

Occupation

As was the case with the transitway users, the majority of the motorists surveyed in 1985, 1986 and 1987 have occupations which are classified as either "professional" or "managerial."

Education

Katy and North Freeway motorists are a well educated group. On the average, Katy Freeway motorists have completed more than 3 1/2 years of

Table 51. Personal Characteristics of Motorists on the Katy and North Freeway

Personal Characteristic	Before Transitway ¹		After Transitway		
	1981	1984	1985	1986	1987
Age					
<u>Katy Freeway</u>	--	(n=81)	(n=445)	(n=726)	(n=1422)
50th Percentile	--	32-41	40	40	39
<u>North Freeway</u>	(n=449)	(n=52)	--	(n=404)	--
50th Percentile	40	32-41	--	36	--
Sex					
<u>Katy Freeway</u>	---	(n=81)	(n=437)	(n=706)	(n=1401)
Male	---	56%	64%	66%	62%
Female	---	44%	36%	34%	38%
<u>North Freeway</u>	(n=482)	(n=52)	---	(n=400)	---
Male	80%	56%	---	61%	---
Female	20%	44%	---	39%	---
Occupation					
<u>Katy Freeway</u>	---	(n=80)	(n=431)	(n=711)	(n=1365)
Professional	---	39%	51%	42%	41%
Managerial	---	29%	19%	26%	23%
Sales	---	14%	12%	14%	12%
Clerical	---	11%	9%	9%	13%
Craftsman	---	3%	3%	1%	4%
Service Worker	---	3%	2%	2%	2%
Student	---	1%	2%	2%	2%
Other	---	---	2%	4%	3%
<u>North Freeway</u>	---	(n=51)	---	(n=392)	---
Professional	---	18%	---	38%	---
Managerial	---	10%	---	21%	---
Sales	---	0%	---	13%	---
Clerical	---	39%	---	15%	---
Craftsman	---	18%	---	3%	---
Service Worker	---	8%	---	3%	---
Student	---	2%	---	3%	---
Other	---	5%	---	4%	---
Education					
<u>Katy Freeway</u>	----	(n=80)	(n=439)	(n=715)	(n=1401)
Average	----	15.0	15.7	15.9	15.5
<u>North Freeway</u>	(n=444)	(n=52)	----	(n=397)	----
Average	15.4	14.5	----	14.8	----

¹No priority treatment was available in the Katy Freeway Corridor at the time of the 1984 survey. A contraflow lane was available for authorized high-occupancy vehicles in the North Freeway Corridor during the 1981 and 1982 surveys.

college; North Freeway motorists have completed more than 2 1/2 years of college.

Travel Patterns and Trip Characteristics

Questions were asked regarding the selection of the auto mode, trip purpose, trip frequency, vehicle occupancy, trip origin, trip destination, employer incentives and awareness of METRO services. Several of these questions are similar to questions asked in previous surveys of Katy and North Freeway motorists. When possible, for comparative purposes, data from the previous surveys are also presented in this section.

Trip Purpose

As was the case with the transit, vanpool and carpool surveys, virtually all of the peak period motorist trips are to work (Table 52).

Trip Frequency

More than 80% of the trips surveyed occurred at least 5 days per week (Table 52).

Vehicle Occupancy

On the Katy Freeway, peak-period vehicle occupancies (persons/vehicle) averaged 1.2 in 1985, 1986 and 1987. On the North Freeway, vehicle occupancies also averaged 1.2 persons per vehicle (Table 52).

Trip Origin

Two questions were asked concerning trip origin. The first asked for the home Zip Code, and the second asked for the freeway entrance ramp that was used in the a.m.

The 1985 Katy Freeway motorist survey was conducted at locations between Campbell and Voss. Because the Katy Transitway had been extended prior to

Table 52. Trip Purpose, Trip Frequency and Vehicle Occupancy,
Katy and North Freeway Motorist Surveys

Trip Characteristic	1985	1986	Mar 1987	Oct 1987
Trip Purpose				
<u>Katy Freeway</u>	(n=451)	(n=741)	(n=950)	(n=1431)
Work	94%	91%	90%	92%
School	3%	2%	3%	3%
Other	3%	7%	7%	5%
<u>North Freeway</u>	---	(n=425)	---	---
Work	---	90%	---	---
School	---	3%	---	---
Other	---	7%	---	---
Trip Frequency (days/week)				
<u>Katy Freeway</u>	(n=442)	(n=722)	---	(n=1417)
1 or Less	5%	6%	---	9%
2	4%	3%	---	3%
3	3%	3%	---	3%
4	4%	4%	---	2%
5 or More	84%	84%	---	83%
<u>North Freeway</u>	---	(n=415)	---	---
1 or Less	---	9%	---	---
2	---	2%	---	---
3	---	3%	---	---
4	---	3%	---	---
5 or More	---	83%	---	---
Vehicle Occupancy (persons/vehicle)				
<u>Katy Freeway</u>	(n=445)	(n=734)	---	(n=1434)
1	83%	89%	---	84%
2	12%	7%	---	13%
3	3%	2%	---	2%
4 or More	2%	2%	---	1%
<u>North Freeway</u>	---	(n=420)	---	---
1	---	84%	---	---
2	---	13%	---	---
3	---	2%	---	---
4 or More	---	1%	---	---

the 1986 and 1987 surveys, the 1986 and 1987 motorist surveys were conducted at locations between Wilcrest and Fry Road. The North Freeway motorist survey was conducted between Greens Road and FM 1960.

Home Zip Codes. Katy Freeway motorists surveyed listed 50 different home Zip Codes in 1985, 42 in 1986 and 70 different Zip Codes in 1987. The most commonly listed Zip Code in all three survey years was 77079 (Table 53, Figure 34); at least 20% of the Katy Freeway motorists surveyed resided in this Zip Code area.

Sixty-five different Zip Codes were listed by North Freeway motorists. The most frequently listed North Freeway area Zip Codes were 77090 and 77067 (Table 53, Figure 35).

Freeway Entrance Ramp. The most common entrance ramps used to access the Katy Freeway were Gessner and Wilcrest in 1985 and Wilcrest, Dairy Ashford and West Belt in 1986 (Table 53). In 1987, Wilcrest, Fry Road and Dairy Ashford topped the list. The most common entrance ramps to the North Freeway were FM 1960, FM 149 and Greens Road.

Reasons for Choosing the Auto Mode

The reasons most often given for using an auto in the mixed-flow lanes rather than a high-occupancy vehicle in the Katy/North Transitway were: 1) need car for job; 2) convenience and flexibility of an auto; 3) no convenient bus or other HOV available; and 4) work odd hours. Of those surveyed between and 1985 and 1987, at least 85% drove alone on a regular basis (Table 54). In 1986, 75% of the Katy Freeway motorists and 68% of the North Freeway motorists stated that their job requires an auto either "always" or "some times" (Table 54).

Trip Destination

While the downtown was the predominant destination for transitway users, less than 40% of the motorists surveyed on the Katy and North Freeway locations are destined to downtown (Table 55). In fact, only 23% of the Katy

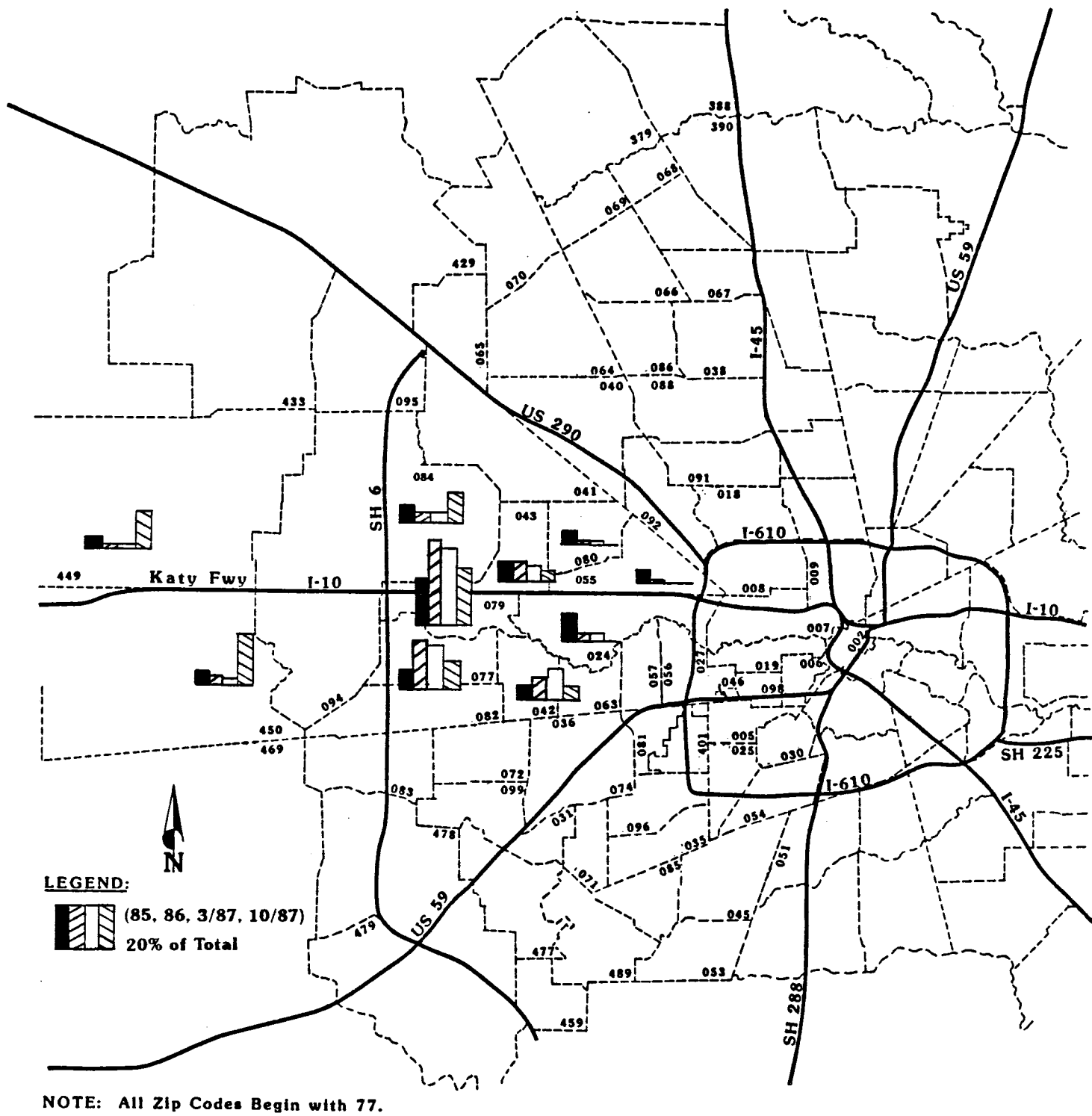
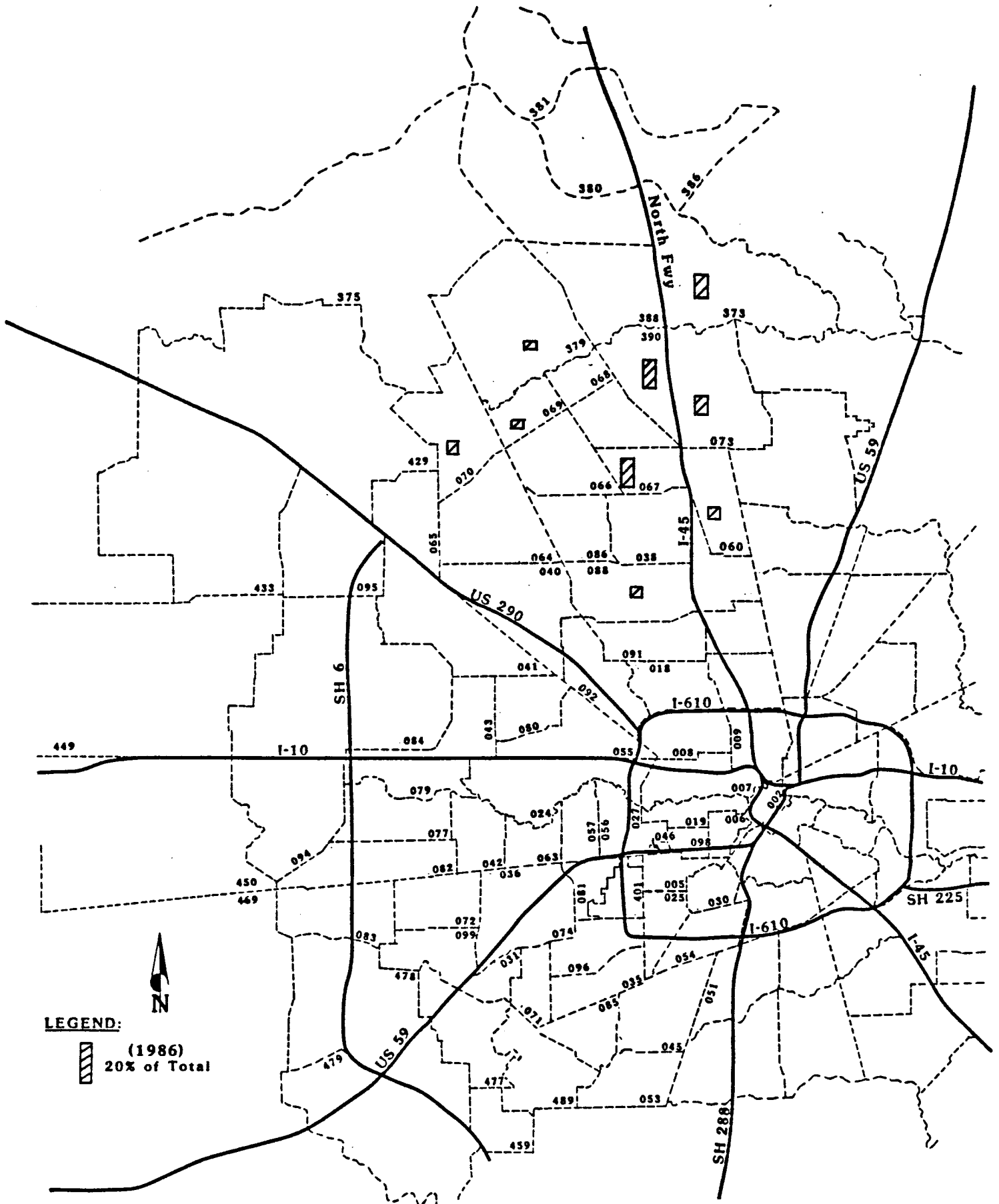



Figure 34. Home Origins of Katy Freeway Motorists



LEGEND:


 (1986)
 20% of Total

NOTE: All Zip Codes Begin with 77.

Figure 35. Home Origins of North Freeway Motorists

Table 53. Characteristics of Trip Origins, Katy and North Freeway Motorist Surveys

Trip Origin Characteristic	1985	1986	Mar 1987	Oct 1987
Home Zip Code				
<u>Katy Freeway</u>	(n=444)	(n=729)	(n=944)	(n=1425)
77079	20%	35%	34%	24%
77024	12%	3%	3%	1%
77043	9%	9%	8%	6%
77077	7%	21%	20%	12%
77080	7%	1%	1%	0%
77084	6%	3%	3%	10%
77042	6%	9%	12%	3%
77055	5%	1%	---	0%
77450	5%	3%	2%	20%
77082	2%	5%	5%	3%
77449	4%	1%	1%	12%
Other	17%	9%	11%	9%
<u>North Freeway</u>	---	(n=407)	---	---
77090	---	14%	---	---
77067	---	13%	---	---
77373	---	10%	---	---
77073	---	8%	---	---
77088	---	5%	---	---
77060	---	5%	---	---
77070	---	5%	---	---
77379	---	3%	---	---
77069	---	3%	---	---
Other	---	34%	---	---
Freeway Entrance Ramp (a.m.)				
<u>Katy Freeway</u>	(n=438)	(n=726)	---	(n=1405)
Gessner	13%	2%	---	3%
Wilcrest	12%	40%	---	19%
Blalock	10%	1%	---	0%
West Belt	9%	15%	---	---
Dairy Ashford	9%	20%	---	14%
Bunker Hill	9%	1%	---	1%
SH 6	8%	4%	---	5%
Kirkwood	8%	5%	---	12%
Fry Road	6%	3%	---	17%
Mason	4%	1%	---	13%
Barker-Cypress	3%	1%	---	9%
Other	9%	7%	---	7%
<u>North Freeway</u>	---	(n=406)	---	---
FM 1960	---	32%	---	---
FM 149	---	21%	---	---
Greens Road	---	16%	---	---
Kuykendahl	---	5%	---	---
North Belt	---	4%	---	---
West Road	---	3%	---	---
FM 2920	---	3%	---	---
Hidden Valley	---	3%	---	---
Other	---	13%	---	---

Table 54. Reasons for Selecting the Auto Travel Mode,
Katy and North Freeway Motorist Surveys

Travel Mode Characteristic	Before Transitway		After Transitway		
	1981	1984	1985	1986	1987
Why Did You Choose Auto¹					
<u>Katy Freeway</u>	---	---	(n=564)	(n=838)	(n=2121)
Need Car for Job	---	---	22%	25%	21%
Convenience and Flexibility	---	---	17%	26%	21%
No Bus/Carpool/Vanpool Available	---	---	22%	21%	18%
Work Odd Hours	---	---	10%	10%	25%
Don't Work in CBD	---	---	6%	3%	8%
Car Is Faster	---	---	3%	2%	---
Other	---	---	20%	13%	7%
<u>North Freeway</u>	---	---	---	(n=498)	---
Need Car for Job	---	---	---	15%	---
Convenience and Flexibility	---	---	---	16%	---
No Bus Available	---	---	---	13%	---
Work Odd Hours	---	---	---	9%	---
No Vanpool Available	---	---	---	7%	---
Don't Work in CBD	---	---	---	7%	---
Car Is Faster	---	---	---	2%	---
Other	---	---	---	31%	---
Usual Mode of Travel					
<u>Katy Freeway</u>	---	(n=81)	(n=445)	(n=738)	(n=1424)
Drive Alone	---	83%	88%	90%	85%
Carpool	---	10%	8%	6%	12%
Vanpool	---	6%	1%	1%	0%
Other	---	1%	3%	3%	3%
<u>North Freeway</u>	(n=482)	(n=52)	---	(n=423)	---
Drive Alone	56%	58%	---	87%	---
Carpool	15%	27%	---	8%	---
Vanpool	11%	9%	---	1%	---
Other	18%	6%	---	4%	---
Does Your Job Require a Car					
<u>Katy Freeway</u>	---	(n=81)	(n=441)	(n=714)	---
Yes, Always	---	56%	37%	36%	---
Yes, Sometimes	---	1%	37%	39%	---
No	---	43%	26%	25%	---
<u>North Freeway</u>	(n=482)	(n=52)	---	(n=403)	---
Yes, Always	47%	36%	---	36%	---
Yes, Sometimes	15%	2%	---	32%	---
No	38%	62%	---	32%	---

¹Respondents were able to give more than one reason. Thus, "n" refers to the number of reasons given, not the number of surveys completed.

Freeway motorists surveyed in October 1987 reported downtown trip destinations. A significant number of trips are also destined to the Galleria, Greenway Plaza and the Texas Medical Center.

Table 55. Trip Destination of Motorists, Katy and North Freeway Motorist Surveys

Destination	Before Transitway	After Transitway			
	1981	1985	1986	Apr 1987	Oct 1987
<u>Katy Freeway</u>	---	(n=302)	(n=728)	(n=944)	(n=1418)
Downtown	---	38%	33%	34%	23%
Galleria	---	24%	10%	14%	13%
Greenway Plaza	---	8%	4%	3%	5%
Medical Center	---	9%	3%	4%	3%
Other	---	21%	50%	45%	56%
<u>North Freeway</u>	(n=482)	---	(n=421)	---	---
Downtown	26%	---	31%	---	---
Galleria	9%	---	7%	---	---
Greenway Plaza	2%	---	4%	---	---
Medical Center	0%	---	4%	---	---
Other	63%	---	54%	---	---

Employer Incentives

As part of the earlier survey efforts, several questions were asked to determine what types of incentives employers provided which might influence the selection of a particular travel mode. These questions centered around the employer's contribution toward parking, bus fare, and vanpooling costs. Responses to these questions are presented in Table 56.

In general, a sizable percentage (39%) of the Katy and North Freeway motorists surveyed in 1986 have all of their parking costs paid by the employer. Conversely, at least 80% do not receive any employer contribution toward the cost of bus or vanpool fares and 90% stated that their employer offers no incentives to carpool. Of those who said their employer did provide incentives to carpool, the principal incentives were: 1) special parking; 2) carpool matching; and 3) minor subsidy.

Table 56. Employer Incentives for Mode Choice,
Katy and North Freeway Motorist Surveys

Employer Incentive	Before Transitway		After Transitway	
	1981	1984	1985	1986
Pays All or Part of Parking Expense				
<u>Katy Freeway</u>	---	(n=81)	(n=414)	(n=693)
Yes, Pays All	---	48%	46%	39%
Yes, Pays Part	---	9%	8%	8%
No	---	43%	46%	53%
<u>North Freeway</u>	(n=482)	(n=52)	---	(n=384)
Yes, Pays All	38%	35%	---	39%
Yes, Pays Part	14%	11%	---	7%
No	48%	54%	---	54%
Pays All or Part of Bus Fare				
<u>Katy Freeway</u>	---	(n=81)	(n=415)	(n=673)
Yes, Pays All	---	11%	2%	5%
Yes, Pays Part	---	9%	3%	5%
No	---	71%	87%	82%
Don't Know	---	9%	8%	8%
<u>North Freeway</u>	---	(n=52)	---	(n=368)
Yes, Pays All	---	25%	---	3%
Yes, Pays Part	---	13%	---	9%
No	---	50%	---	83%
Don't Know	---	12%	---	5%
Pays All or Part of Vanpool Cost				
<u>Katy Freeway</u>	---	---	(n=411)	(n=636)
Yes, Pays All	---	---	2%	3%
Yes, Pays Part	---	---	7%	6%
No	---	---	83%	80%
Don't Know	---	---	8%	11%
Any Special Carpool Incentives				
<u>Katy Freeway</u>	---	---	(n=420)	(n=655)
Yes	---	---	11%	11%
No	---	---	89%	89%
<u>North Freeway</u>	---	---	---	(n=385)
Yes	---	---	---	10%
No	---	---	---	90%

Thus, even after the implementation of the transitways, most motorists perceive their employer is providing an incentive to drive their car by paying at least part of the parking cost. Almost all motorists claim their employer is not providing any incentives to switch to any type of ridesharing mode.

Awareness of METRO Services

Katy and North Freeway motorists were also asked if they were aware of the special services provided by METRO to encourage ridesharing. Between 68% and 79% of the respondents had heard of METRO CarShare; of those that had heard of the program, only 2%-6% had used it (Table 57).

More than 80% of the Katy and North Freeway motorists are familiar with the park-and-ride service provided by METRO in their area. Of that percentage, only 7%-8% of the Katy Freeway motorists have used park-and-ride, whereas 22% of the North Freeway motorists have used the service.

Attitudes and Impacts Pertaining to the Transitways

A final set of survey questions were designed to identify attitudes toward, and impacts associated with, the transitways.

Perception of Transitway Utilization

The perception of whether or not the transitways are sufficiently utilized is a major concern of both the SDHPT and METRO. This is particularly true of the Katy Transitway since fewer than 150 vehicles per peak period typically used the priority lane during its first 6 months of operation. (Approximately 460 vehicles were using the North Transitway at the time it replaced the contraflow lane.) In fact, one of the major reasons for allowing carpools to use the Katy Transitway is to increase the public's perception of transitway utilization.

Table 57. Awareness and Use of METRO Services,
Katy and North Freeway Motorist Surveys

Awareness and Use of METRO Services	Before Transitway		After Transitway	
	1981	1984	1985	1986
Familiar with CarShare				
<u>Katy Freeway</u>	---	---	(n=440)	(n=721)
Yes	---	---	68%	72%
No	---	---	32%	28%
<u>North Freeway</u>	---	---	---	(n=440)
Yes	---	---	---	79%
No	---	---	---	21%
Used CarShare Services				
<u>Katy Freeway</u>	---	---	(n=292)	(n=504)
Yes	---	---	5%	2%
No	---	---	95%	98%
<u>North Freeway</u>	---	---	---	(n=313)
Yes	---	---	---	6%
No	---	---	---	94%
Familiar with Park-and-Ride				
<u>Katy Freeway</u>	---	(n=68)	(n=437)	(n=722)
Yes	---	92%	84%	93%
No	---	8%	16%	7%
<u>North Freeway</u>	(n=482)	(n=52)	---	(n=404)
Yes	91%	83%	---	93%
No	9%	17%	---	7%
Used Park-and-Ride				
<u>Katy Freeway</u>	---	(n=82)	(n=363)	(n=630)
Yes	---	17%	7%	8%
No	---	83%	93%	92%
<u>North Freeway</u>	(n=482)	(n=52)	---	(n=370)
Yes	28%	19%	---	22%
No	72%	81%	---	78%

Katy and North Freeway motorists were asked whether, in terms of both person movement and vehicle movement, they felt the transitway was sufficiently utilized. Their responses are summarized in Table 58. On the Katy Freeway, the responses were overwhelmingly negative -- both before and one year after carpools were allowed (no carpools were present on the transitway at the time of 1985 survey; approximately 100 carpools typically used the transitway at the time of the 1986 survey). Responses from Katy Freeway motorists were significantly more favorable in 1987, however.

For the April 1987 survey, 36% of the Katy Freeway motorists felt the transitway was sufficiently utilized in terms of vehicle movement and 30% thought it was sufficiently utilized in terms of person movement. In October 1987, 44% of the motorists felt there was sufficient vehicle utilization of the transitway and 36% stated there was sufficient person utilization. (Note: By the time of the 1987 surveys, the passenger requirement for carpools had been lowered to 2 persons. Carpool utilization of the transitway averaged just under 2,300 vehicles during the a.m. peak at the time of the April 1987 survey and more than 2,700 vehicles at the time of the October 1987 survey.)

On the North Freeway, 26% perceived there was sufficient person utilization of the transitway and 23% stated there was sufficient vehicle utilization.

Motorists were also asked if they felt the Katy/North Transitway was a good transportation improvement. The percentage of Katy Freeway motorists who responded "yes" fluctuated from 41% in 1985, to 36% in 1986 to 64% in October 1987. On the North Freeway, 62% of the motorists thought the transitway was a good transportation improvement.

Modal Use of the Katy Transitway

Because 4+ (and later 3+) carpools were allowed on the Katy Transitway and because METRO and the SDHPT were considering lowering the carpool passenger requirement again, the 1985 and 1986 Katy Freeway motorist surveys contained an additional series of questions which dealt with attitudes toward

Table 58. Perceptions of Utilization and Desirability of Transitway Improvement, Katy and North Freeway Motorist Surveys

Measure of Effectiveness or Success	1985	1986	Apr 1987	Oct 1987
In Terms of Vehicles, Is the Transitway Sufficiently Utilized				
<u>Katy Freeway</u>	(n=451)	(n=742)	(n=948)	(n=1420)
Yes	3%	3%	36%	44%
No	90%	92%	55%	42%
Not Sure	7%	5%	9%	14%
Katy Transitway vehicle volume ¹	138 ²	256 ³	2412 ⁴	2854 ⁴
<u>North Freeway</u>	---	(n=418)	---	---
Yes	---	26%	---	---
No	---	56%	---	---
Not Sure	---	18%	---	---
North Transitway vehicle volume ¹	---	393 ⁵	---	---
In Terms of Persons Moved, Is the Transitway Sufficiently Utilized				
<u>Katy Freeway</u>	(n=451)	(n=741)	(n=950)	(n=1426)
Yes	4%	4%	30%	36%
No	85%	86%	58%	46%
Not Sure	11%	10%	12%	18%
Katy Transitway persons moved ¹	2465 ²	3156 ³	7769 ⁴	8599 ⁴
<u>North Freeway</u>	---	(n=422)	---	---
Yes	---	23%	---	---
No	---	57%	---	---
Not Sure	---	20%	---	---
North Transitway persons moved ¹	---	6647 ⁵	---	---
Is the Transitway a Good Transportation Improvement				
<u>Katy Freeway</u>	(n=441)	(n=733)	(n=949)	(n=1423)
Yes	41%	36%	56%	64%
No	35%	43%	29%	20%
Not Sure	24%	21%	15%	16%
<u>North Freeway</u>	---	(n=417)	---	---
Yes	---	62%	---	---
No	---	20%	---	---
Not Sure	---	18%	---	---

¹Transitway vehicle volume and person movement figures are for the a.m. peak period.

²Authorized buses and vanpools (before carpools were allowed)

³Authorized buses, vanpools and 3+ carpools

⁴2+ vehicles, no authorization

⁵Authorized buses and vanpools

the types and occupancy of vehicles which should be allowed to use the transitway.

In 1985, almost all motorists felt that buses, vanpools and 4+ carpools should be allowed to use the transitway. In 1986, almost all motorists felt that 3+ carpools should also be allowed and almost 70% stated that 2+ carpools should be able to travel on the transitway (Table 59). These findings are consistent with the previous findings (of 1985 and 1986) where the majority of the Katy Freeway motorists felt the transitway was underutilized. This response by Katy Freeway motorists was taken into consideration (along with other factors) and the minimum carpool passenger requirement on the Katy Transitway was subsequently lowered to 2 persons.

Table 59. Attitudes Concerning the Vehicles Allowed on the Katy Transitway, Katy Freeway Motorist Surveys

Attitude	1985	1986
Buses should be allowed to use Katy Transitway	(n=449)	(n=736)
Agree	97%	97%
Disagree	2%	2%
Neutral	1%	1%
Vanpools should be allowed to use Katy Transitway	(n=450)	(n=736)
Agree	96%	97%
Disagree	3%	2%
Neutral	1%	1%
4+ Carpools should be allowed to use Transitway	(n=451)	---
Agree	88%	---
Disagree	7%	---
Neutral	5%	---
3+ Carpools should be allowed to use Katy Transitway	---	(n=731)
Agree	---	93%
Disagree	---	4%
Neutral	---	3%
2+ Carpools should be allowed to use Katy Transitway	---	(n=723)
Agree	---	68%
Disagree	---	17%
Neutral	---	15%

Comments

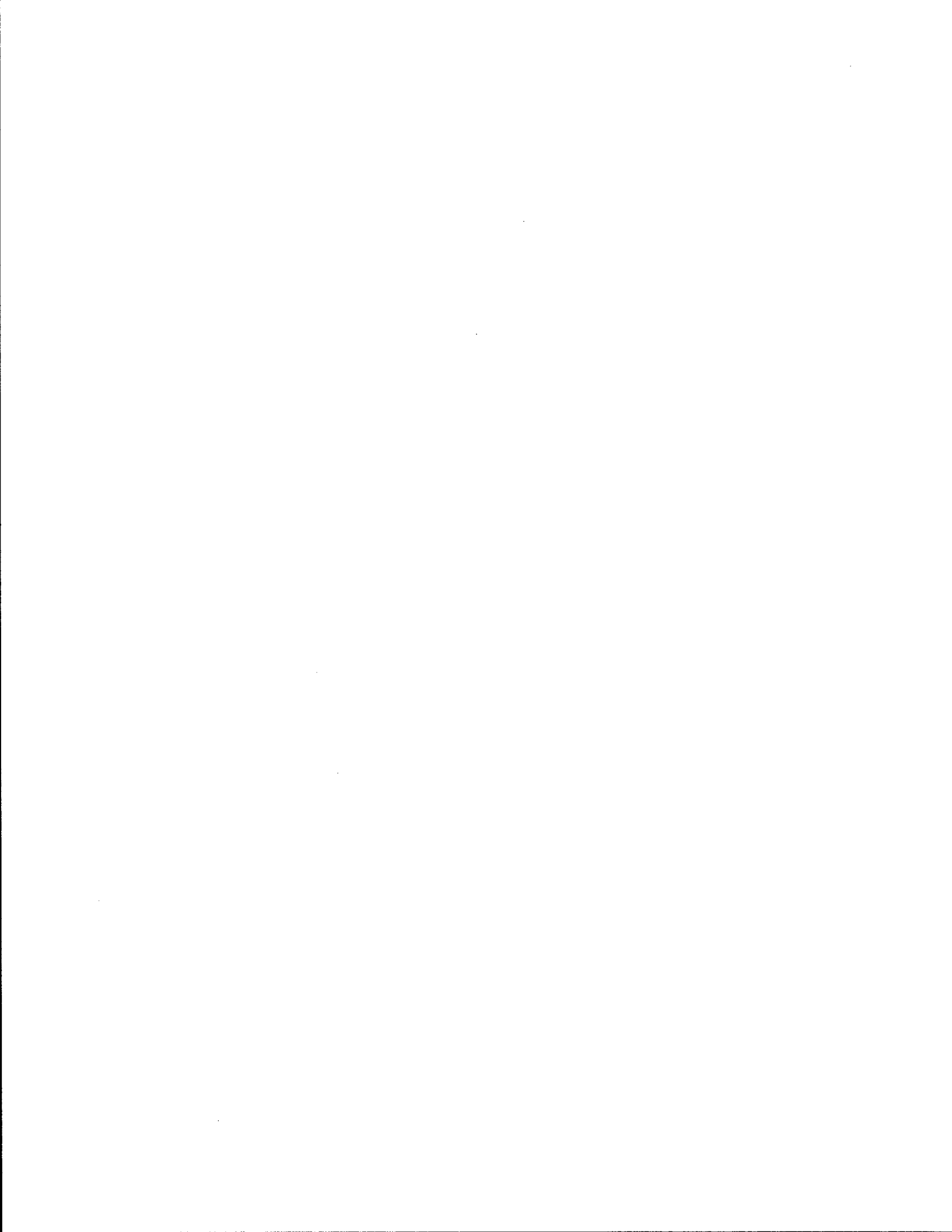
Katy and North Freeway motorists were encouraged to offer additional comments. Katy Freeway motorists responded with more than 460 comments in 1985, more than 375 in 1986 and more than 1,150 in 1987. North Freeway motorists listed more than 475 comments in 1986. These comments are summarized in Table 60.

Table 60. Additional Comments, Katy and North Freeway Motorist Surveys

Comment	Percent of Total Comments			
	1985	1986	Apr 1987	Oct 1987
<u>Katy Freeway</u>				
Transitway is a waste of money	14%	13%	10%	4%
Transitway is underutilized	12%	20%	9%	4%
Open the transitway to all	8%	6%	10%	7%
Allow carpools on the transitway	7%	5% ¹	6% ²	3% ²
Ban trucks on I-10	5%	4%	2%	2%
Transitway is a good idea	5%	6%	12%	16%
Need more freeway lanes	4%	10%	9%	9%
Extend the transitway	3%	1%	---	---
Advertise the transitway	3%	2%	2%	2%
Provide more bus routes	3%	3%	2%	3%
Congestion is no better	3%	5%	4%	3%
Congestion is better	---	---	4%	5%
Other	33%	25%	30%	42%
<u>North Freeway</u>				
Transitway is a waste of money	---	3%	---	---
Transitway is underutilized	---	6%	---	---
Open the transitway to all	---	6%	---	---
Allow carpools on the transitway	---	10%	---	---
Ban trucks on I-45	---	2%	---	---
Transitway is a good idea	---	11%	---	---
Need more freeway lanes	---	5%	---	---
Extend/expand the transitway	---	1%	---	---
Need a rail system	---	4%	---	---
Provide more bus routes	---	3%	---	---
Congestion is no better	---	5%	---	---
Must drive - only way available	---	8%	---	---
Park-and-ride is great if you can use it	---	10%	---	---
Reconstruction is a mess	---	8%	---	---
Other	---	18%	---	---

¹Allow 2+ carpools on transitway

²Allowing 2+ carpools on transitway was a good move



VII. SUMMARY OF MAJOR FINDINGS

The Katy Transitway was opened to authorized buses and 8+ vanpools in October 1984. To encourage increased vehicular utilization of the facility, authorized 4+ carpools were allowed to begin using the transitway in April 1985. A few months later (September 1986), authorized 3+ carpools were permitted to use the transitway. In August 1986, the minimum passenger requirement for vehicles was lowered to 2+ persons and all authorization requirements were eliminated.

In addition to changes in the types of vehicles which have been permitted to use the transitway, there have also been changes in the Katy Transitway configuration. When the transitway opened in October 1984, it extended from Post Oak to Gessner, a distance of 4.7 miles. The only access point on the western terminus was at Gessner. In May 1985, the transitway was extended 1.7 miles from Gessner to West Belt and an additional access point was temporarily provided at West Belt. By June 1987, the transitway had been extended from West Belt to State Highway 6, a distance of 5.1 miles. The West Belt access point was closed and two additional access points were opened -- a flyover ramp which provided a direct link to/from the Addicks Park-and-Ride Lot and an access point located just west of SH 6.

Because of the changing conditions on the Katy Transitway and the changes in the types of vehicles which were permitted to use the facility, several survey efforts were performed in order to assess the impacts of these changes.

In the North Freeway Corridor, the North Transitway replaced the North Freeway contraflow lane in September 1984. The North Transitway extends from downtown to North Shepherd, a distance of 9.6 miles. Access from the north is via one of two points. Since the North Transitway opened, usage has been restricted to buses and authorized 8+ vanpools. Because the operating conditions have remained relatively stable on the North Transitway, no additional surveys have been performed since the 1986 effort.

The preceding sections of this report present considerable data derived from surveys of both transitway users and nonusers in the Katy and North Freeway corridors. Those data are cross classified in a variety of manners. For the purposes of this study, perhaps the most important are the data that relate to trip destination, choice of commuting mode and perceptions of the transitways.

Trip Destinations

During the peak period, less than half of the total trips (transitway user and nonuser) are destined to downtown Houston (Table 61). Yet, essentially all bus service caters to trips downtown. Vanpools and carpools demonstrate more capability to serve trips to destinations other than downtown. In fact, 61% of the 1987 Katy Transitway vanpool and carpool trips were destined to locations other than the downtown.

Mode Choice Considerations

Previous Mode of Travel

In looking at previous travel modes of the transitway users in the Katy and North Freeway corridors, a significant percentage previously drove alone (Table 62).

In the Katy Freeway corridor, the park-and-ride and express bus service (which utilizes the transitway) also attracted 9% of its 1985 ridership and 11% of its 1986 and 1987 ridership from carpools or vanpools.

The vanpools attracted 22% of their 1985 ridership, 17% of their 1986 ridership and 14% of the 1987 ridership from carpools. An additional 15% of the 1985 and 1986 ridership was attracted from buses. Of special interest is the high percentage (43%) of the vanpoolers surveyed in 1987 which stated they had vanpooled even before the transitway had opened. This high percentage may be a result of the fact that only vanpool drivers were surveyed in 1987 and they may have been realizing other benefits for driving which made vanpooling attractive even without the benefits of the transitway.

Table 61. Trip Destination of Katy and North Freeway Corridor Commuters, 1985-1987

Trip Destination	1985	1986	1987
<u>Katy Transitway Bus Users</u>	(n=367)	(n=575)	(n=632)
Downtown	96%	95%	94%
Galleria	---	0%	1%
Texas Medical Center	1%	1%	1%
Greenway Plaza	0%	0%	1%
Other	3%	4%	3%
<u>Katy Transitway Vanpoolers</u>	(n=64)	(n=58)	(n=13)
Downtown	70%	60%	39%
Galleria	11%	12%	15%
Texas Medical Center	5%	7%	---
Greenway Plaza	3%	5%	---
Other	11%	16%	46%
<u>Katy Transitway Carpoolers</u>	(n=31)	(n=65)	(n=573)
Downtown	29%	49%	39%
Galleria	13%	15%	22%
Texas Medical Center	3%	3%	6%
Greenway Plaza	13%	---	6%
Other	42%	33%	27%
<u>Katy Freeway Motorists</u>	(n=302)	(n=728)	(n=1418)
Downtown	38%	33%	23%
Galleria	24%	10%	13%
Texas Medical Center	9%	3%	3%
Greenway Plaza	8%	4%	5%
Other	21%	50%	56%
<u>North Transitway Bus Users</u>	---	(n=1252)	---
Downtown	---	94%	---
Galleria	---	1%	---
Texas Medical Center	---	1%	---
Greenway Plaza	---	2%	---
Other	---	2%	---
<u>North Transitway Vanpoolers</u>	---	(n=199)	---
Downtown	---	61%	---
Galleria	---	7%	---
Texas Medical Center	---	8%	---
Greenway Plaza	---	4%	---
Other	---	20%	---
<u>North Freeway Motorists</u>	---	(n=421)	---
Downtown	---	31%	---
Galleria	---	7%	---
Texas Medical Center	---	4%	---
Greenway Plaza	---	4%	---
Other	---	54%	---

Table 62. Previous Travel Mode of Katy and North Transitway Users,
Current Mode of Katy and North Freeway Motorists, 1985-1987

Previous Travel Mode	1985	1986	1987
<u>Katy Transitway Bus Users</u>	(n=355)	(n=573)	(n=630)
Drove Alone	24%	35%	34%
Carpool	5%	5%	9%
Vanpool	4%	6%	2%
Bus	54%	34%	33%
Didn't Make Trip	12%	18%	21%
<u>Katy Transitway Vanpoolers</u>	(n=461)	(n=433)	(n=13)
Drove Alone	34%	36%	36%
Carpool	22%	17%	14%
Vanpool	13%	12%	43%
Bus	15%	15%	---
Didn't Make Trip	16%	19%	7%
<u>Katy Transitway Carpoolers</u>	(n=88)	(n=191)	(n=564)
Drove Alone	50%	46%	50%
Carpool	24%	18%	29%
Vanpool	4%	4%	2%
Bus	2%	8%	9%
Didn't Make Trip	20%	18%	6%
<u>Katy Freeway Motorists¹</u>	(n=445)	(n=738)	(n=1424)
Drove Alone	88%	90%	85%
Carpool	8%	6%	12%
Vanpool	1%	1%	0%
Other	3%	3%	3%
<u>North Transitway Bus Users</u>	---	(n=1240)	---
Drove Alone	---	35%	---
Carpool	---	10%	---
Vanpool	---	7%	---
Bus	---	22%	---
Didn't Make Trip	---	25%	---
<u>North Transitway Vanpoolers</u>	---	(n=1622)	---
Drove Alone	---	30%	---
Carpool	---	21%	---
Vanpool	---	12%	---
Bus	---	14%	---
Didn't Make Trip	---	21%	---
<u>North Freeway Motorists¹</u>	---	(n=423)	---
Drove Alone	---	87%	---
Carpool	---	8%	---
Vanpool	---	1%	---
Other	---	4%	---

¹For the motorists, this is the current mode they normally use.

Katy transitway carpools attracted between 2% and 9% of their members from buses and between 2% and 4% from vanpools. Thus, opening the transitway to carpools does not appear to have resulted in a significant percentage of persons being attracted away from other transitway modes.

In the North Freeway corridor, transit service had attracted 17% of its ridership from carpools or vanpools. The vanpools had attracted 14% of their members from transit and 21% from carpools.

Impacts of the Transitways on Mode Choice

The Katy and North Transitways appear to have had a definite effect on mode choice (Table 63).

Table 63. Use of Current Mode by Katy and North Transitway Users If Transitway Had Not Opened, 1985-1987

Would You Use Your Current Mode If Transitway Had Not Opened	1985	1986	1987
<u>Katy Transitway Bus Users</u>	(n=356)	(n=575)	(n=629)
Yes	69%	43%	52%
No	15%	26%	20%
Not Sure	16%	31%	28%
<u>Katy Transitway Vanpoolers</u>	(n=461)	(n=463)	(n=13)
Yes	87%	72%	84%
No	6%	12%	8%
Not Sure	7%	16%	8%
<u>Katy Transitway Carpoolers</u>	(n=90)	(n=197)	(n=565)
Yes	70%	59%	50%
No	16%	25%	37%
Not Sure	14%	16%	13%
<u>North Transitway Bus Users</u>	---	(n=1247)	---
Yes	---	23%	---
No	---	41%	---
Not Sure	---	36%	---
<u>North Transitway Vanpoolers</u>	---	(n=1632)	---
Yes	---	43%	---
No	---	27%	---
Not Sure	---	30%	---

While sizable percentages of the transitway users indicated that they would be using their current mode even if there was no transitway, 8% of the current Katy Transitway vanpoolers, 20% of the bus users and 37% of the carpoolers said they would not.

On the North Transitway, 27% of the vanpoolers and 41% of the bus riders stated they would not be using their current mode if not for the transitway. Accordingly, it follows that the transitways can be credited with encouraging individuals to switch travel modes.

Perceived Transitway Travel Time Savings

One of the primary reasons for implementing the transitways was to offer riders of high-occupancy vehicles a travel time advantage and travel time reliability over traveling in the regular freeway lanes. Transitway users generally do perceive a travel time savings as a result of being able to use the priority lane (Table 64).

In the Katy Freeway corridor, the median travel time savings reported by current bus users is 15 minutes in both the a.m. and p.m. Carpoolers and vanpoolers responding to the most recent survey perceive an even greater travel time savings (20 minutes in both the a.m. and p.m.).

North Transitway users also perceive significant travel time savings. Median travel times reported by bus users were 20 minutes in a.m. and 25 minutes in the p.m. Vanpoolers generally perceived a 20 minute savings in both the a.m. and p.m. It is interesting to note the extent to which perceived travel time savings exceed actual transitway travel time savings.

Table 64. Perceived Transitway Travel Time Savings, 1985-1987

Transitway Travel Time Savings (minutes)	1985	1986	1987
Perceived Katy Transitway Travel Time Savings			
<u>Katy Transitway Bus Users</u>	(n=328)	(n=530)	(n=590)
a.m. (50th Percentile)	9	15	15
p.m. (50th Percentile)	13	20	15
<u>Katy Transitway Vanpoolers</u>	(n=417)	(n=401)	(n=13)
a.m. (50th Percentile)	6	10	20
p.m. (50th Percentile)	10	15	20
<u>Katy Transitway Carpoolers</u>	(n=90)	(n=187)	(n=569)
a.m. (50th Percentile)	9	15	20
p.m. (50th Percentile)	17	20	20
Actual Katy Transitway Travel Time Savings¹			
a.m. (6:00-9:00 a.m.)	6.8	3.0	4.4
p.m. (3:30-6:30 p.m.)	5.5	4.0	1.0
Perceived North Transitway Travel Time Savings			
<u>North Transitway Bus Users</u>	---	(n=1147)	---
a.m. (50th Percentile)	---	20	---
p.m. (50th Percentile)	---	25	---
<u>North Transitway Vanpoolers</u>	---	(n=199)	---
a.m. (50th Percentile)	---	20	---
p.m. (50th Percentile)	---	20	---
Actual North Transitway Travel Time Savings²			
a.m. (6:00-9:00 a.m.)	---	4.2	---
p.m. (4:00-7:30 p.m.)	---	8.0	---

¹Source: TTI Research Report 484-7

²Source: TTI Research Report 339-12

Motorists' Attitudes Concerning the Transitways

In the North Freeway corridor, only 26% of the motorists operating in the freeway mainlanes (non transitway users) felt the North Transitway was sufficiently utilized to justify the project (Table 65).

Table 65. Motorists' (Non Transitway Users) Attitudes Toward the North Transitway, 1986

Attitude	Survey Date January 1986 ¹
Is the transitway sufficiently utilized in terms of vehicles being moved?	(n=413)
Yes	26%
No	56%
Not Sure	18%
North Transitway a.m. Peak Period Vehicle Volumes	393
Is the transitway sufficiently utilized in terms of persons being moved?	(n=422)
Yes	23%
No	57%
Not Sure	20%
North Transitway a.m. Peak Period Person Volumes	6647
Is the transitway a good transportation improvement?	(n=417)
Yes	62%
No	20%
Not Sure	18%

¹Authorized buses and vanpools

In the Katy Freeway corridor, as transitway utilization has increased, acceptance of the transitway by the motorists has also increased significantly. In 1985 (before carpools were allowed on the transitway) and again in 1986 (when authorized 3+ carpools were permitted on the lane), only 3% of the non transitway motorists felt the lane was sufficiently utilized to justify the project. However, by October 1987 (after 2+ unauthorized carpools were permitted), 44% of the motorists surveyed felt the transitway was sufficiently utilized. Furthermore, 63% also stated the transitway was a good transportation improvement (Table 66). Thus, it appears that permitting 2+ carpools on the Katy Transitway has greatly increased both the actual and perceived utilization of the priority facility.

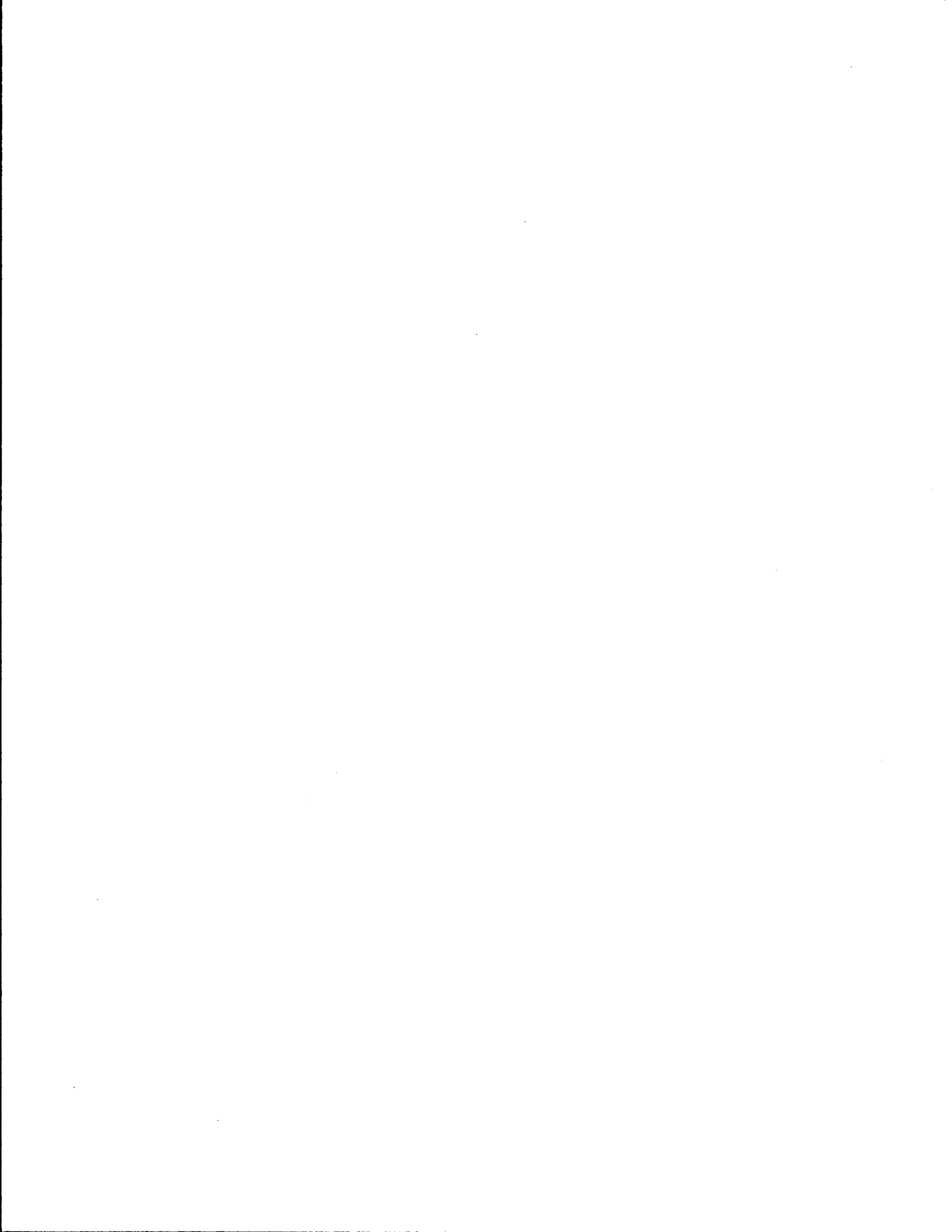
Table 66. Motorists' (Non Transitway Users) Attitudes Toward the Katy Transitway, 1985-1987

Attitude	Survey Date			
	March 1985 ¹	April 1986 ²	April 1987 ³	October 1987 ³
Is the transitway sufficiently utilized in terms of vehicles being moved?	(n=451)	(n=742)	(n=948)	(n=1420)
Yes	3%	3%	36%	44%
No	90%	92%	55%	42%
Not Sure	7%	5%	9%	14%
Katy Transitway a.m. Peak Period Vehicle Volumes	138	256	2412	2854
Is the transitway sufficiently utilized in terms of persons being moved?	(n=451)	(n=741)	(n=950)	(n=1426)
Yes	4%	4%	30%	36%
No	85%	86%	58%	46%
Not Sure	11%	10%	12%	18%
Katy Transitway a.m. Peak Period Persons	2465	3156	7769	8599
Is the transitway a good transportation improvement?	(n=441)	(n=733)	(n=949)	(n=1423)
Yes	41%	36%	56%	63%
No	35%	43%	29%	20%
Not Sure	24%	21%	15%	17%

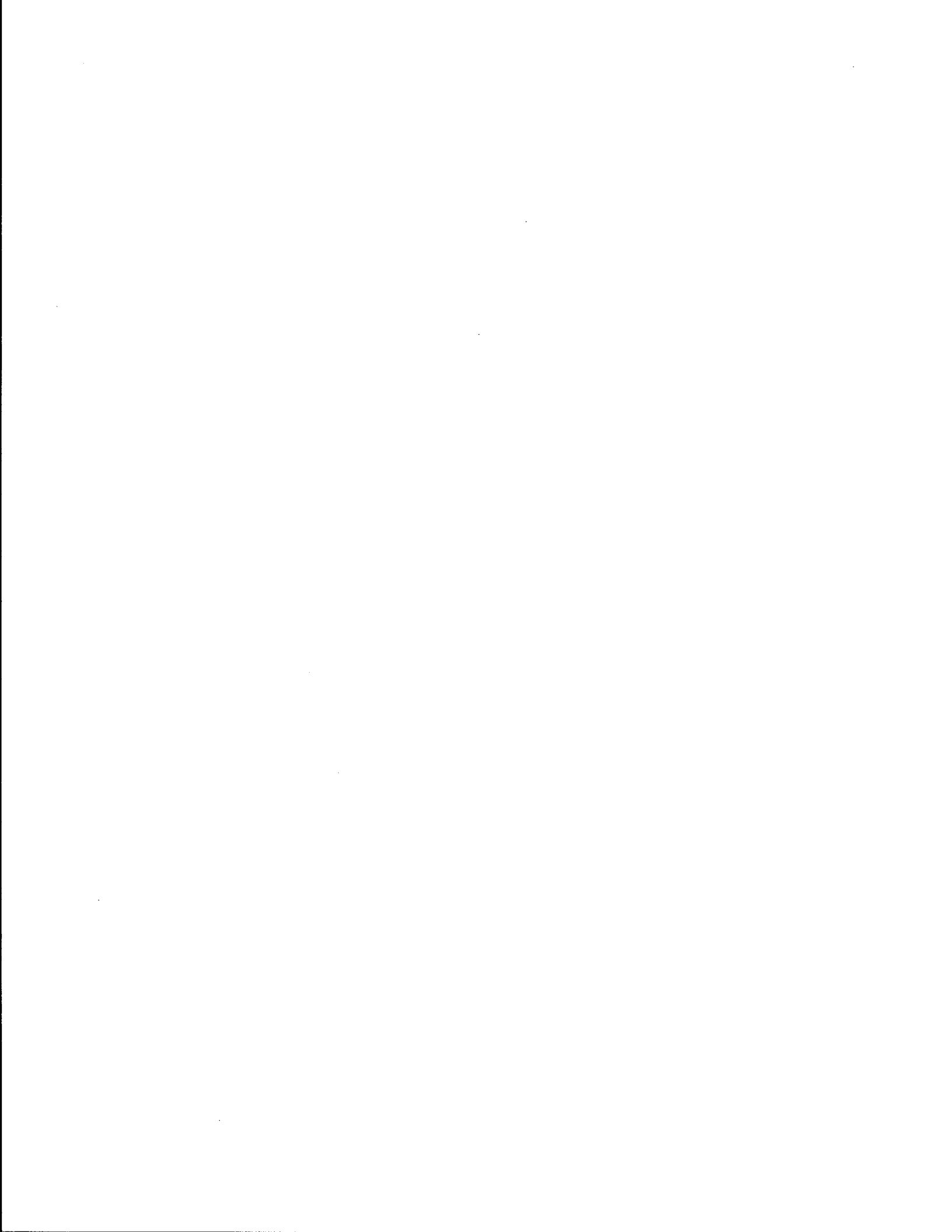
¹Authorized buses and vanpools (before carpools were allowed)

²Authorized buses, vanpools and 3+ carpools

³2+ vehicles, no authorization

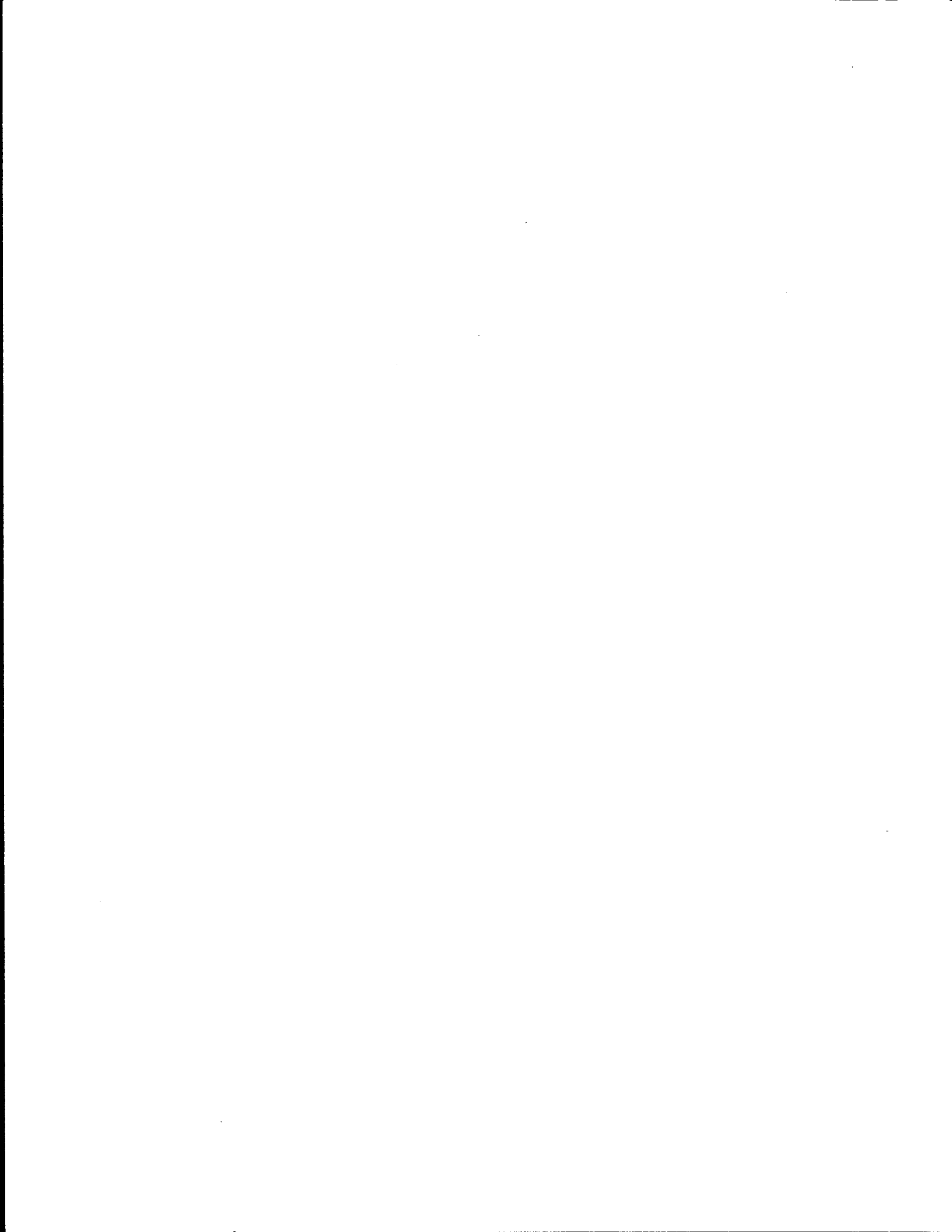


APPENDIX



APPENDIX

Presented in this appendix are examples of the survey instruments and cover letters used in the surveys of Katy and North Transitway users and nonusers.



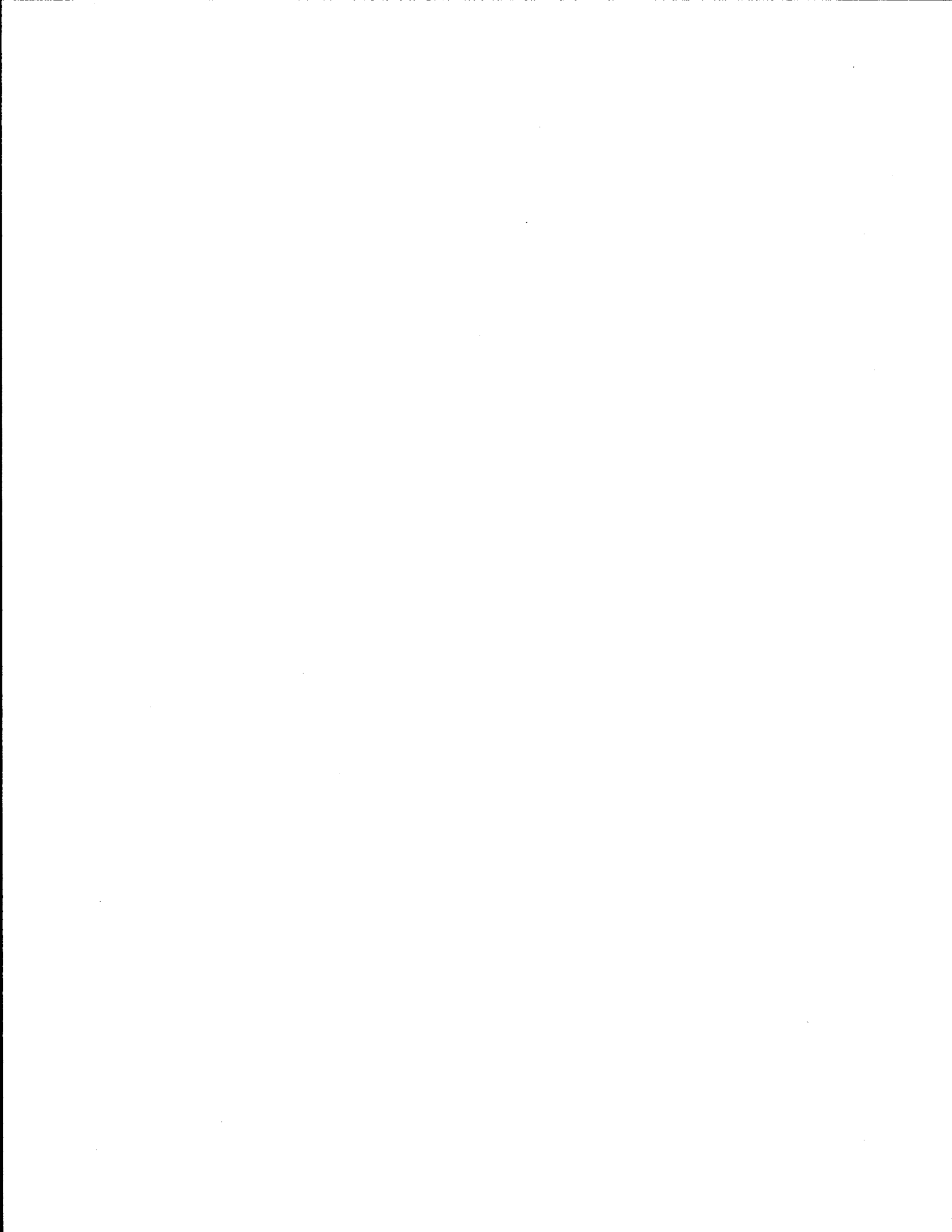
KATY TRANSITWAY TRANSIT USER SURVEY

This survey is being conducted by Texas Transportation Institute, the State Department of Highways and Public Transportation and METRO in order to obtain important information about your use of the Katy Transitway. Please take a few minutes to answer the questions below and return this form to the survey taker before leaving the bus.

1. What is the purpose of your bus trip this morning? Work School Other
2. How many days per week do you normally make this trip on the bus? _____
3. What is the Zip Code of the area where this trip began? (For example, if this trip began from your home this morning, you would list your home Zip Code.) _____
4. What is your final destination on this trip? Downtown Galleria/City Post Oak/Uptown
 Texas Medical Center Greenway Plaza Other (specify Zip Code) _____
5. Since you use the Katy Transitway, why have you decided to ride a bus rather than a carpool or vanpool?
 Bus is more convenient Bus costs less Vanpool not available
 Carpool not available Other (specify) _____
6. Have you ever carpooled or vanpooled on the transitway? Yes, carpooled Yes, vanpooled No
7. How important was the opening of the Katy Transitway in your decision to ride the bus?
 Very important Somewhat important Not important
8. If the Katy Transitway had not opened, would you be riding a bus now?
 Yes No Not sure
9. How many minutes, if any, do you believe this bus presently saves by using the Katy Transitway instead of the regular traffic lanes? _____ Minutes in the morning _____ Minutes in the evening
10. How long have you been a regular bus rider on the Katy Transitway? _____
11. Does your employer pay for any part of your bus pass? Yes, pays all Yes, pays part No
12. Was a car (or other vehicle) available to you for this trip? (check one)
 No, bus was only practical means Yes, but with considerable inconvenience to others
 Yes, but I prefer to take the bus
13. Before you began riding a bus on the Katy Transitway, how did you normally make this trip? (check one)
 Drove alone Rode a park-and-ride bus on the regular freeway lanes
 Carpooled Rode a regular route or express bus
 Vanpooled Did not make this trip prior to using the Katy Transitway
 Other (specify) _____
14. Do you feel that the Katy Transitway is, at present, being sufficiently utilized to justify the project?
 Yes No Not sure
15. What is your... Age? _____ Sex? _____ Occupation? _____
16. What is the last level of school you have completed? _____

Comments: _____

Thank you for your cooperation.





COMMISSION

ROBERT H. DEDMAN, CHAIRMAN
JOHN R. BUTLER, JR.
RAY STOKER, JR.

**STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION**

ENGINEER-DIRECTOR
R. E. STOTZER, JR.

IN REPLY REFER TO

Dear Carpooler/Vanpooler:

Your vehicle was observed traveling eastbound on the Katy Transitway the week of October 12. Since you have first-hand knowledge of the transitway, we need your help in a special study being conducted by the Texas Transportation Institute, The Texas A&M University System. Because the Katy Transitway is the first of its kind to operate in Houston, it is extremely important that we determine what effect it has had on your travel.

Please take a few minutes to answer the enclosed questionnaire. Your answers will provide valuable information concerning carpooling on the transitway. Because of the small number of poolers contacted, your reply is essential to insure the success of the project. All information you provide will remain strictly confidential. Only a summary of survey responses will be available for review.

Your cooperation and timely return of the completed questionnaire in the enclosed postage-paid envelope will be greatly appreciated. Thank you for your time and assistance.

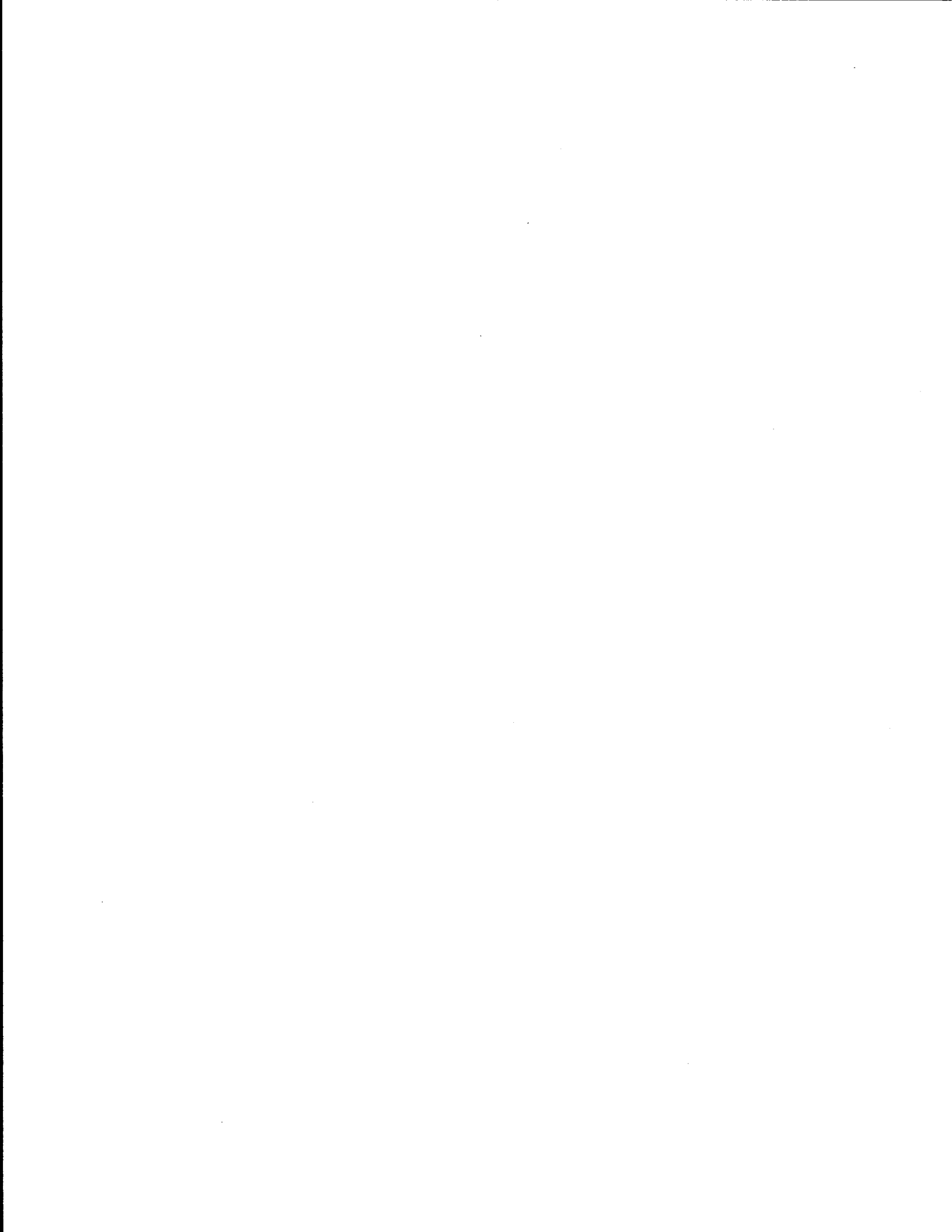
Sincerely,

A handwritten signature in cursive script that reads "Alvin R. Luedecke".

Alvin R. Luedecke
State Transportation Planning Engineer

ARL:DLB:jh

Enclosures



KATY TRANSITWAY CARPOOL/VANPOOL SURVEY

Undertaken by the Texas Transportation Institute, The Texas A&M University System
in cooperation with the Texas State Department of Highways and Public Transportation,
the Metropolitan Transit Authority, and the U.S. Department of Transportation

1. Is your vehicle a Carpool or Vanpool? Carpool Vanpool
2. How many members are regularly in your carpool/vanpool (including yourself)? _____
3. What time do you normally enter the transitway in the morning? _____ a.m.
4. What is your carpool/vanpool destination? Downtown Galleria/City Post Oak/Uptown
 Greenway Plaza Texas Medical Center Other (specify Zip Code) _____
5. If you drove on the Katy Freeway general purpose lanes prior to entering the transitway, which freeway on-ramp did you use to enter the Katy Freeway for the a.m. trip?
 Mason Road SH 6 West Belt
 Fry Road Wilcrest Gessner
 Barker-Cypress Dairy Ashford Other (specify) _____
6. Which transitway entrance did you use to access the Katy Transitway for the a.m. trip?
 I-10 West of SH 6 Addicks Park-and-Ride Flyover Ramp Gessner
7. If the Katy Transitway had not opened, would you be carpooling/vanpooling now?
 Yes No Not sure
8. Prior to carpooling/vanpooling on the Katy Transitway, how did you normally make this trip?
 On the transitway
 Bus Vanpool
 Katy Freeway general purpose lanes
 Bus Vanpool Carpool Drove Alone
 On a parallel street or highway (Street Name _____)
 Bus Vanpool Carpool Drove Alone
 Did not make this trip
 Other (please specify) _____
9. In your opinion, how congested is the Katy Transitway?
 Too congested No problems Too Little Traffic
10. Have you encountered any difficulties in using the transitway?
 No
 Yes, at an a.m. entrance (specify entrance) _____
 Yes, at the a.m. exit
 Yes, a.m. on the lane
 Yes, at the p.m. entrance
 Yes, at a p.m. exit (specify exit) _____
 Yes, p.m. on the lane
11. How many minutes, if any, do you believe your carpool/vanpool saves by using the Katy Transitway instead of the regular traffic lanes? _____ Minutes in the morning _____ Minutes in the evening

(OVER)

12. If actions need to be taken to reduce traffic volumes in order to maintain 55 mph operation during the peak hour on the transitway, which action(s) would you find most acceptable?

Require carpools to have 3 or more occupants

Require vehicles using the transitway to have permits

Selectively close ramps to reduce volumes entering the transitway

Other (please specify) _____

Take no action

13. Do any of the members of your carpool/vanpool use the park-and-pool lots that have recently been opened along the Katy Freeway at Mason Road, Fry Road, and Barker-Cypress?

Yes No Not Sure

14. What is your ... Age? _____ Sex? _____ Occupation? _____

15. What is the last level of school you have completed? _____

16. What is your home Zip Code? _____

We would appreciate your additional comments: _____

THANK YOU FOR YOUR COOPERATION.

Please return this form at your earliest convenience in the postage-paid envelope.



COMMISSION

ROBERT H. DEDMAN, CHAIRMAN
JOHN R. BUTLER, JR.
RAY STOKER, JR.

**STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION**

ENGINEER-DIRECTOR
R. E. STOTZER, JR.

Dear Motorist:

IN REPLY REFER TO

Your vehicle was observed traveling eastbound on the Katy Freeway between 6:00 and 9:00 a.m. the week of October 12. Since you have first-hand knowledge of traffic conditions on the Katy Freeway, we need your help in a special study being conducted by the Texas Transportation Institute, The Texas A&M University System.

To help serve the travel demand, the State Department of Highways and Public Transportation and the Metropolitan Transit Authority have constructed the Katy Transitway for use by buses, carpools and vanpools. Vehicles using the transitway travel inbound toward downtown in the morning and outbound in the afternoon. The Katy Transitway has been constructed within the median of the freeway and is protected from other traffic by concrete barriers. The location of the transitway in the median has not reduced the number of general traffic lanes available to motorists.

Because the Katy Transitway is the first of its kind to operate in Houston, we need your help to determine how it is working. Please take a few minutes to answer the enclosed questionnaire. The questions on this survey concern your routine trips made on the Katy Freeway in the morning, from 6:00 a.m. to 9:00 a.m. Because of the small number of motorists contacted, your reply is essential to insure the success of the project. Your answers will remain strictly confidential. Only a summary of the survey results will be available for review.

Your cooperation and timely return of the completed questionnaire in the enclosed postage-paid envelope will be greatly appreciated. Thank you for your time and assistance.

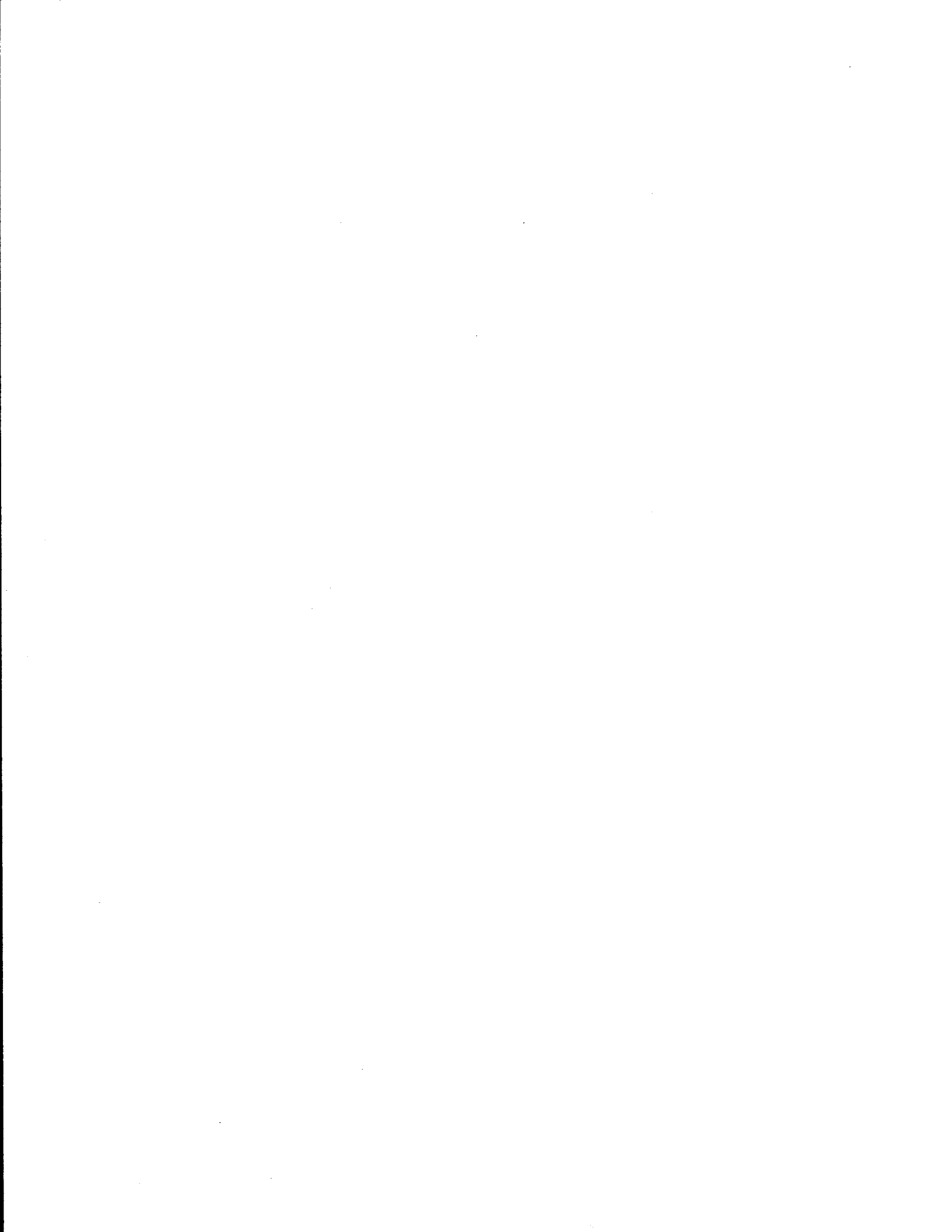
Sincerely,

A handwritten signature in cursive script that reads "Alvin R. Luedecke".

Alvin R. Luedecke
State Transportation Planning Engineer

ARL:DLB:jh

Enclosures



KATY FREEWAY MOTORIST SURVEY

Undertaken by the Texas Transportation Institute, The Texas A&M University System,
in cooperation with the Texas State Department of Highways and Public Transportation,
the Metropolitan Transit Authority, and the U.S. Department of Transportation

Your vehicle was observed traveling eastbound on the Katy Freeway between 6:00 and 9:00 a.m. the week of October 12. To the best of your recollection, please complete this survey as it pertains to that trip.

1. What was the purpose of your trip?
 Work School Other (specify) _____
2. What are your reasons for driving your car on the freeway mainlanes rather than traveling in a high-occupancy vehicle on the transitway?
 Need car for job
 Car is more convenient and flexible
 No convenient bus or carpool available
 Work irregular hours
 Other (specify) _____
3. How many days per week do you normally make this trip? _____
4. How do you usually make this trip?
 Drive alone Vanpool METRO regular route or express bus
 Carpool METRO park-and-ride bus Other (specify) _____
5. How many people (including yourself) were in your vehicle for this trip? _____
6. Which on-ramp did you use to enter the Katy Freeway for this trip? _____
7. What was the destination of your trip?
 Downtown Texas Medical Center Other (specify Zip Code below)
 Greenway Plaza Galleria/City Post Oak/Uptown _____
8. Based on your observation of the number of vehicles using the Katy Transitway, do you feel that it is being sufficiently utilized? Yes No Not sure
9. Based on your perception of the number of persons being moved on the Katy Transitway, do you feel that it is being sufficiently utilized? Yes No Not sure
10. Do you feel that the Katy Transitway was a good transportation improvement?
 Yes No Not sure
11. What is your... Age? _____ Sex? _____ Occupation? _____
12. What is the last level of school that you have completed? _____
13. What is your home Zip Code? _____

We would appreciate your additional comments: _____

THANK YOU FOR YOUR COOPERATION.

Please return this form at your earliest convenience in the postage-paid envelope.