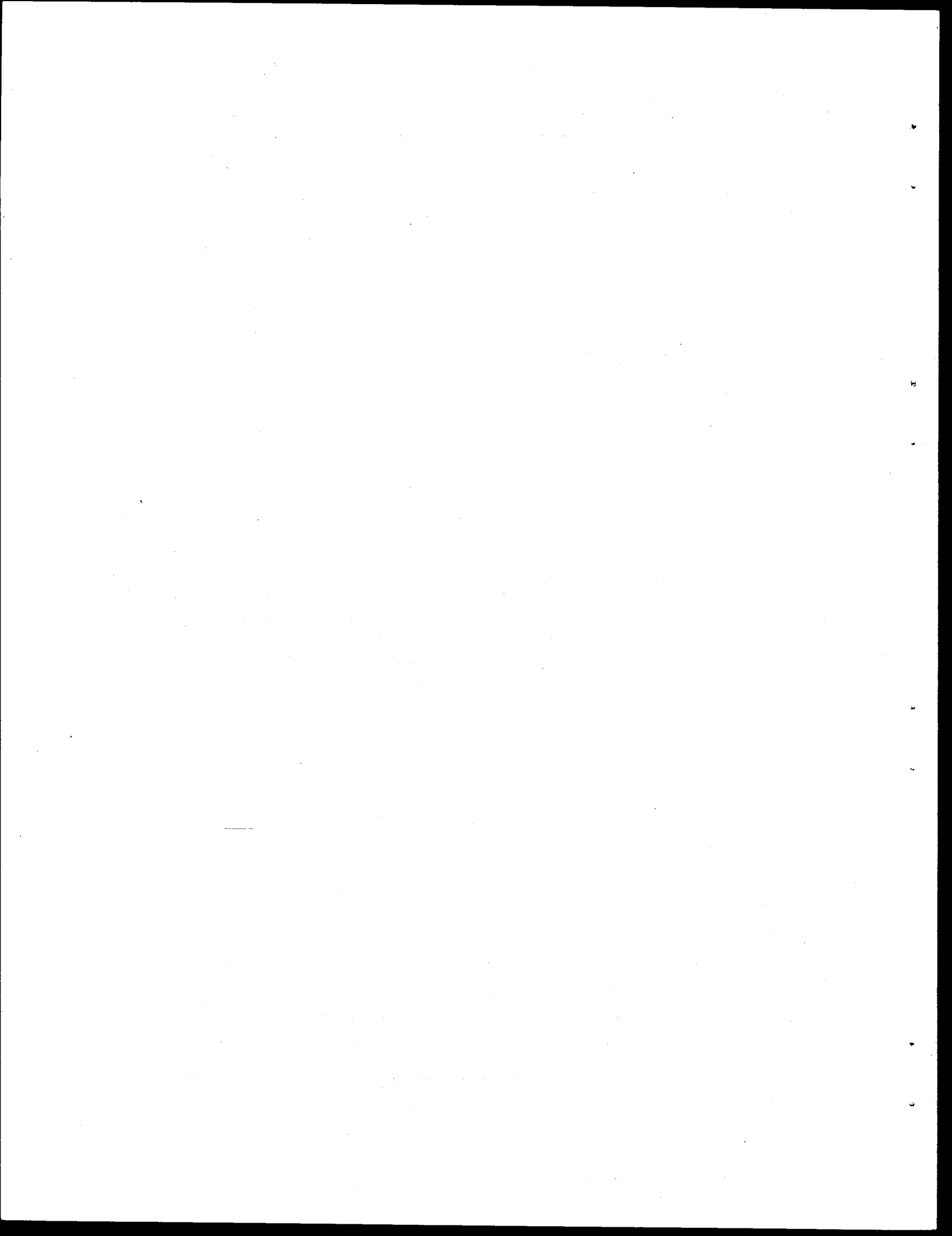


1. Report No. FHWA/TX-83/2+205-19		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Fort Worth Park-and-Go Facilities An Evaluation of Survey Data				5. Report Date August 1982	
				6. Performing Organization Code	
7. Author(s) Clyde J. Porterfield, Dennis L. Christiansen, and Richard L. Peterson				8. Performing Organization Report No. Research Report 205-19	
9. Performing Organization Name and Address Texas Transportation Institute The Texas A&M University System College Station, Texas 77843				10. Work Unit No.	
				11. Contract or Grant No. Study 2-10-74-205	
12. Sponsoring Agency Name and Address Texas State Department of Highways and Public Transportation, State Transportation Planning Division; P. O. Box 5051 Austin, Texas 77863				13. Type of Report and Period Covered Interim - September 1973 August 1982	
				14. Sponsoring Agency Code	
15. Supplementary Notes Research performed in cooperation with DOT, FHWA. Research Study Title: Priority Use of Freeway Facilities					
16. Abstract Through the cooperative Research Program with the Texas State Department of Highways and Public Transportation, the Texas Transportation Institute has been involved in extensive evaluations of Park-and-Ride facilities in Texas. User and non-user surveys were performed in the Dallas area in 1979. In 1980, data collection efforts were extended to the Houston Metropolitan Area. In 1982 the Texas Transportation Institute completed an investigation and survey of similar facilities in Fort Worth known as Park-and-Go lots. This study compares the result of user and non-user surveys from the Houston, Dallas/Garland and Fort Worth areas.					
17. Key Words Park-and-Ride, Park-and-Go, Transit, Terminal Design, Mass Transportation, Bus Rapid Transit, HOV Facilities, Ridesharing, Transportation Planning.			18. Distribution Statement No restrictions. This document is available to the public through the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 74	22. Price



FORT WORTH PARK-AND-GO FACILITIES

AN EVALUATION OF SURVEY DATA

by

Clyde J. Porterfield
Assistant Research Economist

Dennis L. Christiansen
Study Supervisor

and

Richard L. Peterson
Assistant Research Engineer

Edited by

A. V. Fitzgerald
Assistant Research Specialist

Research Report 205-19

Research Study Number 2-10-74-205

Sponsored by

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

August 1982

ACKNOWLEDGEMENTS

To successfully undertake a project of this nature, the cooperation and assistance of a number of organizations and agencies are necessary. The Texas Transportation Institute was provided with this assistance, and the cooperation of the following organizations is gratefully acknowledged: City of Fort Worth; CITRAN; McDonald Transit Inc.; and, State Department of Highways and Public Transportation District. Special recognition is due Messrs. J. R. Stone (District 2), Don Walden (Regional Planning Office), Larry Heil (CITRAN) and Gary L. Santerre (City of Fort Worth).

In addition, the following persons are recognized for their role and contribution to the project: Mr. John Bartosiewicz (CITRAN), Mr. Don Bean (City of Fort Worth), Ms. Carla Foreman (CITRAN), Mr. Bob Green (City of Fort Worth), Mr. Bob Hodge (District 2), Mrs. Reeta McMorrow (City of Fort Worth), Mr. James Toal (City of Fort Worth), and Mr. Mark Young (Regional Planning Office).

ABSTRACT

Through the cooperative Research Program with the Texas State Department of Highways and Public Transportation, the Texas Transportation Institute has been involved in extensive evaluations of Park-and-Ride facilities in Texas. User and non-user surveys were performed in the Dallas area in 1979. In 1980, data collection efforts were extended to the Houston Metropolitan Area. In 1982 The Texas Transportation Institute completed an investigation and survey of similar facilities in Fort Worth known as Park-and-Go lots. This study compares the result of user and non-user surveys from the Houston, Dallas/Garland and Fort Worth areas.

Key Words: Park-and-Ride, Park-and-Go, Transit, Terminal Design, Mass Transportation, Bus Rapid Transit, HOV Facilities, Ridesharing, Transportation Planning.

SUMMARY

Through the 1982 Cooperative Research Program with the Texas State Department of Highways and Public Transportation (SDHPT), The Texas Transportation Institute (TTI) completed an investigation and survey of transit facilities in Fort Worth known as Park-and-Go lots. This report presents the results of user and non-user, or home mail-out, surveys performed in the Fort Worth area and compares the Fort Worth data to similar data collected in previous Park-and-Ride studies conducted in the Dallas/Garland and Houston areas.

Park-and-Go is a unique name to describe a change of mode facility similar to Park-and-Ride facilities in concept and operation. The primary difference between Park-and-Go and Park-and-Ride is the type of transit service provided to and from the facility. Whereas Park-and-Ride lots are typically served by express buses to one or more selective destinations (i.e., CBD, major industrial park), Park-and-Go is simply an additional stop designated along an existing local bus route.

The parking facilities used in support of Park-and-Go are relatively small when compared to Park-and-Ride lots and are normally located on private property furnished by neighborhood churches, shopping centers, and other businesses. As a result, the total public expenditure involved with placing a Park-and-Go lot into service is very minimal and includes such miscellaneous costs as administrative expenditures, signing to delineate the parking area, route maps and schedules, and promotional/marketing expenditures.

Park-and-Go lots are also intended to serve commuters other than the transit patron. People commuting to work are encouraged to utilize the Park-and-Go facility as a place to rendezvous, park one or more of their vehicles, and carpool or vanpool to their final destination. In this regard, Park-and-Go lots are similar to Park-and-Pool facilities.

The Fort Worth Park-and-Go program has continued to grow since its inception in 1975 to some 27 Park-and-Go lots which were in service at the time of this study effort. The number of parked vehicles observed at the 27 lots ranged from 0 to 143. On-board surveys were conducted at 8 of these lots; home mail-out surveys were performed in the vicinity of two of the lots.

While the characteristics of the Park-and-Ride users in Houston and Dallas were nearly identical, the Park-and-Go lots serve a somewhat different clientele. That clientele is, in terms of socioeconomic characteristics, somewhere between traditional transit patrons and Park-and-Ride patrons. Due to the non-express nature of much of the Park-and-Go service, that service does not attract as high a volume of commuters; the mode split served by Park-and-Go in Fort Worth is substantially below the Park-and-Ride service in Houston and Dallas.

It was also found that the market area shape associated with the Park-and-Go lots is somewhat different from Park-and-Ride lots. While the market area for Park-and-Ride is parabolic and oriented toward the activity center served, the market area for Park-and-Go appears to be circular in shape, with the lot located in the center of the circle and having a 3-mile diameter.

The Park-and-Go lots do appear to be an inexpensive means of making transit attractive to a new group of commuters. Since the lots also serve as rendezvous areas for carpoolers and vanpoolers, they represent a positive approach for encouraging all forms of ridesharing.

IMPLEMENTATION STATEMENT

Project 205 is oriented toward assisting the Department in the planning, implementation, and evaluation of priority treatment projects. Park-and-Go and Park-and-Ride lots are integral parts of these improvements.

Numberous new Park-and-Ride lots continue to be built in the State, and the Department is frequently involved in the planning and the funding of those improvements. The comparison of results from the three study areas should enhance the cost-effectiveness of Park-and-Ride and Park-and-Go type improvements.

DISCLAIMER

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

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
ABSTRACT	iii
SUMMARY	iv
IMPLEMENTATION STATEMENT	vi
DISCLAIMER	vi
INTRODUCTION	1
General	1
Park-and-Go Service	1
Study Area	3
DESCRIPTION OF SURVEYS	7
User Survey	9
Non-User Survey	9
Survey Information	10
USERS AND NON-USERS, GENERAL CHARACTERISTICS	11
User Characteristics: Fort Worth, Dallas/Garland and Houston	11
Personal Characteristics	11
Age	11
Sex	13
Education	13
Occupation	15
Travel Characteristics	16
Previous Mode of Travel	16
Years at Present Address	17
Park-and-Go Destination	17
Mode of Arrival at Park-and-Go Lot	19
Length of Time Using Park-and-Go Service	20
Overview, Personal and Travel Characteristics of Users	22
Important Factors and Reasons for Using Park-and-Go	22
Time/Money Savings	22
Satisfaction with Service	25
Important/Unimportant Factors	26
Non-User Characteristics: Fort Worth, Dallas/Garland and Houston	28
Personal Characteristics	30

Age	30
Sex	30
Education	31
Occupation	31
Years at Address	31
Travel Characteristics	33
Mode of Travel	33
Use of CITRAN	33
Knowledge of Park-and-Go Service	34
Perceived Need for Auto	35
Attitudes Concerning Transportation Facilities and Personal Travel	36
Overview: Users and Non-Users	37
MARKET AREA CHARACTERISTICS	41
MAJOR FINDINGS	47
Modal Split	47
Employment at Major Activity Centers	47
Characteristics of Park-and-Go Users and Non-Users	47
Important/Unimportant Features of Park-and-Go	48
MARKETING IMPLICATIONS	51
General	51
Shape of Market Areas	51
REFERENCES	53
APPENDIX A	55
User Survey (On-Board)	57
Non-User Survey (Home Mail-Out)	59
APPENDIX B	63
Survey Procedures	63
On-Board Survey	63
Home Mail-Out Survey	63

INTRODUCTION

General

Through the Cooperative Research Program with the Texas State Department of Highways and Public Transportation (SDHPT), The Texas Transportation Institute (TTI) has been involved in extensive evaluations of Park-and-Ride facilities in Texas. User and non-user surveys were performed in the Dallas area in 1979 as documented in Research Report 205-11 (1)*. In 1980, data collection efforts were extended to the Houston metropolitan area. The Metropolitan Transit Authority (MTA), in order to significantly expand the overall scope of the Houston Park-and-Ride studies, provided supplementary funding to the basic research effort sponsored by the SDHPT. Texas Transportation Institute and Beiswenger, Hoch and Associates, Inc., conducted the study documented in Research Report 205-15 (2). In 1982, through the Cooperative Research Program, the Texas Transportation Institute completed an investigation and survey of similar facilities in Fort Worth known as Park-and-Go lots. This report presents the results of the user and the non-user, or home mail-out, surveys performed in the Fort Worth area and compares the Fort Worth data to similar data collected in the Park-and-Ride studies conducted in the Dallas/-Garland and Houston areas.

Park-and-Go Service

Park-and-Go is a unique name to describe a change-of-mode facility similar to Park-and-Ride facilities in concept and operation. The primary difference between Park-and-Go and Park-and-Ride is the type of transit service provided to and from the facility. Whereas Park-and-Ride lots are typically served by

*Denotes number of reference listed at end of report.

express buses to one or more selective destinations (i.e., CBD, major industrial park), Park-and-Go is an additional stop designated along an existing local bus route.

Fort Worth selected the name Park-and-Go to distinguish the type of transit service (non-express) provided in Fort Worth from express service provided by the Dallas Transit System (DTS) in Dallas/Garland. The parking facilities used in support of Park-and-Go are relatively small when compared to Park-and-Ride lots and are normally located on private property furnished by neighborhood churches, shopping centers, and other businesses. Parking lot identification is performed by CITRAN (City TRANSit) in cooperation with Fort Worth's Rideshare Program, the Transportation Services Information Center (TSIC), with review and endorsement by the City's Public Transportation Advisory Committee (PTAC). Once a location has been identified and determined feasible for Park-and-Go designation, a "hold harmless agreement" is executed between the private property owner and the private CITRAN management company of McDonald Transit, Inc. Normally, the total public expenditure involved with placing a Park-and-Go lot into service is very minimal and includes such miscellaneous costs as:

- Administrative expenditures,
- Signing to delineate parking area,
- Route maps and schedules, and
- Promotional/marketing expenditures.

Park-and-Go lots are also intended to serve commuters other than the transit patron. People commuting to work are encouraged to utilize the Park-and-Go facility as a place to rendezvous, park one or more of their vehicles, and carpool or vanpool to their final destination. In this regard, Park-and-Go lots are similar to Park-and-Pool facilities investigated and documented in Research Report 205-18 (3).

Due to the type of transit service provided to Park-and-Go lots, the number of peak-period buses and, consequently, the service headways, varies considerably from one location to another. Local bus scheduling is constantly reviewed in light of service demand to improve operational efficiency of the transit system. In some limited cases, special peak-period express service has been added to the regular, fixed-route service at certain Park-and-Go locations where transit demand has warranted such action.

Study Area

Since the inception of this public transportation service in 1975, the Fort Worth Park-and-Go program has continued to grow in popularity to the 27 lots which were in use when this study began. The number of vehicles observed parked at the lots ranged from 0 to 143 cars. However, some people utilizing Park-and-Go service arrive at the various lots by other means --some walk, some are dropped off by others, while others carpool to the lot location.

Park-and-Go lots considered in the study are found in Table 1. Vehicle counts made at the lots by the City of Fort Worth on selected dates are shown in Table 2. Figure 1 shows the location of the 27 Park-and-Go lots in service during late 1981, when the study was conducted.

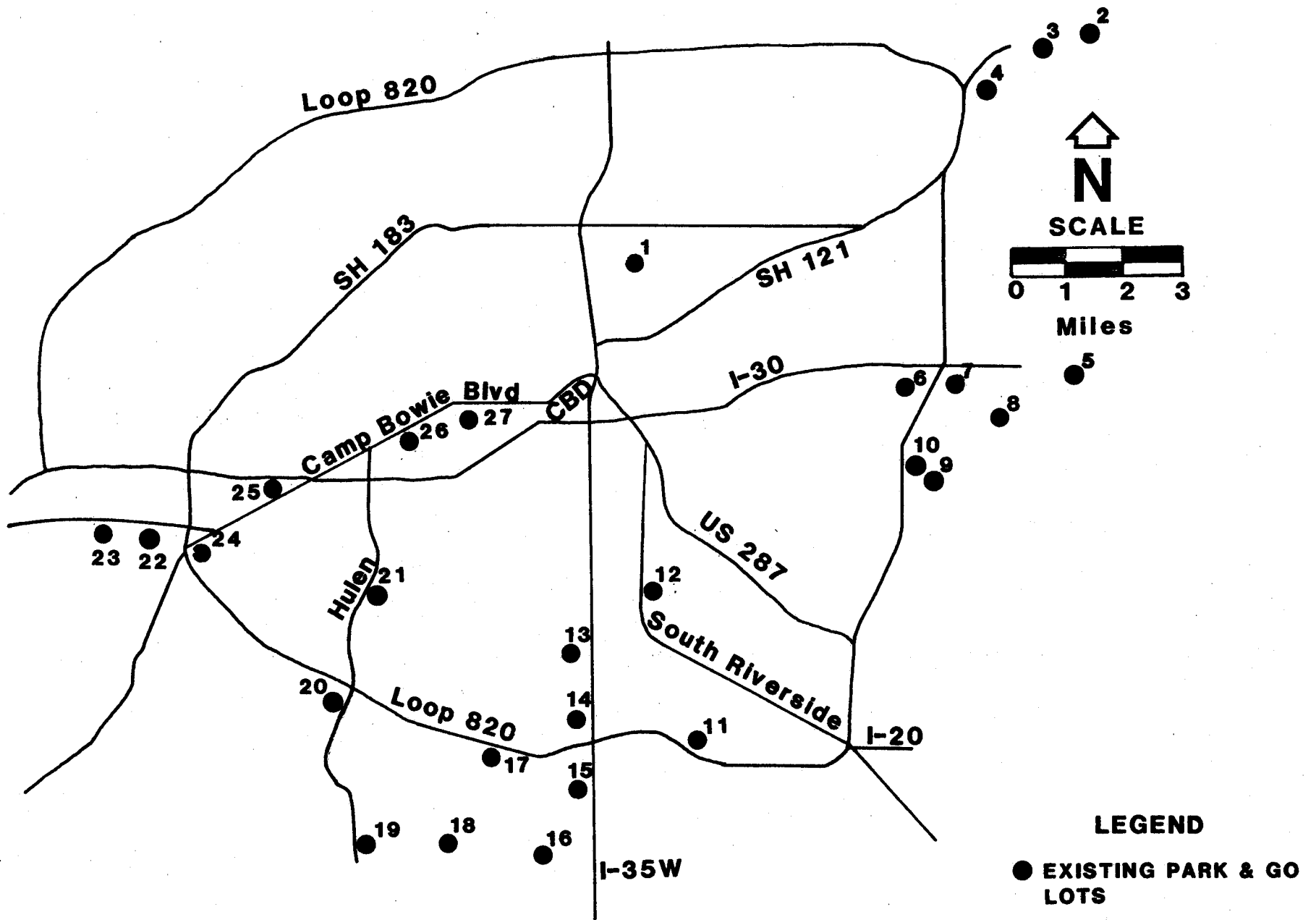


Figure 1: Location of 27 Park-and-Go Lots

Table 1: Fort Worth Park-and-Go Lots

Lot No. and Name	Address/Location
1. Springdale Baptist Church	3016 Selma
2. First Baptist Church/Euless	Hwy. 157 and Airport Freeway
3. Bedford Church	Brown Trail/Airport Freeway
4. NorthEast Mall	Loop 820 and SH 183
5. Six Flags	I-30
6. Brentwood Church of Christ	6516 Brentwood Stair
7. Fort Worth Bible Church	Terbert & Brentwood Stair
8. Jefferson Unitarian Church	1950 Sandy
9. Handley Methodist Church	2929 North Forest Street
10. Handley Baptist Church	6800 Church Street
11. Herman E. Clark Stadium	TCJC Fowell Dr./Eastside
12. Oakbrook Mall	3100 South Riverside at Berry
13. Seminary South NE corner	Bolt across from Library
14. K-Mart Shopping Center	4812 South Freeway
15. St. Mark's United Methodist Church	6250 South Freeway
16. St. Luke's Presbyterian Church	1404 Sycamore School Road
17. Edgepark Methodist Church	5616 Crowley Road
18. K-Mart	Alta Mesa and McCart
19. Altamesa Church/Christ	4600 Alta Mesa
20. Montgomery Ward	Hulen Mall, Southside
21. Tanglewood Village	3100 Blk. Hulen/Bellaire Street
22. Gibson's Shopping Center	Williams Road South of US 80
23. St. Giles Presbyterian Church	8700 Chapin Road
24. Levitz Furniture Warehouse	7100 Block of Camp Bowie
25. Ridglea Baptist Church	6037 Calmont/Guilford/I-30
26. Arlington Heights Christian Church	4600 Camp Bowie Blvd.
27. Will Rogers Stadium	West Lancaster

Table 2: Vehicles Surveyed at Park-and-Go Lots

Lot Number	Dec. '79	Sept. '80	Jan. '81	June '81	Aug. '81	Sept. '81	Oct. '81	Nov. '81
1	1	5	3	3	3	1	1	3
2	11	29	34	20	20	28	27	31
3	36	71	73	75	90	88	84	110
4	21	44	35	29	37	30	33	36
5	NC*	NC*	NC*	NC*	38	52	49	44
6	85	114	143	124	96	104	141	112
7	NC*	NC*	NC*	9	9	11	8	6
8	3	8	NC*	14	15	9	11	15
9	NC*	14	11	NC*	9	13	13	11
10	1	4	5	1	5	2	2	0
11	0	7	10	NC*	2	12	9	11
12	0	0	1	NC*	NC*	0	0	0
13	NC*	NC*	12	NC*	NC*	1	0	0
14	NC*	NC*	NC*	11	16	15	13	12
15	NC*	NC*	1	7	5	11	7	6
16	NC*	NC*	NC*	NC*	NC*	0	1	2
17	49	81	56	49	74	86	72	69
18	NC*	NC*	NC*	11	10	17	12	12
19	20	18	17	12	11	10	16	12
20	NC*	NC*	NC*	NC*	NC*	1	3	15
21	5	6	9	NC*	4	2	8	2
22	NC*	NC*	NC*	19	1	4	7	3
23	1	1	4	1	NC*	1	1	0
24	0	0	NC*	1	NC*	0	0	0
25	56	59	66	65	52	51	60	56
26	0	3	5	5	7	6	7	7
27	NC*	NC*	28	49	55	45	45	53

*NC: No count made or data unavailable

Source: City of Fort Worth, 1981

DESCRIPTION OF SURVEYS

This study was intended to develop information that would provide guidelines concerning more effective means of planning and operating change of mode transit service. Characteristics of Fort Worth's users and non-users of Park-and-Go service are compared with Park-and-Ride service users and non-users characteristics observed in previous studies conducted in Dallas/Garland and Houston. The survey instruments utilized in this investigation are included in Appendix A. The general methodology and statistical analysis of data applied in this study are similar to that described in Research Report 205-11 (1).

The surveys were designed to obtain in variety of data, including particular information to answer the questions highlighted below.

- User Surveys. What existing Park-and-Go features were most important to the patrons in making the decision to utilize the Park-and-Go service? What are the socioeconomic and demographic characteristics of the typical Park-and-Go patron?
- Non-User Surveys. For those individuals that live in the area served by a Park-and-Go lot, what additional features would need to be incorporated into the Park-and-Go service to cause non-users to become Park-and-Go patrons?

The user surveys were made in the Fort Worth metropolitan area by TTI staff with the assistance of McDonald Transit Inc., CITRAN staff and City of Fort Worth personnel. Lots used for data collection were identified based upon vehicle survey data (shown in Table 2) and with guidance from CITRAN and City of Fort Worth staff. The Park-and-Go locations, where user surveys were distributed, ranged in average utilization from 5 vehicles to 67 vehicles and were felt to be typical of Park-and-Go service. Non-user, or home mail-out surveys, were performed in 2 geographic areas within the transit service area defined by the Fort Worth city limits. Figure 2 shows these areas as well as the location of the 8 Park-and-Go lots utilized in conducting the user surveys.

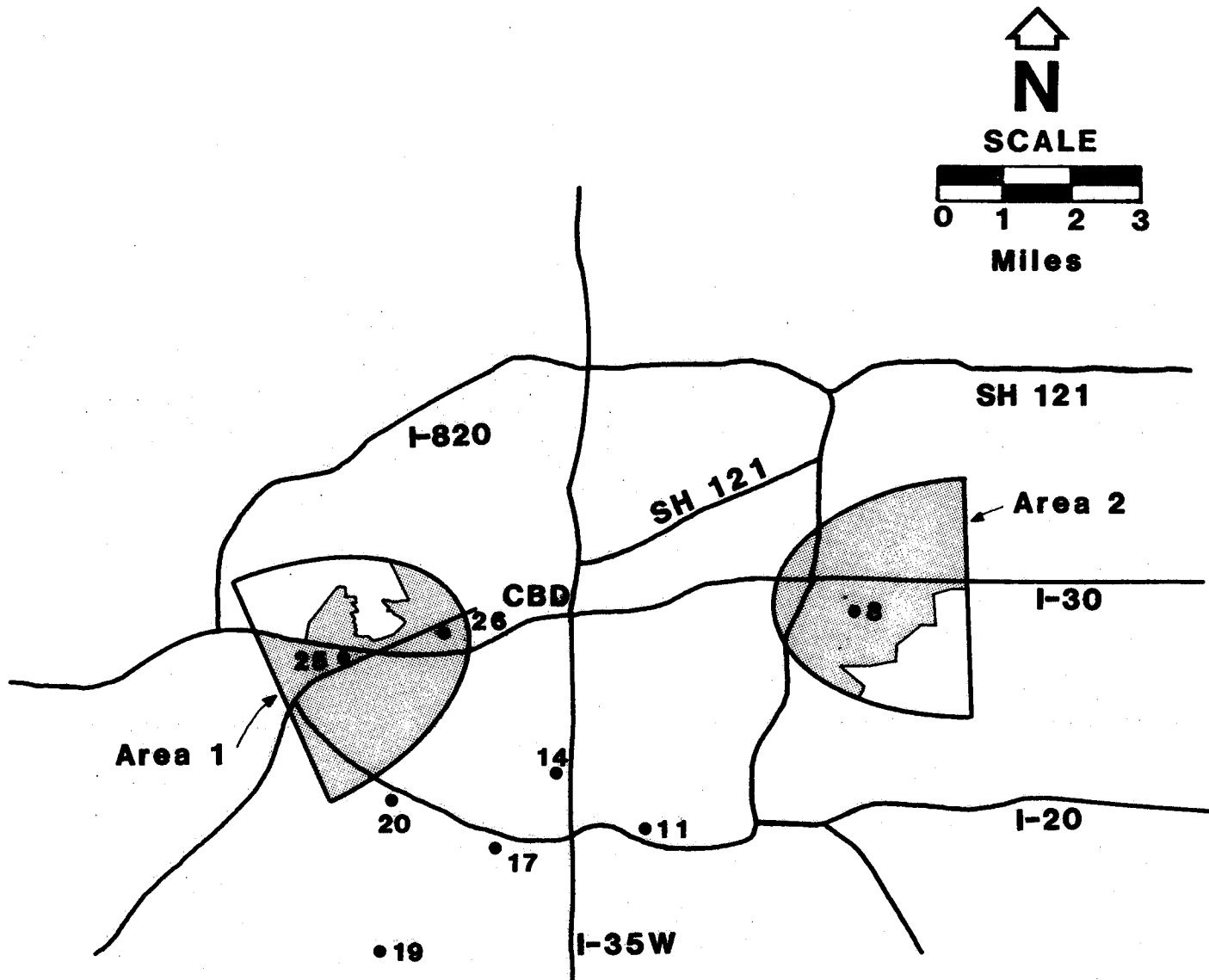


Figure 2: Park and-Go Lots used in Data Collection Effort

User Survey

The user surveys were conducted at the 8 Park-and-Go lots shown in Figure 2. For the purpose of data analysis, the responses received from survey participants from all 8 lots were combined.

Surveys were distributed to Park-and-Go patrons during the morning peak period by CITRAN bus operators. The boarding passengers were requested to fill out the surveys and return them to the driver when they departed the transit vehicle. One hundred forty-six surveys were handed out with 113 being returned for a 77% response rate.

Non-User Survey

The Park-and-Go home mail-out was directed to two geographic market areas within the City of Fort Worth, as shown in Figure 2. Area 1 has two lots located within the home mail-out study area, while Area 2 has 1 lot. Park-and-Go Lots 25 and 26, located on the city's west side, were selected due to their similarity with Park-and-Ride services; both lots are supplemented with express transit service during the peak periods. Lot number 8, located on the east side of Fort Worth, was selected to be representative of pure Park-and-Go service with only local, non-express service provided.

The market area associated with each of the Park-and-Go lots is identified and discussed in more detail in a subsequent section of this report entitled Market Area Characteristics. A random sample of households was selected for the two geographic areas from the Coles Directory (4). The procedure used in selection of households is described in Appendix B. An initial mail-out and one follow-up mail-out were performed to obtain a satisfactory sample size. The mail-outs were sent to a total of 1200 households within the two market areas. An overview of the non-user survey distribution and response is shown

in Table 3. Due to the presence of two Park-and-Go lots (numbers 25 and 26) in Area 1, a total of 800 households were contacted for the non-user survey as compared to 400 households in Area 2 where only one Park-and-Go lot is located.

Table 3: Summary of Non-User Surveys Mailed to Households in Fort Worth

Target Mailing	Number of Households Surveyed	Number of Surveys Returned	Return Rate
Area 1	800	278	35%
Area 2	400	136	34%
Total	1200	414	35%

Survey Information

The types of information collected through these surveys are intended to aid in the planning, operation and marketing of Park-and-Ride/Park-and-Go transit facilities. Data collected provide insight to socioeconomic and demographic characteristics as well as travel patterns of existing and potential Park-and-Go users. The survey instruments are structured to help identify those features of Park-and-Go/Park-and-Ride service that are most important in maintaining existing patronage and in generating new ridership.

This report presents the results of the Park-and-Go user and non-user, or home mail-out, surveys performed in the Fort Worth area. The results of this Park-and-Go investigation are compared to similar data collected in the Park-and-Ride studies conducted in the Dallas/Garland and Houston areas.

USERS AND NON-USERS, GENERAL CHARACTERISTICS

This section of the report is divided into 3 parts. The first part compares user characteristics in Fort Worth, Dallas/Garland and in Houston. The second part compares characteristics of non-users in the three survey cities. The third section provides an overview of user and non-user characteristics in Fort Worth in comparison to Dallas/Garland, presented in Research Report 205-11 (1), and Houston data from Research Report 205-15 (2).

Due to the relatively low number of Park-and-Go users at any given lot, all Fort Worth data from the 8 Park-and-Go facilities are aggregated for analysis. Responses from the 8 surveyed locations ranged from 2 to 47 users and totaled some 113.

User Characteristics: Fort Worth, Dallas/Garland and Houston

Data collected fall into 2 groupings. The first grouping describes personal characteristics, and the second grouping documents travel characteristics.

Personal Characteristics

Questions concerning age, sex, education and occupation of the transit users were posed in the three studies.

Age

Responses to the question, "What is your age?" are depicted in Figure 3. The change of mode transit patrons are relatively young. As shown subsequently in this report and in Research Reports 205-11 and 205-15, users of Park-and-Go and Park-and-Ride are generally younger than are non-users. Table 4 summarizes additional information concerning age of users. The age of users in the Fort Worth area is generally higher than in the other two study areas.

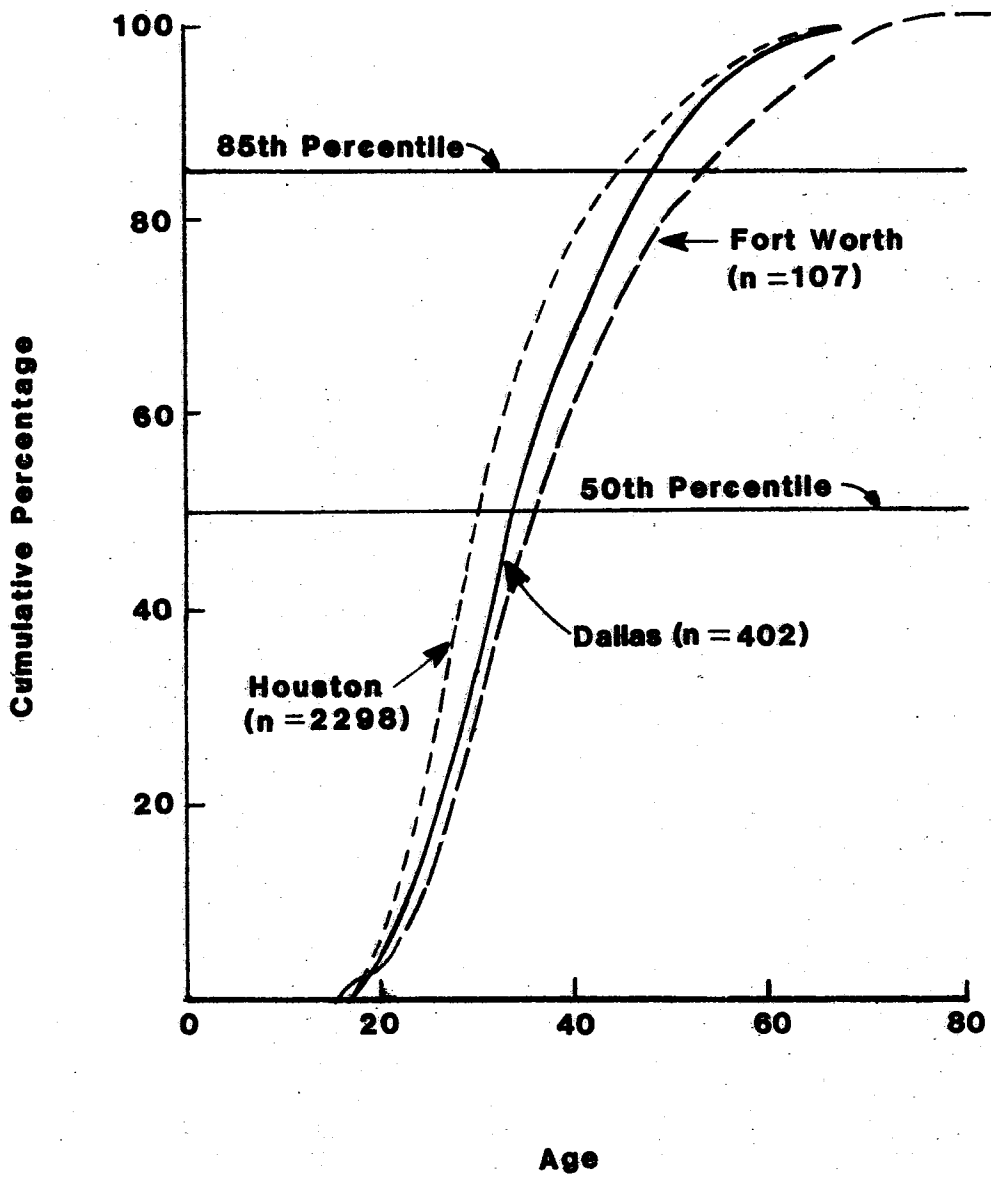


Figure 3: Age of Park-and-Go Users compared to Park-and-Ride Users, Cumulative Frequency Distribution

Table 4: Age of Users: Fort Worth, Dallas/Garland and Houston

Age	Fort Worth n=107	Dallas/Garland n=402	Houston n=2298
50th Percentile	35	34	30
85th Percentile	54	48	45

Sex

Table 5 summarizes responses to the question, "What is your sex?"

Table 5: Sex of Users: Fort Worth, Dallas/Garland and Houston

Sex	Fort Worth n=111	Dallas/Garland n=408	Houston n=2348
Male	37%	42%	42%
Female	63%	58%	58%

Park-and-Go and Park-and-Ride patrons are predominantly female. Again, as shown subsequently in this report and in Research Reports 205-11 and 20S-15, this is significantly different from non-user characteristics. Some 63% of the users in Fort Worth were female compared to 58% in both the Houston and Dallas/Garland areas.

Education

Figure 4 shows the level of education characteristic of the transit patrons. Table 6 provides an additional breakdown. Park-and-Go and Park-and-Ride patrons are an educated group, with over 75% having at least some college education. Data are similar for all lots surveyed in the 3 urbanized areas.

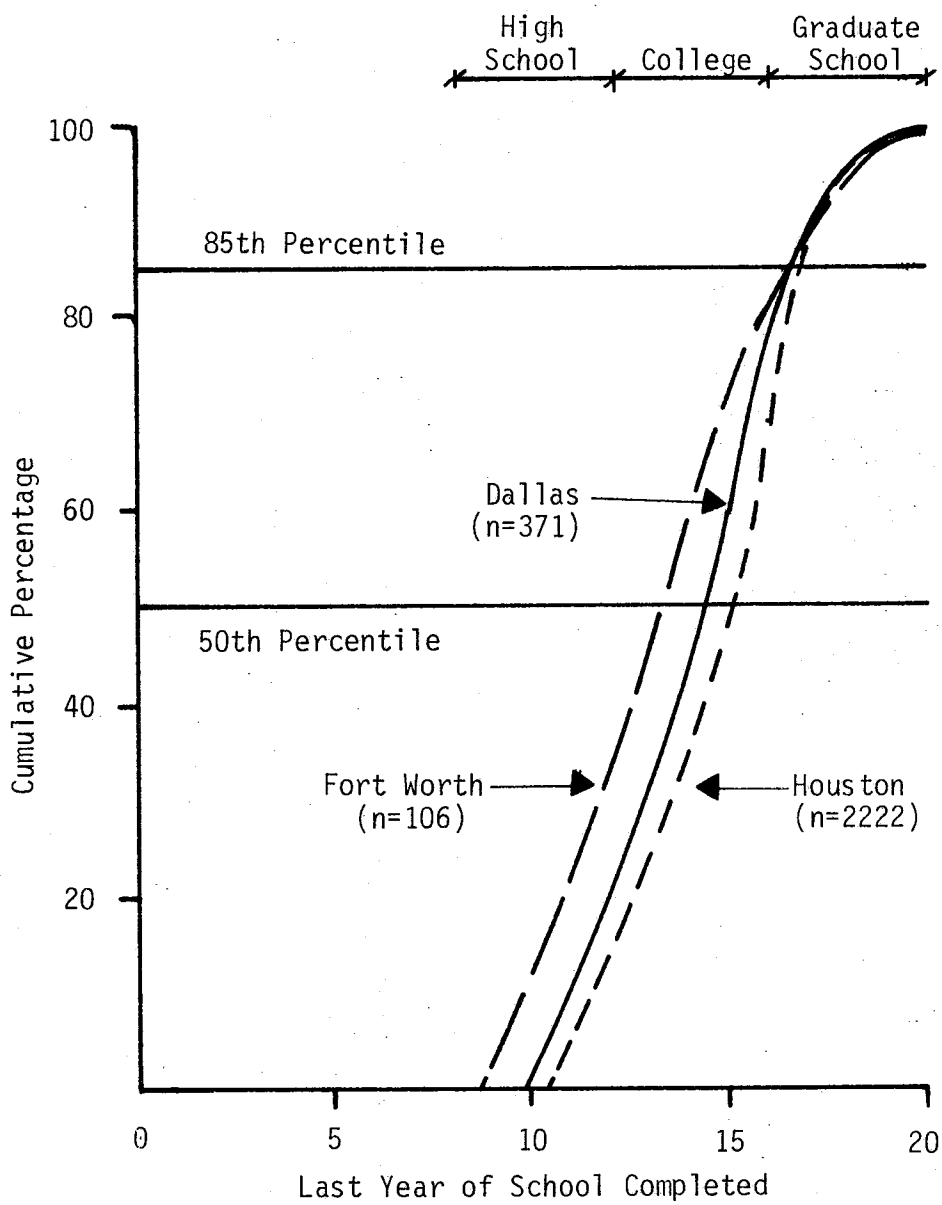


Figure 4: Education Level of Park-and-Go Users, Cumulative Frequency Distribution

Table 6: Education Level (Last Year of School Completed)
Users: Fort Worth, Dallas/Garland and Houston

Education Level	Fort Worth n=106	Dallas/Garland n=371	Houston n=2222
50th Percentile	13	14	15
85th Percentile	17	17	17

Occupation

Data describing the occupations of the transit users are shown in Table 7. The high percentage (35.8%) of clerical workers is in agreement with the high percentage of female Park-and-Go patrons. Clerical, managerial, and professional occupation categories constitute approximately 78% of all Park-and-Go patrons in Fort Worth.

Table 7: Occupation of Users: Fort Worth, Dallas/Garland and Houston

Occupation	Fort Worth n=106	Dallas/Garland n=396	Houston n=2254
Clerical	35.8%	39.6%	35.2%
Professional	28.3	28.3	40.1
Managerial	14.1	18.7	17.1
Craftsman	9.4	1.5	1.0
Service Worker	5.6	1.3	0.4
Operative	4.7	1.5	0.6
Sales	0.9	4.3	3.7
Retired	0.9	1.0	0.1
Student	0.0	2.5	1.4
Laborer	0.0	0.8	0.0
Housewife	0.0	0.5	0.3
Unemployed	0.0	0.0	0.1

Travel Characteristics

In the on-board user surveys, numerous questions were asked that relate to travel patterns. These questions addressed previous mode of travel, Park-and-Go destination, mode of arrival at the Park-and-Go lot, how long Park-and-Go has been used, and the trip origin from within the commutershed served by the different Park-and-Go lots. The trip origins from within the commutershed, or market area, are presented in a subsequent section of this report entitled Market Area Characteristics.

Previous Mode of Travel

The on-board surveys ask the question, "Before you began using the Park-and-Go service, how did you normally make this trip?" Responses are summarized in Table 8.

Table 8: Previous Mode of Travel for Users

Mode	Fort Worth n=106	Dallas/Garland n=416	Houston n=2378
Drove self	63%	50%	49%
Carpool/vanpool	15	11	17
Did not make trip	9	25	24
Regular bus service	8	11	8
Other	5	3	2
Total	100%	100%	100%

The Fort Worth data responses indicate that of 63% of the patrons "drove self" to their destinations prior to utilizing Park-and-Go. Some 15% of the users carpooled or vanpooled before Park-and-Go. Research in Dallas/Garland

and in Houston noted a high response for the "did not make trip" alternative. Fort Worth Park-and-Go users show a contrasting small percentage of those that did not make the trip. This is probably due to the longer length of time Fort Worth users have lived at their present address as discussed below.

Years at Present Address

Park-and-Ride users in Dallas/Garland and in Houston lived at their current address a very short period of time compared to those using Park-and-Go in Fort Worth (see Table 9 and Figure 5). As shown subsequently in this report, users of Park-and-Go have lived at their current address for a significantly shorter period of time than have non-users.

Table 9: Years at Present Address for Users

Years at Address	Fort Worth n=106	Dallas/Garland n=412	Houston n=2342
50th Percentile	2.5	1.7	1.4
85th Percentile	16.5	7.5	6.7

Park-and-Go Destination

For the lots surveyed in Dallas/Garland and in Houston, transit service is provided primarily to the downtown area. Even for those Houston lots providing service to multiple destinations, some 83% to 95% of total patronage is destined to the downtown.

One of the questions asked of Park-and-Go users in Fort Worth was, "What is your final destination and trip purpose?" Given the distinction between Park-and-Go with regular line service and Park-and-Ride with express service

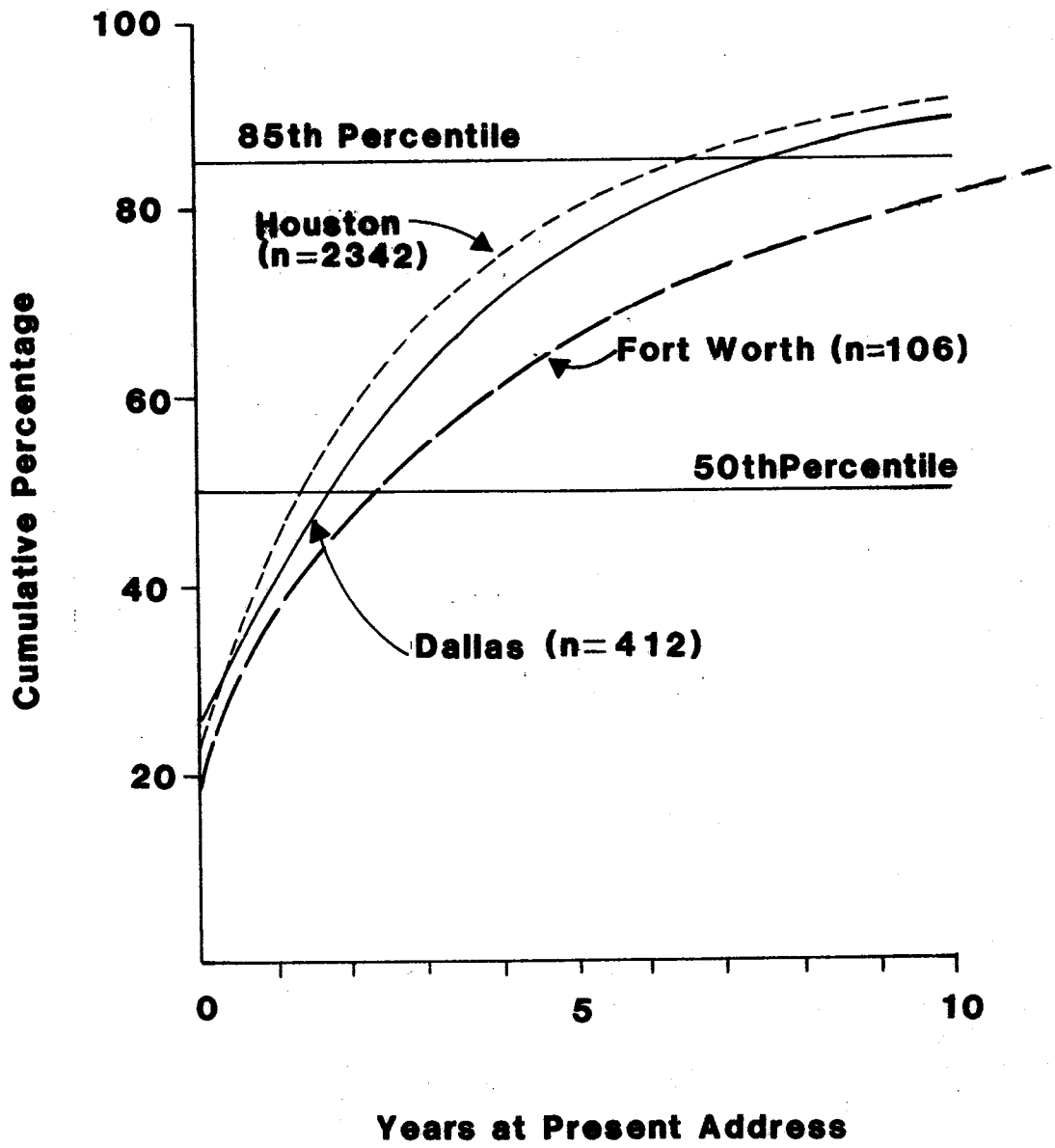


Figure 5: Years at Present Address for Park-and-Go Users, Cumulative Frequency Distribution

typically oriented to the central business district, one might expect a significant difference in the destination of Fort Worth users. Table 10 presents a summary of trip destinations indicated by the survey participants and shows that 2 primary activity centers exist, with 63% of the users going to the CBD and 29% to General Dynamics.

Almost all of the users made the trip for the purpose of work. Based upon the survey data, Park-and-Go users travel an average of 4.75 days per week to their destination via CITRAN.

Table 10: Destination of Park-and-Go Users

Lot Number	Lot and Number of Responses (n)	Destination		
		CBD	General Dynamics	Bell Helicopter
8	Jefferson Unitarian Church (n=12)	1%	99 %	
11	Herman E. Clark Stadium (n=1)	100		
14	K-Mart Shopping center (n=6)	100		
17	Edgepark Methodist Church (n=27)	15	59	26 %
19	Altamesa Church of Christ (n=4)	50	50	
20	Montgomery Ward (n=9)	100		
25	Ridglea Baptist Church (n=46)	100		
26	Arlington Heights Christian Church (n=6)		66.6	33.3
	Percent of Total (n=111)	63	29	8

Mode of Arrival at Park-and-Go Lot

On the user survey, "How did you arrive at the Park-and-Go lot this morning?" was asked. Responses are shown in Table 11.

Table 11: Mode of Arrival at the Lot: Fort Worth, Dallas/Garland and Houston

Arrival Mode	Fort Worth n=113	Dallas/Garland n=420	Houston n=2384
Drove alone	57%	66%	68%
Dropped off by someone	26	20	15
Rode with someone who also uses Park-and-Go (Ride)	8	9	11
Walk	8	0	5
Motorcycle/bicycle	1	1	0
Other	0	4	1

One point of interest arises in reviewing the data. Those data suggest that, if the lot is located close to residential areas and is easy to walk to, a significant percentage of walk-in traffic can be generated; this was not generally expected to be the case for Houston lots. Some 8% of all Park-and-Go users walk to the lot in Fort Worth. It was noted that a large variation in this percentage exists between lots, ranging from a low of 0% to some 50% of total patronage walking to the various Park-and-Go locations.

Length of Time Using Park-and-Go Service

The question "How long have you been using the Park-and-Go service?" was asked on the user survey. The responses are shown in Figure 6 and summarized in Table 12. The relatively short lengths of utilization in Houston are largely a result of the Park-and-Ride service being in place, at the time of the study, for not more than 3 or 4 years. Both Fort Worth and Dallas/Garland lots have operated since the mid-seventies and showed marked similarities in the utilization time.

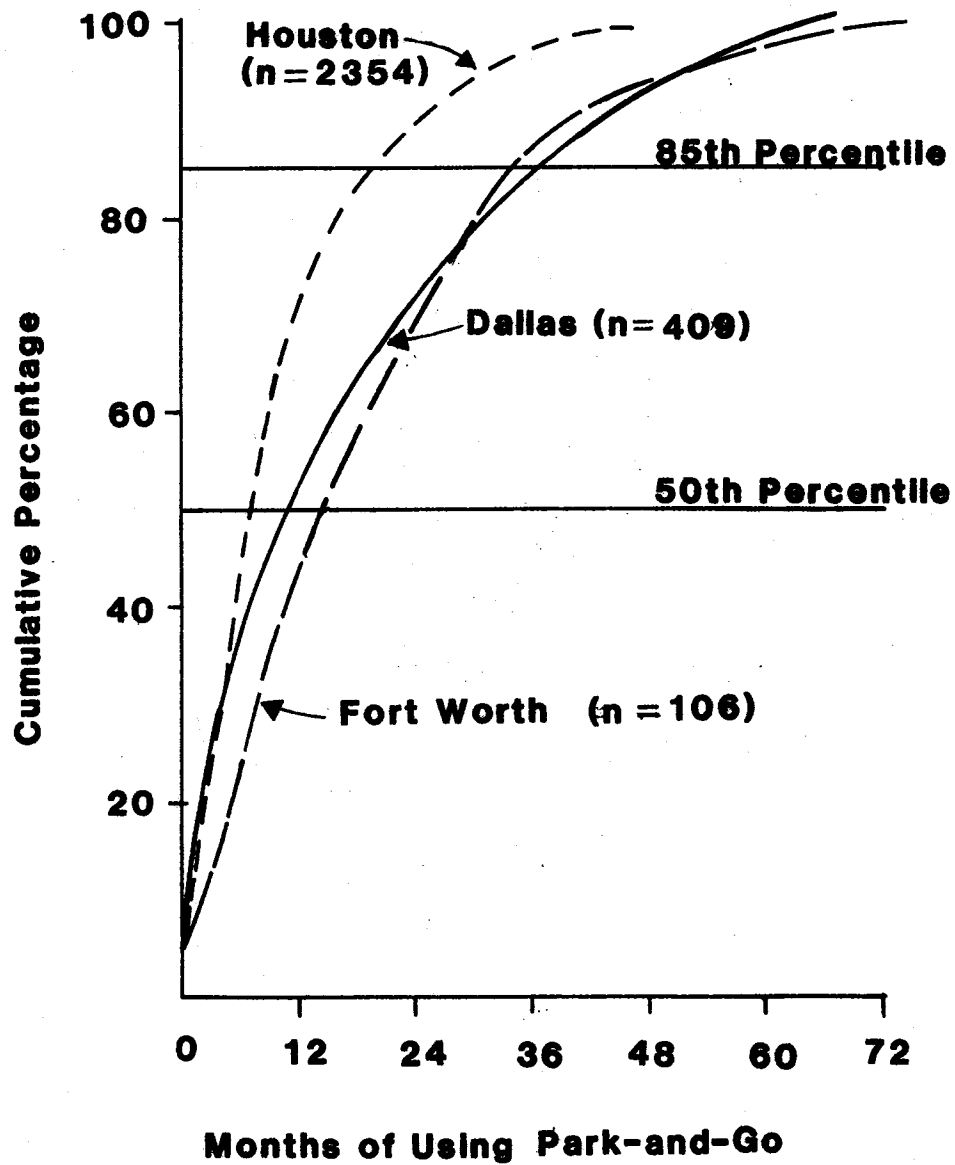


Figure 6: Length of Time for Utilizing Park-and-Go Service, Cumulative Frequency Distribution

Table 12: Length of Time Utilizing Service

Months Using Service	Fort Worth n=106	Dallas/Garland n=409	Houston n=2354
50th Percentile	15	11	7
85th Percentile	34	36	24

Overview and Personal Characteristics of Users

In terms of some characteristics, such as age, education and sex, users of the Park-and-Go, Park-and-Ride service are very similar. In terms of other factors, such as years of residing at present address, marked differences occur. The overall responses to selected characteristics by participants in the three cities are summarized in Table 13.

Important Factors and Reasons for Using Park-and-Go

In the Fort Worth, Houston, and Dallas/Garland surveys, an attempt was made to identify those aspects of the change of mode service that were most important in maintaining existing or generating new ridership.

Time/Money Savings

Patrons were asked whether they saved time and/or money by using the Park-and-Go or Park-and-Ride facilities. Follow-up questions asked the amount of time and/or money saved or lost.

Responses to the question, "Do you save time using the Park-and-Go service rather than driving?" are shown in Table 14. As would be expected, the contra-flow lane in Houston allows time savings not associated with lots in Fort Worth and in Dallas/Garland. For lots without special priority treatment, the majority of the respondents paid a time penalty by using the change of mode facility.

Table 13: Overview of Selected User Characteristics:
Fort Worth, Dallas/Garland and Houston

Characteristic	Fort Worth	Dallas/Garland	Houston
Age (Years)			
50th Percentile	35	34	30
85th Percentile	54	48	45
Sex			
Male	37%	42%	42%
Female	63%	58%	58%
Years of Education			
50th Percentile	13	14	15
85th Percentile	17	17	17
Occupation			
Clerical	36%	40%	35%
Managerial	14%	19%	17%
Professional	28%	28%	40%
Previous Mode of Travel			
Drove self	63%	50%	49%
Carpool/vanpool	15%	11%	17%
Regular bus route	8%	11%	8%
Did not make trip	9%	25%	24%
Other	5%	3%	2%
Length of Time at Present Address (Years)			
50th Percentile	2.5	1.7	1.4
85th Percentile	16.5	7.5	6.7

Table 14: Responses to the Question Pertaining to "Time Savings":
Fort Worth, Dallas/Garland and Houston Lots

Response	Fort Worth n=107	Dallas/Garland n=325	Houston n=2237
Yes	33%	30%	52%
No	62	70	41
Same	5	---	6
Not sure	0	---	1

Note: The Houston data includes lots served by buses using the priority contraflow lane.

The extent of time savings or losses will be influenced by bus headways and how close the final destination is to the bus stop compared to where the employee would normally park his or her vehicle.

Responses to the question, "Do you save money using the Park-and-Go service rather than driving?" are shown in Table 15. Responses are very similar for all surveys shown in that table. It is apparent that dollar savings are a major reason for using both Park-and-Go and Park-and-Ride services.

Table 15: Response to the Question Pertaining to "Money Savings":
Fort Worth, Dallas/Garland and Houston Lots

Response	Fort Worth n=110	Dallas/Garland n=290	Houston n=2247
Yes	87%	90%	91%
No	6	10	5
Same	7	---	3
Not sure	0	---	1

Table 16 summarizes the perceived time and dollar savings associated with using Park-and-Go or Park-and-Ride service. Median values suggest that the

typical Park-and-Go patron spends 13 additional minutes to make a one-way trip in order to save \$28 per month.

Table 16: Time and Dollars Saved/Lost Using Park-and-Go or Park-and-Ride: Fort Worth, Dallas/Garland and Houston

Dollars/Time Saved or Lost	Fort Worth	Dallas/Garland	Houston
Dollars <u>Saved</u> (Percent of Sample)	87%	90%	91%
Amount of Dollars Saved (\$/mo.)			
50th Percentile	\$28	\$25	\$39
85th Percentile	\$57	\$50	\$75
Dollars <u>Lost</u> (Percent of Sample)	6%	10%	5%
Amount of Dollars Lost (\$/mo.)			
50th Percentile	\$ 5	NA	\$15
85th Percentile	\$22	NA	\$26
Time <u>Saved</u> (Percent of Sample)	33%	30%	52%
Amount of Time (Min./Trip)			
50th Percentile	10 Min.	NA	15 Min.
85th Percentile	20 Min.	NA	28 Min.
Time <u>Lost</u> (Percent of Sample)	62%	70%	41%
Amount of Time (Min./Trip)			
50th Percentile	13 Min.	15 Min.	14 Min.
85th Percentile	20 Min.	24 Min.	25 Min.

Satisfaction with Service

Users of Fort Worth's Park-and-Go were asked to rate the general satisfaction with the service provided. Responses to this question are summarized in Table 17 along with responses from the Dallas/Garland and Houston studies.

Patrons of CITRAN are significantly more satisfied with Fort Worth's Park-and-Go service than users of Park-and-Ride in either Dallas/Garland or in Houston. Ninety-two percent of the survey participants rated the Park-and-Go services either "satisfactory" or "very satisfactory".

Table 17: Satisfaction with Park-and-Go, and Park-and-Ride Services: Fort Worth, Dallas/Garland and Houston

Level of Satisfaction	Fort Worth n=111	Dallas/Garland n=410	Houston n=2352
Very satisfactory	50%	15%	--
Satisfactory	42	46	78%
Neutral	6	10	18
Unsatisfactory	1	21	4
Very unsatisfactory	1	8	--

Important/Unimportant Factors

The survey participants were asked which features of Park-and-Go were most important to them in deciding to utilize the service. A list of some 17 features was provided, and the participant was requested to rate each feature on a scale of 1 (not important) to 5 (very important).

The responses to this question are shown in Table 18. Differences exist between the surveys in the three study cities. It is apparent that patrons enjoy the safety of riding in a bus, desire frequent and reliable bus service and a lot located close to home. Apparently safe, convenient, direct and reliable service are the most important features a transit operator can provide to serve the present clientele.

Table 18: Relative Importance of Various Park-and-Go and Park-and-Ride Features to Users of the Service: Fort Worth, Dallas/Garland and Houston

Feature	Rating ¹		
	Fort Worth	Dallas/Garland	Houston
Riding in a safe, reliable bus	4.72	4.66	4.64
Having direct bus service to your destination	4.62	4.32	4.42
The rising cost of gas and auto maintenance	4.52	4.36	4.41
A bus stop close to your place of work or school	4.48	4.18	4.31
Having a Park-and-Go lot close to your home	4.47	4.35	4.46
A reliable bus schedule	4.43	4.49	4.63
Convenient auto access to the Park-and-Go lot	4.31	4.35	4.42
Not having to drive in traffic congestion	4.29	4.30	4.55
Being able to park your car close to the bus loading point	4.21	3.80	3.74
Avoiding the stress of driving to and from work or school	4.17	4.06	4.24
Always having a seat on the bus	4.06	4.30	4.28
A bench or shelter close to the bus stop where you wait	3.64	2.91	3.20
The rising cost of parking at your destination	3.33	4.27	3.95
Riding in a new modern bus	3.02	2.85	3.51
Frequent bus service during peak periods	2.97	4.52	4.55
Bus service being available throughout the day	2.97	3.43	3.48
The bus travel time relative to auto travel time	2.94	2.89	3.44

¹Each feature was rated on a scale of 1 (not important) to 5 (very important); means are displayed.

Non-User Characteristics: Fort Worth, Dallas/Garland and Houston

Characteristics of Dallas/Garland citizens that reside in the area served by Park-and-Ride and work in the central business district served by the Dallas Transit System (DTS) are documented in Research Report 205-11 (1). Since Park-and-Ride service in Dallas focuses on the downtown, that was the only employment center or destination considered in assessing the modal split or percentage of travel demand served by transit.

The Metropolitan Transit Authority (MTA) in Houston provides service to several destinations and therefore, the individuals residing in the Park-and-Ride market areas and working in any of the following six activity centers were considered as non-users of the transit service: 1) downtown; 2) Galleria -- Post Oak; 3) Greenway Plaza; 4) University of Houston; 5) Texas Medical Center; and 6) Texas Southern University. The non-user characteristics for the Houston area are documented in Research Report 205-15 (2).

Fort Worth Park-and-Go lots are developed for use as transit facilities and also as Park-and-Pool (Rideshare) lots. Therefore, while the zip codes can be developed for an area that covers only the CITRAN bus routes, non-users would still have the option to pool to areas outside the bus service area. Considering the dual purpose of Park-and-Go, non-users were defined in terms of their occupation, age and current use of Park-and-Go service. If a survey respondent was retired, over 70 years old, and/or a current user of Park-and-Go, they were deleted from the data base. This resulted in some 310 valid observations from the two market areas; 196 from Area 1 on the city's west side and 114 from Area 2 on the east side. Table 19 shows the zip code number and destination given by the respondents defined as non-users. Only 33, or approximately 12%, of the respondents were working or going to school outside of either the Fort Worth city limits or the CITRAN service area.

Table 19: Zip Code Zones for Destination of Non-Users: Fort Worth
n=267

Zip Code Number	City Location	Number of Respondents	Zip Code Number	City Location	Number of Respondents
75050	Dallas	3	76105	Fort Worth	4
75104	Greenville	1	76106	Fort Worth	10
75231	Dallas	1	76107	Fort Worth	38
75247	Dallas	2	76108	Fort Worth	8
75261	Dallas	1	76109	Fort Worth	4
75265	Dallas	3	76110	Fort Worth	5
76000	Arlington	1	76111	Fort Worth	8
76010	Arlington	4	76112	Fort Worth	13
76011	Arlington	5	76114	Fort Worth	2
76014	Arlington	1	76115	Fort Worth	2
76015	Arlington	1	76116	Fort Worth	32
76021	Bedford	1	76117	Fort Worth	2
76039	Euless	3	76118	Fort Worth	9
76043	Glen Rose	1	76119	Fort Worth	5
76053	Hurst	4	76127	Fort Worth	3
76101	Fort Worth	20	76129	Fort Worth	2
76102	Fort Worth	47	76134	Fort Worth	2
76103	Fort Worth	6	78852	Eagle Pass	1
76104	Fort Worth	12			

NOTE: Non-Users were defined as those respondents who were not retired, over 70 years old, and/or Park-and-Go patrons.

Some 45% of the respondents indicated that their household had one or more other persons that either worked or went to school representing an average of 1.64 persons per household. Approximately 18% of the 150 other persons' work or school locations were outside of the Fort Worth city limits. Overall, the household surveys revealed that 1.64 persons either work or go to school with some 86% traveling within the CITRAN service area.

Personal Characteristics

Questions concerning age, sex, education, occupation and years at present address of Park-and-Go non-users were posed in the mail-out, household survey.

Age

Table 20 presents a summary of age for the non-users in Fort Worth, Dallas/Garland and Houston.

Table 20: Age of Non-Users: Fort Worth, Dallas/Garland and Houston

Age	City		
	Fort Worth n=290	Dallas/Garland n=201	Houston n=781
50th Percentile	40	39	39
85th Percentile	57	52	53

In both the Dallas and the Houston surveys, the median age of non-users was found to be 39 years, or one year less than the Fort Worth median of 40 years. The 85th percentile age in Fort Worth was 57, or 4 to 5 years older than non-users in Dallas/Garland and in Houston.

Sex

Table 21 summarizes non-user data on sex of respondents. Again, characteristics in Dallas/Garland and Houston are nearly identical; 68%, or 2% to 3% fewer, of the employees at the major activity centers in Fort Worth are male.

Table 21: Sex of Non-Users: Fort Worth, Dallas/Garland and Houston

Sex	City		
	Fort Worth n=301	Dallas/Garland n=201	Houston n=762
Male	68%	70%	71%
Female	32	30	29

Education

The surveys asked the question, "How many years of school have you completed?" The responses to this question are shown in Table 22.

Table 22: Education of Non-Users: Fort Worth, Dallas/Garland and Houston

Years of Education	Fort Worth	Dallas/Garland	Houston
50th Percentile	15	15	14
85th Percentile	17	17	17

As would be expected, employees in major urban centers tend to be well educated groups in all three study areas. Approximately 75% of the non-users surveyed in the Fort Worth area have at least some college education.

Occupation

As would be anticipated from the education data, the majority of non-users are white collar employees. Occupation data are summarized in Table 23. About 74% of the total employees at the major activity centers in Fort Worth and Dallas/Garland have occupations classified as clerical, managerial, or professional.

Years at Address

"How many years have you lived at your present address?" was asked in all three household surveys. While the answers were similar, non-users in Fort Worth and Dallas/Garland have lived at their present address somewhat longer than Houston residents, as shown in Table 24.

Table 23: Occupation of Non-Users: Fort Worth, Dallas/Garland and Houston -- Percentage

Occupation	Fort Worth n=296	Dallas/Garland n=194	Houston n=781
Professional	55.1%	28.9%	34.3%
Clerical	10.5	15.4	11.5
Managerial	8.1	29.9	31.0
Sales	6.4	12.4	10.2
Service Worker	5.4	2.5	2.2
Craftsman	5.7	4.2	6.1
Operative	3.7	2.1	0.9
Student	2.7	4.1	3.7
Laborer	1.0	0.5	0.1
Unemployed	1.0	0.0	0.0
Housewife	0.4	0.0	0.0

Table 24: Length of Time at Present Address, Non-Users: Fort Worth, Dallas/Garland and Houston

City	Years at Present Address	
	50th Percentile	85th Percentile
Fort Worth (n=297)	5.0	16.1
Dallas/Garland (n=201)	5.5	16.0
Houston (n=697)	4.2	10.0

Travel Characteristics

A series of questions were included on the household surveys to identify past and present travel patterns of the non-Park-and-Go patron. These questions addressed mode of travel, use of CITRAN, knowledge of Park-and-Go, perceived need for automobile, and general attitude concerning transportation. This section of the report summarizes the responses received from the home mailout questionnaire pertaining to the travel characteristics.

Mode of Travel

Non-users were asked, "How do you travel to your work or school location?" Responses to this question are summarized in Table 25. The extensive vanpool program in Houston causes the vanpool/carpool percentage to exceed that of either Fort Worth or Dallas/Garland. A higher percentage (83%) of non-users in Fort Worth "drove self" to their work or school location than in either Dallas/Garland or Houston.

Table 25: Mode of Travel to Work or School, Non-Users:
Fort Worth, Dallas/Garland and Houston

City	Mode					
	Drove Self	Carpool	Vanpool	Local Bus	Carpool/ Vanpool	Other
Fort Worth (n=297)	83%	10%	2%	3%	---	2%
Dallas/Garland (n=207)	69	---	---	4	25	2
Houston (n=711)	70	18	9	2	---	1

Use of CITRAN

Respondents to the home mail-out were asked how frequently they used the CITRAN service. The responses to this question are summarized in Table 26 for Fort Worth and compared to responses received from the Houston study.

Table 26: Use of Local Bus Service: Fort Worth and Houston -- Percentage

Frequency of Use	Fort Worth (n=300)	Houston (n=774)
Every Day	5%	11%
About once a week	4	1
Seldom	17	10
Never	74	78

In addition, respondents were asked "Do you know what bus route serves your area?" and, if yes, how far away is the nearest bus stop. Some 40% of the respondents (n=299) said they knew which bus served their neighborhood with approximately 85% indicating the bus stop location being within 7 blocks from their home.

Knowledge of Park-and-Go Service

A series of questions were asked concerning use and knowledge of the CITRAN Park-and-Go service in Fort Worth. These responses are summarized in Tables 27, 28, and 29.

Table 27: Prior Use of Park-and-Go, Park-and-Ride Services, Non-User:
Fort Worth, Dallas/Garland and Houston

City	Percentage of Non-Users that Have Used Park-and-Go or Park-and-Ride Services
Fort Worth (n=301)	10.0%
Dallas/Garland (n=207)	35.0
Houston (n=783)	25.0

Table 28: Response to the Question, "Do You Know Enough About the Park-and-Go (Park-and-Ride) Service Available to Confidently Begin Using It Tomorrow?"

City	Response		
	Yes	No	Not Sure
Fort Worth (n=297)	26%	61%	13%
Dallas/Garland (n=200)	42	48	10
Houston (n=792)	41	50	9

Table 29: Response to the Question, "Do You Know the Location of the Park-and-Go (Park-and-Ride) Nearest Your Home?"

City	Response		
	Yes	No	Not Sure
Fort Worth (n=300)	54%	39%	7%
Dallas/Garland (n=203)	80	17	3
Houston (n=792)	87	5	8

It appears that most non-users are not familiar with the CITRAN Park-and-Go service. Ninety percent have not used a Park-and-Go lot; 61% felt that they did not know enough about the service to confidently begin using it; and 39% did not know the location of the nearest Park-and-Go lot. Respondents in Dallas/Garland and Houston appear to be more knowledgeable about the service provided; with 35% of the respondents in Dallas/Garland trying the service and 25% of the respondents in Houston trying the service.

Perceived Need for Auto

Surveys in all cities asked if the respondent needed an automobile available during the day. Individuals perceiving a need for a vehicle during the day

generally are not potential Park-and-Go or Park-and-Ride patrons. Responses to the question are summarized in Table 30.

Table 30: Perceived Need for Automobile During the Workday

City	Percentage of Respondents Perceiving a Need for an Auto During the Day			
	Everyday	1 day a week	Seldom	Never
Fort Worth (n=300)	71%	12%	15%	2%
Dallas/Garland	48	---	---	---
Houston	46	17	27	10

Attitudes Concerning Transportation Facilities and Personal Travel

The Fort Worth survey presented a series of four statements relating to transportation facilities and personal travel. Respondents were asked to assess the statements with a rating of 1 (strongly disagree) to 5 (strongly agree). A summary of these results are shown in Table 31. The range of responses can be interpreted as indicating agreement or disagreement with each of the statements.

One of the intents of the household surveys has been to identify those features that could be added to the Park-and-Go or Park-and-Ride service that would be most successful in generating new ridership. A list of alternative improvements was provided to the non-users, and these individuals were asked to rate each improvement based on the likelihood of their using Park-and-Go if that improvement was implemented; each improvement was rated on a 1 to 5 basis, a 1 meaning very unlikely and a 5 meaning very likely. The alternative improvements listed were not identical in the Fort Worth, Dallas/Garland, and Houston

Table 31: General Attitudes of Non Park-and-Go Users Concerning Provision of Park-and-Go Facilities, Fort Worth

Statement Relating to Facilities	Rating ¹
I'll always dislike the idea of riding buses no matter how much the service is improved (n=281)	2.59
Traveling by bus is so much more relaxing than driving (n=282)	3.06
More tax money should be spent on improving mass transit in the Fort Worth area (n=281)	3.56
Bus riding will be more attractive as auto congestion and gasoline and parking cost increase (n=283)	4.00

¹The statements were rated on a scale of 1 to 5; a 1 meaning strongly disagree and a 5 meaning strongly agree; means are shown.

surveys. Those potential improvements addressed in the surveys are summarized in Table 32. The two most important considerations for non-users of Park-and-Go were non-stop (express) service to the destination and a time savings relative to the automobile. Conversely, the least important concerns expressed by respondents were a better understanding of the service, provision of newspapers and magazines, and seating arrangements on the bus.

Overview: Users and Non-Users

Table 33 presents an overview of selected personal and transportation characteristics of users and non-users of the three cities. Personal and travel characteristics of survey respondents in the three study cities are generally similar with a few exceptions. Users in Fort Worth tend to be older than users in Dallas/Garland or Houston. A higher percentage (63%) of Park-and-Go users "drove self" prior to becoming involved with Park-and-Go and have typically

Table 32: Relative Importance of Various Improvements to Park-and-Go/
Park-and-Ride Service in Generating Additional Ridership

Potential Improvement	Rating ¹		
	Fort Worth	Dallas/Garland	Houston
If the bus trip was non-stop to your destination	3.22	----	----
If the bus trip took less time than an automobile	3.16	4.00	3.10
If the buses stopped closer to you place of work or school	2.93	3.83	3.03
If traffic congestion of the streets and freeways became worse	2.90	3.16	2.86
If there was better security at the Park-and-Go lot	2.88	3.59	2.73
If the cost of gasoline were to increase	2.87	3.45	----
If the bus fares were lower	2.87	3.48	----
If there were bus shelters and/or benches at the Park-and-Go stops	2.84	3.27	----
If a comfortable temperature was always maintained inside the buses	2.81	3.49	3.11
If there was always a seat available	2.79	3.67	3.01
If you didn't have to wait more than 5 minutes for a bus	2.71	3.47	2.90
If there were telephones at the bus waiting areas	2.69	2.99	----
If the buses were new and more modern	2.64	2.97	----
If auto access to and from the Park-and-Go lot was more convenient	2.63	3.28	2.75
If the bus arrived and departed at the scheduled time	2.62	3.35	2.84
If the Park-and-Go lot was more visible from the roadway	2.50	2.00	----
If the buses were safer to ride on than they are now	2.48	2.84	----
If the trip did not require sitting next to strangers	2.38	2.44	----
If newspapers/magazines were provided on board on the bus	2.37	2.61	----
If you had a better understanding of how the service operates	2.33	2.65	----

¹ All improvements were rated on a 1 to 5 scale; the higher the rating, the more likely the improvements will generate additional ridership.

Table 33: Overview of Selected Personal and Transportation Characteristics, Users and Non-Users, Fort Worth, Dallas/Garland and Houston

Characteristics	Fort Worth		Dallas/Garland		Houston	
	Users	Non-Users	Users	Non-Users	Users	Non-Users
Age (Years)						
50th Percentile	35	40	34	39	30	39
85th Percentile	54	57	48	52	45	53
Sex						
Male	37 %	68 %	42 %	70 %	42 %	71 %
Female	63 %	32 %	58 %	30 %	58 %	29 %
Years of Education						
50th Percentile	13	15	14	15	15	14
85th Percentile	17	17	17	17	17	17
Occupation						
Clerical	36 %	10 %	40 %	15 %	35 %	12 %
Managerial	14 %	8 %	19 %	30 %	17 %	31 %
Professional	28 %	55 %	28 %	29 %	40 %	34 %
Mode of travel to work or school ¹						
Drove self	63 %	83 %	50 %	69 %	49 %	70 %
Carpool	15 %	10 %	-----	-----	-----	18 %
Vanpool	-----	2 %	-----	-----	-----	9 %
Carpool/Vanpool	-----	-----	11 %	25 %	17 %	-----
Regular bus route	8 %	3 %	11 %	4 %	8 %	2 %
Did not make trip	9 %	-----	25 %	-----	24 %	-----
Other	5 %	2 %	3 %	2 %	2 %	1 %
Length of time at present address (Years)						
50th Percentile	2.5	5.0	1.7	5.5	1.4	4.2
85th Percentile	16.5	16.1	7.5	16.0	6.7	10.0

¹This is the previous mode of travel for Park-and-Go and Park-and-Ride users and the current mode of travel for non-users.

lived at their current address longer than users in either Dallas/Garland or Houston. Some 13% more of the non-users in Fort Worth than in the other two urban areas "drive self" to work or school.

MARKET AREA CHARACTERISTICS

As part of the on-board surveys, two questions were asked that were used in an attempt to define the market area, or watershed, typical of Park-and-Go service. The first question asked for the origin of the trip, by zip code; the second question asked for the intersection nearest the user's home.

The variation in the survey data suggests that the market area is not the same shape for all Park-and-Go lots. Factors such as location accessibility, type of bus service, and non-user awareness appear to influence the shape of the market area. As an initial generalization for the Fort Worth study, the same typical market area defined in the Dallas/Garland and Houston studies was used to define the survey zone for the lots that were supplemented with express CITRAN service. This area is defined as being parabolic in shape, with a vertex 0.5 to 1.0 mile downstream of the lot, an axis 7 miles in length following the major artery of the lot, and a chord 8 miles in length as shown in Figure 7. The parabolic market area shape was used for defining the geographic catchment zone necessary for conducting the home mailout survey. Since express transit service to the Fort Worth CBD was provided during peak periods by CITRAN, the orientation of the parabolic area was toward the CBD destination and aligned with the principal arterial of Camp Bowie Boulevard.

Figures 7 and 8 show the two market areas where Park-and-Go household surveys were mailed plus the location of the Park-and-Go lots within the market areas. It was found that Area 1, on the City's west side, approximates the same parabolic dimensions used in the previous studies as shown in Figure 7. Following data analysis, lot 8 located in Area 2 on the City's east side shows a different market area as seen in Figure 9. Home origin data indicate that 77% of the patrons of this lot live within a circle with a diameter of 3 miles

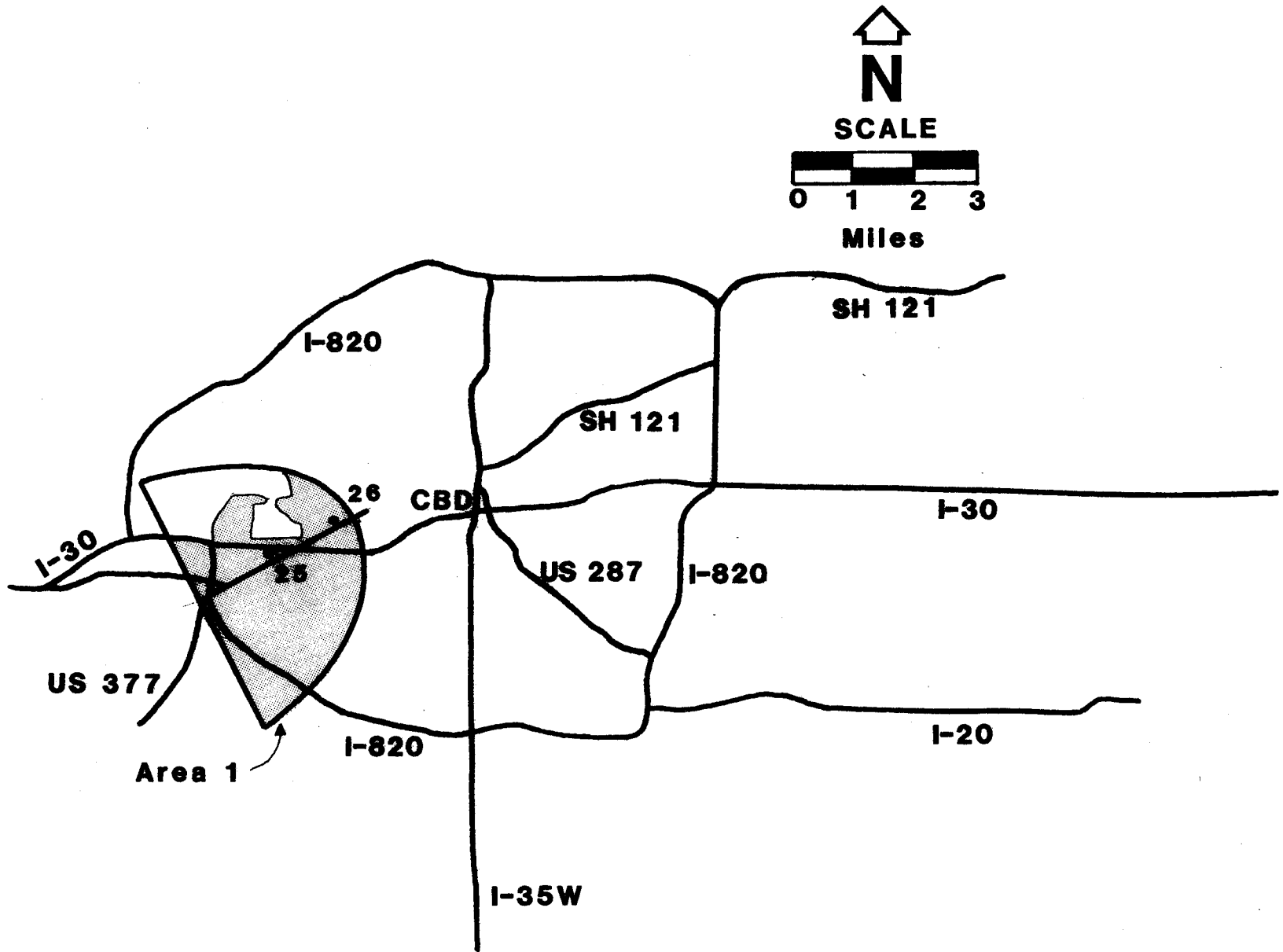


Figure 7: Market Area 1 for Park-and-Go Lots 25 and 26:
Geographic Area used for Household Survey

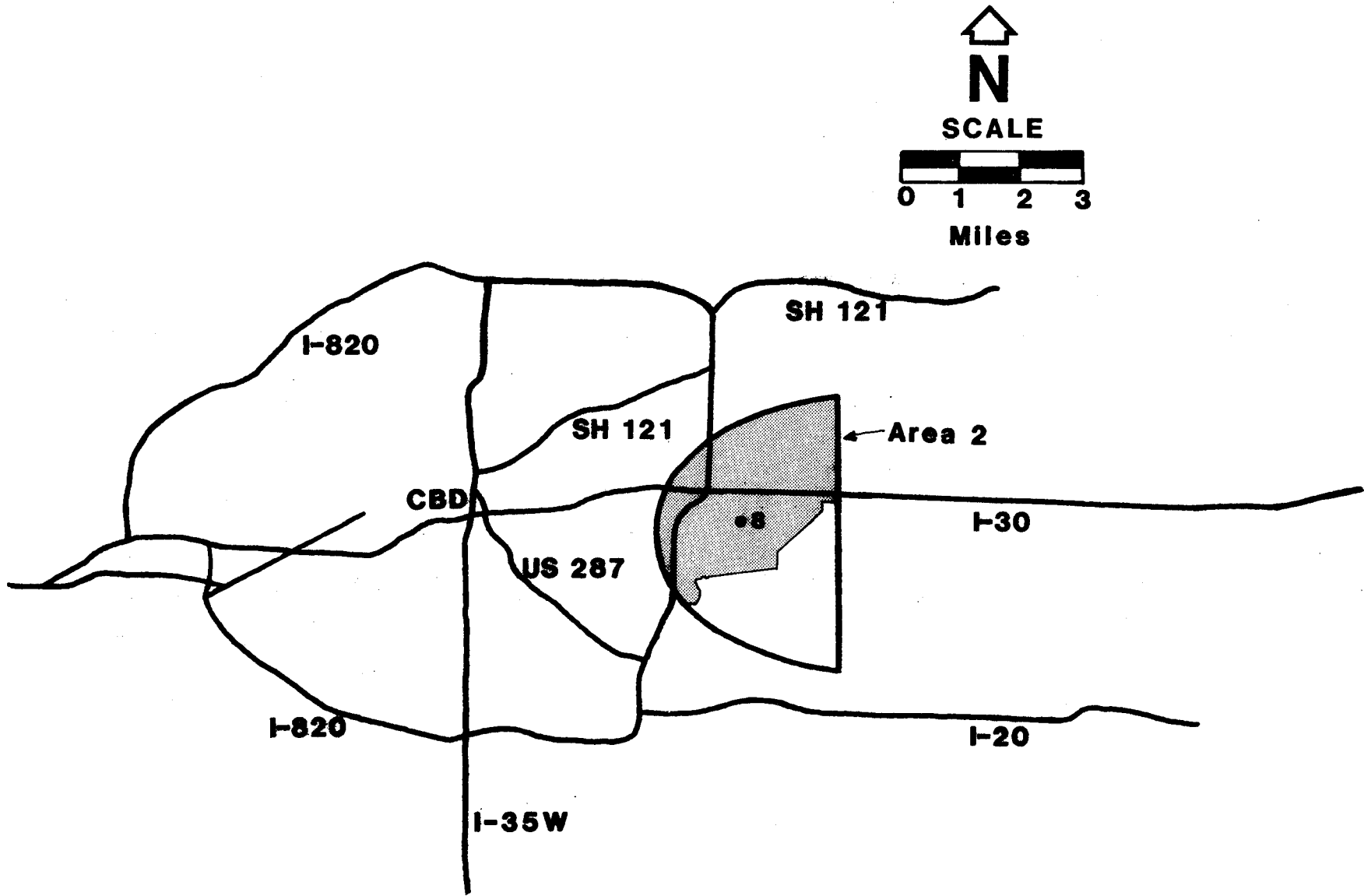


Figure 8: Market Area 2 for Park-and-Go Lot 8:
Geographic Area used for Household Survey

or a radius of 1.5 miles. Since this lot had only 9 responses that could be plotted, this shape was checked against responses from Lot 17 located in South Fort Worth at Edgepark Methodist Church. Here it was found that 76% of the patrons of this lot live within a 3 mile diameter circle as shown in Figure 9.

Given the local or non-express transit service provided to typical Park-and-Go lots, a much smaller market area seems to be more representative of the influence or catchment zone for transit users. It should be noted, however, that the smaller market areas shown in Figure 9 do not consider the home origins of Park-and-Poolers or those commuters which use the facility for carpooling/vanpooling activity.

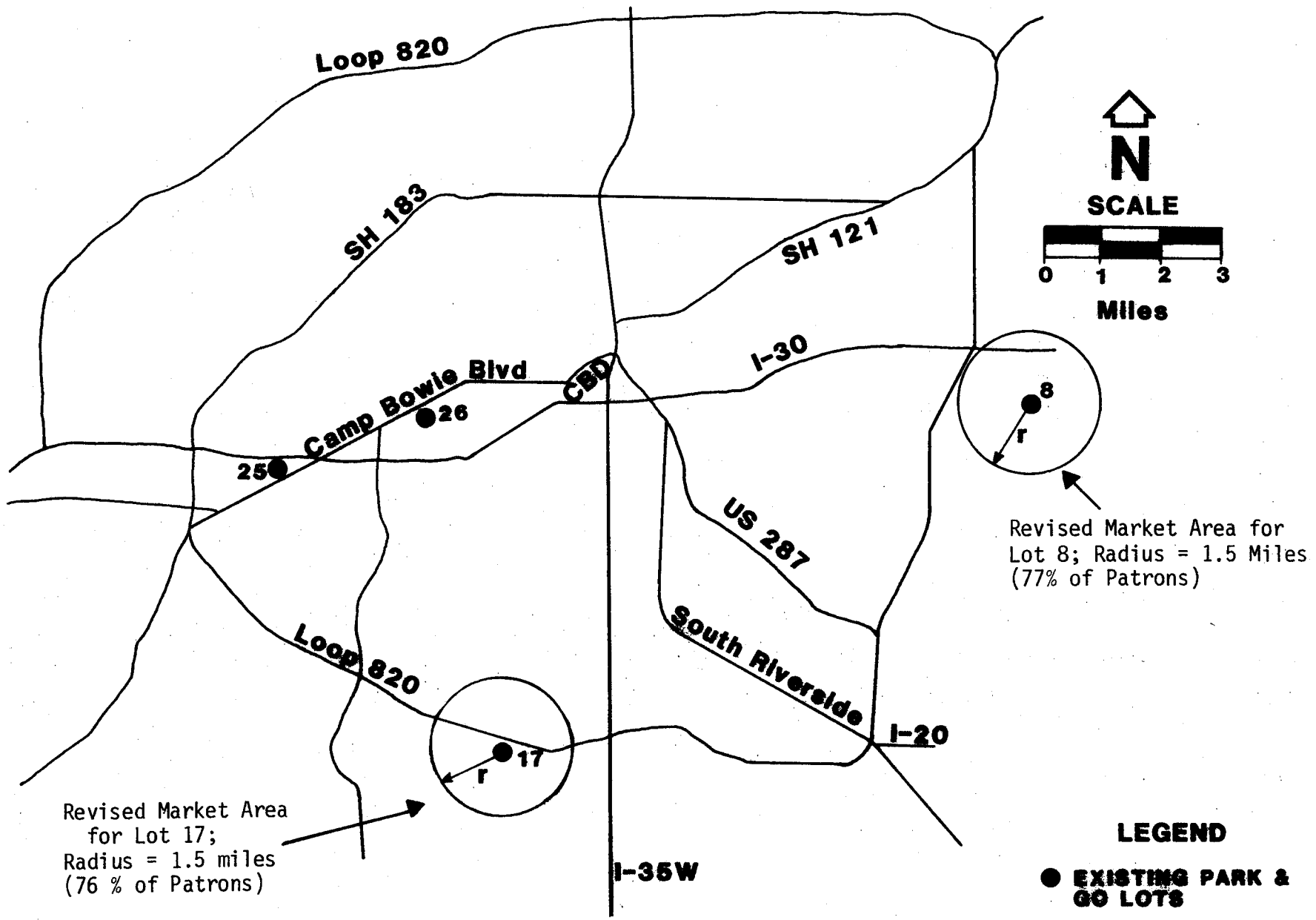
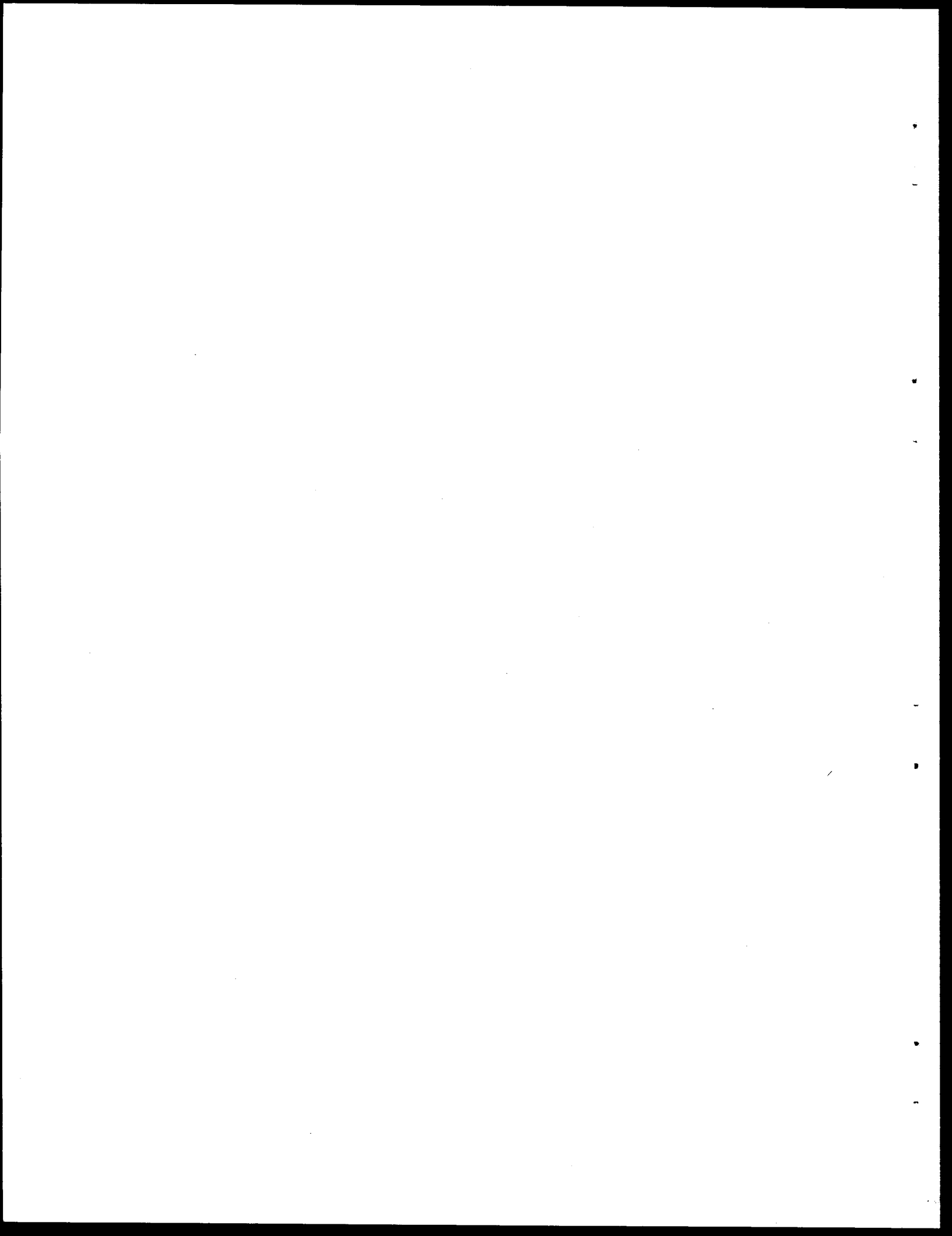


Figure 9: Park-and-Go Market Areas for Lots 8 and 17



MAJOR FINDINGS

The data collected in Fort Worth expanded the available information on Park-and-Go and Park-and-Ride facilities in Texas. As a general observation, it is surprising the data collected in Fort Worth, Dallas/Garland, and Houston are similar, especially in light of the priority treatment on the North Freeway in Houston that provides three lots with a distinctly different service feature from other lots surveyed in the State.

Park-and-Go lots are a success in terms of usage in some areas of the Fort Worth area, with car counts ranging from 36 to 110 in November 1981; however, there were numerous lots (18) with car counts ranging from 0 to 15.

Modal Split

Modal split values for transit use in Fort Worth are not high. Less than 1% of the households in the 2 market areas surveyed that work in the central business district (CBD) use Park-and-Go or local bus service as a means of transportation. Some 83% of the non-users drive alone to their work or school location while approximately 12% vanpool or carpool.

Employment at Major Activity Centers

Users of Park-and-Go service identified two major activity centers as primary destination; the CBD and General Dynamics. The largest percentage, 63%, traveled to the CBD, while 29% worked at General Dynamics.

Characteristics of Park-and-Go Users and Non-Users

The user and non-user characteristics as determined in the Fort Worth, Dallas/Garland, and Houston surveys are similar. The user group is younger, has

a larger percentage of females and has generally lived at the present address a shorter period of time than the non-user group. All groups have similar educational backgrounds and are relatively well-educated. The user segment has a higher percentage of clerical personnel, while the non-user group has a higher percentage of managerial personnel.

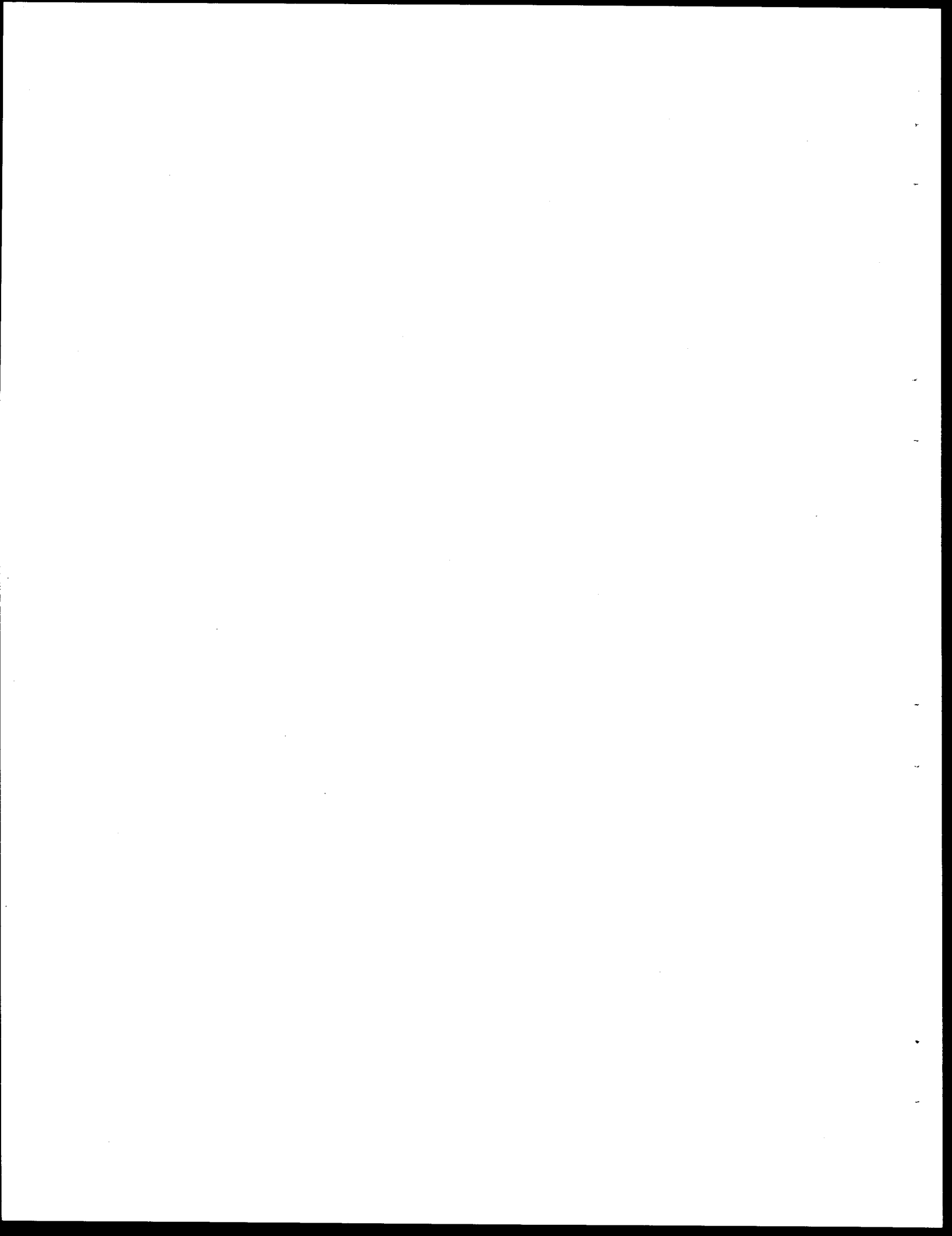
Important/Unimportant Features of Park-and-Go

A major thrust of this research has been to identify the features of Park-and-Go that were important to users as well as those unimportant to users in making their decision to use Park-and-Go. Also, the surveys were designed to determine what new features of Park-and-Go could be added to cause non-users to consider using Park-and-Go transit service. These features are summarized in Table 34.

It appears that direct, reliable, and safe bus service are the most important features to users while provisions of priority treatment to provide a travel time advantage for express buses may be the most effective means of attracting new users to Park-and-Go.

Table 34: Important and Unimportant Features of Park-and-Go Service

Survey Group	Important Features	Unimportant Features
Users	<ul style="list-style-type: none"> ● Safe, reliable bus ● The rising cost of gas and auto maintenance ● Direct service to destination ● Bus stop close to work/school ● Bus stop close to home 	<ul style="list-style-type: none"> ● Shelter at bus stop ● Riding in new, modern bus ● Bus travel time relative to auto ● Frequent bus service ● Mid-day service
Non-Users	<ul style="list-style-type: none"> ● Non-stop to destination ● Bus trip faster than auto ● Bus stop close to work/school ● Worse traffic congestion ● Better security at lot ● Bus shelters and/or benches at the Park-and-Go stop 	<ul style="list-style-type: none"> ● Better access to lot ● Buses were safer, newer and more modern ● Newspapers and magazines provided ● Lot more visible and/or more accessible



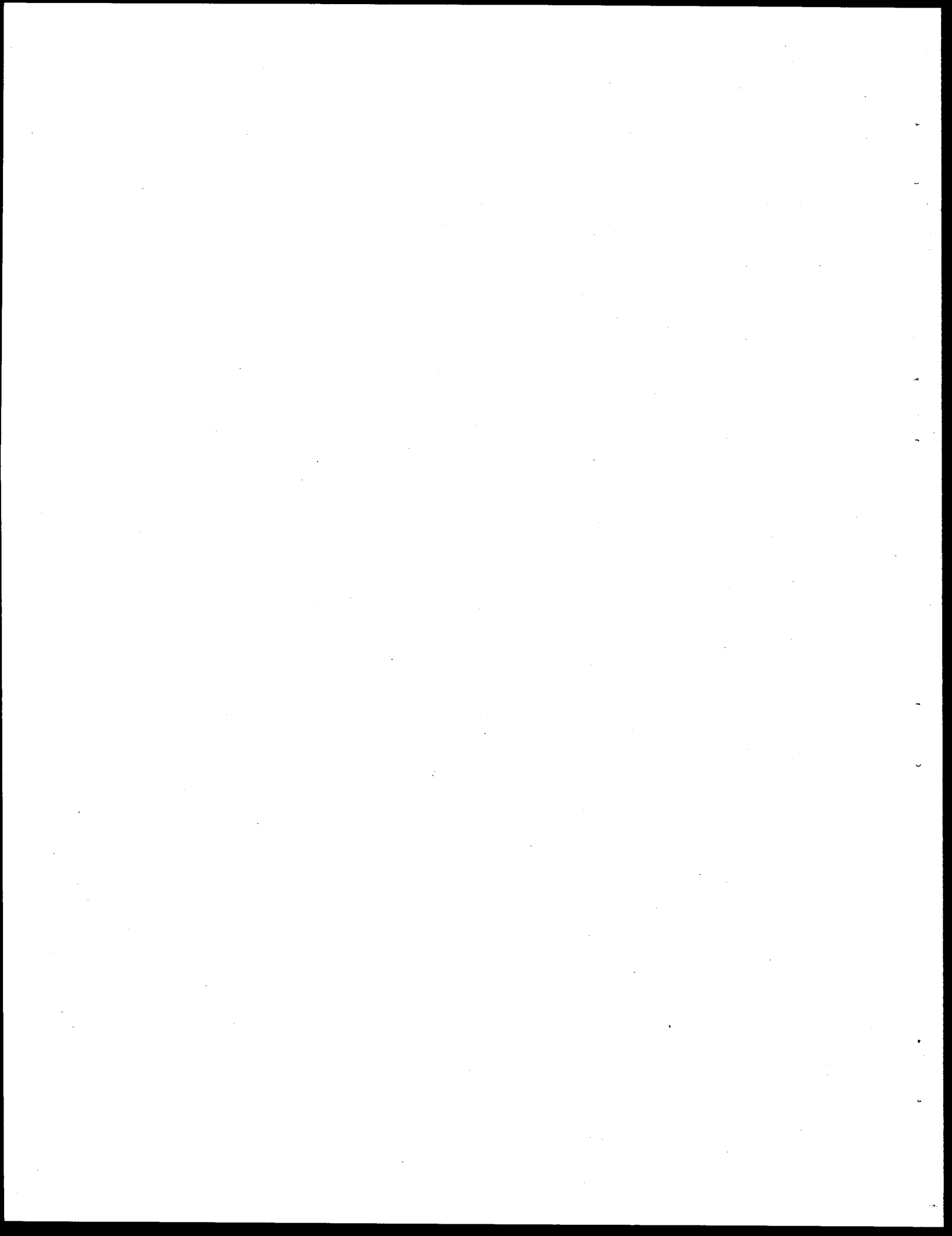
MARKETING IMPLICATIONS

General

Fort Worth residents appear to know less about the Park-and-Go features than non-users in both Dallas/Garland and Houston. A small percentage (54%) know the location of the Park-and-Go lot nearest their home. However, approximately 71% of the non-users in Fort Worth perceive the need for a car daily as compared to 48% for Dallas/Garland and 46% for Houston. Marketing could be an effective tool in educating the non-user group in Fort Worth; 74% of the non-users did not feel or were not sure that they could confidently use the Park-and-Go service tomorrow.

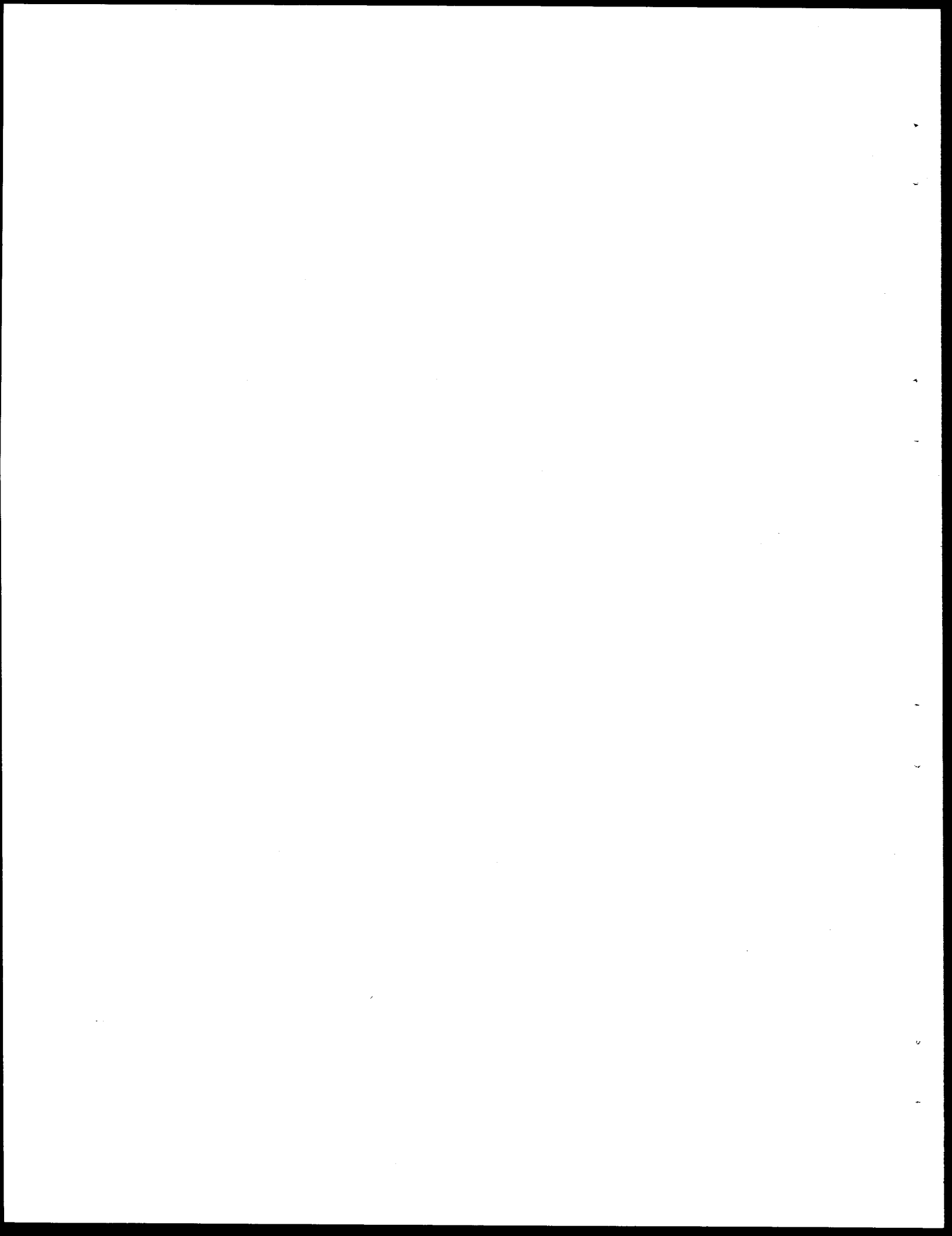
Shape of Market Areas

While many factors will influence the shape of a Park-and-Go market area there are possibly two typical shapes in Fort Worth depending on the type of bus service provided. The first typical shape would be the parabolic market area of the Dallas/Garland and Houston Park-and-Ride services. This shape market area was verified for Lot 25, Ridglea Baptist Church, which has express service to downtown Fort Worth. The second shape common to most Park-and-Go lots would be a circle with a diameter of about 3 miles. This shape was tested by plotting the nearest intersection to the user home in Lots 8 and 17 as shown in Figure 9. The results show that in Lots 8 and 17, over 75% of the patrons lived within these limits.



REFERENCES

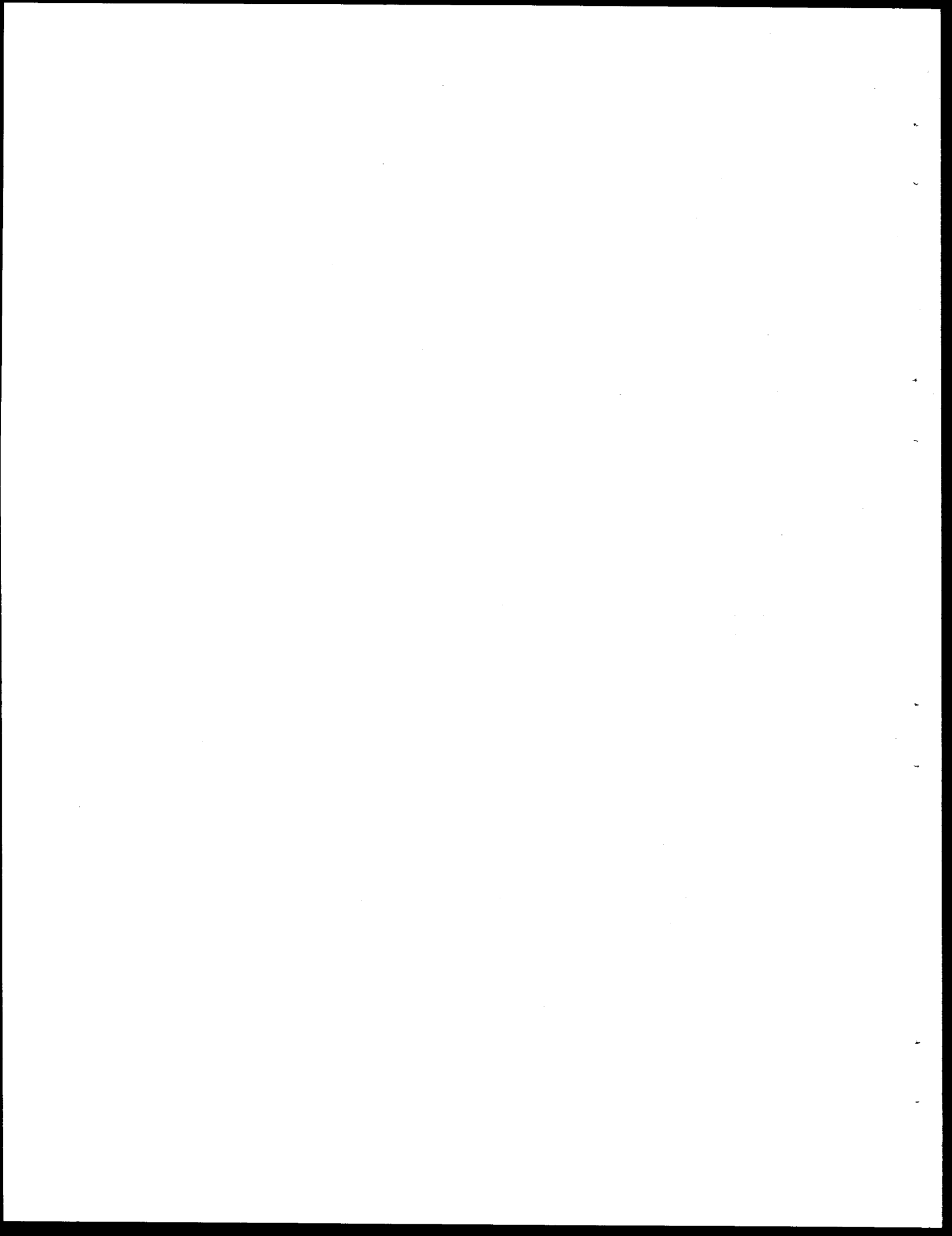
1. "Factors Influencing the Utilization of Park-and-Ride: Dallas/Garland Survey Results," Research Report 205-11, available through State Department of Highways and Public Transportation, Planning and Research Division, Austin, Texas 78701
2. "Houston Park-and-Ride Facilities: An Analysis of Survey Data," Research Report 205-15, available through the State Department of Highways and Public Transportation, Planning and Research Division, Austin, Texas 78701.
3. "Park-and-Pool Lots Dallas/Fort Worth Area: An Analysis of Survey Data," Research Report 205-18, available through the State Department of Highways and Public Transportation, Planning and Research Division, Austin, Texas 78701.
4. Cole's Cross Reference Directory, Fort Worth, Texas, 1981-82 Issue, Cole Publications, 5280 Trail Lake Drive, Fort Worth, Texas 76133.



APPENDIX A

SURVEY INSTRUMENTS

Survey instruments used for both the on-board and the home mail-out surveys are included in this appendix.



Park & Go User 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
and the U.S. Department of Transportation, Federal Highway Administration*

Dear Park & Go User: We need your Help! The purpose of this study is to obtain information about your use of, and opinions concerning, Park & Go Lots to assist in planning future lots. Please answer the questions and give your completed survey form to the bus driver at the end of your trip.

1. Before you began using the Park & Go service, how did you normally make this trip?
 Drove alone CITRAN local bus Other
 Carpool Vanpool Did not make trip
2. How long have you been using the Park & Go service? _____ Months
3. How did you arrive at the Park & Go lot this morning?
 Drove alone Dropped off by someone Walked
 Rode with someone who also uses Park & Go Motorcycle/Bicycle Other
4. What is your final destination and trip purpose?
Address, building or company: _____ Zip: _____
Trip purpose: Work School Other(Specify) _____
5. How many days per week do you travel from this Park & Go lot to your final destination? _____ Days
6. If you drove to work instead of using Park & Go, would your employer pay all or part of your parking cost?
 Yes (All) Yes (Part) No
7. Does your employer or school provide any incentives for carpools or vanpools?
 Yes No
7a. If yes, what incentives? _____
8. Do you save time using the Park & Go service rather than driving?
 Yes / If "yes," how many minutes do you save one-way? _____ Minutes
 No / If "no," how many minutes do you lose one-way? _____ Minutes
9. Do you save money using the Park & Go service rather than driving?
 Yes / If "yes," about how much do you save? \$ _____ Per Month
 No / If "no," about how much do you lose? \$ _____ Per Month

(OVER)



**STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION**

AUSTIN, TEXAS 78763

COMMISSION

A. SAM WALDROP, CHAIRMAN
DEWITT C. GREER
RAY A. BARNHART

ENGINEER-DIRECTOR
M. G. GOODE

IN REPLY REFER TO
FILE NO.

PUBLIC TRANSPORTATION SURVEY

Dear Resident:

A limited number of households in your area are being asked to participate in a study undertaken by the Texas Transportation Institute, Texas A&M University System. The purpose of this survey is to obtain information about your household's transportation needs.

Since we have included only a small number of households in this survey, your participation is essential to insure the success of the project. Please complete the requested information and return it in the enclosed envelope at your earliest convenience.

We are grateful for your participation in the survey.

Sincerely,

A handwritten signature in cursive script that reads "Phillip L. Wilson".

Phillip L. Wilson
State Planning Engineer, Transportation

PLW:jem
Enclosure



COMMISSION

A. SAM WALDROP, CHAIRMAN
ROBERT H. DEDMAN
JOHN R. BUTLER, JR.

**STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION**

AUSTIN, TEXAS 78763

ENGINEER-DIRECTOR
MARK G. GOODE

IN REPLY REFER TO
FILE NO.

PUBLIC TRANSPORTATION SURVEY

Dear Resident:

During the last few weeks a number of households in your area were asked to participate in a survey being conducted by The Texas Transportation Institute, Texas A&M University System. The purpose of this survey is to obtain information about your household's transportation needs.

Since we have included only a small number of households in this survey, your participation is essential to insure the success of the project. Please complete the requested information as best you can and return it to us in the postage-paid envelope at your earliest convenience.

We are grateful for your participation in the survey.

Sincerely,

A handwritten signature in cursive script that reads "Phillip L. Wilson".

Phillip L. Wilson
State Planning Engineer, Transportation

PLW:jem
Enclosure

Park & Go Household 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
and the U.S. Department of Transportation, Federal Highway Administration

This questionnaire is designed to be easy to complete and should take no more than 5-10 minutes of your time. All answers will remain confidential. Please answer the following questions and return this form at your earliest convenience in the postage-paid envelope.

1. What is the location of your work or college? _____ Zip _____
2. How many others in your household work or attend college? _____
2a. At which location(s) do they work or attend college?
_____, Zip _____; _____, Zip _____; _____, Zip _____
3. How do you travel to your work or college location? _____ Drive Alone _____ Carpool
_____ Vanpool _____ CITRAN Park & Go Bus _____ CITRAN Local Bus _____ Other
4. Do you know what bus route serves your area? _____ Yes _____ No
If yes, about how far do you live from the nearest bus stop? _____ Blocks
5. How often do you ride a CITRAN bus?
_____ Almost Every Day _____ About Once a Week _____ Seldom _____ Never
6. Have you ever used a Park & Go Lot? _____ Yes _____ No
Do you know what CITRAN Park & Go service is? _____ Yes _____ No _____ Not Sure
7. Do you know the location of the Park & Go lot nearest your home?
_____ Yes _____ No _____ Not Sure
8. Do you know enough about the CITRAN Park & Go service to "confidently" start using it tomorrow?
_____ Yes _____ No _____ Not Sure
9. How often do you need to have your car available during the day?
_____ Almost Every Day _____ About Once a Week _____ Seldom _____ Never
10. How many years have you lived at your present address? _____
10a. If less than 2 years, in what city and state did you previously live?
City: _____ State: _____
11. What is your current occupation, in as specific terms as possible. (Also, please specify if retired, unemployed, student, or homemaker.)

12. How many years of school have you completed? _____ years
13. Age _____
14. Sex? _____ Male _____ Female

15. The following is a list of considerations which may affect a person's use of the CITRAN Park & Go service. Please answer by circling the number which best explains how likely you would be to use Park & Go for each of the following conditions.

HOW LIKELY WOULD YOU BE TO USE PARK & GO	Very Unlikely	No Difference	Very Likely
If you had a better understanding of how the service is operated	1	2 3 4 5	
If the buses arrived and departed at the scheduled time	1	2 3 4 5	
If you didn't have to wait more than 5 minutes for a bus	1	2 3 4 5	
If the buses were safer to ride on than they are now	1	2 3 4 5	
If the buses stopped closer to your place of work or school	1	2 3 4 5	
If traffic congestion on the streets and freeways became worse	1	2 3 4 5	
If the cost of gasoline were to increase	1	2 3 4 5	
If the bus trip took less time than an automobile trip	1	2 3 4 5	
If the bus fares were lower	1	2 3 4 5	
If the buses were newer and more modern	1	2 3 4 5	
If the trip did not require sitting next to strangers	1	2 3 4 5	
If there was always a seat available	1	2 3 4 5	
If a comfortable temperature was always maintained inside the buses	1	2 3 4 5	
If newspapers/magazines were provided on board the bus	1	2 3 4 5	
If the Park & Go lot was more visible from the roadway	1	2 3 4 5	
If auto access to and from the Park & Go lot was more convenient	1	2 3 4 5	
If there was better security at the Park & Go lot	1	2 3 4 5	
If there were telephones at the bus waiting areas	1	2 3 4 5	
If there were bus shelters and/or benches at the Park & Go stops	1	2 3 4 5	
If the bus trip was non-stop to your destination	1	2 3 4 5	

16. Below are several statements relating to transportation facilities and personal travel; you will probably agree with some of the statements and disagree with others. Please answer by circling the number which best represents your feeling about each of the statements.

	Strongly Disagree	Neutral	Strongly Agree
I'll always dislike the idea of riding buses no matter how much the service is improved	1	2 3 4 5	
Traveling by bus is so much more relaxing than driving	1	2 3 4 5	
More tax money should be spent on improving mass transit in the Fort Worth area	1	2 3 4 5	
Bus riding will be more attractive as auto congestion and gasoline and parking costs increase	1	2 3 4 5	

APPENDIX B

Survey Procedures

Most of the data presented in this report were obtained through either the on-board (user) survey or the home mail-out (non-user) survey. The two survey instruments for Fort Worth are shown in Appendix A. Lot locations and geographical areas for the home mail out are shown in the main body of the report in Figures 1 and 2.

Sample selection is discussed in Research Report 205-11. The general procedures used in that study were duplicated in the Fort Worth surveys.

On-Board Survey

The Fort Worth surveys were conducted at 8 Park-and-Go lots during the morning peak period (approximately 6-8 a.m.). Each rider was given a survey and asked to fill out the form and return it to the bus driver upon departing the bus. Some 77% of the patrons chose to participate in answering the survey. The number of surveys completed, by lot, is shown in Table B-1.

Home Mail-Out Survey

The target geographic areas as well as the number of household surveys mailed and returned from each survey area are discussed in the main body of this report. An initial mail-out plus one follow-up mail-out was undertaken.

The two target areas were defined for the Park-and-Go lots in the approximate area as parabolic resembling catchment areas typical to Park-and-Ride services. These market areas were related to the trade zones shown in Cole's Directory. Based on work performed in Dallas/Garland (Research Report 205-11), 800 addresses were selected at random for Area 1 to represent households in the

Table B-1: Completed On-Board Surveys Per Lot, Fort Worth

Lot Name	Lot Number	Number of Surveys Completed
Jefferson Unitarian Church	8	12
Herman E. Clark Stadium	11	2
K-Mart Shopping Center	14	6
Edge Park Methodist Church	17	27
Altamesa Church of Christ	19	4
Montgomery Ward	20	9
Ridgelea Baptist Church	25	47
Arlington Heights Christian Church	26	6
TOTAL		113

vicinity of Lots 25 and 26. Since Area 2, located on the city's east side, contained only one Park-and-Go lot within the defined market area, 400 addresses were selected at random. These 1200 addresses formed the basis for the home mail-out or non-user surveys. Tables B-2 and B-3 give the sampling calculations for the two market areas.

Table B-2: Area 1, Sampling Calculations for Home Mail-Out.

Trade Zone	Total Residences	Percent In Market Area	Adjusted Resident Catchment Area	*Number To Sample	Number Multi-Family	Number Single Family
52	4746	5	237	8	5	3
10702	2355	2	47	2	0	2
2301	1204	100	1204	41	14	27
2302	1994	50	977	33	1	32
2402	1877	100	1877	64	10	54
2401	2014	100	2014	69	28	41
22	4260	100	4260	145	28	117
25	2169	100	2169	74	1	73
26	8322	100	8322	282	51	231
27	1585	100	1585	54	8	46
4201	4282	2	85	3	0	3
5402	3367	20	673	23	2	21
5401	604	100	64	2	0	2
TOTAL			23,514	800	148	652
Total Samples					800	

$$\text{*Number to Sample} = \frac{\text{Adjusted Residents X Sample Size}}{\text{Total Adjusted Residences}}$$

Table B-3: Area 2, Sampling Calculations for Home Mail-Out

Trade Zone	Total Residences	Percent In Market Area	Adjusted Resident Catchment Area	*Number To Sample	Number Multi-Family	Number Single-Family
6501	3068	65	1944	109	37	72
6502	1173	98	1150	63	18	45
6503	2274	100	2274	125	26	99
6504	2098	10	210	12	1	11
6505	288	100	288	16	1	15
64	717	100	717	39	3	36
13	3325	20	665	36	4	32
TOTAL			7298	400		
					Total Samples	400

*Number to Sample = $\frac{\text{Adjusted Residents X Sample Size}}{\text{Total Adjusted Residence}}$