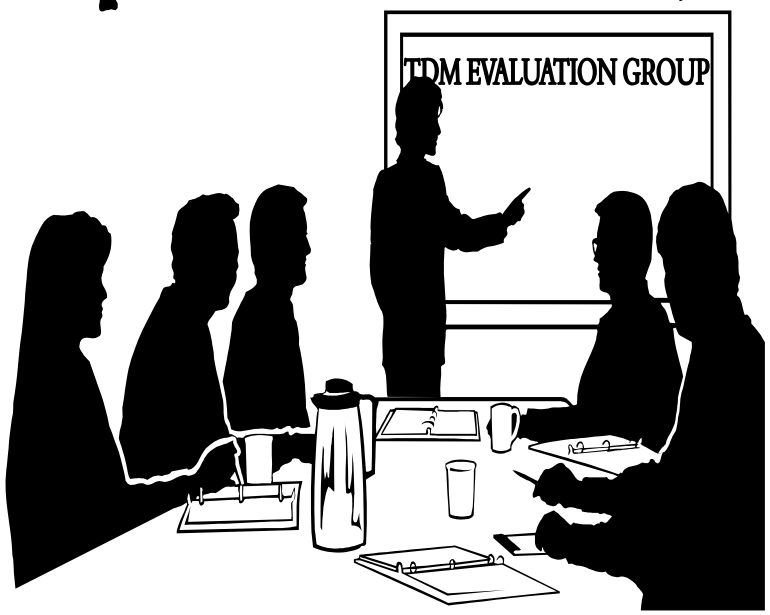
HANDOUTS

from previous meeting



January 16, 2007

ITEM #2

COMMUTER CONNECTIONS TRANSPORTATION DEMAND MANAGEMENT EVALUATION PROJECT

TRANSPORTATION EMISSION REDUCTION MEASURES (TERMS) REVISED EVALUATION FRAMEWORK 2005 – 2008

DRAFT

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EXECUTIVE SUMMARY

The Commuter Connections Program of the Metropolitan Washington Council of Government (COG), in concert with program partners, is responsible for implementing five Transportation Emission Reduction Measures (TERMs) in support of the metropolitan Washington region's efforts to meet the conformity requirements of federal transportation and clean air mandates. The TERMs include:

- Telework Resource Center / Telework Outreach – Provides information and assistance to commuters and employers to further in-home and telecenter-based telecommute programs.
- Guaranteed Ride Home – Eliminates a barrier to use of commute alternatives by providing free rides home in the event of an unexpected personal emergency or unscheduled overtime to commuters who use commute alternatives.
- Employer Outreach – Provides regional outreach to encourage large, private-sector employers voluntarily to implement commute alternative 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.

Commuter Connections also operates the Commuter Operations Center (COC), providing direct commute assistance services, such as carpool and vanpool matching through telephone and internet assistance to commuters. The COC is not an "official" TERM, however, it supports all other TERMs.

This report provides a framework and methodology for evaluating the transportation and air quality impacts of these TERMs. This methodology and numerous surveys and other data collection tools described later in this report have been developed to measure the TERMs' impacts for the period from July 2005 through June 2008 (FY 06-08). These impacts then will be compared against the goals established for each TERM by COG's National Capital Region Transportation Planning Board (TPB), the region's designated Metropolitan Planning Organization (MPO). The TERM evaluation framework and analysis reports are reviewed by the Commuter Connections Subcommittee and the TDM Evaluation Group.

At the early stages of the TERMs' implementation, Commuter Connections elected to undertake significant evaluation for each TERM. The TERM evaluation and analysis process has been ongoing since 1997. The objective of the evaluation process is to provide timely, useful, and meaningful information on the performance of the TERMs to decision-makers and other groups, including the TPB and other regional policy makers; COG program funders; Commuter Connections staff; TERM program partners, such as local jurisdictions and Transportation Management Associations (TMA); and employers and commuters who comprise Commuter Connections' clients.

Three previous evaluation frameworks have been prepared, the first for the January 1997 through June 1999 period (1997-1999) period, the second for the July 1999 through June 2002 period (1999-2002), and the third for July 2002 through June 2005 (2002-2005). The evaluation framework presented in this document builds on the framework used in the 2002-2005 analysis. The major change in the 2002-2005 framework was the addition of the methodology for the Mass Marketing TERM. Minor changes will be

made to the TERM evaluation framework for 2005-2008 to address consolidation of some the TERM, such as the integration of the Employer Outreach for Bicycling into the Employer Outreach TERM and the integration of the Integrated Rideshare Software Updates into the Commuter Operations Center. Additionally, the InfoExpress Kiosk component of the Integrated Rideshare TERM now will be analyzed and measured separately.

The evaluation process outlined in this framework allows for both on-going estimation of program effectiveness and for annual and triennial evaluations. Two types of performance measures are included in the evaluation process to assess effectiveness. First, program awareness, participation, utilization and satisfaction and attitude measures are used to track recognition, output, and service quality. Second, program impact measures are used to quantify six key outcome results, including:

1) Vehicle trips reduced
2) Vehicle miles of travel (VMT) reduced
3) Emissions reduced (Volatile Organic Compounds (VOC) and Oxides of Nitrogen - NOx)
4) Energy reduction (fuel saving)
5) Consumer saving (commuting cost saving)
6) Cost effectiveness, in terms of cost per benefit obtained (e.g., cost per trip reduced)

The evaluation process uses several calculation factors derived from surveys of Commuter Connections' program applicants and/or the public-at-large. These factors include: 1) placement rate (percent of commuters who shift to commute alternatives), 2) vehicle trip reduction (VTR) factor (average daily trips reduced for each commuter placed), 3) average commute trip distance, and 4) proportion of ridesharers and transit users that drive alone to the location where they meet their carpool, vanpool, bus, or train.

These performance measures and 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) Calculate "placement rate" – Percentage of commuters in the population base who made a travel change as a result of the TERM
3) Estimate the number of new commute alternative placements – Multiply placement rate by the population base for the evaluation period
4) Calculate the vehicle trip reduction (VTR) factor for new placements (average trips reduced per placement)
5) Estimate vehicle trips reduced – Multiply number of placements by the VTR
6) Estimate VMT reduced – Multiply number of vehicle trips reduced by average commute distance
7) 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
8) Estimate NOx and VOC emissions reduced – Multiply adjusted vehicle trips and VMT reduced by emissions factors consistent with the regional planning process
9) Estimate the energy and commuter cost savings – Multiply VMT reduced by fuel efficiency and vehicle operating cost factors
10) Estimate cost effectiveness – Divide program or TERM costs by the program impact measures

The calculations outlined above have been embedded into a spreadsheet used by Commuter Connections and its partners to track estimated results by month. An annual summary of these results is included in Commuter Connections' Annual Report. The factors used in the spreadsheet are updated as new surveys relevant to each TERM are completed. At the end of the three-year evaluation period, a TERM Analysis Report is prepared to summarize periodic reductions in vehicle trips, VMT, and emissions and progress toward goals in each of these performance indicators.

Throughout the three-year period, additional reports are prepared to present results of major data collection efforts, such as the annual rideshare applicant placement survey, the "State-of-the-Commute" survey of regional commuting trends and attitudes, GRH Applicant survey, and others. These reports are distributed widely, to program partners, policy makers, and other with an interest in regional transportation.

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SECTION 1 OVERVIEW

This report provides a framework and methodology for evaluating the transportation and air quality impacts of five Transportation Emission Reduction Measures (TERMs) implemented by the Commuter Connections Program of the Metropolitan Washington Council of Governments (COG), in support of the Washington metropolitan region's efforts to meet the conformity requirements of federal transportation and clean air mandates. The TERMs include:

- Telework Resource Center / Telework Outrach – Provides information and assistance to commuters and employers to further in-home and telecenter-based telecommute programs.
- Guaranteed Ride Home – Eliminates a barrier to use of commute alternatives by providing free rides home in the event of an unexpected personal emergency or unscheduled overtime to commuters who use commute alternatives.
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Commuter Connections also operates the Commuter Operations Center (COC), providing direct commute assistance services, such as carpool and vanpool matching through telephone and internet assistance to commuters. The COC is not an "official" TERM, however, it supports all other TERMs.

The evaluation framework serves two purposes. First, it assesses Commuter Connections' progress in meeting the transportation and air quality goals established by COG's National Capital Region Transportation Planning Board (TPB) for the TERMs for the period July 2005 through June 2008 (FYs 06-08). Second, it guides COG's future evaluation efforts to assess the effectiveness and cost effectiveness of the TERMs. The TERM evaluation framework and analysis reports are reviewed by the Commuter Connections Subcommittee and the TDM Evaluation Group. The framework describes an overall evaluation process for the program and specific evaluation techniques for each TERM.

This report represents an update to three previous evaluation framework documents developed in 1997 and 2001 to evaluate results and progress toward goals during the periods January 1997 through June 1999,[1] July 1999 through June 2002[2], and July 2002 through June 2005[3] respectively. The evaluation seeks to quantify the impacts of these five TERMs, results which will be used in post calculations of the

[1] Commuter Connections Transportation Demand Management Evaluation Project: Transportation Control Measures Evaluation Framework, June 30, 1997.
[2] Commuter Connections, Transportation Demand Management Evaluation Project: Transportation Emission Reduction Measures (TERMs) Revised Evaluation Framework 1999-2002, MWCOG, March 20, 2001.
[3] Commuter Connections, Transportation Demand Management Evaluation Project: Transportation Emission Reduction Measures (TERMs) Revised Evaluation Framework 2002-2005, MWCOG, March 16, 2004.

region's air quality conformity from the TERM Tracking Sheet. Commuter Connections had previously provided traditional ridematching services. These activities are included in the "baseline" of travel and air quality indicators for the purposes of assessing regional air quality conformity.

This evaluation framework report is organized into seven subsections, following this overview. Section 2 defines evaluation objectives and issues guiding the process. Section 3 enumerates performance measures to be used in assessing program effectiveness and cost effectiveness.

Section 4 discusses evaluation components specific to each TERM. The Employer Outreach method now includes a bicycling element, the InfoExpress Kiosk TERM is now a separate TERM, and Mass Marketing TERM has been refined in this updated evaluation framework, thus six total methods are described in this evaluation framework, including the Commuter Operations Center.

Section 5 describes the data sources and data collection tools to be used to collect evaluation data. The next section, Section 6, outlines the method to calculate travel, air quality, energy, and consumer cost impacts of the TERMs. The last section presents recommendations for the evaluation schedule, responsibilities, and reporting of results to maintain and utilize information produced through the evaluation process.

SECTION 2 EVALUATION OBJECTIVES AND ISSUES

PURPOSE OF THE EVALUATION

The objective of the evaluation process is to provide timely, useful, and meaningful information on the performance of the TERMs to decision-makers and other groups, including the TPB and other regional policy makers; COG program funders; Commuter Connections staff; TERM program partners, such as local jurisdictions and Transportation Management Associations (TMA); and employers and commuters who comprise Commuter Connections' clients. This information includes travel and air quality impacts, such as vehicle trips and miles of travel reduced and emissions reduced from the five TERMs implemented by the Commuter Connections program.

EVALUATION OBJECTIVES

The ultimate goal of an evaluation is to provide sound, definitive, and useful information about the results of a program. Evaluations are not performed simply for the sake of documentation or reporting. Rather, they guide future decision-making about funding priorities, reinforce program users' participation, identify desirable program enhancements, and define the benefits of one program in relation to those of others. Evaluation activities have been tailored to support decision-making; activities that do not support decision-making have not been undertaken in the evaluation process.

For these reasons, there are clear and specific objectives for the evaluation of the TERMs. The evaluation has been proceeding for the past seven year with primary objectives of providing useful information to the following groups of decision-makers and others who need or desire evaluation information:

- Providing information to regional policy-makers on the effectiveness and cost effectiveness of TERMs in contributing to regional goals for reducing congestion, improving air quality, reducing energy consumption, and improving mobility and accessibility. This includes the development of policy reports that document TERM impacts in simple, clear language.

- For both regional policy-makers and TERM program staff, helping establish regional commute trends and attitudes and provide an indication of the collective effect of all Commuter Connections programs on regional traffic and air quality, including impacts that are not specifically assigned in the evaluation to one of the five TERMs.[4]

- Providing information to program funders on the effectiveness and cost effectiveness of the TERMs being implemented via the Commuter Connections program.

- Providing information through monthly management information to Commuter Connections staff and program partners on potential program enhancements to increase effectiveness and efficiency.

- Providing information to employers and commuters, the consumers of program services, on the collective, regional impacts of individual participation. Evaluation information can also be useful in showing employers the types of trip reduction strategies that may be most cost effective.

[4] One new evaluation-related activity that will be undertaken during this evaluation period is an assessment of future performance measures and communication tools that might assist program managers to relay the benefits of the TERMs in ways that are most meaningful to policy-makers and funders.

Additionally, the evaluation process follows accepted and recognized evaluation techniques; and is rigorous, ongoing, resource efficient, unobtrusive for COG partners, and compatible with regional, state, and national practices.

EVALUATION ISSUES

Prior to discussing the specific evaluation approach for each TERM, it is useful to discuss several key evaluation issues that are addressed in this framework that should be kept in mind as COG utilizes and modifies the process over time.

Purpose of the Evaluation

- The evaluation uses common, quantitative performance measures for all evaluation components to allow for comparisons among TERMs and between TERMs and other strategies that could be implemented to address congestion and air quality concerns. A crucial function of this evaluation process is to estimate the combined impacts of TERMs to assess the overall effectiveness of the Commuter Connections Program. Consistent and comparable methodologies also enhance confidence in the results. These common measures are enumerated in Section 3.

- The evaluation framework allows for monthly activity reporting and benefits projection as a program management information tool. While assessment of travel and air quality benefits is the key purpose of the evaluation, the process must equally provide information to direct the day-to-day activities of the Commuter Connections program.

- The evaluation framework covers all current Commuter Connections TERMs, but assures that the impacts of each TERM can be separated from one another to avoid double counting.

Separating Impacts of Program Elements

- It is also important to separate the impacts of various Commuter Connections programs to avoid double counting benefits. For example, carpools might be formed as a joint result of enhanced employer outreach and GRH program benefits. These impacts must either be wholly credited to one of the two TERMs or the impact divided between the TERMs. Program benefits are not necessarily additive.

- Similarly, the evaluation separates the baseline impacts of Commuter Operations Center "basic" services from the impacts of the new TERM programs. The method for attributing impacts to a specific TERM or service is discussed in Section 6. This is important for the Mass Marketing TERM as impacts on commuters and air quality will be distributed to the advertising campaign or to other service components, such as the Commuter Operations Center or Guaranteed Ride Home, for example, that are promoted by Mass Marketing efforts.

- When possible, the evaluation recognizes and attempts to address the possible impacts of exogenous factors. Travel decisions also are influenced by the extent of congestion, work and home location, economic factors, fuel prices, and other factors. User surveys must carefully query commuters who shift to commute alternatives to define the relative importance of TERMs in influencing their mode choices. Data collected through the State-of-the-Commute survey, also should support this objective by suggesting exogenous factors that could have influenced travel changes and by

identifying some "indirect" impacts of other commute assistance measures implemented in the region, such as the enhanced mass marketing effort.

Accounting for Prior Mode and Access Mode

- 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 shifts from driving alone to an alternative mode, 2) if the commuter increased the frequency of use of a commute alternative, 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.

- Finally, for air quality evaluation purposes, it is necessary to know the access mode of carpoolers, vanpoolers, 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.

Refining Assumptions Used in the Evaluation

- Experience gained during past evaluation periods helped refine the assumptions and calculation steps developed for each TERM in this evaluation framework. Additionally, NOx and VOC emissions factors will be updated to reflect factors that will apply in 2008. The specific revisions included in this 2005-2008 evaluation framework update are presented later in this report for each TERM. The most significant potential refinement might involve the Employer Outreach TERM. During the last two evaluation periods, the US Environmental Protection Agency's COMMUTER model has been used to estimate the impact of employer services programs. During this evaluation period, a new model, the CUTR Worksite Trip Reduction Model developed by the Center for Urban Transportation Research (CUTR) at the University of South Florida, will be evaluated to assess whether it might be a more robust and accurate tool for estimating the mode shift impacts of employer program enhancements.

Specific Evaluation Issues for Individual TERMs

In general, the TERM analysis approaches documented in the 2005 TERM Analysis Report are used as the basis for the TERM evaluation methods described in this framework. A sample of the TERM calculation for each TERM (except the new Mass Marketing TERM) are included in Appendices C through J and are derived from the 2005 TERM Analysis Report.

- Telework Resource Center / Telework Outreach (Telework Outreach) – Telework Outreach is a resource service to help employers and program partners initiate telecommuting programs. In evaluating telecommuting, several travel changes need to be assessed, including: trip reduction due to telecommuting, the mode on non-telecommute days, and mode and travel distance to telework cen-

ters. Telework impacts are primarily estimated from the State of the Commute survey and by surveys conducted of employers directly requesting information from Commuter Connections.

- 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 already were ridesharing before they applied for GRH benefits, an additional benefit of GRH is likely the continuation and expansion of existing ridesharing arrangements. Thus, the evaluation process outlined here will estimates 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.

- 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 applies these empirical data to project the likely change in employee commuting behavior for given change in the employer's program. During this evaluation period, the COMMUTER model will be compared to the CUTR Worksite Trip Reduction Model to assess which would be better for this analysis and the preferred model used to evaluate the Employer Outreach TERM. Additionally, employer bicycle programs, which were evaluated separately from other Employer Outreach services in 2005, will be evaluated using the preferred model, along with the survey data from the regional "bike-to-work day" used to estimate travel and emission impacts from this event.

- Mass Marketing – The proposed evaluation approach for this new TERM is included in Section 4. 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 based on increases in Commuter Connections rideshare and GRH applications attributed to the campaign. This is explained further in Section 4. The evaluation will be accomplished using a variety of data sources, including the State of Commuter survey and COC tracking data. It also requires careful attribution of impacts to Mass Marketing or other TERMs, as appropriate.

- InfoExpress Kiosks – The evaluation of kiosks is now a separate TERM and uses State of Commute survey information to identify changes in commute behavior related to the use of information kiosks.

- Commuter Operations Center (COC) – The evaluation of COC activities will now include the impacts of improved transit information from the software upgrades that were heretofore included in the Integrated Rideshare TERM.

The evaluation activities described in the sections below elaborate on these issues.

SECTION 3 PERFORMANCE MEASURES

The previous evaluation frameworks established performance measures for each TERM. This framework updates and expands on those measures. Performance measures are measures of a program's success; how well the program is meeting its goals. Generally, we recommend that performance measures be established in the following two categories:

- Program awareness, attitudes, participation, utilization, and satisfaction
- Program impacts

Program awareness provides an indication of how well known the Commuter Connections program and its service are to commuters. Awareness will assume a larger role in this evaluation period since awareness is a primary goal of the new Mass Marketing TERM. A related type of measure is *attitude*, that is commuters' attitudes toward their commute and toward various commute modes. These measures examine commuters' personal feelings about travel modes and their willingness to consider and try new modes of travel.

Participation, utilization, and satisfaction measures could include, for example, the number of commuter assistance requests, number of matchlists provided, the speed with which assistance is delivered, and users' satisfaction with the assistance. These measures are important for tracking funding, estimating staffing, and identifying program improvements.

They generally also are needed to calculate the ultimate performance measures, *program impacts*, such as changes in mode split, vehicle trips reduced, and emissions reduced. This section describes several common performance measures recommended for each TERM and for the program as a whole. Performance measures specific to each TERM are listed in Section 4.

AWARENESS AND ATTITUDES

- Awareness – Program awareness will be measured in the proportion of residents and commuters who recognize the Commuter Connections "branding" and the range of services it provides or facilitates and are aware of transportation facilities available to them. Awareness will be assessed by both unaided and prompted questions in surveys of the public at large.

- Attitudes – A second area of exploration is attitudes toward commuting and solutions to congestion. Another goal of the Mass Marketing TERM is to address growing frustration levels among commuters that congestion is worsening and that there are few alternatives to sitting alone in rush-hour traffic. The evaluation will work to measure changes in travel attitudes over time, including: commute frustration levels and attitudes toward a range of possible alternatives to driving alone. This information is currently captured in the State of the Commute survey and report and will now be tracked over time as more general population surveys are conducted.

PROGRAM PARTICIPATION, UTILIZATION AND SATISFACTION

These performance measures gauge program output, that is, services provided and the use of those services.

Program Participation – Program participation refers to the number of clients who request services and the number who are assisted. Participation could include the numbers of new employer clients, GRH applicants, telecommuting employer sites, kiosk users, etc. A primary participation measure will be *number of applicants*, but other measures, specific to individual TERMs, also are described in Section 4.

Utilization – Utilization is defined as the number of "placements," commuters actually shifting to alternative mode arrangements as a result of the Commuter Connections services. These commuters could be new carpoolers, vanpoolers, transit riders, telecommuters, etc. The primary utilization measure will be the *placement rate*, the ratio of the number of commute who made a mode change to an alternative to the number of total users of the TERM services.

Program Satisfaction – A qualitative, but important set of performance measures is suggested to assess client satisfaction, an important feedback mechanism to determine whether services are meeting customers' needs and their expectations. This is important for Commuter Connections to gauge satisfaction of all groups using its services: employers, commuters, GRH users, telecommuters, and kiosk users, for example.

PROGRAM IMPACTS

Program impact measures estimate the results of the programs implemented and are needed to assess the travel, air quality, energy, and commuter cost saving benefits of the TERMs. The five impact measures include: vehicle trips reduced, vehicle miles traveled (VMT) reduced, emissions reduced, energy saving, consumer cost saving, and cost-effectiveness.

Vehicle Trips Reduced – The number of vehicle trips reduced is the first of two transportation impact measures. It estimates the number of daily vehicle trips removed from the road. This is a primary measure of congestion relief, as fewer vehicles on the road during peak hours could reduce delay, increase travel speed, reduce commute time, and improve service levels on roads. It is also a primary input (trip end emissions) to the air quality analysis.

Vehicle trip reduction is estimated using a *vehicle trip reduction (VTR) factor*, the average number of vehicle trips reduced per day for each person placed into a commute alternative (placement). This rate accounts for shifts from drive alone to commute alternatives, for shifts among commute alternatives (e.g., from carpool to vanpool and from transit to carpool), and for increases in the frequency (days per week) that a commuter uses an alternative mode. Shifts from alternative modes to drive alone are not included in the VTR factor, since these changes are not the purpose of commuters' contact with Commuter Connections, but generally an unintended effect. Appendix A describes how the VTR factor is calculated. Appendix B shows a sample VTR factor calculation.

Vehicle Miles of Travel (VMT) Reduced – VMT reduced, the second transportation impact measure, estimates the total miles of travel removed from the road daily. While less of a factor in congestion relief than trips reduced, VMT reduced is important to an air quality and energy evaluation.

Emissions Reduced – Emissions reduced measures the decrease in mobile source (tailpipe) emissions that result from reductions in vehicle trips or VMT. The primary pollutants of concern in the Washington metropolitan area for these TERMs are Oxides of Nitrogen (NOx) and Volatile Organic Compounds (VOC). Daily reductions of NOx and VOC, expressed in terms of tons per day reduced, are the air quality performance measures of greatest interest to this evaluation process.

Energy Saving – The energy saving, defined as the reduction in the number of gallons of gasoline used, results when commuters drive alone fewer miles.

Consumer Cost Saving – A fifth measure of program impacts is the aggregate cost savings realized by commuters who shift from driving alone to a commute alternative.

Cost-Effectiveness – Cost effectiveness, the final program impact measure, is calculated as the cost expended to achieve the benefits noted above, for example, the cost per vehicle trip reduced.

SECTION 4 EVALUATION COMPONENTS FOR INDIVIDUAL TERMS

Sections 2 and 3 stated the objectives and issues guiding the evaluation process and defined several common performance measures that will be used for all TERMs. This section details the specific evaluation approach for each of the five TERMs and for the Commuter Operations Center.

The TERMs included are:

1. Telework Resource Center / Telework Outreach
2. Guaranteed Ride Home
3. Employer Outreach
4. Mass Marketing
5. InfoExpress Kiosks
6. Commuter Operations Center

For each TERM, the following information is provided:

- TERM description
- Goals defined by TPB for the TERM for 2008
- Nature of the evaluation
- Performance measures recommended for the TERM
- Data needed to measure TERM impacts and recommended data sources

Section 5 of this report provides a more detailed description of the surveys and other data sources enumerated in this section. Section 7 presents a schedule for the collection of data and recommends a party to be responsible for collecting the data. Included in the appendices are examples of how travel and emission impacts are calculated for each TERM. These are taken from the 2005 TERM Analysis Report to provide real examples of how the calculations were performed in the last evaluation period. These calculation methods form the basis for the refinements included in this evaluation framework.

The specific data required for each TERM to calculate vehicle trips reduced and VMT reduced are described in the individual TERM evaluation component sections that follow. Additionally, some common data are needed to calculate emissions, cost, and energy impacts of each TERM, including:

- Access mode and distance to meeting locations for alternative mode users (to perform air quality analysis)
- Regional emissions factors (to determine NOx and VOC reductions)
- Regional fuel economy data in average miles per gallon consumed (to calculate energy saving)
- Program costs (to derive cost effectiveness)

TELEWORK RESOURCE CENTER / TELEWORK OUTREACH TERM

Program Description

In the Telework Resource Center / Telework Outreach (Telework Outreach), Commuter Connections, working with numerous partners in the region, assists employers to establish worksite telecommuting programs and arrangements and provides telecommute information to individual commuters. Telework Outreach estimates the impact of the portion of regional telecommuting that is attributable to Commuter Connections' telework assistance.

TERM Evaluation Changes Since 2002-2005

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

Stated Goals for 2008

The purpose of Telework Outreach is to increase the number of full-time or part-time home-based and telework center-based telecommuters in the region. COG defined five regional goals for this TERM for 2008:

- Create 31,854 new telecommuters
- Reduce 11,830 daily vehicle trips
- Reduce 241,209 daily miles of travel
- Reduce 0.122 daily tons of NOx
- Reduce 0.072 daily tons of VOC

Nature of Evaluation

The populations of interest for this TERM include two groups:

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

The evaluation first determines the number of regional teleworkers who were influenced or assisted by TRC services to begin teleworking and the travel impacts of their teleworking. Data for this component come from the State of the Commute survey: 1) number of new telecommuters in the region, 2) their frequency of telecommuting, 3) how they commute on non-telework days, and 4) how they learned about telecommuting. Placement rates and average trips reduced per placement are derived for home-based telecommuters and for those working at telecenters or other non-home locations.

Second, the evaluation estimates the portion of regional telecommuting influenced by Telework Outreach through employer telecommute seminars, direct telecommute assistance to employers, direct information assistance to commuters, and general promotion of telecommuting to the public-at-large.
Thus, the evaluation will define the regional universe of telecommuting and examine employers' and commuters' sources of information or assistance for telecommuting and the value of that information or

assistance in their starting or expanding telecommuting programs to estimate the share of telecommuting attributable to the TERM.

Performance Measures

Performance measures recommended to evaluate Telework Outreach include:

Participation, Utilization, and Satisfaction Measures:

- Number of employers that receive telecommute information or assistance from Commuter Connections
- Number of employers that implement/expand telecommute programs after receiving assistance
- Number of commuters who receive telecommute information or assistance from Commuter Connections
- Number of commuters that begin telecommuting after receiving assistance
- Number of new telecommuters – home-based and non-home based
- Telecommute placement rate

Program Impact Measures:

- Vehicle trips reduced (number of daily trips reduced)
- VMT reduced (in miles)
- Emissions reduced (in tons of pollutants)

Data Needs and Sources

The following data are needed to assess Telework Outreach impacts. Each data source is described in Section 5.

Data Need	*Data Source*
• Regional home-based telecommuters	State of the Commute (SOC) survey
• Non-home-based telecommuters	SOC survey
• Telecommute frequency (days/week)	SOC survey
• Percent drive-alone on non-telecommute days	SOC survey
• Travel distance on non-telecommute days	SOC survey
• Travel distance to telework centers	SOC survey
• Commuters' source of telecommute information	SOC survey
• TW at assisted employers worksite	TRC TW assistance survey

Proposed timing of data collection

- SOC survey – Early 2007
- Commuter Connections Telework assistance survey – Early 2008

To avoid double counting benefits, the portion of travel and emissions impacts attributable to the employer assistance component of Telework Outreach are subtracted from the Employer Outreach TERM.

GUARANTEED RIDE HOME TERM

Program Description

The Guaranteed Ride Home (GRH) program eliminates a real or perceived barrier to use of commute alternatives, the fear of being stranded without a personal vehicle. GRH provides free return transportation by taxi or rental car in the event of an unexpected personal emergency or unscheduled overtime to commuters who carpool, vanpool, use transit, or bike or walk to work at least two times per week on average. Commuters pre-register for GRH and may use the service up to four times per year. The program also allows "one-time exception" rides provided to non-registered commuters who used an alternative on the day a GRH trip was needed. Commuters who wish to use GRH again in the future must then register.

TERM Evaluation Changes Since 2002-2005

- No changes

Stated Goals

COG defined the following regional goals for GRH for 2008:

- Register 36,992 GRH applicants
- Reduce 12,593 daily vehicle trips
- Reduce 355,136 daily vehicle miles of travel
- Reduce 0.177 daily tons of NOx
- Reduce 0.097 daily tons of VOC

Nature of Evaluation

GRH is intended to encourage SOV commuters to shift to commute alternatives. Additionally, GRH is expected to help maintain existing commute alternatives and increase frequency of use. The evaluation measures the number of new alt mode users whose shifts were influenced by GRH and the number of commuters who used alt modes before registering for GRH who were influenced to continue using the modes. Since commuters must use commute alternatives when they register for GRH, the impact of GRH on shifts from driving alone must be assessed to determine the importance of GRH to travel changes.

Two populations are of interest for the GRH TERM evaluation:

- Commuters who registered for GRH
- One-time exception users – did not register for GRH but took an "exception" trip

Performance Measures

The following performance measures are used for GRH:

Participation, Utilization, and Satisfaction Measures:

- Number of commuters who request GRH information
- Number of GRH applicants
- Number of one-time exception users
- GRH placement rate

- Percent of GRH participants who take a GRH trip
- Satisfaction of GRH users with the service

Program Impact Measures

- Vehicle trips reduced (number of daily trips reduced)
- VMT reduced (in miles)
- Emissions reduced (in tons of pollutants)

Data Needs and Sources

The following data are needed to estimate GRH impacts. Each data source is described in Section 5.

Data Need	*Data Source*
• GRH applicants	Commuter Connections GRH database
• One-time GRH exception users	Commuter Connections GRH database
• GRH placement rate	GRH Applicant survey
• GRH VTR factor	GRH Applicant survey
• Average travel distance (trip length)	GRH Applicant survey

Proposed timing of data collection

- Commuter Connections GRH database – ongoing
- GRH Applicant surveys – spring 2007

Two subgroups are identified for GRH. The first sub-group includes participants who both live and work within the Washington, DC Metropolitan Statistical Area (MSA). The second group includes participants who work within the MSA but live outside it. Placement rates, VTR factors (average trips reduced per placement), and travel distances are estimated for each of the two sub-groups. This distinction is made because credit for the "out of MSA" participants is discounted to eliminate the VMT reduction that occurs outside the MSA.

The analysis of GRH also includes steps to avoid credit double counting from overlap with two other TERMs. Overlap occurs between GRH and the Commuter Operations Center because some GRH applicants also ask for rideshare information. The COC impacts are discounted to account for this overlap. GRH results also will be adjusted to assign a portion of the GRH program's impacts to the Mass Marketing TERM to recognize that some GRH applicants will be influenced to contact Commuter Connections and apply for GRH after by hearing a Mass Marketing ad.

EMPLOYER OUTREACH TERM

Program Description

The Employer Outreach TERM is designed to encourage employers to implement new commute alternative programs and to expand the services they offer in existing programs. In this TERM, jurisdiction-based sales representatives contact employers, educate them about the benefits commuter alternative programs offer to employers, employees, and the region and assist them to develop, implement, and monitor work site commute alternative programs. Commuter Connections assists the sales force with the following services, designed to enhance regional coordination and consistency:

- Computerized regional employer/employee contact database
- Marketing and information materials
- Employer outreach sales and service force training
- Annual evaluation program
- Support to Employer Outreach Ad-Hoc Group

TERM Evaluation Changes Since 2002-2005

- Eliminate Credit for Metrochek Employers not in ACT! Database – 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 WMATA's program. This credit will not be included in the 2005-2008 calculation.

- Incorporate Credit from Employer Outreach for Bicycling – In the 2002-2005 evaluation, a separate credit was estimated for impacts related to bicycle support implement 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.

Stated Goals

COG has defined the following regional goals for Employer Outreach for 2008:

- Achieve 942 participating employers, 90 with bicycle support
- Reduce 86,627ily vehicle trips
- Reduce 1,427,874 daily vehicle miles of travel
- Reduce 0.735 daily tons of NOx
- Reduce 0.46 daily tons of VOC

Nature of Evaluation

Employer Outreach is aimed at increasing the number of private employers implementing worksite commute alternative programs, but Employer Outreach is ultimately designed to encourage employees of client employers to shift from driving alone to commute alternatives. Two primary evaluation questions are thus important. First, how many employers start or expand commute alternative programs? And second, how many employees use commute alternatives in response to new employer-sponsored services at the worksite?

The populations of interest for this TERM are:

- Employers that participate in Employer Outreach
- Employees at Employer Outreach worksites

Performance Measures:

The following performance measures are recommended for Employer Outreach:

Participation, Utilization, and Satisfaction Measures:

- Number of employer clients (employers with commute alternative programs)
- Number of employees at worksites with commute alternative programs
- Level/extent of employers' commute alternative programs
- Commute alternative mode split at worksites with commute alternative programs (placements)
- Employer satisfaction with outreach assistance and services

Program Impact Measures:

- Vehicle trips reduced (number of daily trips reduced)
- VMT reduced (in miles)
- Emissions reduced (in tons of pollutants)

Data Needs and Sources

The following data items will be used to calculate program impacts. Each data source is described in Section 5.

Data Need	*Data Source*
• Employers participating in Employer Outreach Program (incl. bicycle)	ACT! database
• Employer characteristics	ACT! database
• Level of commute alternative program at worksite	ACT! database
• Starting Average Vehicle Ridership (AVR)	Employee baseline surveys
• Ending AVR (estimated)	EPA COMMUTER or CUTR WTR Model
• Average travel distance	SOC survey

Proposed timing of data collection

- ACT! database – ongoing
- Employee baseline surveys – ongoing
- SOC survey – Early 2007

The Employer Outreach TERM is unique in that it is the only TERM for which placement rates and VTR factors are not used to determine the number of new participants, vehicle trips reduced, or VMT reduced. This is because employee survey data cannot feasibly be collected to assess employees' post-program travel behavior. These missing evaluation elements are modeled using the EPA COMMUTER Model.

To estimate impacts, employers' starting mode shares and commute alternative program strategies are input into the COMMUTER Model and the model estimates "after" mode split and average vehicle ridership, that is, with the program in place. The TERM analysis used this model in both the 1999-2002 and 2002-2005 evaluations. For the 2005-2008 TERM analysis, a new model will be evaluated to assess its

use for this TERM. The CUTR Worksite Trip Reduction (WTR) Model will be assessed to gauge whether it is a more robust tool for evaluating changes to employer programs. Based on the results of that assessment, the COMMUTER or CUTR WTR Model will be used for the 2005-2008 evaluation period.

MASS MARKETING TERM

Program Description

In 2003, Commuter Connections embarked on an ambitious effort to educate the region's commuters about alternatives to stress-filled solo commuting and to raise awareness of commute assistance services available through Commuter Connections and its partners. Radio, direct mail, and other media are used to create a new level of public awareness and to provide a call to action to entice commuters to switch to alternative modes. Support of Bike to Work Day is also now included with the Mass Marketing TERM. 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

TERM Evaluation Changes Since 2002-2005

- Calculate Both "Direct" and "Referred" Impacts – In the 2002-2005 TERM framework, it was assumed that credits would be calculated only for commuters who were directly influenced by the MM TERM to change modes. In the 2005 TERM analysis, however, a second credit was estimated for a share of GRH and ridematching applications that were generated by referrals from MM ad campaigns to the GRH program and Commuter Operations Center. Both credits will be included in the 2005-2008 evaluation framework.

- Incorporate Bike to Work Day – In the 2002-2005 evaluation, impacts from Bike-to-Work Day were captured in the Employer Outreach for Bicycling TERM. In 2005-2008, this credit will be included in the Mass Marketing TERM.

Stated Goals

COG has defined the following regional goals for Mass Marketing for 2008:

- Induce 11,023 commuters to switch modes
- Reduce 7,759 daily vehicle trips
- Reduce 141,231 daily vehicle miles of travel
- Reduce 0.072 daily tons of NOx
- Reduce 0.044 daily tons of VOC

Nature of Evaluation

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 Bike-to-Work Day event

The Mass Marketing 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 pro-

gram 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 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 co-worker 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.

This influence of Mass Marketing on the general commuting population will be assessed through questions in the State of Commute survey that estimate the incidence of mode shifting in the region and what prompted the shift. If the shift is 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 by the ads to contact Commuter Connections. These changes would include, for example, a commuter who hears the ad, requests a ridematch list from Commuter Connections, then forms a new carpool.

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 prorated share of the impacts of these other TERM impacts then can be assigned to Mass Marketing.

The Mass Marketing TERM will, therefore, use data from the State of the Commute survey as well as ongoing tracking data from the Commuter Operations Center and tracking of timing of MM ads. Separate direct and indirect placement rates, VTR factors, and impacts will be estimated for each of these two components.

Participation, Utilization, and Satisfaction Measures:

- Percentage of regional commuters aware of ad campaign and messages
- Percentage of commuters with positive attitudes toward alt modes (e.g., willingness to try alt mode)
- Percentage of regional commuters aware of Commuter Connections programs/services
- Number of contacts to Commuter Connections (e.g., call volumes, web hits, registrants)
- Direct change placement rates (temporary and continued change)

Bike to Work Day – Participation, Utilization, and Satisfaction Measures:

- Number of riders participating in Bike to Work Day event
- Mode split of participants before and after Bike to Work Day event

Program Impact Measure (direct and indirect):

- Vehicle trips reduced (number of daily trips reduced)
- VMT reduced (in miles)
- Emissions reduced (in tons of pollutants)

<u>Data Needs and Sources</u>

Assess changes in awareness, attitudes, information (Population-at-large):

- In SOC survey, assess commuters' awareness and recall of specific marketing messages and awareness of Commuter Connections commuter assistance services. Were commuters aware of commute ads and the specific messages conveyed? Were commuters who heard the ads more willing to consider using alt modes?

Assess increase in contacts (Population-at-large and Commuter Connections clients):

- Monitor volume of inquiries to Commuter Connections program information sources (phone, internet). Did contact increase during periods of mass marketing advertisement waves?
- Ask commuters who contact CC about referral source
- In SOC survey, ask about use of regional services that might correspond to awareness of the Mass Marketing campaign

Assess trial and permanent behavior change (Population-at-large):

- In SOC survey, assess travel behavior changes among commuters who recall hearing message and cite influence of marketing campaign. Also compare incidence of change with and without TERM influence. Need to correct for double counting with commuters who also cite influence of other TERMs on change.
- Track changes in call and internet email request volumes to COC and assign incremental increase in placements to the Mass Marketing TERM.

Data Needs	*Data Source*
Advertising Campaign	
• Regional commuters aware of ads / messages	SOC survey
• Percentage of commuters with positive attitudes toward alt modes	SOC survey
• Regional commuters aware of CC services	SOC survey
• Contacts to CC info sources	SOC survey and COC tracking
• MM placement rates (temporary and continued)	SOC survey and COC tracking
• MM VTR factors	SOC survey, GRH survey, CC Applicant Placement survey
Bike to Work Day (BTWD)	
• Number of BTWD participants	BTWD survey
• Before and after travel behavior	BTWD survey
• Average travel distance	BTWD survey

Proposed timing of data collection

- SOC survey – Early 2007
- CC Applicant Placement survey – 2005
- GRH Applicant survey – Spring 2007
- Commuter Operations Center (COC) tracking – Ongoing
- Bike-to-Work Day (BTWD) event survey – Fall 2007

Not all increases in program inquiries resulting from indirect impacts will be assigned to the Mass Marketing TERM. The share of GRH and COC indirect impacts to be assigned to MM will be determined by

estimating the increase in applications that occur during period when MM ads are run. These credits will be subtracted from GRH or COC to avoid double counting.

INFOEXPRESS KIOSKS

Program Description

This TERM focuses on the information delivery system for commuters. It 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.

TERM Evaluation Changes Since 2002-2005

- None

Stated Goals

The following goals were defined for the InfoExpress Kiosk program for 2008:

Reduce 5,925 daily vehicle trips
Reduce 155,839 daily vehicle miles of travel
Reduce 0.078 daily tons of NOx
Reduce 0.043 daily tons of VOC

Nature of Evaluation

The kiosk population of interest includes regional commuters who can be directly identified as having used an InfoExpress Kiosk to obtain transportation information. Evaluation of the kiosk users is more difficult than for other TERMS, because the anonymous nature of kiosks makes it difficult to follow-up with these users. To assess impacts for those users who obtain traveler information using kiosks, the evaluation will rely on the SOC survey. A sufficient number of survey respondents used kiosks (based on the 2001 and 2004 SOC surveys) to enable kiosk analysis from this source and we anticipate a similar use incidence in 2007. From these data, a placement rate and VTR factor will be developed for this population.

Performance Measures

The following performance measures are proposed:

Participation, Utilization, and Satisfaction Measures:

- Number of users who access commute/transportation information through a kiosk
- Number of users who submit a ridematch application to Commuter Operations Center
- Number of users who obtain transit schedules or maps
- Kiosk user placement rate (percent of users who shift to a commute alternative)

Program Impact Measures:

- Vehicle trips reduced (number of daily trips reduced)
- VMT reduced (in miles)
- Emissions reduced (in tons of pollutants)

Data Needs and Sources

The following data items will be used to calculate performance measures for the InfoExpress Kiosks. Each data source is described in Section 5.

Data Needs	*Data Source*
• Kiosk users	SOC survey
• Applications submitted to CC via kiosks	Commuter Connections database
• Kiosk users' placement rate	SOC survey
• Kiosk VTR Factor, average travel distance	SOC survey

Proposed timing of data collection

- Commuter Connections database – ongoing
- SOC survey – Early 2007

This TERM overlaps with the Commuter Operations Center for rideshare applicants who submit their applications via the kiosk. Double counting of impacts is avoided by estimating the kiosk impact for these rideshare applicants and subtracting this credit from the impacts calculated for the Commuter Operations Center.

COMMUTER OPERATIONS CENTER

Program Description

For many years COG has offered basic commute information and assistance, such as ridematching. Because these services were available when the emissions baseline was developed for regional conformity, only benefits above this 1997 baseline are included as a TERM.

The function of the Commuter Operations Center is to increase commuters' awareness of commute alternatives, 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 commute alternatives is a priority for the COC, but the COC also assists commuters who now use commute alternatives to continue to do so, by offering ridematching and transit assistance when carpools break up or commuters' travel patterns change and disrupt existing commute alternative 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 information kiosks described below.

TERM Evaluation Changes Since 2002-2005

- Incorporate Software Upgrades – In the 2002-2005 evaluation, the Integrated Rideshare TERM included a Software Upgrade component. This component integrated information on transit service options, Park & Ride locations, and telecenter locations into the Commuter Connections Ridematch Software System (information provided to all matchlist recipients). This component has now been incorporated into the Commuter Operations Center.

Stated Goals

COG has defined the following goals for the Commuter Operations Center for 2008:

- Register 152,356 commuters
- Reduce 10,399 daily vehicle trips
- Reduce 296,635 daily vehicle miles of travel
- Reduce 0.147 daily tons of NOx
- Reduce 0.081 daily tons of VOC

Nature of Evaluation

Since the basic Commuter Connections ridematching and information services are covered in the conformity baseline, this evaluation component seeks to credit the program with any increases in effectiveness due to program enhancements not covered by other TERMs. Thus, the basic approach is to determine the total transportation and air quality impacts for all Commuter Connections services and subtract out impacts assigned to GRH, Mass Marketing, InfoExpress Kiosks, and any other TERM that overlaps with the COC. The balance of impacts equals the impacts of the COC.

Performance Measures

The following performance measures are proposed for the Commuter Operations Center:

Participation, Utilization, and Satisfaction Measures

- Number of commuter applicants to the COC
- Percent of applicants who receive matchnames on their matchlist
- COC placement rate
- Applicant satisfaction with COC service

Program Impact Measures:

- Vehicle trips reduced (number of daily trips reduced)
- VMT reduced (in miles)
- Emissions reduced (in tons of pollutants)

Data Needs and Sources:

The following data items will be used to calculate program impacts for the Commuter Operations Center, including the improved transit information from the software upgrades. Each data source is described in Section 5.

Data Needs	*Data Source*
Commuter Connections (CC) applicants	Commuter Connections database
CC placement rate	CC Applicant Placement survey
CC VTR Factor and average travel distance	CC Applicant Placement survey
Vehicle trips and VMT assigned to other TERMs	Results of other TERM evaluations

Proposed timing of data collection

- Commuter Connections database – ongoing
- CC Applicant Placement survey (2005)
- SOC survey – early 2007

SECTION 5 DESCRIPTION OF DATA SOURCES

Much of the data needed to perform the evaluation outlined in this framework is available from two basic sources. Data on program participation will be available from ongoing monitoring activities of COG and its partners in the form of application records, GRH registration forms, etc. The other basic source of travel impact and attitudinal information comes from annual or triennial surveys of applicants, service users or the public-at-large. All these surveys have been used in past years; all with be reviewed and modified as needed for the 2006-2008 period. The data sources and surveys can be divided into three groups as follows:

Ongoing Monitoring

ACT! Employer Contact database
Telework Resource Center / Telework Outreach
Bike to Work Day participant records
Commuter Connections applicant database (COC, GRH, kiosk, internet applicants)
Commuter Operations Center activity tracking

Existing/Ongoing Surveys

- Commuter Connections applicant Placement Rate survey (completed in FY 06)
- GRH survey
- State of the Commute survey
- Employee commute surveys (voluntarily administered by employers)
- Telework assisted employer follow-up survey
- Bike-to-Work Day participant survey

Analysis Tools

- EPA COMMUTER Model or CUTR Worksite Trip Reduction Model

Each data source, survey, and analysis tool is described below, noting the TERM or TERMs for which it collects evaluation data. Table 1 serves as a quick reference for the proposed uses of each data source. In general, the data are used for either or both of two purposes. The first, TERM tracking, monitors use of and user satisfaction with the TERMs. The second purpose, conformity analysis, refers to the calculation of transportation, air quality, energy, and cost impacts of the TERM. This evaluation framework document deals primarily with the second of the purposes.

Table 1
Data Collection and Reporting Activities
Use of the Data

Evaluation Activity/Tool	Applicable TERM	Use of Data
Ongoing Monitoring		
• ACT! Employer Contact Database	Employer Outreach	TERM tracking, conformity analysis
• Telework employer contact and seminar records	TRC / Telework Outreach	TERM tracking, conformity analysis
• Bike to Work Day participant records	Mass Marketing	TERM tracking, conformity analysis
• Commuter Connection Applicant Database	COC	TERM tracking, conformity analysis
• Commuter applicant base	Mass Marketing	TERM tracking, conformity analysis
Existing/Ongoing Surveys		
• Commuter Connections Applicant Placement Rate Survey	COC, Mass Marketing	TERM tracking, conformity analysis
• State of the Commute Survey	TRC, Kiosks, Mass Marketing	Commute trend analysis, conformity analysis
• GRH Applicant Survey	GRH	Conformity analysis
• Bike-to-Work Participant Survey	Mass Marketing	TERM tracking, conformity analysis
• Employee Commute Surveys	Employer Outreach	TERM tracking, conformity analysis
• Telework assisted employer follow-up survey	TRC	TERM tracking, conformity analysis
Analysis Tools		
• COMMUTER or WTR Model	Employer Outreach	Conformity analysis
Evaluation Results Reporting		
• CC monthly “Report Card”	All TERMs	TERM tracking
• CC Program Annual Report	All TERMs	TERM tracking
• TERM Analysis Report	All TERMs	Conformity analysis

ONGOING MONITORING

Program activity and utilization tracking is an ongoing function already performed by COG staff and regional partners. Included here are records of services provided (e.g., number of employers contacted and GRH rides provided) and information on requests received (e.g., number of ridematch applications and kiosk "hits"). It is important to track these activities by program element, especially for activities within TERM programs.

The information gathered in the ongoing tracking process is summarized in a monthly Commuter Connections "report card" that reports participation and utilization data and estimates travel, air quality, energy and consumer savings benefits using the factors generated from the most recent placement rate survey. This tool is used primarily by Commuter Connections staff and staff of regional partner programs as a frequent check of progress in various activity and program areas. Annual or triennial evaluation results are then reported to the COG Transportation Planning Board and other policy-makers and program partners.

- Commuter Operations Center Activity Tracking – Ongoing tracking of telephone and internet information requests, GRH registration, and ridematching applications received for processing. *(Used for GRH, InfoExpress Kiosk, and Mass Marketing TERMs and Commuter Operations Center)*

- ACT! Employer Client Database – Tracks the number of employers participating in Employer Outreach Program and the commute alternative services they offer in worksite programs. Sales representatives who assist employers to begin and maintain commute alternatives programs update the database when new employers join the program and when employers already participating in EO change their commute alternative programs. The database includes information on employer characteristics (e.g., size, location, type of employer) and on the strategies (e.g., transit subsidies, GRH, preferential parking, telecommuting) employers include in their programs. *(Used for Employer Outreach TERM)*

- Telework Seminar Records – Tracks the number of and contact information for employers who attend a Commuter Connections telework information seminar. This information may be used to identify employers to be sent a follow-up survey. *(Used for Telework Resource Center/Telework Outreach TERM)*

- Bike-to-Work Day Records – Provides information on commuters who register to participate in Bike-to-Work Day and the employer for whom they work. *(Used for Mass Marketing TERM)*

EXISTING/ONGOING SURVEYS

Several surveys are currently conducted by Commuter Connections to follow-up with program applicants and to assess user satisfaction. All of these surveys provide data used to estimate program impacts. Some of the surveys, such as the Applicant Placement survey and GRH Survey, also provide information to be used by Commuter Connections staff to fine tune programs.

- Commuter Connections Applicant Placement Rate Survey – Since May 1997, Commuter Connections has conducted commuter applicant placement surveys to assess the effectiveness of the Commuter Operations Center and other program components. These surveys have been used to derive placement rates and other evaluation variables needed to calculate program impacts. The surveys also assess users' perceptions of and satisfaction with the services provided. Through 2005, this survey was conducted annually, at the same time each year in the fall. In the 2005-2008 evaluation period, only one placement survey will be conducted (November 2005).

  Data from the applicant placement survey are used to calculate placement rates for the Commuter Operations Center and for the Mass Marketing TERM (referred impacts). Additionally, Vehicle Trip Reduction factors are derived from this survey.

  Results of the surveys conducted during this evaluation period were presented in a survey report. Reported results are primarily for internal use by program and technical staff, but results also can be summarized for policy makers, such as the TPB, the TPB's Technical Committee, and other regional policy makers. In the future, selected results may also be summarized for distribution to the media, employers, commuters, and the public-at-large. *(Used for the Mass Marketing TERM and Commuter Operations Center)*

- GRH Applicant Survey – Commuters who register with the GRH program or use a one-time exception trip will be surveyed to establish how the availability and use of GRH influenced their decision to use an alternative mode and to maintain that mode. Satisfaction with GRH services also will be polled. Some data collected in the survey, such as current and previous mode, travel distance, and access mode, will be used to develop the GRH placement rate and VTR factor. *(Used for GRH TERM).*

- State of the Commute Survey – The SOC survey, a random sample survey of employed adults in the Washington metropolitan region, serves several purposes. First, it establishes trends in commuting behavior, such as commute mode and distance, and awareness and attitudes about commuting and about specific services, such as HOV lanes and public transportation, available to commuters in the region. To this end, it will be compared to the 2001 and 2004 State of the Commute Surveys.

  The SOC survey also helps to estimate the impacts of TERMs that have a possible influence on the population-at-large. Specifically, the survey generates information on kiosk use and telecommuting, two TERMs that have broad application and for which it is not possible to identify all users from any Commuter Connections database. The survey also is used to assess awareness and penetration of the regional GRH program.

  Finally, by querying respondents about commuters' sources of information on commute alternatives and their reasons for choosing commute alternatives, the survey will also suggest how other commute alternative programs and marketing efforts influence commuting behavior in the region. In this way, it will also help to establish the influence of the Mass Marketing advertising messages on mode switching and use of Commuter Connections services.

The State of the Commute survey is a triennial survey and will be conducted in early 2007. *(Used for Telework Resource Center, GRH, Employer Outreach, and Mass Marketing TERMs)*

- Employee Commute Surveys – Some employers also conduct baseline surveys of employees' commute patterns, before they develop commute alternative programs and follow-up surveys after the programs are in place. The results of these surveys also are available through the database. COG reviews the results quarterly. *(Used for Employer Outreach TERM)*

- Employer Telework Assistance Follow-up Survey – Sent to employers who have attended a Commuter Connections telework information seminar or received other telework assistance from Commuter Connections to determine if and how they used the information they received. Specifically, the survey asks if the employer has begun a telecommute program since attending the seminar and if the seminar was helpful. This information is used to estimate the number of telecommuters directly influenced by Commuter Connections telework outreach to start telecommuting. *(Used for Telework Resource Center/Telework Outreach TERM)*

- Bike-to-Work Day Participant Survey – A survey among registered participants in the Bike-to-Work Day event is undertaken to assess travel behavior before and after the Bike-to-Work Day, as well as commute distance and travel on non-bike days. *(Used for Mass Marketing TERM)*

ANALYSIS TOOLS

During the 2006-2008 evaluation period, the predictive model used as part of the Employer Outreach TERM method will be evaluated against a new model available from the Center for Urban Transportation Research at the University of South Florida. The evaluation will be conducted in 2008 and presented to COG with a recommendation. The selected model will be used as part of the Employer Outreach TERM analysis and included in the Analysis Report.

EPA COMMUTER Model – This model estimates the change in mode split at an employer worksite or group of worksites based on changes to employer-provided support services, incentives, and transportation services. It is based on a logit mode choice model and experiential data on employer support services.

CUTR Worksite Trip Reduction Model – The CUTR Worksite Trip Reduction Model is built upon empirical evidence from thousands of employer TDM plans from around the U.S., but it estimates changes in commute behavior in a very different manner than the other two models and can evaluate a greater number of employer programs.

As part of the evaluation framework development process, the team will assess this new tool and compare it to the EPA Commuter Model, in terms of ease of use, comparative rigor, range of measures that can be evaluated, and format for reporting results. As was done during the switch to the COMMUTER model in the 1999-2002 evaluation, the team will again evaluate a sample set of employers with both the EPA COMMUTER model and CUTR Worksite Trip Reduction Model to attain a comparative assessment on the same data set and recommend the best tool for the TERM analysis.

SECTION 6 BASIC METHOD FOR CALCULATING PROGRAM IMPACTS

This section presents the methodology for calculating and quantifying the travel, air quality, energy and commuter cost impacts of the TERMs. Following are the basic calculation steps common to all TERMs (except Employer Outreach, which uses a modeled method and Mass Marketing, which uses information from the State of the Commute and COC activity tracking to assess mode change due to the campaign). Specific examples of the evaluation calculations and unique methodological elements for each TERM are included in Appendices C through H:

- Appendix C – Telework Resource Center / Telework Outreach
- Appendix D – Guaranteed Ride Home
- Appendix E – Employer Outreach
- Appendix F – Mass Marketing
- Appendix G - InfoExpress Kiosks
- Appendix H – Commuter Operations Center

DOCUMENTING PROGRAM PARTICIPATION AND UTILIZATION

The evaluation of program impacts requires first an accurate documentation of the participation of employers and commuters in each TERM program. Commuter Connections staff and local jurisdiction program partners will need to consistently and continuously track the number of participants or users of each TERM. Specifically, we propose that the following be counted:

- Private employers participating in the Employer Outreach TERM.

- Commuters who request Commuter Connections assistance also will be tracked, as will the type of information requested (e.g. ridematching, transit information, telework assistance, bicycle information, etc.) and information on where they heard about Commuter Connections (advertisement, employer, friend, etc.). Using the results of the applicant placement survey and other surveys conducted under this project, separate placement rates will be developed for Integrated Rideshare and the Commuter Operations Center.

- GRH registrants and one-time exception users should be tracked as a group, separately from all applicants. A GRH placement rate and VTR factor will be developed from the GRH survey.

- Employers participating in Commuter Connections' Telework Outreach activities should be tracked through telework contact records. Telecommute placement rates (proportion of employees at the worksites who become telecommuters) and a corresponding VTR factor will be developed from data collected in the telework outreach follow-up survey.

- Finally, the number of kiosk users in total and those requesting specific follow-on information should be tracked. Using the results of the SOC survey, placement rates and VTR factors will be estimated for regional kiosk users.

- Commuters participating in Bike-to-Work Day should be tracked to determine the total number of participants

The purpose of this tracking process is to determine the "population base" to be used to quantify impacts and then to credit those impacts back the TERM from which they were derived. Other program information, in addition to participation and utilization, also should be tracked and documented for use in program refinement.

Information on participation and utilization will be included in monthly and annual program summaries. The intent is for Commuter Connections and its partners to input participation results, credited to each TERM, into a form that allows for the calculation of impacts. This is accomplished with a simple spreadsheet that includes the factors discussed below.

CALCULATING PROGRAM IMPACTS

The following subsection provides an example of how program impacts will be calculated for the five TERM programs. As each of these services has become fully operational, tailored surveys have been developed to produce unique placement rates and VTR factors for each TERM.

The calculation method is designed to:

- Quantify the benefits of the program
- Compare projected impacts to actual results
- Be simple to understand and apply
- Be inserted into simple spreadsheet program for monthly and semi-annual reporting

Eight basic steps are used to calculate program impacts. These steps are described below. A hypothetical numerical example of the steps is presented in Figure 1 for one TERM.

TERM Evaluation
Basic Program Impact Calculation Methodology Steps

1. Estimate commuter "population base" for the TERM	= e.g., all commuters, GRH applicants, CC applicants, Kiosk users, EO employees,
2. Calculate placement rate (from commute survey data)	= Proportion of commuters who made a travel change as a result of the TERM
3. Estimate number of "placements"	= Population base x placement rate
4. Estimate VTR factor (from commute survey data)	= Average daily vehicle trips reduced per placement
5. Estimate vehicle trips (VT) reduced	
- GRH, kiosks, COC, Telework, MM	= placements x VTR factor
- Employer Outreach	= Modeled method
6. Estimate VMT reduced	= Vehicle trips reduced x avg. trip length
7. Adjust VT and VMT for SOV access	
- Adjusted vehicle trips reduced	= Total vehicle trips – SOV access trips
- Adjusted VMT reduced	= Total VMT – SOV access VMT
8. Estimate emissions reduced	= Vehicle trips x "trip end" emission factors = VMT x "running" emission factor
9. Estimate energy and commuter savings	= VMT reduced x average fuel consumption = VMT reduced x average vehicle operating cost
10. Estimate cost-effectiveness	= total annual TERM budget ÷ annual emissions reduced by TERM

Figure 1

Example of Basic Program Impact Calculation Methodology Steps for a TERM

(Caution: this is a hypothetical example. The factors used and results generated from this example should not be used for actual evaluation purposes)

1. Estimate TERM "population base"	= 8,000 commuters
2. Calculate placement rate	= 20%
3. Estimate number of "placements"	= 8,000 x 0.2 =1,600 commuters placed
4. Estimate VTR factor	= 0.7 vehicle trips reduced per placement
5. Estimate vehicle trips (VT) reduced	= 1,600 x 0.7 trips reduced per placement = 1,120 vehicle trips reduced
6. Estimate VMT reduced	= 1,120 vehicle trips reduced x 25 miles/trip = 28,000 VMT reduced
7. Adjust VT and VMT for SOV access	(assume 60% of placements have SOV access and drive 5 miles to meeting point)
- Adjusted vehicle trips reduced	= 1,120 trips – 0.6 x 1,120 = 1,120 - 672 = 448 vehicle trips (without SOV access)
- Adjusted VMT reduced	= 28,000 VMT – (0.6 x 1,120 x 5 miles) = 28,000 – 3,360 = 24,640 VMT
8. Estimate emissions reduced	
VOC	= 448 trips x 1.7569 gm/trip = 787 gm = 24,640 VMT x 0.1856 gm/VMT = 4,573 gm = (787 gm + 4,573 gm) / 907,185 gm/ton = 0.0059 tons VOC reduced
NOx	= 448 trips x 0.6291 gm/trip = 310 gm = 24,640 VMT x 0.4287 gm/VMT = 10,563 gm = (310 gm + 10,563 gm) / 907,185 gm/ton = 0.012 tons NOx reduced
9. Estimate energy and commuter savings	
Energy saving (gallons of fuel)	= 28,000 daily VMT / 23.8 mpg = 1,176 gallons per day x 250 work days/yr = 294,100 gallons saved per year

Commuter cost saving ($) = 28,000 VMT x $0.144/mile
= $4,032 per day x 250 work days/year
= $1,008,000 saved per year / 1,600 placements
= $630 saved per placement per year

Step 1 – Determine Commuter Population Base

It is important first to establish the population base, or population of interest, relevant to the TERM specific. This is the population that potentially could have been influenced by the TERM. Depending on the TERM being evaluated, this could be all commuters, GRH applicants, kiosk users, telecommuters, or some other population. In the example shown in Figure 1, the population base is 8,000 commuters.

Step 2 – Calculate Placement Rate

The next step in determining program impacts is to calculate the placement rate for the population base exposed to the TERM. The placement rate is equal to the percentage of commuters in the population base who shift to a commute alternative (carpool, vanpool, public transportation, walk/bike, telecommute) after receiving assistance under the TERM. Placement rates are calculated from survey data.

Two separate placement rates are calculated for each TERM, to account for the length of time the commuter uses the commute alternative after shifting: continuing rate (did not shift back to original mode), temporary (tried new alternative mode but shifted back to original mode within the evaluation period).

For simplicity, Figure 1 shows only one placement rate, 20%. This means that 20% of the commuters in the population base made a change to a commute alternative as a result of the TERM. The placement rates for one TERM will not necessarily be the same as the placement rates for any other TERM.

Step 3 – Estimate Number of New Placements

Step 3 estimates the number of new commuter placements in commute alternatives. This is the actual number of commuters who are expected to have made the shift to a commute alternative as a result of the TERM. It is calculated by multiplying the placement rate (calculated in Step 2 from a survey of a sample of commuters in the population base) by the total population base. In our example in Figure 1, the calculation of placements is as shown below:

Placements = 8,000 commuters (population base) x 0.2
= 1,600 placements

Step 4 – Estimate VTR Factor

From the same survey data used to calculate placement rate, the Vehicle Trip Reduction (VTR) factor is next calculated. This is equal to the average daily vehicle trips reduced per placement. As described in Section 3, not all commuter placements will reduce the same number of trips. Three types of commute shifts are captured in the VTR factor:

1) Drive alone applicants shifting to a commute alternative
2) Current commute alternative users shifting to different alternative modes (e.g., carpool to transit)
3) Current commute alternative users increasing the number of days they use commute alternatives

The number of trips a commuter reduces also depends on the number of days per week that he or she now use the commute alternative, compared to the number of days he or she used it before. The VTR factor combines the varied trip reduction results of all commuter placements to develop an average reduction per placement. An explanation of how the VTR Factor is calculated is provided in Appendix A and a numeric example is shown in Appendix B. As for placement rate, VTR factors might be different for different TERMs.

As shown in Figure 1, the VTR factor for the TERM in our hypothetical example is 0.70. This means that each of the placements for this TERM reduces, on average, 0.7 vehicle trips per day.

Step 5 – Estimate Vehicle Trips Reduced

The number of vehicle trips reduced for the TERM is then estimated by multiplying the number of commuter placements from Step 3 by the VTR factor, the average number of trips reduced per placement, calculated in Step 4. The calculation of vehicle trips reduced for the example shown in Figure 1 would be as follows:

Vehicle trips reduced = 1,600 placements x 0.7 trips reduced per placement
= 1,120 vehicle trips reduced

Step 6 – Estimate VMT Reduced

The total daily VMT reduced is calculated by multiplying the number of vehicle trips reduced (Step 5) by the average commute distance for the population of interest. The average distance for the population is calculated from the same survey data used to calculate the placement rate and VTR factor. The example in Figure 1 assumes that the average distance is 25 miles per one-way trip. Using this distance, the total VMT reduced for 1,120 vehicle trips is:

VMT reduced = 1,120 vehicle trips reduced x 25 miles per trips
= 28,000 VMT reduced

Step 7 – Adjust Vehicle Trips and VMT for SOV Access

Because a basic purpose for implementing the TERMs is to meet regional air quality standards and resulting emission reduction targets, single occupant vehicle (SOV) access to commute alternatives must be considered. Emission reduction, as explained in Step 8, is calculated by multiplying vehicle trips reduced and VMT reduced by emission factors. But because commuters who drive-alone to meet a carpool, vanpool, bus, or train do create a "cold start," their trips must be subtracted from the vehicle trip reduction to assess the air quality impact of TERMs. Additionally, the distance they travel to the meeting point must be subtracted from the VMT reduced to obtain an accurate VMT count. It is these "adjusted" vehicle trips reduced and VMT reduced, rather than the initial totals, that are used to calculate emissions reduced.

In our example, it is assumed that 60% of the commuter placements drives alone to the rideshare or transit meeting point and that the average distance to this point is 5 miles. Using these figures, the "adjusted" vehicle trips reduced and VMT reduced are shown below:

Adjusted vehicle trips reduced = 1,120 trips – (1,120 x 0.6 with SOV access)
= 1,120 trips – 672 trips

= 448 vehicle trips reduced (for emissions calculation)

Adjusted VMT reduced = 28,000 VMT – (1,120 trips x 0.6 SOV access x 5 miles)
= 28,000 – 3,360
= 24,640 VMT reduced (for emissions calculation)

Step 8 – Estimate Emissions Reduced

As noted in Step 7, emissions reduced are estimated by applying two regional emission factors, a "trip end emissions" factor and a "running emissions" factor, respectively, to the number of vehicle trips or "trip ends" reduced and to the VMT reduced to determine the pollutants (in this case NOx and VOC) reduced as result of the program. The trip end emissions factor accounts for the emissions created from a "cold start," when a vehicle is first started, and a "hot soak," that occur when the vehicle is later turned off. The running emission factor accounts for the emissions generated per mile of travel by a warmed-up engine.

For 2008, the 2005-2008 TERM Analysis target year, the emission factors are:

Emission Factor

	NOx	VOC
• Trip end *(grams per one-way vehicle trip)*	0.6291	1.7569
• Running *(grams per mile)*	0.4287	0.1856

To estimate total emissions, the trip end emission factor is multiplied by the adjusted daily vehicle trips reduced (Step 7) and the running factor is multiplied by the adjusted daily VMT reduced (Step 7). These two products are then added to determine total annual NOx and VOC reductions in grams. This total is then divided by 907,185 grams per ton to convert the emissions reduced to tons per day. Using these emissions factors, the total VOC and NOx reduced for our example in Figure 1:

VOC = 448 trips x 1.7569 g/trip = 787 g
= 24,640 VMT x 0.1856 g/VMT = 4,573 g
= (787 gm + 4,573 g) / 907,185 g/ton

= 0.0059 tons VOC reduced

NOx = 448 trips x 0.6291 g/trip = 310 g
= 24,640 VMT x 0.4287 g/VMT = 10,563 g
= (310 g + 10,563 g) / 907,185 g/ton

= 0.012 tons NOx reduced

Step 9 – Estimate Energy and Commuter Cost Savings

While air quality is the primary impact driving the TERM analysis, energy and consumer benefits also are real and tangible benefits from commute alternative programs. For this analysis, energy and commuter cost savings factors are applied to the VMT reduced. These factors are as follows:

- Energy savings are based on a national average fuel consumption factor of 23.8 miles per gallon (2006 data, US EPA)

- Consumer savings are based on an average marginal operating cost per mile (oil, gasoline, maintenance) for a mix of vehicle types and average distance driven per year. The American Automobile Association estimated a composite national average cost to be 16.4 cents per mile in 2006, the most recent period for which AAA prepared cost estimates.

For this analysis, energy and commuter cost savings are calculated by multiplying the energy and consumer cost factors to the total (not adjusted) VMT reduced. As shown in Figure 1, the daily and annual energy and cost savings for the example TERM are as follows:

Energy saving (gallons of fuel)	= 28,000 daily VMT / 23.8 mpg
Daily saving	= 1,176 gallons per day
Annual saving (250 work days)	= 294,100 gallons saved per year
Commuter cost saving ($)	= 28,000 VMT x $0.144/mile
Daily saving	= $4,032 per day
Annual saving (250 work days)	= $1,008,000 saved per year
Annual saving per commuter (based on 1,600 placements)	= $630 saved per placement per year

Step 10 – Estimate Cost-Effectiveness

The final step in the impact calculation is that of estimating TERM cost-effectiveness. The simplest means to calculate cost effectiveness is to divide the annual program results (number of vehicle trips reduced, VMT reduced, and tons of NOx and VOC reduced attributed to each TERM area by the cost of funding that TERM. This will create the following measures:

- Cost per vehicle trip reduced
- Cost per VMT reduced
- Cost per ton of NOx and VOC reduced

A complicating issue is that of the longevity of impacts. Even though a new ridesharer placed in 2006 should be credited against the cost of the program in 2006, that new ridesharer may be in a carpool for two or three years. Therefore, the "benefits" stream may be greater than one year.

SAMPLE CALCULATIONS OF IMPACTS FOR EACH TERM

The impact calculation methodology described above described the basic steps applied to all TERMs and provided one hypothetical numerical example. However, each TERM has unique placement rates and VTR factors and some of the steps differ slightly. Specific examples are presented for each TERM in Appendices C through H.

It should be noted that the numbers shown in the example are from the 2005 TERM Analysis Report, which forms the basis of this evaluation framework. The actual 2005-2008 values for placement rates, VTR factors, trip distances, SOV access percentages, and other calculation variables will be computed after the appropriate surveys have been completed and are likely to be somewhat different that the values shown in the appendices examples. The appendices are provided for illustrative purposes only.

SECTION 7 RECOMMENDED EVALUATION SCHEDULES AND RESPONSIBILITIES

The key to any successful evaluation effort is for evaluation information to be generated and reported in a timely manner to decision makers. Commuter Connections prepares monthly summaries for use by internal staff and local jurisdiction program partners to assess on-going progress. Annual or triennial evaluation results are reported to Commuter Connections staff, local jurisdiction program partners, and regional policy-makers in a useful, easily-digestible manner for policy purposes. Formal review of the results is an integral part of the work program development for both COG and program partners.

Evaluation activities fall into four categories, with various recommended schedules as described in Table 2. The first column shows the evaluation activity, including surveys and on-going tracking activities. The second column indicates the recommended frequency for administering surveys and on-going tracking. The specific schedule for all data collection activities has been established by Commuter Connections and is included as Appendix I. The final column of Table 2 indicates the party that would be responsible for collecting or maintaining the data.

Table 2 also shows recommended results reporting activities. It is assumed that reports will be prepared following each survey (annual placement survey, GRH survey, SOC survey, kiosk survey, etc.) to document the results of the survey and calculate updated placement rates and VTR factors (if applicable) for the populations surveyed. As Table 2 indicates, in addition to these reports, activity and evaluation reports also are recommended to report the progress of the Commuter Connections program as a whole and for individual TERMs. A full TERM Evaluation Report will be developed every three years to document the TERM impacts during the previous three-year period.

RECOMMENDED EVALUATION RESPONSIBILITIES

The primary responsibility for performing monthly and annual evaluations will reside with Commuter Connections staff. Commuter Connections will assume responsibility for managing regular and special survey efforts conducted by outside contractors and will conduct some surveys, such as the GRH satisfaction survey, using in-house staff. Commuter Connections staff also will assemble ongoing monitoring data, oversee all activities, and seek input from Transportation Planning Board (TPB) staff to ensure consistency with accepted TERM analysis methods.

Commuter Connections local jurisdiction program partners will play a role in tracking some ongoing activities, especially in Employer Outreach, and will review and provide input on TERM evaluation activities.

Contractors may be used for some data collection and evaluation activities as directed by Commuter Connections staff. GRH service providers will provide data on usage as required in their contracts. Finally, employers will work with Commuter Connections staff and its partners to provide information on program service utilization.

Table 2
Data Collection and Reporting Activities
Proposed Frequency and Responsibility

Evaluation Activity/Tool	Frequency	Responsibility
Ongoing Monitoring		
• ACT! employer contact database	Monthly	Sales representatives
• Telework Employer Records	Ongoing	CC
• Bike-to-Work Day participant records	Annual	CC
• Commuter Connections Applicant Database	Ongoing	CC
• GRH Applicant Database	Ongoing	CC
• Commuter Operations Center activity tracking	Ongoing	CC
Existing/Ongoing Surveys		
• CC Applicant Placement Survey	Triennial	Contractor to CC
• State of the Commute Survey	Triennial	Contractor to CC
• GRH Survey	Triennial	CC
• Bike-to-Work Participant Survey	ual	CC
• Employee Commute Surveys	Ongoing	Contractor to CC
• Telework-assisted Employer follow-up Survey	ual	CC
Evaluation Results Reporting		
• Commuter Connections "Report Card"	Monthly	CC
• CC Program Annual Report	Annual	CC
• TERM Evaluation Report	Triennial	Contractor to CC

CC – Commuter Connections

LIST OF APPENDICES

APPENDIX A
CALCULATION OF VTR FACTOR

The vehicle trip reduction (VTR) factor represents the average number of vehicle trips that a commuter "placed" in an alternative mode would reduce per day. The VTR factor combines the trip reduction results of three possible types of travel changes that new commuter placements might make:

1. Drive alone commuters shifting to a commute alternative
2. Commuters who currently use a commute alternative shifting to another alternative mode (e.g., from carpool to transit)
3. Commuters who currently use a commute alternative increasing their weekly frequency of commute alternative use (e.g., from carpool one time per week to carpool three times per week).

Shown below is a brief example of how the VTR factor would be calculated for seven commuter placements who made the following travel changes:

- Placement 1 – shifts from driving alone, 5 days per week, to a two-person carpool, 5 days per week
- Placement 2 – shifts from driving alone, 5 days per week, to transit, 5 days per week
- Placement 3 – shifts from driving alone, 5 days per week, to telecommuting, 2 days per week and driving alone 3 days per week
- Placement 4 – shifts from driving alone, 5 days per week, to two-person carpool, 2 days per week and driving alone 3 days per week
- Placement 5 – shifts from a two-person carpool, 5 days per week, to transit, 5 days per week
- Placement 6 – shifts from transit, 5 days per week, to a two-person carpool, 5 days per week
- Placement 7 – increases the frequency of carpool from 1 day per week to 3 days per week, driving alone the other 2 days

The VTR factor is calculated by determining the number of vehicle trips all placements would reduce together and dividing that total by the number of placements. We assume that a commuter makes both a trip from home to work and a second trip from work to home, thus a commuter who drives alone would make 2 vehicle trips each day. If the commuter carpools, he would make ½ vehicle trip to work and ½ trip back home, for a total of 1 vehicle trip per day. A commuter who uses transit, bikes, or walks is assumed to make 0 vehicle trips. A commuter who telecommutes also makes 0 vehicle trips for telecommute days.

Shown below are the travel modes and the numbers of vehicle trips each of the seven commuters described above would make for each day of the week before the shift to a commute alternative and after the shift. The third column shows the net vehicle trips (number of trips after the shift minus number of trips before the shift). The final column shows the total weekly trips reduced. Note that commuter placement #6 actually increases his weekly commute trips, because he shifts from a higher occupancy mode (transit) to a lower occupancy mode (carpool).

APPENDIX A (CONT.)

Sample VTR Calculation
Travel Modes Before and After Shifts to Commute Alternatives
By Commuter Placement and by Day of the Week

	Vehicle Trips Before Shift					Vehicle Trips After Shift					Vehicle Trips Net Trips					Weekly
	M	**T**	**W**	**T**	**F**	**M**	**T**	**W**	**T**	**F**	**M**	**T**	**W**	**T**	**F**	**Change**
Placement 1	D	D	D	D	D	C	C	C	C	C						
DA to 2p CP	2	2	2	2	2	1	1	1	1	1	-1	-1	-1	-1	-1	-5 trips
Placement 2	D	D	D	D	D	T	T	T	T	T						
DA to TR	2	2	2	2	2	0	0	0	0	0	-2	-2	-2	-2	-2	-10 trips
Placement 3	D	D	D	D	D	D	D	C	C	C						
DA to TC/DA (part-time)	2	2	2	2	2	2	2	2	0	0	0	0	0	-2	-2	-4 trips
Placement 4	D	D	D	D	D	D	D	C	C	C						
DA to CP/DA (part-time)	2	2	2	2	2	2	2	2	1	1	0	0	0	-1	-1	-2 trips
Placement 5	C	C	C	C	C	T	T	T	T	T						
2p CP to TR	1	1	1	1	1	0	0	0	0	0	-1	-1	-1	-1	-1	-5 trips
Placement 6	T	T	T	T	T	C	C	C	C	C						
TR to 2p CP	0	0	0	0	0	1	1	1	1	1	+1	+1	+1	+1	+1	+5 trips
Placement 7	D	D	D	D	C	D	D	C	C	C						
DA/CP to CP (part-time)	2	2	2	2	1	2	2	1	1	1	0	0	-1	-1	0	-2 trips
Total weekly trips	11	11	11	11	10	8	8	7	4	4	-3	-3	-4	-7	-6	-23 trips

Total placements	= 7 placements (travel for each shown above)
Total trips reduced per week	= 23 trips per week (all placements together)
Total trips per day (all placements together)	= 23 trips per week / 5 days per week =4.6 trips per day
Average trips reduced per placement	**= 4.6 trips per day / 7 placements** **= 0.66 trips per placement**

The seven commuter placements would reduce a total of 4.6 trips during a single day, thus the average number of trips reduced per day by each of the seven placements would be 0.66. This is the VTR factor.

APPENDIX B
SAMPLE CALCULATION OF VEHICLE TRIP REDUCTION (VTR) FACTOR

Summary of Current and Previous Mode for Survey Respondents Who Made a Shift to an HOV Mode

	Current One-Way Weekly Person Trips				Previous One-Way Weekly Person Trips				New One-Way Weekly Person Trips (current – prev)		
	DA	**RS**	**TR**	**RSOcc.**	**DA**	**RS**	**TR**	**RSOcc.**	**DA**	**RS**	**TR**
Drive alone shift to Transit											
	0	0	8	0	8	0	0	0	-8	0	8
	0	0	10	0	2	0	8	0	-2	0	2
	0	0	10	0	10	0	0	0	-10	0	10
Total	**0**	**0**	**28**		**20**	**0**	**8**		**-20**	**0**	**20**
Drive alone shift to Rideshare											
	2	6	0	2	8	0	0	0	-6	6	0
	0	2	8	8	2	0	8	0	-2	2	0
	0	10	0	3	2	8	0	2	-2	2	0
	0	10	0	2	10	0	0	0	-10	10	0
	0	10	0	3	10	0	0	0	-10	10	0
	0	8	0	13	8	0	0	0	-8	8	0
Total	**2**	**46**	**8**		**40**	**8**	**8**		**-38**	**38**	**0**
Rideshare shift to Transit *											
	0	0	10	0	0	2	8	3	0	-2	2
	0	0	10	0	0	10	0	3	0	-10	10
	0	0	10	0	0	10	0	4	0	-10	10
	0	0	10	0	0	8	2	2	0	-8	8
Total	**0**	**0**	**40**		**0**	**30**	**10**		**0**	**-30**	**30**
Rideshare shift to Rideshare (ex. carpool to vanpool)											
	0	5	0	3	0	5	0	2	0	0	0
	0	5	0	3	0	5	0	13	0	0	0
	0	10	0	3	0	10	0	3	0	0	0
Total	**0**	**20**	**0**		**0**	**20**	**0**		**0**	**0**	**0**
Transit shift to Other Transit (ex. bus to train) *											
	0	0	10	0	0	0	10	0	0	0	0
	0	0	10	0	0	0	10	0	0	0	0
Total	**0**	**0**	**20**	**0**	**0**	**0**	**20**		**0**	**0**	**0**
Transit shift to Rideshare*											
	0	10	0	2	0	0	10	0	0	10	-10
	0	10	0	2	0	0	10	0	0	10	-10
	0	10	0	12	0	0	10	0	0	10	-10
	0	10	0	4	0	0	10	0	0	10	-10
	0	10	0	3	0	0	10	0	0	10	-10
Total	**0**	**50**	**0**		**0**	**0**	**50**		**0**	**50**	**-50**
Average RS Occupancy				**4.5**				**4.0**			

APPENDIX B – SAMPLE CALCULATION OF VTR FACTOR (CONT.)

Summary of Travel Changes for all Respondents

Current One-way Weekly Trips (all respondents)

	DA	RS	TR/BW
Weekly person trips	2	116	96
Average RS occupancy	1	4.5	N/A
Weekly Vehicle trips (Person trips/RS occupancy)	2	25.8	0

Previous One-way Weekly Trips (all respondents)

	DA	RS	TR/BW
Person trips	60	58	96
Average RS occupancy	1	4.0	N/A
Vehicle trips	60	14.5	0

Net One-way Weekly Trips (all respondents) = current trips – previous trips

	DA	RS	TR/BW
Person trips	-58	58	0
Vehicle trips	-58	11.3	0

Weekly person trips reduced *(DA + RS+ TR/BW)*	0
Weekly vehicle trips reduced *(DA + RS + TR/BW)*	-46.7
Respondents with change	23
Average weekly vehicle trips reduced *(Weekly vehicle trips reduced / # of respondents)*	-2.03
Average daily vehicle trips reduced *(Average wkly vehicle trips reduced / 5 days per week)*	**-0.41**

* For purpose of VTR calculation, Transit category also includes bike/walk

NOTE: Numbers shown in this sample calculation are not based on actual survey data. Data were created as a hypothetical example for illustration only.

APPENDIX C
SAMPLE CALCULATIONS OF METROPOLITAN WASHINGTON TELEWORK RESOURCE CENTER IMPACTS

Populations of Interest

• All regional teleworkers (TW)	318,130	(from SOC survey)
• Employees at worksites assisted by TRC	265,250	(from TRC TW assistance survey)

Telecommute Placement Rates

Directly assisted TW	6.4%	(% of TW assisted by TRC, from SOC survey)
Assisted worksites	3.4%	(% of new TW at sites, from TRC assistance survey)

Placements

Mixed home and TC based

Directly assisted TW	20,505	(regional TW x directly assisted placement rate)
TW at TRC asst. sites	9,018	(employees at assisted sites x asst site placement rate)
Total assisted TW	**29,524**	

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

% Home-based TW	95%	(from SOC survey)
% telecenter-based TW	5%	(from SOC survey)
HB TW	28,048	(total assisted TW x % HB TW)
TC-based TW	1,476	(total assisted TW x % TC-based TW)

Daily Vehicle Trips Reduced

VTR Factors

Home-based factor	0.38	(from SOC survey)
TC-based factor	0.26	(from SOC survey)
Home-based VT reduced	10,793	(HB TW x HB VTR factor)
TC-based VT reduced	380	(TC-based TW x TC VTR factor)

Total Daily Vehicle Trips Reduced 11,173

Appendix C, continued

Daily VMT Reduced

Ave one-way trip distance (mi)		
Home-based TW	19.2	(SOC survey)
Telecenter reductions (TC days)		
VMT reduction – telecenter days	12.0	(SOC survey)
Ave. days/wk at TC	1.2	(SOC survey)
VMT reduction – home TC days	38.4	(SOC survey)
Ave. days/wk at home	1.0	(SOC survey)
Total weekly VMT reduction	52.8	(TC days x TC mi)+(home days x home mi)
Daily reduction per teleworker	10.6	
VMT reductions on TC days		
Home-based VMT reduced	207,219	(HB VT reduced x ave trip distance)
Non MWTC VMT reduced	15,593	(TC TW x daily miles reduced)
Total Daily VMT Reduced	**222,812**	

Daily Emissions Reduced

NOx reduced	**Trips**	**05 Emis. Factor**	**VMT**	**05 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	11,173	0.9905			11,067	0.0122
• Running (40 mph)			222,812	0.6995	155,416	0.1713
Total NOx reduced (tons)						**0.1835**

VOC reduced	**Trips**	**05 Emis. Factor**	**VMT**	**05 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	11,173	2.3454			26,205	0.0288
• Running (40mph)			222,812	0.2717	60,367	0.0665
Total VOC reduced (tons)						**0.0953**

APPENDIX D
SAMPLE CALCULATIONS OF GUARANTEED RIDE HOME IMPACTS

Populations of Interest		
• GRH registrants	26,702	(GRH database)
• One-time exceptions	550	(GRH database)
Total GRH base	**27,252**	
Within MSA	22,919	
Outside MSA	4,333	
GRH Placement Rates (continued rates only)		
Within MSA placement rate	50.5%	(GRH survey)
Outside MSA placement rate	51.8%	(GRH survey)
Placements (continued only)		
Within MSA	**11,574**	(Within MSA base x within MSA placement rate)
Outside MSA	**2,245**	(Outside MSA base x outside MSA placement rate)
Daily Vehicle Trips Reduced		
VTR Factors (continued only)		
Within MSA	0.91	(GRH survey)
Outside MSA	0.81	(GRH survey)
VT Reduced (continued only)		
Within MSA	**10,532**	**(**Within MSA placements x within MSA VTR factor)
Outside MSA	**1,818**	(Outside MSA placements x outside MSA VTR factor**)**
Daily VMT Reduced		
• Ave one-way trip distance (mi)		
• Within MSA	28.2	(from GRH survey)
• Outside MSA	28.2	(discounted from actual 52.0 miles from GRH survey)
VMT reduced		
Within MSA	297,014	(Within MSA VT reduced x trip distance)
Outside MSA	51,270	(Outside MSA VT reduced x trip distance)
Total Daily VMT Reduced	**348,283**	

Appendix D, continued

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

Inside MSA		
Non-SOV access percentage	40%	(GRH survey)
SOV access distance (mi)	5.3	(GRH survey)

Outside MSA – not applicable – all access outside MSA

VT Reduction

• No SOV access	6,031	(VT x non-SOV access %)
Total VT for AQ analysis	**6,031**	

VMT Reduction

• No SOV access	170,075	(VT x SOV % x trip distance)
• With SOV access	144,715	(VT x SOV % x (trip distance – access distance)
Total VMT for AQ analysis	**314,790**	

Daily Emissions Reduced

NOx reduced	**Trips**	**05 Emis. Factor**	**VMT**	**05 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	6,031	0.9905			5,974	0.0066
• Running (40 mph)			314,790	0.6995	220,196	0.2427
Total NOx reduced (tons)						**0.2493**

VOC reduced	**Trips**	**05 Emis. Factor**	**VMT**	**05 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	6,031	2.3454			14,145	0.0156
• Running (40 mph)			314,790	0.2717	85,528	0.0943
Total VOC reduced (tons)						**0.1099**

Correction for Overlap with MM TERM

Total GRH apps FY 03, 04, 05	27,252	
New GRH apps FY 04, 05	13,884	42%
Estimated MM share of new GRH	8%	
Estimated MM share of GRH impact	3%	

	GRH base	**MM**	**Net GRH**	
Placements	13,819	563	13,255	
VT reduced	12,350	503	11,847	
VMT reduced	348,283	14,195	334,088	
NOx reduced (T)	0.249	0.010	0.239	
VOC reduced (T)				0.110
				0.004
				0.105

APPENDIX E
SAMPLE CALCULATION OF EMPLOYER OUTREACH

Populations of Interest

• Sites 100+ with Level 3-4 prog	373	(ACT! database)
• Sites <100 with Level 3-4 prog	443	(ACT! database)
• Employees at L3-4 sites	217,913	(ACT! database)
Total TERM base employees	**217,913**	

Average Vehicle Occupancy (AVO)

Starting (pre-program)	1.37	(employee survey data)
Ending (with program)	1.70	(COMMUTER model runs)

Daily person trips

Starting (pre-program)	435,826	(total employees x 2 one-way trips per day)
Ending (with program)	435,826	(total employees x 2 one-way trips per day)

Daily vehicle trips

Starting (pre-program)	318,156	(total employees / starting AVO)
Ending (with program)	255,758	(total employees / ending AVO)
Total Daily Vehicle Trips Red.	**62,398**	(starting vehicle trips – ending vehicle trips)

Daily VMT Reduced

• One-way trip dist (mi)	16.5	(SOC survey, regional average)
Total Daily VMT Reduced	**1,029,567**	**(**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)	44,303	(VT reduced x non-SOV access %)
Total VT for AQ analysis	**44,303**	

VMT Reduction

• No SOV access	730,993	(VT reduced x SOV % x trip distance)
• With SOV access	242,479	(VT reduced x SOV % x (trip dist – access dist)
Total VMT for AQ analysis	**973,471**	

Appendix E, continued

Daily Emissions Reduced

NOx reduced	**Trips**	**05 Emis. Factor**	**VMT**	**05 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	44,303	0.9905			43,882	0.0484
• Running (40 mph)			973,471	0.6995	680,943	0.7506
Total NOx reduced (tons)						**0.7990**

VOC reduced	**Trips**	**05 Emis. Factor**	**VMT**	**05 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	44,303	2.3454			103,907	0.1145
• Running (40 mph)			973,471	0.2717	264,492	0.2916
Total VOC reduced (tons)						**0.4061**

Correction for TRC TERMs

	EO base	**TRC**	**Net EO**
Vehicle Trips Reduced	62,398	1,585	60,813
VMT Reduced (miles)	1,029,567	26,153	1,003,414
NOx Reduced (tons)	0.799	0.022	0.777
VOC Reduced (tons)	0.406	0.012	0.394

APPENDIX F

SAMPLE CALCULATION OF MASS MARKETING IMPACTS

PART 1
Populations of Interest – commuters influenced by ads to contact CC
New CC apps (does not include re-apply or follow-up)

• FY 2003	0	(no MM credit for FY 2003)
• FY 2004	19,656	(CC database)
• FY 2005	15,077	(CC database)
Total applicants	**34,733**	

Commuters influenced by ads to contact CC	15%	(COC – monthly applicant analysis)
New apps 04-05 as % of total	24%	(new apps FY04, 05 / total CC apps)
% all apps influenced by ads	3.6%	

CC Impacts – FY 03-05	**Total**	**MM Share**
• CC placements	55,336	2,011
• CC Vehicle trips reduced	13,466	489
• CC VMT reduced	402,019	14,614

CC Impacts – FY 03-05 – Discounted for AQ Analysis

	Total	**MM Share**
• CC Vehicle trips reduced	6,874	250
• CC VMT reduced	362,916	12,192

Daily Emissions Reduced – Part I

NOx reduced	**Trips**	**05 Emis. Factor**	**VMT**	**05 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	250	0.9905			247	0.0003
• Running (40 mph)			13,192	0.6995	9,228	0.0102
Total NOx reduced (tons)						**0.0105**

VOC reduced	**Trips**	**05 Emis. Factor**	**VMT**	**05 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	250	2.3454			586	0.0006
• Running (40 mph)			13,192	0.2717	3,584	0.0040
Total VOC reduced (tons)						**0.0046**

Appendix F, continued

PART 2
Populations of Interest – commuters influenced by ads to change mode – no contact CC

Total commuters in region	2,422,811	(SOC and Mini-HH surveys)
• % recall commute message	39%	(SOC and Mini-HH)
• % chg to alt mode after ads	1.0%	(SOC and Mini-HH)
• % chg influenced by ad	85%	(SOC and Mini-HH)
Placements – no contact with CC	**7,785**	(COC – monthly applicant analysis)
Placement Rates		
Continued placement rate	56%	(SOC and Mini-HH)
Temporary placement rate	44%	(SOC and Mini-HH)
Placements		
• Continued placements	4,360	(Placements x continued placement rate)
• Temporary placements	3,426	(Placements x temporary placement rate)
Daily Vehicle Trips Reduced		
VTR Factors		
Continued VTR factor	1.25	(SOC and Mini-HH)
Temporary VTR factor	1.00	(SOC and Mini-HH)
Continued VT reduced	5,450	(Continued placements x continued VTR factor)
Temporary VT reduced	856	(Temporary placements x temporary VTR factor x 0.25 discount for temporary use)
Total Daily Vehicle Trips Reduced	**6,306**	
Daily VMT Reduced		
• Ave one-way trip dist (mi)	16.5	(SOC and Mini-HH)
Total Daily VMT Reduced	**104,052**	
Trip and VMT Adjustment for SOV Access to HOV Modes (reduce VT and VMT for AQ analysis)		
Non-SOV access percentage	71%	(from CC placement survey)
SOV access distance (mi)	3.1	(from CC placement survey)
VT Reduction		
• No SOV access	4,477	(VT x non-SOV access %)
Total VT for AQ analysis	**4,477**	
VMT Reduction		
• No SOV access	73,877	(VT x SOV % x trip distance)
• With SOV access	24,506	(VT x SOV % x (trip dist – access dist)
Total VMT for AQ analysis	**98,383**	

Appendix F, continued

PART 2 (cont.)
Daily Emissions Reduced

NOx reduced	**Trips**	**05 Emis. Factor**	**VMT**	**05 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	4,477	0.9905			4,435	0.0049
• Running (40 mph)			98,383	0.6995	68,819	0.0759
Total NOx reduced (tons)						**0.0808**

VOC reduced	**Trips**	**05 Emis. Factor**	**VMT**	**05 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	4,477	2.3454			10,501	0.0116
• Running (40 mph)			98,383	0.2717	26,731	0.0295
Total VOC reduced (tons)						**0.0411**

PART 3 – GRH Credit
From GRH Analysis

Total GRH apps FY 03, 04, 05	27,252	
New GRH apps FY 04, 05	13,884	51%
Estimated MM share of new GRH	8%	
Estimated MM share of GRH impact	4%	

	GRH base	**MM**
Placements	13,819	563
VT reduced	12,350	403
VMT reduced	348,283	14,195
NOx reduced (T)	0.249	0.010
VOC reduced (T)	0.110	0.004

PART 4 – **Bike-to-Work Day Event**

Participants' riding percentage and frequency

• Number of riders	5,738	(BTWD registration data, 2002, 2003, 2004)
• % biking to work before event	78%	(BTWD survey)
• Ave days riding before event	2.4	(BTWD survey)
• % part. Start/incr biking	20%	(BTWD survey)
• Ave days riding after event	1.4	(BTWD survey)
• % new riders still Bk winter	72%	(BTWD survey)
• Weekly bike days during winter	1.1	(BTWD survey)

New Bike Days

New wkly bike days summer	1,607	(riders x % new after event x ave days summer)
New wkly bike days winter	909	(riders x % new riders x still ride winter x ave days)

• Total new bike days summer	44,986	(wkly summer days x 28 wks – Apr-Oct)
• Total new bike days winter	19,996	(wkly winter days x 22 wks – Nov-Mar)
Total new bike days-year	64,982	(summer bk days + winter bk days)
New bike trips - year	129,963	(annual bike days x 2)

New Bike Trips and VT Reduction

Ave new daily bk trips	520	(Annual new bike trips / 250)
% DA/RS on non-bike days	41%	(BTWD survey)
Daily vehicle trips reduced	213	(daily new bike trips x DA %
BTWD Daily Vehicle Trips Reduced	**213**	

Daily VMT Reduced

• Ave trip distance (mi)	10.0	(BTWD survey)
BTWD Daily VMT Reduced	**2,131**	(vehicle trips reduced x average trip distance)

Total – PART 1, PART 2, PART 3 and PART 4

	CCContacts	NoContact	GRH	BTW	Total MM
Placements	2,011	7,785	563	520*	10,880
VT reduced	489	6,306	503	213	7,512
VMT reduced	14,614	104,052	14,195	2,131	134,992
NOx reduced (T)	0.010	0.081	0.010	0.002	0.103
VOC reduced (T)	0.005	0.041	0.004	0.001	0.051

* new bicycle trips per day

APPENDIX G
SAMPLE CALCULATION OF INFOEXPRESS KIOSK IMPACTS

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

• Regional kiosk users	22,612	(SOC survey)

Kiosk Placement Rates

Continued placement rate	1.6%	(SOC survey)
Temporary placement rate	16.5%	(SOC survey)

Placements

• Continued placements	353	(Kiosk users x continued placement rate)
• Temporary placements	3,741	(Kiosk users x temporary placement rate)
Total placements	**4,094**	

Daily Vehicle Trips Reduced

VTR Factors

Continued VTR factor	1.60	
Temporary VTR factor	1.49	(from SOC survey)
Continued VT reduced	565	
Temporary VT reduced	2,741	(Temporary placements x temporary VTR factor x .49 discount for temporary use)
Total Daily Vehicle Trips Reduced	**3,306**	

Daily VMT Reduced

• Continued one-way trip dist (mi)	22.1	
• Temp trip dist (mi)	22.1	(from SOC survey)
Continued VMT reduced	12,482	
Temp VMT reduced	60,576	(Temp VT reduced x Temp trip distance)
Total Daily VMT Reduced	**73,058**	

Daily Emissions Reduced

NOx reduced	**Trips**	**05 Emis. Factor**	**VMT**	**05 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	3,306	0.9905			3,274	0.0036
• Running (40 mph)			73,058	0.6995	51,104	0.0563
Total NOx reduced (tons)						**0.0599**

VOC reduced	**Trips**	**05 Emis. Factor**	**VMT**	**05 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	3,306	2.3454			7,753	0.0085
• Running (40 mph)			73,058	0.2717	19,850	0.0219
Total VOC reduced (tons)						**0.0304**

APPENDIX H
SAMPLE CALCULATION OF COMMUTER OPERATIONS CENTER IMPACTS

Populations of Interest – Commuter Connections Rideshare Applicants

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

- FY 2003 40,125 (CC database)
- FY 2004 46,888 (CC database)
- FY 2005 56,313 (CC database)

Total assisted commuters 143,326

Within MSA (84%) 120,393
Outside MSA (16% 22,919

COC Placement Rates	**In MSA**	**Out MSA**
Continued rate	25.2%	24.3%
Temporary rate	13.6%	13.6%
Total	38.7%	37.9%

Placements			
Continued	30,337	5,533	(Apps x cont. rate)
Temporary	16,366	3,101	(Apps x temporary rate)
Total placements		**55,336**	

Daily Vehicle Trips Reduced			
VTR Factors			
Continued	0.33	0.47	
Temporary	0.38	0.42	
Temporary discount	10.5%	10.5%	
Continued trips reduced	10,075	2,596	(Placements x cont. VTR factor)
Temporary trips reduced	657	138	(Placements x temp. VTR factor)
Total VT reduced	**13,466**		

Daily VMT Reduced			
Ave one-way trip distance (mi)			
Continued	29.9	29.9	(Actual Outside dist. 54.4 miles)
Temporary	28.6	28.6	(Actual Outside dist. 57.9 miles)
Continued VT reduced	301,593	77,713	(Vehicle trips x ave distance)
Temporary VT reduced	18,769	3,944	
Total VMT Reduced	**402,019**		

Appendix H, 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 % - cont/temp	39%	0%	(CC placement survey)
SOV access dist (mi) – cont/temp	5.9	0.0	(CC placement survey)

VT Reduction

- No SOV access (cont + temp) 4,139 2,734 (VT x non-SOV access %)

Total VT for AQ analysis 6,874

VMT Reduction

- No SOV access (cont + temp) 123,572 81,657 (VT x SOV % x (dist – access dist))
- SOV access (cont + temp) 157,688 0

Total VMT for AQ analysis 362,916

Daily Emissions Reduced

NOx reduced	**Trips**	**05 Emis. Factor**	**VMT**	**05 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	6,874	0.9905			6,808	0.0075
• Running (40 mph)			362,916	0.6995	253,860	0.2798
Total NOx reduced (tons)						**0.2873**

VOC reduced	**Trips**	**05 Emis. Factor**	**VMT**	**05 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	6,874	2.3454			16,122	0.0178
• Running (40 mph)			362,916	0.2717	98,604	0.1087
Total VOC reduced (tons)						**0.1265**

Correction for Overlap with GRH, Kiosks and MM TERMs

	COC base	**MM**	**Kiosk**	**GRH**	**Net COC**
Placements	55,336	2,011	318	3,040	35,322
Vehicle Trips Reduced	13,466	489	77	740	7,406
VMT Reduced (miles)	402,019	14,614	2,310	22,082	189,097
NOx Reduced (tons)	0.287	0.010	0.0017	0.016	0.149
VOC Reduced (tons)	0.126	0.005	0.0007	0.007	0.069

Notes:
MM influenced commuters – from MM analysis, Appendix F
Kiosk – 0.7% of COC base applications obtained through kiosks
GRH – 13.3% of new apps/reapps ask for GRH and other info = 5.7% of COC total after MM adjustment

Appendix H, continued

Daily Emissions Reduced

NOx reduced	**Trips**	**02 Emis. Factor**	**VMT**	**02 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	20,416	1.1835			24,162	0.0266
• Running (35mph)			402,190	1.2075	730,992	0.5353
Total NOx reduced (tons)						**0.5619**

VOC reduced	**Trips**	**02 Emis. Factor**	**VMT**	**02 Emis. Factor**	**Tot gm**	**Tot ton**
• Cold start	20,416	3.202			65,371	0.0721
• Running (35mph)			402,190	0.4885	196,470	0.2166
Total VOC reduced (tons)						**0.2887**

APPENDIX I
COMMUTER CONNECTIONS TERM EVALUATION SCHEDULE

Measure line(s)	**Data Collection** FY Completion		**Dead-** Activity
Telework 2007	State of the Commute	June 2007 (Draft Report) June 2008 (Final Report)	FY07 & 08
	Employer Survey	January 2008 FY08	
Employer Outreach	Database Information Analysis From ACT!	December 2007	FY08
GRH	In-depth GRH applicant Survey	June 2007 (Final Report)	FY07
Commuter Operations Center	Placement Rate Study ***(survey completed)***	July – September 2005 3rd Quarter Survey by Oct/Nov 2005	FY06
Marketing	State of the Commute	June 2007 (Draft Report) June 2008 (Final Report)	FY07 & 08
Bike To Work Day	2007 Participant Survey	Nov/Dec 2007 (Draft Report) June 2008 (Final Report)	FY08
InfoExpress Kiosk	2007 State of the Commute	June 2007 (Draft Report) June 2008 (Final Report)	FY07 & 08
ALL	Regional State of the Commute Survey	June 2007 (Draft Report) June 2008 (Final Report)	FY07 & 08
ALL	2005 TERM Analysis Report ***(completed)***	January 2006	FY06
ALL	2006 - 2008 TERM Analysis Report	June 2008 (Draft Report) January 2009 (Final Report)	FY08 & 09
ALL	TDM Evaluation	December 2006 FY07	

Framework Methodology

FY06 = July 1, 2005 – June 30, 2006
FY07 = July 1, 2006 – June 30, 2007
FY08 = July 1, 2007 – June 30, 2008
FY09= July 1, 2008 – June 30, 2009

APPENDIX J
GLOSSARY OF ACRONYMS

ACT	-	Association for Commuter Transportation
AVR	-	Average Vehicle Ridership
CC	-	Commuter Connections
CCWP	-	Commuter Connections Work Program
COC	-	Commuter Operations Center
COG	-	Council of Governments
DDOT	-	District of Columbia Department of Transportation
DTP	-	Department of Transportation Planning
ECO	-	Employee Commute Options
FHWA	-	Federal Highway Administration
GIS	-	Geographic Information System
GRH	-	Guaranteed Ride Home
HOV(s)	-	High Occupancy Vehicle(s)
ITAC	-	International Telework Association & Council
MATAC	-	Mid-Atlantic Telecommuting Advisory Council
MTA	-	Maryland Transit Administration
MDOT	-	Maryland Department of Transportation
MWAQC	-	Metropolitan Washington Air Quality Committee
MWCOG	-	Metropolitan Washington Council of Governments
MWTRC	-	Metropolitan Telework Resource Center
NO_X	-	Nitrogen Oxides
OPA	-	Office of Public Affairs
P & R	-	Park and Ride
PRTC	-	Potomac & Rappahannock Transportation Commission
SOC	-	State of the Commute
SOV	-	Single Occupant Vehicle
TAHG	-	Telecommute Ad-Hoc Group
TCM	-	Transportation Control Measure
TDM	-	Transportation Demand Management
TERM	-	Transportation Emission Reduction Measure

Appendix J (cont.)

TIP	-	Transportation Improvement Program
TMA	-	Transportation Management Association
TMO	-	Transportation Management Organization
TPB	-	Transportation Planning Board
TRC	-	Telework Resource Center
VDOT	-	Virginia Department of Transportation
VDRPT	-	Virginia Department of Rail & Public Transportation
VMT	-	Vehicle Miles Traveled
VOC	-	Volatile Organic Compounds
VRE	-	Virginia Railway Express
VT	-	Vehicle Trips
VTR	-	Vehicle Trip Reduction
WMATA	-	Washington Metropolitan Area Transit Authority
WMTC	-	Washington Metropolitan Telework Centers

LDA Consulting Team (LDA, ESTC, CUTR/USF)

Outline for a Process to Assess Needs and Expectations of Commuter Connections' Key Stakeholders – 1-16-07

A key objective in Commuter Connections' TERM evaluation is to assess and communicate the impacts and benefits of CC's services to policy makers, travelers, and other program stakeholders. But the perceived value of Commute Connections' efforts likely differs among the diverse groups that have a stake in transportation in the Washington metropolitan region because the groups likely have different mobility and accessibility needs and expectations. Their definitions of Commuter Connections' performance and value will be driven by how they define transportation "success" and what they consider important or valuable in the transportation system.

This document outlines a suggested process to help Commuter Connections identify stakeholders' near-term and long-term needs and expectations and recommend changes that might be made to the TERM evaluation process within the current evaluation cycle or in later years to respond to them. In particular, this process would identify new or enhanced performance measures, data, and methods that would be needed to support the evaluation needs of elected officials, transportation and air quality planners, and service providers and define effective methods with which to communicate TERM benefits to stakeholders in terms that will be relevant and clearly understood.

Potential Stakeholders

The following stakeholders were identified as those who benefit directly or indirectly from Commute Connection activities.

Primary Stakeholders

- Elected officials and policy makers –State and local jurisdiction officials, in particular members of COG's Transportation Policy Board (TPB) and others who influence transportation funding in the metropolitan Washington region
- Other state and local government stakeholders – Federal, state, regional, and local transportation departments/planning agencies
- Commuter Connections staff and local rideshare program partners
- Local travelers – Residents and employees who make trips regularly within the region
- Employers, developers, and property owners
- Regional and local transit agencies and other transportation service providers

Secondary Stakeholders

- Visitors and tourists
- Special needs travelers – Transportation disadvantaged, elderly, Welfare to Work, etc.
- Other state and local government stakeholders – Schools, Police, Emergency services, Military
- Associations –Environmental Defense, STPP, etc.
- Commercial/freight transportation companies
- Peers – TDM programs in other parts of the country

Methodology:
This approach described in this outline would involve three primary activities:

1) conduct individual interviews with key stakeholders
2) conduct series of web forums with interested stakeholders
3) prepare recommendations for future direction of Commuter Connections' evaluation process

Task 1 – Conduct Interviews with Key Stakeholders

The project team proposes to begin by interviewing representatives of some or all of the primary stakeholder groups noted above. The purpose of these interviews will be to:

1) develop a clearer understanding of the near-term and long-term expectations that stakeholders have for transportation and for Commuter Connections
2) understand if and how they have used Commuter Connections' evaluation data
3) gather recommendations for new or enhanced evaluation measures and/or data that would be relevant to stakeholders in measuring transportation system and program performance

The project team would prepare a discussion guide and conduct in-person and/or telephone interviews and/or focus groups with stakeholders. The number of stakeholders and specific stakeholders to be interviewed will be determined in consultation with Commute Connections staff.

The specific questions asked would vary by stakeholder, but could include probing questions such as:

- Measuring Transportation Success – How do you measure success of the regional transportation system? What aspects of transportation system performance are most important to you? What features do you expect or need as a *user* of the transportation system?
- Need for and Value of TDM Services – How important is the availability of "retail" transportation information and assistance in making the transportation system work? What is the perceived value of Commute Connections within your organization? How does the performance of regional TDM services affect fulfillment of your organization's goals and objectives? How relevant are Commuter Connection's current goals and objectives for your organization?
- Desire for and Use of Evaluation Data – How has your organization used Commuter Connections' evaluation results (planning, budgeting, public relations, etc.)? Are there any Commute Connections activities that are not being measured but should be? Are there potential benefits or expectations of Commuter Connections' services that are not being measured? Are there transportation-related questions that your organization would like to answer but for which you do not have data now?
- Communication of Results – How effectively does Commute Connections communicate results from its current evaluation process? What would you change, if anything (information conveyed, length/depth of analysis, format, frequency, etc.) about this process?

Deliverable: Technical memorandum summarizing the results of the interviews.

Task 2 – Forums Summarizing the Needs Assessment and Encouraging Discussion

In this second task, the team would summarize the findings of Task 1 and convene in-person and/or web meetings to share the results of Task 1 with stakeholder groups and offer an opportunity for discussion among stakeholders. This sharing of perceptions and experiences would acquaint stakeholders with the needs and expectations of other stakeholders and enhance buy-in for the evaluation process.

We envision conducting one in-person discussion with elected officials who want to participate beyond the initial interview (Task 1) and a series of internet web-conferences to conduct discussions with other stakeholder groups. Web meeting technology allows the project to connect groups of any size and in any location, so stakeholders can collaborate effectively at a much lower cost than would be the case for an in-person meeting. When cost is an issue, this technology offers an efficient method to bring groups of people together quickly without travel expense or time.

Web meetings require only a phone and a computer with an Internet connection. "Attendees" hear the audio portion of the live presentation via a toll-free telephone call and simultaneously view written material (e.g., PowerPoint presentation) via the Internet. Attendees can privately post questions to panelists who may then respond privately (to questioner) or publicly (to audience).

Supplemental web tools can be used to facilitate a collaborative setting and enhance effective attendee interaction. Small groups can use tools such as online whiteboards, polling, live application viewing (e.g., online software demonstrations without the need to download the software application), and interactive chats. Entire events can be recorded for on-demand playback. Recorded sessions can be streamed directly to an attendee's media player and can be copied to a CD-ROM.

We propose to conduct a series of web meetings to enable participation of a broad range of stakeholders. As we anticipate that stakeholder groups could have very different needs and interests, it might be most effective to organize the meetings by type of stakeholder (e.g., elected officials, planners, travelers, employers, etc). Alternatively, if Task 1 indicates that needs and expectations are not so dissimilar, or if it appears that mixing stakeholder within discussion groups might be useful to educate stakeholders about the perceptions and expectations of other stakeholder groups, groups could be organized simply by time/schedule. In this case, any interested stakeholders could participate in the meeting or meetings scheduled at a convenient time. The number and organization of meetings would be determined after Task 1 was completed.

Deliverable: Meetings in which the results of the Task 1 interviews are presented and feedback and additional ideas are solicited. Meetings will be recorded and available for on-demand playback via the web

Task 3 – Provide Recommendations on Future Directions for the Evaluation and Communication of Commute Connections' Results

This task would synthesize the input obtained in from Task 1 and any additional feedback from Task 2 to identify changes to the performance measures, data collection activities, and reporting procedures that would enhance Commuter Connections' ability to evaluate and communicate results of its programs. Specific changes cannot be defined here, but types of modifications that might be expected could include:

- Adding performance measures to reflect new program goals or segments, such as improving mobility versus reducing congestion, measuring impacts at sub-regional (e.g., activity center) levels, estimating business/economic impacts or customer satisfaction
- Changing the focus of, frequency of, or methodology for surveys to collect new data and or expand the range of data that can be collected efficiently
- Devising new communication tools to share results
- Examining internal operations and procedures, such as employer outreach strategies, to improve overall Commute Connections operational performance (e.g., lower cost per person served)
- Benchmarking results to compare performance with peers

Deliverable: Final Report and presentation to TPB?

Budget: TBD
Schedule: TBD

GRH Survey – 2007
Summary of Topics/Questions

Objectives of Survey

- Define current travel patterns of GRH participants
- Identify percentage of GRH participants who made travel changes in response to the program (started alt modes, increased use of alt modes) and types of changes made
- Estimate level of influence of GRH on mode change decisions, relative to other influences
- Estimate level of trip reduction and VMT reduction resulting from GRH mode changes
- Identify use of and satisfaction with GRH

Section 1 – Registration (Q1 – Q7)

- Defines respondents by their registration status: current, past, or one-time participant. This distinction is necessary to route respondents to the correct travel change questions.

Section 2 – Commute Patters (Q8 – Q20)

- Collects data on respondents' current travel – mode, frequency, travel distance, carpool occupancy, duration of alt mode use, and mode used to access rideshare/transit

Section 3 – Past Registrants Mode During GRH (Q21 – Q23)

- For respondents who are not in GRH now, collects data on mode, frequency of mode use WHILE in GRH (during GRH). For respondents who are in GRH now, the current travel is the same as the "during GRH" travel

Section 4 – Previous Mode (Q24 – Q29)

- Collects data on mode, frequency of mode use before joining GRH. Respondents who are one-time exceptions (non-registered) are asked about travel before they heard of GRH.

Section 5 – GRH Influence on Mode Decisions (Q30 – Q44)

- Defines travel changes (mode / frequency/ occupancy) respondents made to participate in GRH – (from "before GRH" to "during GRH"). Respondents are classified as "previously driving alone and started new alt mode," "previously using alt mode but increased alt mode" or "previously using alt mode and continued alt mode with no changes"
- Asks respondents how GRH influenced these decisions

Section 6 – Other Influence on Mode Decisions (Q45 – Q48)

- Asks respondents about other services or benefits they received and the influence of GRH relative to these other services on mode change decisions

Section 7 – Referral Sources for GRH and GRH Ad Recall (Q49 – Q53)

- Asks respondents how they learned about GRH and if they recall GRH advertising

Section 8 – Use of GRH (Q54 – Q59)

- Asks respondents if they made a GRH trip, for what purpose, and it they were satisfied

Section 9 – Demographics (Q60 – Q63)

- Asks typical demographic questions

MWCOG Guaranteed Ride Home Survey
V1– 01/11/07

Hello. May I speak to ____ . My name is _____. I'm calling from CIC Research on behalf of Commuter Connections. We're surveying people who have registered for or participated in Commuter Connections' Regional Guaranteed Ride Home (GRH) program. It takes less than __ minutes. Is now a good time?

REGISTRATION INFORMATION

Q1. In what year did you first register for Commuter Connections' GRH program?

1 Before 2002
2 2002
3 2003
4 2004
5 2005
6 2006
7 2007
8 Never registered (SKIP TO Q3)
9 Don't remember/don't know

Q2 Are you currently registered for Commuter Connections' GRH program?

1 yes (SKIP TO Q6)
2 no (SKIP TO Q4)
9 DK (CONTINUE)

Q3 Have you ever taken a GRH trip provided by Commuter Connections' GRH program?

1 yes (SKIP to Q8)
2 no (THANK and TERMINATE)

Q4 How long were you registered in the GRH program?

1 Less than 1 year
2 1 year
3 2 years
5 more than 3 years
4 3 years
9 Don't remember/don't know

Q5 Why did you not re-register when your registration expired? (DO NOT READ)

1 changed job/work hours
2 moved to a different residence
3 joined a program offered by employer
4 joined a program offered by TMA or other group
5 couldn't use transit or rideshare at least 2 days per week
6 couldn't continue using carpool/vanpool/transit didn't work out
7 needed my car for work or other purpose (had to start driving alone)
8 too much effort to use the program
9 did not know I had to re-register
10 other (SPECIFY) _____

Q6 Did you participate in another GRH program before registering for Commuter Connections' GRH program?

1 yes (ASK Q7)
2 no (SKIP TO Q8)

Q7 Who offered/sponsored that program? (DO NOT READ)

1 My employer
2 Local government program (i.e., Fairfax County, Montgomery County)
3 VRE
9 Other _____

DEFINITION OF REGISTRATION STATUS

IF Q1 = 7 AND Q3 = 1, GRHTYPE = ONE_TIME
IF Q1 = 8 AND Q2 = 9 AND Q3 = 1, GRHTYPE = ONE_TIME

IF Q1 = 1, 2, 3, 4, 5, 6, OR 8 AND Q2 = 1, GRHTYPE = CURR_REG

IF Q1 = 1, 2, 3, 4, 5, 6, OR 8 AND Q2 = 2, GRHTYPE = PAST_REG
IF Q1 = 1, 2, 3, 4, 5, OR 6 AND Q2 = 9 AND Q3 = 1, GRHTYPE = PAST_REG

COMMUTE PATTERNS

Q8 Next, I'd like to ask you about your travel to work. First, in a TYPICAL week, how many weekdays (Monday-Friday) are you assigned to work?

_____ Days

Q9 Do you work a compressed or flexible work schedule, for example, a full-time work week in fewer than five days or a schedule with flexible start and end times?

1 yes (CONTINUE)
2 no (SKIP TO Q11)

Q10 What type of schedule do you use? **(DO NOT READ, UNLESS NEEDED TO CLARIFY)**

1 4/40 (4 10-hour days per week, 40 hours)
2 9/80 (9 days every 2 weeks, 80 hours)
3 3/36 (3 12-hour days per week, 36 hours - police, fire, hospitals)
4 flex-time or flexible work hours (core hours with flexible start & stop)
5 work five days per week, 35 or more hours per week **(RECODE Q9 = 2)**
9 other (SPECIFY) _____

Q10a Now I want to ask you about telecommuting, also called teleworking. For purposes of this survey, "telecommuters" are defined as "wage and salary employees who at least occasionally work at home or at a telework or satellite center during an entire work day, instead of traveling to their regular work place." Based on this definition, are you a telecommuter?

1 yes
2 no (SKIP TO Q11)
9 DK/Ref (SKIP TO Q11)

Q10b How often do you usually telecommute? **(DO NOT READ)**

1 1 day a week
2 2 days a week
3 3 days a week
4 4 days a week
5 5 or more days a week
6 occasionally for special projects
7 Less than one time per month/only in emergencies (e.g., sick child, snowstorm)
8 1-3 times a month
9 other (SPECIFY) _____
19. DK/Ref.

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Q11 Would you consider last week to be a typical work and commuting week?

1 yes **(ASK Q12, THEN SKIP TO Q15)**
2 no **(SKIP TO Q14)**

Q12 Then thinking just about LAST week, how did you get to work each day. Let's start with Monday? . . . How about Tuesday? . . . Wednesday? . . . Thursday? . . . Friday?

(IF RESPONDENT MENTIONS MORE THAN ONE MODE ON ANY DAY, PROMPT FOR THE MODE USED FOR THE LONGEST DISTANCE PORTION OF THE TRIP.)

(IF Q10 = 1, 2, OR 3 AND RESPONDENT DOES NOT MENTION "CWS day off" (RESPONSE 1), ASK:) "You said you typically work a compressed work schedule. Did you have a compressed work schedule day off last week?"

IF Q10b = 1, 2, 3, 4, OR 5 AND RESPONDENT DOES NOT MENTION "Telecommute" (RESPONSE 2), ASK: "You said you typically telecommute one or more days per week. Did you telecommute last week?"

IF RESPONDENT SAYS TRAVEL TO WORK IN A CAR, TRUCK, OR VAN, SAY, Were you alone in the vehicle? **IF YES, REPORT RESPONSE 3. IF NO, SAY,** "Including yourself, how many people were in the vehicle?" **IF 2-4, RECORD RESPONSE 5, IF 5, PROBE TO ASK ABOUT VANPOOL, THEN CODE RESPONSE 5 OR 7 AS APPROPRIATE, IF 6 OR MORE, RECORD AS RESPONSE 7**

(IF ALL WEEKDAYS IN Q8 ARE ACCOUNTED FOR BY MODES 1-15 IN Q12 BEFORE ALL WEEKDAYS ARE COUNTED, ASK: "You said you typically work only (number of weekdays reported in Q8) per week. Were the weekdays I haven't asked you about regular days off for you last week?" **IF RESPONSE IS YES, CATI WILL AUTOFILL REMAINING DAYS WITH CODE 16; OTHERWISE CONTINUE AND RECORD MODES USED FOR THOSE DAYS)**

(IF RESPONDENT MENTIONS "BUSINESS TRIP, WORK OUT OF AREA" (RESPONSE 17) FOR ANY DAY, CODE RESPONSE 17, THEN ASK "If you had worked at your regular work location that day, how would you likely have traveled to work?" **AND CODE ADDITIONAL MODE RESPONSE FOR THAT DAY.**

(IF RESPONDENT MENTIONS "SICK, VACATION, HOLIDAY" (RESPONSE 18) FOR ANY DAY, CODE RESPONSE 18, THEN ASK "If you had worked that day, how would you likely have traveled to work?" **AND CODE ADDITIONAL MODE RESPONSE FOR THAT DAY.**

	Go to Work				
Mode/Day of Week	Mon	Tues	Wed	Thur	Fri
1 compressed work schedule day off	1	1	1	1	1
2. telecommute/telework	2	2	2	2	2
3. drive alone in your car, taxi	3	3	3	3	3
4. motorcycle	4	4	4	4	4
5. carpool, including carpool w/family member, dropped off	5	5	5	5	5
6. casual carpool (slugging)	6	6	6	6	6
7. vanpool	7	7	7	7	7
8. buspool	8	8	8	8	8
9 rode a bus (public Bus, shuttle)	9	9	9	9	9
10. Metrorail	10	10	10	10	10
11. MARC (MD Commuter Rail)	11	11	11	11	11
12. VRE	12	12	12	12	12
13. AMTRAK/other train	13	13	13	13	13
14. bicycle	14	14	14	14	14
15. walk	15	15	15	15	15
16. regular day off (non-CWS)	16	16	16	16	16
17. business trip, work out of area, etc. (prompt for travel on non trip day)	17	17	17	17	17
18. sick, vacation, holiday, etc. (prompt for travel on non sick, vacation day)	18	18	18	18	18
19. N/A					

SKIP TO Q15

Q13 Then thinking about a TYPICAL week, what type or types of transportation do you use to get to work?

PROGRAMMER, LIST MODES FOR USE IN Q14.
IF Q10 = 1, 2, OR 3, ADD "CWS day off" TO LIST OF MODES FOR Q14.
IF Q10b = 1, 2, 3, 4, OR 5, ADD "telecommute/telework" TO LIST OF MODES FOR Q14

IF "CWS DAY OFF" IS IN Q13 LIST, ASK FIRST: "You said you typically work a compressed work schedule. How many compressed schedule days do you typically have off in a week?"

IF "telecommute/telework" IS IN Q13 LIST, ASK SECOND: "You said you typically telework <NUMBER OF TELEWORK DAYS FROM Q10b>, right? **IF YES, CODE THAT NUMBER OF DAYS. IF NO, ASK**,"How many days do you telework in a typical week?

THEN FOR EACH OTHER MODE MENTIONED IN Q13, ASK...

Q14 About how many days per week do you <MODE FROM Q13>?

(IF RESPONDENT MENTIONS MORE THAN ONE MODE ON ANY DAY, PROMPT FOR THE MODE USED FOR THE LONGEST DISTANCE PORTION OF THE TRIP.)

(IF SUM OF DAYS FROM Q14 NE Q8, ASK) "And how do you commute on other days you are assigned to work?" **– ACCEPT OPTION OF "don't work, regular day off."**

(IF RESPONDENT MENTIONS "BUSINESS TRIP, WORK OUT OF AREA" (RESPONSE 17) FOR ANY DAY, CODE RESPONSE 17, THEN ASK "If you worked at your regular work location that day, how would you likely travel to work?" **AND CODE ADDITIONAL MODE RESPONSE FOR THAT DAY.**

	Go to Work – number of days				
Mode/Days typically used per week	1	2	3	4	5
1. have a compressed work schedule day off	1	2	3	4	5
2. telecommute/telework	1	2	3	4	5
3. drive alone in your car, taxi	1	2	3	4	5
4. ride a motorcycle	1	2	3	4	5
5. carpool, including carpool w/family member, dropped off	1	2	3	4	5
6. casual carpool (slugging)	1	2	3	4	5
7. vanpool	1	2	3	4	5
8. ride in a buspool	1	2	3	4	5
9 ride a bus (public Bus, shuttle)	1	2	3	4	5
10. ride Metrorail	1	2	3	4	5
11. ride MARC (MD Commuter Rail)	1	2	3	4	5
12. ride VRE	1	2	3	4	5
13. ride AMTRAK/other train	1	2	3	4	5
14. bicycle	1	2	3	4	5
15. walk	1	2	3	4	5
16. have a regular day off (non-CWS)	1	2	3	4	5
17. have a business trip, work out of area, etc. (prompt for travel on non trip day)	1	2	3	4	5
18. N/A					
19. N/A					

IF NO ALT MODE MENTIONED IN Q12 OR Q14, ASK Q14a

Q14a Do you occasionally use any of the following types of transportation to get to work? (READ; Select all that apply)

1 Carpool or Casual Carpool
2 Vanpool
3 Bus or Train
4 Bike or Walk
5 Don't use any of these modes (DO NOT READ)

Q15 About how many miles do you usually travel from home to work one way?

_____ miles one way

Q16 And about how many minutes does it take you to get to work?

_____ minutes

IF Q12 OR Q14 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15 ASK ABOUT MOST COMMON ALTERNATIVE <MODE Q12 or Q14>. OTHERWISE, SKIP TO Q18

Q17 About how long have you been using < MODE Q12 OR Q14 > for your trip to work? **(DO NOT READ) (ADD TO BRIEFING DOCUMENT INSTUCTIONS IF RESPONDENT SAYS, "DO YOU MEAN HOW LONG HAVE I BEEN USING THIS MODE OR HOW LONG I'VE BEEN IN THIS PARTICULAR ARRANGEMENT," INTERVIEW SHOULD SAY,** ""Using <MODE Q12/Q14>, Using this type of transportation")

_____ months (CONVERT YEARS TO MONTHS)
_____ Don't know

IF Q12 or Q14 = 5, 6, OR 7, ASK Q18, OTHERWISE SKIP TO Q21

Q18 Including yourself, how many people usually ride in your <carpool or vanpool>? (If more than one answer in Q12 or Q14, select one using this priority: vanpool, carpool, casual carpooling.)

_____ total people in pool

(ASK Q19-Q20 OF RESPONDENTS ANSWERING CODE 5-13 IN Q12 OR Q14)

Q19 How do you get from home to where you meet your <MODE Q12 or Q14>?

1 picked up at (or leave from) home by car/van pool or driver (SKIP TO Q21)
2 drive alone to driver's home or drive alone to passenger's home
3 drive to a central location, like a park & ride or station
4 another car/van pool, including dropped off by HH members
5 bicycle
6 motorcycle
7 walk
8 driver of carpool/vanpool
9 bus/transit
19 other (SPECIFY) _____

Q20 How many miles is it one way from your home to where you meet your <MODE Q12 OR Q14>?

_____ miles (no decimals)

PAST REGISTRANTS – MODE DURING GRH

IF PAST_REG, ASK Q21-23. IF CURR_REG, SKIP TO Q27. IF ONE_TIME, SKIP TO Q24

(Past Registrants)

Q21 Next I'd like you to think back to the time that you were registered for the GRH program. During that time, how many days were you assigned to work in a typical week?

____ days

Q22 And at that time, what type or types of transportation did you use to get to work? **(PROGRAMMER, LIST MODES FOR USE IN Q23)**

FOR EACH MODE MENTIONED IN Q22, ASK...

Q23 About how many days per week did you use <MODE FROM Q22>?

IF SUM OF DAYS FROM Q23 NE Q21, ASK, "And how did you commute on other days you were assigned to work?" **– ACCEPT OPTION OF "didn't work, regular day off."**

IF Q12 OR Q14 = 1 AND RESPONDENT DOES NOT MENTION "CWS day off" (RESPONSE 1), ASK: "You said you typically work a compressed work schedule now. Did you work a compressed schedule during the time you were registered for the GRH program?"

IF Q12 OR Q14 = 2 AND RESPONDENT DOES NOT MENTION "Telecommute/telework" (RESPONSE 2), ASK: "You said you typically telecommute now. Did you telecommute during the time you were registered for the GRH program?"

Mode/Days typically used per week	Go to Work – number of days				
	1	2	3	4	5
1. compressed work schedule day off	1	2	3	4	5
2. telecommute/telework	1	2	3	4	5
3. drive alone in your car, taxi	1	2	3	4	5
4. motorcycle	1	2	3	4	5
5. carpool, including carpool w/family member, dropped off	1	2	3	4	5
6. casual carpool (slugging)	1	2	3	4	5
7. vanpool	1	2	3	4	5
8. buspool	1	2	3	4	5
9 rode a bus (public Bus, shuttle)	1	2	3	4	5
10. Metrorail	1	2	3	4	5
11. MARC (MD Commuter Rail)	1	2	3	4	5
12. VRE	1	2	3	4	5
13. AMTRAK/other train	1	2	3	4	5
14. bicycle	1	2	3	4	5
15. walk	1	2	3	4	5
16. regular day off (non-CWS)	1	2	3	4	5
17. business trip, work out of area, etc. (prompt for travel on non trip day)	1	2	3	4	5
18. N/A					
19. N/A					

NOW SKIP TO Q27

PREVIOUS MODE – MODE BEFORE GRH

(One-Time Exceptions)

Q24 Now, please think back to the time before you heard about the GRH program. At that time, how many days were you assigned to work in a typical week?

____ days
18 Did not work then

IF Q24 = 18, AUTOCODE "DID NOT WORK THEN" IN Q25 AND AUTOCODE Q26 = 19

Q25 And at that time, what type or types of transportation did you use to get to work? **(PROGRAMMER, LIST MODES FOR USE IN Q26)**

FOR EACH MODE MENTIONED IN Q25, ASK…

Q26 About how many days per week did you use <MODE FROM Q25>??

IF SUM OF DAYS FROM Q26 NE Q24, ASK, "And how did you commute on other days you were assigned to work?" **– ACCEPT OPTION OF "didn't work, regular day off."**

IF Q12 OR Q14 = 1 AND RESPONDENT DOES NOT MENTION "CWS day off" (RESPONSE 1), ASK: "You said you typically work a compressed work schedule now. Did you work a compressed schedule before you heard about the GRH program?"
IF Q12 OR Q14 = 2 AND RESPONDENT DOES NOT MENTION "Telecommute/telework" (RESPONSE 2), ASK: "You said you typically telecommute now. Did you telecommute before you heard about the GRH program?"

	Go to Work – number of days				
Mode/Days typically used per week	1	2	3	4	5
1. compressed work schedule day off	1	2	3	4	5
2. telecommute/telework	1	2	3	4	5
3. drive alone in your car, taxi	1	2	3	4	5
4. motorcycle	1	2	3	4	5
5. carpool, including carpool w/family member, dropped off	1	2	3	4	5
6. casual carpool (slugging)	1	2	3	4	5
7. vanpool	1	2	3	4	5
8. buspool	1	2	3	4	5
9 rode a bus (public Bus, shuttle)	1	2	3	4	5
10. Metrorail	1	2	3	4	5
11. MARC (MD Commuter Rail)	1	2	3	4	5
12. VRE	1	2	3	4	5
13. AMTRAK/other train	1	2	3	4	5
14. bicycle	1	2	3	4	5
15. walk	1	2	3	4	5
16. regular day off (non-CWS)	1	2	3	4	5
17. business trip, work out of area, etc. (prompt for travel on non trip day)	1	2	3	4	5
18. N/A					
19. Did not work then, did not work in area then					5

NOW SKIP TO INSTRUCTIONS BEFORE Q30

Q27 Now, please think back to the time before you registered for the GRH program. At that time, how many days were you assigned to work in a typical week?

____ days
18 Did not work then

IF Q27 =18, AUTOCODE "DID NOT WORK THEN" IN Q28 AND AUTOCODE Q29 = 19, "DID NOT WORK THEN,"

Q28 At that time, what type or types of transportation did you use to get to work? **(PROGRAMMER, LIST MODES FOR USE IN Q29)**

FOR EACH MODE MENTIONED IN Q29, ASK...

Q29 About how many days per week did you use <MODE FROM Q28>?

IF SUM OF DAYS FROM Q29 NE Q27, ASK "And how did you commute on other days you were assigned to work?" **– ACCEPT OPTION OF "didn't work, regular day off."**

IF Q12 OR Q14 = 1 AND RESPONDENT DOES NOT MENTION "CWS day off" (RESPONSE 1), ASK: "You said you typically work a compressed work schedule now. Did you work a compressed schedule before you registered for the GRH program?"

IF Q12 OR Q14 = 2 AND RESPONDENT DOES NOT MENTION "Telecommute/telework" (RESPONSE 2), ASK: "You said you typically telecommute now. Did you telecommute before you registered for the GRH program?"

Mode/Days typically used per week	Go to Work – number of days				
	1	2	3	4	5
1. compressed work schedule day off	1	2	3	4	5
2. telecommute/telework	1	2	3	4	5
3. drive alone in your car, taxi	1	2	3	4	5
4. motorcycle	1	2	3	4	5
5. carpool, including carpool w/family member, dropped off	1	2	3	4	5
6. casual carpool (slugging)	1	2	3	4	5
7. vanpool	1	2	3	4	5
8. buspool	1	2	3	4	5
9 rode a bus (public Bus, shuttle)	1	2	3	4	5
10. Metrorail	1	2	3	4	5
11. MARC (MD Commuter Rail)	1	2	3	4	5
12. VRE	1	2	3	4	5
13. AMTRAK/other train	1	2	3	4	5
14. bicycle	1	2	3	4	5
15. walk	1	2	3	4	5
16. regular day off (non-CWS)	1	2	3	4	5
17. business trip, work out of area, etc. (prompt for travel on non trip day)	1	2	3	4	5
18. N/A					
19. Did not work then, did not work in area then					5

GRH INFLUENCE IN STARTING, CONTINUING, OR INCREASING USE OF ALTERNATIVE MODES

Skip instruction for previous Drive Alone by registration status

INSTRUCTIONS BEFORE Q30
Current Registrants
IF **CURR_REG** AND IF Q12 or Q14 =5, 6, 7, 8, 9, 10, 11,12, 13, 14, OR 15 AND Q29 NE 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, ASK Q30.
IF Q29 = 19, SKIP TO Q45

Past Registrants
IF **PAST_REG** AND IF Q23 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15 AND Q29 NE 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15 , ASK Q31.
IF Q29 = 19, SKIP TO Q46

One-time Exception users
IF **ONE_TIME** AND IF Q12 or Q14 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15 AND Q26 NE 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15 , ASK Q32.
IF Q26 = 19, SKIP TO Q45
ALL OTHERS, SKIP TO INSTRUCTIONS BEFORE Q35

(Current Registrants who always drove alone to work before registering)

Q30 You said that you regularly drove alone before you registered for GRH. How important was the availability of GRH to your decision to start carpooling, vanpooling, using transit, biking,or walking (FROM Q12 or Q14)? (READ)

1 very important
2 somewhat important
3 not at all important
9 DK/REFUSED (DO NOT READ)

NOW SKIP TO Q33

(Past Registrants who always drove alone to work before registering)

Q31 You said that you regularly drove alone before you registered for GRH. How important was the availability of GRH to your decision to start carpooling, vanpooling, using transit, biking, or walking (FROM Q23)? (READ)

1 very important
2 somewhat important
3 not at all important
9 DK/REFUSED (DO NOT READ)

NOW SKIP TO Q34

(One-Time Exceptions who always drove alone to work before learning about GRH)

Q32 You said that you regularly drove alone before you heard about GRH. How important was the availability of GRH to your decision to start carpooling, vanpooling, using transit, biking, or walking (FROM Q12 or Q14)? (READ)

1 very important
2 somewhat important
3 not at all important
9 DK/REFUSED (DO NOT READ)

CONTINUE WITH Q33

(Current Registrants or One-Time exceptions who always drove alone to work before registering)

Q33 If GRH had not been available, how likely would you have been to start carpooling, vanpooling, using transit, biking, or walking (FROM Q12 or Q14)? (READ)

1 very likely
2 somewhat likely
3 not at all likely
9 DK/REFUSED (DO NOT READ)

NOW SKIP TO Q45

(Past Registrants who always drove alone to work before registering)

Q34 If GRH had not been available, how likely would you have been to start carpooling, vanpooling, using transit, biking, or walking (FROM Q23)? (READ)

1 very likely
2 somewhat likely
3 not at all likely
9 DK/REFUSED (DO NOT READ)

NOW SKIP TO Q46

Skip instruction for increased use of alt modes by registration status
INSTRUCTIONS BEFORE Q35
Current Registrants
(IF **CURR-REG** and IF Q12 or Q14 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15 AND THE FREQUENCY OF Q12 or Q14 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15 IS GREATER THAN THE FREQUENCY OF Q29 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15, ASK Q35 AND Q38.

Past Registrants
IF **PAST_REG** and IF Q23 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15 AND THE FREQUENCY OF Q23 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15 IS GREATER THAN THE FREQUENCY OF Q29 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15, ASK Q36 AND Q39.

One-time Exceptions
IF **ONE_TIME** and IF Q12 or Q14 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15 AND THE FREQUENCY OF Q12 or Q14 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15 IS GREATER THAN THE FREQUENCY OF Q26 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15, ASK Q37 AND Q38.
ALL OTHERS SKIP TO INSTRUCTIONS BEFORE Q40)

(Current Registrants who increased use of alternative modes after registering)

Q35 You said that since you registered for GRH, you've increased the number of days per week that you use types of tranportation OTHER than driving alone for your trip to work. How important was GRH to your decision to make this change? (READ)

1 very important
2 somewhat important
3 not at all important
9 DK/REFUSED (DO NOT READ)

NOW SKIP TO Q38

(Past Registrants who increased use of alternative modes after registering)

Q36 You said that while you were registered for GRH, you used types of transportation OTHER than driving alone more days per week for your trip to work than you did before you registered for GRH. How important was GRH to your decision to make this change? (READ)

1 very important
2 somewhat important
3 not at all important
9 DK/REFUSED (DO NOT READ)

NOW SKIP TO Q39

(One-Time Exceptions who increased use of alternative modes after registering)

Q37 You said that since you heard about GRH, you've increased the number of days per week that you use types of transportation OTHER than driving alone for your trip to work. How important was GRH to your decision to make this change? (READ)

1 very important
2 somewhat important
3 not at all important
9 DK/REFUSED (DO NOT READ)

CONTINUE WITH Q38

(Current Registrants, or One-time Exceptions)

Q38 If GRH had not been available, how likely would you have been to make this change? (READ)

1 very likely
2 somewhat likely
3 not at all likely
9 DK/REFUSED (DO NOT READ)

SKIP TO Q45

(Past Registrants)

Q39 If GRH had not been available, how likely would you have been to make this change? (READ)

1 very likely
2 somewhat likely
3 not at all likely
9 DK/REFUSED (DO NOT READ)

SKIP TO Q46

INSTRUCTIONS BEFORE Q40
Skips for Respondents who used alt modes before GRH but did not increase the number of days using alt modes, by registration status

Current Registrants
(IF **CURR_REG** AND Q12 or Q14 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15 AND Q29 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15 , AND THE FREQUENCY OF Q12 or Q14 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 IS LESS THAN OR EQUAL TO THE FREQUENCY OF Q26 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, ASK Q40.

Past Registrants
IF **PAST_REG** and Q23 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15 and Q29 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15, AND THE FREQUENCY OF Q23 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 IS LESS THAN OR EQUAL TO THE FREQUENCY OF Q29 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, , ASK Q41.

One-Time exceptions
IF **ONE_TIME** and Q12 or Q14 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15 AND Q26 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, OR 15, AND THE FREQUENCY OF Q12 OR Q14 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 IS LESS THAN OR EQUAL TO THE FREQUENCY OF Q26 = 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, , ASK Q42.

ALL OTHERS, SKIP TO INSTRUCTIONS BEFORE Q45

(Current Registrants who were ridesharing/using transit at least some days before registering)

Q40 You said that you were carpooling, vanpooling, using transit, biking, or walking (FROM Q29) before you registered for GRH. How important was the availability of GRH to your decision to continue using a type of transportation other than driving alone? Was it... (READ)

1 very important
2 somewhat important
3 not at all important
9 DK/REFUSED (DO NOT READ)

NOW SKIP TO Q43

(Past Registrants who were ridesharing/using transit at least some days before registering)

Q41 You said that you were carpooling, vanpooling, using transit, biking, or walking (FROM Q29) before you registered for GRH. How important was the availability of GRH to your decision to continue using a type of transportation other than driving alone? Was it... (READ)

1 very important
2 somewhat important
3 not at all important
9 DK/REFUSED (DO NOT READ)

NOW SKIP TO Q43

(One-Time Exceptions who were ridesharing/using transit at least some days before hearing about GRH)

Q42 You said that you were carpooling, vanpooling, using transit, biking, or walking (FROM Q26) before you heard about GRH. How important was the availability of GRH to your decision to continue using a type of transportation other than driving alone? Was it... (READ)

1 very important
2 somewhat important
3 not at all important
9 DK/REFUSED (DO NOT READ)

NOW SKIP TO Q44

(Current Registrants or Past Registrants))

Q43 If GRH had not been available, how likely would you have been to continue? Would you say it was... (READ RESPONSES)

1 very likely
2 somewhat likely
3 not at all likely
9 DK/REFUSED (DO NOT READ)

NOW SKIP TO Q45

(One-Time Registrants)

Q44 If GRH had not been available, how likely would you have been to continue? Would you say it was ... (READ)

1 very likely
2 somewhat likely
3 not at all likely
9 DK/REFUSED (DO NOT READ)

OTHER SERVICES RECEIVED THAT COULD HAVE INFLUENCED DECISIONS

INSTRUCTIONS BEFORE Q45
IF **CURR_REG** or **ONE_TIME,** ASK Q45
IF **PAST_REG,** ASK Q46

(Current Registrants or One-Time Exceptions)

Q45 Did you receive any commute assistance or benefits, in addition to GRH, from any source, that influenced your decision to carpool, vanpool, use transit, bike, or walk (FROM Q12 or Q14)?

1 yes
2 no (SKIP TO Q48)
9 DK/REFUSED (DO NOT READ; SKIP TO Q48)

NOW SKIP TO Q47

(Past Registrants)

Q46 Did you receive any commute assistance or benefits, in addition to GRH, from any source, that influenced your decision to carpool, vanpool, use transit, bike, or walk (FROM Q23)?

1 yes
2 no (SKIP TO Q48)
9 DK/REFUSED (DO NOT READ; SKIP TO Q48)

Q47 Was any assistance or benefit you received more important than GRH to your decision? (DO NOT READ; ACCEPT ONLY ONE RESPONSE)

1 matchlist
2 transit route/schedule info
3 P&R info
4 vanpool assistance
5 HOV lane specs
6 discount/free transit pass/Metrochek/SmarTrip, Smart Benefits
7 NuRide (Virginia carpool incentive)
8 other cash incentive
9 employer GRH
10 CP/VP preferential parking
11 parking fees
12 carpool/vanpool discount parking
13 assistance from employer
14 no assistance more important
15 other _____

Q48 Were any other factors or circumstances important to your decision? (DO NOT READ; ACCEPT MULTIPLE RESPONSES)

1 changed jobs or work hours
2 moved to a different residence
3 save money
4 save time
5 didn't want to drive
6 no longer had a car available for commuting
7 needed my car for work or other purpose (had to start driving alone)
8 family obligations
88 other (SPECIFY) _____
99 no other factor or circumstance was important

REFERRAL SOURCES FOR GRH, GRH ADVERTISING RECALL

Q49 How did you hear about the GRH Program? (DO NOT READ, ACCEPT MULTIPLE RESPONSES; PROBE FOR ADDITIONAL SOURCES)

1 direct mail/postcard from COG/CC
2 radio
3 TV
4 bus/train sign
5 internet
6 bus/train schedule
7 brochure/promo materials
8 highway sign
9 Info Kiosk
10 yellow Pages (One Book or Verizon)
11 newsletter
12 newspaper (regional or local)
13 employer/employer survey
14 fair/on-site event
15 word of mouth
16 other rideshare/transit organization
17 Other (specify)
19. DK/Ref.

IF Q49 = 1, 2, 3, 4, OR 5, SKIP TO Q52

Q50 Have you heard, seen, or read any advertising about GRH?

1 yes
2 no (SKIP TO Q54)
9 DK/Ref (SKIP TO Q54)

Q52 Had you registered for GRH before you saw or heard this advertising?

1 yes
2 no (SKIP TO Q54)
9 DK/Ref (SKIP TO Q54)

Q53 Did the advertising encourage you to seek information about GRH or to register for GRH?

1 yes
2 no
9 DK/Ref

USE OF GRH

IF **Q3 = 1,** SAY "You said you had taken a GRH trip," THEN SKIP TO Q55

Q54 Have you taken a GRH trip since you registered for GRH?

1 yes
2 no (SKIP TO Q59)

Q55 For what reason did you take the trip? (ASK ABOUT MOST RECENT TRIP; DO NOT READ, ACCEPT ONLY ONE RESPONSE)

1 illness (self)
2 illness of family member
3 other personal emergency
4 illness of child
5 child care problem
6 illness of carpool partner
7 unscheduled overtime
8 missed CP/VP
9 other (SPECIFY) _____

Q56 Was the service satisfactory?

1 yes (SKIP TO Q58)
2 no
9 DK (SKIP TO Q58)

Q57 Why was it not satisfactory?

1 waited too long
2 hard to get approval
3 didn't like taxi/driver
4 other (SPECIFY) _____

Q58 About how long did you wait for the taxi to arrive? (IF DK, ASK FOR BEST GUESS)

_____ minutes

Q59 In what ways could Commuter Connections improve the GRH program? (DO NOT READ, CHECK ALL THAT APPLY)

1 quicker response for GRH ride requests
2 don't require registration
3 allow use of GRH if ridesharing/using transit less than twice per week
4 allow more GRH trips in a year
5 easier/faster approval process
6 wider area for trips
88 no improvement needed
99 other (SPECIFY)
98 DK

DEMOGRAPHICS

Now just a few last questions to help us group your answers with those of others.

Q59a Do you have access to the internet, either at your home or your work?

1 Yes
2 No
9 DK/Ref.

Q60 Which of the following groups includes your age? (READ CHOICES)

1 under 18
2 18 - 24
3 25 - 34
4 35 - 44
5 45 - 54
6 55 - 64
7 65 or older
9 Refused

Q61 Do you consider yourself to be Latino, Hispanic, or Spanish?

1 Yes
2 No
9 DK/Ref.

Q62 Now I want to ask you about your race. Which one of the following best describes your racial background. Is it . . . (READ CHOICES 1-5; SELECT ONE RESPONE ONLY)

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 DK/Ref

Q63 Finally, please stop me when I reach the category that best represents your household's total annual income. Is it . . . (READ CHOICES)

1 less than $20,000
2 $20,000 - $29,999
3 $30,000 - $39,999
4 $40,000 - $59,999
5 $60,000 - $79,999
6 $80,000 - $99,999
7 $100,000 -$119,999
8 $120,000 - $139,999
9 $140,000 - $159,999
10 $160,000 or more
19 Ref, DK

Thank you very much for your time and cooperation!

(RECORD SEX:) 1 male 2 female

2007 Guaranteed Ride Home Survey
Proposed Internet Pilot Study – 1-16-07

Overview and Objectives

- Pilot survey of internet / web-based administration of GRH survey
- Test internet application for future Commuter Connections applicant surveys
- Supplement telephone survey, which will use same method as used for 2004 GRH
- Highlight issues / survey modifications needed to use internet in lieu of or as supplement to telephone survey

Survey Methodology Summary

- Random selection of respondents from among applicants with email addresses in GRH database
- Email invitation to participate in survey – link to survey site
- Pretest online survey to estimate response rate, ID response issues, and estimate time to complete
- Respondents complete questionnaire online
- Reminder email sent to applicants who do not respond
- Proposed sample of 300 completed internet interviews

Analysis

- Compare data from telephone and online methods to identify issues that appear to affect results – try to control for demographic differences
- Compare data from telephone survey alone for respondents who provided an email address and for respondents who did not provide this information to identify differences that were population-based and unrelated to interview method
- Examine individual questions to determine if the two methods produced significantly different responses on particular questions
- Use statistical tests to test the differences of central tendency of the means and medians and differences of proportions of the two groups on key questions, such as the frequency of GRH use and demographics in the tests

Online Issues

Sampling

- Can select respondents only from among applicants with email address – expect about 40-50% of applicants with email
- Analysis of telephone survey will test if applicants who provided email addresses are different from those who did not provide an email address
- Recommend checking for invalid emails before selecting sample

Response Rate

- Goal is 70% response rate for telephone survey – Online response rates generally are lower for voluntary surveys (< 40%)
- Propose email reminder notices and, perhaps, small financial incentive to enhance response rate
- Follow-up with non-respondents to assess reason for non-response

Questionnaire Design and Complexity

- Revise questionnaire for online (visual) application - same questions but different format
- Identify "mandatory" questions
- Accommodate "do not read responses" questions from telephone survey – two options:
  - Use open-ended questions – could increase time to write answers and lead to skipped questions
  - Include short response lists – could bias incidence of responses compared to telephone survey
- Clarify and confirm responses and ensure accurate data collection
  - Build in prompts and "help" clues that are provided by telephone interviewers
  - Offer electronic techniques (e.g., clickable "info" icons, mouse-over) to enhance question clarity, especially on key questions that could be difficult to understand
  - Online "help" email address to obtain assistance
  - Access to toll-free number to ask questions by phone

COMMUTER CONNECTIONS
RESPONSE TO COMMENTS ON STATE OF THE COMMUTE SURVEY
January 16, 2007

This document summarizes additional comments received by Commuter Connections on the draft 2007 State of the Commute survey and Commuter Connections' response to the comments. The comments are organized into the following categories:

- Survey method and reporting
- Comments on specific questions

Survey Method and Reporting

Comment: The rationale for obtaining a fixed number of interviews in each jurisdiction has been explained to be the provision of statistically accurate results on an individual jurisdiction basis. While this is logical, I wonder if prior survey results have in fact been extracted and distributed on a jurisdictional basis.

Response: The purpose of sampling across jurisdictions is to provide a balance of opportunity to explore results at the regional level and at the jurisdictional level. A substantial number of crosstabs were examined at the county/jurisdiction level and at the state level for the 2004 survey. Additionally, several jurisdictions (Alexandria, Arlington, District of Columbia, Fairfax, Loudoun, Montgomery, and Prince Georges) have requested and received jurisdiction-level data from the 2004 SOC survey. The confidence level for data for a county/jurisdiction, each of which has a sample of 600 respondents, is 95% ± 4.0%. For the 2007 SOC, the confidence level for the five Maryland jurisdictions combined and the five Virginia jurisdictions combined will be 95% ± 1.8%.

Comment: I recognize the potential problems with the statistical validity of attempting to analyze some data at too fine a grain. At the same time, however, the survey needs to be designed in a fashion that will provide measurable information about the effectiveness of some programs that are either currently underway, or are being considered. At a minimum, these include

- The Live Near Your Work program
- The Guaranteed Ride Home Retention / Loyalty program

I had submitted some suggested cross-tabulations that I felt might be helpful in developing this information. If these cannot be prepared because of the lack of statistical confidence, then the consultant should develop alternative questions and cross-tabs that will be effective in obtaining this information.

Response: The primary Commuter Connections activity under the Live Near Your Work program will be to encourage employer to provide information to employees about residential and work-life balance incentive programs available to residents of the region. CC envisions evaluating success in this effort primarily by tracking the number of employers that offer these programs at some time in the future, using data from the ACT! employer contact management database maintained through the Employer Outreach TERM.

Additionally, to help establish a pre-program baseline about employers' current participation in such programs, we have added one question to the SOC questionnaire (Q60d) in which commuters who said they moved their home location will be asked if their employer offered any information about fi-

nancial incentive available to employees. We do not envision asking more detailed information for this purpose in the SOC survey.

With respect to the GRH Retention/Loyalty program, we do not believe the SOC survey is an appropriate tool to collect these data. The GRH survey, which will be conducted in the spring of 2007 and will survey both current and past registrants, will provide limited insights for this purpose. The 2004 survey asked past registrants why they chose not to renew. About a quarter

But in both the 2001 and 2004 GRH surveys, it was difficult to reach past registrant, because for many the contact information they provided at the time they registered was no longer valid (moved, changed jobs, etc.). In 2004, past registrants comprised about a third of the registrant in the database, but only 12% of the interviewed respondents. In other words, we were only able to reach about a third of the past registrants; we did not have valid phone numbers for many. This suggests a sizeable portion of the past registrants could have chosen not to renew because they had moved or made other changes that made GRH no longer an option.

Commuter Connections staff propose that the most appropriate method to test the benefits of the retention/loyalty program will be to conduct a pilot study with a treatment group (receives the retention/loyalty incentive) and a control group that does not. Examining the retention rates for these two groups will be a more effective method to test the program. Additionally, COG staff are exploring the option of contacting registrants who do not renew immediately following the renewal date and asking them why they are not renewing. This method will enable staff to reach a higher percentage of non-renewing registrants, because forwarding contact information might be more readily available at that time.

Comment: Some of the previous comments noted that some of the findings that appear in the survey *Report* appear to be surprising and / or contradictory. The responses to these comments indicated that these situations often are the result of the provision of multiple answers to specific questions. It seems to me that while this may be appropriate for some areas, in many cases it allows for the primary answer to be obscured by secondary ones. Moreover, as indicated in the discussion, it also allows for potentially contradictory results. It would probably be useful to devote more discussion to this subject, but in the absence of such discussion I would urge that the number of opportunities for providing multiple answers to individual questions be minimized.

Response: We understand that permitting multiple responses can cause confusion if readers of reports are not aware that this was done, however, it is sometimes necessary or very useful to permit more than one response. As a general rule, we include a footnote that states that multiple responses were permitted. We will continue this practice, but also will include a note in the text when it would be important for readers to know that percentages in a table cannot properly be added together.

Comments on Specific Questions

Comment: *Q20 - What were the reasons you began using <MODE Q15>?*
I appreciate the modifications that are described in the written responses, as well as those mentioned verbally at the meeting, and I assume that these will be integrated into the final survey. In particular, one verbal response was an agreement to differentiate the availability of parking from the price of parking within the category of reasons for using an alternate mode (Question 20). This is an important distinction.

Response: These changes were made as discussed at the meeting. Please see the revised version of the questionnaire (v3-1-16-07) for changes to Q20 and other questions.

Comment: *Q2/Q2a - In what county (or Independent City) do you live now? What is your home zip code?*
Another issue discussed at the meeting on December 12 was the potential overlap of political boundaries with postal addresses. While one obvious example is the Alexandria portion of Fairfax County, several others were mentioned at the meeting as possibilities (e.g. portions of Loudoun County – South Riding – having Chantilly addresses in Fairfax). This may also be true for some Herndon postal addresses. It is my understanding that COG staff and / or the consultant will perform a more rigorous examination of the areas in the region where such inconsistencies exist so that this potential error will not occur.

> Response: These changes will be made as discussed at the meeting. COG staff will provide details to the consultants. If additional details are needed for any particular jurisdiction, we will contact the jurisdiction directly. If you have a particular situation that you believe should be included, please contact Nick Ramfos.

Comment: *Q83 – "What is (phone number or website you can use to obtain information on ridesharing, public transportation, HOV lanes, and telecommuting in the Washington region?"*
The item # 4 phone number for Montgomery County should be 301-770-POOL and/or 240-777-RIDE. The description for this number ought to be "Montgomery County Commuter Services."

> Response: We have made this change.
> will be made as discussed at the meeting. COG staff will provide details to the consultants. If additional details are needed for any particular jurisdiction, we will contact the jurisdiction directly. If you have a particular situation that you believe should be included, please contact Nick Ramfos.

Comment: Q88b-d – In the section marked "Define Local Program for Q88b-Q88d," the line that reads "IF Q2=9 ORQ3=15 (Montgomery) INSERT …, the description should be Montgomery County Commuter Services. And how would Bethesda Transportation Solutions and North Bethesda Transportation Center be handled?

> Response: We have made the change to MCCS. As for asking about programs that serve only a portion of a jurisdiction (e.g., activity center), this will be considered on a case-by-case basis, depending on the sample size for expected workers in the jurisdiction. If there are multiple programs in your jurisdiction and you think they should be included, please contact Nick Ramfos to make this request. We will include them IF we believe that the number of total work respondents for that jurisdiction is sufficient to obtain a reasonable sample of respondents who might have had contact with the local programs.

Comment: *Q104a - In some U.S. cities … If a service like this (online ridematching) was available in the Washington metro area, how likely would you be to use it?*

Should we include something that lets the interviewee know that we are going to keep their personal information confidential and we will not provide their home or work address on the website? If we don't mention that we will keep their personal addresses confidential and/or let them know we will use the latest encryption technology, I fear a lot of people will answer this question thinking their personal info will be out there for anyone to see. Although, question 104b asks for a reason from those that say they would not be interested in website ridematching, there isn't any follow up question for those who answer "concerned about privacy, don't want personal information on internet" to see if they would change their mind if we kept their personal info private.

Response: Please see the revised questionnaire. We have modified the second half of the question to read: *If a service like this was available in the Washington metro area and your personal information was kept confidential, how likely would you be to use it?*
If a respondent still notes that he/she would not be interested due to privacy concerns, even with this safeguard, we will accept this response as a lingering privacy concern. We do not expect this to be a significant issue. This question was asked in the 2005 Mini-Household survey and although 70% of respondents indicated they were not likely to use the service, only 5% of those respondents cited a privacy concern as the reason. It will be interesting to see if commuters have become more concerned about privacy, however.

Comment: *Q104d - Suppose commuters who carpool to work could receive a monthly $25 gift card for purchases at area merchants. How likely would you be to try carpooling to receive the gift card? And Q104e - What if the monthly gift card was for $50?*

We ask if the interviewee would try carpooling if they receive a "monthly $25 gift card" and a "monthly $50 gift card" respectively. The word "monthly" indicates that we would provide the gift card each month they carpool. If that is the correct intent of the question then shouldn't we put a limit on the number of months (e.g., six month, twelve months) so it is clear how long they will receive the gift card? If this is a one-time incentive then we should delete the word "monthly" in both questions.

I know it can be tricky to survey people to find out at what type of incentive will get them to try something, in this case carpooling. I'm curious as to why we are using only $25 and $50 as the incentive amounts. Sometimes a $5 gift card to the right merchant (like Starbucks for the coffee lover) can do the trick. Is there any way to change the questions to get a better gauge as to what amount on the gift card would be effective? I realize there are pitfalls with leaving the amount open ended and having the interviewee provide the amount, but perhaps we can look at a few other amounts like $10, $15 and $20 to see what the interest may be at those incentive levels. I also realize that we don't want these questions to go on-and-on.

Response: Regarding the first comment about the use of the word “monthly,” it was CC staff’s intent that this would be a monthly benefit. Regarding the second comments, CC staff do not believe it will be valuable to test smaller levels of incentive.

These questions were included in the 2005 Mini-Household Survey conducted by COG and we found the following results: 15% of drive alone respondents said they were “very likely” or “somewhat likely” to try carpooling with a $25 monthly incentive. When the amount was increased to $50, an additional 5% of respondents said “very likely” or “somewhat likely” for a total of 20% of respondents who probably would try CP. Survey experience suggests that we should discount these “yes” responses by about half, to obtain a realistic expectation of interest. Given the relatively low level of interest at $25 or even $50, we feel it would not be worth asking about a much smaller incentive.