HANDOUTS

from previous meeting

July 15, 2008

Commuter Connections 2005-2008 TERM Analysis Results

Interim Report – Draft

July 15, 2008

LDA Consulting
with
ESTC, CIC Research, and CUTR

LDA CONSULTING

Analysis Objective

- **Estimate effectiveness of Commuter Operations Center and five TERMs**
  - **Maryland and Virginia Telework**
  - **Guaranteed Ride Home**
  - **Employer Outreach**
  - **Mass Marketing**
  - **InfoExpress Kiosks**
- **Effectiveness measures: participants, placements, and reductions in vehicle trips, VMT, and emissions**

Impacts for All TERMs – 7/05-12/07

Comparison of collective goals against collective impacts – including COC

	Goal	Impact	Net
Trips reduced	52,976	66,056	13,080
VMT reduced	1,221,586	1,536,181	314,595
NOx reduced	0.614 T	0.725 T	0.111 T
VOC reduced	0.353 T	0.398 T	0.046 T

Met all goals

Maryland and Virginia Telework

- **Direct assistance to commuters**
  - **9.6% of regional teleworkers cited CC/TW as their source of TW info = 43,700 new teleworkers**
- **Assistance to employers – workshops, information materials**
  - **4.1% increase in number of teleworkers at assisted worksites = 5,300 new teleworkers**
- **49,000 new teleworkers**
  - **Each teleworker reduced 2.2 vehicle trips and 42 VMT each week**

MD and VA Telework Impacts

	Goal	Impact	Net
Number of TWs	31,854	49,027	17,173
Trips reduced	11,830	21,866	10,036
VMT reduced	241,209	413,703	172,495
NOx reduced	0.122 T	0.211 T	(0.088 T)
VOC reduced	0.072 T	0.127 T	(0.055 T)

Impacts represent only MVTW contribution to regional teleworking (about 11% of regional TC trips reduced)

GRH TERM

- 22,100 commuters in GRH in December 2007
- 12,661 commuters joined GRH from 7/05 – 12/07
  - 38% started using new alt mode, but some alt mode users shifted from another alt mode
  - New users reduced 1.0 vehicle trips and 27 VMT daily
- VMT results were discounted to count only VMT reduced within the MSA – GRH registrants who live outside the MSA received only partial credit
- GRH results discounted to share a small amount of credit with Mass Marketing TERM

GRH Impacts

	Goal	Impact	Net
GRH participants	36,992	22,099	(14,893)
Apps 7/05 – 12/07	N/A	12,661	N/A
Trips reduced	12,593	8,245	(4,128)
VMT reduced	355,136	221,136	(133,347)
NOx reduced	0.177 T	0.103 T	(0.073 T)
VOC reduced	0.097 T	0.055 T	(0.042 T)

Employer Outreach

- **Impacts calculated only for employers with new or expanded programs since June 2005 – don't count "maintained" employers**
  - **40 new employers with Level 3-4 program**
  - **49 employers expanded their programs**
  - **52,700 employees**
  - **16% reduction in vehicle trips from pre-program**
- **Eliminate impact overlap with EO-Bike and TW**
  - **28 employers offered bike services**
  - **15,000 employees at bike worksites**
  - **0.5% reduction in vehicle trips from bike (net of other EO impacts)**

Employer Outreach

	Goal	Impact	Net
Level 3-4 empl.	581	NA	N/A
New/expanded			
Employers	96	89	(7)
Trips reduced	8,618	12,702	4,084
VMT reduced	140,622	207,887	207,887
NOx reduced	0.072 T	0.099 T	0.027 T
VOC reduced	0.046 T	0.058 T	0.012 T

Met all goals – High impact due to high level of programs

Mass Marketing

- **Commuters directly influenced to make mode change (no other CC contact)**
  - **35% of commuters recalled commute messages**
  - **0.1% tried/shifted to alt mode after ad**
  - **0.04% said ad influenced chg = 628 commuters**
- **Commuters influenced to contact CC**
  - **Rideshare requests increased 14% with MM ads**
  - **Very slight increase in GRH with ads (1%)**
  - **MM ads accounted for 12% of new RS apps = 1,814 new alt mode users**
  - **MM ads accounted for 0.3% of new GRH apps = 24 new alt mode users**

BTW Day Results – 2005, 2006, 2007

- **17,700 total riders in three events – 6,846 riders not previously counted in BTW analyses**
  - **79% biked to work before event**
  - **10% new riders after event, 12% increased riding**
  - **74% of new riders continued riding in early winter**
- **Riders who started or increased bike commuting added 1.5 bike days per week during the summer and 0.7 bike days per week in the early winter**
  - **Total new bike trips – 694 per day**
- **49% DA to work on non-bike days**
- **Ave 10.4 miles one way bike commute distance**

Mass Marketing Impacts

	Goal	Impact	Net
Placements	11,023	3,846	(7,187)
Trips reduced	7,759	1,416	(6,343)
VMT reduced	141,231	37,516	(103,715)
NOx reduced	0.072 T	0.018 T	(0.054 T)
VOC reduced	0.044 T	0.009 T	(0.035 T)

43% of VMT impact from "direct influence," 48% from "indirect influence," and 9% from Bike-to-Work event

InfoExpress Kiosks

- **InfoExpress kiosks**
  - **27,600 users obtained travel info from kiosk**
  - **31.2% shifted to alt mode**
  - **Most shifts to transit – 1.3 VTR factor**
- **InfoKiosk results discounted to reflect shorter TERM duration – program ended in January 2007, so impacts were generated for only 19 of the 36-month evaluation period.**

Kiosk Impacts

	Goal	Impact	Net
Placements	N/A	8,627	N/A
Trips reduced	1,178	2,840	1,062
VMT reduced	46,755	53,638	5,883
NOx reduced	0.023 T	0.027 T	0.004 T
VOC reduced	0.013 T	0.016 T	0.003 T

Met all goals for 2008, even with discounted credit

Commuter Operations Center

- **154,150 commuters assisted from 7/05–12/07**
  - **35,500 new or reapply RM/TR requests**
  - **118,650 follow-up requests**
  - **42% placed into new alt modes = 64,450 new alt mode users**
- **VMT results discounted for applicants who live outside the MSA**
- **COC impacts reduced to account for overlap with GRH and MM**

Software Upgrades

- **Ridematch software upgrades**
  - **33% of COC apps recalled receiving transit and/or P&R info on ridematch**
  - **16% used information – either called transit agency or located P&R lot**
  - **4.8% used info to change modes**
  - **Ave daily reductions – 0.52 vehicle trips and 17 VMT**
- **VMT discounted for applicants who live outside the MSA**

COC Impacts- basic services

	Goal	Impact	Net
Total apps	152,356	154,147	1,791
Trips reduced	10,399	14,993	4,594
VMT reduced	296,635	480,450	183,815
NOx reduced	0.147 T	0.213 T	0.066 T
VOC reduced	0.081 T	0.107 T	0.026 T

Met all goals

Software Upgrade

	Goal	Impact	Net
Placements	N/A	7,393	N/A
Trips reduced	2.370	3,773	1,403
VMT reduced	62,339	122,198	59,859
NOx reduced	0.031 T	0.054 T	0.023 T
VOC reduced	0.017 T	0.026 T	0.009 T

Met all goals

TERM Analysis Observations

- **TERMs were 2% shy of meeting collective goals, but TW, Employer Outreach, and Kiosks met individual goals.**
- **Commuter Operations Center (basic servcies) and Software upgrades also met individual goals.**
- **Commuter Connections programs overall (TERMs + COC) met goals**

TERM Analysis Observations (2)

- **Shortfalls were related to specific issues with each TERM**
  - **GRH – number of participants was much lower than in 2005**
  - **Mass Marketing – much lower "direct influence" impact and lower GRH referrals**
- **New goals, established by COG after the 2005 evaluation, more closely reflected realistic per participant impact from actual behavior change.**

ITEM #2

METROPOLITAN WASHINGTONCOUNCIL OF GOVERNMENTS
COMMUTER CONNECTIONS PROGRAM

TRANSPORTATION EMISSION REDUCTION MEASURE (TERM)
ANALYSIS REPORT
FY 2005-2008

Prepared for:

National Capital Region Transportation Planning Board
Metropolitan Washington Council of Governments
777 North Capitol Street, NE, Suite 300
Washington, DC 20002-4239

Prepared by:

LDA Consulting
Washington, DC
202-548-0205

In association with:

CIC Research, Inc., San Diego, CA
ESTC, San Diego, CA
Center for Urban Transportation Research, Tampa, FL

Draft
June 30, 2008

EXECUTIVE SUMMARY

BACKGROUND

This report presents the results of an evaluation of five Transportation Emission Reduction Measures (TERMs), voluntary Transportation Demand Management (TDM) measures implemented by the National Capital Region Transportation Planning Board's Commuter Connections program at the Metropolitan Washington Council of Governments (COG) to support the Washington, DC metropolitan region's air quality conformity determination. This evaluation documents transportation and air quality impacts for the 36-month period between July 1, 2005 and June 30, 2008, for the following TERMs:

- Maryland and Virginia Telework – Provides information and assistance to commuters and employers to further in-home and telecenter-based telework programs.
- Guaranteed Ride Home – Eliminates a barrier to use of alternative modes by providing free rides home in the event of an unexpected personal emergency or unscheduled overtime to commuters who use alternative modes.
- Employer Outreach – Provides regional outreach to encourage large, private-sector employers voluntarily to implement commuter assistance strategies that will contribute to reducing vehicle trips to worksites, including the efforts of jurisdiction sales representatives to foster new and improved in-house trip reduction programs.
- Mass Marketing – Involves a large-scale, comprehensive media campaign to inform the region's commuters of services available from Commuter Connections as one way to address commuters' frustration about the commute.
- InfoExpress Kiosks – Involves self-service electronic kiosks located in the District of Columbia and in northern Virginia that offer information on commute options and allow for remote submittal of ridematch and GRH registration applications.

COG's National Capital Transportation Planning Board (TPB), the designated Metropolitan Planning Organization (MPO) for the Washington, DC metropolitan region, adopted these TERMs, among others, in recent regional Transportation Improvement Programs (TIP) to help the region reach emission reduction targets that would maintain a positive air quality conformity determination for the region. It is also important to note that the regional travel demand model was calibrated and validated against the year 2000 traffic counts and regional emission credits are only taken for TERM benefits that occurred after the year 2000 in the regional TERM tracking sheet and may not be consistent with results in this report.

COG's Commuter Connections program, which also operates an ongoing regional rideshare program, is the central administrator of the TERMs noted above. Commuter Connections elected to include a vigorous evaluation element in the implementation plan for each of the adopted TERMs to develop information to be used to guide sound decision-making about the TERMs. This report summarizes the results of the TERM evaluation activities and presents the transportation and air quality impacts of the TERMs and the Commuter Operations Center (COC).

This evaluation represents a quite comprehensive evaluation for these programs. It should be noted that the evaluation still remains conservative in the sense that it includes credit only for impacts that can be reasonably documented with accepted measurement methods and tools. However, we also note that many of the calculations used survey data from surveys that are subject to statistical error rates.

A primary purpose of this evaluation was to develop useful and meaningful information for regional transportation and air quality decision-makers, COG staff, COG program funding agencies, and state and local commute assistance program managers to guide sound decision-making about the TERMs. The results of this evaluation will provide valuable information for regional air quality conformity, improve the structure and implementation procedures of the TERMs themselves, and to refine future data collection methodologies and tools.

SUMMARY OF RESULTS

The objective of the evaluation is to estimate reductions in vehicle trips (VT), vehicle miles traveled (VMT), and tons of Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOC) resulting from implementation of each TERM and compare the impacts against the goals established for the TERMs.

The impact results for these measures are shown in Table A for each TERM individually. Results for all TERMs collectively and for the Commuter Operations Center (COC) are presented in Table B. Table C shows comparisons of results from the 2002 and 2005 TERM analyses to the 2008 results. As shown, the TERMS combined met the goals for vehicle trips reduced (net of 4,712 trips reduced) and VMT reduced (8,581 VMT), but fell about two percent short of the goals for reductions in tons of emissions reduced. It's important to note, however, that this calculation does not include the final six months of the three-year evaluation period, thus it is highly likely that the TERMs will meet all goals when the full evaluation period is covered.

When the COC results were added to the TERM impacts, it made up the TERM deficits for reductions in VMT and emissions, such that the combined TERMs plus Commuter Operations Center impacts exceeded the overall goals for the TERMs plus the COC. The totals for all Commuter Connections programs, compared to the goals, were: +13,080 daily vehicle trips reduced, +314,595 daily VMT reduced, +0.111 daily tons of NOx reduced, and +0.046 tons of VOC reduced.

Three of the five TERMs met their individual impact goals. Estimated impacts for Employer Outreach were about 50% over the goal for this TERM, due primarily to the strong worksite commute programs implemented. Impacts for Maryland and Virginia Telework were about twice the goal for the TERM. And the InfoExpress Kiosk TERM met its goal. The COC also exceeded its goal by about 40%.

Impacts for Guaranteed Ride Home were about 33% below the goals for this program. Mass Marketing also missed its estimated target, by a substantial amount. The impacts for these programs also are likely to be higher when the full evaluation period is included in the calculation, thus these deficits will decline.

The reasons for the shortfalls from the goals vary by TERM and are discussed in individual report sections on each TERM.

Table A
Summary of Results for Individual TERMs (7/05– 6/08) and Comparison to Goals

TERM	Participation [2]	Daily Vehicle Trips Reduced	Daily VMT Reduced	Daily Tons NOx Reduced	Daily Tons VOC Reduced
Maryland and Virginia Telework [1]					
2008 Goal		11,830	241,208	0.122	0.072
Impacts (7/05 – 6/08)	49,027	21,866	413,703	0.211	0.127
Net Credit or (Deficit)		**10,036**	**172,495**	**0.088**	**0.055**
Guaranteed Ride Home					
2008 Goal		12,593	355,135	0.177	0.097
Impacts (7/05 – 6/08)	8,269	8,465	221,788	0.104	0.055
Net Credit or (Deficit)		**(4,128)**	**(133,347)**	**(0.073)**	**(0.042)**
Employer Outreach – new employer services since July 2005					
2008 Goal		8,618	140,622	0.072	0.046
Impacts (7/05 – 6/08)		12,702	207,887	0.099	0.058
Net Credit or (Deficit)		**4,084**	**67,265**	**0.026**	**0.012**
Employer Outreach – Bike					
2008 Goal		130	567	0.0010	0.0005
Impacts (7/05 – 6/08)		58	351	0.0004	0.0002
Net Credit or (Deficit)		**(72)**	**(216)**	**(0.0006)**	**(0.0003)**
Mass Marketing					
2008 Goal		7,758	141,231	0.072	0.044
Impacts (7/05 – 6/08)	3,836	1,416	37,516	0.018	0.009
Net Credit or (Deficit)		**(6,342)**	**(103,715)**	**(0.054)**	**(0.035)**
InfoExpress Kiosks					
2008 Goal		1,778	46,755	0.023	0.013
Impacts (7/05 – 6/08)	8,627	2,840	52,638	0.027	0.016
Net Credit or (Deficit)		**1,062**	**5,883**	**0.004**	**0.003**

1) Impact represents portion of regional telecommuting attributable to TERM-related activities. Total telecommuting credited for conformity is higher than reported for the TERM.

2) Participation refers to number of commuters participating, except for the Employer Outreach TERM. For this TERM, participation equals the number of employers participating.

Table B
Summary of TERM and COC Results (7/05 – 6/08) and Comparison to Goals

TERM	Participation [1)]	Daily Vehicle Trips Reduced	Daily VMT Reduced	Daily Tons NOx Reduced	Daily Tons VOC Reduced
TERMS (all TERMs collectively)					
2008 Goal		42,577	924,951	0.4666	0.2717
Impacts (7/05 – 6/08)	69,759	47,289	933,532	0.4576	0.2650
Net Credit or (Deficit)		**4,712**	**8,581**	**(0.009)**	**(0.007)**
Commuter Operations Center					
2008 Goal		10,399	296,635	0.147	0.081
Impacts (7/05 – 6/08)	51,927	14,993	480,450	0.213	0.107
Net Credit or (Deficit)		**4,594**	**183,815**	**0.066**	**0.026**
Commuter Operations Center – Software Upgrades					
2008 Goal		2,370	62,339	0.031	0.017
Impacts (7/05 – 6/08)	7,200	3,773	121,198	0.054	0.026
Net Credit or (Deficit)		**1,403**	**59,859**	**0.023**	**0.009**
All TERMS plus COC					
2008 Goal		52,976	1,221,586	0.614	0.353
Impacts (7/05 – 6/058	128,886	66,056	1,536,181	0.725	0.398
Net Credit or (Deficit)		**13,080**	**314,595**	**0.111**	**0.046**

1) Participation refers to number of commuters participating, except for the Employer Outreach TERM. For this TERM, participation equals the number of employers participating.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i
Background
Summary of Results

SECTION 1 – INTRODUCTION 1
Purpose of the Report
Organization of the Report

SECTION 2 – OVERALL SUMMARY OF RESULTS 4

SECTION 3 – HIGHLIGHTS OF REVISED EVALUATION METHODOLOGY 7
Background
Evaluation Methodology Overview
Revised Evaluation Framework
Nature of the Evaluation Approach as Compared to Other Regions

SECTION 4 – MARYLAND AND VIRGINIA TELEWORK 13
Background
Evaluation Methodology and Data Sources
Maryland and Virginia Telework Summary of Goals and Impacts

SECTION 5 - GUARANTEE RIDE HOME 16
Background
Evaluation Methodology and Data Sources
GRH Summary of Goals and Impacts

SECTION 6 - EMPLOYER OUTREACH 19
Background
Evaluation Methodology and Data Sources
- Calculation of Impacts – Employer Outreach base
- Calculation of Impacts – Employer Outreach – bicycling programs
Employer Outreach Summary of Goals and Impacts

SECTION 7 – MASS MARKETING 24
Background
Evaluation Methodology and Data Sources
Mass Marketing Summary of Goals and Impacts

Table of Contents (cont.)

SECTION 8– INFOEXPRESS KIOSKS 28
Background
Evaluation Methodology and Data Sources
InfoExpress Kiosks Summary of Goals and Impacts

SECTION 9 - COMMUTER OPERATIONS CENTER 31
Background
Evaluation Methodology and Data Sources
Commuter Operations Center Summary of Goals and Impacts

SECTION 10 - CONCLUSIONS ABOUT TERM IMPACTS 36
Maryland and Virginia Telework
Guaranteed Ride Home
Employer Outreach
Mass Marketing
InfoExpress Kiosks
Commuter Operations Center

LIST OF APPENDICES 39

APPENDIX 1 - CALCULATION OF MARYLAND AND VIRGINIA TELEWORK IMPACTS
APPENDIX 2 - CALCULATION OF GUARANTEED RIDE HOME IMPACTS
APPENDIX 3 - CALCULATION OF EMPLOYER OUTREACH
APPENDIX 4 – CALCULATION OF MASS MARKETING IMPACTS
APPENDIX 5 - CALCULATION OF INTEGRATED RIDESHARE - KIOSK IMPACTS
APPENDIX 6 - CALCULATION OF COMMUTER OPERATIONS CENTER IMPACTS
APPENDIX 7 - CALCULATION OF SOFTWARE UPGRADES IMPACTS

SECTION 1 INTRODUCTION

PURPOSE OF THE REPORT

This report presents the results of an evaluation of five Transportation Emission Reduction Measures (TERMs), voluntary Transportation Demand Management (TDM) measures implemented by the National Capital Region Transportation Planning Board's Commuter Connections program at the Metropolitan Washington Council of Governments (COG) to support the Washington, DC metropolitan region's air quality conformity determination. This evaluation documents transportation and air quality impacts for the 36-month period between July 1, 2005 and June 30, 2008, for the following TERMs:

- Maryland and Virginia Telework – Provides information and assistance to commuters and employers to further in-home and telecenter-based telework programs.
- Guaranteed Ride Home – Eliminates a barrier to use of alternative modes by providing free rides home in the event of an unexpected personal emergency or unscheduled overtime to commuters who use alternative modes.
- Employer Outreach – Provides regional outreach to encourage large, private-sector employers voluntarily to implement commuter assistance strategies that will contribute to reducing vehicle trips to worksites, including the efforts of jurisdiction sales representatives to foster new and improved in-house trip reduction programs.
- Mass Marketing – Involves a large-scale, comprehensive media campaign to inform the region's commuters of services available from Commuter Connections as one way to address commuters' frustration about the commute.
- InfoExpress Kiosks – Involves self-service electronic kiosks located in the District of Columbia and in northern Virginia that offer information on commute options and allow for remote submittal of ridematch and GRH registration applications.

The TPB, the designated Metropolitan Planning Organization (MPO) for the Washington, DC metropolitan region, adopted these TERMs in recent regional Transportation Improvement Programs (TIP) to help the region reach emission reduction targets that would maintain a positive air quality conformity determination for the region. The United States Environmental Protection Agency has designated the Washington, DC metropolitan region as a "moderate" ozone non-attainment area. No regional mandates have been adopted that would require the reduction of nitrogen oxides (NOx) or the implementation of any specific mitigation measure. But COG's Travel Management Subcommittee developed and analyzed regional TERMs and the TPB adopted these TERMs in annual TIPs.

COG's Commuter Connections program, which operates an ongoing regional rideshare program, was given responsibility for implementation of the five regional Transportation Demand Management (TDM) TERMs that are described in this report. Commuter Connections is the central administrator of the TERMs, but works with partner organizations, such as local jurisdiction commuter programs and transportation management associations (TMAs) to implement them. Commuter Connections directly provides some client services, such as the regional rideshare database matching service, which are most cost-effectively provided by a central agency. But other services are offered by local organizations and coordinated regionally by the Commuter Connections Subcommittee, a coordinating body comprised of state and local government agencies in the region, several large federal employers, a number of TMAs, and other partner organizations.

At the early stages of implementation of the TERMs, the Commuter Connections Subcommittee elected to include a vigorous evaluation element in the implementation plan for each of the adopted TERMs. The purpose of the evaluation was to develop timely, useful, and meaningful information to be used by regional transportation and air quality decision-makers, COG staff, COG program funders, and state and local commute assistance program managers to guide sound decision-making about the TERMs.

This report summarizes the results of the TERM evaluation activities and presents the transportation and air quality impacts of the TERMs. The report also documents impacts of the commuter assistance activities of the Commuter Operations Center, which COG operates to provide a basic level of commuter information and ridesharing assistance services throughout the Washington region. Results from this report will be included in the region's conformity analysis determination.

In June 1997, a consultant team was retained to assist Commuter Connections to define an evaluation methodology. This methodology was used for the first triennial evaluation of five TERMs. In 2001, 2004, and 2007, the consultants, along with Commuter Connections, expanded and enhanced the methodologies, data collection tools, and data sources to expand the coverage, corroborate assumptions, and enhance the reliability of the evaluation estimates. Section 3 presents highlights of the changes made to the methodology in this updated framework. Readers who desire additional details on the methodology are directed to the report entitled, "Commuter Connections' Transportation Demand Management Evaluation Project: Transportation Emission Reduction Measures (TERMs) Revised Evaluation Framework, July 2005 – June 2008." This document is available from COG's Information Center or on-line at www.commuterconnections.org.

The data collection activities recommended in the Evaluation Framework report were undertaken by COG or by data collection consultants retained by COG. This report summarizes the results of the evaluation activities and analysis. The report also summarizes the transportation and air quality impacts of commuter assistance activities of the Commuter Operations Center, which COG operates to provide a basic level of commuter information and ridesharing assistance services throughout the Washington region. The COC is not an adopted TERM, but is included in this analysis because its operation supports the operation of most of the TDM TERMs.

ORGANIZATION OF THE REPORT

This TERM Analysis Report is divided into 9 sections following this Introduction section:

- Section 2 Overall Summary of Results
- Section 3 Highlights of Revised Evaluation Methodology
- Section 4 Maryland and Virginia Telework
- Section 5 Guaranteed Ride Home
- Section 6 Employer Outreach
- Section 7 Mass Marketing
- Section 8 InfoExpress Kiosks
- Section 9 Commuter Operations Center
- Section 10 Conclusions About TERM Impacts

Section 2 summarizes the overall results for each TERM individually and for all TERMs plus the Commuter Operations Center collectively. Section 3 presents highlights of the revised evaluation methodology developed in 2007 for the 2005-2008 evaluation period. Sections 4 through 8 present for the each individual TERM, a brief description of the TERM and its purpose, an overview of the methodology used to estimate the TERM's impacts and the data used in the analysis, and a comparison of the measured impacts against the goals set for the TERM. Section 9 presents similar information for the Commuter Operations Center. The final section, Section 10, presents general conclusions from the analysis.

Summaries of the calculations of transportation and air quality impacts of individual TERMs also are included, in appendices following the body of the report.

SECTION 2 OVERALL SUMMARY OF RESULTS

The objective of the evaluation was to estimate the reductions in vehicle trips, vehicle miles traveled (VMT), and tons of Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOC) resulting from the implementation of each regional Commuter Connections TERM between July 2005 and June 2008 and to compare these measured impacts against the goals established for the TERMs. The Revised Evaluation Framework document finalized in May 2007 also recommended that other performance measures be tracked for these TERMs to assess levels of program participation, utilization, satisfaction, and cost-effectiveness. These measures are tracked by Commuter Connections on a monthly and annual basis for the TERMs and are reported in other documents.

The objective of the evaluation is to estimate reductions in vehicle trips (VT), vehicle miles traveled (VMT), and tons of Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOC) resulting from implementation of each TERM and compare the impacts against the goals established for the TERMs.

The impact results for these measures are shown in Table A for each TERM individually. Results for all TERMs collectively and for the Commuter Operations Center (COC) are presented in Table B. Table C shows comparisons of results from the 2002 and 2005 TERM analyses to the 2008 results. As shown, the TERMS combined met the goals for vehicle trips reduced (net of 4,712 trips reduced) and VMT reduced (8,581 VMT), but fell about two percent short of the goals for reductions in tons of emissions reduced. It's important to note, however, that this calculation does not include the final six months of the three-year evaluation period, thus it is highly likely that the TERMs will meet all goals when the full evaluation period is covered.

When the COC results were added to the TERM impacts, it made up the TERM deficits for reductions in VMT and emissions, such that the combined TERMs plus Commuter Operations Center impacts exceeded the overall goals for the TERMs plus the COC. The totals for all Commuter Connections programs, compared to the goals, were: +13,080 daily vehicle trips reduced, +314,595 daily VMT reduced, +0.111 daily tons of NOx reduced, and +0.046 tons of VOC reduced.

Three of the five TERMs met their individual impact goals. Estimated impacts for Employer Outreach were about 50% over the goal for this TERM, due primarily to the strong worksite commute programs implemented. Impacts for Maryland and Virginia Telework were about twice the goal for the TERM. And the InfoExpress Kiosk TERM met its goal. The COC also exceeded its goal by about 40%.

Impacts for Guaranteed Ride Home were about 33% below the goals for this program. Mass Marketing also missed its estimated target, by a substantial amount. The impacts for these programs also are likely to be higher when the full evaluation period is included in the calculation, thus these deficits will decline.

The reasons for the shortfalls from the goals vary by TERM and are discussed in individual report sections on each TERM.

Table 1
Summary of Results for Individual TERMs (7/05– 6/08) and Comparison to Goals

TERM	Participation [2]	Daily Vehicle Trips Reduced	Daily VMT Reduced	Daily Tons NOx Reduced	Daily Tons VOC Reduced
Maryland and Virginia Telework [1]					
2008 Goal		11,830	241,208	0.122	0.072
Impacts (7/05 – 6/08)	49,027	21,866	413,703	0.211	0.127
Net Credit or (Deficit)		**10,036**	**172,495**	**0.088**	**0.055**
Guaranteed Ride Home					
2008 Goal		12,593	355,135	0.177	0.097
Impacts (7/05 – 6/08)	8,269	8,465	221,788	0.104	0.055
Net Credit or (Deficit)		**(4,128)**	**(133,347)**	**(0.073)**	**(0.042)**
Employer Outreach – new employer services since July 2005					
2008 Goal		8,618	140,622	0.072	0.046
Impacts (7/05 – 6/08)		12,702	207,887	0.099	0.058
Net Credit or (Deficit)		**4,084**	**67,265**	**0.026**	**0.012**
Employer Outreach – Bike					
2008 Goal		130	567	0.0010	0.0005
Impacts (7/05 – 6/08)		58	351	0.0004	0.0002
Net Credit or (Deficit)		**(72)**	**(216)**	**(0.0006)**	**(0.0003)**
Mass Marketing					
2008 Goal		7,758	141,231	0.072	0.044
Impacts (7/05 – 6/08)	3,836	1,416	37,516	0.018	0.009
Net Credit or (Deficit)		**(6,342)**	**(103,715)**	**(0.054)**	**(0.035)**
InfoExpress Kiosks					
2008 Goal		1,778	46,755	0.023	0.013
Impacts (7/05 – 6/08)	8,627	2840	52,638	0.027	0.016
Net Credit or (Deficit)		**1,062**	**5,883**	**0.004**	**0.003**

1) Impact represents portion of regional telecommuting attributable to TERM-related activities. Total telecommuting credited for conformity is higher than reported for the TERM.

2) Participation refers to number of commuters participating, except for the Employer Outreach TERM. For this TERM, participation equals the number of employers participating.

Table 2
Summary of TERM and COC Results (7/05 – 6/08) and Comparison to Goals

TERM	Participation [1)]	Daily Vehicle Trips Reduced	Daily VMT Reduced	Daily Tons NOx Reduced	Daily Tons VOC Reduced
TERMS (all TERMs collectively)					
2008 Goal		42,577	924,951	0.4666	0.2717
Impacts (7/05 – 6/08)	69,759	47,289	933,532	0.4576	0.2650
Net Credit or (Deficit)		**4,712**	**8,581**	**(0.009)**	**(0.007)**
Commuter Operations Center					
2008 Goal		10,399	296,635	0.147	0.081
Impacts (7/05 – 6/08)	51,927	14,993	480,450	0.213	0.107
Net Credit or (Deficit)		**4,594**	**183,815**	**0.066**	**0.026**
Commuter Operations Center – Software Upgrades					
2008 Goal		2,370	62,339	0.031	0.017
Impacts (7/05 – 6/08)	7,200	3,773	121,198	0.054	0.026
Net Credit or (Deficit)		**1,403**	**59,859**	**0.023**	**0.009**
All TERMS plus COC					
2008 Goal		52,976	1,221,586	0.614	0.353
Impacts (7/05 – 6/058	128,886	66,056	1,536,181	0.725	0.398
Net Credit or (Deficit)		**13,080**	**314,595**	**0.111**	**0.046**

1) Participation refers to number of commuters participating, except for the Employer Outreach TERM. For this TERM, participation equals the number of employers participating.

SECTION 3 HIGHLIGHTS OF REVISED EVALUATION METHODOLOGY

BACKGROUND

In 1997, consultants selected by COG developed an evaluation framework to guide the collection and analysis of data to estimate the travel and air quality impacts of TDM TERMs adopted by COG's TPB. This methodology described evaluation objectives, performance measures for each TERM, data needs and data collection tools and sources, and analysis and calculation steps to be used to estimate travel, air quality, energy, and consumer cost impacts of the TERMs. The framework also presented recommendations for the evaluation schedule, responsibilities, and reporting of results to maintain and utilize information produced through the evaluation process.

The methodology developed in 1997 was designed to collect sufficient data, using recognized and accepted survey and tracking techniques, to allow TERM effectiveness to be measured with confidence. But it also was designed to be practical and efficient to undertake. The first TERM analysis, conducted in the summer of 1999, reinforced the well-established view that data collection and evaluation for TDM programs can be challenging, especially when the programs are voluntary. Reliable data can be difficult to assemble, assumptions may need to be made using little data, and many factors outside the TDM program can influence results.

The first evaluation made recommendations for several data collection changes that could enhance the accuracy, rigor, coverage, and reliability of future TERM evaluations. A revised methodology was prepared in 2001, reflecting these recommendations. In 2004 and 2007, following the second and third triennial evaluations, respectively of the TERMs, the methodology was updated again to enhance the analysis results for several TERMs.

This section identifies key enhancements that were made to the methodology since the 2005 TERM Analysis Report was completed and discusses the overall rigor of the evaluation framework as compared to other regions. Overall, the Transportation Demand Management evaluation process employed for this analysis is among the most rigorous and comprehensive in the U.S.

EVALUATION METHODOLOGY OVERVIEW

Evaluation Principles

Before discussing the methodology changes in the Revised Evaluation Methodology, it is useful to review several element of the methodology developed in 1997. The TERM evaluation process was founded on several key evaluation principles that formed the foundation for the Evaluation Framework that has guided the process since 1997. Some of those principles, which have since been adopted by other regions evaluating TDM programs, include:

- Provide sound, definitive, and useful information about the results of the program
- Assure objective evaluation by using a third-party (other than a funding or implementing agent)
- Avoid double counting by separating out the impacts of individual program elements or TERMs
- Report only those impacts associated with the TERMs, and not the combined impacts of the TERMs and the basic commuter services that have been in place since the 1970s

- Follow accepted and recognized evaluation techniques
- Be rigorous, ongoing, resource efficient, unobtrusive for COG partners, and compatible with regional, state, and national practices

Evaluation Methodology Steps

The evaluation of Commuter Connection's TERM program impacts is based on a step-by-step calculation methodology that uses a series of "multiplier factors" to estimate several important program impact measures related to transportation and air quality benefits. The methodology calls for these multiplier factors, which are developed primarily from survey data, to be applied to a known number of commuters in the population that might be influenced or affected by the TERM to make a travel pattern change (population base"). The result of these step-by-step calculations is an estimate of the numbers of vehicle trips, VMT, and emissions reduced through the travel pattern changes made by commuters after contact with the TERM programs or services.

For most TERMs, the population base is commuters who participate in or use TERM services, although in a few cases, the population is broader, such as all regional commuters. Thus, this methodology requires first an accurate documentation of the participation of employers and commuters in each TERM program and an accurate count of other population bases. This is accomplished primarily by program participant tracking performed by Commuter Connections staff and survey results.

As noted earlier, the methodology uses several calculation factors derived from surveys of the populations of interest. The five major factors include:

1) Placement rate (percent of commuters in the population base who shifted to commute alternatives as a result of the TERM)
2) Vehicle trip reduction (VTR) factor (average number of vehicle trips reduced per day by each placement)
3) Average one-way commute trip distance
4) Drive alone access percentage (proportion of ridesharers and transit users that drive alone to the location where they meet their carpool, vanpool, bus, or train)
5) Drive alone access distance (distance commuters travel to rideshare/transit meeting points)

These factors are applied within the basic methodology steps listed below to calculate program impacts for each TERM.

1) Estimate commuter population "base" for the TERM (e.g., all commuters, GRH applicants, rideshare matching applicants, kiosk users, Employer Outreach employees, etc.)
2) Estimate the number of new commute alternative placements – Multiply placement rate by the population base for the evaluation period
3) Estimate vehicle trips reduced – Multiply number of placements by the Vehicle Trip Reduction (VTR) factor
4) Estimate VMT reduced – Multiply number of vehicle trips reduced by average commute distance
5) Adjust vehicle trips and VMT for access mode – Discount vehicle trips reduced and VMT reduced to account for commuters who drive alone to meet rideshare modes and transit

6) Estimate NOx and VOC emissions reduced – Multiply adjusted vehicle trips and VMT reduced by emissions factors consistent with the regional planning process

These steps were established largely in the 1997-99 evaluation framework developed in 1997 and remained unchanged for the subsequent evaluations conducted for the 1999-2002, 2002-2005, and 2005-2008 evaluations. Two other issues should be noted as background, because they are critical to understanding the high level of rigor build into the evaluation process:

- Prior mode is an important variable in this evaluation; a shift of a commuter to commute alternative mode does not always mean the commuter reduced a vehicle trip. Vehicle trips are reduced only in three cases: 1) if the commuter previously drove alone, 2) if the commuter previously used a commute alternative but increased the frequency of use of this mode, or 3) if the commuter shifted to a higher occupancy commute alternative (e.g., from carpool to vanpool). Section 6 describes the development of vehicle trip reduction (VTR) factors that are used to translate the number of new commute alternatives placements into the number of vehicle trips reduced, taking into account the three change factors listed above.

- For air quality evaluation purposes, it is necessary to know the access mode of ridesharers and transit riders. Access mode refers to the travel mode carpoolers, vanpoolers, and transit riders use to travel from home to Park & Ride lots, to other places where they meet their rideshare partners, or to the bus stop or train station, if they do not walk or are not picked up at home. Access mode is less important for evaluating travel impacts, because access trips generally account for a small portion of the total trip and the alternative mode generally is used in the most congested and longest portion of the trip. However, from an air quality standpoint, a commuter who drives alone to the meeting point still makes a vehicle trip and accumulates some drive alone VMT, which must be subtracted from the total numbers of vehicle trips reduced and VMT reduced in the air quality analysis.

REVISED EVALUATION FRAMEWORK

In general, the TERM analysis approaches documented in the 2005 TERM Analysis Report were used as the basis for the TERM evaluation methods described used in the 2005-2008 evaluation. The 2005 TERM Analysis Report concluded with a few minor recommendations for each TERM regarding enhancements to future evaluations. These enhancements were included, for the most part, in the Revised Evaluation Framework for the current evaluation period (2005-2008). A brief summary of key methodology issues and approaches is presented below for each TERM. More details of each approach are presented in Sections 4 – 8 for each individual TERM.

- Maryland and Virginia Telework – Maryland and Virginia Telework (Telework TERM) is a resource service to help employers, commuters, and program partners initiate telework programs. In evaluating teleworking, several travel changes need to be assessed, including: trip reduction due to teleworking, the mode on non-telework days, and mode and travel distance to telework centers. Telework impacts are primarily estimated from the State of the Commute survey and by surveys conducted of employers directly requesting information from Commuter Connections.

- *Eliminate Separate Credit for MWTCs – In the 2002-2005 evaluation, the TERM analysis included credit for Commuter Connections assistance to the Metropolitan Washington Telework Centers. This component has been eliminated from the analysis, as Commuter Connections has largely eliminated this support. However, credit for telecenter users who obtained telework information from Commuter Connections will continue to be counted.*

- Guaranteed Ride Home (GRH) – The primary goal of GRH is to encourage commuters who drive alone to shift to ridesharing, transit, and bike/walk. However, since past evaluation results show that a sizeable portion of GRH applicants were ridesharing before they applied for GRH benefits, the TERM analysis also explores benefits from the continuation and expansion of existing ridesharing arrangements. Thus, the evaluation process outlined here will estimate the influence of GRH availability on both mode shifts and frequency/duration of ridesharing. Enhancements made over the past several evaluation periods include discounting of VMT reductions made outside the COG non-attainment area and the derivation of one placement rate for both GRH applicants and one-time exemptions. No additional changes were made to the methodology for the 2005-2008 evaluation.

- Employer Outreach – Employer outreach applies a two-faceted approach employing empirical data on employer programs and modeled impacts. The empirical data come from the ACT! database of employer contacts, including information on the trip reduction strategies implemented at each worksite. The EPA COMMUTER model (v 2.0) applies these empirical data to project the likely change in employee commuting behavior for given change in the employer's program.

  Three changes were made to the methodology for this TERM for the 2005-2008 analysis. First, in the 2002-2005 evaluation, a separate calculation was performed to estimate impacts for employers that were not participating in Employer Outreach but that did offer Metrochek/Smart Benefits through the program administered by the Washington Metropolitan Area Transit Authority (WMATA). This credit is no longer included in the 2005-2008 calculation.

  Second, during this evaluation period, the evaluation team reassessed the COMMUTER Model as the predictive tool for the analysis and compared it to other models that could be used. The decision following that analysis was to continue to use the COMMUTER model, but with a modified cost coefficient that better reflects the expected response of employees to financial incentives.

  Third, in the 2002-2005 evaluation, a separate credit was estimated for impacts related to bicycle support implemented by employers participating in Employer Outreach (Employer Outreach for Bicycling TERM). In the 2005-2008 evaluation, this credit will be captured in the Employer Outreach TERM. This will not result in a loss of benefits, since the Employer Outreach for Bicycling credit was subtracted from the Employer Outreach TERM credit in 2002-2005 to avoid double counting these credits.

- Mass Marketing – The critical issues for this TERM are documenting and attributing changes in attitudes and behavior to the mass marketing campaign. Two types of impacts will be measured, "direct" impacts, for commuters who cite the regional marketing campaign as the reason for their commuting change and "referred" impacts generated when advertising encourages commuters to submit rideshare and GRH applications. This is explained further in Section 4. The evaluation will be accomplished using a variety of data sources, including the State-of-the-Commuter survey and COC tracking data. It also requires careful attribution of impacts to Mass Marketing or other TERMs, as appropriate.

- InfoExpress Kiosks – In the 2002-2005 framework, the InfoExpress Kiosk TERM was one of two components of the Integrated Rideshare TERM. It is now a separate TERM, with goals established for the TERM. The analysis of this TERM will use State of Commute survey information to identify changes in commute behavior related to the use of information kiosks. The kiosk evaluation will assess impacts only through January 31, 2007, the end date of the program.

- Commuter Operations Center (COC) – The evaluation of COC activities will now include the impacts of Software Upgrades, improved transit information, that were previously included in the Integrated Rideshare TERM.

NATURE OF THE EVALUATION APPROACH AS COMPARED TO OTHER REGIONS

The evaluation approach used in the Washington DC region to assess the impact of the TERMs implemented by Commuter Connection has become recognized as among the most comprehensive and rigorous in the nation. Several regions of a similar size and complexity have looked to this evaluation as a model and adopted similar approaches. For example:

- The evaluation of voluntary trip reduction strategies in Atlanta is using a similar "bottom-up" approach to measure the impact of various program elements individually and carefully sum the results while avoiding double counting from overlapping program influences. The TERM analysis has been held up as a model for this approach.
- A comprehensive evaluation of TDM services in Los Angeles County derived unique placement rates and VTR factors for the programs being evaluated and estimated the cost per person placed and cost per trip reduced of the overall TDM program. This evaluation also explicitly drew from the evaluation experience in Washington DC.

The only other regions that may have data and an evaluation approach comparable to MWCOG's TERM Analysis are Washington State's Commute Trip Reduction (CTR) program and the regional evaluation performed in the Atlanta, GA region. The CTR program performs its evaluation under a legislative mandate and uses data that regulated employers are required to provide. This shifts some of the effort of data collection to employers and allows full capture of data directly from employers, simplifying some data analysis tasks. In Atlanta, data are collected and analyzed to evaluate regional ridesharing, transit and vanpool subsidy programs, and marketing campaigns. The data collection and analysis methods used are similar to those used in the MWCOG evaluation.

The key characteristics of the evaluation approach used in metropolitan Washington that have elevated or enhanced the state of the practice in TDM evaluation include:

- The careful avoidance of double counting between program elements
- The derivation of unique placement rates for each program element and mode
- The inclusion of placement duration in the calculation of impacts
- The derivation of empirically-based Vehicle Trip Reduction (VTR) factors to avoid the document mistaken assumption that every new placement reduces a full vehicle trip every day
- The consideration of access mode to a shared ride arrangement to account for cold starts

For these reasons, the users of these evaluative results should feel confident that the reported impacts are as accurate and reliable as is reasonably possible and are based on what is widely accepted as one of the most comprehensive and rigorous evaluation approaches being used today in the US.

SECTION 4 MARYLAND AND VIRGINIA TELEWORK

BACKGROUND

The TPB adopted a telework-oriented TERM in the Fiscal Year 1995-2000 TIP and in June 1996, the Metropolitan Washington Telework Resource Center (TRC) was implemented. This TERM has been renamed as Maryland and Virginia Telework (Telework) when its scope was reduced to focus solely on Maryland and Virginia-based employers, but its purpose remains the same: to provide information, training, and assistance to individuals and businesses to further in-home and telecenter-based telework programs. Telework activities during the past few years have included employer and employee telework seminars, distribution of telework information included in a telework information kit, and ongoing marketing and outreach initiatives.

EVALUATION METHODOLOGY AND DATA SOURCES

The goal of Telework is to increase the number of home-based and telework center-based teleworkers in the region, whether full-time or part-time teleworkers. For 2005-2008, Telework impacts were evaluated by calculating the number of teleworkers in the region who used or were influenced by Telework services and estimating the number of vehicle trips and VMT they did not make, as a result of telecommuting, and the tons of emissions that were reduced by the trip and VMT reductions. Through this method, only impacts that could be traced directly to the Telework TERM were counted in the impacts for this TERM as the contribution of the Telework to regional telecommuting. In other words, it was recognized that some telecommuting would have occurred even if the Telework TERM was not in place.

Two Telework components were evaluated, including:

- All regional teleworkers who are influenced by Maryland and Virginia Telework services / assistance to begin teleworking
- Telework employees at Maryland and Virginia worksites assisted by Commuter Connections

Data for impacts of these components were obtained from several sources. The sources and the evaluation data collected from each, are described briefly below:

Telework Assistance Survey (new teleworkers at worksites assisted by Telework)

- Percentage of employers with telework programs before and after receiving Telework assistance
- Percentage of teleworkers at assisted sites before and after receiving assistance

State of the Commute Survey (regional commuters)

- Number of regional teleworkers and their frequency of teleworking
- Telework locations – the mix between home-based and non-home-based telework
- Average frequency of teleworking, teleworkers' commute modes on non-telework days, and commute distance they traveled on non-telework days
- Teleworkers travel patterns to telework locations outside the home
- Sources of information teleworkers had used to learn about teleworking

Using results from these surveys and records, the number of teleworkers who had either direct or indirect (through their employers) contact with the Telework TERM during the evaluation period were estimated

and divided into "home-based" and "non-home-based" groups. These numbers of teleworkers were then multiplied by average VTR factors, as identified by the appropriate survey data, to obtain the number of vehicle trips reduced by their teleworking.

For this TERM, VTR factors accounted for both the average telework frequency of the groups as well as their commute modes on telework days (non-home-based teleworkers) and non-telework days (all teleworkers). The VTR factor for home-based teleworkers was 0.45 daily trips reduced per teleworker, reflecting the part-time (1.5 days per week average) telework frequency and the elimination of vehicle trips for teleworkers who drove alone, carpooled, or vanpooled on non-telework days. The VTR factor was lower (0.31) for non-home-based teleworkers, because the majority of these teleworkers drove alone to these outside locations. Thus they did not reduce (and in some cases increased) the number of vehicle trips they made on an average day. However, the benefit of their teleworking was in the reduction of VMT on telework days at a location outside the home.

The VMT reduced by teleworking was calculated for home-based teleworkers by multiplying the number of daily vehicle trips reduced by the average commute distance. In the case of non-home-based teleworkers, the VMT reduced was calculated by multiplying the number of teleworkers on an average day by the reduction of VMT for a telework day (travel distance to main work location minus travel distance to the outside telework location).

Tons of emissions removed were calculated by multiplying vehicle trip and VMT reductions by 2008 emission factors developed for NOx and for VOC for the region. Appendix 1 details the calculations made to estimate impacts for the Telework TERM.

MARYLAND AND VIRGINIA TELEWORK SUMMARY OF GOALS AND IMPACTS

The results of the calculations for Telework are shown in Table 3 below, along with the goals established for the TERM. The net credits or deficits, which were equal to the impacts minus goals, also are shown.

Table 3
Telework Goals, Estimated Telework TERM Impacts, and Estimated Regional Telecommute Impacts

	Regional TW Impacts	Telework Goal	Telework TERM Impact*
• Number of teleworkers	456,636	31,854	49,027
• Daily vehicle trips reduced	203,660	11,830	21,866
• Daily VMT reduced	3,853,246	241,209	413,703
• Daily tons NOx reduced	1,962 T	0.122 T	0.211 T
• Daily tons VOC reduced	1.183 T	0.072 T	0.127 T

Impacts vs Goals

Participation Benefit (net over or (under) goal):	Telecommuters: 17,173
Transportation Benefit (net over or (under) goal):	Vehicle Trips: 10,036 VMT: 172,495 miles
Emission Benefit (net over or (under) goal):	NOx: 0.088 tons per day) VOC: 0.055 tons per day)

As shown, in 2008, approximately 456,000 regional workers were telecommuting at least occasionally, about 17.4% of the total regional workforce and nearly 19% of all workers who are not self-employed, working only at home. This number of teleworkers represented an increase of 43% over the 2005 number of 318,130 teleworkers and several times the 1996 baseline of 150,900 teleworkers. Telecommute growth is likely the result of several factors, including the use of teleworking by employers to recruit and retain employees in a very competitive labor market. Increasing traffic congestion in the Washington region also might have prompted some commuters to work at home or at a telework center or employer satellite center to avoid fighting traffic. Finally, the desire of employees for a better balance of work and family, a trend occurring nationally, and greater affordability of sophisticated technology, also might have contributed to the growth in telecommuting.

The Telework TERM's expected contribution to regional teleworking is shown in the second column of Table 3 and the impacts are shown in the third column. The Telework TERM exceeded by more than 17,000 the goal for the number of teleworkers expected from Telework activities. The TERM also substantially exceeded the reduction goals established for vehicle trips, VMT, and emission reductions.

As shown in Table 3, the Telework TERM was responsible for a portion of, but not all of, the regional telecommuting. The TERM is credited with about one tenth of the number of teleworkers and regional telework impacts. One possible area in which the Telework TERM's contribution to the regional telework impacts could have been undercounted is in the area of regional telework advertising. The State of the Commute Survey indicated that about eight percent of teleworkers mentioned Commuter Connections or MWCOG as a source of their telework information. These teleworkers were credited to the Telework TERM contribution.

But an additional five percent said they learned of teleworking through "advertising," newspaper ads, or "other website." Although these sources were not necessarily controlled by Commuter Connections, Commuter Connections has advertised consistently and broadly about telework via radio, television, print media, and the internet. So this response likely indicates additional teleworkers who learned about teleworking from outreach and promotion conducted by Commuter Connections. Because the source of the advertising could not be clearly documented, only a share of these commuters (1.9% of total teleworkers) was credited to the Telework TERM.

SECTION 5 GUARANTEED RIDE HOME

BACKGROUND

The regional Guaranteed Ride Home (GRH) program was adopted by the TPB in the Fiscal Year 1995-2000 TIP to eliminate a major barrier to using alternative modes, commuters' fear of being without transportation in the case of an emergency. The program provides up to four free rides home per year in a taxi or rental car in the event of an unexpected personal emergency or unscheduled overtime. When the program was implemented, it was offered to commuters who used alternative modes three or more times per week and who would register with Commuter Connections for GRH. In January 1999, to encourage additional participation, the program guidelines were changed to require use of alternative modes only two days per week. This new rule was in place throughout the entire 2005-2008 evaluation period.

EVALUATION METHODOLOGY AND DATA SOURCES

The transportation and emissions impacts of the GRH program were measured through data from the GRH survey conducted in the spring of 2007. This survey polled 1,000 commuters who had registered for GRH at some point between March 1, 2004 and March 15, 2007. Both commuters who were currently registered at the time of the survey and those who were "past registrants" were eligible to participate in the survey. Additionally, commuters who had not registered for the program, but had taken a "one-time exception trip" were included in the survey sample.

The survey asked detailed questions needed to define changes commuters made in their travel behavior during their participation in GRH and the influence of GRH on these changes. Information collected from all respondents, included, among other elements:

- Commute patterns: current mode and previous mode (if commuter made a mode shift), frequency of mode use, travel distance, access mode to rideshare/transit pick-up point, and pool occupancy
- Permanence of mode changes: whether change was continued (still in effect) or temporary (commuter had reverted to the original mode)
- Importance of GRH to commuters' decisions to start or continue use of alternative modes

Data from the GRH surveys were used to estimate the calculation multipliers needed to estimate vehicle trips, VMT, and emissions reduced as a result of GRH; placement rate, VTR factor, travel distance, and emission factors. These multipliers were estimated for two sub-groups in the GRH population. The first sub-group included respondents who both live and work within the Washington, DC Metropolitan Statistical Area (MSA); that is within the 11-jurisdiction area covered by the TERM evaluation. The second group included respondents who work within the MSA but live outside it.

This distinction was made because applicants who live outside the MSA traveled a portion of their VMT outside the MSA. During the evaluation, it was decided that the VMT for these "out of MSA" applicants should be discounted to credit VMT reduction only for the portion that occurred within the MSA. Approximately 32% of the total participants lived outside the MSA.

For both sub-groups of survey respondents, the GRH placement rate, that is, the percentage of respondents who registered for GRH and made a mode shift to an alternative mode was calculated. The duration

of alternative mode placement was 45 months, longer than the entire evaluation period. Thus, for purposes of the analysis, all placements were considered "continued placements," that is they made a shift to an alternative mode and did not return to the previous mode. Overall, the continued placement rate for GRH was calculated for the two sub-group populations as follows:

- Within MSA 33.9%
- Outside MSA 44.9%

To determine the number of commuters placed in alternative modes between July 2005 and June 2008, these placement rates were multiplied by the total number of commuters who participated in GRH during that time period, 22,099, divided into the two sub-groups: 15,027 within the MSA and 7,072 outside the MSA. This calculation resulted in 5,094 placements from within the MSA and 3,175 placements from outside the MSA.

These placement figures were then multiplied by GRH VTR factors derived from the survey data to estimate the number of vehicle trips reduced. The VTR factors for the two sub-groups were as follows:

- Within MSA 0.92 vehicle trips reduced per placement
- Outside MSA 1.19 vehicle trips reduced per placement

As noted earlier, VTR factors represent the average number of vehicle trips reduced by a new alternative mode placement. They combine the vehicle trip reduction contributions of various types of mode changes, such as from transit to rideshare, drive alone to transit, and drive alone to carpool, each of which reduces a different number of vehicle trips per day, into one number. VTR factors of 0.92 and 1.19 indicate a significant number of the changes were to higher occupancy modes, such as transit, and/or were shifts from drive alone to alternative modes. The calculation of vehicle trips reduced produced a total of 8,465 trips reduced; 4,687 from commuters within the MSA and 3,778 from commuters outside the MSA.

Next, VMT reduced by GRH was calculated by multiplying the numbers of vehicle trips reduced by the average trip length for GRH commuters who made a shift to an alternative mode. The one-way trip distance for the within MSA respondents was 26.2 miles. The actual one-way distance for the outside MSA respondents was an average of 47.0 miles. To discount the distance credited to the outside MSA respondents, their one-way travel distance was set equal to that of the distance for the within MSA respondents. This resulted in a loss of 20.8 one-way miles per trip for each outside-MSA respondent. The VMT calculation reflected the following:

(4,687 within MSA trips reduced + 3,778 outside MSA trips reduced) x 26.2 miles per trip

= 221,788 VMT reduced

Estimates of NOx and VOC reductions were calculated using regional emission factors, as described for the Telework. Details of these calculations are shown in Appendix 2.

GUARANTEED RIDE HOME SUMMARY OF GOALS AND IMPACTS

Table 4 presents the transportation and emission impact results for GRH and compares the results against the goals established for the TERM.

Table 4
Guaranteed Ride Home Goals and Estimated Impacts

	TERM Goal	Estimated Impacts
• Number of GRH participants*	36,992	22,099
• New applicants during evaluation period	N/A	12,661
• Daily vehicle trips reduced	12,593	8,245
• Daily VMT reduced	355,136	221,136
• Daily tons NOx reduced	0.177 T	0.103 T
• Daily tons VOC reduced	0.097 T	0.055 T

* Number of participants currently enrolled in GRH

Impacts vs Goals

Participation Benefit (net over or (under) goal): Participants: (14,893)

Transportation Benefit (net over or (under) goal): Vehicle Trips: (4,128)
VMT: (133,347 miles)

Emission Benefit (net over or (under) goal): NOx: (0.073 tons per day)
VOC: (0.042 tons per day)

The number of commuters participating in GRH in December 2007 was considerably lower than the participant goal, and the vehicle trip reduction, VMT, and emissions impacts were correspondingly short of the goals for these measures. Participation in GRH has dropped markedly since 2005, perhaps due to reduced level of Commuter Connections program advertising and outreach for GRH. The 2007 State of the Commute survey found that only 26% of respondents said they knew a regional GRH program existed, compared to 59% who said they knew about the program in the 2004 SOC survey.

Finally, note that the GRH results were adjusted to eliminate double counting due to overlap between GRH and the Mass Marketing TERM. As described in Section 7 (Mass Marketing), a portion of the GRH impacts were assigned to the Mass Marketing TERM to recognize that some GRH applicants were influenced to contact Commuter Connections and apply for GRH after they heard a Mass Marketing ad.

Only about one percent of the total new GRH applicants were assigned to Mass Marketing, however, because the analysis of GRH applications in response to ad campaigns suggested a much lower connection in 2005–2008 than occurred in the 2002–2005 period. But to avoid double counting impacts, this MM share was subtracted from the base GRH impacts. The impacts shown in Table 4 account for the adjustment and reflect the net GRH impacts.

SECTION 6 EMPLOYER OUTREACH

BACKGROUND

The Employer Outreach TERM was adopted by the TPB in the Fiscal Year 1995-2000 TIP. This program provides regional outreach to encourage private sector employers voluntarily to implement TDM strategies that will contribute to reducing vehicle trips to their worksites.

The program was designed to increase outreach efforts in ten jurisdictions located in the region. Seventy percent of the funds received by COG for the Employer Outreach program element is passed-through to the jurisdictions for implementation of the program. Commuter Connections assists the sales force with the following services, designed to enhance regional coordination and consistency:

- Computerized regional employer contact database
- Marketing and information materials
- Employer outreach sales and service force training
- Annual evaluation program
- Support to Employer Outreach Committee

EVALUATION METHODOLOGY AND DATA SOURCES

Two variables are important for assessing the impacts of a TDM employer outreach program. First is the number of employers offering TDM services and the level of effort and commitment by the employer; that is the extent of the TDM programs they implement. Second is the level of employee participation in alternative modes as a result of the program. These two variables are strongly linked, as other TDM effectiveness research has shown. Higher levels of employer effort can be expected to offer greater incentive to employees to use alternative modes, leading to reductions in vehicle trips, VMT, and emissions.

Employer Participation in Commute Programs

The first of these variables was assessed through data collected by Commuter Connections from sales and outreach contacts with employers. Employer Outreach jurisdiction sales representatives documented the levels of programs implemented by their employer clients in the ACT! contact management database maintained by Commuter Connections. The Employer Outreach program specified services employers offered, for example, transit subsidy, information/promotions, Guaranteed Ride Home, etc.

The Employer Outreach program defined four levels of employer effort: Bronze (Level 1), Silver (Level 2), Gold (Level 3), and Platinum (Level 4), distinguished by the expected increasing trip reduction effectiveness of the services offered and the commitment of the employer, as shown below.

- **Bronze (Level 1) programs** offer only commute information.
- **Silver (Level 2) programs** offer the services of an Employee Transportation Coordinator (ETC) and information, and include one or more of: preferential parking, carpool/vanpool formation meetings, bike racks or lockers, transportation fairs, informal telework, and alternative work hours.

- **Gold (Level 3) programs** include, in addition to the Silver services, services such as financial incentives or parking "cash out," formal telework programs, parking fees, on-site ridematching, shuttles to transit stations, showers and lockers for bikers, and company vanpools.
- **Platinum (Level 4) programs** include two or more of the Gold program components and actively promote the program.

In June 2008, the ACT! database included approximately 900 employers with programs that met the Level 3 or 4 definitions. Forty of these employers were new to the Employer Outreach Program since June 2005 and an additional 49 employers had expanded their commute program services.

These Level 3 and 4 employers served as the primary employer population on which the regional impact evaluation of Employer Outreach was based. Level 1 and 2 employers were not included in the original regional impact calculation because their level of impact would be very small due to the lack of incentives or enhanced commute alternatives. Further, Level 3 and 4 employers that had been in the Employer Outreach program in June 2005 and that had not changed their commute program were not counted in this evaluation. The Employer Outreach TERM was considered fully implemented in June 2005, thus the 2008 evaluation assumed continued involvement of these employers and goals were set for 2008 to reflect impacts only from new and expanded programs.

Employee Participation in Commute Programs

The second variable in the impact evaluation, employees' response to the services offered, was more difficult to obtain. Starting mode split data were available for about 500 employers that had conducted a baseline commuter survey prior to implementing the TDM program. But as is typical for voluntary programs, only a few had conducted a follow-up survey by the time the evaluation data were being collected. Because baseline data were available, but post-program survey data were not, the researchers elected to estimate employee behavior changes using the US EPA's COMMUTER Model, which estimates worksite mode shifts from inputs on starting mode split and TDM program components.

This was the same methodology as was used in the 2005 evaluation, except that a new version of the COMMUTER model replaced the version used in the 2005 evaluation. Additionally, as noted earlier, the cost coefficient was adjusted in the model, to reflect a more conservative estimate of employees' responses to financial incentive strategies.

Starting Mode Split – The COMMUTER model requires several "scenario" inputs, including the type of employer (primarily office or non-office) and the starting mode split. For employers that had conducted a baseline, "pre-program" survey, the actual mode split from the survey was used as the input. But for employers that had not conducted a survey, a starting mode split was assigned that reflected the average mode split that would be likely for employers with similar location and employee work conditions.

These average mode splits were calculated by aggregating employers in the ACT! database that had conducted baseline surveys into six groups, based on two employer/site variables that are known to influence mode choice: 1) type of employer / work performed, either office or non-office, and 2) availability of transit service: low, moderate, or high. Low transit was defined as limited bus service within ½ mile of the worksite. Moderate transit included a higher level of frequency and route availability. To be designated as a "high transit" employer, the site had to be within ½ mile of a Metrorail station and have access to a significant level of bus service.

For each of the six combinations of these two variables, for example, non-office employers with high transit and office employer with moderate transit, an average mode split was calculated from the baseline survey data of employers in that employer group that had conducted commuter surveys. Additionally, the Average Vehicle Ridership (AVR) was calculated for each group.

Program Definition – Employers included in the TERM analysis also were classified by the specific elements offered in their commute program. The COMMUTER model permits direct analysis of strategies, such as transit subsidies, that change the travel cost of one or more modes, and strategies that change the travel time (duration of a trip).

The model also has the capability to predict impacts of telework and compressed work schedules (CWS), when certain parameters of the work hours arrangements are known. The ACT! database indicated employers that had a telework program and, in most cases, the number of employees who were teleworking. Employers that offered telework, but for which participation numbers were not available were assumed to have telework rates equal to the regional average calculated from the 2007 State of the Commute survey. The ACT! database also noted employers that offered CWS, but no participation data were included for any of these employers, so default percentages were calculated from the SOC survey.

Other commute strategies, such as GRH, flextime, information support, and preferential parking, all are treated by the model as elements in a "support package." They are not modeled separately. Rather the level or extent of the support service package is modeled and the higher the number of these strategies offered, the higher the level of support that is modeled.

The total strategy package assigned to an employer was thus comprised of the following potential actions:

- Amount of financial incentives (transit, carpool, vanpool)
- Participation in telework and number of teleworkers (if known)
- Participation in CWS and assumed percentage of employees participating
- Level of transit/rideshare commuter support offered
- Level of bicycle services offered

The COMMUTER model was run in a batch format that allowed each employer's program components to be modeled separately. The analysis thus calculated for each employer, the final mode split with the program in place. By comparing the starting and ending mode splits, the percentage trip reduction that would be expected following implementation of the program elements was calculated. This trip reduction was then applied to the number of employees at the worksite to estimate the number of vehicle trips reduced for that employer.

Because travel distance was not available for either individual employees or employers in the ACT! database, the number of VMT reduced was estimated by multiplying the vehicle trips reduced for an employer by the average regional one-way trip lengths for each mode, as measured through the 2008 State of the Commute Survey. Emissions reduced were calculated by multiplying trips and VMT reduced by 2008 regional emission factors. Finally, the individual results for each employer were aggregated to estimate the combined impact of all employers in the TERM. Appendix 3 provides details of the calculations of impacts for Employer Outreach.

EMPLOYER OUTREACH SUMMARY OF GOALS AND IMPACTS

The impacts calculated as described above, were compared against the TERM goals. The total goals and impacts are shown in Table 5.

Table 5
Employer Outreach Goals and Estimated Impacts

	EO Goal	Estimated Impacts
Employer Outreach Base (all programs)		
• Employers participating	581	N/A
– Maintained from 2005	424	N/A
– New/expanded programs	96	89
– Employers with bike programs	61	28
Total Program		
• Daily vehicle trips reduced	64,644	N/A
• Daily VMT reduced	1,065,851	N/A
• Daily tons NOx reduced	0.5485 T	N/A
• Daily tons VOC reduced	0.343 T	N/A
New / Expanded Programs		
• Daily vehicle trips reduced	8,618	12,702
• Daily VMT reduced	140,622	207,887
• Daily tons NOx reduced	0.072 T	0.099 T
• Daily tons VOC reduced	0.046 T	0.058 T
Bike Program Strategies		
• Daily vehicle trips reduced	130	58
• Daily VMT reduced	567	351
• Daily tons NOx reduced	0.001 T	0.0004 T
• Daily tons VOC reduced	0.0005 T	0.0002 T

Impacts vs Goals

New / Expanded Employer Programs

Participating Employers (net over or (under) goal): Employers: (7)

Transportation Benefit (net over or (under) goal): Vehicle Trips: 4,084
VMT: 67,265 miles

Emission Benefit (net over or (under) goal): NOx: 0.026 tons per day
VOC: 0.012 tons per day

New / Expanded Employer Programs – Bike Services

Participating Employers (net over or (under) goal):	Bike Employers (33)
Transportation Benefit (net over or (under) goal):	Vehicle Trips: (72) VMT: (216 miles)
Emission Benefit (net over or (under) goal):	NOx: (0.0005) tons per day VOC: (0.0003) tons per day

As shown, the number of employers with new or expanded commute programs (89) came very close to the goal of 96 for this measure. As with other TERMs, the number of employers is expected to rise when the final six-months of the evaluation period are added to the impacts. Additionally, the impacts calculated here include only employers that could be reached by phone during an independent effort by a contractor hired by Commuter Connections to verify the strategies reported in the ACT! database. The contractor is continuing to attempt contacts with additional employers, some of which are likely to be added to the calculation when the analysis update in performed during summer 2008.

But the trip reduction and VMT reduction impacts for Employer Outreach were about a third higher than the goals for these measures. This was because all the employers included in the analysis had implemented substantial programs, most of them including several of the services that research has shown are likely to produce high levels of trip reduction (e.g., transit and rideshare subsidies, compressed work schedules, telecommuting). Emissions reduced were calculated by multiplying trips and VMT reduced by 2008 regional emission factors. Details of the calculation are presented in Appendix 4.

We note that Employer Outreach overlaps with the Maryland and Virginia Telework TERM. Some employers counted in Employer Outreach could also be counted in the Telework "assisted employer" category. To avoid double counting credits, employers that offered telework strategies that also had received assistance from the Telework TERM were included in the comprehensive Employer Outreach impact calculation, but impacts from the telework components of their programs were removed from Employer Outreach impacts and assigned to Telework.

To estimate the extent of the overlap, the COMMUTER model was run for these employers with and without telework. The trip reduction when telework was excluded was subtracted from the vehicle trip reduction when the services were included. The difference was considered to be the overlap. It was assigned to the Telework TERM and subtracted from the total Employer Outreach impact. The results presented in Table 5 show the adjusted impacts with the overlap removed.

A similar exercise was performed to estimate the contribution of bike strategies to the overall Employer Outreach program impacts. The impacts for employers that offered bicycle strategies were modeled both "with bicycling" and "without bicycling." The differences in vehicle trips and VMT reduced between these two cases was determined to be the bicycle share of the impact and was assigned to the bike strategies component of Employer Outreach.

The VMT reduced was estimated by multiplying the vehicle trips reduced by an average regional one-way trip length for bicycle commuters, of 6.0 miles, calculated from the 2007 State of the Commute Survey. This was a change from the 2005 evaluation, which used a one-way trip distance of 10.0 miles, calculated from Bike-to-Work Day survey data.

SECTION 7 MASS MARKETING

BACKGROUND

In July 2003, Commuter Connections embarked on an ambitious effort to educate the region about alternatives to stress-filled solo commuting and to raise awareness of commute assistance services available through Commuter Connections and its partners. This effort, captured in the Mass Marketing TERM, employs radio, television, direct mail, and other mass media to create a new umbrella level of public awareness and to provide a call to action to entice commuters to switch to alternative modes. The objectives of the Mass Marketing TERM are to:

- Raise regional awareness about the Commuter Connections brand
- Address commuters' frustration with congestion
- Induce commuters to try and adopt alternative commute modes

In the 2008 analysis, one additional program component was added to the Mass Marketing TERM analysis. Commuter Connections provides support to the annual Bike-to-Work Day event. In the 2005 evaluation, impacts of BTW Day were captured under the Employer Outreach for Bicycling TERM. But Commuter Connections' role in this event is primarily promotional in nature. Thus, when Employer Outreach for Bicycling was absorbed into the Employer Outreach TERM, this program was moved for the 2008 evaluation to Mass Marketing.

EVALUATION METHODOLOGY – UMBRELLA ADVERTISING CAMPAIGN

The Mass Marketing TERM has three populations of interest:

1) All commuters in the Commuter Connections service area
2) Commuter Connections rideshare and GRH applicants who were influenced by the marketing campaign to request Commuter Connections services
3) Commuters who participate in the Bike-to-Work Day event

This TERM presents two challenges not encountered in most of the other TERMs. First, it is more difficult to assess influence on the general commuting public than it is to identify and track program participants. Second, when commuters who changed travel behavior can be identified, it is still necessary to identify what motivated their change – the media campaign or another influence.

The Mass Marketing evaluation method examines impacts from two types of change, which are measured separately. The first is ***"directly"*** influenced change. These are mode shifts that are made when the ads motivate commuters to change mode with no intermediate contact with Commuter Connections. An example of this type of change would be a carpool formed when a commuter hears the ad and asks a coworker to carpool. Direct influences can only be assessed through a regional survey of commuters that asks about mode change and the reasons for the changes. If a shift occurred and the shift can be attributed to a message that is part of the Mass Marketing campaign, the associated trip, VMT, and emissions reductions can be credited to the campaign.

The second is "referred change." These are mode shifts that occur among commuters who are influenced to contact Commuter Connections by the ads. This change would include, for example, a commuter who hears the ad, requests a ridematch list from Commuter Connections, then forms a new carpool as a result.

Referred influences are best measured by tracking changes in the volume of requests of information and services through two Commuter Connections' traditional programs: the Commuter Operations Center and GRH. A comparison of the volumes of requests received during periods of media activity to periods without media activity can provide an estimate of the change in requests as a result of the ads. A pro-rated share of the impacts of these other TERM impacts then can be assigned to Mass Marketing.

Evaluation of Direct Influence

Directly influenced change is measured for this evaluation through the regional 2007 State of the Commute survey, which included questions related to the following:

- Ad awareness – Were commuters aware of commute advertising and the specific messages conveyed?
- Changes made after hearing the ads – How many commuters who recalled the ads shifted to alternative modes after hearing the ads and how were they traveling before making the change?
- Reasons for change – Did the ads influence the commuters to make the change?
- Other commute services used – Did the commuters use any commute services provided by Commuter Connections?

The results on these questions were averaged from the two surveys to estimate the number of total regional commuters who were influenced by ads to change mode without any contact with Commuter Connections. The survey results were as follows:

Percentage of commuters who:

• Recalled commute message	35%
• Shifted to an alternative mode after hearing the ads	0.1%
• Said the ad influenced their decision to shift	100%
• Did not use any other commute service	100%
• **Resulting influence percentage**	**0.04%**

Thus, 0.04% of regional commuters were directly influenced to make a change. This percentage was multiplied by the average number of regional commuters (2,426,248) to estimate the number of alternative mode placements.

Further analysis of the survey respondents who had made a change showed that 19% continued using the new mode and 81% were temporary users and these commuters reduced on average 1.00 and 1.70 trips per placement respectively. These factors, and the 31.2 mile per trip distance calculated from the State of the Commute data were applied to the total number of new alternative mode placements to obtain the numbers of vehicle trips and VMT reduced by direct influence.

Evaluation of Referred Influence

Indirect influences were estimated through comparison of the numbers of new Commuter Operations Center and GRH applications received:

- In months between July 2005 and June 2008 when MM ads were aired
- In months between July 2005 and June 2008 when MM ads were NOT aired

As a first step, this analysis calculated the average numbers of applications received during "with MM' and "without MM" periods and compared the numbers. An increase in requests observed during the "with MM" periods could be assumed to result from the ads and other marketing efforts performed during the same time periods. Thus, the analysis also calculated volumes of requests that were received under "with ad" and "without ad" scenarios. The analysis indicated the following:

	Increase in Applications		
	All CC Inquiries	RS Apps	GRH Apps
• With ads compared to no ads	14%	14%	1%

These results suggest that ads increase rideshare applications by about 14% and increase GRH applications by about 1%. When taken as a percentage of total new applications, these increases translate to about 12% of total rideshare applications (14/114) and 1% of total GRH applications (1/101). The impact resulting from these increases was assigned to Mass Marketing.

Evaluation Methodology – Bike to Work Day Event

Impacts for the second component of this TERM, Bike-to-Work Day (BTWD) Event, were calculated using data obtained from a survey of BTWD participants conducted following the 2007 BTW Day event. The survey included questions regarding participants' use of bicycling for commuting before and after the event, and their ongoing level of bicycle commuting.

The impact methodology estimated the trip reduction impacts of new ridership by calculating the number of commuters who started riding to work after the event or who increased the number of days per week they rode to work and the average number of "new" bike days per week. Two periods of time were examined: 1) spring/summer/fall following the event and 2) winter following the event. From these data the number of new "seasonal" use and "continued winter" use days were calculated for a year. This number was then translated to a daily figure.

The number of vehicle trips reduced by new bicycling was estimated by multiplying the percentage of participants who said they drove alone or carpooled on non-cycling days (49%) by the number of daily bicycle trips. VMT reductions were estimated by multiplying the vehicle trip reduction by the average commute distance of these participants (10.4 miles). Emissions reduced were calculated as for other TERMs.

MASS MARKETING SUMMARY OF GOALS AND IMPACTS

Shown in Table 6 are the shows the results for the TERM, compared to the goals established for Mass Marketing. Individual goals were not established for any of the four elements that comprised the Mass

Marketing TERM (direct influence, indirect ridematch influence, indirect GRH influence, and BTW Day event).

Table 6
Mass Marketing Goals and Estimated Impacts

	MM Goal	Estimated Impacts
Total Mass Marketing		
• Commuter placements	11,023	3,836
• Daily vehicle trips reduced	7,759	1,416
• Daily VMT reduced	141,231	37,516
• Daily tons NOx reduced	0.072 T	0.018 T
• Daily tons VOC reduced	0.044 T	0.009 T

Impacts vs Goals

Transportation Benefit (net over or (under) goal): Vehicle Trips: 6,342
VMT: 103,715 miles

Emission Benefit (net over or (under) goal): NOx: (0.054 tons per day)
VOC: (0.035 tons per day)

MM reached about a third of the goal for commuter placements, but fell farther short of the goals for vehicle trips and VMT reduced, meeting 19% and 27% respectively of these two goals. Emissions also fell short, by similar percentages. The shortfall for this TERM was largely in the areas of ad-prompted GRH referrals, which were considerably under the referrals counted in the 2005 evaluation, and in the much lower level of "direct influence" credits compared to 2005. Only one percent of the credit for GRH applications was assigned to Mass marketing in this evaluation, compared to 13% of the credit assigned in 2005. Similarly, a higher percentage of direct influence from ads was measured in the 2004 State of the Commute survey and in the 2005 Mini-Household survey compared to that measured for ad influence in the 2007 SOC survey.

Details of the calculation for Mass Marketing are presented in Appendix 5. Appendix 6 shows the calculations for Bike-to-Work Day.

SECTION 7 INFOEXPRESS KIOSKS

BACKGROUND

The fifth TERM, InfoExpress Kiosks, was adopted by the TPB in the FY1995-2000 TIP. This TERM involved installation of InfoExpress traveler information kiosks in the District of Columbia and in Northern Virginia and was designed to improve the quality and delivery of alternative mode information products to commuters.

The InfoExpress traveler kiosks were launched in January 1998. Kiosks were placed permanently at two locations in the District of Columbia and at nine locations in Northern Virginia. Two mobile kiosks, one in the District of Columbia and one in Northern Virginia were been temporarily installed at various sites. In addition, Fairfax County placed Commuter Connections' ridematch applications on its Community Residence Information System kiosks.

The kiosks offered self-service transit schedules and maps and other commute information. Commuters also could apply for ridematching and for the regional GRH program through the kiosk. Requests for ridematches and other information offered by Commuter Connections but not immediately available through the kiosks were then e-mailed directly to the Commuter Operations Center for service delivery.

The kiosks also offered information on weather, real-time traffic, and maps & guides and kiosks located at retail locations in Fairfax County additionally provided local county information. Kiosks located at retail centers also offer retail information such as maps and lists of special events occurring at the sites. Since they were installed, several design improvements have been made to enhance the ease of use and attractiveness of the displays.

The InfoKiosk program ended on January 31, 2007, thus the daily impacts of this TERM are calculated only for the period July 1, 2005 through January 31, 2007.

EVALUATION METHODOLOGY AND DATA SOURCES

It is technologically easy to track the number of kiosk users for various information screens, but very difficult to follow-up with users to determine their use of the information they received because kiosk use is largely anonymous. Commuter Connections had contact names and phone numbers for only tiny fraction of kiosk users recorded between July 2005 and June 2008, those who had submitted an on-screen Commuter Connections application for a ridematch and/or GRH or who completed an on-line survey, including their names and phone numbers.

For analysis of other TERMS, Commuter Connections conducted surveys of commuters who had used TERM services. But because the kiosks allow users to obtain some information, notably transit schedules and maps, without any further contact with Commuter Connections, kiosk use and mode change information for these commuters was captured through questions included in the 2007 State of the Commute survey.

This survey asked commuters about the following information:

- Use of the InfoExpress kiosks to obtain travel or commute information
- Changes in travel pattern or trial use of alternative mode after receiving information
- Mode used prior to making the change and duration of the change
- Commute distance

About 10% of the commuters surveyed in the State of the Commute survey said they had seen a kiosk and 11% of these commuters had used a kiosk to obtain transportation information. This represented approximately 243,200 commuters region-wide. About 30% of these commuters said they tried or started using an alternative mode with information they received from the kiosk (placement rate). About a quarter of these commuters continued using the new mode; the rest were temporary placements. Analysis of the changes made by these commuters produced VTR factors of 0.54 for continued placements and 1.55 for those who made temporary changes. The relatively high VTR factors, relative to factors for many other TERMs, were due to the substantial use of the kiosks to obtain and use transit information.

Because the InfoExpress Kiosks program ended in January 2007, about half-way through the three-year evaluation period, these VTR factors were discounted to credit only 53% of the total impact (19 months / 36 months) for the time the Kiosks were in place. This resulted in effective VTR factors of 0.29 for continued placements and 0.82 for temporary placements.

Vehicle trips reduced through the use of the kiosk was calculated by multiplying these kiosk VTR factors by the number of kiosk placements. Finally, as with Telework and GRH, daily VMT reduced was calculated by multiplying the number of vehicle trips reduced by average trip distances calculated from the kiosk survey (24.0 miles per one-way trip for continued placements and 17.3 miles for temporary placements). Emission reduction was calculated by multiplying vehicle trips and VMT reduced by the 2005 regional emission factors. Calculation details for kiosk impacts are presented in Appendix 6.

INFOEXPRESS KIOSKS SUMMARY OF GOALS AND IMPACTS

Shown in Table 7 below are the evaluation results for InfoExpress Kiosks. As shown, the TERM met its individual goals for all impact measures.

Table 7
InfoExpress Kiosks Goals and Estimated Impacts

	TERM Goal	Estimated Impacts
• Daily vehicle trips reduced	1,178	2,840
• Daily VMT reduced	46,755	52,638
• Daily tons NOx reduced	0.023 T	0.027 T
• Daily tons VOC reduced	0.013 T	0.016 T

Impacts vs Goals

Transportation Benefit (net over or (under) goal):	Vehicle Trips: 1,062 VMT: 5,883 miles
Emission Benefit (net over or (under) goal):	NOx: 0.004 tons per day VOC: 0.003 tons per day

SECTION 9 COMMUTER OPERATIONS CENTER

BACKGROUND

Since the 1970's, COG has offered basic commute information and assistance, such as regional ride-matching database, to commuters living and/or working in the Washington metropolitan region. Prior to 1995, when Commuter Connections was established, these services were provided by COG's RideFinders program. Because these services, now provided through the Commuter Operations Center (COC), were available when the emissions baseline was developed for regional conformity, the Center was not established as a TERM, but was included in the region's TIP as an ongoing program.

The function of the Commuter Operations Center is to increase commuters' awareness of alternative modes, through regional and local marketing and outreach programs and to encourage and assist commuters to form ridesharing arrangements. Encouraging commuters who drive alone to shift to alternative modes is a priority for the COC, but the COC also assists commuters who now use alternative modes to continue to do so, by offering ridematching and transit assistance when carpools break up or commuters' travel patterns change and disrupt existing alternative mode arrangements.

Commuter Connections program services include: carpool and vanpool matchlists, transit route and schedule information, information on Park & Ride lot locations and HOV lanes, telework information, commute program assistance for employers, GRH, and bicycling and walking information. Commuters obtain services by calling a toll-free telephone number or by submitting a ridematch application obtained from COG, an employer, a local partner assistance program, a transportation management association (TMA), or through the internet or one of the InfoExpress Kiosks described in Section 8.

EVALUATION METHODOLOGY

In past years, the Commuter Operations Center has enhanced the services it offers to commuters and expanded its marketing of alternative modes to raise public awareness of and interest in alternatives. These efforts were designed to increase the number of commuters placed in alternative modes and generate trip, VMT, and emission reduction benefits for the region. Further, the activities of the COC support the implementation of the TERMs administered by Commuter Connections. Thus, although it is not an adopted TERM, the COC is included in this evaluation.

The impacts of the COC were measured using data from one Commuter Connections placement survey conducted in November 2005. This survey interviewed a sample of commuters assisted by Commuter Connections in the three-months prior to the survey and collected data to estimate placement rates, VTR factors, drive alone access percentages, and travel and access distances. As was done for GRH, these multipliers were estimated for two sub-groups of applicants. The first sub-group included respondents who both live and work within the Washington, DC Metropolitan Statistical Area (MSA); that is within the 11-jurisdiction area covered by the TERM evaluation. The second group included respondents who work within the MSA but live outside it.

This distinction was made because applicants who live outside the MSA traveled a portion of their VMT outside the MSA. During the evaluation, it was decided that the VMT for these "out of MSA" applicants should be discounted to credit VMT reduction only for the portion that occurred within the MSA. Approximately 31% of the total participants lived outside the MSA.

For each sub-group of survey respondents, the placement rate, that is, the percentage of respondents who switched to an alternative mode, was calculated. Two rates were calculated, a "continued" rate, including respondents who switched and remained in the new alternative mode until the placement survey was conducted, and a "temporary" rate, including respondents who made a switch, but returned to their original mode before the survey. The two sub-group populations had the following placement rates:

	Continued	Temporary
• Within MSA	25.0%	15.7%
• Outside MSA	31.1%	13.2%

To determine the number of commuters placed in alternative modes between July 2005 and June 2008, these placement rates were multiplied by the total number of commuters who received assistance from Commuter Connections during that time period, 154,147, divided into the two sub-groups: 106,361 within the MSA and 47,786 outside the MSA. This calculation resulted in a total of 64,458 placements, with 41,452 placements from within the MSA and 23,006 placements from outside the MSA.

These placement figures were then multiplied by VTR factors derived from the survey data to estimate the number of vehicle trips reduced. The VTR factors, expressed in terms of average vehicle trips reduced per placement, for the two sub-groups were as follows:

	Continued	Temporary
• Within MSA	0.44	0.61
• Outside MSA	0.48	0.45

VTR factors combine the vehicle trip reduction contributions of various types of mode changes, such as from transit to rideshare, drive alone to transit, and drive alone to carpool, each of which reduces a different number of vehicle trips per day, into one number. VTR factors of less than 0.50 indicate a significant number of the changes were to lower occupancy shared modes, such as carpool and/or were shifts from one alternative mode to another.

The vehicle trip reductions for temporary placements also were discounted to reflect their short duration of 6.6 weeks of the year (12%). The calculation of vehicle trips reduced produced a total of 20,459 trips reduced; 18,833 from commuters within the MSA and 1,626 from commuters outside the MSA.

Next, VMT reduced was calculated by multiplying the numbers of vehicle trips reduced by the average trip length for commuters who made a shift to an alternative mode. The one-way trip distance for the within MSA respondents was 32.2 miles for continued placements and 31.1 miles for temporary placements. The actual average one-way distances for the outside MSA respondents were 54.4 miles for continued placements and 57.9 miles for temporary placements. To discount the distance credited to the outside MSA respondents, their one-way travel distance was set equal to that of the distance for the within MSA respondents, resulting in a loss of more than 22 one-way miles per trip for each outside-MSA respondent. The VMT calculation resulted in a total of 656,990 VMT reduced.

Emission reduction for the COC was calculated using trip-based and VMT-based regional emission factors for 2005. Details of these calculations are presented in Appendix 7.

Software Upgrades

The 2005 evaluation included a "Software Upgrade" component as part of the Integrated Rideshare TERM. This service involves upgrading and maintaining the regional ridematching system to include integrated transit information, information on HOV lanes, Park & Ride lots, and telecommuting, to provide full-service commuter information through traveler information kiosks. By providing transit and telework information to all commuters who received a matchlist, the service is expected to encourage commuters to try transit and park & ride lots, even if they did not have these options in mind when they requested assistance from Commuter Connections. The software upgrade portion of the TERM was implemented in October 1998. In the 2008 evaluation, this component was merged into the COC impacts. But they were calculated separately, using the following method.

Impacts of the software upgrades were assessed using data from the rideshare placement survey conducted in November 2005. This survey assessed changes commuters made after receiving a ridematch or other commute service from Commuter Connections. Respondents were asked if they remembered receiving transit and/or park & ride (P&R) information on a matchlist and if they used the information to make any travel changes. Changes to transit influenced by use of transit information and changes to rideshare or transit influenced by P&R information were captured in this COC component.

The surveys showed that 4.3% of applicants who lived inside the MSA and 5.9% of applicants who lived outside the MSA used the transit and/or P&R information to shift to an alternative mode. Most said they continued using the alternative mode. The placement rates and VTR factors for this calculation were:

	Continued	Temporary
Placement Rates		
• Within MSA	2.7%	1.6%
• Outside MSA	5.0%	0.9%
VTR factors		
• Within MSA	0.65	0.64
• Outside MSA	0.75	0.60

To estimate vehicle trips reduced, placement rates were multiplied by the 154,147 commuters who applied to Commuter Connections or received follow-up assistance from Commuter Connections during the evaluation period and by the VTR factors derived from the placement surveys for commuters who used the information provided.

VMT reductions were estimated by multiplying the number of trips by the average trip lengths calculated from the placement surveys (32.3 miles for continued placements and 33.8 miles per trip for temporary placements). As was explained in the descriptions for both the GRH TERM and the COC, these distances were used for both within MSA and outside MSA respondents. Emission reduction was calculated using trip-based and VMT-based 2008 regional emission factors. Calculation details for the software upgrade are shown in Appendix 8.

COMMUTER OPERATIONS CENTER SUMMARY OF GOALS AND IMPACTS

Shown below are the evaluation results for the COC and the goals established for the Center.

Table 7
Commuter Operations Center Regional Goals and Estimated Impacts

	Regional Goal	Estimated Impacts
Commuter Operations Center (basic services)		
• Total commuters (new and re-apply)	152,356	154,147
• Daily vehicle trips reduced	10,399	14,993
• Daily VMT reduced	296,635	480,450
• Daily tons NOx reduced	0.147 T	0.213 T
• Daily tons VOC reduced	0.081 T	0.107 T
Software Upgrades (additional to Basic COC)		
• Daily vehicle trips reduced	2,370	3,773
• Daily VMT reduced	62,339	122,198
• Daily tons NOx reduced	0.031 T	0.0054 T
• Daily tons VOC reduced	0.017 T	0.0027 T

Impacts vs Goals

Applicant Number (net over or (under) goal): Applicants: 1,791

Basic COC

Transportation Benefit (net over or (under) goal): Vehicle Trips: 4,594
VMT: 183,815 miles

Emission Benefit (net over or (under) goal): NOx: 0.066 tons per day
VOC: 0.026 tons per day

Software Upgrades

Transportation Benefit (net over or (under) goal): Vehicle Trips: 1,403
VMT: 59,859 miles

Emission Benefit (net over or (under) goal): NOx: 0.023 tons per day
VOC: 0.009 tons per day

As shown, the COC fulfilled more than applicant goal during the three year period. About a quarter of the requests were from new applicants or re-applicants, who comprised 35,500 applicants. The COC also provided follow-up assistance to more than 118,600 commuters. This assistance included providing additional match names for existing carpools and vanpools that needed or wanted a new or additional rider. Some of this assistance likely helped maintain existing ridesharing arrangements. The COC substantially exceeded the goals for vehicle trips, VMT, and emissions reduced.

The results shown in Table 7 were adjusted results that eliminated double counting due to overlap between the COC and individual TERMs. As was explained in Section 7, a portion of the Commuter Operations Center's impacts were assigned to the software upgrades implemented under the Integrated Rideshare TERM. Additionally, a small portion of the COC's impacts resulted from applications received through the kiosks (0.1% of total applications). And about one in ten new CC applicants requested both GRH and other information (5.7% of total COC assisted commuters). Finally, the impacts for about 12% of new COC applicants were assigned to the Mass Marketing TERM, to reflect the impact of this TERM in influencing commuters to contact CC for travel-assistance services.

To avoid double counting of impacts, the impacts of these other TERMs were subtracted from the COC base impacts to determine the net impacts attributable solely to the COC and to account for those impacts covered by TERMs and those attributable to the base operations. These adjustments are shown in Table 8 below. The "Net COC" impacts shown in Table 8 were used in Table 7 as the impacts attributable only to the COC and not to any TERM.

Table 8
Adjustment For Double Counting Among COC and TERMs

Evaluation Measure	COC Base	Mass Mkt	Kiosks	SW Upgr	GRH	Net COC
Placements	64,458	1,685	69	7,200	3,578	51,927
VT reduced	20,459	535	22	3,773	1,136	14,993
VMT reduced	656,990	17,172	700	122,198	36,470	480,450
Tons of NOx reduced	0.291	0.008	0.0003	0.054	0.016	0.213
Tons of VOC reduced	0.145	0.004	0.0002	0.027	0.008	0.107

Notes:

- Mass Marketing – new applicants influenced by ads to contact CC, see Section 8
- Kiosks - 0.1% of new COC applications received through kiosks
- Software upgrades – see description in this section
- GRH – 10% of new/re-applicants ask for GRH and other commute information = 5.5% of COC total after Mass Marketing adjustment

SECTION 10 CONCLUSIONS ABOUT TERM IMPACTS

The preceding sections of this report documented estimated impacts for individual TERMs and for the Commuter Operations Center. As noted in an earlier section, the combined set of programs administered by Commuter Connections did not meet the goals set for the five TERMs collectively, although several of the TERMs did meet or exceed their individual goals.

Many of the TERMs met goals established for participation, vehicle trip, VMT, and emissions reductions. Commuters and employers, as appropriate, apparently are aware of and utilizing the services. Where shortfalls did occur against the goals, they appeared to be related to the less aggressive marketing campaigns implemented for GRH and Mass Marketing during 2006 and the early part of 2007. But COG revised the goals for each TERM following the 2005 analysis, so the 2008 goals reflect more closely the impacts from actual types of behavior changes that commuters make than did the 2005 goals.

It also should be noted that many of the impact calculations in this report used data from surveys that are subject to statistical error rates. So the impact numbers should be considered estimates of impacts that could be somewhat higher or lower than are shown. Additionally, this interim evaluation covers only the first 30 months of the 36-month evaluation period. TERMs such as GRH, COC, Mass Marketing, and Employer Outreach, whose impacts are tied to levels of commuter or employer participation in Commuter Connection programs, are likely to experience an increase in impacts when the final six months are included in the calculations.

Individual sections of this report have discussed factors that affected the achievement of goals. Below are presented highlights of those discussions for the five TERMs and the COC.

MARYLAND AND VIRGINIA TELEWORK

The incidence of telework continues to grow in the Washington region. In 1996, about 150,000 regional workers were telecommuting. By 2005, the number had grown to more than 318,000, and increase of 165,000 and the 2007 State of the Commute survey estimates regional teleworkers at 456,600 or about 19% of regional commuters.

About 10% of the teleworkers can be attributed to the efforts of the Telework TERM, either directly through information distributed to commuters, through regional advertising to the public-at-large, or through assistance to employers that want to start a telework program. This number of new teleworkers exceeded the goal set for the Telework.

The Telework TERM exceeded the goals for trip, VMT, and emission reductions assigned to the TERM. The goals were revised following the 2005 analysis and now more closely represent the actual telework patterns existing in the region; primarily the average frequency of 1.5 days per week and the 29% non-drive alone mode share of teleworkers on non-telework days. These two factors have a substantial impact on the total trip reduction generated by teleworking.

It is possible the Telework TERM's contribution could be slightly underreported. About five percent of regional teleworkers said they learned of telecommuting through "advertising," newspaper ads, or "other website." Although these sources were not necessarily controlled by Commuter Connections, the Telework has advertised consistently and broadly about telecommuting via radio, television, print media, and

the internet. So this response likely indicates additional teleworkers who learned about telecommuting from outreach and promotion conducted by Commuter Connections. Because the source of the advertising could not be clearly documented, only a small share of these commuters (1.9% of total teleworkers) was credited to the Telework.

GUARANTEED RIDE HOME

Unlike the Telework TERM, the GRH TERM did not meet the adopted goals, falling 33% short in the number of vehicle trips reduced and about 37% short of the VMT goal.

The shortfall primarily resulted because the number of new GRH registrants dropped substantially in 2006 and 2007 from annual registration counts of previous years. COG adjusted the goals for this TERM after the 2005 evaluation to reflect the actual travel patterns of typical GRH applicants and the fact that a sizeable share of GRH registrants were ridesharing or using transit prior to registering. These changes resulted in the vehicle trip and VMT calculations more accurately measuring the trip reduction per new GRH registrant, but the lower participation levels results in correspondingly lower results for vehicle trip and VMT reduction goals.

Finally, note that a very small share of GRH impacts were assigned to the Mass Marketing TERM to recognize that some GRH applicants were influenced to contact Commuter Connections and apply for GRH after they heard a Mass Marketing ad. Approximately one percent of the total new GRH applicants were assigned to Mass Marketing. This accounted for less than one percent of the GRH impacts.

EMPLOYER OUTREACH

Impacts for Employer Outreach (new or expanded program impacts) were well above the goal for this TERM. Both the vehicle trip reduction and VMT reduction were nearly 50% over their respective goals. This result was due to the large number of employees at these worksites and the aggressiveness of the worksite programs. Only Level 3 and 4 employers were included in the calculation and these employers have implemented highly effective commute strategies to encourage use of alternative modes, including financial subsidies, telecommuting, compressed work schedules and packages of commute support services.

We note that Employer Outreach overlaps with the Maryland and Virginia Telework TERM. Some employers counted in Employer Outreach could also be counted in the Telework "assisted employer" category. To avoid double counting credits, employers that offered telework strategies that also had received assistance from the Telework TERM were included in the comprehensive Employer Outreach impact calculation, but impacts from the telework components of their programs were removed from Employer Outreach impacts and assigned to Telework.

MASS MARKETING

MM reached about a third of the goal for commuter placements, but fell farther short of the goals for vehicle trips and VMT reduced, meeting 19% and 27% respectively of these two goals. Emissions also fell short, by similar percentages. This TERM estimates impacts for three primary groups of commuters,

1) "Directly influenced" commuters who had no contact with Commuter Connections other than through hearing or seeing the ads
2) Indirectly influenced commuters, who were influenced by the ads to contact Commuter Connections for rideshare or GRH assistance
3) Commuters who participated in Bike to Work Day events

Directly influenced commuters accounted for about 45% of commuters placed, indirect placements accounted for about 48% of the total, and the balance of nine percent was contributed by Bike to Work Day.

The shortfall for this TERM was largely in the areas of ad-prompted GRH referrals, which were considerably under the referrals counted in the 2005 evaluation, and in the much lower level of "direct influence" credits compared to 2005. Only one percent of the credit for GRH applications was assigned to Mass Marketing in this evaluation, compared to 13% of the credit assigned in 2005. Similarly, a higher percentage of direct influence from ads was measured in the 2004 State of the Commute survey and in the 2005 Mini-Household survey compared to that measured for ad influence in the 2007 SOC survey.

INFOEXPRESS KIOSKS

The InfoExpress Kiosk TERM met its goals for all impact measures. Because the InfoExpress Kiosks program ended in January 2007, about half-way through the three-year evaluation period, the impacts for this TERM were discounted to credit only 53% of the total impact (19 months / 36 months) for the time the Kiosks were in place.

COMMUTER OPERATIONS CENTER

The Commuter Operations Center is not an adopted TERM, but was included in this evaluation because it supports the success of several of the TERMs, including GRH, Integrated Rideshare, and Employer Outreach. The COC fulfilled more than 154,000 requests during the 30-month period from July 2005 through December 2007. About 35,500 of the requests were from new applicants or re-applicants.

But the COC also provided follow-up assistance to more than 118,000 commuters. This assistance included providing additional match names for existing carpools and vanpools that needed or wanted a new or additional rider. Some of this assistance likely helped maintain existing ridesharing arrangements. The COC substantially exceeded the goals for vehicle trips, VMT, and emissions reduced, by a factor of two or three, depending on the impact measure.

The base results for the COC were adjusted to eliminate double counting due to overlap between the COC, GRH, and the Mass Marketing TERM. The overlap with GRH results because some commuters request both GRH and ridematch assistance. The overlap with Mass Marketing reflects the impact of this TERM in influencing commuters to contact the COC for travel-assistance services.

The COC impacts also were adjusted to separate the impact of the software upgrades implemented previously under the Integrated Rideshare TERM. In this 2008 evaluation, impacts for this program were reported under the COC, but its individual impacts were shown separately. The software upgrades met all the goals defined for the program.

LIST OF APPENDICES

APPENDIX 1 - CALCULATION OF TELEWORK RESOURCE CENTER IMPACTS

APPENDIX 2 - CALCULATION OF GUARANTEED RIDE HOME IMPACTS

APPENDIX 3 - CALCULATION OF EMPLOYER OUTREACH IMPACTS

APPENDIX 4 – CALCULATION OF MASS MARKETING IMPACTS

APPENDIX 5 - CALCULATION OF INFOEXPRESS KIOSK IMPACTS

APPENDIX 6 - CALCULATION OF COMMUTER OPERATIONS CENTER IMPACTS

APPENDIX 7 - CALCULATION OF SOFTWARE UPGRADE IMPACTS

APPENDIX 1 – CALCULATION OF MARYLAND AND VIRGINIA TELEWORK IMPACTS

Populations of Interest

• All regional teleworkers (TW)	456,636	(from SOC survey)
• Employees at worksites assisted by TW	127,161	(from TW assistance survey)

Telecommute Placement Rates

• Directly assisted TW	9.6%	(% of TW assisted by TW, from SOC survey)
• Assisted worksites	4.1%	(% of new TW at sites, from TW assistance survey)

Placements

Mixed home and Non-home based

• Directly assisted TW	43,762	(regional TW x directly assisted placement rate)
• TW at TW asst. sites	5,264	(employees at assisted sites x asst site placement rate)
Total assisted TW	**49,027**	

Breakdown of placements by Location (home-based and telecenter-based)

• % Home-based TW	95%	(from SOC survey)
• % Non-home (NH)-based TW	5%	(from SOC survey)
• Home-based TW	46,575	(total assisted TW x % Home-based TW)
• NH-based TW	2,451	(total assisted TW x % NH-based TW)

Daily Vehicle Trips Reduced

VTR Factors

• Home-based factor	0.45	(from SOC survey)
• NH-based factor	0.31	(from SOC survey)
• Home-based VT reduced	21,097	(HB TW x HB VTR factor)
• NH-based VT reduced	769	(NH-based TW x NH VTR factor)

Total Daily Vehicle Trips Reduced 21,866

Appendix 1, continued

Daily VMT Reduced

Ave one-way trip distance (mi)

• Home-based TW	18.5	(SOC survey)

Telecenter reductions (TC days) – other than MWTC

• VMT reduction – Non-home days	19.4	(SOC survey)
• Ave. days/wk at TC	1.0	(SOC survey)
• VMT reduction – home TW days	31.8	(SOC survey)
• Ave. days/wk at home	0.9	(SOC survey)
• Total weekly VMT reduction	47.8	
• Daily reduction per teleworker	9.6	

VMT reductions on TW days

• Home-based VMT reduced	390,290	(HB VT reduced x ave trip distance)
• NH-based VMT reduced	23,412	(NH-based TW x daily miles reduced)
Total Daily VMT Reduced	**413,702**	

Daily Emissions Reduced

		08 Emission		**08 Emission**		
NOx reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start	21,866	0.6291			13,756	0.0152
• Running (40 mph)			413,703	0.4287	177,355	0.1955
Total NOx reduced (tons)						**0.211**

		08 Emission		**08 Emission**		
VOC reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start	21,866	1.7569			38,416	0.0423
• Running (40mph)			413,703	0.1856	76,783	0.0846
Total VOC reduced (tons)						**0.127**

APPENDIX 2 – CALCULATION OF GUARANTEED RIDE HOME IMPACTS

Populations of Interest		
• GRH registrants	12,661	(GRH database)
• Registrants	9,114	
• One-time exceptions	324	(GRH database)
Total GRH base	**22,099**	
Within MSA	68%	15,027
Outside MSA	32%	7,072
GRH Placement Rates (continued rates only)		
• Within MSA placement rate	33.9%	(GRH survey)
• Outside MSA placement rate	44.9%	(GRH survey)
Placements (continued only)		
• Within MSA	**5,094**	(Within MSA base x within MSA placement rate)
• Outside MSA	**3,175**	(Outside MSA base x outside MSA placement rate)
Daily Vehicle Trips Reduced		
VTR Factors (continued only)		
• Within MSA	0.91	(GRH survey)
• Outside MSA	1.19	(GRH survey)
VT Reduced (continued only)		
• Within MSA	**4,687**	**(**Within MSA placements x within MSA VTR factor)
• Outside MSA	**3,778**	(Outside MSA placements x outside MSA VTR factor**)**
Total Daily VT Reduced	**8,465**	
Daily VMT Reduced		
• Ave one-way trip distance (mi)		
• Within MSA	26.2	(from GRH survey)
• Outside MSA	26.2	(discounted from actual 47.0 miles from GRH survey)
VMT reduced		
• Within MSA	122,792	(Within MSA VT reduced x trip distance)
• Outside MSA	98,996	(Outside MSA VT reduced x trip distance)
Total Daily VMT Reduced	**221,788**	

Appendix 2, continued

Trip and VMT Adjustment for SOV Access to HOV Modes (reduce VT and VMT for AQ analysis)

Inside MSA

- Non-SOV access percentage 50% (GRH survey)
- SOV access distance (mi) 4.8 (GRH survey)

Outside MSA – not applicable – all access outside MSA

VT Reduction

- No SOV access 6,122 (VT x non-SOV access %)

Total VT for AQ analysis **6,122**

VMT Reduction

- No SOV access 160,392 (VT x SOV % x trip distance)
- With SOV access 50,148 (VT x SOV % x (trip distance – access distance)

Total VMT for AQ analysis **210,540**

Daily Emissions Reduced

		08 Emission		08 Emission		
NOx reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start + hot soak	6,122	0.6291			3,851	0.0042
• Running			210,540	0.4287	90,258	0.0995
Total NOx reduced (tons)						**0.104**

		08 Emission		08 Emission		
VOC reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start + hot soak	6,122	1.7569			10,755	0.0119
• Running			210,540	0.1856	39,076	0.0431
Total VOC reduced (tons)						**0.0055**

Correction for Overlap with MM TERM

Total GRH apps FY 06, 07, 08	22,099	
New GRH apps FY 06, 07, 08	12,985	59%
Estimated MM share of new GRH	1%	
Estimated MM share of GRH impact	0.3%	

	GRH base	**MM**	**Net GRH**
Placements	8,269	24	8,245
VMT reduced	8,465	25	8,440
VMT reduced (mi)	221,788	652	221,136
NOx reduced (T)	0.104	0.0001	0.103
VOC reduced (T)	0.055	0.0001	0.055

APPENDIX 3 – CALCULATION OF EMPLOYER OUTREACH

Populations of Interest (new / expanded programs)

• Sites 100+ with Level 3-4 program	40	(ACT! database)
• Sites <100 with Level 3-4 program	49	(ACT! database)
• **Total TERM base employees**	**52,694**	(ACT! database)

Average Vehicle Occupancy (AVO)

• Starting (pre-program)	1.26	(employee survey data)
• Ending (with program)	1.50	(COMMUTER model runs)

Daily person trips

• Starting (pre-program)	105,388	(total employees x 2 one-way trips per day)
• Ending (with program)	105,388	(total employees x 2 one-way trips per day)

Daily vehicle trips

• Starting (pre-program)	83,545	(total employees / starting AVO)
• Ending (with program)	70,428	(total employees / ending AVO)
Total Daily Vehicle Trips Red.	**13,117**	(starting vehicle trips – ending vehicle trips)

Daily VMT Reduced

• One-way trip dist (mi)	16.3	(SOC survey, mode averages)
Total Daily VMT Reduced	**214,128**	**(**vehicle trips reduced x average trip distance)

Trip and VMT Adjustment for SOV Access to HOV Modes (reduce VT and VMT for AQ analysis)

• Non-SOV access percentage	71%	(from SOC survey)
• SOV access distance (mi)	3.1	(from SOC survey)

VT Reduction

• No SOV access (cont)	9,313	(VT reduced x non-SOV access %)
Total VT for AQ analysis	**9,313**	

VMT Reduction

• No SOV access	152,031	(VT reduced x SOV % x trip distance)
• With SOV access	50,305	(VT reduced x SOV % x (trip dist – access dist)
Total VMT for AQ analysis	**202,336**	

Appendix 3, continued

Daily Emissions Reduced

NOx reduced	Trips	08 Emission Factor	VMT	08 Emission Factor	Tot gm	Tot ton
• Cold start + hot soak	9,313	0.6291			5,859	0.0065
• Running			202,336	0.4287	86,741	0.0956
Total NOx reduced (tons)						**0.102**

VOC reduced	Trips	08 Emission Factor	VMT	08 Emission Factor	Tot gm	Tot ton
• Cold start + hot soak	9,313	1.7569			16,362	0.0180
• Running			202,336	0.1856	37,554	0.0414
Total VOC reduced (tons)						**0.0594**

Correction for Overlap with EO-Bike and TW TERMs

	EO base	EO-bike	TW	Net EO
Vehicle Trips Reduced	13,117	158	357	12,702
VMT Reduced (miles)	214,128	351	5891	207,887
NOx Reduced (tons)	0.102	0.0002	0.003	0.099
VOC Reduced (tons)	0.059	0.0001	0.002	0.058

APPENDIX 4 - CALCULATION OF MASS MARKETING IMPACTS

4 impact components
- Part 1 - Commuters influenced by ads to change mode – no contact CC
- Part 2 – Commuters influenced by ads to contact CC
- Part 3 – GRH credit
- Part 4 – Bike to Work Day

PART 1

Populations of Interest – commuters influenced by ads to change mode – no contact CC

Total commuters in region	2,426,248	(SOC)
• % recall commute message	35%	(SOC)
• % chg to alt mode after ads	0.1%	(SOC)
• % chg influenced by ad	100%	(SOC)
Placements – no contact with CC	**628**	(COC – monthly applicant analysis)
Placement Rates		
• Continued placement rate	19%	(SOC)
• Temporary placement rate	81%	(SOC)
Placements		
• Continued placements	119	(Placements x continued placement rate)
• Temporary placements	509	(Placements x temporary placement rate)
Daily Vehicle Trips Reduced		
VTR Factors		
• Continued VTR factor	1.00	(SOC)
• Temporary VTR factor	1.70	(SOC)
• Continued VT reduced	119	(Continued placements x continued VTR factor)
• Temporary VT reduced	399	(Temporary placements x temporary VTR factor x 0.46 discount for temporary use)
Total Daily Vehicle Trips Reduced	**518**	
Daily VMT Reduced		
• Ave one-way trip dist (mi)	31.2	(SOC)
Total Daily VMT Reduced	**16,175**	

Trip and VMT Adjustment for SOV Access to HOV Modes (reduce VT and VMT for AQ analysis)

• Non-SOV access percentage	72%	(from CC placement survey)
• SOV access distance (mi)	3.1	(from CC placement survey)

Appendix 4, continued

PART 1 (cont.)

VT Reduction		
• No SOV access	373	(VT x non-SOV access %)
Total VT for AQ analysis	**373**	

VMT Reduction		
• No SOV access	11,646	(VT x SOV % x trip distance)
• With SOV access	4,079	(VT x SOV % x (trip dist – access dist)
Total VMT for AQ analysis	**15,725**	

Daily Emissions Reduced – Part 1

		08 Emission		08 Emission		
NOx reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start + hot soak	373	0.6291			235	0.0003
• Running			15,725	0.4287	6,741	0.0074
Total NOx reduced (tons)						**0.0077**

		08 Emission		08 Emission		
VOC reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start + hot soak	373	1.7569			656	0.0007
• Running			15,725	0.1856	2,919	0.0032
Total VOC reduced (tons)						**0.0039**

PART 2

Populations of Interest – commuters influenced by ads to contact CC

New CC apps (does not include re-apply or follow-up)		
• FY 2006	13,479	(CC database)
• FY 2007	11,364	(CC database)
• FY 2008	6,149	(CC database)
Total applicants	**30,992**	

Commuters influenced by ads to contact CC	14%	(COC – monthly applicant analysis)
New apps 06-08 as % of total	20%	(new apps FY04, 05 / total CC apps)
% all apps influenced by ads	2.8%	

CC Impacts – FY 06-08	**Total**	**MM Share**
• CC placements	64,458	1,814
• CC Vehicle trips reduced	20,459	576
• CC VMT reduced	656,990	18,493

Appendix 4, continued

PART 2 (cont.)

CC Impacts – FY 05-08 – Discounted for AQ Analysis

	Total	MM Share
• CC Vehicle trips reduced	11,831	333
• CC VMT reduced	598,940	16,859

Daily Emissions Reduced – Part 2

Daily Emissions Reduced

		08 Emission		08 Emission		
NOx reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start + hot soak	333	0.6291			209	0.0002
• Running			16,859	0.4287	7,227	0.0080
Total NOx reduced (tons)						**0.0082**

		08 Emission		08 Emission		
VOC reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start + hot soak	333	1.7569			585	0.0006
• Running			16,859	0.1856	3,129	0.0034
Total VOC reduced (tons)						**0.0040**

PART 3 – GRH Credit

From GRH Analysis

Total GRH apps FY 06, 07, 08	22,099	
New GRH apps FY 06, 07, 08	12,985	59%
Estimated MM share of new GRH	0.5%	
Estimated MM share of GRH impact	0.3%	

	GRH base	MM
Placements	8,269	24
VT reduced	8,465	25
VMT reduced	221,788	652
NOx reduced (T)	0.104	0.0001
VOC reduced (T)	0.055	0.0001

Appendix 4, continued

Part 4 - Bike to Work Day Credit

Participants' riding percentage and frequency

Number of riders	6,846	(BTWD registration data, 2005, 2006, 2007)
% biking to work before event	78.9%	(BTWD survey)
% new riders	9.6%	(BTWD survey)
Number of new riders	657	
% who increase riding days	12.3%	
Number of increased riders	842	
Total new + increased riders	1,499	Placement

Change in Bike Days

Pre-Event		
% biking before event	78.9%	
Ave days riding before event	2.5	(BTWD survey)
Weekly bike days before	13,342	
Summer Biking		
% biking after event	88%	(BTWD survey)
Ave days riding after event	2.6	(BTWD survey)
Weekly bike days after	15,596	
Fall Biking		
% new riders biking late fall	76%	(BTWD survey)
Weekly bike days late fall	1.04	(BTWD survey)
Weekly new bike days fall	518	
% increased riders biking late fall	72%	(BTWD survey)
Weekly new bike days late fall	0.92	(BTWD survey)
Weekly increased bike days	555	

New Bike Days

• New wkly bike days summer	2,254	(riders x % new after event x ave days summer)
• New wkly bike days fall	1,073	(riders x % new riders x still ride winter x ave days)
• Total new bike days summer	63,124	(wkly summer days x 28 wks – Apr-Oct)
• Total new bike days winter	23,601	(wkly winter days x 22 wks – Nov-Mar)
• Total new bike days-year	86,725	(summer bk days + winter bk days)
• New bike trips - year	173,450	(annual bike days x 2)

New Bike Trips and VT Reduction

• Ave new daily bk trips	694	(Annual new bike trips / 250)
• % DA/RS on non-bike days	49%	(BTWD survey)
• Daily vehicle trips reduced	338	(daily new bike trips x DA %

BTWD Daily Vehicle Trips Reduced 338

Appendix 4, continued

Daily VMT Reduced

- Ave trip distance (mi) 10.4 (BTWD survey)

BTWD Daily VMT Reduced **3,518** (vehicle trips reduced x average trip distance)

Total Daily Vehicle Trips Reduced **338** (Bike program VT reduced + BTWD VT reduced)
Total Daily VMT Reduced **3,518** (Bike program VMT reduced + BTWD VMT reduced)

Daily Emissions Reduced

		08 Emission		08 Emission		
NOx reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start + hot soak	338	0.6291			213	0.0002
• Running			3,518	0.4287	1,506	0.0017
Total NOx reduced (tons)						**0.0019**

		08 Emission		08 Emission		
VOC reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start + hot soak	338	1.7569			594	0.0007
• Running			3,518	0.1856	653	0.0007
Total VOC reduced (tons)						**0.0014**

Mass Marketing
Total – PART 1, PART 2, PART 3, AND PART 4

	No Contact	**CC Contact**	**GRH**	**BTWD**	**Total MM**
Placements	628	1,685	24	1,499	**3,836**
VT reduced	518	535	25	338	**1.416**
VMT reduced	16,175	17,172	652	3,518	**37,516**
NOx reduced (T)	0.008	0.008	0.0001	0.002	**0.018**
VOC reduced (T)	0.004	0.004	0.0001	0.001	**0.009**

APPENDIX 5 - CALCULATION OF INFOEXPRESS KIOSK IMPACTS

Populations of Interest – Regional Commuters who used Kiosks to obtain commute information

• Regional kiosk users	27,627	(SOC survey)

Kiosk Placement Rates

• Continued placement rate	6.6%	(SOC survey)
• Temporary placement rate	24.6%	(SOC survey)

Placements

• Continued placements	1,829	(Kiosk users x continued placement rate)
• Temporary placements	6,798	(Kiosk users x temporary placement rate)
Total placements	**8,627**	

Daily Vehicle Trips Reduced

VTR Factors

• Continued VTR factor	0.54	(SOC survey) x 53% (reduced kiosk period)
• Temporary VTR factor	1.55	(SOC survey) x 53%
• Continued VT reduced	523	
• Temporary VT reduced	2,316	(Temporary placements x temporary VTR factor x 42% discount for temporary use)
Total Daily Vehicle Trips Reduced	**2,840**	

Daily VMT Reduced

• Continued one-way trip dist (mi)	24.0	
• Temp trip dist (mi)	17.3	(from SOC survey)
• Continued VMT reduced	12,563	
• Temp VMT reduced	40,075	(Temp VT reduced x Temp trip distance)
Total Daily VMT Reduced	**52,638**	

Daily Emissions Reduced

		08 Emission		08 Emission		
NOx reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start + hot soak	2,840	0.6291			1,787	0.0020
• Running			52,638	0.4287	22,566	0.0249
Total NOx reduced (tons)						**0.0269**

		08 Emission		08 Emission		
VOC reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start + hot soak	2,840	1.7569			4,990	0.0055
• Running			52,638	0.1856	9,770	0.0108
Total VOC reduced (tons)						**0.0163**

APPENDIX 6 - CALCULATION OF COMMUTER OPERATIONS CENTER IMPACTS

Populations of Interest – Commuter Connections Rideshare Applicants

New, Reapply, Transit/other, follow-up requests

• FY 2006	63,358	(CC database)
• FY 2007	58,221	(CC database)
• FY 2008	32,568	(CC database)
Total assisted commuters	**154,147**	

Within MSA (69%)	106,361
Outside MSA (31%)	47,786

COC Placement Rates	**In MSA**	**Out MSA**	
• Continued rate	25.0%	31.3%	
• Temporary rate	15.7%	13.2%	
• Total	40.7%	44.3%	
Placements			
• Continued	26,590	14,861	(Apps x cont. rate)
• Temporary	16,699	6,308	(Apps x temporary rate)
• **Total placements 64,458**			
Daily Vehicle Trips Reduced			
VTR Factors			
• Continued	0.44	0.48	
• Temporary	0.61	0.45	
• Temporary discount	12.7%	11.7%	
• Continued trips reduced	11,700	7,133	(Placements x cont. VTR factor)
• Temporary trips reduced	1,294	332	(Placements x temp VTR factor)
Total VT reduced 20,459			
Daily VMT Reduced			
Ave one-way trip distance (mi)			
• Continued	32.2	32.2	(Actual Outside dist. 54.4 miles)
• Temporary	31.1	31.1	(Actual Outside dist. 57.9 miles)
• Continued VT reduced	376,732	229,696	(Vehicle trips x ave distance)
• Temporary VT reduced	40,233	10,328	
Total VMT Reduced 656,990			

Appendix 6, continued

Trip and VMT Adjustment for SOV Access to HOV Modes (reduce VT and VMT for AQ analysis)

	In MSA	Out MSA	
• Non-SOV access % -Continued	67%	0%	(CC placement survey)
• SOV access dist (mi) – Continued	6.6	0.0	(CC placement survey)
• Non-SOV access % - Temporary	61%	0%	(CC placement survey)
• SOV access dist (mi) – Temporary	8.0	0.0	(CC placement survey)

VT Reduction

• No SOV access (cont + temp)	4,366	7,465	(VT x non-SOV access %)

Total VT for AQ analysis 11,831

VMT Reduction

• No SOV access (cont + temp)	140,013	240,024	(VT x SOV % x (dist – access dist))
• SOV access (cont + temp)	218,903	0	

Total VMT for AQ analysis 598,940

Daily Emissions Reduced

		08 Emission		08 Emission		
NOx reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start + hot soak	11,831	0.6291			7,443	0.0082
• Running			598,940	0.4287	256,766	0.2830
Total NOx reduced (tons)						**0.2912**

		08 Emission		08 Emission		
VOC reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start + hot soak	11,831	1.7569			20,786	0.0229
• Running			598,940	0.1856	111,163	0.1225
Total VOC reduced (tons)						**0.1454**

Correction for Overlap with Integrated Rideshare and GRH TERMs

	COC base	MM	Kiosk	Soft Upg	GRH	Net COC
Placements	64,458	1,685	69	7,200	3,578	51,927
Vehicle Trips Reduced	20,459	535	22	3,773	1,136	14,993
VMT Reduced (miles)	656,990	17,172	700	122,198	36,470	480,450
NOx Reduced (tons)	0.291	0.008	0.0003	0.0538	0.016	0.213
VOC Reduced (tons)	0.145	0.004	0.0002	0.0267	0.008	0.107

Notes:
MM influenced commuters – from MM analysis, Appendix 9
Kiosk – 0.1% of COC base applications obtained through kiosks
GRH – 11% of new apps/reapps ask for GRH and other info = 5.7% of COC total after MM adjustment

APPENDIX 7 - CALCULATION OF SOFTWARE UPGRADE IMPACTS

Populations of Interest – Commuter Connections Rideshare Applicants

New, Reapply, Transit/other, follow-up requests

• FY 2006	63,358	(CC database)
• FY 2007	58,221	(CC database)
• FY 2008	32,568	(CC database)
Total assisted commuters	**154,147**	

Within MSA (69%)	106,361
Outside MSA (31%)	47,786

COC Placement Rates	**In MSA**	**Out MSA**	
• Continued rate	2.7%	5.0%	
• Temporary rate	1.6%	0.9%	
• Total	4.3%	5.9%	
Placements			
• Continued	2,872	2,389	(Apps x cont. rate)
• Temporary	1,702	430	(Apps x temporary rate)
• **Total placements 7,393**			

Daily Vehicle Trips Reduced

VTR Factors			
• Continued	0.65	0.75	
• Temporary	0.64	0.60	
• Temporary discount	17.0%	12.0%	
• Continued trips reduced	1,867	1,792	(Placements x cont. VTR factor)
• Temporary trips reduced	185	31	(Placements x temp VTR factor)
Total VT reduced 3,875			

Daily VMT Reduced

Ave one-way trip distance (mi)			
• Continued	32.3	32.3	(Actual Outside dist. 56.9 miles)
• Temporary	33.8	33.8	(Actual Outside dist. 57.2 miles)
• Continued VT reduced	60,293	57,880	(Vehicle trips x ave distance)
• Temporary VT reduced	6,258	1,047	

Total VMT Reduced 125,478

Appendix 7, continued

Trip and VMT Adjustment for SOV Access to HOV Modes (reduce VT and VMT for AQ analysis)

	In MSA	Out MSA	
• Non-SOV access % -Continued	85%	0%	(CC placement survey)
• Non-SOV access % - Temporary	86%	0%	(CC placement survey)
• SOV access dist (mi) – Continued	6.6	0.0	(CC placement survey)
• SOV access dist (mi) – Temporary	8.0	0.0	(CC placement survey)

VT Reduction

• No SOV access (cont + temp)	306	1,823	(VT x non-SOV access %)

Total VT for AQ analysis 2,129

VMT Reduction

• No SOV access (cont + temp)	9,920	58,927	(VT x SOV % x (dist – access dist))
• SOV access (cont + temp)	44,885	0	

Total VMT for AQ analysis 113,732

Daily Emissions Reduced

		08 Emission		08 Emission		
NOx reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start + hot soak	2,129	0.6291			1,339	0.0015
• Running			113,732	0.4287	48,757	0.0537
Total NOx reduced (tons)						**0.0552**

		08 Emission		08 Emission		
VOC reduced	**Trips**	**Factor**	**VMT**	**Factor**	**Tot gm**	**Tot ton**
• Cold start + hot soak	2,129	1.7569			3,740	0.0041
• Running			113,732	0.1856	21,109	0.0233
Total VOC reduced (tons)						**0.0274**

Correction for Overlap with MM TERM

Total CC apps FY 06, 07, 08	154,147	
New CC apps FY 06, 07, 08	30,992	20%
Estimated MM share of new CC	14%	
Estimated MM share of IR impact	2.8%	

	SU Base	MM	Net SU
Placements	7,393	208	7,185
VT reduced	3,875	109	3,765
VMT reduced	125,478	3,532	121,946
NOx reduced (T)	0.055	0.002	0.054
VOC reduced (T)	0.27	0.001	0.27

Commuter Connections TDM Evaluation
2008-2009 Project Schedule – 7-15-08

TERM Report Document

Draft document

- Release draft TERM report (interim) — July 15
- Present report to Evaluation Group — July 15
- Review period — July 15 – August 22
- Present report to CC Subcommittee — September 16
- Review period — October 1
- Prepare update including Jan-June 2008 results — October 15
- Present updated report to Evaluation Group — October 21
- Present final report to CC Subcommittee — November 18
- Review Period — Early December
- Prepare final report — Late December
- Approval/release of final document (CC Subcommittee) — January 20, 2009
- Present report to TPB Tech Committee — February 2009

Rideshare Placement Survey

Survey preparation

- Review / update 2005 survey methodology — August 29
- Distribute draft questionnaire — September 15
- Review / revision period — September 15 – October 21
- Obtain applicant sample from COG — October 17
- Prepared final questionnaire for pretest — October 27

Conduct survey interviews

- Conducted survey pre-test — October 29 – 31
- Conduct survey interviews — November 3 – November 24

Perform analysis and presentations

- Conduct preliminary survey analysis — December – January 08
- Prepare draft technical report — Mid February
- Present draft report to TDM Evaluation Group — Mid February
- Present draft report to CC Subcommittee — Mid March
- Establish comment period — Early April
- Finalize technical report — May 2008

Employer Satisfaction Survey

Survey preparation

- Prepare survey methodology draft — October 17
- Prepare draft questionnaire — October 17
- Review / revision period — October 21st – End December
- Obtain employer list sample from COG — January 16
- Prepared final questionnaire for pretest — January 30

Conduct survey interviews

- Conducted survey pre-test — February 2 - 4
- Conduct survey interviews — February 7 – March 7

Perform analysis and presentations

- Conduct preliminary survey analysis — March – April
- Prepare draft technical report — Mid April
- Present draft report to TDM Evaluation Group — Mid April
- Present draft report to CC Subcommittee — Mid May
- Establish comment period — Late May
- Finalize report — June 2009

COMMUTER CONNECTIONS
CARSHARE SURVEY
2008

Draft

Prepared for:

Metropolitan Washington Council of Governments

Prepared by:

LDA Consulting
Washington, DC 20015
(202) 548-0205

In conjunction with:

CIC Research, Inc.
San Diego, CA

June 30, 2008

TABLE OF CONTENTS

SECTION 1 - INTRODUCTION 1

Overview and survey objectives
Survey methodology summary

SECTION 2 – SURVEY RESULTS 4

Demographic characteristics 4
Program Membership characteristics 9
Typical carshare use 13
Most recent carshare use 20
Changes in auto ownership since joining carshare 26
Work travel patterns of carshare users 28
Changes in driving miles since joining carshare 35
Changes in other mode trip patterns since joining carshare 40
Changes in home / work locations since joining carshare 44
Carshare satisfaction 48

SECTION 3 –CONCLUSIONS 57

APPENDIX A –SURVEY QUESTIONNAIRE

SECTION 1 INTRODUCTION

Overview and Survey Objectives

This report presents the results of the Carshare Survey conducted for the Commuter Connections program of the Metropolitan Washington Council of Governments (COG). Commuter Connections provides a wide range of transportation information and assistance services in the Washington metropolitan area designed to inform commuters of the availability and benefits of alternatives to driving alone and to assist them to find alternatives that fit their commute needs. COG administers these services, called Transportation Emission Reduction Measures (TERMs), in a regional effort to reduce vehicle trips, vehicle miles of travel, and emissions resulting from commute travel.

Several jurisdictions and agencies in the Washington Metropolitan region, including Washington, DC; Arlington County, VA; City of Alexandria, VA; Montgomery County, MD; and the Washington Metropolitan Area Transit Authority (WMATA), sponsor or support the operation of carshare program in the region. These entities were interested in learning more of carshare users' experience with the program and exploring the impact of carsharing on travel patterns in the region. The Carshare survey was conducted for three primary purposes:

- Examine characteristics of carshare trips
- Examine travel changes made in response to carshare availability
- Examine auto ownership and use changes in response to carshare availability

Survey Methodology Summary

Sample Selection – The Carshare survey was administered online to registered members of the Zipcar carshare program. On March 6, 2008, Zipcar sent an email to its approximately 28,000 members that informed them of the online survey and provided the link to the survey website. The email indicated that Zipcar was offering a prize drawing for five half-hour carshare use credits to members who completed the survey. To increase the response rate further, Zipcar send a reminder email to all members on March 26. During the approximately four week period that the survey website was active, 6,060 members accessed the site and 5,568 answered at least one question.

Of these responses, 4,379 were complete. An additional 553 respondents had completed a sufficient portion of the questionnaire to allow their responses to be used for key analysis purposes, so also were retained. This resulted in a total of 4,932 usable responses, for a total response rate of 17.6%. The remaining responses were insufficiently complete, so were discarded.

The original survey methodology would have administered the survey to all persons who were known to have registered or participated in either of two carshare programs in the Washington region, Zipcar and Flexcar. The two carshare organizations had agreed to assist with distribution of an announcement of the survey and to encourage their members to complete the survey. But in November 2007, just before the survey pre-test was to occur, the two companies merged.

The arrangements of the merger made it impossible to contact Flexcar members after this time, thus the pre-test was conducted only with Zipcar members. Further, administration of the full survey was delayed until the spring, after Zipcar's outreach to Flexcar members to convert their membership to Zipcar

was completed. When the full survey was conducted in March 2008, Flexcar members who converted their membership to Zipcar following the merger were included, but Flexcar members who did not join Zipcar could not be identified, so were not included. As noted, about 28,000 persons were registered in Zipcar in March 2008.

Questionnaire Development – The survey questionnaire was developed jointly by COG, LDA Consulting, and CIC Research, with assistance from a Carshare Survey review panel comprised of members of Commuter Connections' jurisdiction partners and Zipcar and Flexcar staff. The questionnaire also was reviewed by the COG Evaluation Group.

The questionnaire collected data on seven major topics:

- Carshare participation background
- General carshare use patterns
- Details of last carshare use/trip
- Work travel patterns
- Travel pattern changes since joining carshare
- Changes in vehicle ownership and residential/work location since joining carshare
- Carshare satisfaction
- Demographics

The questionnaire was designed for online self-administration. Prior to conducting the full survey, an invitation was sent to a random sample of 300 carshare members. Forty-nine members accessed the site and 32 (10%) completed the questionnaire. An analysis of the termination points of incomplete surveys suggested the low response rate could be due, in part, to the length of the questionnaire. Numerous questions were, therefore, deleted from the questionnaire to reduce its length. A copy of the final questionnaire is presented in Appendix A

Survey Data Expansion – COG originally planned to review the demographic distribution of the survey respondents and determine if the sample should be weighted to reflect the population accurately. The only variable that appeared available for weighting purposes was respondent home jurisdiction. An initial examination of several survey variables indicated that responses differed by jurisdiction. Unfortunately, due to privacy concerns, Zipcar was unable to provide any information on the distribution of carshare members by geographic area. Thus the results could not be tested or adjusted on this measure. This is noted to alert readers that the results might not be representative of the full carshare member population.

Survey Analysis

The balance of this report presents key results of the survey (Section 2) and general conclusions about the survey results (Section 3). A copy of the questionnaire is presented in Appendix 1.

SECTION 2 SURVEY RESULTS

This section presents an overview of the survey findings. As noted in Section 2, the sampled vanpools were not expanded to represent the vanpool population in the Washington D.C. region. Thus, the findings shown in this section are presented for the frequencies of respondents. The raw numbers of respondents who answered each question are shown as (n=___).

The survey collected data in several primary topic areas. Results for these topics are presented below:

- Demographic characteristics
- Carshare program membership characteristics
- Typical carshare use
- Most recent carshare trip
- Commute travel patterns
- Other travel patterns
- Vehicle ownership and Home / Work Location
- Satisfaction with Carsharing

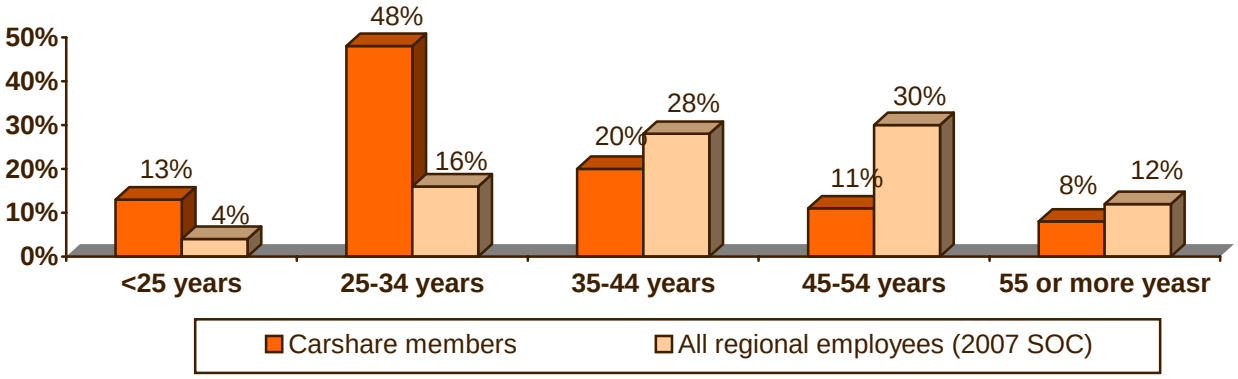
Demographic Characteristics

The demographic characteristics of respondents are presented below. When data were available, results also are presented from the State of the Commute survey conducted by Commuter Connection in 2007 (2007 SOC). Although the SOC survey interviewed only employed residents of the Washington metropolitan region, it provides a reasonable dataset for demographic comparisons because 93% of the carshare survey respondents said they were employed, either full-time or part-time.

Sex – Slightly over half (56%) of the respondents were female. This was very close to the 54% of regional employees who were female.

Age – As shown in Figure 1, carshare survey respondents were considerably younger than were all regional employees, as measured through the 2007 SOC survey. One in ten carshare respondents were under 25 years old and more than six in ten were under 35 years old. By comparison, only 20% of the regional employee population was under 35 years old.

Figure 1
Respondent Age Distribution – Carshare Members and All Regional Employees
(Carshare n = 4,932, 2007 SOC n = 6,359)



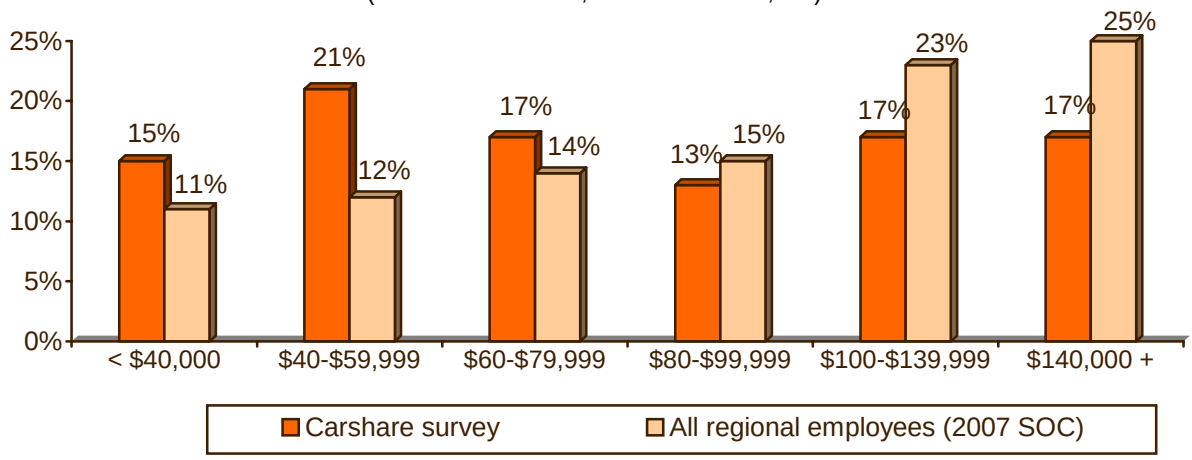
Ethnic Background – Caucasians represented, by far, the largest ethnic group of carshare survey respondents; accounting for 75% of respondents. African-Americans, Asians, and Hispanic/ Latino respondents accounted for about ten percent, seven percent, and five percent, respectively, of respondents. These results are shown in Table 1. The table also shows the ethnic background distribution of all regional employees. Carshare members were disproportionately Caucasian and African-Americans and Hispanics were underrepresented, compared to the regional employee population.

Table 1
Ethnic Background – Carshare Members and All Regional Employees

Ethnic Group	**Carshare Survey** (n = 3,851)	**2007 SOC Survey** (n = 6,183)
White/Caucasian	75%	62%
African-American	10%	22%
Asian	7%	4%
Hispanic/Latino	5%	9%
Other / Mixed	3%	3%

Income – Figure 2 shows that a slightly over a third of respondents (36%) had household incomes of less than $60,000 per year, 30% had incomes of $60,000 to $99,999, and 34% had incomes of $100,000 or more per year. Carshare survey respondents had lower household incomes than did the regional employee population, as measured by the 2007 SOC survey. More than half (53%) of carshare respondents had household incomes under $80,000, while 37% of all regional employees had incomes of this level.

Figure 2
Income Distribution – Carshare Members and all Regional Employees
(Carshare n = 3.559, 2007 SOC n = 5,258)



Home and Work Locations – Table 2 presents the distributions of respondents by their home and work jurisdictions. Two-thirds of respondents said they live in the District of Columbia. Arlington County, VA and Montgomery County, MD were the home locations of 13% and seven percent of respondents, respectively. Small percentages of respondents said they lived in other jurisdictions.

The distribution of respondents by work jurisdictions was similar to that for home location, but slightly more concentrated in Washington DC. Almost three-quarters quarters of respondents said they work in the District of Columbia, nine percent worked in Arlington County and seven percent worked in Montgomery County.

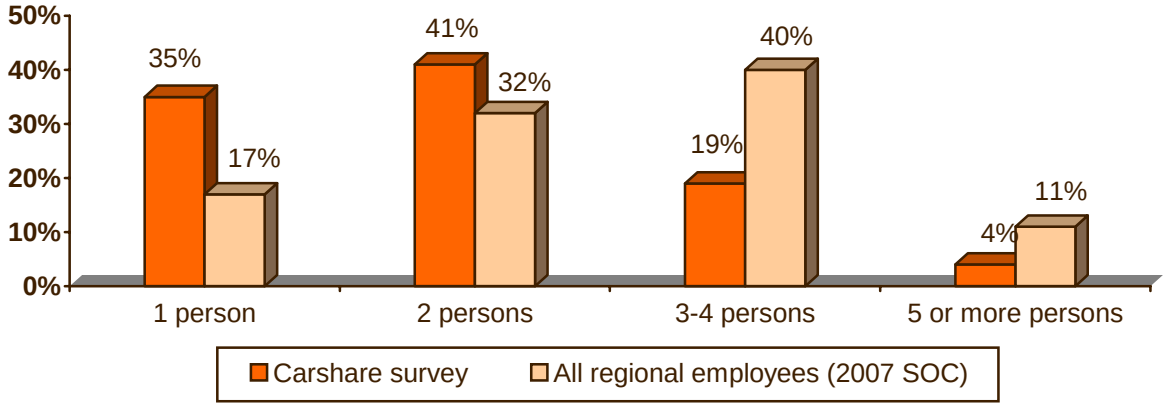
Table 2
Home and Work Locations

State/County	Home Location* (n = 4, 269)	Work Location** (n = 3,641)
District of Columbia	67%	73%
Arlington County (VA)	13%	9%
Montgomery County (MD)	7%	7%
Prince Georges County (MD)	4%	3%
Alexandria City (VA)	3%	3%
Fairfax County (VA)	2%	2%
Other *	4%	3%

* Each response in the "Other" category was mentioned by less than one percent of respondents.

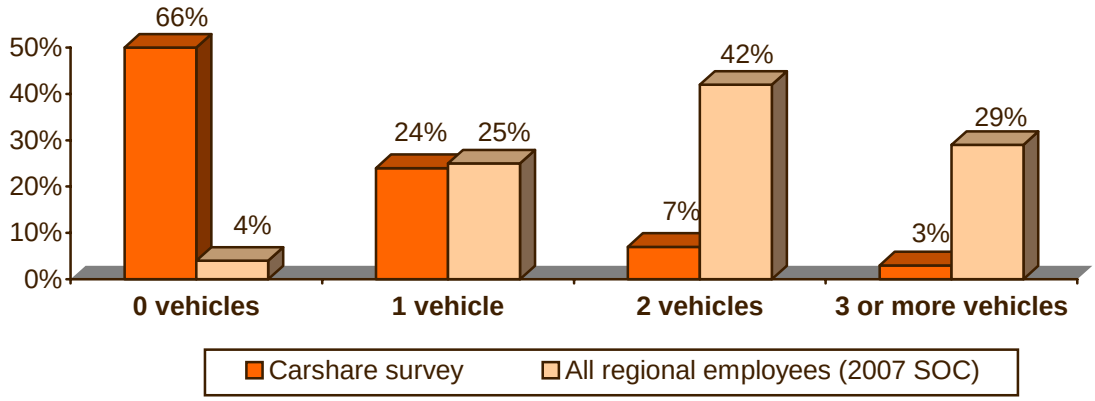
Household Size and Number of Drivers in the Household – Respondents were asked how many people lived in their households and how many of those members were licensed drivers. Carshare members' households were relatively small, when compared to households of all employed persons across the Washington metropolitan region. A third (35%) of carshare respondents lived alone and 41% said their household had only two persons. Only 49% of all regional employees lived in households with one or two members.

Figure 3
Household Size – Carshare Members vs All Regional Employees
(Carshare n = 4,106, 2007 SOC n =6,434)



Household Vehicles and Vehicles Per Licensed Driver – It would be reasonable to expect carsharing to be most popular among people who do not own a personal vehicle, because it offers vehicle access that doesn't otherwise exist. The survey results support that theory. Two-thirds of the carshare survey respondents said their household did not own or lease any vehicle for household members' use. About a quarter of carshare users had one vehicle per household and only 10% had two or more vehicles.

Figure 4
Household Vehicles – Carshare Members and All Regional Employees
(Carshare members n = 4,363, 2007 SOC n = 6,529)



As shown in Figure 4, the carshare population differed dramatically in vehicle ownership from the regional population of all employed persons. The State of the Commute survey conducted by Commuter Connections in 2007 found that only about four percent of all employed people in the region had no household vehicles. The share of one-car households was the same for both carshare users and all regional employees, about a quarter of respondents. Carshare users were much less likely than were all regional employees to have two or more vehicles per household, but this is due in part to the smaller household sizes of carshare users.

Licensed Drivers and Vehicles per Licensed Driver – Perhaps more important than total household vehicle count, however, in determining vehicle access, is the number of vehicles available per licensed driver in the household.

Four in ten carshare survey respondents said there was one licensed driver in the household and another 44% said there were two drivers. The remaining 16% reported three or more drivers. When the number of licensed drivers was combined with the number of vehicles in the household, it's clear that most carshare members do not have access to a vehicle for everyday use. As shown in Table 3, only 12% of carshare users said there was a vehicle available for each licensed driver in the household. Two in ten said there was at least one vehicle in the household, but that there were more drivers than vehicles.

Table 3
Household and Vehicles per Driver
(n = 4,253)

Vehicles per Licensed Driver	Percentage
No vehicles in household	67%
Less than one vehicle per driver	21%
One vehicle per driver	10%
More than one vehicle per driver	2%

Distance from Home to Bus Stop – Conventional wisdom of carshare programs also suggests that carsharing is more popular and feasible when users have easy and close access to transit for non-carshare trips. A large majority of respondents (81%) lived less than ½ mile from the nearest bus stop. Another 14% lived between ½ mile and 1 mile away. The remaining five percent lived more than 1 mile away. Table 4 shows this distribution for carshare survey respondents.

Table 4
Distance from Home to Bus Stop
n = 4,263

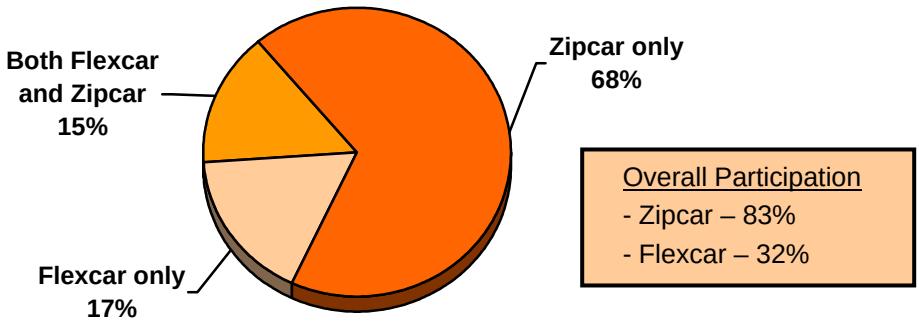
Distance	Percentage
Less than ½ mile	81%
½ mile to 1 mile	14%
More than 1 miles but less than 2 miles	3%
2 miles or more	2%

Program Membership Characteristics

One section of the survey asked respondents about their carshare membership, such as when and why they joined carsharing and how they heard about carshare programs. Although Flexcar was no longer operating by the time the survey was administered, this section asked respondents about both programs.

Registration by Program – Two-thirds of respondents said they had registered only in Zipcar and 15% said they had registered in both Zipcar and Flexcar. Nearly two in ten (17%) said they had registered only in Flexcar. Since Zipcar sent the email only to members who had registered with Zipcar at some time, respondents who said they had registered only in Flexcar likely did not consider their conversion to Zipcar as a "registration." When dual-registration participants were counted in both programs, it was found that 83% of registrants participated at some time in Zipcar and 32% participated in Flexcar.

Figure 5
Carshare Program Registration
(n = 4,920)



Current Participation Status – All respondents reported that they current carshare members. As expected, 99% reported being current Zipcar members. One percent of respondents said they were "currently participating" only in Flexcar and another 17% said they were currently participating in both Zipcar and Flexcar. Again, this was likely confusion related to the recent conversion from Flexcar to Zipcar after the merger. These respondents might not have understood that their previous Flexcar membership was no longer active and had been replaced by a Zipcar membership.

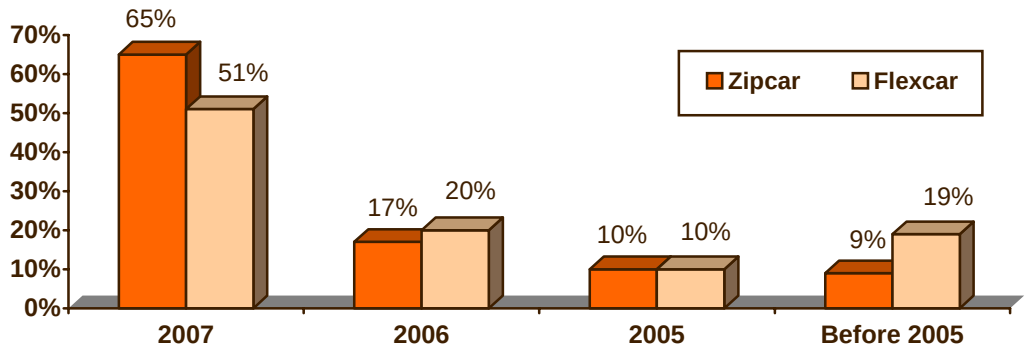
Reasons for Participating in Both Carshare Programs – Two-thirds (63%) of respondents who participated in both programs said they did so because the companies merged. But some respondents had been participating in both programs even before the merger and cited other reasons for dual registration, primarily related to enhancing the flexibility or options they enjoyed in carshare use. The most common reasons included (n = 750, multiple responses permitted):

- 30% To have access to carshare in multiple locations or neighborhoods
- 30% Gives me more options / opportunities / flexibility for reserving cars
- 26% Have access to all carshare vehicles at home, work, or school
- 10% Programs offer different types of vehicles
- 5% Programs have different rates and/or membership policies
- 4% One account is personal and the other through employer or school

Year Joining Carshare – Respondents were asked when they joined either or both of the carshare companies. These results are shown in Figure 6. Eight percent of respondents who participated in Flexcar joined that program in the past three years, with half joining in 2007. Two in ten said they registered before 2005.

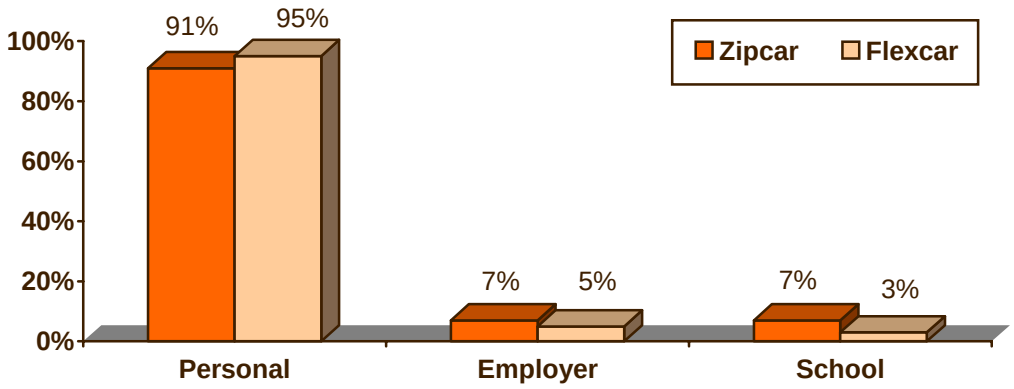
Ninety percent of Zipcar members joined that company in the past three years, with two-thirds (65%) joining in 2007 (or the first two months of 2008). The higher share of recent membership for Zipcar is certainly related to the merger of the two companies, and the conversion of former Flexcar memberships to memberships in Zipcar. But Flexcar also was the first of the two companies to begin operations in the region, in 2001; Zipcar initiated service in 2003. So the higher share of "before 2005" registrants is reasonable.

Figure 6
Year Joining Carshare – by Company
(Flexcar n = 1,569, Zipcar n = 4,572)



Personal Vs Organizational Account – As illustrated in Figure 7, both Flexcar and Zipcar accounts were overwhelmingly personal; 95% of Flexcar members and 91% of Zipcar members said they had personal carshare accounts. A much smaller percentage of respondents, about five percent of Flexcar members and seven percent of Zipcar members said they had accounts through their employers. Similarly small percentages said they had a school-based account. These percentages add to more than 100% because some respondents have multiple accounts.

Figure 7
Carshare Account Holder – by Company
(Flexcar n = 1,691, Zipcar n = 4,870)



These percentages were consistent with results of a question about who pays for carshare expenses. Nearly nine in ten (89%) respondents said they paid all carshare costs. Three percent said their employer or another entity pays all of the costs. The remaining eight percent of respondents said they paid some of the costs and their employer paid some.

How Heard About Carshare –Table 5 presents the sources of information noted by Flexcar and Zipcar members for how they heard of the programs.

Respondents cited very similar sources of information, regardless of the program in which they participated. The primary source of information was word of mouth or referral from a friend or family member, cited by at least a quarter of respondents in Flexcar (26%) and Zipcar (30%). About two in ten respondents in both programs said they saw a carshare vehicle, parked in a carshare parking space on the street (Flexcar 12%, Zipcar 15%), parked in a Metro lot or garage (Flexcar 4%, Zipcar 4%), or being driven on the road (Flexcar 4%, Zipcar 8%). The other most common source was advertisements (Flexcar 16%, Zipcar 17%).

Only one information source, "information from Metro," showed a difference between the two programs. It was cited by 13% of Flexcar members and 8% of Zipcar members as their first source of carshare information. Five percent of respondents said they learned of Zipcar through the merger. Since more than 30% of respondents were former Flexcar members who had converted their memberships to Zipcar, this suggests that most of the former Flexcar members knew of Zipcar before the merger.

Table 5
Carshare Information Sources – by Company

Carshare Information Source	Flexcar (n = 1,581)	Zipcar (n = 4,594)
Referral from friend/family member	**26%**	**30%**
Saw carshare vehicle	**18%**	**21%**
- Parked in carshare space	12%	15%
- Parked in other location	4%	4%
- Being driven	4%	8%
Advertisement	**17%**	**16%**
Information from Metro	**13%**	8%
Internet	6%	6%
Saw orange carshare pole	4%	3%
Employer told me	3%	3%
Received information in the mail	2%	2%
Table / promotion at event	3%	1%
Media article (newspaper, magazine, TV)	3%	1%
Information from local jurisdiction	2%	1%
From Zipcar during merger	---	6%

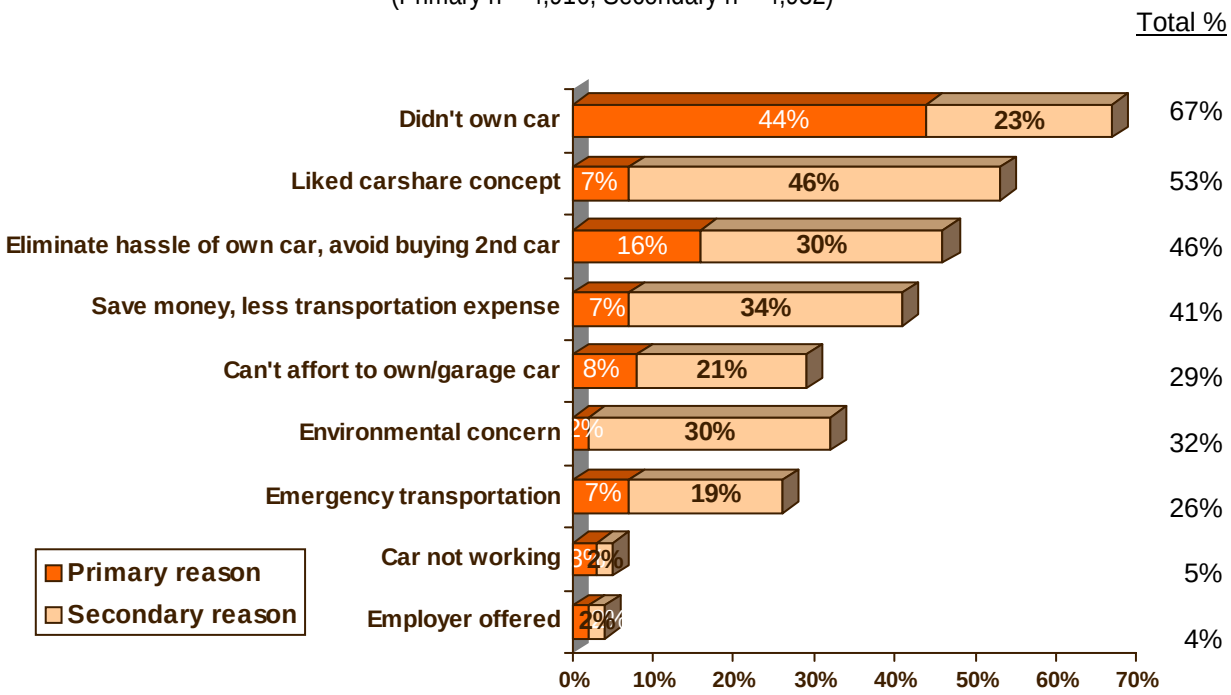
Percentages might add to more than 100%, multiple responses permitted

Reasons for Joining Carshare – Primary and Secondary – Respondents were asked why they joined a car-share program at the time that did join. They were permitted to offer multiple reasons, then were asked which of the reasons was their primary reason. Figure 8 presents the percentages of respondents who noted various reasons and the percentages who noted the reasons as primary or secondary motivations.

Many of the reasons cited indicated either a need for greater transportation options or a desire to reduce or eliminate the costs associated with car ownership. More than four in ten (44%) respondents said their primary reason for joining a carshare program was that they didn't own a car. Another 23% said this was a secondary reason for their carshare membership. About one in eight (16%) said they joined a carshare program primarily to eliminate the hassle of owning a car or avoid buying a second car. This was a secondary reason for about three in ten respondents.

About 15% of respondents said they joined carsharing primarily for economic or cost saving reasons – to save money or pay less in transportation costs (7%) or because they couldn't afford to own or garage a car (8%). But saving money also wase secondary motivations for a significant number of respondent; more than four in ten respondents mentioned one or more cost-saving motivation.

Figure 8
Carshare Motivations: Primary and Secondary
(Primary n = 4,916, Secondary n = 4,932)



Smaller percentages of respondents noted non-financial reasons for carshare membership. Eight percent started carsharing because they liked the philosophy or concept of carsharing. But the motivating influence of this reason is actually much higher than this small percentage suggests; an additional 47% of respondents who cited another primary reason also mentioned this as a secondary reason.

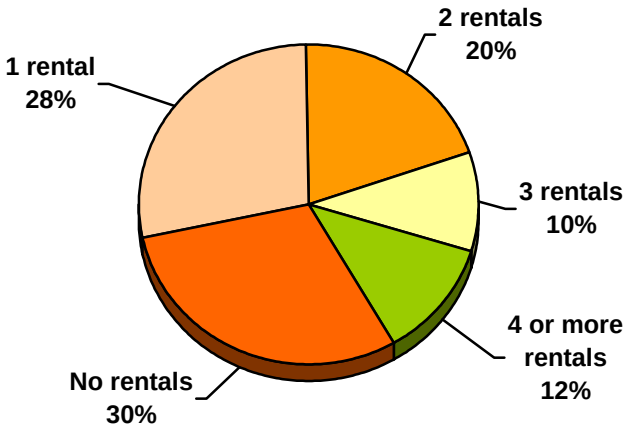
Seven percent of respodents started carsharing for access to emergency transportation. Another 20% mentioned this as a secondary reason. And a third (33%) of respondents said concern for the environment was a motivation to join carsharing, but it was the primary motivation for just 2% of respondents.

Typical Carshare Use

Another section of the questionnaire asked respondents about their typical carshare use, including the frequency of carshare rentals, they days and times they typically used carsharing, and the types of trips for which they rented carshare vehicles.

Frequency of Carshare Use (Figure 9) –Three in ten respondents said they did not rent a carshare vehicle at all. About half (48%) said they rented carshare vehicles one or two times. Ten percent rented three times and 12% rented four or more times. This results in an average rental of 1.7 times in the past month. But when respondents who did not make any trips are removed from the calculation, the average number of rentals by those who did rent a vehicle rises to 2.4 trips per month.

Figure 9
Carshare Rentals in Past Month
(n = 4,886)

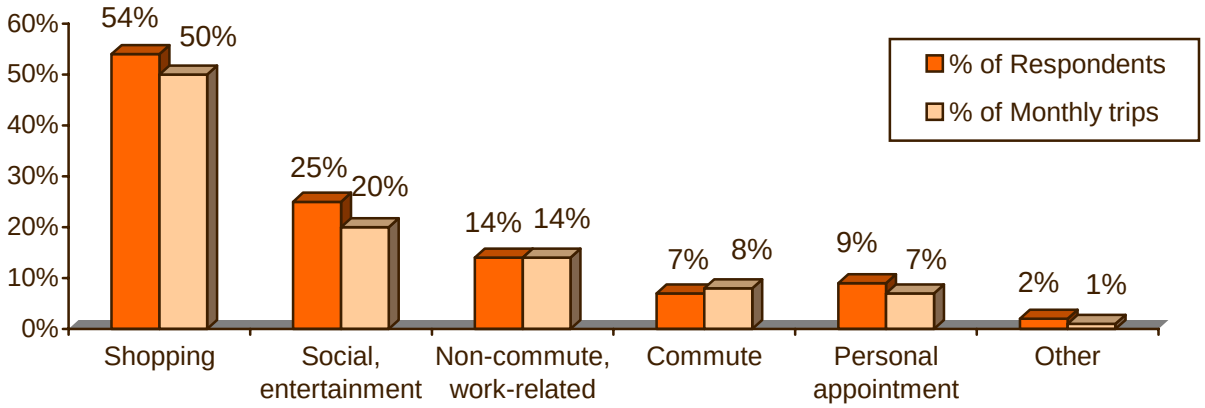


Rentals Frequency by Carshare Member Characteristics – Frequent and infrequent carshare users were distributed across all demographic characteristics. For example, there were no significant differences in rental frequency by age, income, or ethnicity. And respondents rented at about the same frequency regardless of the type of carshare parking facility (e.g., street parking, off-street, garage, etc.). But a few differences were noted in users who rented more or less often. For example:

- Account Type – 33% of respondents whose accounts were established through their employers used carsharing three or more times in the previous month, compared with 20% of respondents who had personal or school-based accounts.
- Personal vs Business Use – 33% of respondents who used carshare for business travel only and 32% who used carshare for both business and personal trips rented three or more times per month, compared to only 19% of respondents who used carshare exclusively for personal trips.
- Distance to Pick-up Location – 75% of respondents who lived within 2 blocks of the carshare location rented at least once in the previous month, compared with only 60% of respondents who lived one mile or more from the pick-up location.
- Home Jurisdiction – About 30% of respondents who lived in the carshare "core" jurisdictions of Alexandria, Arlington County, Montgomery County, and Washington, DC rented at least once in the past month, compared with only 60% of respondents in Prince George's County and 54% of respondents who lived in Fairfax County.
- Household Vehicles per Driver – 76% of respondents who said they had no household vehicles made at least one carshare trip in the previous month, compared with only 54% of respondents who had one or more vehicles per driver in the household.

Carshare Trip Purposes – As noted earlier, only five percent of carshare accounts were through employers, but 28% of respondents said they used their accounts for both personal and work-related trips. The majority of respondents (69%) used carsharing for personal trips only and the remaining three percent said they used their account only for business-related trips. Figure 10 portrays the specific trip purposes for which carsharing was used.

Figure 10
Carshare Trip Purposes – by Respondent and by Share of Monthly Trips
(n = 4,885)



Average trips per month by trip purpose – Respondents who made trips

Shopping – 1.5	Social, entertainment – 0.6	Non-commute work-related – 0.4
Commute – 0.2	Personal appointment – 0.2	Other – < 0.1

The figure shows two types of trip distributions, 1) "percentage of respondents," that is, the percentage of respondents who made at a trip for the stated purpose during the past month, and 2) "percentage of monthly trips," the percentage of carshare trips during the past month that were made for the stated purpose. This distinction is shown because some types of trips are made more frequently than others.

The most common carshare trip purpose was *shopping*. More than half (54%) of respondents used carshare for a shopping trip in the past month and shopping trips accounted for 50% of all carshare trips made. Respondents who made carshare trips used carshare an average of 1.5 times per month for this purpose.

The second most common use was for *social and entertainment trips*. A quarter (25%) of respondents rented a carshare vehicle for this purpose in the past month and social/entertainment trips accounted for 19% of all carshare trips. These trips were made 0.6 times per month.

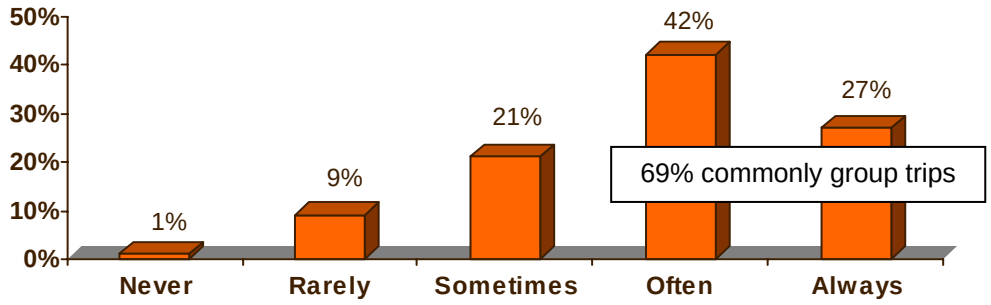
Non-commute, *work-related trips*, such as for a travel to a meeting, were made by 14% of respondents and accounted for the same percentage of carshare trips. Respondents who made carshare trips made about 0.4 trips for this purpose per month.

Carsharing was used by about seven percent of respondents to make a *commute trip*, that is, trips for travel from home to work or school, but commute trips accounted for a slightly higher share, nine percent, of total carshare trips made. And nine percent of respondents made a *personal appointment trip* by carshare, with seven percent of the previous month's carshare trips made for this purpose. About 0.2 trips were made for each of these purposes per month.

Multiple Stops During Carshare Trips – The sum of the "percentages by respondents" shows in Figure 10 add to more than 100%, because some respondents indicated that they used carsharing for more than one purpose. And the sum of the average trips per month for each purpose (e.g., 1.5 shopping trips per month) adds to more than the average of 2.4 rentals per month per carshare user. This is because some carshare users grouped or "chained" trips when they were carsharing. In other words, they made trips or stops for several purposes in one carshare rental.

As shown in Figure 11, nearly seven in ten (69%) said they "always" or "often" made multiple stops when they rented a carshare vehicle. About two in ten said they "sometimes" made multiple stops. Only 10% said they "rarely" or "never" made multiple stops.

Figure 11
Frequency of Multiple Stops on Carshare Rentals
(n = 4,768)



Timing of Carshare Use – Weekend vs Weekday – Carshare rentals were about evenly divided between weekday (Monday through Friday) and weekend use; 52% of the previous month's carshare trips were made on weekdays and 48% of trips were made on weekends. But because there are five weekdays and only two weekends, carshare use was actually concentrated on weekends. On average 10% of weekly carshare trips were made each weekday and 24% were made per weekend day.

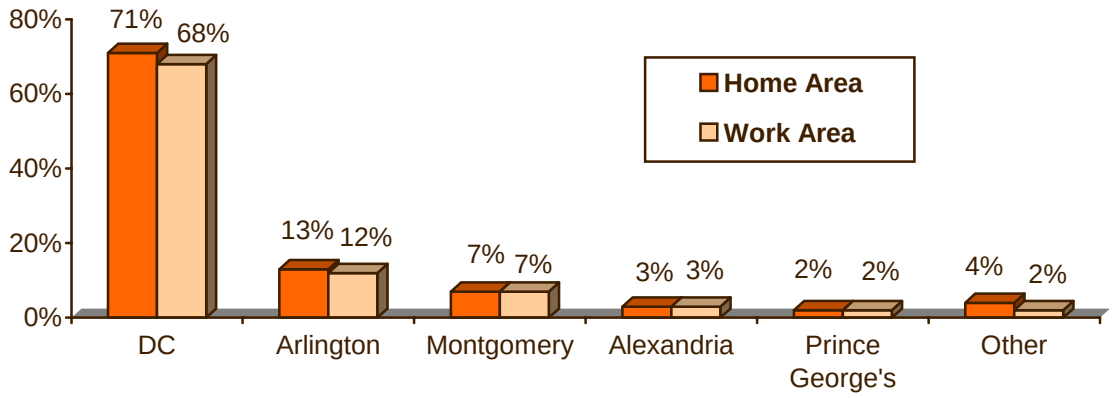
Carshare Pickup Locations – Respondents were asked where they picked up carshare vehicles, how far these locations were from their homes, work, or school, and the type of parking facility that was used for these vehicles.

Home and Work Pick-up (Figure 12) – The primary location for carshare pick-up was in the home neighborhood; 90% of respondents said they picked up carshare vehicles at a home-area location. About three in ten (28%) picked up vehicles near their work, and seven percent picked up vehicles near their school. About 14% said they picked up a car in "another location." In most cases, these locations were Metrorail stations that were not near the respondents' homes but were near the destination loca-

tion. These percentages add to more than 100% because a large share of respondents picked up cars in multiple locations.

The primary home pick-up area was Washington DC. Seven in ten respondents said their nearest home area carshare location was in Washington. About 13% of respondents named Arlington County and 7% named Montgomery County.

Figure 12
Home and Work Pickup Locations
(Home n = 4,871, Work n = 1,401)



Common home-end pick-up neighborhoods in Washington DC included: Dupont Circle (7%), Capitol Hill/Union Station/Eastern Market (7%), Adams-Morgan (5%), Columbia Heights (5%), Logan Circle (4%), Shaw/U Street (4%), Foggy Bottom / GWU (3%), Mount Pleasant (3%), Cleveland Park (2%), and Van Ness / UDC (2%). Outside of Washington, DC, only two locations were named by two percent or more of respondents; the Ballston area of Arlington County, VA (3%) and the Court House area of Arlington County (2%).

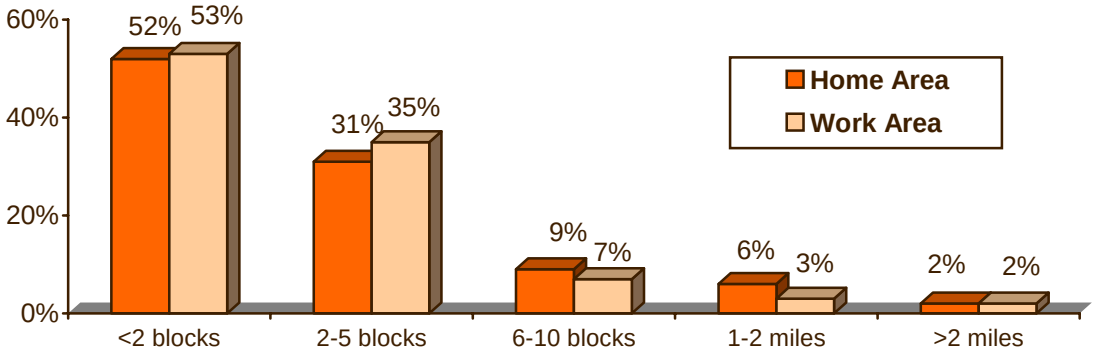
The work pick-up area distribution was similar to the home distribution. Washington was the most named location of those who said they picked-up cars near work; 68% of respondents said their closest work-area carshare location was in this city. About 12% of respondents named Arlington County and seven percent named Montgomery County as the carshare location closest to their work.

Common work-end pick-up neighborhoods included: in Washington DC – Downtown Washington (i.e., K Street area) (12%), Dupont Circle (9%), Foggy Bottom / GWU (7%), Capitol Hill/Union Station/Eastern Market (6%), Georgetown (2$), Metro Center (2%), Penn Quarter / Chinatown (2%), Tenley Circle / AU Park (2%). In Arlington County, VA, four locations were noted by two percent or more respondents picked-up cars at work; Rosslyn (4%), Ballston (2%), Court House (2%), and Crystal City (2%). One location in Montgomery County, MD, Bethesda, was the pick-up area for two percent of work-area carshare users.

Distance to Carshare Pickup Location – Carshare locations were quite close to most members' homes and work locations. More than half (52%) of respondents who picked up cars near home said they lived within two blocks of the carshare parking location and 83% lived within five blocks. Only eight percent

said they lived one mile or more from the parking location. The distribution for distance to work pick-up locations was similar to that for the home locations; 53% worked within two blocks of the location and 88% worked within five blocks. About five percent worked more than one mile from the pick-up location. These results are displayed in Figure 13.

Figure 13
Distance to Home and Work Pick-up Locations
(Home n = 4,402, Work n = 1,314)

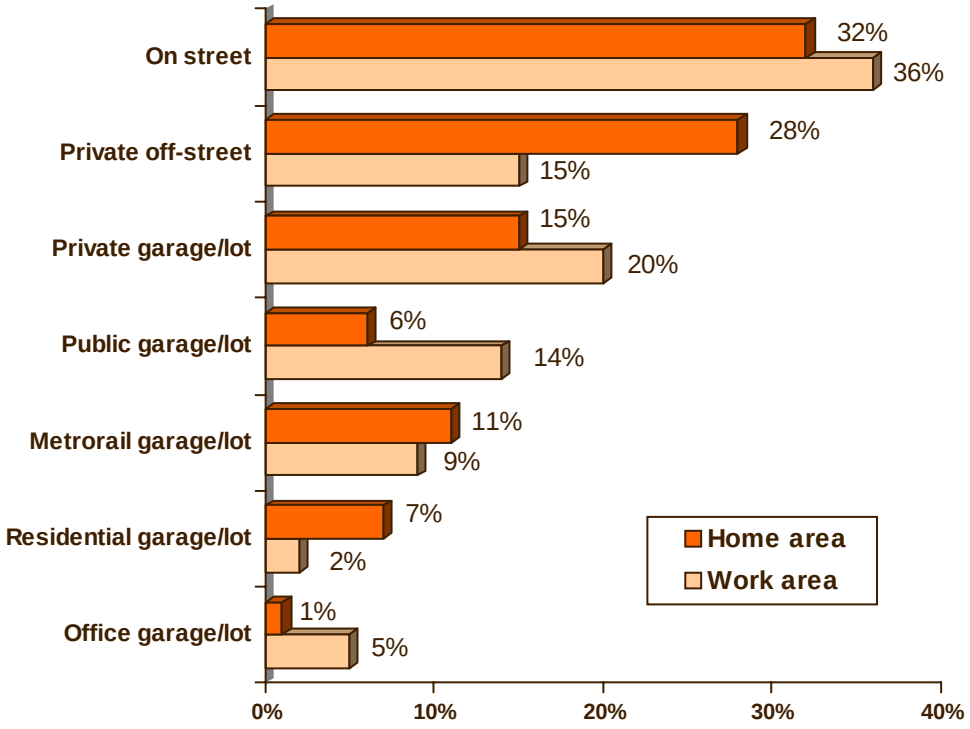


Respondents whose home pick-up location was in Washington or Arlington County reported the shortest carshare access distances. Ninety percent of Washington carshare members and 82% of Arlington County members said they lived within five blocks of the pick-up location. About half of Montgomery County members lived within five blocks and about a third of members in Alexandria and Prince George's County were within this distance.

Jurisdiction	Percent within 5 blocks
• Washington DC (n = 3,141)	90%
• Arlington County (n = 601)	82%
• Montgomery County (n = 301)	56%
• Alexandria City (n = 133)	37%
• Prince George's County (n = 113)	31%
• Fairfax County (n = 32)	16%

Type of Parking Location – Carshare vehicles are parked in a variety of locations, including on the street and in public and private garages and lots. Respondents were asked in what type or types of facilities the vehicles they used were parked. As shown in Figure 14, the dominant facility was on-street parking spaces for both home (32%) and work (35%) pick-up locations. Private, off-street spaces were noted as the parking facility for 27% of home-area carshare vehicles and for 14% of work-area vehicles.

Figure 14
Parking Facility type - Home and Work Pickup Locations
(Home n = 4,364, Work n = 1,297)



Public or private garages were named as the locations for 20% of home-area vehicles and 33% of work-area vehicles. And about one in ten vehicles in both the home area and work area were parked in Metrorail lots or garages. One in twenty respondents who picked-up cars at home said the cars were parked in a lot or garage at a residential building. A similar percentage of respondents who picked-up cars at work said the cars were parked in a lot or garage at a commercial building.

Respondents who lived in different jurisdictions noted quite different patterns in the types of parking facilities for the carshare vehicles that they used. Table 6 presents the parking facility distribution for the five jurisdictions with 100 or more survey respondents. Eight in ten respondents who lived in Arlington County picked up cars from on-street spaces, while eight in ten Alexandria and Prince George's County respondents picked up cars from private off-street spaces. Private, off-street spaces also predominated in Montgomery County, but a third of respondents in these areas picked up cars parked in lots or garages. Respondents from Washington, DC noted the most balanced mix of parking locations.

Table 6
Type of Parking Facility by Home Location

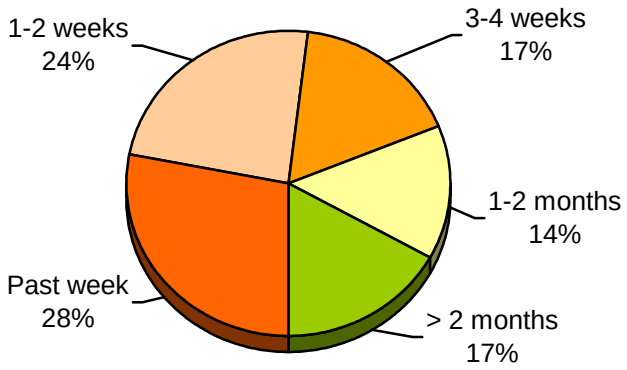
Home Location	Type of Parking Facility		
	On Street	Private off-street	Lot or garage
Alexandria (n = 132)	7%	**83%**	11%
Arlington (n = 602)	**79%**	9%	12%
Montgomery (n = 297)	6%	**58%**	**36%**
Prince George's (n = 110)	9%	**75%**	15%
Washington (n = 3,108)	22%	**38%**	**41%**

Most Recent Carshare Use

One purpose of the carshare survey was to examine the characteristics of carshare trips. For this purpose, the survey included questions exploring the details of respondents' "last carshare rental." It was expected that respondents would be able to recall this last rental in sufficient detail to provide accurate information from which overall characteristics of all trips could be discerned. Highlights of these results are shown below.

Timing of Last Carshare Rented – About three in ten (28%) respondents said they rented a carshare vehicle recently, within the past week. Another quarter (24%) said their last rental was one to two weeks ago. And 17% had rented a carshare vehicle three to four weeks ago. The remaining 31% had last used carsharing at least one month ago. These results are shown in Figure 15

Figure 15
Timing of Most Recent Carshare Rental
(n = 4,680)



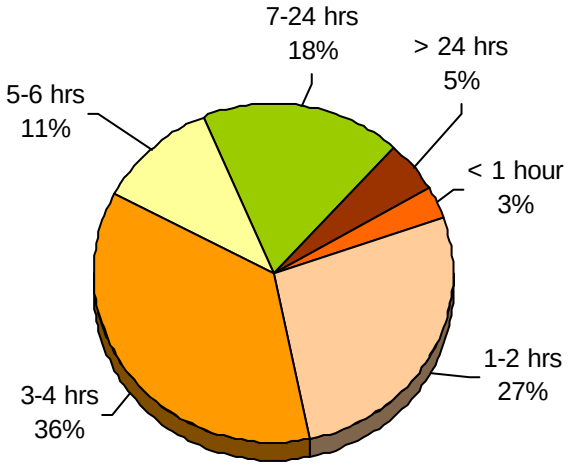
Day of Last Rental – About half (53%) of respondents said they last rented a carshare vehicle on a weekday. A third (32%) of respondents' most recent rental was on a Saturday. The remaining 15% rented last on a Sunday. These results closely tracked the results respondents reported for their carshare trips during the "last month;" about 52% of respondents reported that they had rented a carshare vehicle on a weekday during the past month and 48% said they had rented a carshare vehicle on a weekend day.

Time of Day – The pick-up times for respondents' last carshare rentals were distributed throughout the day, but the majority of vehicle pick-ups were during the late morning to midday hours. Four in ten rental pick-ups were made between 10:00 am and 2:59 pm. About three in ten rentals occurred in the late afternoon or early evening:

Rental Pick-up time	Percentage
• 5 am – 9:59 am	18%
• 10 am – 2:59 pm	42%
• 3 pm – 7:59 pm	32%
• 8 pm – 11:59 pm	8%
• Midnight – 4:59 am	1%

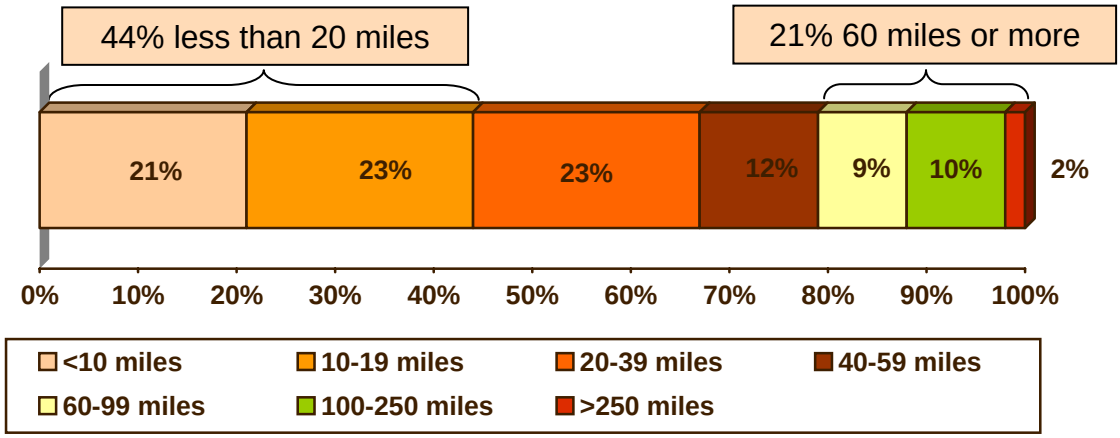
Duration of Rental – A large share of carshare rentals were of short duration. As illustrated in Figure 16, a third (33%) of respondents reported they returned the carshare vehicle for their last rental within two hours of the pick-up time and another 36% returned the car three or four hours after pick-up. About a quarter (23%) of rentals lasted longer than six hours and five percent kept the car for more than a full day.

Figure 16
Duration of Most Recent Carshare Rental (hours)
(n = 4,605)



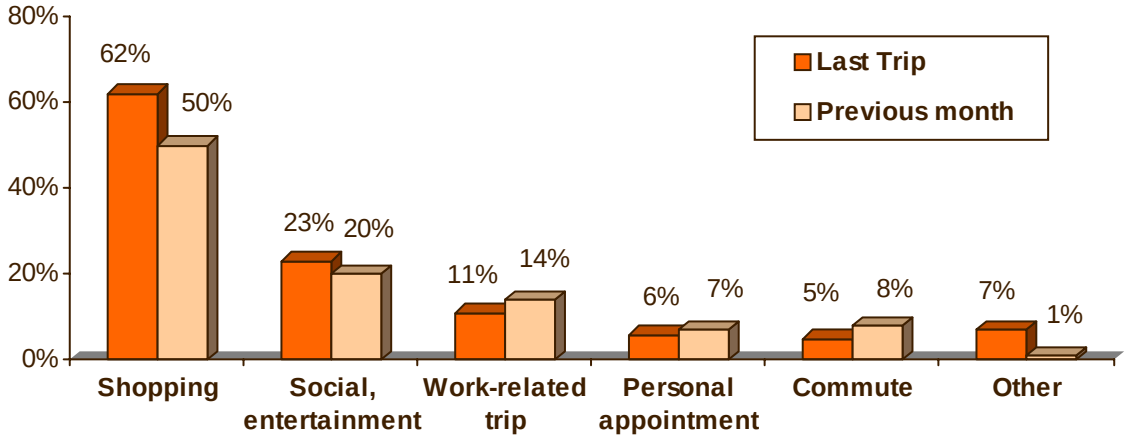
Length of Carshare Trip (Figure 17) – More than four in ten (44%) carshare rentals covered fewer than 20 miles and 67% covered fewer than 40 miles. But as shown in Figure 17, about one in eight (12%) trips was more than 100 miles and two percent of rentals were quite long – more than 250 miles. With these very long distance rentals, the average carshare rental was 48 miles. But when these extreme rentals were removed from the calculation, the average rental covered 36 miles.

Figure 17
Distance Traveled on Most Recent Carshare Rental (miles)
(n = 3,063)



Most Recent Carshare Trip Purpose – The section of the questionnaire that explored the last carshare rental asked for what purpose or purposes the carshare vehicle had been rented. Figure 18 shows the results for this question.

Figure 18
Distribution of Trip Purposes – Most Recent Carshare Rental and Last Month's Trips
(Most recent rental n = 4,852, Last month's trips n = 4,885, multiple responses permitted)



This question permitted respondents to report more than one purpose, and about two-thirds of respondents (63%) said they made at least two stops during the rental period. About half (52%) of respondents said they made two or three stops on the trip and 11% said they made four or more stops. The remaining 37% said they made just one stop on the last carshare rental.

Shopping was the most popular rental purpose; 62% of respondents said they made a trip or stop for shopping on their last carshare rental. Two in ten (23%) said their last carshare rental included a trip or stop for social or entertainment purposes and six percent used carsharing last for a personal appointment. About one in ten (11%) respondents noted making a work-related trip and five percent said their last carshare rental was for a trip from home to work or school.

Figure 18 also shows the trip purposes for all trips reported by respondents over the past month (repeated from Figure 8). Respondents noted a higher percentage of recent shopping trips compared to the percentage of shopping trips reported in the last month total. The survey was conducted during March and early April, well after the December holiday period, so it's unlikely that holiday shopping constituted a large share of "last trips" except for the small number of respondents whose last trip was more than 2 months ago. It's more likely that some respondents forgot to count some shopping trips or stops when they were reporting trips in the previous monthly count.

Carshare Trip Purpose Differences by Demographic Groups – The distribution of trip purposes was quite similar for respondents in different demographic group; there were no significant differences by income, ethnic group, or gender. Slight differences were noted for respondents of different age groups. Work related trips were more prevalent among older respondents. About one in ten trips was made for a work-related purpose, but 16% of the trips made by respondents who were 45 year of age or older were for this purpose. Younger respondents were most likely to use carsharing for shopping and social / entertainment trips. Sixty percent of all trips were made for shopping, but 65% of the trips made by respondents who were under 35 years old were for shopping.

Carshare trip purpose also appeared to differ by the number of vehicles available to respondents at home. Respondents who did not have a vehicle in the household were more likely to have made a shopping trip than were other respondents. Two-thirds of car-less households made a shopping trip in the past month, while only 51% of respondents who had at least one vehicle in the household (51%) used carsharing for a shopping trip. Respondents who had greater access to household vehicles were more likely to have used carsharing for a work-related trip; 17% of respondents who had a vehicle in the household made a work-related carshare trip in the past month, compared to only eight percent of respondents who were from car-less households.

A third different in carsharing trip purpose was that respondents who lived in the Washington region's core jurisdictions of Alexandria, Arlington County, and Washington, DC were less likely to make work-related trips (11%) than were respondents who lived outside the core (17%). They also were less likely to use carsharing for personal appointments; about six percent of these respondents made a personal appointment trip by carshare, compared with 14% of respondents who lived outside these jurisdictions.

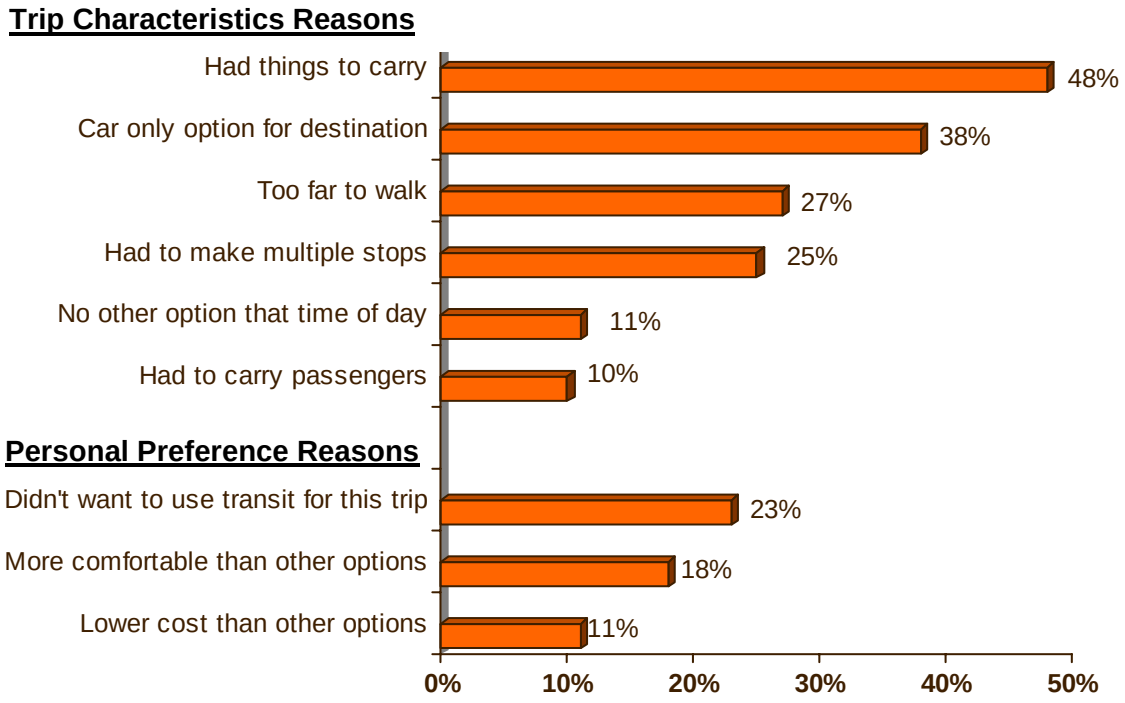
Differences in Trip Purpose by Trip Characteristics – Carshare trips of different purposes also differed in other trip characteristics. Notable differences included:

- Number of Stops/Destinations on Carshare Trip – Shopping and social/entertainment trips were combined with other trip purposes more often than were other trip purposes. Work-related trips were more likely to be "single destination" trips that were not linked to or combined with other trip purposes.
- Day of Week – As might be expected, work-related trips and personal appointment trips were more likely to be made on weekdays. Eighty-five percent of work-related trip and 87% of personal appointment trips were made on weekdays. Shopping and social / entertainment trips were concentrated on weekend; 55% of shopping trips and 62% of social / entertainment trips occurred on either Saturday or Sunday.
- Time of Day – Trip purposes also varied by the time of day at which they occurred. A third of commute trips, work-related trips, and personal appointment trips were made during the early morning hours of 5:00 a.m. to 9:59 a.m., while only 13% of shopping trips and 16% of social trips were made this early in the day. Trips made between 10:00 a.m. and 2:59 p.m. were more balanced. Four in ten of trips for work-related, shopping, social/entertainment, and personal appointments were made at this time. Late evening and night trips were disproportionately social / entertainment trips. Forty percent of trips made between 8:00 p.m. and 4:59 a.m. were for this purpose.
- Duration of Trip – Trips made for work-related purposes and social purposes were more likely to be of longer duration. Forty-six percent of work-related trips and 56% of social/entertainment trips lasted five or more hours, compared to only 26% of shopping trips and 29% of trips made for personal appointment purposes.
- Trip Distance – Trip distance also varied by the trip purpose. Work-related and social / entertainment trips tended to be longer distance, while shopping trips were on the shorter side. Two-thirds (67%) of work-related trips and 73% of social / entertainment trips were 20 or more miles; only half (49%) of shopping trips traveled this far. Trips made for "other" purposes also tended to be longer distance; 85% were 20 or more miles and 55% were 60 or more miles. This trip purpose group included trips respondents described as "out-of-town" or "road trips."

Reasons for Using Carshare for this Trip (Figure 19) – Respondents were asked why they used carsharing for their most recent carshare rental. The most common reasons focused on characteristics of the trip purpose or trip location that made it difficult to travel by means other than a personal vehicle. About half (48%) reported that they needed to carry or transport items and 10% said they needed to carry passengers. The second most common reason was that a vehicle was the only option for this destination, because public transit did not serve the destination (38%). About a quarter (27%) of respondents said the trip was too far to walk and 25% said they had to make multiple stops. About one in ten (11%) respondents said no other option was available at the time of day they needed to travel.

Some respondents reported personal preference reasons for using carsharing. About a quarter (23%) said they used carsharing for this trip because they didn't want to use public transit, although presumably, transit was an option. Two in ten (18%) used carshare because it was more comfortable than other options they could have used and 11% said they used carsharing because it was lower cost than other options.

Figure 19
Reasons for Using Carshare for the Most Recent Carshare Rental
(n = 4,828)

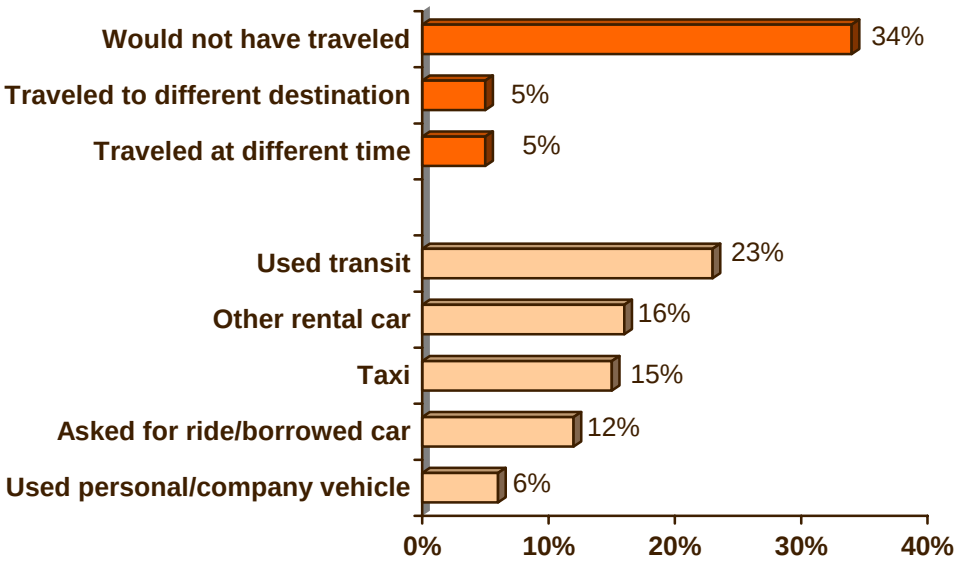


Travel Options if Carshare Not Available – A related question asked about the most recent trip was how the respondent would have made that particular trip if carsharing had not been available. Consistent with the finding that some trips could be made only using a vehicle, a significant number of respondents would not have made the trip in its current form if carsharing had not been available. As illustrated by Figure 20, a third (34%) said they would not have traveled at all, five percent would have traveled to a different destination, and five percent would have traveled at a different time of day. Thus carsharing broadened not just mode options, but also destination and trip options.

The remaining respondents said they would have made the trip but would have used a different type of transportation, most likely transit (23%), another rental car (16%), or a taxi (15%). About one in ten would have asked someone for a ride or borrowed a car from a friend or family member who had a vehicle. Only six percent said they would have used a personal or company car. As noted earlier, 88% of respondents said they had less than one vehicle per driver in the household, so this was likely not an option for the majority of respondents.

Respondents' options for making these trips differed by the type of trip they were making. Overall, only six percent of respondents said they would have used a personal or company car, but 27% of respondents whose last trip was work-related said they would have made the trip this way. Respondents who had made shopping and social/entertainment trips were mostly likely to have said they "would not have traveled" if they could not have used carsharing. More than half of respondents who made these trips gave this response, suggesting these were discretionary trips rather than trips of necessity.

Figure 20
Travel Options for Most Recent Trip if Carshare Not Available
(n = 4,828)



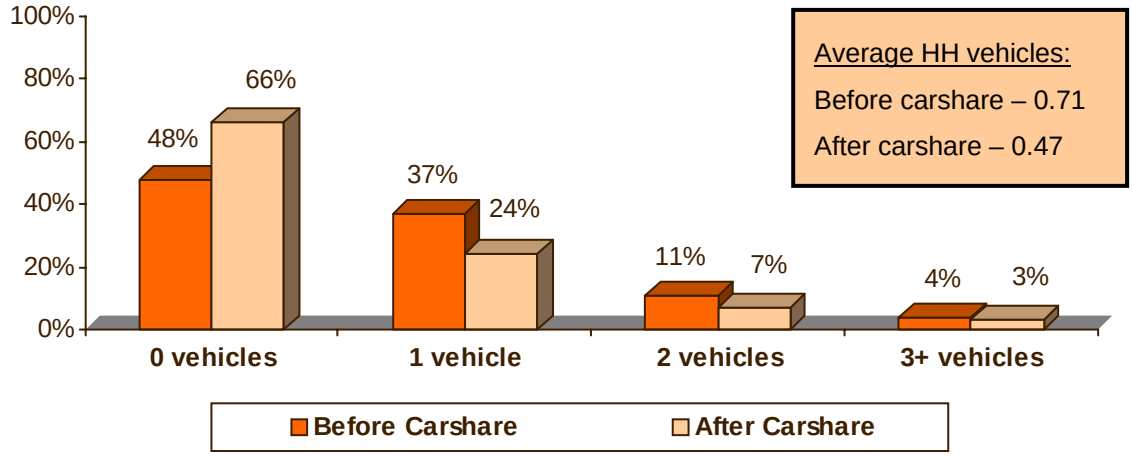
Changes in Auto Ownership Since Joining Carsharing

The survey included a series of questions asking respondents about various personal and travel changes they might have made since joining carsharing. One such change was in the number of vehicles they owned or leased in their households. These results are summarized below.

As noted before, two-thirds (66%) of carshare survey respondents do not currently own or lease a car for personal use. When asked how many vehicles they owned before joining carsharing, about half (52%) of respondents said they owned or leased one or more vehicles and 48% said they did not have any household vehicles. Thus, since joining carsharing, 18% of respondents eliminated the only vehicle in the household. The majority of the drop appears to have been in one-vehicle households, but a drop was observed in two-vehicle households also. These results are displayed in Figure 21.

Before joining carsharing, respondents owned or leased an average of 0.71 vehicles per household. After joining carsharing, the average vehicles per household dropped to 0.47, a reduction in 0.24 vehicles per household.

Figure 21
Vehicles Owned/Leased by Household Before and After Joining Carsharing
(Before n = 4,339, After n = 4,363)



This change reflected a small percentage of respondents who increased their household vehicles. Table 7 indicates that five percent of respondents added at least one vehicle to the household. But this was more than offset by the 27% of respondents who reduced the number of vehicles the household owned or leased.

Table 7
Change in Vehicle Ownership Since Joining Carshare
(n = 4,534)

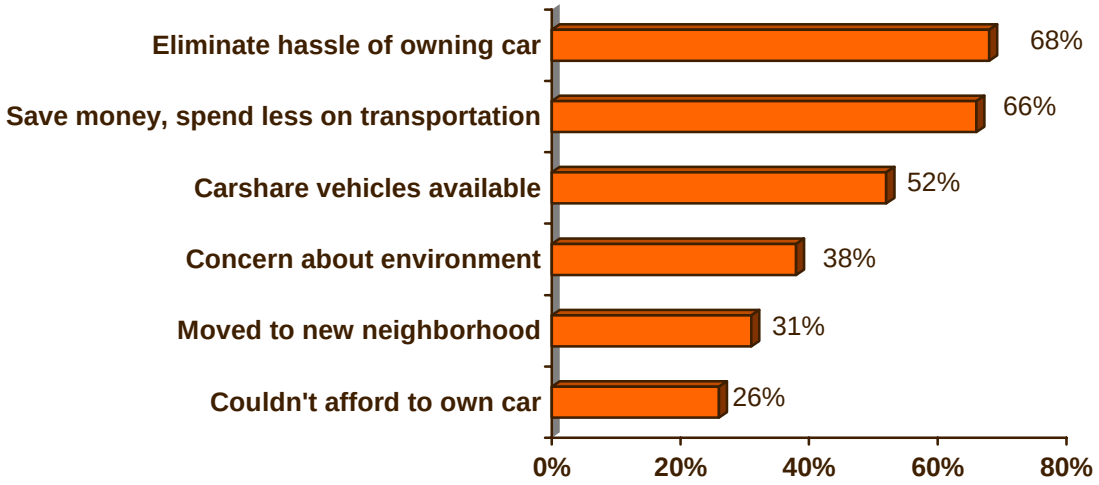
Household Vehicles Change	Percentage
Reduced number of vehicles	27%
Made no change	68%
Increased number of vehicles	5%

Reasons for Reducing Vehicles in Household – Respondents who had eliminated a household vehicle were asked why they had done so and if the availability of carsharing had influenced their decision. Figure 22 displays respondents' answers to the first of these questions.

Avoiding the hassles of car ownership (68%) and saving money (66%) were the most common reasons to eliminate a household vehicle. But more than half of respondents cited availability of carshare vehicles as a motivation for reducing car ownership. Nearly four in ten cited concern for the environment as one motivation. Three in ten said their reason was that they had moved to a new neighborhood. This

could suggest at least two related motivations; that it was difficult to own a vehicle in their new neighborhood or that they had sufficient transportation options, including carsharing, in the new neighborhood, so did not need a vehicle.

Figure 22
Reasons for Eliminating Household Vehicle
(n = 1,140)



More than four in ten respondents who reduced a household vehicle said that carsharing had influenced this decision. Two in ten (19%) said they were somewhat unlikely and 24% said they were very unlikely to have eliminated a household vehicle if carsharing had not been available.

Avoided Purchasing Vehicle – Another potential impact of carsharing is to enable carshare members to avoid the purchase of a vehicle that they might have needed if carsharing were not available. Respondents who said they had not changed their number of household vehicles were asked if they *bought or considered buying* a vehicle since becoming a carshare member.

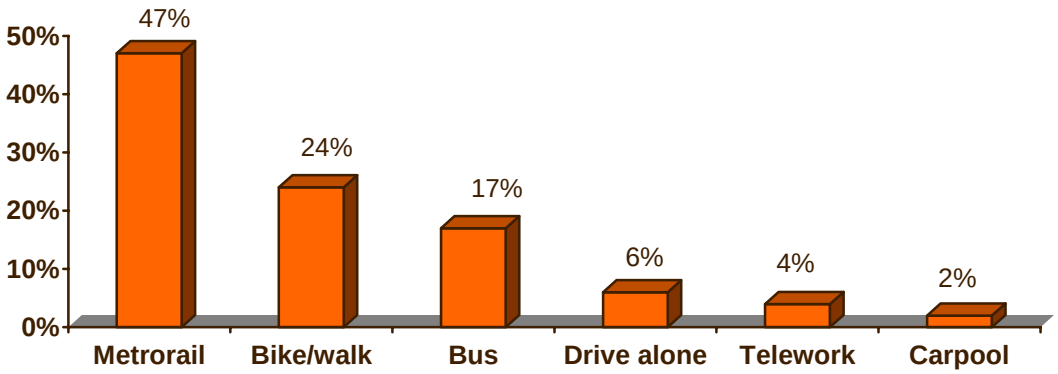
A quarter (26%) of respondents said they considered buying a vehicle after they became a carshare member, but didn't do so. Carsharing also appeared influential in these decisions not to buy a vehicle. Six in ten said they were either very likely (21%) or somewhat likely (40%) to have purchased a vehicle if carsharing had not been available.

Commute Patterns of Carshare Users and Change Since Joining Carsharing

More than nine in ten (93%) respondents said they were employed, either full-time or part-time. Another three percent of respondents were college or university students who lived off campus. These respondents were asked about their current travel from home to work or to school and about any changes they might have made in their travel since they started carsharing. As shown in Figure 23, the over-

whelming majority of respondents reported that they used a non-drive-alone mode of travel to get to work or school.

Figure 23
Commute Mode of Carshare Respondents
(n = 4,654)

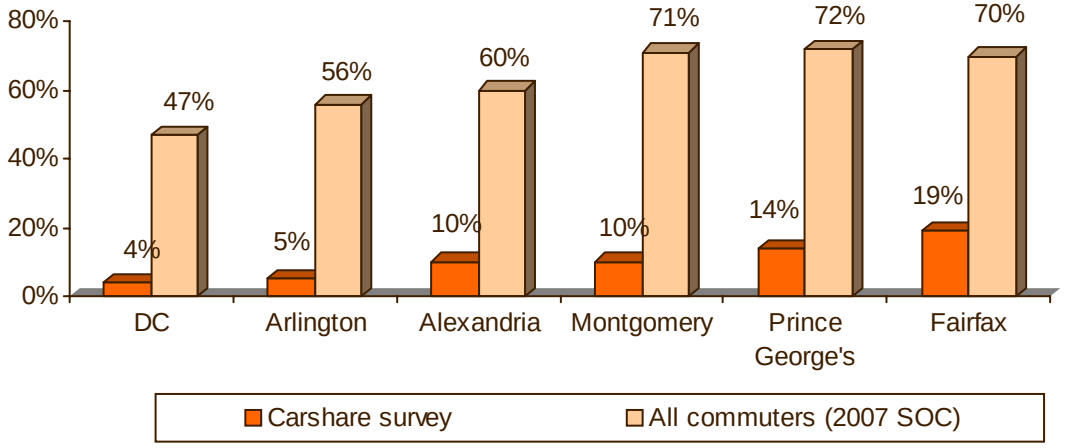


Respondents made nearly half (47%) of their work/ school commute trips by Metrorail, 17% by bus and a quarter (24%) by biking or walking. Only six percent of commute trips were made by driving alone and only two percent of trips were carpool. Another four percent of work days were non-travel days because respondents teleworked.

The share of commute trips that are made by drive-alone modes is dramatically lower for carshare users than for all commuters in the Washington metropolitan region. Over the entire region, drive alone trips account for about 67% of weekly work day trips. Even accounting for the fact that the majority of carshare respondents live in Washington, Arlington County, or Montgomery County, the drive alone rate of carshare users is quite low.

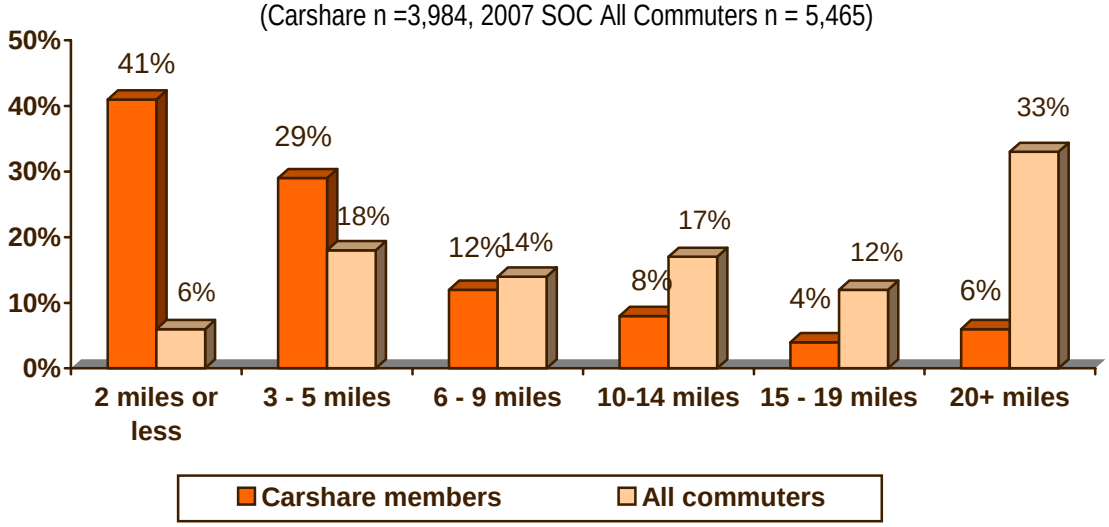
Figure 24 shows the drive alone rates by home area for carshare users and for all commuters in these jurisdictions, as found in the 2007 State of the Commute Survey conducted by Commuter Connections. As shown, only four percent of carshare users who live in Washington DC drive alone to work, compared to 47% of all commuters who live in Washington. The disparities in drive alone rate are similarly striking for the other five jurisdictions that had measurable carshare use.

Figure 24
Drive Alone Mode Share – Carshare Respondents vs All Commuters by Home Area
(Carshare: DC n = 2,959, Arlington n = 577, Alexandria n = 141, Montgomery n = 313, Prince Georges n = 153, Fairfax n = 89))
(2007 SOC survey: DC n = 600, Arlington n = 600, Alexandria n = 600, Montgomery n = 600, Prince Georges n = 600, Fairfax n = 601)



Commute Distance for Carshare Users – Carshare members also travel much shorter distances to work than do all commuters in the region. Figure 25 presents a comparison of the commute distance distribution for carshare users and for all commuters in the region.

Figure 25
Commute Distance – Carshare Users and All Commuters
(Carshare n =3,984, 2007 SOC All Commuters n = 5,465)



The distributions clearly are dramatically different for these two groups. Carshare users travel much shorter distances. Four in ten carshare users travel two miles or less to work and 70% travel five or fewer miles. By contrast, only 24% of all regional commuters travel five miles or fewer. On the other end of the distance scale, the figure shows that 10% of carshare user travel 15 miles or more, while more than four in ten (45%) commuters region-wide travel this far.

Changes in Commuting Since Joining Carshare – One survey objective was to identify changes carshare users had made in their travel since joining carshare. Table 8 shows the changes respondents said they made in commuting mode. A large majority (82%) said they had made no changes in their commuting, but 18% said they made one or more changes. About nine percent said they started using an alternative mode, either transit (5%), bicycle/walk (3%), or carpool (1%). Some respondents also said they increased the number of days they used alternative modes, either transit (10%) or bicycle/walk (9%). Some respondents noted more than one change.

Table 8
Commute Mode Change Since Joining Carshare
(n = 4,468, multiple responses permitted)

Commute Changes	Percentage
No changes	82%
Started riding transit	5%
Ride transit more often	10%
Started carpooling	1%
Started bicycling / walking	3%
Bicycle / walk more often	9%

Impact of Commute Changes on Daily Commute Vehicle Trips and VMT – A comparison of the changes respondents said they made to respondents current travel showed that 82% of these respondents had continued this change; the remaining respondents had not continued the changes.

Overall, the changes respondents made were quite small. The majority (71%) of respondents who made a commute shift had made shifts from one alternative mode to another. Only a quarter (24%) of "changers" had reduced the number of drive alone trips and five percent actually increased their drive alone trips. On average, respondents who made a change reduced 0.26 vehicle trips per day.

The impact of commute changes on commute vehicle miles traveled also was relatively small, primarily because carshare survey respondents traveled relatively short distances to work. On average, respondents who made commute changes reduced 3.0 miles per day for these trips.

When these survey results are applied to the estimated total carshare member population of 28,000 members, the results are as follows:

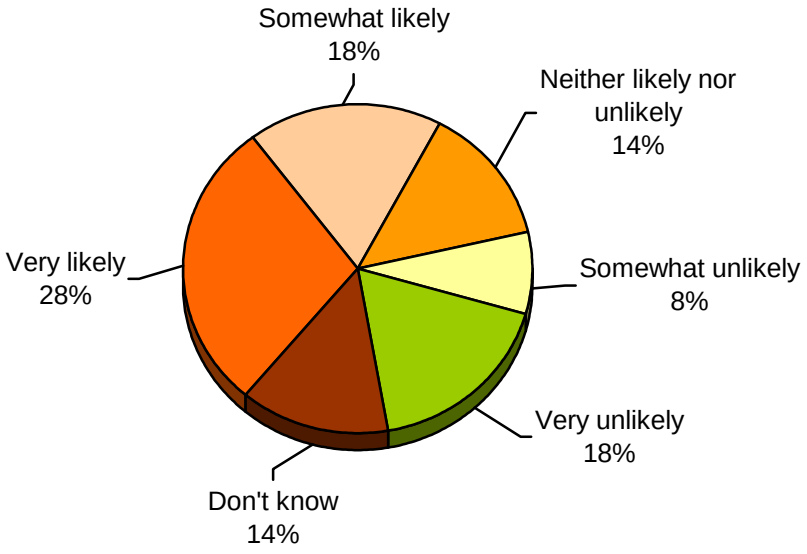
- Total carshare members 28,000
- Estimated commuting carshare members 26,425
- Estimated carshare members with change 4,700

- Estimated daily trips reduced 1,250 daily trips reduced
- Estimated annual trips reduced 31,000 annual trips reduced

- Estimated daily VMT reduced 14,000 daily VMT reduced
- Estimated annual VMT reduced 3,501,000 annual VMT reduced

As shown in Figure 26, about a quarter of respondents who made a change said they were either somewhat unlikely (8%) or very unlikely (18%) to have made the change if carsharing had not been available. Thus, about 26% of the impacts noted above, or 325 daily vehicle trips and 3,650 daily VMT, could reasonably be credited to a carshare influence.

Figure 26
Likelihood to Make Commute Change Without Carshare
(n = 314)



Changes in Commuting by Respondents Demographics – Analysis of the survey data showed some differences in the incidence of commute change among various demographic groups. Table 9 presents the percentages of respondents who did not make any travel changes and the percentages of respondents who started or increased use of alternative modes after joining carsharing.

Increased use of alternative modes after joining carsharing appeared connected to:

- Ratio of household vehicles to drivers – Respondents who had at least one household vehicle per driver were more likely to have made a commute change than were respondents who had fewer vehicles in the household. This is likely because most respondents in zero-car households had no other option except alternative modes even before they joined carsharing.
- Age – Commute change rate increased as age increased. As for vehicles per driver, this could be related to a higher level of pre-carshare use of alternative modes among younger respondents.
- Home Jurisdiction – Respondents who lived in Washington, DC and Arlington County, VA were less likely to have made a commute change than were respondents in other jurisdictions. But data from the State of the Commute survey indicated these jurisdictions had lower drive alone rates than did other jurisdictions, thus it seems likely these areas had higher use of alternative modes even before carsharing.
- Gender – A higher proportion of men than women started or increased use of alternative modes.
- Ethnicity – Non-white respondents were more likely to have made commute changes.

Table 9
Commute Mode Change Since Joining Carshare – By Respondent Demographics

Respondent Characteristic	Change in Use of Alternative Modes for Commuting	
	No Change	Started or Increased Use
Household vehicles per driver		
Zero (car-free household) (n = 2,699)	83%	17%
Less than one per driver (n = 841)	81%	19%
One or more (n = 447)	79%	21%
Age		
Less than 25 years old (n = 516)	88%	12%
25 – 34 years old (n = 2,002)	83%	17%
35 or older (n = 1,478)	79%	21%
Home jurisdiction		
Washington, DC (n = 2,964)	83%	17%
Arlington Co, VA (n = 567)	82%	18%
Montgomery Co, MD (n = 315)	79%	21%
Fairfax Co, VA (n = 91)	76%	24%
Alexandria, VA (n = 141)	75%	25%
Prince George's Co., MD (n = 154)	73%	27%
Gender		
Female (n = 2,202)	84%	16%
Male (n = 1,670)	79%	21%
Ethnicity		
White (n = 2,759)	84%	16%
Non-white (n = 882)	79%	21%

Changes in Commuting by Respondents' Travel Characteristic – The incidence of commute changes also seemed related to several characteristics of respondents' travel patterns. These comparisons are presented in Table 10.

Table 10
Commute Mode Change Since Joining Carshare – By Travel Pattern Characteristic

Respondent Characteristic	Change in Use of Alternative Modes for Commuting	
	No Change	Started or Increased Use
Distance from home to transit		
Less than ½ mile (n = 3,214)	83%	17%
Between ½ and one mile (n = 577)	80%	20%
More than one mile (n = 191)	76%	24%
Commute distance		
Less than 10 miles (n = 3,199)	83%	17%
10 miles or more (n = 717)	74%	26%
Moved residence or work location		
No change (n = 2,333)	84%	16%
Change in home or work (n = 1,770)	80%	20%

Increased use of alternative modes for commuting after joining carsharing appeared connected to:

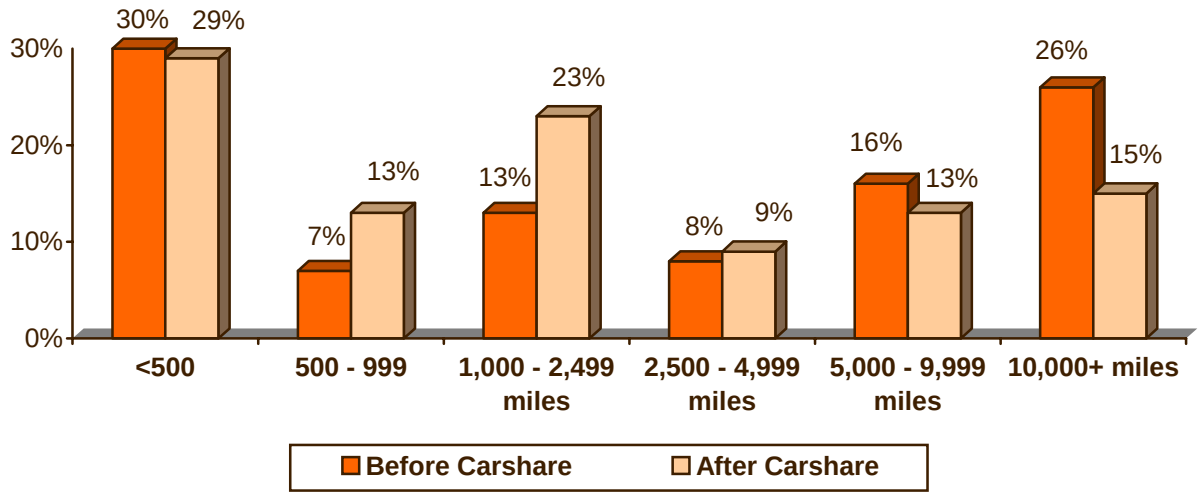
- Distance from Home to Transit Stop – Respondents who lived farther from transit were more likely to have made a commute change than were respondents who lived closer to transit. This seems counter-intuitive, but likely reflects higher pre-carsharing use of alternative modes by respondents who lived closer to transit.
- Commute Distance – A higher percentage of respondents who had longer commute distances made commute changes, compared to respondents whose trips were short.
- Moved Residence or Work Location – Respondents who said they made a change in either their work or home location since joining carsharing were more likely to increase use of alternative modes. This is consistent with research that indicates commuters are most open to shifting commute modes when they are making personal changes that disrupt previous commute patterns.

Changes in Driving Miles Since Joining Carsharing

Annual Miles Traveled by Driving – Respondents were asked how many miles they drove annually before they joined carsharing and how many they drive now. Figure 27 presents the distribution of respondents by their annual miles driven. Before carsharing, about four in ten (42%) respondents drove 5,000 or more mile per year. After joining carsharing, only 28% of respondents drove 5,000 or more miles per year.

The biggest change was in the 500 to 2,499 miles groups. Before carshare, about 20% of respondents drove this far; after joining carshare this group expanded to include more than a third (36%) of respondents. A large drop was noted in the percentage of respondents who traveled at least 10,000 miles annually. Before carsharing, 26% of respondents drove this many miles in a year; after carsharing, only 15% drove 10,000 or more miles annually.

Figure 27
Total Annual Vehicle Miles Driven Before and After Joining Carsharing
(Before carshare n = 2,473, After carshare n = 2,513)



Note that the "n =" sample sizes indicate that only about half (2,473 / 4,932) of the respondents answered both of these questions. This suggests that these might have been difficult questions for some respondents to answer. So these results should be interpreted cautiously, both because the results do not include data from a sizeable portion of the respondents and because respondents' who did answer the questions could have inaccurate estimates of their driving miles.

As Table 11 shows, 36% of respondents said they made no change in their annual driving miles after joining carsharing. A similar percentage said they decreased annual driving miles. Almost three in ten respondents said they increased their annual driving miles, but these increases tended to be modest, compared to decreases; 24% of the 28% added fewer than 1,500 miles, while 20% of the 36% who decreased miles reduced 3,500 or more miles.

Table 11
Change in Annual Driving Miles Since Joining Carshare
(n = 2,274)

Drive Alone Miles Change	No Change	Decrease	Increase
No change in annual miles	**36%**		
Made a change in DA miles		**36%**	**28%**
1 to 1,499 miles		9%	24%
1,500 to 3,499 miles		7%	2%
3,500 miles or more		20%	2%

Changes in Driving Miles by Various Groups of Respondents – As was observed in the previous section, changes in commute travel patterns were not uniformly distributed across all respondents; change occurred more often in some respondents groups than in others. A similar pattern was noted in the change in driving miles. Table 12 shows the percentages of various respondent groups who decreased driving miles, increased driving miles, and made no changes.

Table 12
Change in Annual Driving Miles Since Joining Carshare – By Respondent Demographics

Respondent Characteristic	Change in Annual Driving Miles		
	Reduced	No Change	Increased
Number of household members			
1 person (n = 714)	42%	29%	28%
2 persons (n = 876)	38%	34%	29%
3 or more (n = 483)	27%	45%	28%
Household vehicles per driver			
Zero (car free household) (n = 1,302)	41%	22%	37%
Less than one per driver (n = 492)	33%	50%	17%
One or more (n = 336)	25%	64%	12%
Age			
Less than 25 years old (n = 228)	25%	25%	50%
25 – 34 years old (n = 986)	39%	28%	33%
35 – 44 years old (n = 425)	35%	42%	23%
45 or older (n = 475)	38%	49%	13%
Gender			
Female (n = 1,009)	35%	32%	33%
Male (n = 1,056)	38%	38%	24%

The number of driving miles after joining carsharing appeared connected to:

- Number of Household Members – The percentage of respondents who increased driving miles after joining carsharing was the same across all household sizes, but respondents were more likely to have reduced their annual driving miles if they lived in smaller households. Respondents who lived in households with three or more members were more likely to have made no change in their driving miles.

- Ratio of Household Vehicles to Drivers – The connection of driving miles in relationship to the number of vehicles per driver in the household was interesting. Respondents in zero vehicle households were more likely than were respondents who had some vehicle access to have *reduced* driving miles, but also were more likely to have *increased* miles. Only 22% of these respondents said they made no change in their annual miles driven, compared to at least half of respondents who had greater access to a personal vehicle. The increased miles likely are due to new vehicle access by carshare members who were car-free before joining carsharing, while the reduced miles appear to be concentrated among respondents who had a vehicle before carsharing but reduced the number of vehicles after joining carsharing.
- Age – The percentage of respondents who increased driving miles declined with increasing age, but with the exception of very young respondents, the drop in increased miles was not balanced by a greater percentage of respondents who reduced miles, but by greater percentage of maintained driving miles.
- Gender – A higher proportion of women than men increased driving miles. Men were more likely to have maintained their driving miles. The differences in reduced miles were not significant.

Changes in Driving Miles by Respondents' Travel Characteristic – Several travel pattern characteristics appeared to be linked to changes in annual driving miles. These comparisons are presented in Table 13.

Changes in driving miles after joining carsharing appeared connected to:

- Distance from Home to Transit Stop – Respondents who lived closer to transit were more likely to have increased their driving miles than were respondents who lived farther away. This likely is related to the availability of a personal vehicle in the household; a higher percentage of respondents who lived close to transit were zero-car households. Thus, the connection is likely that these respondents had no access to a vehicle before joining carsharing, so carsharing increased their driving opportunities.
- Vehicle Purchase or Consideration of Purchase – Respondents were asked if they purchased a vehicle or considered buying a vehicle since they joined carsharing. Respondents who bought a vehicle were most likely to say they maintained their driving miles, while respondents who did not buy a vehicle, even if they considered buying one, were more likely to have reduced driving miles.
- Change in Household Vehicles – A significant difference was noted in the reduction of driving miles among respondents who reduced the number of vehicles owned or leased by the household. Eight in ten of these respondents reduced driving miles, compared to only two in ten respondents who did not reduce household vehicles.
- Made Commute Mode Change – A significant difference in driving miles also was found for respondents who said they had increased their use of alternative modes for commuting. Two-thirds of these respondents reduced their annual driving miles, while only 28% of respondents who had not made a commute mode change reduced driving miles. This suggests that, at a minimum, the commute driving miles were reduced, but it's possible these respondents also decreased non-commute miles.
- Moved Residence or Work Location – Respondents who said they made a change in either their work or home location since joining carsharing had higher rates of reduced miles, but also increased miles. This likely means the move enhanced opportunities to make trips by modes other than driving for some respondents, but decreased non-driving opportunities for others.

Table 13
Commute Mode Change Since Joining Carshare – By Travel Characteristics

Travel Characteristic	Change in Annual Driving Miles		
	Reduced	No Change	Increased
Distance from home to transit			
Less than ½ mile (n = 1,696)	36%	34%	30%
Between ½ and one mile (n = 311)	40%	36%	24%
More than one mile (n = 114)	34%	47%	18%
Bought or considered buying vehicle			
Bought a vehicle (n = 148)	24%	49%	28%
Considered, did not buy (n = 518)	41%	29%	31%
Did not consider buying (n = 2,140)	37%	35%	28%
Reduced number of household vehicles			
Reduced vehicles (n = 663)	79%	15%	6%
No change in vehicles (n = 1,405)	17%	45%	37%
Increased vehicles (n = 32)	22%	34%	44%
Made commute mode change			
Increased alt mode use (n = 438)	67%	17%	16%
No change in alt mode use (n = 1,667)	28%	40%	32%
Moved residence or work location			
No change (n = 1,213)	34%	41%	25%
Change in home or work (n = 953)	39%	28%	33%

Impact of Driving Miles Reductions Overall – On average, survey respondents drove an average of about 4,950 miles per year before carsharing. After joining carsharing, respondents drove an average of 3,400 miles, a reduction of about 1,550 miles annually.

When these survey results are applied to the estimated total carshare member population of 28,000 members, the results are as follows:

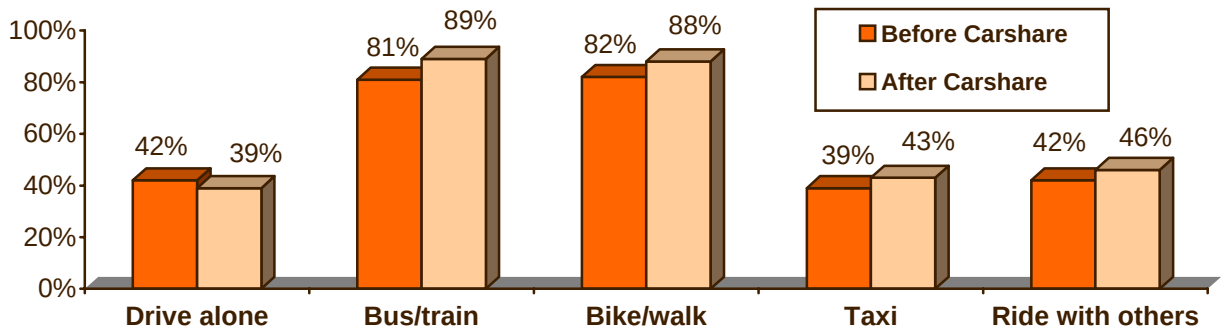
- Number of carshare members 28,000
- Estimated VMT reduced per member 1,550
- Estimated daily trips reduced per member 4.2 miles per day

- Estimated total daily VMT reduced 119,000 daily VMT reduced
- Estimated total annual VMT reduced 43,400,000 annual VMT reduced

Changes in Other Mode Trip Patterns Since Joining Carsharing

Use of Various Travel Modes Before and After Joining Carshare – Respondents also were asked about the numbers of trips they made in a typical week by various travel modes before and after joining carshare. Figure 28 shows the percentages of respondents who made at least one trip by each of the five modes during a typical week. The percentage of respondents who made a drive alone trip dropped slightly, from 42% before carsharing to 39% after carsharing.

Figure 28
Weekly Trips by Mode Driven Before and After Joining Carsharing
(Before n = 3,882, After n = 4,001)



The percentages of respondents who used each of the other modes rose after they joined carsharing. About eight in ten respondents made a transit trip in a typical week before carsharing and nine in ten made a transit trip after joining carsharing. Slight increases were noted in the other modes; the percentage of respondents who made bike/walk trips increased from 82% to 88%, taxi use rose from 39% to 43%, and riding with others grew from 42% of respondents before carsharing to 46% after carsharing.

But as shown in Table 14, the changes in mode use reflected some increased use and some decreased use of each mode by various carshare users. More than four in ten respondents reduced the number of weekly drive alone trips that they made, but 23% increased drive alone trips. This still resulted in an overall decrease in the percentage of respondents making drive alone trips. The net percentage of respondents who made transit trips rose, because while 11% of respondents reduced their weekly transit

trips, 22% increased these trips. Bike / walk use rose similarly, because 17% of respondents increased these trips, more than balancing the nine percent of respondents who decreased their bike/walk trips.

Table 14
Percentages of Respondents Who Made Change in Weekly Trips
by Mode Since Joining Carshare

Travel Mode	Percentage of Respondents who:			Net Change
	Made no Change in Weekly Trips	Reduced Weekly Trips	Increased Weekly Trips	
Any mode (n = 4,395)	51%	30%	19%	- 22%
Drive alone (n = 2,314)	32%	45%	23%	- 22%
Bus / train (n = 3,944)	67%	11%	22%	+ 11%
Bike / walk (n = 3,404)	60%	9%	17%	+ 8%
Taxi (n = 2,037)	60%	19%	20%	+ 1%
Ride with others (n = 2,239)	54%	22%	24%	+ 1%

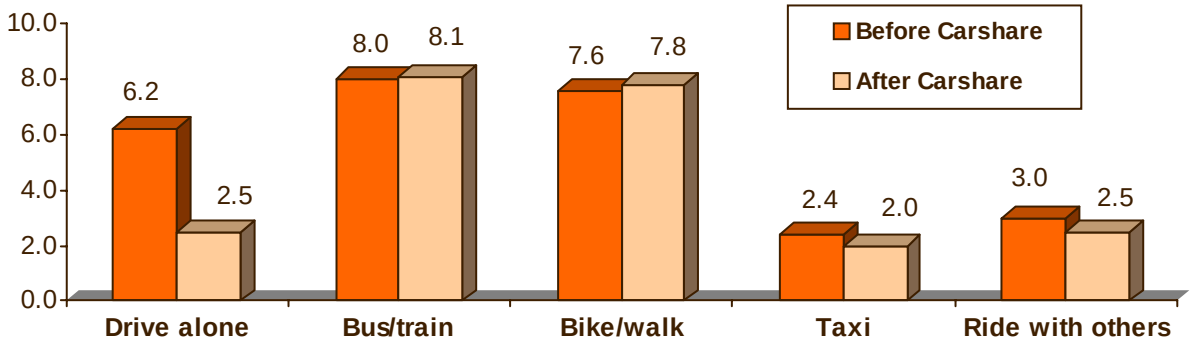
Number of Trips Made Weekly by Various Travel Modes Before and After Joining Carshare – Respondents were asked how many trip they make in a typical week by each of five modes of travel. Overall, respondents made an average of 16.7 trips weekly at the time of the survey, that is, after joining carsharing. This represented a 13% reduction from the pre-carsharing trip making, when respondents made 19.3 trips per week.

How those trips were distributed across travel modes also changed. As illustrated in Figure 29, the average number of weekly drive alone trips experienced a marked decline after respondents joined carsharing. Respondents made an average of 6.2 drive alone trips before carsharing and 2.6 drive alone trips after joining carsharing, an average drop of 3.6 weekly drive alone trips per carshare member.

Respondents also said they slightly decreased the numbers of trips they made weekly by taxi (2.4 weekly trips before to 2.0 trips after) and by riding with others (3.0 weekly trips before to 2.5 trips after). Respondents did not make significant changes in the number of trips by other modes. This suggests they eliminated trips, rather than replacing them with other modes of travel.

Figure 29
Weekly Trips by Mode Driven Before and After Joining Carsharing

(Before: DA n = 1,849, Bus/train n = 3,581, B/W n = 3,501, Taxi n = 1,702, Ride with others n = 1,849)
(After: DA n = 1,715, Bus/train n = 3,902, B/W n = 3,189, Taxi n = 1,903, Ride with others n = 2,023)



Changes in Drive Alone Trips by Respondent Characteristics – Changes in the number of drive alone trips by respondents' demographic and travel pattern characteristics closely tracked the patterns observed for the number of annual driving miles described earlier.

Overall, 45% of respondents said they reduced driving alone trips, but respondents were more likely to have reduced drive alone trips if they:

- Were members of households with one or two persons (50% reduced DA trips)
- Were older than 25 years old (47% reduced DA trips)
- Had zero vehicles in the household (61% reduced DA trips)
- Reduced the number of household vehicles since joining carshare (81% reduced DA trips)
- Increased use of alternative modes for work trips (73% reduced DA trips)
- Had changed either their home or work location (49% reduced DA trips)
- Lived within ½ mile of a bus stop or train station (48% reduced DA trips)

Overall 23% of respondents said they had increased trips by driving alone, but respondents were most likely to have made this change if they:

- Were younger than 25 years old (45% increased DA trips)
- Had zero vehicles in the household (27% increased DA trips)
- Increased the number of household vehicles since joining carshare (53% increased DA trips)
- Moved home location since joining carshare (30% increased DA trips)
- Bought a vehicle since joining carshare (38% increased DA trips)
- Had a household income of less than $50,000 (35% increased DA trips)

Changes in Numbers of Alternative Mode Trips by Respondent Characteristics – Changes in the number of weekly alternative mode trips differed by only a few respondent characteristics. For example, respondents who used carsharing for both business and personal trips increased their weekly transit trips by 29% compared to 19% for respondents who used carsharing for personal trips only. And, as would be expected, respondents who said they has started or increased use of alternative modes for commuting after joining carshare increased their weekly transit trips by 55%, compared to only a 15% increase for respondents who said they had not made a commute mode change.

One respondent characteristic that was associated with increases in several non-drive alone modes was a change in the number of household vehicles. As Table 15 indicates, respondents who decreased the number of vehicles they had available in the household were much more likely to increase their use of transit, bike/walk, and taxi trips than were respondents who either did not make a change in the number of vehicles or increased the number of vehicles in the household.

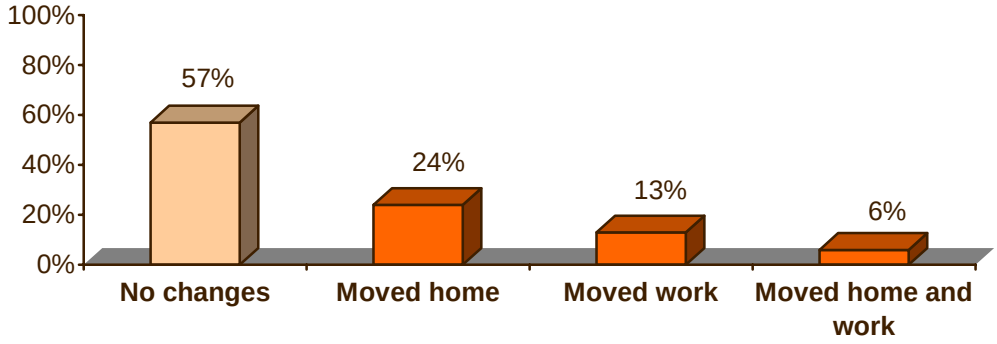
Table 15
Change in Weekly Alternative Mode Trips Since Joining Carshare –
By Change in Number of Household Vehicles

	Change in Household Vehicles		
Change in trip patterns	**Reduced** (n=1,047)	**No Change** (n = 2,558)	**Increased** (n = 158)
Change in weekly TRANSIT trips			
Reduced trips	8%	11%	44%
No change in trips	43%	78%	37%
Increased trips	**49%**	11%	19%
Change in trip patterns	**Reduced** (n=948)	**No Change** (n = 2,240)	**Increased** (n = 140)
Change in weekly BIKE/WALK trips			
Reduced trips	6%	10%	31%
No change in trips	46%	81%	50%
Increased trips	**47%**	9%	19%
Change in trip patterns	**Reduced** (n=543)	**No Change** (n = 1,330)	**Increased** (n = 73)
Change in weekly TAXI trips			
Reduced trips	14%	20%	52%
No change in trips	44%	69%	37%
Increased trips	**42%**	12%	11%

Changes in Home/Work Location Since Joining Carsharing

The carshare survey explored one additional possible change that could have been influenced by availability of carsharing – home or work location changes. Four in ten 43% of respondents said they had moved their home and/or work locations since joining carsharing.

Figure 30
Moved Home or Work Location Since Joining Carsharing
(n = 4,403)



Carsharing appears to have had only a modest influence on respondents' decisions to move. As shown in Table 16, when asked what factors were important in deciding whether and where to move, respondents mentioned several-transportation related factors, such as access to transit (16%) and wanting to be close to work/school (11%). Only three percent mentioned carsharing. Further, only 14% said they were either somewhat or very unlikely to have made the move without carsharing.

Table 16
Factors Important to Decision to Move
(n = 1,614)

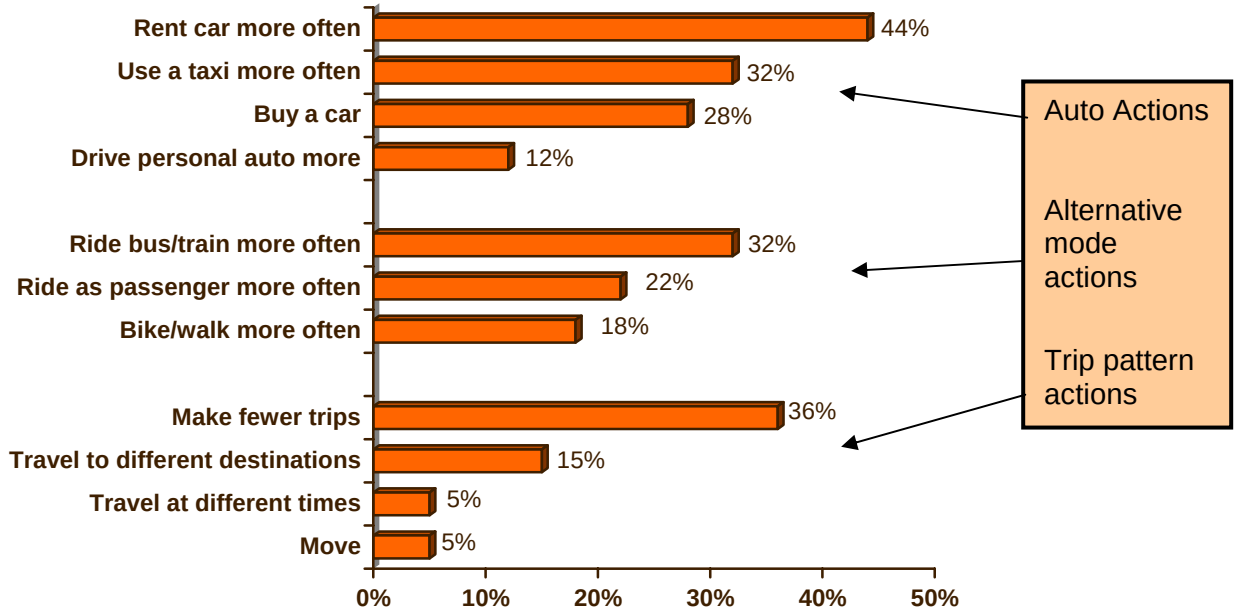
Factors	Percentage
New job, better job, new school, job availability	20%
Access to transit	16%
Housing affordability, cheaper housing	16%
Close to work / school	11%
Better neighborhood, liked neighborhood or location	10%
Bought a house/condo	7%
Access to shopping, recreation	6%
Bigger house	6%
Personal situation changed (e.g., married, divorced)	4%
Carshare was available	**3%**
Urban environment	3%
Close to city	3%
Graduated	2%
Lease ended / had to move	2%

Expected Action if Carsharing Was No Longer Available – Finally, respondents were asked a general and open-ended question about actions they might take if carsharing was no longer available to them. Responses fell into three primary types: 1) use other auto option, 2) use alternative modes, and 3) alter trip-making behavior. These results are displayed in Figure 31.

A large segment of respondents said they would take actions that afforded them continued vehicle access. Nearly four in ten (44%) respondents said they would use a taxi more often, 28% said they would buy a car, and 12% would drive more often in a vehicle they currently own. A sizeable percentage of respondents also said they would use alternative transportation options more often, including riding a bus or train (32%), riding as a passenger (22%), or biking or walking (18%). In essence, these respondents would continue to make current trips but, with some accommodation of mode use.

But numerous respondents reported that the loss of carsharing would alter their ability to make the types of trips they now make or when they make those trips. More than a third (36%) said they would make fewer trips, 15% said they would travel to different destinations, and five said they would travel at different times of day. An additional five percent said they would move.

Figure 31
Likely Actions if Carsharing Not Available
(n = 1,614)



Not surprisingly, the degree of access the respondent had to a personal vehicle influenced the types of actions they were likely to take if carshare was not available. As illustrated in Table 17, respondents who had one or more vehicles per driver in the household were least likely to note any possible changes in their travel. The one change they would make more often than would respondents who had fewer vehicles available was "drive in personal auto more." Respondents who had no vehicles available noted changes that would allow them continued use of automobiles, such as "rent a car more often," use taxi more often," or "buy a car." But they also were more likely than were other respondents to mention changes that resulted in greater use of alternative modes or greater alterations in the number of trips they made or the destinations to which they traveled.

Somewhat surprisingly, the distance respondents lived from the nearest bus stop or train station had no impact on their likelihood to make more bus or train trips if carshare was not available. A third of respondents overall said they would be more likely to use transit and the percentages were the same regardless of the distance respondents lived from a bus stop or train station.

Distance to bus stop/train station	Likely to Increase transit trips
• Less than ½ mile (n = 1,059)	32%
• Between ½ mile and 1 mile (n = 187)	32%
• More than 1 mile (n = 63)	31%

Table 17
Likely Changes in Travel if Carsharing not Available by Household Vehicles per Driver

Changes in Travel	None	Less than one	One or more
Auto Actions			
Rent car more often	**49%**	39%	34%
Use taxi more often	**35%**	27%	21%
Buy a car	**30%**	**27%**	14%
Drive in personal auto more	3%	29%	**38%**
Alternative Mode Actions			
Use bus / train more often	**35%**	**28%**	20%
Ride as passenger more	23%	25%	13%
Bike / walk more often	19%	18%	20%
Trip Pattern Actions			
Make fewer trips	**42%**	30%	21%
Travel to different destinations	**18%**	10%	6%

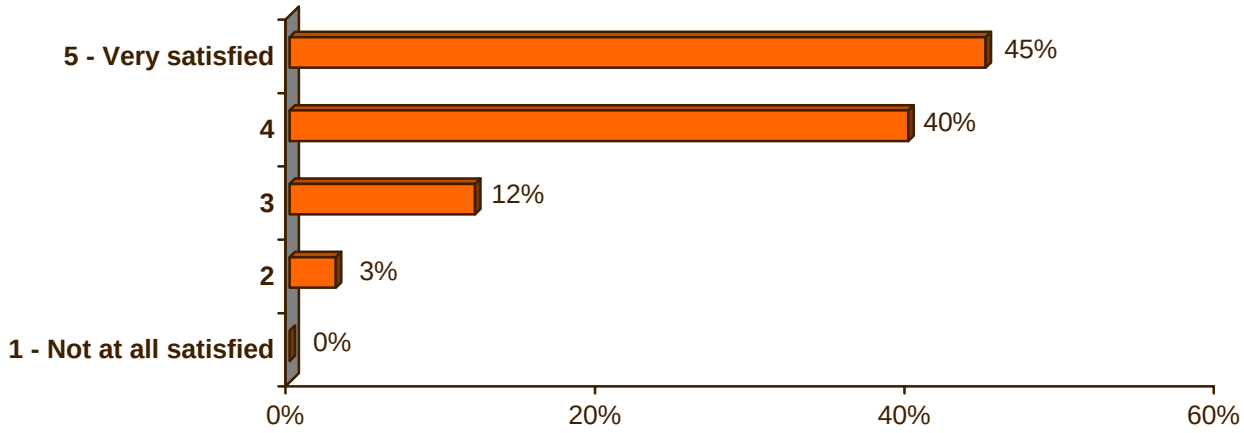
Carshare Satisfaction

The final section of the survey included questions about respondents' satisfaction with their carshare membership and any issues or problems they had experienced. These results are summarized below.

Overall Satisfaction (Figure 32) – Respondents had quite high satisfaction with carshare programs. Eighty-five percent of respondents said they were either satisfied (rating of 4 on a 5-point scale) or very satisfied (rating of 5). Only three percent (110 respondents) said they were unsatisfied with carsharing (rating of 1 or 2). These respondents gave the following reasons for being not satisfied with carsharing:

- Cost too high/Zipcar raised price 55%
- Availability of cars/cars not available when booked 17%
- Cars dirty/need maintenance 11%
- Scheduling problems/no half-hour reservation/one-way trips 11%
- Parking issues/don't like pick-up/drop-off point 8%
- Poor customer service 8%
- Cars not close 4%
- No gas in vehicle 3%

Figure 32
Overall Satisfaction with Carsharing
(n = 4,932)



Three quarters (76%) of respondents said they were very likely to recommend carsharing to others and 20% said they were somewhat likely to recommend it. Only two percent said they were somewhat or very unlikely to recommend carsharing.

Satisfaction by Respondent Characteristics – Respondent satisfaction was generally high across all demographic and user groups. Only one demographic characteristic, age, was associated with differences in overall satisfaction. As indicated in Table 18, satisfaction increased with increasing age. Ninety-one percent of respondents who were 55 year or older gave carsharing a rating of 4 or 5, compared to 84% of respondents who were younger than 35 years old. There were no significant differences in ratings or weighted score for income, gender, ethnicity, or home jurisdiction.

Table 18
Overall Satisfaction with Carsharing – By Respondent Age

Respondent Age	Percentage Rating 4 or 5	Weighted Score
Age		
Less than 35 years old (n = 2,578)	84%	4.22
35 – 44 years old (n = 831)	85%	4.29
45 – 54 years old (n = 429)	88%	4.39
55 or older (n = 333)	91%	4.51

Satisfaction by Carshare use Characteristics – The analysis also examined satisfaction as a function of carshare use characteristics and again, satisfaction was quite uniform across all user groups. Table 19 shows comparison results for three carshare features: frequency of rentals, type of carshare parking facility, and the distance to carshare pick-up locations.

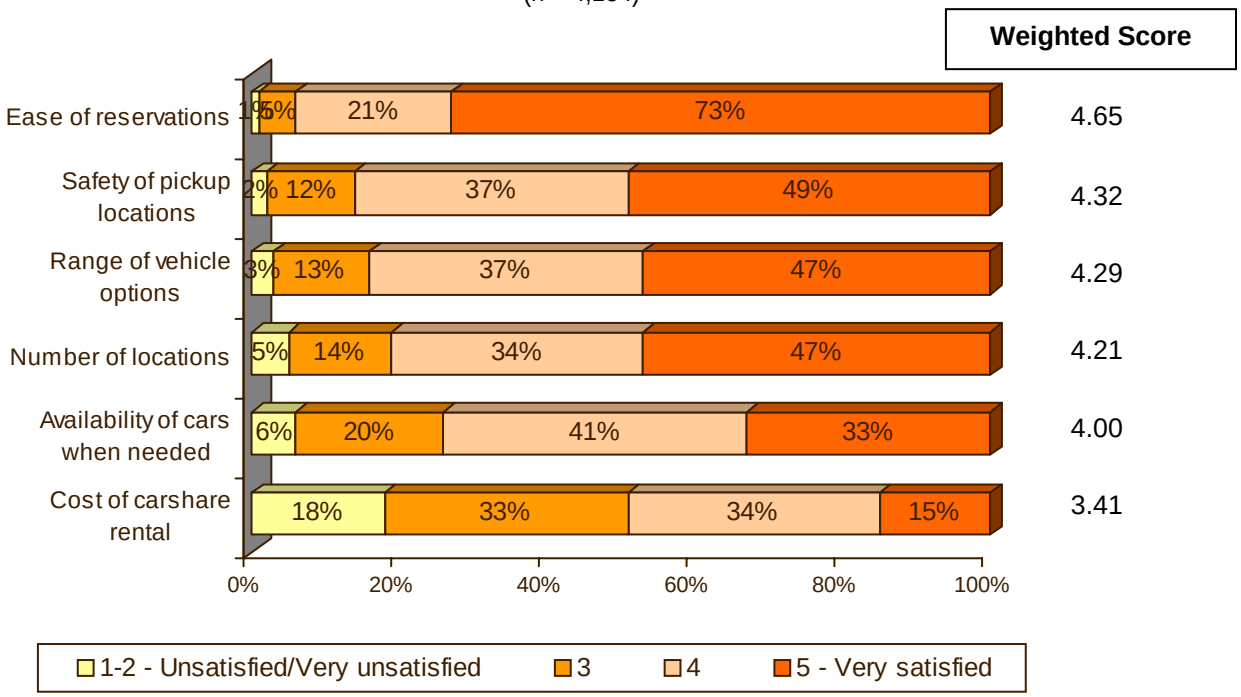
- Frequency of Rentals – Satisfaction appeared to be related to the frequency of rentals. Respondents who said they had not rented a carshare vehicle in the past month were less satisfied than were respondents who had rented at least one time during the month. There was no significant difference in satisfaction for more frequent rentals, however. Respondents who rented one or two times were equally satisfied as respondents who had rented three or more times.
- Carshare Parking Facility – No differences were found in satisfaction among respondents who picked up cars on the street, picked up cars from private off-street spaces, or picked up cars in garages or lots.
- Distance to Carshare Pick-up Locations – But the distance respondents had to travel to the carshare pick-up location did seem related to overall satisfaction. Satisfaction declined as distance to the pick-up locations increased.

Table 19
Commute Mode Change Since Joining Carshare – By Travel Characteristics

Respondent Characteristic	Percentage Rating 4 or 5	Weighted Score
Rental frequency (past month)		
Zero (n = 1,266)	80%	4.17
1-2 rentals (n = 2,081)	87%	4.29
3 or more (n = 982)	88%	4.34
Carshare parking facility type		
On-street (n = 1,169)	85%	4.26
Private off-street (n = 1,509)	85%	4.26
Garage or lot (n = 1,500)	86%	4.29
Distance to carshare pick-up location		
Less than 2 blocks (n = 2,106)	87%	4.32
2 to 5 blocks (1,200)	84%	4.23
6 to 10 blocks (n = 336)	84%	4.21
1 mile or more (n = 309)	81%	4.16

Satisfaction with Carshare Features – Respondents also were asked to rate their satisfaction with a set of individual carshare features. The ratings for each feature are shown in Figure 33.

Figure 33
Carshare Satisfaction by Program Characteristic
(n = 4,184)



Respondents gave generally high marks to most carshare features. More than eight in ten gave ratings of 4 or 5 to "ease of reservation," "safety of pickup location," and "range of vehicle options." And at least three-quarters were satisfied with the number of locations and the availability of cars. Respondents were much less satisfied with the cost of carshare rentals. Only about half (49%) of respondents gave a rating of 4 or 5 to this feature.

Ratings on these features were quite consistent across all demographic groups: income, gender, ethnicity, age, and home jurisdiction. Ratings also were consistent even when it might be assumed some difference would exist. For example, the following characteristics appeared to be unimportant in determining carshare feature satisfaction:

Satisfaction with carshare feature by: Respondent or carshare program characteristic

- Safety of pick-up location by: Distance to carshare pick up location
- Safety of pick-up locations by: Home jurisdiction
- Safety of pick-up locations by: Type of carshare parking facility (e.g., on street, etc.)
- Cost of carshare rental by: Number of rentals in past month
- Availability of vehicles when needed by: Number of vehicles per driver in the household

Importance of Individual Carshare Features to Overall Satisfaction – The analysis examined whether **satisfaction** ratings for individual features were related to overall satisfaction with carsharing. Table 20 details this connection for each of the six carshare features noted in Figure 33 above. The table lists features from highest overall satisfaction (ease of carshare rental, weighted score of 4.65) to lowest overall satisfaction (cost of carshare rentals, weighted score 3.41).

Table 20
Overall Ratings on Satisfaction – By Satisfaction on Carshare Feature

Individual Carshare Features Satisfaction Ratings	Overall Carshare Satisfaction		
	Rating 4 or 5	Weighted Score	Gap- low to high score
Ease of making carshare reservations			
1 (not at all satisfied) (n = 11)	36%	3.09	
2 (n = 40)	35%	3.15	
3 (n = 210)	60%	3.60	**1.34**
4 (n = 872)	79%	3.99	
5 (very satisfied) (n = 3,023)	90%	4.43	
Safety of carshare pick-up locations			
1 (not at all satisfied) (n = 14)	50%	3.43	
2 (n = 93)	63%	3.71	
3 (n = 475)	78%	4.00	1.02
4 (n = 1,523)	84%	4.17	
5 (very satisfied) (n = 2,034)	90%	4.45	
Range of vehicle options			
1 (not at all satisfied) (n = 14)	36%	3.07	
2 (n = 103)	58%	3.63	
3 (n = 536)	74%	3.92	**1.41**
4 (n = 1,521)	85%	4.19	
5 (very satisfied) (n = 1,974)	91%	4.48	

Table 20 (cont)
Overall Ratings on Satisfaction – By Satisfaction on Carshare Feature

Individual Carshare Features Satisfaction Ratings	Overall Carshare Satisfaction		
	Rating 4 or 5	Weighted Score	Gap- low to high score
Number of vehicle pick-up locations			
1 (not at all satisfied) (n = 39)	44%	3.44	
2 (n = 180)	58%	3.59	
3 (n = 587)	76%	3.98	1.05
4 (n = 1,422)	88%	4.21	
5 (very satisfied) (n = 1,931)	91%	4.49	
Availability of vehicles when needed			
1 (not at all satisfied) (n = 48)	44%	3.19	
2 (n = 199)	60%	3.59	
3 (n = 832)	75%	3.96	**1.39**
4 (n = 1,702)	89%	4.30	
5 (very satisfied) (n = 1,372)	93%	4.58	
Cost of carshare rentals			
1 (not at all satisfied) (n = 177)	29%	2.99	
2 (n = 572)	62%	3.71	
3 (n = 1,410)	87%	4.21	**1.79**
4 (n =1,408)	95%	4.51	
5 (very satisfied) (n = 604)	98%	4.78	

For each feature, the table shows the percentage of respondents who gave a score of 4 or 5 for overall satisfaction at various levels of satisfaction for the feature noted. The table also indicates the weighted overall satisfaction score given by respondents who rated the individual feature as shown. For example, 36% of respondents who gave a score of 1 to "ease of carshare rental" gave a rating of 4 or 5 for overall carshare satisfaction and the weighted overall satisfaction score for these respondents was 3.09. The table also shows the gap between the highest and lowest weighted score. The larger the gap, the more important the feature is to overall satisfaction.

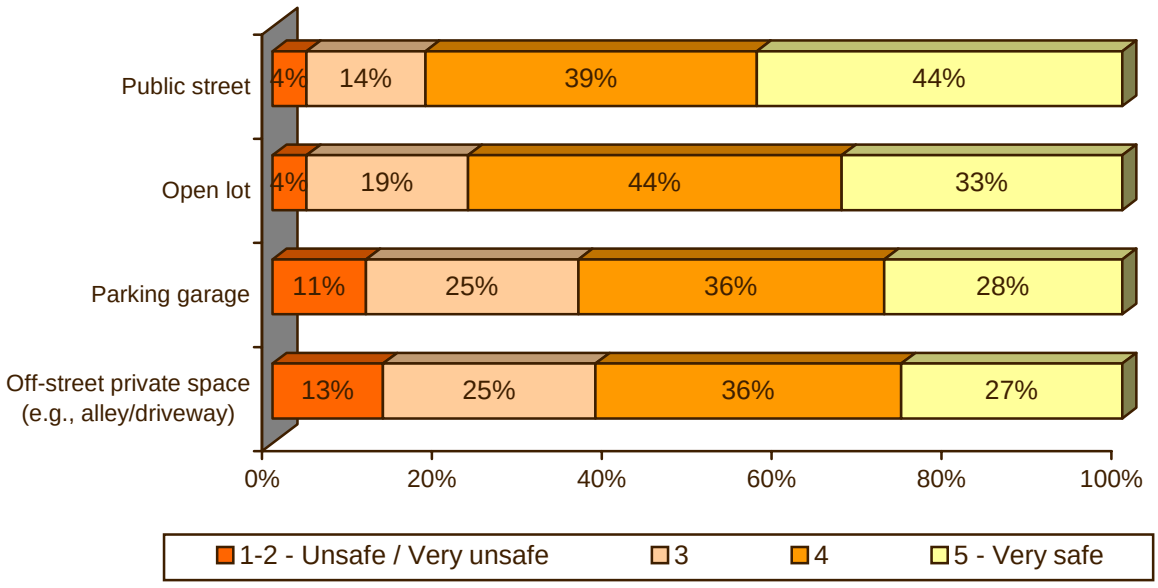
The table shows that the largest gap between high and low overall satisfaction is for the cost of carshare rentals. Respondents who rated this feature a "1 (not at all satisfied) gave a rating of 2.99 for overall

satisfaction, the lowest weighted score for any feature, while respondents who rated cost a "5" (very satisfied) rated overall satisfaction a 4.78, the highest rating for all features. The range of vehicle options, availability of vehicles when needed, and ease of making carshare reservations also showed gaps of 1.3 or greater between the highest and lowest weighted score.

The remaining two features showed less disparity between high and low ratings, safety of carshare pick-up locations and number of pick-up locations, with gap scores of 1.02 and 1.05, respectively. This suggests these are less influential to overall carshare satisfaction. However, it is possible that these features are of less concern to respondents because they do not see them as issues or problems.

Safety of Pickup Locations – As described earlier, some carshare vehicles are parked on the street and others are parked in lots or garages. Respondents were asked how safe they would feel picking up cars in various types of parking facilities, including street spaces, open lots, garages, and off-street parking. These ratings are displayed in Figure 34.

Figure 34
Ratings for Safety of Carshare Pick-up Locations
(n = 3,883)



Respondents gave the highest safety marks to on-street parking; 83% of respondents rated these spaces at least a 4 on a 5-point scale. Respondents also considered open-lot parking to be quite safe; 77% gave a rating of 4 or 5 to this type of parking facility. By contrast, less than two-thirds of respondents gave ratings of 4 or 5 to either parking garages (64%) or off-street private spaces (63%).

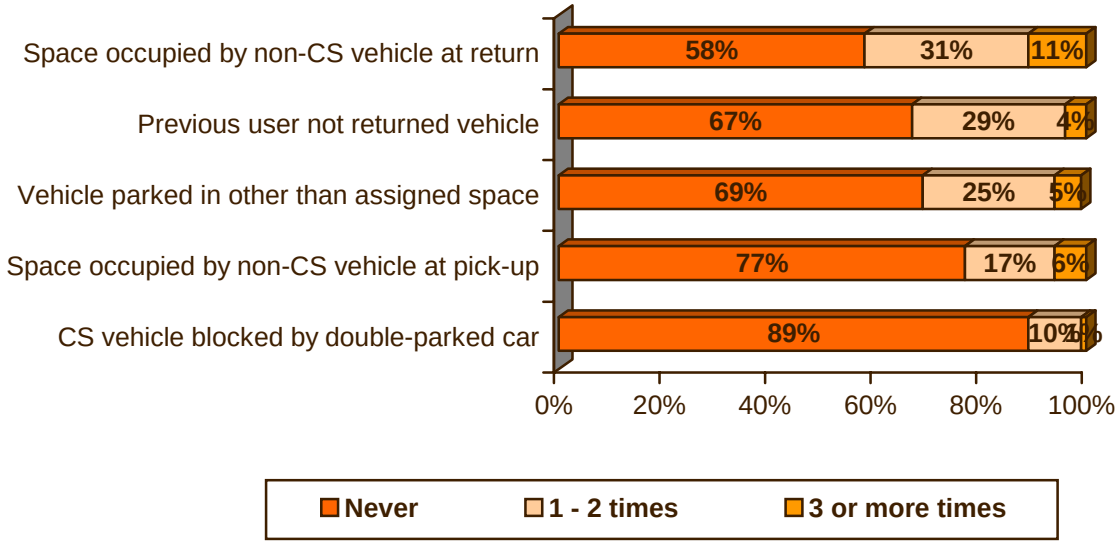
The high safety ratings for on-street parking appeared to support the motivation to join carsharing. As shown in Table 21, nearly half of respondents said the availability of carshare vehicles in highly trafficked and visible on-street locations either greatly influenced (17%) or somewhat influenced (30%) respondents' decisions to become a carshare member,

Table 21
Influence of On-Street Location in Decisions to Become Carshare Member
(n = 4,151)

Influence on Carshare Membership	Percentage
Greatly influenced decision to join carsharing	17%
Somewhat influenced decision to join	30%
Did not influence decision to join	53%

Carshare Street Parking Issues (Figure 28) – The survey tested the incidence of several possible pickup and drop-off situations that respondents could have encountered that would make it difficult for the respondent to pick-up or return the vehicle as scheduled. These situations were assumed primarily to affect cars parked in on-street spaces, so respondents who said they picked-up vehicles parked on the street were asked how often each situation had occurred. Figure 35 shows for each possible situation, the percentage of respondents who said the situation "never" had occurred and the percentages who said it had occurred one or two times or three or more times.

Figure 35
Incidence of Street parking Pick-up and Drop-off Issues
(n = 1,421)



The most common problem was that the designated space was occupied by a non-carshare vehicle when the respondent returned the vehicle, making it impossible to park there. Three in ten (31%) respondents noted that this had happened one or two times and 11% said it had happened three or more times.

A second issue was that the previous carshare user had not returned the vehicle on time, so the next user could not pick it up as scheduled. About three in ten (29%) respondents said they had experienced this problem one or two times and four percent said it had happened three or more times. This could affect vehicles parked in other locations also, but the question was not asked about other parking locations.

Similar percentages of respondents said they had found the carshare vehicle parked in other than its assigned space. A quarter of respondents noted this had happened one or two times and four percent said it had occurred three times or more. Presumably, these respondents had been able to find the car parked nearby, so other than an initial issue of locating where the car was parked, were not unduly inconvenienced.

About a quarter of respondents said they had experienced the problem of the space being occupied by a non-carshare vehicle when trying to pickup the car, making it difficult to find the carshare vehicle. About two in ten (17%) said this had happened one or two times and six percent said they encountered this issue three or more times.

Finally, respondents were asked if the space had been blocked by a double-parked car, making it difficult to pick-up or return the car. Only 10% of respondents said it had ever happened and only one percent of respondents said it had happened three or more times.

Frequency of Parking Issues by Frequency of Rentals – Not surprisingly, respondents were more likely to say they had encountered one or more of these issues if they were more frequent carshare renters. As indicated in Table 22, respondents who said they encountered street parking issues three or more times had rented an average of at least 2.48 times per month. Respondents who encountered these issues one or two times rented slightly less frequently and respondents who said they never encountered these issues had rented 1.35 to 1.60 times per month.

Table 22
Average Rental Frequency (Rentals in past Month)
by Frequency of Encountering Street Parking Issues

Street Parking Issue	Frequency of Encountering Street Parking issue		
	Never	1 – 2 times	3 or more times
Space occupied by non-CS vehicle at return	1.35	2.15	2.48
Space occupied by non-CS vehicle at pick-up	1.53	2.21	2.72
Previous user not returned vehicle	1.43	2.24	3.08
Vehicle parked in other than assigned space	1.47	2.12	2.76
Carshare vehicle blocked by double-parked car	1.60	2.36	2.60

SECTION 4 CONCLUSIONS

The preceding section of this report detailed specific results from the survey. This section presents several overall conclusions about the following topics:

- Characteristics of carshare users and their memberships
- Typical and recent carshare trips
- Impact of carsharing on auto ownership
- Impact of carsharing on commute patterns
- Impact of carsharing on other travel patterns
- Satisfaction with carsharing

Overall, several conclusions realted to the travel impacts of carsharing rise to the top of importance. Carshare availability appears to influence net reductions in car ownership, driving miles, and driving trips by carshare users, several travel-related changes that are desirable from a TDM perspective.

Overall these changes are relatively small, however, because many carshare users did not own personal vehicles before they joined carsharing. But about 22% of carshare users reduce their number of household vehicles after joining carsharing, and carsharing appears to have influenced this reduction for about four in ten of these carshare members.

About two in ten carshare users eiher started or increased their use of non-drive alone modes after joining carsharing. But many of these respondents were using alternative modes already for most or all of their commute trips, thus only about one in five reduced driving trips. And only one in four said they would not have made these commute changes if carsharing had not been available. When these changes are translated into daily impacts, they result in estimated reductions of about 325 daily vehicle trips reduced and about 3,650 daily VMT reduced.

Carshare users appear to reduce their total annual driving miles, for all trip purposes, by about 1,550 miles per carshare user. About 28% of carshare users actually increase their annual miles, because for members who did not own a car before joining carsharing, carsharing represents increased vehicle access. But 36% reduce driving miles and the per person reductions tend to be higher than the per user increases, resulting in a net decrease in miles across all carshare users.

Carshare users also appear to reduce their weekly driving trips by about and make a small additional number of trips by non-driving modes. The driving trip reductions are greater than the replacement alternative mode trips, however, resulting in a net reduction in all trips.

Characteristics of Carshare Users and their Memberships

Demographics – Carshare users do not mirror the adult population of the Washington metropolitan region. More than 90% of the survey respondents were employed, while only about sen in ten adults were employed. But carshare survey respondents also differ from the general employed population.

Compared to all commuters in the region, they are, on average,

- Considerably younger,
- Slightly more likely to be Caucausian, and
- Slightly less affluent than the regional employee population.
- Much more likely to live and work in the urban core of the region – Washington DC, Arlington County, VA, or Alexandria, VA.

Personal Vs Organizational Account – Carshare accounts were overwhelmingly personal; more than nine in ten respondents said they had personal carshare accounts. About five percent said they had accounts through their employers and about five percent said they had a school-based account. These percentages add to more than 100% because some respondents have multiple accounts.

How Heard About Carshare –Respondents were most likely to have heard about carsharing through word of mouth or referral from a friend or family member (30%), through a carshare advertisement (17%), or by seeing a carshare vehicle parked in an on-street space (15%) or in a Metro lot or garage (4%), or being driven on the road (8%)

Reasons for Joining Carshare – Many of the reasons cited for joining carshare indicated either a need for greater transportation options or a desire to reduce or eliminate car ownership costs. Three-quarters of respondents said joioned in part because they didn't own a car; for 44% of respondents, this was their primary reason for joining a carshare program. About one in eight (16%) said they joined a carshare program primarily to eliminate the hassle of owning a car or avoid buying a second car. This was a secondary reason for about three in ten respondents. Saving money also was a motivations for a significant number of respondent; more than four in ten respondents mentioned wanting to save money or pay less in transportation costs, or that they couldn't afford to own or garage a car.

Smaller percentages of respondents noted non-financial reasons for carshare membership, such as liking the philosophy or concept of carsharing, wanting access to emergency transportation, or concerns about the environment.

Typical and Recent Carshare Use

Frequency of Carshare Use – Most respondents said they used carsharing occasionally; 48% had rented carshare vehicles one or two times in the past month. Only 22% said they rented a carshare vehicle three or more times in the past month and 30% said they had not rented at all within the past month.

Overall, respondents rented vehicles an average of 1.7 times in the past month. But when respondents who did not make any trips are removed from the calculation, the average number of rentals by those who did rent a vehicle rises to 2.4 trips per month. Frequent renters were most likely to be business users, respondents who had no vehicle available in the household, and respondents who lived closer to carshare locations.

Carshare Pickup Locations – The primary location for carshare pick-up was in the home neighborhood; 90% of respondents said they picked up carshare vehicles at a home-area location. About three in ten (28%) picked up vehicles near their work, and 7% picked up vehicles near their school. About 14% said

they picked up a car in "another location." In most cases, these locations were Metrorail stations that were not near the respondents' homes but were near the destination location. These percentages add to more than 100% because a large share of respondents picked up cars in multiple locations.

Distance to Carshare Pickup Location – Carshare locations were quite close to most members' homes and work locations. More than half (52%) of respondents who picked up cars near home said they lived within two blocks of the carshare parking location and 83% lived within five blocks. The distribution for distance to work pick-up locations was similar to that for the home locations; 53% worked within two blocks of the location and 88% worked within five blocks.

Type of Parking Facility – Carshare vehicles are parked in a variety of locations. The dominant facility was on-street parking spaces for both home (32%) and work (35%) pick-up locations. Private, off-street spaces were noted as the parking facility for 27% of home-area carshare vehicles and for 14% of work-area vehicles. Public or private garages were named as the locations for 20% of home-area vehicles and 33% of work-area vehicles. And about one in ten vehicles in both the home area and work area were parked in Metrorail lots or garages.

Respondents who lived in different jurisdictions noted quite different patterns in carshare parking

- 79% of Arlington County respondents picked up cars from on-street spaces
- 84% of Alexandria and 75% of Prince George's County respondents picked up cars from private off-street spaces
- Private, off-street spaces also predominated in Montgomery County (58%), but 36% of Montgomery respondents picked up cars parked in lots or garages.
- Respondents from Washington, DC noted the most balanced mix of parking locations

Carshare Trip Purposes – The majority of respondents (69%) used carsharing for personal trips only, three percent said they used their account only for business-related trips, and 28% said they used their accounts for both personal and work-related trips. When asked about their most recent carshare rentals:

- 62% of respondents said they made a trip or stop for shopping
- 23% said the rental included a trip or stop for social or entertainment purposes
- 11% of respondents noted making a non-commute, work-related trip
- 6% used carsharing for a personal appointment.
- 5% said the rental included a commute trip, from home to work or school
- 7% indicated they made an "other" purpose trip, such as an out-of-town "road trip, for moving, or to pick-up someone at an airport.

About two-thirds of respondents (63%) said they made at least two stops during the rental period and 11% said they made four or more stops. A third said they made just one stop on the last carshare rental.

The distribution of carshare trip purposes was quite similar for different respondent groups; there were no significant differences by income, ethnic group, or gender. Two exceptions include:

- Non-commute, work-related trips were more prevalent among respondents who were 45 year of age or older. Younger respondents were most likely to use carshare for shopping and social / entertainment trips.

- Respondents who did not have a vehicle in the household were more likely to have made a shopping trip than were other respondents. Respondents who had greater access to household vehicles were more likely to have used carsharing for a work-related trip.

Day and Time of Most Recent Carshare Rental – About half (53%) of respondents said they last rented a carshare vehicle on a weekday (Monday through Friday). A third (32%) of respondents' most recent rental was on a Saturday. The remaining 15% rented last on a Sunday. Work-related trips and personal appointment trips were more likely to be made on weekdays. Shopping and social / entertainment trips were concentrated on weekends.

The majority of vehicle pick-ups were during the late morning to midday hours and in the afternoon/early evening. Four in ten rental pick-ups were made between 10:00 am and 2:59 pm and 32% occurred in the late afternoon or early evening, between 3:00 pm and 7:59 p.m. A third of commute trips, work-related trips, and personal appointment trips were made during the early morning hours, while only 13% of shopping trips and 16% of social trips were made during this time. Late evening and night trips were disproportionately social / entertainment trips.

Duration of Rental and Length of Carshare Trip – A large share of carshare rentals were of short duration. A third (33%) of respondents reported they returned the carshare vehicle for their last rental within two hours of the pick-up time and another 36% returned the car three or four hours after pick-up. Trips made for work-related purposes and social purposes were more likely to be of longer duration.

Carshare rentals also typically were of short distance. More than four in ten (44%) carshare rentals covered fewer than 20 miles and 67% covered fewer than 40 miles. But about one in eight (12%) trips was more than 100 miles and 2% were quite long – more than 250 miles. With these very long distance rentals, the average carshare rental was 48 miles. But when these extreme rentals were removed from the calculation, the average rental covered 36 miles.

Reasons for Using Carshare for this Trip – Respondents were asked why they used carsharing for their most recent carshare rental. The most common reasons focused on characteristics of the trip purpose or trip location that made it difficult to travel by means other than a personal vehicle. Other common reasons were related to personal preferences in travel:

- 48% needed to carry or transport items and 10% needed to carry passengers
- 25% said they had to make multiple stops
- 38% said public transit did not serve the destination and 27% said the trip was too far to walk
- 23% didn't want to use public transit (presumably when it was available)
- 18% said carshare was more comfortable than other options and 11% said carshare was lower cost

Travel Options if Carshare Not Available – Carsharing broadened mode options for carshare users, but also destination and trip options. A significant number of respondents said they would not have made their most recent carshare trip in its current form if carsharing had not been available.

Other respondents said they would have made the trip but using a different type of transportation:

- 34% would not have traveled at all
- 5% would have traveled to a different destination
- 5% would have traveled at a different time of day
- 23% would have used transit
- 16% would have used another rental car
- 15% would have taken a taxi
- 11% would have asked someone for a ride or borrowed a car
- 6% would have used a personal or company car

Respondents' options for making these trips differed by the type of trip they were making. Overall, only six percent of respondents said they would have used a personal or company car, but 27% of respondents whose last trip was work-related said they would have made the trip this way. Respondents who had made shopping and social/entertainment trips were mostly likely to have said they "would not have traveled" if they could not have used carsharing. More than half of respondents who made these trips gave this response, suggesting these were discretionary trips rather than trips of necessity.

Impact of Carsharing on Auto Ownership

Change in Auto Ownership – Carsharing appeared to facilitate the reduction or avoidance of vehicle ownership. Five percent of respondents increased the number of vehicles in their households since they joined carsharing, but 27% said they reduced the number of vehicles.

Two-thirds (66%) of carshare survey respondents had zero cars in the household at the time of the survey and about half (48%) of respondents said they had no household vehicles before carsharing. Thus, 18% of respondents eliminated the only vehicle in the household.

More than four in ten respondents who reduced a household vehicle said carsharing had influenced this decision. Two in ten (19%) said they were somewhat unlikely and 24% said they were very unlikely to have eliminated a household vehicle if carsharing had not been available.

Before carsharing, respondents owned or leased an average of 0.71 vehicles per household. After joining carsharing, the average vehicles per household dropped to 0.47, a reduction in 0.24 vehicles.

Reasons for Reducing Vehicles in Household – Respondents cited various reasons for why they eliminated a household vehicle, primarily related to cost or difficulty of auto ownership, but availability of carshare appeared to be important to many respondents:

- 68% wanted to avoid the hassles of car ownership
- 66% wanted to save money
- 52% cited the availability of carshare vehicles as a motivation
- 38% noted concern for the environment
- 31% said their reason was that they had moved to a new neighborhood
- 26% couldn't afford to own a car

Avoided Purchasing Vehicle –Respondents who said they had not changed their number of household vehicles were asked if they replaced an existing vehicle or considered buying a vehicle but did not buy one. A quarter (26%) of these respondents said they did consider buying a vehicle after they became a carshare member, but didn't do so. Carsharing appeared influential in these decisions; 21% said they were very likely and 40% said they were somewhat likely to have purchased a vehicle if carsharing had not been available.

Impact of Carsharing on Commute Travel Patterns

Commute Patterns of Carshare Users – Nearly all respondents said they made regular commute trips for either work (93%) or to college or university (3%). The overwhelming majority of these respondents said they used a non-drive-alone mode of travel to get to work or school: 47% by Metrorail, 17% by bus, and 24% by biking or walking. Only 6% of commute trips were made by driving alone and 2% were carpool. Four percent of work days were non-travel days because respondents teleworked.

Carshare members' trip distances are relative short and are much shorter than are the commute distances for all commuters in the region. Four in ten carshare users travel two miles or less to work and 70% travel five or fewer miles. By contrast, only 24% of all regional commuters travel five miles or fewer. On the other end of the distance scale, the figure shows that 10% of carshare user travel 15 miles or more, while more than four in ten (45%) commuters region-wide travel this far.

Changes in Commuting Since Joining Carshare – About 18% of commuting respondents said they had started or increased use of alternative modes since joining carshare. Most of these changes were to transit or to bicycle / walk.

Some differences were noted in rates of change by various respondent groups, as shown below. Although these results may seem counter-intuitive in some cases, it is likely they reflect already high rates of alternative mode use for other respondent groups pre-carshare. Respondents who were most likely to have made commute changes included:

- Respondents who had at least one household vehicle per driver
- Respondents who were older, women, and non-white
- Respondents who lived outside Washington, DC and Arlington County, VA
- Respondents who lived farther from a transit stop or station
- Respondents who had longer commute distances made commute changes
- Respondents who made a change in either their work or home location since joining carsharing

Impact of Commute Changes on Daily Commute Vehicle Trips and VMT – Overall, the commute changes respondents made were quite small. The majority (71%) of respondents who made a commute change shifted from one alternative mode to another. Only a quarter (24%) of "changers" had reduced the number of drive alone trips and five percent actually increased their drive alone trips. On average, respondents who made a change reduced 0.26 vehicle trips per day and 3.0 miles per day.

When these survey results are applied to the estimated total carshare member population of 28,000 members, the results are as follows:

- Estimated carshare members with change 4,700
- Estimated daily trips reduced 1,250 daily trips reduced
- Estimated annual trips reduced 31,000 annual trips reduced
- Estimated daily VMT reduced 14,000 daily VMT reduced
- Estimated annual VMT reduced 3,501,000 annual VMT reduced

About a quarter of respondents who made a change said they were either somewhat unlikely (8%) or very unlikely (18%) to have made the change if carsharing had not been available. Thus, about 26% of the impacts noted above, or 325 daily vehicle trips and 3,650 daily VMT, could reasonably be credited to a carshare influence.

Impact of Carshare on Other Travel Patterns and on Home / Work Location Choice

Annual Miles Traveled by Driving – Respondents were asked how many miles they drove annually before they joined carsharing and how many they drive now. Only about half of respondents answered both of these questions. This suggests that these might have been difficult questions for some respondents to answer. So these results should be interpreted cautiously, both because the results do not include data from a sizeable portion of the respondents and because respondents' who did answer the questions could have inaccurate estimates of their driving miles.

Slightly more than a third (36%) of respondents said they made no change in their annual driving miles after joining carsharing. A similar percentage said they decreased annual driving miles. Almost three in ten respondents said they increased their annual driving miles, but these increases tended to be modest, compared to decreases; 24% of the 28% added fewer than 1,500 miles, while 20% of the 36% who decreased miles reduced 3,500 or more miles.

Before carsharing, about four in ten (42%) respondents drove 5,000 or more mile per year. After joining carsharing, only 28% of respondents drove 5,000 or more miles per year. The biggest change was in the 500 to 2,499 miles groups. Before carshare, about 20% of respondents drove this far; after joining carshare this group expanded to include more than a third (36%) of respondents. A large drop was noted in the percentage of respondents who traveled at least 10,000 miles annually. Before carsharing, 26% of respondents drove this many miles in a year; after carsharing, only 15% drove 10,000 or more miles annually.

Impact of Driving Miles Reductions Overall – On average, survey respondents drove an average of about 4,950 miles per year before carsharing. After joining carsharing, respondents drove an average of 3,400 miles, a reduction of about 1,550 miles annually.

When these survey results are applied to the estimated total carshare member population of 28,000 members, the results are as follows:

- Number of carshare members 28,000
- Estimated VMT reduced per member 1,550
- Estimated daily trips reduced per member 4.2 miles per day

- Estimated total daily VMT reduced 119,000 daily VMT reduced
- Estimated total annual VMT reduced 43,400,000 annual VMT reduced

Drive Alone Trips Before and After Joining Carshare – Respondents also were asked about the numbers of trips they made in a typical week by various travel modes before and after joining carshare. More than four in ten (45%) respondents reduced the number of weekly drive alone trips that they made, but 23% increased drive alone trips. This still resulted in an overall decrease in the percentage of respondents making drive alone trips; 42% of respondents said they made a drive alone trip in a typical week before carsharing and 39% said they made a drive alone trip after carsharing. Respondents made an average of 6.2 drive alone trips before carsharing and 2.6 drive alone trips after joining carsharing, an average drop of 3.6 weekly drive alone trips per carshare member.

Non-Drive Alone Trips Before and After Joining Carshare The net percentage of respondents who made transit trips rose after carsharing, from 81% to 89%, because while 11% of respondents reduced their weekly transit trips, 22% increased these trips. Bike / walk use rose similarly, from 82% to 885 of respondents, because 17% of respondents increased these trips, more than balancing the 9% of respondents who decreased their bike/walk trips. Taxi use rose from 39% to 43% and riding with others grew from 42% of respondents before carsharing to 46% after carsharing.

Changes in the total number of these non-driving trips were slight. Respondents also said they slightly decreased the numbers of trips they made weekly by taxi (2.4 weekly trips before to 2.0 trips after) and by riding with others (3.0 weekly trips before to 2.5 trips after). Respondents did not make significant changes in the number of trips by other modes. Since driving alone trips declined, this suggests respondents eliminated trips entirely, rather than replacing them with other trips made by non-drive alone modes.

Changes in Home/Work Location Since Joining Carsharing – The carshare survey explored one additional possible change that could have been influenced by availability of carsharing – home or work location changes. Four in ten 43% of respondents said they had moved their home and/or work locations since joining carsharing. Carsharing appears to have had only a modest influence on respondents' decisions to move. When asked what factors were important in deciding whether and where to move, only three percent mentioned carsharing. Further, only 14% said they were either somewhat or very unlikely to have made the move without carsharing.

Expected Action if Carsharing Was No Longer Available – Finally, respondents were asked a general and open-ended question about actions they might take if carsharing was no longer available to them. Responses fell into three primary types: 1) use other auto option, 2) use alternative modes, and 3) alter trip-making behavior. A large segment of respondents said they would take actions that afforded them

continued vehicle access. Nearly four in ten (44%) respondents said they would use a taxi more often, 28% said they would buy a car, and 12% would drive more often in a vehicle they currently own. A sizeable percentage of respondents also said they would use alternative transportation options more often, including riding a bus or train (32%), riding as a passenger (22%), or biking or walking (18%). In essence, these respondents would continue to make current trips but, with some accommodation of mode use.

But numerous respondents reported that the loss of carsharing would alter their ability to make the types of trips they now make or when they make those trips. More than a third (36%) said they would make fewer trips, 15% said they would travel to different destinations, and 5% said they would travel at different times of day.

Satisfaction with Carsharing

Overall Satisfaction – Respondents reported quite high satisfaction with carshare programs. Eighty-five percent of respondents said they were either satisfied (rating of 4 on a 5-point scale) or very satisfied (rating of 5). Only three percent (110 respondents) said they were unsatisfied with carsharing (rating of 1 or 2). These respondents were primarily unhappy about the cost of carsharing (55%) and the availability of cars/cars not available when booked (17%).

Three quarters (76%) of respondents said they were very likely to recommend carsharing to others and 20% said they were somewhat likely to recommend it. Only two percent said they were somewhat or very unlikely to recommend carsharing.

Respondent satisfaction was generally high across all demographic and user groups. Satisfaction increased with increasing age, but there were no significant differences in ratings or weighted score for income, gender, ethnicity, or home jurisdiction.

Satisfaction also appeared to be related to the frequency of rentals. Respondents who said they had not rented a carshare vehicle in the past month were less satisfied than were respondents who had rented at least one time during the month. There was no significant difference in satisfaction for more frequent rentals, however. Respondents who rented one or two times were equally satisfied as respondents who had rented three or more times.

Satisfaction with Carshare Features – Respondents also gave generally high marks to most carshare features. More than eight in ten gave ratings of 4 or 5 to "ease of reservation," "safety of pickup location," and "range of vehicle options." And at least three-quarters were satisfied with the number of locations and the availability of cars. Respondents were much less satisfied with the cost of carshare rentals. Only about half (49%) of respondents gave a rating of 4 or 5 to this feature.

Safety of Pickup Locations – Respondents were asked how safe they would feel picking up cars in various types of parking facilities, including street spaces, open lots, garages, and off-street parking. Respondents gave the highest safety marks to on-street parking; 83% of respondents rated these spaces at least a 4 on a 5-point scale. Respondents also considered open-lot parking to be quite safe; 77% gave a rating of 4 or 5 to this type of parking facility. By contrast, less than two-thirds of respondents gave ratings of 4 or 5 to either parking garages (64%) or off-street private spaces (63%).

Carshare Street Parking Issues – The survey tested the incidence of several possible pickup and drop-off situations that respondents who picked-up cars from on-street locations could have encountered that would make it difficult for the respondent to pick-up or return the vehicle as scheduled. The most common problem was that the designated space was occupied by a non-carshare vehicle when the respondent returned the vehicle, making it impossible to park there. Four in ten (42%) respondents noted that this had happened at least once. About 33% of respondents said they had encountered the problem that the previous carshare user had not returned the vehicle on time.

A similar percentage of respondents (30%) said they had found the carshare vehicle parked in other than its assigned space. And 23% said the carshare space had been occupied by a non-carshare vehicle when trying to pickup the car, making it difficult to find the carshare vehicle. Finally, 11% of respondents reported that the carshare space had been blocked by a double-parked car, making it difficult to pick-up or return the car.

APPENDICES

Appendix A – Survey Questionnaire

APPENDIX A – CARSHARE SURVEY QUESTIONNAIRE

Online Intro

Commuter Connections, with assistance from Flexcar and Zipcar is conducting this brief online survey of Flexcar and Zipcar members to learn about members' experience with carsharing and identify ways to improve the service. Commuter Connections is aware that Zipcar and Flexcar have merged their car-sharing operations. We are interested in gathering information about your car-sharing experience both before and after the merger. Your answers will be confidential. It will take about 10-15 minutes. Please complete the survey and click on the "SUBMIT" button at the end. If you want to enter the drawing for the $25 driving credit, please provide your email address in the space provided at the end of the survey. Thank you for your participation.

Background

1. Do you recall registering in either the Flexcar or Zipcar carshare program?

   1 Yes
   2 No **(THANK AND TERMINATE)**
   9 Don't know, don't remember **(THANK AND TERMINATE)**

2 In which carshare program or programs did you register?

   1 Flexcar only
   2 Zipcar only
   3 Both Flexcar and Zipcar
   9 Don't know, don't remember

3 Are you currently registered in either Flexcar or Zipcar?

   1 Currently In Flexcar only
   2 Currently in Zipcar only
   3 Currently in both Flexcar and Zipcar
   4 Not currently in either Flexcar or Zipcar
   9 Don't know, don't remember

IF Q2 = 3, ASK Q3a, OTHERWISE, SKIP TO DEFINE PROGRAM STATUS

3a Why did you register in both Flexcar and Zipcar? Check all that apply (**ACCEPT MULTIPLES**)

   1 To have access to carshare in multiple locations or neighborhoods (e.g., home, work, school)
   2 To have access to all carshare vehicles in my home, work, or school neighborhood
   3 One account is personal and the other is through my employer or through my school
   4 Gives me more options / opportunities / flexibility for reserving cars
   5 Programs offer different types of vehicles
   6 Flexcar and Zipcar merged and I transferred my Flexcar membership to Zipcar
   7 Other _____
   9 Don't know, don't remember

DEFINE PROGRAM STATUS

IF Q3 = 1 OR 3, FLEXSTAT = CURRENT
IF Q3 = 2 OR 3, ZIPSTAT = CURRENT

IF Q2 = 1 OR 3 AND Q3 = 2, 4, OR 9, FLEXSTAT = PAST
IF Q2 = 2 OR 3 AND Q3 = 1, 4 OR 9, ZIPSTAT = PAST

IF Q2 = 2 OR 9 AND Q3 = 2, 4, OR 9, FLEXSTAT = NEVER
IF Q2 = 1 OR 9 AND Q3 = 1, 4 OR 9, ZIPSTAT = NEVER

IF FLEXSTAT = NEVER AND ZIPSTAT = NEVER, THANK AND TERMINATE
IF Q2 = 9 AND Q3 = 9, THANK AND TERMINATE

Branch for Current and Past Participants
IF FLEXSTAT = PAST OR NEVER AND ZIPSTAT = PAST OR NEVER, GO TO INSTRUCTIONS AFTER Q67 (P4)
IF FLEXSTAT = CURRENT OR PAST, CONTINUE TO Q4
IF FLEXSTAT = NEVER AND ZIPSTAT = CURRENT OR PAST, SKIP TO Q5

Current Carshare Participants Section – Q3a – Q65,
(Note parallel section, P-4 – P-67, for respondents who are not currently in either Flexcar or Zipcar)

Flexcar Background

4 In what year did you become a Flexcar member?

1 Before 2002
2 2003
3 2004
4 2005
5 2006
6 2007
9 Don't know, don't remember

IF FLEXSTAT = CURRENT, SKIP TO Q4b

4a How long were you a Flexcar member?

1 Less than 6 months
2 6 to 11 months
3 1 to 2 years
4 3 to 4 years
5 5 to 6 years
6 More than 6 years
5 5 or more years
9 Don't know, don't remember

4b Which of the following describe your Flexcar account or accounts? If you have more than one account, please check all that apply.

1 Personal account
2 Account through employer
3 Account through school / university
4 Account through other organization (specify) _____
9 Don't know, don't remember

IF Q4b NE 2, SKIP TO Q4d

4c Does your employer maintain company cars or fleet cars for business or work-related travel?

1 Yes
2 No
9 Don't know

4d How did you first learn about Flexcar?

ROTATE 1-9, SHOW 10 (other) AT THE END OF THE LIST
1 Advertisement
2 Received information in the mail
3 Saw Flexcar vehicle
4 Saw an orange carsharing pole with information holder
5 Employer told me
6 Friend or family member told me, word of mouth
7 Internet
8 Information from local jurisdiction (e.g., County, City)
9 Information from Metro
10 Other _____
19 Don't know, don't remember

IF Q4d NE 3, SKIP TO INSTRUCTIONS BEFORE Q5

4e Where did you see the Flexcar vehicle?

1 Being driven on the road
2 Parked in a Flexcar parking space on the street
3 Parked in a Metrorail lot or garage
4 Parked in a lot or garage in a location other than Metrorail
5 Other _____
9 Don't know, don't remember

Zipcar Background

IF ZIPSTAT = CURRENT OR PAST, CONTINE TO Q5
IF ZIPSTAT = NEVER, SKIP TO Q6

5 In what year did you become a Zipcar member?

1 Before 2002
2 2003
3 2004
4 2005
5 2006
6 2007
9 Don't know, don't remember

IF ZIPSTAT = CURRENT, SKIP TO Q5b

5a How long were you a Zipcar member?

1 Less than 6 months
2 6 to 11 months
3 1 to 2 years
4 3 to 4 years
5 5 or more years
9 Don't know, don't remember

5b Which of the following best describe your Zipcar account? If you have more than one account, please check all that apply

1 Personal account
2 Account through employer
3 Account through school / university
4 Account through other organization (specify) _____
9 Don't know, don't remember

IF Q5b NE 2, SKIP TO Q5d

5c Does your employer maintain company cars or fleet cars for business or work-related travel?

1 Yes
2 No
9 Don't know

5d How did you first learn about Zipcar?

ROTATE 1-9, SHOW 10 (other) AT THE END OF THE LIST
1 Advertisement
2 Received information in the mail
3 Saw Zipcar vehicle
4 Saw an orange carsharing pole with information holder
5 Employer told me
6 Friend or family member told me, word of mouth
7 Internet
8 Information from local jurisdiction (e.g., County, City)
9 Information from Metro
10 Other _____
19 Don't know, don't remember

IF Q5d NE 3~~,~~ SKIP TO Q6

5e Where did you see the Zipcar vehicle?

1 On the road / being driven
2 Parked in a Zipcar parking space on the street
3 Parked in a Metrorail lot or garage
4 Parked in a lot or garage in a location other than Metrorail
5 Other _____
9 Don't know, don't remember

6 What motivated you to join a carsharing program? Please check all that apply. (**ALLOW MULTIPLES FOR 1-10**)

1 Didn't own a car
2 Car was not working, needed extensive repairs
3 Liked the philosophy / concept of carsharing
4 Couldn't afford to own, maintain, garage a car
5 Save money, spend less on transportation
6 Eliminated the hassle of owning a car, avoid buying a second car
7 Wanted another travel option for emergencies
8 My employer offered it at work
9 Concerned about the environment, global warming
10 Other _____
19 Don't know, don't remember

IF Q6 = ONLY ONE RESPONSE, AUTOCODE Q6a = Q6, THEN SKIP TO Q10

6a Of the reasons you just checked, which was your primary reason for joining carsharing at the time you joined? Please check only one answer.

SHOW ONLY RESPONSES 1-10 THAT WERE CHECKED IN Q6

1 Didn't own a car
2 Car was not working, needed extensive repairs
3 Liked the philosophy / concept of carsharing
4 Couldn't afford to own, maintain, garage a car
5 Save money, spend less on transportation
6 Eliminated the hassle of owning a car, avoid buying a second car
7 Wanted another travel option for emergencies
8 My employer offered it at work
9 Concerned about the environment, global warming
10 Other _____
19 Don't know, don't remember

General Car Share Use Patterns

10 Do you use carshare vehicles for personal trips, work-related trips, or both personal and work-related trips?

1 Exclusively for personal trips
2 Exclusively for business / work-related trips
3 Use for both types of trips
9 Don't know

11b When you rent carshare vehicles, how often do you stop at multiple destinations during your rental period?

1 Always
2 Often / usually
3 Sometimes
4 Rarely / seldom
5 Never
9 Don't know

11c In the past month, how many times have you rented a carshare vehicle?

_____ number of times

999 Don't know, don't remember

IF Q11c = 0 or 999, SKIP TO Q14a

12 In the past month, how many times did you make each of the following types of trips by carsharing?

Type of Trip	**# times**
1 Travel between home and work or between home and school	
2 Work-related meeting or errand	
3 Shopping or personal errand	
4 Social / entertainment / meals / recreation	
5 Medical / personal appointment	
6 Other purpose _____	

13 You said you rented a carshare vehicle <Q**11c**> times in the past month. How many of those rentals were on weekdays (Monday – Friday) and how many were on weekend days?

Days of the Week	**# times**
1 Weekday (Monday – Friday)	
2 Weekend (Saturday – Sunday)	

14a In which of the following locations do you ever pick up and return carshare vehicles? Check all that apply (**DO NOT ALLOW MULTIPLES WITH DK - 9**)

1 In or near my home neighborhood
2 In or near my work neighborhood
3 In or near the neighborhood of my school / university
4 Other location
9 Don't know (**SKIP TO Q18a)**

IF Q14a = 1, ASK Q15
IF Q14a NE 1, SKIP TO INSTRUCTIONS BEFORE Q16

15 How far from your <u>home</u> is the nearest carshare pick up location?

1 Less than 2 blocks
2 2 – 5 blocks
3 6 – 10 blocks
4 1 – 2 miles
5 More than 2 miles
9 Don't know

15a In what county / city and neighborhood/area is this vehicle located?

County _____ City _____ Neighborhood / area_____

15b In which of the following types of facilities is this vehicle parked?

1 On-street parking space
2 Private off-street space (e.g., driveway, private road)
3 Public garage or lot
4 Private garage or lot
5 Residential building garage (e. g., apartment, condo building)
6 Office or commercial building garage
7 Metrorail station garage or lot
8 Other _____
9 Don't know

IF Q14a = 2, ASK Q16
IF Q14a NE 2, SKIP TO INSTRUCTIONS BEFORE Q17

16 How far from your <u>work place</u> is the nearest carshare pick up location?

1 Less than 2 blocks
2 2 – 5 blocks
3 6 – 10 blocks
4 1 – 2 miles
5 More than 2 miles
9 Don't know

16a In what county / city and neighborhood/area is this vehicle located?

County _____ City _____ Neighborhood / area_____

16b In which of the following types of facilities is this vehicle parked?

1 On-street parking space
2 Private off-street space (e.g., driveway, private road)
3 Public garage or lot
4 Private garage or lot
5 Residential building garage (e. g., apartment, condo building)
6 Office or commercial building garage
7 Metrorail station garage or lot
8 Other _____
9 Don't know

IF Q14a = 3, ASK Q17
IF Q14a NE 3, SKIP TO INSTRUCTIONS BEFORE Q18

17 How far from your school / university is the nearest carshare pick up location?

1 Less than 2 blocks
2 2 – 5 blocks
3 6 – 10 blocks
4 1 – 2 miles
5 More than 2 miles
9 Don't know

17a In what county / city and neighborhood/area is this vehicle located?

County / city _____ Neighborhood / area_____

17b In which of the following types of facilities is this vehicle parked?

1 On-street parking space
2 Private off-street space (e.g., driveway, private road)
3 Public garage or lot
4 Private garage or lot
5 Residential building garage (e. g., apartment, condo building)
6 Office or commercial building garage
7 Metrorail station garage or lot
8 Other _____
9 Don't know

IF Q14a = 4, ASK Q18
IF Q14a NE 4, SKIP TO Q18a

18 In what other location(s) do you pick up carshare vehicles?
_____

18a Who pays for the expenses of your carsharing trips?

1 I pay all the costs
2 My employer pays all the costs
3 Someone else pays all the costs
4 I pay some and my employer or someone else pays some
5 Other _____
9 Don't know

Details of Last Carshare Use

Please answer the following questions about the last trip you made in a carshare vehicle. Answer for this trip, even if it was not a typical carshare trip for you.

20 When did you make your last carshare trip?

1 Within the past week
2 1 - 2 weeks ago
3 3 - 4 weeks ago
4 1 – 2 months ago
5 More than 2 months ago
9 Don't know, don't remember

21 What was the purpose of that trip? Please check all that apply (**ALLOW MULTIPLES FOR 1-6**)

1 Travel between home and work or between home and school
2 Work-related meeting or errand
3 Shopping or personal errand
4 Social / entertainment / meals / recreation
5 Medical / personal appointment
6 Other purpose _____
9 Don't know, don't remember

22 In what county / city did you pick up the vehicle?

County _____ City _____

22a Did you have a single destination on this trip or did you make stops at more than one location?

1 Single destination only
2 Made stops at 2 – 3 locations
3 Made stops at 4 or more locations
9 Don't know, don't remember

23 On what day of the week did you make this trip?

1 Weekday (Monday-Friday)
2 Saturday
3 Sunday
9 Don't know, don't remember

23a At about what time did you pick up the car?

1 5:00 am – 9:59 am
2 10:00 am – 2:59 pm
3 3:00 pm – 7:59 pm
4 8:00 pm to 11:59 pm
5 12:00 midnight to 4:59 am
9 Don't know, don't remember

23b About how long did you keep the car?

1 Less than 1 hour
2 1 – 2 hours
3 3 – 4 hours
4 5 – 6 hours
5 7 – 24 hours
6 More than one day
9 Don't know, don't remember

24 About how many miles did you travel? _____

25 How did you get to the location where you picked up the vehicle?

1 Walked
2 Bicycled
3 Rode a bus or train
4 Dropped off, rode as passenger in someone's car
5 Taxi
6 Other _____
9 Don't know, don't remember

26 For what reason or reasons did you use carsharing for this particular trip? Check all that apply (**ACCEPT MULTIPLES**)

ROTATE 1-10, SHOW 11, 19 AT THE END OF THE LIST
1 Lower cost than for other travel options
2 More comfortable than other travel options
3 Had things to carry, transport
4 No other travel option at that time of day/night
5 Needed to pick up passengers
6 Had to make multiple stops
7 Car was the only option to get to that destination
8 Too far to walk
9 Didn't want to use bus or train for this trip
10 Company car was not available
11 Other _____
19 Don't know, don't remember

27 If a carsharing vehicle had not been available, how would you have made this trip? Check all that apply. **(DO NOT ALLOW MULTIPLES WITH 1 OR 9**

1 Would not have traveled at all
2 Driven myself in a personal or company vehicle
3 Driven myself in a company vehicle
4 Used a different type of transportation
5 Traveled to a different destination
6 Traveled at a different time of day
7 Other _____
9 Don't know, don't remember

IF Q27 = 4, ASK Q27a, OTHERWISE, SKIP TO Q30

27a What other type of transportation would you most likely have used for this trip? Please check only one.

ROTATE 1-7, SHOW 9 AT THE END OF THE LIST
1 Ride as a passenger in a personal auto/vehicle
2 Metrorail
3 Walk or bicycle
4 Bus
5 Taxi
6 Rental car
9 Don't know, don't remember

Commute Travel Patterns

30 Are you currently employed, either full-time or part-time?

1 Yes, employed full-time (**SKIP TO INSTRUCTIONS BEFORE Q31)**
2 Yes, employed part-time (**SKIP TO INSTRUCTIONS BEFORE Q31)**
3 No
9 Don't know, prefer not to answer

30a Are you a full-time student?

1 Yes
3 No (**SKIP TO Q40**)
9 Don't know, prefer not to answer (**SKIP TO Q40**)

30b Do you live on campus or off campus?

1 On campus **(SKIP TO Q40)**
2 Off campus
9 Don't know, prefer not to answer (**SKIP TO Q40**)

IF Q30 = 1 OR 2, INSERT "get to work" IN Q31
IF Q30a = 1, INSERT "get to school" IN Q31

31 In a typical week, how many weekdays (Monday-Friday) do you use each of the following types of transportation to [get to work, get to school]? If you use more than one type on a single day (e.g., walk to the bus stop, then ride the bus), count only the type you use for the **longest distance part** of your trip. If you telework one or more days per week, please report those days also.

Type of Transportation	**Number of Weekdays Used (0 – 5)**
1 Drive alone, motorcycle, taxi	
2 Ride a bus	
3 Ride Metrorail, subway train, or commuter train (VRE, MARC, Amtrak)	
4 Carpool or vanpool (ride or drive with others in a car, truck, van, or SUV, dropped off)	
5 Walk or bicycle	
6 Telework (work at home or at telework center all day)	
7 Other (describe) _____	

IF Q30 = 1 OR 2, INSERT "usual work location" IN Q32
IF Q30a = 1, INSERT "school" IN Q32

32 About how many miles is it from your home to your [usual work location, school]?

_____
999 Don't know

IF Q30 = 1 OR 2, INSERT "work" IN Q33a
IF Q30a = 1, INSERT "school" IN Q33a

33a On days that you drive to [work, school], how much do you pay to park? If you don't usually drive, please enter what you would pay if you needed to drive. If you did not or would not pay to park, enter $0 in the box.

$_____ per: day / month (check one)

IF Q30 = 1 OR 2, INSERT "work" IN Q35-Q35c
IF Q30a = 1, INSERT "school" IN Q35-Q35c

35 Since you became a carshare member, have you made any of the following changes in how you get to [work, school]? Check all that apply (ALLOW MULTIPLES)

1 Started riding train or bus
2 Ride train or bus more often
3 Started carpooling or vanpooling
4 Carpool or vanpool more often
5 Started walking or bicycling
6 Bicycle or walk more often
9 No – did not make any of these changes

IF Q35 = 1, 3, OR 5, ASK Q35a, OTHERWISE, SKIP TO Q40

35a How did you typically travel to [work, school] before you made this change? (Please check only one)

1 Didn't [work then, go to school then]
2 Drove alone all or most days
3 Rode a train or bus all or most days
4 Carpooled or vanpooled all or most days
5 Walked or bicycled all or most days
6 Teleworked all or most days
7 Other _____

35c If carsharing had not been available to you, how likely would you have been to make this change in how you travel to [work, school]?

1 Very likely
2 Somewhat likely
3 Neither likely nor unlikely
4 Somewhat unlikely
5 Very unlikely
9 Don't know, prefer not to answer

Before / After Travel Patterns

40 About how many miles do you drive annually now, for all trip purposes? (Please include miles you drive in the Washington metropolitan area in carshare vehicles and in vehicles you own, rent, or borrow)

_____
999 Don't know

41 Before you joined carsharing, about how many miles did you drive annually? Please include miles you drove in the Washington metropolitan area in carshare vehicles and in vehicles you owned, rented, or borrowed

_____
999 Don't know

42 In a typical week, about how many trips do you make now by each of the following types of transportation?

	Type of transportation	Number of weekly trips
1	Driving alone in a personal or rented/borrowed vehicle	_____
2	Driving or riding with someone in personal or rented/borrowed vehicle	_____
3	Riding a bus or train	_____
4	Taxi	_____

43 Before you joined carsharing, about how many trips did you make in a typical week by each of the following types of transportation?

Type of transportation	Number of weekly trips
1 Driving alone in a personal or rented/borrowed vehicle	_____
2 Driving or riding with someone in personal or rented/borrowed vehicle	_____
3 Riding a bus or train	_____
4 Taxi	_____

44 Not counting trips you make solely for exercise or recreation, or to get to a bus or train stop, about how many trips do you make in a typical week by bicycle or walking?

_____ number of trips
999 Don't know

45 Before you joined carsharing, about how many bicycle or walking trips did you make in a typical week, other than trips solely for exercise or recreation or to get to a bus or train stop?

_____ number of trips
999 Don't know

47 If the carsharing service ended, would you be likely to make any of the following changes? Check all that apply. (**ACCEPT MULTIPLES FOR 1-12)**

ROTATE 1-12
1 Buy a car
2 Move to a different neighborhood
3 Drive in your personal auto/vehicle more
4 Ride more often as a passenger in a personal auto/vehicle
5 Use bus or train more often
6 Bicycle or walk more often
7 Use a taxi more often
8 Rent a car more often
9 Make fewer trips
10 Travel to different destinations
11 Travel at different times of day
12 Use a company vehicle or fleet car more often
19 Don't know

Impact on Vehicle Ownership / Residential Choice

50 How many cars, trucks, vans, or other personal vehicles do you or other members of your household own or lease now for household use?

_____
99 Don't know, prefer not to answer

51 How many cars, trucks, vans, or other personal vehicles did you or other members of your household own or lease before you joined carsharing?

_____
99 Don't know, prefer not to answer

Check change in vehicle ownership
IF Q50 = 99 AND Q51 = 99, SKIP TO Q53
IF Q50 >= Q51, SKIP TO Q53

52 You said you've reduced the number of household vehicles since you became a carshare member. What factors influenced your decision to make this change? (**ALLOW MULTIPLES FOR 1-7**)

1 Save money, spend less on transportation
2 Carshare vehicles were available
3 Moved to a new neighborhood
4 Couldn't afford to own, maintain, garage a car
5 Eliminate the hassle of owning a car
6 Concerned about the environment
7 Other _____
19 Don't know, prefer not to answer

52a If carsharing had not been available, how likely would you have been to reduce the number of household vehicles?

1 Very likely
2 Somewhat likely
3 Neither likely nor unlikely
4 Somewhat unlikely
5 Very unlikely
9 Don't know, prefer not to answer

53 After you joined carsharing, did you buy or consider buying a car, truck, van, or other personal vehicle?

1 Yes, bought a car, truck, van, or other vehicle (**SKIP TO Q54**)
2 Considered buying but did not buy a vehicle
3 No, did not consider buying or buy a vehicle (**SKIP TO Q54**)
9 Don't know, prefer not to answer (**SKIP TO Q54**)

53a If carsharing had not been available, how likely would you have been to buy a vehicle?

1 Very likely
2 Somewhat likely
3 Neither likely nor unlikely
4 Somewhat unlikely
5 Very unlikely
9 Don't know, prefer not to answer

54 Since you first learned about carsharing, have you moved your residence or changed your work location?

1 Yes, moved my residence
2 Yes changed work location
3 Yes, moved my residence and changed my work location
4 No, did not make either of these changes (**SKIP TO Q60**)
9 Don't know, prefer not to answer (**SKIP TO Q60**)

54a What factors were important in your decision to make this location change?

OPEN-ENDED _____

55 Was carsharing available in your <u>old</u> home and/or work location?

1 Yes, available at home
2 Yes, available at work
3 Yes, available at both home and work
4 No, not available at either home or work
9 Don't know

55a Was carsharing available in the new home or work location?

1 Yes, available at home
2 Yes, available at work
3 Yes, available at both home and work
4 No, not available at the new location(s) (**SKIP TO Q60**)
9 Don't know (**SKIP TO Q60**)

56a If carsharing had not been available in the new location, how likely would you have been to make this home or work location change?

1 Very likely
2 Somewhat likely
3 Neither likely nor unlikely
4 Somewhat unlikely
5 Very unlikely
9 Don't know, prefer not to answer

General Carshare Satisfaction

60 Overall, how satisfied are you with your carshare experience? Please rate the service on a scale of 1 to 5, where 1 is not at all satisfied and 5 is very satisfied?

1 1 (not at all satisfied)
2 2
3 3 (**SKIP TO Q62**)
4 4 (**SKIP TO Q62**)
5 5 (very satisfied) (**SKIP TO Q62**)
9 Don't know, prefer not to answer (**SKIP TO Q62**)

61 Why are you not satisfied with the service? _____

62 Please rate the carshare service on each of the following features, using a scale of 1 to 5, where 1 means "very poor" and 5 means "very good."

ROTATE RESPONSES

Feature	**1 – Very poor**	**2**	**3**	**4**	**5 – Very good**	**DK**
1 Ease of making carshare reservations						
2 Cost of carshare rental						
3 Range of vehicle options						
4 Safety of carshare pick-up locations						
5 Availability of vehicles when needed						
6 Number of vehicle pick-up location						

62b Carshare vehicles can be parked in various types of parking locations. Using a scale of 1 to 5, where 1 means "not at all safe" and 5 means "very safe", please rate how safe you would feel in picking up and returning cars at each of the following types of locations.

Feature	1 – Not at all safe	2	3	4	5 – Very safe	DK
1 Space on a public street						
2 Space in open lot						
3 Space in parking garage						
4 Private off-street parking space						

62c Did availability of carshare vehicles in highly trafficked and visible on-street locations influence your decision to become a carshare member?

1 Greatly influenced my decision to join
2 Somewhat influenced my decision to join
3 Did not influence my decision to join
9 Don't know

IF Q15b = 1 OR Q16b = 1 OR Q17b = 1 (use cars parked on-street), ASK Q63, OTHERWISE, SKIP TO Q70 (demographics)

63 You indicated earlier that you have used carshare vehicles that are parked in public, on-street parking spaces. How often have you encountered any of the following situations?

Situation	Never	1-2 times	3 or more times	DK
1 Space was occupied by a non-carshare vehicle when I arrived to pick up the carshare vehicle				
2 Previous carshare user had not returned the vehicle				
3 Vehicle had been parked in a location other than its assigned space				
4 Space was occupied by a non-carshare vehicle when I was returning the car				
5 Carshare vehicle was blocked by a double-parked vehicle				

IF FLEXSTAT = CURRENT OR ZIPSTAT = CURRENT, SKIP TO Q70 (Demographics)
IF FLEXSTAT = PAST, CONTINUE TO QP-4
IF FLEXSTAT = NEVER AND ZIPSTAT = PAST, SKIP TO INSTRUCTIONS BEFORE QP-5

Past Participant Section

Flexcar Background

P-4 In what year did you become a Flexcar member?

1 Before 2002
2 2003
3 2004
4 2005
5 2006
6 2007
9 Don't know, don't remember

P-4a How long were you a Flexcar member?

1 Less than 6 months
2 6 to 11 months
3 1 to 2 years
4 3 to 4 years
5 5 or more years
9 Don't know, don't remember

P-4b Which of the following described your Flexcar account or accounts? If you had more than one account, please check all that apply.

1 Personal account
2 Account through employer
3 Account through school / university
4 Account through other organization (specify) _____
9 Don't know, don't remember

IF QP-4b NE 2, SKIP TO QP-4d

P-4c Did your employer maintain company cars or fleet cars for business or work-related travel?

1 Yes
2 No
9 Don't know

P-4d How did you first learn about Flexcar?

ROTATE 1-9 SHOW 10 (other) AT THE END OF THE LIST
1 Advertisement
2 Received information in the mail
3 Saw Flexcar vehicle
4 Saw an orange carsharing pole with information holder
5 Employer told me
6 Friend or family member told me, word of mouth
7 Internet
8 Information from local jurisdiction (e.g., County, City)
9 Information from Metro
10 Other _____
19 Don't know, don't remember

IF QP-4d NE 3, SKIP TO INSTRUCTIONS BEFORE QP-5

P-4e Where did you see the Flexcar vehicle?

1 Being driven on the road
2 Parked in a Flexcar parking space on the street
3 Parked in a Metrorail lot or garage
4 Parked in a lot or garage in a location other than Metrorail
5 Other _____
9 Don't know, don't remember

Zipcar Background

IF ZIPSTAT = PAST, CONTINE TO QP-5
IF ZIPSTAT = NEVER, SKIP TO QP-6

P-5 In what year did you become a Zipcar member?

1 Before 2002
2 2003
3 2004
4 2005
5 2006
6 2007
9 Don't know, don't remember

P-5a How long were you a Zipcar member?

1 Less than 6 months
2 6 to 11 months
3 1 to 2 years
4 3 to 4 years
5 5 or more years
9 Don't know, don't remember

P-5b Which of the following best described your Zipcar account? If you had more than one account, please check all that apply

1 Personal account
2 Account through employer
3 Account through school / university
4 Account through other organization (specify) _____
9 Don't know, don't remember

IF QP-5b NE 2, SKIP TO QP-5d

P-5c Did your employer maintain company cars or fleet cars for business or work-related travel?

1 Yes
2 No
9 Don't know

P-5d How did you first learn about Zipcar?

ROTATE 1-9, SHOW 10 (other) AT THE END OF THE LIST

1 Advertisement
2 Received information in the mail
3 Saw Zipcar vehicle
4 Saw an orange carsharing pole with information holder
5 Employer told me
6 Friend or family member told me, word of mouth
7 Internet
8 Information from local jurisdiction (e.g., County, City)
9 Information from Metro
10 Other _____
19 Don't know, don't remember

IF QP-5d NE 3,SKIP TO QP-6

P-5e Where did you see the Zipcar vehicle?

1 On the road / being driven
2 Parked in a Zipcar parking space on the street
3 Parked in a Metrorail lot or garage
4 Parked in a lot or garage in a location other than Metrorail
5 Other _____
9 Don't know, don't remember

P-6 What motivated you to join a carsharing program? Please check all that apply. (ALLOW MULTIPLES FOR 1-10)

1 Didn't own a car
2 Car was not working, needed extensive repairs
3 Liked the philosophy / concept of carsharing
4 Couldn't afford to own, maintain, garage a car
5 Save money, spend less on transportation
6 Eliminated the hassle of owning a car, avoid buying a second car
7 Wanted another travel option for emergencies
8 My employer offered it at work
9 Concerned about the environment, global warming
10 Other _____
19 Don't know, don't remember

IF QP-6 = ONLY ONE RESPONSE, AUTOCODE QP-6a = QP-6, THEN SKIP TO QP-10

P-6a Of the reasons you just checked, which was your primary reason for joining carsharing at the time you joined? Please check only one answer.

SHOW ONLY RESPONSES 1-10 THAT WERE CHECKED IN QP-6

1 Didn't own a car
2 Car was not working, needed extensive repairs
3 Liked the philosophy / concept of carsharing
4 Couldn't afford to own, maintain, garage a car
5 Save money, spend less on transportation
6 Eliminated the hassle of owning a car, avoid buying a second car
7 Wanted another travel option for emergencies
8 My employer offered it at work
9 Concerned about the environment, global warming
10 Other _____
19 Don't know, don't remember

General Car Share Use Patterns

P-10 When you were a carshare member, did you use carshare vehicles for personal trips, work-related trips, or both personal and work-related trips?

1 Exclusively for personal trips
2 Exclusively for business / work-related trips
3 Use for both types of trips
9 Don't know

P-11 How many times did you rent a carshare vehicle in a typical month?

_____ number of times

999 Don't know, don't remember

P-11a When you rented carshare vehicles, how often did you stop at multiple destinations during your rental period?

1 Always
2 Often / usually
3 Sometimes
4 Rarely / seldom
5 Never
9 Don't know

P-14a In which of the following locations did you ever pick up and return carshare vehicles? Check all that apply (**DO NOT ALLOW MULTIPLES WITH DK - 9**)

1 In or near my home neighborhood
2 In or near my work neighborhood
3 In or near the neighborhood of my school / university
4 Other location
9 Don't know **(SKIP TO QP-18a)**

IF QP-14a = 1, ASK QP-15
IF QP-14a NE 1, SKIP TO INSTRUCTIONS BEFORE QP-16

P-15 How far from your home was the nearest carshare pick up location?

1 Less than 2 blocks
2 2 – 5 blocks
3 6 – 10 blocks
4 1 – 2 miles
5 More than 2 miles
9 Don't know

P-15b In which of the following types of facilities was this vehicle parked?

1 On-street parking space
2 Private off-street space (e.g., driveway, private road)
3 Public garage or lot
4 Private garage or lot
5 Residential building garage (e. g., apartment, condo building)
6 Office or commercial building garage
7 Metrorail station garage or lot
8 Other _____
9 Don't know

IF QP-14a = 2, ASK QP-16
IF QP-14a NE 2, SKIP TO INSTRUCTIONS BEFORE QP-17

P-16 How far from your work place was the nearest carshare pick up location?

1 Less than 2 blocks
2 2 – 5 blocks
3 6 – 10 blocks
4 1 – 2 miles
5 More than 2 miles
9 Don't know

P-16a In what county / city and neighborhood/area was this vehicle located?

County _____ City _____ Neighborhood / area_____

P-16b In which of the following types of facilities was this vehicle parked?

1 On-street parking space
2 Private off-street space (e.g., driveway, private road)
3 Public garage or lot
4 Private garage or lot
5 Residential building garage (e. g., apartment, condo building)
6 Office or commercial building garage
7 Metrorail station garage or lot
8 Other _____
9 Don't know

IF QP-14a = 3, ASK QP-17
IF QP-14a NE 3, SKIP TO INSTRUCTIONS BEFORE QP-18

P-17 How far from your school / university was the nearest carshare pick up location?

1 Less than 2 blocks
2 2 – 5 blocks
3 6 – 10 blocks
4 1 – 2 miles
5 More than 2 miles
9 Don't know

P-17a In what county / city and neighborhood/area was this vehicle located?

County / city _____ Neighborhood / area_____

P-17b In which of the following types of facilities was this vehicle parked?

1 On-street parking space
2 Private off-street space (e.g., driveway, private road)
3 Public garage or lot
4 Private garage or lot
5 Residential building garage (e. g., apartment, condo building)
6 Office or commercial building garage
7 Metrorail station garage or lot
8 Other _____
9 Don't know

IF QP-14a = 4, ASK QP-18
IF QP-14a NE 4, SKIP TO QP-18a

P-18 In what other location(s) did you pick up carshare vehicles?

_____

P-18a Who paid for the expenses of your carsharing trips?

1 I paid all the costs
2 My employer paid all the costs
3 Someone else paid all the costs
4 I paid some and my employer or someone else paid some
5 Other _____
9 Don't know

Commute Travel Patterns

P-30 During the time you were a carshare member, were you employed, either full-time or part-time?

1 Yes, employed full-time (**SKIP TO INSTRUCTIONS BEFORE QP-31)**
2 Yes, employed part-time (**SKIP TO INSTRUCTIONS BEFORE QP-31)**
3 No
9 Don't know, prefer not to answer

P-30a Were you a full-time student while you were a carshare member?

1 Yes
3 No (**SKIP TO QP-40**)
9 Don't know, prefer not to answer (**SKIP TO QP-40**)

P-30b Did you live on campus or of-campus then?

1 On campus **(SKIP TO QP-40)**
2 Off campus
9 Don't know, prefer not to answer (**SKIP TO QP-40**)

IF QP-30 = 1 OR 2, INSERT "get to work" IN QP-31
IF QP-30a = 1, INSERT "get to school" IN QP-31

P-31 In a typical week during the time you were a carshare member, how many weekdays (Monday-Friday) did you use each of the following types of transportation to [get to work, get to school]? If you used more than one type on a single day (e.g., walked to the bus stop, then rode the bus), count only the type you used for the **longest distance part** of your trip. If you teleworked one or more days per week, please report those days also.

Type of Transportation	**Number of Weekdays Used (0 – 5)**
1 Drove alone, motorcycle, taxi	
2 Rode a bus	
3 Rode Metrorail, subway train, or commuter train (VRE, MARC, Amtrak)	
4 Carpooled or vanpooled (rode or drove with others in a car, truck, van, or SUV, dropped off)	
5 Walked or bicycled	
6 Teleworked (worked at home or at telework center all day)	
7 Other (describe) _____	

IF QP-30 = 1 OR 2, INSERT "usual work location" IN QP-32
IF QP-30a = 1, INSERT "school" IN QP-32

P-32 About how many miles was it from your home to your [usual work location, school]?

_____
999 Don't know

IF QP-30 = 1 OR 2, INSERT "work" IN QP-33a
IF QP-30a = 1, INSERT "school" IN QP-33a

P-33a On days that you drove to [work, school], how much did you pay to park? If you didn't usually drive, please enter what you would pay if you needed to drive. If you did not or would not pay to park, enter $0 in the box.

$_____ per: day / month (check one)

IF QP-30 = 1 OR 2, INSERT "work" IN QP-35 - QP-35c
IF QP-30a = 1, INSERT "school" IN QP-35 - QP-35c

P-35 After you became a carshare member, did you make any of the following changes in how you got to [work, school]? Check all that apply (ALLOW MULTIPLES)

1 Started riding train or bus-
2 Rode Ride train or bus more often
3 Started carpooling or vanpooling
4 Carpooled or vanpooled more often
5 Started walking or bicycling
6 Bicycled or walked more often
9 No – did not make any of these changes

IF QP-35 = 1, 3, OR 5, ASK QP-35a, OTHERWISE, SKIP TO QP-40

P-35a How did you typically travel to [work, school] before you made this change? (Please check only one)

1 Didn't [work, go to school] then
2 Drove alone all or most days
3 Rode a train or bus all or most days
4 Carpooled or vanpooled all or most days
5 Walked or bicycled all or most days
6 Teleworked all or most days
7 Other _____

P-35c If carsharing had not been available to you, how likely would you have been to make this change in how you traveled to [work, school]?

1 Very likely
2 Somewhat likely
3 Neither likely nor unlikely
4 Somewhat unlikely
5 Very unlikely
9 Don't know, prefer not to answer

Before / After Travel Patterns

P-40 About how many miles do you drive annually now, for all trip purposes? (Please include miles you drive in the Washington metropolitan area in carshare vehicles and in vehicles you own, rent, or borrow)

_____
999 Don't know

P-41 Before you joined carsharing, about how many miles did you drive annually? Please include miles you drove in the Washington metropolitan area in carshare vehicles and in vehicles you owned, rented, or borrowed

_____
999 Don't know

P-41a During the time you were a carshare member, about how many miles did you drive annually? (Please include miles you drove in the Washington metropolitan area in carshare vehicles and in vehicles you owned, rented, or borrowed)

_____
999 Don't know

P-42 In a typical week, about how many trips do you make now by each of the following types of transportation?

Type of transportation	Number of weekly trips
1 Driving alone in a personal or rented/borrowed vehicle	_____
2 Driving or riding with someone in personal or rented/borrowed vehicle	_____
3 Riding a bus or train	_____
4 Taxi	_____

P-43 Before you joined carsharing, about how many trips did you make in a typical week by each of the following types of transportation?

Type of transportation	Number of weekly trips
1 Driving alone in a personal or rented/borrowed vehicle	_____
2 Driving or riding with someone in personal or rented/borrowed vehicle	_____
3 Riding a bus or train	_____
4 Taxi	_____

P-43a During the time you were a carshare member, about how many trips did you make in a typical week by each of the following types of transportation?

Type of transportation	Number of weekly trips
1 Driving alone in a personal or rented/borrowed vehicle	_____
2 Driving or riding with someone in personal or rented/borrowed vehicle	_____
3 Riding a bus or train	_____
4 Taxi	_____

P-44 Not counting trips you make solely for exercise or recreation, or to get to a bus or train stop, about how many trips do you make in a typical week by bicycle or walking?

_____ number of trips
999 Don't know

P-45 Before you joined carsharing, about how many bicycle or walking trips did you make in a typical week, other than trips solely for exercise or recreation or to get to a bus or train stop?

_____ number of trips
999 Don't know

P-45a During the time you were a carshare member, about how many bicycle or walking trips did you make in a typical week other than trips solely for exercise or recreation or to get to a bus or train stop?

_____ number of trips
999 Don't know

P-47a Since you ended your carsharing membership, did you make any of the following changes? Check all that apply. (**ACCEPT MULTIPLES FOR 1-12)**

ROTATE 1-12
1 Bought a car
2 Moved to a different neighborhood
3 Drive in your personal auto/vehicle more
4 Ride more often as a passenger in a personal auto/vehicle
5 Use bus or train more often
6 Bicycle or walk more often
7 Use a taxi more often
8 Rent a car more often
9 Make fewer trips
10 Travel to different destinations
11 Travel at different times of day
12 Use a company vehicle or fleet car more often
19 Don't know

Impact on Vehicle Ownership / Residential Choice

P-50 How many cars, trucks, vans, or other personal vehicles do you or other members of your household own or lease now for household use?

_____
99 Don't know, prefer not to answer

P-51 How many cars, trucks, vans, or other personal vehicles did you or other members of your household own or lease before you joined carsharing?

_____
99 Don't know, prefer not to answer

P-51a How many cars, trucks, vans, or other personal vehicles did you or other members of your household own or lease while you were a carshare member? If you added or eliminated a household vehicle while you were a carshare member, please indicate the largest number of vehicles that were in the household.

_____
99 Don't know, prefer not to answer

Check change in vehicle ownership
IF QP-51a = 99 OR QP-51 = 99, SKIP TO QP-53
IF QP-51a >= QP-51, SKIP TO QP-53

P-52 You said you reduced the number of household vehicles while you were a carshare member. What factors influenced your decision to make this change? (**ALLOW MULTIPLES FOR 1-7)**

1 Save money, spend less on transportation (Ask how much? I'd like a dollar amount to quantify this.)
2 Carshare vehicles were available
3 Moved to a new neighborhood
4 Couldn't afford to own, maintain, garage a car
5 Eliminate the hassle of owning a car
6 Concerned about the environment
7 Other _____
19 Don't know, prefer not to answer

P-52a If carsharing had not been available, how likely would you have been to reduce the number of household vehicles?

1 Very likely
2 Somewhat likely
3 Neither likely nor unlikely
4 Somewhat unlikely
5 Very unlikely
9 Don't know, prefer not to answer

P-53 After you joined carsharing, did you buy or consider buying a car, truck, van, or other personal vehicle?

1 Yes, bought a car, truck, van, or other vehicle (**SKIP TO QP-54**)
2 Considered buying but did not buy a vehicle
3 No, did not consider buying or buy a vehicle (**SKIP TO QP-54**)
9 Don't know, prefer not to answer (**SKIP TO QP-54**)

P-53a If carsharing had not been available, how likely would you have been to buy a vehicle?

1 Very likely
2 Somewhat likely
3 Neither likely nor unlikely
4 Somewhat unlikely
5 Very unlikely
9 Don't know, prefer not to answer

P-54 Since you first learned about carsharing, have you moved your residence or changed your work location?

1 Yes, moved my residence
2 Yes changed work location
3 Yes, moved my residence and changed my work location
4 No, did not make either of these changes (**SKIP TO QP-60**)
9 Don't know, prefer not to answer (**SKIP TO QP-60**)

P-54a What factors were important in your decision to make this location change?

OPEN-ENDED _____

P-55 Was carsharing available in your old home and/or work location?

1 Yes, available at home
2 Yes, available at work
3 Yes, available at both home and work
4 No, not available at either home or work
9 Don't know

P-55a Was carsharing available in the new home or work location?

1 Yes, available at home
2 Yes, available at work
3 Yes, available at both home and work
4 No, not available at the new location(s) (**SKIP TO QP-60**)
9 Don't know (**SKIP TO QP-60**)

P-56a If carsharing had not been available in the new location, how likely would you have been to make this home or work location change?

1 Very likely
2 Somewhat likely
3 Neither likely nor unlikely
4 Somewhat unlikely
5 Very unlikely
9 Don't know, prefer not to answer

General Carshare Satisfaction

P-60 Overall, how satisfied were you with your carshare experience? Please rate the service on a scale of 1 to 5, where 1 is not at all satisfied and 5 is very satisfied?

1 1 (not at all satisfied)
2 2
3 3 (**SKIP TO QP-62**)
4 4 (**SKIP TO QP-62**)
5 5 (very satisfied) (**SKIP TO QP-62**)
9 Don't know, prefer not to answer (**SKIP TO QP-62**)

P-61 Why were you not satisfied with the service? _____

P-62 Please rate the carshare service on each of the following features, using a scale of 1 to 5, where 1 means "very poor" and 5 means "very good."

ROTATE RESPONSES

Feature	1 – Very poor	2	3	4	5 – Very good	DK
1 Ease of making carshare reservations						
2 Cost of carshare rental						
3 Range of vehicle options						
4 Safety of carshare pick-up locations						
5 Availability of vehicles when needed						
6 Number of vehicle pick-up location						

P-62b Carshare vehicles can be parked in various types of parking locations. Using a scale of 1 to 5, where 1 means "not at all safe" and 5 means "very safe", please rate how safe you would feel in picking up and returning cars at each of the following types of locations.

Feature	1 – Not at all safe	2	3	4	5 – Very safe	DK
1 Space on a public street						
2 Space in open lot						
3 Space in parking garage						
4 Private off-street parking space						

P-62c Did availability of carshare vehicles in highly trafficked and visible on-street locations influence your decision to become a carshare member?

1 Greatly influenced my decision to join
2 Somewhat influenced my decision to join
3 Did not influence my decision to join
9 Don't know

IF QP-15b = 1 OR QP-16b = 1 OR QP-17b = 1 (use cars parked on-street), ASK QP-63, OTHERWISE, SKIP TO QP-66

P-63 You indicated earlier that you used carshare vehicles that were parked in public, on-street parking spaces. How often did you encounter any of the following situations?

Situation	Never	1-2 times	3 or more times	DK
1 Space was occupied by a non-carshare vehicle when I arrived to pick up the carshare vehicle				
2 Previous carshare user had not returned the vehicle				
3 Vehicle had been parked in a location other than its assigned space				
4 Space was occupied by a non-carshare vehicle when I was returning the car				
5 Carshare vehicle was blocked by a double-parked vehicle				

P-66 You said you are not currently a carshare member. Why did you end your membership?

1 Bought a personal vehicle
2 Moved to a neighborhood where carsharing is not available
3 Changed jobs and carsharing not available now
4 Did not use vehicle enough to justify cost
5 Carsharing membership fee too high
6 Carsharing user (hourly or daily) fees too high
7 Dissatisfaction with carshare program
8 Other _____
9 Don't know

P-67 How likely are you to recommend carsharing to others?

1 Very likely
2 Somewhat likely
3 Neither likely nor unlikely
4 Somewhat unlikely
5 Very unlikely
9 Don't know, prefer not to answer

Demographics

70 In what year were you born?

19 ___ ___

71 How many people live in your home? Please count yourself, family and friends, and anyone who may be unrelated to you such as live-in housekeepers or boarders.

_____ persons
99 Prefer not to answer (**SKIP TO Q72**)

71a How many of these household members are licensed to drive?

_____ household members

99 Prefer not to answer

72 What is your zip code at home? ___ ___ ___ ___ ___

IF Q30 = 2 OR 9 OR QP-30 = 2 OR 9, SKIP TO Q74

73 What is your zip code at work? ___ ___ ___ ___ ___

74 How far from your home is the nearest bus stop or train / subway station?

1 Less than ½ mile
2 Between ½ mile and 1 mile
3 More than 1 mille but less than 2 miles
4 2 or more miles
9 Don't know

75 Do you consider yourself to be Latino, Hispanic, or Spanish?

1 Yes
2 No
9 Prefer not to answer

75a Which of the following best describes your racial background. Please select only one reponse

1 White
2 Black or African-American
3 American Indian or Alaska Native
4 Asian
5 Native Hawaiian or Other Pacific Islander
6 Other (SPECIFY) _____
9 Prefer not to answer

76 Which category best represents your household's total annual income

1 Less than $20,000
2 $20,000 - $29,999
3 $30,000 - $39,999
4 $40,000 - $49,999
5 $50,000 - $59,999
6 $60,000 - $79,999
7 $80,000 - $99,999
8 $100,000 - $119,999
9 $120,000 - $139,999
10 $140,000 - $159,999
11 $160,000 or more
99 Prefer not to answer

77 Are you female or male?

1 Female
2 Male
9 Prefer not to answer

Open-Ended Comment Box

Is there anything else you'd like to comment on, related to your experience with carsharing or any program improvements you'd like to suggest? If so, please describe it here.

Thank you for taking the time to fill out the survey. Your input is very important!

Drawing for $25 driving credit

Zipcar will award $25 in driving credit to 5 randomly-chosen survey respondents. If you would like to enter this drawing, please provide your name and phone number or email address below.

This contact information will be used only for this survey. We will not provide your contact information to any other organization for any purpose.

Name _____

Email or Phone number _____

2008 MWCOG
VANPOOL DRIVER SURVEY

DRAFT
JUNE 30, 2008

Prepared for:
Metropolitan Washington Council of Governments
National Capital Region Transportation Planning Board

Prepared by:

LDA Consulting
Washington, DC

in association with:
CIC Research, Inc.
San Diego, CA

LDA CONSULTING

TABLE OF CONTENTS

1. INTRODUCTION 1

2. SURVEY AND SAMPLING METHODOLOGY 2

Questionnaire Design and Pretest
Sample Selection Process
Survey Administration
Estimation of Vanpool Population
Response Rate

3. SURVEY RESULTS 6

Van Ownership and Operation
Vanpool Use and Travel Patterns
Vanpool Assistance and Services
Other Issues

4. COMPARSIONS BETWEEN 1989, 2002, and 2008 SURVEYS 25

APPENDICES

APPENDIX A – SURVEY METHODOLOGY REMARKS

APPENDIX B – DISPOSTION OF RESULTS

APPENDIX C – MAIL SURVEY INTRODUCTORY LETTER, AND QUESTIONNAIRE

APPENDIX D – TELEPHONE SURVEY QUESTIONAIRE

APPENDIX E – GWRC COVER LETTER, ALERT LETTER, AND TELEPHONE SCRIPT

SECTION 1 INTRODUCTION

The Metropolitan Washington Council of Governments (COG) is the regional organization of the Washington area's major local governments and their governing officials, plus area members of the Maryland and Virginia legislatures and the U.S. Senate and House of Representatives. The National Capital Region Transportation Planning Board (TPB), the federally-designated Metropolitan Planning Organization (MPO) for Washington, DC and the surrounding areas of Maryland and Virginia, directs the continuing comprehensive transportation planning process. The TPB includes representatives from the sixteen local jurisdictions that are members of COG, plus the state legislatures, the two state transportation agencies, the District of Columbia Department of Public Works, the Metropolitan Washington Airports Authority, the Washington Metropolitan Area Transit Authority, and five Federal agencies. Staff of COG serves as the staff of the TPB.

In this role, COG/TPB projects anticipated regional travel patterns through its regional transportation planning models, which are developed using data collected from periodic travel surveys, mechanized vehicle count systems, and observation tools such as cordon counts. One modal element that is difficult to project is vanpooling, due to the generally low prevalence of this mode in the modal split and the difficulty of estimating vehicle occupancy.

COG also serves as a primary provider of regional transportation demand management (TDM) information and services to commuters. In an effort to improve the effectiveness and efficiency of these services, COG performs evaluations of these services. One of these services is assistance to vanpools, particularly in the formation of vanpool groups.

To provide information that can serve both of these planning and evaluation functions, COG has undertaken the vanpool driver study described in this report to analyze current vanpooling practices in the Washington DC region. The 2008 study represents the fourth vanpool study for the Washington region. COG previously conducted similar vanpool studies in 1982, 1989 and 2002.

The 2008 survey was administered through a mail-out/mail- or fax-back survey sent to vanpool operators and drivers. Drivers were asked to mail or fax back the completed questionnaire or complete the survey online. Follow-up telephone calls were made to operators/drivers who did not respond through one of these methods. This report summarizes the survey effort. The report details the survey and sampling procedures and provides highlights of the survey results.

This report is divided into four sections. Following this introductory section is a description of the survey and sampling methodology (Section 2). A presentation of survey results is contained in Section 3. Section 4 presents selected comparisons between the 1989, 2002, and 2008 surveys.

Several appendices also are included. These include: observations on the survey methodology, details on the distribution of sample record results, and copies of the mail-out and telephone survey instruments and associated cover letters.

SECTION 2 SURVEY AND SAMPLING METHODOLOGY

OVERVIEW

The survey was administered through a mailed packet that contained a letter of introduction and a copy of a mail-back/fax-back questionnaire. The surveyed population consisted of vanpool drivers traveling to destinations in the Washington region. Using a similar survey methodology to the 1989 and 2002 studies, vanpool drivers were contacted by mail and if not reached, were contacted by follow-up telephone calls using Computer Assisted Telephone Interviewing (CATI). Similar to the 2002 study, follow-up calls were made to operators/drivers who did not respond to the mailed survey packet to attempt to administer the entire questionnaire by telephone. This proved to be a successful strategy, obtaining an overall response rate of 60 percent.

COC staff provided a total of 1,030 vanpool driver and operator records for the study to CIC Research. CIC examined the database and eliminated duplicate records, with a resulting final sample of 861 records. CIC Research assembled questionnaire packages that were sent to all operators/drivers for whom a mailing address was available. Some records only had a telephone number. CIC Research contacted these operators/drivers during the follow-up telephone survey phase.

One of the databases provided by COG, the database for the George Washington Regional Commission (GWRC) vanpool program, included numerous vanpool operators who oversaw multiple vans. In these cases, only the operators' contact information was available, so CIC mailed questionnaire packages to the operators to distribute to their respective drivers. Follow-up telephone surveys were conducted with vanpool drivers who had not returned their completed surveys via mail/fax/ Internet, and follow-up reminder calls were made to GWRC operators.

QUESTIONNAIRE DESIGN AND PRETEST

The questionnaire used for the 2008 survey was based on the 2002 survey instruments. Minor adjustments were made to reflect changes in vanpooling in the Washington region since the last vanpool survey was conducted. COG, LDA Consulting, and CIC Research jointly prepared the questionnaire, which was reviewed by the COG Evaluation Group. A copy of the final mail-out and telephone questionnaires, as well as the introductory letters, and telephone script can be found in Appendices C, D and E.

For the current study, CIC requested assistance from GWRC with the vanpool operators. GWRC sent out an alert letter to operators asking their cooperation with the upcoming vanpool survey. This additional step in 2008 facilitated CIC's recruitment calls to operators requesting that they distribute surveys to vanpool drivers. A copy of the alert letter can be found in Appendix E.

SAMPLE SELECTION PROCESS

COC provided five databases from which to obtain the sample. Because it was expected that some vanpool drivers could be included in multiple databases, a hierarchy was developed for selection of sample points from these databases. The order of preference for selection from the sample was:

1. VPSI (records=226)
2. GWRC (records=340)
3. PRTC (records=78)
4. Crystal City Commuter Vans (records=16)
5. Commuter Connections (records=370)

If a vanpool driver was listed in multiple databases, the records were examined and only one was kept. Items for comparison included first and last name, phone number, and address. In addition, CIC inspected the list for minor differences that would result in duplicate records. Much of the inspection involved a visual scan of the records since duplicate cases could differ through only a slight difference in spelling, spacing, use of abbreviations, etc. Approximately 20 sample points had no mailing address, only a telephone number or e-mail address. These sample points were removed from the list prior to mailing the survey packages, and retained for calling or e-mailing at a later time. The final sample included 861 records.

SURVEY ADMINISTRATION

A total of 541 individual survey packets were mailed out to vanpool drivers in the first mailing. Survey packets containing an introductory letter, survey form and postage-paid reply envelope were sent to each of the potential vanpool drivers for whom CIC had a mailing address. Each vanpool driver record was assigned a unique number to facilitate the check-in process and to eliminate duplicate questionnaires.

All survey packets were sent via Federal Express to Eagle Direct mailing service on January 25, 2008. Eagle Direct, in turn mailed the packets out on January 29, 2008. A follow-up mailing was originally planned, but COG and the consultants decided there was a greater likelihood of a successful contact through the telephone follow-up effort. This is described under the telephone survey effort below.

The majority of GWRC and a few of PRTC's database included operators with multiple vanpools. The 62 GWRC and PRTC vanpool operators were called and asked if they would be willing to participate in the study. Thirty-three (33) of the 62 operators agreed to participate in the survey, but were reluctant to provide CIC with their driver's names, addresses, or telephone numbers. To retain drivers' privacy, CIC prepared survey packages for the operators to send to each of the drivers in the operators' groups. A total of 335 surveys were mailed to the 33 GWRC and PRTC operators. The operators were then responsible for distributing the packets to their respective drivers. Reminder calls were made or e-mails were sent to GWRC and PRTC operators during March, 2008. On March 13, 67 replacement packets were sent to four operators who had not distributed the original packets.

The cover letter inside the survey packages explained that vanpool operators or drivers had four possible options to respond to the survey. They could: 1) return the completed questionnaire in the enclosed postage-paid envelope, 2) fax the completed questionnaire to a toll-free number, 3) use the enclosed PIN number to log onto the web and enter their responses via the Internet, or 4) complete the survey over the phone by calling a toll-free telephone number.

A three week period was designated for vanpool drivers to respond. Following this period, drivers whose record contained a telephone number and who had not responded to the mail-out survey or who had not received a mail-out packet because the database did not include a mailing address, were called and asked to complete a survey via the telephone. Approximately 365 drivers were initially eligible for inclusion in the follow-up telephone survey. (This number does not include the surveys sent to the GWRC and PRTC operators). As completed surveys were returned via the mail, fax, or internet, these sample points were removed from the telephone survey base.

Prior to beginning the telephone survey effort, interviewer-training sessions were held. Issues discussed in the session included:

- an explanation of the purpose of the study
- identification of the group to be sampled
- overview of COG and its function
- verbatim reading of the questionnaire
- review of all instructions to insure interviewers were familiar with the terminology
- review of skip-patterns to familiarize interviewers with questionnaire flow
- practice session on CATI systems in full operational mode

Telephone calls were made to vanpool drivers between February 22, 2008 and March 24, 2008. The calls were conducted via CIC's CATI system using VOXCO software. After a maximum attempt of 15 calls, when the call was answered by an answering machine, a message was left asking the person to call back on CIC's 1-800 number. All interviewing was conducted with survey supervisors present. The survey supervisor was responsible for overseeing the CATI server, checking quotas, editing call-back appointment times, monitoring interviews, answering questions, reviewing completed surveys, and passing respondents to an available station when they called in on the 800 line. To insure quality control, periodic random monitoring by the survey supervisor was conducted.

A total of 408 surveys were completed via the telephone, mailed, internet, faxed, or called into CIC's toll-free number by April 11, 2008, the survey cutoff date. By using multiple methods of survey administration, the respondent was able to choose the most flexible and convenient way to return the questionnaire. A tally of the completed questionnaires by method of administration is as follows: 204 returned via mail (50%), 131 completed by follow-up telephone call (32%), 65 completed via the internet (16%), six returned by fax (1%), and two called the toll-free number (<1%).

Taking into account an initial sample frame of 861 (including 178 dead sample points*) the combined mail/fax-back and telephone response rate was 47%. After removing the dead sample points, the response rate is calculated on a sample size of 683 and is equal to 60%. The refusal rate for the telephone survey was 2.6 percent**. The final disposition of results is detailed in Appendix A.

*Vanpool driver names that were considered "dead" included 43 who were identified as second drivers for a particular vanpool, 36 who were vanpool riders not drivers, 18 who were in a carpool, not a vanpool, and 6 whose vanpool was no longer in operation. In addition, 22 of the numbers were wrong, 22 numbers were not in service, 27 of the names given were no longer with the company and 4 numbers were a computer/fax or pager.

** Refusal rates are calculated as the number of initial refusals plus the number terminated during the interview divided by the total sample. See Appendix A.

ESTIMATION OF VANPOOL POPULATION

During past survey periods, the Washington DC area Beltway Cordon Count was used to develop an estimate of the vanpool population for the study area. The number of completed questionnaires from vanpool drivers whose vans crossed the Beltway on the travel to work was expanded to equal the number of vans that had been observed crossing the Beltway cordon. This expansion factor was then used also to estimate the total number of vans operating in the region.

The last Beltway Cordon Count was conducted in 2001 and was used to calculate the vanpool population estimate for the 2002 Vanpool Drivers Survey. Because comparable cordon count statistics were not available in 2008, it was impossible to determine if the number of vanpools in the Washington, DC area had changed appreciably from the 2002 survey period. While results show a decrease in the number of registered vanpools in regional databases from 2002 (736) to 2008 (683), the 2006 Central Employment Core Cordon Count shows an increase of vanpools counted into central Washington, DC from 2002 (approximately 700) to 2006 (approximately 1,000). Consequently, survey characteristics appearing in Section 3 – Survey Results, are presented without an estimation of the vanpool population.

RESPONSE RATE

The 2008 Vanpool Driver Survey experienced a high overall response rate of 60 percent (408 completed surveys divided by the active sample of 683). While this is a fairly high response rate, non-response bias may be evident among the 40% who did not respond to the survey. However, this response rate is consistent with the 1982, 1989, and 2002 surveys.

The proportion of vanpools that crossed the Beltway, versus those that did not has changed over time from the 1989 study to the current study. The 1989 study reported that seven percent of the responding vanpools did not cross the Beltway. In the 2002 survey, the proportion of sampled vanpools that crossed the Beltway was 71 percent versus 29 percent that did not. In the current study, the proportion of sampled vanpools that crossed the Beltway was 55 percent versus 45 percent that did not.

SECTION 3 SURVEY RESULTS

This section presents an overview of the survey findings. As noted in Section 2, the sampled vanpools were not expanded to represent the vanpool population in the Washington D.C. region. Thus, the findings shown in this section are presented for the frequencies of respondents. The raw numbers of respondents who answered each question are shown as (n=___).

The survey collected data in four primary topic areas. Results for these topics are presented below:

- Van ownership and operation
- Vanpool use and travel patterns
- Availability and use of vanpool assistance and support services
- Issues of potential concern to vanpool drivers

VAN OWNERSHIP AND OPERATION

The first section of the survey examined physical and ownership characteristics of the van and duration of the vanpool group.

Length of Time Vanpool in Operation and Length of Time Driving the Vanpool

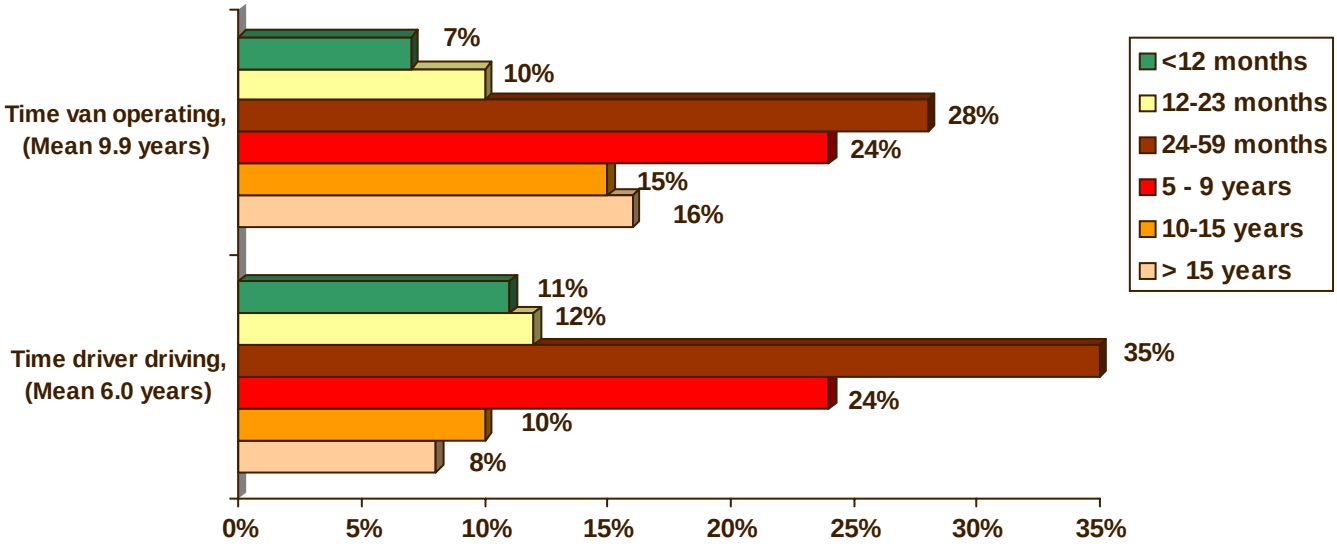
Figure 1 details the results to two questions about vanpool longevity. First, how long has the vanpool been in operation, and second, how long has the driver been driving this vanpool group?

Duration of Vanpool Operation – Vanpools in the survey had been in operation an average of 9.9 years. This was considerably longer than the average of 8.4 years measured in the 2002 vanpool survey. Likely this reflects the slowing of new vanpool start-ups in recent years. As fewer new vans enter the vanpool fleet, the average vanpool duration would rise.

About a third (31%) of the vanpools had been in operation for 10 years or longer and a quarter (24%) had operated for between five and nine years. The remaining 45% had been in operation fewer than five years.

Duration of Driving – As also shown in Figure 1, the vanpool groups had been in operation longer than the current drivers had been driving. Respondents had been driving the vans for an average of 6.0 years, about the same amount of time as was observed in 2002 (6.4 years). About a quarter (23%) had been driving for less than two years and a third (35%) had been driving at least two years but fewer than five years. The remaining respondents were divided between driving five to nine years (24%) and driving ten years or longer (18%).

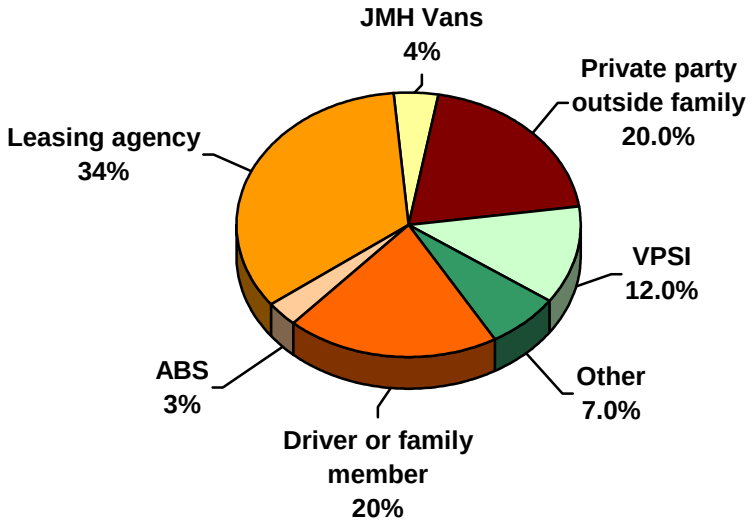
Figure 1
Length of Time Vanpool in Operation and
Length of Time Driver has been Driving
(n=408)



Van Ownership

Respondents were asked who owned the van they operated. As indicated by Figure 2, the highest proportion of vans were owned by a leasing agency (34%), followed by the respondents themselves or a family member (20%), or a private party outside the family (20%) .

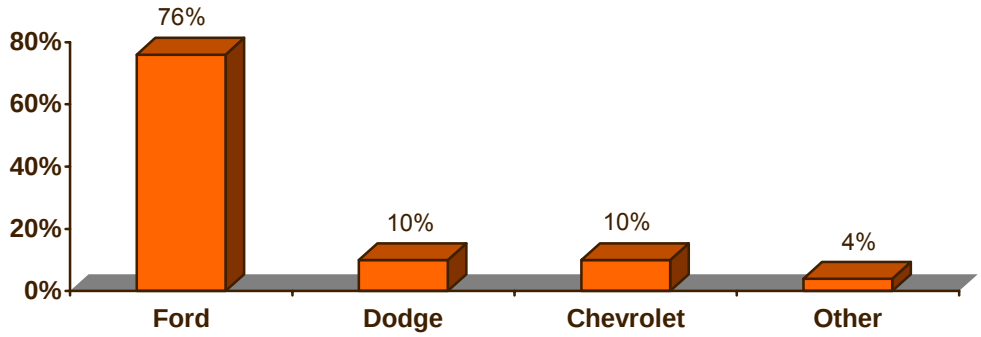
Figure 2
Distribution of Van Ownership
(n = 401)



Make, Model Year

Van Make – Figure 3 presents the distribution of vans by maker/manufacturer. Three-quarters (76%) of respondents said they drive a Ford van. About one in ten drives a Dodge and one in ten drives a Chevrolet. The remaining 4% of respondents drive another make of van.

Figure 3
Van Make/Model
(n = 408)



Van Model Year – The model year of the vans vary from 1991 models to 2008 models. 75% of the vans are model year 2003 or later. Results for this question are presented in Table 1.

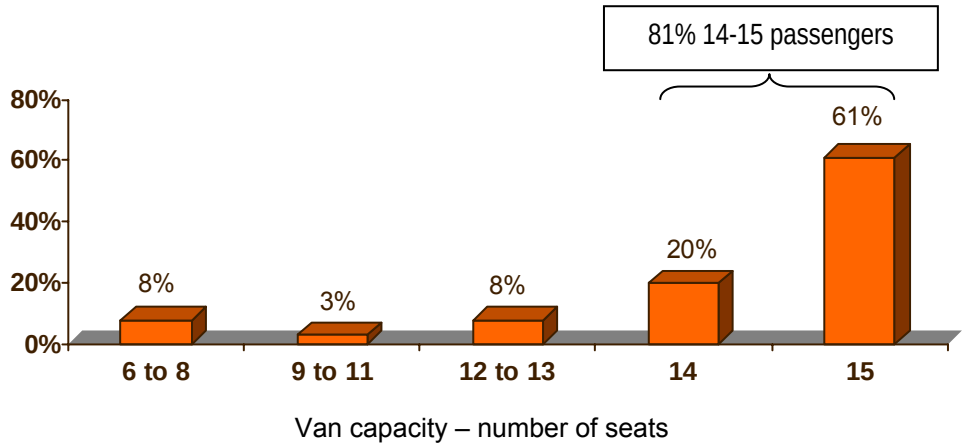
Table 1
Make and Model Year of Van
(n = 381)

Van Model Year	Percentage	Cumulative Percentage
2008	6%	6%
2007	11%	17%
2006	24%	41%
2005	12%	53%
2004	12%	65%
2003	4%	69%
2002	6%	75%
2001	4%	79%
2000	4%	83%
1999 or earlier	8%	91%
Don't know	9%	100%

Van Capacity

Respondents were asked how many passengers could be carried in the van, if every seat was filled. Van capacity ranged from a low of six people to a high of 15 people, with an average capacity, including the driver, of 13.8 people. Results for this question are shown in Figure 4.

Figure 4
Van Seating Capacity
(n = 399)



Six in ten (61%) vans were traditional commuter vans, with capacity for 15 passengers and an additional 20% of the vans carry 14 passengers. The remaining 19% carry between six and 13 passengers. About eight percent of the vans could be considered "minivans," with eight or fewer passengers.

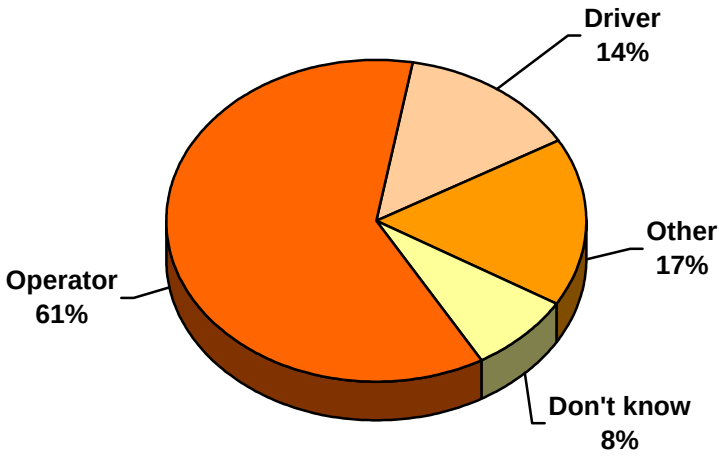
Type of Van Insurance, Person Responsible for Paying Insurance, and Annual Insurance Cost

The survey asked three questions related to van insurance. What type of insurance do you have? Who pays the insurance cost? And what is the annual insurance cost?

Type of Insurance – About 56% of respondents said they carry commercial insurance and 6% have personal insurance. Another nine percent carried another type of coverage. But nearly three in ten (29%) said they were unsure of the type of insurance they have, likely because their insurance is administered by the van operator.

Who Pays Insurance Cost – Figure 5 portrays the distribution of who pays for van insurance. About six in ten (61%) respondents said the van owner is responsible for the payment of the insurance and 14% said the van driver was responsible. About two in ten (18%) said someone else paid the insurance. Eight percent of respondents were unsure of who pays for the insurance.

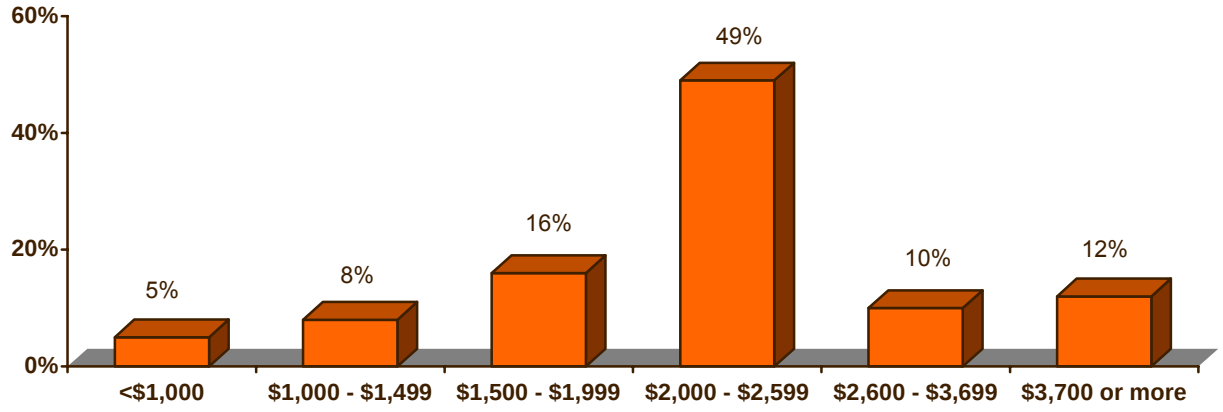
Figure 5
Person Responsible for Paying Insurance
(n = 408)



Annual Insurance Cost – A large majority (74%) of respondents were unsure of the cost of their van insurance. This could be due to the fact that many drivers do not own the van they drive, and, in most cases, the van owner pays the insurance.

Among those who gave an annual insurance cost for their van, the cost ranged from a low of $500 to a high of $10,000. Three in ten (29%) paid less than $2,000. Half (49%) paid between $2,000 and $2,599 per year. 12% paid $3,700 or more per year for insurance. The mean cost was $2,548 and the median was $2,106. These results are presented in Figure 6

Figure 6
Insurance Cost
(n = 76)



VANPOOL USE AND TRAVEL PATTERNS

A second section of the questionnaire asked about vanpool occupancy, origin and destination, number and locations of passenger pick-up and drop-off locations, and travel distance and time. Results for these questions are described below.

Usual Vanpool Size and Vanpool Size on Wednesday Prior to the Survey

Usual Size – The survey asked vanpool drivers how many people, including the driver, "usually" ride in the vanpool, that is the total number of people who are part of the vanpool group. The average (mean) number of people, including the driver, who usually ride in the vanpool was 10.5 people.

As shown in Table 2, about half (47%) of the vanpools usually have 10 or fewer passengers. About three in ten (29%) usually have 11 or 12 riders. The remaining 24% said they usually have 13-15 riders.

Table 2
Number of People in the Vanpool
Usual Number and Number on Previous Wednesday
("Usually ride" n = 407, "Rode Previous Wednesday" n = __)

Number of People Riding in Vanpool	"Usually Ride" Percentage	"Rode Previous Wednesday" Percentage
5 or fewer people	4%	7%
6 – 10 people	43%	58%
11 – 12 people	29%	18%
13 – 15 people	24%	9%
Don't know	___	8%
Mean	**10.5**	**9.0**

Riders "Last Wednesday" – Respondents also were asked how many people rode in their vanpool on the Wednesday prior to the survey. The last column of Table 2 shows these results. This question examined the actual number of people who would be likely to ride on a typical day, recognizing that some absenteeism is to be expected.

On average, 9.0 people, including the driver, rode in the van that day. This indicates that the average absenteeism rate is about 1.5 people, compared to the 10.5 people who "usually ride" in the van.

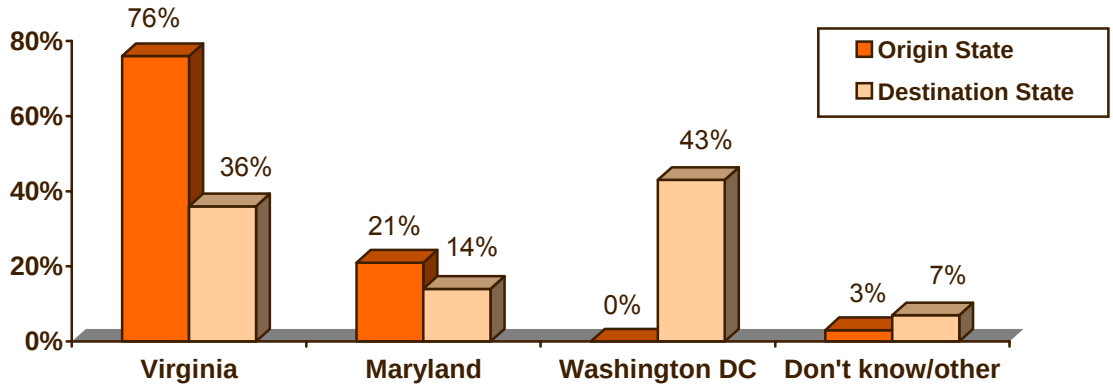
Seven in ten (71%) respondents said they had 10 or fewer riders on the previous Wednesday. Two in ten (20%) said 11 or 12 people rode in the van and nine percent said between 13 and 15 people rode in the vanpool.

Vanpool Origin and Destination States and Counties

States of Origin and Destination – Figure 7 presents the distribution of vanpool origin and destination states. More than three-quarters (76%) of the vanpools originate in Virginia. Most of the remaining respondents (21%) said their vanpools originate in Maryland. A small number (2%) of vanpools originate either in Pennsylvania or West Virginia.

More than half (55%) of the respondents said their vanpools were destined for Washington DC. Virginia was the destination of about a four in ten (38%) of the vanpools and Maryland was the destination of 7%.

Figure 7
Distribution by Origin and Destination Jurisdiction
(n = 408)



Counties of Origin and Destination – Table 3 shows the origin and destination counties mentioned most frequently. The top three origin counties all were located in Virginia. They included: Spotsylvania (27%), Prince William (21%), and Stafford (17%). The top origin counties in Maryland included: Frederick (5%), Anne Arundel (3%), and Howard (3%).

As noted above, Washington DC dominated the list of destination jurisdictions with 43% of the vanpools. Three Virginia jurisdictions accounted for almost another third of the vanpool destinations: Fairfax County (13%), Arlington County (12%), and the City of Alexandria, (7%). Two Maryland counties, Montgomery (7%) and Anne Arundel (3%) accounted for another ten percent of the destinations.

Table 3
Distribution by Origin/Destination Jurisdiction
(n = 408)

Origin/Destination County/State	Origin Percentage	Destination Percentage
District of Columbia	0%*	43%
Virginia Counties		
Alexandria City	0%*	7%
Arlington County	0%	12%
Culpeper County	1%	0%
Fairfax County	2%	13%
Fauquier County	2%	0%
Loudoun County	3%	2%
Prince William County	21%	1%
Spotsylvania County	27%	0%
Stafford County	17%	0%
Warren County	2%	0%
Other Virginia	1%	1%
Maryland Counties		
Anne Arundel County	3%	3%
Baltimore County	1%	0%
Carroll County	2%	0%
Charles County	2%	0%
Frederick County	5%	0%
Howard County	3%	0%
Montgomery County	2%	7%
Prince Georges County	1%	2%
St. Mary's County	0%	2%
Washington County	1%	0%
Other Maryland	1%	0%
Other	3%	0%
Don't know	0%	7%

* Less than 0.5%.

State to State Vanpool Trips

Table 4 presents the percentages of vanpool trips made within and between states. More than four in ten (44%) of trips do not cross a state boundary: within Maryland (9%) and within Virginia (35%). The primary state-to-state trips include: Virginia to District of Columbia (37%) and Maryland to District of Columbia (8%). All other state-to-state movements represented 10% or less of the total trips.

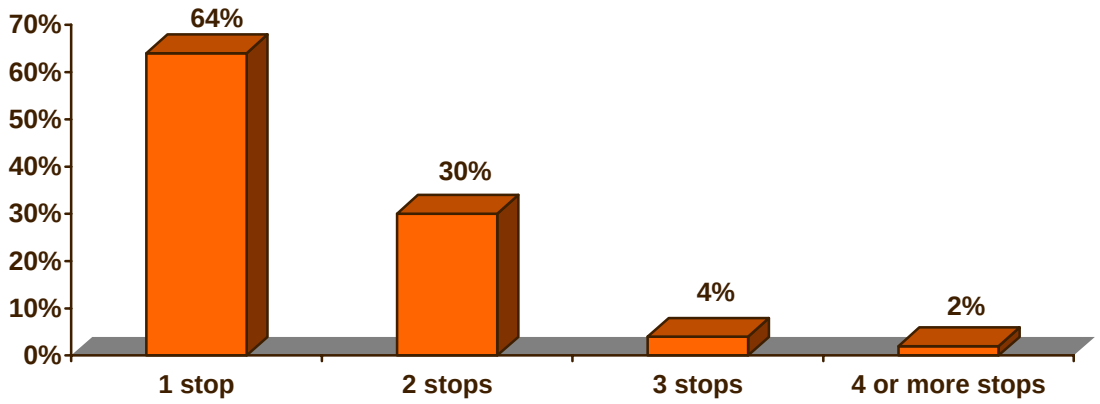
Table 4
Distribution by Origin and Destination Jurisdiction
(n = 385)

	Destination State (Percentage of total Trips)				
Origin State	**DC**	**Maryland**	**Virginia**	**Other**	**TOTAL**
DC	0%	0%	<1%	0%	**<1%**
Maryland	8%	9%	3%	<1%	**20%**
Virginia	37%	4%	35%	0%	**76%**
Other	1%	1%	1%	1%	**3%**
TOTAL	**46%**	**15%**	**39%**	**1%**	**100%**

Number of Vanpool Stops to Pick-up and Drop-off Passengers

As illustrated in Figure 8, nearly two-thirds (64%) of the vanpools make one stop at a central meeting place to pick up passengers in the morning. Three in ten (30%) of the vanpools make two stops and the remaining six percent make three or more stops.

Figure 8
Number of Rider Pickup Stops Made by Vanpool in the Morning
(n = 405)



About three in ten (29%) respondents said that all passengers worked at the same location, so that only one drop-off stop was made at the final vanpool destination. The remaining 72% said they made at least one additional drop-off stop before parking the van.

Vanpool Collection, Line-Haul, and Distribution Time

The survey asked detailed questions about the timing of the morning vanpool trip, including the time at which the driver leaves home to start the trip, the time the van leaves the last passenger pick-up stop, the time the van arrives at the first passenger drop-off stop, and finally, the time the van is parked for work. The ranges of times respondents reported for these four vanpool activities are:

Vanpool Activity	**Range of Time**
• Vanpool drivers leave home:	3:15 am and 7:15 am
• Vanpool leaves the last pick-up stop:	4:05 am and 8:00 am
• Vanpool arrives at the first drop-off stop:	3:45 am and 9:15 am
• Van is parked for work:	3:50 am and 9:35 am

The percentage distributions of responses to these questions are shown in Table 5. As shown, more than eight in ten (81%) of the vanpool drivers leave their homes to start the vanpool trip before 6:00 am. Six in ten (60%) of the vanpools make their last pick-up stop between 5:30 and 6:29 am. More than two-thirds (67%) of the vanpools make their first passenger drop-off stop between 6:00 and 6:59 am. And almost six in ten (57%) park the van for work between 6:30 and 7:29 am.

Table 5
Vanpool Trip Start, Pick-up, Drop-off, and End Times

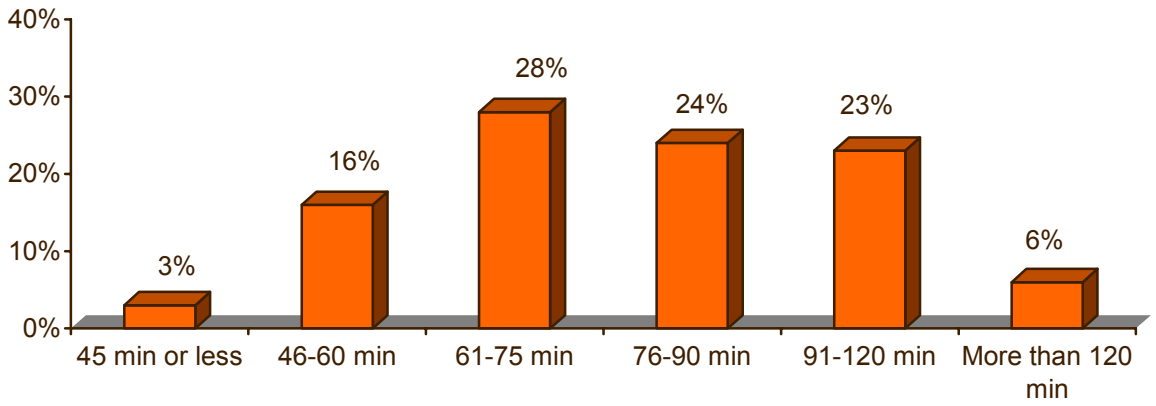
Morning Time	**Vanpool Morning Activity (Percentage of Vanpools)**			
	Driver Leaves Home (n=392)	**Van Leaves Last Pick-Up Stop** (n=391)	**Van Arrives First Drop-Off Stop** (n=376)	**Van Parked for Work** (n=398)
Before 5:00 am	28%	7%	<1%	0%
5:00 am – 5:29 am	28%	20%	1%	<1%
5:30 am – 5:59 am	25%	34%	14%	10%
6:00 am – 6:29 am	12%	26%	26%	22%
6:30 am – 6:59 am	5%	11%	41%	35%
7:00 am – 7:29 am	2%	1%	11%	22%
7:30 am – 7:59 am	0%	1%	6%	8%
8:00 am or later	0%	<1%	1%	3%

Using the start and end time data provided by vanpool drivers for various morning activities, it was possible to estimate the amount of time vanpools spent in vanpool rider pickup (collection) and drop-off (distribution). It also was possible to estimate the total travel time experience by the driver and by the vanpool at its maximum rider level (line-haul time). These survey results are detailed below.

Total Driver Travel Time – Figure 9 shows the distribution of total travel time for the vanpool trip, from the time the driver leaves home in the morning to the time he or she parks the van for work. The average total travel time is 84 minutes.

About one in five (19%) of the vans travel one hour or less. More than a quarter (28%) travel between 61 and 75 minutes, another quarter (24%) travel between 76 and 90 minutes, and slightly less than a quarter (23%) travel between 1½ and 2 hours. The remaining 6% travel more than 2 hours.

Figure 9
Total Travel Time
(n = 388)



Pick-up (Collection) and Drop-Off (Distribution) Time – Table 6 shows the distribution of time it takes the driver in the morning to pick-up all passenger at the start of the vanpool trip and drop them off at their respective work destinations. About one in eight (13%) of the driver respondents said they pick-up all passengers within 10 minutes of leaving their homes. Almost three in ten (29%) said it takes between 11 and 20 minutes to collect all passengers, and an additional 28% reported that passenger pick-up takes between 21 and 30 minutes. The remaining 31% said morning passenger pick-up consumes more than 30 minutes.

Passenger drop-off takes less time. Approximately one in eight (12%) of the vanpool drivers said that drop-off takes no time, because all passengers work at the location where the van is parked. Almost one half (46%) said it takes one to ten minutes to drop-off passengers. More than three in ten (31%) respondents reported that drop-off takes between 11 and 20 minutes, and the remaining 11% of drivers said drop-off takes more than 20 minutes.

Table 6
Morning Passenger Pick-up and Drop-off Time
(Pick-up n = 379, Drop-off n = 372)

Time	Passenger Pick-up (Percentage)	Passenger Drop-Off (Percentage)
0 minutes	2%	12%
1– 5 minutes	3%	23%
6 – 10 minutes	8%	23%
11 – 15 minutes	16%	23%
16 – 20 minutes	13%	8%
21 – 30 minutes	28%	7%
31 – 40 minutes	15%	2%
More than 40 minutes	16%	2%
Mean	**28 minutes**	**12 minutes**

On average, it takes a vanpool group 28 minutes to pick-up passenger in the morning (collection stage). Passenger drop-off (distribution stage) on the destination end consumes another 12 minutes. As noted above, the average vanpool trip takes 84 minutes. Thus, collection and distribution together, totaling 40 minutes, comprise about 48% of the total vanpool trip time and the "line-haul" portion of the trip, when the vanpool is carrying the greatest number of passengers, takes 45 minutes, or 54 % of the total trip time.

Travel Distance

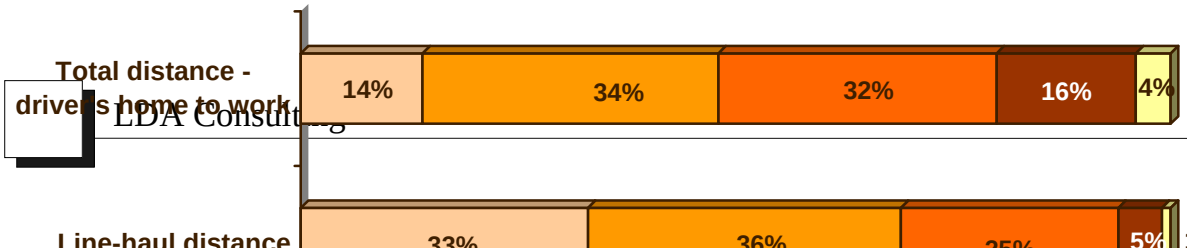
The survey also asked the vanpool drivers how many miles they traveled for the total trip and for the portion of the trip between the last pick-up and first-drop off stops (line-haul portion). These results are shown in Figure 10. Vanpool drivers commute an average of:

- 48.6 miles from their home to their work location
- 39.5 miles from the last morning pick-up to the first drop-off location

Fourteen percent (14%) of the respondents said the total trip distance was 30 miles or less. One-third of respondents (34%) travel between 31 and 45 miles, and another third (32%) travel 46 to 60 miles. The remaining 20% travel more than 60 miles one-way. Two-thirds (69%) of the respondents said the line-haul portion of the trip was 45 miles or less.

Respondents whose trips originated in Virginia traveled an average total trip distance of 50 miles, compared to 44 miles for respondents whose trips originated in Maryland. Trip distances for destination states ranged from 47 miles for Virginia, 49 miles for District of Columbia, to 52 miles for Maryland.

Figure 10
Travel Distance
(Total n = 386, Line-haul n = 381)



Primary Vanpool Routes and Use of HOV Lane

The survey asked respondents which major roads they used for their vanpool trip and if they used an HOV lanes on the route.

Primary Vanpool Routes – As would be expected from the origin-destination distribution, a large share of respondents said they used a major interstate highway. The most widely used roadway was I-95, used by 64% of respondents for a portion of their trip. I-395 / Shirley Highway in Virginia was used by one in five respondents and 14% used the Capital Beltway. One in ten traveled on I-66 in Virginia and a similar percentage of respondents said they traveled on I-270 in Maryland for a portion of the vanpool trip. All other roadways were named by no fewer than six percent of respondents.

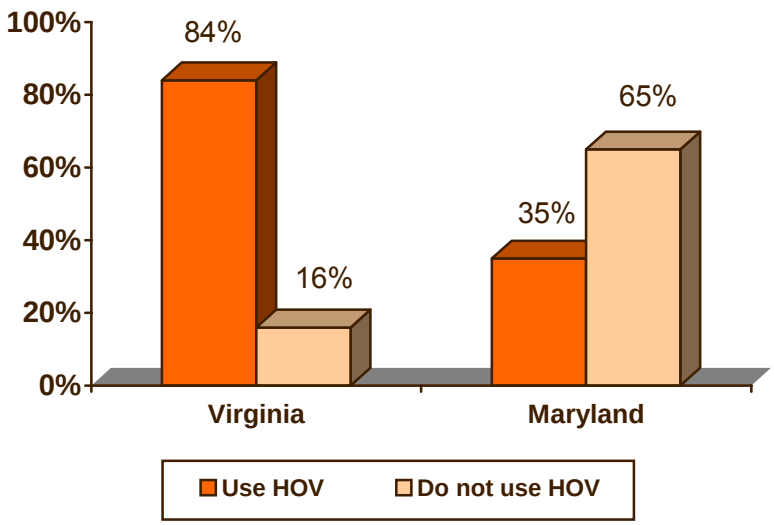
Table 7
Primary Routes Used by Vanpools
(n = 408)

Primary Routes	Percentage
I-95 (VA, MD)	64%
I-395/Shirley Highway (VA)	20%
Capital Beltway	14%
I-66 (VA)	11%
I-270 (MD)	8%
I-295 / SE-SW Freeway	5%
US Route 29	4%
Route 267 / Dulles Toll Road (VA)	4%
MD Route 3	4%
US Route 50	3%
George Washington Parkway	3%
US Route 301	3%
I-70 (MD)	2%
MD Route 210 / Indian Head Highway	2%
MD Route 32	2%
US Route 1	2%

Use of HOV Lanes – Almost three-quarters (72%) of respondents said their vanpool uses an HOV lane during the trip to work. But use of the lanes is unevenly distributed between the two primary origin states, Virginia and Maryland (Lori please note that the Maryland sample size is less than 100 respondents).

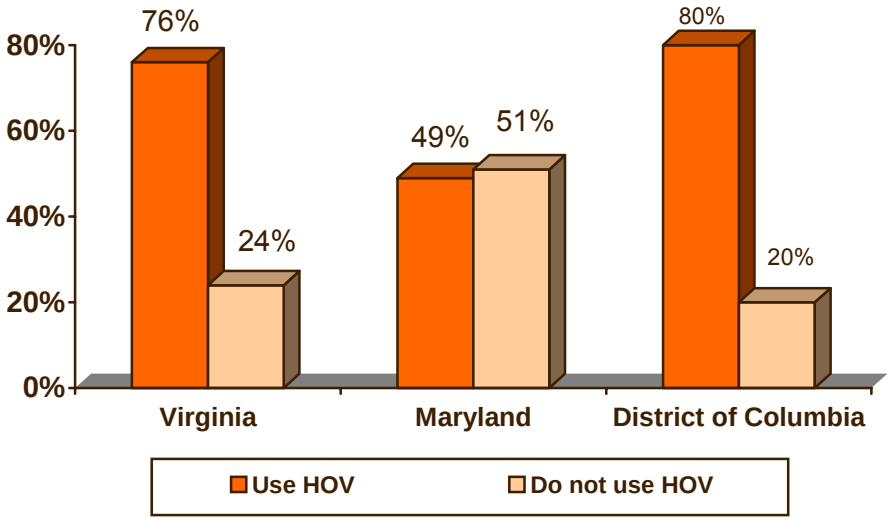
As Figure 11 indicates, 84% of the vanpools that originate in Virginia use an HOV lane, compared to only 35% of the vanpools that originate in Maryland. This is almost certainly related to the greater availability of HOV lanes that exist in Virginia (I-95, I-66, I-395, Dulles Toll Road, some arterial streets) compared to Maryland (I-270 and US-50), as well as the distribution of trip origins within Virginia and Maryland.

Figure 11
Use of HOV Lane to Work by Origin State
(Virginia n = 311, Maryland n = 82)



Use of HOV lanes is more evenly distributed by destination state, as shown in Figure 12. About three-quarters of the vanpools traveling to Virginia (76%) and eight in ten to the District of Columbia (80%) use an HOV lane. About a half (49%) of the vanpools destined for Maryland use an HOV lane.

Figure 12
Use of HOV Lane to Work by Destination State
(Virginia n = 148, Maryland n = 57, DC n = 176)



VANPOOL ASSISTANCE AND SERVICES

The third section of the survey asked respondents about vanpool assistance services and benefits they receive, either from their employer or another commute assistance group. Additionally, respondents were asked about parking charges they pay at their worksite.

Assistance Received when Forming Vanpool

More than four in ten (44%) vanpool drivers said they received some type of assistance in forming their vanpool. The remaining 56% said they didn't receive assistance (49%) or didn't know if their vanpool had received assistance (7%), possibly because the driver was not driving the van when it was formed.

Of respondents who did receive assistance, 16% said it was provided by their employer and 31% received assistance from another organization, including Commuter Connection (8%), VPSI (7%), RADCO/GWRC (5%), PRTC (3%) or another organization (6%). Table 8 shows these results.

Table 8
Sources of Vanpool Formation Assistance
(n = 395)

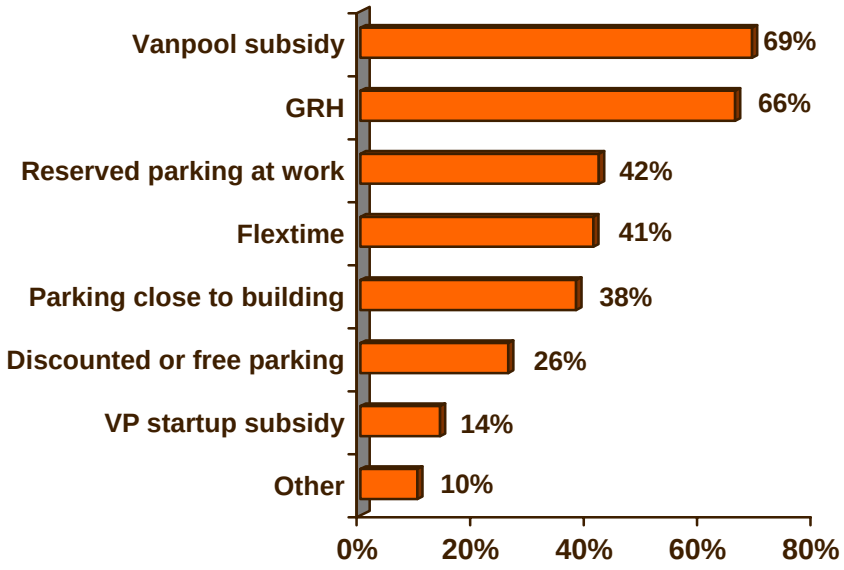
Source of Formation Assistance	Percentage
No assistance received	56%
Employer	16%
Commuter Connections	8%
VPSI	7%
RADCO/GWRC	6%
PRTC	3%
Other	6%

Vanpool Services or Benefits Received from Employers and Commute Organizations

Respondents also were asked about vanpool services they or their vanpool receive from an employer, a commute service organization, or a local jurisdiction agency. Nearly all (94%) respondents indicated that they received one or more different commute services or benefits at work for vanpooling. Figure 13 shows the services mentioned and the percentages of respondents who have access to these services.

The most common services were vanpool subsides, received by 69% of vanpools, and Guaranteed Ride Home, available to 66%. About four in ten (42%) said they had reserved parking at work, flexible arrival and departure hours (41%), and/or parking close to the building (38%). Smaller percentages said they received discounted or free parking (26%), a vanpool start-up subsidy (14%), or another service (10%).

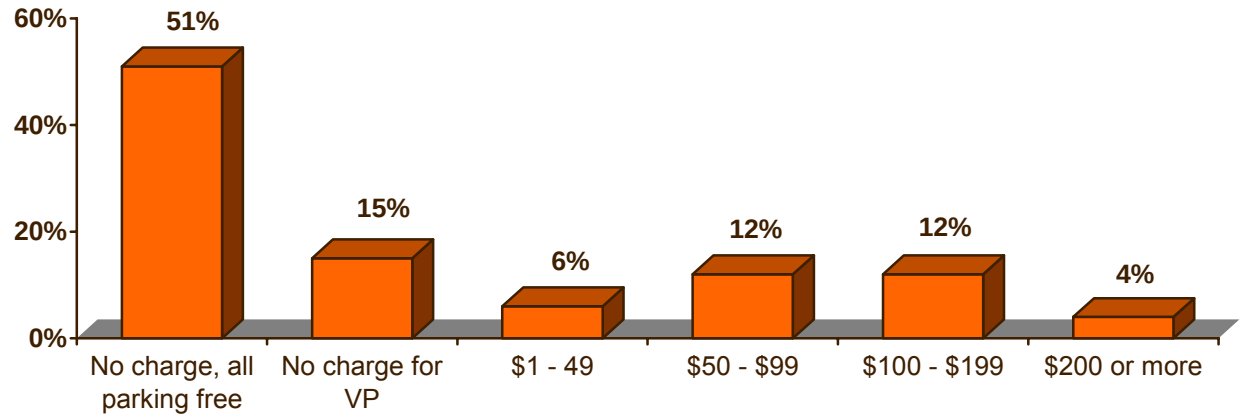
Figure 13
Vanpool Services or Benefits Received
(n = 408, multiple responses permitted)



Monthly Parking Fee

About two-thirds (66%) of the respondents said they pay no parking fee at work. Most of these respondents (51%) said parking is free for all employees. An additional 15% of drivers said parking is free for vanpools. The remaining 34% said they do pay a fee to park. Figure 14 details the monthly parking fees paid. These respondents were evenly divided between those who paid less than $100 (18%) and those who paid $100 or more (16%). A small percentage (4%) said they pay more than $200 per month.

Figure 14
Monthly Parking Fee Paid
(n = ___)



As shown in Table 9, respondents whose vans were parked for the day in Maryland were most likely to have free parking. More than nine in ten of these respondents (93%) said parking was free for all employees and an additional 7% said parking was free for vanpools.

Almost six in ten (58%) of the respondents who parked in Virginia said they had free parking and an additional quarter of respondents (26%) said they paid less than $100 for parking. One percent paid $200 or more for parking.

Approximately the same percentage (60%) of respondents who parked in the District of Columbia said they had free parking, but parking fees for those who did pay to park were slightly higher than for vans parked in Virginia; 17 percent said they paid less than $100 for parking, and 9 percent paid $200 or more.

Table 9
Monthly Parking Fee Paid by Destination State
(DC n = 168, Maryland n = 56, Virginia n = 141)

Parking Fee	DC Percentage	Maryland Percentage	Virginia Percentage
No charge – free for all employees	39%	93%	47%
No charge – free for all vanpools	21%	7%	11%
Parking fee $1 - $99	17%	0%	26%
Parking fee $100 - $199	14%	0%	15%
Parking fee $200 or more	9%	0%	1%

OTHER ISSUES

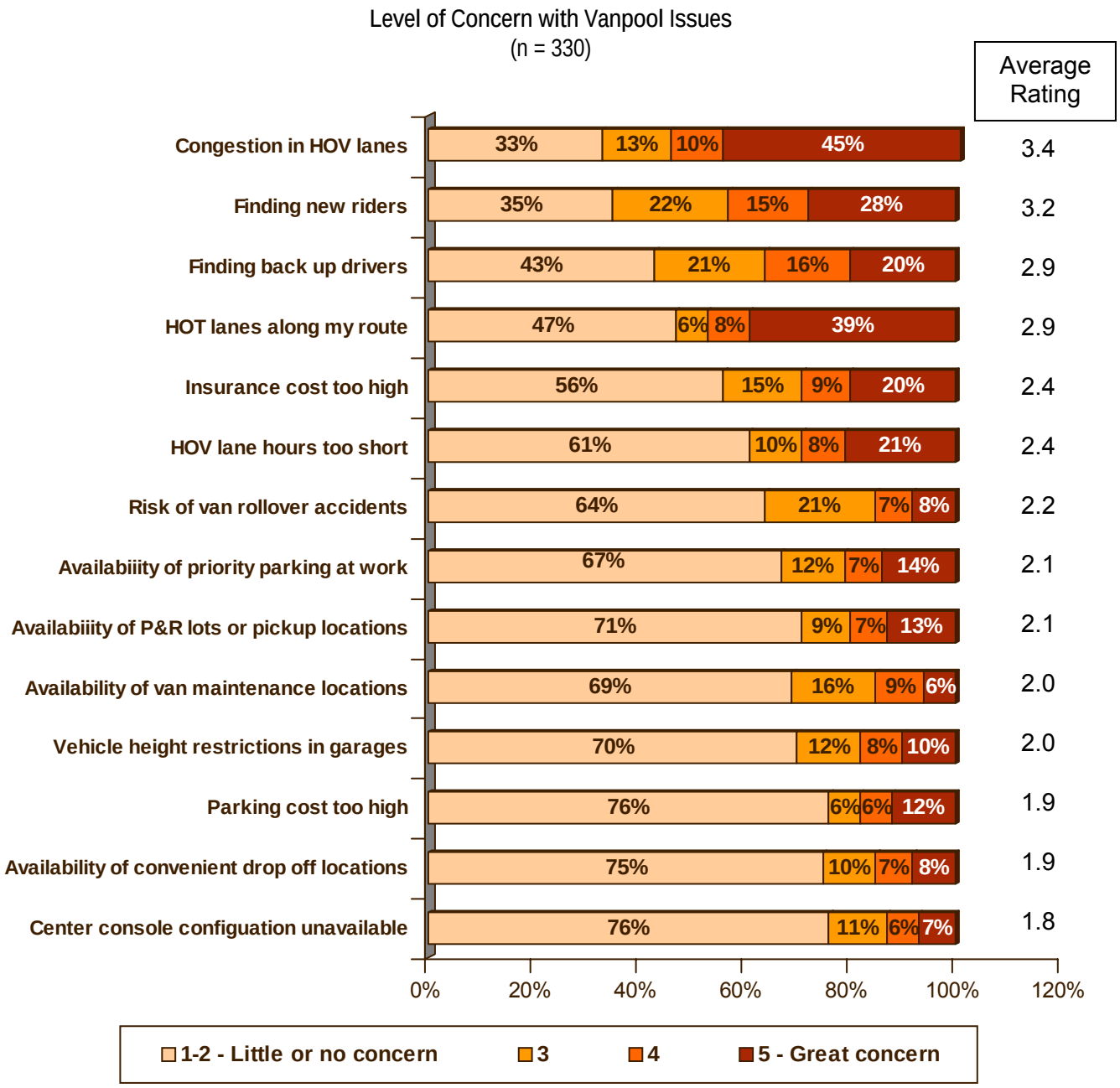
Level of Concern with Vanpool Issues

Finally, respondents were asked to rate their level of concern with various vanpool issues on a scale of one to five, with one equal to “no concern” and five equal to “great concern.”

Figure 15 lists the issues presented in the questionnaire and shows the percentages of respondents who rated the issue a 1 or 2, a 3, a 4, or a 5. The right side of the figure also shows the average rating for each issue. Overall the ratings suggest only modest concern for most issues. The highest average rating was 3.4 and only four of the issues had a rating of 2.9 or higher.

The most pressing issue was “congestion in HOV lanes,” which had an average rating of 3.4. It was cited as a great concern (5) by 45% of respondents and as a concern (4) by another 10%. Finding new riders (average rating of 3.2) was cited as a concern or great concern to 41% of drivers. Finding back-up drivers (2.9) also appeared to be of moderate concern.

Figure 15



"New High Occupancy Toll (HOT) lanes along my route," (2.9), also was notable because 39% of drivers rated it a "great concern." Two other issues, "insurance cost too high" and "HOV lane hours too short", received average ratings of 2.4. In both of these cases, about 30% of drivers rated them of concern (4) or great concern (5).

All other issues received an average rating of 2.2 or lower, suggesting they did not present serious concern to most drivers.

Several other issues were not specified in the questionnaire, but were mentioned by drivers as being of concern. These issues are listed in Table 10, with the percentage of respondents who reported these issues. The top issues named by the largest number of respondents all related to HOV lanes: "single-person hybrid cars in HOV lanes" (4%), "need more/extended HOV lanes" (2%), and "cost of gas/ operating costs" (2%). All other issues were named by less than 2% of the respondents.

Table 10
Other Vanpool Issues
(n = 408)

Issues	Percentage
Single-person hybrid cars in HOV lanes	4%
Need more/extended HOV lanes	2%
Cost of gas/operating costs	2%
Parking issues	1%
Issues with converting to HOT lanes	1%
AC/heat/seats/armrests/maintenance	1%
Getting/keeping riders	1%
HOV violators/enforcement	1%
Extend HOV hours earlier	1%
Need VP subsidy/assistance	1%
Congested roads/conditions/bad drivers	<1%
Reimbursement/Metrochek issues/collecting fees	<1%
Other HOV issues	2%
Other	3%

Level of Concern by Population Sub-Groups

Not surprisingly, some respondent sub-groups were more concerned about these issues than were other sub-groups. Notable results are presented in Table 11.

As shown, respondents who said either the driver (3.3 average concern rating) or the van owner (2.4) paid for insurance were more concerned about the cost of insurance than were respondents who said the leasing agency paid for the insurance. And respondents whose insurance cost was $2,000 (4.0) or more were much more concerned about insurance cost than were those whose insurance cost was less than $1,000 (2.8).

Table 11
Vanpool Issue Concern Ratings by Respondent Sub-groups

Vanpool Issue	Respondent Sub-Group	Average Concern Rating
Insurance cost too high by:	**Who pays for insurance**	
	Driver pays	3.5
	Van owner pays	2.4
	Leasing agency pays	2.1
Insurance cost too high by:	**Annual insurance cost**	
	$2,000 or more	4.0
	$1,000 – $1,999	3.5
	Less than $1,000	2.8
Congestion in HOV lanes by:	**Use HOV lane**	
	Yes	3.8
	No	2.5
New HOT lanes along route to work by:	**Use HOV lane**	
	Yes	3.2
	No	2.0
Parking cost too high by:	**Monthly parking fee paid**	
	$150 or more	3.8
	$50 – $149	2.9
	$1 – $49	2.1
	Free parking	1.2

Differences also were noted in two HOV lane issues for respondents who did and did not use HOV lanes for their trip to work. Respondents who used the HOV lanes rated a concern of "congestion in HOV lanes" an average of 3.8, compared with an average concern rating of 2.5 for respondents who did not use HOV lanes. HOV users also were more concerned that HOT lanes would be implemented along their route to work (3.2 rating) than were respondents who did not use HOV lanes (2.0 rating).

The other concern that varied significantly by respondent sub-group was parking cost by the monthly parking fee paid. Respondents who paid $150 or more per month for parking rated this concern 3.8 on average, compared to a rating of 2.9 for respondents who paid between $50 and $149, a rating of 2.1 for respondents who paid between $1 and $49 per month, and a rating of 1.2 for respondents who said they had free parking.

Concern ratings also were examined for several other issues and sub-groups for which ratings differences might be expected. These issues and sub-groups are listed below. No significant ratings differences were observed for any of these issues/sub-groups.

Vanpool Issue	Respondent Group (Sub-groups)
• P&R availability by:	Origin state (MD, VA)
• Convenient drop-off locations by:	Destination state (DC, MD, VA)
• Availability of priority parking at work by:	Receive reserved van parking (yes, no)
• Availability of priority parking at work by:	Receive van parking close to building (yes, no)
• Find new riders by:	Origin state (MD, VA)
• Finding new riders by:	Had assistance forming vanpool (yes, no)
• Finding new riders by:	Destination state (DC, MD, VA)

SECTION 4 COMPARISONS BETWEEN 1989, 2002, AND 2008 SURVEYS

As noted earlier, COG conducted similar vanpool driver surveys in 2008, 2002 and in 1989. This section highlights several noteworthy differences between the results of the three studies. These differences include the following:

- Number of vanpools crossing the Beltway
- Distribution by origin and destination state
- Average vanpool occupancy
- Trip distance and travel times
- Number of morning passenger pick-up and drop-off stops
- Vanpool Concerns

NUMBER OF VANPOOLS CROSSING THE BELTWAY

The number of surveyed vanpools crossing the Beltway declined from 1989 to 2002 and declined again from 2002 to 2008. The numbers decreased from 541 vanpools in 1989 to 313 in 2002 and to 223 in 2008. This decrease in the proportion of sampled vanpools crossing the Beltway suggests a change has occurred in the orientation of vanpools trips and/or the number of passengers carried in vanpools in the central Washington DC area.

DISTRIBUTION BY ORIGIN AND DESTINATION STATE

Results on the distribution of vanpools by origin and destination states were almost identical for the 2008 and 2002 studies. In 2008, 77% of the sampled vanpools originated in Virginia and 20% originated in Maryland, compared to 77% from Virginia and 21% from Maryland in the 2002 survey. However, there was a marked change from the 1989 survey to 2002, in which 60% of the vanpools originated in Virginia and 40% originated in Maryland.

VANPOOL OCCUPANCY

Also supporting the observation of changing vanpool use was the measured decrease in the average "usual" passenger occupancy of vanpools from the 1989 study to the 2008 study. The 2008 survey calculated an average occupancy of 10.5 passengers, compared with 10.8 passengers in 2002. In comparison, the 1989 vanpool driver survey showed an average vanpool occupancy of 11.5 passengers. This 26 year period indicates a trend toward decreasing vanpool capacity, due likely to the growth of minivans (5-7 passengers) in the vanpool fleet.

The percentage of "usual" riders who actually rode in the van on any one day tended to increase slowly over time. In 1989, 86% of the "usual" riders actually rode in the van., compared to 89% in 2002. This percentage increased once again in 2008 to 92%, suggesting vanpools are filling most of the seats and that passengers are regular vanpool riders.

TRIP DISTANCE AND TRAVEL TIMES

Trip lengths appear to have grown, in both mileage and time. In 1989, the average one-way trip distance was 37.2 miles. By 2002, the average had risen to 46.4 miles and rose an additional five percent from 2002 to 2008 to 48.6 miles. The average travel time also increased, from 59 minutes in 1989 to 77 minutes in 2002, and to 84 minutes in 2008. This was an increase of 9% from 2002 to 2008.

NUMBER OF MORNING PASSENGER PICK-UP AND DROP-OFF STOPS

In the 1989 survey, about a third of the vanpools (32%) made one stop to pick up passengers in the morning and 66% picked up passengers at several meeting places. The 2002 survey showed a higher percentage (53%) of vanpools making only one pick-up stop, with the remaining 47% stopping at two or more locations to pick-up riders. In 2008, an even higher percentage (63%) of vanpools made only one pick up stop, with the remaining 37% stopping at two or more locations.

The percentage of vanpools that drop off passengers in more than one employment location also has changed. In 1989, 65% of vanpools dropped all passenger in one employment location. In the 2002 survey, this percentage had dropped subtantially, to 29%. The percentage for 2008 was the same, 29%. This indicates that vanpools are increasingly drawaing their riders from multiple employers. It could signal a decrease in the number of employers that promote and support large vanpool programs or an increase in regional and local programs designed to help vanpool drivers find riders from a wider population.

VANPOOL CONCERNS

The other survey topic in which changes were noted from 1989 to 2008 is in the area of vanpool concerns. Vanpool drivers seem less concerned about most vanpool issues in 2008 than they did in 1989. However, they are either slightly more concerned or have the same concern rating in 2008 than in 2002. As shown in Table 20, for the issues that were examined in both surveys, the average concern ratings (on a scale of 1-5) generally were higher in 1989 than in 2002 or in 2008, and were either the same or slightly higher in 2008 than in 2002.

For example, respondents were more concerned about “finding new riders”, “congestion in HOV lane”, “P&R lots/pick-up locations”, and “priority parking at work” in 2008, than in 2002. “Insurance cost too high”, and “height restriction in garages” was rated slightly lower in 2008 compared to 2002.

Table 20
Level of Concern with Vanpool Issues – 2008 Compared to 2002 and 1989

Issue *	2008 Average Concern Rating	2002 Average Concern Rating	1989 Average Concern Rating
Finding new riders	3.2	3.0	3.3
Congestion in HOV lane (2002)	3.4	2.9	N/A
Insurance cost too high (1989 "insurance")	2.4	2.7	3.1
HOV lane hours too short	2.4	2.4	NA
More HOV lanes (2002)	NA	NA	4.0
Height restriction in garages (1989 "access to garages")	2.0	2.1	2.9
Van maintenance (1989 "van servicing")	2.0	2.0	2.9
P&R lots/pick-up locations (1989 "AM meeting place")	2.1	2.0	2.0
Cost of parking too high	1.9	1.9	NA
Operating cost (1989)	NA	NA	3.3
Priority parking at work (1989 "parking at work")	2.1	1.9	3.4

* 1989 wording shown in parentheses when wording changed from 1989 to 2002

APPENDICES

APPENDIX A SURVEY METHODOLOGY OBSERVATIONS

This section of the report presents the major remarks associated with the technical aspects of conducting the survey for the 2008 Vanpool Driver Study. The technical elements deal with the survey and sampling procedures.

Overall, the survey and sampling methodology provided a framework for the collection of sound statistical results. Analysis of the survey dialing results supports this conclusion with refusal rates well within the acceptable range. The following should be noted for future studies:

- The use of one mailing followed by additional telephone survey callbacks helped to increase the response rate for this survey.
- Given the complexity in tracking the sample for the study, the use of a CATI system continues to be essential.
- Allowing the respondent the choice of mail back, fax back, completion via the Internet or telephone that was either respondent initiated (toll-free) or interviewer initiated, provided the greatest convinence to the respondent resulting in a high response rate.
- Rather than conducting a second mailing to drivers who had not responded, the CATI follow-up effort was used instead to successfully achieve a high response rate.
- The likelihood of completing an interview was greatly enhanced if both a work and home number were available.
- The nature of survey and the survey requirements means that the number of callbacks required is fairly substantial.
- Survey administration for the GWRC operator database presented a unique set of challenges to data collection. Although operators generally agreed to partipate in the survey, control of survey distribution and collection was left to the operators. After driver packets were mailed to the operators and delivered to drivers, there was no convenient way to get the drivers to send the surveys back to the operators. As a result, CIC was not able to obtain a high response rate from the GWRC operators using this methodology.

APPENDIX B
DISPOSITION OF RESULTS

Vanpool Drivers Dialing/Return Results of Sample						
CATI Dialing Result	**Commuter Connections**	**GWRC**	**PRTC**	**VPSI**	**Crystal City Commuter Vans**	**Total**
Complete	47	157	44	151	9	408
No Answer	9	6	1	9	2	27
Answering Machine	7	10	5	12	0	34
Callback	0	1	2	11	3	17
Respondent Never Available	0	1	0	2	0	3
Refused	4	4	3	7	2	20
Hostile Interrupt/Quit	0	0	1	1	0	2
Surveys Never Returned/No Phone Number	2	199	15	0	0	216
Total Active Sample	**69**	**378**	**71**	**193**	**16**	**727**
Computer/FAX/Pager	0	2	0	2	0	4
Not in Service	8	7	2	5	0	22
Wrong Number	4	8	3	7	0	22
No Longer with Company	7	10	2	8	0	27
Rider not Driver	17	11	1	7	0	36
Not Part of Vanpool	9	5	2	2	0	18
Vanpool Driver, No Riders	3	2	0	0	0	5
Total Dead Sample	**48**	**45**	**10**	**31**	**0**	**134**
TOTAL SAMPLE	**117**	**423**	**81**	**224**	**16**	**861**
Total Complete Ratio(Completes/Total	**40%**	**37%**	**54%**	**67%**	**56%**	**47%**
Active Complete Ratio (Completes/Total Active Sample)	**68%**	**42%**	**62%**	**78%**	**56%**	**56%**

* GWRC Completes include fax/mail back/Internet surveys not part of main dialing

APPENDIX C
MAIL SURVEY INTRODUCTORY LETTER, AND QUESTIONNAIRE

January 29, 2008

Dear Vanpool Operator or Driver,

Vanpools are an important means of transportation for commuting in the Washington region. To learn more about the characteristics of vanpools, the Commuter Connections program at the Metropolitan Washington Council of Governments (COG) is conducting a brief survey of vanpool operators and drivers in the region. The results of this survey will be used to identify current vanpooling practices and to plan for improved facilities and services for vanpools in the future. Our goal is to have the main driver from each vanpool in the region participate in the 2008 Vanpool Driver Survey.

The survey takes only a few minutes and all responses will be kept strictly confidential. Your participation is very important.

COG has hired an independent research firm, CIC Research, Inc. to assist with the survey. To make it as easy as possible for you, COG and CIC Research have set up four methods to participate:

1 - Return the completed questionnaire it in the enclosed, postage-paid envelope to:
CIC Research, Inc., 8361 Vickers Street, San Diego, CA 92111

2 - Fax the questionnaire, toll-free, to CIC Research at (888) 714-9846

3 - Using the PIN number on the questionnaire, enter your responses on the Internet at the following web address: http://proj.cicresearch.com/vp08.htm

4 - Participate by telephone at the toll-free number (800) 892-2250. Interviewers are available at CIC Research from 9:00 a.m. to 9:00 p.m. Monday through Friday and from 1:00 p.m. to 9:00 p.m. on Saturdays. The interviewer will ask you for the PIN number on the questionnaire.

If you've been unable to complete your questionnaire by February 15, an interviewer from CIC Research will contact you by telephone. In that call, the interviewer will be able to take your answers over the telephone.

Thank you in advance for your participation in this important study. If you have any questions, please feel free to contact me at nramfos@mwcog.org or at (202) 962-3313.

Sincerely,

Nicholas Ramfos
Director
Commuter Connections

METROPOLITAN WASHINGTON
COUNCIL OF GOVERNMENTS

COMMUTER CONNECTIONS
A SMARTER WAY TO WORK

Van Ownership and Operation

1. How long has this vanpool been in operation? _____ years **OR** _____ months

2. How long have you been the vanpool driver? _____ years **OR** _____ months

3. Who owns the van? (Check one)

   ❑ Myself or a family member ❑ Leasing agency ❑ Employer
   ❑ Private party outside my family ❑ Other _____

4. Please provide the following information about your van (if known).

   a) Van make/model _____ c) Model year _____

   b) Passenger capacity (including driver) if every seat is filled _____

5. Please provide the following information about your van insurance (if known).

   a) Type of insurance: ❑ Personal ❑ Commercial ❑ Don't know

   b) Who pays for insurance: ❑ Myself/driver ❑ Van owner ❑ Other _____

   c) Annual insurance cost: $ _____ per year ❑ Don't know

Vanpool Use

6. How many people, <u>including the driver</u>, usually ride in the vanpool? _____

7. How many people, <u>including the driver</u>, rode in the vanpool last Wednesday? _____

   If no one rode in the vanpool last Wednesday, please explain why not _____

8. From what area does your vanpool originate (i.e., where is your van parked overnight)? Please specify town, city, or community. _____

9. *How many stops does your van make in the morning to pick up passengers?*

   ❑ One stop (central meeting place) ❑ 2 stops ❑ 3 stops ❑ 4 or more stops

10. Where does the van <u>pick up</u> riders in the morning? Please specify the locations for the first and last morning pick-ups. Note street address, nearest cross streets, or park & ride location. Also indicate the town or city.

    a) <u>First</u> pick-up location: _____

    b) <u>Last</u> pick-up location: _____

    c) Is the last pick-up location <u>inside</u> or <u>outside</u> the Capital Beltway? ❑ inside ❑ outside

11. Where does the van <u>drop-off</u> riders in the morning? Please specify the locations for the first drop-off and where the van is parked during the day. Note street address or nearest cross streets. Also indicate the town or city.

    a) <u>First</u> drop-off location: _____

b) Is the first drop-off location inside or outside the Capital Beltway? ❑ inside ❑ outside

c) Where van is parked during the day: _____

12. At what times do the following morning vanpool activities occur? (usual / scheduled clock time)
    a) Driver leaves home at: _____ am
    b) Van leaves last pick-up stop at: _____ am
    c) Van arrives at first drop-off stop at: _____ am
    d) Van is parked for work at: _____ am

13. What is the approximate distance of your vanpool trip to work?
    a) Miles from driver's house to worksite/parking location: _____ miles
    b) Miles from last morning pick-up to first drop-off location: _____ miles

14. What major roadways does the van take for the trip to work? _____

15. Does the vanpool use an HOV lane for any portion of the trip to work?
    ❑ No ❑ Yes, use HOV lane (specify all HOV route(s)) _____

Vanpool Assistance and Services

16. In forming your vanpool, did you receive assistance from your employer or from an organization that helps with vanpool formation, organization, or ridership?
    ❑ No ❑ Yes, from employer ❑ Yes, from organization (specify) _____

17. Do you or does your vanpool receive any of the following services/benefits, from your employer, from a commute service organization, or from a local jurisdiction agency? (Check all that apply)
    ❑ No vanpool services or benefits

    ❑ Reserved van parking at work
    ❑ Van parking close to the building at work
    ❑ Discounted or free van parking at work
    ❑ Guaranteed Ride Home program
    ❑ Payment or subsidy from employer for any vanpool costs
    ❑ Vanpool start-up or other subsidy from any other organization
    ❑ Flexible work hours (arrival and departure times)
    ❑ Other _____

18. What is the monthly parking fee for your van at work? (Please check only one)
    ❑ No charge, parking is free for all employees
    ❑ No charge, parking is free for vanpools
    ❑ $1 – $49 per month
    ❑ $50 – $99 per month
    ❑ $100 – $149 per month
    ❑ $150 – $199 per month
    ❑ $200 or more per month

Other Issues

19. Following is a list of issues that might be of concern to vanpool drivers. Using a scale of 1 to 5, with "1" being "no concern" and "5" being "great concern," please rate your level of concern about each issue.
    ___ Insurance cost too high
    ___ Cost of parking too high
    ___ HOV lane hours too short
    ___ Congestion in HOV lane
    ___ Finding new riders
    ___ Risk of van rollover accidents
    ___ Finding back-up drivers
    ___ Other _____
    ___ Vehicle height restrictions in parking garages
    ___ Availability of P&R lots/ pick-up locations
    ___ Center aisle configuration unavailable from manufacturer
    ___ Availability of priority parking at work
    ___ Availability of convenient drop-off locations
    ___ Availability of van maintenance locations
    ___ New high-occupancy toll (HOT) lanes along my route

20. If you have other comments about vanpooling or vanpool services, please note them below.

_____

_____

Thank you for your cooperation. Please fax this questionnaire to us, toll-free, at (888) 714-9846. Or, if you prefer, you may provide your responses online at the following website: http://proj.cicresearch.com/vp08.htm or to an interviewer over the phone by calling the following toll-free number: (800) 892-2250. Your answers will be confidential.

APPENDIX D
TELEPHONE QUESTIONNAIRE

Vanpool Survey January – February 2008

METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS

COMMUTER CONNECTIONS
A SMARTER WAY TO WORK

Project #821

Before we get started, please tell me the pin number located on the label on the top right corner of your questionnaire

PIN:_____ or

Name:_____

Van Ownership and Operation

1. How long has this vanpool been in operation? _____ years **OR** _____ months

2. How long have you been the vanpool driver? _____ years **OR** _____ months

3. Who owns the van? (Check one)

   ❑ Myself or a family member ❑ Leasing agency ❑ Employer
   ❑ Private party outside my family ❑ Other _____

4. Please provide the following information about your van (if known).

   a) Van make/model _____ c) Model year _____

   b) Passenger capacity (including driver) if every seat is filled _____

5. Please provide the following information about your van insurance (if known).

   a) Type of insurance: ❑ Personal ❑ Commercial ❑ Don't know

   b) Who pays for insurance: ❑ Myself/driver ❑ Van owner ❑ Other _____

   c) Annual insurance cost: $ _____ per year ❑ Don't know

Vanpool Use

6. How many people, including the driver, usually ride in the vanpool? _____

7. How many people, including the driver, rode in the vanpool last Wednesday? _____

   If no one rode in the vanpool last Wednesday, please explain why not _____

8. From what area does your vanpool originate (i.e., where is your van parked overnight)? Please specify town, city, or community. _____

9. How many stops does your van make in the morning to pick up passengers?

   ❑ One stop (central meeting place) ❑ 2 stops ❑ 3 stops ❑ 4 or more stops

10. Where does the van pick up riders in the morning? Please specify the locations for the first and last morning pick-ups. Note street address, nearest cross streets, or park & ride location. Also indicate the town or city.

    a) First pick-up location: _____

    b) Last pick-up location: _____

    c) Is the last pick-up location inside or outside the Capital Beltway? ❑ inside ❑ outside

11. Where does the van drop-off riders in the morning? Please specify the locations for the first drop-off and where the van is parked during the day. Note street address or nearest cross streets. Also indicate the town or city.

    a) First drop-off location: _____

b) Is the first drop-off location inside or outside the Capital Beltway? ❑ inside ❑ outside

c) Where van is parked during the day: _____

12. At what times do the following morning vanpool activities occur? (usual / scheduled clock time)
    a) Driver leaves home at: _____ am
    b) Van leaves last pick-up stop at: _____ am
    c) Van arrives at first drop-off stop at: _____ am
    d) Van is parked for work at: _____ am

13. What is the approximate distance of your vanpool trip to work?
    a) Miles from driver's house to worksite/parking location: _____ miles
    b) Miles from last morning pick-up to first drop-off location: _____ miles

14. What major roadways does the van take for the trip to work? _____

15. Does the vanpool use an HOV lane for any portion of the trip to work?
    ❑ No ❑ Yes, use HOV lane (specify all HOV route(s)) _____

Vanpool Assistance and Services

16. In forming your vanpool, did you receive assistance from your employer or from an organization that helps with vanpool formation, organization, or ridership?
    ❑ No ❑ Yes, from employer ❑ Yes, from organization (specify) _____

17. Do you or does your vanpool receive any of the following services/benefits, from your employer, from a commute service organization, or from a local jurisdiction agency? (Check all that apply)
    ❑ No vanpool services or benefits

    ❑ Reserved van parking at work
    ❑ Van parking close to the building at work
    ❑ Discounted or free van parking at work
    ❑ Guaranteed Ride Home program
    ❑ Payment or subsidy from employer for any vanpool costs
    ❑ Vanpool start-up or other subsidy from any other organization
    ❑ Flexible work hours (arrival and departure times)
    ❑ Other _____

18. What is the monthly parking fee for your van at work? (Please check only one)
    ❑ No charge, parking is free for all employees
    ❑ No charge, parking is free for vanpools
    ❑ $1 – $49 per month
    ❑ $50 – $99 per month
    ❑ $100 – $149 per month
    ❑ $150 – $199 per month
    ❑ $200 or more per month

Other Issues

19. Following is a list of issues that might be of concern to vanpool drivers. Using a scale of 1 to 5, with "1" being "no concern" and "5" being "great concern," please rate your level of concern about each issue.
    ___ Insurance cost too high
    ___ Cost of parking too high
    ___ HOV lane hours too short
    ___ Congestion in HOV lane
    ___ Finding new riders
    ___ Risk of van rollover accidents
    ___ Finding back-up drivers
    ___ Other _____
    ___ Vehicle height restrictions in parking garages
    ___ Availability of P&R lots/ pick-up locations
    ___ Center aisle configuration unavailable from manufacturer
    ___ Availability of priority parking at work
    ___ Availability of convenient drop-off locations
    ___ Availability of van maintenance locations
    ___ New high-occupancy toll (HOT) lanes along my route

20. If you have other comments about vanpooling or vanpool services, please note them below.

_____

_____

Thank you for your cooperation. Please fax this questionnaire to us, toll-free, at (888) 714-9846. Or, if you prefer, you may provide your responses online at the following website: http://proj.cicresearch.com/vp08.htm or to an interviewer over the phone by calling the following toll-free number: (800) 892-2250. Your answers will be confidential.

APPENDIX E
GWRC COVER LETTER, ALERT LETTER, AND TELEPHONE SCRIPT

January 29, 2008

Dear <name of Vanpool Operator>,

Thank you for offering to assist us with the 2008 Vanpool Driver Survey that is being conducted by Commuter Connections, a program at the Metropolitan Washington Council of Governments (COG). The results of this survey will be used to identify current vanpooling practices and to plan for improved facilities and services for vanpools in the future. All survey results will be kept confidential.

Our goal is to have the main driver from each vanpool in the region participate in the study. COG has hired an independent research firm, CIC Research, Inc. to assist with the survey effort. CIC called you earlier in January to confirm your willingness to participate, as well as the number of drivers in your vanpool operation.

As quickly as possible, please distribute one envelope to each driver. We would like to have all questionnaires returned no later than February 15. The packet contains a letter, a questionnaire and a pre-paid envelope. Drivers are identified by number only. To make it easy for drivers to return the completed questionnaire, COG and CIC Research have set up four methods as described in the packet for drivers to participate.

Thank you in advance for your assistance in this important study. If you have any questions, please feel free to contact me at nramfos@mwcog.org or at (202) 962-3313.

Sincerely,

Nicholas Ramfos
Director
Commuter Connections

ALERT LETTER

Dear GWRC Van Operators,

In early January 2008 we will begin working with the Metropolitan Washington Council of Governments (COG) to conduct the regional Vanpool Driver Survey. You may remember the 2002 study which was also conducted by COG and their consultants, LDA Consulting (Lori Diggins) and CIC Research (Lois Wauson).

As you know, vans are a very important means of transportation for commuting in the Washington region, taking numerous, single-occupancy vehicles off the road. The Metropolitan Washington Council of Governments is conducting this survey of van operators and drivers in the region in order to analyze current vanpooling practices and plan for improved facilities and services for vanpools.

The Metropolitan Washington Council of Governments and their consultants are aware that your driver contact information is confidential. However, it is important for each van driver in the Washington, DC region to participate in this survey. Therefore, I am asking you to assist us with this project by answering a few questions by telephone when CIC Research calls in January. The questions will concern the number of drivers in your operation and your contact information. CIC staff will also be sending you a package containing a cover letter, a short two-page questionnaire and pre-paid envelope for each of your drivers. Please assist them by distributing the surveys to your drivers after you receive the package in mid-January.

The drivers should fill out the questionnaire and return it directly to CIC Research; either by mailing it back, faxing it back or completing it via an easy-to-use Internet link. Hopefully, this will limit the impact on you! Also, please be assured that all of the driver information will be kept confidential and only used in the aggregate for presenting results of the study.

Thanks so much for your help.

Sincerely,

Diana Utz

SCRIPT FOR GWRC OPERATORS

Recruitment for GWRC Vanpool Operators/Drivers - #821

January 2008

Hello: My name is _____ and I'm with CIC Research. I'm calling on behalf of the Metropolitan Washington Council of Governments. They have asked us to conduct a survey of vanpool operators and drivers in the region. We got your name from (agency name from call record) and we need your help in collecting contact information for vanpool owners and drivers so that we can send survey packets to all of them.

You may remember that this study was last conducted in 2002 and it is not likely that another study of this magnitude will be conducted again in the near future. Results will be used in the planning of vanpool facilities and services in the future. The questionnaire only takes a few minutes to fill out and all responses are strictly confidential.

Q1. First I'd like to ask, are you ….?

1. An operator or owner with multiple vans, or (GO TO Q2)
2. An operator/driver with a single van (GO TO Q5)

Q2. We'd like a driver from each vanpool in your operation to receive a questionnaire and we need your help to do that. After drivers complete their questionnaires, they can either mail it back or fax it back, or they can complete it over the Internet.

1. Would you prefer to give us the names and addresses of your drivers and we'll send them the questionnaires,(GO TO Q3)
2. Or would you rather distribute the questionnaires to the drivers yourself? (SKIP TO Q4)

(IF HESITANT, SAY:) We know that your driver information is confidential and we'd like to assure you that all information we collect will be kept strictly confidential. Is there some other way we could do this so you'd feel comfortable with the procedure? (IF UNABLE TO CONVERT, THANK & TERMINATE AND RECORD REASON FOR REFUSAL ON BACK.)

Q3. Would you rather fax their names and addresses to us or would it be easier to email their contact information to us?

1. fax (GIVE RESPONDENT OUR TOLL-FREE FAX NUMBER: **888/714-9846**)
2. email (GIVE EMAIL ADDRESS: **survey@cicresearch.com**)

Q3a. And when do you think you'll be able to get those names to us? _____
(NOW SKIP TO CLOSING)

Q4. That's great. How many main drivers (one for each van) do you have so we can send you the correct number of survey packages? _____ (number of vans in the operation)

Let me just take a minute to confirm your contact information so that we can send those out to you. [SKIP TO CONTACT GRID BELOW]

Q5. We'd like to send the survey package directly to you. After you complete the questionnaire, you can either mail it back or fax it back, or you can complete the questionnaire on the Internet if you prefer. Let me confirm your contact information and we'll get those materials sent out to you. [GO TO CONTACT GRID BELOW]

CONTACT GRID

Contact Name: _____ ☐ Call Record is correct

Vanpool Co. Name: _____ ☐ Call Record is correct

Street Address: _____ ☐ Call Record is correct

City: _____ ☐ Call Record is correct

State: _____ ☐ Call Record is correct

ZIP: _____ ☐ Call Record is correct

E-mail: _____

Thank you very much for your help. We look forward to your participation.