



ARLINGTON COUNTY COMMUTER SERVICES

Arlington Transportation Partners | The Commuter Store |  
CommuterPage.com | CommuterDirect.com | Bike/Walk Arlington |  
Car-Free Diet | Mobility Lab | Capital Bikeshare

# Residential Building Transportation Performance Monitoring Study Topline Results Presentation

**October 2013**

**SIMPLE SOLUTIONS**  
Planning & Design, LLC



# Study Purpose

## Goals

- Travel and parking behaviors of Arlington residents in high density residential buildings with TDM services
- Factors that influence travel choices
- Inform the public about the performance of residential site plans relative to County transportation objectives

## Objectives

- Convey mode split and vehicle trip generation
- Convey parking regulation and availability
- Convey auto ownership rates
- Compare awareness/attitudes with mode choice and trip generation
- Compare local trip generation to ITE rates and to TIAs

**Data  
Collection  
methods:**

Voluntary  
resident  
survey

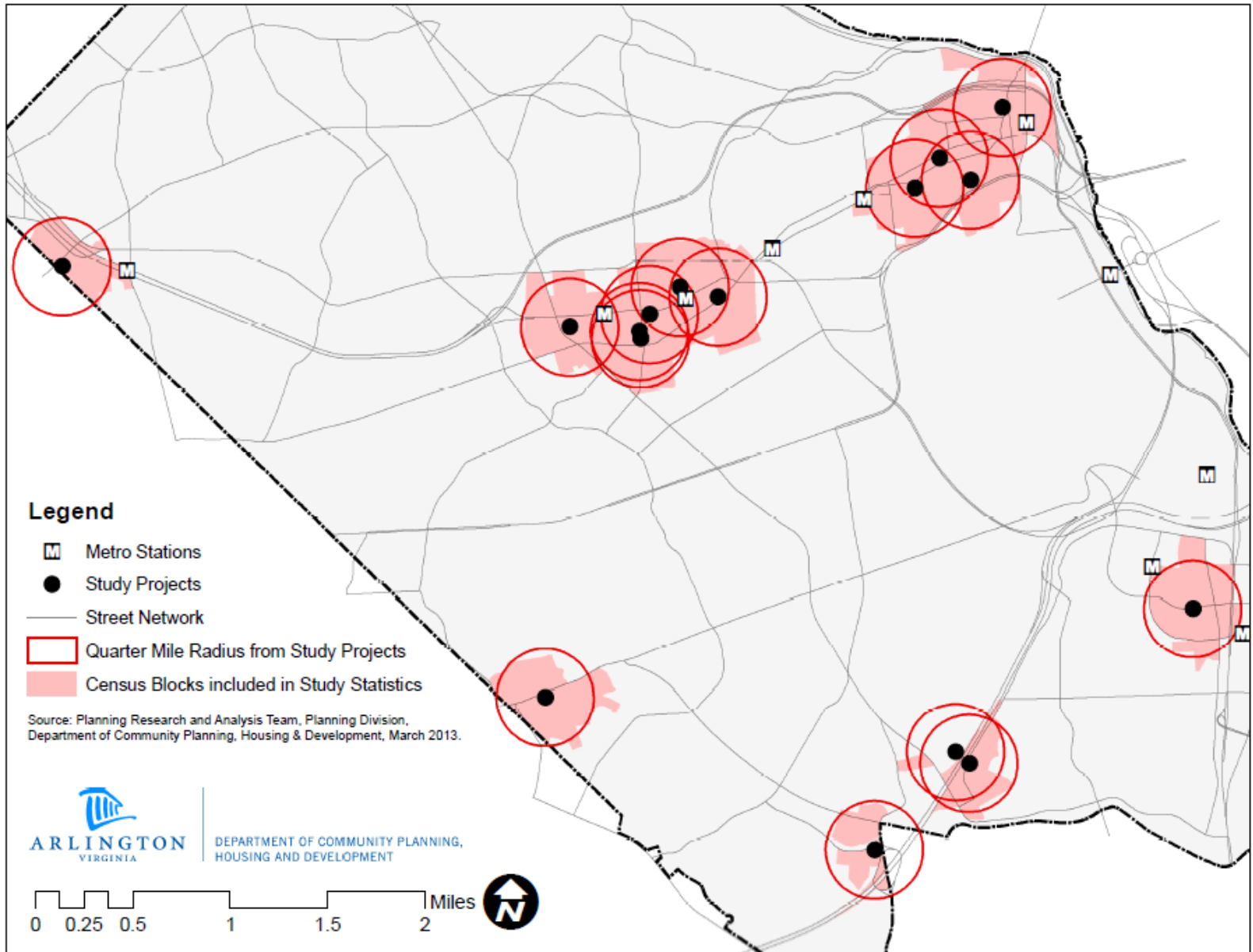
24 x 7  
vehicle trip  
and parking  
data

Field survey

Property  
manager  
interviews

16 residential  
buildings =  
7 apartments,  
1 extended-  
stay hotel, and  
8 condos

# Residential Building Locations




## Building Sample Characteristics

- 3,700 occupied dwelling units (96%)
- 4,840 total parking spaces, all types
- 1.04 – 1.55 residential parking spaces per unit (not including visitor/retail spaces)
- Over 38,000 trips counted
- 11 sites within Metrorail corridors, 5 outside
- 3 sites outside the Metrorail corridors offer shuttle to Metro or ongoing transit subsidy
- East Falls Church is considered outside Metrorail corridors for purposes of this study

# Resident Sample Characteristics

	Sample	County	Sample is...
Tenure <5 years	69%	35%	Newer
HHs 2-person or fewer	88%	60%	Smaller
Sex	49% male	similar	
Age < 35 years	47% (71% under 45)	31%	Younger
Race/Ethnicity	76% White, 11% Asian, 6% Hispanic	83% White, 6% Asian, 4% Hispanic	Fewer Asian, more Hispanic
HH Income \$80K	77% (65% \$100K+)	60%	Wealthier
Employment	88%	67%	More employed
Work Location	45% DC/Alexandria 27% Arlington	41% DC/Alexandria 33% Arlington	Fewer work in Arlington, more in DC/Alexandria



Behaviors:  
Commute Travel  
Mode Split

Sources:

Region and Live  
in Arlington –  
2010 COG SOC  
Survey

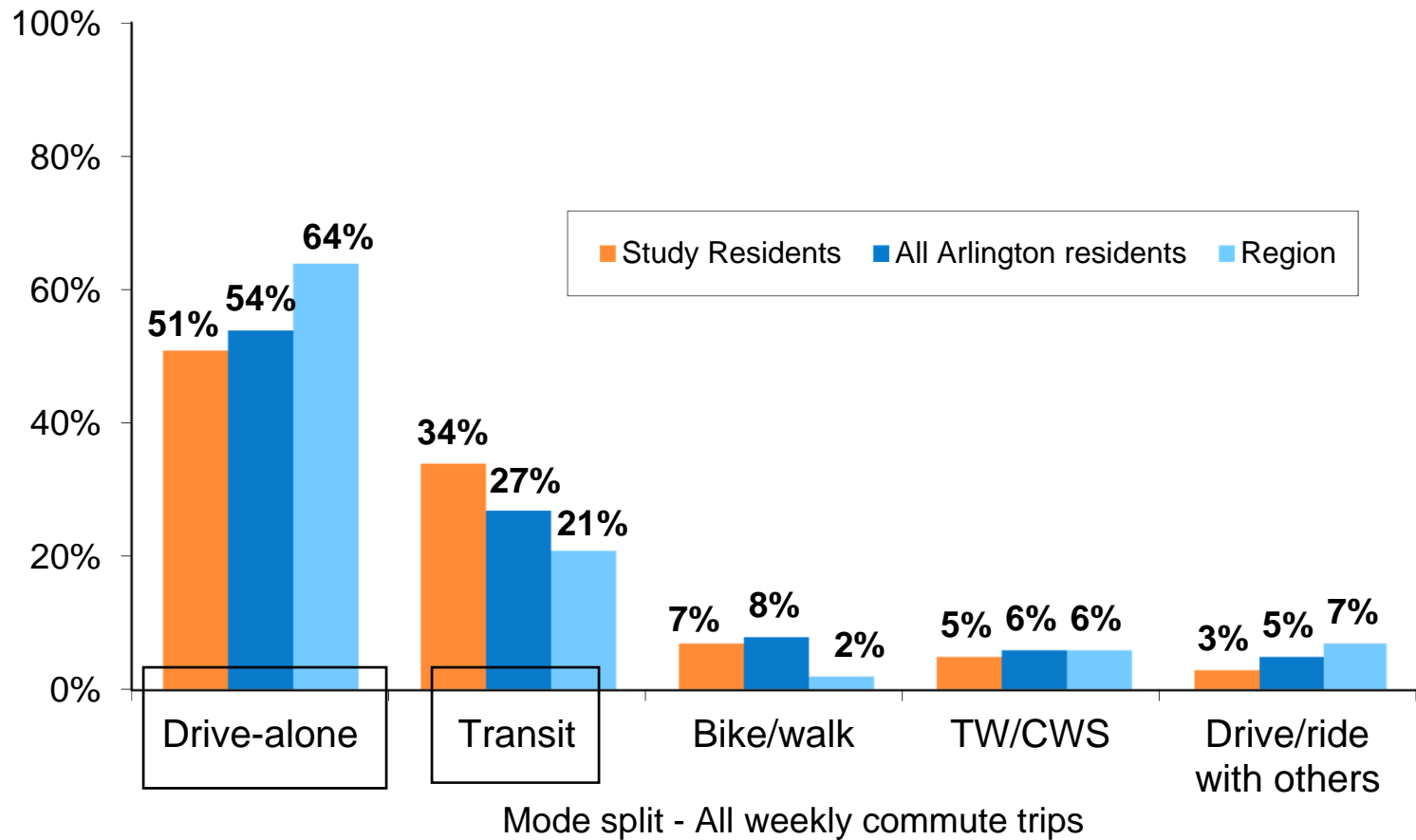
Study Bldgs –  
Resident Surveys

Region  
n = 6,050

Live in  
Arlington  
n = 551

Study Bldgs  
n = 1,283

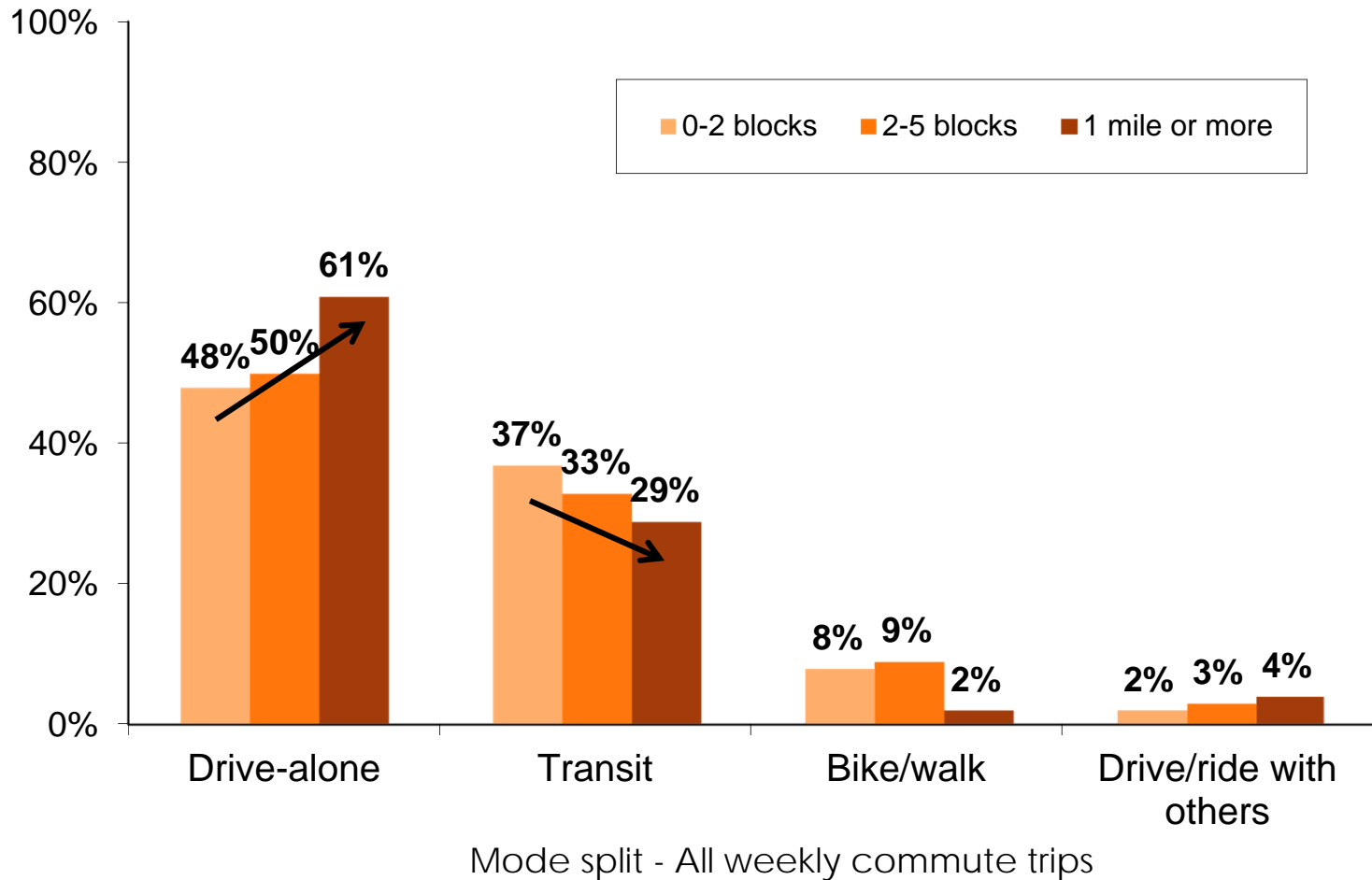
## Study Residents Drove Alone to Work Less and used Transit More than the Regional Average



Q6 How many weekdays do you typically use each of the following types of transportation to get to work?

Source:  
Resident Surveys

## Commute Mode Split Correlated to Distance from Home to Metrorail – As Distance Increased, Driving Alone Went Up; Transit Use Dropped



Distance to  
Metrorail

0 – 2 blocks  
n = 373

3-5 blocks  
n = 573

6-10 blocks  
No sample

More than 10  
blocks  
n = 337

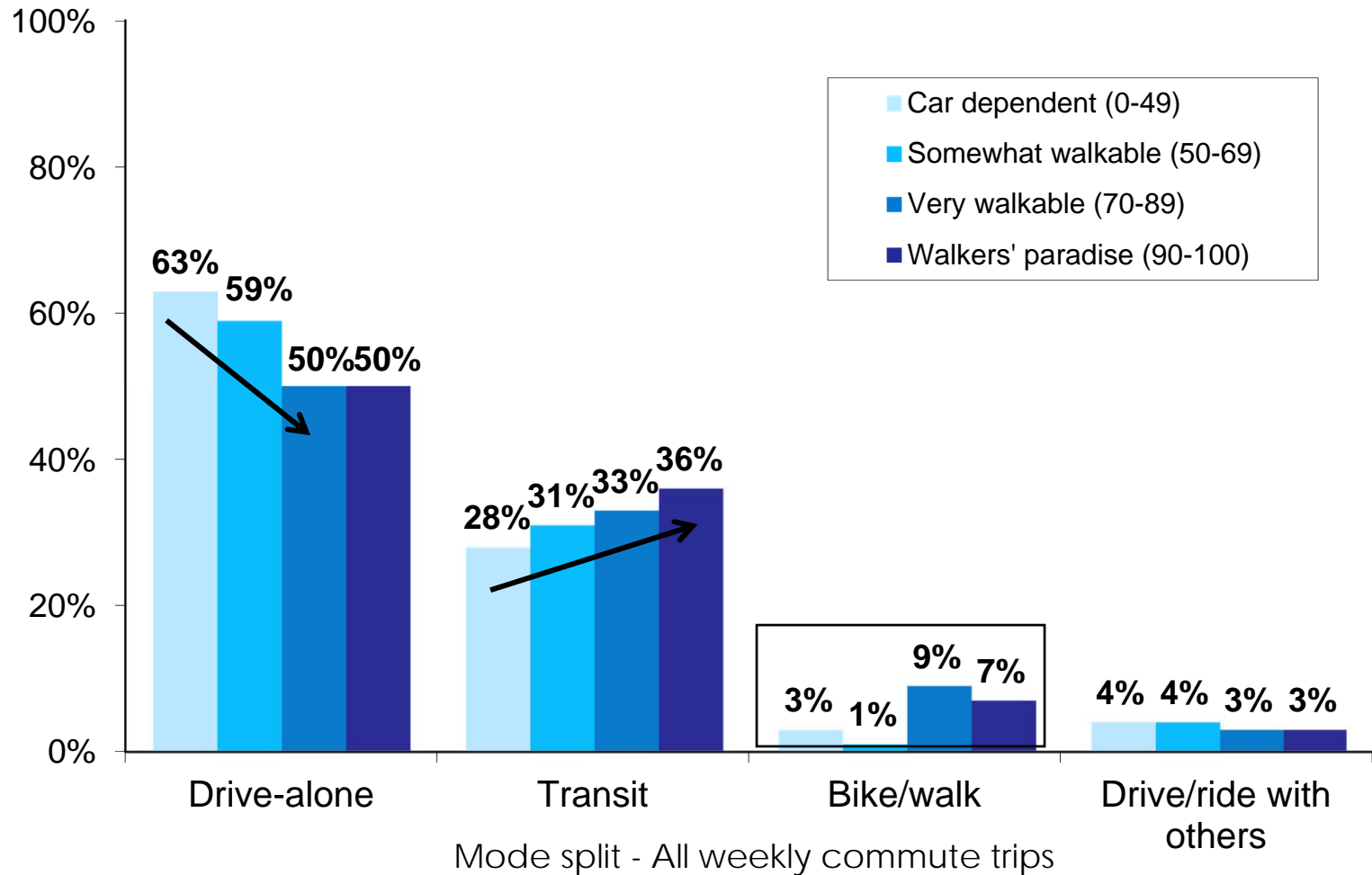
Q6 How many weekdays do you typically use each of the following types of transportation to get to work?



Source:  
Resident Surveys

# Residents who Lived in Areas with Higher “Walk Scores” Drove Alone to Work less, and Walked, Biked and used Transit More than other areas

Similar trends were noticed for “Transit Score”



### Walk Score

0 - 49  
n = 110

50 - 69  
n = 147

70 - 89  
n = 639

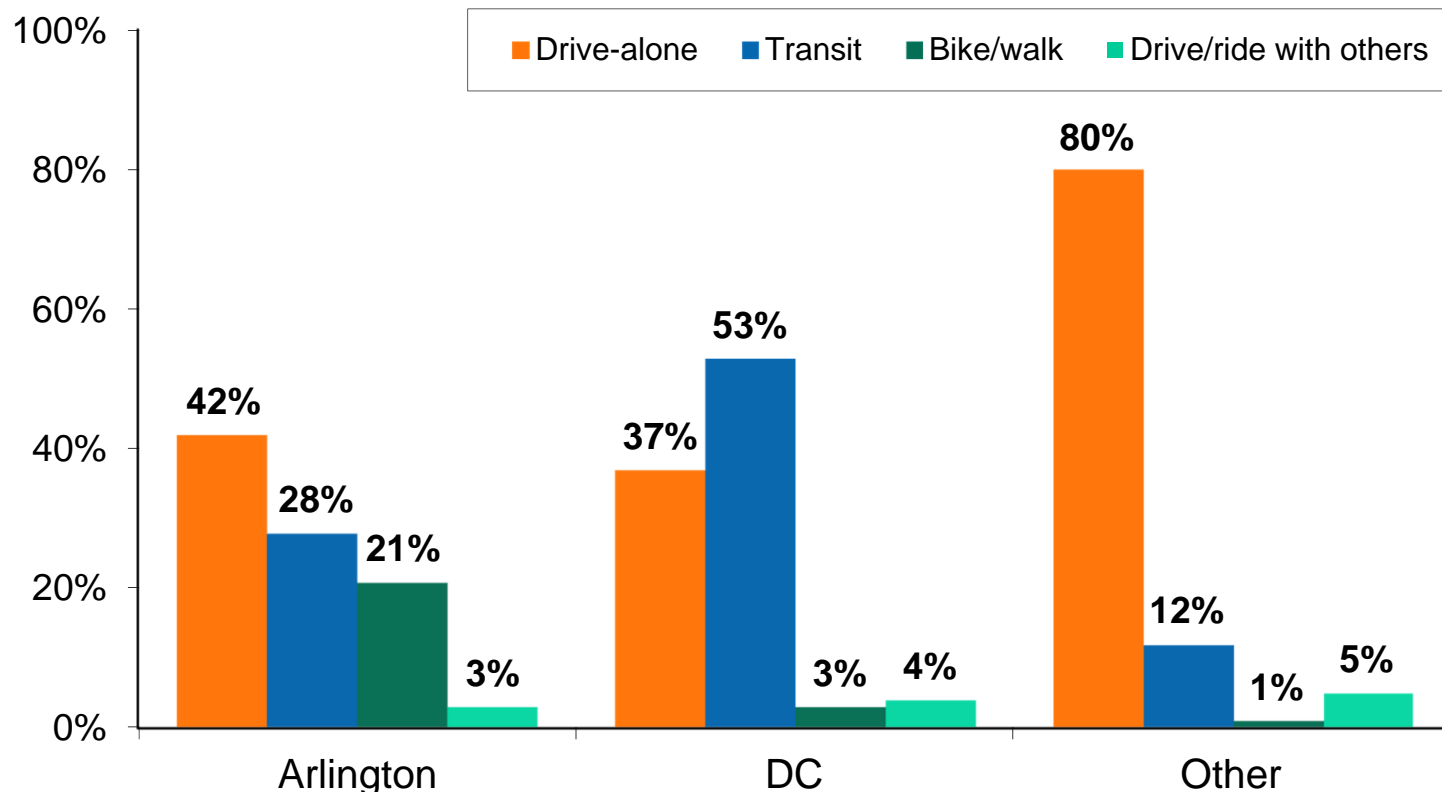
90 - 100  
n = 387

Q6 How many weekdays do you typically use each of the following types of transportation to get to work?

Source:  
Resident  
Surveys

## Study Residents' Commute Mode was Strongly Related to Where they Work

Work in Arlington – 21% Bike/Walk; Work in DC - 53% Transit;  
Work Elsewhere - 80% Drive Alone



Mode split - All weekly commute trips

Q6 How many weekdays do you typically use each of the following types of transportation to get to work?

Q34 In what county do you work?

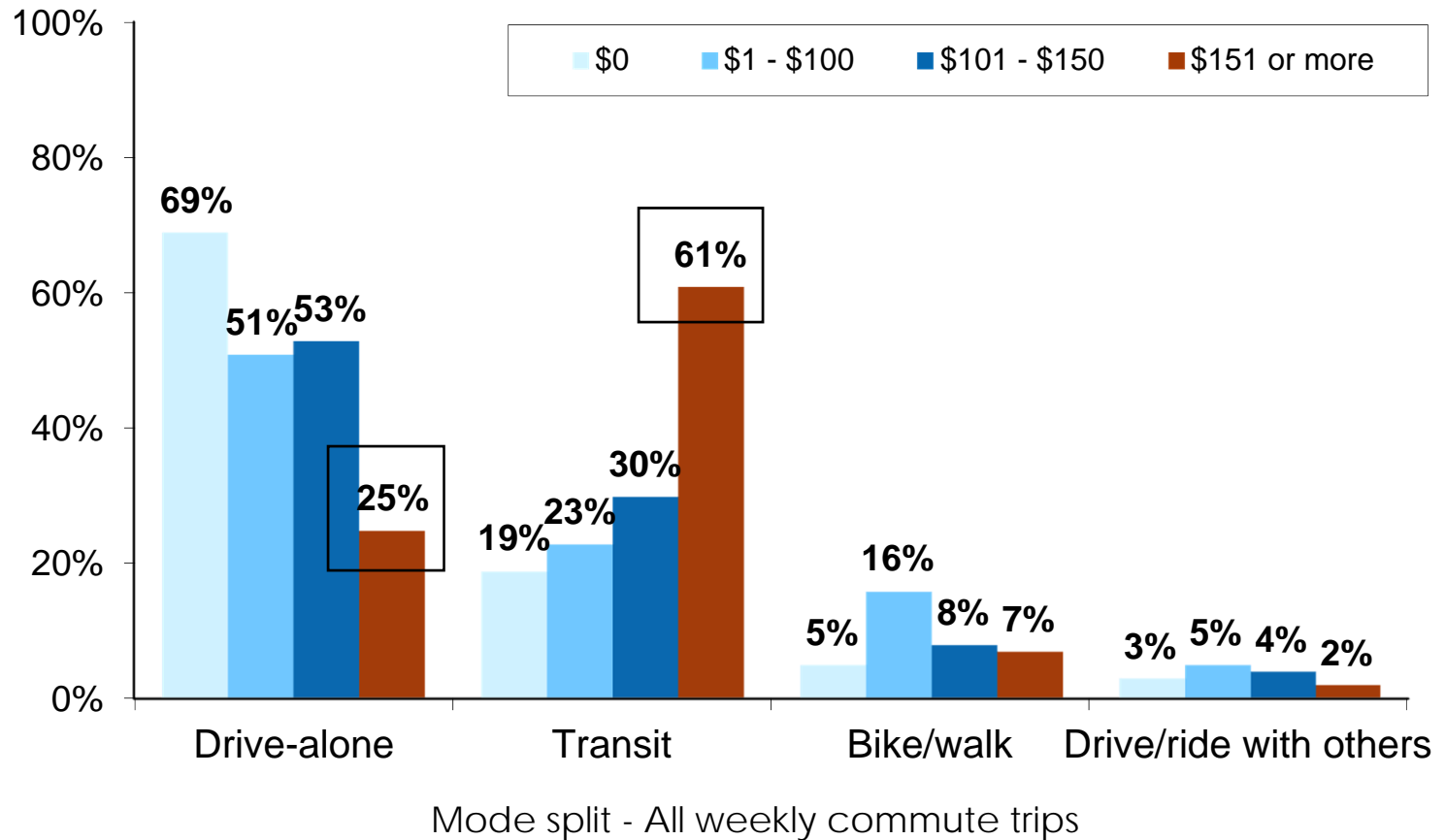
Arlington  
n = 332

District of  
Columbia  
n = 505

Other area  
n = 398

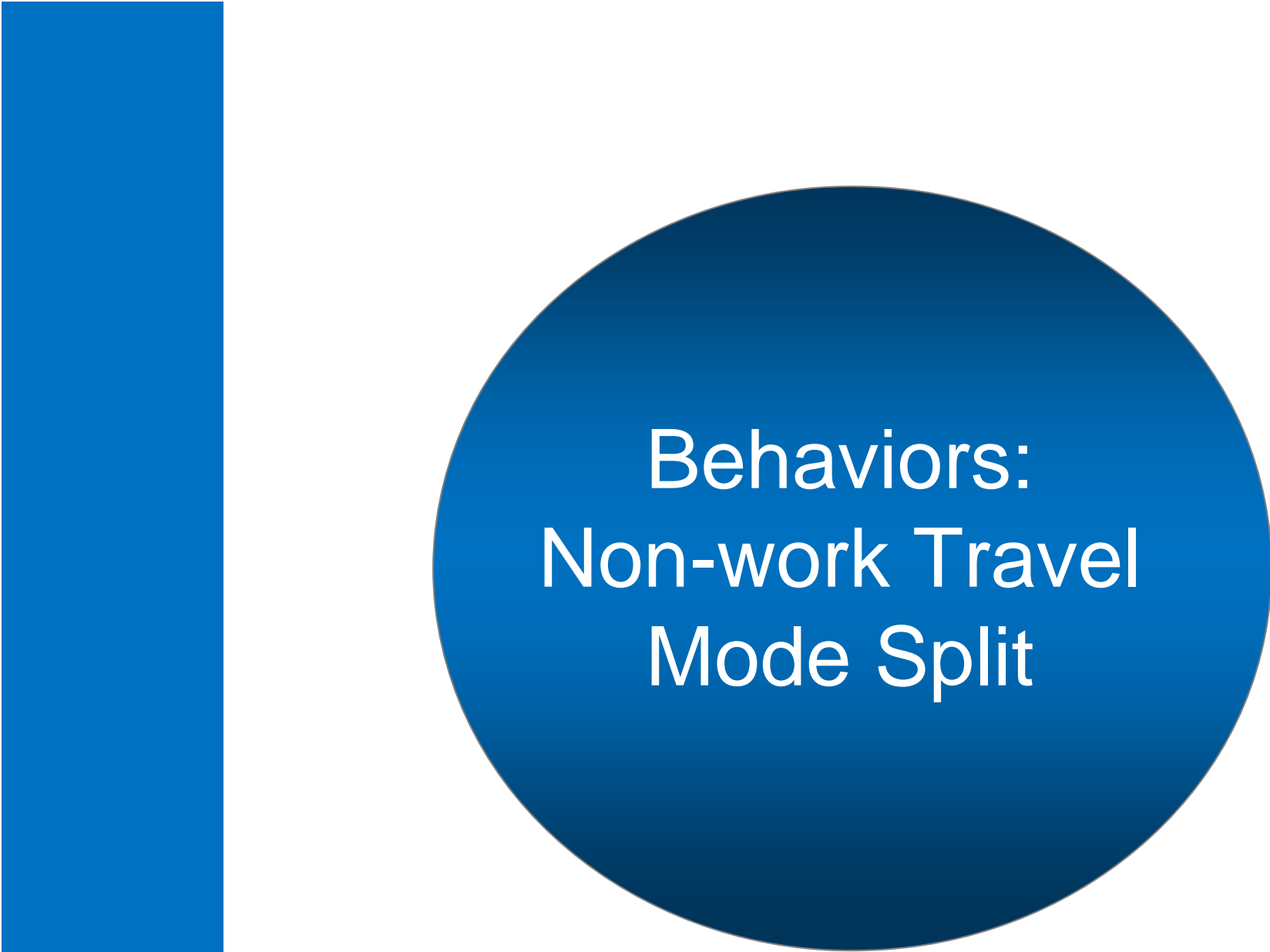
Source:  
Resident  
Surveys

## Workplace Parking Cost influenced Commute Mode, Primarily When Monthly Cost was \$100+



Q6 How many weekdays do you typically use each of the following types of transportation to get to work?

Q15 How much do you pay to park at work? If you don't usually drive, enter what you would have to pay if you drove.



# Behaviors: Non-work Travel Mode Split

Source:  
Resident  
Surveys

## Study Residents Made a Quarter of their Non-Work trips by Walking and 14% by Transit

### 2009 Overall County Non-work Trip Distribution

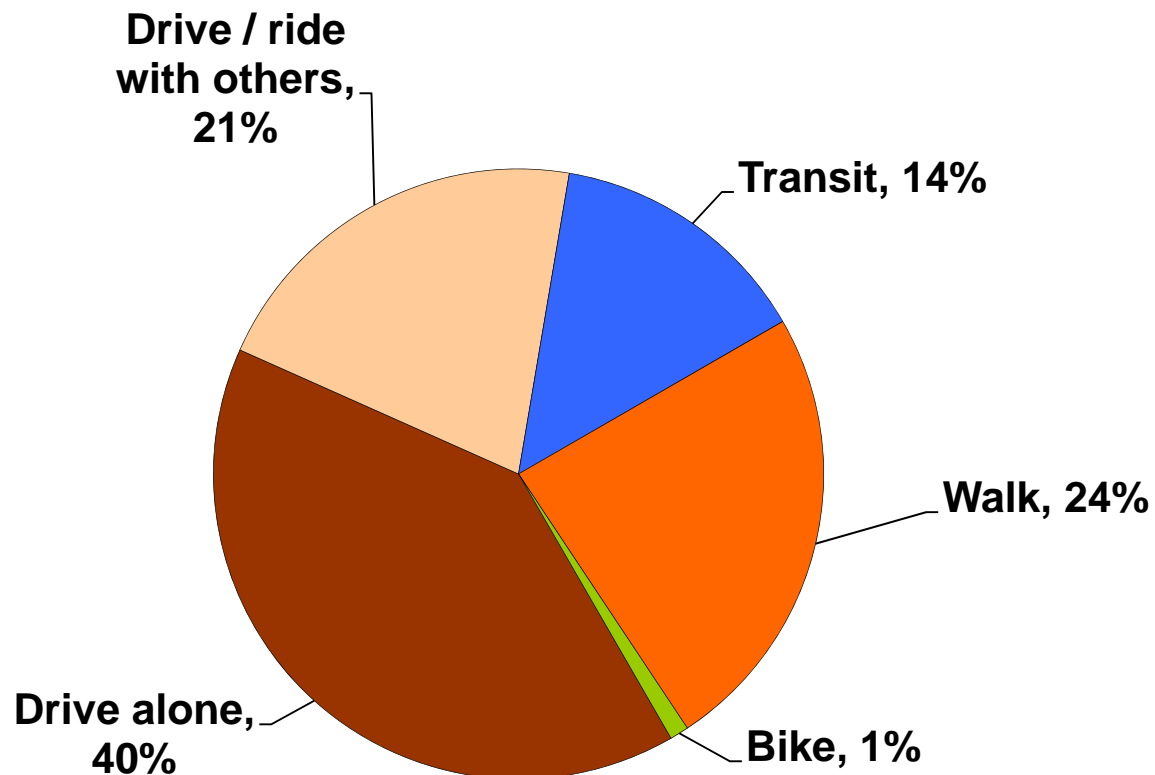
Drive alone  
40%

Drive/ride with  
others  
36%

Walk/Bike  
16%

Transit  
8%

2009 Arlington Resident  
Survey



Mode split – Typical day Non-Work Trips

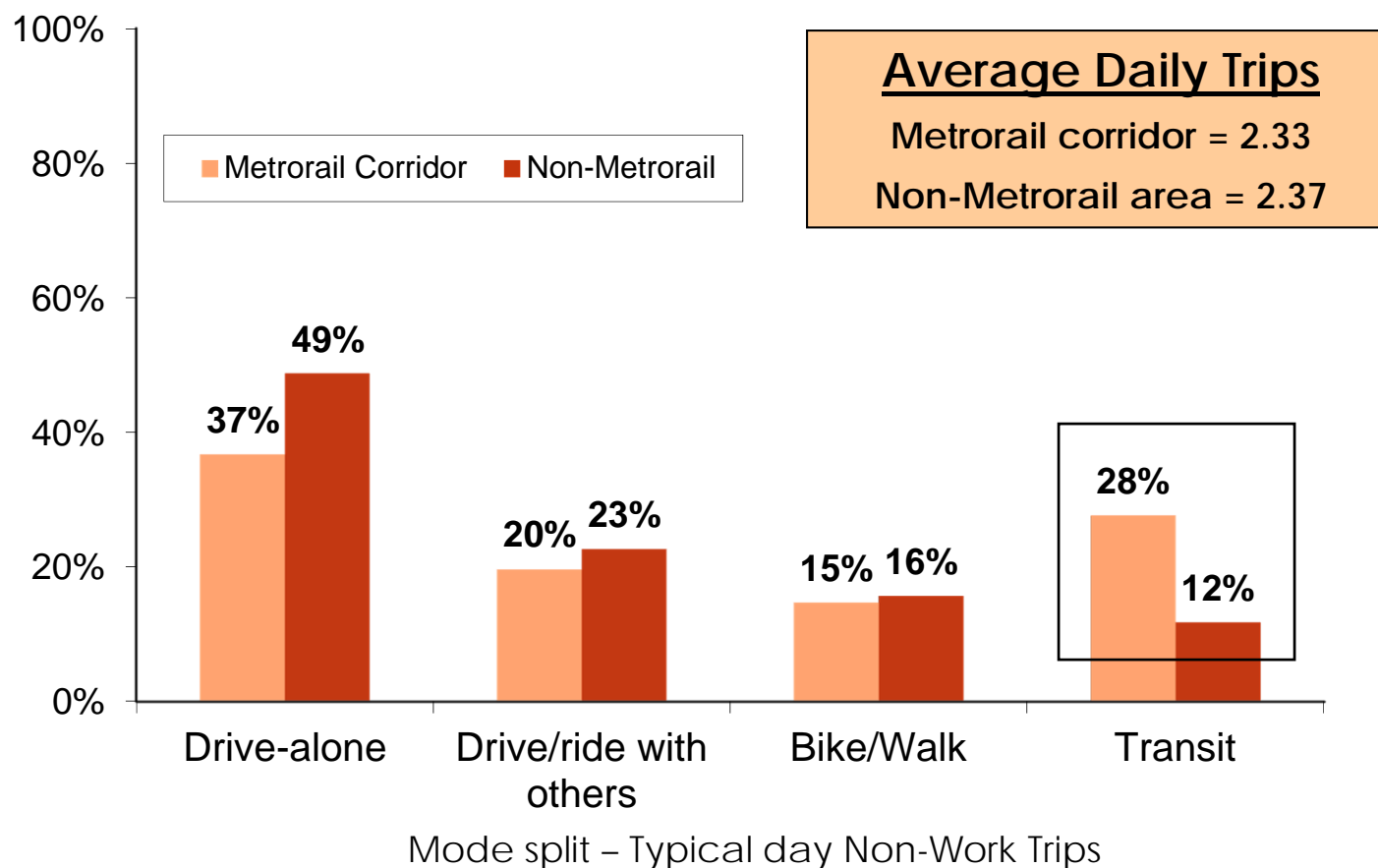
Q21 How many non-work trips did you make [yesterday] by each of the following types of transportation? Please count both the trip leaving your home and the trip returning home as individual trips.

n = 1,032

Source:  
Resident  
Surveys

## Respondents who Lived in a Metrorail Corridor Made the Same Number of Daily Non-work Trips as Residents who Lived in Non-Metrorail Areas

But they use transit for a much higher share of their trips



Metro Corridor  
n = 1,044

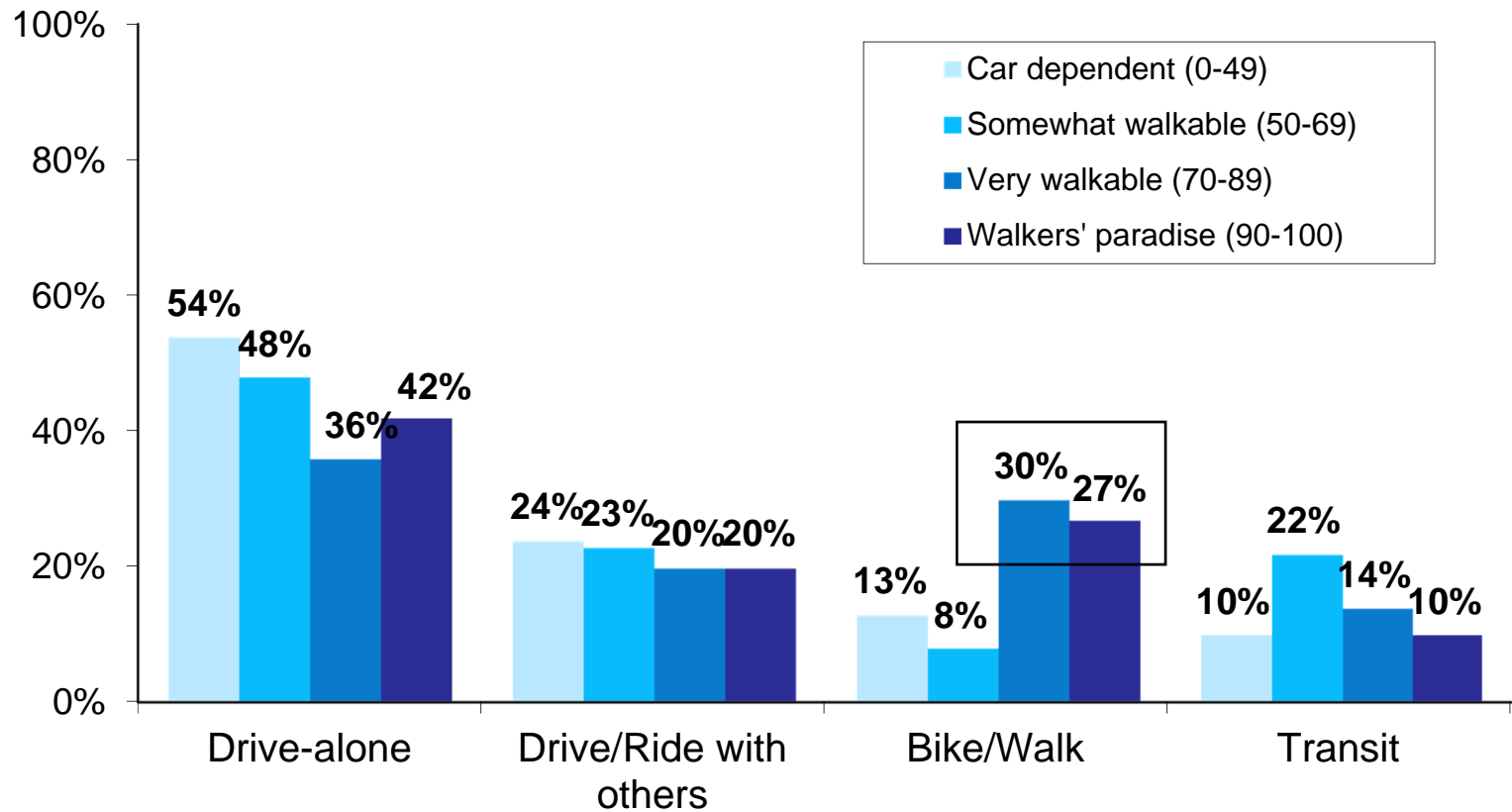
Non-Metro  
n = 372

Q21 How many non-work trips did you make [yesterday] by each of the following types of transportation?

Source:  
Resident  
Surveys

## Residents who Lived in Areas with “Walk Scores” of 70+ Walked for More than a Quarter of their Non-Work Trips;

Compared to 1 in 10 walk trips in areas with lower Walk Scores



Mode split – Typical day Non-Work Trips

Q21 How many non-work trips did you make [yesterday] by each of the following types of transportation?

### Walk Score

0 – 49  
n = 118

50 – 69  
n = 161

70 – 89  
n = 691

90 – 100  
n = 446

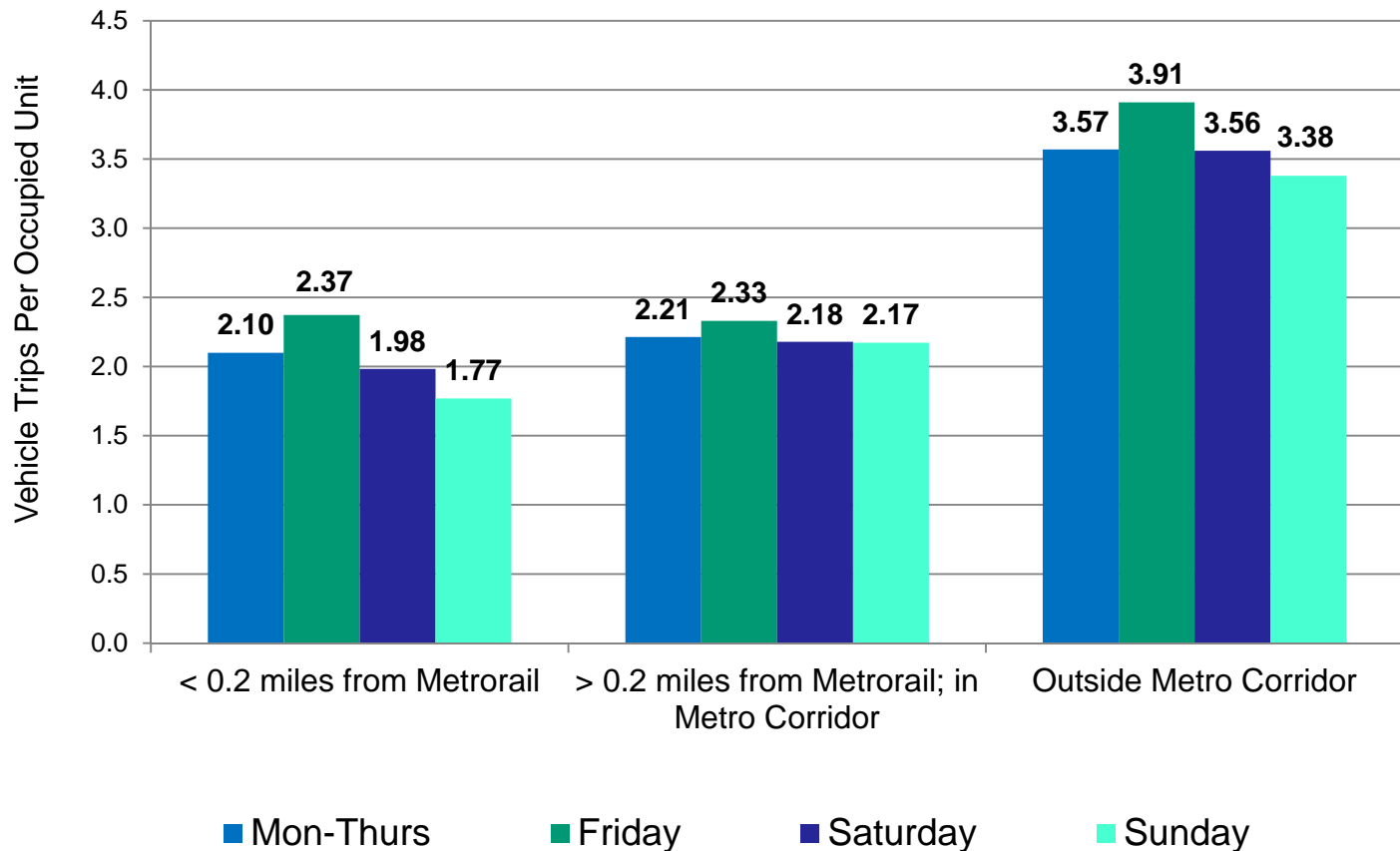


# Behaviors: Trip Generation



# Location Inside/Outside the Metrorail Corridors was the Most Significant Factor Affecting Vehicle Trip Generation

Buildings Inside the Metrorail Corridors generated about One-Third Fewer Daily Vehicle Trips



< 0.2 miles from Metro  
n = 4

> 0.2 miles from Metro; in corridor  
n = 7

Outside Metro corridor  
n = 5

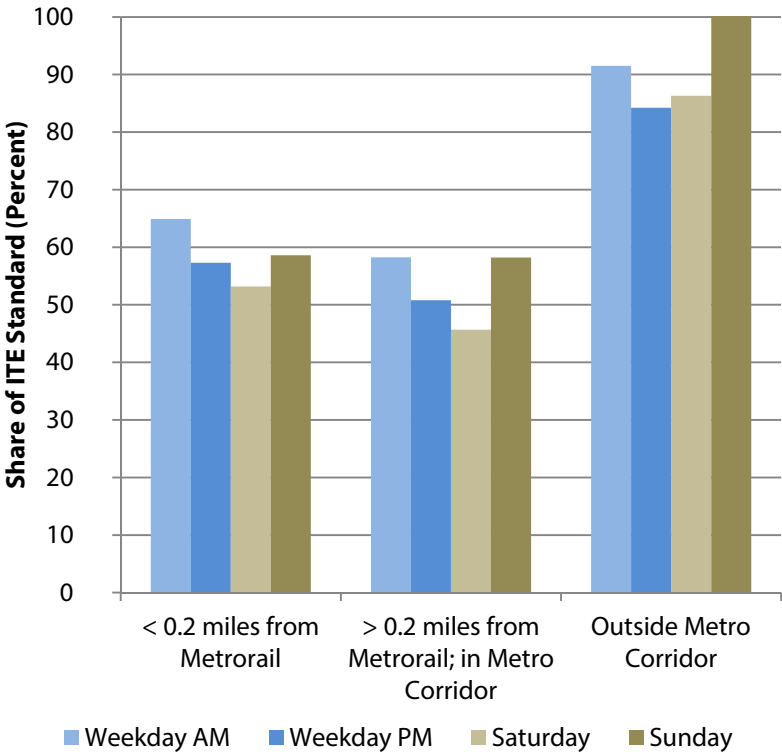
# Vehicle Trip Generation Rates within Metrorail Corridors were Much Lower than those Predicted Based on ITE Standards

Peak Hour and Daily Vehicle Trips on Weekdays and Weekends were all Significantly Lower

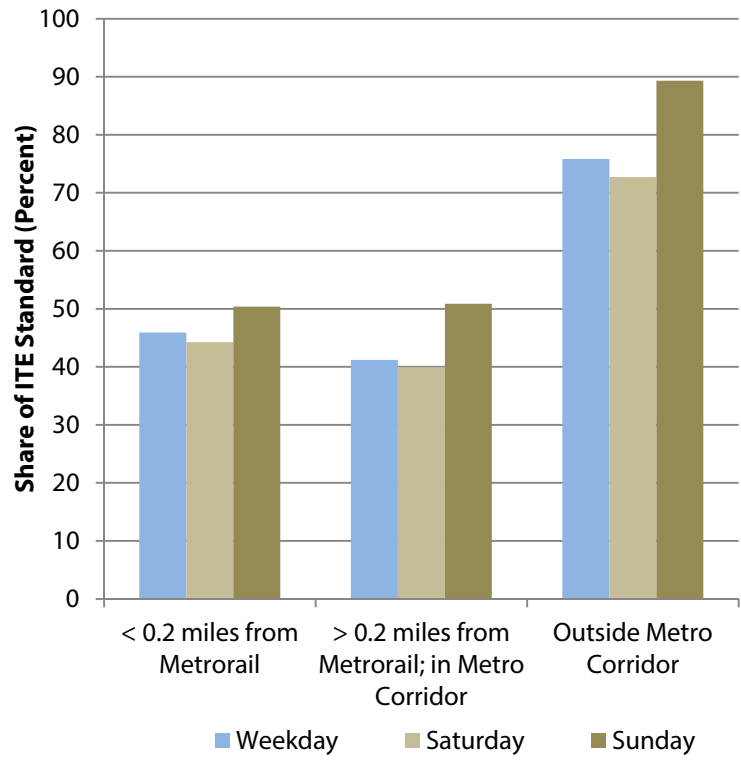
< 0.2 miles from Metro  
n = 4

> 0.2 miles from Metro; in corridor  
n = 7

Outside Metro corridor  
n = 5



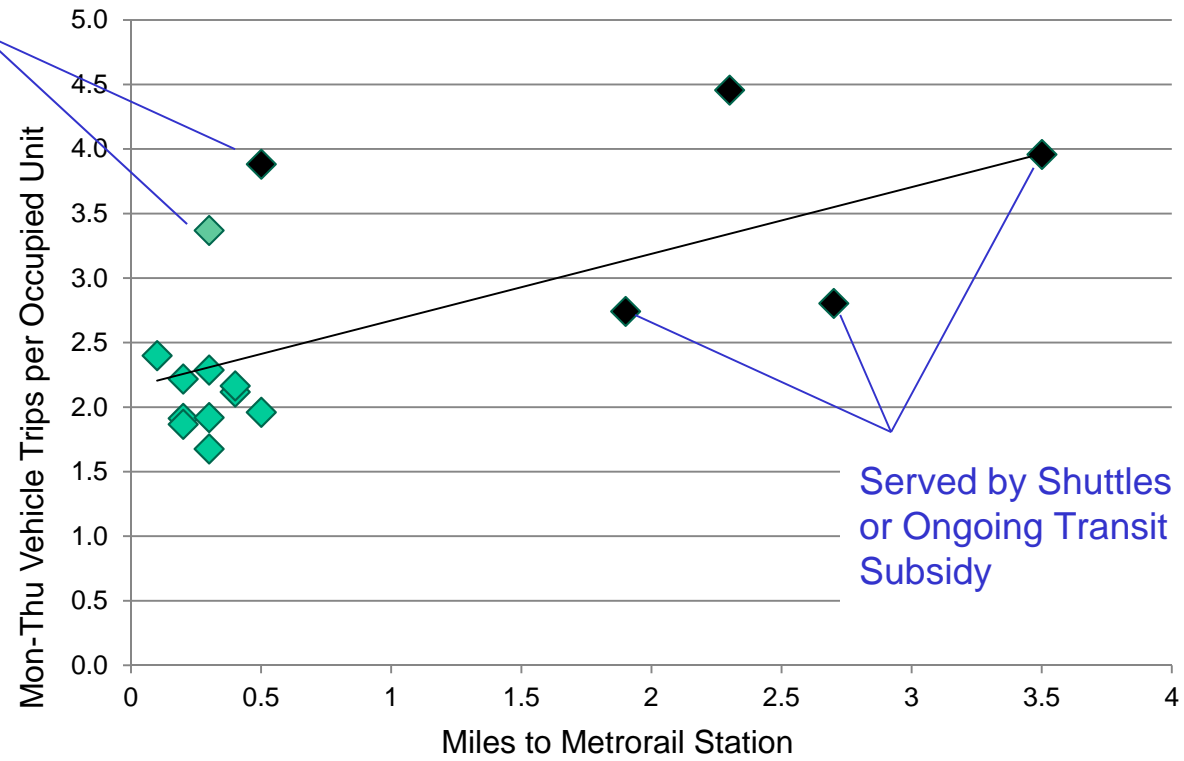
Peak Hour Vehicle Trip Generation Rates



Daily Vehicle Trip Generation Rates

# Buildings Within Metrorail Corridors had Similar Vehicle Trip Generation Rates (1.5 - 2.5 Avg Vehicle Trips per Occupied Unit on Mon-Thu)

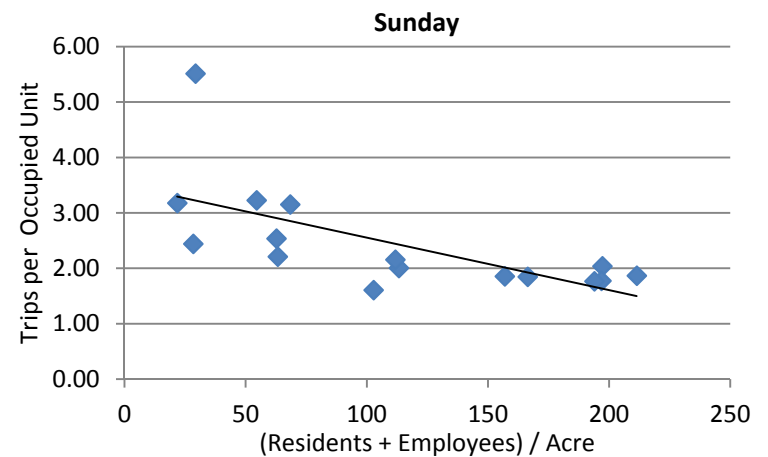
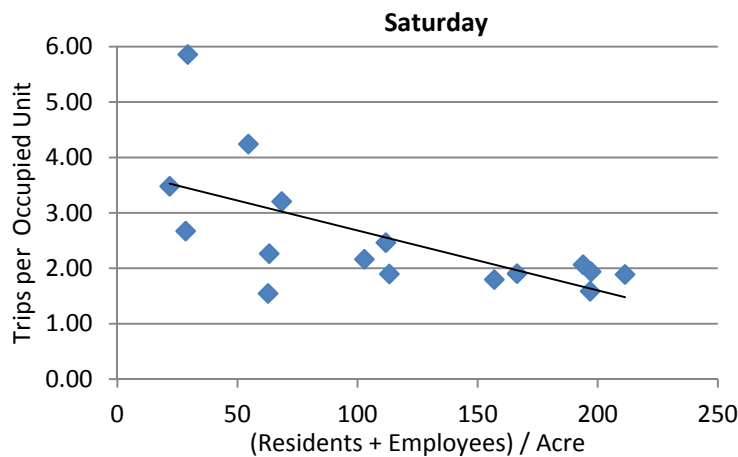
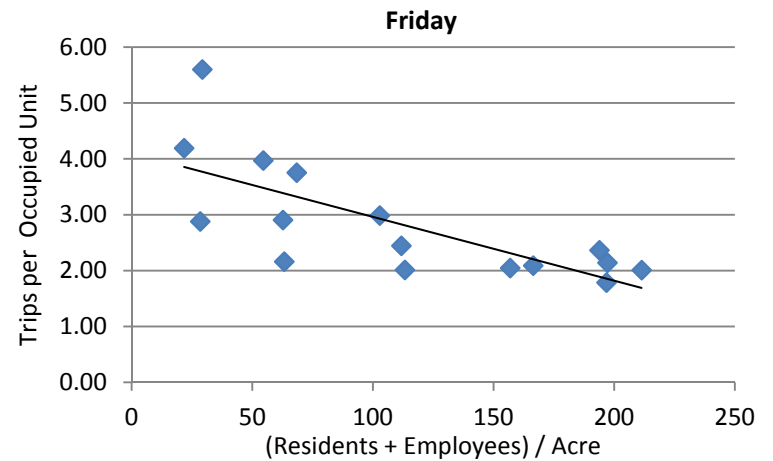
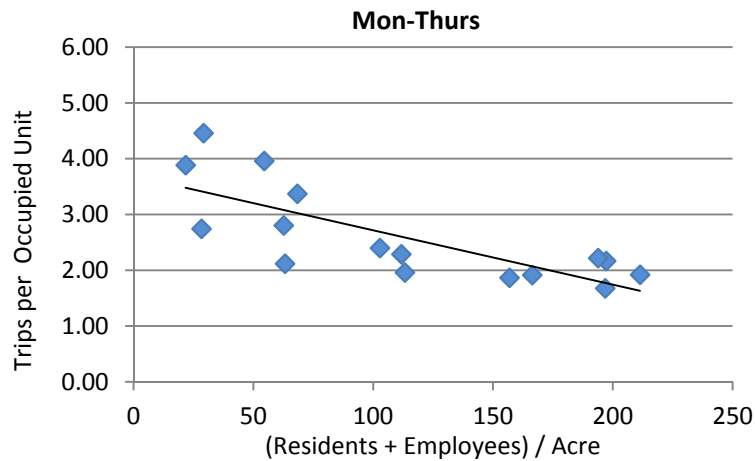
Difference in Land Use (extended stay hotel) and Location (East Falls Church)



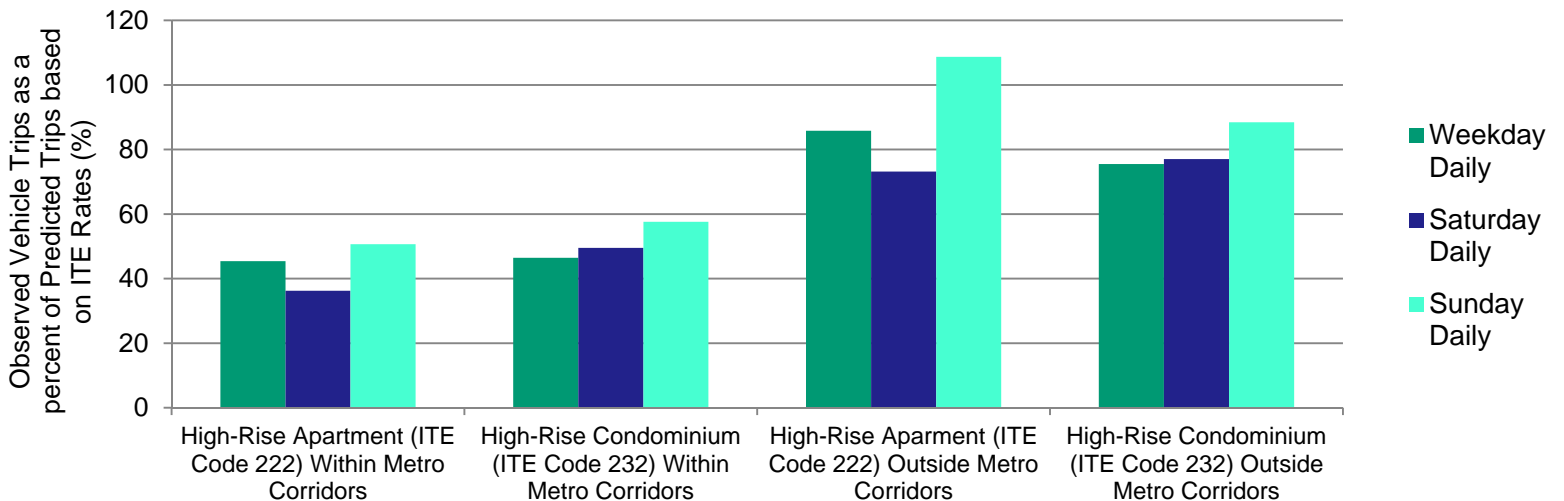
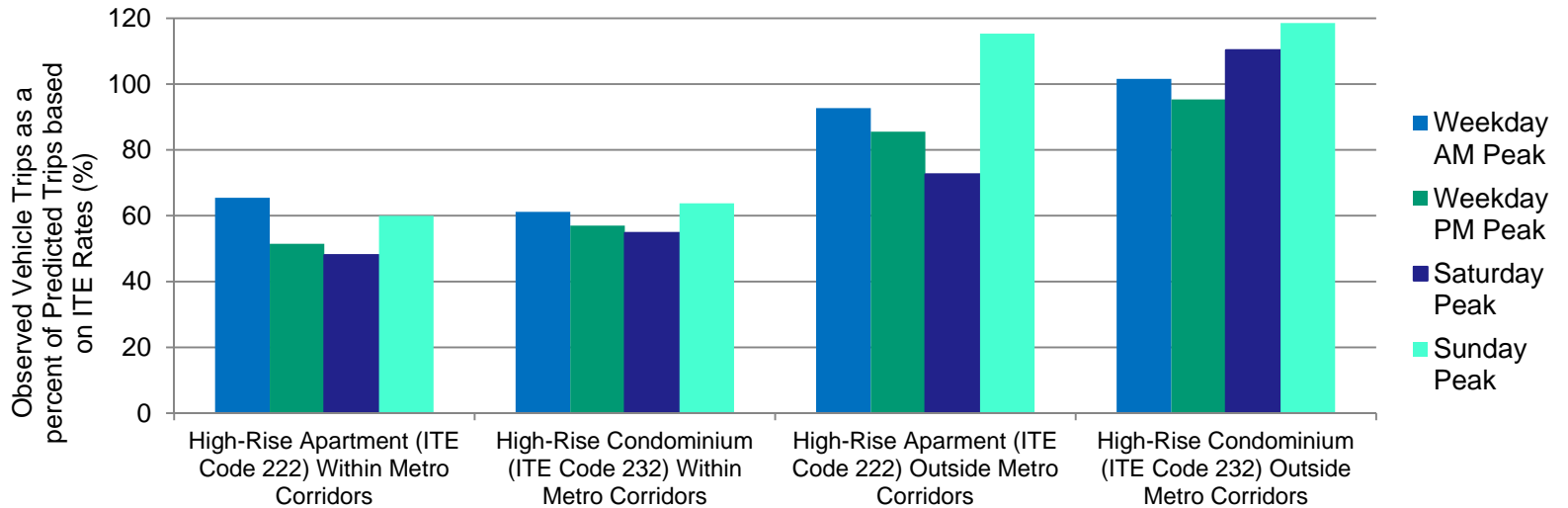
◆ Within Metro Corridors    ◆ Outside Metro Corridors

# Daily Vehicle Trips per Occupied Unit Decreased as Neighborhood Intensity Increased

Neighborhood intensity = Total number of residents and employees per acre within a quarter-mile radius of the building



# Peak hour trips for all days were 35-55% less than the predicted trips for the ITE Codes 222 (Apartments) and 232 (Condos) within the Metro corridors; daily trips were 40-60% less.



**ITE Code 222 Within Corridor n = 3**  
**ITE Code 222 Outside Corridor n = 2**  
**ITE Code 232 Within Corridor n = 6**  
**ITE Code 232 Outside Corridor n = 2**

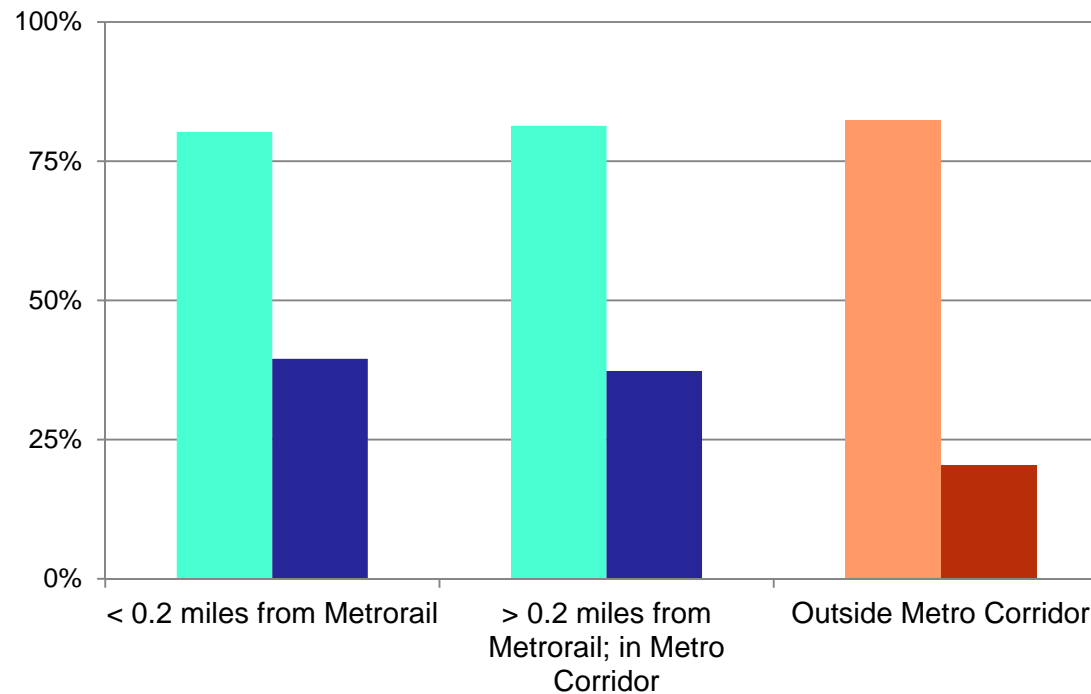


# Behaviors: Vehicle Ownership & Parking

# Few Garages Approached Full Occupancy. Vehicle Usage was Lower within Metrorail Corridors. Occupancy did not correlate to Parking Ratio.

Maximum parking occupancy ranged from 66% to 96%.

Minimum parking occupancy ranged from 5% to 47%.



< 0.2 miles from Metro  
n = 4

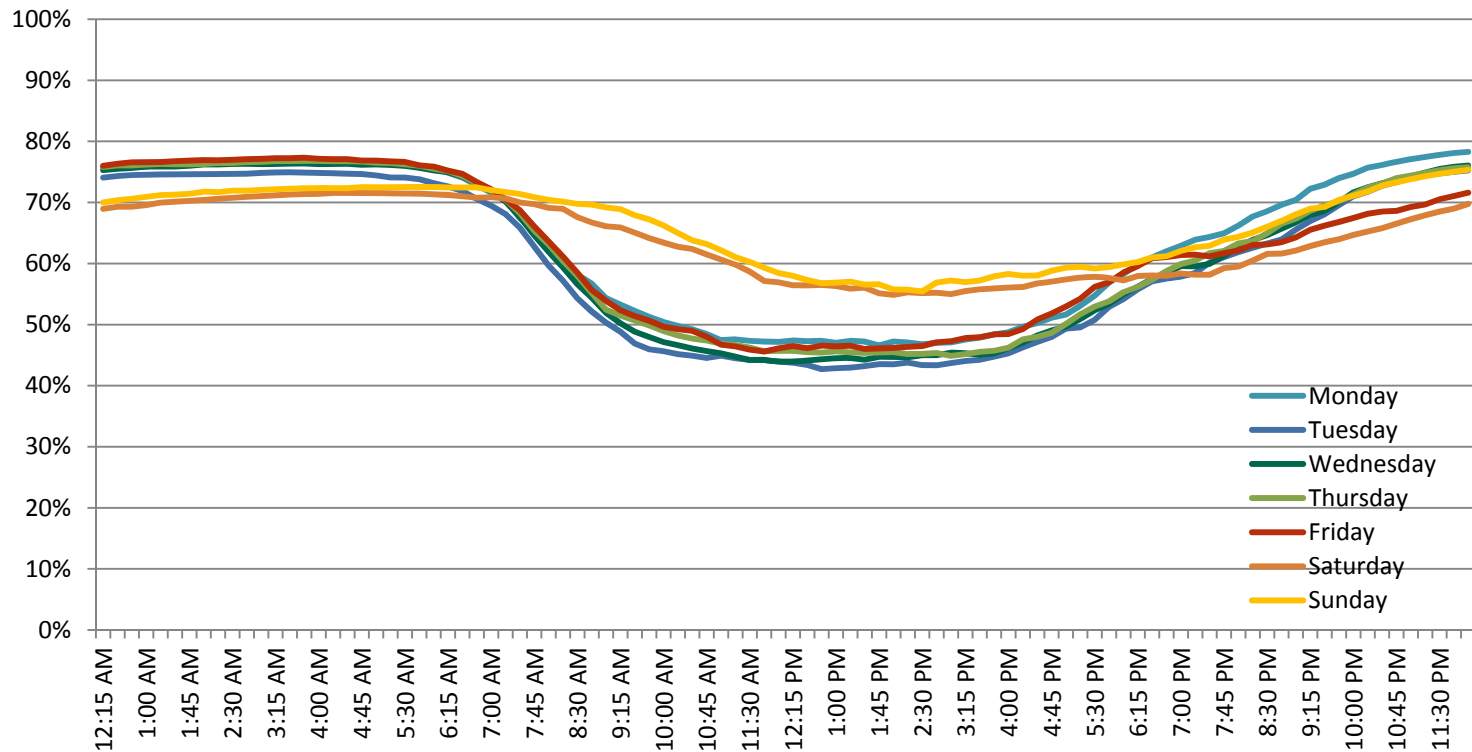
> 0.2 miles from Metro; in corridor  
n = 6

Outside Metro corridor  
n = 3

- █ Max Parking Occupancy Inside Metrorail Corridors
- █ Min Parking Occupancy Inside Metrorail Corridors
- █ Max Parking Occupancy Outside Metrorail Corridors
- █ Min Parking Occupancy Outside Metrorail Corridors

# Weekday and Weekend Occupancy Showed Consistent Trends, with a Difference in Fri and Sat PM

Average Parking Occupancy for Buildings in Metro Corridors, % of Total Spaces

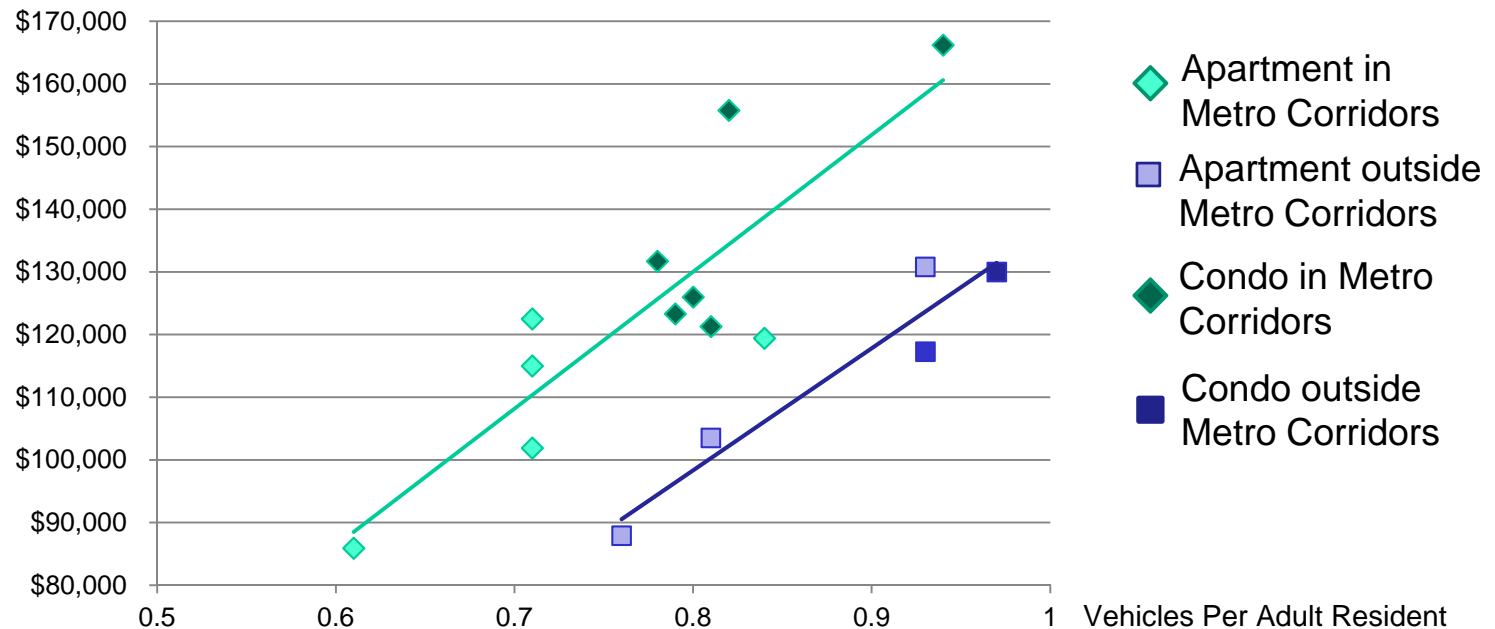


- Friday evening occupancy is similar to Saturday evening
- Sunday evening occupancy is similar to weekdays
- Weekday occupancy is generally similar

n = 7



## Vehicle Ownership Increased with Average Household Income, and Outside Metro Corridors

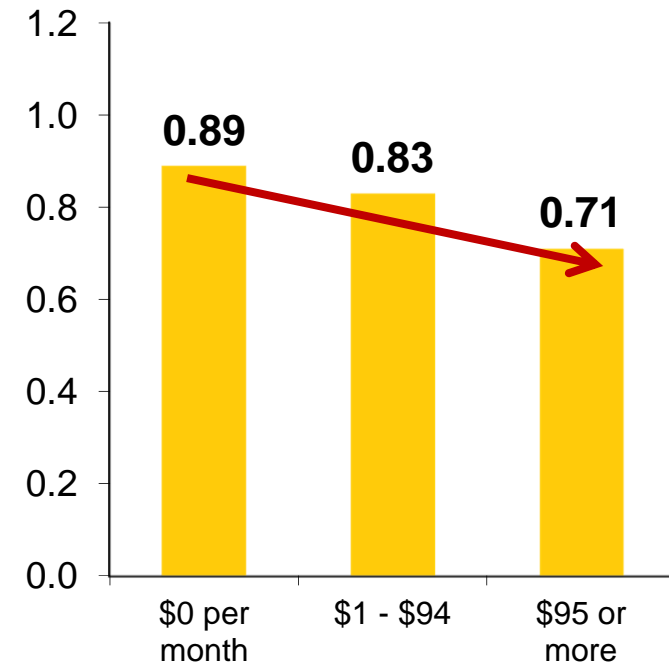
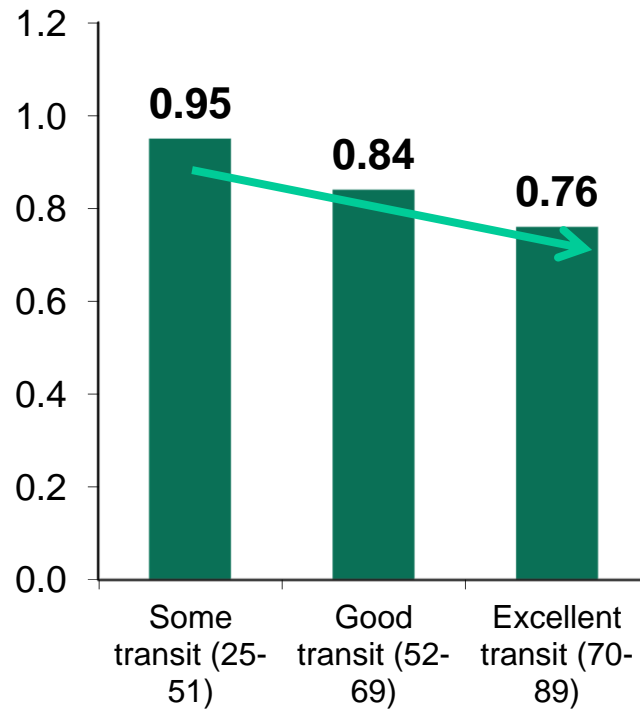


- By location, condos had higher vehicle ownership than apartments. This may be due to the higher average household incomes of condo owners than apartment renters.

Source:  
Resident  
Surveys

# Vehicle Ownership Dropped as Home-Area Transit Improved and the Cost of Residential Parking Went Up

Average vehicles per adult resident



Transit Score

Monthly charge for first regular parking space

### Transit Score

25 – 51  
n = 261

52 – 69  
n = 657

70 - 89  
n = 397

90 – 100  
n = 0

### Cost per month

\$0 per month  
n = 629

\$1 to \$75  
n = 487

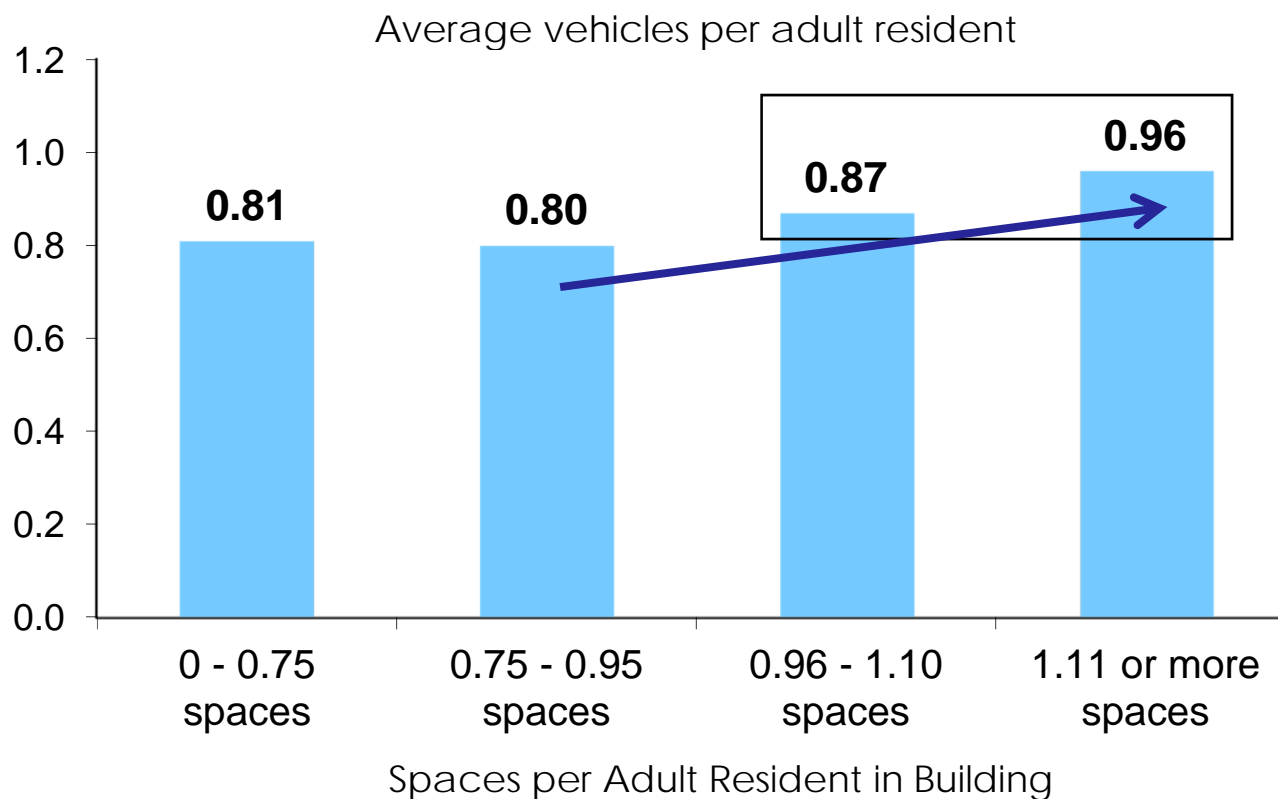
\$76 or more  
n = 199

Q31 In total, how many motor vehicles, in working condition, including automobiles, trucks, vans, and highway motorcycles, are owned or leased by members of your household?

Q32 Including yourself, how many persons live in your household?

Source:  
Resident  
Surveys

## Vehicle Ownership was Highest when the Residential Building had Parking for All Adult Residents



### Spaces per adult resident

0 to 0.75  
n = 429

0.76 to 0.95  
n = 480

0.96 to 1.10  
n = 209

1.11 or more  
n = 197

Q31 In total, how many motor vehicles, in working condition, including automobiles, trucks, vans, and highway motorcycles, are owned or leased by members of your household?

Q32 Including yourself, how many persons live in your household?

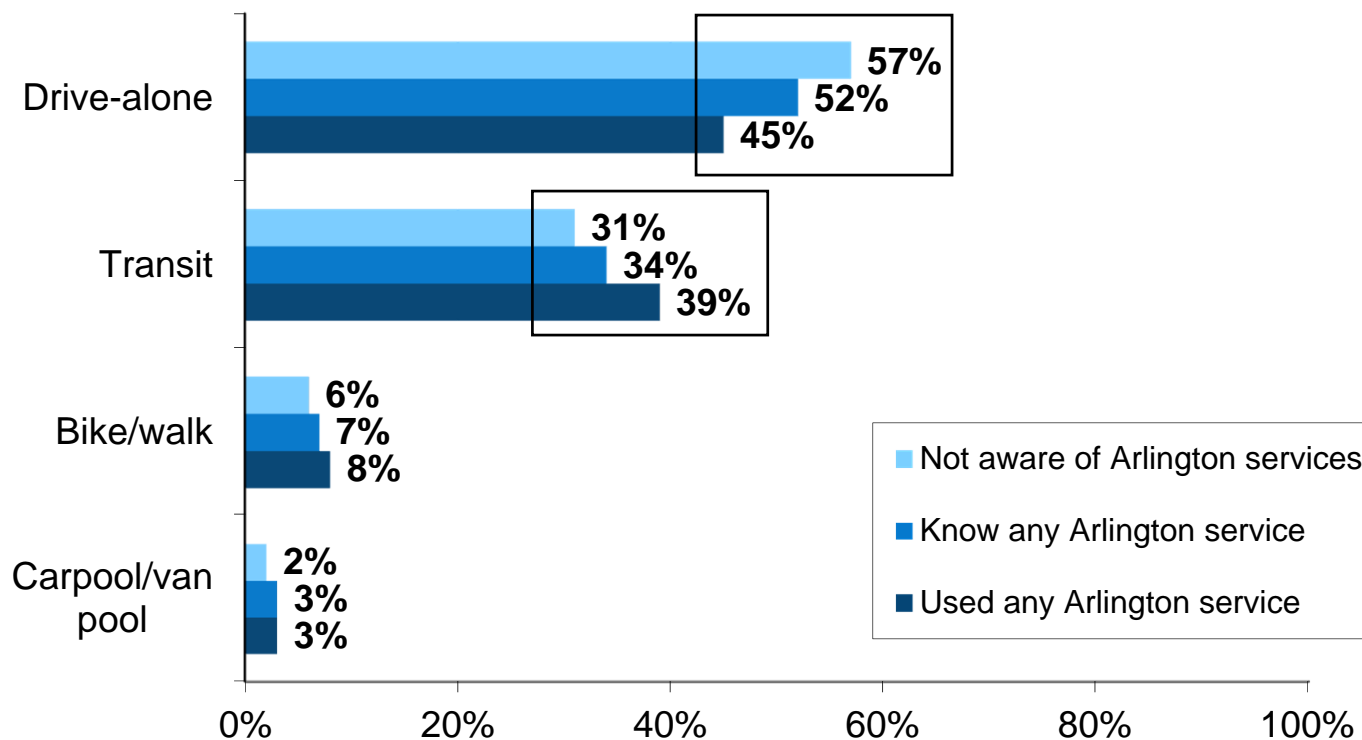


# Awareness, Preferences & Influence

Source:  
Resident  
Surveys

# Study Residents who Knew of Arlington TDM Services Drove Alone to Work Less and Used Transit More than Residents who Did Not Know of the Services

Those who USE Arlington services drive alone even less



Mode split - All weekly commute trips

Not aware of services  
n = 179

Aware of services  
n = 1,104

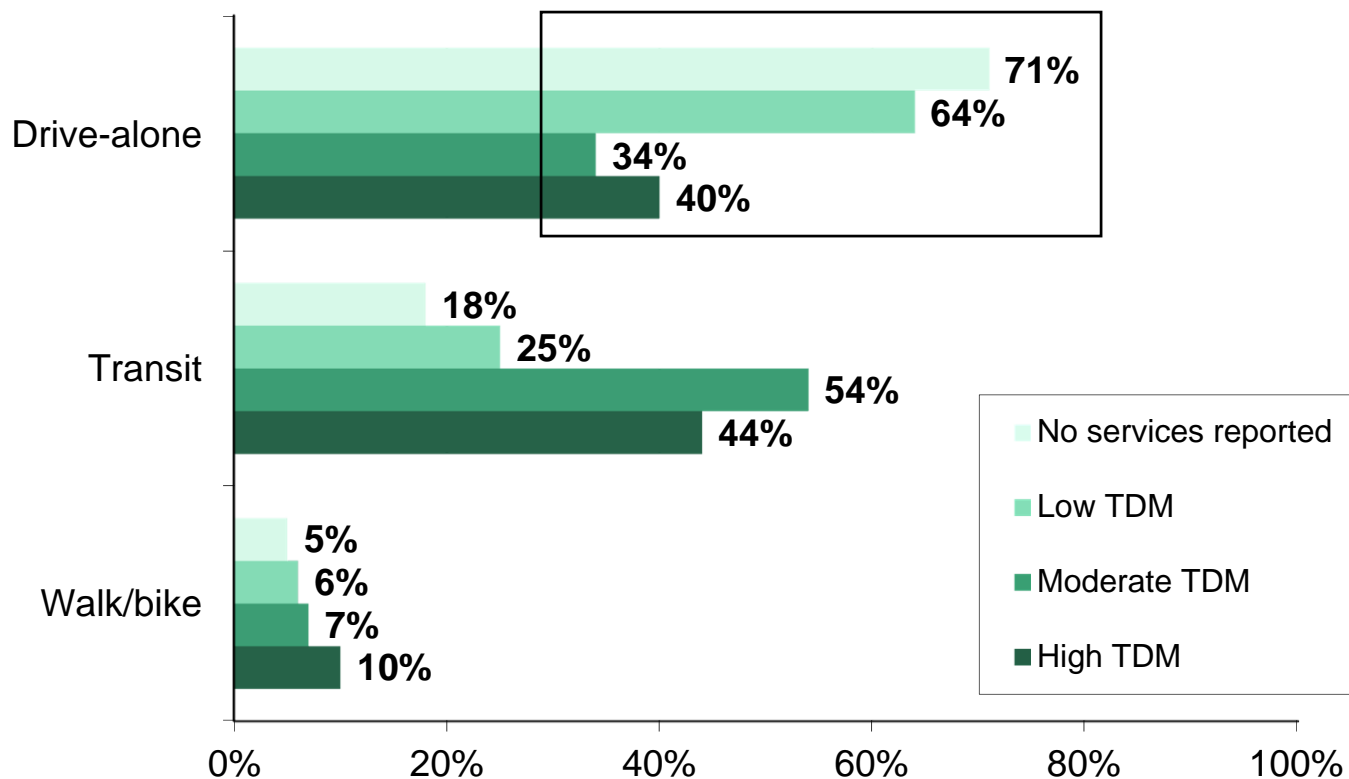
Used services  
n = 629

Note:  
respondents who  
"used services"  
also are included  
in the "aware of  
services" group

Q28 Shown below is a list of organizations and programs that provide transportation information and assistance to Arlington residents and employees. For each, please indicate ... if you have used services of the organization, you have heard of the organization but have not used it, you don't know of the organization.

Source:  
Resident  
Surveys

## Only about 4 in 10 Employees Who had Access to Moderate to High Worksite TDM Drove Alone, vs About 7 in 10 Who Didn't have Robust Services



Mode split - All weekly commute trips

No services reported  
n = 279

Low TDM  
n = 401

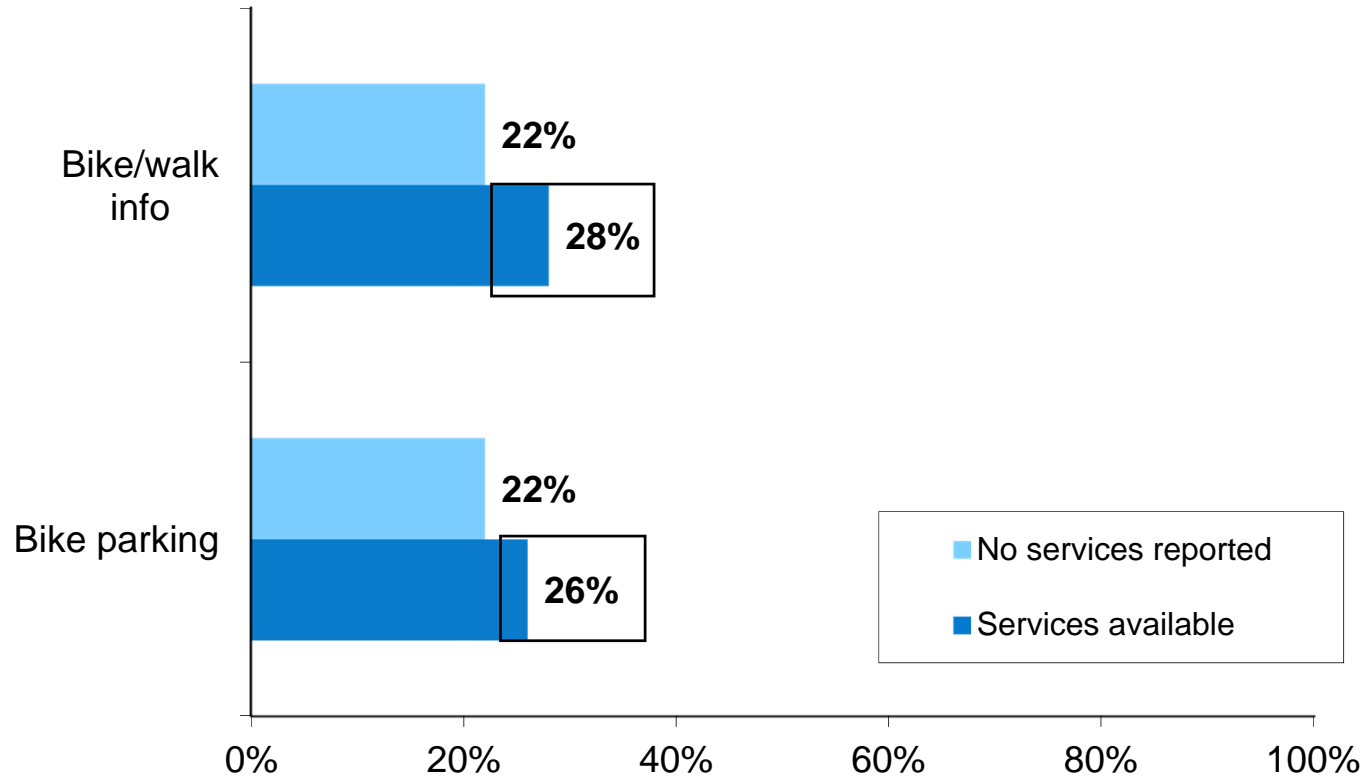
Moderate TDM  
n = 226

High TDM  
n = 353

Q25 Listed below are travel services or benefits that might be available at your work. For each service or benefit, indicate ... if the service: is available and you have used it, is available and you have not used it, is not available.

Source:  
Resident  
Surveys

## Availability of Individual Bike/Walk Services Seems to Support Use of Bike/Walk for Non-work Trips



**Bike/walk** Mode split – Typical day **Non-Work** Trips

### Bike/walk info

No services  
n = 569

Available, used  
n = 847

### Bike parking

No services  
n = 440

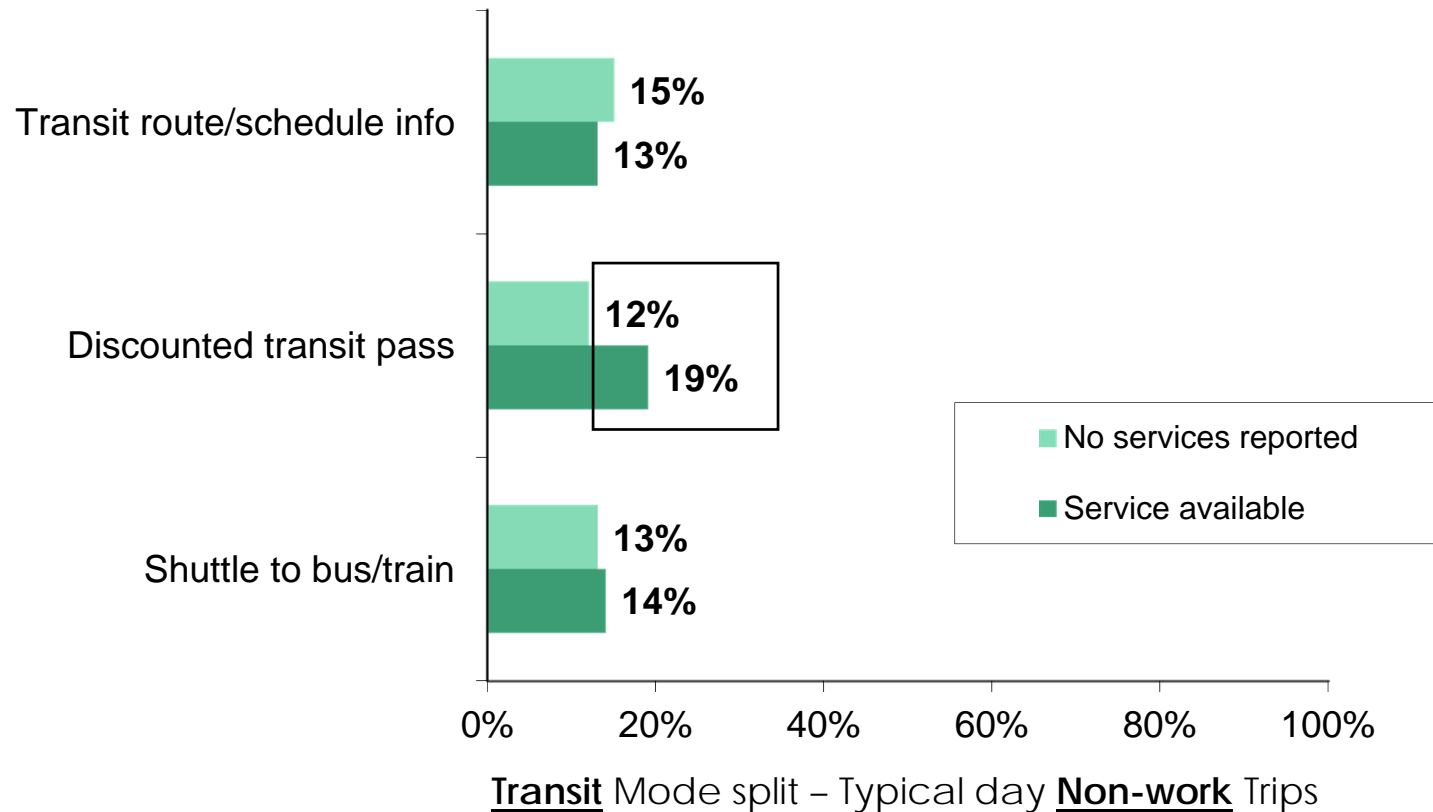
Available  
n = 976

Q26 Listed below are travel services or benefits that might be available at the building or in the complex where you live.... For each service or benefit, indicate ... if the service: is available and you have used it, is available and you have not used it, is not available – Bicycle or walking information; Secure parking for bicycles

Source:  
Resident  
Surveys

## And Availability of a Discounted Transit Pass Appears to Influence Non-work Transit Use

No difference for transit info or shuttle, but some respondents might have reported regular route transit as shuttle availability



### Transit info

No services  
n = 456

Available  
n = 960

### Transit pass

No services  
n = 1,179

Available  
n = 237

### Shuttle

No services  
n = 973

Available  
n = 443

Q26 Listed below are travel services or benefits that might be available at the building or in the complex where you live.... For each service or benefit, indicate ... if the service: is available and you have used it, is available and you have not used it, is not available – Transit schedule or route information; Shuttle





# Future Research Needs

# Future Research

## Residential Buildings

- Are there differences in travel or parking behavior for CAFs (affordable housing) or “edge sites”?
- Bike and pedestrian trip data

## Commercial Buildings

- FY 2014 study of 20-24 buildings
- Site plans and non-site plans
- Lessons learned from 2009 commercial and 2013 residential building studies
- Responding to continued need for more information about commercial parking demand and trip generation
- Data collection October 2013-July 2014; Analysis in Fall FY15