Transportation Association of Canada

Phase 2 of the Framework for High Quality Data Collection of Urban Goods Movement in Canada
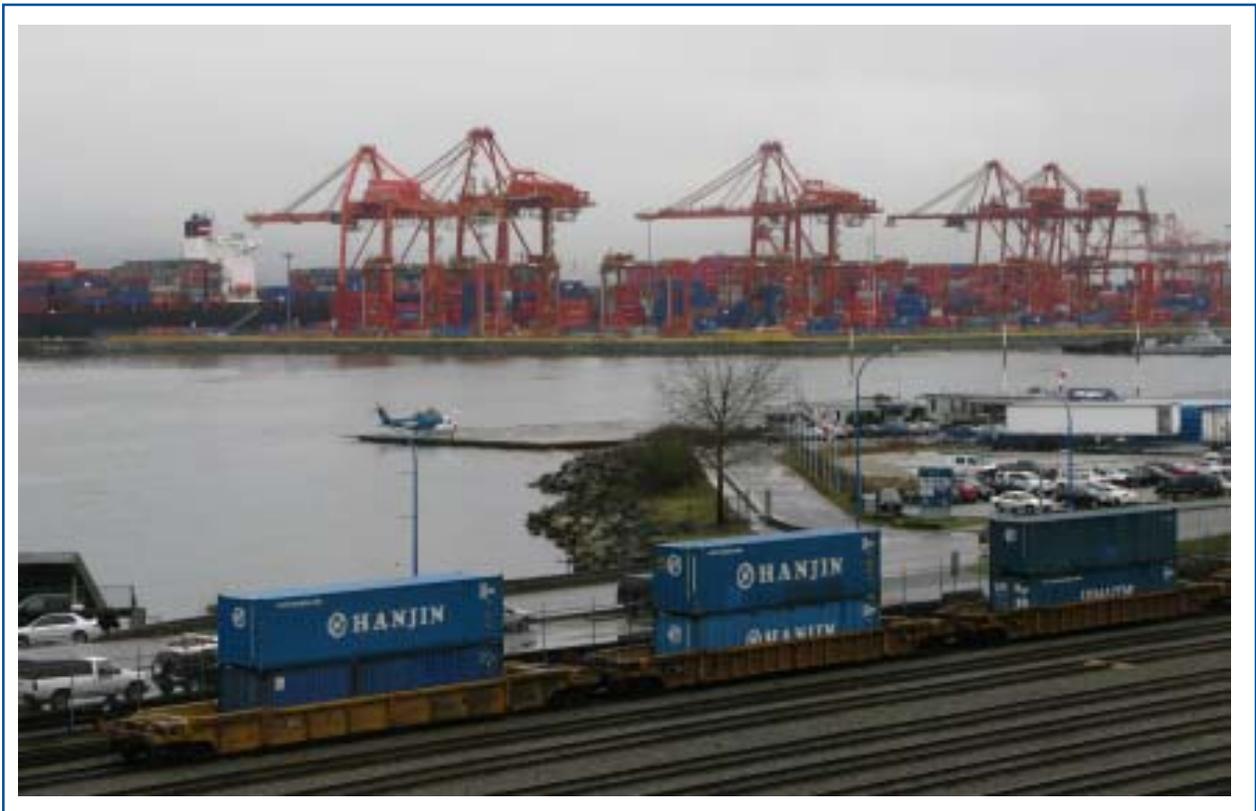

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Transportation Association of Canada

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Abstract

This report presents a recommended framework and a program for gathering high-quality data for urban goods movement surveys in Canada. The urban goods movement data are needed for planning and investment decisions as well as for addressing traffic safety and operations, demand management and sustainable transportation issues. The proposed framework has two dimensions; the first dimension is with respect to the origin-destination surveys and commodity flow surveys (CFS), and the second dimension is with respect to the geographic scale, namely the urban and interurban areas. The report focuses on the need for an interurban Canadian CFS which would be based upon the current U.S. Commodity Flow Survey.

A nationwide online survey on goods movement data usage and needs in Canada was also conducted as part of this project, and responses are summarized in the report. Furthermore, a nine-part implementation strategy to advance the identified needs and develop the framework is also presented in the report.

Keywords

Traffic and Transport Planning
  Data Acquisition
  Freight Transport
  Goods Traffic
  Inter Urban
  Method
  Origin-Destination
  Traffic
  Statistics
  Trade
  Urban Area

Supplementary Information

Phase 1 report was published in 2007 and is available in English and French on the TAC website www.tac-atc.ca in the Resource Centre.

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EXECUTIVE SUMMARY

A.   <u>Purpose</u>

This research develops a recommended framework and outlines a program for gathering high-quality data for urban goods movement surveys in Canada. Notwithstanding its urban focus, the framework also covers inter-urban goods movement data collection, for the fundamental reason that most inter-urban goods activity is generated through an urban activity at least at one end. Thus, a holistic treatment of urban goods activity necessarily must account for inter-urban activity.

These data primarily are needed for planning and investment decisions. However, transportation practitioners also recognize the need for proper goods movement data to address traffic safety and operations, demand management and sustainable transportation issues (the last including Climate Change and, increasingly, air quality and public health issues).

At the basis of all these needs is a fundamental requirement to understand the movement of goods in Canada. The country has seen some notable achievements, including the National Roadside Survey of trucks (NRS) and state-of-the-practice urban goods surveys in Calgary, Edmonton and Peel Region. However, as is discussed in this report, data collection activities remain somewhat ad hoc, and there remain fundamental gaps.

Accordingly, a recent Transportation Association of Canada (TAC) scoping study established the need to provide transportation planners in Canada with:

1. An understanding of the types of data that are needed to address urban goods movement issues as they relate to land use planning, infrastructure planning, traffic safety and operations, demand management and sustainable transportation, and

2. A framework to guide goods movement data collection efforts.

TAC subsequently initiated a research study to develop the framework. The research had two phases. Phase 1 conducted a literature review regarding national and international experience and emerging trends with urban goods movement surveys and data. It also developed and tested an on-line user needs survey. The Phase 1 report was published in November 2007, and is available in English and French at the TAC website (www.tac-atc.ca).

Phase 2 was initiated in November 2008. This phase administered the user needs survey, and developed the framework and program for urban goods movement surveys.

This report describes the Phase 2 user needs survey and the proposed framework.

B.   <u>User Needs Survey</u>

The Survey

A nationwide online survey on goods movement data usage and needs in Canada was conducted in the spring of 2009. The purposes of the survey were to understand current practices and to identify user needs for goods movement data.

The survey comprised six sections:
1. Applications of existing data collection (i.e., the applications for which users collect or need data).
2. Data collection programs (description of the types of data that users collect).
3. Public and commercial data sources (review of the use of other available data sources).
4. Freight data requirements (i.e., information requirements).
5. Other data sources (i.e., complementary data sources).
6. Lessons learned (an assessment of the collected or available data).

The survey was distributed by e-mail to 243 public and private sector organizations across Canada. English and French versions of the survey were distributed, with 221 English surveys and 22 French surveys being sent out.

Overall, 33 responses were received, for a response rate of 13.4%. The highest response rate was recorded for Provincial / Territorial governments, at 53.3%. No responses were received from the Federal government or from goods-producing organizations and companies: the last may reflect the lack of use or collection of these types of data (hence, the respondents may not have perceived the survey as relevant to them); the planning orientation of the survey (i.e., respondents may view this as business planning); unfamiliarity with sponsoring organization (i.e., TAC); the reluctance to divulge what they might perceive as confidential information; and/or the length of the survey. Government respondents provided the highest responses rate, while members of the supply chain provided the lowest response rate.

Although the absolute number is small, the results do provide a broad geographic range; they cover cities of various sizes; and they include an airport authority, an economic development agency and two multi-agency freight councils.

Key Findings

A key finding of the Phase 1 research was that no one set of data can captures all the relevant characteristics of urban goods movement. The user needs survey corroborated this fundamental point, in that it identified several user needs, as described in the previous sections. The survey identified needs, current internal data collection efforts, usage of existing external public and commercial datasets, and an assessment of how well the internal and external data met users' needs. The key findings are summarized below.
▪ Primarily public sector interests responded to the survey. This is consistent with the planning nature of the survey (i.e., a perception that the survey did not apply to them),

and possibly also such factors as the length of the survey and the desire by many private sectors interests to maintain confidentiality.

▪ The responses, although yielding important and rich information, were relatively few in number – as noted, a response rate of 13.4%. This may suggest that there is a relatively low incorporation of goods movement in the urban transportation planning process.

▪ Freight data are needed for operational and safety applications, in addition to more traditional planning applications such as modelling, network, corridor and facility planning, and environmental planning. At the same time, actual involvement in these activities varied among respondents.

▪ Several respondents conducted their own types of data collection and surveys. Traffic counts were most common, and counting activities tended to be conducted regularly. Surveys also were conducted, although less frequently. Of particular importance were the inter-urban roadside surveys conducted nationwide; however, these are not conducted to specific schedules or frequencies.

▪ Fewer than half the respondents used the many available multi-modal public or commercial datasets. Of 40 such datasets, fewer than half were actually used. Of these, the most common usage was to understand cross-border freight movements. However, these data were considered to be lacking in detail and in Canadian content.

▪ Respondents' needs focused on truck freight data. Other modes also were of interest (rail, air and marine), although to a much lesser extent. Common to all modes was the need for data on origins and destinations; movement of goods and vehicles (including travel times, costs and itineraries); and, characteristics of the goods being shipped (including cost and volume). Intermodal data also were lacking: that is, the movement of the good through the entire chain from origin to destination. A national commodity flow survey was identified as a potential platform for gathering provincial- or regional-level data.

▪ Respondents expressed varying degrees of satisfaction with their internal and external datasets, with most tending to consider their data as inadequate. This echoed the aforementioned data needs, along with:
  • Urban goods movement data generally.
  • More precise geographical and temporal definitions.

▪ Electronic technologies for collecting data were cited, but were not used as frequently as traditional methods: their potential to offset response burdens and costs while improving quality also represent a need.

▪ Finally, the survey results yielded an implied need for common definitions in terms of goods movement survey types, terms and practices.

Key Requirements and Priorities

A number of specific actions can be derived from the user needs survey. The importance of available data for transportation planning, which identified roadside surveys, cross-border data and commodity flow surveys as being 'critical' or 'important' to planning (and note that many of these data are available only from the United States), suggests that the actions can be categorized along two main themes:

1. **There is a widespread gap in - hence the need for - detailed information about the characteristics of goods movement trips** – that is, trip origin and destination, routes or itineraries, schedules, mode, time of day, seasonal variations, frequency, cost, inter-modal transfer, greenhouse gas emissions, tonnage/volume and commodity carried, vehicle type, etc. Corresponding data on intermodal transportation largely do not exist (or are held privately). Moreover, there is a need to provide these data at a sufficient level of detail and precision, especially geographical, in order to support use of these data for analysis, modelling, planning and policy development.

   It is important to note that respondents referred mainly to the inter-urban surveys – roadside surveys and cross-border data – recalling that they were asked to comment on the use of *existing* available data sets, which are oriented almost entirely towards inter-urban goods movement. However, it must be inferred that both urban and inter-urban data are required in order to provide complete coverage, as are data that cover internal-external movements.

   The NRS and selected urban goods movement surveys (Calgary, Edmonton and Peel) exemplify inter-urban and urban best practices, respectively. However, aside from these surveys, sources are quite limited. In addition, respondents identified the need to enhance the aforementioned surveys which, as noted, have been cited in the literature as North American best practice. These enhancements include specialized fleet allocator surveys (subsets of the main establishment survey); increased use of GPS surveys to ascertain the accuracy of survey responses and to verify routes; improved methods to link NRS data with traffic counts and ensure that the counts and the surveys are conducted at the same time; address response problems (e.g., survey length, need for assistance in responding, respondent's ability to provide the necessary information, clarity of questions, and reliability and honesty of the responses); and, enhance the clarity of survey forms.

2. **There is a need for commodity flow data with broad geographic coverage** – that is, with the exception of the aforementioned urban goods surveys, there is no information about the inter-urban, domestic, cross-border or international flows of goods that move through the supply chain. These data provide the 'big picture.' Contrary to the aforementioned urban goods surveys and the NRS, there are no Canadian examples of commodity flow surveys. It is important to note that the urban establishment surveys and inter-urban commodity flow surveys are not the same thing and, accordingly, are not interchangeable, although there are some points of commonality. Accordingly, they cannot be combined into a single survey.

It should be noted that the first two needs were discerned quite clearly from the survey results. However, the consultant inferred two additional needs, from the responses and from the variation in the responses to the same questions, as follows:

3. There is a need for **best practice guidance** and **common standards and definitions** for all aspects of urban goods movement data – both for surveys and for ancillary data, such as traffic counts and travel time surveys.

4. There is a need for **education and awareness** regarding goods movement issues, best practices in goods movement planning, and how data can be applied to planning.

In the development of the framework and in adhering to the terms of reference of this research, the remainder of this report focuses upon the first two needs; however, the latter two needs are fundamental to the fulfillment of the framework and also should be addressed in the future.

C.   Concept for a Framework

The proposed framework has at its core two dimensions:

- The two types of surveys, namely origin-destination (OD) trip surveys and commodity flow surveys (CFS). These correspond to the two main needs identified above from the user surveys.

- Geographical scale; namely, urban areas and inter-urban areas (essentially, urban regions and anything larger than that [including inter-urban corridors], respectively).

Together, these two dimensions yield a four-part core framework, as illustrated conceptually in **Exhibit ES-1**.

Best practices exist in Canada for three of four parts of this core. These are:

- Urban CFS: Edmonton, Calgary and Peel Region.

- Urban OD: Edmonton, Calgary and Peel Region.

- Inter-urban OD: National Roadside Survey

An inter-urban CFS does not exist in Canada. Rather, as proposed by the terms of reference for this research, a Canadian inter-urban CFS would be based upon, and would expand, the current U.S. Commodity Flow Survey.

Note that the urban CFS and urban OD surveys *together* are defined by the multi-faceted goods movement surveys that have been conducted in Edmonton, Calgary and Peel Region.

	Commodity Flow Survey	**Origin-Destination Survey (Trips)**
Urban	Edmonton, Calgary, Peel	Edmonton, Calgary, Peel
Inter-urban	CFS (*proposed*)	National Roadside Survey

Exhibit ES-1. Conceptual CFS and OD Core Framework

This framework is properly placed as the 'core' of a broader data collection effort – that is, it can serve as the basis for supplementary data collection. This is due to several reasons:

▪ The recognition that no one type of survey captures all the information needs.

▪ The need to reflect the different types of data that actually are now collected for urban goods movement, depending upon specific informational requirements.

▪ The recognition that some aspects of urban goods movement are relatively well established in practice (for example, establishment surveys) while an understanding of other aspects is only nascent (notably, the supply chain): in turn, this impacts data collection requirements.

▪ The relative newness and ongoing evolution of urban goods movement data collection methods.

▪ Considerable variability in definitions in the practical literature: in particular, between movement and flows; between qualitative and quantitative data; and, between surveys and counts. This is evidenced, in particular, by experience in the United States (although also, to some extent, in Canada as well: a key difference is that relatively fewer goods movement studies have been conducted in Canada). In the absence of reasonably consistent definitions, a meaningful framework is not possible.

As noted, other surveys and data collection activities could be 'hung' from this platform. Moreover, local, regional, Provincial and Territorial authorities could augment the sample in selected locations, on a cost-recovery basis, to allow for a finer geographical level; all maintaining the same survey method, sampling frame, etc.

The Canada-wide CFS would follow the same questionnaire and have the general logistical requirements as the U.S. CFS. The possibility of a collaborative effort with the sponsors of the U.S. CFS to synchronize the two surveys should be investigated, yielding economy of scales in logistics and execution costs.

Similarly, the Edmonton, Calgary and Peel surveys, which are variations of each other, represent the state of the practice for urban goods movement surveys in Canada, and the continued conduct of these surveys should be encouraged, as a complement to the CFS. It is important to note, however, that subsequent surveys might add components and improve others, and so it is not desirable to 'fix' a single survey format, beyond the general framework that has been adapted in these three surveys.

On the other hand, it is important to develop common terms and definitions, particularly in the categorization of industry and commodity types as well as of vehicle classifications for traffic counts (which support the surveys). A sampling method is proposed for the CFS, which by intent is similar to that of the U.S. and, accordingly, allows for a possible integration with the U.S. CFS. In turn, this integration allows for an improved analysis of cross-border flows. A Canadian CFS could be coordinated with a National Roadside Survey. Improved disclosure avoidance techniques are being developed, and some preliminary testing

using current techniques should be considered in the development of any future surveys or
pilot tests.

It is recognized that the effort required to conduct a nation-wide CFS is not trivial. This effort
requires coordination at several levels, as well as significant resources. However, the need is
clearly demonstrated in the user needs' surveys; and the benefits to transportation planning
and investment decisions would be considerable (to speak nothing to the potential
improvements to the efficiency of goods movement and, it follows, to the country's
economic wellbeing and competitive position).

D.   Next Steps: Implementation Strategy

The research proposed a nine-part implementation strategy to advance the identified needs
and develop the framework, as follows:

1. Develop a Business Case for a CFS

The nation-wide coverage of a Canadian CFS requires national coordination and this in turn
requires collaboration of all levels of government as well as non-governmental partners.
Accordingly, the object of this activity is to detail the specific requirements of a Canadian
CFS for presentation to responsible agencies, and importantly to agencies of the Federal
Government, to lead a CFS. It is noted that part of the success of the CFS in the United States
has been that the survey is mandatory and conducted as an interagency effort involving a
partnership among the Bureau of the Census, U.S. Department of Commerce, and the Bureau
of Transportation Statistics, U.S. Department of Transportation. In Canada it also is likely
that several Federal Government departments would need to be involved, potentially
including Transport Canada, Industry Canada, Statistics Canada and possibly others.

The business case can draw from this research. It would include an overview of the proposed
Canadian CFS; an outline of the CFS and proposed approach; applications of the data, and
who would use the data; benefits and costs; and, a detailed implementation plan. The
business case also could be used to develop partnerships and support from other interested
organizations - e.g., provincial / territorial ministries of economic development or municipal
affairs (and local / regional counterparts), port authorities, and goods movement industries
associations – in order to build support for the concept. Consideration also should be given to
establishing a level of financial support that other levels of government would be willing to
provide to a Federally-driven CFS.

2. Establish Sustainable Funding for Other Data Collection

Complementary to the CFS business case, local, regional and provincial / territorial
governments could develop sustainable funding to ensure continued and regular conduct of
other necessary data – in particular, the NRS as well as traffic counts and travel time surveys.
Solicitation of Federal funding also could be an option given, for example, the linkage of

trade and economic competitiveness (and other issues, such as safety) to efficient transportation.

3. Establish Quick Wins in Data Collection

One respondent to the user needs survey advocated the use of 'quick wins' in data collection and surveys, in order to demonstrate what could be done (and to what benefit) while increasing the awareness of the need for proper data. The intended audience includes decision makers at all levels of government; equally important it should include the transportation professionals who are responsible for their organization's data collection activities and those who would use the data.

4. Test the CFS Concept

The concept of a CFS should be tested, given the significant implications of initiating such a survey on a national scale. This could take place even before Federal sponsorship is finalized; and tests would go far in demonstrating the viability of the concept. Specifically:

- A pilot test of a Canadian Commodity Flow Survey (see next section).

- A pilot test of a CFS supply chain trace, similar to that conducted in France; using a small sample of from the pilot Canadian CFS.

- The initiation of discussions with the U.S. Bureau of Transportation Statistics and Bureau of the Census to promote and plan for integrated Canadian and U.S Commodity Flow Surveys.

This approach is not meant to preclude any other types of surveys; rather, to provide a starting point for a step-by-step build-up of data. Clearly individual policy and planning needs will dictate the need for other surveys, in any event.

5. Jointly Implement NRS and CFS Pilot Test

A Canadian CFS pilot test could be conducted in conjunction with the National Roadside Survey or a component thereof (e.g., Ontario's Commercial Vehicle Survey). The object is to test the CFS in a single jurisdictional environment (i.e., for which a single sampling frame exists [registry of establishments]). Together, the CFS / NRS provide the necessary data on goods flows and goods movement. Moreover, a logical extension of this pilot is to include an American component to the CFS: that is, just as the Federal Highway Administration contributes to the capture of border-crossing data from the NRS, similarly a combined effort at capturing Canada-US CFS data would address the important gap in cross-border flows.

6. Establish Technical Oversight

In 2003, the Transportation Research Board (TRB) proposed a national freight data framework for the United States. That proposal focused on inter-urban freight (mainly truck)

data collection, with urban freight considered as a separate element. The framework was conceptual in nature. Among many laudable features was a proposal to have technical oversight for future surveys and data collection activities to be provided by a TRB committee.

A technical oversight body similarly would be useful for Canada. However, its focus should be on technical *guidance*. The key reason is that the state of the practice in urban goods movement data collection is relatively immature, compared with that of inter-urban data collection. This means that each agency uses and adds to the last agency's survey – witness the Peel Region research which used the Edmonton / Calgary framework as a basis, but added behavioural questions and methodological tests. Accordingly, a better role for this body would be to compare and assess surveys and methods; sponsor research; sponsor the harmonization of terms, definitions and performance metrics; promote the development of appropriate sampling frames (i.e., business registry databases); and, provide a forum for the exchange of ideas and expertise. Complementary to this would be a clearinghouse of surveys and methods.

7. Establish Best Practices / Standards and Definitions

Common standards and definitions would go far in promoting goods movement data collection. These should address terminology, sampling methods, data expansion practices, survey design, survey media and traffic counts. It is recognized that there may be several options for a given activity: accordingly, best practices and guidance could be considered as part of this need.

8. Promote Education and Awareness

Also as discussed above, the importance of having sufficient (let alone 'high quality') goods movement data for a wide range of transportation applications should be widely promoted in the transportation community. TAC is an obvious medium for this, as are other industry associations such as CITE and the CIP (as well as, for example, the Federation of Canadian Municipalities, and goods movement associations). Promotional activities could consist of conference presentations and papers; papers in industry newsletters and magazines; and. presentations to local and regional councils. Consideration also should be given to hosting a specialty conference or webinar on urban goods data: the Transportation Research Board has been holding several conferences on the topic of freight data, including a conference on the CFS in 2005. A second option is to hold a specialty conference on the general topic of transportation data (including both passenger and goods movement), which might be more attractive to potential participants while, at the same time, showing how goods movement data collection efforts could complement other data collection and how important they are to planning, analysis and modelling.

9. Promote the Conduct of Urban Surveys

The aforementioned framework focuses on the development of a nation-wide CFS and on augmenting roadside survey programmes: this responds to the priorities identified by the users. However, given the ultimate focus of this research on addressing urban goods movement data, it is important that urban activities be continued. Accordingly, we propose that efforts should be focused on implementing multi-part surveys similar to the Edmonton / Calgary and Peel Region efforts, in other urban areas in Canada. This allows individual cities to proceed, without necessarily waiting for a national methodological foundation and source of funding. The two key 'conditions' are to build upon the existing best practices, and then to document and disseminate the processes, lessons learned, etc.

E.　　　Funding Considerations

The user needs survey indicated a range of costs for the conduct of surveys and counts. The Edmonton and Calgary multi-faceted goods movement surveys, including roadside surveys at an external cordon, each cost of the order of $1 million. Evidence elsewhere with these types of surveys, and more generally with household travel surveys in Canada, indicates that a seven-figure order of magnitude is not unreasonable. Note that these estimates do not include the development of appropriate sampling frames (i.e., an inventory of establishments by type) or ancillary data collection, such as traffic counts.

The 2007 U.S. Commodity Flow Surveys cost approximately $14 million (USD): although the sample for a Canadian CFS would be smaller (although not necessarily proportionate to the population, given the need to ensure adequate geographic coverage), there would be fixed costs, and the coverage would be augmented in at least two ways, to cover all industry sectors and cross-border movements. Hence, an estimate based upon the proportionate populations or economies alone (i.e., 10%) is unreasonable; and – taking all of the aforementioned factors into consideration – a cost upwards of half of the U.S. cost might well be expected. An initial one-time development cost also might be required although, at the same time, some economies could be achieved if the U.S. Commodity Flow Survey method, questionnaire and survey tools, which are all well established, are transferred to Canada.

As for funding sources, the Edmonton and Calgary surveys both benefited from the ability to share resources and surveys, as well as funding from the province. Other sources could include economic development agencies or ministries. For a CFS, a provincial / federal coalition, as was done for the NRS, could be a likely medium: on the other hand, linking the CFS to economic censuses, as is the U.S. practice, would give the leading role to Federal departments as discussed above.

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1. INTRODUCTION

1.1 Overview

This research develops a recommended framework and outlines a program for gathering high-quality data for urban goods movement surveys in Canada. Notwithstanding its urban focus, the framework in fact also covers inter-urban goods movement data collection, for the fundamental reason that most inter-urban goods activity is generated through an urban activity at least at one end. Thus, a holistic treatment of urban goods activity necessarily must account for inter-urban activity. There are several other reasons for this broader treatment:

▪ Although the focus is on road-based goods movement, this broader treatment allows for the inclusion of goods that are moved by other modes; or, at least, the impacts of these modes on the road network.

▪ On this point, it is important to note that inter-urban goods movement terminals – intermodal rail yards, truck terminals, courier depots, airports, marine ports and tank farms – are significant generators of vehicular traffic on urban road networks. Hence, there is a practical urban planning aspect to inter-urban transportation.

▪ Transportation investment decisions and long-range plans alike increasingly recognize the inter-dependence of efficient transportation and economic development: this now establishes a three-way linkage with land use planning.

▪ In turn, this makes urban transportation a trade issue, with manifestations and impacts that go beyond urban boundaries, to affect national prosperity and well-being. It further establishes the linkage between addressing inter-urban and cross-border infrastructure needs and urban transportation infrastructure needs.

Going beyond planning and investment decisions, transportation practitioners also recognize the need for proper goods movement data to address traffic safety and operations, demand management and sustainable transportation issues (the last including Climate Change and, increasingly, air quality and public health issues).

At the basis of all these needs is a fundamental requirement to understand the movement of goods in Canada. The country has seen some notable achievements, including the National Roadside Survey of trucks and state-of-the-practice urban goods surveys in Calgary, Edmonton and Peel Region. However, as is discussed below, data collection activities remain somewhat ad hoc, and there remain fundamental gaps.

Accordingly, a recent Transportation Association of Canada (TAC) scoping study established the need to provide transportation planners in Canada with:

1. An understanding of the types of data that are needed to address urban goods movement issues as they relate to land use planning, infrastructure planning, traffic safety and operations, demand management and sustainable transportation, and
2. A framework to guide goods movement data collection efforts.

TAC subsequently initiated a research study to develop the framework. The research had two phases. Phase 1 conducted a literature review regarding national and international experience and emerging trends with urban goods movement surveys and data. It also developed and tested an on-line user needs survey. The Phase 1 report was completed in November 2007.[1]

Phase 2 was initiated in November 2008. This phase administered the user needs survey, and developed the framework and program for urban goods movement surveys.

This report describes the Phase 2 user needs survey and the proposed framework.

1.2 Report Organization

The report has six chapters. After some further introductory information in **Chapter 1**, the remainder of the report is structured as follows:

- **Chapter 2** summarizes the findings of the user needs survey.

- **Chapter 3** presents a concept for a data framework, based upon the Phase 1 findings and upon the user needs survey. The chapter also describes existing 'best practice' components.

- **Chapter 4** details the technical aspects of a proposed Canadian Commodity Flow Survey – the main missing component of the framework – as well as ancillary data.

- **Chapter 5** summarizes the report, proposes a possible implementation strategy, and discusses possible funding options.

- **Chapter 6** complements the report with a list of references.

The report is complemented by four appendices. **Appendix A** tabulates the results of the user needs survey. **Appendix B** provides a comprehensive list of urban goods movement survey types. **Appendix C** presents the questionnaire from the 2007 U.S. Commodity Flow Survey, and **Appendix D** presents the accompanying instruction booklet.

1.3 Key Definitions

The Phase 1 report defined and clarified a number of terms. It is useful to repeat here three key definitions, because these are fundamental to the discussion that follows in the remainder of this report. The reader is referred to Appendix B of the Phase 1 report for additional definitions.

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[1] iTRANS Consulting Inc., "Phase 1 of the Framework for High Quality Data Collection of Urban Goods Movement in Canada," Final Report. Transportation Association of Canada, Ottawa, November 2007. 206 pages. Accessible in English at: http://www.tac-atc.ca/english/resourcecentre/readingroom/pdf/goodsmovement.pdf, and in French at: http://www.tac-atc.ca/francais/centredesressources/salledelecture/pdf/goodsmove-f.pdf.

1.3.1 Freight versus Goods Movement

To some degree, the terms "*freight*" and "*goods movement*" are interchangeable. Both terms refer to the carriage of "*commodities*" for a price, by any mode. Importantly, however, the broader term "goods movement" also includes the movement of people and goods in order to provide "*commercial*" services, such as appliance repair, parcel delivery and waste collection.

Both types may operate on fixed routes (e.g., waste pick-up) or may be generated randomly (on demand). The importance of trips related to the provision of services is illustrated in a recent study in Calgary in which surveys revealed that 50% of all business stops are made to provide a service (Stefan and others 2005). Clearly, a complete profile of urban commercial movements requires consideration beyond just freight movements and must include service deliveries within the urban area.

1.3.2 Commodities

For the purposes of this study, the term "commodity" refers to any tangible item that is transported by goods movement modes. Commodities are defined for all sectors of the economy, including both raw materials and finished products: standard classification systems are used to define these commodities. A commodity might be discrete – such as, a courier package or a piece of furniture – or bulk, for example, aggregate stone or oil. For the purposes of this research, the electronic transmission of documents is not included in this definition; and, as noted above, the term "commodity" does not include the movement of people and goods for the provision of services.

1.3.3 Movement versus Flow of Goods

The *"movement"* of goods refers to a trip, while *"flow"* describes the good that is being moved. Note that the description in both cases can be both quantitative and qualitative.

Specifically, **goods movement** describes the characteristics of the trip made by a vehicle(s) or person(s) to transport a particular good between a single origin and a single destination. The characteristics are depicted in terms of their origin-destination, the mode or modes used, trip start or end time, frequency, trip route or itinerary, cost, vehicle ownership, points of intermodal transfer, loading factors, etc.; that is, in terms that are typical of an origin-destination survey.

The **flow of goods** (i.e., commodity flow survey) describes the characteristics of the goods that are generated at a location for distribution to another location(s). The flow is expressed commonly in terms of economic activity or output, such as the type of good generated (i.e., the commodity; and typically according to a standard industrial classification), the total volume that is generated in a given period, its value and so on. In addition to the economic reference, the description might also be based in land use. Critically, however, there may be no reference to the actual physical movement of the good, nor is the description necessarily

developed for purposes of transportation, nor might there be a reference to the actual movement of the good. However, flows are often translated into vehicle trips through the use of factors.

Goods movement characteristics, such as are provided by origin-destination surveys and traffic counts, are most commonly associated with urban and inter-urban road vehicle transportation. Commodity flow data typically are reported for all types of inter-urban goods movement, for example, Statistics Canada's annual *Shipping in Canada* report of marine flows.

This study considers both the movement of goods and the flow of goods (commodity flow surveys).

2. USER NEEDS SURVEY

2.1 Introduction

This chapter summarizes and interprets the results of a national online survey on goods movement (freight) data in Canada. The purposes of the survey were to understand current practices and to identify user needs for goods movement data.

The survey comprised six sections:
1. Applications of existing data collection (i.e., the applications for which users collect or need data).
2. Data collection programs (description of the types of data that users collect).
3. Public and commercial data sources (review of the use of other available data sources).
4. Freight data requirements (i.e., information requirements).
5. Other data sources (i.e., complementary data sources).
6. Lessons learned (an assessment of the collected or available data).

The survey was developed and tested as part of Phase 1 of this study. It is described in detail in the November 2007 report, *Phase I of the Framework for High Quality Data Collection of Urban Goods Movement in Canada.*

The remainder of this chapter is organized as follows. **Section 2.2** profiles the responses and the characteristics of the respondents. **Section 2.3** describes the applications for which respondents use or need data, and **Section 2.4** describes their data collection activities. **Section 2.5** describes respondents' use of existing data sets. **Section 2.6** discusses specific freight data requirements. **Section 2.7** presents the users' assessment of their data. **Section 2.8** presents a synopsis of findings from the user needs survey, and, finally, **Section 2.9** derives specific actions and priorities to serve as the basis for the framework. A complete tabulation of survey responses can be found in **Appendix A**.

2.2 Respondent Characteristics

The survey was distributed by e-mail in the spring of 2009 to 243 public and private sector organizations across Canada. English and French versions of the survey were distributed, with 221 English surveys and 22 French surveys being sent out. Some of the e-mail addresses were incorrect: those returned were corrected and re-sent; however, an additional 20 English addresses could not be corrected (i.e., 263 surveys were distributed). Note that 3 of the respondents were those who had replied to the 2007 'beta' survey: although they were re-contacted for the current survey (essentially identical to the 'beta' survey), they chose not to respond again and so their 'beta' survey results were incorporated into this analysis.

The list was compiled by the consultant with the assistance of the Project Steering Committee members. For each category of survey, **Table 1** lists the total number of surveys sent out, the number of respondents and the response rate. The highest response rate was

recorded for Provincial / Territorial governments, at 53.3%. No responses were received from the Federal government or from goods-producing organizations and companies: the last may reflect the lack of use or collection of these types of data (hence, the respondents may not have perceived the survey as relevant to them); the planning orientation of the survey (i.e., respondents may view this as business planning); unfamiliarity with sponsoring organization (i.e., TAC); the reluctance to divulge what they might perceive as confidential information; and/or the length of the survey. Overall, government respondents provided the highest responses rate, while members of the supply chain provided the lowest response rate.

Table 1. Survey Sample and Responses

Respondent Category	Respondent Type	Total Surveys	Number of Respondents	Response Rate
Government	Federal	7	0	0.0%
Government	Provincial / Territorial	15*	8	53.3%
Government	Municipal / Regional	83	17	20.5%
Supply Chain	Industry and Carrier Associations	34	4	8.8%
Supply Chain	Goods-producing organizations and companies	38	0	0.0%
Supply Chain	Services	46	2	6.5%
Others	Academic	17	1	5.9%
Others	Consultants	3	1	33.3%
Total, all respondents		243	33	13.4%

*   Includes all 13 Provincial / Territorial MoTs, plus Ontario Ministries of Food and Agriculture and Municipal Affairs and Housing.

Overall, 33 responses were received, for a response rate of 13.4%. Although the absolute number is small, the results do provide a broad geographic range; they cover cities of various sizes; and they include an airport authority, an economic development agency and two multi-agency freight councils. Most member agencies of the Project Steering Committee also responded.

2.3   Applications and Data Needs

In Section 1, most respondents indicated that they considered several types of issues in their planning function or business decisions. As shown in **Exhibit 1**, the most dominant of these

were environmental issues (33 responses); followed by policies (29), capacity enhancement, system preservation and operations (all at 28 responses), and safety (25).[2] The key points to note are the multiplicity of issues, and that applications go beyond what is traditionally considered as planning applications (e.g., operations and safety). In other words, the applications are pervasive in many organizations.

Exhibit 1. Freight Planning Issues
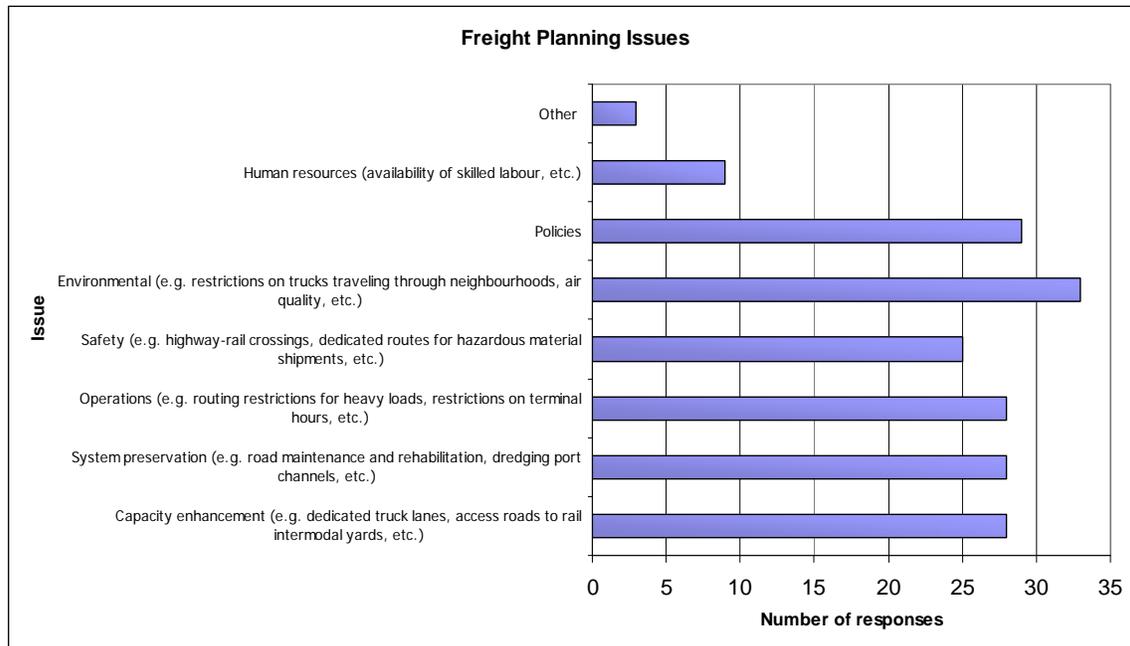
Exhibit 2 describes how freight data are used to address the aforementioned freight planning issues. As with the issues, respondents cited a wide variety of uses. The most frequent application was responding to community, public or political concerns and questions (29 responses); developing profiles and trends analysis of current conditions, traffic operations analysis, and facility / access design (all at 25 responses); modelling and forecasting freight demand (22); environmental assessments, air quality or Climate Change (21); and cost-benefit or financial analysis, and investment decision-making (both at 18 responses). Two respondents indicated that they did not have access to any data. Key points to note are that the applications were broad, as were the issues; non-planning issues such as operations, safety and finances/economics were important; and, a good number of respondents were modelling and forecasting freight demand.

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[2]   Note that some of the "Other" responses for this discussion, Exhibit 1 and Exhibit 2 have been re-categorized to more appropriate categories (e.g., two respondents included greenhouse gas [GHG] analysis under "Other," so these responses were grouped under "Environmental" [see Exhibit 1]). Appendix A tabulates the actual responses as submitted.

Exhibit 2. Uses of Freight Data
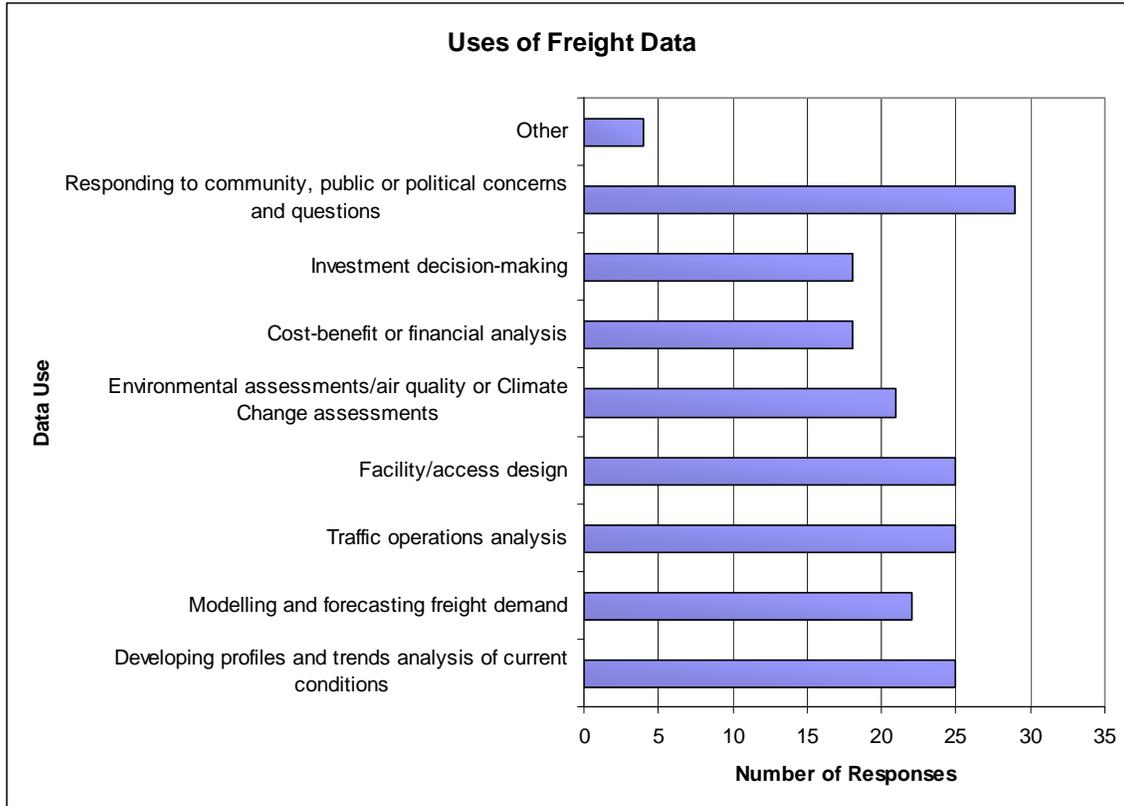
2.4   In-House Data Collection Programs

2.4.1   In-House Surveys

In Section 2, respondents were asked about the types of data collection programs that they conducted in-house or fund. Just under half (16) of the respondents collected any type of data. As **Exhibit 3** indicates, of these the majority conducted roadside / intercept surveys (12 respondents) and half conducted personal interviews (i.e., telephone or face-to-face interviews; 8 respondents). These two survey types are discussed in further detail below, along with the combined telephone / mailback surveys (which generated important comments): the complete results for all surveys are provided in **Appendix A**. Note that the Appendix, as well as some of the material cited in this chapter, contains free translations of the original French text.

Exhibit 3. Types of Surveys Conducted by Respondents
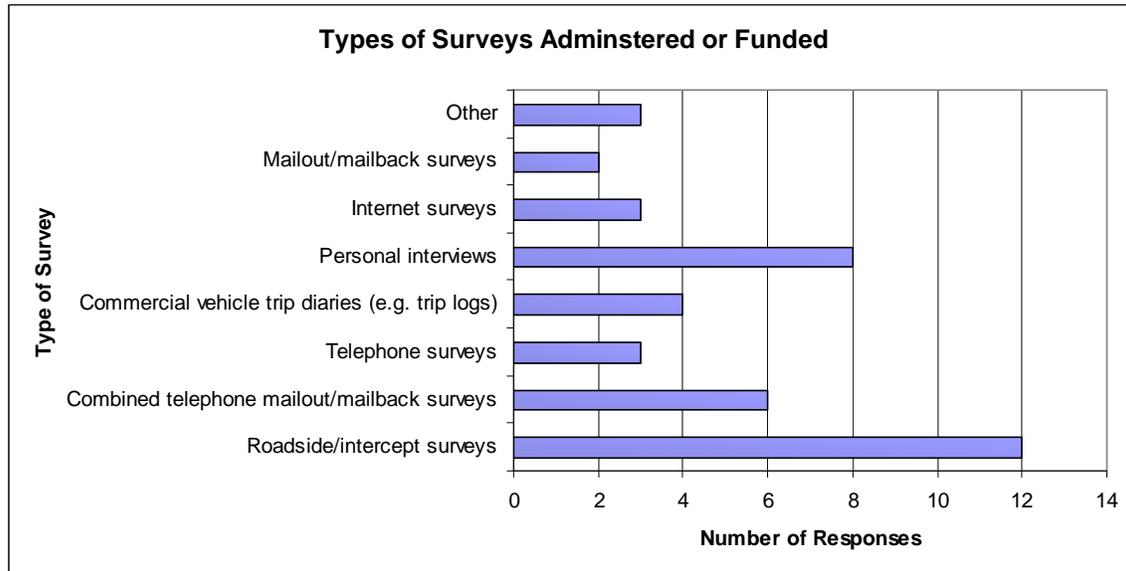
The **roadside / intercept surveys** had several key attributes, as follows (again, the complete responses can be found in **Appendix A**):

- Most of the roadside / intercept surveys are conducted infrequently or as 'one-time' surveys, or they have no fixed schedule of frequency. The National Roadside Survey (NRS) and Ontario's Commercial Vehicle Survey (CVS) are perceived to have a strong value; however, neither survey is programmed.
- The numbers of responses generally appear reasonable and robust – for example, the most recent CVS captured 100,000 records, representing about 14% of the trucks counted on the highways. An external cordon survey around an urban area achieved a sample of 98% of all trucks counted.
- Once the vehicle has been stopped, generally drivers are cooperative, although one respondent noted that drivers are reluctant to divulge some information in the post- 9/11 environment).
- Finding a good place to stop is difficult, as it depends on topography, alignment, etc.; and – in one case – only remote locations could be found.
- The NRS and CVS are considered to be comprehensive and very rich. However, they also are perceived (by the survey sponsors) as being costly and intrusive.
- Cordon surveys conducted around one city provided comprehensive information, except for cost (value) data and information regarding dangerous goods movement.

Respondents described experiences for four **telephone / mailback surveys**. Three of the surveys (Peel, Edmonton and Calgary) represent recent urban establishment surveys, in which the activities and trips made by establishments of all types are sampled. The fourth survey, Ottawa-Gatineau, represents an older type of survey, in which the sampling base was the region's vehicle population. Vehicle and driver surveys generally now are conducted in

the context of an establishment survey (i.e., the sampling frame is the list of establishments, not the vehicle population). Key points to note are the following:

- For the establishment surveys, the key challenges are recruitment: getting the right people to respond, ensuring a careful sample design, and maintaining data privacy.
- Some respondents to establishment surveys require help to complete the survey. That is, they are not always self-sufficient.
- The results for fleet allocators (that is, transportation and warehouse/distribution establishments that are in the business of moving goods) were not very good, and this may require a better design in order to be addressed. All other types of establishments (that is, establishments for all other economic activities) provided good-quality responses.
- Standardized reporting and the provision of fewer options that respondents can use to describe their activities may improve the results. (For example, the terms used to describe the attributes of the cargo can take many forms.)
- It was noted that it was difficult for respondents to put a monetary value on service vehicle activity, which also was surveyed along with that of goods vehicles.
- The Peel survey included a parallel GPS component, in order to verify the accuracy of the paper-based information provided by respondents.

Finally, **personal interview surveys** are noteworthy for two reasons: they were the second-most cited type of surveys; and, they often include qualitative information (i.e., there is a role for qualitative as well as quantitative information in planning). At the same time, however, key points to note are that there is no common format for these surveys; nor is there an established frequency. Key points to note are the following:

- Respondents generally were cooperative, and were willing to help with pre-arranged interviews.
- One sponsor noted that the process was time consuming; however, it provided meaningful data and built stronger relationships with shippers. Another sponsor noted the receipt of similarly useful information, although this sponsor also detected a 'slight' influence on what respondents actually said (regarding the study issue) given current market conditions and possible downsizing.
- Interview surveys ranged between 10 and 100 participants (business establishments).
- The interview surveys generally were conducted on an as-needed basis.
- There did not appear to be any standardized format to the interviews.

Finally, insofar as the remaining survey types are concerned, as noted the complete set of responses is provided in **Appendix A**. Key points to note from these surveys are that – as with the three types cited above – there is no established frequency or common methods for any of the types. Moreover, the categorization of surveys was not always consistent among respondents.

2.4.2   In-House Traffic Counting Programs

Respondents also were asked to describe their traffic count programs. Seventeen of 30 respondents to this set of questions replied affirmatively. As illustrated in **Exhibit 4**, the most frequent type of count was vehicle classification counts (14 respondents), followed by unclassified vehicle counts (10 respondents).

Exhibit 5 describes the types of classification / categorization systems used for these counts. Several points are important to note:
- There is no single standardized classification system.
- The most commonly used system is an American system; that is, the Highway Performance Monitoring System.
- Emphasizing the first bullet point, the classification system appears to depend on the particular needs of the respondent's organization, as evidenced by **Table 2**, which allowed respondents to comment if they chose "other US standard," "Canadian standard," or "standard unique to the organization." The table indicates a range in responses in classification sources and types.

Respondents also were asked to describe the methods they use to conduct traffic counts. As shown in **Exhibit 6**, tube counts were most commonly used (14 responses), followed by electronic sensors (13), manual vehicle recorders (11) and automatic vehicle recorders (9). Video counts (6 responses) were less commonly used.

Exhibit 4. Types of Data Collected

Types of Data Collected in Traffic Counts
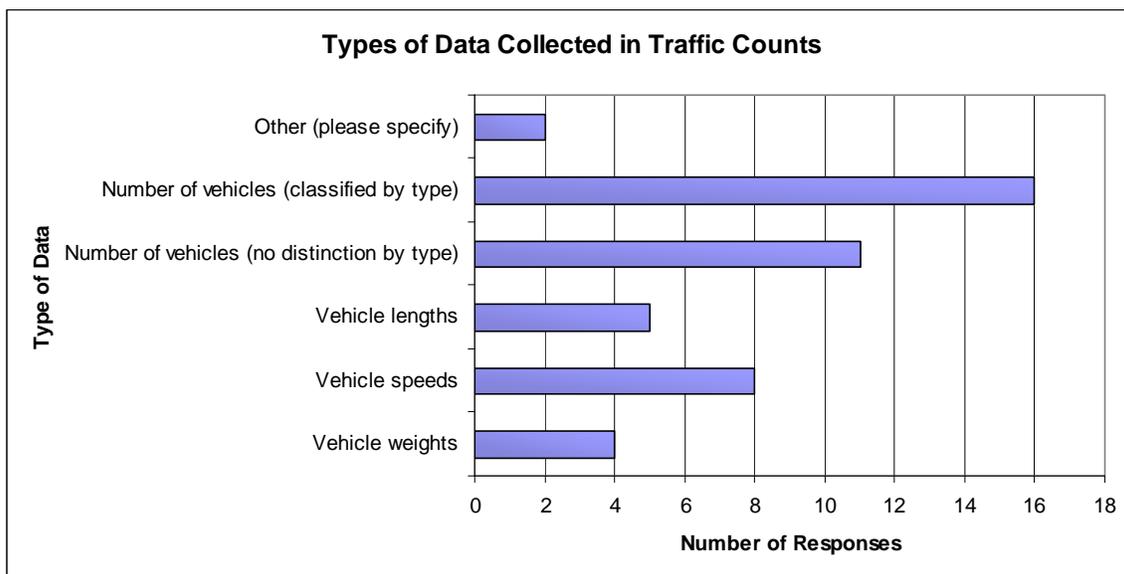
Exhibit 5. Classification / Categorization Systems

Classification / Categorization Systems for Data Collected in Traffic Counts
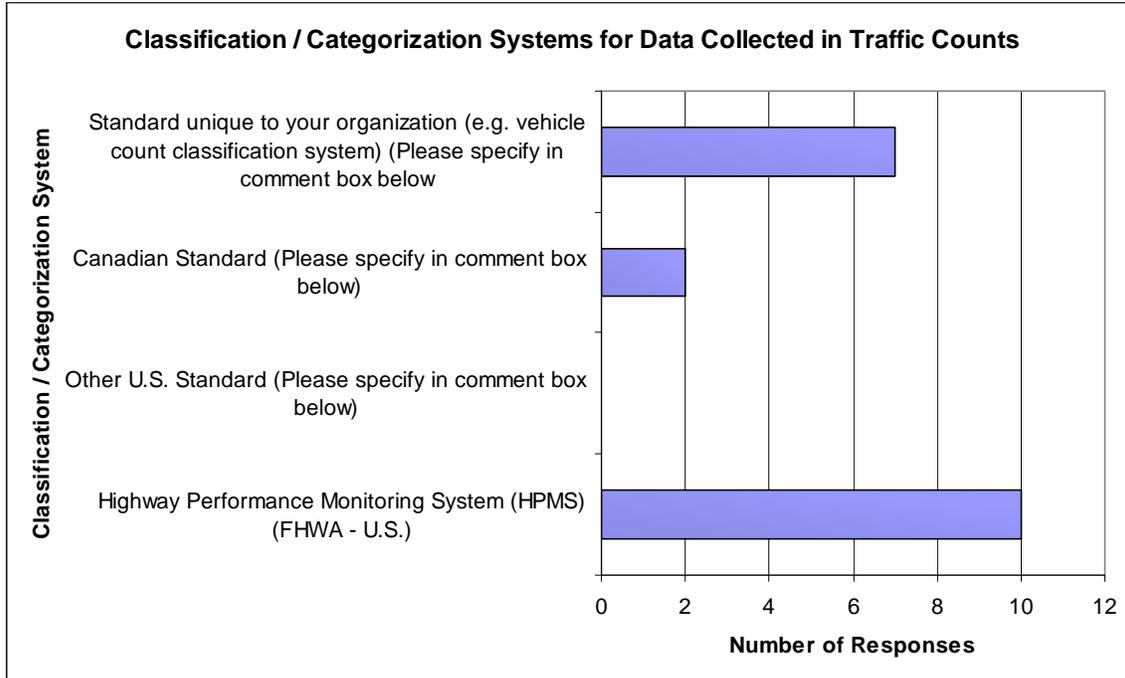
Table 2. Comments Related to Use of Non-HPMS Classification Standards

[Regional] Cordon Count vehicle classification list
Heavy truck (3+ axles), light truck (2 axles with dual rear wheels)
assorted [standards are used] which is also an issue; too many variations and sources to list
not sure...typically try and distinguish vans and smaller commercial vehicles from multiple axle trucks and buses
Trucks are classified into two types: light trucks and heavy trucks.
Car (with occupants), Motorcycle (with occupants), Buses (with occupants), Pedestrians, Bicycles, Semi - multiple trailers, Semi - single trailer, Truck - dual axle rear, Truck - single axle rear, Semi – no trailer, car/pickup/van with trailer
The classification categories depend on the type of equipment and on the particular need for the count.

Exhibit 6. Methods Used to Conduct Traffic Counts
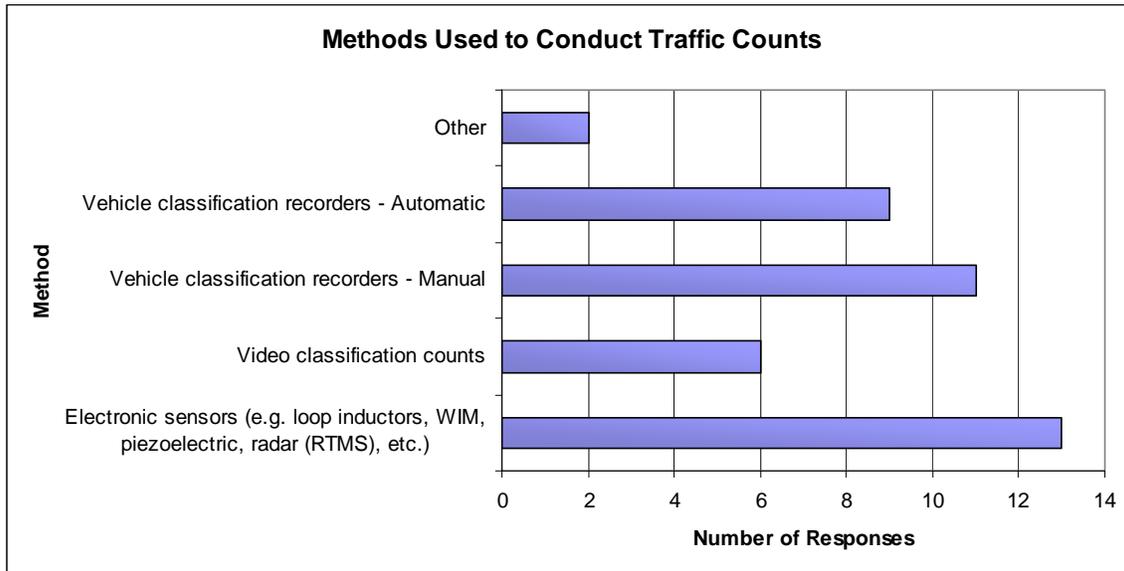
Of particular interest, only 9 of 33 respondents indicated that they used ITS (Intelligent Transportation Systems) technologies to collect freight data. The potential use of ITS to reduce data collection costs, improve data quality and reduce intrusion and respondent burden has attracted considerable attention in the freight planning community.

Of the respondents who used ITS technologies, **Exhibit 7** shows sensors at 5 responses and global positioning systems (GPS) at 4 responses were the most commonly used technologies. Only 9 of the possible 16 technologies were used.

2.5 <u>Use of Existing Data Sets</u>

Section 3 of the survey asked respondents to review a list of 40 public and commercial (private) Canadian and American data sets that covered the major freight modes (truck, rail, marine and air). The purpose was to determine which of these existing sources, external to the respondents' organizations, were used; that is, as a possible alternative to in-house data collection. Respondents also were asked to assess the data sets that they used.

First, it is important to note that of 31 respondents to this question, only 11 actually used these external data sets to "populate [their] freight databases." Second, only 18 of the 40 data sets were used (19 of 41, including the "other" category). The most frequent uses were of Border Crossing Data (US Bureau of Transportation Statistics, 6 responses) and the US Commodity Flow Survey (6 responses); followed by the CVS (4 responses) and Statistics Canada's International Trade Flow data (4 responses). Two of these data sets (if not also the CVS) focus on cross-border freight movements: this suggests an important need for that type of information.

Exhibit 7. ITS Technologies Used to Collect Freight Data

Types of ITS Technologies Used

Chart: Horizontal bar chart. X-axis: Number of Responses (0 to 6). Y-axis: Type of ITS Technology.

Type of ITS Technology	Number of Responses
Other	0
Smart cards	0
Radio frequency identification	0
Automatic vehicle location (AVL) system	1
Electronic toll collection equipment	0
Automated vehicle classification (AVC)	0
Cellular phone coordinates (probe vehicles)	1
Advanced video image processing	0
License plate matching systems	0
Aerial videos	1
Global position system (GPS) equipment	4
Closed circuit cameras (CCTV)	2
Vehicle tracking and navigation systems (VT&NS)	1
Environmental sensor stations	0
Automated vehicle identification (AVI) technologies	1
Sensors (i.e. loop detectors, acoustic sensors, infrared sensors, and radar/microwave sensors)	5
Weigh-in-motion (WIM) technologies	3

The next four tables describe how the users perceive these data:

- **Table 3** rates the quality of the available data. Most data sets (26) were rated as 'adequate,' with 10 rated data as 'poor,' 1 data set as 'very poor,' 8 data sets as 'good,' and 3 as 'very good.'

- **Table 4** describes the perceived shortcomings of the data. The most commonly cited shortcoming was the lack of detail in the data; and this was common to several data sets. Other shortcomings included lack of origin and destination information, timeliness in the availability of the data, incomplete geographic coverage and inappropriate or incomplete depiction of the actual trip from beginning to end.

- **Table 5** describes the perceived importance of the data to planning. Of the 51 responses, there were 10 rankings of 'critical,' 34 citations of 'important,' and 6 responses of 'not used for planning.' Of the critical data sets, roadside surveys were cited 5 times (3 times for the CVS and twice for the NRS) and three cross-border data sets each were cited once (i.e., 3 times in total; note that two sets of U.S. border crossing data also were cited as important a total of 7 times) – i.e., the roadside surveys and cross-border data were the most critical data for planning. However, although not 'critical,' commodity flow data were cited as important, with 4 citations for the U.S. Commodity Flow Survey, 3 for Statistics Canada's international trade flow data and 2 for the U.S. Freight Analysis Framework.

- **Table 6** describes the purposes for which the data were used. A range of purposes was cited, including modelling and forecasting, infrastructure studies and border studies. However, there were several citations for general statistics and trends, with some respondents commenting that analyses only at this level were possible (i.e., since the data were not sufficiently detailed to allow any further analysis).

Table 3. Quality of Available Data

Data set	How would you rate the quality of the available data?				
	Very poor	Poor	Adequate	Good	Very good
Air Charter Statistics (Statistics Canada)	0	1	0	0	0
Air Passenger Origin and Destination - Domestic Journeys/Canada-U.S. (Statistics Canada)	0	0	1	0	0
Border Crossing Data - Bureau of Transportation Statistics	0	2	2	2	0
Canadian Vehicle Survey (Statistics Canada)	0	1	1	0	0
Commercial Vehicle Survey (Ministry of Transportation of Ontario)	0	0	2	1	1
Commodity Flow Survey (CFS) - U.S. Bureau of Transportation Statistics and the Census Bureau	0	2	3	0	0
Cross-Rail Transportation (Statistics Canada)	0	0	1	0	0
For-Hire Trucking Survey (Statistics Canada)	0	0	2	0	0
Freight Analysis Framework (FAF) - U.S. Department of Transportation	0	0	2	0	0
Freight Commodity Statistics - Association of American Railroads	0	0	0	1	0
International Trade Flow Data (Statistics Canada)	1	1	1	1	0
Marine International Freight Origin and Destination Survey (Statistics Canada)	0	1	0	0	1
National Roadside Survey / Commercial Vehicle Surveys	0	0	1	1	0
Quarterly Motor Carriers of Freight Survey (Statistics Canada)	0	0	1	0	0
Rail Commodity Origin and Destination Statistics (Statistics Canada)	0	1	1	0	0
Railway Carloadings Survey - Monthly (Statistics Canada)	0	0	1	0	0
Railway Transport Survey - Annual (Statistics Canada)	0	0	2	0	0
Shipping in Canada Report (Statistics Canada)	0	0	2	0	0
Transborder Surface Freight Data - U.S. Bureau of Transportation Statistics	0	1	1	1	0
Others	0	0	2	1	1
Total	1	10	26	8	3

Table 4. Shortcomings of Available Data

Data set	What shortcomings/limitations have you encountered with these data?			
	Comment 1	**Comment 2**	**Comment 3**	**Comment 4**
Air Charter Statistics (Statistics Canada)	origin of products, specific products in more specific classifications			
Air Passenger Origin and Destination - Domestic Journeys/Canada-U.S. (Statistics Canada)	fine for general trend data			
Border Crossing Data - Bureau of Transportation Statistics	relevant detail	It is fairly too high-level and can be out of date	good for general information	
Canadian Vehicle Survey (Statistics Canada)	Relevant detail			
Commercial Vehicle Survey (Ministry of Transportation of Ontario)	Needs more quality control. Data need to be turned around sooner (3 - 4 years after survey not relevant in fast paced areas such as GTA / GGH	For 2001 implementation the OD codes are often not very precise. No urban focus.	Not easily available	
Commodity Flow Survey (CFS) - U.S. Bureau of Transportation Statistics and the Census Bureau	Include a lot of assumptions that are not totally understood by user	relevant detail	High level and can be out of date.	also good general trend data
Cross-Rail Transportation (Statistics Canada)	General data			
For-Hire Trucking Survey (Statistics Canada)	I recall a major issue was the lack of OD information.	Only covers a part of the universe of transporters. Does not permit [the ability] to infer information for transporters that are not included.		
Freight Analysis Framework (FAF) - U.S. Department of Transportation	Data are from diverse sources, with many limitations.			
Freight Commodity Statistics - Association of American Railroads				

Table 4. Shortcomings of Available Data

Data set	What shortcomings/limitations have you encountered with these data?			
	Comment 1	**Comment 2**	**Comment 3**	**Comment 4**
International Trade Flow Data (Statistics Canada)	Not enough detail for Regional areas	Not much detail.	it isn't useful in identifying what types of commodities are being transported, helps to have the origin and destinations	Problem of the "province of clearance" for imports, rather than the [actual] province of destination. Inadequate representation of multi-modal chains. Very doubtful geographic refinement.
National Roadside Survey / Commercial Vehicle Surveys	No urban data, poor coding of origins/destinations	Coverage problems, especially in urban centres. Problems of statistical reliability and of synchronization with classified counts.		
Quarterly Motor Carriers of Freight Survey (Statistics Canada)	Not sure, I haven't used the detailed data.			
Rail Commodity Origin and Destination Statistics (Statistics Canada)	Very general	Data confidentiality masks much of the detail of goods categories. Also missing are activities of secondary rail lines (short lines).		
Railway Carloadings Survey - Monthly (Statistics Canada)	too general with respect to products commodities			
Railway Transport Survey - Annual (Statistics Canada)	general data			
Shipping in Canada Report (Statistics Canada)				
Transborder Surface Freight Data - U.S. Bureau of Transportation Statistics	It would be useful to be able to go down a level of detail in order to understand which types of good are transported across the border			
Others	Not much behavioural or firm information	Irregular intervals, timely responses to our requests, lack of current data, construction impacts (detours).	The data are largely a subjective opinion, but suit our immediate needs.	

Table 5. Importance of Available Data to Planning

Data set	How important are the data to planning?			
	Responses	Critical	Important	Not used for planning
Air Carrier Operations in Canada Quarterly Survey (Statistics Canada)	0	0	0	0
Air Charter Statistics (Statistics Canada)	1	0	1	0
Air Passenger Origin and Destination - Domestic Journeys/Canada-U.S. (Statistics Canada)	1	0	1	0
Aircraft Movement Statistics (Statistics Canada)	0	0	0	0
Airport Activity Statistics of Certificated Route Air Carriers - Bureau of Transportation Statistics	0	0	0	0
Border Crossing Data - Bureau of Transportation Statistics	6	1	5	0
Canadian Vehicle Survey (Statistics Canada)	2	0	2	0
Coastwise Shipping Survey (Statistics Canada)	0	0	0	0
Commercial Vehicle Survey (Ministry of Transportation of Ontario)	4	3	1	0
Commodity Flow Survey (CFS) - U.S. Bureau of Transportation Statistics and the Census Bureau	6	0	4	2
Coupon Passenger Origin-Destination Report (Statistics Canada)	0	0	0	0
Cross-Rail Transportation (Statistics Canada)	0	0	0	1
For-Hire Trucking Survey (Statistics Canada)	3	0	2	0
Freight Analysis Framework (FAF) - U.S. Department of Transportation	3	0	2	1
Freight Commodity Statistics - Association of American Railroads	1	0	1	0
IANA Report - Intermodal Association of North America	0	0	0	0
International Trade Flow Data (Statistics Canada)	4	1	3	0
LECG Marine Industry Benefits Study	0	0	0	0
LTL Commodity and Market Flow Database - American Trucking Association	0	0	0	0
MARAD - U.S. Department of Transportation Maritime Administration	0	0	0	0
Marine International Freight Origin and Destination Survey (Statistics Canada)	2	0	2	0
Maritime Administration Office of Statistical and Economic Analysis	0	0	0	0
National Roadside Survey / Commercial	2	2	0	0

Table 5. Importance of Available Data to Planning

Data set	How important are the data to planning?			
	Responses	**Critical**	**Important**	**Not used for planning**
Vehicle Surveys				
North American Trucking Survey (NATS) - Association of American Railroads	0	0	0	0
Port/Import/Export Reporting Service (PIERS) - Journal of Commerce	0	0	0	0
Quarterly Motor Carriers of Freight Survey (Statistics Canada)	1	0	1	0
Rail Commodity Origin and Destination Statistics (Statistics Canada)	2	0	2	0
Rail Waybill Sample - Surface Transportation Board	0	0	0	0
Railway Carloadings Survey - Monthly (Statistics Canada)	2	0	0	2
Railway Transport Survey - Annual (Statistics Canada)	2	0	1	0
RAILINC (American Association of Railroads)	0	0	0	0
St. Lawrence Seaway Traffic Report	0	0	0	0
Shipping in Canada Report (Statistics Canada)	2	0	2	0
State Estimates of Truck Traffic - Federal Highway Administration	0	0	0	0
Survey of the Couriers and Local Messengers Industry (Statistics Canada)	0	0	0	0
Transborder Surface Freight Data - U.S. Bureau of Transportation Statistics	3	1	2	0
Transportation Annual Survey - U.S. Census Bureau	0	0	0	0
TRANSEARCH - Insight Database	0	0	0	0
TranStats: The Intermodal Transportation Database - Bureau of Transportation Statistics	0	0	0	0
Vehicle Inventory and Use Survey (VIUS) - U.S. Census Bureau (Discontinued as of 2002)	0	0	0	0
Waterborne Commerce of the United States (US Army Corps of Engineers)	0	0	0	0
Others	4	2	2	0
Total	51	10	34	6

Table 6. Purposes for Which Available Data are Used

Data set	For what purposes do you use these data?				
	Comment 1	**Comment 2**	**Comment 3**	**Comment 4**	**Comment 5**
Air Charter Statistics (Statistics Canada)	developing business cases for increased cargo service to specific destinations				
Air Passenger Origin and Destination - Domestic Journeys/Canada-U.S. (Statistics Canada)	forecasting				
Border Crossing Data - Bureau of Transportation Statistics	Border crossing studies - plaza processing and bridge operations MTO provincial corridor EA studies	Developing investment attraction and retention proposals	forecasting		
Canadian Vehicle Survey (Statistics Canada)	For investment and retention proposals	infrastructure planning			
Commercial Vehicle Survey (Ministry of Transportation of Ontario)	Border crossing studies, [provincial] Corridor Planning / Environmental Assessment Studies, Regional Goods Movement Studies	Modelling of intercity flows	provides data for policy development and investment attraction proposals		
Commodity Flow Survey (CFS) - U.S. Bureau of Transportation Statistics and the Census Bureau	Benchmark alternate analysis techniques	infrastructure investment	Use it to identify first which type of industry is shipping where, in order to identify specific companies that are shipping where we want to position our equipment.	These types of US data only provide us with general indications.	trends and general analysis
Cross-Rail Transportation (Statistics Canada)					

Table 6. Purposes for Which Available Data are Used

Data set	For what purposes do you use these data?				
	Comment 1	**Comment 2**	**Comment 3**	**Comment 4**	**Comment 5**
For-Hire Trucking Survey (Statistics Canada)	Mainly to gather a few statistics, and general trucking trends	Understanding of long-distance flows.			
Freight Analysis Framework (FAF) - U.S. Department of Transportation	Understanding of cross-border flows.				
Freight Commodity Statistics - Association of American Railroads	investment attraction proposals and policy development				
International Trade Flow Data (Statistics Canada)	Required for infrastructure business cases and presenting needs / justification for Environmental Assessment studies	Mainly for general statistics	To help in identifying potential markets and industries	Understanding of international commerce, by corridor and by mode.	
Marine International Freight Origin and Destination Survey (Statistics Canada)	In consideration of alternative modes	Understanding of the evolution of [province's] port activities, and of marine flows between [province's] ports and [province's] economic partners.			
National Roadside Survey / Commercial Vehicle Surveys	Modelling, especially inter-city	Understanding of trucking flows between the regions of [province] and economic partners outside [province]. Corridor analysis. Evaluation of highway projects. Evaluation of modal transfer (for sustainable transportation). Etc.			

Table 6. Purposes for Which Available Data are Used

Data set	For what purposes do you use these data?				
	Comment 1	Comment 2	Comment 3	Comment 4	Comment 5
Quarterly Motor Carriers of Freight Survey (Statistics Canada)	General published statistics				
Rail Commodity Origin and Destination Statistics (Statistics Canada)	Alternative mode analysis for Environmental Assessment studies	Corridor studies.			
Railway Carloadings Survey - Monthly (Statistics Canada)					
Railway Transport Survey - Annual (Statistics Canada)	Investment attraction and policy	infrastructure planning			
Shipping in Canada Report (Statistics Canada)					
Transborder Surface Freight Data - U.S. Bureau of Transportation Statistics	Border crossing studies	Helps in identifying markets to target along with industries/ customers			
Others	research	Primarily for study and planning purposes; model development, truck route development, congestion cost analysis	Bridge and road design, and network planning.		

2.6   Freight Data Requirements

Section 4 of the survey asked respondents to describe the type of data they use or, if not available, need. **Table 7** indicates, for all data that are used or are needed, that the 'needs' exceed the 'use,' in many cases significantly – notably, cargo detail, cross-border data and terminal and inter-modal data and, to some extent, origin-destination detail. At the same time, it is informative to note that several respondents neither used nor needed many types of data, including cargo detail, cross-border data and terminal and inter-modal data.

Table 8 indicates that although highway / truck planning dominates in respondents' planning activities (at 28 responses), other modes – rail (15), marine (10) and air (9) – also figure in planning activities. However, the results suggest a disconnect between the non-highway/truck needs and in-house data collection activities (**Section 2.4**) and use of existing data sets (**Section 2.5**), which focus strongly on highway/truck modes.

Table 7. Freight Data Used or Needed

Freight Data Requirement	Currently use	Need, but not available	N/A
Commodity Detail (i.e. formal Classification system, etc.)	8	10	8
Cargo Detail (i.e. aggregate categories, hazardous and non-hazardous cargo, empty vs. non-empty, etc.)	4	12	11
Origin/Destination Detail (i.e. provinces/states, postal codes/zip codes, municipalities/counties, shipper detail, Traffic Analysis Zone (TAZ), customs port of exit/entry, etc.)	9	14	4
Shipment Detail (i.e. weight, volume, value, mode of transport, average length of haul, number of stops per trip, time-sensitive shipment, truckload or less-than-truck load shipments, empty shipments, etc.)	7	10	9
Routing Detail (i.e. major routes used, number of stops, interim trip origin and destinations, vehicle routing, Hazardous Materials (HAZMAT) vehicle routing, etc.)	10	12	5
Cross Border Data (i.e. O/D patterns, commodity, vehicle type, shipment characteristics, mode, stop/delay data, etc.)	2	12	13
Terminal and Intermodal Transfer Facilities (truck Volumes entering/exiting, congestion related delays on access roads, length of queue on access roads, incident rates on access roads, travel time contours around the facility, capacity of facility, etc.)	4	14	9

Table 8. Modes Considered in Planning

Mode	Responses
Highways/trucks	28
Rail	15
Air	9
Water (marine port, barge, short sea shipping)	10
Other (pipeline)	1

The next four tables describe the data needs for each mode in turn.

- **Table 9** describes highway / truck data needs. Although count data largely were available (see **Section 2.4.2**), significant needs were expressed for the specifics of vehicle and trip activity; namely, vehicle and trip origin-destination patterns (15 responses each), cargo data (14), and vehicle emission data, travel times and travel time reliability data (13 responses each).

- **Table 10** summarizes the requirements for freight data. The 'needs' generally exceed the 'uses,' often significantly: origin-destination patterns and commodity type (10 responses each), shipment (cargo) information and routing (9 responses each) and travel time (8 responses) were the most common needs – in other words, the needs were similar to those for highway / truck data although much fewer data were actually used. On the other hand, cost information was relatively less important.

- **Table 11** lists the freight data requirements for air. As with rail, very few data were currently used. Commodity and shipment information (8 responses each) and origin-destination patterns (6 responses) were the most commonly-cited needs.

- **Table 12** lists the data requirements for marine freight. The characteristics are essentially similar as those for rail freight, with very few data currently being used and commodity (8 responses), shipment (7 responses), and origin-destination, routing and equipment type (6 responses each) being cited among the 'needs.'

Finally, respondents addressed intermodal data uses and needs. **Table 13** indicates that, by far, intermodal data for combinations of trucks and other modes were used or needed, with the truck/rail combination eliciting 21 responses. Respondents indicated the need for a wide range of data, including those that described the movement of intermodal commodities and shipments, routing, origins, destinations, costs, travel times and vehicle movements cited – i.e., there was a need for a full set of data that complement the data requirements cited above for the other modes.

Table 9. Highway / Truck Freight Data Use and Needs

Data Type	Currently use	Need, but not available	N/A
Vehicle type	22	3	2
Vehicle size	17	6	3
Average vehicle speed	10	7	7
Vehicle emission data	3	13	8
Traffic counts & classification data	21	4	2
Cargo type	5	14	7
Payload weight	6	8	10
Truck O/D patterns	9	15	2
Trip O/D patterns	8	15	2
Travel time	7	13	6
Travel time reliability	2	13	9
Number of truck stops for LTL shipments	3	7	14
Incident data	4	8	12
Line-haul costs	3	7	14
Drayage costs	2	6	15
Other	0	0	10

Table 10. Rail Freight Data Use and Needs

Data Type	Currently use	Need, but not available	N/A
O/D patterns	1	10	3
Commodity	1	10	3
Equipment details (e.g. car type)	0	5	9
Shipment (e.g. weight, volume, value)	0	9	5
Routing data	3	9	3
Travel time	2	8	4
Reliability	1	6	7
Stop/delay data	2	5	6
Ramp-to-ramp costs	1	4	8
Other	0	0	4

Table 11. Air Freight Data Use and Needs

Data Type	Currently use	Need, but not available	N/A
O/D patterns	0	6	1
Commodity	0	8	0
Shipment (weight, volume, value)	1	8	0
Routing data	2	3	3
Travel time	1	3	3
Reliability	1	3	3
Air Freightage	1	4	2
Drayage costs	0	4	2
Hazardous materials	0	4	3
Other	0	1	1

Table 12. Marine Freight Data Use and Needs

	Currently use	Need, but not available	N/A
O/D patterns	2	6	1
Commodity	2	8	0
Equipment details (e.g. vessel type)	1	6	2
Shipment (e.g. weight, volume, value)	2	7	0
Routing data	1	6	3
Travel time	1	7	2
Reliability	1	5	3
Port-to-port costs	1	5	2
Drayage costs	1	5	2
Hazardous materials	1	4	4
Other	0	0	2

Table 13. Intermodal Freight Data Uses and Needs

Intermodal Combination	Responses
Truck/rail	21
Truck/airport	14
Truck/marine port	12
Rail/marine port	9
Rail/airport	4
Other	0

2.7   <u>User Assessment of Data</u>

Section 6 of the survey asked respondents to assess their data, whether sourced in-house or from external public or commercial databases. Several open-ended questions addressed this issue. The main findings are presented below for each of several questions.

Respondents first were asked to **assess how well their freight data meet their needs**. Among a wide range of responses (which was typical of all the questions in Section 6), key points to note are the following:

▪ Most respondents indicated that the data generally were inadequate or insufficient, although a smaller number indicated their satisfaction with the data. Moreover, "the [available] information tends to be widely scattered and difficult to coalesce."

▪ The comments describe a lack of data in several respects, essentially amplifying the gaps identified in the previous section:

  • Origin-destination data (in particular), and data on the movement of both commodities and vehicles. "Urban goods movement data on vehicle movements, shipment flows, and origin and destination information are not typically available on a system-wide basis. This is a global problem."
  • Urban and inter-urban data.
  • More precise geographic detailing.
  • Data at a sufficient level of detail and precision to be used for such applications as GHG emissions analysis.

As one respondent noted, "the existing data sources are very deficient, incompatible and incomplete. It is impossible to have a reliable portrait of goods flows for each mode as well as for multi-modal chains. It is impossible to forecast flows in line with forecasts of economic interchanges among origin-destination regions. [The lack of] reliable available data

on costs and freight travel times [makes it] impossible to feed [intermodal] mode choice models for evaluating environmental policies."

Respondents then identified **improvements that were needed to address current deficiencies** and gaps. Key among these (in no particular order of importance) were:

- Origin-destination surveys and commodity flow surveys.
- Ability to access and share information among different governmental levels.
- Coordination of data collection.
- Resources to collect and compile data.
- More participation by organizations involved in the movement of goods [i.e., including the private sector].
- Use of GPS and other techniques to capture details.

One respondent noted that regional government "should pursue acquisition of additional needed freight data, which are a critical aspect of the goods movement corridor analysis and assessment process. More robust and current data will allow [region] to analyze system performance and needs in more detail and evaluate the feasibility of various implementation strategies. The [region] should initiate investigations to expand traffic classification counts at intersections and cordons where there is high density of commercial traffic, and start to build trend information so that such traffic can be correlated with other growth indicators in the [region]. In addition, there is a critical need for information on shipments and vehicle trip types and purposes that would require extensive investment in survey instruments. This is an issue that cannot adequately be addressed by any one municipality or region in the [metropolitan area]; rather, it needs to be addressed at a larger systemic level. Options for joint data initiatives with the provincial and federal governments need to be explored. For its part, the [region] could take an active role in advancing priority of this area and promoting inter-governmental collaboration through promotion of its initiatives and communicating data needs in local, [regional], provincial and federal settings."

The key **priorities for new or improved data** were:
- Data that could help to identify 'quick wins' for freight, which in turn would spur further data collection [and learning from one process would inform the next].
- Highway (truck) freight data [i.e., as opposed to other modes].
- More detail of existing data collection activities.
- Updates to existing data.
- Intermodal data.
- Greenhouse gas emissions data.
- Urban goods movement data.
- [Truck] routing and itineraries.
- Greater understanding by senior levels of government of the importance of goods movement [and data].

Respondents identified several **benefits of having improved and new data**. Key among these benefits were:

- Improved planning, priority-setting, and investment decision-making. One respondent cited several benefits: "Improve transportation system planning; be able to examine scenarios such as diverting goods from trucks to rail. Be able to evaluate the effects of good movement on the existing network and implications of changes of the network." Another saw "[the development of] new approaches to moving goods and services [which] is seen as an important aspect of managing [city's] transportation system. There has been a historic shift in moving goods from rail to road - this combined with the economic growth of [metropolitan region]."
- Ability to meet mandated greenhouse gas emission targets.
- Identifying quick wins.
- Improved ability to use technology to collect data and to access electronic data.
- Improved planning for hazardous goods movement.
- Nationwide commodity flow survey that could be used as the base for provincial or regional detailing. "A Commodity Flow Survey would permit [the development of] a realistic analytical model and forecasts of integrated, multi-modal goods movement. Depending upon the investment provided by each level of government, the geographic precision of the model could be augmented."

Key **factors for success** included:

- Quality in survey design and administration.
- [Adequate] funding.
- Partnerships with the private sector and with senior levels of government.
- Willingness of data owners to share the data.
- Staff who understand goods movement.
- "Historical knowledge, dependable and lasting relationships, improved awareness of the importance of freight, large data collection budgets."

Respondents identified several **plans to expand, enhance or change their data collection and storage methods**, notably:

- Building consensus among stakeholders [to move forward on data and other activities].
- Extension of existing marine data applications to other freight modes.
- Work with data providers to obtain micro-level data.
- Proposed urban goods movement study.
- Harmonization of data.
- Addition of staff resources.

Respondents identified **other data needs**:

- Employment, land use and economic data.
- Truck usage by lane (i.e., lane splits).
- Freight OD surveys at ports of entry to Canada.
- Fleet allocator surveys.

Respondents also described **problems with existing surveys**. Key among these were:

- Incomplete information for all types of trucks.
- Urban goods movement data.
- Coordination of data collection activities.
- Inconsistent definitions.
- Incompatible datasets.
- Data unavailable or difficult to access, or sources unknown.
- Timeliness of data availability.
- Limited existing data and counts.
- Improved information on shipments, including their value, temporal variation, movement by modes other than trucks, intra- and inter-regional flows.
- Data reliability.

The needs are complex and multi-faceted, as exemplified by one respondent who specified several specific needs:

- "Better information on all commodities shipped, including [commodity] type and the dollar value [of the commodities shipped].
- "Better details of shipments by modes other than truck.
- "Better information on "non-business" organizations i.e. public sector organization movements [as workplaces but also which may include services such as waste removal].
- "Better understanding of variation in movements by day of week / time of year.
- "Our survey captured shipments by businesses in the [region]; did not capture External - External / external - Internal movements. We got these via the External cordon survey; but this was limited to 1 day 8 till 4PM, so need better info on this aspect, again including variation through the year!"

Respondents also cited **problems in the responses to their existing surveys**:

- Proprietary impediments to releasing data.
- Number of potential respondents.
- Lengthy surveys.
- Assistance needed to complete survey forms.
- Reliability and honesty in responses.
- Lack of clarity of survey forms.

One respondent noted both gaps in existing data and in how these data are linked with traffic counts: "Concerning the 2006-07 NRS that was conducted with Transport Canada, [one] must evaluate response problems, notably on certain variables that drivers could not answer. The principal gap is the systematic linkage with complete classification counts, which must be conducted at the same time as the interviews."

Respondents noted two types of **technical and content problems and limitations** in existing surveys:

- Confidentiality, which is an impediment to getting private establishments to participate. "Confidentiality is an omnipresent problem with data provided by private operators and transporters, who have little time to devote to surveys or data collection. Federal agencies have [a significant amount of] precise information (rail, marine, air) but they cannot release them to the provinces. Customs data on trade are not reliable, neither geographically nor in terms of tonnage."
- Language [i.e., ensuring that the surveys are available in the appropriate language, which may not be English or French].

In order to address the **impacts of legal and confidentiality on respondents' surveys**, several respondents noted that their data are protected by Freedom of Information laws, and that this was indicated to the survey participants. One respondent noted the existence of data sharing agreements for external data.

Finally, respondents were asked if they were interested in participating in a potential nation-wide TAC program to coordinate the collection of urban goods movement data. Not all respondents indicated this willingness; however, contribution of data inventory lists, contribution of the actual data and development of common standards were most commonly cited. Some respondents were willing to contribute funds.

Exhibit 8 describes the costs that respondents devoted to freight data collection. Essentially, costs were not available or not applicable; or data collection costs were relatively small (less than $250,000) or relatively large (greater than $750,000). However, it is important to note that these costs were generalized and, as can be seen from **Table 14**, these costs covered a wide range of data collection activities. Accordingly, they must be used with caution. Moreover, it is important to note that these responses cannot necessarily be considered as statistically representative of the entire community: they reflect only the responses. Finally, it also should be noted that the more expensive data collection activities incorporated recent or planned establishment-based surveys.

Exhibit 8. Freight Data Collection Costs
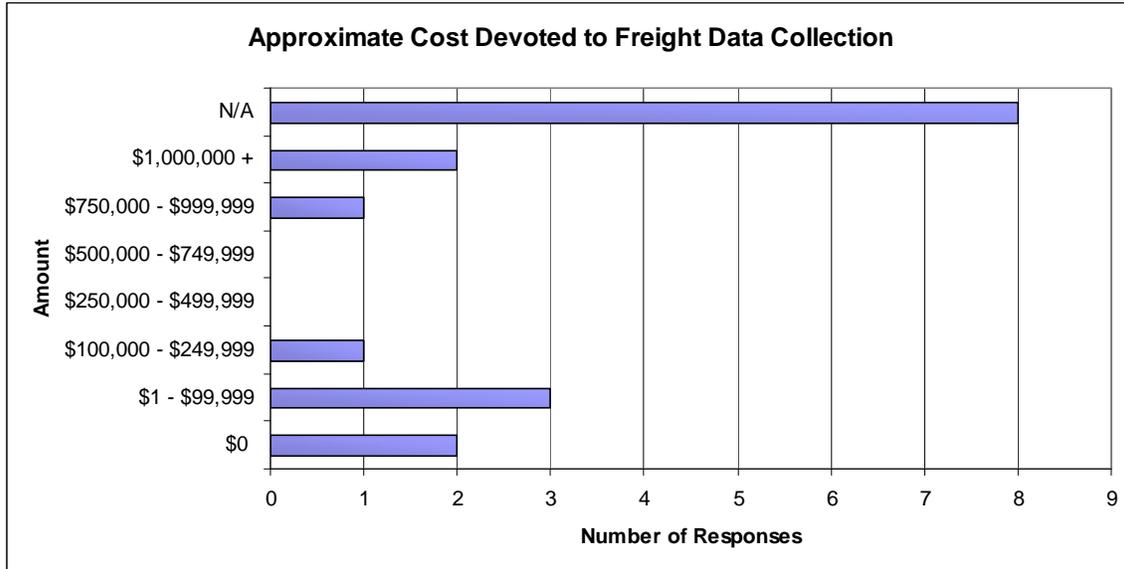
Table 14. Freight Data Collection Costs

$0
$5,000 to $20,000 per year direct cost $30,000 in kind cost(staff time)
$10,000.00 per year (consultant and equipments related inclusive)
$1 million per year Distributed as:20% consultant fees, 2% data purchase, 1% purchase equip., 70% services, 7% staff resources
N/A
none specifically
Not Available.
Currently, the truck volumes data are collected as part of annual count program, so no dedicated funding is needed to truck volume data collection. A goods movement study has been proposed for this region.
Internal - negligible External - $20k/yr
The Data Division's budget is on the order of $1.3 million annually but the information gathered isn't only for freight data collection. It would be difficult to separate that out. This does not include the costs of doing the Commodity Flow Survey or the External Cordon Truck Survey.
This information is not available
$0
N/A
Impossible to determine. [Activities are] dispersed throughout the organization. [This] requires an exhaustive inventory, which would take several weeks to research.
$100,000 for consulting limited budget for freight data collection
N/A
Not available

2.8   Synopsis of Key Findings

A key finding of Phase 1 was that no one set of data can captures all the relevant characteristics of urban goods movement. The user needs survey corroborated this fundamental point, in that it identified several user needs, as described in the previous sections. The survey identified needs, current internal data collection efforts, usage of existing external public and commercial datasets, and an assessment of how well the internal and external data met users' needs. The key findings are summarized below.

- Primarily public sector interests responded to the survey. This is consistent with the planning nature of the survey (i.e., a perception that the survey did not apply to them), and possibly also such factors as the length of the survey and the desire by many private sectors interests to maintain confidentiality.
- The responses, although yielding important and rich information, were relatively few in number – a response rate of 13.4%. This may suggest that there is a relatively low incorporation of goods movement in the urban transportation planning process.
- Freight data are needed for operational and safety applications, in addition to more traditional planning applications such as modelling, network, corridor and facility planning, and environmental planning. At the same time, actual involvement in these activities varied among respondents.
- Several respondents conducted their own types of data collection and surveys. Traffic counts were most common, and counting activities tended to be conducted regularly. Surveys also were conducted, although less frequently. Of particular importance were the inter-urban roadside surveys conducted nationwide; however, these are not conducted to specific schedules or frequencies.
- Fewer than half the respondents used the many available multi-modal public or commercial datasets. Of 40 such datasets, fewer than half were actually used. Of these, the most common usage was to understand cross-border freight movements. However, these data were considered to be lacking in detail and in Canadian content.
- Respondents' needs focused on truck freight data. Other modes also were of interest (rail, air and marine), although to a much lesser extent. Common to all modes was the need for data on origins and destinations; movement of goods and vehicles (including travel times, costs and itineraries); and, characteristics of the goods being shipped (including cost and volume). Intermodal data also were lacking: that is, the movement of the good through the entire chain from origin to destination. A national commodity flow survey was identified as a potential platform for gathering provincial- or regional-level data.
- Respondents expressed varying degrees of satisfaction with their internal and external datasets, with most tending to consider their data as inadequate. This echoed the aforementioned data needs, along with:
  - Urban goods movement data generally.
  - More precise geographical and temporal definitions.
- Electronic technologies for collecting data were cited, but were not used as frequently as traditional methods: their potential to offset response burdens and costs while improving quality also represent a need.

▪ Finally, the survey results yielded an implied need for common definitions in terms of goods movement survey types, terms and practices.

2.9 <u>Key Requirements and Priorities</u>

A number of specific actions can be derived from the user needs survey. The importance of available data for transportation planning (see **Section 2.5** and, specifically, **Table 5**), which identified roadside surveys, cross-border data and commodity flow surveys as being 'critical' or 'important' to planning (and note that many of these data are available only from the United States), suggests that the actions can be categorized along two main themes:

1. **There is a widespread gap in - hence the need for - detailed information about the characteristics of goods movement trips** – that is, trip origin and destination, routes or itineraries, schedules, mode, time of day, seasonal variations, frequency, cost, inter-modal transfer, greenhouse gas emissions, tonnage/volume and commodity carried, vehicle type, etc. Corresponding data on intermodal transportation largely do not exist (or are held privately). Moreover, there is a need to provide these data at a sufficient level of detail and precision, especially geographical, in order to support use of these data for analysis, modelling, planning and policy development.

   It is important to note that respondents referred mainly to the inter-urban surveys – roadside surveys and cross-border data – recalling that they were asked to comment on the use of *existing* available data sets, which are oriented almost entirely towards inter-urban goods movement. However, it must be inferred that both urban and inter-urban data are required in order to provide complete coverage, as are data that cover internal-external movements.

   The National Roadside Survey and selected urban goods movement surveys (Calgary, Edmonton and Peel) exemplify inter-urban and urban best practices, respectively. However, aside from these surveys, sources are quite limited. In addition, respondents identified the need to enhance the aforementioned surveys which, as noted, have been cited in the literature as North American best practice. These enhancements include specialized fleet allocator surveys (subsets of the main establishment survey); increased use of GPS surveys to ascertain the accuracy of survey responses and to verify routes; improved methods to link NRS data with traffic counts and ensure that the counts and the surveys are conducted at the same time; address response problems (e.g., survey length, need for assistance in responding, respondent's ability to provide the necessary information, clarity of questions, and reliability and honesty of the responses); and, enhance the clarity of survey forms.

2. **There is a need for commodity flow data with broad geographic coverage** – that is, with the exception of the aforementioned urban goods surveys, there is no information about the inter-urban, domestic, cross-border or international flows of goods that move through the supply chain. These data provide the 'big picture.' Contrary to the aforementioned urban goods surveys and the NRS, there are no Canadian examples of

commodity flow surveys. <u>**As is discussed in Chapter 3, it is important to note that the urban establishment surveys and inter-urban commodity flow surveys are not the same thing**</u> and, accordingly, <u>**are not interchangeable**</u>, although there are some points of commonality. Accordingly, they cannot be combined into a single survey.

It should be noted that the first two needs were discerned quite clearly from the survey results. However, the consultant inferred two additional needs, from the responses and from the variation in the responses to same question. These are as follows:

3. There is a need for **best practice guidance** and **common standards and definitions** for all aspects of urban goods movement data – both for surveys and for ancillary data, such as traffic counts and travel time surveys. This framework is a first step in providing this commonality and outlining best practices; however, it does not address such basic attributes as agreed industry type classifications[3] or vehicle count classifications. Moreover, any coordination of data collection activities or sharing of surveys requires such common definitions, as do the development of partnerships and the encouragement of greater participation by other potential beneficiaries of data collection. Finally, common standards and definitions would help to improve the accuracy and reliability of the data, since they also must apply to the development of survey sampling and data processing, editing, expansion and validation techniques.

4. There is a need for **education and awareness** regarding goods movement issues, best practices in goods movement planning, and how data can be applied to planning. The user needs survey identified a wide range of applications of their data. However, several respondents used different approaches to respond to similar needs; with varying degrees of comprehensiveness in the approach (meaning, in other words, that the issue may only have been addressed partially). The issue is not to prescribe planning processes, but rather to make sure that transportation planners are aware of how increasingly complex goods movement issues could be addressed and, especially, to make sure that the linkage among transportation, land use and economic development is understood. The importance to this research is that, in the absence of this guidance, it is difficult for an agency to identify exactly what type of data it needs, let alone develop partnerships to sponsor data collection or actually collect the data. It also substantiates the need to continue or broaden existing data collection activities – the Edmonton, Calgary and Peel surveys were all one-time surveys while the NRS is not established or funded as a recurrent activity.

In the development of the framework and in adhering to the terms of reference of this research, the remainder of this report focuses upon the first two needs; however, the latter two needs are fundamental to the fulfillment of the framework and also should be addressed in the future.

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3   The issue relates to the sampling frames for industry types. It can be assumed that the NAICS classification is applicable across all Provincial, Territorial and Federal business registries (at least, the records can be rolled up to two digits). However, the sampling frame for urban establishments may have been developed locally (for example, from land use or business directories), and so may not necessarily be consistent with the relevant senior-level sources or those of other urban areas). In other words, it is an urban planning issue.

3.   CONCEPT FOR A FRAMEWORK

3.1   Introduction

Following on the requirements and priorities identified in the preceding section, this chapter proposes a concept for a framework for developing high-quality urban goods movement data. As is discussed below, because urban and inter-urban data are related, the framework necessarily includes both, although – consistent with the intent of this project – the focus is on the collection of data on road-based goods movement.

The concept is detailed in **Chapter 4**. There are also considerations regarding funding (study Task 4.3) which must be considered first: of particular importance is the feasibility or desirability of obliging respondents to an inter-urban commodity flow survey to participate. The roles of Federal and Provincial / Territorial governments follow from this consideration.

3.2   Taxonomy of Urban Goods Surveys

The two-part categorization – trips and flows – characterizes this research, since it describes the fundamental building blocks for a goods movement data framework. However, it is important to recognize, within this basic categorization, that there are further sub-categories and variations. These are described in a 2008 United Kingdom study, which lists eleven distinct types of urban goods movement surveys:[4]

1. Establishment survey - surveys of the shipments made by businesses, i.e. the shippers and/or receivers of goods and services, with specific origin-destination information.
2. Commodity flow survey - surveys of businesses, on the quantities of goods shipped. These generally include some information about the origin and destination of the commodity; however, specific, precise or detailed origin-destination information may be lacking.
3. Freight operator survey - surveys of logistics managers of businesses or of carriers, regarding the fleet's activities (including origin-destination).
4. Driver survey - surveys of a driver's activities on his/her rounds for a given period.
5. Roadside interview survey - surveys of the vehicle's activities for the trip being made when the vehicle is stopped for the interview.
6. Vehicle observation survey - observations by others of a vehicle's activities at a given site(s). Does not necessarily involve the vehicle driver.
7. Parking survey – observations by others of a vehicle's activities while it is parked or while it is being loaded or unloaded at a stop.

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[4]   Allen, J. and Browne, M., "Review of Survey Techniques Used in Urban Freight Studies." University of Westminster, November 2008.

8. Vehicle trip diaries – surveys of a vehicle's activities on its rounds for a given period. (Similar to the driver survey, but specific to the vehicle.)

9. GPS (Global Positioning System) survey – electronic surveys of a vehicle's exact location. Also captures travel times (hence speed and delay).

10. Suppliers survey – surveys of supplier businesses (i.e., suppliers to the supply chain), on the goods being shipped and on the supporting vehicle activity.

11. Service provider survey – surveys of services-generating businesses regarding the characteristics of its employees' trips. Similar to freight operator survey, but specific to services.

Several points regarding this list are noteworthy:

▪ Some of these are variations to each other: for example, the driver survey and trip diary survey *may* differ only in the basic reference (i.e., the survey is conducted by the driver, no matter how many vehicles s/he uses, or is assigned to the vehicle, no matter how many drivers use it) but have essentially the same form.

▪ Some urban data collection efforts used combinations of these: for example, the Edmonton, Calgary and Peel surveys conducted establishment surveys and driver surveys, and the Peel initiative also included a GPS survey. This becomes apparent in the discussion of the framework in **Section 3.3**.

▪ The survey types are mostly quantitative, but also include qualitative or subjective information gathering (in particular, some freight operator, suppliers and service provider surveys have included subjective questions regarding issues and concerns).

▪ This list considers surveys only. Counts are not included.

▪ Most of the surveys require some interaction with the respondent, while others are passive and are burden-free (e.g., the parking survey).

A detailed description of each type of survey is provided in **Appendix B**.

This list is provided in order to provide a context for the framework and its possible variations. It is impractical for the framework to consider each of the eleven types of survey, given that there exist significant fundamental data gaps which must be addressed first, as identified by the user needs survey and by the TAC project steering committee (i.e., commodity flow surveys); some of the survey types require or assume the prior existence of other surveys; and, some types of surveys clearly are less important to a common framework than others (e.g., parking surveys are site- or neighbourhood-specific). Nonetheless, the framework could be used as the common platform to which ancillary surveys subsequently could be tied.

3.3 <u>Concept for a Framework</u>

The proposed framework has at its core two dimensions:

- The two types of surveys, namely origin-destination (OD) trip surveys and commodity flow surveys (CFS).

- Geographical scale; namely, urban areas and inter-urban areas (essentially, urban regions and anything larger than that [including inter-urban corridors], respectively).

Together, these two dimensions yield a four-part core framework, as illustrated conceptually in **Exhibit 9**.

Best practices exist in Canada for three of four parts of this core. These are:

- Urban CFS: Edmonton, Calgary and Peel Region.

- Urban OD: Edmonton, Calgary and Peel Region.

- Inter-urban OD: National Roadside Survey (NRS).

An inter-urban CFS does not exist in Canada. Rather, as proposed by the terms of reference for this research, a Canadian inter-urban CFS would be based upon, and would expand, the current U.S. Commodity Flow Survey.

Note that the urban CFS and urban OD surveys *together* are defined by the multi-faceted goods movement surveys that have been conducted in Edmonton, Calgary and Peel Region.

	Commodity Flow Survey	**Origin-Destination Survey (Trips)**
Urban	Edmonton, Calgary, Peel	Edmonton, Calgary, Peel
Inter-urban	CFS (*proposed*)	National Roadside Survey

Exhibit 9. Conceptual CFS and OD Core Framework

However, it may be appropriate to define a broader framework – that is, to put the core framework within the context of broader data collection. There are several reasons:

- The recognition that no one type of survey captures all the information needs.

- The need to reflect the different types of data that actually are now collected for urban goods movement, depending upon specific informational requirements (as exemplified by the eleven-survey taxonomy described in **Section 3.2**).

- The recognition that some aspects of urban goods movement are relatively well established in practice (for example, establishment surveys) while an understanding of other aspects is only nascent (notably, the supply chain): in turn, this impacts data collection requirements.

- The relative newness and ongoing evolution of urban goods movement data collection methods.

- Considerable variability in definitions in the practical literature: in particular, between movement and flows; between qualitative and quantitative data; and, between surveys and counts. This is evidenced, in particular, by experience in the United States (although also, to some extent, in Canada as well: a key difference is that relatively fewer goods movement studies have been conducted in Canada). In the absence of reasonably consistent definitions, a meaningful framework is not possible.

The Edmonton, Calgary and Peel Region surveys comprised establishment surveys, freight operator surveys, service provider surveys, driver surveys and roadside interviews (the last conducted at external cordons around the two cities)[5]. The Peel Region survey comprised an establishment survey, driver surveys and GPS surveys. These are described in **Section 3.4**. The U.S. Commodity Flow Survey, which is proposed to serve as the basis for a Canadian inter-urban CFS, is described in **Section 3.5**. Finally, the National Roadside Survey (inter-urban OD survey) is described in **Section 3.6**.

3.4 <u>Urban CFS and OD Surveys</u>

Edmonton and Calgary collaborated on the development of an urban goods model and on the underlying data collection. The two cities, which are approximately 300 kilometres apart, are the largest in Alberta and have approximately the same population (900,000 – 950,000 at the time of the surveys described here).

A comprehensive series of quantitative, region-wide goods and services surveys was conducted in Calgary in 2000-2001 and in Edmonton in 2001-2002. The data collection activities included commodity flow surveys. The Edmonton and Calgary surveys essentially are identical. The data were collected as the basis for calibrating micro-simulation goods and services models for the respective cities; i.e., which required a sophisticated and comprehensive quantification of goods movement patterns (and this is opposed to the more common collection of qualitative information on goods movement activities for use in goods movement studies, as evidenced by recent studies in Canada and the United States). The two surveys remain the state-of-the-practice for region-wide surveys in Canada (if not also in North America). Finally, and perhaps most important, the two studies sampled all types of

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[5] Note that the freight operator and service provider surveys essentially are variants to the establishment survey.

establishments in the respective regions (that is, all industrial sectors – much the same basis that an inter-urban CFS would do).

The surveys were used in the development of micro-simulation goods and services models for the two cities. In addition to sharing a common approach and resources, the collaboration was intended to address:[6]

- *A priori* concerns about the data and sample size "challenges" that would arise, given the heterogeneity of commercial movements.

- Regional and inter-city corridor aspects that were relevant to goods movement in the Province of Alberta; that is, beyond the immediate boundaries of the two cities alone.

- The capturing of direct freight flows between the two cities, to result in relevant information about flows in one city to be collected in the other city's survey.

- The need for a coordinated effort to gain endorsements for the data collection from relevant Province-wide motor carrier associations and Provincial government agencies.

The same approach was applied in Calgary in 2000-2001 and in Edmonton in 2001-2002. It combined an establishment survey with an origin-destination survey of truck drivers. The establishment survey captured the activities of a significant sample of all business establishments in the respective region. Drivers of commercial vehicles leaving the establishments then were surveyed regarding the specifics of their goods movement over one weekday. These urban surveys were complemented by a roadside survey of trucks at an external cordon surrounding each city to capture inter-urban goods movement to, from and through each city.

This combination of surveys aimed to ensure a systematic and comprehensive coverage of goods movement to, from, within and through each urban area, with an approach designed specifically to get beyond the traditional, low-response focus on truck origin-destination surveys that used the truck fleet as the sample population, rather than the organizations that generate the activity. As exemplified by the Edmonton data collection, the survey featured:

- Coverage of all establishments involved in the shipment of both goods and services, including transportation depots.

- Information gathering on individual shipments of goods and services for one weekday, rather than for a longer period.

- A focus on outbound activity only (except for transportation depots, for which both inbound and outbound activities were captured), thereby reducing the response burden.

- The provision of direct assistance to respondents (including face-to-face contacts, training and staff for data collection).

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6   Hunt, J. D., Stefan, K., Brownlee, A. T., McMillan, J. D. P., Farhan, A., Tsang, K., Atkins, D., and Ishani, M., "A Commercial Movement Modelling Strategy for Alberta's Major Cities." Proceedings of the Annual Conference of the Transportation Association of Canada, 2004.

■ Use of a special survey approach for establishments that had large numbers of small shipments and which allocate fleets of vehicles to routes to accommodate these shipments (e.g., postal services and refuse collection).

The surveys attempted to sample all types of businesses. In the Edmonton survey, 27,478 business establishments were contacted to ascertain their eligibility for participating in the establishment survey. Information also was collected regarding the number of employees, location and industry category of the establishment. Establishments that produced either a product or a service that required transportation were deemed to be eligible. Of the contacted establishments, 13,792 were determined to be eligible and, of these, 4,324 agreed to participate in the survey. The survey was expanded according to three independent variables: number of employees, industry category and geographic location, using the total number of employees within each variable to determine the individual establishment expansion factors. The resultant average expansion factor for all establishments was 2.36.[7]

The Calgary experience, which surveyed 3,411 establishments, is instructive insofar as developing the establishment sample is concerned. Difficulties with finding a workable sample database caused delays in the process, and required that the sample be verified before the actual survey could begin. Samples ultimately were drawn from the Provincial Treasury ministry's registry of businesses and from the City of Calgary's City Business Tax database. Within the City of Calgary, approximately 3.4% of the sample of 49,354 companies could not be reached. This was due to incorrect telephone numbers (for initial contact and recruitment), the provision only of a facsimile number, or the fact that the company no longer was in business. Another 25.1% did not qualify, because they did not ship, or used only the postal service or personal couriers; and a further 7.2% were duplicates. Of the remainder, 2.4% declined to participate. In total, only 3,791 establishments, or 7.7% of the initial sample, pre-qualified. Of these, 3,150, or 6.4%, were recruited, and 3,107 establishments ultimately provided usable data. Another 304 surveys were completed in the surrounding region, for a total of 3,411 surveyed establishments.[8] The point here is that the coverage and representation of the establishment survey depends on the availability of appropriate databases and, as the City of Calgary's experience indicates, much of the available data were erroneous, duplicates or otherwise unusable. Moreover, the use of telephone recruitment ensured that sampling quotas were met and that, once recruited, respondents' participation was maximized.

The challenges of reporting were noted in the Calgary survey. Following the telephone recruitment, packages were delivered to the establishment. Even with the availability of complete or partial support (i.e., the interviewing contractor was available to complete all or part of the survey for the respondent), 92% of the surveys required amendments, including correction of addresses and compilation of the required information from original sources. Respondents had operational differences that impacted the establishment and driver surveys:

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7   Hunt, J. D., Brownlee, A. T., and Ishani, M., "Edmonton Commercial Movements Study." 39th Annual Conference of the Canadian Transportation Research Forum, Calgary, 2004.
8   International Results Group, "2000 Commodity Flow Survey Report." Prepared for the City of Calgary, 2001.

in particular, the inability to record monetary values of the shipments, because product owners did not share this information with them (and the goods were insured by the producing company), value information was kept elsewhere (at a head office), or details could not be broken out. More reporting units of measure (for volume) than were expected also were received, and had to be reconciled. Consistency for service vehicle reporting was difficult depending, for example, on whether or not the service vehicle was parked at home (i.e., in which case, the first trip of the day may be that from home to the service site, or to work to pick up the service vehicle).[9]

Once an establishment had been recruited by telephone, a face-to-face visit followed, in order to obtain management buy-in and personalize the project. The survey contractor also used the visit to gather information about the establishment, based upon which a package of survey forms was then delivered to the respondent. The Calgary package comprised:[10]

- Establishment Form, which asked about the numbers of employees by category and the number of service or commodity 'shipments' sent out over the 24-hour period by type, units (e.g., weight, quantity or visits) and the total dollar value. A variant of this form was provided to depots, and it asked for both inbound and outbound shipment information.

- Goods Shipment Form which, for each goods shipment, asked about the type of goods shipped, the destination and address, the size and value of the shipment, and whether or not the shipment went directly to the destination or went first via a depot. A variant of this form was provided to depots, and asked whether the shipments moved inbound or outbound (and collected the origin or destination address), and about the type of vehicle and its ownership that was used to move the shipments.

- Vehicle (driver) Forms, which asked the driver about the vehicle's stops, the reason for the stop, the "exact" address of the stop and the stop arrival and departure times. Each form also recorded information about the vehicle type. There were three variants to the form: one for service vehicles, which also asked about the service type made at the stop and its value; and two for goods vehicles, which asked about the goods type (and its quantity) picked up or delivered. The goods vehicle surveys were distinguished by for-hire trucks and all other goods vehicles.

- Instructions, code sheets, examples, contact information and a covering letter also were provided.

Samples of the establishment, goods shipment and goods vehicle forms from the Calgary survey are shown in **Exhibit 10**, **Exhibit 11** and **Exhibit 12**, respectively.[11] Note that there are several variations to these, to account for depots and warehouses, services (as opposed to goods shipments) and vehicle ownership (e.g., for-hire vehicles).

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[9] Ibid.

[10] Ibid.

[11] Forms courtesy of the Forecasting Division, Transportation Planning business unit, City of Calgary.

Establishment Form

Page [ ] of [ ]

Establishment Address	Company or Location Name	Serial #: _____
	Exact Street Address	**Collection Date**
	City / Town & Province / State	Day Nov 2 Tue

Employment Information
(See Employment Category Code descriptions)

Employment Category	Number of Employees	Employment Category	Number of Employees
		Please continue your list here if needed	
		Total Number of Employees	

Shipment or Service Information
Between 4am on the survey day and 4am the next day, record the total shipments by commodity or by service type, the quantity and type of units and the total dollar value.

Service or Commodity Type please use codes on ORANGE pages	Quantity	Units (check only one box)	Total Dollar Value (with GST)
		☐ tonnes ☐ m³ ☐ litres ☐ ft² ☐ items ☐ ____ ☐ Service Visits	
		☐ tonnes ☐ m³ ☐ litres ☐ ft² ☐ items ☐ ____ ☐ Service Visits	
		☐ tonnes ☐ m³ ☐ litres ☐ ft² ☐ items ☐ ____ ☐ Service Visits	
		☐ tonnes ☐ m³ ☐ litres ☐ ft² ☐ items ☐ ____ ☐ Service Visits	
		☐ tonnes ☐ m³ ☐ litres ☐ ft² ☐ items ☐ ____ ☐ Service Visits	

Freedom of Information Declaration
The Company Information is collected for transportation purposes by the City of Calgary, Transportation Department under the authority of Section 32(c) of the Freedom of Information and Protection of Privacy (FOIP) Act and is protected by the FOIP Act. The International Results Group is acting on behalf of the City of Calgary to collect and process the data from this survey and must adhere to the provisions of the FOIP Act. If you have any questions about the collection, please contact the Senior Transportation Engineer, Transportation Department, 7th Floor 800 Macleod Trail SE at 268-1657.

Exhibit 10. Establishment Form – Calgary Goods Movement Survey

Goods Shipment Form | Time period covered from 4 AM on your survey day until 4 AM the next day. | Page [ ] of [ ]

To be filled out by the shipper/receiver.   Serial #:_____

Fill out for each shipment that leaves the establishment

Goods Type Please use Codes on ORANGE page.	Exact address for the **final** destination of the goods Calgary Industries 528 12 Street SE Calgary, Alberta	Size of Shipment check off only one unit type	Dollar Value of the shipment (include GST)	Clarification on the route the goods take to final destination. A depot is a location where goods are recombined, repacked or transferred to another vehicle.
[ ]	Company or Location Name Exact Street Address City / Town & Province / State	[ ] ☐ tonnes ☐ litres ☐ m³ ☐ items ☐ ft³ ☐ _____	$ [ ]	☐ Goes first to a depot ☐ Goes directly to final destination
[ ]	Company or Location Name Exact Street Address City / Town & Province / State	[ ] ☐ tonnes ☐ litres ☐ m³ ☐ items ☐ ft³ ☐ _____	$ [ ]	☐ Goes first to a depot ☐ Goes directly to final destination
[ ]	Company or Location Name Exact Street Address City / Town & Province / State	[ ] ☐ tonnes ☐ litres ☐ m³ ☐ items ☐ ft³ ☐ _____	$ [ ]	☐ Goes first to a depot ☐ Goes directly to final destination
[ ]	Company or Location Name Exact Street Address City / Town & Province / State	[ ] ☐ tonnes ☐ litres ☐ m³ ☐ items ☐ ft³ ☐ _____	$ [ ]	☐ Goes first to a depot ☐ Goes directly to final destination
[ ]	Company or Location Name Exact Street Address City / Town & Province / State	[ ] ☐ tonnes ☐ litres ☐ m³ ☐ items ☐ ft³ ☐ _____	$ [ ]	☐ Goes first to a depot ☐ Goes directly to final destination

Go to next page.

Exhibit 11. Goods Shipment Form – Calgary Goods Movement Survey

Exhibit 12. Vehicle Form – Calgary Goods Movement Survey

A 2007 establishment survey in Peel Region built upon the Edmonton / Calgary surveys, but captured additional behavioural information. Peel, just west of the city of Toronto, is home to Canada's largest international airport and the surrounding warehouse / distribution cluster. As in Edmonton / Calgary, extensive use was made of telephone recruitment and face-to-face contact. It should be noted that the Peel survey was a research effort, with a limited number of samples.

The Peel survey asked additional questions regarding behaviour, in two ways: The survey asked establishment drivers about the frequency of their activities, and how 'typical' their activities were on the survey date – thereby providing a measure of whether 'normal' activities were greater or fewer. The survey also captured information on how these activities translate into a sequence (tour) of truck trips, and further examined the attributes of the actual trips, including route choice. Finally, it added a GPS (Global Positioning System) tracker in a sample of goods vehicles to verify the accuracy of the information that was provided on paper survey forms.[12]

3.5   US Commodity Flow Survey (Inter-urban CFS)

3.5.1   Applicability

Commodity flow surveys have been conducted in various countries. However, for the purposes of this research, this report discusses the U.S. Commodity Flow Survey as the basis for a prospective Canadian CFS.

Why the U.S. Commodity Flow Survey? There are several reasons:

- The U.S. CFS has been conducted approximately every five years since 1993 – most recently in 2007, and so its approach and method are well developed.

- The CFS uses the North American Industry Classification System (NAICS), thus providing a common, continent-wide definition of industries and commodities.

- It covers a large geographical area that is similarly dispersed as that of Canada.

- Its sampling features a two-part stratification by geography and by industry sector that is suited to Canada.

- The CFS depicts movements in transportation infrastructure systems that are similar to those of Canada

- It lends itself to a complementary effort with the NRS (i.e., for Canada).

- Perhaps most important, it provides a ready basis to link data for the two countries. At the same time, significant limitations to the U.S. CFS might require augmentation to this

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[12]   Roorda, M., McCabe, S., and Kwan, H., "A Shipper-Based Survey of Goods and Service Movements in the Greater Golden Horseshoe (GGH) - Report I: Survey Design and Implementation." Draft report, prepared for the Ministry of Transportation of Ontario and the Region of Peel, 14 September 2007.

general model, in order to meet Canadian needs (that is, as elucidated by the *Request for Proposals* for this research). These are described below in **Section 4.3**.

In sum, the U.S. CFS – notwithstanding its problems (as described below) – provides the best example for an economy, geography, freight transportation system and demography that are similar to those of Canada. Nothing else exists at this scale: analysts in Europe have pointed to the CFS as a model for that continent[13], although small-scale commodity flow ("shipper") surveys have been conducted successfully in France, with 5,000 samples in 1988, 10,000 samples in 2004, and two special surveys of 600 samples each in 1999. The focus of this research effort has been to trace the transport chain, wherein three shipments for each shipper are traced from the shipper to the consignee, including the different legs of the chain, the movements of the vehicles, and so on. As well, the most recent (2004) survey focused on energy consumption per shipment – that is, the surveys have specific emphases that may differ from survey to survey.[14]

3.5.2   Description

The U.S. Bureau of Transportation Statistics (BTS; an agency of the U.S. Department of Transportation) and the Bureau of the Census (which is responsible for the U.S. Census) jointly conduct nation-wide Commodity Flow Surveys (CFS) at approximately five-year intervals (1993, 1997, 2002, and most recently in 2007). Freight characteristics also were captured in earlier surveys, from 1963 through 1977. However, the CFS represented an important improvement in method, sample size and scope over the earlier surveys.[15]

The CFS is a nationwide survey of business establishments in selected industries: specifically, in mining, manufacturing, wholesale trade and selected retail and services establishments (auxiliary establishments). An establishment is defined as "a single physical location where business transactions take place."[16] The CFS supplies data on the flow of goods generated by the sampled establishments by mode of transportation in the United States. Data are provided on tons, miles, ton-miles, value, shipment distance, commodity type and weight. All major modes of freight transportation are captured.[17]

A sample of establishments is drawn across all 50 states and the District of Columbia. It is important to note that participation by sampled establishments is <u>mandatory</u>, because it is linked to the five-year Economic Census. The sampling frame is drawn from the Census

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[13]   McKinnon, A. and Leonardi, J., "The Collection of Long Distance Road Freight Data in Europe," presented at the 8th International Conference on Survey Methods in Transport, Annecy, France, May 2008.

[14]   Rizet, C., "3 Approaches of Freight Transport Energy Analysis," presentation to the International Energy Agency workshop on "New Energy Indicators for Transport: the Way Forward," Paris, January, 2008.

[15]   Mani, A. and Prozzi, J., "State of the Practice in Freight Data: A Review of Available Freight Data in the U.S." Center for Transportation Research, 2004.

[16]   Ibid.

[17]   Transportation Research Board, "Special Report 277 - Measuring Personal Travel and Goods Movement - A Review of the Bureau of Transportation Statistics' Surveys." Transportation Research Board, Washington, DC, 2003.

Bureau's Business Register of approximately 6 million establishments, of which approximately 754,000 (in 2007) were in the industry categories covered by the CFS.[18]

The sample dropped steadily from 200,000 establishments in 1993 to 100,000 in 1997 and 50,000 in 2002.[19] However, it increased back to 100,000 establishments in 2007[20] (i.e., in effect doubling the sample from 2002, as the total number of candidate establishments was approximately the same in both years).

A stratified three-stage sampling process was used in the 2007 CFS (and also previously), as follows:[21]

1. Establishment selection. The sampling frame was first stratified by geography (accounting for the 50 states, the District of Columbia, and 65 metropolitan areas [the last according to population and importance as "transportation hubs"]). Within each of the geographic strata, 48 industry groups were defined (i.e., within the candidate industry types), according to the 2002 NAICS). Separate strata of hazardous materials shippers also were created, to gain more information on these shipments. The combined geography-by-industry stratification resulted in 2,745 primary strata. Based upon these strata, a sample size of 102,369 establishments was used to ensure a minimum of 2 and a maximum of 100 samples per stratum.

2. Reporting week selection. The sampled establishments were asked to report on four weeks – one in each calendar quarter for 2007 (i.e., January 6, 2007 to January 4, 2008). Because different establishments were assigned different times, the sample covered all 52 weeks of the year.

3. Shipment selection. If respondents made more than 40 shipments per week, they were asked to conduct a systematic sample, such that they reported a minimum of 20 shipments and a maximum of 40 shipments. If respondents made 40 or fewer shipments per week, they reported all shipments.[22]

Each of the four surveys used a mail-back document, with on-line assistance provided in 2002 and 2007. Respondents were asked to record the total numbers of their outbound shipments and, for a sample of these shipments, information on value, weight, commodity,

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18 Bureau of Transportation Statistics, "2007 Commodity Flow Survey, Survey Overview and Methodology." Bureau of Transportation Statistics, 2009.

19 Transportation Research Board, "Special Report 277 - Measuring Personal Travel and Goods Movement - A Review of the Bureau of Transportation Statistics' Surveys." Transportation Research Board, Washington, DC, 2003.

20 Bureau of Transportation Statistics, "2007 Commodity Flow Survey, Survey Overview and Methodology." Bureau of Transportation Statistics, 2009.

21 Ibid.

22 Mani, A. and Prozzi, J., "State of the Practice in Freight Data: A Review of Available Freight Data in the U.S." Center for Transportation Research, 2004.

domestic destination or port of exit (from the United States) and mode(s) of transportation. Instructions were provided on how to sample the shipments.[23]

The 2007 questionnaire is presented in **Appendix C** while **Appendix D** presents the instruction booklet that accompanied the questionnaire.[24]

3.5.3   Limitations and Concerns

The Commodity Flow Survey has the benefit of being the only nationwide source of goods movement data. However, several concerns have been identified:[25]

▪ The CFS covers only some industry sectors. This appears to represent less than three quarters of all goods moved within the United States. Government, farms, construction, oil and gas, and households (which also generate goods) are not sampled. The CFS misses the rapidly growing service sector and most retail establishments.[26]

▪ The CFS also does not cover all modes well – in particular, air cargo is not captured well, because many of the industries that depend on air are not included in the sampling frame.[27] Also, not all truck activity is captured: only shipments via private (i.e., own-account) and for-hire trucks are captured.[28] Among other implications, activity by other types of trucks is not captured;[29] and modal shares by truck type can be distorted.[30]

▪ There is a lack of geographic and commodity detail at the state and local levels. This constraint reflects both the stratification of the sample to ensure broad industry and geographic coverage, and the need to protect the confidentiality of individual establishments (some of whom, by their size and location, could be identified easily). In addition, the CFS breaks down metropolitan areas along state lines, thereby making it impossible to distinguish intra-regional flows from inter-regional flows in multi-state

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[23]   Transportation Research Board, "Special Report 277 - Measuring Personal Travel and Goods Movement - A Review of the Bureau of Transportation Statistics' Surveys." Transportation Research Board, Washington, DC, 2003.

[24]   Bureau of Transportation Statistics, Survey Materials website: http://www.bts.gov/publications/commodity_flow_survey/survey_materials/index.html.

[25]   Ibid.

[26]   Southworth, F., "A Preliminary Roadmap for the American Freight Data Program (DRAFT)." Oak Ridge National Laboratory, Oak Ridge, Tennessee, 2004.

[27]   There is also evidence that commodities that are understood to be moving by air may actually be moving by truck. For example, shipments may be consolidated at the point of origin onto a truck, which then is driven to a remote airport. In other cases, Air Canada truck trips between the airport in the shipper's origin city and a second airport that serves as the port of exit are known to be designated as "flights," and so the actual mode of transportation of a good being shipped for export may not be known by the shipper.

[28]   Transportation Research Board, "Special Report 276 - A Concept for a National Freight Data Program." Transportation Research Board, Washington, DC, 2003.

[29]   Southworth, F., "Filling Gaps in the U.S. Commodity Flow Picture, Using the CFS with Other Data Sources," in Hancock, K.L., editor, "Commodity Flow Survey Conference," Transportation Research Circular E-C088, Transportation Research Board, Washington, DC, 2006

[30]   Duych, R.J., "Scope and Industry Coverage of the 2007 Commodity Flow Survey," in Hancock, K.L., editor, "Commodity Flow Survey Conference," Transportation Research Circular E-C088, Transportation Research Board, Washington, DC, 2006.

urban regions.[31] The varying CFS sample sizes contribute to the lack of geographic detail.[32]

▪ There is no coverage of the external leg outside the U.S., beyond the border crossing point. That is, only the mode to the port of exit is identified. Through flows that traverse the United States – e.g., Canada to Mexico – also are not covered. No information is captured regarding imports to the United States, except where they leave the importer's domestic location for shipment elsewhere in the United States.[33]

▪ Routing information is not collected.[34] Rather, the Bureau of Transportation Statistics synthesizes routes as part of the post-survey analysis.[35]

▪ Although participation in the CFS is mandatory, establishment response rates consistently have been of the order of 70%.[36] Respondent burden has been cited as one reason, with the CFS form inviting suggestions on ways to reduce this burden.

▪ The turnaround time for processing the data – of the order of two years – limits the timeliness and effectiveness of the data. Moreover, the five-year cycle cannot capture rapid changes in economic cycles or the impacts of new technologies, policies, etc., that might take place in the intervening years.

▪ The cost of the CFS is "substantial" - $15 million in 1993, $19 million in 1997, $13 million in 2002,[37] and $14 million in 2007. (All figures are in $US.) The budget for the 2007 CFS, in fact, was cancelled at one point.[38]

A 2005 Transportation Research Board conference on the CFS identified a number of methodological concerns (mostly based upon the 2002 CFS, but also applicable to the 2007 CFS):[39]

▪ <u>Sampling methods</u>. Compared with household origin-destination surveys (i.e., which are more commonly conducted in the transportation community than are goods movement

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[31] Jessup, E., Casavant, K. L., and Lawson, C., "Truck Trip Data Collection Methods," Final Report, SPR 343, Oregon Department of Transportation, Salem, Oregon; and Federal Highway Administration, Washington, DC, February 2004.

[32] Transportation Research Board, "Special Report 276 - A Concept for a National Freight Data Program." Transportation Research Board, Washington, DC, 2003.

[33] Ibid.

[34] Jessup, E., Casavant, K. L., and Lawson, C., "Truck Trip Data Collection Methods," Final Report, SPR 343, Oregon Department of Transportation, Salem, Oregon; and Federal Highway Administration, Washington, DC, February 2004.

[35] Bureau of Transportation Statistics, "2007 Commodity Flow Survey, Survey Overview and Methodology." Bureau of Transportation Statistics, 2009.

[36] Southworth, F., "A Preliminary Roadmap for the American Freight Data Program (DRAFT)." Oak Ridge National Laboratory, Oak Ridge, Tennessee, 2004.

[37] Ibid.

[38] Personal communication, John Wells, Director, Office of Economic and Strategic Analysis Office of Policy, U.S. Department of Transportation, May 2006.

[39] Zmud, J., "Commodity Flow Survey, Improving Methods to Enhance Data Quality and Usefulness," in Hancock, K., editor, "Commodity Flow Survey Conference, Transportation Research Circular E-C088, Transportation Research Board, Washington, DC, 2006.

surveys), CFS and establishment surveys general have several inherent problems, namely:

- Reliance upon "list" frames as the source of sampling: these are subject to misclassification of the industrial code (no such classification occurs in household surveys[40]) and the 'lists' are associated with omissions and incorrect information. The use of list frames also impedes innovations in sampling, compared with other types of frames.

- Currency of the establishment samples is often out of synch with the dynamics of the economy, such as recessionary periods or industry changes.

- There is little ability to consider sample rotation over time, so as to ease the burden on establishments that have participated in previous CFS (i.e., participation in which is mandatory).

- The coverage of the 'total universe' is impeded by changes in the ways of doing business.

- The distribution of establishment populations 'typically' is skewed, with a small number of large firms commonly dominating the results for most parameters of interest.

- The sample size must be large enough (let alone properly distributed) so as to gain a sufficient number of results at a usable level of geographic detail.

Suggested ways to address these concerns included:

- Conducting a pre-CFS 'canvas' of potential respondents, in order to identify inapplicable establishments (e.g., which do not ship anything), better understand reporting arrangements (since many respondents had to refer to a head office for the data), and identify shippers that use less common modes or ship dangerous goods or exports.

- Changing the way shipments are sampled, such as stratifying shipments by size and including all large shipments over a single long period (a month or a year), rather than the current one-week period.

- Exploring ways to minimize respondent errors in their determination of which shipments to sample; for example, by implementing alternate shipment selection procedures.

- Survey (instrument) design. Concerns about the response burden, the form's intrusiveness and confidentiality had been raised with previous CFS. All of these impact the response rate and the completeness and quality of the responses. The BTS solicits respondent concerns regarding burden: one suggestion was to conduct 'cognitive' interviews during the CFS pre-test, in order to understand better how business are organized (noting, for example, where records are kept [e.g., at the head office]), the questions that should be

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[40] Household survey samples have been stratified by type of dwelling; however, this is not commonly done in Canada.

asked, who within the organization should be asked (including understanding who has the data and who can authorize the gathering and reporting of confidential data), and when in the business year the questions should be asked (to help ensure that data were more readily available to respondents). Panels of business stakeholders also could be used to enhance this understanding.

▪ Mode of collection. Electronic submission of data has increased in all types of surveys. However, there remain concerns about confidentiality; the ability to allow respondents to answer questions out of sequence; and, about the impacts on response and quality of different survey modes. One authority has suggested that mixed-mode surveys be used (that is, providing respondents with choices for responding).

▪ Non-response. Four types of non-response were identified: to the entire survey, to specific quarters (reporting weeks), to individual questions and to the required shipments. In other words, some respondents do not respond at all (despite the obligation to do so) whereas others miss reporting periods, questions or shipments. The importance of non-response is outlined by the fact that, of 50,000 establishments sampled in the 2002 CFS, 32,000 (64%) did not provide "usable data" for at least one quarter. To compensate, the responses were re-weighted. Also, a shipment record was considered incomplete if *any* of its value, weight or destination information was not provided: these data are not always available to the respondent. Here again, consultation during pre-testing was recommended to better understand the issue.

Finally, other issues also are emerging: for example, regarding domestic security.[41]

3.6   <u>National Roadside Survey (Inter-urban OD)</u>

The Ministry of Transportation of Ontario has conducted a large-scale truck roadside origin-destination survey at approximately five year intervals since 1978. The surveys are conducted on Provincial highways throughout the province, at inspection stations, rest stops and inter-provincial and international (i.e., with the U.S.) border crossings. They focus on inter-urban trips. The surveys have collected information on carrier information; vehicle type, number of axles and weight; origin and destination of the trip segment; and commodity type.[42][43] The survey focuses on medium and heavy trucks (that is, greater than 4,500 kg.), so other commercial vehicles are not captured. Intra-urban travel also is not captured.

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[41]   Aultman-Hall, L. and Drumm, S., "Improving the Use and Accessibility of the 2002 CFS," in Hancock, K., editor, "Commodity Flow Survey Conference, Transportation Research Circular E-C088, Transportation Research Board, Washington, DC, 2006.

[42]   Jessup, E., Casavant, K. L., and Lawson, C., "Truck Trip Data Collection Methods," Final Report, SPR 343, Oregon Department of Transportation, Salem, Oregon; and Federal Highway Administration, Washington, DC, February 2004.

[43]   Rob Tardif of the MTO notes that commodity "value" is not captured directly in the survey process. However, it is estimated subsequently using commodity, carrier, commodity weight and trip origin-destination type (i.e., export / import / inter-provincial / internal origin or destination) from the survey, and is computed using Statistics Canada data.

In 1999-2001, a nation-wide truck roadside survey – the National Roadside Survey (NRS) - was conducted across Canada. This comprised the aforementioned Ontario survey, as well as surveys in other provinces and at U.S. border crossings. A selection of intermodal terminals also was surveyed. The NRS was a cooperative effort among the federal and provincial ministries of transportation as well as the U.S. FHWA (with respect to the border crossings). Approximately 65,000 trucks were surveyed at 238 data collection sites, including border crossings.

The NRS provides a proven example of a nationwide programme for collecting inter-urban truck traffic. The NRS has been cited as an example that could be followed in the United States. A consistent survey form, a common general surveying procedure, and common classifications and terms were developed and used across the country. However, although driver interviews were conducted by local staff who were familiar with local travel and vehicle characteristics, some variations in the data collection were observed. Different groups having different objectives (e.g., enforcement, planning, policy development) gathered the data. This reflected each province's interest in participating in the NRS. However, as a result of these different interests, there was some variation in the focus of the interviews: some focused on vehicle weight and dimensions, which are important for enforcement, while others focused on trip details, which are important for planning. Although these differences must be captured, local nuances must be captured in a "well-planned and consistent manner when national data for a wide range of uses are collected."[44] A further complication arose in the expansion of the 1999-2000 NRS data, whereby the provinces of Ontario and Québec and Transport Canada each used a different method. This means that the resultant travel characteristics and trip tables may differ for the same location, depending upon whose expansion method is used.

A new NRS was conducted in 2006-2007. Data from this survey are being analyzed currently and a final database is expected to be released before the end of 2009. Although direct data entry has been in place since the 1995 survey, this survey incorporated a GIS-based routing component that enabled the surveyor to confirm the route with the driver and, if necessary, to modify it in order to get an accurate profile of the highways used for the trip. The 1999-2001 had asked drivers to list the highways used in the trip: this information was used to confirm the route during the subsequent data processing stage.[45]

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[44] Transportation Research Board, "Special Report 276 - A Concept for a National Freight Data Program." Transportation Research Board, Washington, DC, 2003

[45] Hancock, K. L., "Freight Demand Modeling, Tools for Public-Sector Decision Making, Summary of a Conference." Conference Proceedings 40, Transportation Research Board, Washington, DC, September 2006.

4. A COMMODITY FLOW SURVEY FOR CANADA

4.1 <u>Introduction</u>

This chapter proposes a model for collecting commodity flow data; specifically a Commodity Flow Survey. As noted, the U.S. CFS is used as the basis.

In concept, this approach allows the urban CFS surveys (conducted as part of multi-faceted survey programs, as exemplified by Edmonton, Calgary and Peel) and inter-urban CFS surveys to be conducted separately. This reflects the scale of the urban surveys and the differences in the information that is gathered in each type of survey.

At the same time, this approach does allow for integration, as follows:

- The urban surveys – which are the ultimate focus of this project – should be developed in the context of a nationwide inter-urban survey. This reflects the recognition that urban supply chains extend beyond a specific region; and that some commodity flows generated by an establishment selected in a CFS may be local (i.e., there are no limitations to either survey – both can capture local and long-distance flows and trips).

- It recognizes the desirability of having common standards and definitions across the country. In other words, there is a desire to have scalable commodity flow surveys that could be conducted at geographical levels as small as an urban region, and then up to Provincial/Territorial and national levels (and levels in between, such as trade or 'Gateway' corridors or groups of provinces). Note that insofar as the survey methods are concerned, the key difference between the two scales of commodity flow surveys lies in the sampling frame; that is, the registry of establishments in the given territory: Whereas Provincial/Territorial and Federal registries exist in formats that could be used as the basis for sampling, the same is not always true of municipalities or regions.

- Both types of bases also provided the ability to link goods movement with economic parameters; and the urban surveys also provide the ability to link with land use parameters. It should be noted, however, that the urban surveys include service movements, separately from the goods movements; in principle, these are not included in a CFS.

- Finally, these bases provide an ability to link with proven or existing origin-destination surveys; in particular, vehicle surveys conducted in the three urban surveys and the National Roadside Survey that was conducted in several parts of the country, provided common data definition and classification rules are used.

A preliminary outline for a CFS for Canada is elaborated in the following sections. **Section 4.2** describes the concept. **Sections 4.3**, **4.4** and **4.5** describe three critical elements of a Canadian CFS: respectively, these are sampling, disclosure avoidance (i.e., maintenance of confidentiality), and the integration of urban and inter-urban data. Finally, **Section 4.6**

discusses two important ancillary data needs: an understanding of the supply chain, and the need for consistent traffic count data, using common classification schemes.

4.2   <u>Concept</u>

In our view, an inter-urban commodity flow survey for Canada would use the U.S. CFS as a basis, with certain important additions. The proposed concept is described below. Interspersed in the points below are comments provided by the U.S. Bureau of Transportation Statistics regarding selected practical aspects of the U.S. CFS.

▪ Retention of the basic geographic-industry stratification approach and the respondent sampling process (depending upon the number of weekly shipments).

▪ Retention of a quarterly reporting, with sampling spread over a 52-week period (see also point below regarding a rolling survey).

▪ Inclusion of all industrial sectors in the sampling frame, categorized by NAICS. We propose that households not be included in the CFS: in theory, they should be considered; however, the ability to include them in an industry-based CFS adds a level of complication that might be addressed best through a separate survey, not least because a separate sampling frame and survey method are required.[46]

▪ Both the Edmonton / Calgary surveys (with the exception of depots) and U.S. CFS cover outbound shipments only. There is a need to account for inbound and through shipments as well, in order to capture the full supply chain. Possibilities are the following (and see also **Section 4.6.1** for a complementary treatment):

  • Select a sub-sample of establishments to describe both inbound and outbound shipments.

  • Coordination with the U.S. CFS, in effect broadening the coverage to Canada and the United States, thus capturing externally generated commodity flows up to the final Canadian destination (to the extent that the U.S. CFS could be adjusted to capture that information).

  • Separate, complementary surveys to cover the warehouse / distribution sector, in order to capture both inbound and outbound shipments. These data could be complemented by Transport Canada / Statistics Canada sources on domestic, cross-border and international shipments made through marine and (using a new common reporting system) airports: in our experience, the description of flow data varies significantly among ports and airports (let alone the availability of the data). Rail flows remain a significant obstacle, in the sense that the railways hold detailed

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[46] The importance of understanding the generation of goods flows by consumers (that is, by the action of purchasing a good) is noted in Patier, D. and Routhier, J.L., in "Best Practice in data collection, modelling approaches and application fields for urban commercial transport models," Report D3.2., BESTUFS (Best Urban Freight Solutions II), The Netherlands, August 2008.

information as confidential. Note that these data are intended to augment the CFS, not replace it. (See also **Section 3.5.1** for a discussion of a French CFS that captures the full supply chain: note that this is a much smaller survey than the Canadian CFS envisioned here.)

▪ The possibility of a 'rolling' survey could be considered. Proposed as a way of ensuring the currency of the U.S. CFS and accounting for changes in business cycles while reducing costs, the rolling survey concept essentially involves a continuous survey of a smaller sample (thereby minimizing annual budget allocations). Other advantages include:[47]

  • The potential for achieving economies of scope, by allowing for supplementary surveys at "relatively marginal cost" (that is, allowing for agencies to supplement funding in order to address a topic or area of specific interest at a given time).

  • The potential to develop robust time series data at an aggregate level (by geography, industrial sector or mode), while – over time – providing sufficient data to allow for more disaggregate analysis.

  • The ability to introduce improvement in data collection techniques and database management more quickly.

  • The ability to revisit previous data in light of new findings, in order to develop more accurate or revised flow tabulations if appropriate.

  On the other hand, U.S. CFS planners note two significant impediments: first is cost, since it will be necessary to augment the annual sample in order to ensure that all strata are represented. Second is the implied requirement to average the data (i.e., if five years' rolling data represent the same number of respondents captured in a single CFS, then a difficulty arises in how to report these data: they no longer can be reported as *observations* for a single year, and must be reported in other ways – for example, as *averages* over the five-year period).[48]

▪ Consideration of the use of online reporting, to complement paper-based surveys. (That is, the current paper-based survey form, essentially based upon that of the U.S. CFS and supported by online and telephone support, should be used as the basis.) The U.S. CFS considered online reporting for the 2007 survey; however, its actual implementation was cancelled due to budget considerations. Online reporting is being considered actively for the next CFS, proposed for 2012.[49]

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[47] Southworth, F., "A Preliminary Roadmap for the American Freight Data Program (DRAFT)." Oak Ridge National Laboratory, Oak Ridge, Tennessee, 2004.

[48] Telephone conversation with Joy Sharp, Assistant Director for Survey Programs, Bureau of Transportation Statistics, 1 September 2009.

[49] Ibid.

- Consideration should be given to making participation in the CFS mandatory. This in turn likely requires a linkage to existing compulsory surveys and data gathering; and – it follows – participation (if not leadership) by Statistics Canada.

  The mandatory participation in the U.S. is not seen as the primary motivation for its relatively high response rate: rather, the perception of the Bureau of the Census as a reputable and high-profile government organization is viewed as encouraging participation by establishments. Moreover, the U.S. CFS now has a 'history,' which does not exist in Canada: this encourages participation as well.

  Regardless, it should be noted that participation in the U.S. CFS has consistently been of the order of 60%: this refers to the provision of the required data over most of the four quarters. (The participation rate of 70% - 75% that is cited in the literature refers to a sample that is weighted according to volume, which in turn reflects the larger establishments.) The primary reasons for non-compliance are non-applicability (e.g., the sampled establishment does not ship goods): although considerable effort is placed in identifying and removing these establishments during the sample preparation, the process is not guaranteed.[50]

4.3 Commodity Flow Survey Sampling Method

The purpose of this section is to outline a commodity flow survey sampling method for Canada. This proposed method is similar to one used by the 2007 Commodity Flow Survey in the United States by the joint effort by the Research and Innovative Technology Administration (RITA), the Bureau of Transportation Statistics (BTS), and the U.S. Census Bureau of the U.S. Department of Commerce.[51] The issue is the development of appropriate strata to differentiate urban areas from the remaining areas of each province or territory.

4.3.1 Stratification

Stratification is a method of sampling a population by purposely focusing on the groups of interest. Stratification has several advantages over simple random sampling which includes obtaining a higher level of precision for the groups of interest. The stratification used by the 2007 CFS is such that the number of surveys distributed is based upon *geography* and *industry*. The number of surveys that should be collected from each geography and industry strata can be allocated at least one of two ways. The first way is to allocate the number of surveys in proportion to the size of the strata. If the population in the strata is large, then the variation in the responses to the survey will likely be quite large, and therefore the number of surveys allocated to that population should be proportionate to size of the population.

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[50] Ibid.
[51] http://www.bts.gov/programs/commodity_flow_survey/

The second method of allocation requires knowledge of the standard deviation of the responses to the survey by strata. This second method is known as *Neyman allocation*, and is the allocation of the number of surveys in proportion to the standard deviation of the responses by strata.[52] Usually the standard deviation of a stratum can only be known through the collection of prior data, usually through a previous survey. The 2007 CFS does use the Neyman allocation along with methods which take into account the strata boundary breakpoints.[53]

4.3.2 Stratification by Geography

The 2006 *Census of Canada* population counts identify 144 Census Metropolitan Areas (CMAs) and Census Agglomerations (CAs) across Canada. The ten largest CMAs and CAs are listed in **Table 15**, the ten smallest CMAs and CAs with populations greater than 100,000 are provided in **Table 16** (note that in 2006, there were 35 CMAs and CAs with populations greater than 100,000), and the ten smallest CMAs and CAs greater than 50,000 population are in **Table 17** (again, note that in 2006 there were 59 CMAs and CAs with populations greater than 50,000). [54] The overall ranking of each in terms of population is listed as well.

The level of stratification is derived from the level of detail that is needed in the findings and from the available budget. Increasing the number of strata increases the number of surveys that must be collected. Obviously the ideal is to collect data across all subdivisions, but that approach would be cost-prohibitive. For a CFS in Canada, it will be necessary to set up geographic subdivisions under which all surveyed establishments may be assigned to. A basic national cut-off such as, for example, all subdivisions greater than 50,000 population must be established, and all other establishments found in smaller subdivisions could be assigned to the catch-all location of the rest of the province. However, local, regional and provincial / territorial governments could build upon this base in order to develop a finer geographical sampling plan, under specific funding agreements.

The 2007 U.S. CFS contains 73 metropolitan areas to which establishments are assigned. Establishments that are not found in one of the 73 metropolitan areas are assigned to the balance of the state, area which gives 73 + 50 (metropolitan areas + states) = 123 strata for the geographic division. However, it should be noted that the need to cover all these strata dictates the actual number of respondents: the experience of the U.S. CFS planners indicates that anything less than approximately 100,000 samples suggests that gaps in coverage may result. The number of strata in Canada (and the number of samples) depends, then, on the number of metropolitan areas that are of interest.[55]

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[52]   Rice, J.A., Mathematical Statistics and Data Analysis. Wadsworth, Inc. 1988.
[53]   Winkler, W.E., Strata Boundary Determination. http://www.census.gov/srd/papers/pdf/rr9803.pdf
[54]   Statistics Canada. Population and dwelling counts, for census metropolitan areas and census agglomerations, 2006 and 2001 censuses. http://www12.statcan.gc.ca/census-recensement/2006/dp-pd/hlt/97-550/Index.cfm?TPL=P1C&Page=RETR&LANG=Eng&T=201&S=3&O=D&RPP=150
[55]   Telephone conversation with Joy Sharp, Assistant Director for Survey Programs, Bureau of Transportation Statistics, 1 September 2009.

Table 15: Ten Largest Population Counts for CMAs and CAs, 2006

Rank	Geographic Name	Population
1.	Toronto (Ont.)	5,113,149
2.	Montréal (Que.)	3,635,571
3.	Vancouver (B.C.)	2,116,581
4.	Ottawa - Gatineau (Ont./Que.)	1,130,761
5.	Calgary (Alta.)	1,079,310
6.	Edmonton (Alta.)	1,034,945
7.	Québec (Que.)	715,515
8.	Winnipeg (Man.)	694,668
9.	Hamilton (Ont.)	692,911
10.	London (Ont.)	457,720

Table 16: Population Counts for CMAs and CAs Larger than 100,000, 2006

Rank	Geographic Name	Population
26.	Saguenay (Que.)	151,643
27.	Trois-Rivières (Que.)	141,529
28.	Guelph (Ont.)	127,009
29.	Moncton (N.B.)	126,424
30.	Brantford (Ont.)	124,607
31.	Thunder Bay (Ont.)	122,907
32.	Saint John (N.B.)	122,389
33.	Peterborough (Ont.)	116,570
34.	Chatham-Kent (Ont.)	108,589
35.	Cape Breton (N.S.)	105,928

Table 17: Population Counts for CMAs and CAs Larger than 50,000, 2006

Rank	Geographic Name	Population
50.	Medicine Hat (Alta.)	68,822
51.	Granby (Que.)	68,352
52.	North Bay (Ont.)	63,424
53.	Norfolk (Ont.)	62,563
54.	Charlottetown (P.E.I.)	58,625
55.	Cornwall (Ont.)	58,485
56.	Shawinigan (Que.)	56,434
57.	Saint-Hyacinthe (Que.)	55,823
58.	Vernon (B.C.)	55,418
59.	Wood Buffalo (Alta.)	52,643

For example, a cut-off of 50,000 for subdivisions could be used to create 59 + 10 +3 (subdivisions + provinces + territories) = 72 strata for the geographic division for Canada. On the other hand, some large CMAs might warrant further geographical refinement, corresponding to significant geopolitical or economic sub-regions within the CMAs: this would add to the number of strata. Regardless of which population cut-off is used as the national basis, it will be necessary to apply an expert review to subdivide geographic areas

based upon their **importance as transportation gateways**; allowing, at the same time, for local, regional or provincial / territorial authorities to augment the sample on a cost-recovery basis, in order to achieve finer geographies. Geographical subdivisions of particular importance should not be collapsed with larger metropolitan areas. This approach has also been used by 2007 U.S. CFS.

4.3.3   Stratification by Industry

The North American Industry Classification System (NAICS) 2007 is the current industry standard across Canada, Mexico, and the United States for providing common definitions of the industrial structure. At the highest level of classification there are twenty different classes as shown in **Table 18**.

The larger the number of classifications, the larger the number of surveys needed to obtain goods movement information that is statistically representative for each class. Whether or not classifications can be collapsed - for example, such as across numbers 51 to 55 - is a function of the rates of generation of goods and service movement for each class and how the survey results will be applied by the end-users. (For example, some white-collar industries do not generate significant volumes of goods movement, and so they could be regrouped.)

Table 18: North American Industry Classification System (NAICS) 2007 - Canada[56]

Code	Classification
11	Agriculture, Forestry, Fishing and Hunting
21	Mining, Quarrying, and Oil and Gas Extraction
22	Utilities
23	Construction
31-33	Manufacturing
41	Wholesale Trade
44-45	Retail Trade
48-49	Transportation and Warehousing
51	Information and Cultural Industries
52	Finance and Insurance
53	Real Estate and Rental and Leasing
54	Professional, Scientific and Technical Services
55	Management of Companies and Enterprises
56	Administrative and Support, Waste Management and Remediation Services
61	Educational Services
62	Health Care and Social Assistance
71	Arts, Entertainment and Recreation
72	Accommodation and Food Services
81	Other Services (except Public Administration)
91	Public Administration

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[56]   Statistics Canada. North American Industry Classification System (NAICS) 2007 – Canada.
       http://www.statcan.gc.ca/subjects-sujets/standard-norme/naics-scian/2007/list-liste-eng.htm

Classifications may also be expanded. The 2007 Commodity Flow Survey includes, at the highest level, 48 different classifications. These include 21 manufacturing (three-digit NAICS) and 18 wholesale (four-digit NAICS) classifications. The 48 different classifications do not always show up for each geographic stratum. For example it may be, in a metropolitan area, that there are no establishments shipping agricultural products. As stated in the "Survey Overview and Methodology" report, if a classification contributed at least 4% of the total value for the geographic stratum, it was designated as a "do not collapse" stratum. Less than 4% of the total value meant that the classification could be collapsed.

4.3.4 Total Number of Strata and Surveys

Without collapsing, the total number of strata would be multiplicative. For example, 123 geographical areas multiplied by 48 industry classifications would result in 5,904 strata in total. By collapsing across industries, the number of strata can be reduced further. The 2007 CFS included in total 2,745 strata (which includes 160 hazard materials strata and 125 advanced survey strata). Collapsing across strata was accomplished through a combination of a software algorithm and manual regrouping.

The 2007 CFS optimizes the number of surveys collected from each stratum as a function of the variability of the data in the strata. In addition, the 2007 CFS included a maximum sample size of 100 surveys and a minimum of 2 surveys per stratum. The total number of surveys collected was 102,369, giving an average of approximately 37 (102,369/2,745) surveys per stratum.

4.3.5 Determining the Survey Size

In order to determine an appropriate sample size in order to achieve a desired level of precision, it is necessary to have an estimate of the amount of variability in the establishments (e.g., number of employees, volume and frequency of shipments, etc.). This variability is known as the *standard error* and is defined as the square root of the variance. Unfortunately the only way to know the standard error in survey responses is to have collected data from a previous survey. Therefore, it will not be possible to know the precision of the first commodity flow survey conducted in Canada until after the survey is complete.

The 2007 CFS gives a rough idea of the magnitude of the survey that would be needed for an equivalent survey to be conducted in Canada. Most likely, the number of surveys that would be collected during a first commodity flow survey in Canada would be decided as a function of available budget. Once the survey has been conducted, the level of precision obtained can be calculated. The quality of a small sample may be more accurate than a larger enumeration of the entire population because the quality of the small sample can be more easily monitored and controlled.[57]

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[57] Rice, J.A., Mathematical Statistics and Data Analysis. Wadsworth, Inc. 1988.

The number of surveys needed, or sample size, to achieve a level of precision as a function of sampling error can be calculated as described, for example, by Ceder.[58] The following equation was derived from Ceder's *precision tables for survey sample sizes* (page 43):

$$\text{Precision} = \frac{\sqrt{Z^2_{1-\frac{\alpha}{2}} \dfrac{p_i(1-p_i)}{n}}}{p_i}$$

Where:

$Z_{1-\frac{\alpha}{2}}$	Critical value from a standard normal distribution. Usually one of the three values of 1.645, 1.96, 2.75 are used which correspond to a confidence interval of 90%, 95%, or 99%.
p_i	The group proportion, which corresponds to the ratio between the tonnes of commodities measured by the survey compared to the true tonnes shipped by all establishments.
N	The number of surveys.

So, for the following example values:

$Z_{1-\frac{\alpha}{2}}$	1.96
p_i	0.15
N	100,000

The resulting precision is calculated to be 1.24% at the 95% confidence level. Note that the precision of a sample mean is inversely proportional to the square root of the sample size. What this means is that in order to *double* the accuracy of a value measured through a survey, one must *quadruple* the sample size.

4.4   <u>Disclosure Avoidance</u>

The need for greater geographic detail has long been cited as a concern by users of the U.S. CFS and other nationwide travel surveys and censuses. Dissemination rules result in significant "data loss" - that is, the inability of transportation planners to use what otherwise would be rich data sources – as data are made available only in aggregated formats. (Some travel surveys ask permission of the participants for the authority to disseminate detailed

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[58]   Ceder, A., Public Transit Planning and Operation: Theory, Modeling and Practice. 2007. http://books.google.ca/books?id=QucV7bDg9N4C&pg=PA34&lpg=PA34&dq=origin+destination+sample +size&source=bl&ots=JHN8oQmUFt&sig=R9uvIJHWmGPfTzv2orvKS4EcNl0&hl=en&ei=nZhDSuGHE eixtwe_9MyXCA&sa=X&oi=book_result&ct=result&resnum=2#v=onepage&q=origin%20destination%20 sample%20size&f=false.

Pierre Tremblay of MTQ comments that the variability across establishments can be so great that an enumeration for specific data sometimes might be required. On the other hand, the total number of establishments producing significant goods shipments may not be large.

responses. However, experience suggests that a minority – at best – tends to respond affirmatively; and there remains the issue of how to tabulate and present these data with the aggregated data.)

Similar concerns apply to Canadian data sources, including the Census of Canada's Place of Work / Place of Residence linkages. The dominance of large or unique businesses in many communities, and the apparent bias of the CFS to smaller numbers of large establishments, represents an additional confidentiality concern for the Commodity Flow Survey. As well, disclosure 'thresholds' might apply for any one of the many attributes that comprise a record of interest – that is, the more categories a record has, the more likely at least one threshold will be reached: for example, 80% of the data for small geographies were "eliminated" from the 2000 U.S. Census Transportation Planning Package data due the imposition of such threshold rules (i.e., some data were not included in the package while others were provided but only in aggregate form).

The treatment of disclosure in travel data is an emerging topic. The Transportation Research Board recognized the topic in 2003 in its "Concept for a National Freight Data Program," but addressed it only in terms of a research need.[59] This research is now underway, but it is only at a preliminary stage. A 2009 NCHRP study examined possible "disclosure avoidance techniques" that could be applied to travel surveys, in order to avoid 'disclosing' the identity of the respondent.[60] The study focused on 'synthetic data techniques' that could be applied to such data sources as the American Community Survey and the Census Journey to Work linkages. The study identified four broad categories of 'disclosure limiting strategies' that generally have been applied to statistical data of all types:

- Suppression, in which some data are not provided to users (i.e., data that are unique or for which the source can be readily identified).

- Recoding, in which some data are collapsed or swapped.

- Sampling, in which only a subset of the data are provided to users.

- Simulation, in which observed data are replaced by 'pseudo-data.'

Several techniques are often used to implement these strategies:

- Rounding, in which individual data points (i.e., cells in a table) are rounded. For example, values greater than 7 are rounded to the nearest 5, and values between 1 and 7 are rounded to 4. Values of 0 are unchanged. The cells with very small values are those of concern (in this example, values of 4 or less), and their inclusion with larger values (5, 6 or 7) makes it more difficult to identify them. The rounding of the larger cells to the nearest 5 further makes it difficult for an 'intruder' to isolate small count cells by

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[59]   Transportation Research Board, "Special Report 276 - A Concept for a National Freight Data Program." Transportation Research Board, Washington, DC, 2003.

[60]   Tierney, K., Fienberg, S.E. and Love, T.M.T.P., "Disclosure Avoidance Techniques to Improve ACS [American Community Survey] Data Availability for Transportation Planners," Report No. NCHRP 08-36, Task 71. National Cooperative Highway Research Program, Transportation Research Board, Washington, DC. May 2009.

subtracting the other cells in a row or column. The key disadvantage is that the absolute and proportional values of the cells are changed demonstrably.

- Cell suppression, in which the values for small-count cells are suppressed (not reported). However, an intruder still could infer some values, by looking at the row or column totals (which are not suppressed): to address this, some agencies use an additional suppression of larger values. However, the legitimate user cannot discern the actual value of the cell, or which cells truly are small-count suppression.

- Data recoding, in which random or systematic 'perturbations' (i.e., changed values) are introduced to the values, to protect the smaller-value cells. The perturbations – e.g., subtractions or additions to individual cell values – can be arranged so as to ensure that the row and column totals are unaffected, thereby maintaining a reasonably accurate distribution while protecting confidentiality. However, the perturbations can be arbitrarily applied.

- Data synthesis, in which all cell values are replaced by a mathematical model (which, in turn, is derived from the data), so that only the modelled values, and not the actual observed values, are reported. In addition to providing modelling values for 0-value cells, it is difficult for the user to determine how closely the model fits the observed data. Although this is 'only' a model, the accuracy of the data is not biased by perturbations, which can be subjective.[61]

As can be seen, each of the aforementioned methods has its limitations. However, the NCHRP researchers found that data synthesis likely provided the best approach for transportation planning needs. Accordingly, the NCHRP study assessed the use of two alternatives to the aforementioned techniques. The application was for the American Community Survey (i.e., relating to the movement of people, not goods). However, the approaches may have potential application to goods movement – although this requires further research and verification. The two alternatives were the following:

- Iterative Proportional Fitting (IPF) – essentially, the application of the 'Fratar' modelling process to develop synthetic matrices. Tests with the U.S. Census Journey to Work linkages provided adequate results and demonstrated the feasibility of the method. However, certain biases in the synthesized data "seemed" to occur.

- As a result, a combined IPF / Bayesian approach was considered. The Bayesian techniques were used to synthesize workers' place of residence (even at small-value cells) according to disclosable data. The results were found to be "promising," because the synthetic and observed data matched well, with in the observed fit and statistically.

The study concluded by noting that its findings were preliminary, and that further testing was recommended. At the time of this writing (August 2009), the NCHRP had initiated further detailed research.

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[61] The 2009 NCHRP study notes that commonly used techniques to account for missing values in travel surveys, such as imputation, constitute a type of data synthesis.

Insofar as Canadian goods movement data are concerned, it may be appropriate to conduct tests on existing data sets, using the currently available techniques described above. This would provide a stop-gap measure for immediate use, as the results of the NCHRP research become available to practice.

4.5   Integration of Urban and Inter-Urban Commodity Flow Surveys

The application of a survey sampling and stratification strategy (as described in **Section 4.3**) and the development of improved disclosure avoidance techniques (**Section 4.4**) both address data needs at the inter-urban level – that is, they provide the basis for a national Commodity Flow Survey. However, the very small geographies required at the urban level (i.e., traffic analysis zones), the more precise and detailed nature of the information needs that are collected from urban goods surveys (trips as well as flows, to be used in detailed modelling, among other applications), and the different sampling frames (i.e., local business registries) all mean that these approaches may not always be applicable at an urban scale, or at least not in the same way. On the other hand, the high costs and resource requirements of these urban goods surveys means, to achieve some purposes, that local, regional or provincial / territorial authorities may wish to pay to augment the sample size in specific areas in order to achieve a finer geography; moreover, it may be easier to gain buy-in and to develop local funding partnerships. In sum, both approaches for collecting urban goods data – urban goods surveys *and* augmenting the local sample for a large-scale CFS – have their merits. It is important to note that the two approaches are complementary, and that one is not the substitute for the other. Both respect the conceptual definition proposed in **Section 3.3**.

As noted, the augmentation approach essentially maintains the same characteristics (sampling frame, survey method, analytical method, etc.) as the national CFS. While the need remains to address disclosure considerations, integration is inherent.

Insofar as conducting separate urban goods movement surveys is concerned , there remains a need to be able to integrate these with the inter-urban CFS. The principal challenges of this integration are the following:

- Ensuring consistency in sampling frame sources and classifications. The ideal is to be able to access the same Federal and Provincial / Territorial business registries for both urban and inter-urban CFS. However, as the Calgary experience described above indicates, even these data are not infallible. A more practical approach might be to ensure that a common industry classification is used (NAICS) and that all industry types are included.

- Use of common sets of questions and definitions. That is, the inter-urban CFS would use the same sets of questions, regardless of whether the scope is national, Provincial / Territorial, or groupings or sub-groupings of provinces or territories. Consistency in urban CFS may be more difficult to achieve, given the relative newness of such surveys and the need to continue to experiment and evaluate alternate survey forms and techniques (e.g., paper forms, online forms or in-person surveys; the role of GPS; etc.).

- ▪ Agreement on common sampling and stratification procedures at both levels. The U.S. CFS approach, as noted, could be applied to inter-urban surveys, regardless of scale; and the Edmonton / Calgary approach could be applied to urban surveys. A key qualification of both is that funding and resource requirements are considerable.

- ▪ Common expansion methods. Expansion of the two types of surveys also means adhering to the approaches used in the respective surveys.

- ▪ Geographic aggregation. Being able to 'roll up' detailed geographical information into inter-urban CFS geographies allows the inter-urban CFS data to be used as control totals for the urban data; and for the urban data to provide the necessary detailing.

In essence, given basic aspects of commonality as described above, the two levels of commodity flow surveys (and OD surveys) could continue separately. This also allows for some testing and building up of a storehouse of data and of knowledge.

4.6   Other Data Considerations

Two other needs were raised in the literature or by the TAC project steering committee: supply chain characteristics and the need for common definitions in the traffic counts that support the surveys. These are addressed below.

4.6.1   Supply Chain Characteristics

As proposed in **Chapter 3**, the framework focuses on certain core activities. This core framework, in turn, is intended to serve as the platform upon which more detailed or specific surveys could be conducted, to meet individual needs. The core framework also focused on meeting basic data needs, as a first step.

However, consideration also could be given to complementing a CFS with information on the characteristics of the supply chain. The importance is two-fold: even with a Canadian (or continent-wide) CFS, there still would be some gaps in coverage and in the completeness of the responses; and, information about the full supply chain could be used to corroborate the CFS (and the NRS).

This could be conducted as an adjunct to a sub-sample of the CFS, using the French model discussed in **Section 3.5.1**. As noted, the French CFS focuses on tracing the shipment through the entire supply chain, from shipper to consignee and over all modes. A small number of establishments is sampled, and three shipments are traced for each sample. The advantage of this approach is that it provides a quantitative assessment of the complete chain. A potential disadvantage is that respondents might not know all of the characteristics of each component of the chain: many of the U.S. CFS response problems identified in **Section 3.5.3** would be amplified.

A second approach is provided by TransLink in the Vancouver region: A 2006 study proposed a data collection exercise to capture supply chain characteristics. The study found

that of the three main components of goods movement activity in the Vancouver region - international trade transportation, domestic trade with local industries, and local distribution and service industries supporting the region's population and commercial sector - international trade was a disproportionately large component of the region's goods movement activity compared with similarly-sized areas, because of the importance of Asian trade. As a result, understanding the linkage between transportation system performance and international trade, and how this performance impacts the economic performance of the region's international trade gateways, required a greater understanding of global supply chains. A two-part data collection activity was proposed:[62]

▪ Surveys of 'gateway' facilities (marine ports, rail and truck terminals and the airport) and of major industries and shippers, to gather quantitative data regarding shipping activity (origin-destination, type, size and mode of shipments) and qualitative information regarding how goods are handled along the supply chain, the most critical aspects of transportation system performance (for supply chain performance), the identification of the most critical bottlenecks and how these influence business costs, and how transportation system performance influences their routing choices (i.e., whether through the Vancouver region or via other trade gateways).

▪ Surveys of the economics of the goods movement system, to gather information on how transportation system deficiencies impact local trucking and its costs, and how local trucking costs fit into the overall cost structure of local industries. Surveys were to be conducted of a sample of firms that represented different types of service, commercial and trade businesses.

The data were then to be fitted to a series of spreadsheet models that depicted the supply chain and relevant routing choices, which in turn was to be incorporated into the regional truck forecasting model.

A pilot data collection protocol was tested successfully, and these data will be used for future goods movement initiatives. However, a proposed region-wide data collection was not implemented.[63]

The advantages of the TransLink approach are that it incorporates qualitative and quantitative information, and – because it uses interviews as opposed to CFS-like forms – it minimizes the response burden. As well, the approach has been proven, now, in Canada. On the other hand, because the proposed sample selection was limited to the largest shippers, the representation of the sample may be limited.

It is important to note that these data were not intended to replicate commodity flows. Rather, they help to explain the movement of these flows through multiple legs. Accordingly, such surveys could be used to complement CFS data or even to impute missing information.

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[62] Cambridge Systematics, "Phase II Work Program - Greater Vancouver Goods Movement Study." Prepared for the Greater Vancouver Transportation Authority, December 2006.

[63] Personal communication, Brian Mills, Director, Strategic Planning and Policy, TransLink, 8 June 2009.

4.6.2   Common Classification Schemes for Traffic Counts

The need for a broad range of common definitions for the surveys has been noted above. The TAC project steering committee also noted the need for a common definition for classification schemes that are used in traffic counts: these data are essential for expanding and validating survey data, and for calibrating and validating travel demand forecasting models. As indicated in the user needs survey, (see *Survey Summary Report*), traffic counts are the most common type of data collected by transportation agencies, both urban and inter-urban.

However, despite (or perhaps because of) this wide-spread activity, there is little consistency in the scheme used to classify vehicle types. This matters, because it limits the comparability both of the actual counts and, perhaps more important, of survey data (which may have been expanded according to different vehicle classifications).

The U.S. Federal Highway Administration has developed a common classification scheme for 13 vehicle types, with an allowance for two additional categories.[64] The scheme for the commercial vehicles subset is illustrated in **Exhibit 13**.[65] The scheme has been adapted by several states and by Canadian authorities, although with some variations.

Table 1. FHWA commercial vehicle classification schema.

Vehicle Class	Schema	Description
4		Buses
5		Two-axle, six-tire, single-unit trucks
6		Three-axle single-unit trucks
7		Four- or more than four-axle single-unit trucks
8		Four- or less than four-axle single trailer trucks
9		Five-axle single trailer trucks
10		Six- or more than six-axle single trailer trucks
11		Five- or less than five-axle multi-trailer trucks
12		Six-axle multi-trailer trucks
13		Seven- or more than seven-axle multi-trailer trucks

Exhibit 13. FHWA Vehicle Classification "Scheme F"

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[64]   Federal Highway Administration, "Traffic Monitoring Guide," Section 4, Vehicle Classification Monitoring, Federal Highway Administration, Washington, DC. May 2001. http://www.fhwa.dot.gov/ohim/tmguide/tmg4.htm#app4c.

[65]   Federal Highway Administration, "Estimating Cumulative Traffic Loads, Volume II: Traffic Data Assessment and Axle Load Projections for the Sites with Acceptable Weight Data, Final Report for Phase 2; Chapter 1. Introduction," Table 1. Federal Highway Administration, Washington, DC. Updated June 2006. http://www.fhwa.dot.gov/pavement/ltpp/03094/01.cfm.

A related issue concerns the ability to differentiate commercial and private light vehicles (minivans, light trucks and even automobiles): these must be differentiated not by the vehicle body type or number of axles, but by the markings on the vehicle or, in some cases, by the licence plate (which may be different for commercial registrations). Limited data are available on this differentiation, which requires special surveys that allow counters to make this distinction, in addition to that of the body type.[66] Individual transportation agencies could conduct such surveys, in order to develop the appropriate private / commercial vehicle mixes. Data could be shared among other agencies, to gain ranges of values by location (urban or inter-urban), city size, type of facility or time of day. The resultant factors could be applied to counts, in order to allow for the necessary differentiation.

Finally, it should be noted that the counting locations – screenlines, cordons and intersections – similarly require a structure and consistency over time. Major goods movement terminals (airports, marine ports, intermodal terminals) should be covered, as well. It is essential that the counts are conducted according to a regular cycle and, in particular, must coincide with the actual roadside surveys or CFS. Consistent, practical and statistically reliable methods for expanding count data, interpolating missing data and allowing for seasonal variation also are required. Finally, it is important to ensure that counts cover all the important activity times for goods movement: for example, many existing count programmes cover only selected daylight hours (corresponding largely to commuter travel and other daily personal activity), whereas much goods movement activity occurs during the night or even continuously over a 24-hour period. (Given the inherent problems of night-time counts, methods also should be investigated to synthesis data, as an alternative.)

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[66]   Miranda Carlberg of Saskatchewan Highways and Infrastructure points out that reconciling intra-city vehicle type standards may not be very difficult because of the equipment being used today. Weigh-in-motion equipment retains axle and spacing records, so post-processing could be done to generate any classification scheme required.

5.   SUMMARY AND NEXT STEPS

5.1   <u>Summary</u>

This report has proposed a core framework for the collection of high-quality data on urban (and, necessarily, inter-urban) goods movement. At the core of the framework are four components: origin-destination surveys and commodity flow surveys, which in turn are differentiated for urban and inter-urban treatments. Best practice examples exist for the urban OD and CFS (namely, Edmonton, Calgary and Peel Region), and for the inter-urban OD survey (the National Roadside Survey). However, the principal gap is a Canada-wide commodity flow survey, the basic dimensions of which are proposed herein. Other surveys and data collection activities could be 'hung' from this platform. Moreover, local, regional, Provincial and Territorial authorities could augment the sample in selected locations, on a cost-recovery basis, to allow for a finer geographical level; all maintaining the same survey method, sampling frame, etc.

The Canada-wide CFS would follow the same questionnaire and have the general logistical requirements as the U.S. CFS. The possibility of a collaborative effort with the sponsors of the U.S. CFS to synchronize the two surveys should be investigated, yielding economy of scales in logistics and execution costs.

Similarly, the Edmonton, Calgary and Peel surveys, which are variations of each other, represent the state of the practice for urban goods movement surveys in Canada, and the continued conduct of these surveys should be encouraged, as a complement to the CFS. It is important to note, however, that subsequent surveys might add components and improve others, and so it is not desirable to 'fix' a single survey format, beyond the general framework that has been adapted in these three surveys.

On the other hand, it is important to develop common terms and definitions, particularly in the categorization of industry and commodity types as well as of vehicle classifications for traffic counts (which support the surveys). A sampling method is proposed for the CFS, which by intent is similar to that of the U.S. and, accordingly, allows for a possible integration with the U.S. CFS. In turn, this integration allows for an improved analysis of cross-border flows. A Canadian CFS could be coordinated with a National Roadside Survey. Improved disclosure avoidance techniques are being developed, and some preliminary testing using current techniques should be considered in the development of any future surveys or pilot tests.

It is recognized that the effort required to conduct a nation-wide CFS is not trivial. This effort requires coordination at several levels, as well as significant resources. However, the need is clearly demonstrated in the user needs' surveys; and the benefits to transportation planning and investment decisions would be considerable (to speak nothing to the potential improvements to the efficiency of goods movement and, it follows, to the country's economic wellbeing and competitive position).

5.2 Next Steps: Implementation Strategy

This section proposes a nine-part implementation strategy to advance the identified needs and develop the framework, as follows:

5.2.1 Develop a Business Case for a CFS

The nation-wide coverage of a Canadian CFS requires national coordination and this in turn requires collaboration of all levels of government as well as non-governmental partners. Accordingly, the object of this activity is to detail the specific requirements of a Canadian CFS for presentation to responsible agencies, and importantly to agencies of the Federal Government, to lead a CFS. It is noted that part of the success of the CFS in the United States has been that the survey is mandatory and conducted as an interagency effort involving a partnership among the Bureau of the Census, U.S. Department of Commerce, and the Bureau of Transportation Statistics, U.S. Department of Transportation. In Canada is also likely that several Federal Government departments would need to be involved, potentially including Transport Canada, Industry Canada, Statistics Canada and possibly others.

It is proposed that this report be presented to Transport Canada to explore the role it might take to move this forward at the Federal level. Transport Canada has developed key knowledge in the field of goods movement in several ways:
- Its leadership in the development of economic and trade gateways and corridors, as well as several other transportation initiatives (including the funding of urban transportation improvements), in cooperation with local, regional and Provincial authorities.
- Its Canada-wide mandate for several aspects of multi-modal goods movement policy and regulation.
- The department already is a user of multi-modal inter-urban goods data, and has sponsored nation-wide initiatives such as the NRS.

Statistics Canada could become the administrating department, to ensure consistency with the procedures of Statistics Canada's other mandatory data gathering activities, such as the Census of Canada and existing goods movement data collection activities that it conducts for Transport Canada.

The business case can draw from this research. It would include:
- Overview of the proposed Canadian CFS.
- Outline of the CFS and proposed approach.
- Applications of the data, and who would use the data.
- Benefits and costs.
- Detailed implementation plan.

In our opinion, an important aspect of the business case is to develop partnerships and support from other interested organizations. A first step would be the endorsement of the

framework and, specifically, the CFS, by TAC's Board of Directors.[67] Presentations should be made to other organizations – e.g., provincial / territorial ministries of economic development or municipal affairs (and local / regional counterparts), port authorities, and goods movement industries associations – in order to build support for the concept. Consideration also should be given to establishing a level of financial support that other levels of government would be willing to provide to a Federally-driven CFS.

5.2.2 Establish Sustainable Funding for Other Data Collection

Complementary to the CFS business case, local, regional and provincial / territorial governments could develop sustainable funding to ensure continued and regular conduct of other necessary data – in particular, the NRS as well as traffic counts and travel time surveys. Solicitation of Federal funding also could be an option given, for example, the linkage of trade and economic competitiveness (and other issues, such as safety) to efficient transportation.

5.2.3 Establish Quick Wins in Data Collection

One respondent to the user needs survey advocated the use of 'quick wins' in data collection and surveys, in order to demonstrate what could be done (and to what benefit) while increasing the awareness of the need for proper data. The intended audience includes decision makers at all levels of government; equally important it should include the transportation professionals who are responsible for their organization's data collection activities and those who would use the data. An efficient way of doing this is to augment existing data collections activities – for example:

- Extend existing screenline and cordon coverage, to account for night-time traffic along major goods movement facilities.
- Add screenlines and cordons around major goods movement terminals.
- Develop or adapt methods to account for gaps in the data (e.g., for locations where night-time accounts are not practical).
- Ensure that truck and commercial data are distinguished from data and compared with for other traffic in reports and tabulations (i.e., emphasis is commonly given to describing the movement of passenger vehicles in many urban reports; trucking characteristics also should be elaborated). For example, use the data to identify truck peaking characteristics and locations, and distinguish these from and compare these with the characteristics of other traffic.

5.2.4 Test the CFS Concept

The concept of a CFS should be tested, given the significant implications of initiating such a survey on a national scale. This could take place even before Federal sponsorship is

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[67] The Urban Transportation Council approved this report and the implementation strategy at its meeting of 18 October 2009. The Transportation Planning and Research Standing Committee approved the report and the implementation strategy at its meeting of 17 October 2009.

finalized; and tests would go far in demonstrating the viability of the concept. Specifically, we propose three initiatives:

- A pilot test of a Canadian Commodity Flow Survey (see next section).

- A pilot test of a CFS supply chain trace, similar to that conducted in France; using a small sample of from the pilot Canadian CFS.

- The initiation of discussions with the U.S. BTS and Bureau of the Census to promote and plan for integrated Canadian and U.S Commodity Flow Surveys.

This approach is not meant to preclude any other types of surveys; rather, to provide a starting point for a step-by-step build-up of data. Clearly individual policy and planning needs will dictate the need for other surveys, in any event.

5.2.5   Jointly Implement NRS and CFS Pilot Test

We propose that a pilot test of a Canadian CFS be conducted in conjunction with the National Roadside Survey or a component thereof (e.g., Ontario's Commercial Vehicle Survey). The object is to test the CFS in a single jurisdictional environment (i.e., for which a single sampling frame exists [registry of establishments]). Together, the CFS / NRS provide the necessary data on goods flows and goods movement. Moreover, a logical extension of this pilot is to include an American component to the CFS: that is, just as the Federal Highway Administration contributes to the capture of border-crossing data from the NRS, similarly a combined effort at capturing Canada-US CFS data would address the important gap in cross-border flows.

5.2.6   Establish Technical Oversight

A 2003 Transportation Research Board study proposed a national freight data framework for the United States.[68] The focus of that study was on inter-urban freight (mainly truck) data collection, with urban freight considered as a separate element but not detailed. The framework was conceptual in nature. Among many laudable features was a proposal to have technical oversight for future surveys and data collection activities to be provided by a TRB committee.

A technical oversight body similarly would be useful for Canada. However, its focus should be on technical *guidance*. The key reason is that the state of the practice in urban goods movement data collection is relatively immature, compared with that of inter-urban data collection. This means that each agency uses and adds to the last agency's survey – witness the Peel Region research which used the Edmonton / Calgary framework as a basis, but added behavioural questions and methodological tests. Accordingly, in our view a better role for this body would be to:

- Continue to compare and assess surveys and their methods.

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[68]   Transportation Research Board, "Special Report 276 - A Concept for a National Freight Data Program." Transportation Research Board, Washington, DC, 2003.

- Sponsor research on selected specific topics, notably including:

  - Methods to integrate disparate sources of data in a statistically reliable manner.

  - Methods to transfer data from different sources.

  - Assessment and evaluation of alternate survey techniques (specifically, the use of paper, online, face-to-face and telephone surveys, and the potential role of electronic technologies such as GPS).

- Sponsor harmonization of terms and definitions, as well as performance metrics (i.e., ways of expressing and tabulating the data that are collected): these are key recommendations of recent BESTUFS research on urban freight data collection; the point being that these are basic building blocks before commonality of surveys can be achieved.[69]

- Promote the development of business registry databases that are up-to-date: this is a specific need for urban areas, whose own information on businesses often is incomplete and out-of-date.

- Provide a forum for exchange of ideas and a resource base of expertise.

Complementary to this would be a clearinghouse of surveys and methods.

5.2.7   Establish Best Practices / Standards and Definitions

Common standards and definitions would go far in promoting goods movement data collection. As discussed above, these should address:
- Terminology
- Sampling methods
- Data expansion practices
- Survey design and medium
- Traffic counts

It is recognized that there may be several options for a given activity: accordingly, best practices and guidance could be considered as part of this need.

5.2.8   Promote Education and Awareness

Also as discussed above, the importance of having sufficient (let alone 'high quality') goods movement data for a wide range of transportation applications should be widely promoted in the transportation community. TAC is an obvious medium for this, as are other industry associations such as CITE and the CIP (as well as, for example, the Federation of Canadian Municipalities, and goods movement associations). Promotional activities could consist of:

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[69]   Patier, D. and Routhier, J.-L., "Best Urban Freight Solutions II; D 3.2. BESTUFS Best Practice in data collection, modelling approaches and application fields for urban commercial transport." University of Lyon, August 2008.

- Conference presentations and papers.
- Papers in industry newsletters and magazines.
- Presentations to local and regional councils.

Consideration also should be given to hosting a specialty conference on data. The Transportation Research Board has been holding several conferences on the topic of freight data, including a conference on the CFS in 2005. Given the relatively small number of organizations that are involved in goods movement data in Canada, one alternative is to do this via a webinar (which minimizes travel costs and should increase participation). A second option is to hold a specialty conference on the general topic of transportation data (including both passenger and goods movement), which might be more attractive to potential participants while, at the same time, showing how goods movement data collection efforts could complement other data collection and how important they are to planning, analysis and modelling.

5.2.9 Promote the Conduct of Urban Surveys

The aforementioned framework focuses on the development of a nation-wide CFS and on augmenting roadside survey programmes: this responds to the priorities identified by the users. However, given the ultimate focus of this research on addressing urban goods movement data, it is important that urban activities be continued. Accordingly, we propose that efforts should be focused on implementing multi-part surveys similar to the Edmonton / Calgary and Peel Region efforts, in other urban areas in Canada. This allows individual cities to proceed, without necessarily waiting for a national methodological foundation and source of funding. The two key 'conditions' are to build upon the existing best practices, and then to document and disseminate the processes, lessons learned, etc.

5.3 Funding Considerations

The user needs survey indicated a range of costs for the conduct of surveys and counts (see **Section 2.7**). The Edmonton and Calgary multi-faceted goods movement surveys, including roadside surveys at an external cordon, each cost of the order of $1 million. Evidence elsewhere with these types of surveys, and more generally with household travel surveys in Canada, indicates that a seven-figure order of magnitude is not unreasonable. Note that these estimates do not include the development of appropriate sampling frames (i.e., an inventory of establishments by type) or ancillary data collection, such as traffic counts.

The 2007 U.S. Commodity Flow Surveys cost approximately $14 million (USD): although the sample for a Canadian CFS would be smaller (although not necessarily proportionate to the population, given the need to ensure adequate geographic coverage), there would be fixed costs, and the coverage would be augmented in at least two ways, to cover all industry sectors and cross-border movements. Hence, an estimate based upon the proportionate populations or economies alone (i.e., 10%) is unreasonable; and – taking all of the aforementioned factors into consideration – a cost upwards of half of the U.S. cost might well be expected. An initial one-time development cost also might be required although, at

the same time, some economies could be achieved if the U.S. Commodity Flow Survey method, questionnaire and survey tools, which are all well established, are transferred to Canada.

As for funding sources, the Edmonton and Calgary surveys both benefited from the ability to share resources and surveys, as well as funding from the province. Other sources could include economic development agencies or ministries. For a CFS, a provincial / federal coalition, as was done for the NRS, could be a likely medium: on the other hand, linking the CFS to economic censuses, as is the U.S. practice, would give the leading role to Federal departments as discussed above.

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Appendix A
Summary of Survey Results

Data Collection of Urban Goods Movement in Canada Survey Summary of Survey Results

Section 1: Issues and Applications of Existing Data Collection

3) Freight planning may include a wide range of activities and issues, depending on the jurisdiction or municipality involved. What freight planning issues do you consider in your planning function (impact your business decisions)? (Check all that apply)

	Responses
Capacity enhancement (e.g. dedicated truck lanes, access roads to rail intermodal yards, etc.)	28
System preservation (e.g. road maintenance and rehabilitation, dredging port channels, etc.)	28
Operations (e.g. routing restrictions for heavy loads, restrictions on terminal hours, etc.)	28
Safety (e.g. highway-rail crossings, dedicated routes for hazardous material shipments, etc.)	25
Environmental (e.g. restrictions on trucks traveling through neighbourhoods, air quality, etc.)	31
Policies	29
Human resources (availability of skilled labour, etc.)	9
Other	5

Comments related to the 4 respondents that indicated "Other" survey types:

1.	Land Use and Development
2.	GHG implications
3.	GHG generation
4.	Interrelationships among modes e.g. transit
5.	High level/Strategic/Corridor Planning

4) How do you use freight data to address the aforementioned freight planning issues? (Check all that apply)

	Responses
Developing profiles and trends analysis of current conditions	25
Modelling and forecasting freight demand	21
Traffic operations analysis	25
Facility/access design	25
Environmental assessments/air quality or Climate Change assessments	21
Cost-benefit or financial analysis	18
Investment decision-making	18
Responding to community, public or political concerns and questions	29
Other	5

Comments related to the 4 respondents that indicated "Other" survey types:

1.	Don't have access to any of this data
2.	Don't have access to data
3.	Policy development
4.	Commercial vehicle modelling and forecasting
5.	Localised truck traffic counting

Section 2: Data Collection Programs

1) Do you administer or fund surveys to collect freight data?

	Responses
Yes	16
No	17

2) What types of surveys do you administer or fund? (Check all that apply)

	Responses
Roadside/intercept surveys	12
Combined telephone mailout/mailback surveys	6
Telephone surveys	3
Commercial vehicle trip diaries (e.g. trip logs)	4
Personal interviews	8
Internet surveys	3
Mailout/mailback surveys	2
Other	3

3) For roadside/intercept surveys:

	Please give a short description of your roadside/intercept survey program (i.e. survey name, objectives, etc.):	*Please describe briefly your successes and lessons learned for this type of survey:*	*What year was your last survey conducted?*	*What was the sample size for your last survey?*	*How frequently do you conduct these surveys?*
1.	we rely on [province], TC surveys				
2.	various specific studies for infrastructure design in urban communities		2009	unsure	several are funded per year
3.	Typical truck counts, classification counts.		2006	3000 trucks per day	annual
4.	Past survey of truck movements for truck model development (1999). Potential future replication.	Development of truck model.	1999		Rarely
5.	Commercial Vehicle Survey (CVS) forming part of [province]'s contribution the Transport Canada National Roadside Survey (NRS), objective: to measure time series trends related to truck travel characteristics covering the vehicle, driver, carrier, commodity and trip	While the final product is comprehensive, transparent and provides an accurate measure various metrics including: trips (hourly, day-of-week volume), tonnage, and facilitates linkages to economic attributes the survey itself is intrusive to truck drivers, difficult if not impossible to repeat on an annual basis, costly to conduct, intrusive to [provincial] enforcement staff, takes years to process the data.	2007	100,000 surveys collected within Ont between 2005 to 2007	this is not programmed, frequency can be 2 to 5 years, but the future is uncertain
6.	[City's] Roadside Origin/Destination Survey. Completed in 2007 to obtain a better understanding of truck movements to and through [city] along [highway] to support a future vision for a new bypass.	The end result of the data produced was extremely valuable as it in itself provided opportunities for further freight movement studies and congestion cost analysis. Lessons learned that it is extremely difficult to set up a roadside station in our area due to site conditions. The nearest weight stations provide to be the safest alternative, however some distance away from the city	2007	Total 340 trucks over 3 Days at 2 locations.	Infrequently.

	Please give a short description of your roadside/intercept survey program (i.e. survey name, objectives, etc.):	*Please describe briefly your successes and lessons learned for this type of survey:*	*What year was your last survey conducted?*	*What was the sample size for your last survey?*	*How frequently do you conduct these surveys?*
		itself.			
7.	These are done from time to time. Generally, as a "one-off" initiative to collect information in a specific area/region. There is no ongoing program.	Can be difficult to get people to participate. For trucks, undertaking surveys at weigh scales is usually more successful.	2007	4 locations; 500 to 2000 vehicles	As required.
8.	2007 [provincial] Commercial Vehicle Survey. As part of a province-wide CVS conducted by [province], the City and other agencies funded two additional survey sites, targeting truck traffic using two bridges. The objective is to establish a comprehensive database on origins, destinations and characteristics of interprovincial truck travel.		2007	Sample size is around 14% of total trucks.	No specified frequency. The latest survey was conducted in 2007, and the previous one was conducted in 1999.
9.	[Regional] External Truck/Commodity Survey Objective: Collect O-D information and type of goods and services being moved to and from the Region and through the Region	We were successful in stopping a large number of trucks. The interview questions were well received. We were able to get the O_D and routing information. The type of trucks and the share of traffic were deemed valuable. However, due to the 9/11 incident, some of the operators were reluctant in divulging the contents being transported. Also it was difficult to obtain the value of the goods. We were deficient in collecting the dangerous goods information.	2001	6390 surveys were accepted. This was 98% of the operators interviewed and 94% of the trucks counted	This was a one time survey
10.	Truck counts, license matching for O-D patterns		2002	Two days, approx 600 units	very sporadically

	Please give a short description of your roadside/intercept survey program (i.e. survey name, objectives, etc.):	Please describe briefly your successes and lessons learned for this type of survey:	What year was your last survey conducted?	What was the sample size for your last survey?	How frequently do you conduct these surveys?
11.	External Truck Survey used for calibrating the Regional Transportation Model. Truckers intercepted at external cordon locations. Origin and Destination survey of Medium and Heavy trucks.	Need full cooperation from the Province. Extremely difficult to stop trucks on the highway.	2000		Once every 10 years
12.	Two types of surveys: Participation in the NRS with Transport Canada and other provinces n 1995, 1999 and 2006-2007; and ad hoc roadside OD surveys for specific corridor studies.	The national roadside studies present several challenges in the quality of the information, but they provide very rich information on inter-urban goods flows. In contrast, corridor coverage is incomplete and much urban activity is missing.	2006	The final 2007 NRS results are not yet available. A total of 114,700 surveys at 183 sites were conducted across Canada, of which 20,700 were conducted at 49 sites in [province].	These surveys used to follow a 4-5 year cycle (1991, 1995, 1999, 2006-2007), but this [cycle] is not prescribed. The next survey has not yet been planned.

4) Are the data resulting from your survey available to the public?

	Responses
Yes	7
No	5

5) What is the format of data dissemination? (Check all that apply)

	Responses
Hardcopy	4
Electronic	9

6) For combined telephone-mailout/mailback surveys:

	Please give a short description of your combined telephone-mailout/mailback survey program:	*Please describe briefly your successes and lessons learned for this type of survey:*	*If data collection for this survey type was completed in a joint program along with other survey type(s) for which you have already provided information, please specify those other survey type(s) here.*	*What year was your last survey conducted?*	*What was the sample size for your last survey?*	*How frequently do you conduct these surveys?*
1.	[Regional] Commercial Travel Survey Shipper based survey to collect information about goods and services movements in urban areas	Successes: Good response rate, unprecedented data for modelling in the [region], successful pilot test such that the instrument is being used and considered for use in other surveys in the [region]. We also conducted paper/pencil driver log survey for trucks regularly returning to the shipper (usually private fleet for the shipper). On half of these trucks, we installed electronic onboard recorders that collected GPS and engine data. This experiment gave us new insights into the advantages/disadvantages of electronic data. Lessons learned: Recruitment challenges... how to get the right person on the	Driver logs for drivers regularly returning to the shipper firm.	2007	600 shippers, 100 drivers.	This was a one time survey, though I think such surveys should be conducted on a regular basis, at a larger scale, coinciding with the census and [regional OD survey].

	Please give a short description of your combined telephone-mailout/mailback survey program:	*Please describe briefly your successes and lessons learned for this type of survey:*	*If data collection for this survey type was completed in a joint program along with other survey type(s) for which you have already provided information, please specify those other survey type(s) here.*	*What year was your last survey conducted?*	*What was the sample size for your last survey?*	*How frequently do you conduct these surveys?*
		telephone, importance of careful sample design, some small problems in the design of the questionnaire, importance of privacy of data, technological challenges with electronic on board recorders, dealing with very large and very small firms for which the survey was not as effective.				
2.	[Regional] Goods Movement Study. The objective of the survey was to provide clear understanding on the goods movement operations in the [region]: travel patterns, costs of goods movement, evaluate effectiveness and effect of goods movement on existing transportation network, review policies concerning goods movement in particular			1989	6.2% of total registered trucks were sampled. Complete responses were received from 19.5% of the total sample.	Done only once in 1989.

	Please give a short description of your combined telephone-mailout/mailback survey program:	*Please describe briefly your successes and lessons learned for this type of survey:*	*If data collection for this survey type was completed in a joint program along with other survey type(s) for which you have already provided information, please specify those other survey type(s) here.*	*What year was your last survey conducted?*	*What was the sample size for your last survey?*	*How frequently do you conduct these surveys?*
	those concerning restrictions on goods movement.					
3.	2002 [regional] Commodity Flow Survey The main objectives of the Commodity Flow Surveys were to: - Measure the magnitude of goods and service movements throughout the [region] - Provide information on the characteristics of these goods and movements - Determine the quantity, origin-destination, and types of vehicles used to move the goods and services throughout the [region]	For the most part the establishments surveyed were quite good in completing the survey. However, there were a few establishments that needed personal help from our consultant in filling out the forms. We had a good response for buy-in from the establishments. The draw back of the survey was poor buy-in from fleet allocators.	External Region Truck/Commodity Flow Survey	2002	In order to measure the magnitude of goods and services that are produced and then shipped in the [region], only those business establishments that produce and ship (or move) a good or service, were included in this survey. Between Oct 2001 and Aug 2002, 27,478 business establishments were contacted in the [region] to determine their eligibility to participate in the Survey. At the same time, information was also collected to establish the number of employees, location and industry category of the establishment Of these business establishments, 13,792	One time Survey

Please give a short description of your combined telephone-mailout/mailback survey program:	*Please describe briefly your successes and lessons learned for this type of survey:*	*If data collection for this survey type was completed in a joint program along with other survey type(s) for which you have already provided information, please specify those other survey type(s) here.*	*What year was your last survey conducted?*	*What was the sample size for your last survey?*	*How frequently do you conduct these surveys?*
				were eligible to participate in the survey in that these establishments produced either a product or service that required transportation. And of these eligible establishments, 4,324 agreed to participate in the survey.	
4. 2000 Commodity Flow Survey for calibrating and validating the Regional Transportation Model.	Standardised reporting units with fewer options should be established. Home based businesses added challenges Service vehicle drivers unable to place value on their service.		2000	49,354 stops gathered from 3,107 completed surveys	
5. Perishable goods survey to collect volumes, frequency and destination date. Issues survey to find out the most critical transportation and logistics issues facing shippers.	you need to keep the surveys focused and short - easy to respond to. Data collected in this manner was meaningful, however, less of a response rate than internet surveys.				

7) Are the data resulting from your survey available to the public?

	Responses
Yes	2
No	2

8) What is the format of data dissemination? (Check all that apply)

	Responses
Hardcopy	1
Electronic	2

9) For telephone surveys:

	Please give a short description of your telephone survey program (i.e. survey name, objectives, etc.):	*Please describe briefly your successes and lessons learned for this type of survey:*	*If data collection for this survey type was completed in a joint program along with other survey type(s) for which you have already provided information, please specify those other survey type(s) here.*	*What year was your last survey conducted?*	*What was the sample size for your last survey?*	*How frequently do you conduct these surveys?*
1.	The [city] commissioned a Freight Movement Study in 2007. The objectives of the study; to determine the feasibility of an intermodal facility on the outskirts of the city. Ultimately the intent was to determine the longer term viability of an active rail corridor that traverses through the urban area.	Of primary interest were a number of industries in the centre core whom rely on the rail corridor. The impact associated with trucking goods to the intermodal facility versus direct loading to rail. There was some sensitivity amongst the industries as it related to current market conditions and pending closures and/or downsizing.		2007		
2.	Collect info for local/regional traffic movements.			2004	30	As required

10) Are the data resulting from your survey available to the public?

	Responses
Yes	0
No	1

11) What is the format of data dissemination? (Check all that apply)

	Responses
Yes	0
No	0

12) For commercial vehicle trip diaries:

	Please give a short description of your commercial vehicle trip diary survey program (i.e. survey name, objectives, etc.):	*Please describe briefly your successes and lessons learned for this type of survey:*	*If data collection for this survey type was completed in a joint program along with other survey type(s) for which you have already provided information, please specify those other survey type(s) here.*	*What year was your last survey conducted?*	*What was the sample size for your last survey?*	*How frequently do you conduct these surveys?*
1.	[Regional] Commercial Travel Survey	See previous entry	This was in combination with the shipper based mail-out mail-back survey.			
2.	Trip end studies at selected commercial establishment for planning purpose	similar type of land use will yield approximately the same amount of trips per objective, however, it may not be applicable/reflective for the function of our network		2007	20 trucks per peak hour	based on applications/ concerns, its done on an as needed basis

13) Are the data resulting from your survey available to the public?

	Responses
Yes	1
No	0

14) What is the format of data dissemination? (Check all that apply)

	Responses
Hardcopy	0
Electronic	1

15) For personal interviews:

	Please give a short description of your personal interview survey program (i.e. survey name, objectives, etc.):	*Please describe briefly your successes and lessons learned for this type of survey:*	*If data collection for this survey type was completed in a joint program along with other survey type(s) for which you have already provided information, please specify those other survey type(s) here.*	*What year was your last survey conducted?*	*What was the sample size for your last survey?*	*How frequently do you conduct these surveys?*
1.	[Freight council] goods movement survey					
2.	various specific studies are funded to properly design infrastructure improvements		same as previous			
3.	[Regional] Goods Movement Survey	Preliminary development of qualitative typologies for classes of goods movement. Suitable as input to further studies only.		2008	100	Once
4.	[City] Freight Movement Study Similar to the telephone survey, personal interviews were set up to gain a better understanding of the reliance on the rail corridor. Again, the rail corridor dead ends in the downtown and exhibits relatively low activity.	We were successful in assembling the information required however the data may be slightly skewed in hopes that the rail remains. Significant investment in facilities supports ongoing use of the rail. Some sensitivity related to market conditions and possible down sizing may have influence the responses slightly.				
5.	Collect info from local shippers and transportation service providers	Participants are generally very willing to help with pre-arranged interviews		2008	10	As required
6.	See 2000 Commodity Flow Survey previously.					

	Please give a short description of your personal interview survey program (i.e. survey name, objectives, etc.):	Please describe briefly your successes and lessons learned for this type of survey:	If data collection for this survey type was completed in a joint program along with other survey type(s) for which you have already provided information, please specify those other survey type(s) here.	What year was your last survey conducted?	What was the sample size for your last survey?	How frequently do you conduct these surveys?
7.	Transportation and Logistics air cargo survey. Objective to find out volumes, frequency and destination of major air cargo shipments.	Time consuming, but meaningful data. Also relational - built stronger relationships with the shippers.		2006	30 companies	as needed basis

16) Are the data resulting from your survey available to the public?

	Responses
Yes	3
No	2

17) What is the format of data dissemination? (Check all that apply)

	Responses
Hardcopy	2
Electronic	2

18) For internet surveys:

	Please give a short description of your internet survey program (i.e. survey name, objectives, etc.):	*Please describe briefly your successes and lessons learned for this type of survey:*	*If data collection for this survey type was completed in a joint program along with other survey type(s) for which you have already provided information, please specify those other survey type(s) here.*	*What year was your last survey conducted?*	*What was the sample size for your last survey?*	*How frequently do you conduct these surveys?*
1.	We survey our members on a number of operational and economic matters.	E-survey is the way to go to get quick response. Also keep the #'s element to ranges. If you ask for specifics it will decrease volumes		2009	80	monthly
2.	Shippers Survey of volume of goods, frequency and destination. Rail services survey to obtain rating of rail service; identify issues relating to rail service and to forcast demand for rail services for the next 5 years.	Excellent response due to the fact that many firms were experiencing rail servicing issues. Easy to respond to and therefore more responses than mail surveys.		2006	150 firms	once (as required)

19) Are the data resulting from your survey available to the public?

	Responses
Yes	2
No	0

20) What is the format of data dissemination? (Check all that apply)

	Responses
Hardcopy	2
Electronic	2

21) For mailout/mailback surveys:

	Please give a short description of your internet survey program:	*Please describe briefly your successes and lessons learned for this type of survey:*	*If data collection for this survey type was completed in a joint program along with other survey type(s) for which you have already provided information, please specify those other survey type(s) here.*	*What year was your last survey conducted?*	*What was the sample size for your last survey?*	*How frequently do you conduct these surveys?*
1.	Issues survey to obtain feedback from industry on current industry trends and issues.	more expensive, less response than e-mail more time consuming to collate information. However, those who responded took time to provide more detailed information		2005	250 firms	Alternating years

22) Are the data resulting from your survey available to the public?

	Responses
Yes	1
No	0

23) What is the format of data dissemination? (Check all that apply)

	Responses
Hardcopy	1
Electronic	1

24) Please complete the following fields for one of the other types of surveys you conduct:

	Please enter the name of the survey:	*Please enter a brief description of your survey (i.e. objectives, etc.):*	*Please describe briefly your successes and lessons learned for this type of survey:*	*If data collection for this survey type was completed in a joint program along with other survey type(s) for which you have already provided information, please specify those other survey type(s) here.*	*What year was your last survey conducted?*	*What was the sample size for your last survey?*	*How frequently do you conduct these surveys?*
1.	Various GPS surveys	Objectives: a) To collect electronic on-board recorder data, in collaboration with [GPS provider] from truck fleets of over 250 firms, including over 20,000 trucks. Ultimately we are going to be downloading this information in (delayed) real time via roadside detectors (5 are currently installed, another 25 are forthcoming). The purpose of this is to aid traffic management on the 400 series highways, but also to collect GPS data for pickup/delivery tours throughout the [metropolitan region], over long periods of time. One of the tests that we ran was for a single firm, for which we obtained driver log information from the company, to be compared against electronic on board recorder data for a period of 2 months.	The set up of the real-time data transmission of these data, from 5 test receivers located along [expressway], appears to be successful, although we are still conducting tests. There are some issues of stop identification that we are conducting research on.			>250 firms, >20,000 trucks.	On an ongoing basis.
2.	Screenline surveys	Vehicles volumes and classification at regional screenline locations	Tracks patterns of travel at major screenlines, including volumes, vehicle types		2008		5 years

	Please enter the name of the survey:	*Please enter a brief description of your survey (i.e. objectives, etc.):*	*Please describe briefly your successes and lessons learned for this type of survey:*	*If data collection for this survey type was completed in a joint program along with other survey type(s) for which you have already provided information, please specify those other survey type(s) here.*	*What year was your last survey conducted?*	*What was the sample size for your last survey?*	*How frequently do you conduct these surveys?*
			(classification), time of day, direction and (for passenger vehicles) occupancy.				
3.	Public Open House/Workshop	Facilitated consultations that result in an exchange of information between key stakeholders. Often use a questionnaire to gather more info.	Limited participation. Advertising and promoting Open House/Workshop is critical.		2008	25	As required.

25) Are the data resulting from your survey available to the public?

	Responses
Yes	1
No	2

26) What is the format of data dissemination? (Check all that apply)

	Responses
Hardcopy	0
Electronic	2

27) Do you have an additional other survey type you would like to add?

	Responses
Yes	0
No	3

Questions 28) to 43) repeat questions 24) to 27) concerning any additional other types of surveys conducted. Any additional other types of surveys were added to the answers to questions 24) to 27).

44) Do you conduct traffic counts to collect freight data?

	Responses
Yes	19
No	14

45) What type of traffic counts do you conduct? (Check all that apply)

	Responses
Cordon or screenline counts	9
Toll or turnpike counts	0
Turning movement/intersection counts	14
Traffic counts at weigh stations	4
Mid-block counts	6
State-wide count program	4
Others	0

46) For cordon or screenline counts:

	Please give a short description of your cordon or screenline count program:	*Please describe briefly your successes and lessons learned for this type of traffic count:*	*What was the last year you conducted a count?*	*What was the sample size for your last count?*	*How frequently do you conduct these counts?*	*What was the duration of your count?*
1.	Spot traffic counts to confirm Cordon Count data in [metropolitan region] for corridor planning studies	Comparison of counts in some cases challenges the adequacy of [regional] cordon counts. The reasons for the differences can range from a major incident on the [regional] transportation system to recording errors.		NA	NA	Spot counts run from 2 - 3 hours
2.	Screenline surveys (see above)	Tracks volumes and classifications by time of day as well as trends over time (see above) question.	2008		5 years	Conducted in fall period. 14 days per location for automatic counts. 1 weekday for manual counts.
3.	The [regional] Cordon Count Program involves the counting of vehicles and people that cross selected counting stations which are strategically located at major crossings, such as roads or rail lines, creating screenlines or cordons. The traffic data [are] collected in 15 minute intervals over a specified time period.	One of the strength of cordon count program is that it builds on a wealth of transportation database from the previous years. It is a reliable source for trend analysis. Also, it contains a variety of transportation including	2006	260 counting stations	2-3 years	18 hours per station

	Please give a short description of your cordon or screenline count program:	*Please describe briefly your successes and lessons learned for this type of traffic count:*	*What was the last year you conducted a count?*	*What was the sample size for your last count?*	*How frequently do you conduct these counts?*	*What was the duration of your count?*
	Similar programs are conducted in other regions in the [metropolitan region]. The objective of the Program is to collect consistent and comprehensive regional daily vehicle and person movement data in order to monitor travel pattern changes and to assist in the planning of the transportation system in [region]. The data provides a valuable information source to estimate future vehicle (passenger and truck) and transit trends.	types of vehicle, traffic volume by time, auto occupancy, etc. The shortfall of this program is that it is only a snapshot of one day that represents the survey year.				
4.	[City's] Annual Classification and Occupancy Count Program. Objective: to provide a tool to monitor travel patterns and characteristics on a current and a historical basis. It also assists in short and long-term transportation planning of the city's transportation system.		2008	No sample size, all screenlines are counted at least once every 2 years.	This is an annual program. Some screenlines are counted every year and the others are counted on alternative years. Overall, about 120 screenline stations are counted each year.	From late April to mid June. Counts are done on weekdays for 12 hr from 7: a.m. to 7:00 p.m.
5.	All traffic movements crossing the [urban expressway]	Traffic variation is limited when dealing	2008	Approximately 12 screen and	Yearly	4 days

	Please give a short description of your cordon or screenline count program:	*Please describe briefly your successes and lessons learned for this type of traffic count:*	*What was the last year you conducted a count?*	*What was the sample size for your last count?*	*How frequently do you conduct these counts?*	*What was the duration of your count?*
		with major roads. Factoring of counts is consistent		cordon lines 200 locations in total for the cordon and screenlines		
6.	Peak counts taken at 17 stations along three screenlines include trucks.		2009		Twice yearly.	4 hours per count station, two separate days.
7.	Annual CBD Cordon and once every 5 years a Suburban Screenline study.		2008		Annually for the CBD Cordon and roughly once every 5 years for Suburban Screenlines.	16 hours
8.	Highway counts are programmed in each urban region at the same time that [household] OD surveys are conducted. Some counts are done at screenlines and at external cordons around the urban regions in which the OD surveys are being conducted.	It is impossible to obtain classified highway counts (by vehicle type) at all counting stations and to ensure coherence in the classification counts that are collected by several methods (length, weight, axles, visual review, etc.).	2009	600 directional stations, of which 200 included vehicle classifications counts (all done in connection with a regional OD survey).	Every 5 years in major urban regions; every 10 years in other urban regions.	Each count covers 1 or 2 work days. The counts take place throughout the autumn.
9.	[City] Cordon Count Program - Cordon Count data are used for infrastructure planning, the development of transportation		2006	City Boundary Cordon City Central Area Cordon	The Cordon Count program is conducted on a regular basis with surveys being	One-day counts are taken from Monday through Thursday during the months of

Please give a short description of your cordon or screenline count program:	*Please describe briefly your successes and lessons learned for this type of traffic count:*	*What was the last year you conducted a count?*	*What was the sample size for your last count?*	*How frequently do you conduct these counts?*	*What was the duration of your count?*
policies and as part of the process of monitoring travel trends, assessing the potential impacts of transportation changes.				conducted at alternating intervals of three and two years.	May and June. The base counting period in 2006 was from 6:00 a.m. to 8:00 p.m. Field staff manually count vehicles by direction, type and by occupancy. Totals are recorded for ever

47) Are the data resulting from your count available to the public?

	Responses
Yes	8
No	1

48) What is the format of data dissemination? (Check all that apply)

	Responses
Hardcopy	6
Electronic	9

49) For toll or turnpike counts:

50) Are the data resulting from your count available to the public?

51) What is the format of data dissemination? (Check all that apply)

There were no responses to questions 49-51.

52) For turning movement/intersection counts:

Please give a short description of your turning movement/intersection count program:	*Please describe briefly your successes and lessons learned for this type of traffic count:*	*If data collection for this traffic count type was completed in a joint program along with other traffic count type(s) for which you have already provided information, please specify those other traffic count type(s) here.*	*What was the last year you conducted a count?*	*What was the sample size for your last count?*	*How frequently do you conduct these counts?*	*What was the duration of your count?*
1. Selected TM counts when undertaking EA studies or TIS. Generally 8 hours with vehicle classification.	Placing the counter in the best location improves quality of count. When counts being done by third party it is important that the PM be in the field and to confirm counting location					
2. various specific studies to quantify improvements required for intersections			2009		several per year	8 hour count
3. Cities Annual Traffic Count Program	Due to size of budget, its crucial to select a group of locations (Art, Col, Local) annually that can be representative of Cities network condition.		2008	30 locations, TMC and Tube.	Annually	5-7 hours TMC and 24 hr tube
4. [Regional] Turning Movement Count is a daylight manual count program. The objective is to collect vehicle and person movement at to/from all direction approaching the intersection in order to monitor travel pattern	It provides a valuable source of transportation information to help decision makers to determine road improvement needs. However, due to the fact that it is being conducted manually, there has been	ATR	2008	300 counting stations	1-2 years	8 daylight hours

	Please give a short description of your turning movement/intersection count program:	Please describe briefly your successes and lessons learned for this type of traffic count:	If data collection for this traffic count type was completed in a joint program along with other traffic count type(s) for which you have already provided information, please specify those other traffic count type(s) here.	What was the last year you conducted a count?	What was the sample size for your last count?	How frequently do you conduct these counts?	What was the duration of your count?
	changes and to assist in determining road improvement needs in the transportation system in Peel.	a portion of discrepancy that contributes to human error.					
5.	Hire Counting contractor companies to do field counts (manual)					about every 3 to 5 years for major intersections	typically 8 hours (daytime)
6.	as required	stop sign and signal warrants	Volume counts	2008	location based 8 hours	yearly as required	8hours
7.	Used to measure traffic levels, level of service, and plan improvements where required.	Improves ability to identify capacity issues and plan improvements accordingly		2009		Depends on intersection. Annually, bi-annually, or once every few years.	10 hrs
8.	Undertake turning counts at intersections as required	Very valuable for local design and for long range system planning.		2009	unknown	Estimate about 50 per year	Generally 14 hours on 2 or 3 separate occasions over the course of a year.
9.	Turning Movements Program. Objective: to monitor travel movements. Counts are used for signal			2008		Annual program	Usually 8 or 12 hrs counts on week day from end of April to mid June. However

	Please give a short description of your turning movement/intersection count program:	*Please describe briefly your successes and lessons learned for this type of traffic count:*	*If data collection for this traffic count type was completed in a joint program along with other traffic count type(s) for which you have already provided information, please specify those other traffic count type(s) here.*	*What was the last year you conducted a count?*	*What was the sample size for your last count?*	*How frequently do you conduct these counts?*	*What was the duration of your count?*
	timing and intersection modifications, traffic impact studies, safety studies.						special counts are done for different days and periods upon request (project specific)
10.	Traffic Signal Network Signal Timing verification or redesign	Helps with the timing changes required to move traffic efficiently	No	2008	200	Done yearly but locations vary since there is a need to conduct these counts for approximately 1200. Counts are normally repeated in 4 year cycles or more	5 hours a day between AM Peak Hour, PM peak hour and Off Peak time frames
11.	We count approximately 700 intersections per year.			2009	?	Every year	6 hour
12.	Traffic Count program	Mandated activity					
13.	Annual manual turning movement count program - Ongoing monitoring Program undertaken by [City's] Transportation Services		Automatic road tube counts/ permanent counting stations - embedded loops	2007	City roads only	Annual ongoing program	Manual Counts - 8 hours Everything else 24 hour counts

	Please give a short description of your turning movement/intersection count program:	*Please describe briefly your successes and lessons learned for this type of traffic count:*	*If data collection for this traffic count type was completed in a joint program along with other traffic count type(s) for which you have already provided information, please specify those other traffic count type(s) here.*	*What was the last year you conducted a count?*	*What was the sample size for your last count?*	*How frequently do you conduct these counts?*	*What was the duration of your count?*
14.	Correction intersection geometry Adjusting traffic light	Knowledge of the proportion of truck in an area and established trucker's behavior is important to address our concerns	Our traffic counts are mostly oriented upon projects	2007	±1500	Depending the number and the size of the projects. About twenty counts are complete and about 200 are punctual.	One to 7 days

53) Are the data resulting from your survey available to the public?

	Responses
Yes	10
No	3

54) What is the format of data dissemination? (Check all that apply)

	Responses
Hardcopy	11
Electronic	11

55) For traffic counts at weigh stations:

	Please give a short description of your traffic count program at weigh stations:	*Please describe briefly your successes and lessons learned for this type of traffic count:*	*If data collection for this traffic count type was completed in a joint program along with other traffic count type(s) for which you have already provided information, please specify those other traffic count type(s) here.*	*What was the last year you conducted a count?*	*What was the sample size for your last count?*	*How frequently do you conduct these counts?*	*What was the duration of your count?*
1.	Attempts are made to utilize existing dedicated/existing classification counts where collected. In addition, specialized class counts for a 2 week duration are conducted near to survey site data collection efforts. Traffic counts do not necessarily coincide with our extended multi-year and month survey data collection effort.	Traffic counting is far from perfect, consumes considerable resources. Modelling of traffic counts is always required to balance between multiple in series locations and by direction of travel. Side-fire counters provide the first possible solution. WIMs are desired. Given the vital role of our need for accurate traffic counts, the use of multiple technologies at any cost is cost effective. We have had very positive results with Numetrics devices.		2007	150 locations * 2 weeks * 24 hours	every 5 years	2 weeks * 24 hours
2.	Measures use of weigh station, and truck traffic on route.			2008		annually	year-round
3.	Linked with weigh in motion program	Quiet efficient but information on commodities is not collected	No	2008	100% of all trucks	Continually	24 hours a day, 5 days a week, 52 weeks of the year

	Please give a short description of your traffic count program at weigh stations:	Please describe briefly your successes and lessons learned for this type of traffic count:	If data collection for this traffic count type was completed in a joint program along with other traffic count type(s) for which you have already provided information, please specify those other traffic count type(s) here.	What was the last year you conducted a count?	What was the sample size for your last count?	How frequently do you conduct these counts?	What was the duration of your count?
4.	Traffic count program	Mandated activity		2008	1,000,000 +	Annually	1 year

56) Are the data resulting from your survey available to the public?

	Responses
Yes	2
No	2

57) What is the format of data dissemination? (Check all that apply)

	Responses
Hardcopy	1
Electronic	4

58) For mid-block counts:

	Please give a short description of your mid-block count program:	*Please describe briefly your successes and lessons learned for this type of traffic count:*	*What was the last year you conducted a count?*	*What was the sample size for your last count?*	*How frequently do you conduct these counts?*	*What was the duration of your count?*
1.	Use ATR volume / classification /speed counts for selected EA and TMP studies	Selected TM counts need to be carried out in conjunction with mid block count to confirm degree of accuracy			Selected count locations and time periods	
2.	As part of [city's] Annual Traffic Count Program	its a challenge to facilitate count location with ongoing capital projects/other cities programs	2008	approx 10 midblocks	Annual	7 days 24 hr tube
3.	as required	volumes and types	2005	as required	low frequency 5 yrs	8hrs
4.	Determine hourly traffic variation	Helps identify lane usage and also with operations modelling	2008	550	Rotate in a 2 year cycle	4 days
5.	Automatic Traffic Recorders used to perform 24 hour traffic volume, speed and or classification counts.		2009	?	Continuously	24 hour, daily, weekly.
6.	For evaluating traffic problems	Knowledge of the proportion of truck in an area is important	2007	1500	Sporadically, for project purpose.	One to 7 days

59) Are the data resulting from your survey available to the public?

	Responses
Yes	4
No	2

60) What is the format of data dissemination? (Check all that apply)

	Responses
Hardcopy	4
Electronic	5

61) For province-wide count programs:

	Please give a short description of your province-wide count program:	*Please describe briefly your successes and lessons learned for this type of traffic count:*	*What was the last year you conducted a count?*	*What was the sample size for your last count?*	*How frequently do you conduct these counts?*	*What was the duration of your count?*
1.	Forms part of [province]'s Permanent data Collection Program (PDCS) with approx 80 locations collecting class data 24*7	These systems managed by others provide a valuable and critical service to manage our roads	2009	80 locations collecting class data 24*7	Continuous	15 minute intervals
2.	Traffic counting program covers entire paved provincial network, using variety of permanent and temporary counters.	Allows measure of trends over time.	2008		Annually	varies
3.	weigh-in-motion, AVC, PCS and tube counts at various locations throughout the province	not enough permanent counting stations	2009	hundreds of stations throughout the province	Ongoing	permanent stations are ongoing tube counts are as required
4.	Traffic counts on [province's] highways. Ongoing count programme covers entire province. All of these counts are integrated into a centralized data base and can be accessed via [ministerial] information systems.	Coverage is more or less complete in urban centres; problems are with equipment operations and with data quality.	2009	Over 2,000 count stations covering the entire province	This programme functions well. The 50 permanent count stations transmit data continuously via a telephone link. Temporary stations are activated on a rotating 3-year cycle.	Continuously for the permanent stations. One week for the others.

62) Are the data resulting from your survey available to the public?

	Responses
Yes	2
No	2

63) What is the format of data dissemination? (Check all that apply)

	Responses
Hardcopy	1
Electronic	4

Questions 64) to 83) concern other count types. There were none entered.

84) What types of data are collected in your traffic counts? (Check all that apply)

	Responses
Vehicle weights	4
Vehicle speeds	8
Vehicle lengths	5
Number of vehicles (no distinction by type)	11
Number of vehicles (classified by type)	16
Other (please specify)	2

Comments related to the 2 respondents that indicated "Other" survey types:

1.	Number of Occupancy (classified by vehicle type)
2.	Occupancy

85) What types of classification/categorization systems do you use for the data types identified in the previous question? (Check all that apply)

	Responses
Highway Performance Monitoring System (HPMS) (FHWA - U.S.)	10
Other U.S. Standard (Please specify in comment box below)	0
Canadian Standard (Please specify in comment box below)	2
Standard unique to your organization (e.g. vehicle count classification system) (Please specify in comment box below	7

Comments related to the 9 respondents that indicated "Other U.S. Standard", "Canadian Standard" or "Standard unique to your organization" classification/categorization systems.

1.	[Regional] Cordon Count vehicle classification list
2.	Heavy truck (3+ axles), light truck (2 axles with dual rear wheels)
3.	assorted which is also an issue, too many variations and sources to list
4.	not sure...typically try and distinguish vans and smaller commercial vehicles from multiple axle trucks and buses
5.	Tac
6.	Trucks are classified into two types: light trucks and heavy trucks.
7.	Car (with occupants), Motorcycle (with occupants), Buses (with occupants), Pedestrians, Bicycles, Semi - multiple trailers, Semi - single trailer, Truck - dual axle rear, Truck - single axle rear, Semi - no trailer, car/pickup/van with trailer
8.	Classification categories depend on the equipment type and on the particular need for the count.
9.	Cordon Count Program Vehicle Classification System

86) What methods do you use to conduct traffic counts? (Check all that apply)

	Responses
Tube counts	14
Electronic sensors (e.g. loop inductors, WIM, piezoelectric, radar (RTMS), etc.)	13
Video classification counts	6
Vehicle classification recorders - Manual	11
Vehicle classification recorders - Automatic	9
Other	2

Comments related to the 2 respondents that indicated "Other" survey types:

1.	Visual - short term
2.	GPS

87) Do you use ITS technologies to collect freight data?

	Responses
Yes	9
No	24

88) Please identify the types of ITS technologies you use. (Check all that apply)

	Responses
Weigh-in-motion (WIM) technologies	3
Sensors (i.e. loop detectors, acoustic sensors, infrared sensors, and radar/microwave sensors)	5

Automated vehicle identification (AVI) technologies	1
Environmental sensor stations	0
Vehicle tracking and navigation systems (VT&NS)	1
Closed circuit cameras (CCTV)	2
Global position system (GPS) equipment	4
Aerial videos	1
License plate matching systems	0
Advanced video image processing	0
Cellular phone coordinates (probe vehicles)	1
Automated vehicle classification (AVC)	0
Electronic toll collection equipment	0
Automatic vehicle location (AVL) system	1
Radio frequency identification	0
Smart cards	0
Other	0

Section 3: Public and Commercial Data Sources

1) Do you use any public or commercial data sources to populate freight databases?

	Responses
Yes	11
No	20

2) Which public or commercial data sources do you use in your planning activities?
(Check all that apply)

	Responses
Air Carrier Operations in Canada Quarterly Survey (Statistics Canada)	0
Air Charter Statistics (Statistics Canada)	1
Air Passenger Origin and Destination - Domestic Journeys/Canada-U.S. (Statistics Canada)	1
Aircraft Movement Statistics (Statistics Canada)	0
Airport Activity Statistics of Certificated Route Air Carriers - Bureau of Transportation Statistics	0
Border Crossing Data - Bureau of Transportation Statistics	6
Canadian Vehicle Survey (Statistics Canada)	2
Coastwise Shipping Survey (Statistics Canada)	0
Commercial Vehicle Survey (Ministry of Transportation of Ontario)	4
Commodity Flow Survey (CFS) - U.S. Bureau of Transportation Statistics and the Census Bureau	6
Coupon Passenger Origin-Destination Report (Statistics Canada)	0
For-Hire Trucking Survey (Statistics Canada)	3
Freight Analysis Framework (FAF) - U.S. Department of Transportation	3
Freight Commodity Statistics - Association of American Railroads	1
IANA Report - Intermodal Association of North America	0
International Trade Flow Data (Statistics Canada)	4
LECG Marine Industry Benefits Study	0
LTL Commodity and Market Flow Database - American Trucking Association	0
MARAD - U.S. Department of Transportation Maritime Administration	0
Marine International Freight Origin and Destination Survey (Statistics Canada)	2
Maritime Administration Office of Statistical and Economic Analysis	0
National Roadside Survey / Commercial Vehicle Surveys	2
North American Trucking Survey (NATS) - Association of American Railroads	0
Port/Import/Export Reporting Service (PIERS) - Journal of Commerce	0

Quarterly Motor Carriers of Freight Survey (Statistics Canada)	1
Rail Commodity Origin and Destination Statistics (Statistics Canada)	2
Rail Waybill Sample - Surface Transportation Board	0
Railway Carloadings Survey - Monthly (Statistics Canada)	2
Railway Transport Survey - Annual (Statistics Canada)	2
RAILINC (American Association of Railroads)	0
St. Lawrence Seaway Traffic Report	0
Shipping in Canada Report (Statistics Canada)	2
State Estimates of Truck Traffic - Federal Highway Administration	0
Survey of the Couriers and Local Messengers Industry (Statistics Canada)	0
Transborder Surface Freight Data - U.S. Bureau of Transportation Statistics	3
Transportation Annual Survey - U.S. Census Bureau	0
TRANSEARCH - Insight Database	0
TranStats: The Intermodal Transportation Database - Bureau of Transportation Statistics	0
Vehicle Inventory and Use Survey (VIUS) - U.S. Census Bureau (Discontinued as of 2002)	0
Waterborne Commerce of the United States (US Army Corps of Engineers)	0
Others	4

Air Carrier Operations in Canada Quarterly Survey (Statistics Canada)

There were no responses for questions 3) to 7) concerning the use of this data source.

Air Charter Statistics (Statistics Canada)

8) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	1
Adequate	0
Good	0
Very good	0

9) What shortcomings/limitations have you encountered with these data?

1.	origin of products, specific products in more specific classifications

10) How important are the data to planning?

	Responses
Critical	0
Important	1
Not used for planning	0

11) For what purposes do you use these data?

1.	developing business cases for increased cargo service to specific destinations

12) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	1
Hardcopy	0

Air Passenger Origin and Destination - Domestic Journeys/Canada-U.S. (Statistics Canada)

13) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	0
Adequate	1
Good	0
Very good	0

14) What shortcomings/limitations have you encountered with these data?

1.	fine for general trend data

15) How important are the data to planning?

	Responses
Critical	0
Important	1
Not used for planning	0

16) For what purposes do you use these data?

1.	forecasting

17) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	1
Hardcopy	0

Aircraft Movement Statistics (Statistics Canada)

There were no responses for questions 18) to 22) concerning the use of this data source.

Airport Activity Statistics of Certificated Route Air Carriers - Bureau of Transportation Statistics

There were no responses for questions 23) to 27) concerning the use of this data source.

Border Crossing Data - Bureau of Transportation Statistics

28) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	2
Adequate	2
Good	2
Very good	0

29) What shortcomings/limitations have you encountered with these data?

1.	relevant detail
2.	It is fairly too high-level and can be out of date
3.	good for general information

30) How important are the data to planning?

	Responses
Critical	1
Important	5
Not used for planning	0

31) For what purposes do you use these data?

1.	Border crossing studies - plaza processing and bridge operations MTO provincial corridor EA studies
2.	Developing investment attraction and retention proposals
3.	forecasting

32) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	6
Hardcopy	1

Canadian Vehicle Survey (Statistics Canada)

33) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	1
Adequate	1
Good	0
Very good	0

34) What shortcomings/limitations have you encountered with these data?

1.	Relevant detail

35) How important are the data to planning?

	Responses
Critical	0
Important	2
Not used for planning	0

36) For what purposes do you use these data?

1.	For investment and retention proposals
2.	infrastructure planning

37) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	2
Hardcopy	1

Coastwise Shipping Survey (Statistics Canada)

There were no responses for questions 38) to 42) concerning the use of this data source.

Commercial Vehicle Survey (Ministry of Transportation of Ontario)

43) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	0
Adequate	2
Good	1
Very good	1

44) What shortcomings/limitations have you encountered with these data?

1.	Needs more quality control. Data need to be turned around sooner (3 - 4 years after survey not relevant in fast paced areas such as [region]).
2.	For 2001 implementation the OD codes are often not very precise. No urban focus.
3.	Not easily available

45) How important are the data to planning?

	Responses
Critical	3
Important	1
Not used for planning	0

46) For what purposes do you use these data?

1.	Border crossing studies [provincial] Corridor Planning / Environmental Assessment Studies, Regional Goods Movement Studies
2.	Modelling of intercity flows
3.	provides data for policy development and investment attraction proposals

47) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	3
Hardcopy	1

Commodity Flow Survey (CFS) - U.S. Bureau of Transportation Statistics and the Census Bureau

48) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	2

Adequate	3
Good	0
Very good	0

49) What shortcomings/limitations have you encountered with these data?

1.	Include a lot of assumptions that are not totally understood by user
2.	relevant detail
3.	High level and can be out of date.
4.	also good general trend data

50) How important are the data to planning?

	Responses
Critical	0
Important	4
Not used for planning	2

51) For what purposes do you use these data?

1.	Benchmark alternate analysis techniques
2.	infrastructure investment
3.	Use it to identify first which type of industry is shipping where in order to identify specific companies that are shipping where we want to position our equipment
4.	These are U.S. data, which only give us general indications.
5.	trends and general analysis

52) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	5
Hardcopy	0

Coupon Passenger Origin-Destination Report (Statistics Canada)
There were no responses for questions 53) to 57) concerning the use of this data source.

Cross-Rail Transportation (Statistics Canada)
58) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	0

Adequate	1
Good	0
Very good	0

59) What shortcomings/limitations have you encountered with these data?

1.	General data

60) How important are the data to planning?

	Responses
Critical	0
Important	0
Not used for planning	1

61) For what purposes do you use these data?

1.	

62) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	1
Hardcopy	0

For-Hire Trucking Survey (Statistics Canada)

63) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	0
Adequate	2
Good	0
Very good	0

64) What shortcomings/limitations have you encountered with these data?

1.	I recall a major issue was the lack of OD information.
2.	Covers only part of the universe of truckers. Cannot infer [the characteristics] of the truckers that are not included.

65) How important are the data to planning?

	Responses
Critical	0
Important	2
Not used for planning	0

66) For what purposes do you use these data?

1.	Mainly to gather a few statistics, and general trucking trends
2.	Understanding long-distance flows.

67) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	1
Hardcopy	2

Freight Analysis Framework (FAF) - U.S. Department of Transportation

68) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	0
Adequate	2
Good	0
Very good	0

69) What shortcomings/limitations have you encountered with these data?

1.	Data come from diverse sources, with many limitations.

70) How important are the data to planning?

	Responses
Critical	0
Important	2
Not used for planning	1

71) For what purposes do you use these data?

1.	Understanding cross-border flows.

72) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	2
Hardcopy	0

Freight Commodity Statistics - Association of American Railroads

73) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	0
Adequate	0
Good	1
Very good	0

74) What shortcomings/limitations have you encountered with these data?

1.	

75) How important are the data to planning?

	Responses
Critical	0
Important	1
Not used for planning	0

76) For what purposes do you use these data?

1.	investment attraction proposals and policy development

77) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	1
Hardcopy	0

IANA Report - Intermodal Association of North America

There were no responses for questions 78) to 82) concerning the use of this data source.

International Trade Flow Data (Statistics Canada)

83) How would you rate the quality of the available data?

	Responses
Very poor	1
Poor	1
Adequate	1
Good	1
Very good	0

84) What shortcomings/limitations have you encountered with these data?

1.	Not enough detail for Regional areas
2.	Not much detail.
3.	it isn't useful in identifying what types of commodities are being transported, helps to have the origin and destinations.
4.	Problem of the "province of clearance" for imports, rather than the [actual] province of destination. Inadequate representation of multi-modal chains. Very doubtful geographic refinement.

85) How important are the data to planning?

	Responses
Critical	1
Important	3
Not used for planning	0

86) For what purposes do you use these data?

1.	Required for infrastructure business cases and presenting needs / justification for environmental assessment studies
2.	Mainly for general statistics
3.	To help in identifying potential markets and industries
4.	Understanding international trade flows, by corridor and by mode.

87) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	4
Hardcopy	1

LECG Marine Industry Benefits Study

There were no responses for questions 88) to 92) concerning the use of this data source.

LTL Commodity and Market Flow Database - American Trucking Association

There were no responses for questions 93) to 97) concerning the use of this data source.

MARAD - U.S. Department of Transportation Maritime Administration

There were no responses for questions 98) to 102) concerning the use of this data source.

Marine International Freight Origin and Destination Survey (Statistics Canada)

103) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	1
Adequate	0
Good	0
Very good	1

104) What shortcomings/limitations have you encountered with these data?

1.	Very global
2.	No relevance

105) How important are the data to planning?

	Responses
Critical	0
Important	2
Not used for planning	0

106) For what purposes do you use these data?

1.	In consideration of alternative modes
2.	Understanding of the evolution of marine port activities and of the flows between these ports and [province's] trade partners.

107) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	1
Hardcopy	0

Maritime Administration Office of Statistical and Economic Analysis

There were no responses for questions 108) to 112) concerning the use of this data source.

National Roadside Survey / Commercial Vehicle Surveys

113) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	0
Adequate	1
Good	1
Very good	0

114) What shortcomings/limitations have you encountered with these data?

1.	No urban data, poor coding of origins/destinations
2.	Problems of coverage, especially in urban centres. Problem of statistical reliability and of synchronization with classified counts.

115) How important are the data to planning?

	Responses
Critical	2
Important	0
Not used for planning	0

116) For what purposes do you use these data?

1.	Modelling, especially inter-city
2.	Understanding of truck flows among [province's] regions and its external trading partners. Corridor analysis. Evaluation of highway projects. Evaluation of potential intermodal [usage] for sustainable transportation.

117) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	2
Hardcopy	0

North American Trucking Survey (NATS) - Association of American Railroads

There were no responses for questions 118) to 122) concerning the use of this data source.

Port/Import/Export Reporting Service (PIERS) - Journal of Commerce

There were no responses for questions 123) to 127) concerning the use of this data source.

Quarterly Motor Carriers of Freight Survey (Statistics Canada)

128) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	0
Adequate	1
Good	0
Very good	0

129) What shortcomings/limitations have you encountered with these data?

1.	Not sure, I haven't used the detailed data.

130) How important are the data to planning?

	Responses
Critical	0
Important	1
Not used for planning	0

131) For what purposes do you use these data?

1.	General published statistics

132) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	0
Hardcopy	1

Rail Commodity Origin and Destination Statistics (Statistics Canada)

133) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	1
Adequate	1
Good	0
Very good	0

134) What shortcomings/limitations have you encountered with these data?

1.	Very general
2.	Data confidentiality masks much of the detail [describing the different] commodity categories.

135) How important are the data to planning?

	Responses
Critical	0
Important	2
Not used for planning	0

136) For what purposes do you use these data?

1.	Alternative mode analysis for environmental assessment studies
2.	Corridor studies

137) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	1
Hardcopy	0

Rail Waybill Sample - Surface Transportation Board

There were no responses for questions 138) to 142) concerning the use of this data source.

Railway Carloadings Survey - Monthly (Statistics Canada)

143) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	0
Adequate	1
Good	0
Very good	0

144) What shortcomings/limitations have you encountered with these data?

1.	too general with respect to products commodities

145) How important are the data to planning?

	Responses
Critical	0
Important	0
Not used for planning	2

146) For what purposes do you use these data?

1.	

147) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	1
Hardcopy	0

Railway Transport Survey - Annual (Statistics Canada)

148) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	0
Adequate	2
Good	0
Very good	0

149) What shortcomings/limitations have you encountered with these data?

1.	general data

150) How important are the data to planning?

	Responses
Critical	0
Important	1
Not used for planning	0

151) For what purposes do you use these data?

1.	Investment attraction and policy
2.	infrastructure planning

152) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	2
Hardcopy	0

RAILINC (American Association of Railroads)

There were no responses for questions 153) to 157) concerning the use of this data source.

St. Lawrence Seaway Traffic Report

There were no responses for questions 158) to 162) concerning the use of this data source.

Shipping in Canada Report (Statistics Canada)

163) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	0
Adequate	2
Good	0
Very good	0

164) What shortcomings/limitations have you encountered with these data?

1.	

165) How important are the data to planning?

	Responses
Critical	0
Important	2
Not used for planning	0

166) For what purposes do you use these data?

1.	

167) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	1
Hardcopy	0

State Estimates of Truck Traffic - Federal Highway Administration

There were no responses for questions 168) to 172) concerning the use of this data source.

Survey of the Couriers and Local Messengers Industry (Statistics Canada)

There were no responses for questions 173) to 177) concerning the use of this data source.

Transborder Surface Freight Data - U.S. Bureau of Transportation Statistics

178) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	1
Adequate	1
Good	1
Very good	0

179) What shortcomings/limitations have you encountered with these data?

1.	It would be useful to be able to go down a level of detail in order to understand which types of good are transported across the border

180) How important are the data to planning?

	Responses
Critical	1
Important	2
Not used for planning	0

181) For what purposes do you use these data?

1.	Border crossing studies
2.	Helps in identifying markets to target along with industries/customers

182) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	2
Hardcopy	0

Transportation Annual Survey - U.S. Census Bureau
There were no responses for questions 183) to 187) concerning the use of this data source.

TRANSEARCH - Insight Database
There were no responses for questions 188) to 192) concerning the use of this data source.

TranStats: The Intermodal Transportation Database - Bureau of Transportation Statistics
There were no responses for questions 193) to 197) concerning the use of this data source.

Vehicle Inventory and Use Survey (VIUS) - U.S. Census Bureau (Discontinued as of 2002)
There were no responses for questions 198) to 202) concerning the use of this data source.

Waterborne Commerce of the United States (US Army Corps of Engineers)

There were no responses for questions 203) to 207) concerning the use of this data source.

Other Data Sources

208) Please answer the following questions for the other data source you use.

	What is the name of the data source:	*Please give a short description of the data source:*
1.	[GPS provicer] EOBR data	see answer to previous question
2.	Statistics Can Trucking Commodity OD Survey	
3.	[Provincial] ministry of transportation	The ministry has automated truck classification count data form automated count stations that we can access.
4.	Local trucking companies	We call local trucking companies to identify what freight they move, and where.

209) How would you rate the quality of the available data?

	Responses
Very poor	0
Poor	0
Adequate	2
Good	1
Very good	1

210) What shortcomings/limitations have you encountered with these data?

1.	Not much behavioral or firm information
2.	Irregular intervals, timely responses to our requests, lack of current data, construction impacts (detours).
3.	The data are largely a subjective opinion, but suit our immediate needs.

211) How important are the data to planning?

	Responses
Critical	2
Important	2
Not used for planning	0

212) For what purposes do you use these data?

1.	Research
2.	Primarily for study and planning purposes; model development, truck route development, congestion cost analysis

3.	Bridge and road design, and network planning.

213) How are the datasets from this source maintained? (Check all that apply)

	Responses
Electronic format e.g. Microsoft Access, Microsoft Excel, Oracle, etc.	3
Hardcopy	1

214) Other public or commercial data sources. If you have more information to add, please comment below.

1.	Geographically speaking, the [provincial ministry of transportation's] automated count stations are situated on a single bridge crossing. The City has lobbied to senior levels of government for years regarding the planning of a second crossing to form an extension of a future bypass. It's imperative that we have a good understanding of the goods and services movement.

Section 4: Freight Data Requirements

1) For the following General Freight Detail please indicate whether you currently use the listed detail or if you need it, but it is not available. If you do not currently use or need the detail, please select N/A.

	Currently use	Need, but not available	N/A
Commodity Detail (i.e. formal Classification system, etc.)	8	10	8
Cargo Detail (i.e. aggregate categories, hazardous and non-hazardous cargo, empty vs. non-empty, etc.)	4	12	11
Origin/Destination Detail (i.e. provinces/states, postal codes/zip codes, municipalities/counties, shipper detail, Traffic Analysis Zone (TAZ), customs port of exit/entry, etc.)	9	14	4
Shipment Detail (i.e. weight, volume, value, mode of transport, average length of haul, number of stops per trip, time-sensitive shipment, truckload or less-than-truck load shipments, empty shipments, etc.)	7	10	9
Routing Detail (i.e. major routes used, number of stops, interim trip origin and destinations, vehicle routing, Hazardous Materials (HAZMAT) vehicle routing, etc.)	10	12	5
Cross Border Data (i.e. O/D patterns, commodity, vehicle type, shipment characteristics, mode, stop/delay data, etc.)	2	12	13
Terminal and Intermodal Transfer Facilities (truck Volumes entering/exiting, congestion related delays on access roads, length of queue on access roads, incident rates on access roads, travel time contours around the facility, capacity of facility, etc.)	4	14	9

Comment responses:

1.	gravity model currently used for origin/destination detail, but actual data would be good to have

2.	As we are part of the [metropolitan region], we are interested in big picture transportation and goods movement planning....but we don't specifically need freight data for our own local municipal infrastructure
3.	Goods movements and freight details are difficult to acquire given the private nature of the statistics being requested and the competition in the goods movement sector. Most firms not willing to provide data critical to their bottom line.

2) What transportation modes are currently considered or may be considered in your planning activities? (Check all that apply)

	Responses
Highways/trucks	28
Rail	15
Air	9
Water (marine port, barge, short sea shipping)	10
Other (please specify)	1

Comment related to the 1 respondent that indicated "Other" survey types:

1.	Pipeline

3) For the following Highway/Truck Mode Freight Data please indicate whether you currently use the listed data or if you need it, but it is not available. If you do not currently use or need the data, please select N/A.

	Currently use	Need, but not available	N/A
Vehicle type	22	3	2
Vehicle size	17	6	3
Average vehicle speed	10	7	7
Vehicle emission data	3	13	8
Traffic counts & classification data	21	4	2
Cargo type	5	14	7
Payload weight	6	8	10
Truck O/D patterns	9	15	2
Trip O/D patterns	8	15	2
Travel time	7	13	6
Travel time reliability	2	13	9
Number of truck stops for LTL shipments	3	7	14
Incident data	4	8	12
Line-haul costs	3	7	14
Drayage costs	2	6	15
Other	0	0	10

Comment responses:

1.	Travel time and O/D patterns are identified for the local area only

4) For the following Rail Mode Freight Data please indicate whether you currently use the listed data or if you need it, but it is not available. If you do not currently use or need the data, please select N/A.

	Currently use	Need, but not available	N/A
O/D patterns	1	10	3
Commodity	1	10	3
Equipment details (e.g. car type)	0	5	9
Shipment (e.g. weight, volume, value)	0	9	5
Routing data	3	9	3
Travel time	2	8	4
Reliability	1	6	7
Stop/delay data	2	5	6
Ramp-to-ramp costs	1	4	8
Other	0	0	4

Comment responses:

1.	We have extensive Rail goods movement in and through our City...and primarily affects our road operations at at-grade road/rail crossings

5) For the following Air Mode Freight Data please indicate whether you currently use the listed data or if you need it, but it is not available. If you do not currently use or need the data, please select N/A.

	Currently use	Need, but not available	N/A
O/D patterns	0	6	1
Commodity	0	8	0
Shipment (weight, volume, value)	1	8	0
Routing data	2	3	3
Travel time	1	3	3
Reliability	1	3	3
Air Freightage	1	4	2
Drayage costs	0	4	2
Hazardous materials	0	4	3
Other	0	1	1

6) For the following Water Mode Freight Data please indicate whether you currently use the listed data or if you need it, but it is not available. If you do not currently use or need the data, please select N/A.

	Currently use	Need, but not available	N/A
O/D patterns	2	6	1
Commodity	2	8	0
Equipment details (e.g. vessel type)	1	6	2
Shipment (e.g. weight, volume, value)	2	7	0
Routing data	1	6	3
Travel time	1	7	2
Reliability	1	5	3
Port-to-port costs	1	5	2
Drayage costs	1	5	2
Hazardous materials	1	4	4
Other	0	0	2

7) Do you use or need data on intermodal freight transportation? (Check all that apply)

	Responses
Truck/rail	21
Truck/airport	14
Truck/marine port	12
Rail/marine port	9
Rail/airport	4
Other	0

8) For the intermodal freight transportation modes that you have checked, in the comments box below please describe the types of data that you use or need:

1.	Alternative multi-modal transportation corridor analysis - EA studies
2.	intermodal transfers, locations, costs, time sensitivities,
3.	commodity volumes and destinations
4.	Data that inform policies and plans to optimize the movement of goods in an urban region. E.g. supports decision-making to optimize modal choices, improve the efficiency of trucking to and from rail or marine facilities, etc.
5.	commodity, number of containers, routing from loading dock to rail head, weight of loaded container, size of containers
6.	Container flows, average transfer waiting time, charges,
7.	Only need this info. nominally to understand what truck demands may be placed on our road

	system from rail terminals
8.	volume of commodity, O/D
9.	Time of travel, type of shipment, shipment value, O/D data, travel time, stops within region
10.	The amount of trucking that connects to our air and rail terminals.
11.	Looking to understand the volume, types of commodities, origin and destination, etc.
12.	No intermodal data are available. Because [intermodal transportation] involves private operators, the provincial government does not have access to this information.
13.	product/commodity, o/d patterns, volumes, costs
14.	Volumes O/D data areas of delay/concern to industry
15.	Mostly, number of vehicles, tonnage and value of shipment

Section 5: Other Data Sources

1) What other data do you use for freight planning? (Check all that apply)

	Responses
Economic data	14
Land-use data	16
Transportation network data	20

2) Please complete the following fields for one of the economic data sets you use:

	Please enter the name of the data set and the source:	*Please enter a brief description of the data set:*
1.	Population, employment by industry class and number of employees.	Statistics Canada Place of Work / Place of Residence data, [household OD survey] employment data, various economic indicators
2.	- Have developed econometric models for intermodal site potential - have used Transluscent for NA lane information for investment attraction projects	- data set of self-built econometric model was based on Statistics Canada cross-border traffic information - Transluscent information was based on comparative lane rates
3.	Canadian federal data	Unsure
4.	Local Business license, Statistics Canada	
5.	trucking costs profiles developed internally with input from client)	cost of operating the truck
6.	Statistics Canada Merchandise Trade data, US Bureau of Transportation Statistics, Global Insight, Conference Board of Canada	
7.	GDP, Import, Export	summary from Finance, Eco Dev, Website
8.	Congestion Cost Analysis as it relates to the overall impact on our region. We consult with the [regional] Economic Development Commission and trust their source for this information.	We are not as familiar with this as would be the [region's mandate]; however we did learn that, most businesses report information that may or may not be an accurate representation of true costs.
9.	population, employment, operation and fuel costs, and industry statistics.	Population by occupation Employment by NAICS classification Average Weekly Fuel Costs
10.	We do cost and freight activity surveys of our members	
11.	Use Statistics Canada	export/import shipments for food and related products
12.	Employment data (Place of Work) from Statistics Canada Census of Canada.	Different data tables for Place of Work by geographical sector, categorized by occupation, industrial sector, etc.
13.	[Provincial] registry of heavy vehicle	Data bank on the owners of heavy vehicles (>

	operators.	3,000 kg.), with the number of vehicles categorized according to location of the owner's head office.
14.	[Provincial] registry of business establishment.	This registry provides a complete inventory of business and commercial establishments in the province, with information on the number of employees, industrial sector, etc.
15.	[City's] employment database	Annual Survey of Employers - provides breakdown of number of employees by sector / location / employment areas
16.	Employment in manufacturing and distribution industries - Statistics Canada (Census).	This allows [the evaluation of] geographical traffic generation.
17.	Value of manufacturing shipments (Statistics Canada)	Value of shipments by industrial sector

3) What is the quality of the data?

	Responses
Very poor	0
Poor	3
Adequate	6
Good	5
Very good	3
N/A	1

4) What limitations and shortcomings have you found while working with this data set and what enhancements would be most useful for you?

1.	we pioneered the econometric models and that was challenging
2.	while the data is good, data available may be aggregated to the point where it's relevance is hard to determine
3.	Be useful if the economic data can be disaggregated and categorized by sector / industrial type / etc
4.	During our recent study we were to determine the overall cost impacts attributed to traffic congestion and travel delay. In the end we did not have sufficient data related to VKT and average speeds by geographic areas and had to make assumptions.
5.	Place of Work data details at the Traffic Zone level would be very helpful
6.	We get a very good idea of business operating conditions at macro-level. Perhaps limited at this point from a micro perspective
7.	Was very dense and required industry knowledge to figure out the economic impact
8.	These data are estimated from a sub-sample of the Census. Their geographic coding [level of detail] is [somewhat aggregate].

9.	The geographic location of the head office does not generally correspond to the actual base of the vehicle.
10.	Access to the file is very limited. Only aggregated information can be purchased from [provincial statistical agency].
11.	Number of trucks, tonnage and value shipment are not exactly correlated with the level of employment.
12.	Too long delay to get the data

Questions 5) to 21) repeat questions 2) to 4) for any additional economic data sets. Any additional data sets were added to the answers to questions 2) to 4)

22) Please complete the following fields for one of the land-use data sets you use:

	Please enter the name of the data set and the source:	*Please enter a brief description of the data set:*
1.	Municipal Official Community Plans, zoning and other policies	
2.	[Metropolitan region's] zone system, [regional transportation data agency]	Zone system from 1996 or 2001 model, land use from area municipalities
3.	GIS	ministry uses GIS information for investment attraction proposals
4.	Provincial	land use maps
5.	Official Community Plan	Outlines various planned zones throughout the City
6.	Regional land use	Locations and uses of industrial lands in the region and their relationship to major goods movement activity centres (marine, rail, etc)
7.	n/a	
8.	existing and future population and employment, land type designation	Provided by regional / area municipal staff
9.	City Official Plan, zoning schedules and Property /Business Ownership Data	provides information on potential and actual uses on properties
10.	Map Info Biz Points and [provincial] Assessment Data	Map Info Biz Points provides business related data, sq ft and number of employees and business sector. [Provincial] Assessment provides population data based on taxes.
11.	zoning, freight generators, or other information about how land is occupied or plans for future land-uses.	Municipal Development Plans Used
12.	Zoning	What and where zones exist requiring freight movement.
13.	Mostly US federal government data	
14.	Municipal property assessment rolls.	Municipal property assessment rolls for the entire province. [These] permit the derivation of

		information on land use.
15.	[City] land data	land availability, zoning, services
16.	[City] zoning by-law	Regulatory land use control – mapping
17.	[City] property tax role	Classified data of each taxable building with area and value.

23) What is the quality of the data?

	Responses
Very poor	0
Poor	0
Adequate	6
Good	6
Very good	4
N/A	0

24) What limitations and shortcomings have you found while working with this data set and what enhancements would be most useful for you?

1.	Not standardized across municipalities
2.	Other zonal attributes, for example floor space by industry/occupation, number of and size of firms
3.	pop/emp is allocated to a defined "small geographic unit" that may / may not be refined enough when assess specific freight issues. Truck Intensity map (truck-activity generation) is also useful to have.
4.	In the ERA of substantial economic growth, land uses and densities change from time to time making it difficult to forecast future population employment numbers with any comfort
5.	Certains champs sont mal validés, notamment les superficies.
6.	Classifications are oriented to tax purpose not economic.

Questions 25) to 41) repeat questions 22) to 24) for any additional land-use data sets. Any additional data sets were added to the answers to questions 22) to 24)

42) Please complete the following fields for one of the transportation network data sets you use:

	Please enter the name of the data set and the source:	*Please enter a brief description of the data set:*
1.	Highways traffic count data	Publicly available data from [provincial] MOT
2.	[Regional] model network, [regional data provider] (or government partner, depending on the project	
3.	RAC rail networks	computerized rail maps of North America
4.	provincial highway infrastructure	

	municipal highway infrastructures	
5.	City's EMME2 Model.	City's Network micro traffic projection
6.	Regional truck routes	Network of allowed / prohibited routes for trucks
7.	road system network - internally developed within the Ministry	road map, surface type, bridge limitations
8.	NRCan - National and [provincial] Road Network, [provincial] in-house road networks	2 types of road networks are developed to match either with GPS data to develop performance measures. The 2nd relates to modelling where various networks are developed within our models supported by TransCAD and emme
9.	Truck restrictions, truck volume (by time/type),	
10.	I believe our Fire Dept. uses the HAZMAT data	
11.	Designated truck route maps, access to the [provincial] ministry of transportation route information for the [highway] corridor as it forms a part of the NHS.	Truck Route Bypass [provincial] Classification Counters
12.	road network map	
13.	definitions of truck routes, HAZMAT mapping, truck size, height, and weight limitations, seasonal restrictions, operations and procedures.	Bylaws defining truck routes (24 hour and limited daytime), weight and height restriction, procedures for permits for over weight trucks etc are used and an inventory of the road network is always updated
14.	Hazardous Goods routes	identified routes for hazardous goods movement.
15.	Paramics microsimulation	Detailed traffic simulation network
16.	[Provincial] highway geomatic data base and GIS	Detailed geomatic description of highways, operated by with geometric attribute tools
17.	[Provincial] natural resource ministry's address file.	Geomatic street section files, with address ranges.
18.	Multi-modal network (modelled)	[Provincial] transportation network, coded for modelling. For internal use. Includes highways, ferries, marine ports, airports, railways and intermodal facilities. Integrates highway classifications, speed limits, counts. Covers 1,600 municipal sectors. Supports disaggregate usage.
19.	[Provincial] network data	infrastructure networks for road infrastructure
20.	Origin / destination survey [regional transportation agency]	Trip description by origin/destination
21.	National truck survey (provincial transport ministries)	Survey conducted on roadside

43) What is the quality of the data?

	Responses
Very poor	1
Poor	0
Adequate	6
Good	4
Very good	9
N/A	0

44) What limitations and shortcomings have you found while working with this data set and what enhancements would be most useful for you?

1.	Volume delay functions not adequately tested. Some coding errors, but not bad.
2.	Outdated. new infrastructures and pattern changes has not been accounted for. Annual recalibration would be useful.
3.	Different policies, regulations in each municipality
4.	Development of various networks for multiple purposes is a challenge. In particular, GPS type networks to process and harness the full power of GPS requires high resolution at levels previously unheard of. Perhaps the avg users, just getting into GPS are not fully aware of the issues at hand.
5.	need permanent count station at key locations to maintain a consistent and comprehensive data and monitor seasonality
6.	Truck route bylaw designates routes for trucks however no formal designation for Hazardous Routes. The current hwy system provides routes through residential and urban areas with no consideration given to environmental risks.
7.	Haven't identified any
8.	Takes detailed model coding and calibration.
9.	Very limited dissemination..
10.	It is necessary to adjust this database according to [changes in] traffic operations (e.g., theoretical capacity, AADT, 30th highest hour, etc.)
11.	No data about freight transportation
12.	Sporadically conducted (last time in 1999). Good to estimate truck traffic in a regional context, not urban.

Questions 45) to 61) repeat questions 42) to 44) for any additional transportation network data sets. Any additional data sets were added to the answers to questions 42) to 44)

62) What other economic data do you need for freight planning, but are not available?

1.	Estimates and projections for freight movement in Lower Mainland
2.	Commodity flow survey
3.	to help discern commodity flow on specific transportation routes
4.	Value of goods moved by type, volume, mode, time, etc.

5.	disaggregation of economic data by sector/type/etc
6.	Vehicle Kilometres Travelled by geographic areas.
7.	A 100 percent sample at the Place of Work End by workers on a survey date would be extremely helpful in determining travel patterns
8.	TEST
9.	Timely trucking activity information --- 1st Q info published in @q
10.	Freight Planning is not something that we focus on at the [provincial ministry of transportation]. Our main focus when we design roads and bridges and other infrastructure are volumes of trucks and other vehicles. Data is collected there from our own sources. No data is collected on freight itself as this is not our focus. These questions would be more geared to agencies whose main business is the moving of freight (Courier companies, container pier terminals etc, as their service rates they charge are dependent on the weight or type of cargo). Our focus here is the provider of the infrastructure to move the vehicles, as opposed to the actual freight on the vehicles themselves.
11.	1) Inventory of business establishments with number of employees by employment category. 2) Inventory of heavy vehicle fleet by location of the operational base [rather than by the owner's administrative location]

63) What other land-use data do you need for freight planning, but are not available?

1.	Detailed employment by zone (this is not always given, but we had to obtain special tabulations
2.	to help discern commodity flow on specific transportation routes.
3.	Surrounding municipalities land use plan
4.	Disaggregation of land use data by area
5.	Specific freight OD type information from the larger businesses in the Community
6.	N/A
7.	none
8.	TEST
9.	None
10.	As above
11.	Municipal property assessment rolls provide a means of harmonizing definitions and of validating area data.

64) What other transportation network data do you need for freight planning, but are not available?

1.	rail networks
2.	none
3.	Surrounding municipalities' emme model would be useful
4.	permanent count station
5.	A hazardous truck route that recognizes risk and potential impacts to the urban areas and residential areas.

6.	none
7.	TEST
8.	As above
9.	Data on the structure of the rail network (sections by operational characteristics)
10.	We need a real commodity flow survey conducted from the shippers.

Section 6: Lessons Learned

1) How well do your existing freight data sources or data collection activities meet your needs (e.g., for forecasting, cost-benefit analysis, operational analysis, design, environmental assessment, investment decision-making, etc.)?

1.	not well
2.	We plan at the strategic level and are not specifically looking fr detailed information. Highest priority is for GHG emissions data.
3.	Not enough data on urban goods movement. Not enough information on commodity flows.
4.	The information tends to be widely scattered and difficult to coalesce
5.	we need more information on traffic flow and commodity volumes
6.	adequate
7.	good
8.	Never well enough. Perfect data does not exist nor do perfect answers. An appropriate mix of factual data is required but investment in analysis tools to improve dissemination is equally critical.
9.	GOODS MOVEMENT DATA ARE LACKING Urban goods movement data on vehicle movements, shipment flows, and origin and destination information are not typically available on a system-wide basis. This is a global problem. Although some jurisdictions have carried out special studies to obtain snapshot information of urban goods flows from time to time, this has not yet occurred in [region]. The main sources of data for [region] include intersection counts and cordon counts. Traffic counts are undertaken throughout the Region every two years. In most locations these are basic traffic counts, with buses, trucks and service vehicles (all with three axles or more) counted as one group. Full classification counts are undertaken in some locations, but not enough to generalize across the [region]. Analyzing this data to capture commercial vehicle flows for main arteries is a major undertaking. During the course of this study, the consultant conducted a sample exercise for a section of [arterial road], near [airport], primarily to gauge the level of effort required to analyze freight vehicle flows and to demonstrate the types of results that can be achieved. Additional resources would be required to undertake this type of analysis on a Region-wide basis.
10.	Freight Data are not critical presently for our Local Municipal infrastructure decision making... (possibly the biggest need is for our Emergency Services planning)... However, we are part of the larger [metropolitan region] and we work with our Provincial counterparts in planning the infrastructure needed for the next 30 years and freight data and freight projections, modal choice etc., will be and are critical to those decisions.
11.	We are reliant upon the Ministry to provide data specific to the operations on the urban section of the Highway. The data collected is specific to classification counts only. Origin/destination data is hard to assemble, road side surveys in our area are extremely difficult to implement. Investment decision making falls at the hands of the provincial politicians.
12.	current truck volume data collected for freights (Classification and occupancy counts) are only used for capacity analysis.
13.	Insufficient
14.	Quite well.
15.	The data is quite useful for forecasting, design and environmental assessment as well as

	investment decision making
16.	Adequately for now, although we would like to have better information in the future.
17.	Urban goods movement are outside of our scope and jurisdiction as explained in my email to you
18.	Existing data sources are very deficient, incompatible and incomplete. Impossible to have a reliable portrait of trade flows by mode, or of multi-modal supply chains. Impossible to forecast transport flows [as a function of] economic trade projections among regions. No reliable data are available on the costs and time of freight transport; impossible to 'feed' mode choice / inter-modal transfer models to evaluate environmental policies.
19.	not detailed enough
20.	Lack of information / Information required - data not readily available (volumes, origin, destination)
21.	Poor knowledge of urban truck flows, especially on local streets.

2) What improvements to the existing freight data sources or data collection activities, or new data, would be needed to address any deficiencies or gaps?

1.	truck, rail od
2.	More easily accessible data: one-stop shop
3.	Coordinated data collection throughout the [region], rather than piecemeal surveys that are incompatible
4.	Tend to work with older data
5.	origin-destination surveys ITS (vehicles and weights) continuous counts shipper information
6.	detail annual truck/rail pattern study in the [region] would be beneficial
7.	Part of the problem is communication; mechanisms for provinces to work with other provinces do not exist. Nor do municipalities work well with provinces. Vast amounts of information exists which could help other jurisdictions understand their own traffic exist but are not shared across boundaries. GPS data holds great promise to understand routes (OD), speeds, safety... The collection of OD data is problematic given the extreme costs and time to process these data.
8.	The [region] should pursue acquisition of additional needed freight data, which are a critical aspect of the goods movement corridor analysis and assessment process. More robust and current data will allow [the region] to analyze system performance and needs in more detail and evaluate the feasibility of various implementation strategies. The region should initiate investigations to expand traffic classification counts at intersections and cordons where there is high density of commercial traffic, and start to build trend information so that such traffic can be correlated with other growth indicators in the region. In addition, there is a critical need for information on shipments and vehicle trip types and purposes that would require extensive investment in survey instruments. This is an issue that cannot adequately be addressed by any one municipality or region in the [metropolitan region]; rather, it needs to be addressed at a larger systemic level. Options for joint data initiatives with the provincial and federal governments need to be explored. For its part, the [region] could take an active role in advancing priority of this area and promoting inter-governmental collaboration through promotion of its initiatives and communicating data needs in local, [regional], provincial and federal settings.
9.	more forthcoming freight data from industry and carriers

10.	I'm not sure how reliable the data has to be as long as the political agendas determine what gets built and when.
11.	Origins/Destinations truck data, time of travel, travel patterns, trends and costs of googs movement.
12.	internal resources needs to collect, compile data
13.	More participation by organizations involved in the movement of goods and services as well as by fleet allocators.
14.	More information about what goods are being carried, in what volumes, and on what routes.
15.	N/A
16.	Ideally be able to identify the quantity of goods being transported from origin to destination (province to state, etc.), they type of transport, for a specific time period, etc.
17.	The development of a Canada-wide Commodity Flow Survey is necessary, similar to those conducted in the United States and Europe. A base survey must be conducted across Canada, and each province and region could finance an increase in the sample size according to its interest.
18.	drilled down commodity, o/d patterns etc.
19.	private sector needs to be involved: identify issues - what can government do to assist - more coordination between government levels)
20.	We need a commodity flow survey (with classified data - vehicle size, mode, commodity)

3) What priorities would you give to the improvements or new data needs that you identified in the previous question?

1.	highway freight data
2.	GHG (Greenhouse Gas) emissions data is highest priority.
3.	Urban commercial vehicle survey for [region-wide] Commodity flow survey
4.	Need more current data (within 18 months)
5.	High
6.	Medium
7.	Research the potential of Stats Canada TCOD and identify opportunities to obtain micro data under a license agreement. Utilize Bluetooth data where possible to gain routing data. Invest in traffic class data or support it's collection by other areas. Improve information sharing agreements and open forums.
8.	Priorities would give to the data that ultimately contribute to identifying early-wins solution. This would then build buy-ins and momentum in pursuing more data for the strategic/long term freight planning
9.	Commercial truck movements within our region.
10.	Medium priority - Freight is not a big problem in [city].
11.	Obtain the one missing piece of information relating to the fleet allocators
12.	Volumes of freight traffic.
13.	N/A

14.	It is fundamental and [must have the highest priority], if one wants to be serious about the evaluation of goods movement projects and programmes (e.g., identifying the potential for intermodal transfer, justification of projects, and highway investments).
15.	not certain
16.	Federal and Provincial levels must take a greater role in understanding the complexity and importance of goods movement -
17.	Knowing the itineraries in urban area.

4) What benefits do you see to having these improvements or new data (e.g., in terms of new capabilities, improved productivity, etc.)?

1.	more informed advocacy on infrastructure incestment and transport policy.
2.	Enables us to meet provincial GHG targets as mandated in legislation.
3.	Response rate Finding better ways to use technology to collect passive data.
4.	More intelligent proposal and policy development
5.	improved infrastructure investment decisions
6.	streamline truck routes, rail crossings impact to our traffic network
7.	Tap into electronic forms of data collection.
8.	identifying quick wins, determining strategic/long term vision,
9.	Better infrastructure and mode planning
10.	Systems planning, hazardous goods route identification, travel time savings, reduce GHG
11.	Improve transportation system planning; be able to examine scenarios such as diverting goods from trucks to rail. Be able to evaluate the effects of good movement on the existing network and implications of changes of the network.
12.	Better forecasting of travel demands
13.	Better network planning and traffic operations management, leading to better systems performance and reliability.
14.	N/A
15.	A Commodity Flow Survey would permit the development of a realistic goods movement forecasting model, multi-modal and integrated. Depending on the investment provided by each level of government, the geographical precision of the model would be enhanced.
16.	more effective planning and forecasting, prioritizing for infrastructure planning
17.	Developing new approaches to moving goods and services is seen as an important aspect of managing the City's transportation system. There has been a historic shift in moving goods from rail to road - this combined with the economic growth of the [region].
18.	Impact studies for projects. Hazardous materials.

5) What factors contribute to your success in collecting data for urban goods movement?

1.	We don't collect data on urban goods movements
2.	Quality survey design, Persistent recruiting, Funding,

3.	Transluscent has made this easy
4.	Relevance
5.	cost and men power
6.	Historical knowledge, dependable and lasting relationships, improved awareness of the importance of freight, large data collection budgets.
7.	Partnership with private sectors, leadership from [regional transportation agency] / senior level of governments, funding, privacy issues,
8.	Federal support on planning initiatives. Province seems to only take an interest on federal driven programs.
9.	We can collect almost all of our data in-house so have control over a lot of the various aspects of the process.
10.	A team of engineers and data collection survey firms well versed in the movement of goods and services, and cooperation between the various levels of government
11.	Willingness of data keepers to share.
12.	N/A
13.	We currently have no realization in terms of goods movement, except some partial traffic counts.
14.	N/A
15.	Liability Comparability to other sources

6) What plans do you have to expand, enhance, or change your data collection and storage methods?

1.	As it relates to GHG requirements
2.	If proposal is successful, will advise [agency] on an urban goods movement survey. Renovation of ITS Centre and tested for acquisition and storage of real time CV data.
3.	Not at the present time
4.	n/a
5.	currently under review
6.	Work with Stats Canada TCOD and identify opportunities to obtain micro data under a license agreement.
7.	Build consensus among stakeholders by forming a common forum/platform - a [regional] Goods Movement Task Force is in the beginning stage of initiation
8.	I believe we are making progress on many fronts, were about to embark upon ITS improvements, BRT enhancements, better sense of travel demand requirements for all modes.
9.	[Regional transportation planning committee is considering a new urban goods movement strategy and survey.]
10.	additional internal resources
11.	We are always investigating new and improved methods of data collection. Video data collection is being investigated and we are looking at doing the commercial vehicle survey on a more frequent basis.

12.	None at the present time
13.	none so far.
14.	N/A
15.	The principal issue is the distribution of information of goods flows. [Province] has put in place a SOLAP (Spatial OLAP) application to exploit marine data. One can envision the extension [of this application] to trucking data (NRS) and to rail flows.
16.	uncertain at present
17.	N/A
18.	Harmonization of data

7) What other data items are needed?

1.	See above
2.	employment, rate of equipment utilization factors for lanes i.e. How many times is a truck filled and billed for certain lanes
3.	noted under "improvements"
4.	economic data, land use data, transportation data (e.g. OD flows)
5.	Transit ridership, cycling and pedestrians. Commercial truck movement ranks highly amongst these.
6.	Movement of goods and services by fleet allocators
7.	N/A
8.	To complement any Commodity Flow Survey, we would have to conduct origin-destination surveys at international entry points (e.g., roadside surveys at Customs posts, unloading points at airports, rail border crossing points).
9.	N/A

8) What are the main problems with existing data? What would be the most important improvements to existing data? Has a needs survey been conducted among other users of your data and if so, what have they said?

1.	complete truck infor for all classes. Better intra city data
2.	No idea where to find most of this data. It also needs to be of minimal cost.
3.	Coordination (using common definitions, etc.)
4.	Just not available
5.	data which exists is high quality, but there isn't enough of it.
6.	not enough locations per year.
7.	Timeliness, too many data gaps, data collection interval is too wide. Not programmed.
8.	inconsistency, unreliability, confidentiality
9.	Difficult to obtain current data in a timely manner. The Province charge for traffic volume count information to cover their own costs.

10.	The annual truck traffic count at screenline stations is the city's regular freight database, but it can't provide a comprehensive understanding on origins, destinations and characteristics of truck movements. The 2007 CVS were conducted only at [two locations]. This will limit its usage for understanding the whole region's good movement system. [An earlier] goods movement study once provided better understanding on the goods movement operations in the [region], but it has been long and needs to be update. So a region wide detailed commercial vehicle survey is needed.
11.	No needs survey done that I'm aware of.
12.	1) better information on all commodities shipped, including type $ value -; 2) better details of shipments by modes other than truck; 3) better information on "non-business" organization i.e. public sector organization movements; 3) better understanding of variation in movements by day of week / time of year (we just got one day's worth); 4) Our survey captured shipments by businesses in the Edmonton Region; did not capture External - External / external - Internal movements. We got these via the External cordon survey; but this was limited to 1 day 8 till 4PM (I think), so need better info on this aspect, again including variation through the year!
13.	data reliability and availability.
14.	N/A
15.	Lack of coherence, incompatible definitions. Impossibility to decode multi-modal chains since the data essentially [uni-]modal (by segment). Statistics Canada's trucking surveys cover only partially the universe of truckers at [both] the urban and provincial scales.
16.	N/A
17.	Too aggregated to an urban context.

9) Are you aware of any problems encountered by the survey participants when answering the questions? What were the reasons for these problems? How do you plan to avoid these problems in future surveys?

1.	there are proprietary impediments to release of data as well as the sheer number of potential respondents esp. road goods movement
2.	Had one false start Should ask if participants are actually involved in goods movement planning and at what level. Strategic planning has very different requirements than specific freight movement issues at the engineering level.
3.	[Regional] survey was not very applicable to very small or very large firms. Large firms require an interview or obtaining shipping documents.
4.	length of time taken to answer
5.	long surveys that lead to incomplete / vague response, customize / tailor the questionnaire, identify what the direct benefits are for them
6.	Reliable, honest answers. Not all are receptive to open discussion regarding finances.
7.	Some firms needed assistance in filling out the forms. Our survey firm was very good in providing on site assistance to the organizations requiring help,
8.	No
9.	N/A
10.	Concerning the 2007 NRS that was conducted with Transport Canada, [one] must evaluate response problems, notably on certain variables that drivers could not answer. The principal

	gap is the systematic linkage with complete classification counts, which must be conducted at the same time as the interviews.
11.	not clear enough in question, too lengthy
12.	N/A
13.	OK

10) What technical or content problems or limitations have you found (e.g. precision, issues of confidentiality, unintended applications)? How do you plan to address these issues in future surveys?

1.	None, aside from challenges described above.
2.	N/A
3.	?
4.	Issues of confidentiality played an important role in getting some of the organizations to participate. We don't see any way around this.
5.	N/A
6.	Confidentiality is an omnipresent problem with data provided by private operators and transporters, who have little time to devote to surveys or data collection. Federal agencies have much precise information (rail, marine, air) but they cannot release them to the provinces. Customs data on trade are not reliable, in neither geographic nor tonnage levels.
7.	N/A
8.	A french version would be appreciated

11) How have legal/confidentiality considerations impacted the design/collection of the last survey you conducted in which they were a factor? What steps have been taken to address legal/confidentiality issues?

1.	Yes, University ethics board review. Data sharing agreements for external data.
2.	N/A
3.	?
4.	We include a FOIP statement with all of our surveys.
5.	The data is protected by FOIPP, hence this data cannot be released to anyone even for research purposes.
6.	not at all
7.	N/A
8.	N/A
9.	OK

12) Please indicate your organization's level of interest in participating in a nation-wide TAC program to coordinate the collection of urban goods movement data. An indication of interest at this time does not imply commitment on the part of your organization. (Check all that apply).

	Responses
Contribution of metadata (e.g. lists, inventory and/or reports describing freight data collected or used by your organization)	10
Contribution of freight-related and freight planning datasets including traffic counts (e.g. AVC and WIM counts, manual counts, etc.), O/D survey data, commodity flow data, establishment surveys, etc.	12
Participation in development of national standards or formats for selected types of surveys related to goods movement	12
Contribution of funding for any of the above	5
Other (please specify)	3

Comments related to the 3 respondents that indicated "Other" survey types:

1.	using data if made available at a reasonable or no cost
2.	Moral support
3.	we can facilitate data collection in [city], as required.
4.	N/A

13) What is the approximate cost devoted by your organization to freight data collection, i.e. data collection/surveys (need to address specific datasets)? If possible, please distinguish between your internal costs and external costs (i.e. consultant fees, purchase of data, purchase of equipment, purchase of services, etc.).

1.	$0
2.	$5,000 to $20,000 per year direct cost $30,000 in kind cost(staff time)
3.	$10,000.00 per year (consultant and equipments related inclusive)
4.	$1 million per year Distributed as:20% consultant fees, 2% data purchase, 1% purchase equip., 70% services, 7% staff resources
5.	N/A
6.	none specifically
7.	Not Available.
8.	[Currently, the truck volumes data are collected as part of annual count program, so no dedicated funding is needed to truck volume data collection. A goods movement study has been proposed for this region.]
9.	Internal - negligible External - $20k/yr
10.	The Data Division's budget is on the order of $1.3 million annually but the information gathered isn't only for freight data collection. It would be difficult to separate that out. This does not include the costs of doing the Commodity Flow Survey or the External Cordon Truck Survey.
11.	This information is not available

12.	$0
13.	N/A
14.	Impossible to determine. [Activities are] dispersed throughout the organization. [This] requires an exhaustive inventory, which would take several weeks to research.
15.	$100,000 for consulting limited budget for freight data collection
16.	N/A
17.	Not available

14) Are you able to provide sample data from the surveys carried out by your organization and identified in the preceding sections of this online survey?

	Responses
Yes	11
No	14

Appendix B
Urban Goods Movement Survey Types

Table B-1. Urban Goods Movement Survey Types

Source: Allen, J. and Browne, M., "Review of Survey Techniques Used in Urban Freight Studies." University of Westminster, November 2008, pp. 10-15.

Survey technique	Explanation	How it is conducted	Aspects of urban freight to which most suited
1. Establishment survey	▪ Main method used in studies to collect data about total goods vehicle trips to/from particular establishments, and variation by time, day and month. Can also be used to capture data about type of goods delivered/collected. ▪ Also allows collection of information about the delivery / collection process but some respondents not very sure about issues including: vehicle types, time taken to load / unload, where vehicle stopped, method of goods movement from vehicle, and origin of vehicle / goods.	Face-to-face, telephone or self-completion	▪ Vehicle delivery / collection trips at establishments in the urban area ▪ Goods flows to / from establishments in the urban area ▪ Service trips to establishments in the urban area ▪ Loading / unloading activity of goods vehicles in the urban area ▪ Movement of goods between vehicles and establishments in the urban area ▪ Origin location of goods flow / vehicle trip to establishment in the urban area ▪ Ordering and stockholding arrangements at urban establishment ▪ Supply chain management between establishments, their suppliers and freight transport operators
2. Commodity flow survey	▪ Similar to establishment survey, but used to collect detailed information about type and quantity of goods flowing to / from particular establishments rather than focusing on goods vehicle trips.	Face-to-face, telephone or self-completion	▪ Goods flows to / from establishments in the urban area

Table B-1. Urban Goods Movement Survey Types

Source: Allen, J. and Browne, M., "Review of Survey Techniques Used in Urban Freight Studies." University of Westminster, November 2008, pp. 10-15.

Survey technique	Explanation	How it is conducted	Aspects of urban freight to which most suited
3. Freight operator survey	▪ Provides the opportunity for collecting wide ranging data about the pattern of the companies' goods vehicle activities in the urban area. Allows opportunity to obtain data about the entire fleet rather than a single vehicle or round (as in vehicle trip diary – the two types of survey can be used in conjunction). ▪ Can be used to collect data about loading / unloading activity and movement of goods from vehicle to establishment but this is usually best gathered via a driver survey or vehicle observation survey.	Face-to-face, telephone or self-completion	▪ Trip details and patterns of goods vehicles in the urban area ▪ Loading / unloading activity of goods vehicles in the urban area ▪ Movement of goods between vehicles and establishments in the urban area ▪ Origin location of goods flow / vehicle trip to establishment in the urban area
4. Driver survey	▪ Used to gather data about the driver's overall trip pattern, as well as information about the loading / unloading / servicing activity in the street in which the survey takes place and in general (including time taken, loading / parking locations, methods of moving goods from vehicle etc). ▪ Usually conducted at establishments receiving collections / deliveries, with driver intercepted after carrying out work before they drive away.	Face-to-face or self-completion	▪ Trip details and patterns of goods vehicles in the urban area ▪ Loading / unloading activity of goods vehicles in the urban area ▪ Movement of goods between vehicles and establishments in the urban area ▪ Origin location of goods flow / vehicle trip to establishment in the urban area

Table B-1. Urban Goods Movement Survey Types

Source: Allen, J. and Browne, M., "Review of Survey Techniques Used in Urban Freight Studies." University of Westminster, November 2008, pp. 10-15.

Survey technique	Explanation	How it is conducted	Aspects of urban freight to which most suited
5. Roadside interview survey	▪ Normally involves working with police or appropriate law enforcement agency to pull over moving vehicles / drivers and interview them at the roadside about their current trip. Also can be conducted at off-road locations such as weight stations. ▪ Typically used to capture data about origin / destination, trip purpose, goods carried and vehicle type. ▪ Usually a relatively brief survey so as not to disrupt drivers and avoid causing unnecessary traffic congestion. ▪ Far less used than it used to be due to cost and need for other agency involvement.	Face-to-face	▪ Trip details and patterns of goods vehicles in the urban area ▪ Origin location of goods flow / vehicle trip to establishment in the urban area

Table B-1. Urban Goods Movement Survey Types

Source: Allen, J. and Browne, M., "Review of Survey Techniques Used in Urban Freight Studies." University of Westminster, November 2008, pp. 10-15.

Survey technique	Explanation	How it is conducted	Aspects of urban freight to which most suited
6. Vehicle observation survey	▪ Involves surveyor(s) being positioned on street at establishments to record data about total goods vehicle trips to/from establishments by time of day (and can be used to study variation by day of week). Can also capture information about vehicle type, time taken for delivery / collection / servicing, methods of moving goods from vehicle etc). Difficult to capture details of all goods delivery / collection trips using this technique if more than one location is used to access establishment (e.g. rear or side access as well as frontage). ▪ Also, only captures data for as long as surveyors present so usually misses activity outside the normal working day (so can be combined with establishment survey to capture all delivery / collection trips). ▪ Can prove difficult to determine the establishments at which delivery / collection is taking place if vehicle / driver visits several establishments without moving vehicle. ▪ Can provide better quality information about vehicle activity on the street than establishment survey.	Surveyor observation either in real-time or at a later date using film / camera footage	▪ Vehicle delivery / collection trips at establishments in the urban area ▪ Service trips to establishments in the urban area ▪ Loading / unloading activity of goods vehicles in the urban area ▪ Parking activity of service vehicles in the urban area ▪ Movement of goods between vehicles and establishments in the urban area

Table B-1. Urban Goods Movement Survey Types

Source: Allen, J. and Browne, M., "Review of Survey Techniques Used in Urban Freight Studies." University of Westminster, November 2008, pp. 10-15.

Survey technique	Explanation	How it is conducted	Aspects of urban freight to which most suited
7. Parking survey	▪ Similar to vehicle observation survey but only used to capture information about vehicle loading / unloading / parking activity, (such as vehicle type, time taken, illegal activity etc.) rather than total delivery / collection trips at establishments, and method of moving goods from vehicle. ▪ Can also be used to study use of space allocated for goods / service vehicles by other road users.	Surveyor observation either in real-time or at a later date using film/camera footage	▪ Loading / unloading activity of goods vehicles in the urban area ▪ Parking activity of service vehicles in the urban area ▪ Parking activity of other road users in space used by goods and service vehicles
8. Vehicle trip diaries	▪ Used to collect detailed information about the activities of a single vehicle (usually over a single day or a few days). Can provide data about exact locations served, route, arrival and departure times, time taken for delivery / collection / servicing, type of goods/service etc.)	Self-completion by driver or other suitably informed employee of freight operator	▪ Trip details and patterns of goods vehicles in the urban area ▪ Trip details and patterns of service vehicles in the urban area ▪ Loading / unloading activity of goods vehicles in the urban area ▪ Parking activity of service vehicles in the urban area ▪ Movement of goods between vehicles and establishments in the urban area
9. GPS survey	▪ Equipment can provide data on vehicle location at frequent intervals (thereby providing route information), as well as speed. ▪ Can also be used to record stops for loading / unloading / parking.	Equipment / transmitter fitted in vehicle	▪ Trip details and patterns of goods vehicles in the urban area ▪ Trip details and patterns of service vehicles in the urban area ▪ Loading / unloading activity of goods vehicles in the urban area ▪ Parking activity of service vehicles in the urban area

Table B-1. Urban Goods Movement Survey Types

Source: Allen, J. and Browne, M., "Review of Survey Techniques Used in Urban Freight Studies." University of Westminster, November 2008, pp. 10-15.

Survey technique	Explanation	How it is conducted	Aspects of urban freight to which most suited
10. Suppliers survey	▪ Used to gather information from suppliers about the goods they dispatch to urban establishments and the vehicle activity that supports this goods flow. ▪ If used, then typically used in conjunction with establishment survey (with establishments identifying key suppliers). ▪ Can provide more detailed information about vehicle activity if supplier operates goods vehicle to make deliveries (if so then similar to information captured by freight operator survey).	Face-to-face, telephone or self-completion	▪ Goods flows to / from establishments in the urban area ▪ Trip details and patterns of goods vehicles in the urban area ▪ Loading / unloading activity of goods vehicles in the urban area ▪ Movement of goods between vehicles and establishments in the urban area ▪ Origin location of goods flow / vehicle trip to establishment in the urban area ▪ (Transport-related data above usually only available from suppliers operating their own vehicles)
11. Service provider survey	▪ Similar to freight operator survey, providing wide ranging data about the pattern of the companies' service activities and supporting vehicle activity in the urban area. Allows opportunity to obtain data about the entire fleet rather than a single vehicle or round (as in vehicle trip diary – the two types of survey can be used in conjunction). ▪ Can be used to collect data about vehicle parking activity.	Face-to-face, telephone or self completion	▪ Trip details and patterns of service vehicles in the urban ▪ area ▪ Parking activity of service vehicles in the urban area

Table B-1. Urban Goods Movement Survey Types

Source: Allen, J. and Browne, M., "Review of Survey Techniques Used in Urban Freight Studies." University of Westminster, November 2008, pp. 10-15.

Survey technique	Explanation	How it is conducted	Aspects of urban freight to which most suited
12. Vehicle traffic counts	▪ Road vehicle traffic is counted and disaggregated by vehicle type. This can provide details of types of goods vehicles on selected roads or routes, or crossing specified cordons by time of day and day of week. The area covered by the traffic counts can range from a single road up to an entire urban area.	This can be achieved either by manual counts (i.e. the use of surveyors positioned at the road side who count vehicles a they pass by) or automated counts (which can use either sensors in the roads or camera technology in conjunction with computing software). The extent of the vehicle type disaggregation is dependent on the needs of the study, and the method used for collecting the traffic data. In manual counts the extent of disaggregation may be limited by the degree of expertise of the surveyors. In automated counts disaggregation may be limited by the sophistication of the technology. For instance, road sensors that quantify vehicle length cannot easily distinguish between vehicles of similar length such as cars as light goods vehicles.	▪ Only provides data about goods vehicles travelling on the selected roads/ in the selected areas surveyed. Does not provide information about trip purpose (i.e. whether the vehicle is being used to make goods deliveries, collections, to provide a service), whether the vehicle will visit establishments in the survey area or is just passing through, or the origin or destination of the trip. Only provides insight into the spread of goods vehicles traffic flows by time, day, and month and the proportion of total traffic flow they account for.

Appendix C
2007 U.S. CFS – Questionnaire (Q1, 2, 3)

2007 Commodity Flow Survey

07100019

DUE DATE:

Please make corrections to name, address, and ZIP code if necessary.

INSTRUCTIONS:

- **Please refer to the accompanying Instruction Guide for help in answering specific questions.**

- **More information is available at www.census.gov/cfs or at 1-800-772-7851.**

PURPOSE OF THIS SURVEY: To develop information on the characteristics of freight flows in the United States. The information you provide is critical to understanding transportation markets, investment needs and the economic, energy, safety, and security consequences of transportation.

Item A	ESTABLISHMENT NAME

Is the establishment name shown above in the mailing address correct?

1 ☐ Yes

2 ☐ No - *Enter establishment name* ⟶

Item B	PHYSICAL LOCATION

Is the establishment's physical location the same as shown in the mailing label above? *PO Box or rural routes are not physical locations.*

1 ☐ Yes

2 ☐ No - *Print physical location below*

Number and street

City, town, village, etc.   State   ZIP Code + 4

If you entered a different location above, please complete the form for that location.

Item C   OPERATING STATUS

Which of the following best describes this establishment's operating status during the week of

[   ] **?**

1 ☐ In operation

2 ☐ Temporarily or seasonally inactive

3 ☐ Ceased operation - *Enter date ceased operation* ⟶   Date (MM-DD-YYYY)

[   ] - [   ] - [   ]

Item D   TOTAL NUMBER OF OUTBOUND SHIPMENTS

For this survey, it is important to obtain information about a sample of the outbound shipments made from this establishment.

An outbound shipment in this survey is defined as a movement of commodities from your establishment to another ***single*** *location. If a truck makes multiple stops on a delivery route, please* ***count each stop as one shipment.***

- Remember to include only outbound shipments from your physical location (label address or physical location in Item B).
- Also include customer pick-ups, parcels, and all other outbound shipments.

1. What was the total number of all outbound shipments for this establishment the week of

Total number of outbound shipments

[   ] **?** . . . .   [   ]

Estimates are acceptable.

For further information, refer to the Instruction Guide, page 2.

2. Did you enter 40 or fewer shipments above?

1 ☐ Yes - *Skip Item E and report all outbound shipments in Item F, pages 4-7.*

2 ☐ No - *Continue with Item E, on page 3.*

Item E   SAMPLING INSTRUCTIONS

In order to avoid asking you for information regarding all of your shipments, we will only ask about a sample of them. This section will help you **identify your sample of shipments.**

1. Using the table below, mark the row that includes the total number of outbound shipments reported in Item D, and the corresponding "report every" number.

Number of outbound shipments reported in Line 1	Report every...	Mark (X) one
1-40	Report every outbound shipment	
41-80	Report every **2nd** outbound shipment	
81-100	Report every **3rd** outbound shipment	
101-200	Report every **5th** outbound shipment	
201-400	Report every **10th** outbound shipment	
401-800	Report every **20th** outbound shipment	
801-1600	Report every **40th** outbound shipment	
1601-3200	Report every **80th** outbound shipment	
3201-6400	Report every **160th** outbound shipment	
6401-12800	Report every **320th** outbound shipment	
More than 12800	Call Census at 1-800-772-7851 or go to www.census.gov/cfs	

2. Using your full set of shipments records for the week named in Item D, follow the steps below.

Step 1. Count until you reach the "report every" number marked above.

Step 2. Select that record.

Step 3. Report that record in Line 1 of Item F, pages 4-5.

Step 4. Continuing with the next shipment record, count until you reach the "report every" number again.

Step 5. Select that record.

Step 6. Report in Line 2 of Item F, pages 4-5.

Step 7. Repeat this process until you have gone through your full set of shipment records.

3. Report these selected shipments in Item F.

Example: If an establishment reported 150 shipments in Item D, it would correspond to the range of 101-200 in the table above, and every 5th outbound shipment record would be selected. This means the establishment would count 5 shipment records, select that record, and report it in Item F. Continuing with the next shipment record, the establishment would count 5 shipment records again, select that record, and report it in Item F. The establishment would repeat this until it had gone through the full set of shipment records for the week named in Item D.

For further information, refer to the Instruction Guide, page 3.

Item F SHIPMENT CHARACTERISTICS

NOTE: Each line runs across pages 4 and 5. After entering column H data on page 4 for any line, continue with column (I) on page 5 for the same line.

Line No. (A)	Your Shipment ID Number (B)	Shipment Date (C) Month	Day	Shipment value (excluding shipping costs) in whole dollars. *Estimates acceptable.* (D)	Net Shipment Weight **in pounds** (E)	SCTG commodity code from accompanying booklet (F)	Commodity Description (G)	If a hazardous material, enter the "UN" or "NA" number (H)	*Continue with column (I) on page 5*
0	123-5	4	26	224,235	4840	34520	Mechanical machinery		➡
00	402H	4	26	1,375	50,125	20222	Sulfuric acid	1830	➡
1									➡
2									➡
3									➡
4									➡
5									➡
6									➡
7									➡
8									➡
9									➡
10									➡
11									➡
12									➡
13									➡
14									➡
15									➡
16									➡
17									➡
18									➡
19									➡
20									➡

U.S. Destination or U.S. Exit Port *(Complete for all shipments.)* (I)			Mode(s) of transport to U.S. destination. ***Enter all that apply in order used. Use codes at bottom.*** (J)	* Intermodal shipment? (Y/N) (K)	Export? (Y/N) (L)	Foreign Destination (for export shipments only) **Note:** In column (I) enter the U.S. port, airport, or border crossing of exit. (M)		Export mode (N)	Line No. (O)
City	State	ZIP Code				City	Country		
Los Angeles	**CA**	**90040**	**2, 4**	**Y**	**Y**	**Beijing**	**China**	**6**	0
Newark	**NJ**	**07105**	**4**	**N**	**N**				00
									1
									2
									3
									4
									5
									6
									7
									8
									9
									10
									11
									12
									13
									14
									15
									16
									17
									18
									19
									20

Mode of transport codes for columns (J) and (N):

1 - Parcel delivery, courier, or U.S. Parcel Post	4 - Railroad	7 - Pipeline
2 - Private truck	5 - Shallow draft vessel	8 - Air
3 - For-hire truck	6 - Deep draft vessel	9 - Other mode
		0 - Unknown

* Intermodal shipments (column K): include Trailer on Flat Car (TOFC), Container on Flat Car (COFC), and Intermodal (IM or ISO) tank.

Item F SHIPMENT CHARACTERISTICS - Continued

NOTE: Each line runs across pages 6 and 7. After entering column H data on page 6 for any line, continue with column (I) on page 7 for the same line.

Line No. (A)	Your Shipment ID Number (B)	Shipment Date (C) Month	Day	Shipment value (excluding shipping costs) in whole dollars. *Estimates acceptable.* (D)	Net Shipment Weight **in pounds** (E)	SCTG Commodity Code from accompanying booklet (F)	Commodity Description (G)	If a hazardous material, enter the "UN" or "NA" (H)	*Continue with column (I) on page 7*
21									→
22									→
23									→
24									→
25									→
26									→
27									→
28									→
29									→
30									→
31									→
32									→
33									→
34									→
35									→
36									→
37									→
38									→
39									→
40									→

U.S.Destination or U.S. Exit Port *(Complete for all shipments.)* (I)			Mode(s) of transport to U.S. destination. *Enter all that apply in order used. Use codes at bottom.* (J)	Intermodal shipment? (Y/N) * (K)	Export? (Y/N) (L)	Foreign Destination (for export shipments only) **Note:** In column (I) enter the U.S. port, airport, or border crossing of exit. (M)		Export mode (N)	Line No. (O)
City	State	ZIP Code				City	Country		
									21
									22
									23
									24
									25
									26
									27
									28
									29
									30
									31
									32
									33
									34
									35
									36
									37
									38
									39
									40

Mode of transport codes for columns (J) and (N):

1 - Parcel delivery, courier, or U.S. Parcel Post
2 - Private truck
3 - For-hire truck
4 - Railroad
5 - Shallow draft vessel
6 - Deep draft vessel
7 - Pipeline
8 - Air
9 - Other mode
0 - Unknown

* Intermodal shipments (column K): include Trailer on Flat Car (TOFC), Container on Flat Car (COFC), and Intermodal (IM or ISO) tank.

Item G   MONTHLY VALUE OF OUTBOUND SHIPMENTS

Which of the following represents your best estimate of the total value of all outbound shipments originating from this establishment for the most recently completed month?

1 ☐ Less than $1 Million

2 ☐ $1 Million or more but less than $10 Million

3 ☐ $10 Million or more but less than $40 Million

4 ☐ $40 Million or more but less than $100 Million

5 ☐ $100 Million or more but less than $400 Million

6 ☐ $400 Million or more

Contact   Please provide the information below for the contact person regarding this report.

Name - *Please print*

Title - *Please print*

Signature

Area Code   -   Phone Number   -   Extension   -

Remarks   Please use this space to clarify your responses, if appropriate.

Please return this survey in the enclosed envelope or send it to:
U.S. CENSUS BUREAU
1201 East 10th Street
Jeffersonville IN 47132-0001

THANK YOU FOR COMPLETING THIS REPORT.

Appendix D
2007 U.S. CFS – Instruction Booklet

2007 Commodity Flow Survey

INSTRUCTION GUIDE

Instructions for Completing the Commodity Flow Survey
Please read all instructions.

Contents:

Instructions for completing the Commodity Flow Survey also are available on our website at **http://www.census.gov/CFS**. If you need to contact us by telephone, a representative will be glad to assist you. Call us at **1–800–772–7851** between 8:30 a.m. and 5:00 p.m. Eastern time.

Part I — Instructions for Completing Your Questionnaire

Item A: *Establishment Name:*
Enter **only** if different from mailing address in label area.

Item B: *Physical Location:*
Enter **only** if different from mailing address in label area.

Item C: *Operating Status:*
Check the box that best describes this establishment's operating status during the designated reporting week.

If this establishment was inactive and made no outbound shipments during the designated reporting week: skip to the end of the questionnaire and complete the Contact information, and then return the form to the Census Bureau in the envelope provided.

Item D(1): *Total Number of Outbound Shipments*

Enter in the space provided your total number of outbound shipments **for the one week reporting period** printed in Item D(1).

What we mean by a "shipment":

For the purposes of this survey, a shipment is a single consignment of commodities or products from your establishment to a single customer or to another specific location of your company transported in commerce, often with a shipping document such as a manifest, bill of lading, or waybill.

"Commodities" refer to items that the establishment at this location produces, sells, or distributes, *not* to items that are considered waste-products (without value) of your location's operation.

A special note about "shipments":

A full, or partial, truckload should be counted as a single shipment only if all the commodities on the truck are destined for one location. If a truck makes multiple deliveries on a route, **please count each delivery as one shipment.**

Include:

Include in this count any materials picked up by the customer ("customer pick-up").

Include only those shipments from the location specified in Item B, or label address if not changed.

Include shipments of commodities of all sizes, by any mode of transportation (e.g., parcels).

Include any shipment of products from this establishment to another location of the company if intended for sale (e.g., products moved from this establishment to a company warehouse).

Do not include:

Do *not* include as shipments internal administrative items, such as inter-office memos, payroll checks, business correspondence, etc.

Do *not* include as shipments such as refuse, scrap paper, waste, and recyclable materials **unless** this establishment is in the business of selling or providing these materials to others.

Do *not* include as shipments items moved from the establishment at this location to another location of the company if not intended for commercial activity (e.g., the transfer of office furniture from one location of this company to another location of this company for use at the new location).

Part I — Instructions for Completing Your Questionnaire

Item D(2): Total Number of Outbound Shipments

Check the appropriate box in Item D(2) to indicate whether this establishment reported 40 or fewer shipments in Item D(1). If "Yes" is marked, skip to Item F beginning on page 4 and report the information requested for all shipments made during the assigned week.

If "No", continue with Item E on page 3 to determine the sample of shipments that this establishment should report in Item F.

Item E: Sampling Instructions

If you have more than 40 outbound shipments for the one-week reporting period you are asked to report only a sample of them in Item F.

Item E provides instructions for selecting shipments for which to report in Item F.

Example

For example, if in Item D(1) you reported 150 outbound shipments for the one-week period:

Using the table provided in Item E: Go to the line with the range in column 1 that includes your total number of shipments for the week. In this example, row 4 (101-200), includes 150 so you would follow the instructions in column 2 which reads, "Report every 5th outbound shipment". You would then report the following 30 shipments in Item F, beginning on Page 4 of the report form:

Line 1: your 5th outbound shipment
Line 2: your 10th outbound shipment
Line 3: your 15th outbound shipment
• • • (continue with every 5th shipment)
• • •
• • •
Line 30: your 150th outbound shipment

When sampling your shipments, please use the files, or combination of files that reflect the full range of your location's shipping activities in terms of modes of transportation used, commodities or products shipped, and destinations.

We're here to answer your questions! If you have questions about the sampling process (or any part of the questionnaire) please visit our website at www.census.gov/cfs or call us at 1-800-772-7851, from 8:30 am to 5:00 pm, Eastern time.

Part I — Instructions for Completing Your Questionnaire – Continued

Item F: Shipment Characteristics

- **Shipment ID Number, Column (B) –** Enter the invoice number, shipment number, or some other unique identification number that your establishment could use to find this particular shipping document if questions arise regarding your report.

- **Shipment Date, Column (C) –** Enter the month and day of the shipment. If shipment date is not available, use the invoice/shipping document date. Use numbers only.

- **Shipment Value, Column (D) –** Enter the dollar value, in whole dollars, of the entire shipment. The value should not include freight charges or excise taxes (i.e., report the net selling value, f.o.b. plant). If the value is not readily available from your records, please estimate.

- **Net Shipment Weight, Column (E) –** Enter the net weight of the total shipment in whole pounds. If net weight is not readily available from your records, please estimate.

- **SCTG Commodity Code, Column (F) –** Please use the list of commodity codes provided in the SCTG Commodity Codes booklet to select the proper code. For shipments with more than one commodity, enter only the code for the commodity with the greatest weight. For assistance in locating the appropriate commodity code, refer to the alphabetized listing of selected commodities at the end of the SCTG Commodity Codes booklet. Additional assistance is available at our website at www.census.gov/cfs, or you may call us at 1–800–772–7851 to speak with a Census Bureau representative.

- **Commodity Description, Column (G) –** Enter a brief description of the commodity shipped. For shipments with more than one commodity, describe only the commodity with the greatest weight. Do not use trade names, catalog numbers, or other codes not familiar to persons outside your business.

Item F SHIPMENT CHARACTERISTICS

Line No. (A)	Your Shipment ID Number (B)	Shipment date (C) Month	Day	Shipment value (excluding shipping costs) in whole dollars *Estimates acceptable.* (D)	Net Shipment weight **in pounds** (E)	SCTG commodity code from accompanying booklet (F)	Commodity description (G)	*Continue with column (H) on page 5*
0	123-5	4	26	244,235	4840	34520	Mechanical machinery	➔
00	402H	4	26	1,375	50,125	20222	Sulfuric acid	➔
1								
2								
3								
4								

Part I — Instructions for Completing Your Questionnaire – Continued

Item F: Shipment Characteristics – Continued

- **For Hazardous Materials, Column (H) –** If shipment is a hazardous material, enter the 4-digit United Nations (UN) or North American (NA) number.

- **U.S. Destination or U.S. Exit Port, Column (I) –** For domestic shipments, enter the city, state, and 5-digit ZIP Code of the buyer/receiver as it appears on the shipping document. Use the **"ship to"** address. Use the two letter state postal abbreviation shown in part III.

  Important – For export shipments, report the U.S. **port of exit** as the destination city. The port of exit is the port or airport from which the shipment left the country. In case of land shipments into Mexico or Canada, it is the border crossing.

- **Mode(s) of Transport to U.S. Destination, Column (J) –** Enter the code(s) for **all** modes of transport used for the shipment to its U.S. destination (i.e., the destination reported in **Column (I)**). Codes are located on the bottom of pages 5 and 7 of the questionnaire. Enter in the sequence used, all that apply. See part II for definitions of each mode.

  For Customer Pick-up: Report the mode(s) of transportation used, if known. Otherwise, report mode as "0" (unknown).

  For Export Shipments: List only the mode(s) of transport used to reach the U.S. port, airport, or border crossing of exit.

If a hazardous material, enter the "UN" or "NA" number (H)	U.S. destination or U.S. Exit Port *(Complete for all shipments.)* (I)			Mode(s) of transport to U.S. destination *Enter all that apply in order used. Use codes at bottom.* (J)
	City	State	ZIP Code	
	Los Angeles	C A	90040	2, 4
1 8 3 0	Newark	N J	07105	4

Item F: *Shipment Characteristics – Continued*

- **Intermodal Shipment, Column (K) –** An intermodal shipment is defined as a shipment of a commodity that has been placed within a piece of transportation equipment that is designed to be interchanged (transferred) between different modes of transportation under a single rate (e.g., a single bill of lading). Examples of intermodal transportation include the shipment of commodities in truck trailers designed to be placed on railroad flat cars (TOFC); shipping containers designed to be placed on railroad flat cars (COFC); or shipping containers for marine transportation. Intermodal (IM or ISO) tanks designed for interchange between the truck, rail and marine modes are also examples of intermodal transportation reportable in the CFS.

- **Export Shipment, Column (L) –** Indicate whether or not the shipment is intended for export outside of the United States, by entering a "Y" or "N" (yes or no). For purposes of this survey, shipments to Puerto Rico and U.S. territories and possessions **are** considered exports.

- **Foreign Destination: City and Country, Column (M) –** If the shipment is an export, enter the foreign city and country of destination. For **U.S. Destination, Column (I),** enter the U.S. port, airport, or border crossing of exit. In **Column (J),** enter the mode of transport used to the U.S. destination.

- **Export Mode, Column (N) –** If the shipment is an export, enter the code for the mode of transport by which the shipment left the country. Codes are located at the bottom of pages 5 and 7 of the questionnaire.

Intermodal Shipment? (Y/N) *	Export? (Y/N)	Foreign Destination (for export shipments only) **Note:** In column (I) enter the U.S. port, airport, or border crossing of exit. (M)		Export mode	Line No.
(K)	(L)	City	Country	(N)	(O)
Y	Y	Beijing	China	6	0
N	N				00
					1
					2
					3
					4

Item G: *Monthly Value of Outbound Shipments*

Please check the box that corresponds to the total value of all outbound shipments from this location for the most recently completed calendar month.

Contact

Please enter name and telephone number of the person to contact in the event that we have a question about your report.

Part II — Mode of Transportation Definitions

Parcel delivery/Courier/U.S. Parcel Post – Includes ground and air shipments of packages and parcels that each weigh less than 100 pounds, and are transported by a for-hire carrier.

Private truck – Trucks operated by employees of this establishment or the buyer/receiver of the shipment. Includes trucks providing dedicated services to this establishment.

For-hire truck – Shipments by common or contract carriers made under a negotiated rate.

Railroad – Any common carrier or private railroad.

Shallow draft vessel – Barges, ships, or ferries operating on rivers and canals; in harbors, the Great Lakes, the Saint Lawrence Seaway, the Intracoastal Waterway, the Inside Passage to Alaska, major bays and inlets, or in the ocean close to the U.S. shoreline.

Deep draft vessel – Barges, ships, or ferries operating primarily in the open ocean. (Shipping on the Great Lakes and the Saint Lawrence Seaway is classified with shallow draft vessels.)

Pipeline – Movements of oil, petroleum, gas, slurry, etc. through pipelines that extend to other establishments or locations beyond the shipper's establishment. (Aqueducts for the movement of water are not included.)

Air – Any individual package shipped by air that weighs 100 pounds or more.

Other mode – Any mode not listed above.

Unknown – A shipment where you are unable to determine the mode of transportation.

Note: Transportation equipment that is "shipped" under its own power, such as boats, barges, ferries, ships, aircraft, trucks, and trains **should be classified with the appropriate mode above.** Transportation equipment shipped under its own power for which an appropriate mode is not listed (e.g., buses, recreational vehicles) should be listed as **"other" mode.**

Part III — State Postal Abbreviation List

State	Abbrev.	State	Abbrev.
Alabama	AL	Montana	MT
Alaska	AK	Nebraska	NE
Arizona	AZ	Nevada	NV
Arkansas	AR	New Hampshire	NH
California	CA	New Jersey	NJ
Colorado	CO	New Mexico	NM
Connecticut	CT	New York	NY
Delaware	DE	North Carolina	NC
Dist. of Col.	DC	North Dakota	ND
Florida	FL	Ohio	OH
Georgia	GA	Oklahoma	OK
Hawaii	HI	Oregon	OR
Idaho	ID	Pennsylvania	PA
Illinois	IL	Rhode Island	RI
Indiana	IN	South Carolina	SC
Iowa	IA	South Dakota	SD
Kansas	KS	Tennessee	TN
Kentucky	KY	Texas	TX
Louisiana	LA	Utah	UT
Maine	ME	Vermont	VT
Maryland	MD	Virginia	VA
Massachusetts	MA	Washington	WA
Michigan	MI	West Virginia	WV
Minnesota	MN	Wisconsin	WI
Mississippi	MS	Wyoming	WY
Missouri	MO		