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Guide on Sustainable Transportation Surveying

TDM Solutions for Canadian
Municipalities and Employers



FEDERATION
OF CANADIAN
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1 Introduction to Guide

Over the past few decades, our perception and understanding of Transportation Demand Management (TDM) has changed significantly. Increasingly, more and more Canadians have accepted TDM strategies as desirable methods to reduce the negative effects associated with automobile dependency and improve alternative modes of transportation. As a result, TDM initiatives that encourage walking, cycling, and public transit are now being implemented all across the country. However, many municipalities, companies, and organizations, despite their eagerness to contribute to a sustainable transportation system, lack the necessary tools to assess the TDM initiatives that currently exist within their cities. To ameliorate this situation, Transport Canada, through their ecoMOBILITY program, has produced the following report.

Gathering data for the purpose of evaluating a TDM initiative or program can be a complex and time-consuming endeavour. This fact is especially true for many small- to medium-sized municipal and/or regional governments who do not have a transportation specialist on staff or the required resources. Frequently, ad hoc data collection techniques are employed. As a result, the data collected is often incomplete or inaccurate, leading to misinformed decision making and non-standardized results that cannot be used to compare one TDM initiative with another.

To address these concerns, Transport Canada developed a nine-step evaluation framework, which is outlined in the *Canadian Guidelines for the Measurement of Transportation Demand Management Initiatives* and the *TDM Measurement Toolbox: A Guide for Canadian Municipalities*. These documents describe a process for conducting a TDM evaluation, adapted from two European TDM evaluation guides: SUMO (Systems for Evaluation of Mobility Projects) and MOST-MET, which are explained in more detail in the *TDM Measurement Toolbox*. The following report is a supplementary document to these guides and should be used in conjunction with them.

2 Guide on Sustainable Transportation Surveying

Over the past several years, cities and regions throughout Canada have put into practice a wide variety of transportation surveying techniques. However, many municipalities do not have the resources and expertise to adequately develop and implement sustainable transportation survey techniques. For this reason, Transport Canada decided to work in collaboration with the Federation of Canadian Municipalities to develop methodologies to assist organizations with limited resources to develop their own evaluation plan.

2.1 Why Use the Guide?

The data collection techniques and sample survey questionnaires identified within this report expand upon **Step #8 (Collect Data)** of the nine-step evaluation framework identified in the *Canadian Guidelines for the Measurement of Transportation Demand Management Initiatives* and the *TDM Measurement Toolbox: A Guide for Canadian Municipalities*. The purpose of this document is to:

- provide a **user-friendly guide** that will help government officials and organizations gather the necessary information to evaluate a TDM initiative;
- identify and explain the five **most frequently used data collection techniques**; and,
- provide users with **sample surveys** for each evaluation technique.

2.2 Who is the Guide for?

Essentially, the *Guide on Sustainable Transportation Surveying: TDM Solutions for Canadian Municipalities and Employers* is intended for all individuals working for a municipality, company, or organization that is:

- implementing a TDM initiative and looking to undertake a **pre-implementation study**, or
- conducting a **post-implementation study** for a previously implemented TDM initiative.

2.3 What's in the Guide?

Presented in this document are the five most frequently employed data collection techniques used during a TDM evaluation.

- **Behaviour and Attitude Surveys** are pre-designed surveys conducted by phone or on the internet. These surveys can take several months to complete, but the data collected can be very useful.
- **Origin-Destination Studies**, also called household travel surveys or travel diary studies, are highly specialized surveys used for collecting data about transportation behaviour in large areas—in most cases, a metropolitan region. This type of data collection can take a lot of time and resources to complete.
- **Open Houses** are events open to the general public that focus on a specific initiative. The information obtained from these events is less quantifiable than the other techniques but does highlight stakeholders' awareness, perception, and concern for a specific TDM initiative. Typically, open houses can be conducted within a short period of time.

- **Focus Groups** are small groups of 5-15 people who are assembled to discuss a specific topic of interest. Through in-depth discussion, complex survey results can be generated to uncover issues beneath the surface. Typically, focus groups can be conducted in a relatively short period of time with minimal financial resources.
- **Automated or Manual Traffic Counts** are designed to count the number of users travelling in a predefined location (road, train station, bike path, intersection, etc.) and/or by a specific mode (cycling, walking, transit, driving, etc.).

2.4 How to Use the Guide?

Prior to selecting a specific data collection technique, users of this guide should consider the following:

- the **type of data** that is required for the TDM evaluation;
- the available **resources** – time, money, and personnel;
- the **mode(s)** of transportation;
- the **scope and size** of the TDM initiative; and,
- the **time of year** the data should be collected.

2.5 Limitations

The following list of limitations describes scenarios that potential users might encounter while applying this user guide.

- The evaluation techniques provided within the TDM Toolbox are applicable to a wide range of TDM initiatives, transportation modes, application contexts, and organizational capacities. Consequently, **tailored questionnaires have not been developed** for each initiative or transportation mode. As a result, the questionnaires may need to be adapted for each scenario.
- The evaluation techniques identified and described within this report are **not all-inclusive**. Some practitioners, because of their particular TDM initiative and local context, may find that other evaluation techniques are more applicable.

3 Overview of data collection techniques

The following illustration is a simple overview of the five data collection techniques described within the following report.

Table 1. Summary of data collection methodologies examined in this guide.

Tool	Type of Data	Purpose	Participants	Budget	Timeline
Behaviour and Attitude Surveys	<ul style="list-style-type: none"> • Modal shift • Preferences • Attitudes and perceptions • Program awareness 	<ul style="list-style-type: none"> • Performance measurement • Project Planning 	250 to 2,000	\$25K to \$75K	3 to 12 months
Origin - Destination Studies	<ul style="list-style-type: none"> • Traffic volumes • Modal share • Long-term trends 	<ul style="list-style-type: none"> • Decision making 	5,000 or 5% of total population	\$250K to \$20M	Every 5 years
Open Houses	<ul style="list-style-type: none"> • Preferences • Attitudes and perceptions • Program awareness 	<ul style="list-style-type: none"> • Project Planning 	20 to 200	\$10K to \$20K	Less than 6 months
Focus Groups	<ul style="list-style-type: none"> • Preferences • Attitudes and perceptions • Program awareness 	<ul style="list-style-type: none"> • Project Planning 	5 to 15 people per group	\$10K+	Less than 6 months
Traffic Counts	<ul style="list-style-type: none"> • Traffic volumes • Modal Share • Long-term trends 	<ul style="list-style-type: none"> • Performance measurement 	No direct participants	Manual – \$5K to \$300K Automated – \$5K to \$100K	6 to 12 months

4 Behaviour and Attitude Surveys

Overview	
Definition:	Behaviour and attitude surveys are used to investigate commuters' transportation behaviour and attitudes towards different modes of transportation. They can also be used to investigate public awareness of existing TDM measures.
Scope:	Behaviour and attitude surveys vary widely in scope: they can cover a particular urban district, a whole municipality, a segment of the population or an entire metropolitan region.
Data Collection Method:	Data is collected from a relatively small representative population sample—usually in the order of 1,000 people—using a computer-assisted telephone survey system. These are typically recurring surveys: they are usually repeated at relatively regular time intervals to monitor changes in travel behaviour and public attitudes towards transportation.
Types of Data Collected:	Behaviour and attitude surveys primarily collect data on what modes of transportation people use for their commute to work or school and why. They ask participants about their attitudes towards various modes of transportation, probing reasons for using or not using each mode of transportation.
TDM Applications:	The data collected through behaviour and attitude surveys can be used for the following purposes: <ul style="list-style-type: none">• identifying barriers to the use of various modes of transportation;• monitoring changes in public attitudes towards various modes of transportation;• monitoring public awareness of existing TDM initiatives;• testing public support for potential future TDM initiatives;• measuring modal change following participation in TDM initiative.

4.1 Purpose

The primary goal of behaviour and attitude surveys is to understand people's motives for using certain modes of transportation and not using others for their commute to work or school. This allows for the identification of potential barriers to the use of certain modes of transportation, especially alternatives to the single-occupancy vehicle. Behaviour and attitude surveys are frequently used by public transportation agencies and municipal and regional planners.

4.2 Geographic Scope

Behaviour and attitude surveys are typically conducted on a municipal or metropolitan scale.

4.3 Data Collected

Behaviour and attitude surveys collect three categories of data: (1) data on travel behaviour; (2) data on attitudes towards different modes of transportation; and (3) personal socio-demographic data on the participants. The common types of data collected for each of the three categories are listed below. The items in bold are essential items that are collected by all behaviour and attitude surveys. The remaining items are collected by some but not all behaviour and attitude surveys and can therefore be considered optional. Though optional, these items can be valuable for analyzing travel patterns.

Travel Behaviour Data

- Frequency of commute
- Main mode used
- Other modes used
- Commuting origin

- Commuting destination
- Duration of commute
- Seasonal variation in mode used

Attitudes Data

- Motives for using main mode
- Level of satisfaction with main mode
- Motives for using other modes
- Level of satisfaction with other modes used
- Motives for not using other modes more frequently
- Motives for not using certain modes at all
- Likelihood of switching modes

Personal Data

- Age
- Gender
- Employment status (employed or student, full-time or part-time)
- Occupation (if the person is employed)
- Level of education
- Income
- Possession of a driver's license
- Possession of a transit pass
- Possession of / access to a bicycle
- Household car ownership

A behaviour and attitude survey can also be an opportunity to collect data on the public awareness of existing TDM initiatives, or to gauge public interest in possible future TDM initiatives. To this end, the survey can include hypothetical questions about the proposed TDM measure and probe participants as to whether it would change their transportation behaviour (e.g. transportation mode used, frequency of use).

4.4 Methodology

Most behaviour and attitude surveys are performed using computer-assisted telephone interviews, but an online questionnaire can also be used. A small, randomly selected sample is used—typically, at least 1,000 people. Participants should usually be 16 or over and answer the survey only for themselves; they do not answer for other members of the household, as with Origin-Destination Studies (see section 3).

The interview typically proceeds according to the following steps:

1. Questions about the participant's basic demographic characteristics: age, gender, and employment status, etc., except level of income, which is best saved for the end of the survey as it may inspire refusal to participate.
2. Questions probing the participant about their general attitudes towards transportation (i.e. is it an important issue for him or not) and their main transportation concerns (e.g. traffic congestion, opinions on the quality of transit service or the state of existing infrastructure, etc.)
3. Questions about the participant's commute to work or school, if the participant is a regular commuter. The participant is asked to identify all the different modes of transportation that they use for commuting and the frequency with which they choose these modes.
4. Questions about different modes of transportation, including those used and not used by the participant for their commute to work or school.

For the modes used by the participant, the survey probes the participant about their motives for using the mode and their satisfaction with using the mode. If alternatives to driving alone, including carpooling/vanpooling, public transit, and active modes of transportation, are infrequently or never used, the participant can be probed about factors that limit their use and about possible incentives that would encourage their use of the given mode.

A sample behaviour and attitude survey questionnaire is provided in [Appendix 1](#). The questionnaire contains a very extensive list of questions and should be customized to fill the needs of the organization using it. The number of questions in the survey will depend on the intent of the study. Research has shown that respondents experience fatigue when responding to long surveys, which impacts the quality of the data that is obtained through the survey. As a result, surveys should not take more than 20 minutes to respond; otherwise, the response rate and the quality of the data collected will be lower. It is advised that the questionnaire be kept as short as possible, asking only the questions which are essential to get the data required for the study.

Research has also shown that offering a small incentive to fill out a survey generates higher response rates as well as higher data quality: people put more thought in answering the questionnaire when they are being compensated for their time. It was demonstrated that the value of the incentive generally doesn't matter.

4.5 TDM Applications

Behaviour and attitude surveys provide insight into public attitudes and perceptions that underlie commuting travel behaviours. In particular, this type of survey can be very useful for identifying the principal barriers to the use of certain modes of transportation, especially the use of alternatives to the single-occupant vehicle. This is invaluable information for TDM purposes: it reveals where TDM efforts for shifting modes of transportation should be targeted. The surveys are also likely to reveal the predominant attitudes of different socio-demographic groups towards different modes of transportation, which is useful information for the design of TDM initiatives targeting specific groups. The following are some of the benefits associated with conducting behaviour and attitude surveys.

- Identifying barriers to the use of various modes of transportation
- Monitoring changes in public attitudes towards various modes of transportation
- Monitoring public awareness of existing TDM initiatives
- Testing public support for potential future TDM initiatives

4.6 Case Study

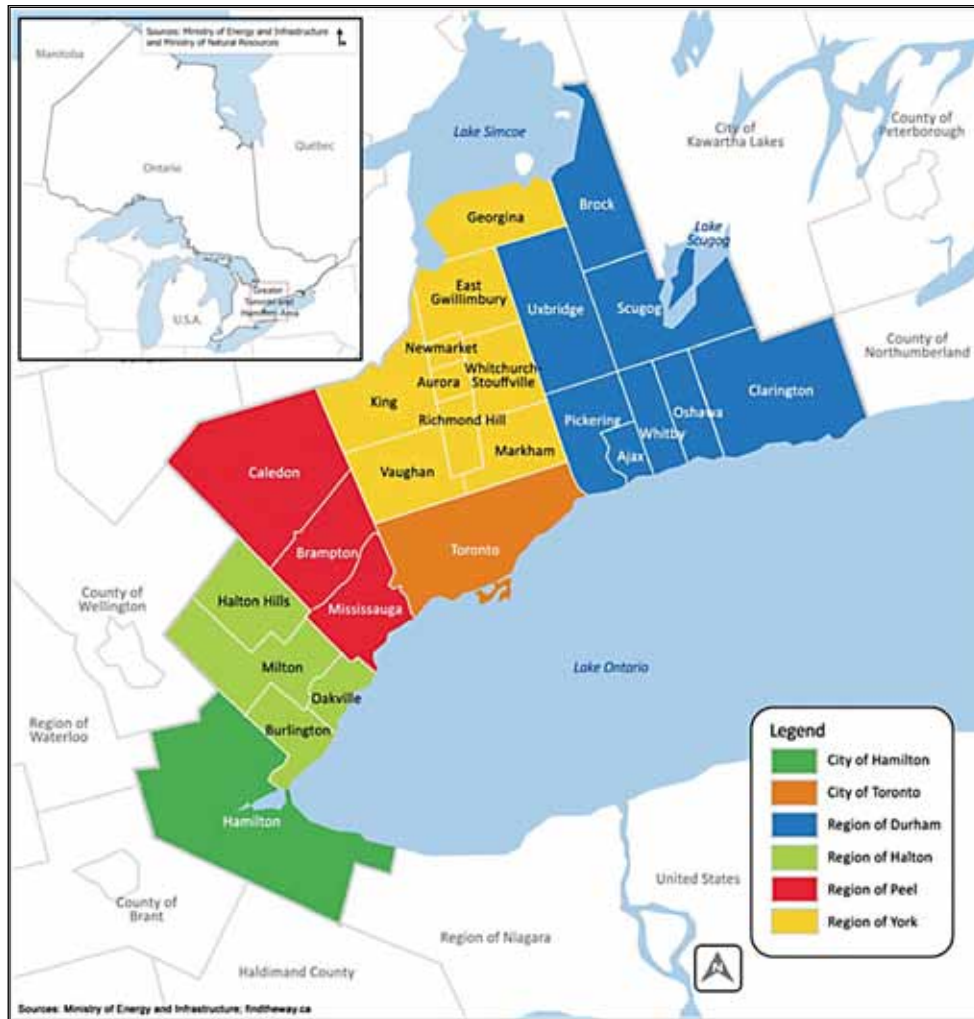
General Information	
Name:	2008 Commuter Attitudes Study
Location:	Greater Toronto and Hamilton Area
Agency:	Metrolinx
History:	Conducted in 2005, 2006, and 2008.

4.6.1 Overview

The 2008 Commuter Attitudes Study was commissioned by Metrolinx, the transportation agency for the Greater Toronto and Hamilton Area (GTHA) as part of its Smart Commute program. Smart Commute is a TDM initiative that aims to reduce traffic congestion and reduce greenhouse gas emissions in the GTHA. A very similar survey was conducted in 2002 by the City of Ottawa (Decima Research, 2002). The bulk of the questions on the GTHA and Ottawa surveys are the same. Some questions were updated for the GTHA version, such as questions about the use of local public transit systems, questions of a geographical nature, and questions on the recognition of local TDM initiatives.

Using a computer-assisted telephone interviews, the survey was conducted between May 29 and June 10, 2008. The study covered the entire GTHA, which includes the City of Toronto, the City of Hamilton, the Regional Municipality of Halton, the Regional Municipality of Peel, the Regional Municipality of York, and the Regional Municipality of Durham (Figure 1). A total of 1,008 residents of the GTHA participated in the survey. To participate, an individual had to be at least 16 years old and commute to work, school, or a volunteering commitment at least three times a week. Individuals who worked from home (i.e. teleworkers) at least three times a week were included, even if they did not commute three times a week. The reason for their inclusion is that teleworking is considered an alternative type of commuting—i.e. telecommuting.

Figure 1. Study area for the 2008 Commuter Attitudes Study.



Source: Metrolinx

4.6.2 Data Collected

The survey collected data on the following topics:

- Characteristics of commuters in the GTHA
- Attitudes of GTHA commuters
- Commute options
- Use of bicycles in combination with public transit
- Teleworking
- Use of high-occupancy vehicle (HOV) lanes
- Awareness of Smart Commute program

4.6.3 Data Analysis and Dissemination

The data was collected, analyzed, and published in a report, available on the Smart Commute website (see Section 4.6.5). The report presents a detailed analysis of the findings, including:

Profile of Survey Participants

- Occupation (worker, student, volunteer)
- Age

Profile of Commuters

- Age
- Percent living in households with children
- Top employment sectors
- Household incomes
- Number of days per week commuting
- Commuting destination (which municipality)
- Commute times

Profile of Teleworkers

- Overall frequency of working at home
- Frequency of working at home by profession

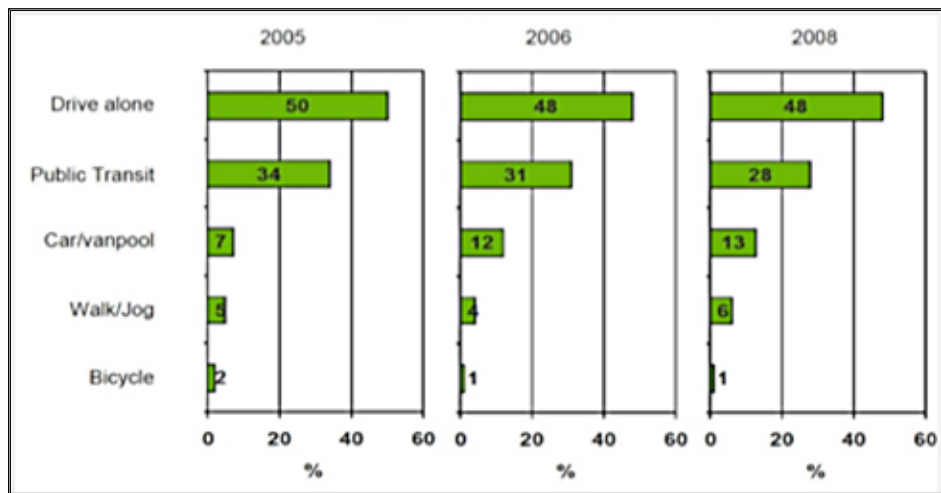
Analysis of External Factors Influencing Commuting

- Gas prices
- Transit pass tax credit
- Climate change
- Air quality

Primary Modes of Commuting

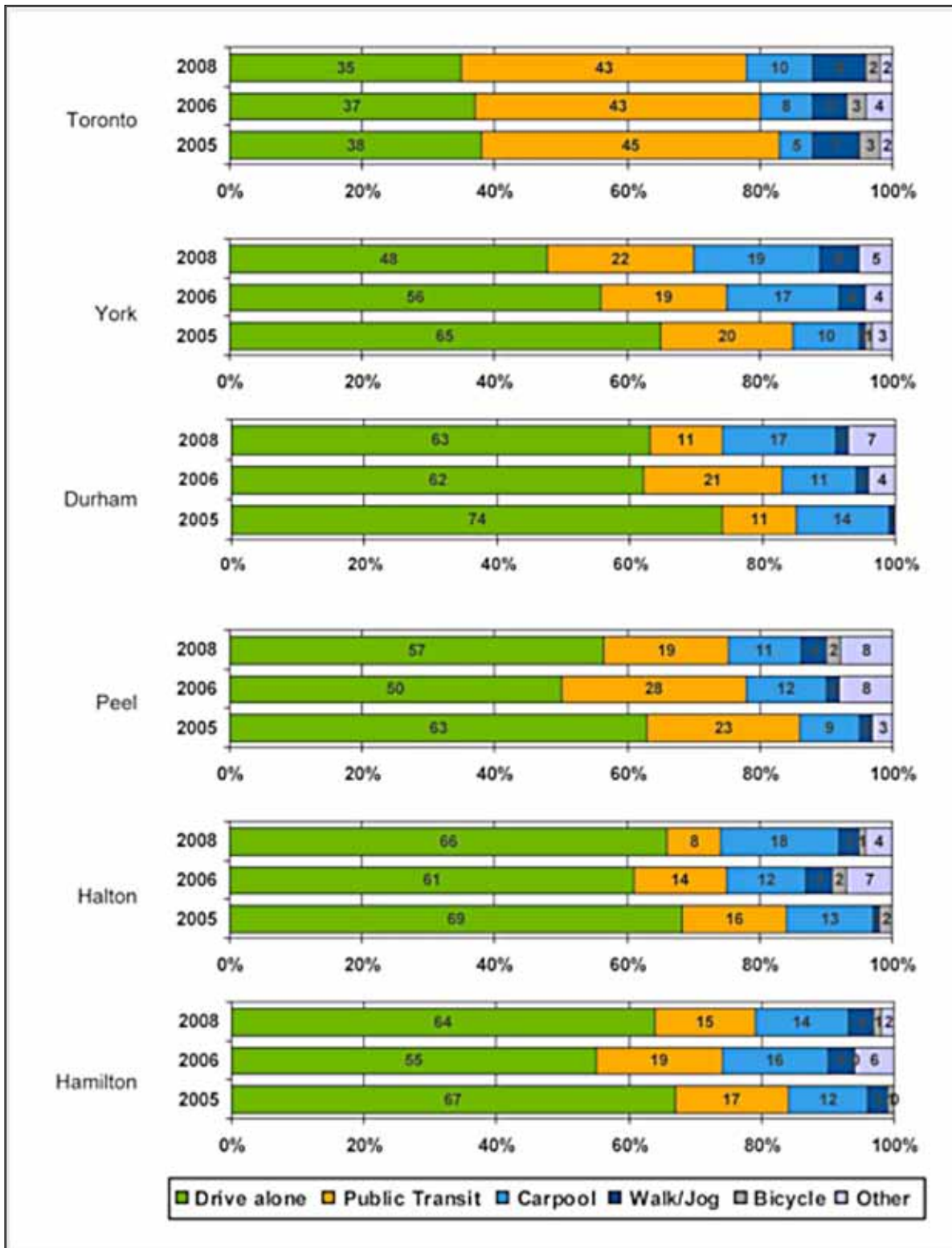
- Mode share (GTHA-wide, see Figure 2)
- Mode share (by region, see Figure 3)
- Reasons for driving alone
- Reasons for carpooling
- Reasons for walking and jogging
- Improvement, deterioration, or no change over the previous year
- Levels of satisfaction by primary commuting mode

Figure 2. Primary modes of commuter transportation in the GTHA.



Source: Harris/Decima (2008)

Figure 3. Primary modes of commuter transportation by GTHA region.



Secondary Modes of Commuting

- Secondary commuting by primary commuting mode (i.e. what secondary modes do users of each primary mode of transportation use)

Drive-alone Commuter Characteristics

- Frequency of use of other modes
- Vehicle type (car, van, SUV, truck, motorcycle, etc.)
- Frequency of carpooling
- Cost of parking at commuting destination
- Mode choice if parking were more expensive
- Average commuting time
- Commuting destination by area of residence
- Willingness to switch to different mode
- Frequency of switching
- Mode choice if switch were to occur
- Employer-sponsored initiatives that could encourage switch

Carpool/vanpool Commuter Characteristics

- Use of ridematching program
- Characteristics of fellow carpool members
- Number of people per vehicle
- HOV lane use
- Carpool facility use
- Cost of parking
- Acceptable commuting time
- Actual commuting time
- Commuting destination by area of residence

Public Transit Commuter Characteristics

- Mode of access to transit stop
- Transit system used (there are several transit agencies in the GTHA)
- Willingness to bring bicycle on public transit
- Availability of route information
- Availability of ticket and pass purchase points
- Acceptable commuting time
- Actual commuting time
- Commuting destination by area of residence

Pedestrian Commuter Characteristics

- Popular months of the year for pedestrian modes (walking, jogging, in-line skating, wheelchair)
- Availability of showers and change rooms
- Acceptable commuting time
- Actual commuting time

Bicycle Commuter Characteristics

- Popular months of the year for cycling
- Availability of bicycle parking
- Availability of showers and change rooms
- Acceptable commuting time
- Actual commuting time

Ideal Commute

- Ideal mode for commuting by primary mode of commuting
- Ideal mode for commuting by area of residence
- Ideal mode for commuting by age

Switching Intention

- Intention to switch from current primary mode to a different primary mode
- Reasons for switching/not switching

Homeworker/teleworker Characteristics

- Overall satisfaction with teleworking
- Average teleworked days per month
- Mode of transportation used when not teleworking
- Possession of internet connection
- Payment for internet connection

Program Recognition

- Recognition of Smart Commute program
- Participation in Smart Commute program
- Awareness of other GTHA commuting programs (Carpool Week, Clean Air Commute, Commuter Challenge, and Carpool Zone website)

4.6.4 Contact Information

Smart Commute Central Office
Metrolinx
416-874-5900
info@smartcommute.ca

4.6.5 Website

Smart Commute
<http://www.smartcommute.ca/>

4.7 Sources

Harris/Decima (2008). Metrolinx Smart Commute: 2008 Commuter Attitudes Study Report. Toronto: Metrolinx (http://www.smartcommute.ca/media/uploads/pdf/commuter_attitudes_survey_2008.pdf).

Decima Research (2002). *2002 Commuter Travel Behaviour and Attitude Survey*. Ottawa: City of Ottawa.

5 Origin-Destination Studies

Overview

Definition:	Origin-Destination (OD) studies, also called household travel surveys or travel diary studies, are a highly specialized type of survey that are used for collecting detailed data about transportation behaviour.
Scope:	OD studies cover a large area—in most cases, an entire metropolitan region.
Data Collection Method:	Data is collected from a relatively large population sample—in some cases, as high as 5% of the population—using either computer-assisted telephone surveys, or paper or electronic travel diary forms to be filled out and submitted by participants. These highly resource-intensive studies are performed at regular time intervals—usually every five to ten years.
Types of Data Collected:	OD studies collect data on who is making trips, from where to where, at what time, by which modes of transportation, and for what purpose. In terms of who is making trips, OD studies collect data on basic household and individual characteristics. This allows for statistical analyses that investigate relationships between travel behaviour and various household or individual characteristics.
TDM Applications:	The data collected through OD studies can be used for the following purposes: <ul style="list-style-type: none">• identifying geographic areas or populations that exhibit undesirable transportation behaviours that are to be targeted by TDM measures;• predicting the transportation behaviour outcomes of proposed TDM measures;• monitoring the effectiveness of existing TDM measures.

5.1 Purpose

OD studies are generally used for collecting data on transportation behaviour and to identify the transportation needs of the population of a particular territory. OD study data is primarily intended to inform regional and local transportation planning. An Origin-Destination Survey is different from a Behaviour and Attitude Survey in that it seeks to find out how, when and where the person/household currently travels as opposed to learning about transportation preferences.

5.2 Geographic Scope

OD studies are typically conducted on a metropolitan or regional scale. The study should cover the entire urbanized area as well as surrounding exurban/rural areas in order to capture a city or region's entire commuter-shed.

5.3 Data Collected

OD studies collect three categories of data: household, personal, and trip. The common types of data collected for each of the three categories are listed below. The **items in bold** are essential items that are collected by all OD studies. The remaining items are collected by some but not all OD studies and can therefore be considered optional. Though optional, these items can be valuable for breaking down data on transportation behaviour by different population characteristics, which can be useful for designing and monitoring targeted TDM measures.

Household Data (for all household members)

- **Location of the household**
- **Type of building in which the household dwells**
- **Number of people in the household**
- **Number of motor vehicles owned by the household**
- Number of bicycles owned by the household
- Total income of the household

Personal Data (for each household member)

- **Age**
- **Gender**
- Employment status (employed or student, full-time or part-time)
- Location of the primary workplace or school
- Occupation (if the person is employed)
- Level of education
- Possession of a driver's license
- Possession of a transit pass
- Use of transit in the last 30 days

Trip Data (for each household member)

- **Trip purpose**
- **Trip origin**
- **Trip destination**
- **Building type at destination**
- **Time of departure**
- **Time of arrival**
- **Mode or modes of transportation used**
- Location of mode transfer (if more than one mode used)
- Name of the transit company and line number (if transit is used)
- Method of fare payment (if transit is used)
- Mode of access to transit (if transit is used)
- Mode of egress from transit (if transit is used)
- Parking method of payment (if automobile is used)
- Highways used (if automobile is used)
- Bridges used (if automobile is used)
- Number of car passengers (if automobile is used)
- Automobile availability (if mode other than automobile is used)

5.4 Methodology

5.4.1 Data Collection

OD studies are performed at regular time intervals—usually every five or ten years. Data is collected from a relatively large population sample—in some cases, as high as 5% of the population. Most OD studies are performed using computer-assisted telephone interviews but some use a printed or internet-based travel diary form instead. In the latter case, telephone interviews are usually still used for recruitment purposes. The two methods are described and then compared below.

Whether telephone surveys or travel diary forms are used, it is preferable to perform OD studies in the spring or fall. Transportation behaviour tends to be stable during these seasons and all modes of transportation, particularly walking and cycling, are used. Transportation behaviour destabilizes in the summer as a result of school vacations and in the winter as a result of variable road conditions related to weather.

Telephone Surveys

The metropolitan region may be broken up into multiple sampling areas, each of which has an assigned sample size proportional to its population size. This helps to ensure that all parts of the region are proportionally represented in the final sample. Within each sampling area, telephone numbers are chosen at random. Usually, one adult member of a participating household answers the survey for all members of the household. The interview typically includes four steps:

1. The interview begins with questions about household characteristics (address, type of building, number of people, number of cars, etc.)
2. The participant is asked questions about their own individual characteristics (age, employment status, occupation, level of education, etc.)
3. The participant is asked questions about all the trips they made during a specific 24-hour period—usually the day preceding the interview. The participant is asked to recall the trips in order, from the first trip in the morning to the last trip before midnight on the same day. The same set of questions is asked for each trip (address or nearest intersection to the origin, address or nearest intersection to the destination, time of departure, time of arrival, purpose, and modes of transportation used).
4. Steps 2 and 3 above are repeated, asking the participant to provide the information on behalf of each of the other members of the household.

A sample OD survey questionnaire is provided in [Appendix 2](#).

Travel Diary Form

An alternative to computer-assisted telephone surveys is to use a travel diary form, as is currently the practice in the Vancouver and Victoria metropolitan regions. In this case, participants are first recruited by telephone using random selection. Households that agree to participate are sent travel diary forms in the mail or directed to an online electronic form. The questions on the form are essentially the same as those asked during a telephone-based OD study. Participants are assigned a specific day on which they fill out the form. Usually, a separate travel diary is to be filled out for each member of the household.

Sample travel diary forms can be found in Mustel Group (2008 a) and (2008 b) (see, Section 3.7).

Comparison of the Techniques

The advantage of using a travel diary is that trips can be recorded on the fly or immediately at the end of the specified study day. In contrast, telephone survey participants recall trips taken the previous day, increasing the risk of underreporting (especially of short walking trips) and misreporting (citing wrong times and locations). The disadvantage of using travel diary forms is that the forms are to be mailed in, which takes time, and once received, the data is manually transferred to a computer (i.e. manually coded). With a telephone survey, the data is coded on the fly and can be error corrected immediately, with input from the respondent. The data is immediately available in digital format and analysis can begin as soon as a sufficient number of participants have been interviewed.

Both techniques are resource intensive. The telephone survey technique may be slightly more resource efficient and is clearly more time efficient as it is a one-step process. In contrast, the travel diary form technique is a multi-step process—telephone recruitment, mailing out blank travel diary forms, mailing in completed travel diary forms, and then coding the data. The majority of OD studies performed in Canada are based on telephone surveys.

5.4.2 Analysis

Raw data collected on trip origins and destinations needs to be analyzed to calculate travel distances. Typically, two different distances are calculated:

- **The straight-line distance** between the point of origin and point of destination (“as the crow flies”)
- **The network distance** between the same two points (i.e. the minimum possible travel distance between the origin and destination using the existing road network)

There are two different approaches to disseminating OD data: matrix/aggregated form or tabulated/disaggregated form.

Matrix/Aggregated Form

To prepare an OD matrix, the given region is broken down into small geographic units. The geographic units form the rows and columns of the matrix. Typically, the rows will represent the point of origin and the columns will represent the destination. So, each cell represents the number of trips that originated in the geographic unit represented by the row and ended in the geographic unit represented by the column. A number of matrices can be generated for the same set of geographic units, each showing the number of trips under different conditions, such as time of day, trip purpose, mode of transportation, and so on.

For an example, see Table 2 in the case study below. The same matrices (i.e. for the same geographic units) can be prepared for OD surveys performed in different years, allowing direct comparisons of transportation behaviour across years.

Tabulated/Disaggregated Form

Raw data on individual trips can be stored in a table or a spreadsheet and can be analyzed using various statistical methods to investigate the relationships between trip characteristics (time, purpose, mode, etc.) and other factors such as household characteristics (number of people, number of cars, income, etc.) and individual characteristics (age, gender, level of education, etc.), depending on what kind of household and individual data has been collected. It is also possible to combine OD data with geographic data from other sources, particularly the census. By converting location data recorded by the OD study to census tracts, the OD data can be combined with rich socio-demographic data from the census.

Regression analysis methods, which are statistical methods for investigating the influence of multiple, independent variables on a dependent variable, are especially useful for analyzing OD study data. Any variable can be assigned as a dependent and any number of variables can be assigned as the independent variables for a particular investigation. For example, for an investigation into what factors influence transit use, mode of transportation could be considered a dependent variable while age, gender, trip purpose, distance to destination, number of household cars, level of education, and population density at the trip origin could be chosen as the independent variables. A regression analysis would show which of the independent variables have an influence on the dependent variable, and whether the influence is negative or positive.

The results of a regression analysis can be used for forecasting. Returning to the aforementioned example, the results of a regression analysis could be used to predict how changing the different independent variables would influence transit use. For example, it would allow a prediction of how an increase in the number of household cars would influence transit use. Predictions of this type can be useful for forecasting the outcomes of TDM measures.

5.5 TDM Applications

OD studies provide a periodic snapshot of transportation behaviour in a metropolitan area. Comparing data from OD studies across time reveals trends in transportation behaviour, especially trends in mode shares. The trend analysis of transportation behaviour (e.g. number of trips per mode, trip distance) can be broken down according to the household, individual, or trip characteristics recorded by the OD study. For example, the trend analysis can be broken down by:

- **Geography:** how does transportation behaviour vary across different parts of the city?
- **Demographic group:** how does transportation behaviour vary according to age and gender?
- **Socioeconomic group:** how does transportation behaviour vary according to level of education and income?
- **Trip characteristics:** how does transportation behaviour vary according to the time of day or the trip purpose?

Analyses of this type can be very useful for identifying areas or populations that exhibit transportation behaviour that could be targeted by TDM measures. For established TDM measures, trend analyses of OD study data provide an indirect means of monitoring. Although OD data will not show that a particular initiative is effective, it will at least show whether or not the trends in transportation behaviour are moving in the intended direction.

Regression analyses on OD study data can be especially useful for gaining insight into how different factors influence transportation behaviour. They can be used to identify factors that have the strongest influence on transportation behaviour and also to predict the impacts of changing these factors. As they ultimately allow potential outcomes to be predicted, OD studies are useful for designing targeted TDM measures.

5.6 Case Study

General Information	
Name:	Montreal Region Origin-Destination Survey
Location:	Metropolitan Montreal
Agency:	Agence métropolitaine de transport (AMT)
History:	Conducted in 1970, 1974, 1978, 1982, 1987, 1993, and every five years thereafter. The most recent study was conducted in 2008.

5.6.2 Data Collected

The data collected included the following:

Household Data

- Location of the household
- Number of people in the household
- Number of motor vehicles owned by the household

Personal Data (for each household member)

- Age
- Gender
- Location of the primary workplace or school
- Possession of a driver's license
- Possession of a transit pass

Trip Data (for each household member)

- Trip purpose
- Trip origin
- Trip destination
- Type of building at the destination
- Time of departure
- Mode or modes of transportation used
- Name of the transit company and line number (if transit is used)
- Highways used (if automobile is used)
- Bridges used (if automobile is used)
- Number of car passengers (if automobile is used)

5.6.3 Data Analysis and Dissemination

The 2008 data is being analyzed by the AMT in association with the École Polytechnique. A digest of the main results (AMT, 2010) has been released to the public via the AMT's OD Study website (see Section 3.6.5). More detailed results, showing travel data by sector, have yet to be released; the 2003 OD study is the most recent for which travel results by sector are available.

For the purpose of disseminating data to the public, the Montreal region was divided in two ways: (1) into eight sub-regions, including four on the Island of Montreal; and (2) into 102 sectors, including 41 on the Island of Montreal. The data is presented in matrices, with the sub-regions or sectors forming the rows and columns of each matrix. The rows represent trip origins and the columns represent trip destination. The number in each cell in the matrix corresponds to the number of trips that originated in the sector represented by the row and terminated in the sector represented by the column. A number of matrices are generated, each representing a different combination of three factors: time period (AM peak hours or 24 hours), trip purpose (all, work, school, return, or all-non-return), and mode (all, car, car as driver, public transit, multi-modal, or all motorized). An example of an OD matrix is presented below (Table 2).

Table 2. OD Study 2003 matrix for eight principal Montreal sub-regions, AM peak period, all trip purposes, all modes.

6	Downtown	Centre Island	East Island	West Island	South Shore	Laval	North Periphery	South Periphery	TOTAL
Downtown	13,720	12,461	1,031	3,006	978	526	433	586	32,740
Centre Island	91,698	297,914	23,389	42,882	8,379	10,080	4,917	3,714	482,973
East Island	17,183	45,020	77,378	6,624	2,422	3,134	2,310	681	154,752
West Island	35,581	47,389	3,499	166,960	3,013	4,493	2,070	5,117	268,122
South Shore	33,471	21,879	3,510	6,084	125,629	1,377	489	9,669	202,107
Laval	16,237	35,377	6,638	18,219	1,557	101,575	9,645	666	189,914
North Periphery	14,263	24,003	12,197	12,357	2,134	21,736	196,483	1,110	284,282
South Periphery	22,648	16,802	3,251	24,513	31,240	1,577	1,227	181,043	282,302
TOTAL	244,800	500,846	130,893	280,646	175,351	144,498	217,574	202,584	1,897,192

Source: http://www.cimtu.qc.ca/EnqOD/2003/Resultats/EnqOD03_matrices_RA.xls

The public can only obtain trip data aggregated by sector, as described above. Researchers can obtain disaggregated data (i.e. data on individual trips) under a special license. To protect the privacy of the participants, exact addresses are not provided in the data sample available to researchers. Instead, the points of origin and destination for all trips are aggregated by census tract. This allows researchers to combine the OD study data with data from the preceding Census of Canada—i.e. 2003 OD data is combined with 2001 census data.

5.6.4 Contact Information

OD survey Secretariat
 Agence métropolitaine de transport
 514-287-2464
enquetes-od@amt.qc.ca

5.6.5 Websites

Enquête Origine-Destination 2008 (French only)
<http://www.enquete-od.qc.ca/>

AMT – Origin-Destination Survey
http://www.amt.qc.ca/corp_template.aspx?id=686&LangType=1033

5.7 Sources

Agence Métropolitaine de Transport (AMT) (2010). *Enquête Origine-Destination 2008 – La mobilité des personnes dans la région de Montréal – Faits saillants*. Montreal: Agence Métropolitaine de Transport (http://www.enquete-od.qc.ca/docs/EnqOD08_FaitsSaillants.pdf) (French only).

Mustel Group (2008 a). *Survey Form*. Blank survey form used for Victoria and Vancouver regional trip diary studies (<http://www.mustelgroup.com/tripdiary/blank.pdf>).

Mustel Group (2008 b). *Example of a Trip Diary Day*. Example of Victoria and Vancouver regional trip diary studies survey form filled out (<http://www.mustelgroup.com/tripdiary/tripexample.pdf>).

TRANS Committee (2005). *2005 Origin-Destination Survey Questionnaire*. Survey questionnaire commissioned jointly by the City of Ottawa and the Ministère des Transports du Québec (http://www.ncr-trans-rcn.ca/uploadedFiles/O-DSurvey/Questionnaire_Final_En_web.pdf).

Overview

Definition:	An open house is an informal gathering of stakeholders where local and regional authorities can disseminate and gather information about a proposed or implemented TDM initiative. It is typically held at a known community venue, such as a community centre, church, or school. Attendance levels at these events vary from 10 to several hundred people. The non-confrontational nature of this event encourages open two-way dialogue between the various stakeholders. Often, the people in attendance represent the diversity of stakeholders within the local community and/or region, including residents, politicians, transit authorities, and community groups. Open houses can be held at several points throughout the TDM initiative's lifecycle – pre-implementation to post-implementation.
Data Collected:	Open houses are used to gather information regarding stakeholder opinions and perceptions about a soon-to-be or recently implemented TDM initiative.
TDM Applications:	The data collected during an open house can be used for the following purposes: <ul style="list-style-type: none"> • disseminating information regarding a TDM initiative; • creating excitement about a new TDM initiative; • encouraging people to re-evaluate their current transportation habits; and • identifying and understanding how various stakeholders perceive a recently implemented or proposed TDM initiative.

6.1 General Purpose

Historically, local and regional authorities made decisions regarding transportation infrastructure with very little public involvement. This top-down approach created a plethora of problems, including resentment toward decision makers, inappropriate public investments, and corruption. Laurie Skuba Jackson, in her article *Contemporary Public Involvement: Toward a Strategic Approach*, argues that “since the 1960s, increased pressure from citizens and stakeholder groups has altered traditional top-down decision making” (Skuba Jackson, 2001, 135). As a result, the general public is being consulted more frequently today than ever before and power is being shared between more stakeholders, reflecting the “desire and commitment of these groups to take an expanded role in the planning decisions which affect them” (Skuba Jackson, 2001, 135).

Today, open houses are not only used to disseminate information, but are also increasingly used to gather valuable data regarding public opinions and perceptions of a given project or program. Consequently, TDM authorities now use open houses to evaluate initiatives and gather important qualitative information.

With respect to evaluating a TDM initiative, the primary purpose of hosting an open house is to provide information to a specific group of population while receiving feedback, comments, and suggestions concerning the particular transportation project. The synergy that is often generated within an open house atmosphere has the ability to create a greater awareness of problems associated with a TDM initiative that frequently do not surface during a quantitative evaluation technique.

6.2 Geographic Scope

An Open House is usually held on a neighbourhood or community scale. It is at this scale that stakeholders can be engaged in a meaningful way.

6.3 Data Collected

During an open house, practitioners seeking to evaluate a TDM initiative are encouraged to survey stakeholders attending the event. Typically, these surveys are very short and used to gather basic information, such as knowledge or perception of the TDM initiative. The common types of data collected are listed below. The **items in bold** are essential items that are collected during all open houses. The remaining items are collected during some but not all open houses and can therefore be considered optional.

Household Data (for all household members)

- **Location of the household in the community**
- Number of cars owned by the household
- Number of people in the household
- Number of bicycles owned by the household

Personal Data (for each household member)

- **Knowledge of the TDM initiative**
- **Perception of the TDM initiative**
- **Experience with the TDM initiative**
- **Recommendations for improving current or proposed service levels**
- Age
- Gender
- Possession of a transit pass
- Use of transit in the last 30 days
- Primary mode of transportation

6.4 Methodology

6.4.1 Planning the Event

Audience Selection

The first step in planning an open house is to select the appropriate target audience. This task should reflect the geographic scope of the TDM initiative identified in section 4.2. In many instances, open houses lack a representative audience and are instead manipulated by well-organized stakeholder groups. Consequently, event planners try to ensure that the stakeholders attending the open house accurately reflect the socio-demographic composition of the defined neighbourhood or community.

Location

The location of an open house should be a neutral and public venue such as a school, church, or community centre. Holding an open house at a local city hall or government building should be avoided whenever possible because it represents a hierarchical structure of power which is not conducive to public participation. In addition, the chosen location should be large enough to accommodate the estimated number of participants, be accessible to all stakeholders (elevator and wheelchair ramps), and have the appropriate facilities (washrooms and sound system).

Time and Date

When planning an open house, one of the most important decisions is choosing a date and time that will permit the largest number of stakeholders to attend. Research indicates that an open house beginning in the late afternoon and ending in the early evening during a weekday (Monday to Thursday) yields desirable stakeholder turnouts, responding to typical work and vacation schedules. Conversely, an open house taking place on a long weekend during the summer will have less than desirable attendance.

Advertising

In order to enhance the overall effectiveness and significance of the open house, marketing and advertising strategies should receive a great deal of attention. Individualized invitations should be sent to “guests of honour” and key participants. In addition, the event should be advertised through various means of communication such as: ads in local newspapers, relevant websites, local radio stations, flyers, and posters. Guest speakers should be clearly announced. Also, providing food and refreshments is highly recommended to increase people’s participation.

6.4.2 Hosting the Event

Open Table

An open house provides key information to participants and guests through the presence of kiosks, display posters, videos, slide shows, and presentations. At each kiosk, a knowledgeable staff member shares their expertise with the participants and answers their questions. Each open table or kiosk will typically highlight a unique aspect of the TDM initiative. Emphasis is given to creating a dialogue between guests and project managers, rather than to a highly structured one-way interaction.

Speech/Discourse

Following the first information session, speeches are usually given by the individual(s) responsible for the project, major stakeholders, and key participants to restate the purpose of the open house and provide updated information regarding the project. It is highly recommended that all speakers suppress unnecessary planning jargon so that the information presented is accessible to all attendance members.

Open Question Period

The speech is followed by a “question and answer” session, providing those in attendance with another opportunity to make comments or suggestions, and ask questions.

6.4.3 Reporting the Event

Data Collection

Key information can be gathered during all stages of the open house. The kiosks provide an opportunity for staff members to ask participants short and simple questions and provide the public with an opportunity to openly comment on the proposed TDM initiative. The comments and observations made at a “private” level by the participants while interacting at the kiosks provide decision makers with valuable information. During the speeches, staff members are also encouraged to monitor the reactions of those in attendance, both positive and negative. And lastly, during the question and answer period all questions and responses should be recorded.

Throughout the data collection process, research indicates that negative comments and perspectives are more common than positive ones. As a result, staff members should cautiously interpret the data collected.

Data Sharing

In addition to collecting data, it is highly recommended that information also be shared during and after the open house. The information gathered from each open table or kiosk (identified in 4.4.2) should be compiled and summarized during the event and the results should be presented to those in attendance before the question and answer session. This step is critical for the continuation of the project as it helps create synergy among participants and organizers.

Individual Report

An individual report is produced for each open table or kiosk. Each report should focus on the specific aspect that was presented at each table.

General Report

Based on the individual reports, a general report reviewing the sequence of the open house is then produced. This report should gather and summarize the key points raised by the participants during the open house. These include the advantages and benefits of the project, as well as the drawbacks and challenges for the future. All these comments and suggestions should be clearly stated in order to improve the overall performance of the program and to meet people's needs and expectations.

Communication of the Results

Once produced, the global report is made available to the people who attended the open house, stakeholders, and all others involved or interested in the project. This report can be printed or made available online. This will ensure that the information received during the open house will be available to everyone and can be used in an efficient manner, meeting people's needs and requirements.

6.5 TDM Applications

Conducting an open house is a creative and non-confrontational way to gather information about a TDM initiative and evaluate it according to a number of qualitative factors. The following list provides a summary of how an open house can be used as an important TDM evaluation technique.

- An open house can be applied to virtually **all types of TDM initiatives**
- Conducting an open house **does not require the stakeholders in attendance to have prior knowledge** of the TDM initiative. Their presence alone is all that is required.
- The evaluation techniques applied during an open house can be used **throughout the TDM life cycle** – pre-implementation, during implementation, and post-implementation.
- The **data** obtained through short qualitative surveys can give decision makers important information about how they can improve the TDM initiative by enhancing public awareness, disseminating information, and breaking down possible barriers and misconceptions.
- Open houses require very **few resources** to conduct. Such an event can be done in a short period of time at a fraction of the cost of other evaluation techniques. Therefore, this type of evaluation technique is perfectly suited for small TDM initiatives such as walking school bus or shared parking programs.
- Open houses offer **transparency**. Government endeavours, which concern public services, are typically expected to be accountable. To avoid severe opposition and to take advantage of community knowledge, there is significant benefit to obtaining public opinion prior to, during, and after the implementation of a project.

However, as stated in the previous sections, organizers should also be aware of the potential biases presented by those attending the open house. Sometimes, organizations can hijack an open house and use it as a platform to discuss their own issues or concerns instead of the TDM initiative. Efforts should be made to contextualize these negative perspectives.

6.6 Case Study

General Information	
Name:	Eglinton Crosstown LRT
Location:	Toronto, Ontario
Agency:	Toronto Transit Authority (TTC), the City of Toronto, and Metrolinx
History:	Conducted: <ul style="list-style-type: none">• August 14, 2008, to September 22, 2008,• June 15, 2009, to July 29, 2009,• September 2009, and• November 23, 2009, to January 14, 2010.

6.6.1 Overview

In 2007, the Government of Ontario's Metrolinx, the Toronto Transit Commission (TTC), and the City of Toronto developed a long-term plan to improve and enhance public transportation throughout the Greater Toronto Area. As part of MoveOntario 2020 and in accordance with the *Places to Move Act*, they collectively proposed to build several Light Rail Transit (LRT) lines, a subway extension, and numerous bus routes to neighbourhoods and areas currently not served by rapid transit.

The LRT plan suggests building several LRT lines at an estimated cost of 10.5 billion Canadian dollars. However, only four lines were retained in the province's budget. Those four lines, now referred to as the Priority LRT lines (or Phase 1), are estimated to cost 8.7 billion Canadian dollars. Construction of the first LRT line began in 2010 and is expected to continue until 2020.

Before engaging in the construction of the LRT plan, the City of Toronto collaborated with third parties to inform Torontonians of the aforementioned alternatives, to obtain feedback, and to gauge public opinion.

A recent online poll suggested that the highest response rate in terms of potential ridership arose from the Scarborough-East York-Toronto-York-Etobicoke area: the Eglinton Crosstown corridor. A private firm was thus appointed the role to hold numerous open houses in the Eglinton Crosstown region (among others) to obtain the public's opinion on the proposed LRT. The objective is to engage people in public sector decision making.

The tasks involved reaching out to as many citizens as possible within the Eglinton Crosstown area to learn their concerns and opinions regarding the LRT's reliability, frequency, cost effectiveness, potential ridership, traffic impacts, environmental and community impacts, alternatives, etc.

Four rounds of open houses were held between August 2008 and December 2009 for the Eglinton Crosstown line. Each round offered six or seven different dates and locations. The open houses were held in public schools, synagogues, churches, conference halls, community centres, arenas, malls, and recreational centres. Venues were chosen on account of accessibility and proximity to public transit. At times, the type of venue affected the type of attendees. Malls and venues with babysitting facilities attracted young professionals the most, while community centres and institutions brought an older crowd.

Public Notifications

Prior to marketing the open houses, a consultation plan was created and a list of all concerned parties was compiled. This list included, but was not limited to, local residents, TTC staff members, and engineers. To establish the target area for each metro line section, a geographic range was set in accordance with the results of a travel pattern study. Open houses for priority lines were held first, followed by the less urgent LRT lines. To market the open houses, a variety of tools to contact and inform the public were used. Amongst these tools are:

- TTC Mailings/Notifications: letters faxed and mailed out to MPs/MPPs, the Minister of Transportation, and the CEO of Metrolinx; letters sent to Business Improvement Areas (BIAs); notification letters sent to all private property owners affected; emails to agencies, ministries, stakeholders; 11X17 laminated flyers posted at the four local transit stations.
- Canada Post Drops and Newspaper Ads (led by the city of Toronto): notices sent to properties within 300m of the study corridor, property owners within 60m of the corridor, and established project contact lists (via email or mail); newspaper ads published in the *Toronto Star*, *Metro*, *City Centre Mirror*, *North York Mirror*, *East York Mirror*, *Scarborough Mirror*, *Etobicoke Guardian*, and other local newspapers.
- Communication between the City of Toronto and First Nations: letters sent to all William Treaty Bands with the notice of commencement; emails to the Mississaugas of the New Credit; and notices to Indian and Northern Affairs Canada Specific Claims, INAC Litigation Management and Resolution Branch, and INAC Comprehensive Claims and the Ontario Ministry of Aboriginal Affairs.

Presented Material

During the open houses, numerous boards and panels were displayed. The detailed boards, all available online, included:

- Traffic management strategies. A video representing rerouted left turns complemented the graphs.
- Proposed stops and alternative routes.
- Information about Metrolinx.
- Preferred designs for both the underground and street level sections.
- Future transportation network drawings.

In addition, the following were handed out:

- Frequently Asked Questions (FAQ) sheet; this sheet was also made available online.
- A questionnaire.
- A comment sheet.

There were two types of open houses held. The first type was a PIC, or public information centre, where the goal of the open house is mostly to present information on panels and through audiovisual presentations. The other type of open house was the community meeting or public consultation, where individuals and officials hold a discussion, followed by a question and answer period. Some communities preferred the former while others favoured the latter.

During the public consultation, an audiovisual presentation with voice-over was presented to introduce the topic at hand. Proposed routes, alternative routes, and the most place-relevant sections of the corridor were examined. Participants were invited to ask questions and discuss the TTC plans openly and throughout the open house. In fact, city and consultant project team members were often present during public consultations to answer concerns or questions directly. Project team members recorded participants' comments as they arose during the discussion.

The public was also invited to submit additional comments via phone, online, or written down at the open house's registration table. Telephone and online comments were collected a few weeks following or preceding the open house. Follow-up replies were common. The private firm hired to host the open houses attempted to answer every individual question if it did not receive any answers during the open house.

Furthermore, individuals could request to be part of the mailing list regarding the TTC's plan updates, whether they participated in the open house or not. This request could be made directly via the appointed website.

6.6.2 Data Collected

The data collected included the following:

Household Data (for all household members)

- Place of Residence

Personal Data (for each household member)

- Age group
- Distance from work/school
- Primary mode of transportation
- Criteria and factors leading to use of different modes of transportation
- Barriers and obstacles hindering the use of Active Transportation
- Preferences and opinions regarding transit and carpooling boards presented during the open house
- Preferences and opinions regarding cycling and pedestrian boards presented during the open house

6.6.3 Data Analysis and Dissemination

Data analysis consisted of assembling all comments, concerns, and questions collected during each round of open houses, online, or via telephone. These comments were then categorized, summarized, and presented to the TTC.

Summary Reports

Following each round of six to seven open houses, LURA created an extensive summary report, which addressed and presented the following:

- A table presenting the date, location, and number of participants for each open house.
- A comments summary divided into two categories: “oppose” and “support”. These were then subdivided into “general comments” and “questions”. Finally, they were organized into topic-related subcategories: aboveground/underground; nuisance concerns; stops and stop suggestions; concerns on business impacts; lane reduction; parking; cycling; accessibility; construction; funding; token prices and points of sale; design; emergencies; and environment and community impacts.
- An annex with every comment, concern, and question addressed at the open houses, online, or via telephone.

The summary reports were handed to the concerned parties and made available to the public via the TTC website, devoid of personal information or individuals’ names.

6.6.4 Contact Information

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LURA Consulting
416-410-3888 ext. 5
jfaught@lura.ca

6.6.5 Websites

Toronto Transit Commission: www.ttc.ca

LURA Consulting: www.lura.ca

6.7 Sources

Skuba Jackson, L. (2001). *Contemporary Public Involvement: Toward a Strategic Approach*. *Local Environment* 6(2), 135-147.

Overview

Definition:	A focus group is a carefully planned discussion group guided by a moderator and involving several interviewees who are encouraged to speak, react, and interact with one another on a specific topic. Participants are solicited to provide their perceptions, feelings and/or opinions on the subject being discussed. By combining the strengths of an in-depth interview with group observation, focus groups provide decision makers with valuable qualitative data and insight about public opinion on a variety of transportation-related issues.
Data Collected:	Focus groups are used to gather information regarding stakeholders' opinions, experiences, expectations and preferences about a recently implemented TDM initiative.
TDM Applications:	The data collected during one or more focus group(s) can be used for the following purposes: <ul style="list-style-type: none"> • collect qualitative data that would otherwise be undocumented; and • encourage dialogue and interaction between stakeholders.

7.1 General Purpose

The primary purpose of a focus group is to collect qualitative data on people's experiences, feelings, expectations, and preferences regarding a program, activity, or a specific social issue. The researcher seeks to explain and describe what is happening in the group or community from the perspective of those being researched. Therefore, the aim of a focus group is to understand what people think, and why they feel the way they do. By probing participant discussions, focus groups are also more informative than ordinary personal interviews. Furthermore, interaction among participants permits the observer to elicit a wider variety of perspectives on a specific issue.

7.2 Geographic Scope

The composition of focus groups usually reflects a small geographic area, focusing on a community, school, or workplace. However, with respect to TDM strategies, focus groups usually reflect the scale of the proposed initiative. For example, if the TDM initiative being evaluated is a regional Universal Public Transit Pass, the focus group will include participants representing the entire region.

7.3 Data Collected

As one method of qualitative research, focus groups do not produce quantifiable data that can be illustrated in tables or graphs for statistical analysis. Instead, the data collected from focus groups takes the form of a large body of unstructured textual material such as interview transcripts. These can either be answers to open-ended questions, an assessment of a program or initiative, or any information perceived as relevant and significant by participants. Focus groups offer an in-depth understanding of the target audience's perspectives or opinions.

The most common types of data collected during a focus group are listed below. The **items in bold** are essential items that are collected during all focus groups. The remaining items are collected during some but not all focus groups and can therefore be considered optional.

Household Data (for all household members)

- **Location of the household**
- Number of cars possessed by the household
- Number of people in the household
- Number of bicycles possessed by the household

Personal Data (for each household member)

- **Knowledge of TDM initiative**
- **Perception of TDM initiative**
- **Experience with the TDM initiative**
- **Recommendations for improving current or proposed service levels**
- Possession of a transit pass
- Use of transit in the last 30 days

7.4 Methodology

The following section describes the required steps to conduct focus group interviews:

7.4.1 Select the team

In order to conduct a focus group interview, a team comprising at least one trained interviewer (also referred to as a facilitator or moderator) and one reporter is required.

Facilitator/Moderator

The focus group facilitator, who is usually the primary resource, is responsible for guiding the discussion among participants. However, focus group facilitators are often hired for specific research purposes. In this case, they should be sufficiently trained, familiar with the research project, the primary research questions, and researcher intentions.

Reporter

The reporter plays a significant role during a focus group because they are responsible for taking notes and recording the discussion, ensuring that the interaction and discussion between the various participants is adequately documented.

7.4.2 Select the participants

A careful selection of participants is critical to avoid and minimize biases. Several issues, attributes, and characteristics have to be carefully considered before dividing people into groups.

Number of Participants

Determining the number of participants is a very important decision. On the one hand, it is argued that smaller groups are more appropriate when participants are emotionally involved with the discussion. On the other hand, larger groups may increase the level of interaction among participants, leading to increased discussion and suggestions. As a result, a greater number of questions and issues may be covered. However, the number of people participating in a focus group will always depend on the researcher's intent and objective; this figure typically ranges from 5 to 15 participants.

Participant Characteristics

Participants are selected according to their knowledge of, or interest in, the discussion topic. Although a wide variety of people should be consulted to yield significant results, the topic should remain relevant to each participant.

People can first be divided into separate groups based on socioeconomic or demographic characteristics such as age, gender, activity, education, and level of involvement in the program or topic. The aim of grouping people based on shared characteristics and a mutual interest is to observe the variations among the individual groups and to facilitate comparisons among individuals sharing specific characteristics. A slight variation of this approach consists of forming groups of people depending on their personal interest and level of involvement in the topic. This means that there will be several "general population" groups along with people having a specific connection with the topic.

Nonetheless, in order to enhance the overall significance of focus groups, it is recommended that participants share at least some common views, traits, or characteristics in relation to the research topic.

Group Selection

The third issue encountered while selecting groups is choosing whether to use natural groups or to select people who are known to each other. Again, this decision strongly depends on the research topic and purpose of the focus group. Some researchers may prefer to exclude people who already know each other in order to avoid unproductive personal interactions. Also, in situations where people already know each other, assumptions about the research topic may simply be taken for granted, which renders the data analysis less straightforward and more delicate.

Number of Groups

Finally, deciding on the number of groups required to collect a sufficient amount of data also depends on the researcher's purpose and expectations. A representative sample of the population is critical to yield appropriate results and to permit distinctions and variations between typical answers to be identified. A larger number of groups may be justified in order to capture the greatest variety of perspectives possible on a specific subject. However, resorting to more groups increases the time and resources required. As a common rule, a minimum of three separate focus groups featuring different types of participants are to be held in order to obtain significant results for the study. There is still a great deal of variation among researchers' opinions with regard to the number of groups to be used, but this figure generally ranges from 10 to 15.

7.4.3 Decide on timing and location

Focus groups should be held at a convenient location that offers participants some degree of privacy. In terms of time, the length of a focus group is dependent on the number of questions, the number of participants, and the intention of the focus group. Usually, focus groups last between 1.5 to 2 hours, but it is not uncommon for focus groups to last more than 2 hours.

7.4.4 Prepare the discussion guide (Questionnaire Agenda)

An outline of the topic and issues to be raised should be prepared in advance and the questions should be prioritized from what absolutely needs to be covered to what would be nice to know. This will ensure that the most important questions are addressed first. This guide provides a framework for conducting the interview. However, it should also allow for some flexibility because the discussion may lead in unanticipated but interesting directions.

This guide, also known as a “questionnaire agenda”, includes the different themes and a list questions to be discussed during the focus group. The emphasis is given to initiating questions in order to help the moderator keep the discussion focused. It also includes potential probes that the moderator might use to stimulate additional discussion.

This guide is also valuable for the reporter who can refer to this framework while taking notes. In addition, it facilitates both data collection and data analysis because it remains a key reference document and helps to distinguish the most relevant information.

7.4.5 Introduce the focus group

The following section briefly outlines how potential users of this guide should begin a focus group. It is expected that this process will take approximately 10 to 15 minutes. The purpose of this process is to ensure that all participants feel comfortable with each other and the formalities associated with a focus group and that they understand that their answers will remain anonymous.

- Greetings
- Purpose of focus group
- Opportunity to offer opinions
- Ground rules:
 - Role of the moderator
 - Recording equipments
 - Confidentiality of comments (no right, no wrong)
 - Speak one at a time and as clearly as possible
- Brief get-acquainted period (names, occupations, hobbies)

7.4.6 Conduct the interview

The moderator's level of involvement during the focus group is very important. There is clearly a delicate balance to be struck between guiding an interview through a structured set of questions and allowing it to evolve naturally.

Before the conversation starts, the moderator outlines the purpose of the focus group and describes the sequence of events to participants who are not familiar with this interview method. This first step seeks to create a thoughtful and permissive atmosphere among the participants. They should be told that the discussion is informal and that everyone is expected to participate. Hence, people should be actively encouraged to voice their opinions.

Referring to the "questionnaire agenda", the facilitator should also phrase the questions carefully. For better results, it is usually recommended to avoid "yes or no" and "why?" questions. Instead, open-ended questions such as "what do you think?" or "How do you feel?" should be used.

The main role of the moderator is to control the conversation by balancing out the discussion among the participants, especially those who are reluctant to talk, and refocusing the discussion when it goes off-topic. However, what appears at first to be "off-topic" may actually be relevant, revealing unexpected and valuable information.

It is important to note that participants' knowledge about the topic can make a difference in their level of involvement. Lower levels of knowledge or interest typically require the moderator to develop a more structured approach.

7.4.7 Record the discussion

Recording and transcribing are two important tasks associated with conducting a focus group. Indeed, participants cannot be asked to “hold on” while the reporter is writing their comments down since it could break the flow in discussion. It is recommended that the reporter tape the discussion while taking notes. The discussion should be reported using the participants’ language (retain specific sentences, intonations, and grammatical use). The best way to collect data is to make a video recording with a camera mounted in a non-intrusive place. The recording should capture both the dialogue of individual participants and their interactions. A reminder that participants must be informed at the beginning of the session of the recording techniques that will be used.

7.4.8 Evaluate the focus group

Typically, a focus group study concludes with the delivery and presentation of a final report, which summarizes the qualitative findings of all the focus groups. This documentation summarizes the similarities and differences between the groups and ties the findings back to the overall research objectives.

A set of different tools is useful for focus group analysis.

First, the moderators’ notes, with participant names removed or blacked out to maintain anonymity, are usually not very detailed but provide a record of their first impressions. In addition, notes taken by those viewing the focus groups may also be useful during the analysis. These generally cover the ideas that were discussed rather than direct quotations from group participants. However, the primary tool used in focus group reporting is the review of audio and/or videotapes from each focus group. Sometimes, a full transcription of the tape is required to make the analysis more accurate.

Following each focus group session, the team should be assembled to review the interview notes, the summaries, and any other relevant data. Summaries and transcripts should be read and each question should be analyzed separately. The debriefing session is not the place to begin data analysis but is intended to clarify certain technical aspects or anomalies, and provide an opportunity to express different perspectives regarding the participants’ responses.

Because of the vast amount of qualitative data, the results generated from focus groups are less straightforward to analyze and evaluate. Therefore, some best practices are listed below:

- Group similar responses
- Identify the most frequent comments
- Evaluate rankings or “votes” that took place during a focus group session
- Provide quotations to support the evaluation process

A final report document is produced and includes:

- An executive summary report, including a summary of the research objectives, the methodology followed, the primary findings, and recommendations.
- A detailed report including quotations, more detailed information regarding the findings, and any other significant results produced.
- Focus group transcripts with names blacked out, using only first names or assigning a number to each participant to maintain anonymity.
- A presentation of the results, key findings, and recommendations.

7.5 TDM Applications

As a qualitative research method, focus groups provide valuable information for assessing the overall performance of TDM programs and/or strategies. Indeed, focus groups aim to gather individual reactions and comments regarding the implementation and operation of a TDM initiative.

In addition, focus groups also reveal users' and travellers' needs and expectations in terms of transportation. As TDM strategies seek to have an impact on people's travel behaviour, understanding what travellers think, what they want, or what they need is crucial for designing and implementing suitable and appropriate TDM policies. People are given the opportunity to interact and provide suggestions and feedback on how the strategy may have had an impact on their travel habits.

Moreover, focus groups can be held throughout a TDM initiative's development process –before, during and/ or after its implementation – allowing transportation authorities and decision makers to collect all kinds of information and data.

Therefore, focus groups are highly valuable and useful for evaluating the success of TDM strategies as they focus on the qualitative and personal aspects of these initiatives.

7.6 Case Study

General Information	
Name:	Kingston Core Area Transportation Review – Phase 1: Strategy Development
Location:	City of Kingston, Ontario
Agency:	Kingston General Hospital, Hôtel Dieu Hospital, Downtown Kingston Business Improvement Association, Queen's University, Providence Continuing Care Centre
History:	Focus group sessions were held in 2005 after several transportation and parking management studies were conducted in the previous 10 years.

7.6.1 Overview

The City of Kingston, Ontario, is often recognized as being one of the most successful downtowns of all small- to mid-size Canadian cities for its urban sustainability efforts. However, despite various attempts and successes, the City of Kingston still experiences major challenges regarding its transportation system.

Kingston's Core Area corresponds to the historic centre of Kingston. It is bound by Bath Road, Concession Street and Stephen Street to the north, Sir John A. Macdonald Boulevard to the west, Lake Ontario to the south, and the Cataraqui River to the east. It comprises major facilities and visitor attractions such as Queen's University, the DKBIA (Downtown Kingston Business Improvement Area) district, health care facilities (Kingston General Hospital, Hôtel Dieu Hospital), the waterfront, museums, as well as long-established residential neighbourhoods.

Between 1995 and 2005, a number of parking-, traffic-, and transit-related studies were conducted to address major transportation issues in Kingston. In addition, a Transit Business Plan was approved (2005), supporting the Kingston Transportation Master Plan (KTMP) that seeks to:

- upgrade and extend the current transit system;
- optimize the use of the existing road transportation network; and,
- identify the specific actions required to increase the use of alternatives to the automobile through the development of a Transportation Demand Management (TDM) and Transportation System Management (TSM) strategies.

In 2005, the City of Kingston and five key stakeholders in the Core Area combined efforts to prepare Terms of Reference and launch the development of a more comprehensive and integrated transportation strategy for the Core Area.

Then, in 2007, a consultant was hired to conduct focus group sessions with the five key stakeholders to address the transportation strategy. Based on the information collected, a report was developed that portrays current transportation conditions within the Core Area and identifies the specific transportation needs of the stakeholders, focusing on parking supply and demand management strategies. Indeed, as all travel needs and traffic generators of this region are different, there is a crucial need to define strategies and solutions that can jointly address the transportation needs of all stakeholders.

The five key stakeholders who participated in the focus group sessions are the following:

- Kingston General Hospital (KGH)
- Hôtel Dieu Hospital (HDH)
- Downtown Kingston Business Improvement Association (DKBIA)
- Queen's University
- Providence Continuing Care Centre (PCCC)

Focus groups sessions appeared to be an efficient approach to address the diverse needs and issues faced by the wide variety of stakeholders involved. Although the focus groups were hosted by the consultant, stakeholders were responsible for providing the venue, time, and place of each focus group. Respondent participation was mandatory. Each focus group held between 5 and 15 respondents and lasted approximately 3 hours.

This tool allowed stakeholders to engage in an in-depth analysis of technical and attitudinal preferences amongst participants. Habits, preferences, observations, and opinions were all addressed in regards to parking and transportation trips.

7.6.2 Data Collected

Through focus group sessions with the five stakeholders mentioned above, data was collected on three main themes:

1. Parking Supply and Demand Management
2. Transit System and Transit Improvements
3. Traffic Conditions

Since focus group sessions seek to address qualitative issues and collect individual information, observations, comments, or suggestions from individual actors, a detailed list of questions raised and issues addressed cannot be provided. However, the discussions were led in the attempt to highlight and identify the main transportation issues faced by the stakeholders.

First, within the context of these focus groups, a great deal of attention was dedicated to parking management and supply issues. For instance, data on the existing current parking conditions was collected (Is the parking supply sufficient? Is there any deficiency? Is it oversupplied?). In addition, data collected during focus group sessions emphasized the need to optimize the existing parking supply through adjustments in parking duration and parking demand management strategies such as transit use and carpooling in order to reduce the need for long term parking in the Core Area. Furthermore, the report highlighted the need to predict and plan for future parking needs, as the City of Kingston is experiencing urban growth, especially within the Core Area. Stakeholders were hence able to discuss and talk about specific concerns regarding the need to provide more off-street public parking following the implementation of different redevelopment projects within the Core Area.

In summary, the data collected regarding parking management and supply can be listed as follows:

- assessment of the current level of parking supply;
- specific needs to be addressed in the future due to redevelopment projects in the area.

Second, the facilitator collected information about:

- the assessment of the current transit system;
- transit service improvements that could be made based on the stakeholders' needs and expectations within their own area.

All participants agreed on the fact that transit and public transportation services should be developed as an alternative to auto use and associated parking demand.

Third, traffic conditions issues were raised but did not produce many reactions. Traffic conditions were hence not identified as a key issue for most of the stakeholders that participated in the focus group sessions.

In addition to the three key themes of discussion, the following issues were also raised by various stakeholders:

- pedestrian conditions;
- cycling conditions.

7.6.3 Data Analysis and Dissemination

Data was disseminated according to each group of stakeholders. Notes and transcripts of each session were first analyzed individually, highlighting the specific needs and expectations for each group of participants, then the data was assembled and analyzed altogether. Some more general aspects were clarified and discussed among the moderators. This permitted them to identify general as well as more specific recommendations and objectives that could meet all stakeholders' expectations and needs in terms of transportation. Furthermore, a public consultation was held at the City Hall for resident approval.

These results then served as the framework for developing a comprehensive strategy for addressing all transportation issues that were raised and identified as decisive. As a consequence, parking, traffic, and transit strategies were developed to be carried over both the short (immediate to 5 years) and long term (5 to 15 years).

7.6.4 Contact Information

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379 Queen Street South
Kitchener, ON N2G 1W6 Canada

7.6.5 Websites

City of Kingston – Transportation Department. Core Area Transportation Review
<http://www.cityofkingston.ca/residents/transportation/core/index.asp>

IBI Group
<http://www.ibigroup.com>

7.7 Sources

USAID Center for Development Information and Education. "Conducting Focus Group Interviews".
http://pdf.usaid.gov/pdf_docs/PNABY233.pdf

Overview	
Definition:	Traffic counts are performed on a regular basis in most urbanized areas across Canada. In most cases, they are used primarily to measure the volume of vehicular traffic circulating between large swaths of an urbanized territory – e.g. between suburbs and the urban core or between individual municipalities in a large metropolitan area. Nevertheless, many of these counts also track bicycles and pedestrians.
Scope:	Varies from a single intersection or point along a road or path to multiple points across an area. Multiple counting points can cover a small area—e.g. the downtown area—or a very large area—e.g. whole municipalities or metropolitan areas.
Data Collection Method:	Data is collected at counting stations set up at intersections or particular points along a transportation corridor. Counting is performed manually or automatically, using electronic sensors and detectors.
Types of Data Collected:	Traffic counts collect data on the number of units of traffic that pass through particular intersections or travel corridors. Units of traffic include vehicles, bicycles, and pedestrians. Manual counts can distinguish between types of vehicles—i.e. cars, motorcycles, buses, and trucks. It is also possible to estimate the number of passengers per vehicle. With automated counts, different types of vehicles cannot always be distinguished; only the total number of vehicles is counted. There is a wide array of automated counting devices: some are designed to count only pedestrians or cyclists and to ignore vehicles, and some can distinguish between different types of vehicles, using plates and video technology.
TDM Applications:	Data collected through traffic counts can be used for the following purposes: <ul style="list-style-type: none"> • monitoring traffic volumes and mode shares on specific transportation corridors; • monitoring traffic volumes and mode shares entering or exiting an area; • studying the hourly, daily, and seasonal variations in traffic volumes and modes shares. Traffic counts cannot be used to explicitly assess the outcomes of specific TDM initiatives. Rather, by monitoring changes in traffic volumes and mode shares over time, traffic counts can be used to monitor whether overall transportation patterns are evolving in the desired direction.

8.1 Purpose

Traffic counts are used to monitor the volumes of different types of traffic—primarily vehicular traffic, but, in many cases, also pedestrian and bicycle traffic. As most traffic counts distinguish between types of motor vehicles as well as bicycles and pedestrians, they can also be used to monitor mode shares. Traffic counts also allow variations in traffic volumes to be studied over time (a 24-hour period, a week, or even a year).

8.2 Geographic Scope

Like the purpose, the geographic scope of traffic counts can vary. They can be limited to counting vehicles at a single point on a road or a path or they can include hundreds of counting stations set up along screenlines (see section 6.4.1) throughout a metropolitan area.

8.3 Data Collected

Traffic counts do not merely record the number of units of traffic passing counting stations. They can collect other data about each unit of traffic, including:

- Type (pedestrian, bicycle, motorcycle, automobile, bus, truck, etc.)
- Direction of travel
- Time
- Number of passengers (if unit is a passenger vehicle)

8.4 Methodology

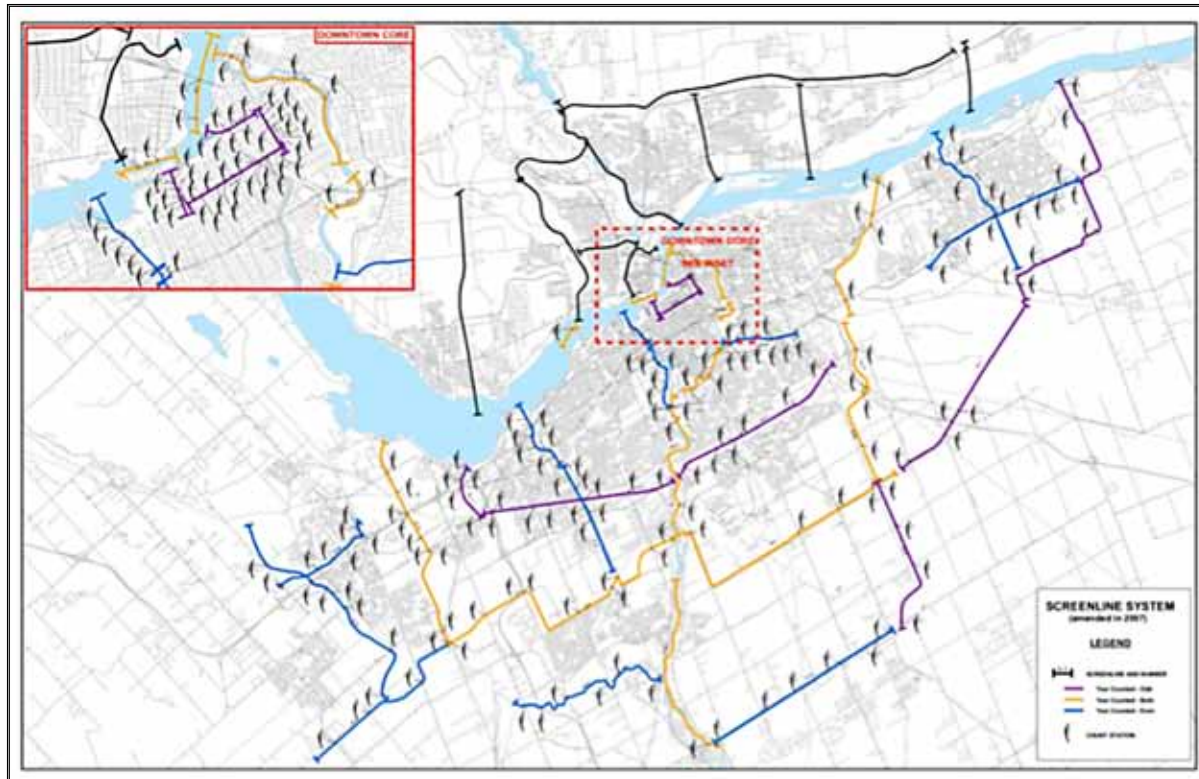
8.4.1 Counting Locations

Counts can be performed at any number of points along a transportation corridor. Distributing several counting stations at different points on the same corridor enables comparisons of traffic volumes across different segments of that corridor.

When counts are performed on more than one transportation corridor, counting stations are often organized along so-called screenlines or cordons. The former is an imaginary line that constitutes a border between two neighbouring areas but does not completely encircle either area. The latter, in contrast, is an imaginary line completely encircling an area. Counting stations are established at all points where the screenline or cordon intersects with a transportation corridor. Typically, screenlines and cordons follow natural barriers, such as rivers, or man-made barriers, such as railways, as only a limited number of transportation corridors cross these barriers. This reduces the necessary number of counting stations.

Figure 5 shows the screenline system used by the City of Ottawa. The purple screenlines on the inset in Figure 5 together constitute a cordon, as they encapsulate the City's downtown core (the Ottawa River constitutes the missing edge of the cordon).

Figure 5. Map of the City of Ottawa screenline system for traffic counts (2007).



Source: TRANS (2007)

8.4.2 Counting Methods

Manual

For manual counting, one or more technicians are deployed to each counting location. The count technicians observe the assigned intersection or corridor and continuously record the number of units of traffic that pass. They typically observe and record the direction of travel and the type of unit of traffic (pedestrian, bicycle, automobile, motorcycle, bus, and truck) and may also be asked to estimate the number of passengers in the motorized vehicles. At counting stations at intersections, manual counters may also be asked to observe and record turning behaviours: counting how many vehicles go straight through the intersection and how many turn left or right.

Manual counts are generally done over the warmer months because they take place outside. While this technique is labour intensive, the typical equipment needed is limited to a lawn chair, parasol, water bottle, clipboard, pencil and data collection sheet. Data is then entered manually into a computer. New electronic devices using touch-based interfaces are being introduced, permitting more detailed data to be captured, and automating the data entry step.

Automated

For automated counting, a sensor and data-logging device should be installed at the counting location. A number of sensors are available, differing in terms of the types of units of traffic they can detect. Also, some types of sensors are amenable to being installed temporarily whereas others need to be installed permanently. Thus, the choice of sensor technology will depend on what type of traffic is to be counted and whether a permanent or temporary installation is desired.

The characteristics of common types of automatic counting sensors are detailed in Table 3 below.

Table 3. Types of automated traffic-counting sensors.

Sensor Type	Description	Corridor Types	Units of Traffic Detected	Permanent or Portable
Induction loop	A metallic wire loop embedded in the road surface detects changes in the magnetic field induced by metallic parts on a bicycle or vehicle passing overtop	Roads, bicycle lanes or paths, recreational paths	Bicycles, motorcycles, cars, buses, or trucks (can be calibrated to specifically detect one type of vehicle)	Permanent
Pyroelectric cell	A small sensor on a post detects infrared radiation from human bodies	Sidewalks, recreational paths	Pedestrians, bicycles	Portable
Slab	A panel beneath the sidewalk or path surface detects the vibrations or pressure changes created by footsteps	Sidewalks, recreational paths	Pedestrians only	Permanent
Pneumatic hose	A pair of parallel rubber tubes laid across the road surface are squeezed by the wheels of passing vehicles; a sensor at one end of the tubes detects the change in air pressure	Roads, bicycle paths, recreational paths	Bicycles, motorcycles, cars, buses, or trucks (can be calibrated to distinguish bicycles from other vehicle types)	Portable
Video camera based road counting	A camera is set up to record footage of a specific area. The video material is subsequently analyzed by a software and results are rendered	Roads, bicycle lanes or paths, recreational paths	Bicycles, motorcycles, cars, buses, or trucks	Portable

Different types of sensors can be combined at a particular location to help distinguish types of traffic. For example, an induction loop sensor could be combined with a pyroelectric sensor in order to distinguish pedestrians from cyclists on a greenway or other type of off-road path. The loop sensor would detect cyclists only whereas the pyroelectric sensor would detect both. By combining the two, it is possible to isolate the pedestrians from the cyclists.

Whichever type of sensor is used, it will be connected to a module called a logger. The logger records and stores the counts detected by the attached sensors. Most loggers have an internal clock and can record the time at which each count was registered. Data can be retrieved from the counter by various means. Some loggers are equipped with wireless communication technology and can upload their data to a remote computer. Other counters may feature a Bluetooth transmitter or a USB port, in which case somebody will have to physically go to the logger with an appropriate data storage device to retrieve the stored data.

8.5 TDM Applications

Data collected through traffic counts can be used for the following purposes:

- Monitoring traffic volumes and mode shares on specific transportation corridors
- Monitoring traffic volumes and mode shares entering or exiting an area
- Studying the hourly, daily, and seasonal variations in traffic volumes and modes shares

Traffic counts cannot be used to explicitly assess the outcomes of specific TDM initiatives because it is impossible to isolate each vehicle type and/or specific TDM initiative (more than one TDM initiative could be operating on the same corridor). Rather, by monitoring changes in traffic volumes and mode shares over time, traffic counts can be used to monitor whether transportation patterns are evolving in the desired direction.

8.6 Case Study

General Information	
Name:	Bicycle Counter Program
Location:	Vancouver, BC
Agency:	City of Vancouver
History:	Ongoing since June 2010

8.6.1 Overview

The City of Vancouver installed its first permanent bicycle counter in the spring of 2008. It has since installed permanent counters at six more locations and has plans to install permanent counters at a further 11 locations in 2011, bringing the total to 18. The permanent counters are installed at key locations on the bicycle network, mainly bridges and greenways. All of the permanent bicycle counters use inductive loop sensors. The sensors, which are embedded in the bicycle lane surface, detect minute changes in the magnetic field induced by bicycle wheels and are calibrated to ignore other changes in the magnetic field induced by cars and other vehicles.

Figure 6. Map of permanent bicycle counter locations in the City of Vancouver.



Source: City of Vancouver

The City of Vancouver also has 21 portable bicycle-counting devices used to take samples of the levels of bicycle use at various locations across the city. The devices are based on pneumatic hose technology: two parallel rubber hoses are mounted across a bicycle lane surface and connected to an air pressure sensor. Each time a bicycle passes over the hose, it increases the air pressure inside the hose. As the pneumatic hose counters are easy to install and remove, they are periodically moved in order to sample levels of bicycle traffic at different locations.

The permanent bicycle counters, which collect data year-round, have enabled the City to observe seasonal and weather-related variations in bicycle use. When these observations are combined with samples obtained by portable counters installed on a temporary basis, the City is able to extrapolate year-round levels of bicycle traffic at other locations. In other words, the City can install a portable counter for only a few months at a particular location and estimate the levels of bicycle traffic for the remainder of the year by comparing usage to the bicycle use patterns observed at permanent counters.

The recently constructed Dunsmuir Street downtown bicycle path, the City's first physically separated on-street bicycle facility, provides an illustration of how bicycle traffic is monitored in Vancouver. The City installed four portable counters along the facility in the final phases of construction. A fifth counter, on Dunsmuir Viaduct east of downtown, had been installed earlier on a permanent basis. The distance between each of the five counters varied between 150 to 250 metres. The counters were installed to monitor bicycle traffic along different sections of the new facility. Comparisons with bicycle counts made prior to construction will also allow the City to gauge whether the facility is helping to increase levels of bicycle use in the Dunsmuir corridor.

The inductive loop and pneumatic hose counters used by the City of Vancouver are connected to self-contained, battery-powered counting modules from which data is periodically downloaded by City staff. The company hired by the City of Vancouver to install the counters assisted the City with the choice of locations and the installation of the counting units.

8.6.2 Data Analysis and Dissemination

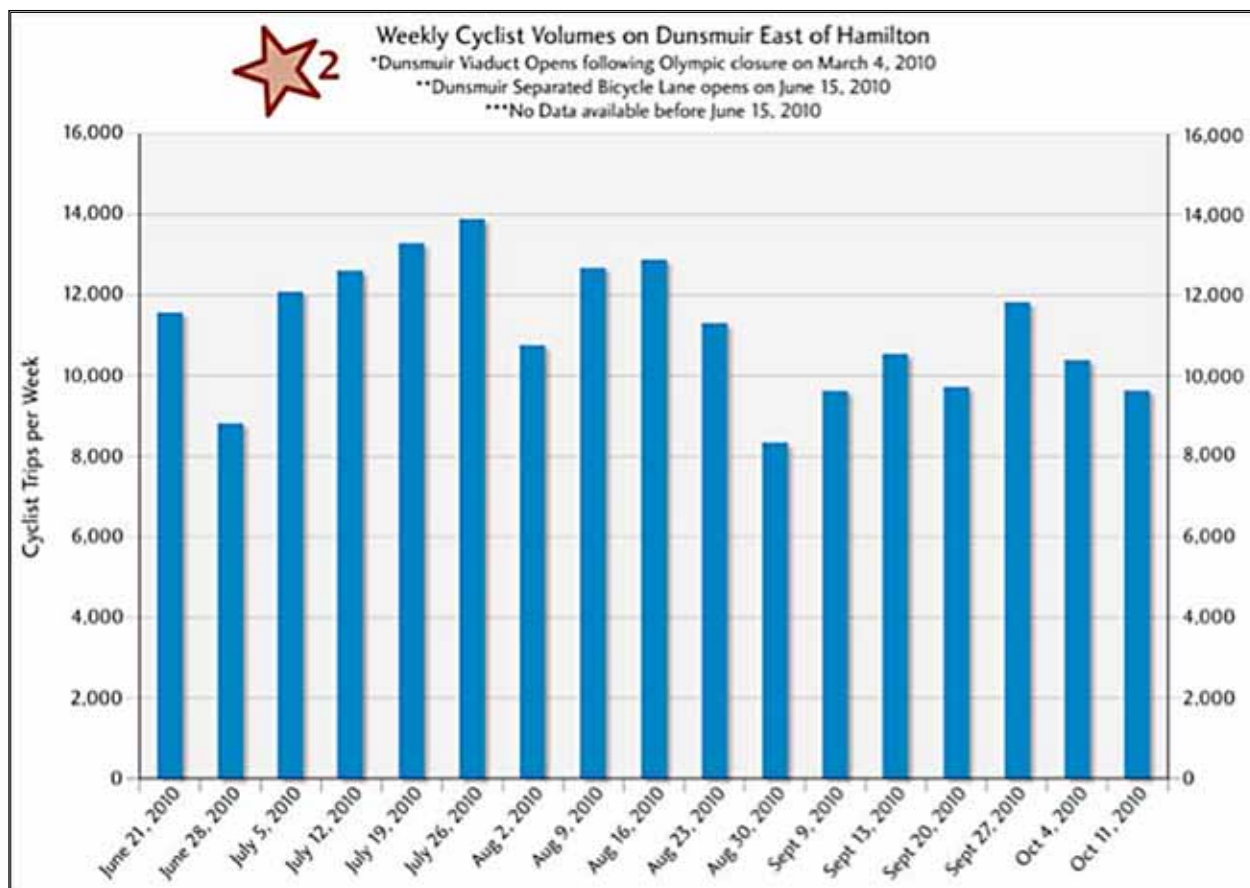
Data from permanent bicycle counters has been analyzed to assess seasonal and weather-related variability in levels of bicycle use. The observed patterns have been used to estimate year-round levels of bicycle use at locations where portable counters have been used to sample levels of bicycle use.

The Dunsmuir bicycle facility provides an example of how bicycle count data can be disseminated. Data from the five bicycle counters on the Dunsmuir corridor has been collected on an ongoing basis since the separated bicycle facility opened in June 2010. At the time of writing, graphs of weekly total traffic counts obtained at each of the five locations from the week of June 21, 2010, up to the week of October 11, 2010, were available on the City of Vancouver website (see example in Figure 7). The City has also made an Excel spreadsheet with daily bicycle traffic for the five locations.¹ The figures are broken down by direction of travel (i.e. east and west). Data for all five locations is available for the period from June 15th, 2010, to October 20th, 2010, with the exception of the Dunsmuir Viaduct, for which daily data was collected as of March 4th, 2010.

¹ The spreadsheet is available at the following URL:

<http://vancouver.ca/engsvcs/transport/cycling/documents/DunsmuirStreetData.xls>

Figure 7. Weekly cyclist volumes on Dunsmuir Street east of Hamilton Street.



Source: City of Vancouver

The daily total traffic counts for the five locations are the lowest level of aggregation made available to the public thus far. However, as the Eco-counter devices are programmed to record traffic counts in 15-minute blocks, the City of Vancouver has considerably richer data at its disposal.

8.6.3 Contact Information

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8.6.4 Websites

City of Vancouver Separated Bicycle Lanes Statistics

http://vancouver.ca/engsvcs/transport/cycling/separated/dunsmuir_results.htm

Eco-counter

<http://www.eco-counter.com/>

8.7 Sources

TRANS (2007). *National Capital Region Screenline System Map*. Ottawa, ON: TRANS

[http://www.ncr-trans-rcn.ca/uploadedFiles/resources/Screenline_System\(2004\).pdf](http://www.ncr-trans-rcn.ca/uploadedFiles/resources/Screenline_System(2004).pdf)

9 Calculation of Vehicles-Kilometers Travelled and Air Emissions Reductions

One of the most challenging indicators to measure is the reduction in vehicles-kilometers travelled (VKT) and the resulting greenhouse gas emissions (GHG) and other air pollutants. According to the *Canadian Guidelines for the Measurement of Transportation Demand Management Initiatives User's Guide*, VKT is the distance travelled by autos in a given time period in a given area. It reflects both the total number of vehicle trips and the distance of those vehicle trips. Consequently, reductions in auto trips and auto trip distance will both reduce VKT.

To obtain reliable data on actual VKT reductions achieved by a TDM initiative, it would be necessary to install GPS units in every vehicle in the region targetted by the initiative and to track the data over a long period of time. The actual impact of the initiative itself would also be challenging to determine, because external factors such as fuels costs and the economic situation have an impact on individual choices made by the population targetted by the TDM initiative.

For these reasons, VKT and GHG reductions calculations will be based on assumptions, with regards to the following elements :

- **Number of trips:** can be obtained through surveys or by making assumptions on the number of days or weeks of work in a calendar year ;
- **Average distance travelled:** can be obtained through surveys, metropolitan area data from Statistics Canada or local Origin-Destination Surveys ;
- **GHG emissions reductions:** can be obtained by multiplying VKT reductions by the provincial average fuel consumption (data available from Natural Resources Canada) to determine the number of liters of fuel saved. Then, the number of liters of fuel saved can be multiplied by Environment Canada's emission factors to obtain the number of kilograms of GHG emissions reduced.

For more information on the methodology to measure VKT reductions, consult Section 4 of the *Canadian Guidelines for the Measurement of Transportation Demand Management Initiatives User's Guide* produced by Transport Canada.

10 Conclusion

Increasingly, Canadians are becoming more aware of the need to alter how, when, where, why and whether or not they travel. Public transit, walking, and cycling are, through a process of reinvesting in TDM initiatives, becoming more accessible and desirable transportation options. However, understanding the effectiveness of a TDM initiative is a critical component in creating sustainable transportation options for all Canadians.

Gathering accurate and relevant data is essential for evaluating any TDM initiative, regardless of transportation mode, type of traffic management strategy (education or promotion), or target audience. The information gathered through the five data collection techniques provided within this document will not only result in better decisions by transportation authorities and elected officials, but will also help to improve our knowledge and application of transportation demand techniques.

As indicated in Section 1, this document should be used in conjunction with the *Canadian Guidelines for the Measurement of Transportation Demand Management Initiatives* and the *TDM Measurement Toolbox: A Guide for Canadian Municipalities*. Collectively, these documents provide individuals working for small- to medium-sized municipalities and employers who have recently implemented, or are in the process of implementing a TDM initiative, with an accessible and effective evaluation tool.

Appendix 1

Sample Behaviour and Attitude Survey

This section provides a sample survey telephone interview script and questionnaire, as per the methodology described in Section 4.4. The script below is adapted from the 2002 Ottawa Commuter Travel and Behaviour Survey (Decima Research, 2002) and the 2008 Metrolinx Smart Commute Survey (Harris/Decima, 2008). The latter script is available online; see the list of sources (Section 4.7 in the main report) for the URL.

In the survey script below, the text in **bold** is the script to be read by the interviewer. The remaining text contains instructions for the interviewer and is not to be read unless otherwise instructed.

The following script is not all-inclusive and users of this guide are encouraged to review and alter it as required: adding or removing questions, adding or removing potential answers to the multiple choice questions, or narrowing the field of study to include few modes of transportation.

Introduction and Screening

Hello, I am calling on behalf of [agency name]. We are conducting a brief survey about transportation and commuting. Your household was selected at random and we would like to speak to someone aged 16 or older.

If yes, proceed to Q1. If no, ask if a person over 16 is available to answer the survey. If no one is available, try to make an appointment.

Q1. Do you travel at least three times per week either to work, to school, or to volunteer?

- *yes*
- *no*
- *decline*

If declined, terminate survey.

Q2. What is your occupation? Are you:

Read answers.

- *employed*
- *student*
- *volunteer*
- *decline*

If declined, terminate survey.

Q3. How many days a week do you travel to work, school, or to volunteer?

[record answer]

If less than 3, terminate survey.

General Options

If answer to Q2 is “employed” or “student” proceed to Q4. If answer to Q2 is “volunteer”, skip to Q4.

Q4. Do you think transportation is an important issue for the city? In your opinion, is it:

Read answers.

- *the most important issue*
- *one of the most important issues*
- *an issue but not an important one*
- *not really an issue*
- *declined*

If answer is “not really an issue” or if answer is declined, skip to Q6.

Q5. In your opinion, what are the reasons why local transportation in the city is an important issue?

Do not read answers. Select the most applicable from the choices below.

- *pedestrian unfriendly neighbourhoods/lack of sidewalks*
- *lack/poor quality of cycling facilities*
- *poor service on public transit*
- *not enough transit*
- *road congestion*
- *air quality/emissions*
- *environment/pollution*
- *noise*
- *traffic safety/accidents*
- *travel times*
- *cost of travel*
- *lack of parking*
- *parking cost*
- *other [record]*
- *does not know/declines to answer*

Q6. How important is transportation in your daily life?

Read answers.

- *very important*
- *somewhat important*
- *not very important*
- *not at all important*
- *don't know/no answer*

General Commuting Questions

The following questions are about your use of transportation to get around the city.

Q7. Thinking about the last year, how did you usually travel to [work/school/your volunteer commitment]?

Do not read.

If answer is *drive*, ask whether the participant drove alone or in a carpool or vanpool.

If answer is *carpool* or vanpool, ask whether the participant was a driver or passenger.

- *drive alone*
- *carpool/vanpool as driver*
- *carpool/vanpool as passenger*
- *taxi*
- *public transit*
- *specialized transit*
- *private bus service*
- *walk/jog*
- *inline skate/skateboard*
- *bicycle*
- *wheelchair*
- *scooter*
- *motorcycle*
- *other [record answer]*
- *don't know/no answer*

If answer to Q7 is "public transit", proceed to Q8. Otherwise, proceed to Q9.

Q8. How do you get to the stop or the station from which you took public transit?

Do not read.

- *walk*
- *bike*
- *drive alone*
- *carpool/vanpool*
- *dropped off*
- *other [record answer]*
- *don't know/no answer*

Q9. How long have you been [driving/taking transit/etc.] to [work/school/your volunteer commitment]?

[record answer in months or years]

Q10. What are your main reasons for [driving/using public transit/walking/etc.]?

Do not read. Accept up to 3 responses. Prompt, if necessary (e.g. "any others?").

- *travel time*
- *cost of ticket/transit pass*
- *cost of fuel*
- *cost of parking*
- *lack of car parking*

- need vehicle during work
- need vehicle before and/or after work
- need drop-off/pick-up children before and/or after work
- stress
- comfort
- privacy
- safety
- convenience
- flexibility
- not being dependent on others
- being able to come and go as I please
- do not have a driver's license
- do not have access to a motor vehicle
- transit is not close enough
- transit schedule is inconvenient
- nobody lives nearby/nobody to carpool or vanpool with
- use time to read/work (on transit)
- incentives offered by employer or another agency
- enjoy the company of others
- environment/pollution
- health/exercise
- other [record answer]
- don't know/no answer

If one of answers for Q10 is "safety", proceed to question Q11. Otherwise, skip to Q13.

Q11. Could you clarify what you mean by safety?

Do not read.

- fear of theft
- traffic safety/risk of traffic accident
- personal security
- other [record answer]
- don't know/no answer

If one of answers for Q10 is "convenience", proceed to question Q12. Otherwise, skip to Q13.

Q12. What do you mean by convenience?

Do not read. Accept up to 3 responses. Prompt if necessary (e.g. "any others?").

- travel time
- cost of ticket/transit pass
- cost of fuel
- cost of parking
- lack of car parking
- need vehicle during work
- need vehicle before and/or after work
- need drop-off/pick-up children before and/or after work
- not being dependent on others
- being able to come and go as I please
- other [record answer]
- don't know/no answer

Q13. How satisfied are you with [driving/public transit/walking/etc.] as a means to get to [work/school/your volunteer commitment]?

Read answers.

- *very satisfied*
- *somewhat satisfied*
- *not very satisfied*
- *not at all satisfied*
- *don't know/no answer*

Q14. Has your commute changed over the last year? Has it gotten better or worse, or is it about the same?

- *better*
- *worse*
- *the same*
- *better in some ways, worse in others*
- *don't know/no answer*

If "worse", skip to Q16. If "the same" or no answer, skip to Q15.

Q15. How has it gotten better?

Do not read. Accept up to 3 responses.

- *changed mode of transportation*
- *moved home*
- *changed job or job location*
- *changed commute route*
- *changed commuting time*
- *traffic is lighter/there is less congestion*
- *road improvements*
- *less road work/construction*
- *improved/new transit service*
- *weather improved*
- *other [record answer]*
- *don't know/no answer*

Q16. How has it gotten worse?

Do not read. Accept up to 3 responses.

- *changed mode of transportation*
- *moved home*
- *changed job or job location*
- *changed commute route*
- *changed commuting time*
- *traffic is heavier/there is more congestion*
- *road work/construction*
- *transit service slower/off-schedule/more crowded*
- *worse weather*
- *other [record answer]*
- *don't know/no answer*

Q17. Over the last year, have you used any other means of transportation to get to [work/school/your volunteer commitment]?

Do not read. Accept up to 3 responses. Prompt, if necessary (e.g. "any others?"). If respondent answers "drive", prompt for drive alone or carpool/vanpool.

- drive alone
- carpool/vanpool
- taxi
- public transit
- specialized transit
- private bus service
- walk/jog
- inline skate/skateboard
- bicycle
- wheelchair
- scooter
- motorcycle
- other [record answer]
- none
- don't know/no answer

If "none" or no answer, skip to Q19. If "public transit" or "private bus service", proceed to Q18. Otherwise, skip to Q20.

Q18. How do you get to the stop or the station from which you took public transit?

Do not read.

- walk
- bike
- drive alone
- carpool/vanpool
- dropped off
- other [record answer]
- don't know/no answer

Q19. If you could choose any other mode of transportation for going to [work/school/your volunteer commitment], which would you choose?

Do not read. If respondent answers "drive", prompt for drive alone or carpool/vanpool.

- drive alone
- carpool/vanpool
- taxi
- public transit
- specialized transit
- private bus service
- walk/jog
- inline skate/skateboard
- bicycle
- wheelchair
- scooter
- motorcycle
- other [record answer]
- none
- don't know/no answer

Q20. If you could use any other mode of transportation more than now, which one would you choose?

Do not read. If respondent answers "drive"; prompt for drive alone or carpool/vanpool.

- drive alone
- carpool/vanpool
- taxi
- public transit
- specialized transit
- private bus service
- walk/jog
- inline skate/skateboard
- bicycle
- wheelchair
- scooter
- motorcycle
- other [record answer]
- none
- don't know/no answer

Q21. Why would you choose to use [mode chosen] more often?

Do not read. Accept up to 3 responses. Prompt, if necessary (e.g. "any others?").

- travel time
- cost of ticket/transit pass
- cost of fuel
- cost of parking
- lack of car parking
- need vehicle during work
- need vehicle before and/or after work
- need drop-off/pick-up children before and/or after work
- stress
- comfort
- privacy
- safety
- convenience
- flexibility
- not being dependent on others
- being able to come and go as I please
- do not have a driver's license
- do not have access to a motor vehicle
- transit is not close enough
- transit schedule is inconvenient
- nobody lives nearby/nobody to carpool or vanpool with
- use time to read/work (on transit)
- incentives offered by employer or another agency
- enjoy the company of others
- environment/pollution
- health/exercise
- other [record answer]
- don't know/no answer

If one of answers for is Q21 "safety"; proceed to question Q22. Otherwise, skip to Q23.

Q22. Could you clarify what you mean by safety?

Do not read.

- *fear of theft*
- *traffic safety/risk of traffic accident*
- *personal security*
- *other [record answer]*
- *don't know/no answer*

If one of answers for Q21 is "convenience", proceed to question Q23. Otherwise, skip to Q24.

Q23. What do you mean by convenience?

- *Do not read. Accept up to 3 responses. Prompt, if necessary (e.g. "any others?").*
- *travel time*
- *cost of ticket/transit pass*
- *cost of fuel*
- *cost of parking*
- *lack of car parking*
- *need vehicle during work*
- *need vehicle before and/or after work*
- *need drop-off/pick-up children before and/or after work*
- *not being dependent on others*
- *being able to come and go as I please*
- *other [record answer]*
- *don't know/no answer*

Q24. How likely are you to switch to [mode chosen] in the foreseeable future?

Read.

- *very likely*
- *somewhat likely*
- *not very likely*
- *not at all likely*
- *don't know/no answer*

If "very likely" or "somewhat likely", skip to Q28.

Q25. Why are you unlikely to switch modes of transportation?

Do not read.

- *distance*
- *safety*
- *weather/seasonal*
- *work hours/schedule*
- *need vehicle during work*
- *need vehicle before and/or after work*
- *need drop-off/pick-up children before and/or after work*
- *meetings*
- *appointments*
- *appearance/clothing related*
- *do not have a driver's license*
- *do not have access to a motor vehicle*
- *transit is not close enough*

- *transit schedule is inconvenient*
- *nobody lives nearby/nobody to carpool or vanpool with*
- *inconvenience*
- *other [record answer]*
- *don't know/no answer*

If one of answers for Q25 is “safety”, proceed to question Q26. Otherwise, skip to Q27.

Q26. Could you clarify what you mean by safety?

Do not read.

- *fear of theft*
- *traffic safety/risk of traffic accident*
- *personal security*
- *other [record answer]*
- *don't know/no answer*

If one of answers for Q25 is “convenience”, proceed to question Q27. Otherwise, skip to Q28.

Q27. What do you mean by convenience?

Do not read. Accept up to 3 responses. Prompt if necessary (e.g. “any others?”).

- *travel time*
- *cost of ticket/transit pass*
- *cost of fuel*
- *cost of parking*
- *lack of car parking*
- *need vehicle during work*
- *need vehicle before and/or after work*
- *need drop-off/pick-up children before and/or after work*
- *not being dependent on others*
- *being able to come and go as I please*
- *other [record answer]*
- *don't know/no answer*

If a mode was mentioned in answer to Q17 other than the mode chosen in Q19, proceed to Q28. Otherwise, skip to Q31.

Q28. You mentioned earlier that sometimes you use [mode mentioned for Q17 that ≠ Q19] to get to [work/school/your volunteer commitment]. Why don't you use this mode of transportation more regularly?

- *Do not read.*
- *travel time*
- *cost of ticket/transit pass*
- *cost of fuel*
- *cost of parking*
- *lack of car parking*
- *need vehicle during work*
- *need vehicle before and/or after work*
- *need drop-off/pick-up children before and/or after work*
- *stress*
- *comfort*
- *privacy*
- *safety*

- convenience
- flexibility
- not being dependent on others
- being able to come and go as I please
- do not have a driver's license
- do not have access to a motor vehicle
- transit is not close enough
- transit schedule is inconvenient
- nobody lives nearby/nobody to carpool or vanpool with
- use time to read/work (on transit)
- incentives offered by employer or another agency
- enjoy the company of others
- environment/pollution
- health/exercise
- other [record answer]
- don't know/no answer

If one of answers for Q28 is "safety", proceed to question Q29. Otherwise, skip to Q30.

Q29. Could you clarify what you mean by safety?

Do not read.

- fear of theft
- traffic safety/risk of traffic accident
- personal security
- other [record answer]
- don't know/no answer

If one of answers for Q28 is "convenience", proceed to question Q30. Otherwise, skip to Q31.

Q30. What do you mean by convenience?

Do not read. Accept up to 3 responses. Prompt, if necessary (e.g. "any others?").

- travel time
- cost of ticket/transit pass
- cost of fuel
- cost of parking
- lack of car parking
- need vehicle during work
- need vehicle before and/or after work
- need drop-off/pick-up children before and/or after work
- not being dependent on others
- being able to come and go as I please
- other [record answer]
- don't know/no answer

Walking, Jogging, etc.

If answer to Q7 or Q17 is “walk/jog” or “inline skating/skateboard” or “scooters” or “wheelchair”, proceed to Q31. Otherwise, skip to Q32.

Now, let’s talk about the times that you choose to [walk/jog/inline skate/skateboard/scooter/wheelchair] to [work/school/your volunteer commitment].

Q31. When you [walk/jog/skateboard/scooter/wheelchair] to [work/school/your volunteer commitment], which of the following types of facilities do you use?

Read answers. Record all that apply.

- sidewalk only
- paved pathway
- unpaved pathway
- street
- other – please specify [*record answer*]
- don’t know/no answer

If answer to Q7 or Q17 or Q19 is “walk/jog” or “inline skating/skateboard” or “scooters” or “wheelchair”, proceed to Q32. Otherwise, skip to Q38.

Q32. What is the maximum amount of time in minutes that you would find acceptable for a regular [walk/jog/inline skate ride/skateboard ride/scooter ride/wheelchair ride] to [work/school/your volunteer commitment]?

[record answer]

Q33. Was the route you take an important a consideration when you decided to [walk/jog/inline/skateboard/scooter/wheel] to [work/school/your volunteer commitment]?

- very important
- somewhat important
- not very important
- not at all important
- don’t know/no answer

Q34. Is there anything about the route you take that could be improved?

Do not read. Record all that apply.

- paths
- sidewalks
- crosswalks
- other [*record answer*]
- don’t know/no answer

Q35. Are there adequate end-of-trip facilities such as showers or change rooms at your [work/school/volunteer commitment]?

- yes
- no
- don’t know/no answer

Q36. Were these facilities an important factor in your decision to [walk/jog/skateboard/ scooter/wheelchair] to [work/school/your volunteer commitment]?

- *very important*
- *somewhat important*
- *not very important*
- *not at all important*
- *don't know/no answer*

Q37. During which months do you [walk/jog/inline/skateboard/scooter/ wheelchair] to [work/school/your volunteer commitment]?

Read list of months, if necessary.

- *January*
- *February*
- *March*
- *April*
- *May*
- *June*
- *July*
- *August*
- *September*
- *October*
- *November*
- *December*
- *don't know/no answer*

Bicycling

If answer to Q7 or Q17 or Q19 is "bicycle", proceed to Q38. Otherwise, skip to Q39.

Q38. What is the maximum amount of time in minutes that you would find acceptable for a regular bicycle ride to [work/school/your volunteer commitment]?

[record answer]

Q39. Which of the following do you use when you ride a bicycle to [work/school/your volunteer commitment]?

Read. Record all that apply.

- *roads without bicycle lanes not marked as bicycle routes*
- *roads without bicycle lanes marked as shared bicycle routes*
- *roads with bicycle lanes or bicycle tracks*
- *off-street/recreational pathways*
- *sidewalks*
- *bring bicycle on train*
- *bring bicycle on bus (using bicycle rack)*
- *other (if volunteered) [record answer]*
- *don't know/no answer*

Q40. Which of these do you use to cover most of the distance of your trip to [work/school/your volunteer commitment]?

Read list if necessary.

- roads without bicycle lanes not marked as bicycle routes
- roads without bicycle lanes marked as shared bicycle routes
- roads with bicycle lanes or bicycle tracks
- off-street/recreational pathways
- sidewalks
- bring bicycle on train
- bring bicycle on bus (using bicycle rack)
- other (if volunteered) *[record answer]*
- don't know/no answer

Q41. Was the route you take an important a consideration when you decided to ride a bicycle to [work/school/your volunteer commitment]?

- very important
- somewhat important
- not very important
- not at all important
- don't know/no answer

Q42. What would you like to see improved on your bicycle route to [work/school/your volunteer commitment]?

Read. Record all that apply.

- roads without bicycle lanes not marked as bicycle routes
- roads without bicycle lanes marked as shared bicycle routes
- roads with bicycle lanes or bicycle tracks
- off-street/recreational pathways
- sidewalks
- bring bicycle on train
- bring bicycle on bus (using bicycle rack)
- other (if volunteered) *[record answer]*
- don't know/no answer

Q43. What type of bicycle parking facilities is available at your [work/school/volunteer commitment]?

Read. Record all that apply.

- posts or stands on the sidewalk
- unsheltered outdoor racks
- sheltered outdoor racks
- outdoor bicycle cage or secure bicycle parking area
- indoor bicycle parking
- bicycle parking in garage
- bicycle lockers
- don't know/no answer

Q44. Is the availability of bicycle parking an important factor in your decision to [walk/jog/skateboard/ scooter/wheelchair] to [work/school/your volunteer commitment]?

- *very important*
- *somewhat important*
- *not very important*
- *not at all important*
- *don't know/no answer*

Q45. Are there adequate end-of-trip facilities such as showers or change rooms at your [work/school/ volunteer commitment]?

- *yes*
- *no*
- *don't know/no answer*

Q46. Were these facilities an important factor in your decision to [walk/jog/skateboard/ scooter/wheelchair] to [work/school/your volunteer commitment]?

- *very important*
- *somewhat important*
- *not very important*
- *not at all important*
- *don't know/no answer*

Q47. During which months do you [walk/jog/inline/skateboard/scooter/wheelchair] to [work/school/your volunteer commitment]?

Read list of months if necessary.

- *January*
- *February*
- *March*
- *April*
- *May*
- *June*
- *July*
- *August*
- *September*
- *October*
- *November*
- *December*
- *don't know/no answer*

Public Transit

If answer to Q7 or Q17 or Q19 is “public transit”, proceed to Q48. Otherwise, skip to Q53.

Q48. What is the maximum amount of time in minutes that you would find acceptable for a regular public transit trip to [work/school/your volunteer commitment]?

[record answer]

Q49. Is your ability to purchase transit tickets or passes near the place where you [work/go to school/volunteer] important to your decision to use public transit? Is it:

Read.

- *very important*
- *somewhat important*
- *not very important*
- *not at all important*
- *don't know/no answer*

Q50. Is your ability to obtain transit route and schedule information near the place where you [work/go to school/volunteer] important to your decision to use public transit? Is it:

Read.

- *very important*
- *somewhat important*
- *not very important*
- *not at all important*
- *don't know/no answer*

Q51. How willing are you to consider accessing public transit by bicycle?

Read list. Record one response only.

- *definitely willing to consider*
- *probably willing to consider*
- *neither willing nor unwilling to consider*
- *probably not willing to consider*
- *definitely not willing to consider*
- *don't know/no answer*

Q52. How willing are you to consider bringing your bicycle with you onto public transit?

Read list. Record one response only.

- *definitely willing to consider*
- *probably willing to consider*
- *neither willing nor unwilling to consider*
- *probably not willing to consider*
- *definitely not willing to consider*
- *don't know/no answer*

Carpool/Vanpool

If answer to Q7 or Q17 is "carpool/vanpool", proceed to Q53. Otherwise, skip to Q63.

Q53. With whom do you usually regularly carpool/vanpool?

Do not read. Record all that apply.

- household members
- non-household relatives
- co-workers
- friends, acquaintances, neighbours
- casual carpool with different people
- other [record answer]
- don't know/no answer

If "household members", skip to Q55.

Q54. Did you use a carpool ridematching service to form your current carpool?

- yes
- no
- don't know/no answer

Q55. Including yourself, what is the total number of persons usually in the vehicle?

[record answer]

Q56. Does your carpool/vanpool use any special facilities for carpools/vanpools/high-occupancy vehicles, such as a preferential parking space, a carpool parking lot, or a dedicated highway lane?

- carpool parking lot
- preferential parking spot
- carpool lane
- other [record answer]
- no/do not use special facilities
- don't know/no answer

Q57. Do the members of your carpool/vanpool meet at a specific location or do you get picked up?

- meet at a specific location
- am picked up
- other [record answer]
- don't know/no answer

Q58. Does your employer provide a more desirable or preferential parking space for carpools/vanpools?

- yes
- no
- don't know/no answer

Q59. Do you pay to park your carpool/vanpool vehicle where you [work/go to school/volunteer]?

- yes
- no
- don't know/no answer

If "yes", skip to Q62.

Q60. If you had to pay for parking, would you still carpool/vanpool to [work/school/your volunteer commitment]?

- *yes*
- *no*
- *depends on the price*
- *don't know/no answer*

If "yes", skip to Q62.

Q61. If you were not carpooling/vanpooling, how would you get to [work/school/your volunteer commitment]?

Do not read. Record all that apply.

- *transit*
- *bicycle*
- *walk*
- *drive alone*
- *don't know/no answer*

Q62. What is the maximum amount you would pay per day to park at your [work/school/volunteer commitment]?

[record answer]

Automobile/Motorcycle (Lone Driver)

If answer to Q7 or Q17 is "drive", proceed to Q63. Otherwise, skip to Q75

Q63. What type of vehicle do you usually use to drive to [work/school/your volunteer commitment]?

Read list. Record one response.

- *car*
- *van*
- *SUV*
- *truck*
- *motorcycle*
- *other (if volunteered) [record answer]*
- *don't know/no answer*

Q64. How often do you have other people in the car with you when you drive to [work/school/your volunteer commitment]?

Read if necessary. Record one only answer.

- *never*
- *rarely*
- *sometimes*
- *don't know/no answer*

If "never", skip to Q50.

Q65. Who sometimes rides with you when you drive to [work/school/your volunteer commitment]?

- *children*
- *other household members*
- *co-workers*
- *other people (neighbours, friends, etc.)*
- *don't know/no answer*

Q66. Do you pay to park where you [work/school/volunteer]?

- *yes*
- *no*
- *don't know/no answer*

If "yes" or "don't know/no answer", skip to Q69.

Q67. If you had to pay for parking, would you still drive to work?

- *yes*
- *no*
- *depends*
- *don't know/no answer*

If "yes" or "don't know/no answer", skip to Q69.

Q68. If you weren't driving, how would you get to [work/school/your volunteer commitment]?

Do not read. Record all applicable answers.

- *transit*
- *cycle*
- *walk*
- *carpool/vanpool*
- *don't know/no answer*

Q69. What is the maximum amount you would pay per day to park at the place where you [work/go to school/volunteer]?

[record answer]

Commuting Schedule

I would like to ask about your daily schedule...

Q70. Do you generally [work/go to school/volunteer] on a regular Monday to Friday schedule or do you have more varied hours?

- Monday to Friday
- more varied hours
- don't know/no answer

Q71. What time do you generally leave home to go to [work/school/your volunteer commitment]?

[record answer]

Q72. What time do you generally arrive at [work/school/your volunteer commitment]?

[record answer]

Q73. What time do you typically start [work/school/your volunteer commitment]?

[record answer]

Q74. What time do you typically finish [work/school/your volunteer commitment]?

[record answer]

Program Recognition

Now I will ask you about some public programs related to transportation.

Note: The following two questions are generic program recognition questions. They can be repeated for several different programs, if desired.

Q75. Have you ever heard of a program called [program name]?

- yes
- no
- don't know/no answer

If "no" or "don't know/no answer", skip to Q79.

Q76. Where did you hear or see about the [program name] program?

Do not read. Record all applicable answers.

- tv
- radio
- newspaper
- internet
- magazine
- pamphlet/brochure
- other *[record answer]*
- don't know/no answer

Q77. From what you know, what is your impression of the [program name]?

Do not read. Record all applicable answers.

Positive mentions:

- *good for community*
- *helpful*
- *informative*
- *interesting*
- *other [record answer]*

Negative mentions:

- *waste of money/tax dollars*
- *meaningless*
- *not helpful*
- *other [record answer]*

Q78. Did you participate in the [program name]?

- *yes*
- *no*
- *don't know/no answer*

Programming Priorities

Now I would like you to tell me how important a priority each of the following should be for the City.

Q79. What do you think about encouraging people to walk more often for their commute? Is it:

Read.

- *very important*
- *important*
- *not very important*
- *not at all important*
- *don't know/no answer*

Q80. What about encouraging people to bike more often for their commute? Is it:

Read

- *very important*
- *important*
- *not very important*
- *not at all important*
- *don't know/no answer*

Q81. What about encouraging people to use public transit more often for their commute? Is it:

Read

- *very important*
- *important*
- *not very important*
- *not at all important*
- *don't know/no answer*

Q82. What about encouraging people to carpool more often for their commute? Is it:

Read.

- *very important*
- *important*
- *not very important*
- *not at all important*
- *don't know / no answer*

Q83. What about encouraging people to telework or work from home more often instead of commuting? Is it:

Read.

- *very important*
- *important*
- *not very important*
- *not at all important*
- *don't know / no answer*

Q84. What about encouraging people to commute earlier or later to avoid rush hours? Is it:

Read.

- *very important*
- *important*
- *not very important*
- *not at all important*
- *don't know / no answer*

Personal Transportation Factors

Q85. Do you have a driver's license?

- *yes*
- *no*
- *declined*

Q86. Do you own or have regular access to a car, a motorcycle, or a scooter that is in good working order? If yes, which ones?

Record all applicable answers.

- *car*
- *motorcycle*
- *scooter*
- *declined*

Q87. Do you own or have regular access to a bicycle in good working order?

- *yes*
- *no*
- *declined*

Q88. Do you have a transit pass?

- *yes*
- *no*
- *declined*

Demographics

To finish up, I would like to ask you a few questions about you and your household for statistical purposes only. Please be assured that your answers will remain completely confidential.

Q89. Where is your home located?

Ask for place name or address. If “declined/unable” to answer, ask for intersection. If “declined/unknown”, ask for postal code. If “declined/unknown”, ask for name of neighbourhood or municipality.

[record answer]

Q90. Where is your [work/school/volunteer commitment] located?

Ask for place name or address. If “declined/unable” to answer, ask for intersection. If “declined/unable”, ask for postal code. If “declined/unable”, ask for name of neighbourhood or municipality.

[record answer]

Q91. What is the highest level of education you have completed?

Read if necessary. Record only one answer.

- elementary school
- some high school
- completed high school
- some community college/technical college/CEGEP
- completed community college/technical college/CEGEP
- some university
- completed university
- post-graduate degree
- no schooling
- don't know/no answer

Q92. What type of employer or industry do you work for?

Do not read. Record one answer only.

- agri-food
- computer/information-technology/telecommunications
- construction
- government (federal)
- government (provincial)
- government (city)
- health/health care
- education (school/university/school board)
- retail
- food service
- other service
- tourism/hospitality
- manufacturing
- other *[record answer]*
- don't know/no answer

Q93. In which of the following age categories can I place you?

Read.

- 16 to 24
- 25 to 34
- 35 to 44
- 45 to 54
- 55 to 64
- 65 to 74
- 75 and older
- don't know/no answer

Q94. How many people live in your household, including both adults and children?

[record answer]

If Q94 = 1, skip to Q96.

Q95. And how many people in your household are less than 16 years old?

[record answer]

Q96. For statistical purposes only, we would like to have approximate information about your household income. Please tell me which of the following corresponds to your total household income last year.

Read. Record one answer only.

- less than \$34,000
- \$35,000 to \$44,000
- \$45,000 to \$54,000
- \$55,000 to 74,000
- \$75,000 to \$100,000
- more than \$100,000
- don't know/no answer

Q97. May I have the six digits of your postal code?

[record answer]

Record the respondent's gender.

- male
- female

This completes the survey. On behalf of [agency], I would like to thank you for your time and cooperation.

Appendix 2

Sample Origin-Destination Study

This section provides a sample survey telephone interview script and questionnaire for telephone data collection methodology, as described in Section 5.4.1 of the main report. For an example of a form used for form-based trip diary study, see Mustel Group (2008 a) for a blank form and Mustel Group (2008 b) for an example of the same form filled out. See the list of sources ([Section 3.7](#) in the main report) for the URLs for the forms.

The script below is loosely based on that which was used for the Ottawa-Gatineau 2005 OD survey (TRANS Committee, 2005). The survey is divided into three sections. The first section screens the respondent for eligibility and collects basic household data. This section is only to be used once during the survey. The second section collects data on the personal characteristics of each individual living in the household. This section is to be repeated for each member of the household. The third section collects data on the trips made during a 24-hour period by each member of the household. This section is to be repeated for all trips made by each member of the household.

In the survey script below, the text in **bold** is the script to be read by the interviewer. The remaining text contains instructions for the interviewer and is not to be read unless otherwise instructed.

Household Data Section

Hello, I am calling on behalf of [agency name]. We are conducting a major study of household transportation behaviour in our region. I would like to ask you some questions about the members of your household yesterday. I need to speak to somebody who is 16 or older and is familiar with the trips made by members of your household. Are you 16 or older and able to answer my questions?

If yes, proceed to Q1. If no, ask if a person over 16 is available to answer the survey. If no one is available, try to make an appointment.

Q1. I need to verify your telephone number and address. Is this [phone number]?

[record answer]

If number is not correct, apologize and end phone call.

Q2. Is this [address] your address?

[record answer]

If address is different, ask for new address. Survey software should verify whether the new address is within the desired area. If software indicates that it is not in the right area:

Your new address is outside of the survey area. I cannot conduct the survey with you. Thank you for your time. Have a good [day/evening].

Q3. How many people, including yourself, live in your household?

[record answer]

Q4. How many vehicles, including cars, vans, and light trucks, are available to you and the other members of your household?

[record answer]

Personal Data Section

The following questions are to be repeated for each member of the household. The questions need to be adapted depending on whether the respondent is answering for him/herself or for other members of the household. The interview software should generate the questions with the appropriate adaptations.

Q5. [Are you/Is this person] male or female?

- *yes*
- *no*
- *declined*

Q6. Could [you/he/she] please tell me [your/his/her] age?

[record answer]

If declines to answer:

Q7. Could [you/he/she] please tell me to which age group [you/he/she] belong?

- *0-4 years*
- *5-9 years*
- *10-14 years*
- *...*
- *70-74 years*
- *75 or older*
- *declined*

If answer to Q7 is "16 or over" or if answer to Q7 is "15-19 or greater", ask Q8. If not, skip to Q9.

Q8. Do [you/he/she] have a valid driver's license?

- *yes*
- *no*
- *declined*

Q9. Do [you/he/she] have a valid transit pass?

- *yes*
- *no*
- *not applicable [under age]*
- *declined*

If yes, and if the given region has more than one type of transit pass, ask what type of pass. List all of the possible types as a multiple-choice answer.

Q10. What is [your/his/her] main occupation? [Are you/Is he/Is she]:

- *full-time worker or volunteer*
- *part-time worker or volunteer*
- *student*
- *homemaker*
- *retired*
- *other*
- *declined*

If Q10 answer is "worker":

Q10A. Where is [your/his/her] usual place of work?

Ask for place name or address. If "declined/unable" to answer, ask for intersection. If "declined/unknown", ask for postal code. If "declined/unknown", ask for name of neighbourhood or municipality

[record answer]

If Q10 answer is "student":

Q10B. What is the name of [your/his/her] school?

[record answer]

If person is a “worker” or “student”, has a valid driver’s license and the household has at least one car:

Q10C. [Do you/Does he/Does she] usually drive to [work/school]?

- *yes*
- *no*
- *declined*

Q11. Did [you/he/she] make at least one trip yesterday?

- *yes*
- *no*
- *declined*

If yes, proceed to Q12. If no, proceed to instructions after Q18.

Trip Data Section

The following questions are to be repeated until all trips made by the given household member have been covered.

Q12. What time did [you/he/she] leave home to make [your/his/her] [first/next] trip?

[record answer]

If “declined/unknown”

If first trip, ask Q13. If not, skip to Q14.

Q13. During what time range did [you/he/she] make this [first/next] trip?

- *midnight to 2:00 AM*
- *2:00 AM to 4:00 AM*
- *...*
- *10:00 PM to midnight*

Q14. What was the purpose of this trip?

- *work*
- *school*
- *shopping*
- *recreation (sports)*
- *entertainment (restaurant, movie, etc.)*
- *visit friend*
- *appointment (doctor, dentist, etc.)*
- *giving someone a ride*
- *picking someone up*
- *returning home*
- *other*
- *declined*

Q15. What was the starting point of this trip?

- *home*
- *usual place of work/school*
- *other*

If “other”, ask for place name or address. If “declined/unable” to answer, ask for intersection. If “declined/unknown”, ask for postal code. If “declined/unknown”, ask for name of neighbourhood or municipality

[record answer]

Q16. What was the destination of this trip?

- *home*
- *usual place of work/school*
- *other*

If “other”, ask for place name or address. If “declined/unable” to answer, ask for intersection. If “declined/unknown”, ask for postal code. If “declined/unknown”, ask for name of neighbourhood or municipality

[record answer]

Q17. How did [you/he/she] get to [your/his/her] destination?

- *car as driver*
- *car as passenger*
- *transit*
- *school bus*
- *taxi*
- *bicycle*
- *walk*
- *motorcycle*
- *other*
- *declined*

If “transit”, ask person to list the different bus, streetcar, light rail, subway, commuter train, ferry lines taken in order.

[record answer]

If Q17 answer is “transit”, also ask Q18 and Q19. If not, skip to Q20.

Q18. How did [you/he/she] get to the transit stop where [you/he/she] got on [first line listed in previous answer]?

- *car as driver*
- *car as passenger*
- *taxi*
- *bicycle*
- *walk*
- *motorcycle*
- *other*
- *declined*

Q19. Where did [you/he/she] get on public transit?

If “other”, ask for transit station name, place name, or address. If “declined/unable” to answer, ask for intersection. If “declined/unknown”, ask for name of neighbourhood or municipality.

[record answer]

Q20. Did [you/he/she] make another trip after that?

[record answer]

If yes, return to Q12. Repeat Q12-Q20 until all trips for the given household member have been covered.

If dealing with main respondent and all trips have been covered:

Now I will ask you about trips made yesterday by the other members of your household. We will proceed from oldest to youngest. I will now ask you about the oldest other member of your household. Return to Q5 and repeat the questions for the oldest other household member.

If other household member was just covered and some household members still remain to be covered:

I will now ask you about the [second oldest/third oldest/.../youngest] other member of your household. Return to Q5 and repeat the questions.

If all trips and all household members have been covered:

Thank you very much for your time and your cooperation. Have a good [evening/day]

Appendix 3

Open House

The following open house script, or sample survey questionnaire, is based on our interview with LURA, a Toronto based consulting firm that specializes in developing public consultation plans. Over the past several years, LURA has conducted several open houses on behalf of Metrolinx, the Toronto Transit Commission, and the City of Toronto. Their knowledge regarding open houses and the public consultation process provided insight on the scope and breadth of the following sample questionnaire. In addition to our primary research, we also conducted a review of open house best practices.

This section provides a sample survey interview script and questionnaire. In the survey script below, the text in **bold** is the script to be read by the interviewer. The remaining text contains instructions for the interviewer and is not to be read.

The following script is not all-inclusive and users of this guide are encouraged to review and alter it as required: adding or removing questions, adding or removing potential answers to the multiple choice questions, or narrowing the field of study to include few modes of transportation.

Household Data Section

Hello my name is [say name]. On behalf of [agency name] I would like to welcome you to our Open House this afternoon/evening. In addition to the information presented here today, we are also conducting a study of household transportation behaviour in your community/region. I would like to ask you some questions about your household, transportation habits, and perceptions of the proposed [or implemented] TDM initiative. Are you 16 years or older and able to answer my questions?

If yes, proceed to Q1. If no, thank the person for coming to the event and move on to the next person.

Q1. What is your postal code?

[record answer]

Q2. How many people, including yourself, live in your household?

[record answer]

Q3. How many vehicles, including cars, vans, and light trucks, are available to you and the other members of your household?

[record answer]

Personal Data Section – Awareness

Q4. Are you familiar with the public transportation services that are available to you?

[record answer]

Q5. Were you aware of the TDM initiative prior to this focus group?

[record answer]

Q6. How did you become aware of the TDM initiative?

[record answer]

Q7. Does your local/regional public transportation agency communicate effectively with its costumers?

[record answer]

Q8. How could communication be improved?

[record answer]

Personal Data Section – Knowledge

Q9. Briefly describe what you know about the proposed/implemented TDM initiative:

[record answer]

Q10. How did you obtain information regarding the proposed/implemented TDM initiative?

[record answer]

Q11. How do you think the distribution of information could be improved?

[record answer]

Personal Data Section – Perception

Q12. What are the advantages/disadvantages of using public transportation?

[record answer]

Q13. If public transportation was improved, would you use it more often?

[record answer]

Q14. What is the main reason that you do not personally take public transportation?

[record answer]

Personal Data Section – Travel Behaviour

Q15. How often do you use public transportation?

- *Often*
- *Sometimes*
- *Rarely*
- *Never*

Q16. How often do you use the public bicycle system?

- *Often*
- *Sometimes*
- *Rarely*
- *Never*

Q17. Have you changed your travel habits following the implementation of the TDM initiative? Explain.

- *Yes*
- *No*

[record answer]

Closing Comments Section

Q18. Do you have any additional comments regarding the [*proposed* or implemented] TDM initiative?

[record answer]

Q19. Did you find the information provided during this open house helpful and/or meaningful?

[record answer]

Thank you very much for your time and your cooperation. Have a good [evening/day]

Appendix 4

Focus Groups

The following focus group script is based on our interview with IBI Group. In 2005, the IBI Group conducted several focus group sessions in Kingston, Ontario, with representatives from the Kingston General Hospital, Hôtel Dieu Hospital, Downtown Kingston Business Improvement Association, Queen's University and Providence Continuing Care Centre. In addition to our interview with IBI, we also conducted background research to identify a number of best practices and review focus group sample questionnaires.

This section provides a sample survey interview script and questionnaire. In the survey script below, the text in **bold** is the script to be read by the interviewer. The remaining text contains instructions for the interviewer and is not to be read.

The following script is not all-inclusive and users of this guide are encouraged to review and alter it as required: adding or removing questions, adding or removing potential answers to the multiple choice questions, or narrowing the field of study to include few modes of transportation.

Household Data Section

The focus group begins with a few basic household questions. However, the facilitator should not spend too much time on this section because it is not the primary purpose of the Focus Group

Q1. How many vehicles, including cars, vans, and light trucks, are available to you and the other members of your household?

[record answer]

Q2. How many people, including yourself, live in your household?

[record answer]

Personal Data Section – Awareness

Q3. Are you familiar with the public transportation services that are available to you?

[record answer]

Q4. Were you aware of the TDM initiative prior to this focus group?

[record answer]

Q5. How did you become aware of the TDM initiative?

[record answer]

Q6. Briefly describe what you know about the proposed/implemented TDM initiative:

[record answer]

Personal Data Section – Usage

Q7. How often do you use public transportation?

- Often
- Sometimes
- Rarely
- Never

Q8. How often do you use the public bicycle system?

- Often
- Sometimes
- Rarely
- Never

Q9. Have you changed your travel habits following the implementation of the TDM initiative? Explain.

- Yes
- No

[record answer]

Personal Data Section – Perception

Q10. What are the advantages/disadvantages of using public transportation?

[record answer]

Q11. If public transportation was improved, would you use it more often?

[record answer]

Q12. What is the main reason that you do not personally take public transportation?

[record answer]

Q13. Does your local/regional public transportation agency communicate effectively with its costumers?

[record answer]

Q14. How could communication be improved?

[record answer]

Closing Comments Section

Q15. Has your interest in public transit (or more particularly the proposed/implemented TDM initiative) changed since the beginning of this focus group?

[record answer]

Q16. Do you have any additional comments?

Thank participants and remind them to pick up their co-op payments on their way out.

