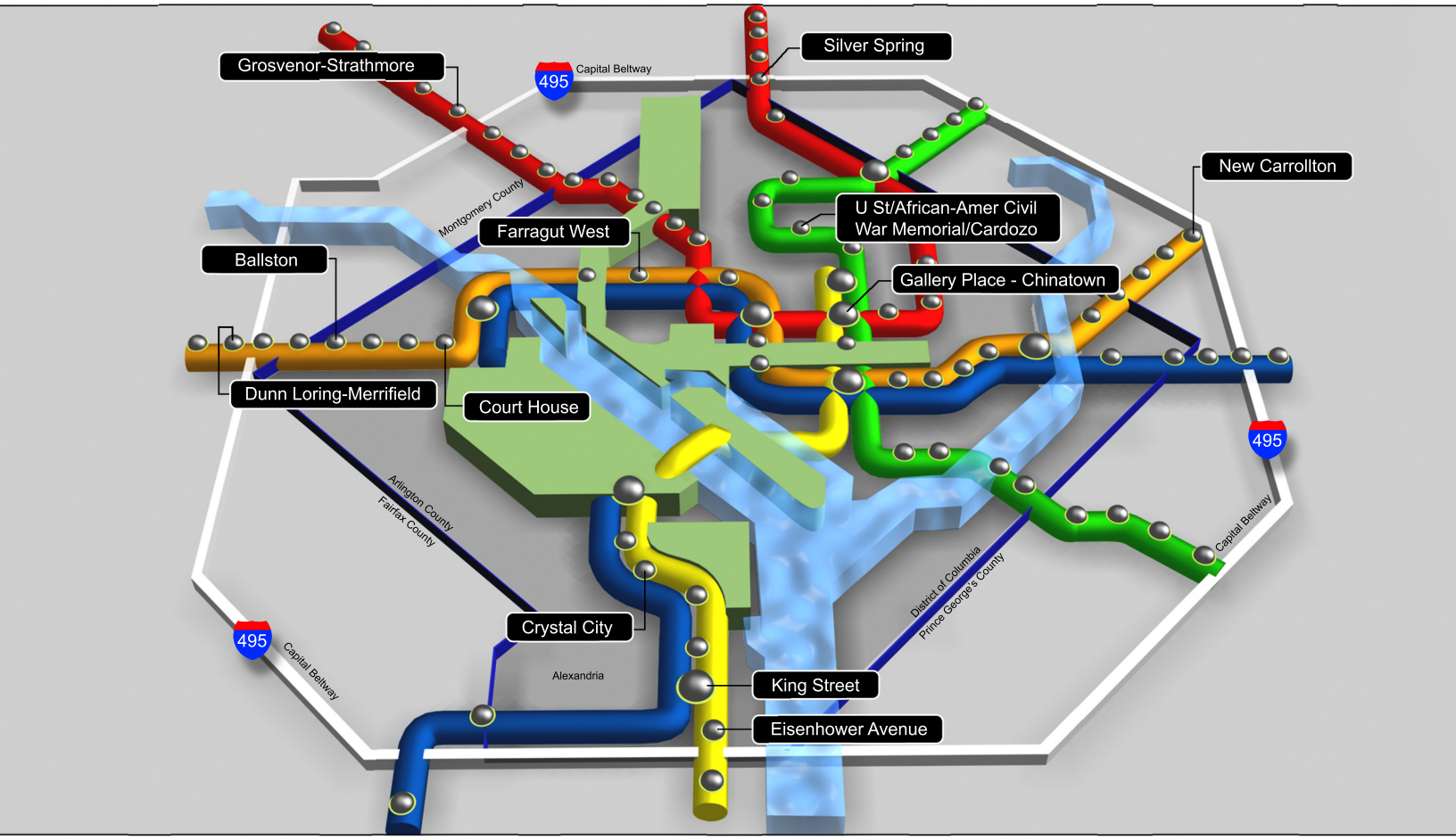
March 2006

2005 DEVELOPMENT-RELATED Ridership Survey

FINAL REPORT



Washington Metropolitan Area Transit Authority

The 2005 Development-Related Ridership Survey was sponsored by the Washington Metropolitan Area Transit Authority (WMATA). The project manager for WMATA was Kristin Haldeman. The prime consultant was Parsons Brinckerhoff (PB). The project manager for PB was Phil Braum. He was assisted by Jason Yazawa and Robert Donnelly. Diversity Services, Inc. conducted the data collection. Its project manager was Ellen DeBremond, and the field supervisor was Salvador Cortes.

WMATA wishes to acknowledge and thank the many people who provided their time and assistance to make this survey effort a success. These included local jurisdiction staff, property and site managers and local community and business groups. Without their cooperation and support, conducting this study would not have been possible.

Executive Summary

S.1 Study Purpose

The purpose of the 2005 Development Related Ridership Survey was to update a 16-year old study conducted by the Washington Metropolitan Area Transit Authority (WMATA) that surveyed the travel behavior of persons traveling to and from office, residential, hotel and retail sites near Metrorail stations. The 2005 effort sought to determine if modal splits for these land uses have changed over time and whether certain physical site characteristics still impact transit ridership. In 2005, 49 sites of the land uses listed above plus entertainment venues near 13 Metrorail stations participated in the study, which was designed to mimic the earlier efforts as a way to provide some context for comparison.

S.2 Background

In the 16 years since WMATA last surveyed development around its rail stations to determine how much transit ridership certain land uses generate when placed near rail stations, much has changed in the Washington metropolitan region in terms of population growth, the regional economy and the built environment. Given these changes, WMATA determined that the time was right to conduct a new survey, modeled on the 1989 survey, to evaluate whether this changed environment had affected modal splits at certain types of land uses in Metrorail station areas and to determine if certain physical attributes of these land uses impact transit ridership.

In 1989, stations were organized into three typologies: CBD location, Suburban-Inside the Beltway and Suburban-Outside the Beltway. The 2005 effort was designed to update these figures based on the changed environment and has generally organized data based upon the same typologies.

The 1989 study and an earlier 1987 study[1] identified a set of statistical relationships between the distance at which a building (office, residential, retail or hotel) is sited from the rail station and the amount of transit ridership it generates. The 2005 effort aimed to assess to what degree these relationships were still valid and whether additional variables might also show a strong relationship with transit ridership. Some of the additional variables tested include: quality of the pedestrian environment; housing density in the station area; job density in the station area; attractiveness of automobile access; and the availability of transit subsidies.

As in the earlier studies, the 2005 survey targeted high-density commercial office and residential sites, retail and hotel sites, as well as a new use, "entertainment" (which for this study's purposes was defined as movie theaters), as these are the types of land uses typically proposed in joint development projects. The 2005 study secured participation from 49 sites distributed as shown in Table S-1.

[1] In addition to the 1989 Survey, WMATA also conducted a similar survey in 1987.

Table S-1
Final Distribution of Survey Sites by Land Use Type and Station Location

Station Area	Classification[1]	Office	Residence	Retail	Hotel	Enter.	Total
Ballston	I	2	2	1	1	1	7
Court House	I	2	2	--	--	--	4
Crystal City	I	2	2	2	2	--	8
Dunn-Loring	O	--	1	--	--	--	1
Eisenhower Avenue	I	--	--	--	--	1	1
Farragut West	C	2	--	--	--	--	2
Friendship Heights	I	2	2	--	1	--	5
Gallery Place	C	--	2	--	--	--	2
Grosvenor	O	--	4	--	--	--	4
King Street	I	2	--	--	--	--	2
New Carrollton	O	1	--	--	--	--	1
Silver Spring	I	3	2	1	1	2	9
U Street/African-Amer Civil War Memorial/Cardozo	I	1	1	1	--	--	4
Total		**17**	**18**	**5**	**5**	**4**	**49**

[1] C = CBD; I=Inside Beltway; O=Outside Beltway

S.3 Summary of Findings

It is important to note that response rates varied considerably from site to site, and particularly with the office surveys. In addition to changes in the physical environment (e.g., greater urbanization in rail station areas, increasing suburbanization of outer jurisdictions) over the last 16 years, the region, like the rest of the nation and even the world, has experienced a change in attitude with respect to security (especially in light of the September 11, 2001, attacks) and to providing personal information to outside entities. The project team anticipated that potential respondents might be reluctant to answer the survey and that property managers might also refuse to allow survey efforts to be conducted at their locations.

These expectations seem to have been borne out in the low response rates at some buildings, offices in particular, as well as in the final number of sites agreeing to participate. For the most part, at office sites where there was a 'champion' from building management or on-site staff, response rates were fairly high. However, without the 'insider assistance,' response rates faltered. The project team also found a resistance on the residential side to the hand-delivery of survey forms, and on the office management side to even approaching tenants with survey forms. Lastly, the project team attempted to secure some federal participation at stations, but was unable to do so for a variety of reasons, namely security concerns. For these reasons, the 2005 effort faced a number of challenges that only performing the study could have revealed. In the end, the process itself yielded a wealth of information to be incorporated into subsequent study efforts.

Nonetheless, the information gleaned from these sites does provide a good look into the current state of travel at sites around rail stations and offer some explanation as to cause and effect. That

said, there also is sufficient reason for additional, more targeted research to be conducted in certain areas to delve more deeply into the reasons for certain modal splits.

S.3.1 General Observations

1. 2005 survey results confirmed previous findings that the walking distance between a site and the Metrorail station affects transit ridership (see Table S-2). In general, the closer a site is to the station, the greater likelihood those traveling to/from or within a site choose Metrorail as their travel mode. Based on the survey results, this relationship was stronger for residential sites than for office sites.

Table S-2
Regression Equation Summary for Office Commute and Residential Trips by Distance from Station

Distance (Mile)	Metrorail Mode share		All Transit[1] Mode Share		Auto Mode Share	
	Office Commute	Residential	Office Commute	Residential	Office Commute	Residential
0	35%	54%	46%	55%	48%	29%
1/4	23%	43%	30%	45%	66%	41%
1/2	10%	31%	13%	36%	83%	54%

Notes: [1] Includes Metrorail, Metrobus, commuter rail and other transit options.

2. In urban fringe or outlying locations, residential uses may be more reliable in boosting Metrorail ridership than office uses (see Table S-3). Based on the results of the survey, outlying office sites tended to produce trips connected with areas outside the core, which typically are not well served by transit.

3. At the overall site level, survey results showed that high-density, mixed-use environments with good transit access generated higher shares of transit and walk trips—especially midday trips from and visitor trips to office sites, than those areas dominated by a single use.

4. Metrorail continues to remain competitive with the automobile in markets where it provides good access and service and has increased its mode share in the core since 1989. In each surveyed land use category, those trips recorded to or from the District, the jurisdiction with the greatest number of rail stations and a comprehensive bus network, showed the highest rates of Metrorail and transit use.

5. Overall, when compared to the results of the 1989 Survey, the 2005 results suggest that land uses surrounding Metrorail stations are supporting higher transit use than in 1989 (see Table S-4). For office sites, the overall average transit share among the sites was about 93 percent greater than the overall average transit share among the 1989 sites. For residential sites, transit shares appeared to have changed little.

Table S-3
Office Commute and Residential Mode Share
by Concentric Location Typology

Mode Share	CBD	Inside the Beltway	Outside the Beltway
Office Site Commute			
Metrorail	63%	21%	8%
Metrobus & Other Transit	12%	9%	3%
Auto	21%	66%	89%
Walk & Other	5%	6%	0%
Residential Sites			
Metrorail	50%	43%	31%
Metrobus & Other Transit	6%	6%	1%
Auto	18%	39%	62%
Walk & Other	26%	14%	6%

Table S-4
Comparison of Transit Share Results from 2005 & 1989 Surveys

Land Use Type	Transit[1] Share Range		Transit Share Average		
	2005 Survey	1989 Survey	2005 Survey	1989 Survey	% Change
Office: Commute	8% - 76%	8% - 50%	34% (17 locations)	17.6% (10 locations)	93%
Residential	17%[2] - 67%	30% - 74%	45% (18 locations)	46.2% (10 locations)	-3%[3]
Retail	19% - 57%	34% - 56%	37% (5 locations)	44.2% (8 locations)	-16%
Hotel	12% - 51%	11% - 38%	31% (5 locations)	25.2% (10 locations)	23%
Entertainment	13% - 44%	N/A	32% (4 locations)	N/A	N/A

Notes: [1] Transit mode share includes Metrorail, Metrobus and Other Transit.
[2] The 17% figure is from a site converting its apartments to condominiums, and is an outlier. The next lowest end of the range is 32%.
[3] This figure may be skewed due to the low figure reported from the site converting its apartments to condominiums.

S.3.2 Land Use Specifics

For each land use type, survey results were tabulated to display frequencies and regression analyses were performed to test the strength of relationships between transit ridership and certain independent variables. A summary of the frequency results follows:

Office (17 sites; 15 percent response rate)

- 25 percent of all workplace survey respondents use Metrorail to commute to work.
- 44 percent of District residents responding to the workplace survey used Metrorail to commute to work. This figure exceeds the auto mode share for District residents, which was 41 percent. District residents accounted for only 14 percent of all survey responses, but accounted for more than 25 percent of all Metrorail commute trips.

- 16 percent of Arlington County residents responding to the workplace survey reported using the 'walk or other' mode to commute to and from work.
- 76 percent of workplace survey respondents who have no vehicle at their disposal use transit to commute; 63 percent of those used Metrorail. 31 percent of single-vehicle households use transit to commute; 28 percent of those use Metrorail.
- The sites with the highest midday Metrorail and walk trips are sites located in areas with a solid mix of office, retail and eating establishments.
- Visitors to the 13 office sites that allowed interviews used Metrorail 15 percent of the time and used the 'walk/other' mode 22 percent of the time.
- Office sites on the low end of the transit share scale in 2005 are located in areas with good auto access and ample parking. On the high end, survey results show that transit mode shares have grown in the inner areas—where traffic congestion is high, highway access limited and parking is constrained.

Residential (18 sites; 12 percent response rate)

- On average, 45 percent of all trips from these sites used transit.
- 55 percent of all work or school trips used Metrorail.
- 67 percent of trips to the District were made on Metrorail.
- 73 percent of zero-vehicle households and 42 percent of single-vehicle households used transit for their reported trips; 66 percent of zero-vehicle households and 40 percent of single-vehicle households used Metrorail as their travel mode.
- Residents living in areas with comparatively higher density housing and dense street networks are less likely to use their car, and more likely to use transit and Metrorail.

Retail (5 sites)

- 1,300 survey respondents.
- 36 percent of retail site patron and employee respondents used transit to access the site; 28 percent of those used Metrorail.
- 28 percent used the walk/other mode

Hotel (5 sites)

- 167 survey respondents.
- 35 percent of respondents used transit to access the site; 30 percent of those used Metrorail.

Entertainment (Movie Theaters) (4 sites)

- 974 survey respondents
- 28 percent used transit; 20 percent of those used Metrorail

S.4 Conclusions and Policy Considerations

The 2005 Development Related Ridership Survey effort provides a starting point for renewed efforts to analyze the travel characteristics of development around Metrorail stations. Despite some challenges related to privacy and security, this latest study provides a useful update to the past work, confirming some historic findings and pointing to some new findings regarding transit ridership. However, study findings also bring to light some areas where the process and data could be improved, and raise some questions as to the considerations and implications of

WMATA joint development opportunities. These are presented below. That said, the base provided herein gives WMATA a place from which to determine its next steps.

S.4.1 Potential Study Improvements

Increased Sample Size – Greater Statistical Significance

The findings from this study should help guide WMATA decision-making with respect to its joint development program and overall station-area planning. However, given that the unit of analysis for this study is at the site level, the survey sample size is admittedly small. Collecting more detailed data for station areas throughout the WMATA system could result in effective increases in the sample size and could create a more robust data set. In particular, a program focusing on federal sites might prove useful as the region supports an extensive federal workforce, but this study was unable to attract specific federal participation.

Weekend Data

Local jurisdictions already have suggested that having weekend ridership data would be useful. There has been a noticeable increase in transit ridership on weekends. Collecting weekend station area transit use data could help WMATA assess the implications of increased weekend service on operations and service planning, maintenance programs and capital spending.

Parking Pricing

Additionally, this effort was unable to adequately address the issue of parking pricing as it relates to workplace transit ridership in Metrorail station areas, as so many variables must be evaluated. For example, at the site level, each employer may have a different parking subsidy policy; at the station level, parking of varying price levels, availability and distance may be available to employees. Research focusing on this issue may also add to the tools at WMATA's disposal.

S.4.2 Questions Raised

Finally, the current study findings raise questions for WMATA with respect to a number of interesting and potentially important policy matters. For example, WMATA has significant unused capacity on outbound railcars in the peak-period. The system as a whole would benefit from increased utilization of this essentially "free" capacity, and office uses at suburban stations could help achieve this goal. To that end, there may be public policy benefits to encouraging office development at suburban rail stations as a complement to residential development, striking a balance between uses. The question raised is, what steps must be taken to raise the transit mode share for transit-proximate office space in suburban settings? More detailed survey information linked to site design and transit use characteristics of different office labor markets (e.g., federal, IT, financial services, biotechnology, back-office support, etc.) could help WMATA and others better understand the implications and opportunities presented by alternative development scenarios, and what steps could be taken to raise transit mode shares in suburban office settings.

Additionally, the 2005 Development Related Ridership Survey data continue to point to the question of how WMATA best meets the access needs of those residents who wish to use

Metrorail but are located in outlying or low-density areas, while maximizing the use of its station areas. For example, can bus service improvements, car-sharing arrangements or bicycle facility enhancements offer alternatives to those who currently drive to a rail station, freeing up some demand for parking? Additional research could tease out the variety of reasons why some Metrorail riders drive to stations and begin to classify those reasons and address them through targeted planning efforts.

These and other questions merit additional research and analysis. It is possible that WMATA's ongoing planning work program could provide opportunities to incrementally address these and related questions. Refinements and supplements to the findings from this study will be presented as they are developed through this work program.

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1. Introduction

It has been 16 years[1] since the Washington Metropolitan Area Transit Authority (WMATA) last surveyed development around its rail stations to determine how much transit ridership certain land uses generate when placed near rail stations. Since that time much has changed in the Washington metropolitan region in terms of population growth, the regional economy and the built environment. Given these changes, WMATA determined that the time was right to conduct a new survey, modeled on the 1989 survey, to evaluate whether this changed environment had affected modal splits at development around rail stations and to determine if any factors related to the nature of development at a station impacts ridership. Accordingly, WMATA enlisted the services of Parsons Brinkerhoff to conduct the survey and prepare the report.

In 1989, stations were organized into three typologies based on their concentric locations from the Metropolitan urban core: (1) central business district (CBD) location; (2) suburban-inside the Beltway; and (3) suburban-outside the Beltway. Transit mode shares for office sites near rail stations ranged from an average high of 50 percent at CBD locations to an average low of 8.5 percent at Suburban-Outside the Beltway locations. Residential sites showed mode shares ranging from an average high of 60 percent at Suburban-Inside locations and an average low of 33 percent at Suburban-Outside locations. The 2005 effort was designed to update these figures using the same typologies. Since 1989, however, the urban environment has changed. There has been a notable increase in densities surrounding a number of Metrorail stations, as well as an increase in suburb-to-suburb commuting.

The 1987 and 1989 studies also found a relationship between the distance at which a building (office, residential, retail or hotel) is sited from the rail station and the amount of transit ridership it generates. The 2005 effort sought to determine if this relationship still bears out and if there are additional variables that also might show a strong relationship to transit ridership. Some of the additional variables tested include: quality of the pedestrian environment, housing density in the station area, job density in the station area, attractiveness of automobile access, and the availability of transit subsidies.

Similar to the earlier studies, the 2005 survey targeted high-density commercial office and residential, retail and hotel sites, as well as a new use, "entertainment" (which for this study's purposes was defined as movie theaters), as these are the types of land uses typically proposed in joint development projects. The 2005 study secured participation from 49 sites distributed as shown in Table 1.

It is important to note that response rates varied considerably, particularly with the office surveys. One possible reason is that many in the Washington Metropolitan region, like the rest of the nation and even the world, have experienced a change in attitude with respect to security (especially in light of the September 11, 2001 attacks) and to providing personal information to outside entities. The project team anticipated reluctance from potential respondents vis à vis answering the survey questions as well as possible refusal to participate on the part of building management. These expectations seem to have been borne out in the low response rates at some

[1] WMATA conducted two studies, the first in 1987 and the second in 1989, examining how certain development near Metrorail stations affect Metrorail ridership and other mode share characteristics.

buildings, offices in particular, and in the final number of sites agreeing to participate. For the most part, at office sites where there was a 'champion' from building management or on-site staff, response rates were fairly high. However, without the 'insider assistance,' response rates faltered. The project team also found a resistance on the residential side to the hand-delivery of survey forms, and on the office management side to approaching tenants with survey forms. Lastly, the project team attempted to secure some federal participation at stations, but was unable to do so for a variety of reasons, namely security concerns. For these reasons, the 2005 effort faced a number of challenges that only performing the study could have revealed. In the end, the process itself yielded a wealth of information to be incorporated into subsequent study efforts.

Table 1
Final Distribution of Survey Sites by Land Use Type and Station Location

Station Area	Typology Classification	Office	Residence	Retail	Hotel	Enter.	Total
Ballston	I	2	2	1	1	1	7
Court House	I	2	2				4
Crystal City	I	2	2	2	2		8
Dunn-Loring	O		1				1
Eisenhower Avenue	I					1	1
Farragut West	C	2					2
Friendship Heights	I	2	2		1		5
Gallery Place	C		2				2
Grosvenor	O		4				4
King Street	I	2					2
New Carrollton	O	1					1
Silver Spring	I	3	2	1	1	2	9
U Street/African-Amer Civil War Memorial/Cardozo	I	1	1	1			4
Total		**17**	**18**	**5**	**5**	**4**	**49**

Notes: C: CBD location
I: Inside the Beltway
O: Outside the Beltway

Nonetheless, the information gleaned from the office sites agreeing to participate in the study, as well as the residential sites, does provide valuable information about the current state of travel at sites around rail stations and offer some explanation as to cause and effect. That said, there also is sufficient reason for additional, more targeted research to be conducted in certain areas to delve more deeply into the reasons for certain modal splits.

2. Survey Site Selection

The project team guiding the study process included members from WMATA's Offices of Business Planning & Project Development, Property Development & Management and Financial Management, as well as planners and staff from Parsons Brinkerhoff and its sub-contractor, Diversity Services, Inc. The team first identified Metrorail station areas for study, then identified actual sites to survey. The project team then worked to secure permission from the selected office, residential, retail, hotel and entertainment sites to conduct the surveys.

Metrorail stations were selected based on certain characteristics of their surrounding environment and land uses. One important consideration for the study was to include some stations located in areas with densities, mix, urban design and streetscape similar to expected future joint, private, or government developments near Metrorail stations. Therefore, some stations were selected specifically because they are located in areas thought to be good examples of transit-oriented development (TOD)[2]. However, for comparative purposes, several other station types also were examined and included stations in metropolitan fringe, midpoint or outlying locations. In addition, all five Metrorail lines and six political jurisdictions containing rail stations were represented among the selected stations. Lastly, in order to make possible some longitudinal comparison with the earlier studies, the project team also considered whether the station area was surveyed in the 1989 study.

Survey sites were selected using criteria consistent with the earlier studies and distributed to ensure adequate response rates. In addition to those criteria, certain principles were developed to guide decisions about the distribution and selection of survey buildings and sites for the study. For instance, because joint development proposals tend to be weighted toward office and residential uses, a greater number of these sites were selected at the expense of retail, hotel and entertainment sites. Also, where there was a choice, sites located in station areas with TOD characteristics, or areas with designs and densities that WMATA would like to replicate with its joint development projects were chosen instead of sites without TOD characteristics. Local jurisdiction staff and other local organizations provided building/site candidate lists to project staff, who then contacted site managers to ask if they would be willing to participate in the study. A number of site managers declined to participate and project staff then contacted managers at other sites in the same station area. Initially, the plan was to survey a total of 55 sites, but due to such refusals, only 49 sites participated in the project.

These 49 sites were distributed among 13 station areas (see Figure 1). Figures 2 through 13 show the locations of these sites relative to the stations. An asterisk appears next to those sites that were surveyed in 1989.

[2] Although there is no one definition of TOD, WMATA defines it as "projects near transit stops which incorporate the following smart-growth principles: reduce automobile dependence; encourage high shares of pedestrian and bicycle access trips to transit; help to foster safe station environments; enhance physical connections to transit stations from surrounding areas; and provide a vibrant mix of land-use activities."

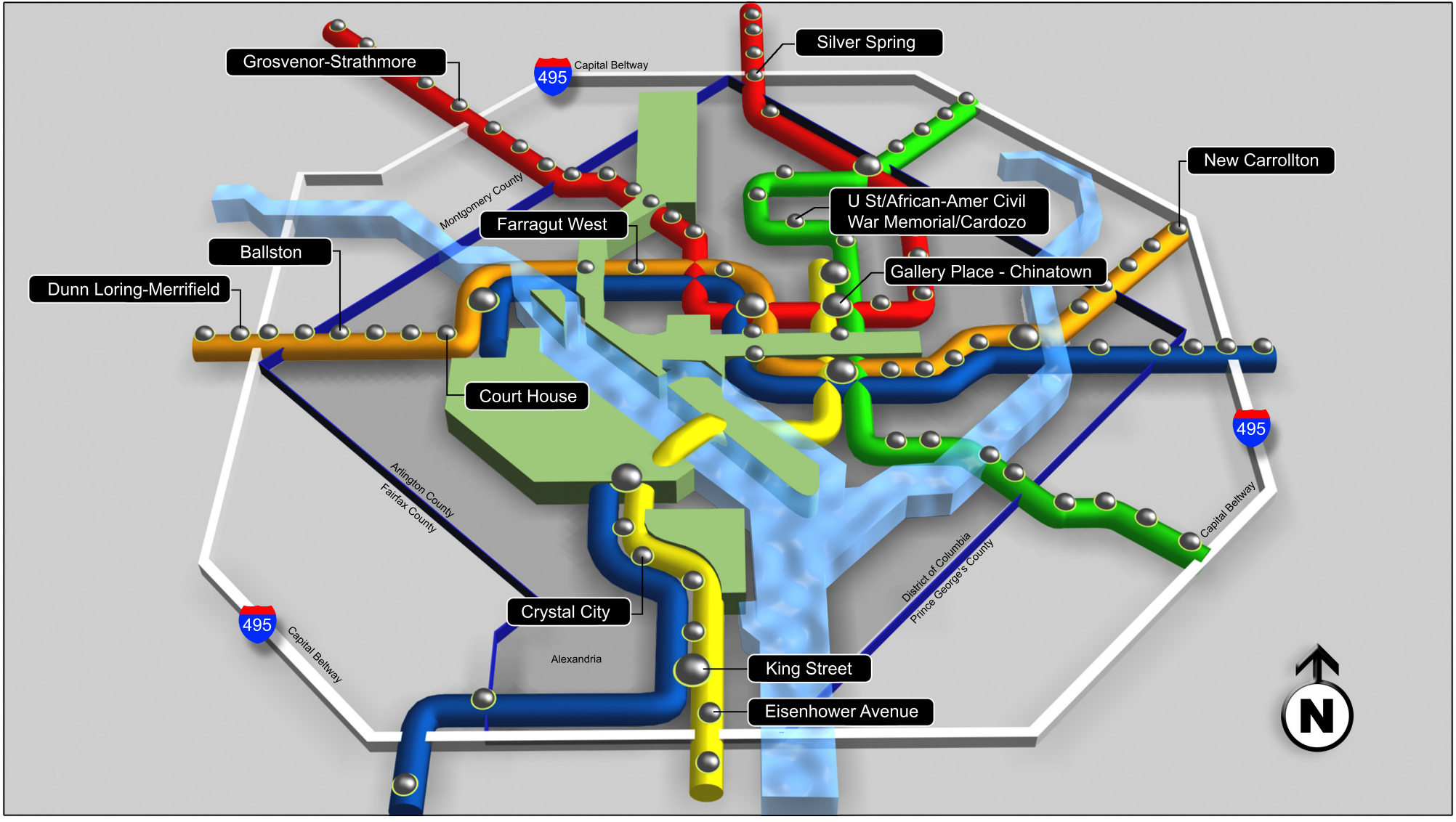

Figure 1: Stations included in survey

Ballston (7 sites) —see Figure 2

- Ballston One (office)*
- 3 Ballston Plaza (office)
- Randolph Towers (residential)*
- Lincoln Towers (residential)
- Ballston Common (retail)*
- Holiday Inn Arlington (hotel)
- Regal Cinemas (entertainment)

Court House (4 sites) —see Figure 3

- 2100 & 2200 Clarendon Drive (office)
- Courthouse Tower (office)
- Arlington Courthouse Plaza (residential)
- Courtland Towers (residential)

Crystal City (8 sites) —see Figure 4

- Crystal Park Four (office)
- Crystal Square 2 (office)*
- Crystal Square Apartments (residential)*
- Crystal Plaza Apartments (residential)*
- Crystal Plaza Shops (retail)*
- Crystal City Shops North (Underground) (retail)*
- Crystal Hyatt Regency (hotel)*
- Crystal Gateway Marriott (hotel)

Dunn-Loring-Merrifield (1 site) —see Figure 5

- Merrifield Village (residential)

Eisenhower Avenue (1 site) —see Figure 6

- AMC Hoffman Theaters (entertainment)

Farragut West (2 sites) —see Figure 7

- 1701 Pennsylvania Avenue (office)*
- 1634 I Street (office)

Friendship Heights (5 sites) —see Figure 8

- 2 Wisconsin Circle (office)
- Chevy Chase Plaza (office)
- Highland House West (residential)
- North Park Apartments (residential)
- Embassy Suites Chevy Chase Pavilion (hotel)

Gallery Place-Chinatown (2 sites) —see Figure 9

- The Lansburgh (residential)
- Meridian at Gallery Place (residential)

Grosvenor-Strathmore (4 sites)—see Figure 10

- Avalon at Grosvenor Station (residential)
- Grosvenor House Apartments (residential)*
- Grosvenor Park I (residential)*
- Stoneybrook (residential)*

King Street (2 sites) —see Figure 6

- King Street Station (office)
- 333 John Carlyle (office)

New Carrollton (1 site) —see Figure 11

- 8400 Corporate Drive (office)

Silver Spring (9 sites) —see Figure 12

- 8720 Georgia Avenue (office)
- Metro Plaza 1 (office)
- 8380 Colesville Road (office)
- Twin Towers (residential)*
- Georgian Towers (residential)*
- Silver Spring Plaza Neighborhood Center (retail)
- Holiday Inn Silver Spring (hotel)*
- The Majestic 20 (entertainment)
- AFI Silver Theater (entertainment)

U Street/African American Civil War Memorial/Cardozo (3 sites) —see Figure 13

- Reeves Center (office)
- Summit Roosevelt (residential)
- U Street (12th to 15th Street) (retail)

More detailed information about the station and site selection process can be found in Appendix A.

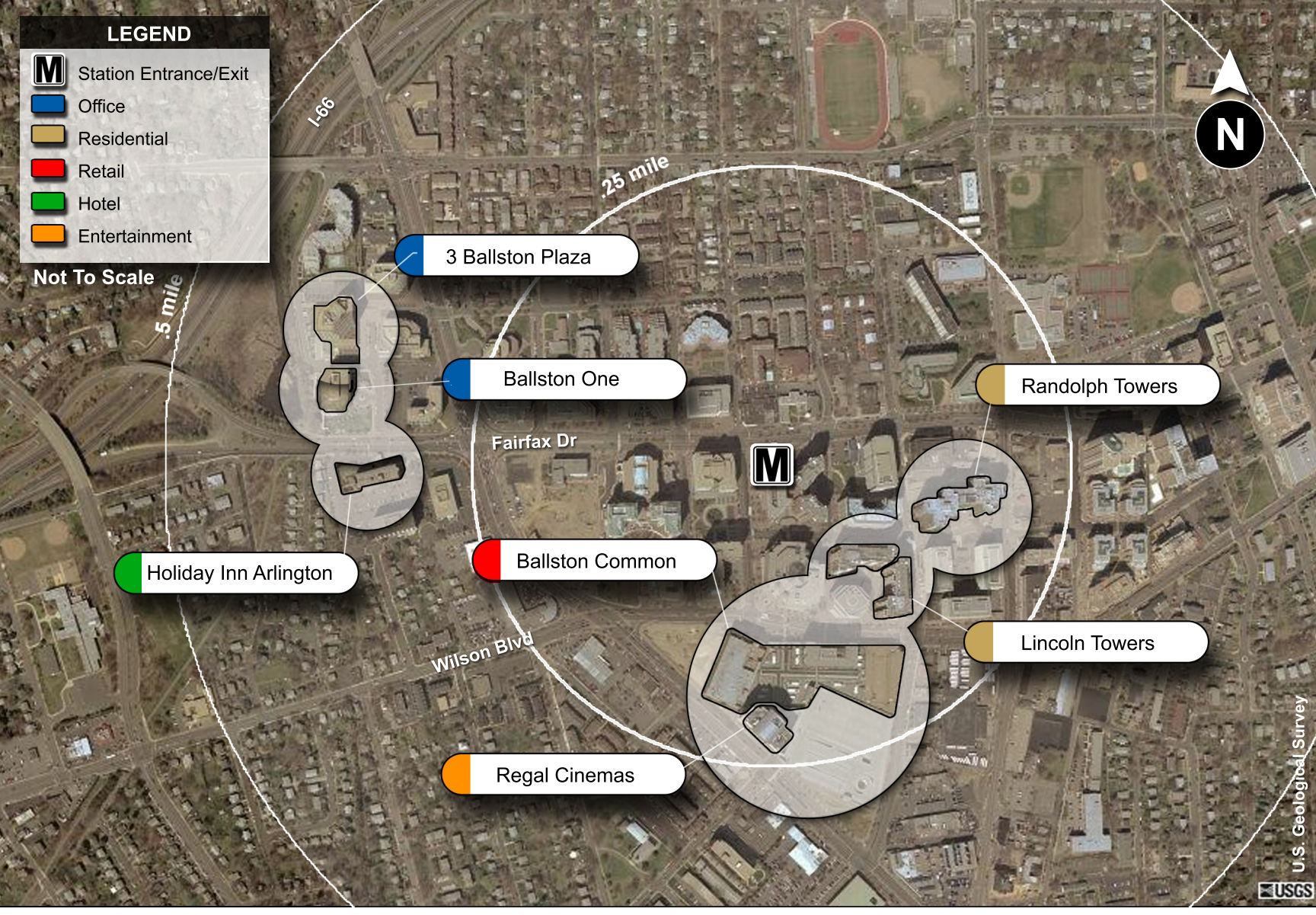

Figure 2: Ballston Station Area Sites

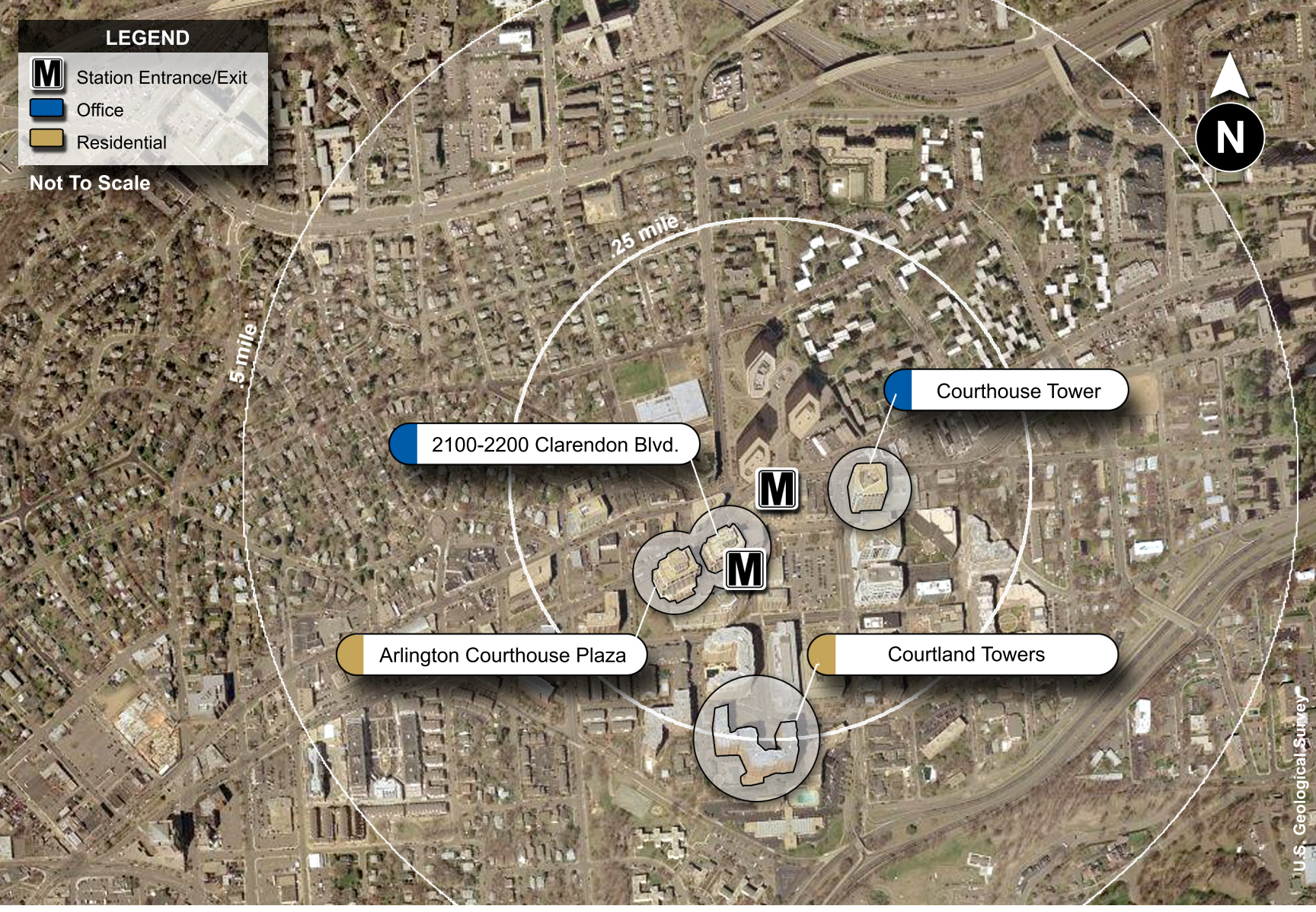

Figure 3: Courthouse Station Area Sites

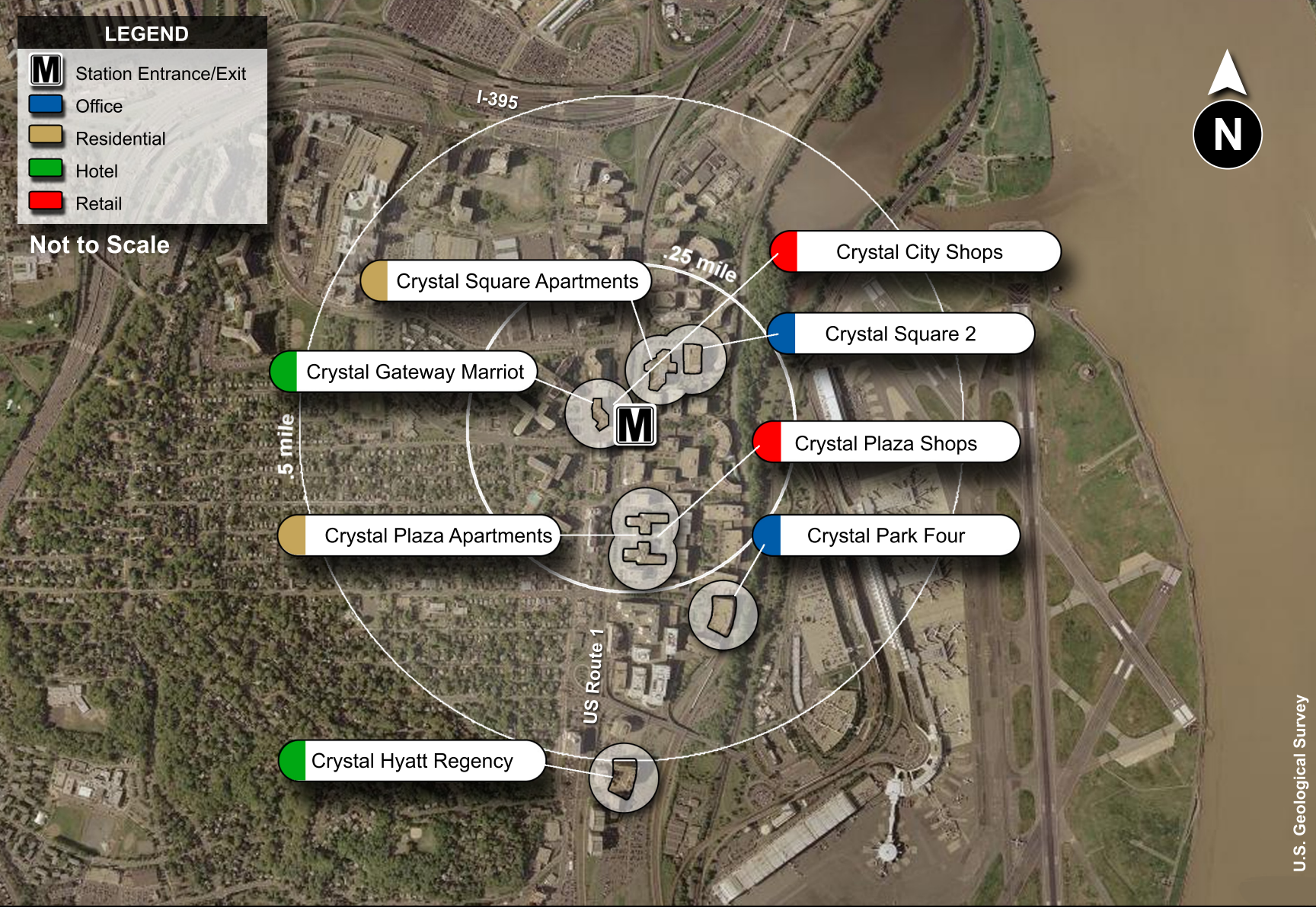

Figure 4: Crystal City Station Area Sites

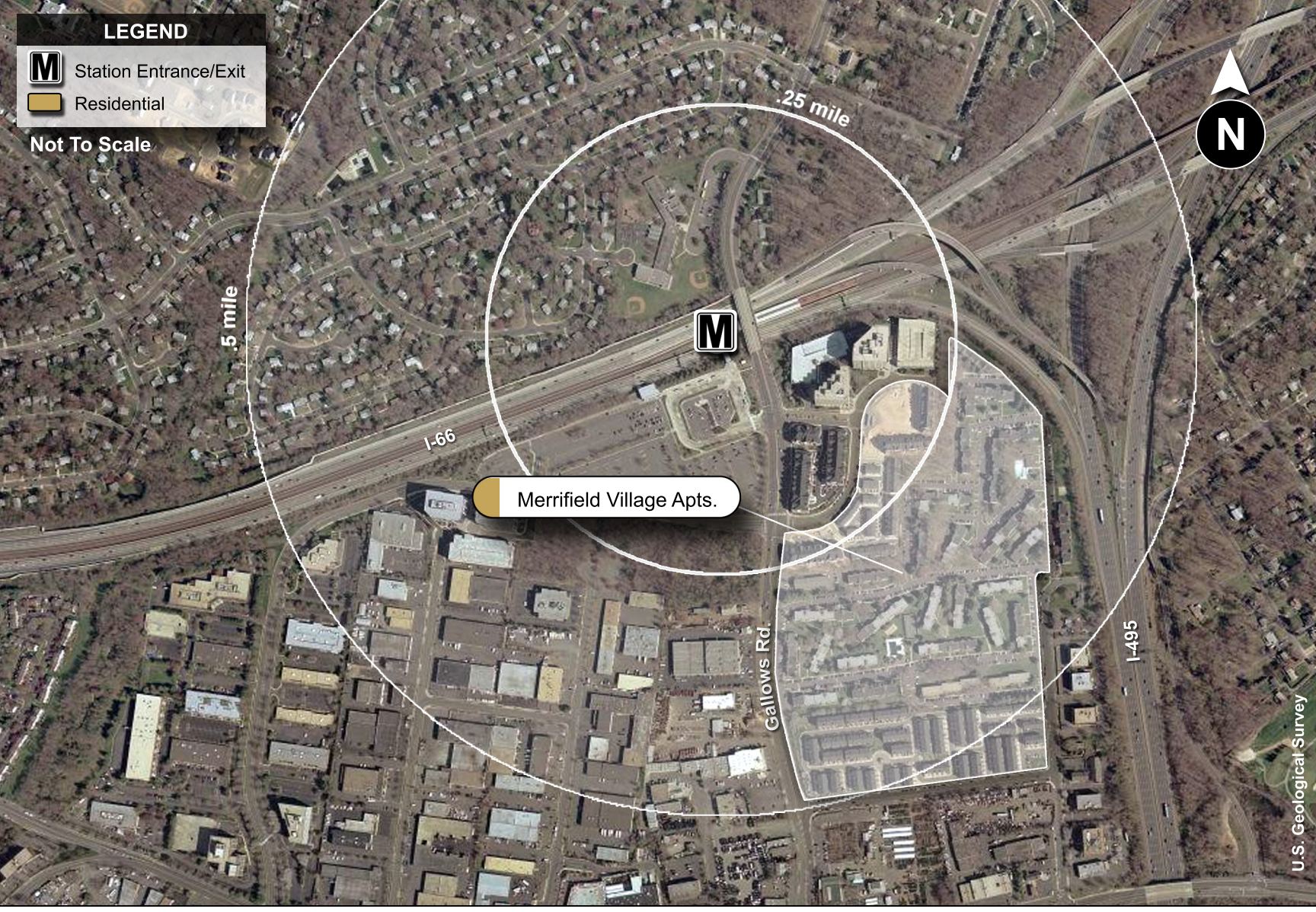

Figure 5: Dunn-Loring-Merrifield Station Area Sites

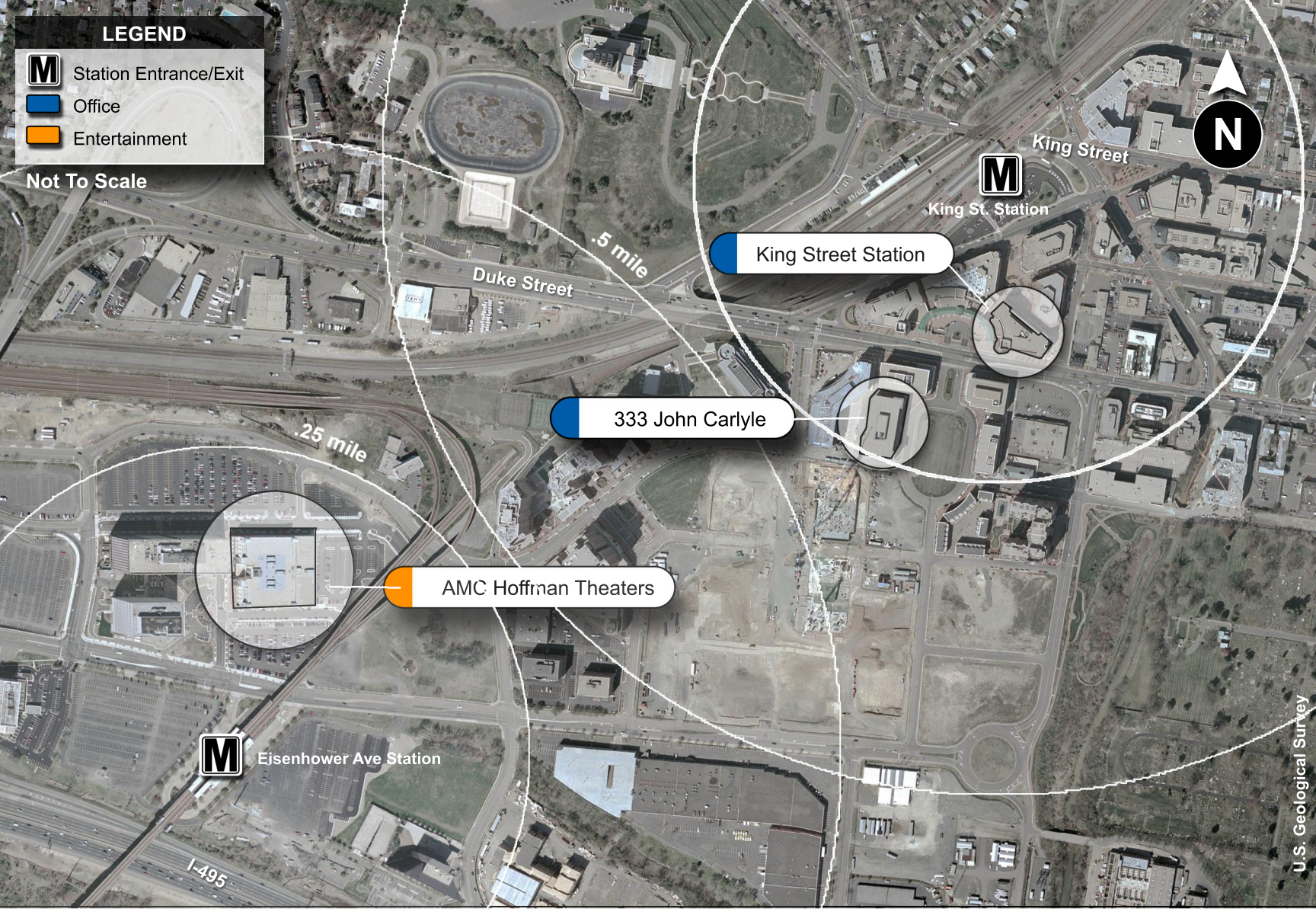

Figure 6: Eisenhower Avenue and King Street Station Area Sites

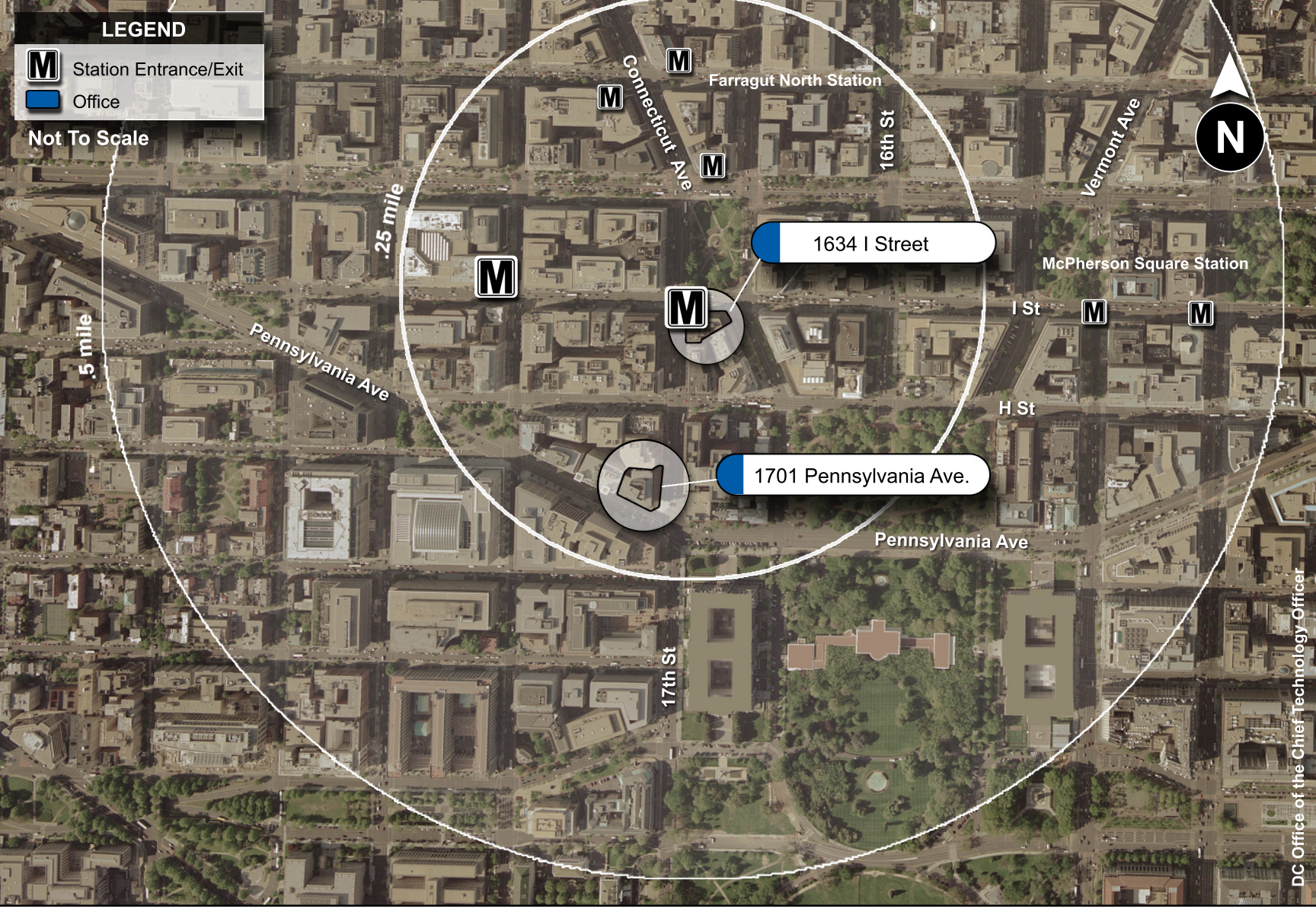

Figure 7: Farragut West Station Area Sites

Figure 8: Friendship Heights Station Area Sites

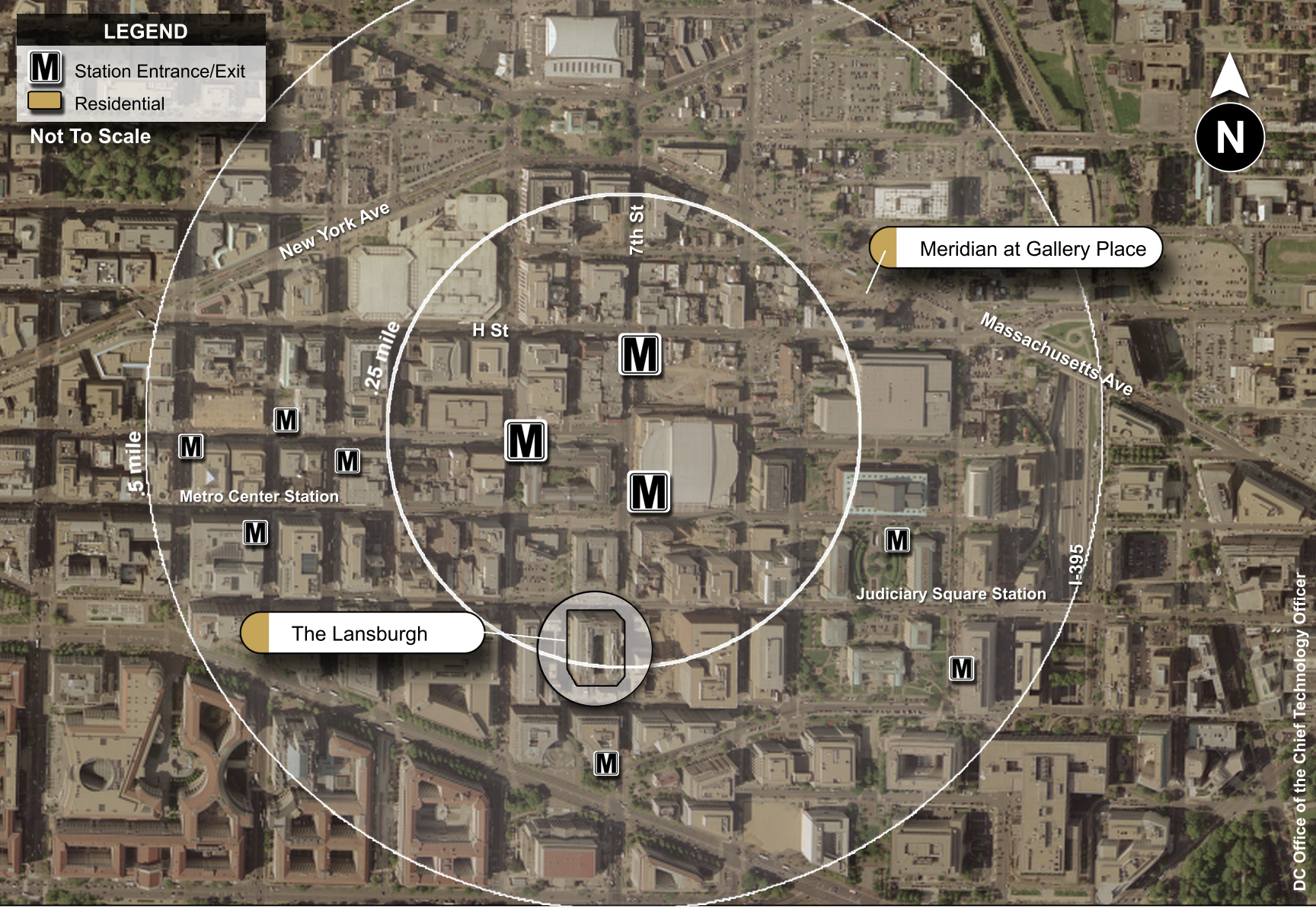

Figure 9: Gallery Place-Chinatown Station Area Sites

Figure 10: Grosvenor-Strathmore Station Area Sites

Figure 11: New Carrollton Station Area Sites

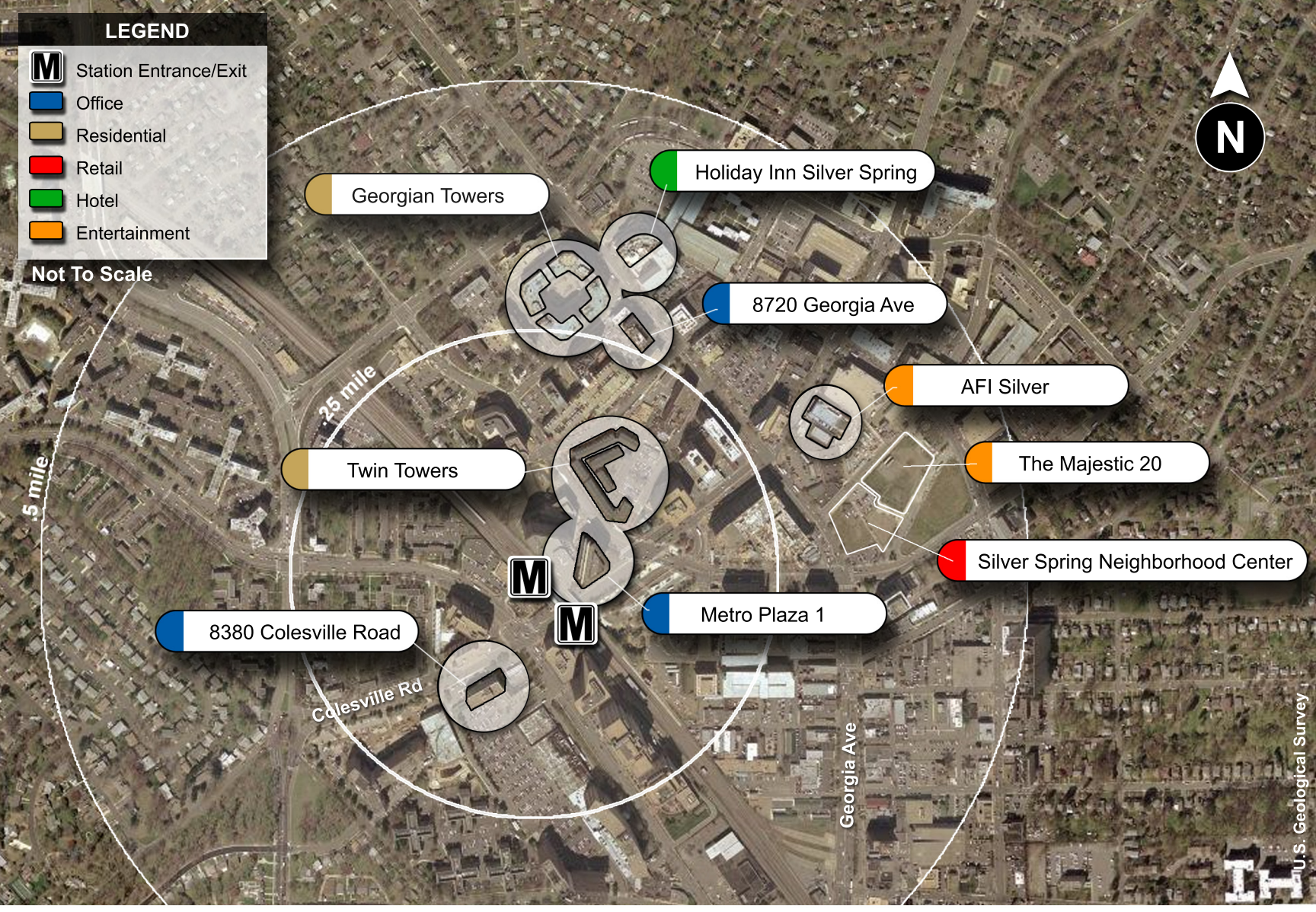

Figure 12: Silver Spring Station Area Sites

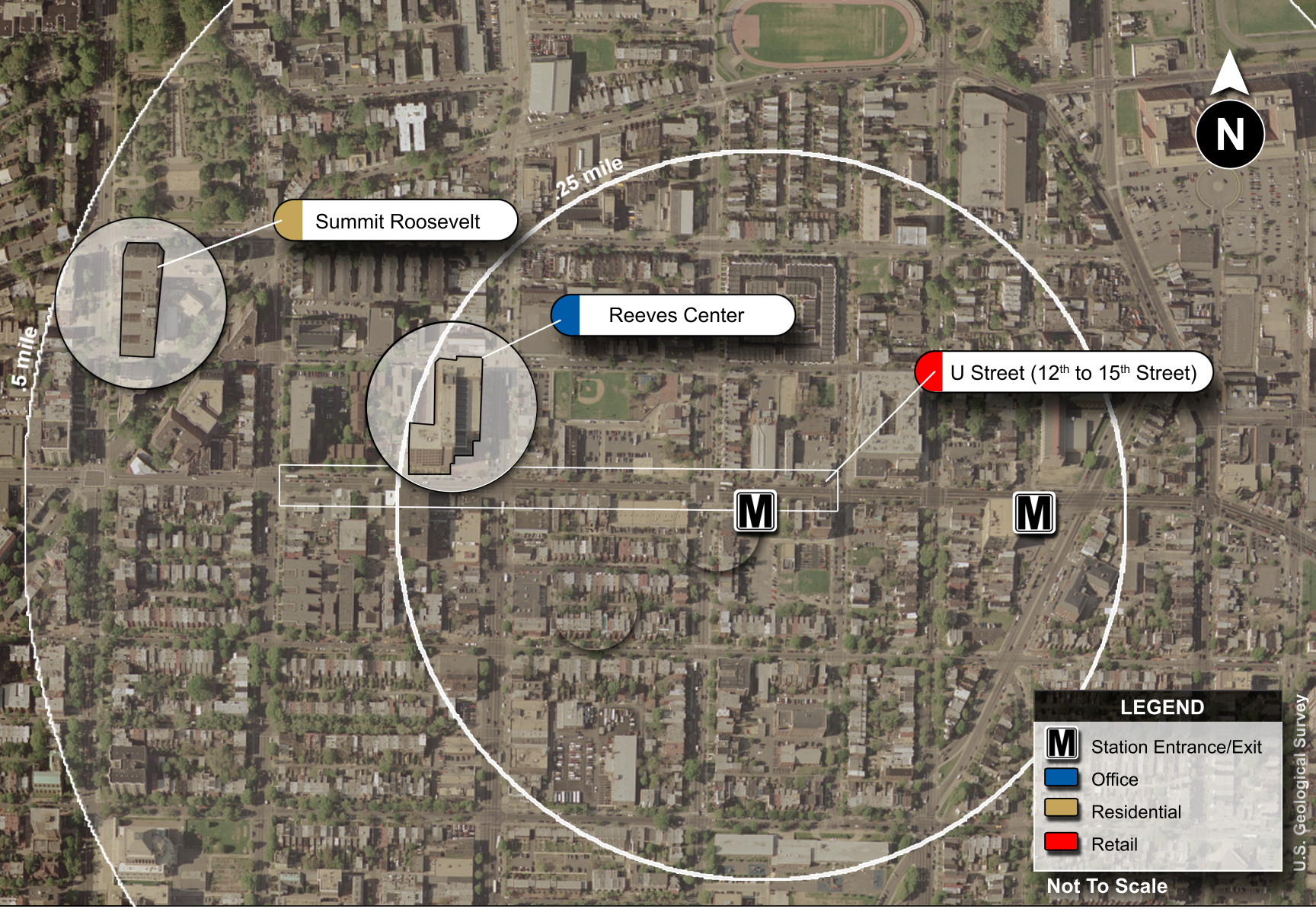

Figure 13: U Street/African American Civil War Memorial/Cardozo Station Area Sites

3. Data Collection

At each site, data about the travel characteristics of individuals who work, live, shop or use the sites were collected through a series of questionnaires conducted through self-administered survey forms and oral intercept interviews. At office sites, building managers provided total employee figures for the site and self-administered surveys were distributed to every employee or worker at the participating site. Intercept oral interviews were conducted with visitors to the site. Office workers who participated in the survey returned the forms to designated "drop boxes" placed throughout the site and project staff returned at designated intervals to collect the completed surveys. At residential sites, self-administered surveys were distributed by hand or via U.S. mail to every unit at the participating site. Residents returned their completed surveys by postage-paid mail. Data collection at retail, hotel and entertainment (movie theater) sites was conducted exclusively through intercept oral interviews. Interviews at retail sites included both patrons and employees. Interviews at hotels included only overnight guests and visitors. Interviewers at entertainment (movie theater) sites included only moviegoers.

More detailed information about the data collection process can be found in Appendix B.

4. Survey Results

All valid data were entered into a Microsoft Access database. Data were analyzed using SPSS software, resulting in frequency distributions and cross-tabs sorting the findings based on a selected independent variable.

In addition, simple regression analyses were conducted to test whether external physical characteristics of the station areas, competition from the auto mode, and transit service levels influence mode share characteristics. Regression is a statistical technique used to determine the degree to which a dependent variable correlates with one or more independent variables, and, and is often used for predictive purposes. Regression equations are not perfect predictors, and should only be used as tools for general planning purposes in conjunction with other available planning tools. The explanatory power of a regression equation is summarized in the R-squared value, which represents the proportion of variance in the dependent variable that can be explained by the independent variable(s). If all the variance could be explained, the R-squared value would be 1.0.

Candidate independent variables tested or experimented with included characteristics internal to the sites, such as square footage, number of employees, or residential units; walking distance between the site and Metrorail station; density of jobs and housing within the station area; and indicators of auto competition and transit service levels.

4.1 Office Sites

The 17 office sites surveyed are located at distances from Metrorail stations varying from zero (building situated on or directly next to station exit) to 3,000 feet (see Table 2). Approximately 9,800 survey forms were distributed, resulting in an average response rate of about 15 percent. As a point of reference, in 1989, about 9,500 surveys were distributed with a 27 percent return rate. As noted in the Introduction, increased concerns about divulging personal information may be a factor in the change in response rates.

Thirteen office sites allowed intercept interviews, which resulted in 499 survey responses.

4.1.1 Frequency Analysis

As shown in Table 3, an average of 25 percent of office survey respondents reported that they used Metrorail to commute to work. However, among the individual sites, there were wide deviations in that figure. The two sites located in Downtown DC near the Farragut West Station (1634 I Street and 1701 Pennsylvania Avenue) showed Metrorail commute rates averaging 61 percent. In the Downtown core, parking is constrained and costly, traffic is heavy and streets are congested, and there is a significant amount of pedestrian activity. At the other end of the scale, 8400 Corporate Drive, located near the New Carrollton Station, showed a Metrorail use rate of only eight percent. The New Carrollton Station is located at the terminus of the Orange line in an area characterized as suburban office with ample free parking and good highway access. In contrast, the average auto use rate among all the sites was 62 percent, which ranged from a high of 89 percent at 8400 Corporate Drive to a low of 16 percent at 1634 I Street.

Table 2
Characteristics of Surveyed Office Sites

Office Site	Number of Surveys Distributed	Distance from Station (feet)	Square Footage (1,000s)	Occupancy Rate (%)	Parking Spaces	Estimated Response Rate (%)	Number of Interviews
Ballston Station Area							
3 Ballston Plaza	932	2,000	303	87	753	15	10
Ballston One	267	1,900	230	--	450	5	N/A
Court House Station Area							
2100-2200 Clarendon Blvd.	850	0	584	--	1681[4]	47	61
Courthouse Tower	500	450	165[2]	--	430	4	15
Crystal City Station Area							
Crystal Park IV	1227	2,600[1]	484	89	1,122	6	35
Crystal Square 2	851	850	412	--	1,899[5]	15	60
Farragut West Station Area							
1634 I Street	138	0	69	100	0	51	53
1701 Pennsylvania Avenue	275	1,000	190	90	N/A[6]	32	18
Friendship Heights Station Area							
2 Wisconsin Circle	800	100	235	90	301	11	32
Chevy Chase Plaza	400	700	163	--	225	6	N/A
King Street Station Area							
333 John Carlyle	250	1,400	153	95	280	17	N/A
King Street Station	250	700	784	75	1,159	13	N/A
New Carrollton Station Area							
8400 Corporate Drive	550	3,000	149	--	503	7	17
Silver Spring Station Area							
8380 Colesville Road	228	600	74	93	400	26	51
8720 Georgia Avenue	400	1,600	87	--	129	19	36
Metro Plaza 1	364	200	619	90	442	7	5
U Street/African American Civil War Memorial/Cardozo Station Area							
Reeves Center	1550	950	512[3]	--	255	7	106

Notes: [1] Distance was measured via an indoor route, in this case, via underground corridors. The walking distance may be less if measured partially outdoor.
[2] This figure does not include 84,000 square feet occupied by one tenant that did not participate in the survey. Total square footage for Court House Tower is 249,000.
[3] Includes first floor lobby.
[4] Parking for the 2100-2200 Clarendon Blvd. is shared with other Court House Plaza users and includes 197 spaces for 2200 Clarendon.
[5] Parking for Crystal Square 2 is shared with other buildings in Crystal Square.
[6] Only valet parking is available, and cars valet parked are stacked.
"--": Unknown or unavailable; NA: Not Applicable.

Table 3
Commute Mode Share at Office Sites

Office Site	Mode			
	Metrorail[1]	Metrobus & Other Transit[2]	Auto[3]	Walk & Other[4]
Ballston Station Area				
3 Ballston Plaza	17%	1%	79%	2%
Ballston One	8%	0%	85%	8%
Court House Station Area				
2100-2200 Clarendon Blvd.	20%	2%	70%	8%
Courthouse Tower	35%	5%	60%	0%
Crystal City Station Area				
Crystal Park IV	12%	2%	81%	5%
Crystal Square 2	28%	14%	58%	1%
Farragut West Station Area				
1634 I Street	69%	7%	16%	7%
1701 Pennsylvania Avenue	56%	16%	25%	3%
Friendship Heights Station Area				
2 Wisconsin Circle	31%	1%	67%	0%
Chevy Chase Plaza	43%	0%	57%	0%
King Street Station Area				
333 John Carlyle	26%	19%	50%	5%
King Street Station	10%	19%	71%	0%
New Carrollton Station Area				
8400 Corporate Drive	8%	3%	89%	0%
Silver Spring Station Area				
8380 Colesville Road	9%	7%	74%	9%
8720 Georgia Avenue	13%	6%	77%	4%
Metro Plaza 1	17%	26%	43%	13%
U Street/African American Civil War Memorial/Cardozo Station Area				
Reeves Center	26%	9%	58%	7%
Average Among All Sites	**25%**	**9%**	**62%**	**6%**

Notes: [1] Includes multimodal trips that may have involved auto or bus use in combination with Metrorail.
[2] Includes bus only trips, and commuter rail, such as MARC, VRE or Amtrak.
[3] Includes trips as driver and passenger of a private automobile.
[4] Includes cycling and any other form of transportation one may use.

When sorted by concentric location typology (CBD location, Suburban-inside the Beltway and Suburban-Outside the Beltway) as shown in Table 4, wide variations in modal splits result. For those sites in CBD locations, which only included the two sites in the Farragut West station area, Metrorail usage for commute trips averaged 63 percent. For those sites located in Suburban-inside the Beltway and Suburban-Outside the Beltway locations, the Metrorail usage averages were 21 percent and 8 percent respectively. However, only one office, 8400 Corporate Drive, is located in a Suburban-Outside the Beltway location.

Office workers who live in the District were much more likely to use Metrorail than those who live in other jurisdictions. Forty-four percent of District respondents said that they used Metrorail for their commute trip. In addition, nine percent of District respondents used other

transit modes, and only 41 percent reported driving to work. The jurisdiction with the second highest rate of Metrorail use was Prince George's County at 35 percent.

Table 4
Commute Mode Share at Office Sites by Concentric Location Typology

Typology	Mode			
	Metrorail[1]	Metrobus & Other Transit	Auto	Walk & Other
CBD	63%	12%	21%	5%
Suburban-Inside the Beltway	21%	9%	66%	6%
Suburban-Outside the Beltway	8%	3%	89%	0%

Overall, Metrorail use among the respondents decreased as the number of vehicles owned in the household increased. Seventy-six percent of respondents whose households have no vehicles (six percent of all respondents) used transit (Metrorail, bus or other type), and 63 percent used Metrorail. Conversely, only 16 and 18 percent of respondents whose households have three (15 percent of all respondents) and four or more vehicles (six percent of all respondents) used Metrorail, respectively.

Most workplace respondents reported that their employers subsidized use of their commuting mode of choice. For transit users, 62 percent reported that their employers pay for or subsidize their transit fares, some of which may include employer participation in government programs that subsidize transit use. For auto users, 72 percent reported that their employers provide free parking or subsidize their parking costs.

Table 5 highlights mode share at offices for midday trips. Some sites such as Courthouse Tower, Crystal Square 2, the Farragut West Station sites, the Friendship Heights Station sites, and Metro Plaza 1, reported fairly high percentages of midday walk trips. Each of these sites is located in an area with ample business, retail and eating establishments. The sites with high auto use rates for midday trips also tended to have high auto use for commute trips.

The transit (Metrorail and Metrobus & Other Transit modes) mode share for office visitors averaged 23 percent, which was slightly greater than the average percentage of visitors who walked to the office site (see Table 6). Similar to the office commute and midday trips, wide deviations in mode shares were reported for individual sites. Those sites located in high-density areas, such as the Farragut West and Crystal City sites tended to have a high percentage of visitors arriving by walk mode. These sites contain a mixed of land uses.

More detailed information about the frequency analysis conducted for office sites can be found in Appendix C.1.1.

Table 5
Mode Share for Midday Trips at Office Sites

Office Site	Mode				Total Trips Reported
	Metrorail	Metrobus & Other Transit	Auto	Walk & Other	
Ballston Station Area					
3 Ballston Plaza	9%	9%	68%	14%	148
Ballston One	36%	0%	45%	18%	22
Court House Station Area					
2100-2200 Clarendon Blvd.	20%	1%	55%	24%	427
Courthouse Tower	26%	0%	22%	52%	23
Crystal City Station Area					
Crystal Park IV	9%	0%	70%	21%	158
Crystal Square 2	34%	2%	25%	38%	131
Farragut West Station Area					
1634 I Street	56%	0%	2%	42%	89
1701 Pennsylvania Avenue	51%	4%	11%	35%	81
Friendship Heights Station Area					
2 Wisconsin Circle	33%	0%	29%	38%	110
Chevy Chase Plaza	10%	0%	33%	57%	21
King Street Station Area					
333 John Carlyle	20%	2%	63%	16%	51
King Street Station	16%	5%	58%	21%	19
New Carrollton Station Area					
8400 Corporate Drive	4%	4%	92%	0%	25
Silver Spring Station Area					
8380 Colesville Road	42%	4%	43%	11%	81
8720 Georgia Avenue	19%	4%	56%	21%	90
Metro Plaza 1	26%	9%	20%	46%	35
U Street / African American Civil War Memorial/Cardozo Station Area					
Reeves Center	19%	8%	48%	25%	156
Average Among All Sites	**25%**	**3%**	**43%**	**28%**	**1667**

Table 6
Office Visitor Mode Share

Office Site	Mode			
	Metrorail	Metrobus & Other Transit	Auto	Walk & Other
Ballston Station Area				
3 Ballston Plaza	11%	0%	89%	0%
Court House Station Area				
2100-2200 Clarendon Blvd.	11%	0%	69%	20%
Courthouse Tower	43%	0%	36%	21%
Crystal City Station Area				
Crystal Park IV	6%	7%	67%	20%
Crystal Square 2	14%	6%	35%	45%
Farragut West Station Area				
1634 I Street	27%	0%	30%	43%
1701 Pennsylvania Avenue	9%	3%	40%	49%
Friendship Heights Station Area				
2 Wisconsin Circle	13%	0%	82%	5%
New Carrollton Station Area				
8400 Corporate Drive	0%	0%	97%	3%
Silver Spring Station Area				
8380 Colesville Road	8%	0%	87%	5%
8720 Georgia Avenue	12%	3%	74%	12%
Metro Plaza 1	43%	0%	29%	29%
U Street /African American Civil War Memorial/Cardozo Station Area				
Reeves Center	16%	18%	49%	17%
Average Among All Sites	**16%**	**7%**	**60%**	**22%**

4.1.2 Regression Analysis

A number of independent variables were tested to determine if any explain the variation in mode choice characteristics for commute, midday and visitor trips to or from the surveyed office sites. In addition to variables internal to the survey sites, such as square footage, and variables relating to transit service, the following variables were of particular interest:

- Distance between station and site;
- Job density within 3/4 mile of the station (number of jobs per acre); and
- Street density within 3/4 mile of the station (total miles of street per square mile), which was used as a proxy for the state of the pedestrian environment.

Because the two Farragut West office sites, which are located in the downtown core, exhibited modal characteristics far different than the other sites (see Table 3), after the initial analysis these sites were removed from the equation as a sensitivity test to determine if the correlations still held true, which they did.

Distance between station and site was the only variable among the ones tested that showed a significant correlation with the worker commute, midday and visitor mode choice. The R-square value for Metrorail commuting was a modest 0.25 under this variable. The correlation indicates that about 35 percent of all commute trips to and from an office site would be on Metrorail if the site is located directly at the station exit/entrance. This percentage decreases by 0.96 percent for every 100 ft. increase in the distance an office site is located from the station exit/entrance (see Figure 14). For midday trips taken by office workers, the correlation indicates that Metrorail use decreases by 0.87 percent for every 100 ft. increase in the distance an office site is located from the station exit/entrance (R-square of 0.28). For visitor trips, the correlation indicates that Metrorail use decreases by 0.78 percent for every 100 ft. increase in the distance an office site is located from the station exit/entrance (R-square of 0.34). Table 7 summarizes the predictive outcomes for office commute, midday and visitor Metrorail trips by distances of zero, one-quarter mile and one-half mile from a Metrorail station.

Table 7
Regression Equation Summary for All Office Metrorail Trips by Distance from Station

Distance (mile)	Metrorail Mode Share		
	Commute	Midday	Visitor
0	35%	35%	24%
1/4	23%	23%	14%
1/2	10%	11%	4%

More detailed information about the regression analysis conducted for office sites can be found in Appendix C.2.1.

4.2 Residential Sites

The 18 residential sites surveyed are located at distances from Metrorail stations varying from 150 to 2,800 feet (see Table 8). More than 7,800 survey forms were distributed and resulted in an average response rate of almost 12 percent. In 1989, almost 4,000 surveys were distributed and approximately 13 percent were returned.

4.2.1 Frequency Analysis

As shown in Table 9, an average of 41 percent of all trips from the surveyed residential sites used Metrorail, which was only slightly less than the average percentage of auto trips. Metrobus & Other Transit trips represented a relatively small share of overall trips. The Metrorail mode share ranged from a low of 17 percent at Grosvenor House Apartments[3] to a high of 61 percent at Meridian at Gallery Place.

[3] At the time of the survey, the Grosvenor House Apartments were in the process of being converted from rentals to condominiums. Therefore, its resident profile was in a state of flux. Nevertheless, the study team decided to proceed with surveying this site because it had been surveyed in 1989.

Figure 14
Office Commute Metrorail Usage by Distance from Station

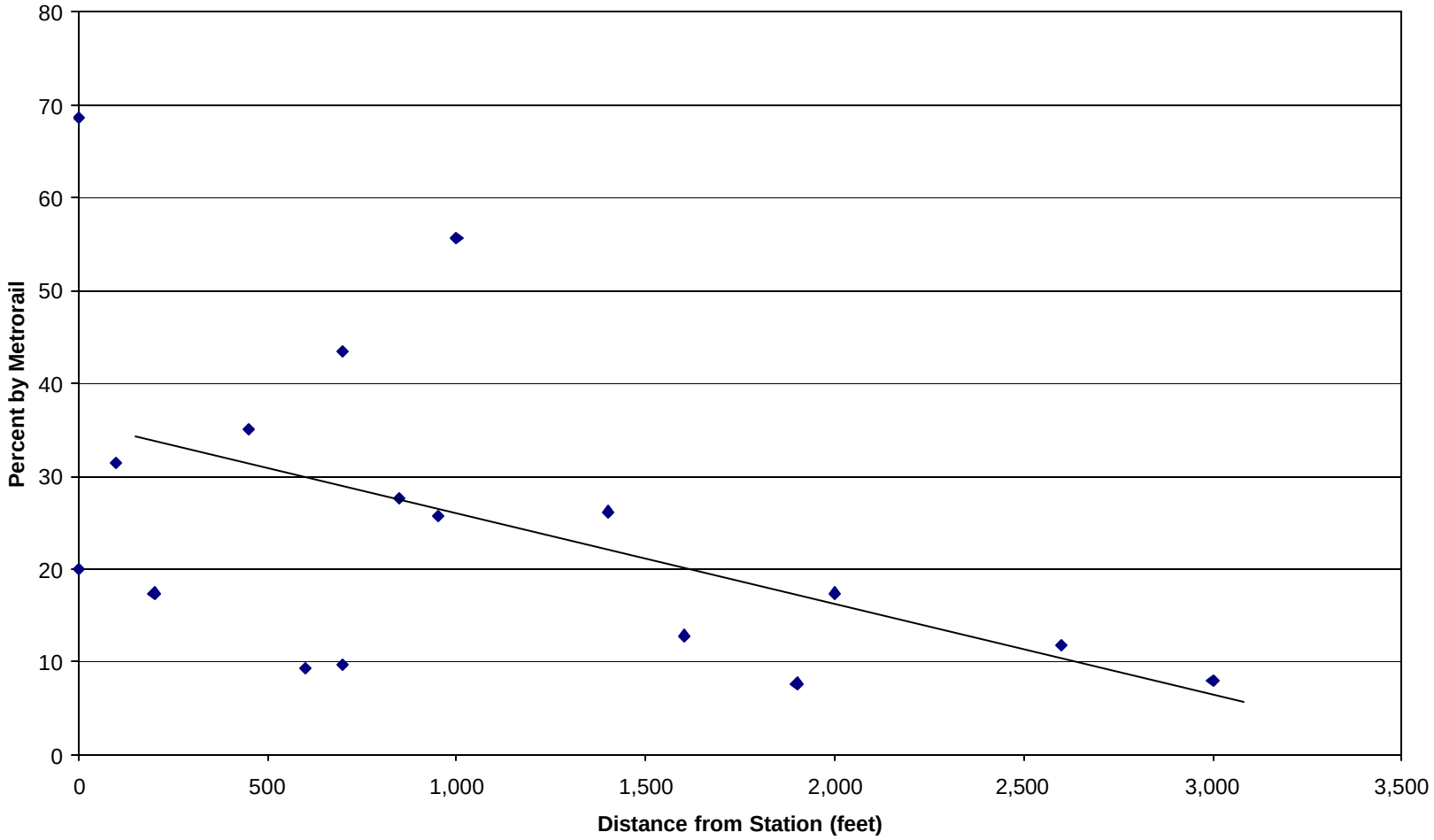

Table 8
Characteristics of Surveyed Residential Sites

Residential Site	Number of Units	Distance from Station (ft)	Parking Spaces	Est. Response Rate[5] (%)
Ballston Station Area				
Lincoln Towers	714	1,100	1,310	9
Randolph Towers	509	1,250	711	11
Court House Station Area				
Arlington Courthouse Plaza	564	150	1,484[2]	10
Courtland Towers	575	1,200	926	17
Crystal City Station Area				
Crystal Plaza Apartments	540	1,450[1]	1,963[3]	13
Crystal Square Apartments	378	600	1,899[4]	16
Dunn Loring-Merrifield Station Area				
Merrifield Village	706	2,800	--	7
Friendship Heights Station Area				
Highland House West	308	1,350	--	20
North Park Apartments	310	2,700	450	8
Gallery Place-Chinatown Station Area				
Meridian at Gallery Place	462	1,700	--	9
The Lansburgh	385	500	700	10
Grosvenor-Strathmore Station Area				
Avalon at Grosvenor Station	499	1,400	771	12
Grosvenor Park I	399	1,700	--	6
Grosvenor House Apartments	404	2,300	--	25
Stoneybrook	120	2,500	--	28
Silver Spring Station Area				
Georgian Towers	858	1,700	--	7
Twin Towers	345	550	312	11
U-Street/African American Civil War Memorial/Cardozo Station Area				
Summit Roosevelt	196	2,600	--	14

Notes: [1] Distance provided is to the north tower. The distance to the south tower is 1,700 feet.
[2] Parking for Arlington Courthouse Plaza is shared with the 2100-2200 Clarendon Blvd. offices.
[3] Parking for Crystal Plaza Apartments is shared with other buildings in Crystal Plaza.
[4] Parking for Crystal Square Apartments is shared with other buildings in Crystal Square.
[5] Response rate excludes those surveys returned due to unit vacancy.
"--": Unknown or not available.

Table 9
Mode Share for All trips by Residential Site

Residential Site	Mode			
	Metrorail[1]	Metrobus & Other Transit[2]	Auto[3]	Walk & Other[4]
Ballston Station Area				
Lincoln Towers	50%	2%	38%	11%
Randolph Towers	45%	1%	40%	15%
Court House Station Area				
Arlington Courthouse Plaza	58%	0%	29%	14%
Courtland Towers	46%	0%	39%	15%
Crystal City Station Area				
Crystal Plaza Apartments	39%	0%	52%	9%
Crystal Square Apartments	53%	0%	42%	5%
Dunn Loring-Merrifield Station Area				
Merrifield Village	37%	1%	53%	9%
Friendship Heights Station Area				
Highland House West	33%	2%	53%	12%
North Park Apartments	32%	2%	57%	9%
Gallery Place-Chinatown Station Area				
Meridian @ Gallery Place	61%	6%	15%	18%
The Lansburgh	39%	6%	21%	34%
Grosvenor-Strathmore Station Area				
Avalon at Grosvenor Station	39%	1%	57%	3%
Grosvenor House Apartments	17%	0%	76%	7%
Grosvenor Park I	30%	2%	64%	5%
Stoneybrook	34%	1%	62%	4%
Silver Spring Station Area				
Georgian Towers	42%	10%	35%	14%
Twin Towers	49%	4%	27%	19%
U-Street/African American Civil War Memorial/Cardozo Station Area				
Summit Roosevelt	31%	20%	22%	27%
Average Among All Sites	**41%**	**4%**	**43%**	**13%**

Notes: [1] Includes multimodal trips that may have involved auto or bus use in combination with Metrorail.
[2] Includes bus only trips, and commuter rail, such as MARC, VRE or Amtrak.
[3] Includes trips as driver and passenger of a private automobile.
[4] Includes cycling and any other form of transportation one may use.

When sorted by concentric location typology (CBD location, Inside the Beltway and Outside the Beltway) as shown in Table 10, modal splits did not vary as widely as modal splits at the surveyed office sites. For those sites in CBD locations, which only included the two sites in the Gallery Place station area, Metrorail usage averaged 50 percent of all trips. For those sites located in Inside the Beltway and Outside the Beltway locations, the Metrorail usage averages were 43 percent and 31 percent for all trips, respectively.

About 46 percent of all trips reported were for work or school, and 55 percent of these trips were made on Metrorail (see Table C-18 in Appendix C). Auto was the most popular mode for trips made for personal business, meals and shopping purposes. Almost 40 percent of all trips from the 18 residential sites ended in the District (only three sites are located in the District), and

among these trips, 67 percent were made using Metrorail. Trips to other political jurisdictions did not come close to this rate of Metrorail use.

Table 10
Residential Mode Share for All Trips by Concentric Location Typology

Typology	Mode			
	Metrorail	Metrobus & Other Transit	Auto	Walk & Other
CBD	50%	6%	18%	26%
Suburban-Inside the Beltway	43%	6%	39%	14%
Suburban-Outside the Beltway	31%	1%	62%	6%

Similar to the office commute results, auto ownership appears to influence mode choice among the surveyed households, with those households having relatively high auto ownership rates tending to use the auto mode more often. However, auto ownership rates were much lower than that reported by office workers, probably reflecting the higher density status of the households. One-vehicle households reported a 40 percent Metrorail use rate. Zero-vehicle and two-vehicle households reported 66 and 30 percent Metrorail use rates, respectively.

More detailed information about the frequency analysis conducted for residential sites is provided in Appendix C.1.2.

4.2.2 Regression Analysis

Independent variables similar to those used in the office site analysis were tested to determine if any explain the variation in modal split for trips made from the residential sites. After initial analysis using all sites, data from the two Gallery Place-Chinatown sites were removed from the equations as a sensitivity test as these sites produced very different mode share characteristics than the other residential sites (see Table 9).

Distance between site and station produced a stronger correlation with mode shares than that found for office sites (see Section 4.1.2). For Metrorail use, the R-square value was 0.41, and the correlation indicates that Metrorail use decreases by 0.87 percent for every 100 feet increase in distance a residential site is located from the station exit/entrance (see Figure 15). If only commute and school trips are counted, the R-square value for Metrorail trips drops to 0.23, but as noted above, the overall percent of trips made by Metrorail increases. Table 11 summarizes the predictive outcomes for all and commute/school residential Metrorail trips by distances of zero, 1/4 and 1/2 mile from a Metrorail station.

Figure 15
Residential Metrorail Usage for All Trips by Distance from Station

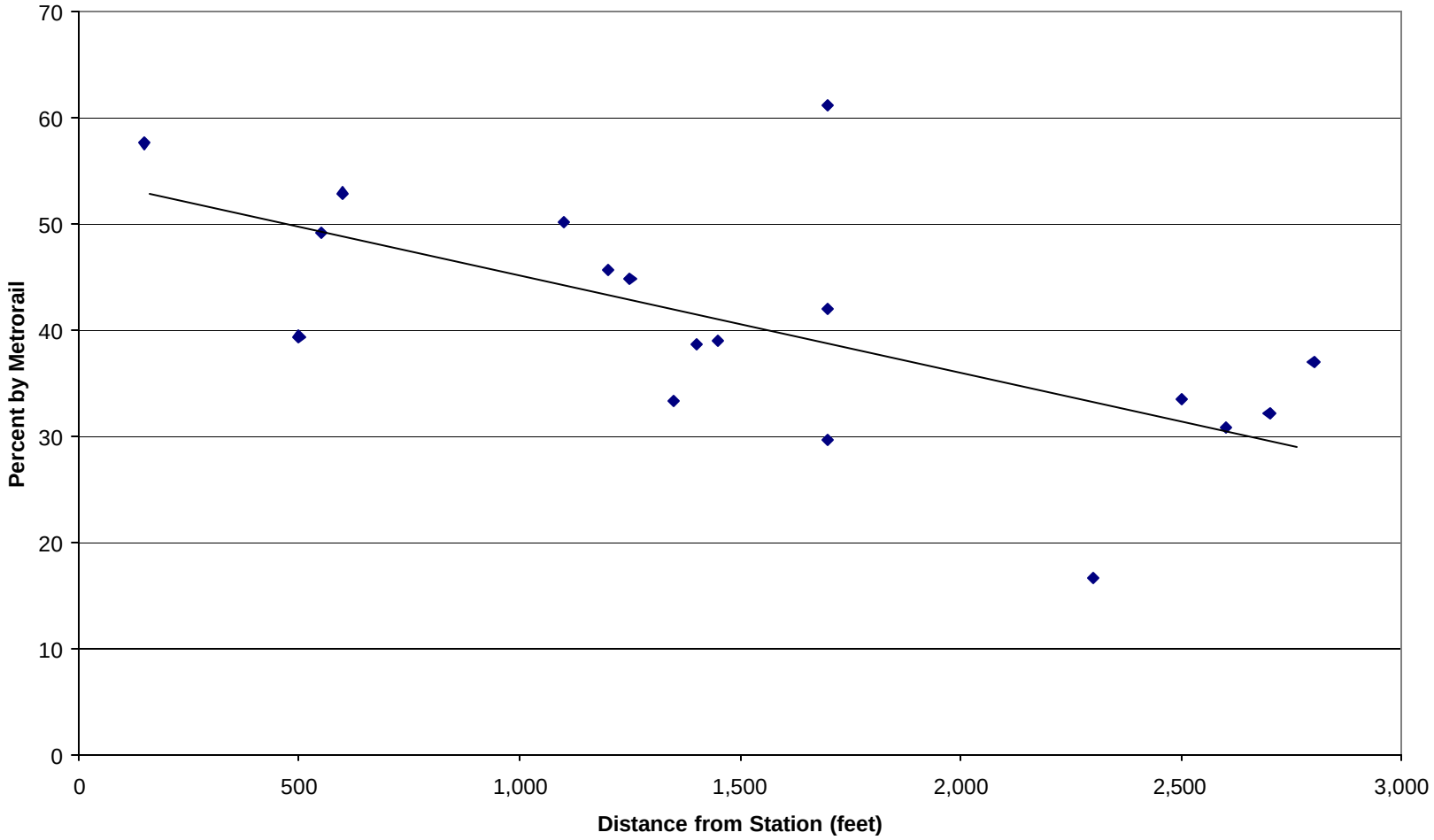

Table 11
Regression Equation Summary for All Residential and Residential Commute/School Metrorail Trips by Distance from Station

Distance (mile)	Metrorail Mode Share	
	Overall	Commute/School
0	54%	65%
1/4	43%	54%
1/2	31%	44%

Housing and street densities showed moderate correlations with auto and other transit (Metrobus and all other transit) modes, but the correlations were weaker when partnered with Metrorail use. As noted above, street density was used as a proxy for the attractiveness of the pedestrian environment. Higher street densities normally indicate good walking or pedestrian environments. The strongest correlation equation indicates that auto use decreases by 2.54 percent for every increase of one residential unit per acre, and decreases by 2.38 percent for every increase of one linear mile per square mile of street. The overall results among the housing and street densities suggest that residents living in areas with comparatively higher density housing and a dense street network are less likely to use their car, and more likely to use transit and Metrorail.

More detailed information about the regression analysis conducted for residential sites is provided in Appendix C.2.2.

4.3 Retail, Hotel and Entertainment (Movie Theater) Sites

The five retail sites are located at distances from Metrorail stations varying from zero to 1,700 feet, and almost 1,300 people were interviewed at these sites (see Table 12). The five hotels are located at distances from Metrorail stations varying from zero to 4,100 feet, and 167 guests and visitors were interviewed at these sites (see Table 13). The four entertainment (movie theater) sites are located at distances from Metrorail stations varying from 700 to 2,200 feet, and 974 moviegoers were interviewed at these sites (see Table 14).

4.3.1 Frequency Analysis

As shown in Table 15, an average of 29 percent of trips to and from retail sites used Metrorail, which was similar to the 36 and 27 percent rates for auto and walk /other modes, respectively. The deviation in Metrorail use ranged from a high of 44 percent on U Street to a low of nine percent at the Silver Spring Neighborhood Center.

An average of 30 percent of all trips to and from the hotels used Metrorail (see Table 15). Similar to the retail sites, the auto and walk/other modes were not much different at 31 and 34 percent, respectively.

Table 12
Characteristics of Surveyed Retail Sites

Retail Site	Square Footage (by 1000 sq ft)	Distance from Station (ft)	Parking Spaces	Number of Interviews
Ballston Station Area				
Ballston Common	490	800	3,450	412
Crystal City Station Area				
Crystal Plaza Shops	108	1,200	1,963[1]	229
The Underground	151	0	1,899[2]	268
Silver Spring Station Area				
Silver Spring Neighborhood Center	N/A	1,700	--	184
U Street/African American Civil War Memorial/Cardozo Station Area				
U St Main Street	N/A	0	N/A	196

Notes: [1] Parking for the Crystal Plaza Shops is shared with other buildings in Crystal Plaza.
[2] Parking for The Underground is shared with other buildings in Crystal Square.

Table 13
Characteristics of Surveyed Hotel Sites

Hotel Site	Hotel Rooms	Distance from Station (ft)	Parking Spaces	Number of Interviews
Ballston Station Area				
Holiday Inn Arlington	221	1,700	225	13
Crystal City Station Area				
Crystal Gateway Marriott	700	550[1]	780	37
Crystal Hyatt Regency	685	4,100[2]	750	27
Friendship Heights Station Area				
Embassy Suites Chevy Chase Pavilion	198	0	--	49
Silver Spring Station Area				
Holiday Inn Silver Spring	242	1,800	250	49

Notes: [1] Via tunnel under Jefferson Davis Highway.
[2] Part of the distance was measured via an indoor route, in this case, via underground corridors.

Table 14
Characteristics of Surveyed Entertainment (Movie Theater) Sites

Movie Theater Site	Screens	Distance from Station (ft)	Parking Spaces	Number of Interviews
Ballston Station Area				
Regal Cinemas	12	800	3,450[1]	55
Eisenhower Station Area				
AMC Hoffman Theaters	22	700	--	377
Silver Spring Station Area				
AFI Silver Theater	3	1400	--	91
The Majestic 20	20	2200	--	451

Notes: [1] Parking is shared with Ballston Common Mall.

Table 15
Mode Shares at Retail, Hotel and Entertainment Sites

Site Name	Site Type	Mode			
		Metrorail[1]	Metrobus & Other Transit[2]	Auto[3]	Walk & Other[4]
Ballston Station Area					
Ballston Common	R	23%	7%	43%	27%
Holiday Inn Arlington	H	17%	0%	67%	17%
Regal Cinemas	E	35%	9%	39%	17%
Crystal City Station Area					
Crystal Plaza Shops	R	36%	5%	24%	36%
The Underground	R	31%	6%	27%	35%
Crystal Gateway Marriott	H	27%	7%	24%	42%
Crystal Hyatt Regency	H	48%	3%	21%	28%
Eisenhower Avenue Station Area					
AMC Hoffman Theaters	E	12%	1%	83%	4%
Friendship Heights Station Area					
Embassy Suites Chevy Chase Pavilion	H	33%	5%	25%	36%
Silver Spring Station Area					
Silver Spring Neighborhood Center	R	9%	10%	67%	14%
Holiday Inn Silver Spring	H	8%	4%	54%	33%
AFI Silver Theater	E	39%	2%	49%	10%
The Majestic 20	E	19%	13%	56%	13%
U Street/African American Civil War Memorial/Cardozo Station Area					
U St Main Street	R	44%	13%	19%	25%
Average Among Sites					
Retail Sites	R	**29%**	**8%**	**36%**	**27%**
Hotel Sites	H	**27%**	**4%**	**38%**	**31%**
Entertainment Sites	E	**26%**	**6%**	**57%**	**11%**

Notes: [1] Includes multimodal trips that may have involved auto or bus use in combination with Metrorail.
[2] Includes bus only trips, and commuter rail, such as MARC, VRE or Amtrak.
[3] Includes trips as driver and passenger of a private automobile.
[4] Includes cycling and any other form of transportation one may use.
R: Retail
H: Hotel
E: Entertainment (Movie Theater)

Among the entertainment (movie theater) sites, the Regal Cinemas and AFI Silver Theater drew the highest percentages of Metrorail riders (35 and 39 percent, respectively) (see Table 15). The AMC Hoffman, with its ample free parking and good highway access, had a much lower Metrorail use rate of only 12 percent.

More detailed information about the frequency analysis conducted for retail, hotel and entertainment (movie theater) sites can be found in Appendices C.1.3 through C.1.5.

4.3.2 Regression Analysis

As with the office and residential sites, the regression analysis conducted for the retail, hotel and entertainment sites tested the strength of the relationship between mode share and variables such as distance from the station, street densities, which served as a proxy for the pedestrian-friendliness of the walk environment, and area housing and job densities. Unlike the other two land uses, however, no sensitivity testing was conducted for these types of land uses because of the small survey samples for each type.

At retail sites, distance between site and station showed a correlation with mode choice. The R-square value indicates that Metrorail use decreases by 1.29 percent for every 100 feet increase in distance a retail site is located away from the station exit/entrance. At entertainment (movie theater) sites, job, housing and street densities showed a relationship with increased transit use. The correlation indicates that an increase of one job per acre increases the percentage of transit trips made to entertainment (movie theater) sites by 0.84 percent. For housing density, the analysis indicates that an increase of one residential unit per acre increases the percentage of transit trips made to movie theater sites by 5.30 percent. For street density, the analysis indicates that an increase of one linear mile per square mile of streets increases the percentage of transit trips made to movie theater sites by 3.59 percent. In other words, a more attractive walking environment promotes increased transit ridership for this land use. However, because sample sizes for these land use types are so small, further analysis should be conducted using a larger sample size.

More detailed information about the regression analyses conducted for retail, hotel and entertainment (movie theater) sites can be found in Appendices C.2.3 through C.2.5.

5. Conclusions & Policy Considerations

The 2005 Development Related Ridership Survey effort provides a starting point for renewed efforts to analyze the travel characteristics of development around Metrorail stations. Despite some challenges related to privacy and security, this latest study provides a useful update to the past work, confirming some historic findings and pointing to some new findings regarding transit ridership. However, study findings also bring to light some areas where the process and data could be improved, and raise some questions as to the considerations and implications of WMATA joint development opportunities. The most notable findings are summarized below.

5.1.1 General Observations

Distance

2005 survey results confirmed previous findings that the walking distance between a site and the Metrorail station affects transit ridership (see Table 16). In general, the closer a site is to the station, the greater likelihood those traveling to/from a site choose Metrorail as their travel mode. Based on the survey results, this relationship was stronger for residential sites than for office sites.

Table 16
Regression Equation Summary for Office Commute and Residential Trips by Distance from Station

Distance (Mile)	Metrorail Mode share		All Transit[1] Mode Share		Auto Mode Share	
	Office Commute	Residential	Office Commute	Residential	Office Commute	Residential
0	35%	54%	46%	55%	48%	29%
¼	23%	43%	30%	45%	66%	41%
½	10%	31%	13%	36%	83%	54%

Notes: [1] Includes Metrorail, Metrobus, commuter rail and other transit options.

Land Use

In urban fringe or outlying locations, residential uses may be more reliable in boosting Metrorail ridership than office uses. Based on the results of the survey, outlying office sites tended to produce trips connected with areas outside the core, which typically are not well served by transit.

At the overall site level, survey results showed that high-density, mixed-use environments with good transit access generated higher shares of transit and walk trips –especially midday trips from and visitor trips to office sites, than those areas dominated by a single use.

Overall, when compared to the results of the 1989 Survey, the 2005 results suggest that land uses surrounding Metrorail stations are supporting higher transit use than in 1989 (see Table 17). In 1989, the transit mode share for office sites near rail stations ranged from a high of 50 percent at

a CBD location to a low of 8.5 percent at a Suburban-Outside the Beltway location, with an overall average of almost 18 percent. In 2005, the high in CBD locations was 76 percent and the low in a Suburban-Outside the Beltway location was 8 percent, for an overall average of 34 percent, a 93 percent change from 1989. For residential sites, transit shares appeared to have changed little (see Table 17). The 1989 residential high/low was 74 and 34 percent, respectively, with an overall average of 46 percent. In 2005, the high/low was 67 and 17 percent, respectively, with an overall average of 45 percent. However, the site with 17 percent transit share was in the process of being converted from rentals to condominiums, which may have skewed the survey results. The next lowest transit share was 32 percent. Nevertheless, for residential sites, the results between 1989 and 2005 appear similar.

Table 17
Comparison of Transit Share Results from 2005 & 1989 Surveys

Land Use Type	Transit[1] Share Range		Transit Share Average		
	2005 Survey	1989 Survey	2005 Survey	1989 Survey	% Change
Office: Commute	8% - 76%	8% - 50%	34% (17)	17.6% (10)	93%
Residential	17%[2] - 67%	30% - 74%	45% (18)	46.2% (10)	-3%[3]
Retail	19% - 57%	34% - 56%	37% (5)	44.2% (8)	-16%
Hotel	12% - 51%	11% - 38%	31% (5)	25.2% (10)	23%
Entertainment	13% - 44%	N/A	32% (4)	N/A	N/A

Notes: [1] Transit mode share includes Metrorail, Metrobus and Other Transit.
[2] The 17% figure is from a site converting its apartments to condominiums, and is an outlier. The next lowest end of the range is 32%.
[3] This figure may be skewed due to the low transit ridership reported from a site (Grosvenor House Apartments) that was in the process of converting its rental apartments to condominiums.

Transit Accessibility

Metrorail continues to remain competitive with the automobile in markets where it provides good access and service and has increased its mode share in the core since 1989. In each surveyed land use category, those trips recorded to or from the District, the jurisdiction with the greatest number of rail stations and a comprehensive bus network, showed the highest rates of Metrorail and transit use. Those sites within or closer to the District tended to have a higher percentage of overall trips connecting to the District. The 1989 survey found similar patterns, noting that "there is a strong propensity to take transit from either Maryland or Virginia to the District but transit mode share is much lower between Montgomery County and Fairfax County," even though the data "indicate that there is considerable trip interchange between Montgomery County and Virginia." In all likelihood, this finding reflects the level of transit availability and access in the studied areas. The District, with the greatest number of rail stations and a comprehensive bus network, provides its residents and workers alike with good transit access on the home and work end.

Auto Environment

Office sites on the low end of the transit share scale in 2005 are located in areas with good auto access and ample parking. At the other end of the scale, survey results show that transit mode shares are higher at sites in the inner areas—areas where traffic congestion is high, highway access limited and parking is constrained. While many of the station areas surveyed in the 2005 effort have similar land use characteristics, specifically in terms of density and design, at some of these stations, the auto environment is more attractive, as there is convenient access from a major highway and ample and inexpensive parking. As the data suggest, though the density and design of station areas can make for an attractive environment, without a transportation management strategy specifically focused on transit, many will still drive to a station area.

5.1.2 Potential Study Improvements

Increased Sample Size – Greater Statistical Significance

The findings from this study should help guide WMATA decision-making with respect to its joint development program and overall station-area planning. However, given that the unit of analysis for this study is at the site level, the survey sample size is admittedly small. Collecting more detailed data for station areas throughout the WMATA system could result in effective increases in the sample size and could create a more robust data set. In particular, a program focusing on federal sites might prove useful as the region supports an extensive federal workforce, but this study was unable to attract specific federal participation.

Weekend Data

Local jurisdictions already have suggested that having weekend ridership data would be useful. There has been a noticeable increase in transit ridership on weekends. Collecting weekend station area transit use data could help WMATA assess the implications of increased weekend service on operations and service planning, maintenance programs and capital spending.

Parking Pricing

Additionally, this effort was unable to adequately address the issue of parking pricing as it relates to workplace transit ridership in Metrorail station areas, as so many variables must be evaluated. For example, at the site level, each employer may have a different parking subsidy policy; at the station level, parking of varying price levels, availability and distance may be available to employees. Research focusing on this issue may also add to the tools at WMATA's disposal.

5.1.3 Questions Raised

Finally, the current study findings raise questions for WMATA with respect to a number of interesting and potentially important policy matters. For example, WMATA has significant unused capacity on outbound railcars in the peak-period. The system as a whole would benefit from increased utilization of this essentially "free" capacity, and office uses at suburban stations could help achieve this goal. To that end, there may be public policy benefits to encouraging office development at suburban rail stations as a complement to residential development, striking a balance between uses. The question raised is, what steps must be taken to raise the transit mode

share for transit-proximate office space in suburban settings? More detailed survey information linked to site design and transit use characteristics of different office labor markets (e.g., federal, IT, financial services, biotechnology, back-office support, etc.) could help WMATA and others better understand the implications and opportunities presented by alternative development scenarios, and what steps could be taken to raise transit mode shares in suburban office settings.

Additionally, the 2005 Development Related Ridership Survey data continue to point to the question of how WMATA best meets the access needs of those residents who wish to use Metrorail but are located in outlying or low-density areas, while maximizing the use of its station areas. For example, can bus service improvements, car-sharing arrangements or bicycle facility enhancements offer alternatives to those who currently drive to a rail station, freeing up some demand for parking? Additional research could tease out the variety of reasons why some Metrorail riders drive to stations and begin to classify those reasons and address them through targeted planning efforts.

Appendix A
Survey Site Selection Process

Appendix A
Survey Site Selection Process

Selecting the survey sites involved a two-step process: first, selecting Metrorail station areas to study, and second, identifying survey site locations distributed throughout the station areas in a manner that would yield comparative results.

A.1 Metrorail Station Selection

The 2005 survey originally targeted about ten station areas. The 1989 study had surveyed 38 sites at 13 station locations and the 2005 project team planned to survey fewer station areas and more sites at each station. As sites near a given station could be expected to share similar access characteristics, the team was of the opinion that surveying more sites at a single station would allow comparisons among those buildings while holding access characteristics, such as the pedestrian environment, relatively constant. However, given subsequently refined criteria and the availability of sites to survey, the 2005 effort also selected 13 station areas to study—but secured participation from 49 sites in total.

The following criteria were used to screen out those stations that would not be good candidates for inclusion in the 2005 study:

- Stations located in the metropolitan core. Stations located in the metropolitan core were generally eliminated from consideration because future joint or other developments are anticipated to be located in core fringe, midpoint or outlying locations. However, in the final list (see Appendix A.2), two exceptions were made to this criterion.
- Stations with surrounding general land uses in early stages of development. If surrounding land uses were "early" in development (i.e., large undeveloped areas, or areas currently undergoing major construction, or areas of low density), these stations would not provide enough data for the study.
- Stations with surrounding land uses dominated by an unconventional or atypical single use. Examples of such stations include Arlington Cemetery and the Pentagon. Land uses at these stations would not represent the kind of development expected at other Metrorail stations.
- Stations with surrounding land uses dominated by low-density residences. Recent joint or similar developments tend to be mixed use (office, commercial and residential), office or high-density residences.

Using the above criteria, about 45 percent of the stations were eliminated from the potential pool of stations.

An important consideration in selecting from the remaining stations was the intensity of their transit-oriented development (TOD) attributes. There is no universally accepted definition of TOD, but WMATA defines it as:

> Projects near transit stops which incorporate the following smart-growth principles: reduce automobile dependence; encourage high shares of pedestrian and bicycle access trips to

transit; help to foster safe station environments; enhance physical connections to transit stations from surrounding areas; and provide a vibrant mix of land-use activities.

A number of Metrorail station areas exhibit these qualities, and therefore, they were given strong consideration to be included in the survey. To help guide selection of the stations, the following principles were developed:

1. Generally, a variety of station types should be examined, including those with primarily commercial or residential uses, as well as those with a mix of uses.
2. The five land use types (office, residential, retail, hotel and entertainment) of the general densities desired (i.e., relatively high) should be generously represented among the selected stations.
3. The densities, mix, urban design and streetscape of land uses surrounding the station should be similar to expected future joint, private, or government developments near Metrorail stations. Application of this principle led to the exclusion of metropolitan core stations mainly because these examples are not likely to be replicated in upcoming developments.
4. The availability of data (i.e., high number of qualified buildings) at stations was a strong consideration because it was expected that many building owners or managers would decline the offer to participate, given the current security climate and related privacy concerns.
5. Some stations should be located in the eastern portion of the region to address issues raised in the Brookings Institution report, "A Region Divided," which reported that the eastern half of the region, with the dividing line at 16th Street, NW, carries "the area's burden of poverty and social distress while the western half enjoys most of the region's fruits of prosperity."
6. All five Metrorail lines should be represented among the selected stations.
7. All six political jurisdictions of the metropolitan area in which Metrorail stations are located (District of Columbia, Arlington County, Fairfax County, City of Alexandria, Montgomery County, and Prince George's County) should be represented among the selected stations.
8. Despite the desire to focus station-area selection on examples of TOD in fringe, midpoint or outlying locations, a small number of stations should be included in the survey for comparative purposes. At least one station should be located in the metropolitan core; at least one station should be located in a primarily residential area, with an adequate number of buildings to survey; and at least one station should be located in a suburban office environment, where parking is widely available, including at the station.
9. Stations included in the 1989 study also were given strong consideration by the project team so that comparisons could be made between past and current information.

Applying the above principles led the project team to propose the following eleven stations for the 2005 Development-Related Ridership Survey:

- Ballston (Orange line/Arlington County)
- Court House (Orange line/Arlington County)
- Crystal City (Yellow and Blue lines/Arlington County)
- Eisenhower Avenue (Yellow line/Alexandria)
- Farragut West (Orange and Blue lines/District of Columbia)

- Friendship Heights (Red line/District of Columbia and Montgomery County)
- Grosvenor-Strathmore (Red line/ Montgomery County)
- New Carrollton (Orange line/Prince George's County)
- Silver Spring (Red line/Montgomery County)
- U Street/African American Civil War Memorial/Cardozo (Green line/District of Columbia)
- Vienna/Fairfax-GMU (Orange line/Fairfax County)

The rationale for selecting these stations is provided below:

- The land uses surrounding the Ballston, Court House, Friendship Heights and Silver Spring stations exhibit many characteristics of desirable TOD at core fringe or midpoint Metrorail stations. These areas provide good pedestrian environments, a high mix of land uses, and higher densities that have led to relatively high Metrorail ridership.
- Although the Crystal City land use model is unlikely to be replicated in the future, the project team decided to include this station because of the high number of nearby buildings that could potentially be included in the survey. This station also was included in the 1989 survey.
- The land uses surrounding the Eisenhower Avenue station exhibit characteristics of desirable TOD at terminus or near-terminus Metrorail stations. In addition, this station has recently supported new developments, such as the relocated Patent and Trademark Office (PTO).
- Farragut West was originally screened from consideration because of its location in the metropolitan core. Nevertheless, this station was included for comparative purposes following Principle 8.
- Grosvenor-Strathmore originally was screened from consideration because its surrounding land uses are mostly residential. However, the project team decided to include this station for two reasons. First, it is possible that a station may be later developed in a predominantly medium- to high-density residential manner, like Grosvenor-Strathmore. Second, this station may be used for comparative purposes, as indicated in principle 8, to determine if this kind of land use pattern has an impact on ridership characteristics. This station also was surveyed in the 1989 study.
- The project team chose the New Carrollton station because it is predominantly commercial office with ample free parking, and is located on the eastern side of the region, therefore, meeting both Principles 8 and 5.
- U Street/African American Civil War Memorial/Cardozo station was selected as a Green Line station in the eastern portion of the region, to meet Principles 5 and 6, and also because it has the advantage of having several nearby residential buildings, an active commercial district, and a hospital, which offer the possibility of a rich data environment, as per Principle 4.
- Vienna/Fairfax-GMU is similar to Grosvenor-Strathmore in that its surrounding land uses are mostly residential. It was selected for comparative purposes, as indicated in Principle 8.

In evaluating the above stations with the selection guidance principles, the following conclusions can be made:

All five land use types are well represented among the eleven station areas.

Seven station areas exhibit TOD characteristics that are either desirable or likely to be replicated at other Metrorail stations: Ballston, Court House, Farragut West, Friendship Heights, Grosvenor-Strathmore, Silver Spring and U Street-Cardozo.

Many of the stations are surrounded by a large number of buildings that would qualify for surveying.

At least two stations, U St.-Cardozo and New Carrollton, are located in the eastern portion of the region.

All five Metrorail lines are represented among the identified stations.

All six political jurisdictions are represented among the stations.

Seven of the stations were included in the 1989 survey: Ballston, Court House, Crystal City, Farragut West, Friendship Heights, Grosvenor-Strathmore and Silver Spring.

The recommended list of stations was presented for comment to WMATA's Jurisdictional Coordinating Committee (JCC), which consists of members representing the local governments in the Washington Metropolitan Area Transit Authority Compact. The JCC review resulted in the following changes to the list of stations:

- The area surrounding King Street Station, part of Old Town, Alexandria, was suggested as a better example of TOD than the development around the Eisenhower Avenue Station, which is newer. The King Street Station area contains a number of commercial office and high-density residential buildings that could qualify for surveying.
- Fairfax County asked that Vienna Metrorail station not be included because the County was planning to conduct its own transportation survey of people living and working near this station. The Vienna Station, therefore, was replaced with the Dunn Loring-Merrifield Station, which also is located in Fairfax County along the Orange Line.

The station list was not finalized until the survey sites were secured as there was no way of knowing if building/site owners or managers would agree to participate in the study at the time the list of stations was being developed. The next section describes the process through which survey sites were identified and selected.

A.2 Survey Site Selection

The project team used the following criteria to select survey sites, which are consistent with the selection criteria used in the 1989 study, and are designed to ensure adequate response rates.

- Sites shall be no more than ½ mile from the station
- Office: Minimum 100,000 square feet (mix of private and public)[1]
- Residence: Minimum 75 dwelling units
- Retail: Clearly identifiable retail location with a high likelihood that those surveyed would be shoppers
- Hotel: Minimum 200 rooms
- Entertainment: movie theaters with no minimum number of screens

[1] Some exceptions had to be made in order not to duplicate annual commuter survey efforts underway in Montgomery County during the same time period.

In addition to the above criteria, the following principles were developed to guide decisions about the distribution and selection of survey buildings and sites for the study:

- Because joint development proposals tend to be weighted toward office and residential uses, higher numbers of these types of sites were selected at the expense of retail, hotel and entertainment sites.
- The entertainment category would consist only of movie theaters (including multiplexes), a common type of entertainment establishment often found near stations.
- The study should try to obtain an even distribution of public (federal, state, or local) and private office building sites.

With the JCC's assistance, the project team obtained candidate lists of buildings/sites. Local jurisdiction staff and other organizations, such as the U-Street Main Street Association and the Golden Triangle and Downtown Business Improvement Districts, also provided information to assist in the selection of candidate survey sites as well. Site managers were then contacted and asked if they would be willing to participate in the study. Some managers declined due to security or privacy concerns, or did not respond to numerous telephone calls and e-mails. Some of the office sites agreed to distribute workplace surveys but declined to allow the visitor intercept surveys to be conducted on their premises. Because the eleven initial stations could not supply the desired distribution of residential and entertainment (movie theater) sites, alternative sites were secured in the Gallery Place-Chinatown and Eisenhower Avenue Metrorail Station areas.

In the end, a total of 49 sites agreed to participate in the 2005 Development-Related Ridership Survey (see Chapter 2). These sites were distributed among 13 station areas. Figures 2 through 13 show the locations of these sites in relation to the stations.

A.3 Metrorail Station Area Profiles

Appendix A-3
Metrorail Station Area Profiles

Station	Metro Line(s)	Initial Selection Parameters																		
			Concentric Location			Metro Service Levels							Area Development Stage			General Land Use				
		Included in 1989 Study	Central Business District	Suburban-Inside the Beltway	Suburban-Outside the Beltway	Terminus/Near Terminus	Midpoint-Single Line	Midpoint-Double Lines	Midpoint-Junction	Core-Single Line	Core-Double Lines	Core-Junction	Early in development	Transitional area	Built-out area	Mostly Institutional/Single Use	Mostly residential	Mostly office/commercial	Mixed, heavy residential	Mixed, heavy office/commercial
Ballston-MU		■		■			■							■						■
Court House		■		■			■								■					■
Crystal City		■		■				■							■					■
Dunn Loring-Merrifield					■	■								■						■
Eisenhower Avenue				■		■								■						■
Farragut West		■	■								■				■			■		
Friendship Heights		■		■			■								■				■	
Gallery Place-Chinatown			■									■		■						■
Grosvenor-Strathmore		■			■		■							■			■			
King Street				■					■						■					■
New Carrollton					■	■								■				■		
Silver Spring		■		■			■							■						■
U St/African-Amer Civil War Mem'l				■			■							■						■

Appendix A-3
Metrorail Station Area Profiles

Station	Additional Information															
	Walkable	Land Uses Found at Station Site					Sites surveyed in 1989 that are included in the 2005 Survey	Activty Center Information[1]						Category or Typology	
								Year 2000			Proj'd (2025)				
		Residential	Office	Retail	Hotel	Entertainment		Job Density	Household Density	Jobs/Household Ratio	Job Density	Household Density	Jobs/Household Ratio	Activity Center	Typical/Desirable vs. Comparative
Ballston-MU	■	■	■	■	■	■	Ballston One (of)	84.5	26.5	3.2	140.6	35.5	4.0	Mixed use center	Typical/Desirable
							Randolph Towers (res)								
							Balston Common (ret)								
Court House	■	■	■	■	■	■		77.7	27.8	2.8	101.2	32.6	3.1	Mixed use center	Typical/Desirable
Crystal City	■	■	■	■	■		Crystal Square 2 (of)	96.1	11.9	8.1	140.1	18.8	7.5	Mixed use center	Comparative
							Crystal Square Apts. (res)								
							Crystal Plaza Apts. (res)								
							The Underground (ret)								
							Crystal Plaza Shops (ret)								
							Crystal Gateway (hot)								
							Crystal Hyatt (hot)								
Dunn Loring-Merrifield		■	■					26.5	1.6	16.6	37.3	2.6	14.6	Employment center	Typical/Desirable
Eisenhower Avenue	■	■	■	■		■		19.6	2.2	9.0	60.7	9.8	6.2	Mixed use center	Typical/Desirable
Farragut West	■	■	■	■	■		1701 Pennsylvania (of)	None/Not Applicable						DC core	Comparative
Friendship Heights	■	■	■	■	■			23.0	8.0	2.9	32.0	10.0	3.1	Mixed use center	Typical/Desirable
Gallery Place-Chinatown	■	■	■	■	■			None/Not Applicable						DC core	Typical/Desirable
Grosvenor-Strathmore		■					Grosvenor House Apts (res)	None/Not Applicable						None	Comparative
							Grosvenor Park I (res)								
							Stoneybrook (res)								
King Street	■	■	■	■				29.3	9.0	3.3	30.9	10.0	3.1	Mixed use center	Typical/Desirable
New Carrollton			■					16.5	3.3	5.0	17.3	3.3	5.2	Suburban employment	Comparative
Silver Spring	■	■	■	■	■	■	Silver Spring Metro Center (of)	83.1	13.6	6.1	107.6	22.8	4.7	Mixed use center	Typical/Desirable
							Twin Towers (res)								
							Georgian Towers (res)								
							Holiday Inn (hot)								
U St/African-Amer Civil War Mem'l	■	■	■			■		None/Not Applicable						DC core	Typical/Desirable

Note: [1] Information from Metropolitan Washington Regional Activity Centers: A Tool for Linking Land Use and Transportation Planning prepared by the Metropolitan Washington Council of Governments.

Appendix B
Data Collection Process

Appendix B
Data Collection Process

The sites listed in Appendix A.2 provide a representative sample of the universe of all similarly sized or similarly functional office, residential, retail, hotel and entertainment sites proximate to (i.e., comfortable walk distance) all Metrorail stations throughout the Washington metropolitan area, which probably number in the thousands. Unlike many transportation surveys where the unit of analysis is an individual person or vehicle, the units of this study involve the transportation decisions and habits of hundreds of people per unit. As such, this sample is too small to provide statistically significant results. Nevertheless, the collected data does provide a useful snapshot of the travel characteristics of land uses around transit stations.

Data about the travel characteristics of individuals who use (e.g., work, live, shop, etc.) the sites identified in Appendix A.2 were collected through a series of questionnaires conducted by self-administered survey forms and oral intercept interviews conducted at each site (see Appendices B.6 and B.7). Data collection for this study began on May 6, 2005, and ended on June 10, 2005. The self-administered surveys were directed at office employees and residents. The oral intercept surveys were directed at office building visitors, patrons and employees of the retail sites, and guests or patrons of hotel and entertainment sites. The specifics of the data collection program by land use type are provided below.

B.1 Data Collection Methodologies

B.1.1 Office Sites

Data collection at office sites was conducted through self-administered surveys distributed to every employee at the participating site, and intercept oral interviews with visitors to the site. The survey form and oral interview questionnaire are provided in Appendices B.6 and B.7. Four office sites participating in the workplace survey declined to participate in the visitor survey.

The workplace survey forms were distributed either by project personnel or by building management. For those sites where the forms were distributed by management, project personnel later returned to the site and retrieved unused survey forms so that a precise distribution count for each site could be calculated. Along with the survey forms, WMATA provided letters to building management and employers explaining how data collection would be conducted at the site, and to request participation (see Appendix B.8). Respondents were asked to deposit completed survey forms in drop boxes placed throughout the office site per management instructions or preferences. Office employees were given at least one week to fill out the questionnaires, but were granted deadline extensions on a case-by-case basis, often depending on whether management allowed the drop boxes to remain on the premises longer than one week.

To collect data from visitors, interviewers were stationed at strategic locations where they could intercept visitors as they entered the office building. In most cases the interviewers were allowed in the lobby and elevator bays where visitors enter the building. Only one site did not allow project staff to conduct interviews inside the building. The interviews were scheduled on a

Tuesday, Wednesday, or Thursday roughly between the hours of 8:00 a.m. and 5:00 p.m. Visitors who entered the office site were stopped by interviewers and asked to participate in an oral interview regarding their trip to the site. If the person stopped was an employee, no questions were asked. Interview staff also counted the total number of visitors who entered the site to compare with the total number of interviews conducted at the site.

B.1.2 Residential Sites

Data collection at residential sites was conducted exclusively through self-administered surveys distributed to every unit of the site (see Appendix B.6).

The residential survey forms were distributed by project personnel or building management and by U.S. mail using WMATA envelopes. Completed survey forms were returned via postage paid mailers.

For those sites where the forms were distributed by management, precise numbers of forms matching the number of units at each particular site were given to management personnel for distribution. Project personnel later returned to the site to retrieve unused survey forms so that a precise distribution count for each site could be calculated. However, only one site (Grosvenor House Apartments) returned unused forms, suggesting that surveys were delivered to vacant units, which would cause an underestimation of survey response rates for the "drop off" sites.

For those sites where the forms were distributed by mail, WMATA monitored the returned undeliverable mail to determine the site's distribution count. Along with the survey forms, WMATA also prepared and sent letters to building management explaining how data collection would be conducted at the site and to request their participation, as well as "Dear Resident" letters which management could post in common areas to alert residents to the process and explain the project rationale (see Appendix B.8). The residential survey form included a business reply mail address so that no postage would be required from respondents. Instructions for mailing back the survey were provided on the form.

B.1.3 Retail Sites

Data collection at retail sites was conducted exclusively through intercept oral interviews of site patrons and employees using the questionnaire shown in Appendix B.7.

To collect data from retail site patrons and employees, interviewers were stationed at strategic locations within the retail site. Unlike the office visitor survey, the interview areas were not always located near entrances because some sites were open or the site had too many entrances for the interviewers to cover. In general, the interviewers were stationed in high pedestrian areas, and to minimize bias, not near an entrance to the retail site that favors one transportation mode over others. The interviews were scheduled on a Tuesday, Wednesday, or Thursday between the hours the establishment opened and closed. Interview staff also counted the number of people who passed through the interview areas to compare with the number of interviews conducted at the site.

B.1.4 Hotel Sites

Data collection at hotels was conducted exclusively through intercept oral interviews of guests and visitors using the questionnaire shown in Appendix B.7.

Interviewers were stationed at strategic locations within the hotel where guests and visitors enter or leave the site. All the hotels participating in the survey allowed interviewers to work in their lobbies. The interviews were scheduled on a Tuesday, Wednesday, or Thursday between the hours of 7:00 a.m. to 10:00 a.m.[2] These hours were selected as the time when most guests would depart the hotel for any number of reasons and when most visitors would enter the hotel for meetings or conferences. Hotel employees were not included in the survey. Interview staff also counted the total number of guests and visitors who entered or departed the site to compare with the number of interviews conducted at the site.

B.1.5 Entertainment Sites

As noted in Appendix A.2, entertainment sites were defined as movie theaters, including multiplexes. Data collection at movie theater sites was conducted exclusively through intercept oral interviews of moviegoers using the questionnaire shown in Appendix B.7.

Interviewers were stationed at locations where they could intercept moviegoers as they entered the site. In three of the four locations, interviewers were allowed to be in the lobby. Only one site did not allow interviewers to work within the lobby. The interviews were scheduled on a Tuesday, Wednesday, or Thursday between the hours the theater opened its doors for the first showing and just before the last showing began. The interviewers usually intercepted moviegoers during the period between waiting to buy their tickets, and handing their tickets to the usher. At the one site where the team was not allowed in the lobby, intercepts occurred before moviegoers entered the building. Interview staff also counted the total number of patrons who entered the site to compare with the number of interviews conducted at the site.

B.2 Statistical Reliability of Survey Results

The travel data collected from surveyed respondents in the WMATA Development-Related Ridership Survey is based on a multiple level sampling design, comprised of selected stations, selected buildings, and sampled persons intercepted at these locations. Those individuals responding to the survey represent an approximate random sampling for which statistical estimates of sampling error can be made. Measures of travel rates at the station and development type summary level are essentially case study measures that represent estimates for those locations. The results at this level can not be generalized or attributed to a larger population of such sites in a meaningful statistical manner.

For an individual building, however, assuming that a random sample of building visitors, employees or residents were included in the survey, it is possible to estimate the range of reliability of the results as they pertain to characteristics of the entire population of persons associated with the site. For measures such as the share of trips made by transit, a proportional

[2] The intercept survey at the Ballston Holiday Inn occurred between the hours of 9 am and 11 am.

or percentage type measure, the binomial sample theorem applies and the confidence limits, at a given level of significance (e.g. 95 percent) can be computed based on the actual number of persons or trips used and the observed share as a plus or minus and percentage point range around the sample statistic.

These confidence limit ranges are shown in Table B-1 for varying sample sizes and for a range of proportional results. For example, if in a sample segment of 150 work trips and 45 (or 30 percent) reported using Metrorail, the estimated share for the all work trips at the site would be +/- 7.3 percent, or between 22.7 percent and 37.3 percent at a 95 percent level of reliability.

Table B-1
Confidence Limits (+/- % points) for Proportional Measure -
at the 95% Significance Level

Sample Size	Observed Percentage from Sample (Segment)									
	1% or 99%	2% or 98%	3% or 97%	5% or 95%	10% or 90%	15% or 85%	20% or 80%	30% or 70%	40% or 60%	50% or 50%
10	n/a	n/a	n/a	n/a	18.6%	22.1%	24.8%	28.4%	30.4%	31.0%
25	n/a	n/a	6.7%	8.5%	11.8%	14.0%	15.7%	18.0%	19.2%	19.6%
50	n/a	3.9%	4.7%	6.0%	8.3%	9.9%	11.1%	12.7%	13.6%	13.9%
75	n/a	3.2%	3.9%	4.9%	6.8%	8.1%	9.1%	10.4%	11.1%	11.3%
100	2.0%	2.7%	3.3%	4.3%	5.9%	7.0%	7.8%	9.0%	9.6%	9.8%
150	1.6%	2.2%	2.7%	3.5%	4.8%	5.7%	6.4%	7.3%	7.8%	8.0%
200	1.4%	1.9%	2.4%	3.0%	4.2%	4.9%	5.5%	6.4%	6.8%	6.9%
300	1.1%	1.6%	1.9%	2.5%	3.4%	4.0%	4.5%	5.2%	5.5%	5.7%
400	1.0%	1.4%	1.7%	2.1%	2.9%	3.5%	3.9%	4.5%	4.8%	4.9%
500	0.9%	1.2%	1.5%	1.9%	2.6%	3.1%	3.5%	4.0%	4.3%	4.4%
600	0.8%	1.1%	1.4%	1.7%	2.4%	2.9%	3.2%	3.7%	3.9%	4.0%
700	0.7%	1.0%	1.3%	1.6%	2.2%	2.6%	3.0%	3.4%	3.6%	3.7%
800	0.7%	1.0%	1.2%	1.5%	2.1%	2.5%	2.8%	3.2%	3.4%	3.5%
900	0.7%	0.9%	1.1%	1.4%	2.0%	2.3%	2.6%	3.0%	3.2%	3.3%
1000	0.6%	0.9%	1.1%	1.4%	1.9%	2.2%	2.5%	2.8%	3.0%	3.1%
2000	0.4%	0.6%	0.7%	1.0%	1.3%	1.6%	1.8%	2.0%	2.1%	2.2%
3000	0.4%	0.5%	0.6%	0.8%	1.1%	1.3%	1.4%	1.6%	1.8%	1.8%

Appendix B.3
Acknowledgements

WMATA wishes to acknowledge the following individuals for their assistance in making the survey a success:

- Ballston Metro Station
  - Ballston One: Ken Rosenbuger
  - 3 Ballston Plaza: Judy Agee
  - Ballston Common and Regal Cinemas: Stephanie Shriver-Engdahl and Selina Tolentina
- Court House Station
  - 2100 & 2200 Clarendon Blvd.: Deidre Schexnayder and Jeff Price
  - Courthouse Tower: Lisa Cunniff
- Crystal City Station
  - Crystal Park Four: Deidre Schexnayder and Doug Forrester
  - Crystal Square 2: Deidre Schexnayder and Doug Wright
  - Crystal Square Apartments: Sabrina Woods
  - Crystal Plaza Shops and Crystal City Shops North (Underground): Brenda Davis
- Dunn-Loring-Merrifield
  - Merrifield Village: Loretta Horn
- Farragut West Station
  - 1701 Pennsylvania Ave.: Karla Christensen
  - 1634 I Street: Ellen De Bremond and Pete Kossiaras
- Friendship Heights
  - 2 Wisconsin Circle: Leslie Olson
  - Chevy Chase Plaza: Nancy Stoner
  - North Park Apartments: Kim Luk
  - Embassy Suites Chevy Chase Pavilion: Jeff Brainerd
- Gallery Place/Chinatown
  - The Lansburgh: Kevin Wilsey and Patty Brempell
- Grosvenor-Strathmore
  - Avalon Bay: Michael Mathis
  - Grosvenor House Apartments: Debra Murray
  - Grosvenor Park I: Vicki Meyer
  - Stoneybrook: Kay Gottesman and Lenore Sack
- King Street
  - King Street Station: Stephen Fenning and Dan Diaz
  - 333 John Carlyle: Carol Goodart
- New Carrollton
  - 8400 Corporate Drive: Sherri Washington and Steve Brown

- Silver Spring
  - 8380 Colesville Road: Chris Healy and Gina Yates
  - 8720 Georgia Avenue: Michael Federici and Donna Cellini
  - Metro Plaza 1: Genny Hardesty
  - Georgian Towers: Alex Hekimian and Brian Beard
  - Twin Towers: Will Kaine
  - Silver Spring Neighborhood Center: Rob Parker
  - Holiday Inn Silver Spring: Sammy Bazuzi and Brooke Ratley
  - AFI Silver Theater: Lori Sousa
  - The Majestic 20 (Consolidated Theaters): David Kussner
- U Street/African American Civil War Memorial/Cardozo Station
  - Reeves Center: James Isley and Deneane Bell
  - U Street Main Street: Nevin Kelly

B.4 Self-Administered Survey Forms

Washington Metropolitan Area Workplace Survey

This survey is part of a continuing effort of the Washington Metropolitan Area Transit Authority (Metro) to plan for the transportation needs of residents and workers within the Washington region. We would appreciate your help by filling out this questionnaire. Any information you provide will be completely confidential, and will only be reported in summary form.

Please return this survey to the drop box designated for your office.

If you have any questions, please contact Jason Yazawa of Parsons Brinckerhoff at 703-742-5820.

THANK YOU FOR YOUR ASSISTANCE!

1. Today's Date: _____/2005

2. What is the address of the place where your report for work? _____

_____

3. Which of the following best describe your job? (Please Check One Box)

- ❑ Professional
- ❑ Executive/Managerial
- ❑ Administrative/Clerical
- ❑ Sales
- ❑ Technician
- ❑ Craftsman, mechanic, etc.
- ❑ Driver
- ❑ Equipment operator
- ❑ Laborer
- ❑ Service worker
- ❑ Military
- ❑ Other

4. Do you work full-time or part-time?

- ❑ Full-time
- ❑ Part-time

5. At what time did you START work TODAY, even if atypical? _____

6. At what time did (or will) you LEAVE work TODAY, even if atypical? _____

7. How did you get to work TODAY? (Please Check One Box)

- ❑ Auto: Drove
- ❑ Auto: Passenger – *Please continue at Question 10*
- ❑ Auto: Drop-off – *Please continue at Question 10*
- ❑ Rode Metrorail then Walked or Biked – *Please continue at Question 9*
- ❑ Rode Metrorail then Rode Bus or Shuttle – *Please Continue at Question 9*
- ❑ Bus or Shuttle Only – *Please continue at Question 9*
- ❑ MARC, VRE or Amtrak – *Please continue at Question 9*
- ❑ Walk all the way – *Please continue at Question 10*
- ❑ Bicycle all the way – *Please continue at Question 10*
- ❑ Other – Please continue at Question 10

8. PLEASE ANSWER QUESTIONS 8A TO 8E IF YOU DROVE TO WORK TODAY.

8A. Do you normally drive to work?

- ❑ Yes
- ❑ No

8B. Are there convenient transit (Metrorail and bus) options available for your trip to work?

- ❑ Yes
- ❑ No
- ❑ Don't Know

8C. Does your employer (May Select More Than One or None at All):

- ❑ Provide free or subsidize your parking costs?
- ❑ Participate in government programs that subsidize parking costs?
- ❑ Subsidize your automobile expenses?
- ❑ Provide a car for business purposes during the day?
- ❑ Have a program to encourage car or vanpooling?
- ❑ Allow flexible working hours?
- ❑ Allow full or partial telecommuting?
- ❑ Other arrangements, please specify:

_____

8D. Do you pay for parking at or near your workplace?

❑ Yes ❑ No

8E. If "yes", how much do you pay for parking?

_____/day or _____/month

9. PLEASE ANSWER QUESTIONS 9A TO 9F IF YOU USED TRANSIT TO COME TO WORK.

9A. Do you normally ride transit?

❑ Yes ❑ No

9B. Was a privately owned vehicle available for your trip to work TODAY?

❑ Yes ❑ No

9C. How would you best describe the walk from the last transit vehicle (e.g., Metrorail station or bus stop) to the building or location where you work? (Please Check One Box)

- ❑ Short and pleasant
- ❑ Long and pleasant
- ❑ Neutral, don't know or no opinion
- ❑ Short and unpleasant
- ❑ Long and unpleasant

9D. What would make the walk between your Metrorail station or bus stop to your work place more enjoyable? (May Select More Than One)

- ❑ Nothing
- ❑ Provide sidewalks or pedestrian walkways
- ❑ Wider sidewalks
- ❑ More shade trees
- ❑ Pedestrian bridge(s) over busy streets
- ❑ Favorable pedestrian walk signals
- ❑ Alternative pedestrian routes available
- ❑ More retail stores and eating places along route
- ❑ Other, please specify

_____

9E. Does your employer (May Select More Than One or None at All):

- ❑ Pay for or subsidize your transit costs?
- ❑ Participate in government programs that subsidize transit costs?
- ❑ Provide a car for business purposes during the day?
- ❑ Have a program to encourage car or vanpooling?
- ❑ Allow flexible working hours?
- ❑ Allow full or partial telecommuting?
- ❑ Other arrangements, please specify

_____

9F. What is your out-of-pocket round-trip daily cost to and from work? (Please include all transit fares and parking charges) _____

10. If you made or plan to make one or more trips from and returning to your place of work TODAY, please check the appropriate boxes (DO NOT INCLUDE TRIPS TO AND FROM YOUR HOME):

	Trip 1	Trip 2	Trip 3
10A. Main purpose of each trip (Please Check One Box Per Column)			
Work related	❑	❑	❑
Errands or personal business	❑	❑	❑
Meal or snacks	❑	❑	❑
Shopping	❑	❑	❑
Educational	❑	❑	❑
Recreational	❑	❑	❑
Other	❑	❑	❑
10B. In what city or county is the destination located for each trip? (Please Check One Box Per Column)			
Within ½ mile from work place	❑	❑	❑
District of Columbia	❑	❑	❑
Arlington County	❑	❑	❑
City of Alexandria	❑	❑	❑
City of Falls Church	❑	❑	❑
Fairfax County	❑	❑	❑
Fairfax City	❑	❑	❑
Prince George's County	❑	❑	❑
Montgomery County	❑	❑	❑
Elsewhere in Virginia	❑	❑	❑
Elsewhere in Maryland	❑	❑	❑
Other	❑	❑	❑
10C. What is the zip code of the destination if you know it?			
10D. What is the nearest intersection of the destination if you know it?			
10E. Means of travel for each trip (Please Check One Box Per Column)			
Drove all the Way	❑	❑	❑
Auto Passenger or Drop-Off	❑	❑	❑
Walk or Bike to Metrorail	❑	❑	❑
Drove, Parked and Rode Metrorail	❑	❑	❑
Auto Drop-off and Rode Metrorail	❑	❑	❑
Bus or Shuttle to Metrorail	❑	❑	❑
Bus or Shuttle Only	❑	❑	❑
MARC, VRE or Amtrak	❑	❑	❑
Walked all the Way	❑	❑	❑
Bicycle all the Way	❑	❑	❑
Other	❑	❑	❑

11. In what city or county is your residence located? (Please Check One Box)

- ❑ District of Columbia
- ❑ Arlington County
- ❑ City of Alexandria
- ❑ City of Falls Church
- ❑ Fairfax County
- ❑ Fairfax City
- ❑ Prince George's County
- ❑ Montgomery County
- ❑ Elsewhere in Virginia
- ❑ Elsewhere in Maryland

11A. What is address of or the intersection nearest to where you live? _____

_____

12. What is your age? (Please Check One Box)

- ❑ 18 years or under
- ❑ 19 to 24
- ❑ 25 to 34
- ❑ 35 to 44
- ❑ 45 to 54
- ❑ 55 to 64
- ❑ 65 years or over

13. What is your gender?

- ❑ Male
- ❑ Female

14. Are you a licensed driver?

- ❑ Yes
- ❑ No

15. How many autos, pickups, SUVs, vans, and motorcycles are available for use by members of your household? (Please Check One Box)

- ❑ None
- ❑ One
- ❑ Two
- ❑ Three
- ❑ Four or more

THANK YOU FOR YOUR ASSISTANCE!

Washington Metropolitan Area Residential Survey

This survey is part of a continuing effort of the Washington Metropolitan Area Transit Authority (Metro) to plan for the transportation needs of residents and workers within the Washington region. We would appreciate your help by filling out this questionnaire about your household's travel patterns for any given **weekday**. Please do not provide information on travel patterns by you and others in your household for any weekend date. Any information you provide will be completely confidential, and will only be reported in summary form.

Please return this survey by **May 25, 2005** by dropping it off in any mailbox (**NO POSTAGE REQUIRED**). The return mailing label is provided on the last page of this questionnaire. When you have completed this survey, please fold the document in thirds, leaving the mailing label exposed, and seal or staple the document closed.

If you have any questions, please contact Jason Yazawa of Parsons Brinckerhoff at 703-742-5820.

THANK YOU FOR YOUR ASSISTANCE!

1. How many autos, pickups, SUVs, vans, and motorcycles are available for use by members of your household? (Please Check One Box)

- ❑ None
- ❑ One
- ❑ Two
- ❑ Three
- ❑ Four or more

2. How many designated parking spaces are provided or allotted to your residence? (Please Check One Box)

- ❑ None
- ❑ One
- ❑ Two
- ❑ Three or more

Please fill out the following information for persons 16 years of age or older (up to three people), including yourself, who currently live in the household. One person should fill in the responses. You would be the subject of the first set of questions. THE INFORMATION WOULD BE FOR ONE DAY ONLY. If you do not know how to answer the questions for others in your household, you may ask them for help in filling in the responses. If they are not available, you may leave those questions blank.

3. Date on which travel occurred or will occur (PLEASE USE WEEKDAY): _____/2005

Yourself (Person 1) – *Questions 4 thru 6E*

4. Are you a licensed driver?

- ❑ Yes
- ❑ No

5. Do you work or go to school outside your residence?

- ❑ Yes
- ❑ No

6. Please tell us about the trips (up to 4) you made or plan to make FROM YOUR HOME on ONE WEEKDAY.

	Trip 1	Trip 2	Trip 3	Trip 4
6A. MAIN PURPOSE OF EACH TRIP (Please Check One Box Per Column)				
Work or school	❑	❑	❑	❑
Errands or personal business	❑	❑	❑	❑
Meal or snacks	❑	❑	❑	❑
Shopping	❑	❑	❑	❑
Recreation	❑	❑	❑	❑
Social	❑	❑	❑	❑
Other	❑	❑	❑	❑

	Trip 1	Trip 2	Trip 3	Trip 4
6B. AT WHAT TIME DID YOU LEAVE OR PLAN TO LEAVE YOUR HOME FOR EACH TRIP?				
6C. IN WHAT CITY OR COUNTY IS THE DESTINATION LOCATED FOR EACH TRIP? (Please Check One Box Per Column)				
District of Columbia	❑	❑	❑	❑
Arlington County	❑	❑	❑	❑
City of Alexandria	❑	❑	❑	❑
City of Falls Church	❑	❑	❑	❑
Fairfax County	❑	❑	❑	❑
Fairfax City	❑	❑	❑	❑
Prince George's County	❑	❑	❑	❑
Montgomery County	❑	❑	❑	❑
Elsewhere in Virginia	❑	❑	❑	❑
Elsewhere in Maryland	❑	❑	❑	❑
Other	❑	❑	❑	❑
6D. WHAT IS THE ADDRESS OR NEAREST INTERSECTION OF THE DESTINATION OF EACH TRIP IF YOU KNOW IT?				
6E. MEANS OF TRAVEL FOR EACH TRIP (Please Check One Box Per Column)				
Drove all the Way	❑	❑	❑	❑
Auto Passenger or Drop-Off	❑	❑	❑	❑
Walk or Bike to Metrorail	❑	❑	❑	❑
Drove, Parked and Rode Metrorail	❑	❑	❑	❑
Auto Drop-off and Rode Metrorail	❑	❑	❑	❑
Bus or Shuttle to Metrorail	❑	❑	❑	❑
Bus or Shuttle Only	❑	❑	❑	❑
MARC, VRE or Amtrak	❑	❑	❑	❑
Walked all the Way	❑	❑	❑	❑
Bicycle all the Way	❑	❑	❑	❑
Other	❑	❑	❑	❑

Person 2 – *Questions 7 thru 9E*

7. Is this person a licensed driver?

❑ Yes ❑ No

8. Does this person work or go to school outside your residence?

❑ Yes ❑ No

9. Please tell us about the trips (up to 4) this person made or plans to make FROM YOUR HOME on the SAME DAY reported in Questions 6A thru 6E. If this person made trips with you or others in your household, please count these separately. For example, if you and this person were on a trip together, this trip should be recorded in both Questions 6A thru 6E, and Questions 9A thru 9E.

	Trip 1	Trip 2	Trip 3	Trip 4
9A. MAIN PURPOSE OF EACH TRIP (Please Check One Box Per Column)				
Work or school	❑	❑	❑	❑
Errands or personal business	❑	❑	❑	❑
Meal or snacks	❑	❑	❑	❑
Shopping	❑	❑	❑	❑
Recreation	❑	❑	❑	❑
Social	❑	❑	❑	❑
Other	❑	❑	❑	❑
9B. AT WHAT TIME DID THIS PERSON LEAVE OR PLAN TO LEAVE YOUR HOME FOR EACH TRIP?				
9C. IN WHAT CITY OR COUNTY IS THE DESTINATION LOCATED FOR EACH TRIP? (Please Check One Box Per Column)				
District of Columbia	❑	❑	❑	❑
Arlington County	❑	❑	❑	❑
City of Alexandria	❑	❑	❑	❑
City of Falls Church	❑	❑	❑	❑
Fairfax County	❑	❑	❑	❑
Fairfax City	❑	❑	❑	❑
Prince George's County	❑	❑	❑	❑
Montgomery County	❑	❑	❑	❑
Elsewhere in Virginia	❑	❑	❑	❑
Elsewhere in Maryland	❑	❑	❑	❑
Other	❑	❑	❑	❑
9D. WHAT IS THE ADDRESS OR NEAREST INTERSECTION OF THE DESTINATION OF EACH TRIP IF YOU KNOW IT?				
9E. MEANS OF TRAVEL FOR EACH TRIP (Please Check One Box Per Column)				
Drove all the Way	❑	❑	❑	❑
Passenger or Drop-Off	❑	❑	❑	❑
Walk or Bike to Metrorail	❑	❑	❑	❑
Drove, Parked and Rode Metrorail	❑	❑	❑	❑
Drop-off and Rode Metrorail	❑	❑	❑	❑
Bus or Shuttle to Metrorail	❑	❑	❑	❑
Bus or Shuttle Only	❑	❑	❑	❑
MARC, VRE or Amtrak	❑	❑	❑	❑
Walked all the Way	❑	❑	❑	❑
Bicycle all the Way	❑	❑	❑	❑
Other	❑	❑	❑	❑

Person 3 – Questions 10 thru 12E

10. Is this person a licensed driver?	**11. Does this person work or go to school outside your residence?**
❑ Yes ❑ No	❑ Yes ❑ No

12. Please tell us about the trips (up to 4) this person made or plans to make FROM YOUR HOME on the SAME DAY reported in Questions 6A thru 6E. If this person made trips with you or others in your household, please count these separately. For example, if you and this person were on a trip together, this trip should be recorded in both Questions 6A thru 6E, and Questions 12A thru 12E.

	Trip 1	Trip 2	Trip 3	Trip 4
12A. MAIN PURPOSE OF EACH TRIP (Please Check One Box Per Column)				
Work or school	❑	❑	❑	❑
Errands or personal business	❑	❑	❑	❑
Meal or snacks	❑	❑	❑	❑
Shopping	❑	❑	❑	❑
Recreation	❑	❑	❑	❑
Social	❑	❑	❑	❑
Other	❑	❑	❑	❑
12B. AT WHAT TIME DID THIS PERSON LEAVE OR PLAN TO LEAVE YOUR HOME FOR EACH TRIP?				
12C. IN WHAT CITY OR COUNTY IS THE DESTINATION LOCATED FOR EACH TRIP? (Please Check One Box Per Column)				
District of Columbia	❑	❑	❑	❑
Arlington County	❑	❑	❑	❑
City of Alexandria	❑	❑	❑	❑
City of Falls Church	❑	❑	❑	❑
Fairfax County	❑	❑	❑	❑
Fairfax City	❑	❑	❑	❑
Prince George's County	❑	❑	❑	❑
Montgomery County	❑	❑	❑	❑
Elsewhere in Virginia	❑	❑	❑	❑
Elsewhere in Maryland	❑	❑	❑	❑
Other	❑	❑	❑	❑
12D. WHAT IS THE ADDRESS OR NEAREST INTERSECTION OF THE DESTINATION OF EACH TRIP IF YOU KNOW IT?				
12E. MEANS OF TRAVEL FOR EACH TRIP (Please Check One Box Per Column)				
Drove all the Way	❑	❑	❑	❑
Passenger or Drop-Off	❑	❑	❑	❑
Walk or Bike to Metrorail	❑	❑	❑	❑
Drove, Parked and Rode Metrorail	❑	❑	❑	❑
Drop-off and Rode Metrorail	❑	❑	❑	❑
Bus or Shuttle to Metrorail	❑	❑	❑	❑
Bus or Shuttle Only	❑	❑	❑	❑
MARC, VRE or Amtrak	❑	❑	❑	❑
Walked all the Way	❑	❑	❑	❑
Bicycle all the Way	❑	❑	❑	❑
Other	❑	❑	❑	❑

THANK YOU FOR YOUR ASSISTANCE!

B.5 Oral Interview Intercept Questionnaires and Recording Sheets

Office Visitor Intercept Questionnaire

INTERVIEWER TO RECORD ARRIVAL TIME.

"Excuse me. Metro is conducting a travel survey. This survey is for visitors of this building."

1. **"Do you work in this building?"**
   1. Yes
   2. No

IF THE ANSWER IS "YES": **"Thank you very much."**

IF THE ANSWER IS "NO": **"Could I ask you a few questions?** OPTIONAL, IF NECESSARY: **It should only take a few moments, and your responses will be confidential."**

2. **"Why did you come here today?"**
   1. Visiting somebody who works in the building.
   2. Deliveries
   3. Eating
   4. Banking
   5. Shopping
   6. Medical, dental or social services
   7. Other

3. **"How did you get here?"**
   1. Auto: Drove
   2. Auto: Passenger
   3. Auto: Drop-off
   4. Metrorail and Walk/Bike
   5. Metrorail and Bus/Shuttle
   6. Bus/Shuttle Only
   7. MARC, VRE or Amtrak
   8. Walk
   9. Bicycle
   10. Taxi
   11. Other

4. ONLY FOR METRORAIL AND BUS USERS (#4, #5 AND #6 ABOVE): **"Did you have a car available for your trip here?"**
   1. Yes
   2. No

5. IF PERSON IS BY THEMSELVES: **"Did you come here by yourself?"** If YES, RECORD "ONE" BELOW**.** IF ANSWER IS NO, ASK THE FOLLOWING, AND ASK THE FOLLOWING IF THE PERSON IS WITH A GROUP (TWO OR MORE): "**How many people came in your group, including yourself?"**
   1. One
   2. Two
   3. Three
   4. Four or more

6. **"What kind of place did you come from prior to coming here?"**
   1. Home
   2. Work place
   3. School / college
   4. Other office
   5. Commercial establishment (restaurant, retail store, etc.)
   6. Other

6A. **"In what city or county is that place located?"**

1. District of Columbia
2. Arlington County
3. City of Alexandria
4. City of Falls Church
5. Fairfax County
6. Fairfax City
7. Prince George's County
8. Montgomery County
9. Elsewhere in Virginia
10. Elsewhere in Maryland
11. Other

6B. **"What is the address of or the intersection nearest to that place?"** NOT A PROBLEM IF PERSON DOES NOT KNOW OR REFUSES TO ANSWER

7. **"How long do you expect to be here?"** INTERVIEWER TO RECORD TIME

8. **"Where will you go after leaving here?"**

1. Same place as before – GO TO QUESTION 9
2. Other place - IF OTHER PLACE –ASK AND RECORD FOR QUESTIONS 8A THRU 8C

8A. ASK THIS QUESTION IF THE ANSWER GIVEN IN QUESTION 8 IS "OTHER PLACE", AND IS NOT OBVIOUS: **"What kind of place is that?"**

1. Home
2. Work place
3. School / college
4. Other office
5. Commercial establishment (restaurant, retail store, etc.)
6. Other

8B. **"In what city or county is that place located?"**

1. District of Columbia
2. Arlington County
3. City of Alexandria
4. City of Falls Church
5. Fairfax County
6. Fairfax City
7. Prince George's County
8. Montgomery County
9. Elsewhere in Virginia
10. Elsewhere in Maryland
11. Other

8C. **"What is the address of or the intersection nearest to that place?"** NOT A PROBLEM IF PERSON DOES NOT KNOW OR REFUSES TO ANSWER

9. **"How will you be getting there?"**

1. Auto: Drove
2. Auto: Passenger
3. Auto: Drop-off
4. Walk/Bike to Metrorail
5. Bus/Shuttle to Metrorail
6. Bus/Shuttle Only
7. MARC, VRE or Amtrak
8. Walk
9. Bicycle
10. Taxi
11. Other

"Thank you for your time."

Retail Intercept Questionnaire

INTERVIEWER TO RECORD ARRIVAL TIME.

"Excuse me. Metro is conducting a travel survey. Could I ask you a few questions?"
OPTIONAL, IF NECESSARY: **"It should only take a few moments, and your responses will be confidential."**

1. **"Why did you come here today?"**
   1. Shopping
   2. Eating
   3. Business
   4. Employee
   5. Banking
   6. Other

2. **"How did you get here?"**
   1. Auto: Drove
   2. Auto: Passenger
   3. Auto: Drop-off
   4. Metrorail and Walk/Bike
   5. Metrorail and Bus/Shuttle
   6. Bus/Shuttle Only
   7. MARC, VRE or Amtrak
   8. Walk
   9. Bicycle
   10. Taxi
   11. Other

3. ONLY FOR METRORAIL AND BUS USERS (#4, #5 AND #6 ABOVE): **"Did you have a car available for your trip here?"**
   1. Yes
   2. No

4. IF PERSON IS BY THEMSELVES: **"Did you come here by yourself?"** If YES, RECORD "ONE" BELOW**.** IF ANSWER IS NO, ASK THE FOLLOWING, AND ASK THE FOLLOWING IF THE PERSON IS WITH A GROUP (TWO OR MORE): "**How many people came in your group, including yourself?"**
   1. One
   2. Two
   3. Three
   4. Four or more

5. **"What kind of place did you come from prior to coming here?**
   1. Home
   2. Work place
   3. School / college
   4. Restaurant or eatery
   5. Other retail or commercial establishment
   6. Hotel or motel
   7. Tourist attraction
   8. Other

5A. **"In what city or county is that place located?"**
   1. District of Columbia
   2. Arlington County
   3. City of Alexandria
   4. City of Falls Church
   5. Fairfax County
   6. Fairfax City
   7. Prince George's County
   8. Montgomery County
   9. Elsewhere in Virginia
   10. Elsewhere in Maryland
   11. Other

5B. **"What is the address of or the intersection nearest to that place?"** NOT A PROBLEM IF PERSON DOES NOT KNOW OR REFUSES TO ANSWER

6. **"How long do you expect to be here?"** [INTERVIEWER TO RECORD TIME]

7. **"Where will you go after leaving here?"**

1. Same place as before – GO TO QUESTION 8
2. Other place - IF OTHER PLACE –ASK AND RECORD FOR QUESTIONS 7A THRU 7C

7A. ASK THIS QUESTION IF THE ANSWER GIVEN IN QUESTION 7 IS "OTHER PLACE", AND IS NOT OBVIOUS: "**What kind of place is that?"**

1. Home
2. Work place
3. School / college
4. Restaurant or eatery
5. Other retail or commercial establishment
6. Hotel or motel
7. Tourist attraction
8. Other

7B. **"In what city or county is that place located?"**

1. District of Columbia
2. Arlington County
3. City of Alexandria
4. City of Falls Church
5. Fairfax County
6. Fairfax City
7. Prince George's County
8. Montgomery County
9. Elsewhere in Virginia
10. Elsewhere in Maryland
11. Other

7C. **"What is the address of or the intersection nearest to that place?"** NOT A PROBLEM IF PERSON DOES NOT KNOW OR REFUSES TO ANSWER

8. "**How will you be getting there?"**

1. Auto: Drove
2. Auto: Passenger
3. Auto: Drop-off
4. Walk/Bike to Metrorail
5. Bus/Shuttle to Metrorail
6. Bus/Shuttle Only
7. MARC, VRE or Amtrak
8. Walk
9. Bicycle
10. Taxi
11. Other

"Thank you for your time."

Hotel Intercept Questionnaire

INTERVIEWER TO RECORD ARRIVAL TIME.

"Excuse me. Metro is conducting a travel survey. Could I ask you a few questions?"
OPTIONAL, IF NECESSARY: **"It should only take a few moments, and your responses will be confidential."**

1. **"Why did you come here?"**
   1. Employee
   2. Overnight guest
   3. Attending meeting or conference
   4. Both #2 and #3
   5. Going to restaurant or lounge
   6. Other

IF EMPLOYEE (#1 ABOVE), STOP SURVEY. **"Thank you. We are only asking questions to hotel guests and visitors."**

2. "Have you been outside this hotel earlier today?"
   1. Yes
   2. No – GO TO QUESTION 7

3. **"How did you return or come to this hotel?"**
   1. Auto: Drove
   2. Auto: Passenger
   3. Auto: Drop-off
   4. Metrorail and Walk/Bike
   5. Metrorail and Bus/Shuttle
   6. Bus/Shuttle
   7. MARC, VRE or Amtrak
   8. Walk
   9. Bicycle
   10. Taxi
   11. Other

4. ONLY FOR METRORAIL AND BUS USERS (#4, #5 AND #6 ABOVE): **"Did you have a car available?"**
   1. Yes
   2. No

5. IF PERSON IS BYTEMSELVES: **"Did you return to the hotel by yourself?"** If YES, RECORD "ONE" BELOW**.** IF ANSWER IS NO, ASK THE FOLLOWING, AND ASK THE FOLLOWING IF THE PERSON IS WITH A GROUP (TWO OR MORE): **"How many people were in your group, including yourself?"**
   1. One
   2. Two
   3. Three
   4. Four or more

6. **"What kind of place did you come from prior to coming here?"**
   1. Home
   2. Work place
   3. Conference or meeting
   4. Restaurant or eatery
   5. Retail or commercial establishment
   6. Tourist attraction
   7. Airport or train station
   8. Other

6A. **"In what city or county is that place located?"**

1. District of Columbia
2. Arlington County
3. City of Alexandria
4. City of Falls Church
5. Fairfax County
6. Fairfax City
7. Prince George's County
8. Montgomery County
9. Elsewhere in Virginia
10. Elsewhere in Maryland
11. Other

7. **"Will you be going outside this hotel later today?"**

1. Yes
2. No – STOP SURVEY

7A. **"What kind of place will you be going to?"**

1. Home
2. Work place
3. Conference or meeting
4. Restaurant or eatery
5. Retail or commercial establishment
6. Tourist attraction
7. Airport or train station
8. Other

7B. **"In what city or county is that place located?"**

1. District of Columbia
2. Arlington County
3. City of Alexandria
4. City of Falls Church
5. Fairfax County
6. Fairfax City
7. Prince George's County
8. Montgomery County
9. Elsewhere in Virginia
10. Elsewhere in Maryland
11. Other

7C. **"How will you be getting there?"**

1. Auto: Drove
2. Auto: Passenger
3. Auto: Drop-off
4. Walk/Bike to Metrorail
5. Bus/Shuttle to Metrorail
6. Bus/Shuttle
7. MARC, VRE or Amtrak
8. Walk
9. Bicycle
10. Taxi
11. Other

"Thank you for your time."

Movie Theater Intercept Questionnaire

INTERVIEWER TO RECORD ARRIVAL TIME.

"Excuse me. Metro is conducting a travel survey. Could I ask you a few questions?"
OPTIONAL, IF NECESSARY: **"It should only take a few moments, and your responses will be confidential."**

1. **"How did you get here?"**
   1. Auto: Drove
   2. Auto: Passenger
   3. Auto: Drop-off
   4. Metrorail and Walk/Bike
   5. Metrorail and Bus/Shuttle
   6. Bus/Shuttle Only
   7. MARC, VRE or Amtrak
   8. Walk
   9. Bicycle
   10. Taxi
   11. Other

2. ONLY FOR METRORAIL AND BUS USERS (#4, #5 AND #6 ABOVE): **"Did you have a car available for your trip here?"**
   1. Yes
   2. No

3. IF PERSON IS BYTEMSELVES: **"Did you come here by yourself?"** If YES, RECORD "ONE" BELOW**.** IF ANSWER IS NO, ASK THE FOLLOWING, AND ASK THE FOLLOWING IF THE PERSON IS WITH A GROUP (TWO OR MORE): "**How many people came in your group, including yourself?"**
   1. One
   2. Two
   3. Three
   4. Four or more

4. **"What kind of place did you come from prior to coming here?"**
   1. Home
   2. Work place
   3. School / college
   4. Restaurant or eatery
   5. Retail or commercial establishment
   6. Tourist attraction or hotel
   7. Other

4A. **"In what city or county is that place located?"**
   1. District of Columbia
   2. Arlington County
   3. City of Alexandria
   4. City of Falls Church
   5. Fairfax County
   6. Fairfax City
   7. Prince George's County
   8. Montgomery County
   9. Elsewhere in Virginia
   10. Elsewhere in Maryland
   11. Other

4B. **"What is the address of or the intersection nearest to that place?"** NOT A PROBLEM IF PERSON DOES NOT KNOW OR REFUSES TO ANSWER

5. **"Where will you go after leaving here?"**
   1. Same place as before – GO TO QUESTION 6
   2. Other place - IF OTHER PLACE –ASK AND RECORD FOR QUESTIONS 5A THRU 5C

5A. ASK THIS QUESTION IF THE ANSWER GIVEN IN QUESTION 5 IS "OTHER PLACE", AND IS NOT OBVIOUS: **"What kind of place is that?"**
   1. Home
   2. Work place
   3. School / college
   4. Restaurant or eatery
   5. Retail or commercial establishment
   6. Tourist attraction or hotel
   7. Other

5B. **"In what city or county is that place located?"**
   1. District of Columbia
   2. Arlington County
   3. City of Alexandria
   4. City of Falls Church
   5. Fairfax County
   6. Fairfax City
   7. Prince George's County
   8. Montgomery County
   9. Elsewhere in Virginia
   10. Elsewhere in Maryland
   11. Other

5C. **"What is the address of or the intersection nearest to that place?"** NOT A PROBLEM IF PERSON DOES NOT KNOW OR REFUSES TO ANSWER

6. **"How will you be getting there?"**
   1. Auto: Drove
   2. Auto: Passenger
   3. Auto: Drop-off
   4. Walk/Bike to Metrorail
   5. Bus/Shuttle to Metrorail
   6. Bus/Shuttle Only
   7. MARC, VRE or Amtrak
   8. Walk
   9. Bicycle
   10. Taxi
   11. Other

"Thank you for your time."

Office Visitor Intercept Recording Sheet

Site Name: ______________________________

Interviewer: ______________________________

Begin Time: ______________________________

Location Number
(If more than One at Site) ____________________

Date: ______________________________

End Time: ______________________________

ARRIVAL TIME	(1)	(2)	(3)	(4)	(5)	(6)	(6A)	(6B)	(7)	(8)	(8A)	(8B)	(8C)	(9)
______ A/P									____H____ M					
______ A/P									____H____ M					
______ A/P									____H____ M					
______ A/P									____H____ M					
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______ A/P									____H____ M					
______ A/P									____H____ M					
______ A/P									____H____ M					
______ A/P									____H____ M					

Retail Intercept Recording Sheet

Site Name: ______________________ Interviewer: ______________________ Begin Time: ______________________

Location Number
(If more than One at Site) ______________ Date: ______________________ End Time: ______________________

ARRIVAL TIME	(1)	(2)	(3)	(4)	(5)	(5A)	(5B)	(6)	(7)	(7A)	(7B)	(7C)	(8)
______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____
______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____
______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____
______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____
______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____
______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____
______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____
______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____
______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____
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______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____
______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____
______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____
______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____
______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____
______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____
______ AM/PM	____	____	____	____	____	____	____________	____H____ M	____	____	____	____________	____

Page _____ of _____

Hotel Intercept Recording Sheet

Site Name: _____ Interviewer: _____ Begin Time: _____

Location Number
(If more than One at Site) _____ Date: _____ End Time: _____

ARRIVAL TIME	(1)	(2)	(3)	(4)	(5)	(6)	(6A)	(7)	(7A)	(7B)	7C)
_____ AM/PM											
_____ AM/PM											
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_____ AM/PM											
_____ AM/PM											

Movie Theater Intercept Recording Sheet

Site Name: _____ Interviewer: _____ Begin Time: _____

Location Number
(If more than One at Site) _____ Date: _____ End Time: _____

ARRIVAL TIME	(1)	(2)	(3)	(4)	(4A)	(4B)	(5)	(5A)	(5B)	(5C)	(6)
_____ AM/PM											
_____ AM/PM											
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_____ AM/PM											

B.6 Introduction Letters

May 3, 2005

Dear Washington Metropolitan Area Property Owner or Manager:

The Washington Metropolitan Area Transit Authority (WMATA) has enlisted the services of Parsons Brinkerhoff, a professional transportation planning consulting firm, and Diversity Services, a professional survey firm, to conduct a survey of travel characteristics for those who live, work, visit, shop or play around several metro station areas throughout the Washington region. Essential to this study is the development of a database of travel characteristics at existing office, residential, retail, hotel and entertainment properties. This information will assist WMATA and our jurisdictional partners in our planning efforts throughout the region. The results will provide valuable information to our transportation planners about the relationship between land use and transit and the role proximity to a station plays in that relationship. We have identified 55 sites throughout the region within ½ mile of our stations where we would like to undertake our survey efforts. Your building is one of those sites.

The enclosed questionnaire requests information from residents in your building about their daily travel patterns. We are seeking your assistance with these tasks: announcing the survey and distributing the questionnaires to residents, as well as collecting the surveys once they are completed. We would like to begin this effort by leaving surveys with you the week of May 9, 2005, and receive replies back from residents by May 25, 2005.

In the week preceding the survey, we will send an announcement for you to provide to the residents in your building. Our survey staff, identified in blue vests, will come to the building on the designated day leave the surveys with the Management Office. Surveys can be returned via two methods: through a drop-box at your main desk or by postage paid mailer. For those properties amenable to using the drop-box, our staff will return on May 26 to retrieve them.

We greatly appreciate any assistance you can provide for these efforts and believe that the data gathered from these surveys will benefit not only WMATA and our jurisdictional partners, but property managers around the region as well. Should you have any questions concerning the study or survey process, contact Jason Yazawa with Parsons Brinkerhoff at 703-742-5820.

Very truly,

Joel R. Washington

Joel R. Washington
Acting Director
Office of Planning

Washington
Metropolitan Area
Transit Authority

600 Fifth Street, NW
Washington, D.C. 2001
202/962-1234

By Metrorail:
Judiciary Square-Red Line
Gallery Place-Chinatown
Red, Green and
Yellow Lines

A District of Columbia
Maryland and Virginia
Transit Partnership

May 3, 2005

Dear Washington Metropolitan Area Employer:

The Washington Metropolitan Area Transit Authority (WMATA) has enlisted the services of Parsons Brinkerhoff, a transportation planning consulting firm, and Diversity Services of DC, Inc., a professional services firm, to conduct a survey of travel characteristics of those who live, work, visit, shop or play around several metro station areas throughout the Washington region. Data gathered from this survey will provide input to the development of a database of travel characteristics at existing office, residential, retail, hotel and entertainment properties. This information will assist WMATA and our jurisdictional partners in our planning efforts throughout the region. The results will provide valuable information to our transportation planners about the relationship between land use and transit and the role proximity to a station plays in that relationship. We have identified 55 sites throughout the region within ½ mile of our stations where we would like to undertake our survey efforts. Your building is one of those sites.

The questionnaires request information from each employee in your office about their daily travel patterns. It should take no more than 8 minutes to complete. We are seeking your assistance with distributing the questionnaires to employees. We realize that this may be a slight inconvenience to you, however, we do believe that the investment of this small amount of time on your part will be worth the effort as it will greatly assist transportation planning in the Washington Metropolitan Area.

We are beginning this effort the week of May 9, 2005, and concluding it by May 20. Our survey staff, identified in blue vests, will come to the building on the designated day to bring you the surveys. They also will leave a 'drop box' either centrally located on your floor (likely near the elevators) or one general box in the lobby. They will notify you as to where the boxes for your building are located and we would ask that you alert employees to that location. We are asking employees to return the completed surveys one week from the day they are distributed. Our staff will then return at the end of one week's time to retrieve the drop boxes.

In addition, we will be surveying visitors to your building. On **one** day during the survey weeks noted above, you may notice blue-vested survey staff positioned at the entrances to your building during normal work hours. They will intercept visitors on their way into the building and ask them if they would answer a very brief set of questions about how they arrived at your building that day. Building employees will not be asked this set of questions.

We greatly appreciate your cooperation and believe that the data gathered from these surveys will benefit not only WMATA and our jurisdictional partners, but employers around the region as well. Should you have any questions concerning the study or survey process, contact Jason Yazawa with Parsons Brinkerhoff at 703-742-5820.

Very truly,

Joel R. Washington

Joel R. Washington
Acting Director
Office of Planning

Washington
Metropolitan Area
Transit Authority

600 Fifth Street, NW
Washington, D.C. 2001
202/962-1234

By Metrorail:
Judiciary Square-Red Line
Gallery Place-Chinatown
Red, Green and
Yellow Lines

A District of Columbia
Maryland and Virginia
Transit Partnership

May 3, 2005

Dear Washington Metropolitan Area Building Owner or Manager:

The Washington Metropolitan Area Transit Authority (WMATA) has enlisted the services of Parsons Brinkerhoff, a professional transportation planning consulting firm, and Diversity Services, a professional survey firm, to conduct a survey of travel characteristics for those who live, work, visit, shop or play around several metro station areas throughout the Washington region. Essential to this study is the development of a database of travel characteristics at existing office, residential, retail, hotel and entertainment properties. This information will assist WMATA and our jurisdictional partners in our planning efforts throughout the region. The results will provide valuable information to our transportation planners about the relationship between land use and transit and the role proximity to a station plays in that relationship. We have identified 55 sites throughout the region within ½ mile of our stations where we would like to undertake our survey efforts. Your building is one of those sites.

The enclosed questionnaires request information from employees in your building about their daily travel patterns. We are seeking your assistance with these tasks: announcing the survey and distributing the questionnaires to employers, as well as collecting the surveys once they are completed. We would like to begin this effort the week of May 9, 2005, and conclude it by May 20. Our Project Manager will contact you next week to provide the date for your building.

In the week preceding the survey, we will send an announcement for you to provide to the employers in your building. Our survey staff, identified in blue vests, will come to the building on the designated day and distribute the surveys to each employer. They will locate a 'drop box' (or boxes) in a place of your designation (e.g., one general box in the lobby or one per floor). Staff will then return at the end of the week to retrieve the survey boxes.

In addition, we would like to capture information about the travel patterns of visitors to your building. On **one** day during the survey weeks noted above, blue-vested survey staff would be positioned at the entrances to your building during normal work hours to intercept visitors and ask them a very brief set of questions about how they arrived at your building that day.

We greatly appreciate any assistance you can provide for these efforts and believe that the data gathered from these surveys will benefit not only WMATA and our jurisdictional partners, but employers around the region as well. Should you have any questions concerning the study or survey process, contact Jason Yazawa with Parsons Brinkerhoff at 703-742-5820.

Very truly,

Joel R. Washington

Joel R. Washington
Acting Director
Office of Planning

Washington
Metropolitan Area
Transit Authority

600 Fifth Street, NW
Washington, D.C. 2001
202/962-1234

By Metrorail:
Judiciary Square-Red Line
Gallery Place-Chinatown
Red, Green and
Yellow Lines

A District of Columbia
Maryland and Virginia
Transit Partnership

May 3, 2005

Re: WMATA Travel Survey

Dear Resident:

The Washington Metropolitan Area Transit Authority (WMATA) is conducting a survey of travel characteristics of those who live, work, visit, shop or play around several metro station areas throughout the Washington region. Data gathered from this survey will provide input to a database of travel characteristics at existing office, residential, retail, hotel and entertainment properties. This information will assist WMATA and our jurisdictional partners in our *land use and capacity planning* efforts throughout the region. The results will provide valuable information to our transportation planners about the relationship between land use and transit and the role proximity to a station plays in that relationship. We have identified 55 sites throughout the region within ½ mile of our stations where we would like to undertake our survey efforts. Your building is one of those sites.

During the week of May 9, 2005, surveys inquiring about the travel patterns of those in your household will be distributed. No identification information is asked on the questionnaire and all responses will be reported only in an aggregate form. On the back of the survey you will find a business reply mailing address, simply fold the questionnaire as directed and mail. No postage is required. We would like to have all responses from residents in the mail by **May 25, 2005**.

We greatly appreciate your assistance with these efforts and believe that the data gathered from these surveys will benefit not only WMATA and our jurisdictional partners, but residents around the region as well.

Very truly,

Joel R. Washington

Joel R. Washington
Acting Director
Office of Planning

Washington
Metropolitan Area
Transit Authority

600 Fifth Street, NW
Washington, D.C. 2001
202/962-1234

By Metrorail:
Judiciary Square-Red Line
Gallery Place-Chinatown
Red, Green and
Yellow Lines

A District of Columbia
Maryland and Virginia
Transit Partnership

May 3, 2005

Re: WMATA Development Related Ridership Study

Dear U Street Retailer:

The Washington Metropolitan Area Transit Authority (WMATA) has enlisted the services of Parsons Brinkerhoff, a transportation planning consulting firm, and Diversity Services of DC, Inc., a professional services firm, to conduct a survey of travel characteristics of those who live, work, visit, shop or play around several metro station areas throughout the Washington region. Data gathered from this survey will provide input to the development of a database of travel characteristics at existing office, residential, retail, hotel and entertainment properties. This information will assist WMATA and our jurisdictional partners in our planning efforts throughout the region. The results will provide valuable information to our transportation planners about the relationship between land use and transit and the role proximity to a station plays in that relationship. We have identified 55 sites throughout the region within ½ mile of our stations where we would like to undertake our survey efforts. The U Street retail corridor is one of those sites.

On either Tuesday, Wednesday or Thursday of next week (beginning May 9th) or the following week (beginning May 16th), survey staff, identified in blue vests, will be stationed along the sidewalk on U Street, between 12th and 15th Streets asking pedestrians a very brief set of questions about how they arrived at U Street that day. Survey staff will carry a letter authorizing them to perform this work on our behalf.

We greatly appreciate any assistance you can provide for these efforts and believe that the data gathered from these surveys will benefit not only WMATA and our jurisdictional partners, but employers and retailers around the region as well. Should you have any questions concerning the study or survey process, contact Jason Yazawa with Parsons Brinkerhoff at 703-742-5820.

Very truly,

Joel R. Washington

Joel R. Washington
Acting Director
Office of Planning

Washington Metropolitan Area Transit Authority

600 Fifth Street, NW
Washington, D.C. 2001
202/962-1234

By Metrorail:
Judiciary Square-Red Line
Gallery Place-Chinatown
Red, Green and Yellow Lines

A District of Columbia Maryland and Virginia Transit Partnership

Appendix C
Detailed Description of Frequency and Regression Analysis Results

Appendix C
Detailed Description of Frequency and Regression Analysis Results

C.1 Frequency Analyses

All valid data were entered into a Microsoft Access database. Frequency analyses were then conducted using SPSS statistical software. Because the survey represents samples of all trips to and from the sites, there is a degree of error associated with the results for each individual site, which varies depending upon response rates. In essence, small sample sizes produce large rates of error. In addition, cross-tabulated data, where results are sorted based on a selected independent variable, can produce relatively high error rates because the samples are then divided even further. Lastly, the sites surveyed for this effort are a sample of the universe of all similarly sized or similarly functional sites near Metrorail stations throughout the Washington metropolitan area, which probably number in the thousands. Although discussion provided in this Appendix is based on land use type (e.g., high-density office and residential buildings, etc.), the number of surveyed sites within each land use category is not great enough to constitute a statistically significant sample. They do, however, constitute a representative sample and provide enough information to discern notable trends.

C.1.1 Office Sites

Data were collected about the travel characteristics of people who work at the 17 surveyed office sites, which are located at distances from Metrorail stations varying from zero (building situated on or directly next to station exit) to 3,000 feet (see Table C-1). Approximately 9,800 survey forms were distributed, which resulted in an average response rate of about 15 percent. Thirteen of the 17 sites agreed to allow visitor surveys.

The workplace survey requested information about the respondent's trip to his or her workplace, including whether the respondent used Metrorail for any part of the trip. In addition, respondents were asked about midday trips, including which travel modes they used or planned to use for such trips. Respondents who drove to work were asked additional questions regarding whether they had convenient access to transit for their work trip and if their employer provided a parking subsidy. Transit (Metrorail, Metrobus, commuter rail, etc.) users were also asked an additional set of questions about the quality of their walk experience between the location where they disembarked from their transit vehicle and their workplace. Visitors who participated in the interviews were asked questions about how they traveled to the office site, and how they planned to travel to their next destination.

As shown in Table C-2, 25 percent of all respondents across all 17 sites use Metrorail to commute. The average Metrorail use rate among all the surveyed sites (see Table C-2) also was 25 percent. In comparing the commute travel characteristics by site, the Metrorail modal share ranged from a high of 69 percent at 1634 I Street in the Farragut West Station area to a low of eight percent at both 8400 Corporate Drive in the New Carrollton Station area and Ballston One in the Ballston Station area. The Farragut West Station is located in downtown Washington, DC, where parking is limited and expensive and auto congestion is heavy, but Metrorail service is

Table C-1
Characteristics of Surveyed Office Sites

Office Site	Number of Surveys Distributed	Dist. from Station (ft)	Square Footage (1,000s)	Occupancy Rate (%)	Parking Spaces	Estimated Response Rate (%)	Number of Interviews
Ballston Station Area							
3 Ballston Plaza	932	2,000	303	87	753	15	10
Ballston One	267	1,900	230	--	450	5	N/A
Court House Station Area							
2100-2200 Clarendon Blvd.	850	0	584	--	1681[4]	47	61
Courthouse Tower	500	450	165[2]	--	430	4	15
Crystal City Station Area							
Crystal Park IV	1227	2,600[1]	484	89	1,122	6	35
Crystal Square 2	851	850	412	--	1,899[5]	15	60
Farragut West Station Area							
1634 I Street	138	0	69	100	0	51	53
1701 Pennsylvania Avenue	275	1,000	190	90	N/A[6]	32	18
Friendship Heights Station Area							
2 Wisconsin Circle	800	100	235	90	301	11	32
Chevy Chase Plaza	400	700	163	--	225	6	N/A
King Street Station Area							
333 John Carlyle	250	1,400	153	95	280	17	N/A
King Street Station	250	700	784	75	1,159	13	N/A
New Carrollton Station Area							
8400 Corporate Drive	550	3,000	149	--	503	7	17
Silver Spring Station Area							
8380 Colesville Road	228	600	74	93	400	26	51
8720 Georgia Avenue	400	1,600	87	--	129	19	36
Metro Plaza 1	364	200	619	90	442	7	5
U Street/African American Civil War Memorial/Cardozo Station Area							
Reeves Center	1550	950	512[3]	--	255	7	106

Notes: [1] Distance was measured via an indoor route, in this case, via underground corridors. The walking distance may be less if measured partially outdoor.
[2] This figure does not include 84,000 square feet occupied by one tenant that did not participate in the survey. Total square footage for Court House Tower is 249,000.
[3] Includes first floor lobby.
[4] Parking for the 2100-2200 Clarendon Blvd. is shared with other Court House Plaza users and includes 197 spaces for 2200 Clarendon.
[5] Parking for Crystal Square 2 is shared with other buildings in Crystal Square.
[6] Only valet parking is available, and cars valet parked are stacked.
"--": Unknown or unavailable; N/A: Not Applicable.

excellent. Therefore, the Metrorail use rate reported from 1634 I Street is not surprising. The other downtown site, 1701 Pennsylvania Avenue, showed a Metrorail use rate of 56 percent, the second highest among all the sites. When the results of this study are compared to those of the 1989 study, the data shows that Metrorail has increased its mode share in the core and remains competitive with the automobile in its primary markets.

The low Metrorail use rate reported from 8400 Corporate Drive also is not surprising. The New Carrollton Station is located in a suburban office park setting where office buildings are widely spaced, there is ample free parking and the area has good highway access from Routes 50 and 295 and Interstate 495.

In comparing the commuting characteristics at non-downtown sites located in station areas with a mix of uses (i.e., high density office and residential and other commercial establishments), which include Ballston, Court House, Crystal City, Friendship Heights, and Silver Spring, Metrorail ridership ranged from a high of 43 percent at Chevy Chase Plaza to a low of 8 percent at Ballston One. However, these rates might not be indicative of the travel characteristics at these sites because both had response rates amongst the lowest of all the sites. The survey included a second site in both the Ballston and Friendship Heights station areas, and both of these sites (3 Ballston Plaza and 2 Wisconsin Circle) had much higher response rates. The Metrorail mode share at these sites was 17 and 31 percent, respectively (see Table C-2), which may be more reflective of the travel characteristics for office buildings in these areas. The Silver Spring station sites averaged 12 percent Metrorail use rate, the lowest among the five TOD areas surveyed, and ranged from 9 percent at 8380 Colesville Road to 17 percent at Metro Plaza 1. However, Metro Plaza 1 had a very high rate for the Metrobus & Other Transit mode (26 percent) probably because the Silver Spring Station connects with MARC and a large number of bus routes.

Table C-3 sorts mode share at office sites by respondents' jurisdiction of residence. The likelihood of using Metrorail based on residential location was highest for those living in the District, with 44 percent of District respondents reporting that they used Metrorail for their commute trip. District residents made up only 14 percent of all respondents yet accounted for 25 percent of all Metrorail commute trips. This too is not surprising, as transit accessibility in the District is quite high, and on the work end all locations in this study are near rail stations. This suggests that transit accessibility at both the home and work end plays an important role in modal choice decisions.

In illustrating the influence of District residents on overall commuting characteristics, only nine percent of the respondents at 3 Ballston Plaza live in the District, yet they made up 42 percent of this site's total Metrorail users. Without District residents, the Metrorail ridership at 3 Ballston Plaza drops to 11 percent. In addition, thirty percent of respondents at the two Farragut West sites live in the District, and more than 60 percent used Metrorail for their commute trips. However, the pattern of very high Metrorail use among District respondents did not fit the travel characteristics at the Reeves Center where only 16 percent of the DC resident respondents used Metrorail. However, high rates of Metrobus & Other Transit (15 percent) use among District residents who work at the Reeves Center boosted the overall transit use for DC residents to 30

percent. Reeves Center workers who live in Prince George's and Montgomery Counties pulled the site's average Metrorail use to its overall 26 percent.

Table C-2
Mode Share at Office Sites

Office Site	Mode			
	Metrorail[1]	Metrobus & Other Transit[2]	Auto[3]	Walk & Other[4]
Ballston Station Area				
3 Ballston Plaza	17%	1%	79%	2%
Ballston One	8%	0%	85%	8%
Court House Station Area				
2100-2200 Clarendon Blvd.	20%	2%	70%	8%
Courthouse Tower	35%	5%	60%	0%
Crystal City Station Area				
Crystal Park IV	12%	2%	81%	5%
Crystal Square 2	28%	14%	58%	1%
Farragut West Station Area				
1634 I Street	69%	7%	16%	7%
1701 Pennsylvania Avenue	56%	16%	25%	3%
Friendship Heights Station Area				
2 Wisconsin Circle	31%	1%	67%	0%
Chevy Chase Plaza	43%	0%	57%	0%
King Street Station Area				
333 John Carlyle	26%	19%	50%	5%
King Street Station	10%	19%	71%	0%
New Carrollton Station Area				
8400 Corporate Drive	8%	3%	89%	0%
Silver Spring Station Area				
8380 Colesville Road	9%	7%	74%	9%
8720 Georgia Avenue	13%	6%	77%	4%
Metro Plaza 1	17%	26%	43%	13%
U Street/African American Civil War Memorial/Cardozo Station Area				
Reeves Center	26%	9%	58%	7%
Average Among All Sites	**25%**	**9%**	**62%**	**6%**

Notes: [1] Includes multimodal trips that may have involved bus or auto use in combination with Metrorail.
[2] Includes bus only trips, and commuter rail, such as MARC, VRE or Amtrak.
[3] Includes trips as driver and passenger of a private automobile.
[4] Includes cycling and any other form of transportation one may use.

The jurisdiction with the second highest rate of Metrorail use was Prince George's County at 35 percent. Prince George's residents made up 11 percent of all office respondents, yet accounted for 16 percent of all Metrorail commute trips.

At 20 percent, the greatest percentage of workplace survey respondents lives in Fairfax County. These respondents along with those who live elsewhere in Virginia drove or rode in private automobiles at rates much higher than the average for all the sites. For example, at 2100-2200

Table C-3
Mode Share at Office Sites by Location of Residence

Office Site	Mode	Location of Residence									
		DC	Arlington County	Alexandria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgomery County	Virginia - Other	Maryland - Other
Ballston Station Area											
3 Ballston Plaza	Metrorail	77%	4%	14%	0%	16%	0%	40%	8%	0%	0%
	Metrobus & Other Transit	8%	4%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	15%	81%	86%	100%	84%	0%	60%	92%	100%	100%
	Walk & Other	0%	12%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%
Ballston One	Metrorail	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	0%	83%	100%	0%	0%	0%	100%	100%	100%	100%
	Walk & Other	0%	17%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	0%	0%	0%	100%	100%	100%	100%
Court House Station Area											
2100-2200 Clarendon Blvd.	Metrorail	59%	7%	27%	33%	17%	25%	34%	56%	22%	25%
	Metrobus & Other Transit	0%	2%	0%	17%	1%	0%	0%	0%	4%	13%
	Auto	41%	71%	70%	50%	78%	75%	66%	33%	71%	63%
	Walk & Other	0%	20%	3%	0%	5%	0%	0%	11%	2%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Courthouse Tower	Metrorail	0%	33%	50%	0%	0%	0%	60%	100%	0%	100%
	Metrobus & Other Transit	0%	33%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	100%	33%	50%	0%	100%	0%	40%	0%	100%	0%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	0%	100%	0%	100%	100%	100%	100%

Table C-3
Mode Share at Office Sites by Location of Residence
(Continued)

Office Site	Mode	Location of Residence									
		DC	Arlington County	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery County	Virginia - Other	Maryland - Other
Crystal City Station Area											
Crystal Park IV	Metrorail	33%	0%	15%	0%	12%	0%	21%	7%	0%	10%
	Metrobus & Other Transit	0%	0%	8%	0%	0%	0%	0%	0%	6%	10%
	Auto	53%	79%	77%	100%	88%	100%	79%	86%	94%	80%
	Walk & Other	13%	21%	0%	0%	0%	0%	0%	7%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Crystal Square 2	Metrorail	60%	35%	25%	0%	29%	50%	11%	100%	7%	36%
	Metrobus & Other Transit	0%	0%	0%	0%	18%	0%	0%	0%	41%	0%
	Auto	40%	60%	75%	100%	54%	50%	89%	0%	52%	64%
	Walk & Other	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Farragut West Station Area											
1634 I Street	Metrorail	64%	100%	100%	100%	50%	100%	57%	81%	50%	0%
	Metrobus & Other Transit	9%	0%	0%	0%	0%	0%	0%	6%	0%	100%
	Auto	9%	0%	0%	0%	33%	0%	43%	13%	50%	0%
	Walk & Other	18%	0%	0%	0%	17%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1701 Pennsylvania Avenue	Metrorail	61%	31%	15%	0%	38%	0%	54%	100%	8%	0%
	Metrobus & Other Transit	14%	0%	0%	0%	0%	0%	10%	12%	33%	86%
	Auto	18%	33%	50%	0%	54%	0%	20%	12%	33%	14%
	Walk & Other	7%	0%	0%	0%	8%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	0%	100%	0%	100%	100%	100%	100%

Table C-3
Mode Share at Office Sites by Location of Residence
(Continued)

Office Site	Mode	Location of Residence									
		DC	Arlington County	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery County	Virginia - Other	Maryland - Other
Friendship Heights Station Area											
2 Wisconsin Circle	Metrorail	40%	25%	0%	0%	43%	0%	33%	25%	0%	67%
	Metrobus & Other Transit	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	53%	75%	0%	0%	57%	100%	67%	75%	100%	33%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	0%	0%	100%	100%	100%	100%	100%	100%
Chevy Chase Plaza	Metrorail	67%	100%	0%	0%	0%	0%	67%	25%	0%	60%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	33%	0%	100%	0%	100%	0%	33%	75%	0%	40%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	0%	100%	0%	100%	100%	0%	100%
King Street Station Area											
333 John Carlyle	Metrorail	60%	33%	33%	0%	0%	0%	50%	100%	10%	50%
	Metrobus & Other Transit	0%	0%	33%	0%	27%	0%	0%	0%	40%	0%
	Auto	20%	33%	33%	100%	73%	0%	50%	0%	50%	50%
	Walk & Other	20%	33%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%
King Street Station	Metrorail	0%	0%	0%	0%	8%	0%	20%	50%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	17%	0%	0%	0%	60%	50%
	Auto	100%	100%	100%	0%	75%	0%	80%	50%	40%	50%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	0%	100%	0%	100%	100%	100%	100%

Table C-3
Mode Share at Office Sites by Location of Residence
(Continued)

Office Site	Mode	Location of Residence									
		DC	Arlington County	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery County	Virginia - Other	Maryland - Other
New Carrollton Station Area											
8400 Corporate Drive	Metrorail	0%	0%	0%	0%	25%	0%	0%	0%	25%	5%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	13%	0%	0%
	Auto	0%	100%	0%	0%	75%	0%	0%	88%	75%	95%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	0%	100%	0%	0%	100%	0%	0%	100%	100%	100%
Silver Spring Station Area											
8380 Colesville Road	Metrorail	20%	0%	0%	0%	50%	50%	0%	4%	0%	10%
	Metrobus & Other Transit	20%	0%	0%	0%	0%	0%	0%	4%	0%	20%
	Auto	60%	0%	0%	0%	50%	50%	100%	74%	100%	60%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%	17%	0%	10%
	Total	100%	0%	0%	0%	100%	100%	100%	100%	100%	100%
8720 Georgia Avenue	Metrorail	50%	0%	0%	0%	0%	0%	31%	5%	0%	0%
	Metrobus & Other Transit	17%	0%	0%	0%	0%	0%	0%	7%	0%	13%
	Auto	33%	0%	0%	0%	100%	0%	69%	84%	100%	75%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%	5%	0%	13%
	Total	100%	0%	0%	0%	100%	0%	100%	100%	100%	100%
Metro Plaza 1	Metrorail	100%	0%	100%	0%	0%	0%	29%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	33%	100%	50%
	Auto	0%	100%	0%	0%	0%	0%	71%	33%	0%	50%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%	33%	0%	0%
	Total	100%	100%	100%	0%	100%	0%	100%	100%	100%	100%

Table C-3
Mode Share at Office Sites by Location of Residence
(Continued)

Office Site	Mode	Location of Residence									
		DC	Arlington County	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery County	Virginia - Other	Maryland - Other
U Street/African American Civil War Memorial/Cardozo Station Area											
Reeves Center	Metrorail	16%	0%	0%	0%	50%	0%	40%	38%	0%	33%
	Metrobus & Other Transit	15%	0%	0%	0%	0%	0%	0%	0%	0%	17%
	Auto	60%	0%	100%	0%	50%	0%	60%	54%	100%	33%
	Walk & Other	9%	0%	0%	0%	0%	0%	0%	8%	0%	17%
	Total	100%	0%	100%	0%	100%	0%	100%	100%	100%	100%
Totals for Office Sites	**Metrorail**	**44%**	**15%**	**26%**	**20%**	**19%**	**31%**	**35%**	**26%**	**12%**	**19%**
	Metrobus & Other Transit	**9%**	**2%**	**3%**	**7%**	**4%**	**0%**	**1%**	**5%**	**17%**	**15%**
	Auto	**41%**	**67%**	**70%**	**73%**	**74%**	**69%**	**65%**	**63%**	**71%**	**64%**
	Walk & Other	**7%**	**16%**	**1%**	**0%**	**3%**	0%	0%	**5%**	**1%**	**3%**
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Clarendon Blvd., 31 percent of respondents live in Fairfax County, and they used the auto mode at a higher rate (78 percent) than the site's average (70 percent). Interestingly, many of the site's employees who reside in Arlington County (20 percent) used the "walk and other" mode, which is quite sizeable given that 29 percent of the respondents live in Arlington County. Although a few other sites had high "walk and other" mode shares from within the same jurisdiction as the surveyed office site, the sample sizes were too small to make any meaningful comparison.

Table C-4 displays modal share information at office sites organized by age of respondent. Overall, Metrorail use decreased with age. The 19 to 24 age cohort reported the highest overall Metrorail use at 45 percent. The Metrorail use rate for the 35 to 44 age cohort dipped to 20 percent, then jumped to 26 percent for the 45 to 54 age cohort. Although many of the individual sites followed the pattern described above, there were a few exceptions, such as 3 Ballston Plaza, Crystal Park IV, and 2 Wisconsin Circle. Interestingly, the Metrorail use rate at the 2100-2200 Clarendon Blvd. remained at about 20 percent among the four cohorts between ages 25 and 64.

Table C-5 displays mode share information at the office sites organized by the number of vehicles (car, pickup, motorcycle, etc.) available in a respondent's household. Overall, Metrorail use among respondents decreased as the number of vehicles owned in the household increased. Seventy-six percent of respondents whose households have no vehicles (six percent of all respondents) used transit (Metrorail, bus or other type), and 63 percent of those used Metrorail. Conversely, only 16 and 18 percent of respondents whose households have three (15 percent of all respondents) and four or more vehicles (six percent of all respondents), respectively, used Metrorail. The cut-off between above and below average Metrorail use was between one (33 percent of all respondents) and two vehicles (39 percent of all respondents) available in a household. The individual survey sites generally followed this pattern.

Table C-6 distributes mode shares at the office sites by gender of respondents. Overall, Metrorail use did not differ widely between males and females, although females made up 60 percent of total respondents. Males used Metrorail slightly more than females (26 percent vs. 24 percent), and used the auto mode slightly less frequently than females (62 percent vs. 64 percent).

Among the transit users (Metrorail, bus, and commuter rail), 92 percent described their walking experience between their last transit vehicle and their workplace as "short and pleasant" (see Table C-7). Even the small percentage of respondents who used transit to commute to 8400 Corporate Drive at New Carrollton described their walk experience as "short and pleasant," despite a walking distance of more than 1/2 mile (see Table C-1). Similarly, 72 percent of transit users working in Crystal Park 4 also described their walk experience as "short and pleasant," even though the walk is more than 1/2 mile if using Crystal City's underground and indoor walkways. When asked for suggestions to improve their pedestrian experience, 65 percent of responses said "nothing," by far the highest response (see Table C-8). The next highest response (11 percent) suggested that having favorable walk signals would improve their walk experience.

Table C-4
Mode Share at Office Sites by Age of Respondent

Office Site	Mode	Age of Respondent						
		= 18	19-24	25-34	35-44	45-54	55-64	65+
Ballston Station Area								
3 Ballston Plaza	Metrorail	0%	50%	26%	6%	13%	17%	25%
	Metrobus & Other Transit	0%	0%	3%	3%	0%	0%	0%
	Auto	0%	50%	72%	89%	83%	78%	75%
	Walk & Other	0%	0%	0%	3%	3%	4%	0%
	Total	0%	100%	100%	100%	100%	100%	100%
Ballston One	Metrorail	0%	0%	20%	0%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%
	Auto	0%	100%	60%	100%	100%	100%	0%
	Walk & Other	0%	0%	20%	0%	0%	0%	0%
	Total	0%	100%	100%	100%	100%	100%	0%
Court House Station Area								
2100-2200 Clarendon Blvd.	Metrorail	0%	33%	22%	19%	20%	21%	0%
	Metrobus & Other Transit	0%	0%	3%	0%	3%	3%	0%
	Auto	0%	67%	60%	71%	74%	68%	80%
	Walk & Other	0%	0%	15%	10%	3%	8%	20%
	Total	0%	100%	100%	100%	100%	100%	100%
Courthouse Tower	Metrorail	0%	100%	33%	25%	50%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	17%	0%	0%
	Auto	0%	0%	67%	75%	33%	100%	0%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%
	Total	0%	100%	100%	100%	100%	100%	0%
Crystal City Station Area								
Crystal Park IV	Metrorail	0%	14%	8%	5%	17%	29%	0%
	Metrobus & Other Transit	0%	0%	8%	0%	0%	0%	0%
	Auto	0%	71%	81%	89%	79%	64%	0%
	Walk & Other	0%	14%	3%	5%	3%	7%	0%
	Total	0%	100%	100%	100%	100%	100%	0%
Crystal Square 2	Metrorail	0%	25%	25%	34%	38%	0%	50%
	Metrobus & Other Transit	0%	0%	14%	17%	15%	10%	0%
	Auto	0%	75%	61%	48%	45%	90%	50%
	Walk & Other	0%	0%	0%	0%	3%	0%	0%
	Total	0%	100%	100%	100%	100%	100%	100%

Table C-4
Mode Share at Office Sites by Age of Respondent
(Continued)

Office Site	Mode	Age of Respondent						
		= 18	19-24	25-34	35-44	45-54	55-64	65+
Farragut West Station Area								
1634 I Street	Metrorail	100%	73%	77%	67%	67%	43%	100%
	Metrobus & Other Transit	0%	18%	8%	0%	7%	14%	0%
	Auto	0%	0%	8%	28%	13%	43%	0%
	Walk & Other	0%	9%	8%	6%	13%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%
1701 Pennsylvania Avenue	Metrorail	0%	88%	57%	53%	50%	56%	0%
	Metrobus & Other Transit	0%	13%	9%	6%	35%	11%	50%
	Auto	0%	0%	30%	41%	10%	28%	50%
	Walk & Other	0%	0%	4%	0%	5%	6%	0%
	Total	0%	100%	100%	100%	100%	100%	100%
Friendship Heights Station Area								
2 Wisconsin Circle	Metrorail	0%	33%	46%	12%	31%	33%	50%
	Metrobus & Other Transit	0%	0%	0%	4%	0%	0%	0%
	Auto	0%	67%	54%	85%	69%	67%	50%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%
	Total	0%	100%	100%	100%	100%	100%	100%
Chevy Chase Plaza	Metrorail	0%	100%	67%	40%	43%	25%	33%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%
	Auto	0%	0%	33%	60%	57%	75%	67%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%
	Total	0%	100%	100%	100%	100%	100%	100%
King Street Station Area								
333 John Carlyle	Metrorail	0%	100%	38%	7%	33%	27%	0%
	Metrobus & Other Transit	0%	0%	0%	21%	33%	27%	0%
	Auto	0%	0%	63%	64%	33%	36%	0%
	Walk & Other	0%	0%	0%	7%	0%	9%	0%
	Total	0%	100%	100%	100%	100%	100%	0%
King Street Station	Metrorail	0%	0%	0%	29%	8%	0%	0%
	Metrobus & Other Transit	0%	0%	25%	29%	23%	0%	0%
	Auto	0%	100%	75%	43%	69%	100%	0%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%
	Total	0%	100%	100%	100%	100%	100%	0%

Table C-4
Mode Share at Office Sites by Age of Respondent
(Continued)

Office Site	Mode	Age of Respondent						
		= 18	19-24	25-34	35-44	45-54	55-64	65+
New Carrollton Station Area								
8400 Corporate Drive	Metrorail	0%	0%	17%	0%	22%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	11%	0%	0%
	Auto	0%	0%	83%	100%	67%	100%	100%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%
	Total	0%	0%	100%	100%	100%	100%	100%
Silver Spring Station Area								
8380 Colesville Road	Metrorail	0%	0%	13%	13%	13%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	6%	6%	13%	0%
	Auto	0%	0%	75%	69%	75%	88%	80%
	Walk & Other	0%	0%	13%	13%	6%	0%	20%
	Total	0%	0%	100%	100%	100%	100%	100%
8720 Georgia Avenue	Metrorail	50%	33%	46%	0%	14%	0%	0%
	Metrobus & Other Transit	50%	0%	0%	11%	7%	7%	0%
	Auto	0%	67%	54%	84%	71%	93%	90%
	Walk & Other	0%	0%	0%	5%	7%	0%	10%
	Total	100%	100%	100%	100%	100%	100%	100%
Metro Plaza 1	Metrorail	0%	0%	14%	33%	0%	17%	0%
	Metrobus & Other Transit	0%	0%	29%	17%	25%	33%	0%
	Auto	0%	0%	43%	33%	75%	33%	0%
	Walk & Other	0%	0%	14%	17%	0%	17%	0%
	Total	0%	0%	100%	100%	100%	100%	0%
U Street/African American Civil War Memorial/Cardozo Station Area								
Reeves Center	Metrorail	0%	17%	38%	27%	29%	13%	17%
	Metrobus & Other Transit	0%	17%	6%	0%	14%	13%	0%
	Auto	0%	33%	44%	64%	54%	75%	83%
	Walk & Other	0%	33%	13%	9%	3%	0%	0%
	Total	0%	100%	100%	100%	100%	100%	100%
Totals for All Office Sites	**Metrorail**	**67%**	**45%**	**30%**	**20%**	**26%**	**19%**	**15%**
	Metrobus & Other Transit	**33%**	**6%**	**6%**	**4%**	**8%**	**7%**	**2%**
	Auto	**0%**	**42%**	**58%**	**70%**	**62%**	**70%**	**74%**
	Walk & Other	**0%**	**6%**	**6%**	**6%**	**3%**	**4%**	**9%**
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table C-5
Mode Share at Office Sites by Number of Household Vehicles

Office Site	Mode	Number of Vehicles				
		None	One	Two	Three	Four Plus
Ballston Station Area						
3 Ballston Plaza	Metrorail	100%	26%	8%	9%	20%
	Metrobus & Other Transit	0%	3%	2%	0%	0%
	Auto	0%	69%	87%	91%	80%
	Walk & Other	0%	3%	3%	0%	0%
	Total	100%	100%	100%	100%	100%
Ballston One	Metrorail	0%	100%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%
	Auto	0%	0%	100%	100%	0%
	Walk & Other	0%	0%	0%	0%	100%
	Total	0%	100%	100%	100%	100%
Court House Station Area						
2100-2200 Clarendon Blvd.	Metrorail	69%	19%	19%	17%	16%
	Metrobus & Other Transit	6%	1%	3%	2%	0%
	Auto	13%	67%	72%	81%	80%
	Walk & Other	13%	13%	6%	0%	4%
	Total	100%	100%	100%	100%	100%
Courthouse Tower	Metrorail	0%	71%	0%	29%	0%
	Metrobus & Other Transit	0%	0%	20%	0%	0%
	Auto	0%	29%	80%	71%	100%
	Walk & Other	0%	0%	0%	0%	0%
	Total	0%	100%	100%	100%	100%
Crystal City Station Area						
Crystal Park IV	Metrorail	50%	9%	13%	5%	0%
	Metrobus & Other Transit	13%	0%	2%	0%	20%
	Auto	13%	84%	83%	95%	80%
	Walk & Other	25%	7%	2%	0%	0%
	Total	100%	100%	100%	100%	100%
Crystal Square 2	Metrorail	100%	41%	19%	24%	22%
	Metrobus & Other Transit	0%	3%	21%	24%	0%
	Auto	0%	57%	59%	53%	78%
	Walk & Other	0%	0%	2%	0%	0%
	Total	100%	100%	100%	100%	100%

TableC-5
Mode Share at Office Sites by Number of Household Vehicles
(Continued)

Office Site	Mode	Number of Vehicles				
		None	One	Two	Three	Four Plus
Farragut West Station Area						
1634 I Street	Metrorail	60%	71%	68%	80%	50%
	Metrobus & Other Transit	10%	4%	14%	0%	0%
	Auto	0%	21%	18%	0%	50%
	Walk & Other	30%	4%	0%	20%	0%
	Total	100%	100%	100%	100%	100%
1701 Pennsylvania Avenue	Metrorail	75%	63%	47%	44%	67%
	Metrobus & Other Transit	25%	9%	13%	22%	33%
	Auto	0%	22%	37%	33%	0%
	Walk & Other	0%	6%	3%	0%	0%
	Total	100%	100%	100%	100%	100%
Friendship Heights Station Area						
2 Wisconsin Circle	Metrorail	75%	30%	31%	20%	40%
	Metrobus & Other Transit	0%	0%	3%	0%	0%
	Auto	25%	70%	67%	80%	60%
	Walk & Other	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%
Chevy Chase Plaza	Metrorail	100%	30%	50%	40%	50%
	Metrobus & Other Transit	0%	0%	0%	0%	0%
	Auto	0%	70%	50%	60%	50%
	Walk & Other	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%
King Street Station Area						
333 John Carlyle	Metrorail	50%	30%	24%	18%	0%
	Metrobus & Other Transit	25%	10%	24%	18%	0%
	Auto	25%	50%	53%	55%	0%
	Walk & Other	0%	10%	0%	9%	0%
	Total	100%	100%	100%	100%	0%
King Street Station	Metrorail	100%	11%	6%	0%	0%
	Metrobus & Other Transit	0%	0%	25%	67%	0%
	Auto	0%	89%	69%	33%	100%
	Walk & Other	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%

Table C-5
Mode Share at Office Sites by Number of Household Vehicles
(Continued)

Office Site	Mode	Number of Vehicles				
		None	One	Two	Three	Four Plus
New Carrollton Station Area						
8400 Corporate Drive	Metrorail	100%	25%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	7%	0%	0%
	Auto	0%	75%	93%	100%	100%
	Walk & Other	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%
Silver Spring Station Area						
8380 Colesville Road	Metrorail	0%	5%	16%	10%	0%
	Metrobus & Other Transit	33%	0%	11%	0%	33%
	Auto	33%	74%	74%	90%	67%
	Walk & Other	33%	21%	0%	0%	0%
	Total	100%	100%	100%	100%	100%
8720 Georgia Avenue	Metrorail	60%	14%	7%	0%	33%
	Metrobus & Other Transit	0%	7%	7%	8%	0%
	Auto	40%	71%	82%	92%	67%
	Walk & Other	0%	7%	4%	0%	0%
	Total	100%	100%	100%	100%	100%
Metro Plaza 1	Metrorail	0%	33%	9%	0%	0%
	Metrobus & Other Transit	0%	11%	36%	50%	100%
	Auto	0%	33%	55%	50%	0%
	Walk & Other	100%	22%	0%	0%	0%
	Total	100%	100%	100%	100%	100%
U Street/African American Civil War Memorial/Cardozo Station Area						
Reeves Center	Metrorail	42%	20%	30%	17%	0%
	Metrobus & Other Transit	25%	10%	3%	8%	0%
	Auto	17%	63%	67%	67%	75%
	Walk & Other	17%	8%	0%	8%	25%
	Total	100%	100%	100%	100%	100%
Totals for Office Sites	**Metrorail**	**63%**	**28%**	**20%**	**16%**	**18%**
	Metrobus & Other Transit	**13%**	**3%**	**8%**	**6%**	**5%**
	Auto	**11%**	**62%**	**69%**	**76%**	**73%**
	Walk & Other	**13%**	**8%**	**3%**	**1%**	**4%**
	Total	**100%**	**100%**	**100%**	**100%**	**100%**

Table C-6
Mode Share by Gender of Respondent

Office Site	Gender	Mode				Total
		Metrorail	Metrobus & Other Transit	Auto	Walk & Other	
Ballston Station Area						
3 Ballston Plaza	Male	17%	0%	79%	5%	100%
	Female	18%	3%	79%	0%	100%
Ballston One	Male	0%	0%	100%	0%	100%
	Female	14%	0%	71%	14%	100%
Court House Station Area						
2100-2200 Clarendon Blvd.	Male	24%	3%	60%	13%	100%
	Female	18%	1%	75%	6%	100%
Courthouse Tower	Male	38%	0%	63%	0%	100%
	Female	33%	8%	58%	0%	100%
Crystal City Station Area						
Crystal Park IV	Male	8%	4%	83%	4%	100%
	Female	15%	1%	80%	4%	100%
Crystal Square 2	Male	26%	14%	59%	1%	100%
	Female	31%	15%	54%	0%	100%
Farragut West Station Area						
1634 I Street	Male	84%	0%	8%	8%	100%
	Female	60%	12%	21%	7%	100%
1701 Pennsylvania Avenue	Male	57%	20%	23%	0%	100%
	Female	54%	14%	27%	5%	100%
Friendship Heights Station Area						
2 Wisconsin Circle	Male	36%	0%	64%	0%	100%
	Female	31%	2%	68%	0%	100%
Chevy Chase Plaza	Male	43%	0%	57%	0%	100%
	Female	44%	0%	56%	0%	100%
Silver Spring Station Area						
8380 Colesville Road	Male	18%	12%	71%	0%	100%
	Female	5%	5%	76%	14%	100%
8720 Georgia Avenue	Male	11%	4%	82%	4%	100%
	Female	15%	8%	73%	4%	100%
Metro Plaza 1	Male	14%	29%	43%	14%	100%
	Female	19%	31%	38%	13%	100%
King Street Station Area						
333 John Carlyle	Male	26%	21%	53%	0%	100%
	Female	24%	19%	48%	10%	100%
King Street Station	Male	9%	45%	45%	0%	100%
	Female	11%	5%	84%	0%	100%
New Carrollton Station Area						
8400 Corporate Drive	Male	9%	5%	86%	0%	100%
	Female	0%	0%	100%	0%	100%

Table C-6
Mode Share by Gender of Respondent
(Continued)

Office Site	Gender	Mode				Total
		Metrorail	Metrobus & Other Transit	Auto	Walk & Other	
U Street/African American Civil War Memorial/Cardozo Station Area						
Reeves Center	Male	28%	9%	59%	4%	100%
	Female	24%	9%	57%	9%	100%
Totals for Office Sites	**Male**	**26%**	**7%**	**62%**	**5%**	**100%**
	Female	**24%**	**6%**	**66%**	**5%**	**100%**

Table C-7
Transit User Opinions of Pedestrian Experience

Office Site	Transit User Pedestrian Experience				
	Short & Pleasant	Short & Unpleasant	Long & Pleasant	Long & Unpleasant	Neutral or No Opinion
Ballston Station Area					
3 Ballston Plaza	92%	4%	4%	0%	0%
Ballston One	0%	0%	0%	0%	0%
Station Total	92%	4%	4%	0%	0%
Court House Station Area					
Arlington County Bldg	94%	0%	2%	0%	3%
Courthouse Tower	88%	13%	0%	0%	0%
Station Total	94%	1%	2%	0%	3%
Crystal City Station Area					
Crystal Park IV	72%	6%	17%	6%	0%
Crystal Square 2	100%	0%	0%	0%	0%
Station Total	93%	1%	4%	1%	0%
Farragut West Station Area					
1634 I St.	96%	0%	4%	0%	0%
1701 Pennsylvania Ave	92%	2%	3%	0%	3%
Station Total	94%	1%	4%	0%	2%
Friendship Heights Station Area					
2 Wisconsin Circle	97%	0%	0%	0%	3%
Chevy Chase Plaza	90%	10%	0%	0%	0%
Station Total	95%	3%	0%	0%	3%
King Street Station Area					
333 John Carlyle	100%	0%	0%	0%	0%
King Street Station	89%	11%	0%	0%	0%
Station Total	96%	4%	0%	0%	0%
New Carrollton Station Area					
8400 Corporate Drive	75%	0%	0%	0%	25%

Table C-7
Transit User Opinions of Pedestrian Experience
(Continued)

Office Site	Transit User Pedestrian Experience				
	Short & Pleasant	Short & Unpleasant	Long & Pleasant	Long & Unpleasant	Neutral or No Opinion
Silver Spring Station Area					
8380 Colesville Rd	89%	11%	0%	0%	0%
8720 Georgia Ave	100%	0%	0%	0%	0%
Metro Plaza 1	73%	9%	9%	0%	9%
Station Total	89%	6%	3%	0%	3%
U Street/African American Civil War Memorial/Cardozo Station Area					
Reeves Center	83%	3%	6%	6%	3%
Totals for Office Sites	**92%**	**2%**	**3%**	**1%**	**2%**

Table C-8
Transit User Suggestions for Improving the Pedestrian Environment

Suggestion	Percent[1]
Nothing	65%
Favorable Walk Signals	11%
More Retail/Eating Establishments Along Route	8%
Wider Sidewalks	7%
More Shade Trees	7%
Pedestrian Bridges Over Busy Streets	6%
Provide Sidewalks	5%
Alternative Pedestrian Routes	4%

Note: [1] Percent of total number of transit users who answered this question. Figures do not add up to 100% as respondents could select more than one answer.

Tables C-9 and C-10 show the frequencies of employer-provided benefits for transit and auto users. Most respondents reported that their employer subsidized their mode of choice. For transit users, 62 percent reported that their employers pay for or subsidize their transit fares. For auto users, 72 percent reported that their employers provide free parking or subsidize their parking costs. Interestingly, very few (8 percent) reported that they participate in government parking subsidy programs in comparison to the transit users. The availability of flexible working hours or telecommuting did not appear to be a factor in modal choice as both groups report similar frequencies.

Table C-9
Employer Benefits Reported by Transit Users

Employer Benefit	Percent[1]
Employer Pays for or Subsidizes Transit Fares	62%
Participates in Government Transit Program	28%
Provides Car for Business During Day	16%
Carpool or Vanpool Program	11%
Flexible Working Hours	43%
Full or Partial Telecommuting	21%

Note: [1] Percent of total number of transit users who answered this question. Figures do not add up to 100% as respondents could select more than one answer.

Table C-10
Employer Benefits Reported by Auto Users

Employer Benefit	Percent[1]
Employer Provides Free or Subsidizes Parking	72%
Participates in Government Parking Program	8%
Subsidizes Automobile Expenses	4%
Provides Car for Business During Day	14%
Carpool or Vanpool Program	18%
Flexible Working Hours	43%
Full or Partial Telecommuting	22%

Note: [1] Percent of total number of auto users who answered this question. Figures do not add up to 100% as respondents could select more than one answer.

For midday trips (see Table C-11), the most popular mode used by office site respondents was auto (43 percent), but at a lower rate than for commuting. The "walk and other" and Metrorail modes were a close second and third at 28 and 25 percent, respectively, of the overall midday trips. The overall averages among the sites were not much different than when calculating overall mode shares from individual respondents (see Table C-11). The sites with high percentages of Metrorail and walk midday trips include: Courthouse Tower, Crystal Square 2, the Farragut West Station sites, the Friendship Heights Station sites, and Metro Plaza 1. Each of these sites is located in an area with ample business, retail and eating establishments, in addition to having good Metrorail access, suggesting that mixed-use environments encourage non-auto travel.

Table C-12 displays midday office trip mode share information organized by trip purpose. The three most common reasons office respondents embarked on midday trips were (1) work- related, (2) meals and snacks, and (3) personal business. Overall, most work-related trips used the auto mode (55 percent), but Metrorail also was used in a fairly large proportion of work-related midday trips (33 percent), which is substantially higher than the Metrorail share for commute

trips. This may suggest that some respondents who drive to work use Metrorail for midday work-related trips. The office sites with well above average Metrorail use for work-related trips include Courthouse Tower, Crystal Square 2, the Farragut West Station sites 2 Wisconsin Circle, 8380 Colesville Road and Metro Plaza 1.

Table C-11
Mode Share for Midday Trips at Office Sites

Office Site	Mode			
	Metrorail	Metrobus & Other Transit	Auto	Walk & Other
Ballston Station Area				
3 Ballston Plaza	9%	9%	68%	14%
Ballston One	36%	0%	45%	18%
Court House Station Area				
2100-2200 Clarendon Blvd.	20%	1%	55%	24%
Courthouse Tower	26%	0%	22%	52%
Crystal City Station Area				
Crystal Park IV	9%	0%	70%	21%
Crystal Square 2	34%	2%	25%	38%
Farragut West Station Area				
1634 I Street	56%	0%	2%	42%
1701 Pennsylvania Avenue	51%	4%	11%	35%
Friendship Heights Station Area				
2 Wisconsin Circle	33%	0%	29%	38%
Chevy Chase Plaza	10%	0%	33%	57%
King Street Station Area				
333 John Carlyle	20%	2%	63%	16%
King Street Station	16%	5%	58%	21%
New Carrollton Station Area				
8400 Corporate Drive	4%	4%	92%	0%
Silver Spring Station Area				
8380 Colesville Road	42%	4%	43%	11%
8720 Georgia Avenue	19%	4%	56%	21%
Metro Plaza 1	26%	9%	20%	46%
U Street/African American Civil War Memorial/Cardozo Station Area				
Reeves Center	19%	8%	48%	25%
Average Among All Sites	**25%**	**3%**	**43%**	**28%**

Trips for meals or snacks generally used the "walk and other" mode (53 percent) (see Table C-12). About half the trips for personal business and shopping used the auto mode (49 and 54 percent, respectively), but a fair amount of these trips also were made by the "walk and other" (28 and 20 percent, respectively), and Metrorail modes (20 and 21 percent, respectively). These mode shares may reflect the mixed land uses of the station areas studied, as well as Metrorail

Table C-12
Mode Share for Midday Trips by Trip Purpose

Office Site	Mode	Trip Purpose						
		Work Related	Personal Business	Meal or Snacks	Shopping	Education	Recreation	Other
Ballston Station Area								
3 Ballston Plaza	Metrorail	16%	3%	8%	0%	0%	50%	0%
	Metrobus & Other Transit	2%	7%	16%	25%	0%	0%	0%
	Auto	73%	80%	50%	63%	100%	0%	100%
	Walk & Other	8%	10%	26%	13%	0%	50%	0%
	Total	100%	100%	100%	100%	100%	100%	100%
Ballston One	Metrorail	33%	50%	0%	0%	100%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%
	Auto	50%	50%	50%	0%	0%	50%	0%
	Walk & Other	17%	0%	50%	100%	0%	50%	0%
	Total	100%	100%	100%	100%	100%	100%	0%
Court House Station Area								
2100-2200 Clarendon Blvd.	Metrorail	20%	20%	17%	22%	69%	0%	6%
	Metrobus & Other Transit	1%	2%	0%	0%	0%	0%	0%
	Auto	67%	51%	38%	65%	31%	40%	81%
	Walk & Other	11%	27%	46%	13%	0%	60%	13%
	Total	100%	100%	100%	100%	100%	100%	100%
Courthouse Tower	Metrorail	75%	0%	17%	50%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%
	Auto	0%	25%	25%	50%	0%	0%	0%
	Walk & Other	25%	75%	58%	0%	0%	0%	100%
	Total	100%	100%	100%	100%	0%	0%	100%

Table C-12
Mode Share of Midday Trips by Purpose of Trip
(Continued)

Office Site	Mode	Trip Purpose						
		Work Related	Personal Business	Meal or Snacks	Shopping	Education	Recreation	Other
Crystal City Station Area								
Crystal Park IV	Metrorail	13%	10%	7%	0%	0%	0%	20%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%
	Auto	78%	69%	53%	100%	0%	90%	80%
	Walk & Other	9%	20%	40%	0%	0%	10%	0%
	Total	100%	100%	100%	100%	0%	100%	100%
Crystal Square 2	Metrorail	62%	0%	8%	0%	100%	0%	0%
	Metrobus & Other Transit	4%	0%	0%	0%	0%	0%	0%
	Auto	22%	43%	8%	100%	0%	0%	50%
	Walk & Other	12%	57%	84%	0%	0%	100%	50%
	Total	100%	100%	100%	100%	100%	100%	100%
Farragut West Station Area								
1634 I Street	Metrorail	76%	44%	25%	67%	0%	100%	40%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%
	Auto	0%	13%	0%	0%	0%	0%	0%
	Walk & Other	24%	44%	75%	33%	0%	0%	60%
	Total	100%	100%	100%	100%	0%	100%	100%
1701 Pennsylvania Avenue	Metrorail	69%	43%	21%	67%	0%	50%	100%
	Metrobus & Other Transit	3%	9%	0%	0%	0%	0%	0%
	Auto	10%	13%	0%	33%	100%	50%	0%
	Walk & Other	17%	35%	79%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%

Table C-12
Mode Share of Midday Trips by Purpose of Trip
(Continued)

Office Site	Mode	Trip Purpose						
		Work Related	Personal Business	Meal or Snacks	Shopping	Education	Recreation	Other
Friendship Heights Station Area								
2 Wisconsin Circle	Metrorail	47%	32%	27%	25%	33%	0%	67%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%
	Auto	37%	41%	14%	38%	33%	33%	0%
	Walk & Other	16%	27%	59%	38%	33%	67%	33%
	Total	100%	100%	100%	100%	100%	100%	100%
Chevy Chase Plaza	Metrorail	0%	20%	14%	0%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%
	Auto	86%	0%	0%	0%	0%	100%	0%
	Walk & Other	14%	80%	86%	100%	0%	0%	0%
	Total	100%	100%	100%	100%	0%	100%	0%
King Street Station Area								
333 John Carlyle	Metrorail	25%	10%	17%	0%	0%	67%	0%
	Metrobus & Other Transit	5%	0%	0%	0%	0%	0%	0%
	Auto	65%	50%	58%	100%	0%	33%	100%
	Walk & Other	5%	40%	25%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	0%	100%	100%
King Street Station	Metrorail	38%	0%	0%	0%	0%	0%	0%
	Metrobus & Other Transit	13%	0%	0%	0%	0%	0%	0%
	Auto	50%	67%	63%	0%	0%	0%	0%
	Walk & Other	0%	33%	38%	0%	0%	0%	0%
	Total	100%	100%	100%	0%	0%	0%	0%

Table C-12
Mode Share of Midday Trips by Purpose of Trip
(Continued)

Office Site	Mode	Trip Purpose						
		Work Related	Personal Business	Meal or Snacks	Shopping	Education	Recreation	Other
New Carrollton Station Area								
8400 Corporate Drive	Metrorail	0%	0%	14%	0%	0%	0%	0%
	Metrobus & Other Transit	17%	0%	0%	0%	0%	0%	0%
	Auto	83%	100%	86%	100%	0%	0%	100%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	0%	0%	100%
Silver Spring Station Area								
8380 Colesville Road	Metrorail	45%	40%	47%	0%	0%	0%	33%
	Metrobus & Other Transit	0%	15%	0%	0%	0%	0%	0%
	Auto	55%	30%	24%	100%	0%	50%	67%
	Walk & Other	0%	15%	29%	0%	0%	50%	0%
	Total	100%	100%	100%	100%	0%	100%	100%
8720 Georgia Avenue	Metrorail	25%	7%	12%	0%	0%	67%	0%
	Metrobus & Other Transit	0%	7%	0%	0%	50%	0%	33%
	Auto	71%	43%	24%	100%	50%	33%	67%
	Walk & Other	4%	43%	65%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%
Metro Plaza 1	Metrorail	40%	43%	6%	100%	0%	67%	0%
	Metrobus & Other Transit	20%	0%	13%	0%	0%	0%	0%
	Auto	40%	29%	0%	0%	100%	33%	0%
	Walk & Other	0%	29%	81%	0%	0%	0%	100%
	Total	100%	100%	100%	100%	100%	100%	100%

Table C-12
Mode Share of Midday Trips by Purpose of Trip
(Continued)

Office Site	Mode	Trip Purpose						
		Work Related	**Personal Business**	**Meal or Snacks**	**Shopping**	**Education**	**Recreation**	**Other**
U Street/African American Civil War Memorial/Cardozo Station Area								
Reeves Center	Metrorail	20%	13%	19%	0%	0%	100%	29%
	Metrobus & Other Transit	11%	4%	7%	0%	33%	0%	0%
	Auto	68%	58%	7%	0%	67%	0%	71%
	Walk & Other	1%	25%	67%	100%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%
Totals for Office Sites	**Metrorail**	**33%**	**20%**	**16%**	**21%**	**36%**	**26%**	**21%**
	Metrobus & Other Transit	**3%**	**3%**	**3%**	**5%**	**9%**	**0%**	**2%**
	Auto	**55%**	**49%**	**29%**	**54%**	**52%**	**44%**	**63%**
	Walk & Other	**9%**	**28%**	**53%**	**20%**	**3%**	**30%**	**15%**
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

accessibility. The office sites that had well above average "walk and other" mode share for meal and personal business trips include Crystal Square 2, the Farragut West and Friendship Heights Station sites, 8720 George Avenue, Metro Plaza 1 and Reeves Center.

Table C-13 sorts the midday trip mode shares by destination—either by jurisdiction or within ½ mile of the respondent's workplace. Overall, 56 percent of trips with destinations ½ mile from the workplace site were made using the "walk and other" mode. Also, by removing the ½ mile choice, the jurisdiction where the site is located tended to be the most common destination for midday trips. For sites located in the District, including 2 Wisconsin Circle, which is actually in Montgomery County but is very near the District's Friendship Heights station, 42 percent of midday trips within the District were made on Metrorail. At the other sites, the midday trips made within the same jurisdiction did not approach this average rate.

Among the visitors to the 13 offices sites surveyed, 15 percent used Metrorail (see Table C-14). Overall, the two most popular modes for visitors were auto (60 percent average) and "walk and other" (22 percent average). The stations exhibiting above average Metrorail use among visitors include: 1634 I Street (27 percent), Metro Plaza 1 (43 percent; but low response rate), and Courthouse Tower (43 percent). The sites to which a majority of visitors arrived by auto include: 3 Ballston Plaza (90 percent), 8720 Georgia Avenue (74 percent), 8380 Colesville Road (87 percent), and 8400 Corporate Drive (97 percent). A significant percentage of visitors to Crystal Square 2 (45 percent) and the Farragut West sites (44 percent combined), arrived by the "walk and other" mode, suggesting that many came from other nearby office or business establishments (e.g., copying shops).

Table C-15 distributes the visitors' mode shares by the location from where the respondent was last, and the destination to which the respondent planned to go after visiting the office site. The highest percentage of visitors came from and planned to go to the jurisdiction where the site is located (see Table C-15). The only exceptions were Crystal Park 4 and Metro Plaza 1, but the latter site had very few participating visitors. The visitors to the five District office sites (Farragut West and Friendship Heights station sites, and Reeves Center) made up 78 percent of all District origin/destination visitor trips to all surveyed sites. Among these trips, Metrorail was used 19 percent of the time, but the "walk and other" mode was used more often at 33 percent (auto mode was 36 percent). For the visitor trips solely within Montgomery and Prince George's Counties (for New Carrollton and Silver Spring station sites), visitors overwhelmingly arrived by automobile. For visitor trips solely within Arlington County (for Ballston, Court House and Crystal City station sites), the auto and "walk and other" modes were used most often by visitors.

Table C-13
Mode Share of Midday Trips by Destination

Office Site	Mode	Destination										
		Within 1/2 Mile	DC	Arlington County	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery	Virginia - Other	Maryland - Other
Ballston Station Area												
3 Ballston Plaza	Metrorail	14%	23%	7%	0%	0%	8%	0%	0%	17%	20%	0%
	Metrobus & Other Transit	14%	0%	5%	0%	25%	0%	40%	0%	0%	0%	0%
	Auto	14%	77%	77%	100%	67%	92%	60%	100%	83%	60%	100%
	Walk & Othe	57%	0%	11%	0%	8%	0%	0%	0%	0%	20%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Ballston One	Metrorail	50%	67%	0%	0%	0%	0%	0%	100%	33%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	17%	33%	60%	0%	0%	0%	100%	0%	67%	0%	100%
	Walk & Othe	33%	0%	40%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	0%	0%	0%	100%	100%	100%	**0%**	100%
Court House Station Area												
2100-2200 Clarendon Blvd.	Metrorail	19%	16%	20%	40%	21%	26%	17%	0%	29%	13%	0%
	Metrobus & Other Transit	0%	3%	0%	0%	0%	0%	0%	0%	8%	0%	0%
	Auto	27%	45%	65%	60%	63%	74%	50%	100%	38%	63%	100%
	Walk & Othe	54%	36%	15%	0%	17%	0%	33%	0%	25%	25%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Courthouse Tower	Metrorail	11%	0%	22%	0%	0%	0%	100%	0%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	22%	0%	33%	0%	0%	0%	0%	0%	0%	0%	0%
	Walk & Othe	67%	0%	44%	0%	100%	0%	0%	0%	0%	0%	0%
	Total	100%	0%	100%	0%	100%	0%	100%	0%	0%	0%	0%
Crystal City Station Area												
Crystal Park IV	Metrorail	6%	16%	6%	0%	17%	0%	0%	17%	30%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	48%	63%	86%	100%	50%	100%	100%	72%	30%	0%	0%
	Walk & Othe	45%	21%	8%	0%	33%	0%	0%	11%	40%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	**0%**	0%

Table C-13
Mode Share of Midday Trips by Destination
(Continued)

Office Site	Mode	Destination										
		Within 1/2 Mile	DC	Arlington County	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery	Virginia - Other	Maryland - Other
Crystal Square 2	Metrorail	15%	52%	52%	0%	33%	17%	0%	100%	27%	25%	0%
	Metrobus & Other Transit	0%	0%	3%	0%	0%	0%	0%	0%	13%	0%	0%
	Auto	15%	24%	16%	67%	33%	83%	0%	0%	13%	50%	100%
	Walk & Othe	70%	24%	29%	33%	33%	0%	0%	0%	47%	25%	0%
	Total	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%
Farragut West Station Area												
1634 I Street	Metrorail	42%	70%	75%	100%	50%	0%	100%	33%	50%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	0%	0%	25%	0%	0%	100%	0%	0%	0%	0%	0%
	Walk & Othe	58%	30%	0%	0%	50%	0%	0%	67%	50%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%
1701 Pennsylvania Avenue	Metrorail	48%	48%	100%	0%	0%	0%	50%	86%	50%	50%	0%
	Metrobus & Other Transit	0%	3%	0%	0%	0%	0%	50%	0%	0%	0%	0%
	Auto	0%	18%	0%	0%	33%	0%	0%	14%	50%	0%	0%
	Walk & Other	52%	30%	0%	0%	67%	0%	0%	0%	0%	50%	0%
	Total	100%	100%	100%	0%	100%	0%	100%	100%	100%	100%	0%
Friendship Heights Station Area												
2 Wisconsin Circle	Metrorail	19%	42%	0%	0%	0%	0%	100%	27%	50%	67%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	11%	47%	100%	0%	0%	0%	0%	36%	50%	0%	0%
	Walk & Othe	70%	11%	0%	0%	0%	0%	0%	36%	0%	33%	0%
	Total	100%	100%	100%	0%	0%	0%	100%	100%	100%	100%	0%
Chevy Chase Plaza	Metrorail	0%	29%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	0%	57%	0%	0%	0%	0%	0%	0%	100%	50%	0%
	Walk & Othe	100%	14%	0%	0%	0%	0%	0%	100%	0%	50%	0%
	Total	100%	100%	0%	0%	0%	0%	0%	100%	100%	100%	0%

Table C-13
Mode Share of Midday Trips by Destination
(Continued)

Office Site	Mode	Destination										
		Within 1/2 Mile	DC	Arlington County	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery	Virginia - Other	Maryland - Other
King Street Station Area												
333 John Carlyle	Metrorail	0%	40%	33%	11%	0%	0%	67%	100%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	25%	0%	0%	0%	0%	0%
	Auto	40%	20%	67%	89%	100%	75%	33%	0%	100%	50%	100%
	Walk & Othe	60%	40%	0%	0%	0%	0%	0%	0%	0%	50%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
King Street Station	Metrorail	0%	50%	0%	0%	0%	0%	0%	0%	100%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%
	Auto	86%	50%	100%	20%	0%	100%	0%	0%	0%	0%	100%
	Walk & Othe	14%	0%	0%	60%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	0%	100%	0%	0%	100%	0%	100%
New Carrollton Station Area												
8400 Corporate Drive	Metrorail	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%
	Auto	100%	100%	0%	0%	100%	0%	0%	100%	100%	100%	50%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	0%	0%	100%	100%	0%	100%	100%	100%	100%
Silver Spring Station Area												
8380 Colesville Road	Metrorail	27%	73%	100%	0%	0%	0%	0%	22%	20%	92%	50%
	Metrobus & Other Transit	7%	0%	0%	0%	0%	0%	0%	11%	0%	0%	0%
	Auto	33%	27%	0%	0%	0%	0%	100%	56%	67%	8%	50%
	Walk & Other	33%	0%	0%	0%	0%	0%	0%	11%	13%	0%	0%
	Total	100%	100%	100%	0%	100%	100%	100%	100%	100%	100%	100%

Table C-13
Mode Share of Midday Trips by Destination
(Continued)

Office Site	Mode	Destination										
		Within 1/2 Mile	DC	Arlington County	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery	Virginia - Other	Maryland - Other
8720 Georgia Avenue	Metrorail	20%	55%	0%	0%	0%	0%	0%	8%	15%	0%	0%
	Metrobus & Other Transit	0%	9%	0%	0%	0%	0%	0%	8%	4%	0%	0%
	Auto	0%	36%	100%	100%	0%	100%	0%	77%	77%	100%	0%
	Walk & Other	80%	0%	0%	0%	0%	0%	0%	8%	4%	0%	0%
	Total	100%	100%	100%	100%	0%	100%	0%	100%	100%	100%	0%
Metro Plaza 1	Metrorail	0%	100%	0%	0%	0%	0%	33%	30%	20%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%
	Auto	0%	0%	0%	0%	0%	0%	33%	30%	40%	0%	0%
	Walk & Other	100%	0%	0%	0%	0%	0%	33%	40%	20%	0%	0%
	Total	100%	100%	0%	0%	0%	0%	100%	100%	100%	0%	0%
U Street/African American Civil War Memorial/Cardozo Station Area												
Reeves Center	Metrorail	14%	27%	0%	0%	0%	0%	14%	17%	0%	0%	0%
	Metrobus & Other Transit	7%	8%	0%	0%	0%	0%	14%	8%	0%	0%	0%
	Auto	36%	58%	100%	0%	0%	100%	43%	58%	100%	0%	0%
	Walk & Other	43%	7%	0%	0%	100%	0%	29%	17%	0%	0%	0%
	Total	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	0%

Table C-14
Mode Share of Office Visitors

Office Site	Mode			
	Metrorail	Metrobus & Other Transit	Auto	Walk & Other
Ballston Station Area				
3 Ballston Plaza	11%	0%	89%	0%
Court House Station Area				
2100-2200 Clarendon Blvd.	11%	0%	69%	20%
Courthouse Tower	43%	0%	36%	21%
Crystal City Station Area				
Crystal Park IV	6%	7%	67%	20%
Crystal Square 2	14%	6%	35%	45%
Farragut West Station Area				
1634 I Street	27%	0%	30%	43%
1701 Pennsylvania Avenue	9%	3%	40%	49%
Friendship Heights Station Area				
2 Wisconsin Circle	13%	0%	82%	5%
New Carrollton Station Area				
8400 Corporate Drive	0%	0%	97%	3%
Silver Spring Station Area				
8380 Colesville Road	8%	0%	87%	5%
8720 Georgia Avenue	12%	3%	74%	12%
Metro Plaza 1	43%	0%	29%	29%
U Street/African American Civil War Memorial/Cardozo Station Area				
Reeves Center	16%	18%	49%	17%
Average Among All Sites	**16%**	**7%**	**60%**	**22%**

Table C-15
Mode Share of Office Visitor by Location Before and After Visit

Office Site	Mode	Place Before and After										
		DC	Arlington County	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery	Virginia - Other	Maryland - Other	Other Place
Ballston Station Area												
Ballston Plaza	Metrorail	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
	Metrobus & Other Transit		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	100%	100%	0%	0%	100%	0%	0%	0%	0%	0%	0%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	0%	0%	100%	0%	0%	100%	0%	0%	0%
Court House Station Area												
2100-2200 Clarendon Blvd.	Metrorail	50%	12%	0%	0%	5%	0%	0%	0%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	25%	57%	100%	100%	95%	100%	0%	100%	100%	0%	0%
	Walk & Other	25%	31%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	0%	100%	100%	0%	0%
Courthouse Tower	Metrorail	67%	0%	0%	0%	0%	0%	0%	100%	0%	100%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	33%	54%	0%	0%	100%	0%	0%	0%	0%	0%	0%
	Walk & Other	0%	46%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%
Crystal City Station Area												
Crystal Park IV	Metrorail	43%	13%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Metrobus & Other Transit	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%	20%
	Auto	14%	13%	67%	100%	93%	0%	100%	100%	100%	100%	80%
	Walk & Other	43%	25%	33%	0%	7%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%
Crystal Square 2	Metrorail	33%	7%	13%	0%	100%	0%	100%	0%	0%	17%	0%
	Metrobus & Other Transit	0%	11%	0%	0%	0%	0%	0%	0%	7%	0%	0%
	Auto	43%	20%	63%	100%	0%	0%	0%	50%	43%	83%	0%
	Walk & Other	24%	63%	25%	0%	0%	0%	0%	50%	50%	0%	0%
	Total	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%

Table C-15
Mode Share of Office Visitor by Location Before and After Visit
(Continued)

Office Site	Mode	Place Before and After										
		DC	Arlington County	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery	Virginia - Other	Maryland - Other	Other Place
Farragut West Station Area												
1634 I Street	Metrorail	22%	0%	0%	0%	0%	0%	100%	40%	0%	0%	100%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	26%	100%	0%	0%	100%	0%	0%	60%	0%	75%	0%
	Walk & Other	52%	0%	0%	0%	0%	0%	0%	0%	0%	25%	0%
	Total	100%	100%	0%	0%	100%	0%	100%	100%	0%	100%	100%
1701 Pennsylvania Ave	Metrorail	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	33%
	Auto	18%	100%	100%	0%	0%	100%	100%	100%	0%	0%	0%
	Walk & Other	68%	0%	0%	0%	0%	0%	0%	0%	0%	0%	67%
	Total	100%	100%	100%	0%	0%	100%	100%	100%	0%	0%	100%
Friendship Heights Station Area												
2 Wisconsin Circle	Metrorail	33%	0%	0%	0%	0%	0%	20%	5%	0%	0%	25%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	67%	100%	100%	0%	100%	0%	80%	90%	100%	100%	50%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	25%
	Total	100%	100%	100%	0%	100%	0%	100%	100%	100%	100%	100%
New Carrollton Station Area												
8400 Corporate Drive	Metrorail	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	100%	0%	0%	0%	100%	0%	96%	0%	0%	100%	0%
	Walk & Other	0%	0%	0%	0%	0%	0%	4%	0%	0%	0%	0%
	Total	100%	0%	0%	0%	100%	0%	100%	0%	0%	100%	0%

Table C-15
Mode Share of Office Visitor by Location Before and After Visit
(Continued)

Office Site	Mode	Place Before and After										
		DC	Arlington County	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery	Virginia - Other	Maryland - Other	Other Place
Silver Spring Station Area												
8380 Colesville Road	Metrorail	33%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	67%	0%	0%	0%	0%	0%	100%	87%	0%	100%	100%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%
	Total	100%	0%	0%	0%	0%	0%	100%	100%	0%	100%	100%
8720 Georgia Avenue	Metrorail	11%	0%	0%	0%	0%	0%	31%	0%	0%	17%	100%
	Metrobus & Other Transit	22%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	67%	100%	0%	0%	0%	0%	69%	79%	100%	83%	0%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%	21%	0%	0%	0%
	Total	100%	100%	0%	0%	0%	0%	100%	100%	100%	100%	100%
Metro Plaza 1	Metrorail	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Walk & Other	0%	0%	0%	0%	0%	0%	100%	100%	0%	0%	0%
	Total	100%	0%	0%	0%	0%	0%	100%	100%	0%	0%	100%
U Street/African American Civil War Memorial/Cardozo Station Area												
Reeves Center	Metrorail	17%	0%	0%	0%	0%	0%	0%	25%	33%	14%	0%
	Metrobus & Other Transit	21%	0%	0%	100%	100%	0%	0%	0%	0%	0%	0%
	Auto	41%	100%	100%	0%	0%	0%	100%	75%	67%	86%	0%
	Walk & Other	22%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%

C.1.2 Residential Sites

The residential survey was designed to capture information about the travel characteristics of the residents at 18 residential sites with more than 8,200 total units located at distances from Metrorail stations varying from 150 to 2,800 feet (see Table C-16). More than 7,800 survey forms were distributed, which resulted in an average response rate of almost 12 percent.

Table C-16
Characteristics of Surveyed Residential Sites

Residential Site	Number of Units	Distance from Station (ft)	Parking Spaces	Est. Response Rate (%)
Ballston Station Area				
Lincoln Towers	714	1,100	1,310	9
Randolph Towers	509	1,250	711	11
Court House Station Area				
Arlington Courthouse Plaza	564	150	1,484[2]	10
Courtland Towers	575	1,200	926	17
Crystal City Station Area				
Crystal Plaza Apartments	540	1,450[1]	1,963[3]	13
Crystal Square Apartments	378	600	1,899[4]	16
Dunn Loring-Merrifield Station Area				
Merrifield Village	706	2,800	--	7
Friendship Heights Station Area				
Highland House West	308	1,350	--	20
North Park Apartments	310	2,700	450	8
Gallery Place-Chinatown Station Area				
Meridian at Gallery Place	462	1,700	--	9
The Lansburgh	385	500	700	10
Grosvenor-Strathmore Station Area				
Avalon at Grosvenor Station	499	1,400	771	12
Grosvenor Park I	399	1,700	--	6
Grosvenor House Apartments	404	2,300	--	25
Stoneybrook	120	2,500	--	28
Silver Spring Station Area				
Georgian Towers	858	1,700	--	7
Twin Towers	345	550	312	11
U-Street/African American Civil War Memorial/Cardozo Station Area				
Summit Roosevelt	196	2,600	--	14

Notes: [1] Distance provided is to the north tower. The distance to the south tower is 1,700 feet.
[2] Parking for Arlington Courthouse Plaza is shared with the Arlington County Building at 2100 Clarendon Blvd.
[3] Parking for Crystal Plaza Apartments is shared with other buildings in Crystal Plaza.
[4] Parking for Crystal Square Apartments is shared with other buildings in Crystal Square.
"—": Unknown or unavailable.

The residential survey requested information about the respondent's trips taken on one weekday from his or her residence. The respondent could identify up to four trips, providing information

about the trip purpose, the general destination (i.e., political jurisdiction) and the mode used. The respondent also could provide the same trip information for up to two other persons who live in the household. Overall, information was obtained for approximately 2,800 trips distributed among the 18 sites.

The mode shares for reported trips generated from the residential sites are provided in Table C-17. Overall, 42 percent of all recorded trips from the residential sites used Metrorail, but other transit modes (which include Metrobus and commuter rail) were not nearly as popular at only three percent of all trips. More than 90 percent of all Metrorail trips included a walk to the station, which is not surprising, as the 18 residential sites are located on average, about 1,500 feet from a station. About six percent of the trips included a bus transfer, and very few trips involved driving and parking at the station or being dropped off by others.

The sites with above-average Metrorail use include: the Ballston sites (Lincoln Towers and Randolph Towers), Crystal Square Apartments, Twin Towers, the Court House sites (Arlington Courthouse Plaza and Courtland Towers), and Meridian @ Gallery Place. The sites exhibiting moderate (average to just below average) Metrorail use include Crystal Plaza Apartments, Avalon at Grosvenor Station, Georgian Towers, Merrifield Village, and the Lansburgh. With the exception of Grosvenor House Apartments, the remaining sites did not have Metrorail shares less than 30 percent. The response rate at Grosvenor House Apartments was among the lowest of all the sites. However, this site is undergoing a conversion from rental to condominium, which may account for the low response rate. Therefore, its low Metrorail use rate may not be indicative of the true travel characteristics of this site. Two nearby sites, Grosvenor Park I and Stoneybrook, had much higher response rates, and both sites reported much higher Metrorail use rates. In addition, the modal characteristics of the Gallery Place/Chinatown sites (Meridian @ Gallery Place and the Lansburgh), which exhibited high numbers of the "walk and other" trips, were quite different from the other sites probably due to of their location in downtown DC.

Work or school trips comprised 46 percent of all reported trips. When sorted by trip purpose (see Table C-18), an overall 55 percent of all work or school trips were conducted using Metrorail. The auto mode (driver or passenger) was used in 34 percent of the work and school trips. In contrast, trips primarily for personal business, meals and shopping had auto mode shares at 58, 53 and 55 percent, respectively. However, Metrorail appeared to be a popular mode of choice for social trips (45 percent).

In general, many of the individual residential sites followed the above pattern. However, the sites showing lower Metrorail use for work and school trips were: Merrifield Village, Highland House West, Grosvenor House Apartments, Grosvenor Park I, The Lansburgh and Summit Roosevelt. With the exception of the latter two District sites, the auto mode comprised relatively large shares for work and school trips at these sites. At the two District sites, "other transit" and "walk and other" modes comprised relatively large shares for these trips.

For personal business, meals and shopping trips, Arlington Courthouse Plaza, Georgian Towers, Twin Towers, Meridian at Gallery Place, The Lansburgh and Summit Roosevelt all exhibited large "walk and other" mode shares. Metrorail use also remained fairly high for these types of trips at these sites as well.

Table C-17
Mode Share for All Trips at Residential Sites

Residential Site	Mode			
	Metrorail[1]	Metrobus & Other Transit[2]	Auto[3]	Walk & Other[4]
Ballston Station Area				
Lincoln Towers	50%	2%	38%	11%
Randolph Towers	45%	1%	40%	15%
Court House Station Area				
Arlington Courthouse Plaza	58%	0%	29%	14%
Courtland Towers	46%	0%	39%	15%
Crystal City Station Area				
Crystal Plaza Apartments	39%	0%	52%	9%
Crystal Square Apartments	53%	0%	42%	5%
Dunn Loring-Merrifield Station Area				
Merrifield Village	37%	1%	53%	9%
Friendship Heights Station Area				
Highland House West	33%	2%	53%	12%
North Park Apartments	32%	2%	57%	9%
Gallery Place-Chinatown Station Area				
Meridian @ Gallery Place	61%	6%	15%	18%
The Lansburgh	39%	6%	21%	34%
Grosvenor-Strathmore Station Area				
Avalon at Grosvenor Station	39%	1%	57%	3%
Grosvenor House Apartments	17%	0%	76%	7%
Grosvenor Park I	30%	2%	64%	5%
Stoneybrook	34%	1%	62%	4%
Silver Spring Station Area				
Georgian Towers	42%	10%	35%	14%
Twin Towers	49%	4%	27%	19%
U-Street/African American Civil War Memorial/Cardozo Station Area				
Summit Roosevelt	31%	20%	22%	27%
Average Among All Sites	**41%**	**4%**	**43%**	**13%**

Notes: [1] Includes multimodal trips that may have involved use of autos and/or buses in combination with Metrorail.
[2] Includes bus only trips, and commuter rail, such as MARC, VRE or Amtrak.
[3] Includes trips as driver and passenger of a private automobile.
[4] Includes cycling and any other form of transportation one may use.

Table C-19 displays mode shares at the surveyed residential sites sorted by the trip destination/jurisdiction. With one exception (Arlington Courthouse Plaza), the most popular destination/jurisdiction for trips made from each individual site was the same jurisdiction as the surveyed site. However, close to 40 percent of all trips from the 18 residential sites ended in the District, and among those trips, 67 percent were made using Metrorail. Trips to other jurisdictions did not come close to this rate of Metrorail use. Eliminating all District trips from the total drops the overall Metrorail use rate from 42 percent to 25 percent. Two of the three District sites (the Lansburgh and Summit Roosevelt) did not follow the District destination pattern even though both sites generated a high number of trips within the District. At the

Table C-18
Mode Share at Residential Sites by Trip Purpose

Residential Site	Mode	Trip Purpose						
		Work or School	Personal Business	Meal or Snacks	Shopping	Recreation	Social	Other
Ballston Station Area								
Lincoln Towers	Metrorail	70%	7%	36%	29%	44%	48%	67%
	Metrobus & Other Transit	2%	0%	0%	4%	0%	0%	0%
	Auto	23%	66%	45%	50%	44%	52%	17%
	Walk & Other	5%	28%	18%	17%	11%	0%	17%
	Total	100%	100%	100%	100%	100%	100%	100%
Randolph Towers	Metrorail	58%	28%	18%	17%	40%	54%	25%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	4%	0%
	Auto	32%	52%	64%	50%	27%	39%	75%
	Walk & Other	10%	20%	18%	33%	33%	4%	0%
	Total	100%	100%	100%	100%	100%	100%	100%
Court House Station Area								
Arlington Courthouse Plaza	Metrorail	72%	33%	21%	36%	54%	67%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%
	Auto	22%	56%	29%	9%	46%	33%	0%
	Walk & Other	6%	11%	50%	55%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	0%
Courtland Towers	Metrorail	62%	19%	26%	23%	43%	28%	0%
	Metrobus & Other Transit	1%	0%	0%	0%	0%	0%	0%
	Auto	32%	56%	35%	69%	36%	48%	50%
	Walk & Other	5%	25%	39%	8%	21%	24%	50%
	Total	100%	100%	100%	100%	100%	100%	100%

Table C-18
Mode Share at Residential Sites by Trip Purpose
(Continued)

Residential Site	Mode	Trip Purpose						
		Work or School	Personal Business	Meal or Snacks	Shopping	Recreation	Social	Other
Crystal City Station Area								
Crystal Plaza Apartments	Metrorail	60%	29%	28%	17%	15%	40%	50%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%
	Auto	33%	65%	72%	63%	69%	55%	38%
	Walk & Other	7%	6%	0%	21%	15%	5%	13%
	Total	100%	100%	100%	100%	100%	100%	100%
Crystal Square Apartments	Metrorail	68%	39%	43%	43%	50%	42%	50%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%
	Auto	29%	50%	57%	52%	50%	58%	33%
	Walk & Other	3%	11%	0%	4%	0%	0%	17%
	Total	100%	100%	100%	100%	100%	100%	100%
Dunn Loring-Merrifield Station Area								
Merrifield Village	Metrorail	44%	23%	17%	21%	30%	54%	33%
	Metrobus & Other Transit	0%	0%	0%	7%	0%	0%	0%
	Auto	44%	68%	67%	71%	50%	46%	67%
	Walk & Other	11%	9%	17%	0%	20%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%
Friendship Heights Station Area								
Highland House West	Metrorail	42%	30%	21%	21%	17%	35%	33%
	Metrobus & Other Transit	1%	0%	7%	7%	0%	0%	0%
	Auto	46%	44%	64%	57%	83%	59%	33%
	Walk & Other	10%	26%	7%	14%	0%	6%	33%
	Total	100%	100%	100%	100%	100%	100%	100%

Table C-18
Mode Share at Residential Sites by Trip Purpose
(Continued)

Residential Site	Mode	Trip Purpose						
		Work or School	Personal Business	Meal or Snacks	Shopping	Recreation	Social	Other
North Park Apartments	Metrorail	61%	19%	9%	17%	40%	25%	25%
	Metrobus & Other Transit	0%	0%	9%	0%	20%	0%	0%
	Auto	36%	73%	64%	67%	40%	50%	75%
	Walk & Other	4%	8%	18%	17%	0%	25%	0%
	Total	100%	100%	100%	100%	100%	100%	100%
Gallery Place-Chinatown Station Area								
Meridian @ Gallery Place	Metrorail	63%	62%	38%	71%	80%	58%	0%
	Metrobus & Other Transit	9%	0%	15%	0%	0%	0%	0%
	Auto	13%	14%	8%	14%	20%	26%	0%
	Walk & Other	16%	24%	38%	14%	0%	16%	0%
	Total	100%	100%	100%	100%	100%	100%	0%
The Lansburgh	Metrorail	37%	67%	43%	31%	33%	40%	20%
	Metrobus & Other Transit	6%	0%	0%	23%	0%	0%	0%
	Auto	25%	17%	0%	23%	17%	10%	40%
	Walk & Other	31%	17%	57%	23%	50%	50%	40%
	Total	100%	100%	100%	100%	100%	100%	100%
Grosvenor-Strathmore Station Area								
Avalon at Grosvenor Station	Metrorail	53%	6%	8%	15%	29%	79%	33%
	Metrobus & Other Transit	1%	3%	0%	0%	0%	0%	0%
	Auto	44%	88%	85%	77%	57%	21%	67%
	Walk & Other	1%	3%	8%	8%	14%		0%
	Total	100%	100%	100%	100%	100%	100%	100%

Table C-18
Mode Share at Residential Sites by Trip Purpose
(Continued)

Residential Site	Mode	Trip Purpose						
		Work or School	Personal Business	Meal or Snacks	Shopping	Recreation	Social	Other
Grosvenor House Apartments	Metrorail	28%	11%	0%	29%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%
	Auto	50%	89%	100%	71%	100%	100%	100%
	Walk & Other	22%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%
Grosvenor Park I	Metrorail	43%	26%	14%	12%	35%	28%	7%
	Metrobus & Other Transit	2%	0%	4%	0%	0%	7%	0%
	Auto	46%	73%	79%	88%	55%	62%	93%
	Walk & Other	9%	1%	4%	0%	10%	3%	0%
	Total	100%	100%	100%	100%	100%	100%	100%
Stoneybrook	Metrorail	53%	15%	0%	8%	17%	60%	0%
	Metrobus & Other Transit	1%	0%	0%	8%	0%	0%	0%
	Auto	42%	81%	100%	83%	75%	40%	100%
	Walk & Other	4%	4%	0%	0%	8%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%
Silver Spring Station Area								
Georgian Towers	Metrorail	48%	26%	27%	36%	13%	33%	64%
	Metrobus & Other Transit	11%	13%	9%	9%	13%	0%	0%
	Auto	32%	39%	36%	36%	63%	33%	29%
	Walk & Other	9%	22%	27%	18%	13%	33%	7%
	Total	100%	100%	100%	100%	100%	100%	100%
Twin Towers	Metrorail	57%	58%	20%	28%	50%	62%	43%
	Metrobus & Other Transit	2%	4%	0%	11%	0%	0%	14%
	Auto	35%	17%	30%	17%	17%	31%	43%
	Walk & Other	7%	21%	50%	44%	33%	8%	0%
	Total	100%	100%	100%	100%	100%	100%	100%

Table C-18
Mode Share at Residential Sites by Trip Purpose
(Continued)

Residential Site	Mode	Trip Purpose						
		Work or School	**Personal Business**	**Meal or Snacks**	**Shopping**	**Recreation**	**Social**	**Other**
U-Street/African American Civil War Memorial/Cardozo Station Area								
Summit Roosevelt	Metrorail	28%	36%	22%	25%	50%	44%	0%
	Metrobus & Other Transit	36%	7%	0%	0%	0%	11%	0%
	Auto	26%	21%	11%	25%	25%	0%	100%
	Walk & Other	10%	36%	67%	50%	25%	44%	0%
	Total	100%	100%	100%	100%	100%	100%	100%
Totals of Residential Sites	**Metrorail**	**55%**	**28%**	**22%**	**25%**	**36%**	**45%**	**35%**
	Metrobus & Other Transit	**3%**	**1%**	**3%**	**4%**	**1%**	**2%**	**1%**
	Auto	**34%**	**58%**	**53%**	**55%**	**49%**	**43%**	**55%**
	Walk & Other	**8%**	**13%**	**22%**	**16%**	**14%**	**10%**	**9%**
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table C-19
Mode Share at Residential Sites by Trip Destination

Residential Site	Mode	Destination										
		DC	Arlington	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery	Virginia - Other	Maryland - Other	Other Place
Ballston Station Area												
Lincoln Towers	Metrorail	88%	39%	50%	33%	0%	0%	100%	0%	0%	0%	0%
	Metrobus & Other Transit	0%	2%	0%	0%	0%	0%	0%	0%	17%	0%	0%
	Auto	12%	37%	50%	67%	94%	100%		100%	83%	100%	0%
	Walk & Other	0%	22%	0%	0%	6%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%
Randolph Towers	Metrorail	85%	22%	44%	0%	6%	0%	100%	0%	25%	100%	0%
	Metrobus & Other Transit	0%	0%	0%	25%	0%	0%	0%	0%	0%	0%	0%
	Auto	13%	49%	44%	75%	88%	0%	0%	0%	75%	0%	0%
	Walk & Other	2%	29%	11%	0%	6%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	0%	100%	0%	100%	100%	0%
Court House Station Area												
Arlington Courthouse Plaza	Metrorail	82%	41%	33%	0%	11%	0%	33%	100%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	15%	26%	67%	0%	89%	100%	67%	0%	100%	100%	0%
	Walk & Other	3%	33%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	0%	100%	100%	100%	100%	100%	100%	0%
Courtland Towers	Metrorail	76%	28%	56%	0%	6%	0%	0%	67%	0%	0%	50%
	Metrobus & Other Transit	0%	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%
	Auto	16%	48%	44%	100%	83%	100%	100%	33%	100%	100%	50%
	Walk & Other	8%	25%	0%	0%	6%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Crystal City Station Area												
Crystal Plaza Apartments	Metrorail	70%	35%	9%	0%	20%	0%	0%	0%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	26%	52%	87%	0%	80%	0%	0%	100%	100%	100%	0%
	Walk & Other	4%	13%	4%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	0%	100%	0%	0%	100%	100%	100%	0%

Table C-19
Mode Share at Residential Sites by Trip Destination
(Continued)

Residential Site	Mode	Destination										
		DC	Arlington	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery	Virginia - Other	Maryland - Other	Other Place
Crystal Square Apartments	Metrorail	77%	49%	17%	33%	0%	0%	0%	75%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	23%	41%	83%	67%	80%	100%	0%	25%	100%	0%	0%
	Walk & Other	0%	10%	0%	0%	20%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	0%	100%	100%	0%	0%
Dunn Loring-Merrifield Station Area												
Merrifield Village	Metrorail	73%	50%	0%	0%	12%	33%	100%	0%	20%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%
	Auto	8%	50%	100%	100%	81%	67%	0%	100%	80%	100%	100%
	Walk & Other	20%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Friendship Heights Station Area												
Highland House West	Metrorail	63%	27%	0%	0%	14%	0%	100%	18%	0%	50%	0%
	Metrobus & Other Transit	2%	3%	0%	0%	0%	0%	0%	2%	0%	0%	0%
	Auto	27%	53%	100%	0%	86%	0%	0%	70%	0%	50%	0%
	Walk & Other	8%	17%	0%	0%	0%	0%	0%	10%	0%	0%	0%
	Total	100%	100%	100%	0%	100%	0%	100%	100%	0%	100%	0%
North Park Apartments	Metrorail	52%	100%	0%	0%	0%	0%	0%	24%	0%	0%	0%
	Metrobus & Other Transit	3%	0%	0%	0%	0%	0%	50%		0%	0%	0%
	Auto	28%	0%	0%	0%	100%	100%	50%	71%	0%	0%	0%
	Walk & Other	17%	0%	0%	0%	0%	0%	0%	6%	0%	0%	0%
	Total	100%	100%	0%	0%	100%	100%	100%	100%	0%	0%	0%
Gallery Place-Chinatown Station Area												
Meridian @ Gallery Place	Metrorail	62%	75%	100%	0%	40%	0%	0%	75%	0%	0%	0%
	Metrobus & Other Transit	7%	0%	0%	0%	0%	0%	0%	0%	0%	33%	0%
	Auto	8%	25%	0%	0%	60%	100%	100%	25%	0%	67%	0%
	Walk & Other	24%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	0%

Table C-19
Mode Share at Residential Sites by Trip Destination
(Continued)

Residential Site	Mode	Destination										
		DC	Arlington	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery	Virginia - Other	Maryland - Other	Other Place
The Lansburgh	Metrorail	42%	33%	0%	0%	0%	0%	0%	50%	33%	0%	0%
	Metrobus & Other Transit	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
	Auto	15%	67%	100%	0%	0%	0%	0%	25%	33%	100%	0%
	Walk & Other	37%	0%	0%	0%	0%	0%	0%	25%	33%	0%	0%
	Total	100%	100%	100%	0%	0%	0%	0%	100%	100%	100%	100%
Grosvenor-Strathmore Station Area												
Avalon at Grosvenor Station	Metrorail	83%	100%	0%	0%	0%	0%	0%	22%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	33%	1%	0%	0%	0%
	Auto	15%	0%	100%	0%	100%	0%	67%	73%	0%	100%	0%
	Walk & Other	2%	0%	0%	0%	0%	0%	0%	4%	0%	0%	0%
	Total	100%	100%	100%	0%	100%	0%	100%	100%	0%	100%	0%
Grosvenor House Apartments	Metrorail	40%	67%	0%	0%	0%	0%	0%	8%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	50%	33%	0%	0%	100%	0%	100%	85%	0%	0%	0%
	Walk & Other	10%	0%	0%	0%	0%	0%	0%	8%	0%	0%	0%
	Total	100%	100%	0%	0%	100%	0%	100%	100%	0%	0%	0%
Grosvenor Park I	Metrorail	62%	11%	67%	100%	25%	0%	17%	13%	0%	0%	0%
	Metrobus & Other Transit	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	24%	89%	33%	0%	75%	0%	83%	83%	75%	100%	100%
	Walk & Other	9%	0%	0%	0%	0%	0%	0%	4%	25%	0%	0%
	Total	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%
Stoneybrook	Metrorail	78%	100%	0%	0%	0%	0%	33%	14%	100%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	33%	1%	0%	0%	0%
	Auto	17%	0%	0%	0%	100%	0%	33%	82%	0%	67%	0%
	Walk & Other	5%	0%	0%	0%	0%	0%	0%	2%	0%	33%	0%
	Total	100%	100%	0%	0%	100%	0%	100%	100%	100%	100%	0%

Table C-19
Mode Share at Residential Sites Trip Destination
(Continued)

Residential Site	Mode	Destination										
		DC	Arlington	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery	Virginia - Other	Maryland - Other	Other Place
Silver Spring Station Area												
Georgian Towers	Metrorail	67%	0%	100%	0%	0%	0%	20%	18%	0%	0%	50%
	Metrobus & Other Transit	4%	0%	0%	0%	0%	0%	10%	15%	0%	33%	0%
	Auto	26%	0%	0%	0%	100%	0%	60%	43%	0%	33%	50%
	Walk & Other	3%	0%	0%	0%	0%	0%	10%	24%	0%	33%	0%
	Total	100%	0%	100%	0%	100%	0%	100%	100%	0%	100%	100%
Twin Towers	Metrorail	71%	100%	0%	100%	0%	0%	100%	31%	0%	33%	0%
	Metrobus & Other Transit	2%	0%	0%	0%	0%	0%	0%	4%	0%	17%	0%
	Auto	22%	0%	0%	0%	100%	0%	0%	28%	0%	42%	0%
	Walk & Other	4%	0%	0%	0%	0%	0%	0%	37%	0%	8%	100%
	Total	100%	100%	0%	100%	100%	0%	100%	100%	0%	100%	100%
U-Street/African American Civil War Memorial/Cardozo Station Area												
Summit Roosevelt	Metrorail	27%	50%	0%	0%	29%	100%	100%	100%	0%	0%	0%
	Metrobus & Other Transit	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	14%	50%	0%	0%	71%	0%	0%	0%	100%	100%	0%
	Walk & Other	34%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	0%	0%	100%	100%	100%	100%	100%	100%	0%
Totals for Residential Sites	**Metrorail**	**67%**	**36%**	**33%**	**23%**	**10%**	**18%**	**33%**	**19%**	**12%**	**11%**	**20%**
	Metrobus & Other Transit	**4%**	**1%**	**0%**	**4%**	**1%**	**0%**	**10%**	**2%**	**3%**	**7%**	**10%**
	Auto	**18%**	**43%**	**64%**	**73%**	**84%**	**82%**	**54%**	**69%**	**79%**	**77%**	**50%**
	Walk & Other	**12%**	**20%**	**3%**	**0%**	**4%**	**0%**	**3%**	**9%**	**6%**	**5%**	**20%**
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Lansburgh, a significant number of these trips were made using the "walk and other" mode, and at the Summit Roosevelt, a significant number of these trips were made using the "Metrobus & Other Transit" mode.

Montgomery and Arlington Counties were the second and third most popular destinations overall with 24 and 21 percent of total trips, respectively, likely because 14 of the 18 residential sites are located in these locations--eight in Montgomery County and six in Arlington County. Thirty-six percent of trips to and within Arlington County were on Metrorail, but only 19 percent of trips to and within Montgomery County were on Metrorail. The reason for this disparity is that 35 percent of trips from the Arlington County sites to destinations within Arlington were made using Metrorail, whereas only 18 percent of trips from the Montgomery County sites to destinations within Montgomery County were made using Metrorail. However, if the trip is to the District, 67 percent of the Montgomery County generated trips were made using Metrorail.

Table C-20 sorts the mode shares at the residential sites by number of vehicles owned in the household. As Table C-20 shows, the fewer vehicles a household owns, the more likely trips generated from that household use transit, and the less likely the trip is made by automobile. However, because the surveyed sites are high-density residences, they tended to have lower rates of vehicle ownership. Households responding to the survey reported an average of about one vehicle. In contrast, the average number of vehicles per household reported by workplace survey respondents was 1.8, almost twice as much. Households owning zero to two vehicles accounted for 97 percent of the total number of trips recorded from residential sites. Households owning just one vehicle accounted for 57 percent of the total. The mode shares for one-vehicle households were 40 percent Metrorail, 2 percent for other transit, 47 percent auto, and 11 percent for the "walk and other" mode. The overall residential Metrorail and auto mode shares summarized in the bottom of Table C-17 are slightly below and above these one-vehicle averages, respectively. The Metrorail mode share for zero-vehicle and two-vehicle households were 66 and 30 percent, respectively. In addition, 20 percent of the trips from zero-vehicle households were made by the "walk and other" mode, as opposed to only 7 percent from the two vehicle households. This pattern— as the number of household vehicles increases, the auto mode increases its share of trips at the expense of the other modes—is generally followed among the sites, with a few exceptions. However, the cross tabulations decreased the sample sizes of the higher-vehicle households, which were relatively few in number to begin with; thus, these results are not robust enough to draw definitive conclusions about the transit characteristics of these types of household.

Table C-20
Mode Share at Residential Sites by Household Vehicle Ownership

Residential Site	Mode	Number of Vehicles Owned				
		None	One	Two	Three	Four +
Ballston Station Area						
Lincoln Towers	Metrorail	75%	45%	50%	60%	0%
	Metrobus & Other Transit	4%	0%	10%	0%	0%
	Auto	0%	47%	25%	40%	0%
	Walk & Other	21%	8%	15%	0%	0%
	Total	100%	100%	100%	100%	0%
Randolph Towers	Metrorail	55%	47%	38%	33%	17%
	Metrobus & Other Transit	9%	0%	0%	0%	0%
	Auto	9%	38%	50%	67%	67%
	Walk & Other	27%	15%	12%	0%	17%
	Total	100%	100%	100%	100%	100%
Court House Station Area						
Arlington Courthouse Plaza	Metrorail	50%	59%	50%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%
	Auto	22%	29%	50%	0%	0%
	Walk & Other	28%	12%	0%	0%	0%
	Total	100%	100%	100%	0%	0%
Courtland Towers	Metrorail	89%	45%	36%	40%	0%
	Metrobus & Other Transit	0%	1%	0%	0%	0%
	Auto	6%	40%	46%	60%	0%
	Walk & Other	6%	14%	19%	0%	0%
	Total	100%	100%	100%	100%	0%
Crystal City Station Area						
Crystal Plaza Apartments	Metrorail	72%	41%	22%	18%	11%
	Metrobus & Other Transit	0%	0%	0%	0%	0%
	Auto	24%	45%	73%	73%	89%
	Walk & Other	3%	13%	5%	9%	0%
	Total	100%	100%	100%	100%	100%
Crystal Square Apartments	Metrorail	95%	41%	33%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%
	Auto	3%	55%	52%	0%	0%
	Walk & Other	3%	4%	14%	0%	0%
	Total	100%	100%	100%	0%	0%
Dunn Loring-Merrifield Station Area						
Merrifield Village	Metrorail	100%	35%	31%	33%	0%
	Metrobus & Other Transit	0%	2%	0%	0%	0%
	Auto	0%	45%	66%	67%	0%
	Walk & Other	0%	18%	3%	0%	0%
	Total	100%	100%	100%	100%	0%

Table C-20
Mode Share at Residential Sites by Household Vehicle Ownership
(Continued)

Residential Site	Mode	Number of Vehicles Owned				
		None	One	Two	Three	Four +
Friendship Heights Station Area						
Highland House West	Metrorail	54%	34%	15%	67%	0%
	Metrobus & Other Transit	0%	3%	0%	0%	0%
	Auto	4%	58%	79%	0%	0%
	Walk & Other	43%	5%	5%	33%	0%
	Total	100%	100%	100%	100%	0%
North Park Apartments	Metrorail	61%	24%	26%	0%	0%
	Metrobus & Other Transit	0%	2%	3%	0%	0%
	Auto	17%	66%	68%	0%	0%
	Walk & Other	22%	7%	3%	0%	0%
	Total	100%	100%	100%	0%	0%
Gallery Place-Chinatown Station Area						
Meridian @ Gallery Place	Metrorail	76%	53%	57%	0%	0%
	Metrobus & Other Transit	2%	13%	0%	0%	0%
	Auto	0%	15%	32%	0%	0%
	Walk & Other	21%	20%	11%	0%	0%
	Total	100%	100%	100%	0%	0%
The Lansburgh	Metrorail	34%	42%	50%	0%	0%
	Metrobus & Other Transit	11%	3%	0%	0%	0%
	Auto	16%	25%	17%	0%	0%
	Walk & Other	39%	30%	33%	0%	0%
	Total	100%	100%	100%	0%	0%
Grosvenor-Strathmore Station Area						
Avalon at Grosvenor Station	Metrorail	75%	41%	38%	0%	0%
	Metrobus & Other Transit	13%	1%	0%	0%	0%
	Auto	13%	56%	57%	100%	0%
	Walk & Other	0%	2%	5%	0%	0%
	Total	100%	100%	100%	100%	0%
Grosvenor House Apartments	Metrorail	50%	15%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%
	Auto	10%	85%	100%	0%	100%
	Walk & Other	40%	0%	0%	0%	0%
	Total	100%	100%	100%	0%	100%
Grosvenor Park I	Metrorail	76%	24%	19%	30%	0%
	Metrobus & Other Transit	12%	0%	0%	0%	0%
	Auto	0%	70%	79%	70%	100%
	Walk & Other	12%	5%	2%	0%	0%
	Total	100%	100%	100%	100%	100%

Table C-20
Mode Share at Residential Sites by Household Vehicle Ownership
(Continued)

Residential Site	Mode	Number of Vehicles Owned				
		None	One	Two	Three	Four +
Stoneybrook	Metrorail	0%	57%	24%	0%	0%
	Metrobus & Other Transit	0%	2%	1%	0%	0%
	Auto	0%	31%	74%	0%	0%
	Walk & Other	0%	10%	1%	0%	0%
	Total	0%	100%	100%	0%	0%
Silver Spring Station Area						
Georgian Towers	Metrorail	64%	32%	20%	100%	0%
	Metrobus & Other Transit	14%	9%	0%	0%	0%
	Auto	3%	51%	70%	0%	83%
	Walk & Other	20%	9%	10%	0%	17%
	Total	100%	100%	100%	100%	100%
Twin Towers	Metrorail	61%	41%	50%	20%	0%
	Metrobus & Other Transit	7%	2%	0%	0%	0%
	Auto	7%	41%	50%	80%	0%
	Walk & Other	25%	17%	0%	0%	0%
	Total	100%	100%	100%	100%	0%
U-Street/African American Civil War Memorial/Cardozo Station Area						
Summit Roosevelt	Metrorail	50%	20%	25%	0%	0%
	Metrobus & Other Transit	29%	13%	25%	0%	0%
	Auto	7%	31%	25%	0%	0%
	Walk & Other	14%	36%	25%	0%	0%
	Total	100%	100%	100%	0%	0%
Totals for Residential Sites	**Metrorail**	**66%**	**40%**	**30%**	**29%**	**5%**
	Metrobus & Other Transit	**7%**	**2%**	**1%**	**0%**	**0%**
	Auto	**7%**	**47%**	**62%**	**68%**	**86%**
	Walk & Other	**20%**	**11%**	**7%**	**3%**	**8%**
	Total	**100%**	**100%**	**100%**	**100%**	**100%**

C.1.3 Retail Sites

Data were collected from almost 1,300 people who patronize or work at the five retail sites located at distances from Metrorail stations varying from zero (entrance to site located directly next to station exit) to 1,700 feet (see Table C-21). Those who participated in the interviews were asked questions about where they came from, why they came to the retail site, how they traveled to the site, and how and where they planned to travel to their next destination.

Table C-21
Characteristics of Surveyed Retail Sites

Retail Site	Square Footage (1000s)	Distance from Station (ft)	Parking Spaces	Number of Interviews
Ballston Station Area				
Ballston Common	490	800	3,450	412
Crystal City Station Area				
Crystal Plaza Shops	108	1,200	1,963[1]	229
The Underground	151	0	1,899[2]	268
Silver Spring Station Area				
Silver Spring Neighborhood Center	N/A	1,700	--	184
U Street/African American Civil War Memorial/Cardozo Station Area				
U St Main Street	N/A	0	N/A	196

Notes: [1] Parking for Crystal Plaza Shops is shared with other buildings in Crystal Plaza.
[2] Parking for The Underground is shared with other buildings in Crystal Square.
"--": Unknown or unavailable.
N/A: Not Applicable.

Table C-22 displays the mode shares of the surveyed retail sites. Overall, 28 percent of the retail site patrons and employees used Metrorail, and the auto and walk/other modes were not much different at 36 and 28 percent, respectively. However, this type of aggregate information may not provide an accurate description of typical travel characteristics at retail sites near Metrorail stations because retail establishments vary widely and can include anything from a big box retailer to a small mom-and-pop general store. Because there is a much greater variation among retail uses than in office or residential uses, retail site travel characteristics are more affected by the internal characteristics of the site (e.g., What does it sell? Who is its clientele?) than those of office or residential sites. Of the sites surveyed, the Crystal City sites are the most similar, and therefore, their results are comparable. As shown on Table C-22, both sites exhibited similar modal share characteristics. The U Street Main Street site exhibited the highest Metrorail use among the retail sites.

Table C-23 displays mode shares at the surveyed retail sites organized by trip purpose. At Ballston Common, a fairly high percentage of those who visited for personal business and other reasons (many employees) used Metrorail, despite the site having ample, nominally priced parking. The high percentage of visitors (48 percent) who arrived for dining purposes used the "walk and other" mode, strongly suggesting that many of them are workers or residents from

nearby buildings. With many nearby office and residential buildings, the Crystal City sites also had high percentages of dining visitors who arrived by the "walk and other" mode (62 and 64 percent). Also, since both Crystal City retail sites are part of the pedestrian network, a very high percentage of respondents reported "personal business" as the purpose of the visit, suggesting that they are workers or visitors walking between office and other buildings.

Table C-22
Mode Shares at Retail Sites

Retail Site	Mode			
	Metrorail[1]	Metrobus & Other Transit[2]	Auto[3]	Walk & Other[4]
Ballston Station Area				
Ballston Common	23%	7%	43%	27%
Crystal City Station Area				
Crystal Plaza Shops	36%	5%	24%	36%
The Underground	31%	6%	27%	35%
Silver Spring Station Area				
Silver Spring Neighborhood Center	9%	10%	67%	14%
U Street/African American Civil War Memorial/Cardozo Station Area				
U St Main Street	44%	13%	19%	25%
Average Among All Sites	**29%**	**8%**	**36%**	**27%**

Notes: [1] Includes multimodal trips that may have involved auto and/or bus use in combination with Metrorail.
[2] Includes bus only trips, and commuter rail, such as MARC, VRE or Amtrak.
[3] Includes trips as driver and passenger of a private automobile.
[4] Includes cycling and any other form of transportation one may use.

Table C-24 sorts the mode shares at the surveyed retail sites by the jurisdiction from which the respondents came, and the jurisdiction to which they planned to go after visiting the site. For all five sites, the most popular origin and destination for trips to and from each individual retail site was the jurisdiction of the site's location. At Ballston Common and the two Crystal City sites, the largest modal share among visitors coming from and going to Arlington County (all three sites are located in Arlington County) was the "walk and other" mode, suggesting large patronage from nearby office workers and residents. The Silver Spring Neighborhood Center did not exhibit this pattern. Its visitors from within Montgomery County overwhelming drove or rode in an automobile (68 percent) to travel to and from the site. U Street Main Street exhibited a different pattern; its largest customer base, those arriving from or going to a District location, tended to use Metrorail (44 percent).

Table C-23
Mode Shares at Retail Sites by Trip Purpose

Retail Site	Mode	Purpose of Visit			
		Shopping	Dining	Personal Business	Other
Ballston Station Area					
Ballston Common	Metrorail	18%	15%	31%	33%
	Metrobus & Other Transit	6%	7%	4%	9%
	Auto	42%	29%	57%	36%
	Walk & Other	33%	49%	8%	22%
	Total	100%	100%	100%	100%
Crystal City Station Area					
Crystal Plaza Shops	Metrorail	3%	17%	52%	36%
	Metrobus & Other Transit	0%	0%	7%	2%
	Auto	27%	21%	30%	11%
	Walk & Other	70%	62%	11%	52%
	Total	100%	100%	100%	100%
The Underground	Metrorail	22%	13%	40%	21%
	Metrobus & Other Transit	0%	5%	10%	0%
	Auto	14%	18%	38%	7%
	Walk & Other	65%	64%	11%	71%
	Total	100%	100%	100%	100%
Silver Spring Station Area					
Silver Spring Neighborhood Center	Metrorail	8%	5%	20%	11%
	Metrobus & Other Transit	19%	0%	20%	6%
	Auto	63%	91%	46%	56%
	Walk & Other	10%	5%	14%	28%
	Total	100%	100%	100%	100%
U Street/African American Civil War Memorial/Cardozo Station Area					
U St Main Street	Metrorail	32%	31%	52%	48%
	Metrobus & Other Transit	16%	0%	13%	10%
	Auto	21%	23%	26%	10%
	Walk & Other	32%	46%	9%	31%
	Total	100%	100%	100%	100%
Totals for Retail Sites	**Metrorail**	**17%**	**13%**	**43%**	**34%**
	Metrobus & Other Transit	**8%**	**3%**	**9%**	**6%**
	Auto	**38%**	**44%**	**38%**	**25%**
	Walk & Other	**37%**	**40%**	**10%**	**35%**
	Total	**100%**	**100%**	**100%**	**100%**

Table C-24
Mode Shares at Retail Sites by Location Before and After Visit

Retail Site	Mode	Place Before and After										
		DC	Arling-ton	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery	Virginia - Other	Maryland - Other	Other Place
Ballston Station Area												
Ballston Common	Metrorail	65%	10%	15%	52%	14%	13%	43%	40%	30%	46%	11%
	Metrobus & Other Transit	2%	9%	10%	17%	9%	6%	0%	12%	0%	0%	0%
	Auto	27%	36%	73%	26%	72%	56%	52%	44%	70%	46%	74%
	Walk & Other	6%	46%	3%	4%	5%	25%	5%	4%	0%	8%	16%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Crystal City Station Area												
Crystal Plaza Shops	Metrorail	53%	9%	51%	0%	54%	0%	59%	71%	50%	60%	38%
	Metrobus & Other Transit	1%	1%	0%	0%	17%	0%	0%	0%	40%	0%	25%
	Auto	41%	8%	41%	100%	27%	100%	37%	29%	0%	40%	25%
	Walk & Other	5%	81%	7%	0%	2%	0%	4%	0%	10%	0%	13%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Crystal City Shops North (The Underground)	Metrorail	55%	19%	31%	0%	20%	100%	58%	61%	14%	40%	13%
	Metrobus & Other Transit	4%	3%	4%	0%	20%	0%	2%	0%	35%	0%	0%
	Auto	33%	13%	62%	0%	60%	0%	36%	28%	46%	40%	0%
	Walk & Other	8%	66%	4%	0%	0%	0%	4%	11%	5%	20%	88%
	Total	100%	100%	100%	0%	100%	100%	100%	100%	100%	100%	100%
Silver Spring Station Area												
Silver Spring Neighborhood Center	Metrorail	19%	0%	0%	0%	0%	0%	19%	5%	0%	0%	0%
	Other Transit	19%	0%	0%	0%	0%	0%	12%	6%	0%	19%	0%
	Auto	61%	0%	100%	0%	100%	0%	69%	68%	100%	81%	75%
	Walk & Other	1%	0%	0%	0%	0%	0%	0%	21%	0%	0%	25%
	Total	100%	0%	100%	0%	100%	0%	100%	100%	100%	100%	100%
U Street/African American Civil War Memorial/Cardozo Station Area												
U St Main Street	Metrorail	44%	67%	100%	0%	0%	0%	73%	39%	0%	20%	25%
	Metrobus & Other Transit	14%	0%	0%	0%	0%	0%	15%	22%	0%	40%	0%
	Auto	14%	0%	0%	100%	100%	0%	8%	39%	100%	40%	50%
	Walk & Other	28%	33%	0%	0%	0%	0%	4%	0%	0%	0%	25%
	Total	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%

C.1.4 Hotel Sites

Data were collected from 167 guests and visitors at five hotels located at distances from Metrorail stations varying from zero (entrance to site located directly next to station exit) to 4,100 feet (see Table C-25). Eighty-three, or 50 percent, of the respondents identified themselves as overnight guests staying at the hotel, 20 of whom also said that they were at the hotel to attend a meeting or conference. Sixty-one, or 37 percent, of the respondents identified themselves as visitors attending a conference or meeting at the hotel, however, it is likely that many of them also were overnight guests because when asked, "Have you been outside this hotel earlier today?" 38 stated yes, suggesting that at least the remaining 23 were overnight guests. If they were all indeed visitors attending a meeting or conference, each of them would have answered yes. The remaining respondents said that they were at the hotel for other reasons.

Table C-25
Characteristics of Surveyed Hotel Sites

Hotel Site	Hotel Rooms	Distance from Station (ft)	Parking Spaces	Number of Interviews
Ballston Station Area				
Holiday Inn Arlington	221	1,700	225	13
Crystal City Station Area				
Crystal Gateway Marriott	700	550[1]	780	37
Crystal Hyatt Regency	685	4,100[2]	750	27
Friendship Heights Station Area				
Embassy Suites Chevy Chase Pavilion	198	0	--	49
Silver Spring Station Area				
Holiday Inn Silver Spring	242	1,800	250	49

Notes: [1] Via tunnel under Jefferson Davis Highway.
[2] Part of the distance was measured via indoor corridors.
"—": Unknown or unavailable.

Table C-26 displays the mode shares for the surveyed hotel sites. Overall, 30 percent of all trips to and from the hotels used Metrorail. The auto and walk/other modes were not much different at 31 and 34 percent, respectively. The averages for the hotels deviated three and seven percentage points from the shares calculated for the Metrorail and auto modes, respectively. This is likely due to the limited sample size and the wide variation in modal characteristics among the sites. The two Crystal City hotels (Hyatt Regency and Marriott) and Embassy Suites had similar mode share characteristics: strong Metrorail use, with high percentages of trips made by the "walk and other" mode reflecting the urban amenities (shops and eateries) of their surrounding environments. A fairly large percentage of trips (11 percent) were made by taxi, which is captured under the "walk and other" mode.

Table C-26
Mode Shares at Hotel Sites

Hotel Site	Mode			
	Metrorail[1]	Metrobus & Other Transit[2]	Auto[3]	Walk & Other[4]
Ballston Station Area				
Holiday Inn Arlington	17%	0%	67%	17%
Crystal City Station Area				
Crystal Gateway Marriott	27%	7%	24%	42%
Crystal Hyatt Regency	48%	3%	21%	28%
Friendship Heights Station Area				
Embassy Suites Chevy Chase Pavilion	33%	5%	25%	36%
Silver Spring Station Area				
Holiday Inn Silver Spring	8%	4%	54%	33%
Average Among All Sites	**27%**	**4%**	**38%**	**31%**

Notes: [1] Includes multimodal trips that may have involved use of autos and/or buses in combination with Metrorail.
[2] Includes bus only trips, and commuter rail, such as MARC, VRE or Amtrak.
[3] Includes trips as driver and passenger of a private automobile.
[4] Includes cycling and any other form of transportation one may use.

Table C-27 displays mode-share information for the surveyed hotels distributed by trip purpose. As noted in Appendix B.4, the interviews were generally conducted between the hours of 7:00 a.m. to 10:00 a.m. Therefore, among the overnight guests, only nine people reported leaving the hotel, and most of these people returned by the "walk and other" mode, suggesting that they did not travel far from the hotel. However, most of the guests interviewed planned to leave the hotel later in the day, and 40 percent of them planned to use Metrorail. The auto mode was generally not a popular choice, at only 24 percent for these guests. Among the guests staying at the hotels for meetings or a conference, most were also planning to leave the hotel later in the day, but many of them were not planning to travel far, based on the expected 56 percent "walk and other" mode choice. The visitors (non-overnight guests) who were at the hotel for meetings or a conference tended to arrive by auto (53 percent). The modal shares for trips away from the hotels for this group as provided in Table C-27 are probably not indicative of the travel characteristics of the market due to the possibility that many of them were mis-categorized (see above).

Respondents reported the District as the origin and destination for 40 percent of the hotel trips, by far the highest among all political jurisdictions of the metropolitan area. For these trips, respondents chose Metrorail 43 percent of the time (see Table C-28). Although only 20 trips were recorded to or from "other place," 40 percent of these trips were made on Metrorail.

Table C-27
Overall Mode Share at Hotel Sites by Purpose

Trip Direction	Mode	Reason for Being at the Hotel				
		Overnight Guest	Meeting or Conference	Guest and Conference	Meals or Eating	Other
To Hotel	Metrorail	22%	19%	0%	67%	25%
	Other Transit	0%	3%	0%	0%	0%
	Auto	0%	53%	0%	33%	42%
	Walk & Other	78%	25%	100%	0%	33%
	Total	100%	100%	100%	100%	100%
From Hotel	Metrorail	40%	26%	22%	100%	32%
	Other Transit	3%	9%	6%	0%	5%
	Auto	24%	33%	17%	0%	37%
	Walk & Other	33%	32%	56%	0%	26%
	Total	100%	100%	100%	100%	100%

C.1.5 Entertainment (Movie Theater) Sites

Data were collected from 974 moviegoers at the four entertainment (movie theater) sites located at distances from Metrorail stations varying from 700 to 2,200 feet (see Table C-29). Similar to the questions asked at retail sites, moviegoers who participated in the interviews were asked questions about where they came from, how they traveled to the site, and how and where they planned to travel to their next destination.

As noted in Table C-30, 20 percent of moviegoers used Metrorail. The Regal Cinemas and AFI Silver Theater drew the highest percentages of Metrorail riders (35 and 39 percent, respectively) among the four sites. As with the hotel sites, the site-level averages for the movie theater sites deviated relatively widely from the modal shares calculated from individual responses. Again, this is likely due to the limited sample size and the wide variation in modal characteristics among the sites. For example, at 12 percent, Metrorail use at the AMC Hoffman was well below the average. This site's ample free parking and good highway access (located near the Beltway) probably led to the low rate, despite its proximity to a Metrorail station.

Table C-31 provides mode-share information at the surveyed movie theater sites sorted by the jurisdiction from which they arrived and the jurisdiction to which they planned to go after the movie. About 50 percent of moviegoers at Regal Cinemas came from or would later go to Arlington County, and many of these people walked (36 percent), which is consistent with the results from Ballston Common (Regal Cinemas is located in the Ballston Common mall). The next highest group at this location came from the District, and most used Metrorail (82 percent).

The AFI Silver Theater and Majestic 20 drew most of their moviegoers from the District and Montgomery County. Moviegoers from the District were more likely to use Metrorail (57 percent at AFI and 39 percent at Majestic 20). The Montgomery County moviegoers were likely to use the auto mode (63 and 56 percent) or the walk/other mode (24 and 20 percent).

Table C-28
Mode Shares at Hotel Sites by Location Before and After

Hotel Site (Metro Station)	Mode	Place Before and After										
		DC	Arlington	Alexandria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgomery	Virginia - Other	Maryland - Other	Other Place
Holiday Inn Arlington (Ballston)	Metrorail	100%	18%	0%	0%	0%	0%	0%	0%	0%	0%	40%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	0%	82%	100%	0%	100%	0%	0%	0%	0%	0%	0%
	Walk & Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	60%
	Total	100%	100%	100%	0%	100%	0%	0%	0%	0%	0%	100%
Crystal Gateway Marriott (Crystal City)	Metrorail	25%	29%	50%	0%	0%	0%	0%	0%	29%	67%	0%
	Metrobus & Other Transit	15%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Auto	15%	18%	50%	100%	100%	0%	0%	0%	43%	33%	0%
	Walk & Other	45%	53%	0%	0%	0%	0%	0%	0%	29%	0%	0%
	Total	100%	100%	100%	100%	100%	0%	0%	0%	100%	100%	0%
Crystal Hyatt Regency (Crystal City)	Metrorail	54%	67%	0%	0%	0%	0%	0%	0%	0%	100%	50%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	0%	50%	0%	0%
	Auto	31%	33%	0%	0%	0%	0%	100%	0%	0%	0%	25%
	Walk & Other	15%	0%	0%	0%	0%	0%	0%	100%	50%	0%	25%
	Total	100%	100%	0%	0%	0%	0%	100%	100%	100%	100%	100%
Embassy Suites Chevy Chase Pavilion (Silver Spring)	Metrorail	47%	0%	0%	0%	0%	100%	50%	33%	0%	12%	29%
	Metrobus & Other Transit	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	29%
	Auto	16%	67%	100%	0%	0%	0%	50%	56%	100%	27%	0%
	Walk & Other	31%	33%	0%	0%	0%	0%	0%	11%	0%	62%	43%
	Total	100%	100%	100%	0%	0%	100%	100%	100%	100%	100%	100%
Holiday Inn Silver Spring (Silver Spring)	Metrorail	33%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Metrobus & Other Transit	0%	0%	0%	0%	0%	0%	0%	8%	0%	0%	0%
	Auto	17%	0%	0%	0%	100%	0%	0%	62%	0%	100%	0%
	Walk & Other	50%	100%	0%	0%	0%	0%	0%	31%	0%	0%	0%
	Total	100%	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%
Totals for Hotel Sites	**Metrorail**	**43%**	**26%**	**17%**	**0%**	**0%**	**100%**	**33%**	**13%**	**20%**	**19%**	**40%**
	Metrobus & Other Transit	**7%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**4%**	**10%**	**0%**	**10%**
	Auto	**18%**	**43%**	**83%**	**100%**	**100%**	**0%**	**67%**	**54%**	**40%**	**29%**	**10%**
	Walk & Other	**33%**	**31%**	**0%**	**0%**	**0%**	**0%**	**0%**	**29%**	**30%**	**52%**	**40%**
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table C-29
Characteristics of Surveyed Entertainment (Movie Theater) Sites

Movie Theater Site	Screens	Distance from Station (ft)	Parking Spaces	Number of Interviews
Ballston Station Area				
Regal Cinemas	12	800	3,450[1]	55
Eisenhower Station Area				
AMC Hoffman Theaters	22	700	--	377
Silver Spring Station Area				
AFI Silver Theater	3	1400	--	91
The Majestic 20	20	2200	--	451

Notes: [1] Parking is shared with Ballston Common.
"—": Unknown or unavailable.

Table C-30
Mode Share at Entertainment (Movie Theater) Sites

Movie Theater Site	Mode			
	Metrorail[1]	Metrobus & Other Transit[2]	Auto[3]	Walk & Other[4]
Ballston Station Area				
Regal Cinemas	35%	9%	39%	17%
Eisenhower Avenue Station Area				
AMC Hoffman Theaters	12%	1%	83%	4%
Silver Spring Station Area				
AFI Silver Theater	39%	2%	49%	10%
The Majestic 20	19%	13%	56%	13%
Average Among All Sites	**26%**	**6%**	**57%**	**11%**

Notes: [1] Includes multimodal trips that may have involved use of autos and/or buses in combination with Metrorail.
[2] Includes bus only trips, and commuter rail, such as MARC, VRE or Amtrak.
[3] Includes trips as driver and passenger of a private automobile.
[4] Includes cycling and any other form of transportation one may use.

The AMC Hoffman drew a large percentage of its customers from Alexandria, but also attracted fairly large percentages from the District, Fairfax County and Arlington County. The Alexandria, Fairfax County and Arlington County customers used the auto mode (84, 86 and 94 percent, respectively) more than any other mode. In comparison, 48 percent of the District customers used Metrorail to travel to and from the AMC Hoffman. Without the District customers, AMC Hoffman's Metrorail mode share drops to 8 percent.

Table C-31
Mode Shares at Entertainment (Movie Theater) Sites by Location Before and After

Movie Theater Site	Mode	Location Before and After										
		DC	Arlington	Alexan-dria	Falls Church	Fairfax County	Fairfax City	Prince George's	Montgo-mery	Virginia - Other	Maryland - Other	Other Place
Ballston Station Area												
Regal Cinemas	Metrorail	82%	17%	40%	50%	0%	0%	100%	0%	0%	0%	0%
	Metrobus & Other Transit	0%	11%	0%	13%	67%	0%	0%	0%	0%	0%	0%
	Auto	18%	36%	60%	38%	33%	0%	0%	0%	100%	0%	100%
	Walk & Other	0%	36%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	0%	100%	0%	100%	0%	100%
Eisenhower Avenue Station Area												
AMC Hoffman Theaters	Metrorail	48%	10%	6%	0%	3%	0%	23%	29%	16%	0%	0%
	Metrobus & Other Transit	0%	0%	1%	0%	0%	0%	0%	0%	0%	6%	0%
	Auto	53%	86%	83%	100%	93%	100%	77%	71%	84%	94%	100%
	Walk & Other	0%	3%	9%	0%	3%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Silver Spring Station Area												
AFI Silver Theater	Metrorail	57%	80%	33%	0%	67%	100%	25%	11%	0%	0%	0%
	Metrobus & Other Transit	4%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%
	Auto	38%	20%	67%	0%	33%	0%	50%	63%	0%	100%	0%
	Walk & Other	0%	0%	0%	0%	0%	0%	25%	24%	0%	0%	0%
	Total	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	0%
The Majestic 20	Metrorail	39%	0%	0%	0%	100%	0%	20%	10%	0%	20%	0%
	Metrobus & Other Transit	10%	100%	0%	0%	0%	0%	16%	14%	0%	7%	0%
	Auto	51%	0%	100%	0%	0%	0%	61%	56%	100%	73%	100%
	Walk & Other	0%	0%	0%	0%	0%	0%	3%	20%	0%	0%	0%
	Total	100%	100%	100%	0%	100%	0%	100%	100%	100%	100%	100%
Totals for Movie Theater Sites	**Metrorail**	**45%**	**22%**	**8%**	**44%**	**8%**	**33%**	**26%**	**10%**	**14%**	**9%**	**0%**
	Metrobus & Other Transit	**7%**	**7%**	**1%**	**11%**	**2%**	**0%**	**10%**	**13%**	**0%**	**6%**	**0%**
	Auto	**48%**	**53%**	**83%**	**44%**	**88%**	**67%**	**61%**	**57%**	**86%**	**85%**	**100%**
	Walk & Other	**0%**	**18%**	**9%**	**0%**	**3%**	**0%**	**3%**	**20%**	**0%**	**0%**	**0%**
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

C.2 Regression Analyses

A considerable body of research shows that under the right conditions, TOD and transit joint development can increase transit ridership.[3] Although much of the research concludes that high transit ridership associated with TOD is partially a product of self-selection,[4] the research also finds that higher transit ridership also results from TOD design characteristics, such as proximity to rail stations, and a high-density, compact, mixed-used, and walk-friendly environment. In addition, the effects of competition from other travel modes, namely the use of private automobiles, and differing levels of transit service have impacts on transit ridership.

To test whether any physical characteristics of the station areas, competition from the auto mode, and transit service levels influence mode share characteristics described in Appendix C.1, a series of linear regression analyses were conducted. Regression is a statistical technique used to determine the degree to which a dependent variable correlates with one or more independent or explanatory variables. The independent variable is a hypothesized cause or influence on the dependent variable (i.e., that which is to be predicted). Regression analysis enables the development of mathematical equations that best explain the variation in the dependent variable on the basis of one or more independent variables, and is often used for predictive purposes--assuming that the independent variables are known. That said, regression equations are not perfect predictors, and should only be used as tools for general planning purposes in conjunction with other available planning tools. In other words, it should not be used as a foolproof method to predict accurate travel characteristics as every building or site that generates travel (to and from) is unique. There are many factors that affect travel to and from any particular site, many of which are unique to the site, such as costs and supply of parking, the age, sex and income of occupants and use of the site. These factors play a principal role in trip generation and mode choice. Any individual site may have certain internal characteristics that affect mode shares far from the norm, and no regression equation could predict such results.

The regression analyses conducted for this study tested candidate independent variables that could explain the variations in travel characteristics described in Appendix C.1. As noted in Appendix A.1, the project team purposely selected for the study certain station areas that exhibit TOD characteristics, often called three "Ds": density, diversity and design. Many of the sites shared these common characteristics or variables despite their different locations throughout the metropolitan area. The candidate independent variables that were tested included characteristics internal to the sites, such as square footage, number of employees, or residential units; walking distance between the site and Metrorail station; density of jobs and housing within the station area; and indicators of auto competition and transit service levels.

[3] Transit Cooperative Research Program, Transit-Oriented Development and Joint Development in the United States: A Literature Review, Research Results Digest, Number 52, October 2002.

[4] Those with a lifestyle preference for using transit choose to live and/or work in TOD areas, and act on that preference.

The following dependent variables also were tested:

- Metrorail ridership,
- Transit (includes Metrorail, bus and commuter rail) ridership, and
- Auto use.

The independent variables are described in this section if they exhibited explanatory power that affected the mode share results provided in Appendix C.1. This explanatory power is summarized in the R-squared statistic and is the proportion of variance in the dependent variable that can be "explained" by the independent variables. If all the variance could be explained, the R-squared value would be 1.0. The predictive power of linear regression is derived from its model or its equation of $\boldsymbol{Y = a + bX}$, where $\boldsymbol{X}$ is the independent variable and $\boldsymbol{Y}$ is the dependent variable. The slope of the line is $\boldsymbol{b}$, and $\boldsymbol{a}$ is the Y-intercept or the value of $\boldsymbol{Y}$ when $\boldsymbol{X}$ is equal to zero.

C.2.1 Office Sites

The following candidate independent variables were tested to determine if any explain the variation in mode choice characteristics for commuting, midday and visitor trips to or from the surveyed office sites as described in Appendix C.1.1:

Characteristics internal to the site

- Building square footage
- Number of employees
- Employees per 1000 square feet

Characteristics external to the site

- Distance between station and site
- Job density within 3/4 mile of the station (number of jobs per acre)
- Street density within a 3/4 mile of the station (total miles of street per square mile)[5]

Transit service characteristics

- Number of Metrorail trains during peak hour (for commuting and visitor trips)
- Number of Metrorail trains during off-peak hour (for midday and visitor trips)

Because 1634 I Street and 1701 Pennsylvania Avenue, the two Farragut West office sites located in the downtown core, exhibited modal characteristics far different than the other sites (see Appendix C.1.1), these sites were removed from the initial equations that uncovered correlations as a sensitivity test to determine whether there truly were correlations.

Among all the independent variables tested, only distance between station and site produced significant correlations with the mode choice characteristics for office worker commute, office worker midday and visitor trips (see Table C-32). Sensitivity testing did not substantially change the R-squared values.

[5] Street density was used as a proxy for the 'pedestrian friendliness' of the walk environment. Higher street densities should indicate good connectivity of the network and thus the potential for a good walking environment.

Table C-32
Linear Regression Equation Inputs for Office Sites using Distance from Station

Mode	Slope[1]	Y-Intercept[2]	R-Square
Office Worker Commuting			
Metrorail	-0.96	35.38	0.25
Transit	-1.21	46.15	0.31
Auto	1.32	48.44	0.35
Office Worker Midday			
Metrorail	-0.87	34.55	0.28
Transit	-0.83	37.16	0.27
Auto	1.97	22.59	0.56
Office Visitor			
Metrorail	-0.78	24.36	0.34
Transit	-0.69	26.30	0.26
Auto	1.31	46.63	0.28

Notes: [1] Percentage point for every 100 feet.
[2] Predictive mode share at 0 feet from station exit.

Table C-32 displays the inputs for the predictive equations for Metrorail, transit and auto commuter mode shares, which are graphically depicted in Figures C-1 through C-3. Table C-33 provides a summary of the expected office commute mode share based on distance from station derived from the regression equations. For example, the Y-intercept value for Metrorail mode share indicates that about 35 percent of all commute trips to and from an office site would be by Metrorail if the site is located directly at the station exit/entrance. The slope column indicates that this percentage decreases by 0.96 percent for every 100 feet increase in distance an office site is located from the station exit/entrance. The percentages of overall commuter trips made by all transit and auto would decrease by 1.21 percent and increase 1.32 percent, respectively, for every 100 feet increase an office site is located from the station exit/entrance.

Table C-33
Regression Equation Summary for Office Commute Trips

Distance (feet)	Mode		
	Metrorail	All Transit	Auto
0	35%	46%	48%
250	33%	43%	52%
500	31%	40%	55%
750	28%	37%	58%
1000	26%	34%	62%
1500	21%	28%	68%
2000	16%	22%	75%
2500	11%	16%	81%
3000	7%	10%	88%

Figure C-1
Office Commute Metrorail Usage by Distance from Station

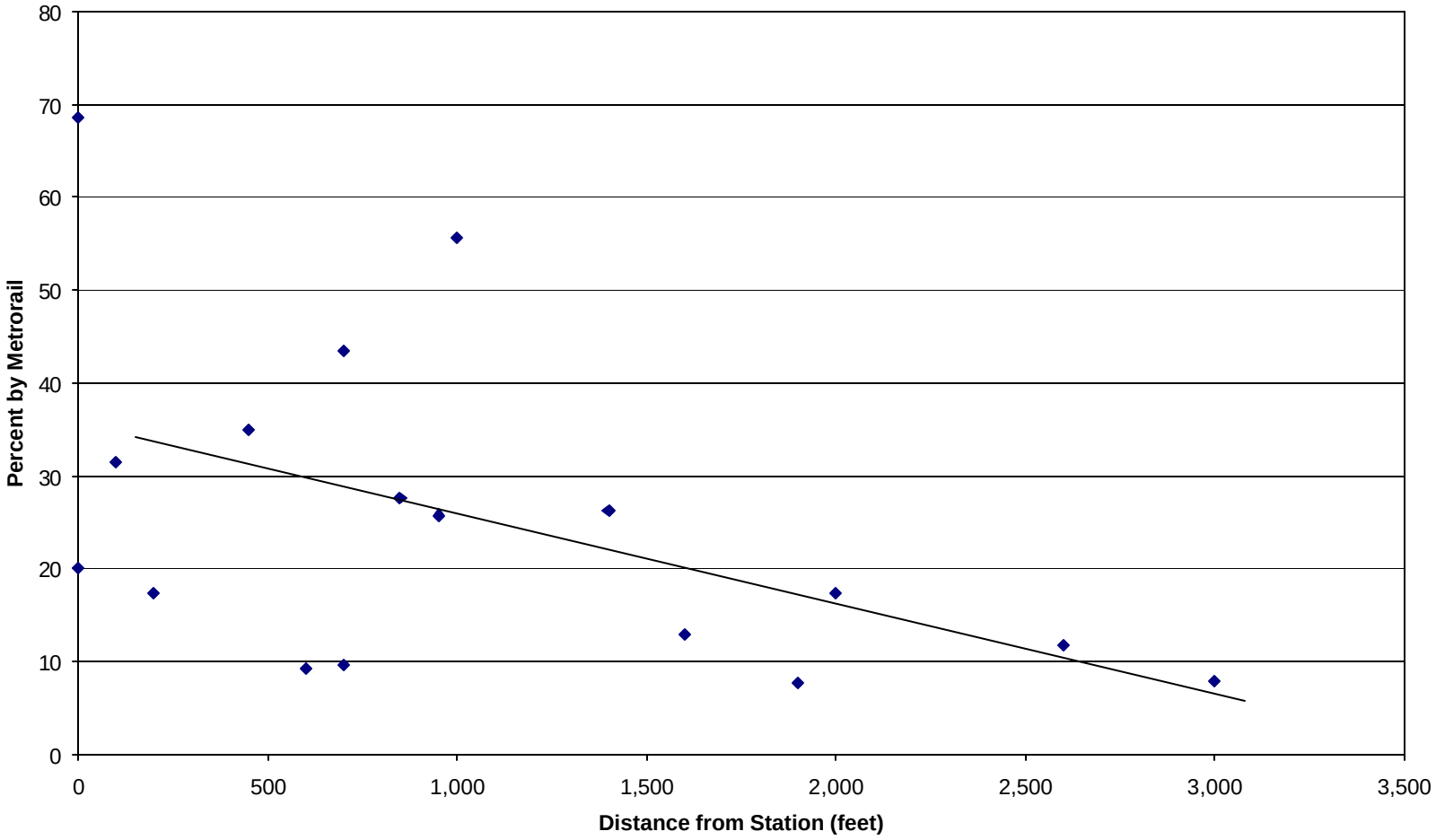


Figure C-2
Office Commute Transit Usage by Distance from Station

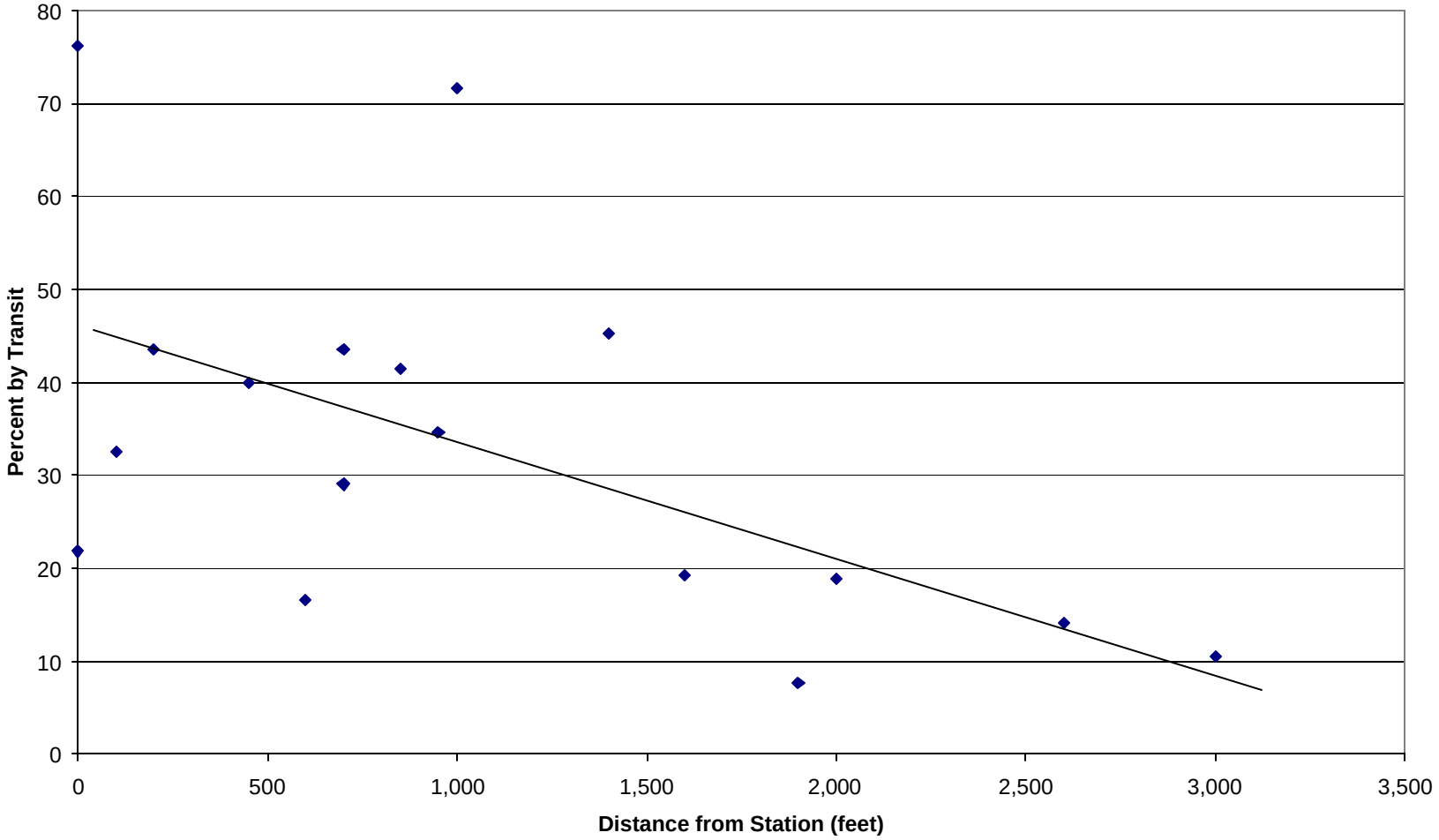
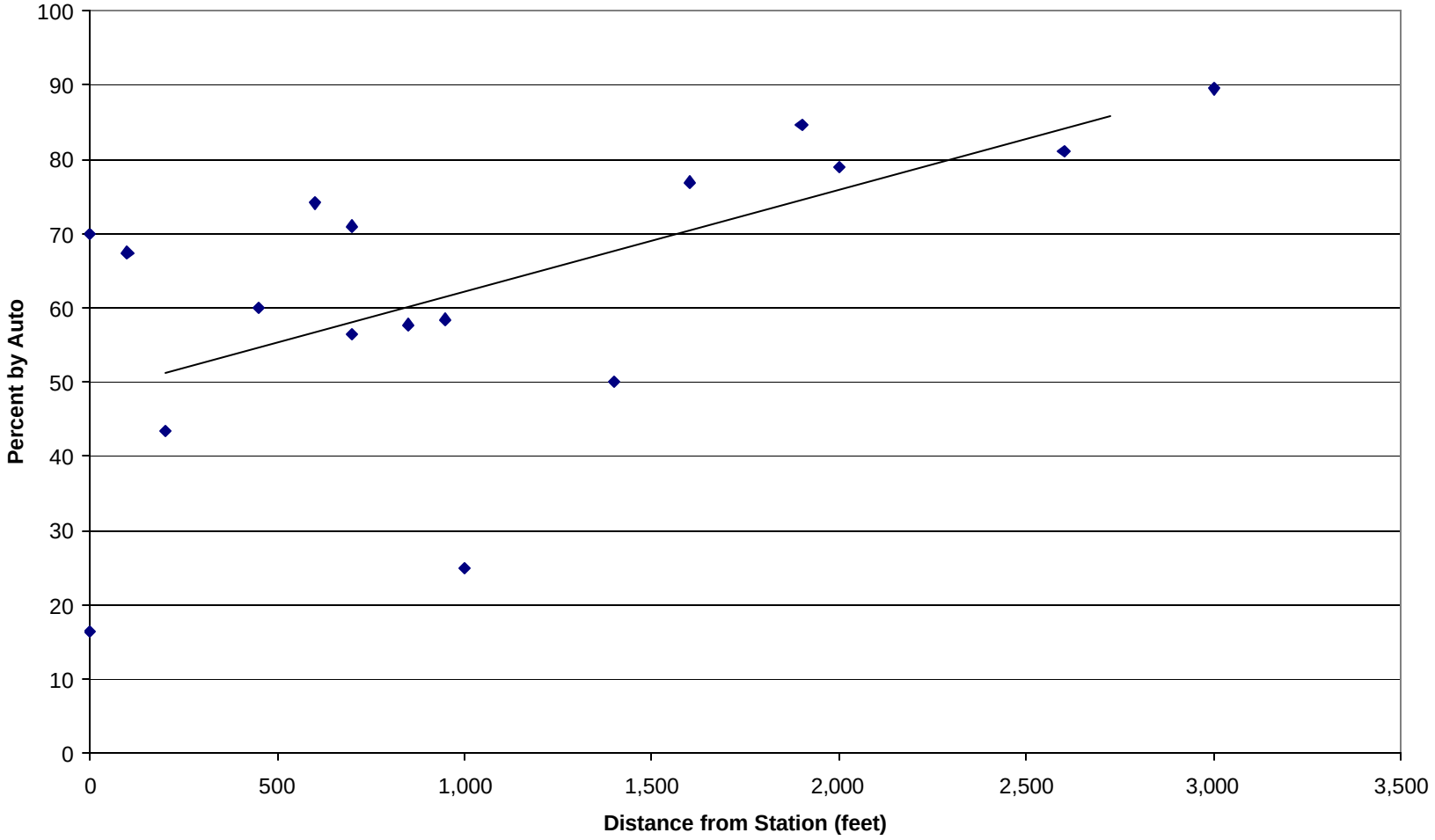


Figure C-3
Office Commute Auto Usage by Distance from Station



Figures C-4 through C-6 graphically depict the equations for midday trips made by Metrorail, transit and auto modes. The percentages for overall midday trips made on Metrorail decreases by 0.87 percent for every 100 feet increase in the distance an office site is located from the station exit/entrance. The percentages for overall midday trips made by all transit and auto would decrease by 0.83 percent and increase 1.97 percent, respectively, for every 100 feet increase in the distance an office site is located from the station exit/entrance.

Figures C-7 through C-9 graphically depict the equations for visitor trips made by Metrorail, transit and auto modes. The percentages of overall visitor trips made on Metrorail decrease by 0.78 percent for every 100 feet increase in the distance an office site is located from the station exit/entrance. The percentages of overall visitor trips made by all transit and auto decrease by 0.69 percent and increase 1.31 percent, respectively, for every 100 feet increase in the distance an office site is located from the station exit/entrance.

No significant correlations between internal office site characteristics were found with any of the dependent variables relating to Metrorail, transit and auto mode choices for all three types of office related trips (worker commute, worker midday trips and trips made by visitors). Transit service characteristics and job and street densities also did not result in notable correlations with the independent variables for office commute and midday trips and visitor trips. Although, the initial regression test between the number of peak-hour Metrorail trains and the percentage of office commuters who use Metrorail produced a moderate R-squared value of 0.35, sensitivity testing, which removed data from the two Farragut West sites, reduced this value to 0.007. The same sensitivity test also found that initial tests showing that job densities correlate with mode share characteristics for commute and midday trips greatly were not true. For instance, prior to dropping the Farragut West sites, the R-squared value between job density and Metrorail use by office commuters was 0.56. The sensitively test reduced this value to 0.14.

C.2.2 Residential Sites

The following candidate independent variables were tested to determine if any explain the variation in mode choice characteristics for trips originating from the residential sites as described in Appendix C.1.2:

Characteristics internal to the site

- Number of residential units

Characteristics external to the site

- Distance between station and site
- Housing density within 3/4 mile of the station (residential units per acre)
- Street density within a 3/4 mile of the station (total miles of street per square mile)

Transit and auto service characteristics

- Number of Metrorail trains during peak hour
- Number of Metrorail trains during off-peak hour

Figure C-4
Office Midday Metrorail Usage by Distance from Station

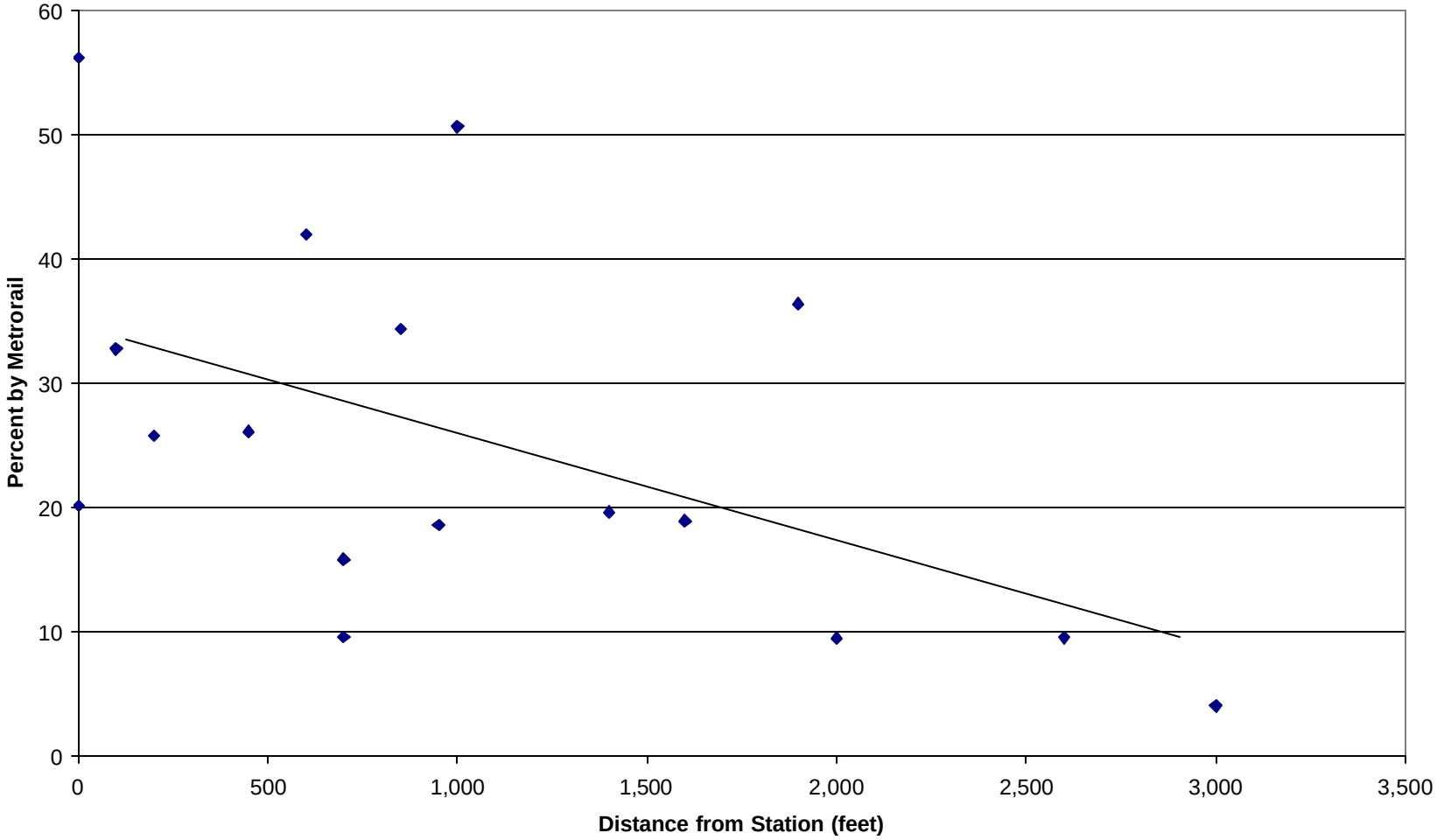


Figure C-5
Office Midday Transit Usage by Distance from Station

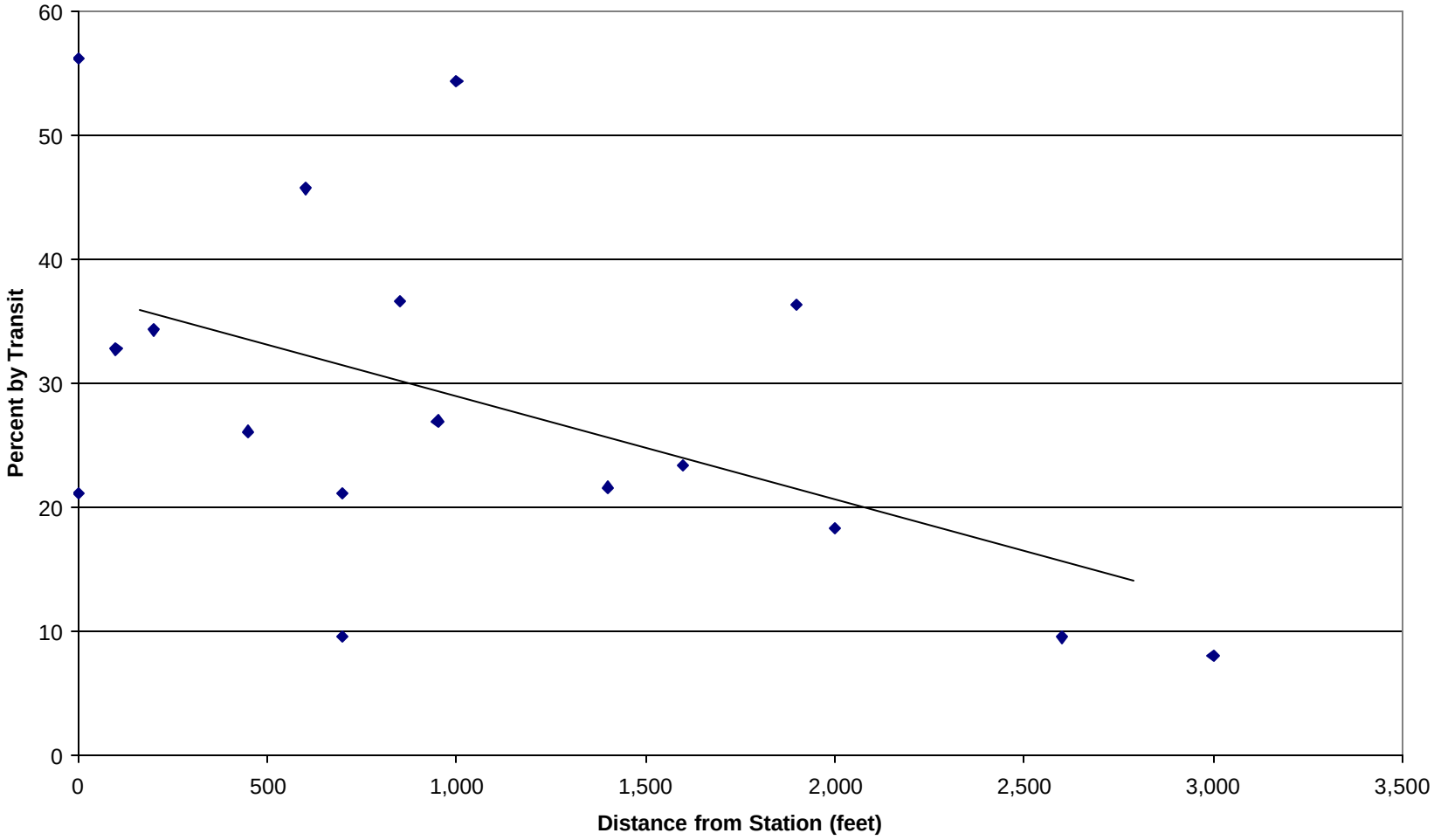


Figure C-6
Office Midday Auto Usage by Distance from Station

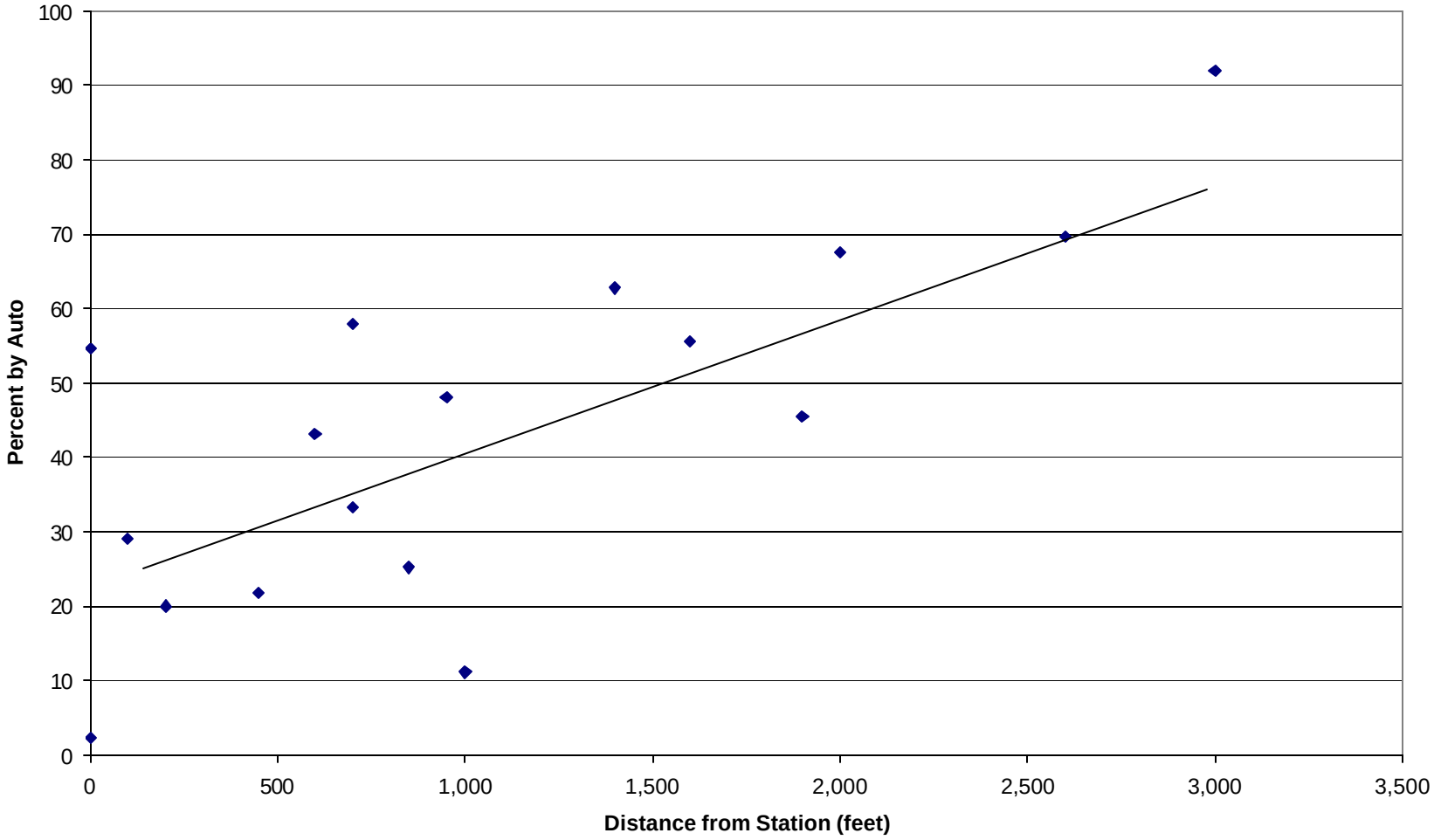


Figure C-7
Office Visitor Metrorail Usage by Distance from Station

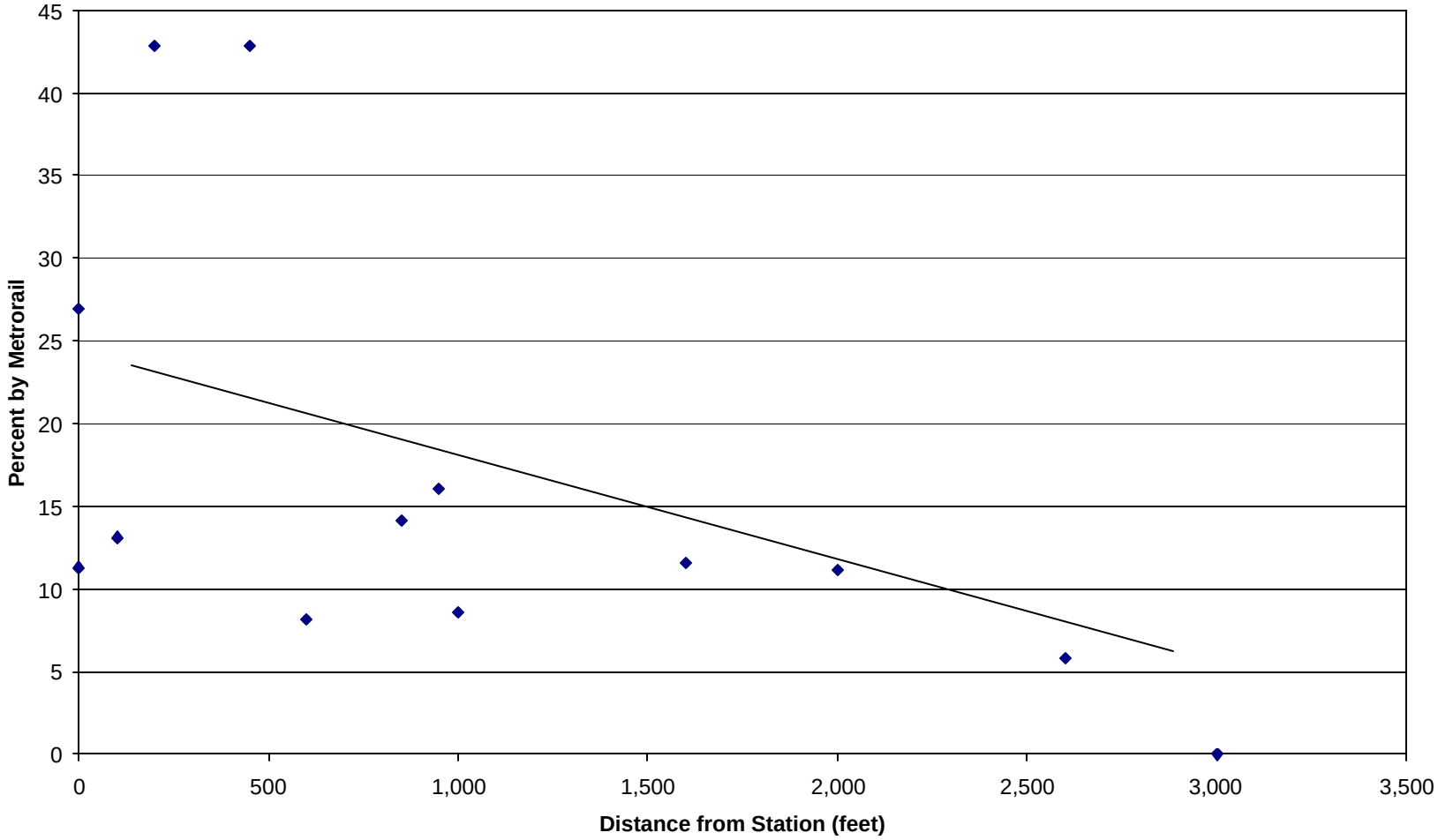


Figure C-8
Office Visitor Transit Usage by Distance from Station

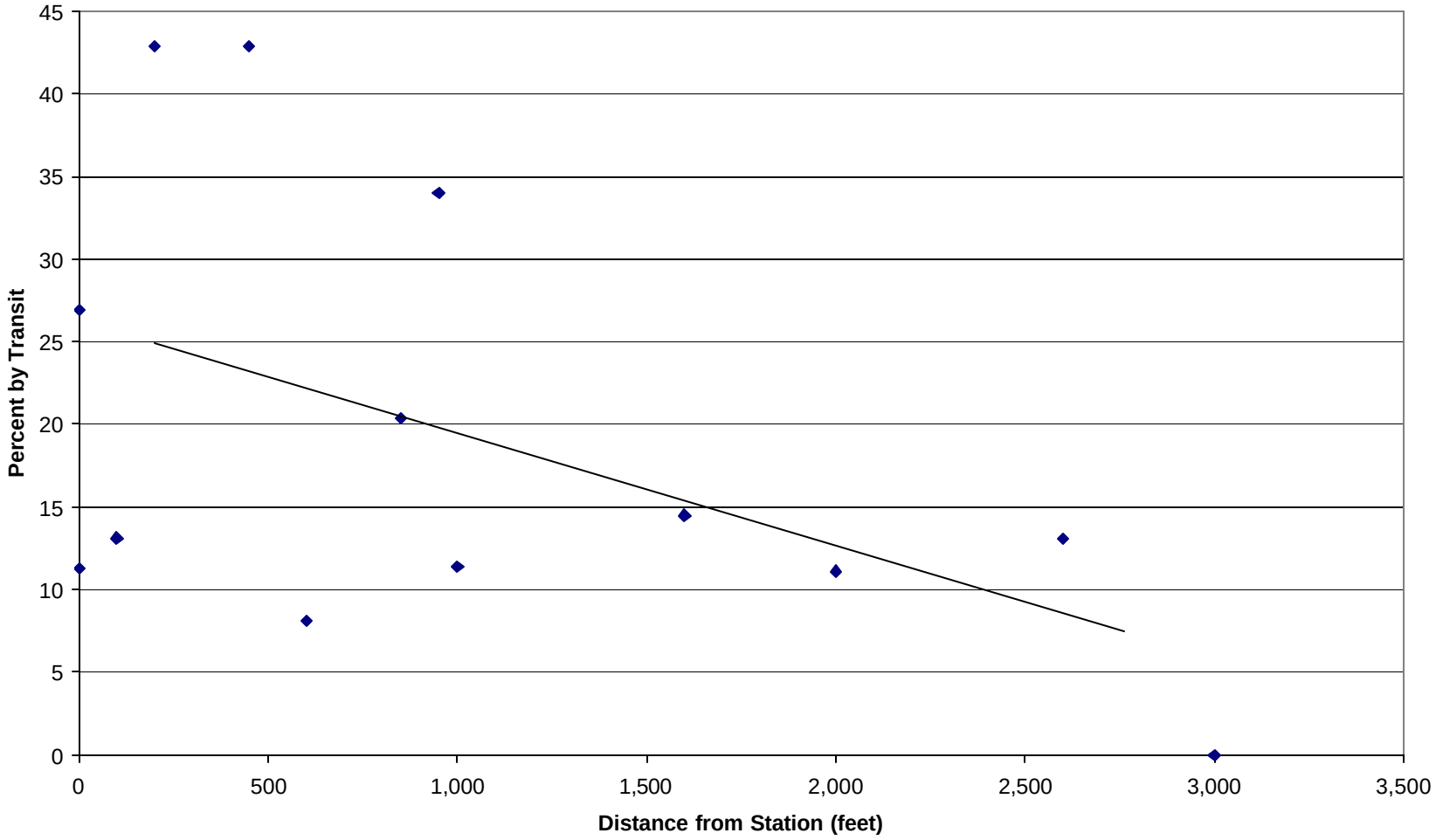
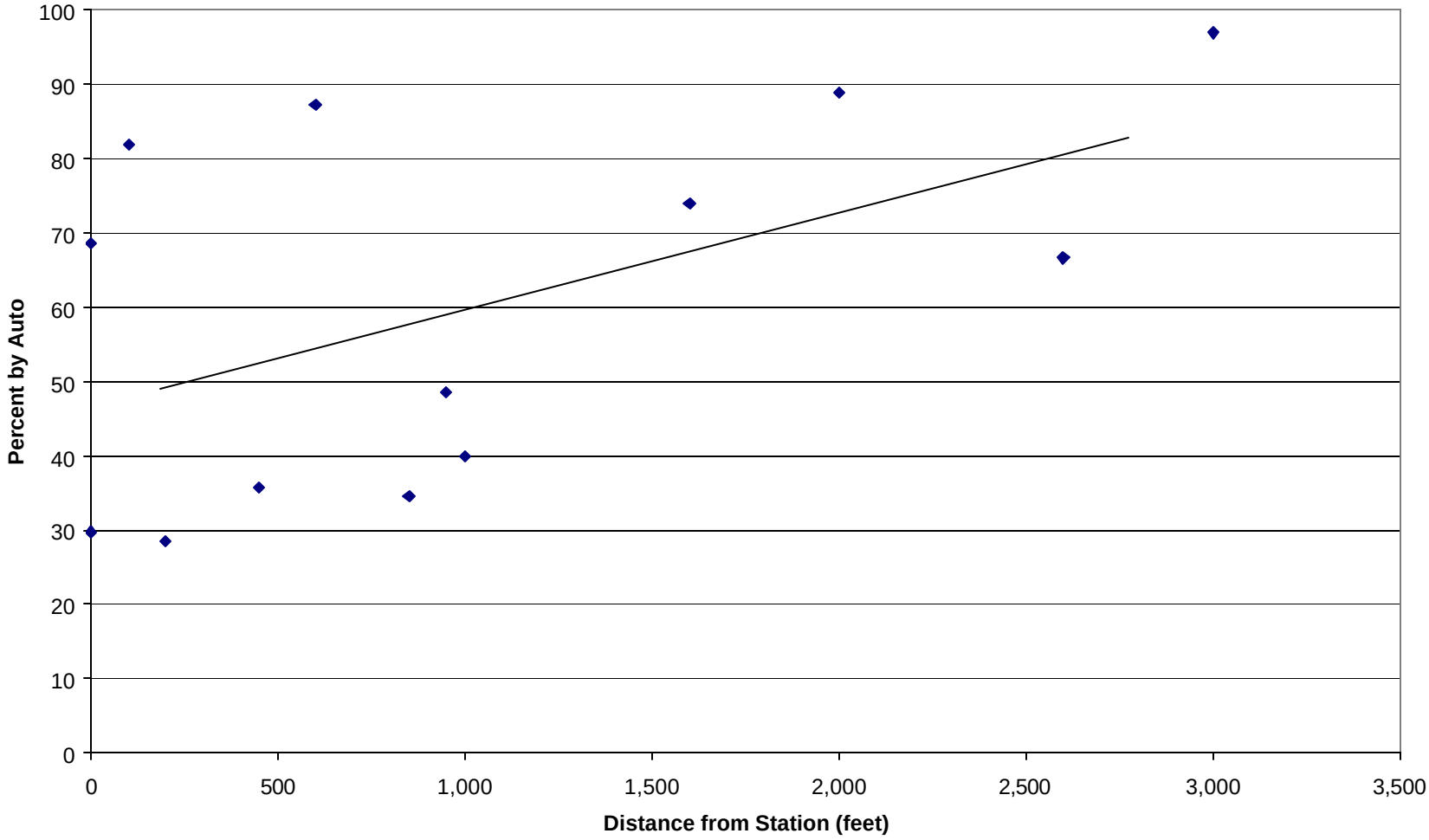


Figure C-9
Office Visitor Auto Usage by Distance from Station



- Number of jobs available within 15, 25, 35 and 45 minutes by auto and transit from the transportation analysis zone (TAZ[6]) of the survey site (auto/job and transit/job accessibility indices)

Tables C-34, C-35 and C-36 display correlations between mode share characteristic and (1) the distance a site is located from a station, (2) housing density surrounding the station, and (3) street density surrounding the station. Because the two residential sites located in the downtown core produced very different mode share characteristics than the other residential sites (see Appendix C.1.2), they were removed from the initial equations as a sensitivity test to determine if any of the equations were truly correlations. In particular, both sites produced very high pedestrian trips and very low auto trips compared with the other sites.

Table C-34
Linear Regression Equations for Residential Sites using Distance from Station

Mode	Slope[1]	Y-Intercept[2]	R-Square
All Sites			
Metrorail	-0.87	54.15	0.41
Transit	-0.71	54.83	0.24
Auto	0.97	28.60	0.21
Sensitivity Test: Without Gallery Place-Chinatown Station Sites			
Metrorail	-1.01	55.64	0.62
Transit	-0.81	55.20	0.37
Auto	0.87	32.83	0.22

Notes: [1] Percentage point for every 100 feet.
[2] Predictive mode share at 0 feet from station exit.

Table C-35
Linear Regression Equation Inputs for Residential Sites by Housing Density

Mode	Slope[1]	Y-Intercept	R-Square
All Sites			
Metrorail	0.87	33.72	0.12
Transit	1.51	31.68	0.32
Auto	-2.54	63.90	0.43
Sensitivity Test: Without Gallery Place-Chinatown Station Sites			
Metrorail	0.95	31.80	0.18
Transit	1.61	29.12	0.48
Auto	-2.74	69.07	0.72

Notes: [1] Percentage point for every one unit per acre.

[6] Transportation Analysis Zones (TAZs) have been used as the geographic analysis area for this exercise as that is the analysis area the regional planning body, the Council of Governments, uses to model transportation forecasts for the Region. However, TAZs, especially in non-core areas, tend to be much larger than a station area, so the measure is not a precise match.

Table C-36
Linear Regression Equation Inputs for Residential Sites by Street Density

Mode	Slope[1]	Y-Intercept	R-Square
All Sites			
Metrorail	0.85	21.72	0.16
Transit	1.27	15.47	0.31
Auto	-2.38	96.88	0.53
Sensitivity Test: Without Gallery Place-Chinatown Station Sites			
Metrorail	0.70	24.14	0.12
Transit	1.10	18.26	0.28
Auto	-2.01	90.66	0.49

Notes: [1] Percentage point for every one mile of additional density per acre.

For distance equations, the strongest correlation was produced for Metrorail use (see Table C-33). Sensitivity testing increased this R-squared value from 0.41 to 0.62. The equation for this regression is graphically depicted in Figure C-10, and shown in a tabular format in Table C-37. The correlation indicates that about 54 percent of trips from a residential site would be on Metrorail if the site is located directly at the station exit/entrance. This percentage would decrease by 0.87 percent for every 100 feet increase in the distance a residential site is located from the station exit/entrance.

Table C-37
Regression Equation Summary for Residential Trips

Distance (feet)	Mode		
	Metrorail	All Transit	Auto
0	54%	55%	29%
250	52%	53%	31%
500	50%	51%	33%
750	48%	49%	36%
1000	45%	48%	38%
1500	41%	44%	43%
2000	37%	41%	48%
2500	32%	37%	53%
3000	28%	33%	58%

For housing density equations, moderate correlations were produced for the auto and transit modes (see Table C-35). A weaker correlation was produced for the Metrorail mode. The sensitivity testing increased the R-squared value for the auto mode from 0.43 to 0.72. The equation for the housing density/auto regression is graphically depicted in Figure C-11. The correlation indicates that an increase of one residential unit per acre within 3/4 mile of the station would decrease the percentage of trips made from residential sites by auto by 2.54 percent. Despite the weakness in the housing density/Metrorail correlation, the overall

Figure C-10
Residential Metrorail Usage by Distance from Station

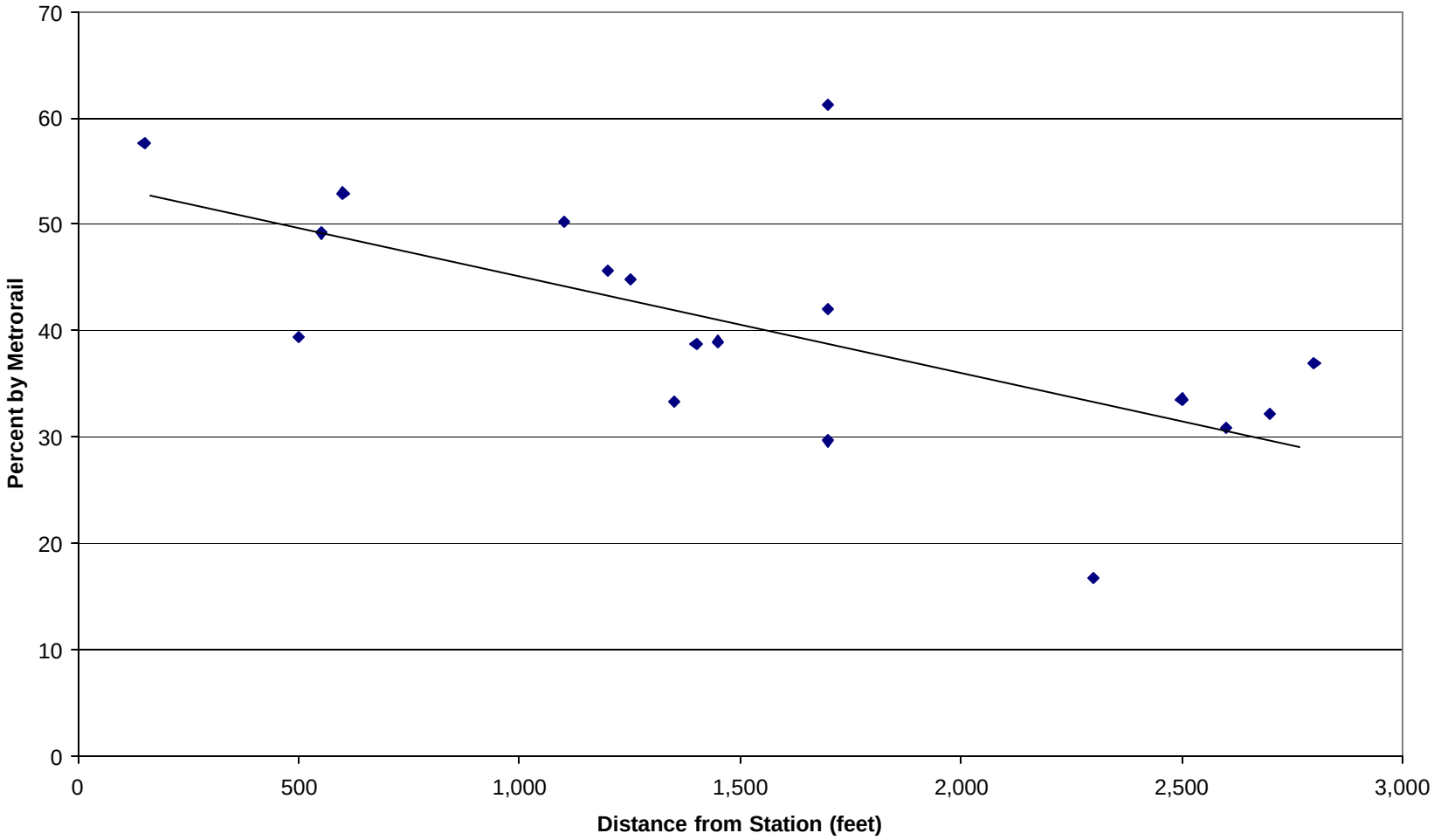
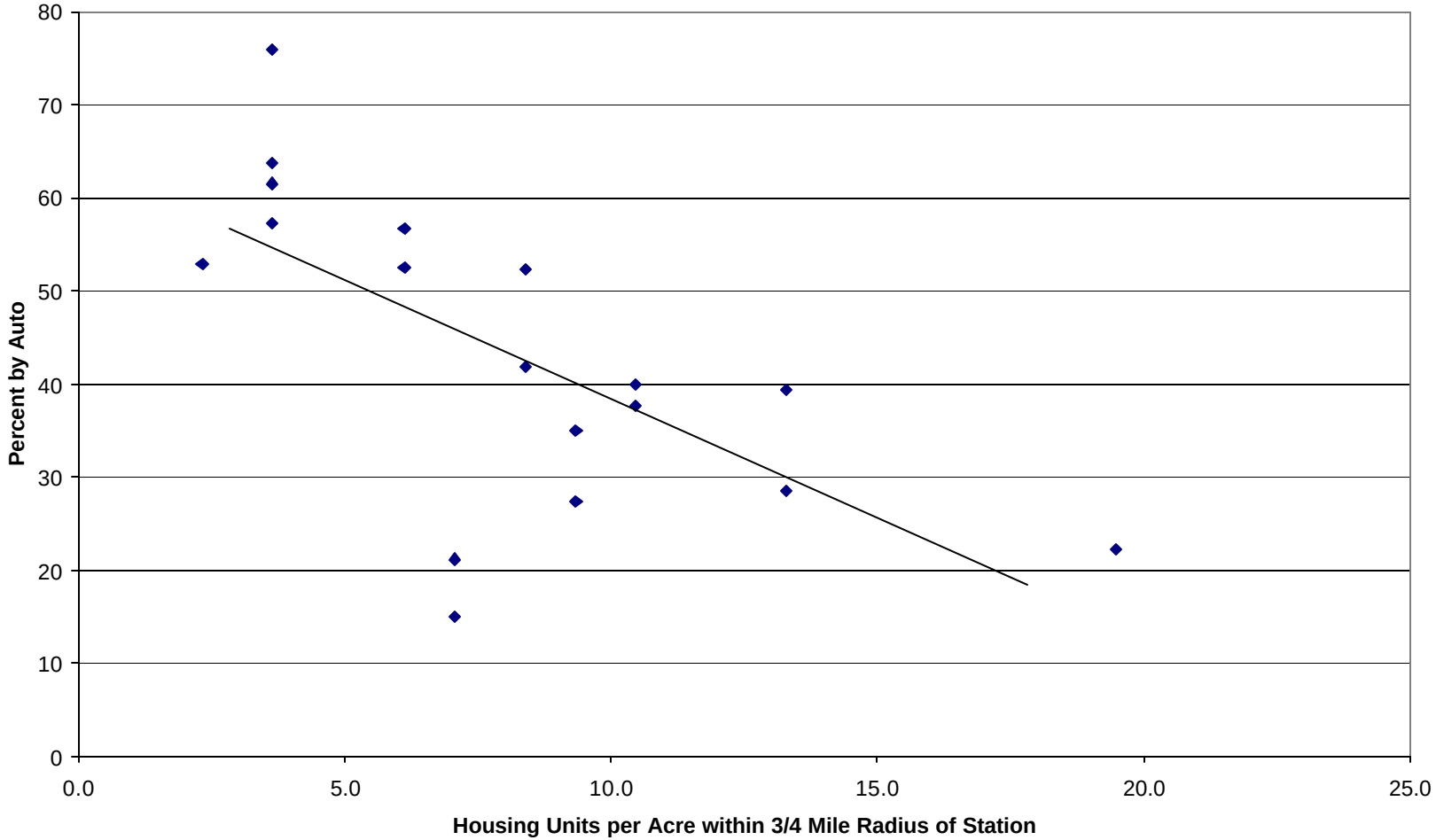


Figure C-11
Residential Auto Usage by Housing Density



correlation equations suggest that housing density near a Metrorail station does influence mode choice because if people are not using their cars, they are likely using Metrorail or other form of transit to travel distances farther than one can walk or bicycle.

Similar to housing density, street densities produced moderate correlations with the auto and transit modes, and the correlation with the Metrorail mode was weaker (see Table C-36). Unlike the other equations, the sensitivity testing slightly decreased the R-squared value for the auto mode from 0.53 to 0.49, but this drop did not substantially affect the correlation. The equation for the street density/auto regression is graphically depicted in Figure C-12. The correlation indicates that an increase of one linear mile of streets per square mile within 3/4 mile of the station would decrease the percentage of trips made from residential sites by auto by 2.38 percent. Similar to the housing density correlations, the overall correlation equations for street densities suggest that this does influence mode choice in Metrorail station areas.

No correlations were uncovered using factors or characteristics internal to the site and Metrorail service levels during the peak and off-peak hours. Nor did the transit/job indices produce correlations with the Metrorail or "all transit" modes.

C.2.3 Retail Sites

The following candidate independent variables were tested to determine if any explain the variation in mode choice for trips made to and from retail sites by patrons and employees as described in Appendix C.1.3:

- Distance between station and site
- Housing and job densities within 3/4 mile of the station (residential units and jobs per acre)
- Street density within 3/4 mile of the station (total miles of street per square mile)
- Number of Metrorail trains during off-peak hour

As shown in Table C-39, distance between stations and sites showed a correlation with all the mode choice variables. Table C-39 also shows that housing density had the strongest correlation with transit use. Sensitivity testing was not conducted for retail sites due to the small sample size (five surveyed sites) in the equations.

The distance variable and Metrorail use correlation showed an R-square value of 0.53. This equation is graphically depicted in Figure C-13. The correlation indicates that about 38 percent of trips to and from a retail site would be on Metrorail if the site is located directly at the station exit/entrance. This percentage would decrease by 1.29 percent for every 100 feet in the distance a retail site is located away from the station exit/entrance.

The housing-density variable and transit-use correlation showed an R-square value of 0.52. This equation is graphically depicted in Figure C-14. The correlation indicates that an increase of one residential unit per acre would increase the percentage of trips made to and from retail sites by transit by 2.15 percent.

Figure C-12
Residential Auto Usage by Street Density

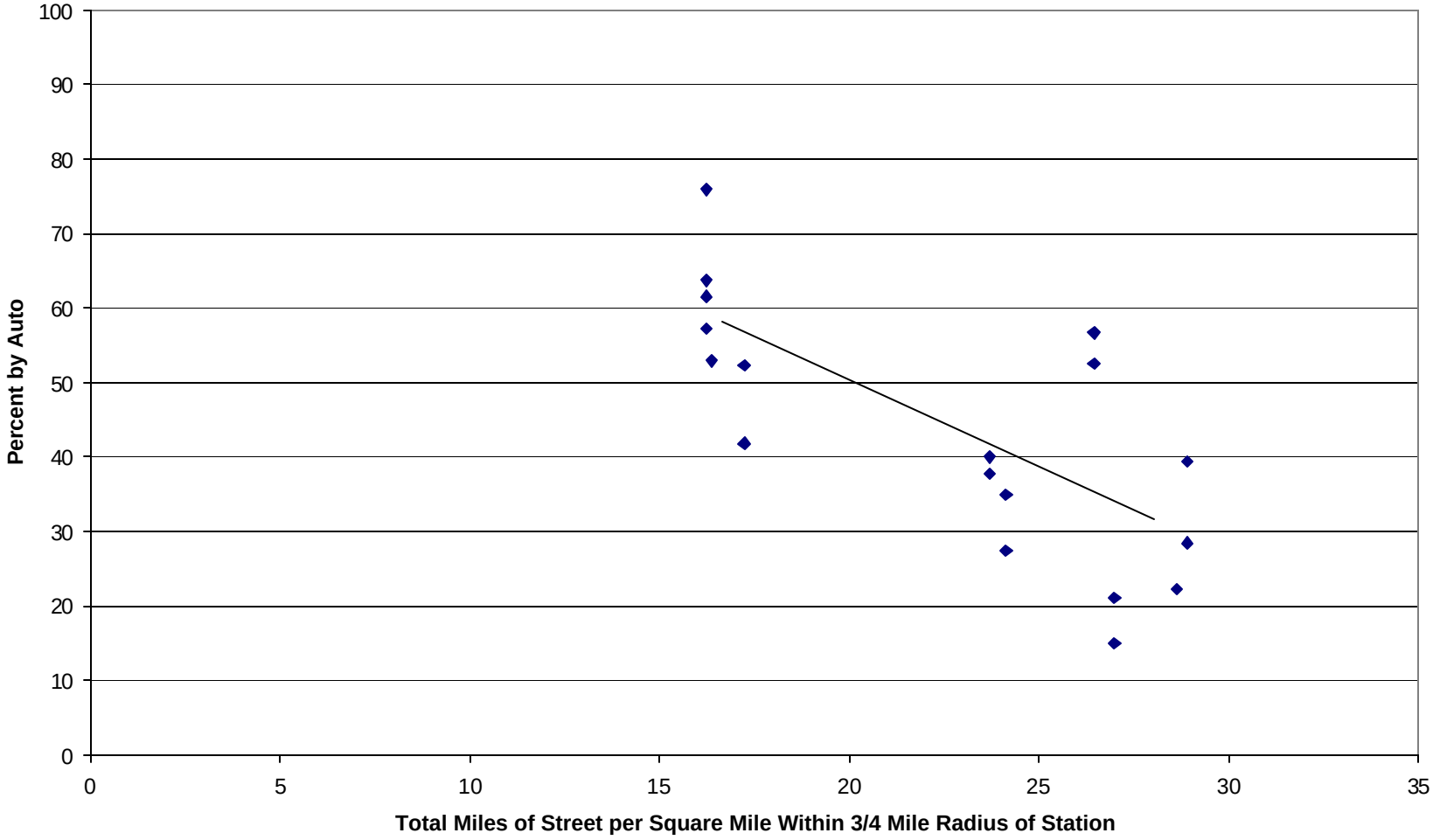


Table C-39
Linear Regression Equation Inputs for Retail Sites by Distance from Station and by Housing Density

Mode	Slope	Y-Intercept	R-Square
Distance Between Station Exit/Entrance and Site[1]			
Metrorail	-1.29	38.20	0.53
Transit	-1.41	47.27	0.57
Auto	1.96	21.44	0.56
Housing Density[2]			
Metrorail	1.54	11.39	0.30
Transit	2.15	12.67	0.52
Auto	-1.67	54.67	0.16

Notes: [1] Percentage point for every 100 feet.
[2] Percentage point for every housing unit per acre.

No significant correlations were uncovered using factors or characteristics relating to job and street densities and Metrorail service levels during off-peak hours.

C.2.4 Hotels

The following candidate independent variables were tested to determine if any explain the variation in mode choice for trips made to and from hotel sites by patrons and employees as described in Appendix C.1.4:

- Distance between station and site
- Job densities within 3/4 mile of the station (jobs per acre)
- Street density within 3/4 mile of the station (total miles of street per square mile)
- Number of Metrorail trains during off-peak hour

None of these independent variables produced correlations with the Metrorail, transit, and auto mode choices as reported in Appendix C.1.4.

C.2.5 Entertainment (Movie Theaters) Sites

The following candidate independent variables were tested to determine if any explain the variation in mode choice characteristics for trips made to and from hotel sites by patrons and employees as described in Appendix C.1.5:

- Distance between station and site
- Job and housing densities within 3/4 mile of the station (residential units and jobs per acre)
- Street density within 3/4 mile of the station (total miles of street per square mile)
- Number of Metrorail trains during off-peak hour

As shown in Table C-40, area job density showed correlations with all the mode choice variables. Sensitivity testing was not conducted for entertainment sites due to the small sample size (four surveyed sites).

Figure C-13
Retail Metrorail Usage by Distance from Station

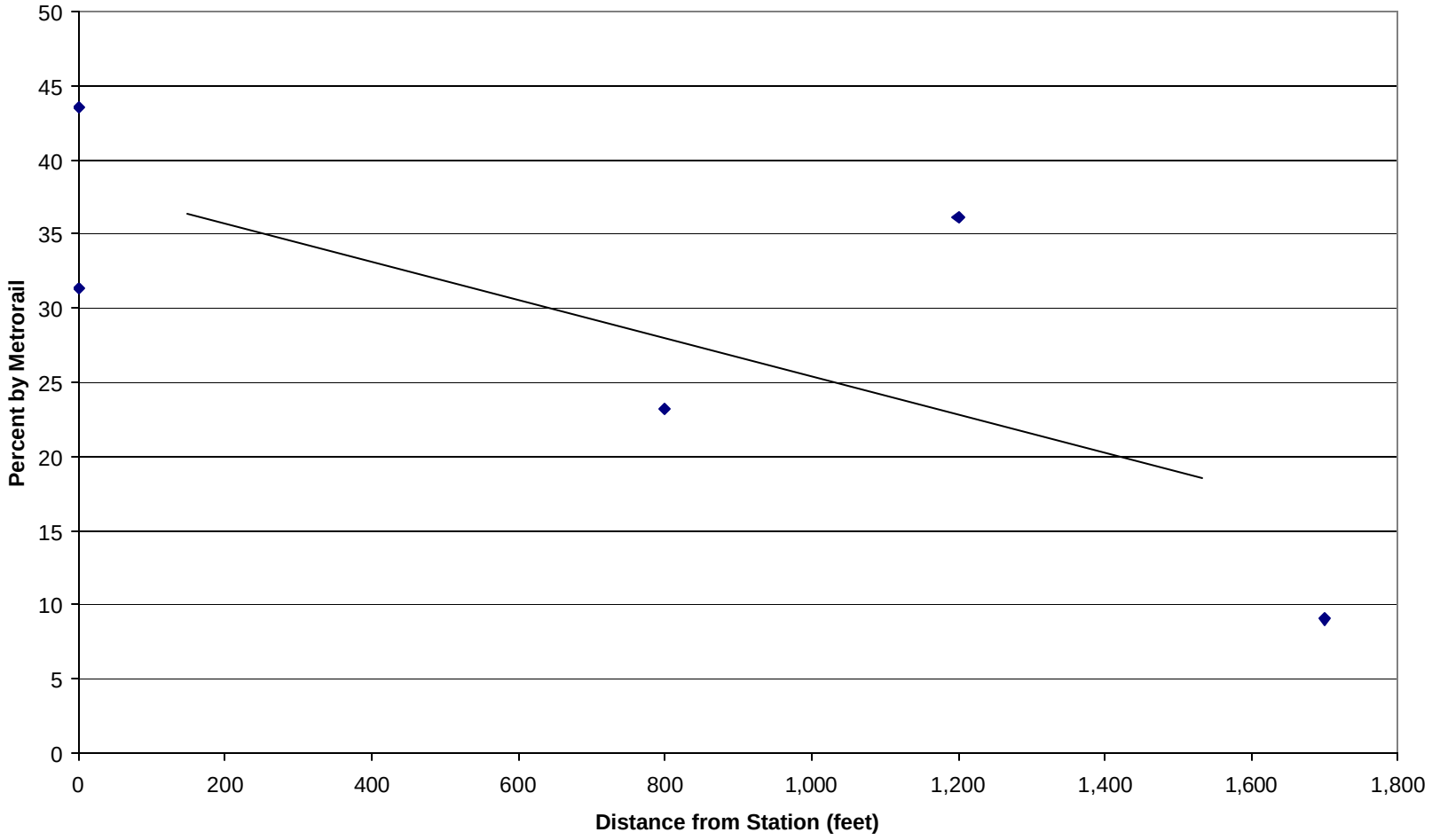


Figure C-14
Retail Transit Usage by Housing Density

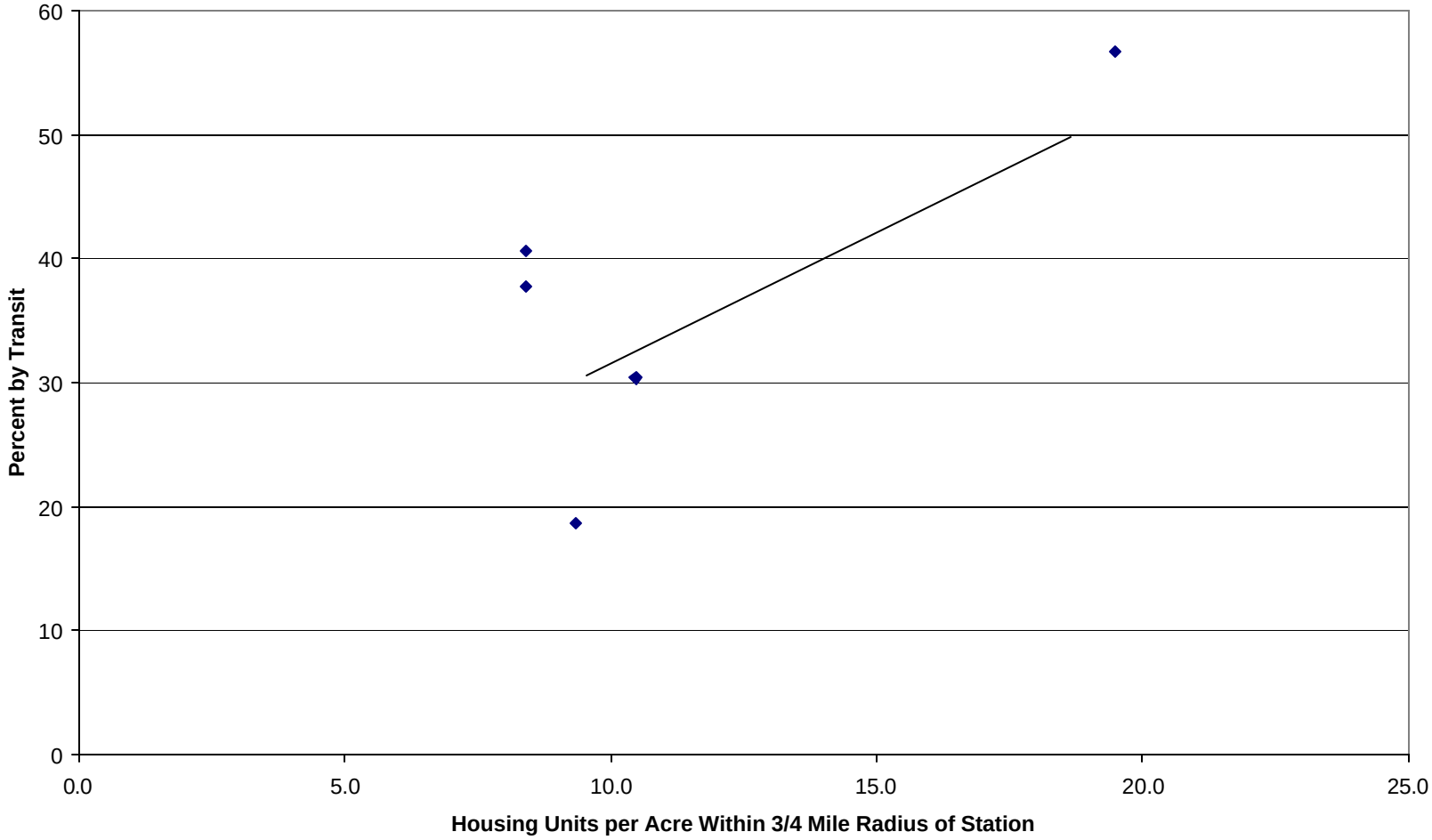


Table C-40
Linear Regression Equation Inputs for Entertainment Sites by Job, Housing and Street Densities

Mode	Slope	Y-Intercept	R-Square
Job Density[1]			
Metrorail	0.60	7.89	0.43
Transit	0.84	6.72	0.71
Auto	-1.10	90.39	0.69
Housing Density[2]			
Metrorail	3.83	-6.26	0.58
Transit	5.30	-12.42	0.91
Auto	-7.20	117.67	0.96
Street Density[2]			
Metrorail	2.57	-30.84	0.51
Transit	3.59	-47.25	0.82
Auto	-4.78	162.78	0.82

Notes: [1] Percentage point for every job per acre within 3/4 mile of station.
[2] Percentage point for every residential unit per acre within 3/4 mile of station.
[3] Percentage point for every street mile per acre within 3/4 mile of station.

Among the correlations shown on Table C-40, the job-density variable and transit-use correlation showed an R-square of 0.71. This equation is graphically depicted in Figure C-15. The correlation indicates that an increase of one job per acre would increase the percentage of trips made to entertainment sites by transit by 0.84 percent. For housing density (see Figure C-16), the correlation indicates that an increase of one residential unit per acre would increase the percentage of trips made to entertainment sites by transit by 5.30 percent. For street density (see Figure C-17), the correlation indicates that an increase of one linear mile of streets per square mile would increase the percentage of trips made to entertainment sites by transit by 3.59 percent.

No correlations were uncovered using factors relating to distance between station exit/entrance and site, and Metrorail service level during the off-peak hour.

Figure C-15
Entertainment Transit Usage by Job Density

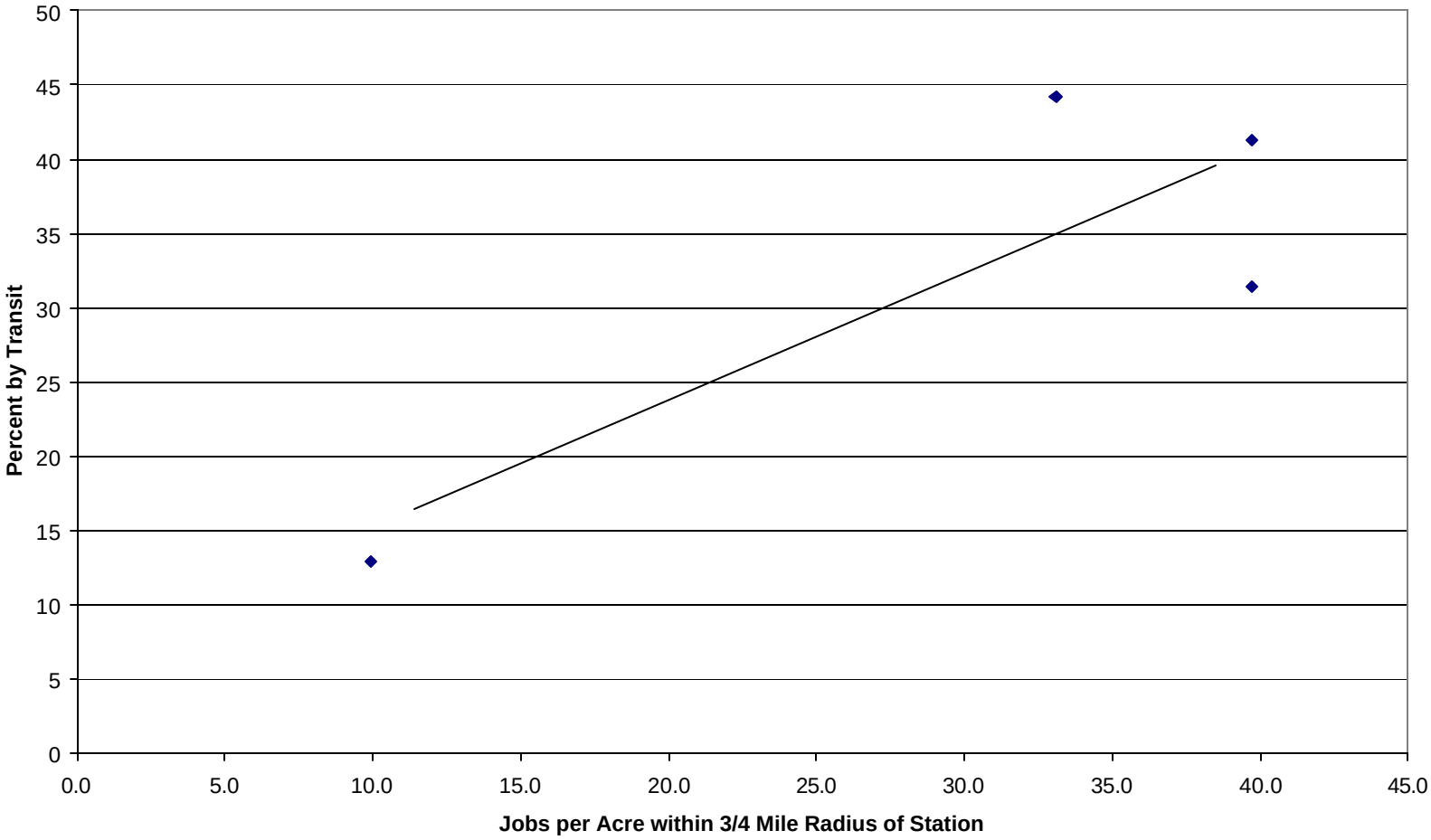


Figure C-16
Entertainment Transit Usage by Housing Density

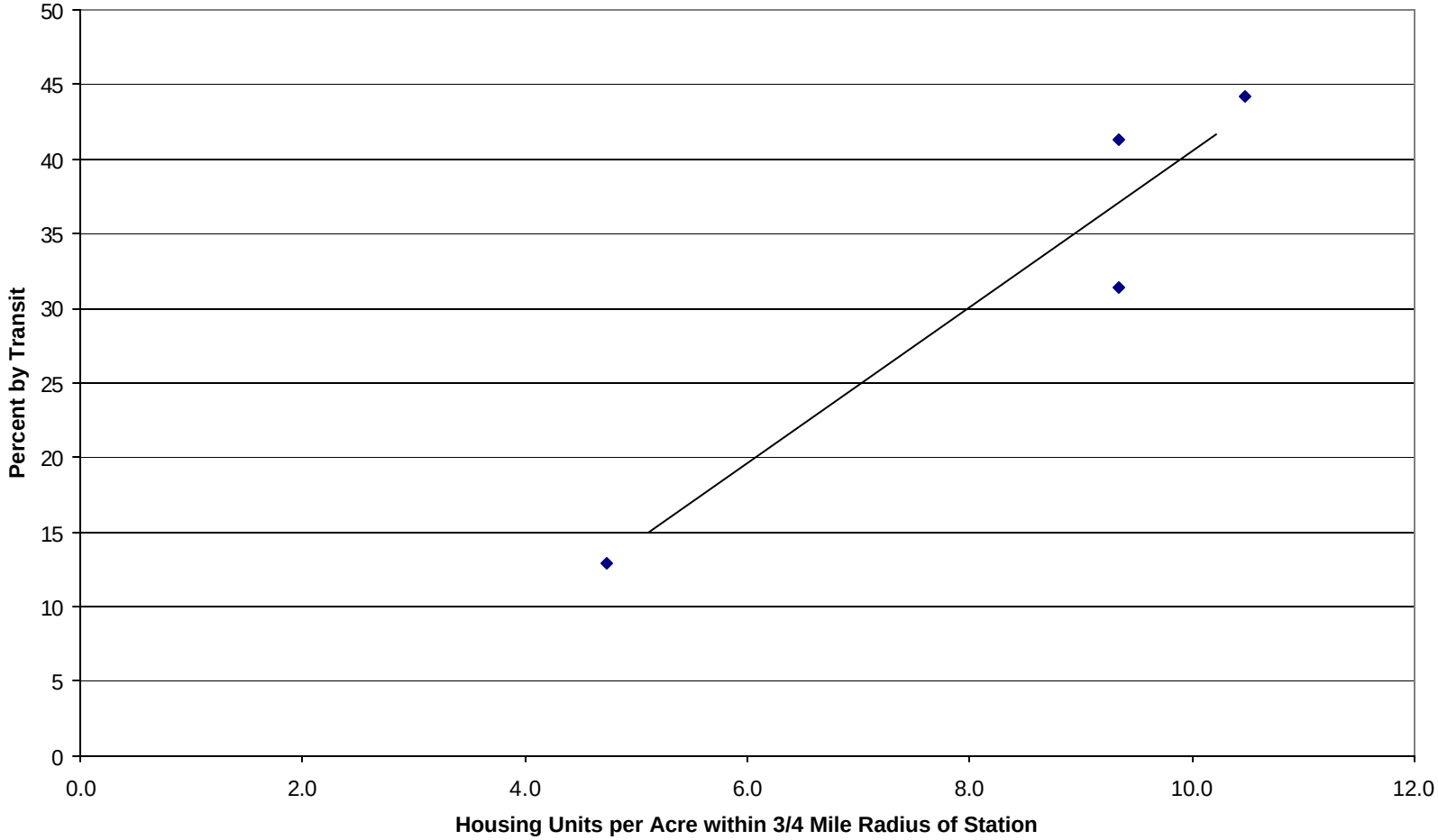


Figure C-17
Entertainment Transit Usage by Street Density