Transportation Association of Canada

Urban Transportation Indicators

Survey 2
1996

Regina
Saskatoon
Windsor
Victoria
Niagara
Kitchener
London
Hamilton
Winnipeg
Calgary
Edmonton
Ottawa-Hull
Vancouver
Montreal
Toronto

December 1999

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Abstract

In 1993, the Urban Transportation Council (UTC) of the Transportation Association of Canada (TAC) proposed a *New Vision for Urban Transportation*, describing 13 principles which point the way to desirable future transportation systems and related urban land use. The Council recognized that periodic surveys of transportation indicators would be required to monitor progress towards achieving the Vision. To this end, a Pilot Survey was carried out in 1995 using 1991 as the study year and including eight urban areas. This report describes the second survey, which included 15 urban areas and was carried out in 1999 for the 1996 study year. This report describes the survey process and results, draws conclusions on the reliability of the resulting database (which includes 1991 and 1996 data and which is mounted on the TAC website), makes recommendations regarding future surveys, and discusses progress towards achieving the TAC Vision in light of the survey findings.

Section S.1 provides an introduction to the project. Section S.2 discusses the process of implementing the survey and response rates achieved. Section S.3 presents the responses to the 1996 study year survey and some comparisons with the 1991 results. Section S.4 presents recommendations regarding an improved survey process and some changes to clarify the questionnaire, and Section S.5 presents conclusions, including comments on key indicators and progress towards TAC's *New Vision for Transportation.*

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Résumé

En 1993, le Conseil des transports urbains (CTU) de l'Association des transports du Canada (ATC) a proposé une *Nouvelle vision des transports urbains*, laquelle préconisait 13 principes directeurs de gestion des réseaux de transport et d'utilisation des terres en milieu urbain. Le CTU a reconnu que des enquêtes périodiques fondées sur l'emploi d'indicateurs de transport urbain seraient nécessaires aux fins de mesurer les progrès accomplis au titre de la concrétisation de cette *Vision*. À cette fin, une enquête pilote a été menée en 1995, enquête qui se fondait sur les données de référence de 1991 et qui s'étendait à huit zones urbaines. Le présent rapport décrit les résultats de la deuxième enquête menée dans ce contexte en 1999, laquelle se fondait cette fois sur les données de référence de 1996 et s'étendait à quinze zones urbaines. Le rapport décrit le processus d'enquête et les résultats ainsi obtenus, propose des conclusions quant à la fiabilité de la base de données établie à la suite de cette deuxième enquête (laquelle comprendra les données réunies en 1991 et 1996 et pourra être consultée dans le site Web de l'ATC), formule des recommandations à propos des futures enquêtes en la matière et décrit les progrès accomplis à l'appui de la concrétisation de la *Vision* de l'ATC, conclusions d'enquête à l'appui.

Concrètement, la section 1 du rapport contient l'introduction de ce dernier. La section 2 est consacrée au processus d'exécution de l'enquête et aux taux de réponse obtenus. La section 3 traite des résultats de la nouvelle enquête en regard des données de l'année de référence 1996 et aussi, dans une certaine mesure, de celles de l'année de référence 1991. La section 4 recommande des améliorations à apporter au processus d'enquête ainsi que certains changements destinés à clarifier le questionnaire. Enfin, la section 5 présente les conclusions des auteurs de l'enquête, y compris certaines observations concernant les principaux indicateurs et les progrès accomplis au regard de la concrétisation de la *Nouvelle vision des transports urbains* de l'ATC.

Mots-clés

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Renseignements supplémentaires

SPECIAL ACKNOWLEDGMENT

John Hartman served as Secretary of the Transportation Association of Canada's Urban Transportation Council from its formation ten years ago until his untimely death on August 31, 1999. At its September, 1999 meeting in Saint John New Brunswick, the TAC Board of Directors unanimously endorsed the following motion presented by the Urban Transportation Council:

> *That the Urban Transportation Council expresses its deep sense of shock and loss at the passing of Mr. John Hartman, whose dedication, intellect, leadership and courage were the essential ingredient in the establishment of the Council, the development of the landmark* ***New Vision for Urban Transportation in Canada*** *in 1993 and the Council's extensive efforts since then to communicate, support and implement the Vision.*

Members of the Council and of the wider community working for greater sustainability in transportation and urban development will miss John's leadership, his ability to get to the heart of things and express it in plain English, his good humour and his extraordinary drive for excellence.

John Hartman played the central role in defining, organizing and implementing the two surveys of Urban Transportation Indicators in Canadian urban areas which the Council has sponsored to record conditions as of 1991 and 1996. This report presents the results of the second survey, and it is the Council's intention, resources permitting, to sponsor and manage future surveys at five year intervals.

This report is dedicated to the memory of John Hartman, without whom the Urban Transportation Council, its groundbreaking Vision and the survey results presented in this report would not have come into being.

ACKNOWLEDGEMENTS

This study is a result of the efforts put forth by many dedicated individuals.

The Project Steering Committee, appointed by the TAC Urban Transportation Council, initiated the study and provided direction throughout. The Steering Committee members were as follows:

Mr. Nick Tunnacliffe (Chair), Region of Ottawa-Carleton
Mr. Ken Cameron, Greater Vancouver Regional District
Mr. Bruce Duncan, City of Edmonton
Mr. Rod McPhail, City of Toronto
Prof. Ron Rice, McGill University
Mr. John Hartman, Transportation Association of Canada
Mr. Russ Smith, Transportation Association of Canada

The Technical Subcommittee consisted of the following individuals:

Mr. Don Stephens (Chair), Region of Ottawa-Carleton
Mr. Dipak Dhrona, City of Toronto
Ms. Monique Kealey, City of Regina
Mr. Karoly Krajczar, Greater Vancouver Transportation Authority
Mr. Richard Nadwodny, Statistics Canada
Prof. Ron Rice, McGill University

Each municipal partner and especially the technical contacts, should be recognized for the considerable time and effort they spent in gathering and validating survey data:

CMA Study Area	Municipal Partners	Technical Contacts
Toronto (ON)	Mr. Paul Bedford Urban Planning & Development Services City of Toronto	Mr. Dipak Dhrona/Mr. Wayne Chan Urban Planning & Development Services City of Toronto
Montréal (QC)	M. André-Philippe Hébert Ville de Montréal	M. François Major Ville de Montréal
Vancouver (BC)	Mr. Ken Cameron Greater Vancouver Regional District	Mr. Basse Clement TransLink, Implementation Planning Mr. Karoly Krajczar Greater Vancouver Transportation Authority
Ottawa-Hull (ON-QC)	Mr. Nick Tunnacliffe Region of Ottawa-Carleton	Mr. Don Stephens/Mr. Mark Campbell/ Mr. Rob Calladine Planning & Development Department Region of Ottawa-Carleton

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Winnipeg (MB)	Mr. Doug Hurl Public Works Department City of Winnipeg	Mr. Doug Hurl Public Works Department City of Winnipeg
Hamilton (ON)	Mr. Bill Pearce Regional Municipality of Hamilton-Wentworth	Mr. Andrew Head Regional Municipality of Hamilton-Wentworth
London (ON)	Mr. John Ford London Transit Commission	Mr. David Stowe London Transit Commission
Kitchener (ON)	Mr. Larry Kotseff Regional Municipality of Waterloo	Ms. Lucille Bush/Mr. Robert Gallivan Regional Municipality of Waterloo
St. Catharines-Niagara (ON)	Mr. Corwin Cambray Regional Municipality of Niagara	Mr. George Nicholson Planning and Development Department Regional Municipality of Niagara
Victoria (BC)	Mr. Larry Roberts Regional Planning Services Capital Regional District	Mr. Larry Roberts/Mr. Lyle Walker Regional Planning Services Capital Regional District
Windsor (ON)	Mr. John Tofflemire City of Windsor	Mr. Wes Hicks Traffic Engineering Department City of Windsor
Saskatoon (SK)	Mr. Paul Nyirongo City of Saskatoon	Mr. Paul Nyirongo City of Saskatoon
Regina (SK)	Mr. Garry Quiring City of Regina	Ms. Monique Kealey City of Regina

The survey work, preparation of the database and results reporting was carried out by IBI Group on behalf of the Urban Transportation Council. The key individuals from IBI Group who participated in the project were Neal Irwin, Lee Sims, Brian Hollingworth and Anna Pushkar.

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Disclaimer

This report presents data and statistics based on information submitted in response to the Urban Indicators Survey Questionnaire prepared and administered by the Transportation Association of Canada. The survey was completed by one individual municipality in each urban area on behalf of an entire urban area. Although some limited data validation was undertaken, the information is generally as reported by each participating municipality. As a result, the data should be observed with a degree of caution. It should also be recognized that techniques and methodologies for data collection and reporting could vary between urban areas.

Urban Transportation Indicators – 1996 Survey 2
Executive Summary

S.1 INTRODUCTION

In 1993, the Urban Transportation Council (UTC) of the Transportation Association of Canada (TAC) proposed a ***New Vision for Urban Transportation,*** describing 13 principles which point the way to desirable future transportation systems and related urban land use. The Council recognized that periodic surveys of transportation indicators would be required to monitor progress towards achieving the Vision. To this end, a Pilot Survey was carried out in 1995 using 1991 as the study year and including eight urban areas. This report describes the second survey, which included 15 urban areas and was carried out in 1999 for the 1996 study year. This report describes the survey process and results, draws conclusions on the reliability of the resulting database (which includes 1991 and 1996 data and has been mounted on the TAC website), makes recommendations regarding future surveys, and discusses progress towards achieving the TAC Vision in light of the survey findings.

This Executive Summary follows the structure of the main report. Section S.2 discusses the process of implementing the survey and response rates achieved. Section S.3 presents the responses to the 1996 study year survey and some comparisons with the 1991 results. Section S.4 presents recommendations regarding an improved survey process and some changes to clarify the questionnaire, and Section S.5 presents conclusions, including comments on key indicators and progress towards TAC's ***New Vision for Transportation.***

S.2 SURVEY IMPLEMENTATION

The **survey questionnaire** (included as Appendix A) is essentially the same as the past survey questionnaire, with some minor reordering and the addition of five new items. Part A of the questionnaire asks the status of 68 transportation and land use initiatives while Part B asks about transportation financing including funding sources and utilization levels, other revenue sources being considered, and financial analysis methods used. Part C requests 83 items of numerical data regarding each urban area's urban structure and the supply, use, performance and costs of their transportation systems. These are used to calculate the majority of the transportation and land use indicators. Each indicator is specific to one of four geographic areas describing each urban area, as follows:

- **Region**: defined as the Census Metropolitan Area (CMA) of the 1996 Census of Canada;
- **Existing Urban Area (EUA):** represents the current built-up area within the Region;
- **Central Area (CA):** an area typically of mixed use development surrounding the central business district and about 3 – 5 times its area; and
- **Central Business District (CBD):** the pre-eminent employment centre for the urban area containing high order private and public sector activities.

Reflecting inconsistencies in the manner in which these geographic areas were defined for the 1991 study year survey, the Urban Transportation Council's Steering Committee for Survey 2 worked closely with municipal representatives and Statistics Canada to produce a more consistent set of geographic definitions; these were applied for the 1996 study year but involved, in some cases, significant

differences from the 1991 definitions. This, in turn, affects the ability to make temporal comparisons (e.g. between 1991 and 1996) for most of the performance indicators from Part C of the questionnaire, although it provides a firm base for such temporal comparisons with future survey year results.

TAC began recruiting cities for the current survey in November 1998 which resulted in the **selection of 15 urban areas located in six provinces across Canada**. IBI Group was retained (as had been the case for the Pilot survey) to carry out Survey #2. The questionnaire was distributed in electronic and paper copy on March 5, 1999 (two urban areas which were delayed in joining this survey received their questionnaire about a month later). TAC staff carried out an initial round of follow-up requests and IBI Group continued this process, including preparation of a preliminary tabular and graphical summary of survey results which was distributed in July, initially to the Steering Committee and then to the participating urban areas; this produced an extremely productive round of discussions to validate the data which resulted in changes and clarifications to increase the reliability and consistency of results.

Fuel sales data were purchased by TAC from Kent Marketing Service for the EUA with each urban area to provide a consistent basis for measuring vehicle-miles of travel by gasoline-fuelled vehicles and carbon dioxide emissions from such vehicles. TAC also obtained from Statistics Canada the **1996 Census journey-to-work data**, again to provide a consistent basis for estimating the transit/auto modal split for work trips. These two sources of data were obtained for the 18 urban areas (see Exhibit 1.1 in the main report) which were originally invited to participate in the second survey and the results for these indicators are presented for all 18 urban areas.

The survey results for both the 1996 and 1991 study years have been incorporated into a **database** in Microsoft Access format. Access to the database and the raw survey results has been provided as part of the purchase of this report. The results for the Montreal urban area regarding questions in Part C of the questionnaire were not available at the time of report preparation, owing to the requirement to complete analysis of a recent travel survey as input to the replies. As a result, the Part C results from the 1991 study year (actually 1993 data for Montreal) have been added to the 1996 study year and are used in the Urban Area comparisons in this report.

Response rates were good to excellent: 99.7% of the requested information on the status of land use/transportation initiatives (Part A) was provided; for Part B, 97% of the questions on financing sources were answered, slightly smaller percentages applied regarding the allocation of these sources for road and transit expenditures, and all of the urban areas responded to the open-ended questions regarding potential new funding sources and financial analysis methods. Excluding Montreal for reasons noted above, the 14 responding urban areas provided 73% of the requested data on the 83 land use/transportation indicators requested in Part C of the questionnaire. This was slightly lower than the 79% response rates for Part C in the Pilot Survey, but was considered satisfactory since the larger sample in the second survey included a greater number of smaller urban areas which tend to have less data from surveys and transportation models pertaining to transportation performance.

Reflecting the standardization of geographic and other definitions and the extensive response validation process, the **reliability of the database** is considered to be good, although the reliability of individual measures may vary reflecting different travel survey methods etc. among the urban areas.

S.3 SURVEY RESULTS

The data collected and verified during the survey process provided the basis for deriving the transportation and land use indicators. Exhibit 3.1 in the body of the report (and reproduced on the following page as Exhibit ES.1) provides a tabular summary of **35 key indicators** for the 1996 study year. The survey results for Part C (land use and transportation data) are presented first, in Sections 3.1 – 3.6 of the main report, followed by the results for Part B (transportation financing in Section 3.7) and for Part A (status of transportation and land use initiatives) in Section 3.8. Exhibits 3.1 – 3.44, located immediately following Chapter 3 in the main report, present details of the survey response and resulting indicators in tabular and graphic form.

A summary of key findings is presented below in Section S.5.4 of this Executive Summary.

S.4 RECOMMENDATIONS FOR FUTURE SURVEYS

A number of recommendations are presented in Chapter 4 to expedite the survey process, including direct entry of survey responses by the urban area staff into the Access database forms, stricter adherence to survey deadlines, and completion of the response/validation process before the onset of the summer vacation period, if possible. A number of specific changes are proposed to clarify the survey questionnaire, including some additional explanatory notes, reordering of one question, and further clarification of the wording in a number of cases. These recommendations are based on problems experienced and comments received from the respondents during the survey response/validation process. The basic sets of questions should be retained, it is recommended, in order to provide a stable basis for comparisons of future survey results with those for the 1996 and 1991 study years.

Finally, it is recommended that municipalities continue to find the resources necessary to carry out and improve data collection efforts in their respective areas, not only for future urban indicator surveys, but more so to improve the base of information that is used in making key decisions impacting sustainability.

S.5 CONCLUSIONS

The concluding Chapter 5 notes that the database of survey responses to the 1996 study year represents a significant improvement in data availability and the reliability of data is generally considered to be good, although affected in individual cases by the different timing of various travel surveys and demand model analyses. The use of standardized definitions for the Region, EUA and CBD (the urban areas defined their own central areas [CAs] owing to the greater need for local knowledge for this purpose) provides considerably greater consistency across the urban areas than was the case for the 1991 study year and builds a solid base for consistent temporal comparisons with future surveys, provided that the standardized geographic definitions are retained.

Because of their importance in providing an overview of the survey results and related commentary, Sections 5.4 and 5.5 of the main report are reproduced here in their entirety.

S.5.1 URBAN TRANSPORTATION INDICATORS: KEY FINDINGS (SECTION 5.4 OF MAIN REPORT)

Chapter 3 of the main report presents and discusses urban transportation and land use indicators for the participating municipalities. These are categorized as follows:

- urban structure
- transportation supply
- transportation demand
- transportation system performance
- environmental impact
- transportation costs and finance
- transportation funding sources
- status of transportation/land-use initiatives

Some of the key findings resulting from a review of these indicators across the urban areas for the 1996 study year are as follows:

- **Population density** - It is generally agreed that intensified and mixed-use urban development encourages transit, cycle and walk trips and reduces dependence on travel by private auto. The survey results suggest that higher population densities are achievable regardless of urban area size. The two urban areas with the highest EUA population densities are Toronto and Regina (Exhibit 3.5a), which represent the largest and smallest urban areas among the participating municipalities. Some of the smaller urban areas have also achieved population densities in their CBDs and CAs that are as high as those of the larger urban areas. It is important to encourage residential uses in the CBDs to make for a more vibrant and safe urban core area. In 1996, only three urban areas had higher population densities in the CBD than in the CA (Exhibit 3.5b).

- **HOV lanes** - Making transit service more attractive through the use of HOV or bus lanes is an initiative that has not gained much momentum in Canadian urban areas, especially in those with a population less than 650,000, except for Regina (Exhibit 3.10).

- **Transit modal share and parking supply** - All of the urban areas with populations of 650,000 or more achieved an AM peak period transit modal share of 30% or more for trips to and from the CBD, whereas those in smaller urban areas are no more than 17% (Exhibit 3.16). Among the larger urban areas, an inverse correlation can be seen between off-street parking supply and transit modal share for trips to and from the CBD (Exhibit 3.15). The use of pricing, tax or other measures to discourage the use of private lots by commuters is generally of low priority across the urban areas, as are setting a cap on the overall parking supply and the setting of maximum parking standards (Exhibits 3.42, 3.43).

- **Auto occupancies** - There is much room for decreasing auto emissions per capita by increasing auto occupancies, the normal range for AM peak period trips being between 1.15 and 1.3 persons

per vehicle, although in some cases occupancies of over 1.4 are achieved (Exhibit 3.23). Encouraging ridesharing is not yet a high priority in Canadian urban areas (Exhibit 3.42).

- **Congestion levels** - Values for an EUA road utilisation or congestion indicator, essentially vehicle-km per arterial and expressway lane-km for an hour in the AM peak, do not show much variation for urban areas with populations less than 850,000, but show a trend of increasing congestion with increasing urban area size for the larger urban areas (Exhibit 3.31).

- **Relationship between transit supply, ridership and expenditures** - There is a striking resemblance in the profiles across all the responding urban areas of three transit-related indicators: transit seat-km per capita, transit ridership per capita, and transit expenditures per capita. These are shown in Exhibits 3.13, 3.25 and 3.34, respectively. Although the direction of causation in these relationships could be interpreted in various ways, it does suggest that capturing a larger transit market is related to the level of investment in transit services. It should also be kept in mind, of course, that many other factors affect transit ridership in addition to the amount of service, not the least of which are transit fare structure, the extent to which transit travel times compete with those by auto, central area parking supply/rates, and the extent to which land use and streetscape design are transit-supportive.

- **Current investment priorities** - A comparison of investment priorities, evidenced by the roads and transit capital and operating expenditures in 1996 across the urban areas, shows that only in three urban areas is there a greater investment in transit than in roads, and two urban areas had comparable investments between roads and transit (Exhibit 3.34).

- **Current gasoline consumption levels** - Gasoline consumption and the resulting gasoline-based carbon-dioxide emissions per capita are quite high. The range of values is about 850 to 1,280 L of gasoline per capita per year, resulting in 2 to 3 tonnes of carbon-dioxide emissions per capita (Exhibit 3.32).

- **Transportation financing** - Transportation financing is facing major changes due to reduced transfer payments and increased pressure on municipal governments to focus on social and other services. In 1996, transit revenue/operating cost ratios were 45% to 60% across Canada, and 71% in the case of Toronto (Exhibit 3.35); the change in these ratios between 1996 and the next survey year will be of special interest. Many urban areas are investigating new sources of revenue for transportation expenditures, especially the use of fuel taxes and vehicle registration taxes or surcharges dedicated to transportation (Exhibit 3.39). These potential new sources are very much in keeping with the TAC Vision of transportation expenditures being increasingly borne by users of the transportation system.

- **Long-term planning** – Urban areas should be encouraged to develop a long-term land-use/transportation plan to ensure the kind of development that is needed to implement the TAC ***New Vision for Transportation*** on a macro scale. In 1996, eight of the fifteen responding municipalities had adopted such a plan, although only three of these included designated limits on urban development to help achieve more transit-supportive development (Exhibit 3.43).

Travel demand management (TDM) initiatives - TDM programs are at various levels of implementation throughout the urban areas. Initiatives such as an overall municipal TDM strategy,

promotion of TDM education programs, and the formation of TDM associations are generally under study, while five or six urban areas are implementing work-related TDM programs such as promoting flextime, telecommuting, and employer or employee TDM strategies (Exhibit 3.43). As pointed out in the TAC Vision TDM is a cost-effective way to achieve more efficient use of existing transportation facilities and services, thereby relieving pressure for system expansions and reducing negative impacts of transportation on the urban environment.

S.5.2 COMMENTS ON KEY INDICATORS AND PROGRESS TOWARDS TAC'S NEW VISION FOR URBAN TRANSPORTATION (SECTION 5.5 OF MAIN REPORT)

What have we learned from TAC's second survey on urban transportation indicators in Canadian Cities? Is there measurable progress towards achieving TAC's ***New Vision for Urban Transportation***? Is it worth proceeding with future surveys of this type to monitor progress? In this final section we provide comments regarding the above "bottom line" questions. In doing so, we differentiate between **performance** indicators (measuring actual on-the-ground changes in transportation system performance and contributing land use factors), indicators relating to **financing** urban transportation, and findings regarding various transportation and land use **initiatives** being taken in the responding urban areas. The latter two sets of indicators measure **input** activities, while the former measures **output** in terms of what is actually being achieved on the ground.

As noted below, we find that there is evidence of reasonable progress on the input side, but the output results are not as encouraging. In short, Canadian urban areas still have a long way to go in achieving the ***New Vision for Urban Transportation.***

S.5.2.1 Performance Indicators: Transportation and Land Use

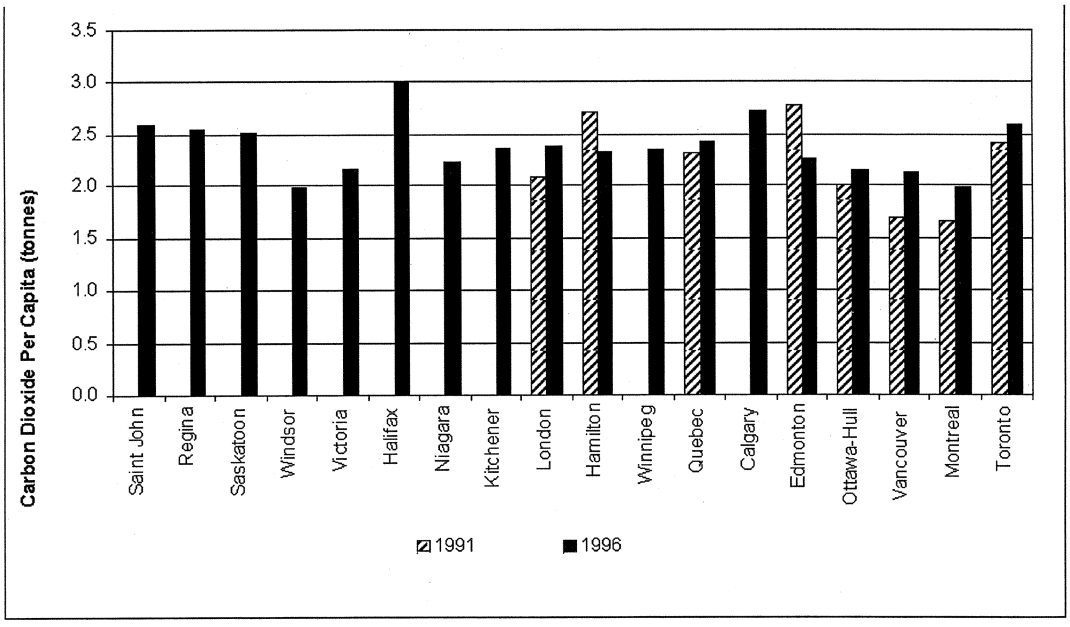
The 1995 report on the Pilot Survey presented a table ranking the importance of the numerical indicators (i.e. derived from Part C of the questionnaire). These key indicators correspond to those presented in Exhibit 3.1 of this report, with the exception of three new indicators that were added in Exhibit 3.1: auto occupancies in the AM peak periods for trips to/from the CBD and for EUA trips, and EUA vehicle-km of travel estimated from fuel-sales data. These thirty-five indicators should continue to be the focus of future data collection efforts and analysis.

We feel that of these key indicators, two are especially significant in monitoring the extent to which more sustainable transportation is being achieved in Canadian urban areas: gasoline-based carbon-dioxide emissions per capita in the EUA and annual transit ridership per capita in the EUA. These two indicators are presented graphically in Exhibits 5.1 and 5.2, respectively, for 1996 and for 1991 where available from the previous survey. Another principal indicator is the amount of transit supply, expressed as transit seat-km, but the 1991-96 trends in this indicator are not included here because it was felt that it is more sensitive to changes in the geographic area definitions which occurred between the two surveys.

The indicator shown in Exhibit 5.1 is truly a bottom line output indicator in that it is a direct measure of a key environmental impact affecting global warming and which is the subject of intense policy consideration by senior levels of government as they consider how best to meet Canada's Kyoto commitment. It is also an indirect measure of energy consumed per capita in urban transportation and (because automobiles are the overwhelmingly predominant contributors to transportation emissions and

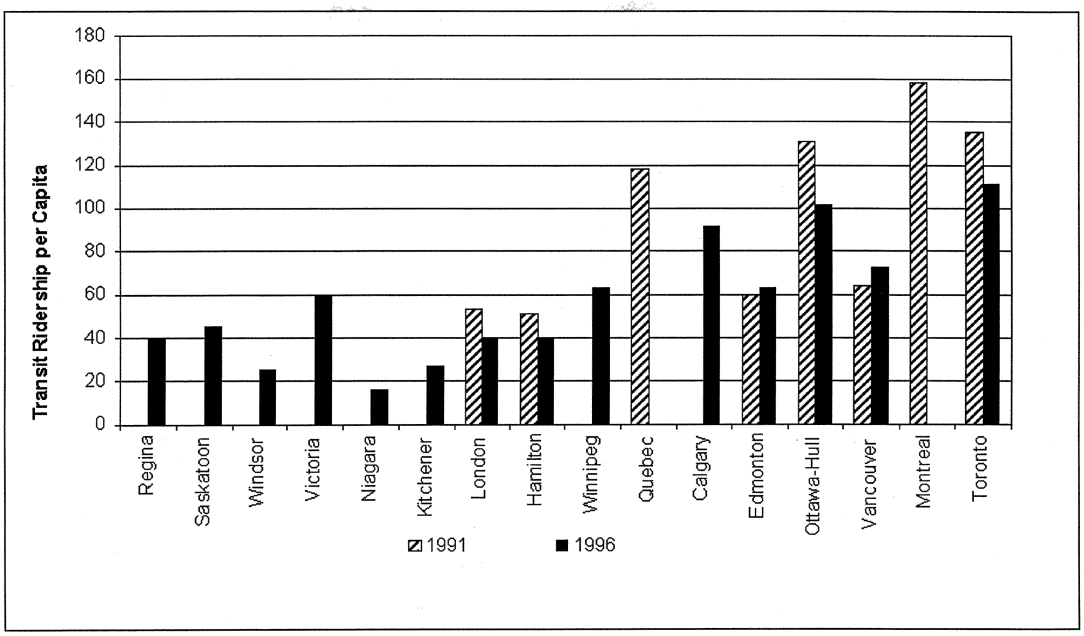
energy consumption) an indirect measure of progress (or lack of progress) towards reducing the level of automobile dependence in Canadian urban areas. Annual transit ridership per capita, as shown in Exhibit 5.2, is singled out as the other key bottom line output indicator, since it measures the extent to which transit's share of the travel market is increasing (or not) on a per capita basis, which is a must if automobile dependence is to be reduced (or even stabilized) as a fundamental step towards the TAC Vision. It is for these reasons that we present a comparison of the 1991 and 1996 results for these two indicators, in spite of the smaller number of urban areas for which the earlier data is available and concerns which must be recognized in interpreting the comparison owing to changes in the definitions of geographic areas, in particular the existing urban area (EUA) boundaries.

Exhibit 5.1: Gasoline-Based Carbon-Dioxide Emissions per Capita in EUA, 1991-1996 (*)



Cautionary Note: (*) The definitions of the EUA for some urban areas changed between the 1991 and 1996 study year and caution should be observed in interpreting these temporal comparisons.

Exhibit 5.2: Annual Transit Ridership per Capita in EUA, 1991-1996 (*)



Cautionary Note: (*) The definitions of the EUA for some urban areas changed between the 1991 and 1996 study year and caution should be observed in interpreting these temporal comparisons.

Due caution should be taken in interpreting these exhibits, owing to the changes in geographic area boundaries that have occurred between the survey years (as discussed earlier in Section 2.2). The differences in these definitions between 1991 and 1996 are partially mitigated by the fact that the indicators are expressed on a per capita basis, but the EUAs still reflect different degrees of urbanisation between the two years. Nevertheless, Exhibit 5.1 shows that, of the eight urban areas for which gasoline-based carbon-dioxide emissions were available in both survey years, six experienced an increase in per capita auto emissions from 1991 to 1996. Turning to Exhibit 5.2, four of the six urban areas for which transit ridership data is available for both survey years show a decline in per capita ridership, while two show a marginal increase. (The increase shown for Vancouver probably reflects the reduction in EUA size between 1991 and 1996, while the reduction shown for Toronto is overstated because the 1991 data was for the TTC only while the 1996 data also includes ridership on other GTA municipal transit properties, reflecting a major increase in size of the EUA.)

Neither of these temporal trends (both of which are corroborated by trend data from other sources) paints an encouraging picture of the direction that transportation systems seem to be heading in Canadian urban areas. If a third urban transportation indicator survey can be carried out for 2001 and with the same geographic area definitions as used in the 1996 study year survey, this will provide a firmer basis for monitoring urban transportation trends and the extent to which TAC's ***New Vision for Urban Transportation*** and more sustainable transportation are being achieved.

S.5.2.2 Financing Urban Transportation

Part B of the questionnaire elicited information on transportation funding sources currently used and their relative contributions, funding sources currently not used and the reasons for this, new funding sources being considered and the types of financial analyses employed as part of the transportation planning and programming process.

Two comments are worthy of note. First, as pointed out in TAC's 1997 briefing, ***Financing Urban Transportation***, achieving the Vision will require more stable and reliable funding sources than are available in most Canadian areas and an infusion of additional funding - particularly to improve public transportation - if the Vision is to be achieved. As pointed out by a number of respondents, and as documented in other reports, changes in transportation funding arrangements and responsibilities have affected urban areas in some provinces, in particular since the 1996 study year. Reduced funding in some cases, coupled with the reluctance towards raising property taxes (currently the major source of municipal funding for urban transportation) has put considerable financing pressure on the affected urban areas.

This leads to the second comment, recognition of an encouraging trend among many urban areas to investigate new sources of funding for transportation, particularly revenue derived from transportation **user charges** such as fuel taxes, vehicle registration fees, parking revenues and/or road pricing. As pointed out in TAC's financial briefing, greater reliance on transportation user charges will provide a reliable source of funding (which increases as travel demand levels increase) and, if properly designed, can significantly moderate the use of single occupant autos on congested roads in peak periods, thereby contributing to more sustainable transportation and the 13 principles of TAC's 1993 Vision.

While current thinking among many of the survey respondents regarding new funding sources is encouraging, progress has been slow since 1996 (with the important exceptions of the Greater Vancouver Transportation Authority and the Agence Metropolitaine de Transport in Montreal) and very considerable, persistent effort will be required to show bottom line results.

S.5.2.3 Transportation and Land Use Initiatives

As described earlier in Section 3.8, transportation/land use initiatives reported by the urban areas (in response to Part A of the questionnaire) are quite encouraging in a number of cases. These include the creation of a long term land use/ transportation plan (necessary as a means of defining and working towards the Vision and helping to ensure that transportation funding is well-directed), urban design and streetscape initiatives to encourage transit, cycling and pedestrian-trips, providing increased priority for surface transit operations in some cases, relating parking standards to the levels/proximity of transit services, designing and operating roads to increase capacity for moving people and goods rather than just vehicles, providing accessible off-street loading facilities, designated truck routes and other initiatives to facilitate goods movement, making transit and pedestrian facilities more accessible to the physically-challenged, encouraging more environmentally-friendly technologies, requiring environmental assessments for new transportation facilities/services, and applying or encouraging transportation demand management programs including flex time, compressed work weeks and telecommuting. In most cases, there has been an increase in the priority of these initiatives between 1991 and 1996.

On the other hand, most of the urban areas are assigning low priorities to initiatives such as facilitating compact, mixed use development at key nodes and in transit corridors, taking specific steps such as reserved bus lanes or HOV lanes to provide transit priority, implementing parking supply and demand management, or promoting/facilitating ridesharing and more widespread application of transportation demand management.

In summary, the picture regarding transportation/land use initiatives is mixed. Some excellent initiatives are being taken, but there are noticeable gaps, particularly in terms of urban structure/land use (e.g. approval processes and incentives to achieve more compact mixed use development) improved transit service levels and coverage (limited by current financial constraints), and more widespread application of transportation demand management (including direct user pricing), greater operational priority for surface transit vehicles, and other measures aimed at achieving more efficient use of the transportation system.

S.5.2.4 Closing Comments

The database of urban transportation indicators described in this report provides a valuable and increasingly reliable source of information which municipalities and other planning agencies can draw on in working towards achieving the Vision. It is hoped that the success of the current study will encourage all fifteen of the participating municipalities to continue their involvement in this program, such that in future years, temporal analyses as described by Exhibits 5.1 and 5.2 can be carried out with greater confidence. It is also hoped that the number of participating urban areas will increase to provide more comprehensive monitoring of transportation trends across Canadian urban areas. The participants in this study should be acknowledged as leaders in helping to advance the state of knowledge on urban transportation indicators.

The picture that emerges is one of good intentions, creative thinking and some excellent initiatives but, as yet, little significant impact on the bottom line performance indicators discussed in Section S.5.2.3 above. It is all the more important, therefore, that the program of Urban Transportation Indicators surveying begun by TAC for the 1991 and 1996 study years be continued on a consistent basis for the 2001 study year and, it is hoped, at each five year point beyond that. In addition to their considerable value as a source of information for municipal leaders/planners and government at all levels across Canada, the performance indicator results will help separate fact from rhetoric in terms of actual progress, and the results regarding transportation financing and the many transportation/land use initiatives stemming from Sections B and A of the survey will provide a common body of knowledge which, it is hoped, will encourage leaders at all levels of government to persist in working towards the ***New Vision for Urban Transportation*** and more sustainable urban transportation and development across Canada.

Indicateurs de transport urbain – Enquête 2, 1996
Sommaire

S.1 – INTRODUCTION

En 1993, le Conseil des transports urbains (CTU) de l'Association des transports du Canada (ATC) a proposé une *Nouvelle vision des transports urbains*, laquelle préconisait 13 principes directeurs de gestion des réseaux de transport et d'utilisation des terres en milieu urbain. Le CTU a reconnu que des enquêtes périodiques fondées sur l'emploi d'indicateurs de transport urbain seraient nécessaires aux fins de mesurer les progrès accomplis au titre de la concrétisation de cette *Vision*. À cette fin, une enquête pilote a été menée en 1995, enquête qui se fondait sur les données de référence de 1991 et qui s'étendait à huit zones urbaines. Le présent sommaire décrit les résultats de la deuxième enquête menée dans ce contexte en 1999, laquelle se fondait cette fois sur les données de référence de 1996 et s'étendait à quinze zones urbaines. Le rapport intégral décrit le processus d'enquête et les résultats ainsi obtenus, propose des conclusions quant à la fiabilité de la base de données établie à la suite de cette deuxième enquête (laquelle comprend les données réunies en 1991 et 1996 et peut être consultée dans le site Web de l'ATC), formule des recommandations à propos des futures enquêtes en la matière et décrit les progrès accomplis à l'appui de la concrétisation de la *Vision* de l'ATC, conclusions d'enquête à l'appui.

Le présent sommaire suit la structure du rapport intégral. La section 2 est consacrée au processus d'exécution de l'enquête et aux taux de réponse obtenus. La section 3 traite des résultats de la nouvelle enquête en regard des données de l'année de référence 1996 et aussi, dans une certaine mesure, de celles de l'année de référence 1991. La section 4 recommande des améliorations à apporter au processus d'enquête ainsi que certains changements destinés à clarifier le questionnaire. Enfin, la section 5 présente les conclusions des auteurs de l'enquête, y compris certaines observations concernant les principaux indicateurs et les progrès accomplis au regard de la concrétisation de la *Nouvelle vision des transports urbains* de l'ATC.

S.2 – EXÉCUTION DE L'ENQUÊTE

Le **questionnaire** (voir l'annexe A) utilisé pour cette enquête est essentiellement le même celui qui a servi à l'enquête précédente, à part un léger réaménagement de l'ordre des questions et l'ajout de cinq nouvelles catégories. La partie A du questionnaire s'intéresse à l'état d'avancement de 68 projets de transport et d'utilisation des terres en milieu urbain. La partie B porte sur le financement des transports, y compris les sources existantes de financement, le degré d'utilisation des ressources ici visées, les autres sources envisagées et les méthodes d'analyse financière employées. La partie C comporte pour sa part 83 questions permettant d'obtenir des données numériques sur la structure de chacune des zones urbaines de même que sur l'offre, l'utilisation, le rendement et les coûts des réseaux de transport de ces zones. Ces données servent à déterminer la majorité des indicateurs de transport et d'utilisation des terres en milieu urbain. Chaque indicateur se rapporte de façon spécifique à l'une de quatre zones géographiques décrivant chacune des zones urbaines. Les descriptifs sont les suivants :

- **Région** s'entend d'une région métropolitaine de recensement (RMR), telle que définie pour les fins du Recensement du Canada de 1996;

- **Zone urbaine existante (ZUE)** désigne l'actuelle zone aménagée par l'homme à l'intérieur d'une Région;

- **Zone centrale (ZC)** désigne une zone généralement constituée de territoires dits déstructurés – ou à vocations multiples – qui ceinturent le District central d'affaires et qui ont de trois à cinq fois sa superficie, et

- **District central d'affaires (DCA)** s'entend du principal centre d'emplois d'une zone urbaine, où les secteurs public et privé mènent des activités de haut niveau.

Étant donné le peu d'uniformité dont témoignaient les définitions originales de ces zones géographiques lors de l'analyse des données de référence de 1991, le Comité directeur de l'enquête n° 2 du CTU a donc collaboré de près avec des représentants des municipalités et de Statistique Canada afin d'élaborer un ensemble plus cohérent de définitions, à telle enseigne que pour l'enquête de 1996 ces définitions, du moins pour certaines, étaient sensiblement différentes de celles utilisées en 1991. De ce fait, il s'avère difficile d'effectuer des comparaisons temporelles (p. ex., entre les résultats des analyses des données de 1991 et de 1996) pour la plupart des indicateurs de rendement visés par la partie C du questionnaire. Cependant, les changements des définitions utilisées en 1996 fourniront une base plus solide de comparaison temporelle pour les prochaines enquêtes quinquennales qui devraient suivre.

L'ATC a commencé à solliciter la participation des villes à l'enquête n° 2 en novembre 1998. Ce processus de **sélection a permis de recruter 15 zones urbaines situées dans six provinces du Canada**. L'enquête a été réalisée par IBI Group (comme ce fut d'ailleurs le cas pour l'enquête pilote). Le questionnaire a été distribué en copie papier et sur support électronique, le 5 mars 1999 (deux zones urbaines se sont jointes à l'enquête un peu plus tard et ont reçu le questionnaire environ un mois après). Après une première ronde de rappels menée par le personnel de l'ATC, les employés de IBI Group ont pris la relève de l'exercice et ont préparé un premier résumé – sous forme de tableaux et de graphiques – des résultats de l'enquête. Ce résumé a été distribué en juillet, d'abord au Comité directeur de l'étude et ensuite aux administrations des zones urbaines participantes. Cette démarche a motivé des échanges très fructueux qui ont permis de valider les données et d'apporter des changements et des éclaircissements qui ont contribué à rehausser le degré de fiabilité et de cohérence des résultats d'enquête.

Les **données sur les ventes de carburant** dans les ZUE ont été acquises par l'ATC auprès de Kent Marketing Service, l'Association désirant ainsi disposer d'une base uniforme de renseignements pour mesurer le nombre de milles-véhicules à essence et les émissions résultantes de dioxyde de carbone. L'ATC a également obtenu de Statistique Canada des données sur le mode de transport utilisé pour se rendre au travail, données recueillies à la faveur du Recensement de 1996, le tout de manière à disposer là encore d'une base uniforme d'estimation du recours aux transports en commun et à l'automobile. Les données sollicitées auprès de ces deux sources visaient les 18 zones urbaines (voir le Tableau 1.1 du rapport intégral) initialement invitées à participer à la seconde enquête. Les résultats relatifs à ces indicateurs sont présentés pour l'ensemble de ces 18 zones urbaines.

Les résultats de l'enquête de 1996 et de l'analyse des données de référence de 1991 ont été incorporés dans une **base de données** montée à partir du logiciel Microsoft Access. L'accès à cette base de données de même que les résultats bruts de la présente enquête ont été fournis en complément de la préparation du présent rapport. En ce qui concerne la partie C du questionnaire, les résultats pour la zone urbaine de Montréal n'étaient pas disponibles au moment de la rédaction du rapport, étant donné que les réponses demandées dépendaient des résultats d'une récente enquête sur les déplacements, résultats dont l'analyse était toujours en cours. De ce fait, les résultats liés à la partie C du questionnaire de l'analyse des données de 1991 (dans le cas de Montréal, il s'agit en fait des données de 1993) ont été ajoutés à ceux de l'enquête de 1996 et sont pris en compte dans les comparaisons entre les zones urbaines.

Les **taux de réponse** à cette dernière enquête ont varié de bons à excellents : on a obtenu 99,7 % de l'information demandée sur l'état d'avancement des projets de transport et d'utilisation des terres en

milieu urbain (partie A); en ce qui concerne la partie B, on a répondu à 97 % des questions portant sur les sources de financement, à un pourcentage un peu moins élevé des questions axées sur l'affectation des ressources au transport routier et aux transports en commun et à la totalité des questions ouvertes sur les nouvelles sources de financement envisagées de même que sur les méthodes d'analyse financière utilisées. À l'exclusion de la zone de Montréal, pour les raisons mentionnées plus haut, les 14 zones urbaines qui ont participé à l'enquête ont fourni 73 % des données demandées à l'égard des 83 indicateurs reliés aux projets de transport et d'utilisation des terres en milieu urbain, projets visés par la partie C du questionnaire. Légèrement inférieur au taux de réponse de 79 % aux questions de la partie C du questionnaire de l'enquête pilote, ce résultat est néanmoins considéré satisfaisant étant donné que le plus grand échantillon sélectionné pour la seconde enquête regroupait davantage de petites zones urbaines, lesquelles disposent généralement de moins de données et de modèles sur le rendement des réseaux de transport.

Comme les définitions des zones géographiques et d'autres notions ont été normalisées et que les réponses ont été soumises à un vaste processus de validation, on considère que la **base de données présente un bon indice de fiabilité**, quoique ce degré varie d'un critère à l'autre en raison de certaines différences entre les zones urbaines, par exemple à l'égard des méthodologies employées pour mener les enquêtes sur les déplacements.

S.3 – RÉSULTATS DE L'ENQUÊTE

Les données recueillies et vérifiées durant l'enquête ont servi de fondements à l'établissement des indicateurs de transport et d'utilisation des terres. Le tableau 3.1 du rapport intégral (qui est reproduit au tableau 1 de la page suivante du présent sommaire) résume les **35 principaux indicateurs** employés dans l'étude des données de 1996. Les résultats liés à la partie C (données sur l'utilisation des terres et les transports) sont présentés en premier lieu dans les sections 3.1 à 3.6 du rapport intégral. Suivent, dans l'ordre, les résultats relatifs à la partie B (financement des transports; section 3.7) et à la partie A (état d'avancement des projets de transport et d'utilisation des terres; section 3.8). Les tableaux 3.1 à 3.44, qui suivent immédiatement le chapitre 3 du rapport intégral, donnent une description détaillée, sous forme de tableaux et de graphiques, des réponses au questionnaire et des indicateurs afférents. Enfin, on trouvera à la section 5.4 du présent sommaire un résumé des principales constatations de l'enquête.

S.4 – RECOMMANDATIONS RELATIVES AUX FUTURES ENQUÊTES

Le chapitre 4 contient un certain nombre de recommandations visant à accélérer le déroulement des enquêtes. Ces recommandations proposent, entre autres, la saisie directe des réponses dans les formulaires de la base de données Access par le personnel des zones urbaines, le respect plus strict des échéances d'une enquête et l'achèvement du processus de compilation et de validation des réponses avant le début de la période des vacances estivales, dans la mesure du possible. On y propose également d'apporter un certain nombre de changements précis en vue de clarifier le questionnaire, notamment l'ajout de notes explicatives supplémentaires, le déplacement d'une question et l'intégration de précisions complémentaires relativement au libellé de certaines questions. Ces recommandations font suite aux difficultés auxquelles se sont heurtés les responsables du projet d'enquête et elles s'appuient aussi sur les commentaires fournis par les participants durant le processus de compilation et de validation des réponses. Il est également recommandé de conserver l'ensemble des questions utilisées lors de cette dernière enquête, de façon à disposer d'une base fiable de comparaison avec les résultats de futures enquêtes en cette matière.

En dernier lieu, il est recommandé que les municipalités conservent la responsabilité de trouver les ressources nécessaires à la collecte et à l'amélioration des données propres à leurs champs respectifs de compétence, non seulement en vue de la tenue des prochaines enquêtes sur les indicateurs urbains, mais

aussi de façon à améliorer la base de données servant à la prise de décisions clés en matière de transports durables.

S.5 – CONCLUSIONS

En guise de conclusion, il est indiqué au chapitre 5 que la base de données où sont consignés les résultats de l'enquête de 1996 constitue en soi une amélioration marquante du point de vue de l'accessibilité à l'information pertinente. Cette base de renseignements offre un assez bon degré de fiabilité, même si la qualité des données y varie d'une zone urbaine à l'autre, en raison des périodes différentes où se sont tenues les enquêtes sur les déplacements et les analyses des modèles de la demande en mobilité. Le recours à des définitions normalisées pour les concepts de Région, de Zone urbaine existante et de District central d'affaires (les administrations des zones urbaines ont elles-mêmes défini leurs zones centrales (ZC) étant donné que ce concept repose davantage sur des paramètres locaux) a permis d'accroître sensiblement l'uniformité des résultats d'une zone urbaine à l'autre (comparativement à l'analyse des données de 1991) et d'obtenir une base de données fiable pour l'établissement de comparaisons temporelles cohérentes lors des prochaines enquêtes, dans la mesure par ailleurs où ces définitions géographiques normalisées seront conservées.

Les sections 5.4 et 5.5 du rapport intégral présentent un aperçu utile des résultats de l'enquête et les commentaires y afférents. De ce fait, elles sont reproduites ici dans leur intégralité.

Tableau 1 : Principaux indicateurs de transport et d'utilisation des terres

Description des indicateurs	Zones urbaines														
	Regina	Saskatoon	Windsor	Victoria	Niagara	Kitchener	London	Hamilton	Winnipeg	Calgary	Edmonton	Ottawa-Hull	Vancouver	Montréal	Toronto
Contexte															
Population de la Région	194 000	219 056	279 000	304 000	372 000	383 000	399 000	624 000	667 000	822 000	892 000	1 010 000	1 830 000	3 326 510	4 265 000
Emplois dans la Région	96 000	107 145	131 000	149 000	165 000	182 350	190 405	294 000	325 000	442 000	434 000	502 000	908 000	1 502 380	2 060 000
Population de la ZUE	180 000	193 647	235 000	286 100	274 000	358 000	327 000	536 771	618 000	768 000	616 000	807 555	1 680 000	3 045 979	3 970 000
Emplois dans la ZUE	87 000	87 000	115 000	132 500	112 000	171 040	154 000	227 000	300 000	390 000	313 000	448 175	797 000	1 371 940	1 940 000
Superficie de la ZUE (km^2)	110	140	200	327	470	317	440	423	460	720	750	1 027	1 300	2 026	2 300
Utilisation des terres - caractéristiques															
Densité de la population dans la ZUE (habitants/km^2)	1 636	1 383	1 175	875	583	1 129	743	1 268	1 343	1 067	821	786	1 292	1 503	1 726
Densité des emplois dans la ZUE (emplois/km^2)	791	621	575	405	238	540	350	536	652	542	417	436	613	677	843
Ratio emplois-population dans la ZC	0,18		1,26	0,49	0,91	0,33			0,40	0,27	0,11	0,40	0,65		0,35
Offre de transport															
Nbre km artères urbaines par 1 000 hab. dans ZUE	5,26	9,19	1,91	1,48	7,33	4,51		2,27	2,82	5,22	4,26	3,81	3,32	1,48	2,52
Nbre km voies rapides par 1 000 hab. dans ZUE	0,72	0,62	0,44	0,12		0,73		1,61	0,19	1,74	1,24	0,77	0,33	0,60	0,50
Nbre km voies réservées VCEO par 100 000 hab. dans ZUE	7,11	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,29	0,00	1,79	6,07	1,85	1,12	2,34
Ratio automobile par habitant dans ZUE	0,75	0,67		0,47		0,57			0,46	0,76	0,53	0,57	0,56		0,55
Période de pointe AM (PP/AM) - Nbre km-usagers trans. comm., par hab. dans ZUE	1,12	0,87		0,77		0,56	0,72		0,85	2,07		2,60	1,59		2,42
Période 24 h - Nbre km-usagers trans. comm., par hab. dans ZUE	4,32	4,00	1,82	4,75	2,06	1,93	3,94	3,65	5,50	7,89		9,52	6,42	8,21	8,61
Nbre places stationnement hors voirie par employé dans DCA		0,86	0,18	0,32			0,57	0,72		0,51	0,66	0,36	0,38		0,18
Demande de transport															
PP/AM - part trans. comm. aller-retour DCA	12,0%	17,1%			2,6%	5,4%		14,0%	36,0%	33,1%	29,5%	32,8%	38,7%	58,4%	56,1%
PP/AM - part automobile aller-retour DCA (conduct. + pass.)	88,0%	78,8%			85,7%	89,2%		63,0%	58,0%	60,9%	67,7%	55,0%	54,6%	37,8%	38,9%
PP/AM - part automobile dans ZUE (conduct. + pass.)	95,0%				76,0%	78,3%	65,0%	77,0%	70,4%	80,0%	68,6%	71,7%	76,2%	53,3%	68,5%
PP/AM - coeff. occup. autom. aller-retour DCA	1,26	1,20			1,15	1,10		1,13	1,36	1,30	1,23	1,28	1,19	1,33	1,21
PP/AM - coeff. occup. autom. dans ZUE	1,32				1,25	1,24	1,23	1,20	1,18	1,21	1,45	1,24	1,42	1,27	1,21
PP/AM (1 h) - nbre voyages-personnes par hab. dans ZUE	0,32				0,31	0,17		0,14		0,26	0,30	0,23	0,31		0,24
Période 24 h - nbre voyages-personnes par hab. dans ZUE					2,60	2,71	2,66	2,13		3,71		2,80	3,44		2,05
Nbre voyages annuels trans. comm. par hab. dans ZUE	39,3	45,3	24,9	60,6	15,7	26,6	40,3	39,4	63,4	91,3	62,8	101,5	72,9	124,5	118,8
Période 24 h - nbre km art. urb./autom., par hab. dans ZUE	11,5								7,4		15,2	17,2			7,0
Jour moyen - nbre km/véhic., par hab., d'après ventes carburant	26,3	26,0	20,6	22,4	23,1	24,5	24,7	24,2	24,4	28,2	23,4	22,3	22,2	20,6	26,8
Année de l'enquête sur la demande en déplacements	*1989*	*1997*	*1996*	*1996*	*1996*	*1996*	*1987*	*1996*	*1992*	*1996*	*1994*	*1995*	*1995*	*1993*	*1996*
Rendement des réseaux de transport															
Distance moy. voyages résid.-trav. dans ZUE	6,0	8,0		6,6	12,8	15,2			6,1	12,0	10,3	12,7	13,2	16,7	15,6
Nbre annuel blessures et décès par 1000 hab. dans ZUE	6,9	6,1	6,3			2,9		5,2	5,8	6,5	12,2	7,5	18,3		4,3
Indice d'utilis. voies de circulation dans ZUE (km-véhic./km art. circ.)	232					314				297	265	368	592		711
Coûts et financement du transport															
Dépenses totales - voies circ., par hab. dans Région	126,5		61,5		72,6	121,3		138,0	134,9	184,2	138,3	120,8	236,8	250,1	56,8
Dépenses totales - transp. comm., par hab. dans Région	68,9	72,6	51,5	149,6	35,8	69,9	93,5	113,3	118,0	145,8	125,0	234,7	202,3	281,6	354,7
Tarifs-passagers/budget fonct. et entretien	50,1%	54,3%	59,3%	49,4%	44,5%	54,7%	60,9%	51,7%	60,5%	46,8%	38,2%	55,0%	50,2%	45,6%	70,6%
Incidences environnementales des transports															
Consommation de carburant par hab. (l/hab./année)	1 078	1 067	845	919	949	1 006	1 014	993	1 000	1 158	960	915	909	847	1 099
Consommation de carburant par voy.-pers. dans ZUE (l/voy.)					1,00	1,02	1,05	1,28		0,86		0,90	0,72		1,47
Émissions de CO_2 par habitant dans ZUE (tonnes/année)	2,54	2,51	1,99	2,17	2,24	2,37	2,39	2,34	2,36	2,73	2,26	2,16	2,14	2,00	2,59
Émissions de CO_2 par voy.-pers. dans ZUE (kg/voy.)					2,35	2,40	2,46	3,01		2,01		2,11	1,71		3,46

S.5.1 INDICATEURS DE TRANSPORT URBAIN : PRINCIPALES CONCLUSIONS (SECTION 5.4 DU RAPPORT INTÉGRAL)

Le chapitre 3 du rapport intégral traite des indicateurs de transport urbain et d'utilisation des terres proposés aux municipalités qui ont participé à l'enquête. Ces indicateurs relèvent des catégories suivantes :

- structure urbaine,
- offre de transport,
- demande en transport,
- rendement des réseaux de transport,
- incidences environnementales,
- coûts et financement des transports,
- sources de financement des transports,
- bilan des projets/initiatives de transport/d'utilisation des terres.

Certaines des principales constatations issues de l'examen de ces indicateurs, pour l'ensemble des zones urbaines visées par l'étude de 1996, sont exposées ci-après.

- **Densité de la population** – Il est généralement reconnu que l'utilisation intensive et à de multiples fins des terres urbaines encourage le recours aux transports en commun et à la bicyclette ainsi que la marche à pied, ce qui contribue à réduire la dépendance des citoyens vis-à-vis des voitures particulières. Les résultats de l'enquête précitée font valoir qu'il est possible d'en arriver à de plus fortes densités de population, quelle que soit la taille des zones urbaines. Les deux villes qui remportent la palme au plan de la densité de population de leur ZUE sont Toronto et Regina (tableau 3.5a), soit à la fois la plus grande et la plus petite des zones urbaines de toutes les municipalités répondantes. Certaines des zones urbaines de moindre envergure peuvent en outre revendiquer pour leurs DCA et ZC respectifs des densités de population aussi élevées que celles des plus grandes zones. Il est important d'encourager, dans les DCA, l'utilisation des terres urbaines à des fins résidentielles afin d'accroître la vitalité et la sécurité de ces secteurs centraux. En 1996, seules trois zones urbaines affichaient dans leur DCA une densité de population supérieure à celle de leur ZC (tableau 3.5b).

- **Voies réservées aux véhicules à coefficient élevé d'occupation (VCEO)** – L'initiative visant à rendre les services de transport en commun plus attrayants en réservant des voies de circulation aux VCEO ou aux autobus ne semble pas avoir suscité beaucoup d'intérêt dans les zones urbaines canadiennes, tout particulièrement dans celles de moins de 650 000 habitants, exception faite de Regina (tableau 3.10).

- **Part des transports en commun par rapport aux autres modes et offre d'espaces de stationnement** – Dans toutes les zones urbaines de 650 000 habitants ou plus, les transports en commun ont compté pour 30 % ou plus des déplacements en provenance et à destination des DCA durant la période de pointe du matin. Dans les zones urbaines de moindre envergure, cette part n'a pas dépassé les 17 % (tableau 3.16). Dans les zones urbaines les plus grandes, on observe

une corrélation inversement proportionnelle entre l'offre d'espaces de stationnement hors voirie et la part des transports en commun pour les déplacements en provenance et à destination des DCA (tableau 3.15). On constate par ailleurs que le recours à différentes stratégies de détermination des prix, d'imposition de taxes ou autres, aux fins de décourager l'utilisation de terrains privés de stationnement par les navetteurs, ne constitue pas une priorité élevée aux yeux des administrations urbaines, pas plus d'ailleurs que le plafonnement de l'offre globale d'espaces de stationnement et l'établissement de normes de limitation du nombre de ces derniers(tableaux 3.42 et 3.43).

- **Coefficient d'occupation des automobiles** – Une excellente façon de réduire les émissions polluantes des automobiles par habitant serait d'accroître le coefficient d'occupation de ces dernières puisque pendant la période de pointe du matin, ce coefficient oscille entre 1,15 et 1,3 occupant par véhicule, bien que dans certains cas un coefficient supérieur à 1,4 ait été enregistré (tableau 3.23). De toute évidence, l'incitation au covoiturage ne constitue pas encore une priorité élevée des zones urbaines du Canada (tableau 3.42).

- **Niveaux de congestion de la circulation** – Les données recueillies au moyen de l'indicateur de congestion des voies de circulation ou autrement dit de l'indicateur d'utilisation des routes dans les ZUE – données établies pour une plage d'une heure durant la période de pointe du matin et essentiellement exprimées en véhicules-kilomètres par kilomètre d'artère urbaine et de voie rapide – varient assez peu dans le cas des zones urbaines de moins de 850 000 habitants, mais dénotent au sein des plus grandes zones une tendance à la hausse de la congestion des voies de circulation, hausse par ailleurs proportionnelle à la taille de l'agglomération visée (tableau 3.31).

- **Rapports entre l'offre de services de transport en commun, les dépenses engagées à l'appui de ces derniers et leur taux d'utilisation** – On note une similitude frappante, pour toutes les zones urbaines répondantes, en ce qui concerne les données réunies au moyen de trois indicateurs visant spécifiquement les services de transport en commun : les sièges-kilomètres par habitant, le taux d'utilisation par habitant et les dépenses engagées par habitant. Les données en question sont exposées dans les tableaux 3.13, 3.25 et 3.34, respectivement. Bien que les relations de causalité que partagent ces données se prêtent à différentes interprétations, on peut néanmoins avancer qu'il existe un lien entre le niveau d'investissement dans les services de transport en commun et l'importance du marché desservi. Ceci dit, il importe par ailleurs de ne pas oublier qu'outre l'étendue de la zone desservie par l'infrastructure de transport en commun d'une agglomération, de nombreux autres facteurs influent sur le taux d'utilisation des services ici visés, notamment la structure de tarification de ces derniers, la mesure dans laquelle les temps de déplacement en transport en commun se comparent avantageusement à ceux des déplacements en automobile, l'offre et les prix du stationnement dans la zone centrale d'une agglomération ainsi que la mesure dans laquelle l'utilisation des terres urbaines et l'aménagement paysager des rues encouragent le recours aux transports en commun.

- **Priorités actuelles d'investissement** – L'analyse comparative des priorités d'investissement – analyse comparative des dépenses d'immobilisation et d'exploitation engagées dans l'infrastructure routière en 1996 par les zones urbaines répondantes, d'un côté, et dans les transports en commun, de l'autre – montre que seules trois zones urbaines ont investi davantage dans les transports en commun que dans les routes et que deux autres zones ont investi des sommes comparables dans l'un et l'autre domaines (tableau 3.34).

- **Niveaux actuels de consommation d'essence** – La consommation d'essence et les émissions connexes de dioxyde de carbone par habitant sont très élevées. Ainsi donc, la consommation

annuelle d'essence elle-même varie de 850 à 1 280 litres par habitant, ce qui correspond à des émissions de 2 à 3 tonnes de dioxyde de carbone par habitant (tableau 3.32).

- **Financement des transports** – Des changements majeurs sont apportés aux méthodes de financement des transports, eu égard à la diminution des paiements de transfert des provinces et aux pressions de plus en plus fortes qui sont exercées auprès des administrations municipales pour qu'elles mettent l'accent sur la prestation de services sociaux et autres. En 1996, le rapport entre les recettes des services de transport en commun et les coûts d'exploitation de ces derniers oscillait entre 45 et 60 % à l'échelle du Canada et s'établissait à 71 % à Toronto (tableau 3.35). L'évolution de ce ratio au cours de la période de 1996 à 1999 ne manquera pas de revêtir un intérêt particulier. Nombre de zones urbaines explorent présentement de nouvelles avenues de financement des transports, notamment la possibilité d'imposer des taxes sur les carburants et des droits d'immatriculation des véhicules, voire des surtaxes pour les services de transport en commun (tableau 3.39). Ces nouvelles sources potentielles de revenus s'inscrivent tout à fait dans la foulée de la ***Vision*** de l'ATC, laquelle préconise un recours accru au recouvrement des coûts des réseaux de transport auprès des usagers.

- **Planification à long terme** – Les zones urbaines devraient être invitées à élaborer des plans à long terme de transport et d'utilisation des terres de manière à favoriser, à grande échelle, le type de développement que propose la ***Nouvelle vision des transports urbains*** de l'ATC. En 1996, huit des quinze municipalités répondantes avaient adopté un tel plan, bien que seules trois d'entre elles avaient prévu des limitations spécifiques du développement urbain de manière à favoriser davantage l'essor des transports en commun (tableau 3.43).

Projets de gestion de la demande en mobilité (GDM) – L'importance des programmes de GDM varie selon les zones urbaines. Ainsi, alors que divers projets sont à l'étude, projets visant par exemple l'instauration de stratégies municipales globales de GDM et de programmes d'éducation en la matière ou encore la création d'associations de GDM, cinq ou six zones urbaines s'emploient par ailleurs à mettre en œuvre des programmes de GDM liés au travail, notamment des régimes d'horaires variables et de télétravail ou encore des stratégies employeurs-employés de GDM (tableau 3.43). Comme le précisait la ***Vision*** de l'ATC, la GDM est à la fois une façon rentable d'utiliser de façon plus efficiente les installations et les services existants de transport, de réduire les besoins en expansion des réseaux et d'atténuer les répercussions des transports sur l'environnement urbain.

S.5.2 OBSERVATIONS CONCERNANT LES PRINCIPAUX INDICATEURS ET LES PROGRÈS ACCOMPLIS AU TITRE DE LA CONCRÉTISATION DE LA NOUVELLE VISION DES TRANSPORTS URBAINS DE L'ATC (SECTION 5.5 DU RAPPORT INTÉGRAL)

Qu'est-ce que cette deuxième enquête de l'ATC nous a appris à propos des indicateurs de mesure des services de transports urbains assurés dans les villes canadiennes? Y a-t-il eu des progrès notables au chapitre de la concrétisation de la ***Nouvelle vision des transports urbains*** de l'ATC? Vaut-il la peine de planifier d'autres enquêtes de ce genre afin de mesurer ces progrès? Dans cette dernière section, les auteurs du rapport intégral proposent leurs observations au regard des questions susmentionnées. Ce faisant, ils ont jugé utile d'établir une distinction entre les indicateurs de **rendement** (la mesure concrète de l'évolution du rendement des réseaux de transport et des facteurs connexes d'utilisation des terres), d'une part, et les indicateurs liés au **financement des transports urbains** ainsi que les diverses **initiatives** mises de l'avant par les zones urbaines répondantes en matière de transport et d'utilisation des terres, d'autre part. Dans les faits, cette distinction se justifie par le fait que les indicateurs de rendement sont avant tout des mesures des **extrants** tandis que les indicateurs liés au financement et les initiatives en question servent plutôt à mesurer les **intrants**.

Comme il en était fait mention précédemment, les auteurs de l'étude ont constaté que des progrès raisonnables avaient été réalisés du côté des intrants, mais que les résultats obtenus du côté des extrants n'étaient pas encourageants. Bref, les zones urbaines canadiennes devront consentir encore beaucoup d'efforts à l'appui de la concrétisation de la ***Nouvelle vision des transports urbains****.*

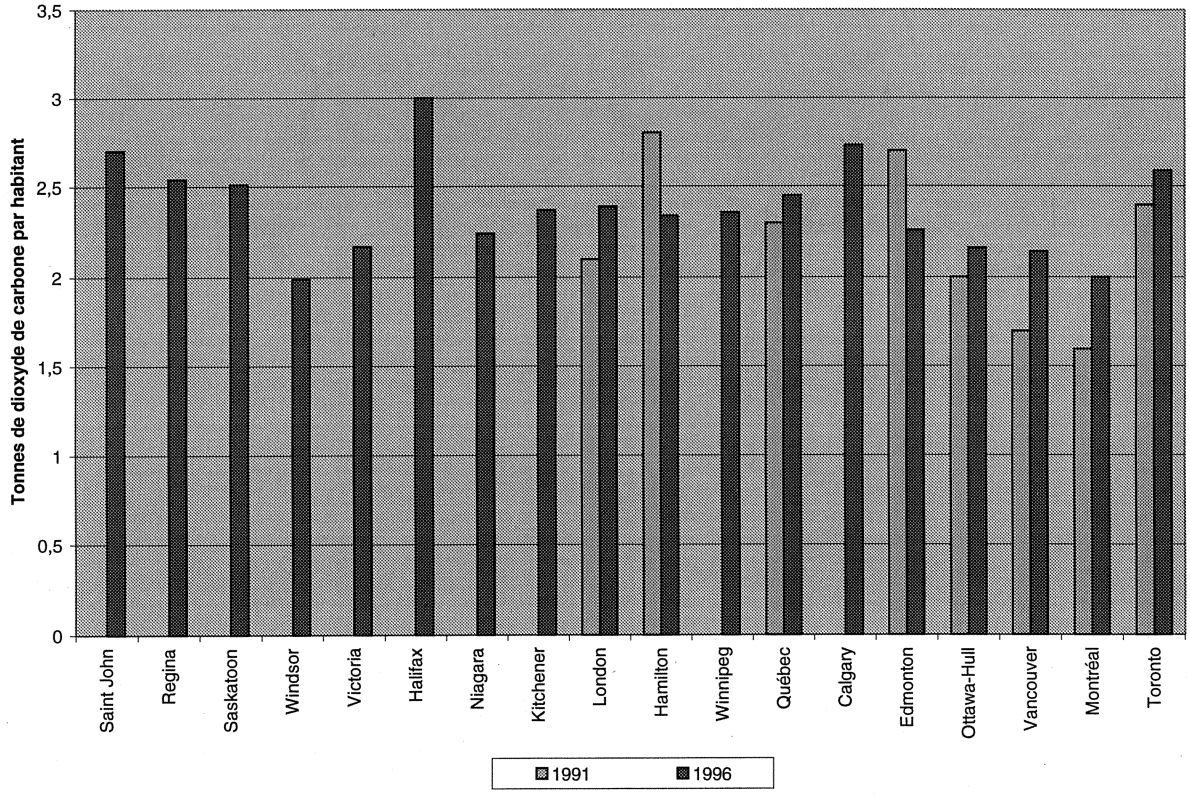
S.5.2.1 Indicateurs de rendement : transport et utilisation des terres

Le rapport de l'enquête pilote de 1996 contenait un tableau de classement des indicateurs numériques par ordre d'importance (classement dérivé des réponses fournies dans la partie C du questionnaire). Ces principaux indicateurs numériques correspondent à ceux qui figurent au tableau 3.1 du présent sommaire, si ce n'est que trois nouveaux indicateurs ont été ajoutés : les coefficients d'occupation des automobiles durant les périodes de pointe du matin, pour les déplacements dans les ZUE ainsi qu'en provenance et à destination des DCA, et les véhicules-kilomètres de déplacement estimés d'après les ventes de carburant. Les trente-cinq principaux indicateurs mentionnés dans ce tableau devraient continuer d'être utilisés pour la collecte et l'analyse des données qui seront réunies dans le cadre de futures enquêtes.

Deux de ces principaux indicateurs permettent tout particulièrement de mesurer dans quelle mesure les zones urbaines canadiennes ont réussi à instaurer des transports plus durables, en l'occurrence : l'indicateur de mesure des émissions de dioxyde de carbone par habitant dans les ZUE d'après la consommation de carburant et le nombre annuel de déplacements en transport en commun par habitant dans les ZUE. Les résultats établis pour ces deux indicateurs sont présentés sous forme graphique aux tableaux 5.1 et 5.2, respectivement, pour les années 1996 et 1991 (dans la mesure où l'on disposait de données pertinentes dérivées de l'enquête pilote). Un autre indicateur important demeure l'offre de transport en commun, exprimée en termes de sièges-kilomètres de transport en commun. Toutefois, les tendances établies à cet égard pour la période de 1991 à 1996 ne sont pas exposées aux présentes du fait qu'elles ne témoigneraient pas des changements apportés aux définitions des zones géographiques entre les deux enquêtes.

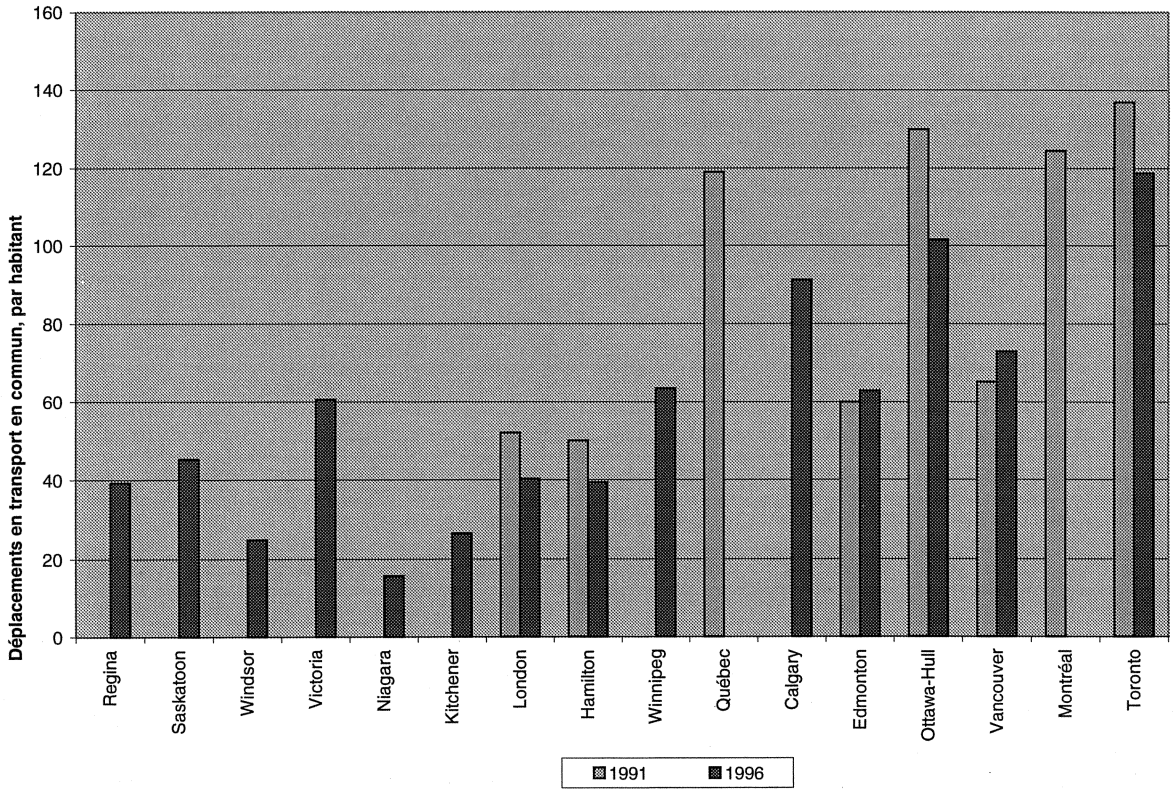
L'indicateur dont traite le tableau 5.1 est véritablement une mesure d'extrant puisqu'il fournit une estimation directe d'un important facteur environnemental influant sur le réchauffement du globe, facteur qui est en outre l'objet d'une attention très particulière de la part des paliers supérieurs de gouvernement puisque ceux-ci s'emploient présentement à élaborer une stratégie qui leur permettra de respecter l'engagement pris par le Canada à Kyoto en matière de réduction des émissions de gaz à effet de serre. Cet indicateur est également une mesure indirecte de la consommation d'énergie par habitant en contexte de transports urbains. Et parce que les automobiles constituent de loin la principale source d'émissions polluantes provenant des transports et qu'elles arrivent au premier rang au chapitre de la consommation énergétique, cet indicateur est aussi une mesure indirecte des progrès (ou de l'absence de progrès) au titre de la réduction de la dépendance vis-à-vis ce mode de déplacement dans les zones urbaines canadiennes. Le tableau 5.2 présente le nombre annuel de déplacements en transport en commun par habitant comme l'autre principal indicateur de mesure des extrants. Cet indicateur mesure en effet dans quelle proportion s'accroît (ou non), par habitant, la part des transports en commun dans le marché de la mobilité, part qui doit absolument augmenter si l'on veut en arriver à réduire (ou même simplement à stabiliser) la dépendance vis-à-vis de l'automobile : un volet fondamental de la concrétisation de la ***Vision*** de l'ATC. C'est en se fondant sur ces motifs que les auteurs de l'enquête ont jugé opportun de comparer, pour ces deux indicateurs, les résultats de 1991 et de 1996, même si les données de 1991 concernaient un moins grand nombre de zones urbaines et qu'entre-temps des changements ont été apportés aux définitions des zones géographiques, notamment dans le cas de la zone urbaine existante (ZUE).

Tableau 5.1 : Émissions de dioxyde de carbone par habitant dans les ZUE, d'après la consommation d'essence, de 1991 à 1996*



* La définition de la ZUE de certaines zones urbaines a été modifiée entre 1991 et 1996. Une certaine réserve s'impose donc dans l'interprétation du tableau comparatif ci-dessus.

Tableau 5.2 : Nombre annuel de déplacements en transport en commun par habitant dans les ZUE, de 1991 à 1996*



* La définition de la ZUE de certaines zones urbaines a été modifiée entre 1991 et 1996. Une certaine réserve s'impose donc dans l'interprétation du tableau comparatif ci-dessus.

Comme le souligne les notes d'avertissement qui accompagnent les deux tableaux ci-dessus, les lecteurs sont invités à faire preuve de réserve dans leur interprétation de ces graphiques en raison des modifications qui ont été apportées au chapitre de la délimitation des zones géographiques (voir section 2.2). Les différences engendrées par la refonte de ces définitions entre 1991 et 1996 sont en partie atténuées par le fait que les résultats des indicateurs sont exprimés sur une base unitaire, soit par habitant. Ceci dit, il demeure qu'entre les deux années d'enquête, les ZUE se sont urbanisées davantage et ce, à différents degrés. Néanmoins, le tableau 5.1 illustre bien que des huit zones urbaines pour lesquelles on disposait, pour chacune des deux années d'enquête, de données sur les émissions de dioxyde de carbone dérivées de la consommation d'essence, six de ces zones ont enregistré en cette matière une hausse par habitant de 1991 à 1996. De même, à l'examen du tableau 5.2, on constate que dans quatre des six zones urbaines pour lesquelles on disposait, pour chacune des deux années d'enquête, de données sur le nombre annuel de déplacements en transport en commun par habitant, il y a eu déclin de ce nombre tandis que les deux autres zones ont connu une hausse marginale à ce titre. (L'augmentation enregistrée à Vancouver est probablement le résultat de la diminution de la superficie de la ZUE entre 1991 et 1996 alors que la réduction indiquée pour Toronto est exagérée du fait que les données de 1991 ne visaient que le territoire de la Commission des transports en commun de Toronto alors que celles de 1996 englobent l'utilisation d'autres services de transport en commun municipaux de l'agglomération torontoise, ce qui correspond donc à un accroissement important de la taille de la ZUE.)

Ni l'une ni l'autre de ces tendances temporelles (qui sont par ailleurs corroborées par des données d'autres sources) ne brossent un tableau encourageant de l'orientation que semblent poursuivre les zones urbaines canadiennes au chapitre de l'évolution de leurs réseaux de transport. Si une troisième enquête était exécutée en 2001 et que les définitions des zones géographiques utilisées pour l'enquête de 1996 étaient conservées, il serait alors possible de mieux dégager les tendances des transports urbains et de mieux cerner dans quelle mesure la ***Nouvelle vision des transports urbains*** de l'ATC est appliquée à l'appui de l'instauration de transports durables.

S.5.2.2 Financement des transports urbains

La partie B du questionnaire visait à réunir de l'information sur les sources de financement des transports présentement utilisées par les zones urbaines et la proportion relative de chaque source dans leur budget total de transport, sur les sources de financement non utilisées pour l'instant, raisons à l'appui, sur les nouvelles sources de financement envisagées ainsi que sur les types d'analyses financières exécutées dans le cadre des processus de planification des services de transport des zones urbaines répondantes.

À cet égard, deux observations méritent d'être avancées. Premièrement, comme le faisait valoir un *Dossier* de l'ATC publié en 1997 sur le ***Financement des transports urbains***, la concrétisation de la ***Vision*** exigera le recours à davantage de sources stables et sûres de financement que n'en ont présentement à leur disposition la majorité des zones urbaines canadiennes. Cette concrétisation exigera en outre l'injection de fonds supplémentaires, notamment pour améliorer les transports publics. Comme l'ont souligné un certain nombre de municipalités répondantes – dont les positions en la matière sont documentées dans d'autres rapports – les changements apportés aux méthodes de financement des transports et aux responsabilités connexes des municipalités ont très concrètement touché les zones urbaines de certaines provinces, en particulier depuis 1996. Dans certains cas, une diminution du financement des transports, conjuguée à une réticence à hausser les taxes foncières (soit actuellement la principale source de financement des transports urbains pour les municipalités), a considérablement altéré la situation financière des zones urbaines visées.

Dans cet ordre d'idées, force est de constater en second lieu chez nombre de zones urbaines une tendance encourageante, à savoir que celles-ci explorent de nouvelles sources de financement des transports et plus particulièrement des méthodes de perception de revenus par le biais de **frais d'utilisation** des transports, par exemple les taxes sur les carburants, les droits d'immatriculation des véhicules, les revenus de stationnement ou encore les méthodes de détermination du coût des routes. Encore une fois, comme le soulignait le *Dossier* précité de l'ATC, le recours accru à l'imposition de frais aux usagers des transports fournira une source stable de financement (qui pourra augmenter à la mesure de la hausse même de la demande en mobilité), une source qui, si elle est bien planifiée, pourrait contribuer à réduire le nombre d'automobiles à un seul occupant sur les routes congestionnées pendant les périodes de pointe, ce qui favorisait du même coup l'instauration de transports plus durables et la concrétisation des 13 principes préconisés dans la ***Vision*** de l'ATC de 1993.

Même si les démarches entreprises par nombre des municipalités répondantes à propos des nouvelles sources de financement des transports sont encourageantes, les progrès réels accomplis à ce titre depuis 1996 ont été lents (exception faite de l'Administration des transports de la communauté urbaine de Vancouver et de l'Agence métropolitaine de transport, à Montréal), si bien que des efforts aussi considérables que soutenus devront être consentis dans ce domaine avant que des résultats tangibles ne puissent être constatés.

S.5.2.3 Projets/initiatives de transport et d'utilisation des terres

Comme en faisait état la section 3.8, les projets de transport et d'utilisation des terres signalés par les zones urbaines (en réponse à la partie A du questionnaire) sont assez encourageants dans un certain nombre de cas. Ces projets s'entendent : de la création d'un plan à long terme de transport et d'utilisation des terres (un outil indispensable pour cibler les efforts en la matière, pour favoriser la concrétisation de la ***Vision*** et pour veiller à ce que le financement des transports soit utilisé à bon escient); de projets d'urbanisme et d'aménagement paysager des rues, afin d'encourager le recours aux transports en commun, le cyclisme et la marche à pied; de l'accentuation de la priorité à accorder dans certains cas aux services de transport en commun de surface; de l'établissement de normes de stationnement en fonction des niveaux/de la proximité des services de transport en commun; de la conception et de l'exploitation de routes dans le but premier d'accroître la mobilité des gens et le trafic-marchandises plutôt que de simplement chercher à accroître la capacité d'accueil de véhicules; de l'offre d'installations accessibles de chargement hors voirie; de la désignation de routes pour le camionnage et d'autres initiatives visant à faciliter le transport des marchandises; de l'amélioration de l'accessibilité des handicapés physiques aux installations de transport en commun et pour piétons; de la promotion de technologies moins préjudiciables à l'environnement; de l'obligation d'exécuter des évaluations environnementales préalablement à l'instauration d'installations ou de services nouveaux de transport; et de la mise en œuvre ou de la promotion de programmes de gestion de la demande en transport, y compris des programmes d'implantation de régimes de travail fondés sur des horaires variables, sur la semaine de travail comprimée et sur le télétravail. Dans la majorité des cas, il y a eu accentuation des priorités accordées à ces projets et initiatives entre 1991 et 1996.

Par ailleurs, la majorité des zones urbaines accordent une faible priorité aux projets visant par exemple à faciliter la mise en valeur intensive des terres à usages multiples situées dans les corridors de transport en commun ou près des principaux points de convergence, à aménager des voies réservées aux autobus ou aux véhicules à coefficient élevé d'occupation afin de donner la priorité aux transports en commun, à instaurer des régimes de gestion de l'offre et de la demande en stationnement ou encore à promouvoir/à faciliter le covoiturage et une application à plus grande échelle des principes de gestion de la demande en transport.

En résumé, la situation concernant les projets ou initiatives de transport et d'utilisation des terres n'est ni brillante, ni catastrophique. Certains excellents projets ont été amorcés, mais il demeure encore bien des lacunes à combler. C'est tout particulièrement le cas des projets d'urbanisation/d'utilisation des terres (c'est-à-dire les processus d'approbation et les mesures d'encouragement concernant le développement plus intense de terres à usages multiples), des projets d'amélioration de la qualité et de l'étendue des services de transport en commun (projets victimes des restrictions financières actuelles), de l'application à plus grande échelle des principes de gestion de la demande en transport (y compris la tarification directe des usagers), de l'accentuation des priorités d'exploitation des véhicules de transport en commun de surface ainsi que des autres mesures visant à favoriser une exploitation plus efficiente des réseaux de transport.

S.5.2.4 Observations finales

La base de données issue de l'analyse des indicateurs de transport urbain décrits dans le présent sommaire constitue une source valable et de plus en plus fiable d'information dont pourront s'inspirer les municipalités et les autres organisations de planification des transports à l'appui de la concrétisation de la ***Vision***. On peut espérer que le succès de la présente étude encouragera chacune des quinze municipalités répondantes à maintenir sa participation à ce programme d'enquête, de sorte qu'au fil des prochaines années, les analyses temporelles dont font état les tableaux 5.1 et 5.2 pourront fournir des données plus fiables. Il serait également utile d'étendre ce programme d'enquête à un plus grand nombre de zones

urbaines, de manière à assurer une surveillance plus approfondie des tendances des transports urbains au Canada. Les municipalités qui ont participé à la présente étude devraient être reconnues à titre de chefs de file, pour leur contribution à l'amélioration des connaissances dérivées des indicateurs de transport urbain.

Globalement, il est permis d'avancer que les agglomérations urbaines sont animées de bonnes intentions, qu'elles font preuve de créativité et qu'elles ont su mettre en œuvre d'excellents projets. Toutefois, ces efforts n'ont encore donné que de minces résultats lorsqu'on regarde les indicateurs de rendement décrits à la section S.5.2.3. Dès lors, il apparaît d'autant plus important que le programme d'enquête sur les indicateurs de transport urbain, amorcé par l'ATC en 1991 et repris en 1996, soit instauré à titre permanent, de manière qu'une nouvelle enquête soit menée en 2001 et, espérons-le, à tous les cinq ans par la suite. Outre leur valeur informative indéniable pour les dirigeants et les planificateurs municipaux de même que pour les instances gouvernementales du Canada, les résultats tirés des indicateurs de rendement aideront à mesurer les progrès concrets qui seront accomplis dans ce domaine. Les résultats obtenus au chapitre du financement des transports et des nombreux projets de transport et d'utilisation des terres (parties B et A, respectivement du questionnaire d'enquête) serviront pour leur part à constituer une banque commune de connaissances qui, du moins peut-on l'espérer, encouragera les dirigeants de tous les paliers d'administration à poursuivre leurs efforts à l'appui de la concrétisation de la ***Nouvelle vision des transports urbains*** ainsi que de l'instauration au Canada de services de transport urbain et de stratégies de développement plus durables.

Urban Transportation Indicators – 1996 Survey 2 Final Report

1. INTRODUCTION

1.1 BACKGROUND

In 1993, the Urban Transportation Council (UTC) of the Transportation Association of Canada (TAC) proposed a ***New Vision for Urban Transportation***, describing thirteen principles which point the way to desirable future transportation systems. To monitor progress in achieving this Vision, the UTC began a long-term program to establish and maintain a consistent and reliable database of standard urban transportation and urban development indicators for Canadian municipalities. This database will help participating municipalities to monitor the progress of their urban areas over time, and to compare their experience with other urban areas. This information will also assist both public and private sectors in a wide variety of planning and transportation areas, and will allow TAC to track progress in achieving its ***New Vision for Urban Transportation***.

Information for this database is provided by responses to surveys that are to be carried out every five years, to coincide with national Census years. A Pilot Survey was carried out in 1995, using 1991 as the study year and including eight urban areas. An expanded second survey was carried out earlier this year (1999), applying lessons learned from the pilot survey. The municipalities (or municipal partners) participating in the 1996 study year survey, and responding for their urban areas, are as follows:

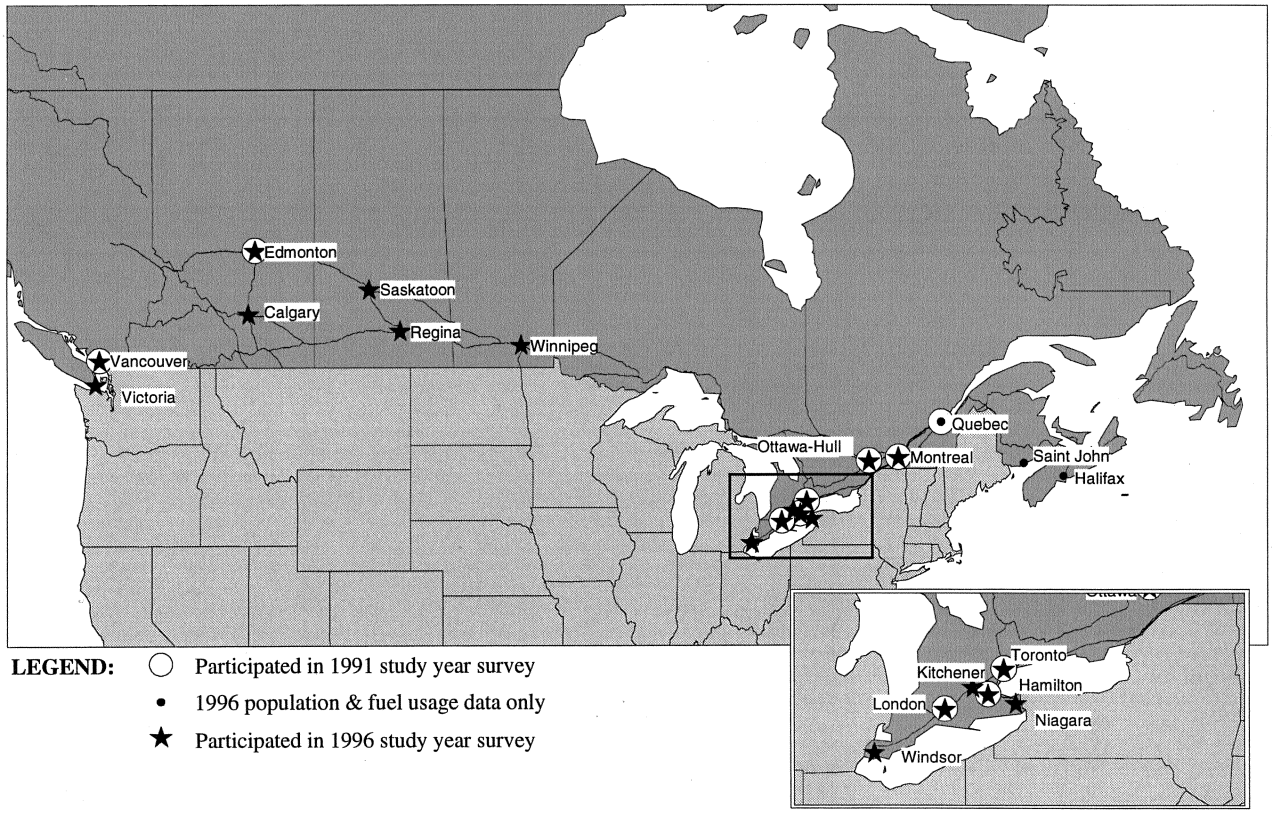
Capital Regional District (Victoria)
City of Calgary
City of Edmonton[a]
City of Regina
City of Saskatoon
City of Toronto[a]
City of Windsor
City of Winnipeg
Greater Vancouver Regional District[a]
London Transit Commission[a]
Regional Municipality of Hamilton-Wentworth[a]
Regional Municipality of Waterloo (Kitchener)
Region of Ottawa-Carleton (Ottawa-Hull)[a,b]
Regional Municipality of Niagara
Ville de Montréal[a]

[a] These municipalities also participated in the Pilot Survey (Quebec also participated but did not participate in the 1996 study year survey).
[b] The Region of Ottawa-Carleton responded individually in the 1991 study year pilot survey, while it responded on behalf of Ottawa-Hull in the 1996 study year survey.

Initially municipalities representing 18 of Canada's 25 Census Metropolitan Areas (CMAs) were invited to participate. The selection included consideration of including centres from various parts of Canada as well as the urban areas' size and willingness to participate. Three of the municipalities indicated that they were unable to participate. Hence there are 15 participating urban areas, located in six of the ten provinces. The locations of the 15 urban areas participating in the 1996 study year survey are shown in Exhibit 1.1 along with the eight urban areas which participated in the 1991 study year survey and the three urban areas (of the original 18) which were unable to participate in the second survey. Population, work trip travel mode and fuel usage data are available for all 18 of the initially selected urban areas. In some cases, individual or regional municipalities have taken the responsibility to respond on behalf of other municipalities within a single urban area, which necessitated some

coordination between municipalities to complete the survey. For example, the responses for the Niagara urban area, which includes Niagara Falls, Welland, and St. Catharines, were provided by the Regional Municipality of Niagara, and the City of Toronto provided responses for the Greater Toronto Area.

Exhibit 1.1: Locations of Urban Areas



1.2 OBJECTIVES AND OUTLINE OF REPORT

The report addresses the following objectives:

- to describe the survey process;
- to draw conclusions on the database's reliability
- to present and discuss the urban indicators based on survey responses;
- to make recommendations for future surveys;
- to discuss progress towards achieving the TAC Vision in light of the survey findings.

Following the Executive Summary and the introductory comments in Chapter 1, Chapter 2 discusses the process of implementing the survey and response rates achieved. Chapter 3 presents the responses to the 1996 study year survey, including both reported and derived indicators. Data describing on-the-ground status and system performance indicators (from Part C of the survey questionnaire) are presented first (Sections 3.1 to 3.6) followed by transportation financing responses (Part B of the questionnaire) in Section 3.7 and responses on the status of transportation and land use initiatives (Part A of the Questionnaire) in Section 3.8. Chapter 4 presents recommendations for future surveys including suggestions for improving the survey process and the clarity of the questionnaire. Chapter 5 presents conclusions regarding data availability, reliability and consistency over time (Sections 5.1, 5.2 and 5.3 respectively), key findings regarding the urban transportation indicators as reported in the survey (Section 5.4), and comments on selected key indicators and progress towards TAC's New Vision for Transportation (Section 5.5).

2. SURVEY IMPLEMENTATION

2.1 SURVEY QUESTIONNAIRE

The survey instrument was made available electronically and in hard copy to the participating municipalities. A copy of the questionnaire is included as Appendix A.

The survey content is essentially the same as for the Pilot Survey. The only changes have been the re-ordering of parts of the survey and some of the questions, and the addition of a small number of new items.

The 1996 study year survey contains three parts:

- **Part A** asks the status of 68 transportation and land-use initiatives in the urban area, where one of six distinct responses can be chosen for each initiative. There are ten categories of initiatives.

- **Part B** asks about transportation funding. There are six questions in this section, which can be further grouped into three sections:

  - Question 1 asks how fifteen different funding sources are used for transportation expenditures, and Question 3 asks why the same funding sources are not used (if they are not used).

  - Question 2 asks what percentage of funding for different types of expenditures is derived from the different sources

  - Questions 4-6 are open-ended questions. Question 4 asks about other revenue sources being considered; Question 5 about cost/benefit or other analysis; and Question 6 about attempts to estimate costs incurred as a result of congestion.

- **Part C** requests 83 items of numerical data regarding each urban area's urban structure and the supply, use, performance and costs of their transportation systems. These are used to calculate the majority of transportation and land-use indicators. Each indicator is specific to one of four different geographic areas, which are defined and discussed in the following section. In addition to the numerical data, the respondent is asked to define the location of these geographic areas on maps.

2.2 DEFINITION OF GEOGRAPHIC AREAS

The urban transportation and land-use indicators in this study refer to one or more of four geographic areas: the Region, the Existing Urban Area (EUA), the Central Area (CA) and the Central Business District (CBD). One finding of the Pilot Survey was that when municipalities were asked to define these areas the resulting areas were quite different in size and were not consistent in terms of employment, population or degree of urbanization. To correct this problem and to create more standardised and uniform definitions of these areas for comparisons among municipalities across Canada, three of these geographic areas (the Region, EUA and CBD) have been redefined for the

current survey by TAC and the fourth (the CA) by participating urban areas. The criteria for defining them are discussed below.

2.2.1 Criteria for Geographic Area Definitions

The most critical element in order to create geographical definitions is the availability of base data such as population and employment (jobs) at common levels of geography throughout Canada. To this end, Census classifications, Census tracts, and local municipalities form the basis of these geographic areas.

2.1.2.1 Region

The Census Metropolitan Areas (CMAs) of the 1996 Census define the Regions in this study. A CMA is, by definition, a large urban area together with adjacent urban and rural areas that have a high degree of social and economic integration with the urban core. Municipalities must meet various criteria, as developed by Statistics Canada, to be included as part of a CMA. These criteria ensure that there are sufficiently high levels of interaction between the main urban centre and suburban/rural municipalities.

2.1.2.2 Existing Urban Area (EUA)

The Existing Urban Area (EUA) represents the currently built-up area within the Region. The average population and employment of the EUA are typically about 85% of the Regional total. The building blocks of the EUA tend to be census subdivisions, and population and population density are used as the criteria in determining whether or not to include a municipality or area in an EUA.

2.1.2.3 Central Area (CA)

The Central (CA) is an area typically characterised by mixed-use development; that is, an area with both high population densities and relatively high employment levels. The CA usually surrounds the CBD, but may not completely encircle it. Census tracts are the building blocks used to define the extent of the CA. The CA was the only geographic area to be defined by the responding municipalities as it was felt that local familiarity with the urban character of the area was necessary to achieve an accurate definition of the CA. As a guideline, it was suggested that the total size of the CA should be about three to five times that of the Central Business District.

2.1.2.4 Central Business District (CBD)

The Central Business District (CBD) is the pre-eminent centre for employment, recreation and tourism within the EUA. For this study, TAC carried out an examination of employment-related data by the industrial divisions most commonly found in the CBD (retail, finance insurance real estate, business services, government, accommodation and food service) at the census tract level in order to locate areas of high employment density. The CBD is built up, using census tracts with high employment densities, to approximately 20% of the total employment of the EUA within these specific industry divisions. However, employment figures reported in this survey reflect total employment, not just specific industry divisions. In two cases, Kitchener/Waterloo/Cambridge and Niagara/St. Catharines/Welland, it was necessary to define multiple CBDs within the CMA, and subsequently multiple CAs.

2.2.2 Changes to Geographic Definitions

The clearer and more uniform approach to identifying the geographic areas, as described above, provides greater confidence in comparisons across jurisdictions as well as over time. This stands in contrast to the Pilot (1991 study year) Survey, where the urban areas were asked to define their own EUAs, CAs and CBDs, and the resulting areas were quite different in size and representative of different types of populations.

As shown on Exhibit 2.1, adopting a common approach for defining geographic areas has resulted in areas that are more realistic in relative terms. For example, for the 1991 study year, the EUA for Vancouver was nearly than twice the size of the EUA for Toronto. The situation is reversed for the 1996 study year where the size of the EUA's are more in line with the population of each area.

Exhibit 2.1: Land Areas (km^2) for Geographic Area Definitions, Toronto and Vancouver, 1991-1996

	Toronto	Vancouver
Region		
1991	3230	8110
1996	5900	2800
% Difference	+83%	-65%
Existing Urban Area (EUA)		
1991	1480	2630
1996	2300	1300
% Difference	+55%	-51%
Central Area (CA)		
1991	29	5.1
1996	18	16.7
% Difference	-38	227%
Central Business District (CBD)		
1991	2	1
1996	5.8	4.7
% Difference	+190%	370%

Unfortunately, these re-definitions limit the amount of temporal comparison that can be made for those urban areas that participated in both surveys. Hence the temporal comparisons in this report have generally been limited to a comparison of the status of the land-use and transportation initiatives, requested in Part A, over time (Section 3.8.11), as these results are not as limited to specific geographic definitions as are Parts B and C of the survey. Two other temporal comparisons, drawn from Part C are, however, presented and discussed in Chapter 5 (Section 5.5) to illustrate (with appropriate cautionary notes) the usefulness of such comparisons for output (performance) indicators and the importance of carrying out future surveys (with consistent geographic definitions over time) so that such comparisons can be made with increasing confidence.

2.3 DATA COLLECTION AND VALIDATION PROCEDURE

TAC began recruiting cities for the current survey in November 1998. Thirteen municipalities who agreed to participate were sent the questionnaire in both electronic format and in paper copy on March 5, 1999 and were given an initial deadline of April 5, 1999 to respond. Two others who "came on board" after that date received their surveys later; and were given extended deadlines so that they would have as much time as the other municipalities.

The TAC Urban Indicators Survey Technical Sub-Committee carried out an initial round of follow-up requests for completed surveys in mid-March. The first completed survey was received April 6, 1999. IBI Group followed up with a round of phone calls and e-mail messages after this date to make requests for outstanding surveys and to thank those municipalities that had responded for their participation. Periodic contact was then made by IBI Group with municipalities that had not yet responded or to validate data already received. The last completed survey was received August 23.

As the survey responses were received, contact was made with municipalities to discuss ways that missing data could be provided, or to verify data that were in question for any of the following reasons:

- questionable magnitudes of some responses, as were sometimes suggested based on comparisons across the urban areas;
- inconsistencies internal to the questionnaire - an example is that if an urban area notes that it uses funding from a particular source towards a particular transportation expenditure category, it should record a non-zero percentage of funding from that source for the same expenditure category;
- large or incompatible differences in survey responses over time, for the few urban areas that were involved in both surveys - for example, the status of the initiatives in Part A were not, in general, expected to show regression over time.

If data were in question, a check was first made against the raw data forms to ensure that the responses had been coded correctly.

IBI Group prepared preliminary tabular and graphical summaries of a number of the indicators for the urban areas that had responded by June 1999. These were presented first to the Steering Committee. After making their suggested changes, we updated these summaries and sent them on July 9, 1999 to the twelve municipalities that had responded initially, asking for their comments and for responses for specific questions for each municipality. Most responded with valuable observations regarding certain data items that required adjustment in the summaries.

The data validation process continued until mid September. The summer season at times delayed this process, owing to vacations.

2.4 ADDITIONAL DATA SOURCES

2.4.1 Kent Marketing Fuel Sales Data

Fuel sales data were purchased by TAC from Kent Marketing Service for each urban area. These data were disaggregated by local municipality, such that the market areas could be further refined to include only those areas within the EUAs as defined for this study. Appendix B includes a listing of the local areas that were included in the market areas for the fuel sales figures that were used in the final analysis.

2.4.2 Census Canada Journey-to-Work Data

The Canadian Census statistics include information about the mode of travel to work places for all full-time and part-time workers who do not work "at home" or "outside Canada." This information was obtained from Statistics Canada under a previous TAC/Statistics Canada agreement, and is included in the database, in addition to modal split information for all trip purposes, as obtained for the different urban areas through the survey. Information on Journey-to-Work data is presented in the data summaries.

2.5 DATABASE OF SURVEY RESPONSES

A database of survey responses and derived urban transportation indicators has been developed in Microsoft Access format. Access to the database and the raw survey results has been provided as part of the purchase of this report. The database was used to generate many of the tables and graphs in this report, and these are to be retained in the database. A more detailed description of the database is included as Appendix C.

2.6 RESPONSE RATES

2.6.1 Part A – Status of Land-Use/Transportation Initiatives

Part A was answered quite completely initially, and the response rate was increased to virtually 100% after querying the municipalities about missing items. Exhibit 2.3 details the response rates regarding the status of the 68 initiatives by urban area for the questions in Part A. As can be seen, only two urban areas had missing data and 99.7% of the requested information was provided.

Exhibits in this report list urban areas in order of increasing size (defined by their CMA population). This assists the reader to understand the implications of population size among urban areas and facilitates comparisons among urban areas of similar size.

Exhibit 2.2 Response Rates by Section and Urban Area to Part A – Status of Land-Use/Transportation Initiatives

		Percent of Questions Answered in Section (%)																
Category	No. of Items	TOTAL	Regina	Saskatoon	Windsor	Victoria	Niagara	Kitchener	London	Hamilton	Winnipeg	Calgary	Edmonton	Ottawa-Hull	Vancouver	Montreal	Toronto
1 Urban Structure/Land Use	(9)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
2 Urban Design	(4)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
3 Walking	(2)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
4 Cycling	(5)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
5 Transit	(11)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
6 Parking	(6)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
7 Road System Optimisation	(7)	99	100	100	100	86	100	100	100	100	100	100	100	100	100	100	100
8 Goods Movement	(4)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
9 Special User Needs	(6)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
10 Energy, Environment, and Travel Demand Management	(14)	99	100	100	100	100	100	100	100	100	100	86	100	100	100	100	100
Total Percent Answered (%)		99.7	100	100	100	99	100	100	100	100	100	97	100	100	100	100	100
Total Items Answered	(68)	(68)	(68)	(68)	(68)	(67)	(68)	(68)	(68)	(68)	(68)	(66)	(68)	(68)	(68)	(68)	(68)

2.6.2 Part B – Transportation Funding Sources

There was good response to Questions 1 and 3, which ask how various funding sources were used or why they were not used, with 97% of the requested data provided overall. Exhibit 2.3 summarises these response rates by urban area and for each category of funding sources. The missing data were with respect to development levies/cost recovery, for which responses may have been difficult owing to limited use in a few urban areas.

Exhibit 2.3: Response Rate to Question B.2 – Use of Financing Sources for Transportation Expenditures, by Financing Source Category and Urban Area

		Percent of Questions Answered in Section (%)																
Financing Source Category	No. of Items	TOTAL	Regina	Saskatoon	Windsor	Victoria	Niagara	Kitchener	London	Hamilton	Winnipeg	Calgary	Edmonton	Ottawa-Hull	Vancouver	Montreal	Toronto
1 Federal/Provincial subsidies/grants	(3)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
2 User fees / parking taxes / surcharges	(5)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
3 Municipal / taxes/surcharges	(4)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
4 Development levies / cost recovery	(3)	87	100	100	100	100	33	100	100	100	100	33	33	100	100	100	100
Total Percent Answered (%)		97	100	100	100	100	87	100	100	100	100	87	87	100	100	100	100
Total Items Answered	(15)	(15)	(15)	(15)	(15)	(15)	(13)	(15)	(15)	(15)	(15)	(13)	(13)	(15)	(15)	(15)	(15)

Question 2 was answered reasonably well. Of the 15 responding urban areas, 14 provided the percentage of funding from different sources for road system expenditures, 11 provided this information for transit system capital expenditures and for transit system operating expenditures. This represents 93% and 73% of urban areas, respectively. All of the urban areas provided responses to the open-ended questions, Questions 4-6.

2.6.3 Part C – Land-Use/Transportation Indicators

Montreal's response to Part C is expected to arrive in October 1999, after a summary of a recent travel survey has been completed. Hence the discussion of response rates in this section considers only the fourteen urban areas that have provided data for Part C. Exhibit 2.4 presents the response rates in aggregate for Part C, including rates for each of the 20 individual questions, for each of which various numbers of items were requested. This totalled 83 items from each urban area for Part C. On average, the fourteen responding urban areas provided 73% of the requested data. This represents a marginal increase from the initial response rate, reflecting subsequent consultation with the individual municipalities about how to acquire missing data or whether IBI Group estimates were acceptable. This response rate is somewhat less than that achieved for the Pilot Survey, 79%. However, this is not unexpected, considering that the second survey included more and smaller urban areas, which may not place as great a priority as larger centres on collecting some of the data that is required for the various indicators.

Response rates were lowest for Questions 14 and 15, which asked for vehicle-km of travel on arterials and on expressways, with response rates of 34% and 24%, respectively. This is due in part to the fact that traffic assignment models are often used to estimate these values. Most transportation demand models are based on peak hour traffic, such that three urban areas were able to provide estimates for one peak period only. The questions answered best were Questions 19 and 20, referring to transit costs and revenues, as these statistics are readily available in CUTA summaries. Where Urban Structure data are missing, the lack is due to Central Area data not provided for four urban areas.

Response rates for individual urban areas for each question in Part C are summarised in Exhibit 2.5. It can be seen that individual urban areas provided 48 to 100% of the requested data. These response rates are generally similar to those for the Pilot Survey except slightly lower than the Pilot for the Transportation Demand and Transportation System Performance questions. Again, this reflects the smaller incidence of transportation demand model use and data availability among the smaller urban areas in the sample for Survey #2.

Exhibit 2.4: Data Availability in Response to Part C

Category	Total Number of Items Per Question	Percentage of Requested Data Provided	Number of Urban Areas with Incomplete Data[1]
Urban Structure			
1 Land Area	4	95%	3
2 Residential Population	4	95%	3
3 Total Employment	4	95%	3
Transportation Supply			
4 Arterial, Expressway and HOV Lane-km	3	93%	2
5 Bike Lane/Bike Path-km	1	93%	1
6 Transit Seat-km	3	83%	3
7 Private Vehicles Registered (leased & private)	1	71%	4
8 Designated Park-and-Ride Spaces	1	100%	0
9 Off-Street Parking Spaces	3	76%	4
Transportation Demand			
10 AM/PM Peak Period and 24-hour Modal Share (CBD)	18	68%	7
11 AM/PM Peak Period and 24-hour Modal Share (EUA)	18	73%	6
12 Weekday Person Trips	3	69%	8
13 Annual and Weekday Transit Riders	3	74%	9
14 Peak Period and 24-hour Arterial Vehicle-km	5	34%	12
15 Peak Period and 24-hour Expressway Vehicle-km	5	24%	13
Transportation System Performance			
16 Average Home-Work Trip Distance (km)	1	86%	2
17 Annual Injuries and Fatalities	1	79%	3
Transportation Costs and Finance			
18 Annual Road Capital and Operating Budget	2	82%	3
19 Annual Transit Capital and Operating Budget	2	100%	0
20 Annual Transit Fare Box Revenue	1	100%	0
Total:	83	73%	

[1] out of 14 participating urban areas (i.e. not including Montreal)

2.7 RELIABILITY OF THE DATABASE

The survey process, as described in this chapter, resulted in a database that is as complete as possible, given the limitations of municipal staff time, available travel survey data, etc. Summaries of the data have been subject to thorough review by the participating urban areas, the project Steering Committee and IBI staff to identify anomalies. Some data items are based more on direct observation, and others on estimates, such that the reliability of individual measures may vary, and this is noted, where relevant, in the discussion of the indicators in the following chapters. In addition, travel survey methods may vary among urban areas.

The standardization of the definitions of the Regions, EUAs, CAs, and CBDs have made the data reported in the current survey for each urban area more consistent than that of the Pilot survey, and creates more confidence in comparisons of the indicators across urban areas. It also sets a more solid foundation to make comparisons over time more credible (i.e. comparisons with future surveys).

Exhibit 2.5: Responses to Part C by Urban Area, 1996 Study Year

CATEGORY	Total Items Per Question	URBAN AREA														
		Regina	Saskatoon	Windsor	Victoria	Niagara	Kitchener	London	Hamilton	Winnipeg	Calgary	Edmonton	Ottawa-Hull	Vancouver	Montreal	Toronto
Urban Structure																
1 Land Area	**4**	4	3	4	4	4	4	3	3	4	4	4	4	4	4	4
2 Residential Population	**4**	4	3	4	4	4	4	3	3	4	4	4	4	4	4	4
3 Total Employment	**4**	4	3	4	4	4	4	3	3	4	4	4	4	4	3	4
Transportation Supply																
4 Arterial, Expressway and HOV Lane-km	**3**	3	3	3	3	2	3	1	3	3	3	3	3	3	3	3
5 Bike Lane/Bike Path-km	**1**	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
6 Transit Seat-km	**3**	3	3	3	3	1	3	3	1	3	3	0	3	3	1	3
7 Private Vehicles Registered (leased & private)	**1**	1	1	0	1	0	1	0	0	1	1	1	1	1	0	1
8 Designated Park-and-Ride Spaces	**1**	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9 Off-Street Parking Spaces	**3**	0	3	3	3	0	0	3	3	2	3	3	3	3	0	3
Transportation Demand																
10 AM/PM Peak Period and 24-hour Modal Share (CBD)	**18**	6	12	5	6	18	18	0	18	12	5	18	18	18	12	18
11 AM/PM Peak Period and 24-hour Modal Share (EUA)	**18**	6	0	5	6	18	18	18	18	12	12	18	18	18	12	18
12 Weekday Person Trips	**3**	2	0	1	2	3	3	3	2	0	2	2	3	3	0	3
13 Annual and Weekday Transit Riders	**3**	3	2	2	3	1	2	2	1	3	2	2	3	3	2	2
14 Peak Period and 24-hour Arterial Vehicle-km	**5**	4	0	1	1	0	1	0	0	5	1	3	5	0	1	3
15 Peak Period and 24-hour Expressway Vehicle-km	**5**	4	0	2	1	0	1	0	0	0	1	0	5	0	0	3
Transportation System Performance																
16 Average Home-Work Trip Distance (km)	**1**	1	1	0	1	1	1	1	0	1	1	1	1	1	1	1
17 Annual Injuries and Fatalities	**1**	1	1	1	0	0	1	0	1	1	1	1	1	1	0	1
Transportation Costs and Finance																
18 Annual Road Capital and Operating Budget	**2**	2	0	2	1	2	2	0	2	2	2	2	2	2	2	2
19 Annual Transit Capital and Operating Budget	**2**	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
20 Annual Transit Fare Box Revenue	**1**	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Totals:	**83**	**53**	**40**	**45**	**48**	**63**	**71**	**45**	**63**	**61**	**54**	**71**	**83**	**73**	**50**	**78**
Percentage of Requested Data:	77%	64%	48%	54%	58%	76%	86%	54%	76%	73%	65%	86%	100%	88%	60%	94%

3. SURVEY RESULTS

The data collected and verified during the survey process provided the basis for transportation and land use indicators. Exhibit 3.1 provides a tabular summary of 35 key indicators for the 1996 study year. (Note: exhibits described in Chapter 3 are presented following the entire text of the chapter.) These key indicators are considered to be the most significant in terms of describing the degree to which the various urban areas are achieving TAC's ***New Vision for Urban Transportation***. These key indicators and others are discussed and presented graphically or in tabular form in this chapter. The indicators presented are basically the same as those developed for the 1991 study year survey, with a small number of additions or changes. The purpose of the discussion of this chapter is not to pinpoint the degree to which specific urban areas are achieving the ***New Vision for Urban Transportation***, but more to paint a picture of how and to what extent the Vision is being implemented across Canada.

The analysis and data descriptions in Sections 3.1 to 3.6 are based on responses obtained from Part C of the survey questionnaire. A table of the detailed responses to these questions is included as Appendix D. Montreal is included in these summaries, although the majority of data for Part C for this urban area will not be available until October 1999, when the results of its recent travel survey will become available. Montreal data will be included in the electronic database when it becomes available. Section 3.7 presents responses to Part B of the questionnaire (Transportation Financing) and Section 3.8 presents responses to Part A of the questionnaire (Status of Transportation and Land Use Initiatives).

3.1 URBAN STRUCTURE

Basic urban structure information - land area, population and employment - for each of the four geographic areas for each urban area was used to give an indication of the extent of these areas and the distribution, density and scope of their activities. These figures are also used to normalise several of the indicators so that comparisons can be made across the urban areas.

The locations of the EUA, CA and CBDs were also indicated on maps, which are included in the electronic database and are presented in Appendix E. The Central Area definitions were provided by the municipalities, and appear to be reasonable, according to their size and population and employment densities. In four cases Central Area definitions were not provided. In the case of London, the municipal contact felt that there is not enough of a transition area in between the CBD and surrounding area to be able to define a CA.

Exhibits 3.2 - 3.4 show the land areas, residential population and employment for each of the 15 urban areas. These and other exhibits are listed in order of increasing size of the urban area, as defined by the population of the Region. This makes it easy to make comparisons among urban areas of similar sizes and to see trends correlated with the size of the urban area. Exhibit 3.2 shows the EUA size both in absolute terms and as a percent of the Region/CMA size. Of these, Regina's and Saskatoon's EUAs stand out as being quite small and compact both in land area and in terms of their proportion of the Regions' land areas.

Exhibits 3.5 and 3.6 show population and employment densities, which are important direct indicators of urban structure and factors affecting travel intensity and behaviour. The figures show no apparent correlation of densities with urban area size. Toronto and Regina stand out as having the highest population and employment densities (over 1,600 people/km^2 and 800 jobs/km^2) in the EUA.

Among CAs, Vancouver has the highest population density, almost 10,000 people/km^2, whereas Toronto and Regina have the highest employment densities, about 20,000 jobs/km^2.

All of the urban areas have approximately 2,000 people/km^2 or more in their CBD, except Regina, with about half that value. In the CBD, all of the urban areas have at least 5,000 jobs/km^2. Again, Toronto has the highest employment density, with over 46,000 jobs/km^2 in the CBD. Toronto's population density in the CBD is the highest, at over 8,000, followed by Hamilton, at just over 6,000 people/km^2. Toronto, Edmonton, Winnipeg and Kitchener are the only urban areas that have higher population densities in the CBD than in the CA.

Comparing the employment-to-population ratios, as presented in Exhibit 3.7, shows that Edmonton and Regina have considerably higher CA employment-to-population ratios than the other urban areas; the typical range is 1-3 jobs per resident in the CA. The EUA employment-to-population ratios show much less variation, with values falling between 0.41 to 0.55. Hamilton and Niagara have markedly the lowest ratios, at just over 0.4 each, which may be offset by long-distance commuting to jobs in the Greater Toronto Area.

Exhibit 3.8 displays employment in the CA as a percentage of employment in the EUA. Toronto and Windsor are seen to have the lowest values. In the case of Toronto, this is likely due to the presence of a number of other major employment nodes throughout the urban area.

3.2 TRANSPORTATION SUPPLY

The ***New Vision for Urban Transportation*** includes adequate provision of transportation infrastructure for a variety of travel modes, keeping infrastructure for automobile use in balance with that for alternative means of travel. The survey includes eight indicators to describe the supply and priority of transportation infrastructure in the urban areas.

Exhibit 3.9 gives an indication of the amount of arterial plus expressway lane-km per capita available for residents of the EUA. Saskatoon, Niagara and Calgary have the highest road supply according to this measure, each with over 7 lane-km per 1,000 capita.

Exhibit 3.10 gives an indication of the priority of bus transit and carpooling in the EUA via HOV lanes. Here HOV lane-km are expressed both on a per-capita basis and as a percent of the arterial and expressway lane-km. It is seen that, with the exception of Regina, only urban areas with a population of over 650,000 have provided HOV lanes. The values of both measures are highest for Ottawa-Hull and Regina, and would be higher still for Ottawa-Hull if the bus-only Transitway were included in the totals.

Exhibit 3.11 shows the provision of bike lane-km or path-km per capita for the EUA. Values of up to about 0.4 lane-km per 1,000 capita are the norm. It can be seen that Calgary has the highest proportion of bike lane-km among the urban areas, at 0.76 lane-km per 1,000 people.

Automobile ownership levels are an important factor in travel decisions and the ensuing gasoline-based carbon-dioxide emissions. The number of automobiles per capita is shown in Exhibit 3.12. This value tends to be between 0.45 and 0.55 vehicles per capita. Calgary, Regina and Saskatoon stand out as having the highest automobile supply, whereas Victoria and Winnipeg have less than 0.5.

Exhibit 3.13 shows the weekday transit seat-km per capita in the EUA across the urban areas. It should be noted that these values have been approximated in some cases by IBI Group based on average seats per transit vehicle, weekday-to-annual expansion factors, and revenue-km as reported by CUTA (this was necessary as some of the contacts could not provide transit-seat km data). However, these figures do provide a good general indication of the amount of transit service supplied in the urban areas. It can be seen that the larger urban areas tend to provide more seat-km on a per capita basis, with Ottawa-Hull highest.

Exhibit 3.14 shows the number of park-and-ride spaces per capita in the EUA. With the exception of Victoria, the smaller urban areas (population under 650,000) reported no park-and-ride spaces. Calgary has the largest supply, at almost 1 space per 100 people, followed by Toronto and Vancouver.

Exhibit 3.15 displays the number of off-street parking spaces per 1,000 employees in the CBD. Toronto's off-street parking supply is notably low, at less than 0.2 spaces per employee. Saskatoon has the highest supply of parking spaces, providing 0.86 spaces per employee in the CBD. Typical values are about 0.3 to 0.7.

3.3 TRANSPORTATION DEMAND

Indicators of transportation demand discussed here are modal splits, vehicle occupancies, number of trips, annual transit riders, and weekday vehicle-km travelled on arterials and expressways.

Exhibits 3.16-3.18 show modal split data for trips to and from the CBD in the AM peak, PM peak, and 24-hour periods. These modal shares are affected to some degree by the population included in the trip data, as some trip surveys exclude children under a certain age. These are also affected by the modal definitions: for example, Windsor's EUA PM peak data and Niagara's CBD AM peak data included a larger proportion of trips by "other" transportation mode, which is largely attributable to school bus trips. Toronto is the only urban area that has achieved an auto modal share (drivers plus passengers) of less than 50% for trips to and from the CBD in the AM peak. In the PM peak, Winnipeg, Vancouver and Toronto all have auto modal shares of about 50% or less. All of the urban areas with populations of 650,000 or more achieved AM peak period transit modal shares of 30% or more, while those of the smaller urban areas are no more than 17%. Toronto's value for this indicator is highest, at 56%. Due to missing data for the smaller urban areas, it is difficult to make comparisons between off-street parking in the CBD (Exhibit 3.15) and transit modal shares for CBD trips. However, among the larger urban areas, for which both types of information are available, an inverse correlation can be seen.

Exhibits 3.19-3.21 show modal split information for trips to, from and within the EUA. For these trips, the trends are less marked than for CBD trips, although London, Edmonton and Toronto show low auto shares in the AM peak period and Winnipeg has the lowest auto share in the PM peak.

Exhibit 3.22 shows modal split data for work trips based on journey-to-work information for each of the 18 regions from the 1996 Census of Canada. The data on which this exhibit is based is included in Appendix D. It is worthwhile to compare this modal split data with that of Exhibit 3.19, the AM peak modal share for EUA trips, although it should be kept in mind that work trips take place at various times and not just in the AM peak. It is striking that the auto driver modal share is in many cases much higher for work trips than for all trip types (Edmonton and Vancouver especially), and vehicle occupancies are lower than for other trip categories, as can be inferred from the low auto-passenger

mode share for work trips. In a few urban areas, the transit modal share is somewhat higher for work trips than for all AM peak trips in the EUA: Ottawa-Hull (19% vs. 15%), Toronto (24% vs. 19%), and Vancouver (15% vs. 11%). For the other responding municipalities, the transit modal shares were about the same or less for work trips than for total trips.

Vehicle occupancies represent a measure of the efficiency of vehicle trips in transporting people. Exhibit 3.23 shows the vehicle occupancies for AM peak period trips, both for trips to and from the CBD, and for all EUA trips. The normal range of AM peak period vehicle occupancies is between about 1.15 and 1.3 persons per vehicle; Hamilton and Kitchener show the lowest vehicle occupancies, at just over 1.1 for trips to and from the CBD, whereas auto occupancies for Edmonton and Vancouver are the highest, at over 1.4 for EUA trips.

Exhibit 3.24 shows the number of daily and peak period person-trips per capita in the EUA. Typically, one could expect that the number of trips per capita should be in the range of about 3 daily trips per capita although the values derived from the survey data range from 2.4 to 3.7. Care has been taken to normalise the reported number of trips by dividing by the population represented by the trip surveys to derive a true value of trips per capita. For each urban area with the exception of Regina, data are reported to include pedestrian and cycling trips; Regina's most recent travel survey included motorized (auto and transit) trips only. The range in values could be a result of other differences in reporting methods not not identified through this exercise.

Exhibit 3.25 shows annual transit ridership for each urban area. These values are a true representation of the average ridership for the entire urban area, as transit ridership data for all transit providers have been included to our best knowledge. There is a broad range of ridership levels, from 16 annual trips per capita in the Niagara EUA to 111 in the Toronto EUA. The three urban areas with the lowest ridership levels correspond to the three urban areas with the lowest transit seat-km (Exhibit 3.13).

Exhibit 3.26 shows the average home-work trip distance, which ranges from about 6 to 16 km. The relatively large values seen for Niagara and Kitchener may result from a number of commuters travelling long distances to work in the Greater Toronto Area; for the other urban areas there is a general trend toward increasing trip length with increasing urban area size. Exhibit 3.27 shows the average transit trip length for the five urban areas for which this information was available.

3.4 TRANSPORTATION SYSTEM PERFORMANCE

The performance of the transportation system can be measured using total vehicle-km travelled, vehicle-km travelled on arterials and expressways, and by the safety of the transportation system based on annual injuries and fatalities per capita. An additional indicator measure "road utilization" is also presented.

Because fuel sales and population data were available for all 18 urban areas initially approached for this study, estimates of average daily vehicle-km of travel per capita based on fuel sales data and EUA population could be made for all 18 municipalities. Exhibit 3.28 shows these estimates, which assume that vehicular fuel efficiency is constant across the urban areas. The values for most of the urban areas are in the range of 20 - 27 daily vehicle-km per capita. Exhibit 3.29 displays the estimated weekday vehicle-km of travel along arterials and along multi-lane expressways in the EUA per capita, based on values reported by the responding municipalities. It can be seen that both sets of figures are in the same

order of magnitude, but the estimates obtained using the fuel sales data range up to twice as high as those for the arterial and expressway vehicle-km of travel. The former estimates are for travel on all roads, not just arterials and expressways. The discrepancy may also reflect under-reporting of trips in travel surveys and subsequent use in computer models, which were the primary sources for the latter estimates.

Annual injuries and fatalities per capita are presented in Exhibit 3.30. The normal range appears to be between roughly 5 and 7 injuries and fatalities per 1,000 residents. Vancouver and Edmonton stand out with the highest values for this indicator.

In addition to the above, a "road utilisation indicator" was calculated for the EUAs; the resulting values are presented in Exhibit 3.31. This measure is the average work trip distance multiplied by the number of vehicle trips in a one hour period in the AM peak and divided by the number of arterial and expressway lane-km. In effect, this is an index that can be expressed as vehicle-km per lane-km in the a.m. peak. Among the larger urban areas, a trend toward increasing congestion with increasing size is evident. The smaller urban areas have values in the order of 300 vehicle-km per lane-km.

This indicator differs from that presented for the 1991 study year survey as the vehicle trips have been normalised to a 1-hour period, rather than the whole AM peak. Hence the length of the peak periods needed to be elicited from the municipalities in addition to the survey data provided. For this reason it is important that municipalities provide the length of the peak periods in future surveys.

3.5 ENVIRONMENTAL IMPACT

Gasoline consumption per capita is considered to be a very key indicator, and was calculated for all 18 municipalities for which fuel sales data was purchased. The values of this indicator are shown in Exhibit 3.32. There does not seem to be a direct correlation of gasoline consumption with the size of the urban area. It can be seen that the range of values is about 850 to 1,280 L/capita. It is expected that the value of this indicator for Windsor, which is shown to have the lowest value of gasoline consumption, is suppressed due to a significant volume of gasoline being purchased across the U.S. border. No reasonable explanation could be found for the high value of gasoline consumption in Halifax. Also shown in this exhibit are gasoline-based carbon-dioxide (CO_2) emissions, which are derived directly from the values of gasoline consumption by multiplying by a factor of 2.356 kg of CO_2 per litre of gasoline. In these urban areas, the normal range of gasoline-based CO_2 emissions is about 2 to 3 tonnes per capita per year.

Values of gasoline consumption and CO_2 emissions per person-trip, where gasoline consumption is normalised by the total number of trips by all modes, are presented in Exhibit 3.33.

3.6 TRANSPORTATION COSTS AND FINANCE

Capital and operating costs for road and transit systems are presented on a per capita basis at the regional level in Exhibit 3.34. Exhibit 3.34(a) shows the value of road system costs to be $237 per capita in the case of Vancouver and $184 per capita in the case of Calgary, although for the other urban areas these costs are no more than $140 per capita. Transit system costs are shown on the same scale in Exhibit 3.34(b) (total operating costs are shown and fare revenues are not netted out), which makes it easy to compare the road system expenditures with transit system expenditures for each urban area. With the exception of Toronto, Ottawa-Hull and Victoria, roads expenditures were higher than transit

expenditures although the two were roughly equal in some urban areas (i.e. Edmonton and Winnipeg). It should be noted that Exhibit 3.34(b), presenting transit system expenditures per capita, bears a striking resemblance to Exhibit 3.13, presenting transit seat-km per capita and to Exhibit 3.25, presenting annual transit ridership per capita, suggesting that transit service levels and expenditures are closely tailored to ridership by transit operators and/or that ridership levels respond to service level and expenditure changes. While the causality probably works in both directions (depending on other factors affecting ridership and the extent to which leaders in each urban area are prepared to allocate scarce dollars to transit improvements) the similarity in profiles across the urban areas for those three indicators suggests that per capita transit ridership is very much a policy-responsive variable which can be increased significantly by appropriately directed increases in service levels and the required expenditures.

The transit revenue/operating cost ratios are presented in Exhibit 3.35. These tend to be in the range of 45% to 60%, although Toronto reported a higher cost-recovery ratio, 71%, as of 1996.

3.7 TRANSPORTATION FUNDING SOURCES

The ***New Vision for Urban Transportation*** includes a requirement for adequate and sustainable funding sources for new, expanded and properly maintained urban transportation infrastructure and services. Opinions vary regarding how this would best be achieved. However, it is generally agreed that funding should increasingly be derived from those users who benefit from the system enhancements. Similarly, funding derived from the transportation sector should be returned to transportation system enhancements.

Exhibit 3.36 is a tabulation of the frequencies of responses describing how different funding sources were used for transportation expenditures in 1996, as well as why the unused funding sources were not used. Exhibit 3.37 summarises the individual responses per urban area. It can be seen that the only three categories of funding that all municipalities made use of were municipal property taxes (normally placed in a general revenue account), cost recovery from new development (usually dedicated to road improvements) and transit user fees (dedicated to transit). Conversely, no municipality made use of surcharges on public parking rates (various reasons), or municipal vehicle registration taxes or emissions-related taxes (usually no legislative authority to use). There is clearly room to encourage the use of such funding sources derived from users of the transportation system.

Exhibit 3.38 shows a graphical display of the percentage of funding for the three expenditure categories: road system capital expenditures; transit system capital expenditures; and transit system operating costs. It can be seen that the responses vary greatly for the capital expenditures categories, even between urban areas within the same province. Municipal property taxes/surcharges tend to be the largest funding sources for road system capital expenditures, followed by provincial subsidies/grants (up to 50% in the case of Toronto as of 1996). Development levies/cost recovery from new development also represented a significant source of road capital funding for many areas.

Transit system capital expenses are normally funded by municipal property taxes and surcharges, supplemented in varying degrees by provincial subsidies/grants (up to 80% in 1996 but significantly decreased or discontinued in some cases since then). Regarding transit systems operations expenditures, user fees were noted as funding 38 to 71% of expenses, and municipal property taxes funded much of the remainder.

Traditionally, municipal and provincial budgets have financed urban road and transit construction and maintenance. Faced with increasing costs for other services, the proportion of funding from these sources is declining and other funding sources must be explored. An important example is that Provincial subsidies and grants for roads and transit have been discontinued since 1998 in some provinces.

Responses to open-ended questions exploring new funding alternatives, financial analysis, and the analyses of the costs of congestion are listed in Appendix F, and discussed below.

Exhibit 3.39 shows the new revenue sources currently being considered by the responding municipalities. The most common response was with respect to fuel tax. Seven municipalities are looking into having at least a portion of fuel tax dedicated toward transportation funding, which would include negotiation with higher levels of government. Four of the municipalities are also exploring the use of vehicle registration fees or surcharges dedicated to transportation, which is already in place in Montreal. Increases in developer charges dedicated to transportation are also being explored in four urban areas. Other sources being explored by the municipalities include road pricing or toll roads, public/private partnerships in transportation projects, and parking charges or taxes dedicated to transportation.

Exhibit 3.40 lists the types of financial analysis that are performed in assessing transportation projects. Because the question was open-ended, many non-financial types of analysis were also included in the responses and included in this Exhibit. One interesting finding from these responses is that transit projects are subject to more rigorous financial assessment than are road projects in several urban areas.

Exhibit 3.41 summarises the responses to whether there have been any attempts to estimate the costs incurred as a result of congestion to transit service, auto users, or commercial goods movement. These responses vary greatly in their precision, although it is encouraging that such costs are at least beginning to get adequate attention in many of the urban areas.

3.8 TRANSPORTATION/LAND-USE INITIATIVES

The fifteen participating municipalities were asked the status of 68 transportation and land-use initiatives in their urban areas. Their responses to these items, together with the indicators presented and discussed previously in this chapter, give a good indication of the extent to which these individual urban areas and possibly all of Canada's largest urban areas are taking actions aimed at achieving TAC's ***New Vision for Urban Transportation***. Exhibit 3.42 provides a summary of the status of these initiatives across the urban areas, and Exhibit 3.43 shows this information for the individual urban areas. These are discussed below.

3.8.1 Urban Structure/ Land Use

Reduced dependence on the private automobile and increased use of alternative means of transport are made more feasible with increased urban densities and mixed land uses. At a macro scale, such urban structure requires the creation of a long-term land-use/transportation plan. Such a plan has been adopted by eight of the responding urban areas, but only three have established designated limits on urban development. Seven have adopted policies/guidelines regarding designated limits to help structure urban development.

Setting appropriate population/employment ratios at both the macro and micro (node/community) levels can facilitate the creation of mixed-use development that is conducive to transit use, walking and cycling. The survey results show that this is of low priority in the urban areas at present. However, most urban areas are promoting residential uses in or near the downtown in some way.

Facilitating compact, mixed use development is especially important along transit corridors and at nodes where these corridors intersect, where initiatives should include re-urbanization or intensification of existing corridors, and relating development density to the level of transit service. In most urban areas, these initiatives are only at the level of being studied, or policies/guidelines adopted.

3.8.2 Urban Design

Urban design that encourages transit, cycling and pedestrian trips is part of the Vision. Almost all of the urban areas are at the stage of implementing some such design features at least in specific cases or areas.

3.8.3 Walking

Walking can be promoted as the preferred mode for person trips through enhancing the pedestrian microclimate (e.g. weather protection). This is being implemented in specific areas in all of the largest urban areas and some western ones, but is not a priority among most other areas. In addition, eight of the municipalities are ensuring that there are adequate road crossing facilities throughout the urban area, and five others are doing so at least in specific cases or areas.

3.8.4 Cycling

Increased opportunities for safe cycling can be provided through a network of on-street cycling lanes or off-street cycling paths, and most of the urban areas seem to be on the way to providing these, at least in specific cases or areas. (This can be compared with Exhibit 3.11 to see the extent of these networks.) For the most part, only the larger urban areas have requirements for secure parking for bicycles. Cycling amenities in new developments are being constructed mostly in medium-sized cities, in specific cases/areas.

3.8.5 Transit

Higher-quality transit service is essential to increase transit's attractiveness relative to the private automobile. This can be achieved in various ways. The use of transit priority by such means as HOV or reserved bus lanes seems to be taking place only in the larger urban areas (greater than 650,000 population) in specific cases or areas. Regina is an exception, being a small urban area with transit priority lanes and other transit priority measures throughout. (This is consistent with Exhibit 3.10, showing the extent of HOV lanes in the urban areas.) Again, only the larger urban areas (together with Victoria) have park'n'ride lots (compare with Exhibit 3.14), kiss'n'ride facilities, and bike'n'ride enhancements, at least in some areas. Integration of transit with inter-city services seems to be taking place only in the largest urban areas (over 1,000,000 population).

Transit safety/security programs have been implemented in twelve of the urban areas, usually across the urban area. The same is true of mandating locating transit stops with walking distance of places of residences and employment.

Four urban areas are successfully implementing co-ordinated inter-municipal service across the urban area. Inter-municipal service and fare co-ordination and "seamless" transit across regions may be facing some setbacks in some areas or are not yet much of a priority, except in most of the larger urban areas and in Victoria.

3.8.6 Parking

Parking is an important part of the transportation infrastructure, and its supply and price are to be in balance with other transportation modes. For example, parking standards could be related to the level/proximity of transit service, as is the case with half of the urban areas represented in this study, at least in specific cases/areas. (See Exhibit 3.15 for off-street parking supply per employee in the CBD.) All but two municipalities are restricting on-street parking on arterial roads in peak hours, for the most part across the urban area.

The use of pricing, tax or other measures to discourage the use of private lots by commuters is of very low priority across all but four of the urban areas, and setting a cap on the overall parking supply is not a priority in most of the urban areas. The setting of maximum parking standards also has not progressed far among the urban areas except in four of the larger ones.

3.8.7 Road System Optimization

Transportation capacity can be optimised by using existing transportation systems as efficiently as possible. To this end, two-thirds of the municipalities are recognising all road user needs (e.g. seeking to increase capacities for moving people and goods, not just vehicles) in planning the road system throughout their urban areas. About half of these are considering person-capacity as well as vehicular capacity as a basis for road design and operations.

There is some form of transportation systems management program (for operational improvements) in most urban areas, although usually only in specific cases/areas. Some form of incident management system is in place in most of the urban areas of over 375,000 population. Real-time traffic signal control is implemented in over half of the participating urban areas in at least some cases/areas. All but one urban area have an intersection improvement program in place; six of these are implemented across the urban area.

The promotion/facilitation of ridesharing is taking place in three of the larger urban areas only, although there does not appear to be much correlation to date with the status of this initiative and observed vehicle occupancies (Exhibit 3.23).

3.8.8 Goods Movement

Efficient goods movement, essential to the economic competitiveness of an urban area, can be improved in various ways: considering goods movement in transportation system planning, consulting with the goods movement industry to identify/resolve issues, providing adequate, accessible off-street loading facilities, and designating appropriate truck routes. These initiatives are reported as being widely followed in most of the urban areas.

3.8.9 Special User Needs

It is important to design and operate transportation systems that are accessible to the physically challenged. In general, the respondents seem to be progressing well toward making transit vehicles and transit stations/stops accessible to the physically challenged, providing paratransit services, installing curb cuts/ramps on pedestrian facilities, and designating parking spaces for the physically challenged. Three urban areas have audible pedestrian signals throughout, ten others have implemented them in specific cases/areas.

3.8.10 Energy, Environment, and Travel Demand Management

New technologies that help protect the environment while improving transportation should be promoted. Examples of this include the use of alternative fuels for municipal and transit vehicles, use of fuel-efficient municipal vehicles, promoting higher fuel-efficiency standards, and promoting emissions control maintenance and inspection. All of these initiatives are in various stages of implementation across the urban areas.

Nine municipal areas are mandating environmental assessments for new transportation facilities/ services, at least in specific cases/areas; seven of these have similar requirements for land-use plans and development proposals. Most of the remaining municipalities have developed policies/guidelines to these ends.

Many of the other travel demand management (TDM) initiatives are not yet a priority or are at the studying or guidelines stage in most of the urban areas, although some are implementing pilot projects or applications in specific areas. Initiatives such as an overall municipal TDM strategy and/or promoting TDM education programs and TDM associations are generally under study, while TDM programs for employers or municipal employees and promoting flextime, telecommuting, compressed work weeks, etc. are being implemented at least partially in five or six urban areas.

3.8.11 Status of Initiatives Over Time

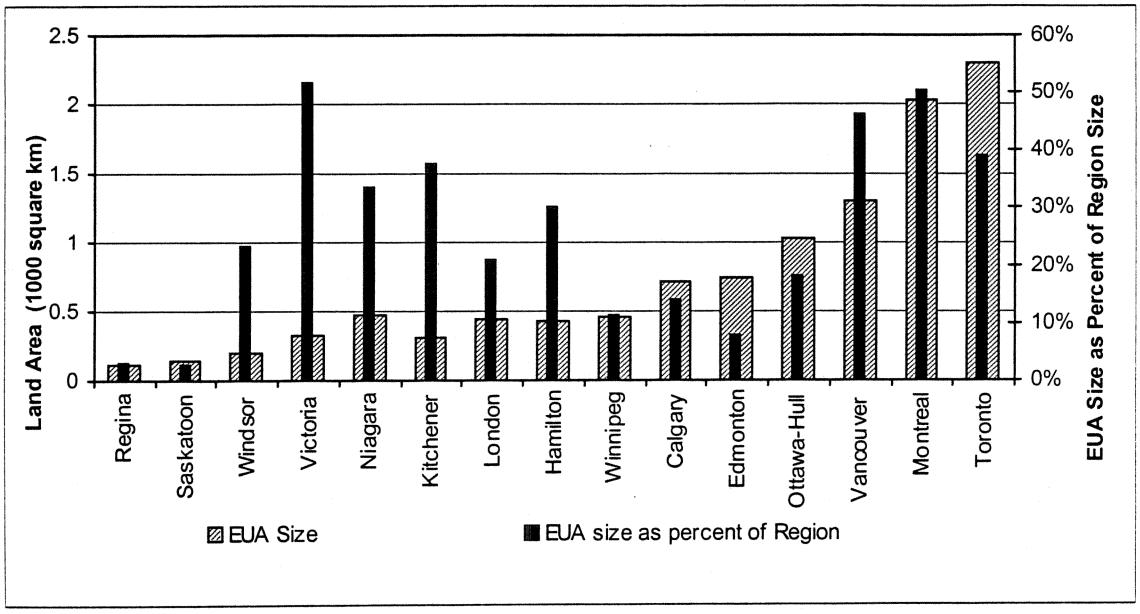
Exhibit 3.44 displays the status of the transportation and land-use initiatives for both the 1991 and 1996 study years for the seven municipalities that participated in both surveys. In many of the cases, especially where the initiative had been implemented either throughout the urban area or in specific cases or areas, the status of the initiatives has remained the same. Where the status of the initiative has changed, there has normally been some increase in the priority of these initiatives in the urban area. However, at times there has been regression. For example, the City of Edmonton confirmed that, after clarification of the direction that the municipality was taking, certain initiatives that were being studied in 1991 were not a priority in 1996.

Exhibit ES.1: Key Transportation and Land-Use Indicators

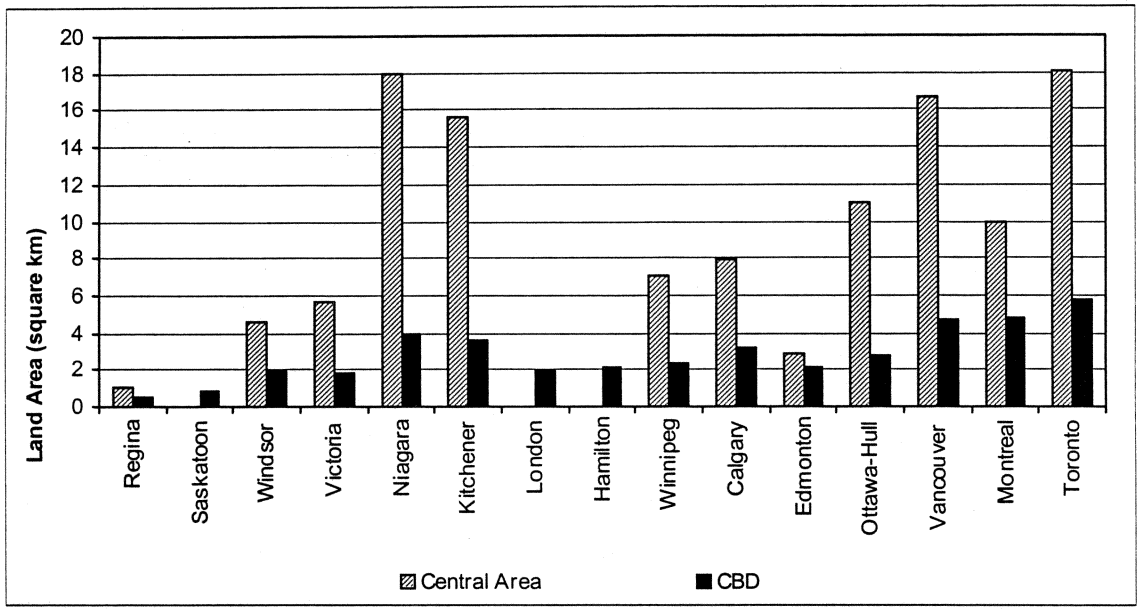
Indicator Description	Urban Area: Regina	Saskatoon	Windsor	Victoria	Niagara	Kitchener	London	Hamilton	Winnipeg	Calgary	Edmonton	Ottawa-Hull	Vancouver	Montreal	Toronto
Background															
Population in Region	194,000	219,056	279,000	304,000	372,000	383,000	399,000	624,000	667,000	822,000	892,000	1,010,000	1,830,000	3,326,510	4,265,000
Employment in Region	96,000	107,145	131,000	149,000	165,000	182,350	190,405	294,000	325,000	442,000	434,000	502,000	908,000	1,502,380	2,060,000
Population in EUA	180,000	193,647	235,000	286,100	274,000	358,000	327,000	536,771	618,000	768,000	616,000	807,555	1,680,000	3,045,979	3,970,000
Employment in EUA	87,000	87,000	115,000	132,500	112,000	171,040	154,000	227,000	300,000	390,000	313,000	448,175	797,000	1,371,940	1,940,000
EUA Land Area (km^2)	110	140	200	327	470	317	440	423	460	720	750	1,027	1,300	2,026	2,300
Land Use Characteristics															
Population Density in EUA (people/km^2)	1,636	1,383	1,175	875	583	1,129	743	1,268	1,343	1,067	821	786	1,292	1,503	1,726
Employment Density in EUA (jobs/km^2)	791	621	575	405	238	540	350	536	652	542	417	436	613	677	843
Employment-to-Population Ratio in CA	0.18		1.26	0.49	0.91	0.33			0.40	0.27	0.11	0.40	0.65		0.35
Transportation Supply															
Arterial Lane-km per 1,000 Capita in EUA	5.26	9.19	1.91	1.48	7.33	4.51		2.27	2.82	5.22	4.26	3.81	3.32	1.48	2.52
Expressway Lane-km per 1,000 Capita in EUA	0.72	0.62	0.44	0.12		0.73		1.61	0.19	1.74	1.24	0.77	0.33	0.60	0.50
HOV Lane-km per 100,000 Capita in EUA	7.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.29	0.00	1.79	6.07	1.85	1.12	2.34
Automobiles per Capita in EUA	0.75	0.67		0.47		0.57			0.46	0.76	0.53	0.57	0.56		0.55
AM Peak Period Transit Seat-km per Capita in EUA	1.12	0.87		0.77		0.56	0.72		0.85	2.07		2.60	1.59		2.42
24-h Transit Seat-km per Capita in EUA	4.32	4.00	1.82	4.75	2.06	1.93	3.94	3.65	5.50	7.89		9.52	6.42	8.21	8.61
Off-Street Parking Spaces per Employee in CBD		0.86	0.18	0.32			0.57	0.72		0.51	0.66	0.36	0.38		0.18
Transportation Demand															
AM Peak Period Transit Mode Share to/from CBD	12.0%	17.1%			2.6%	5.4%		14.0%	36.0%	33.1%	29.5%	32.8%	38.7%	58.4%	56.1%
AM Peak Period Auto Mode Share to/from CBD (driver+pass.)	88.0%	78.8%			85.7%	89.2%		63.0%	58.0%	60.9%	67.7%	55.0%	54.6%	37.8%	38.9%
AM Peak Period Auto Mode Share for EUA (driver+pass.)	95.0%				76.0%	78.3%	65.0%	77.0%	70.4%	80.0%	68.6%	71.7%	76.2%	53.3%	68.5%
AM Peak Period Auto Occupancy to/from CBD	1.26	1.20			1.15	1.10		1.13	1.36	1.30	1.23	1.28	1.19	1.33	1.21
AM Peak Period Auto Occupancy for EUA	1.32				1.25	1.24	1.23	1.20	1.18	1.21	1.45	1.24	1.42	1.27	1.21
AM Peak Period (1-h) EUA Person-Trips per Capita	0.32				0.31	0.17		0.14		0.26	0.30	0.23	0.31		0.24
24-h Person Trips per Capita for EUA					2.60	2.71	2.66	2.13		3.71		2.80	3.44		2.05
Annual Transit Rides per Capita for EUA	39.3	45.3	24.9	60.6	15.7	26.6	40.3	39.4	63.4	91.3	62.8	101.5	72.9	124.5	118.8
24-h Arterial Auto Vehicle-km per Capita for EUA	11.5								7.4		15.2	17.2			7.0
Average-Day Veh-km per Capita, Calculated from Fuel Sales	26.3	26.0	20.6	22.4	23.1	24.5	24.7	24.2	24.4	28.2	23.4	22.3	22.2	20.6	26.8
Year of Travel Demand Survey	*1989*	*1997*	*1996*	*1996*	*1996*	*1996*	*1987*	*1996*	*1992*	*1996*	*1994*	*1995*	*1995*	*1993*	*1996*
Transportation System Performance															
Average Home-Work Trip Distance in EUA	6.0	8.0		6.6	12.8	15.2			6.1	12.0	10.3	12.7	13.2	16.7	15.6
Annual Injuries and Fatalities per 1,000 Capita in EUA	6.9	6.1	6.3			2.9		5.2	5.8	6.5	12.2	7.5	18.3		4.3
Road Utilisation Index in EUA (veh-km/lane-km)	232					314				297	265	368	592		711
Transportation Costs and Finance															
Total Road Expenditures per Capita in Region	126.5		61.5		72.6	121.3		138.0	134.9	184.2	138.3	120.8	236.8	250.1	56.8
Total transit expenditures per Capita in Region	68.9	72.6	51.5	149.6	35.8	69.9	93.5	113.3	118.0	145.8	125.0	234.7	202.3	281.6	354.7
Farebox Revenue/Operating and Maintenance Budget	50.1%	54.3%	59.3%	49.4%	44.5%	54.7%	60.9%	51.7%	60.5%	46.8%	38.2%	55.0%	50.2%	45.6%	70.6%
Environmental Impact of Transportation															
Fuel Usage per Capita (L/capita/year)	1,078	1,067	845	919	949	1,006	1,014	993	1,000	1,158	960	915	909	847	1,099
Fuel Usage per Person-Trip in EUA (L/trip)					1.00	1.02	1.05	1.28		0.86		0.90	0.72		1.47
CO_2 Emissions per Capita in EUA (tonnes/year)	2.54	2.51	1.99	2.17	2.24	2.37	2.39	2.34	2.36	2.73	2.26	2.16	2.14	2.00	2.59
CO_2 Emissions per Person-Trip in EUA (kg/trip)					2.35	2.40	2.46	3.01		2.01		2.11	1.71		3.46

Exhibit 3.2: Land Area

a. LAND AREA FOR REGION & EUA, 1996 Study Year



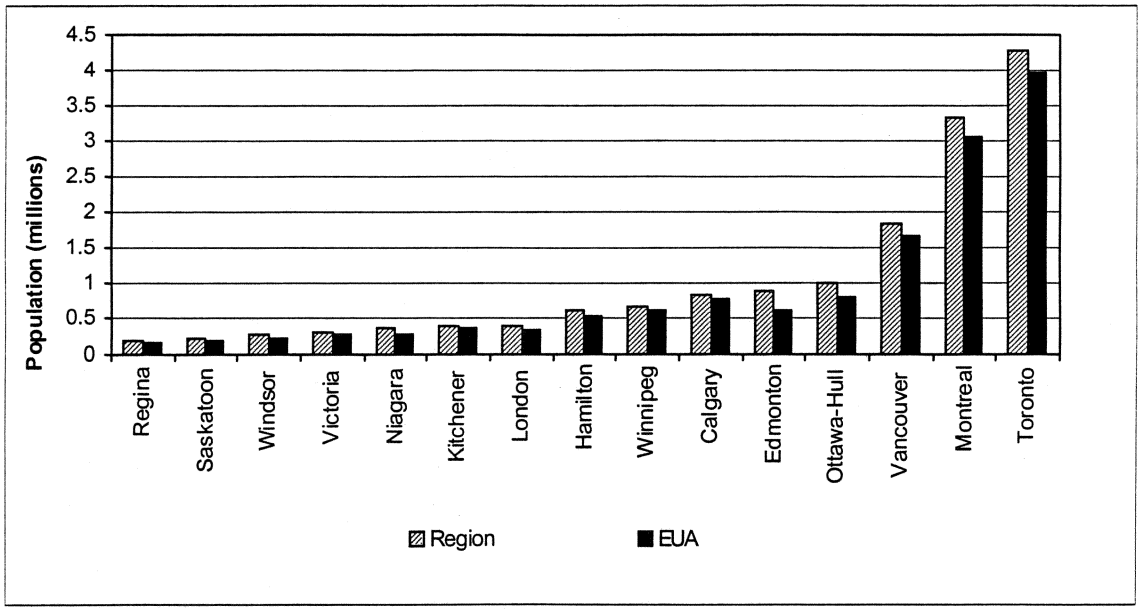
b. LAND AREA FOR CENTRAL AREA & CBD, 1996 Study Year



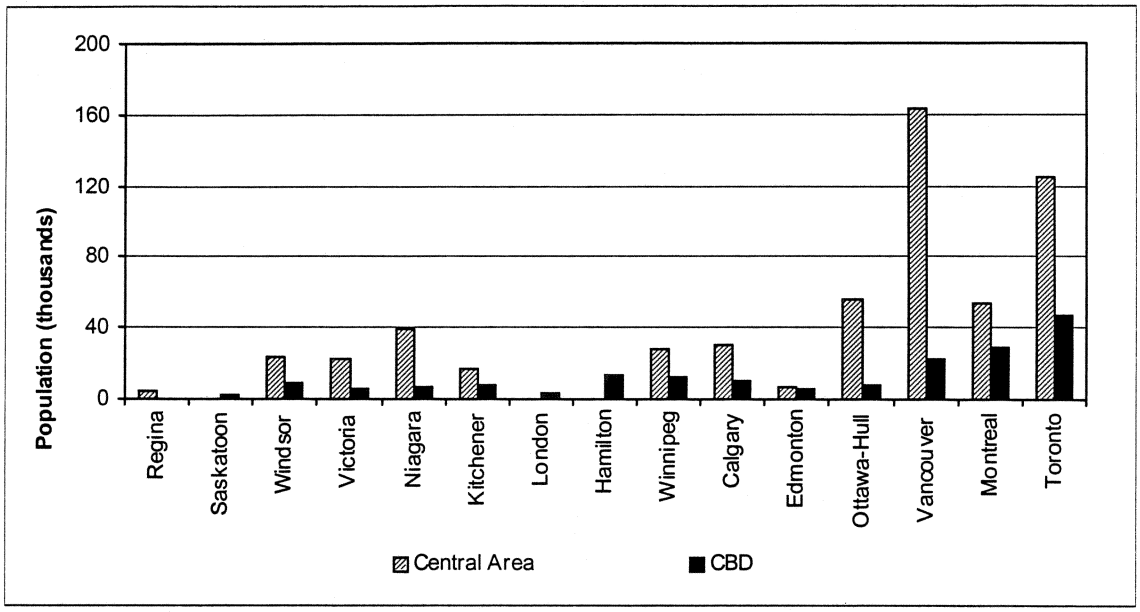
Note: Where land areas are displayed as zero, data were not provided.

Exhibit 3.3: Population

a. POPULATION FOR REGION & EUA, 1996 Study Year



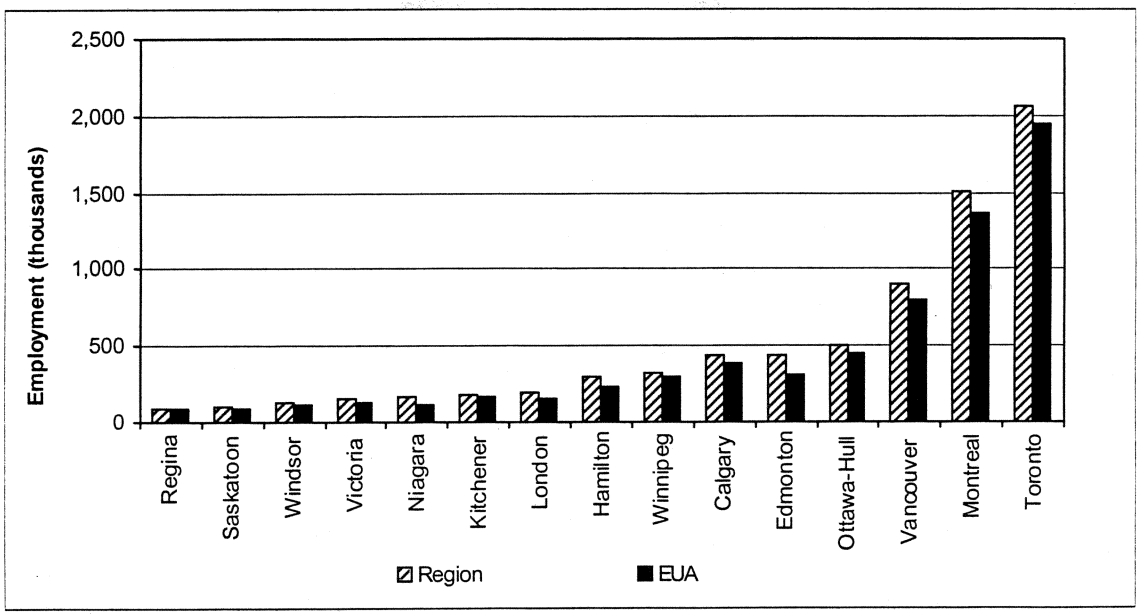
b. POPULATION FOR CENTRAL AREA & CBD, 1996 Study Year



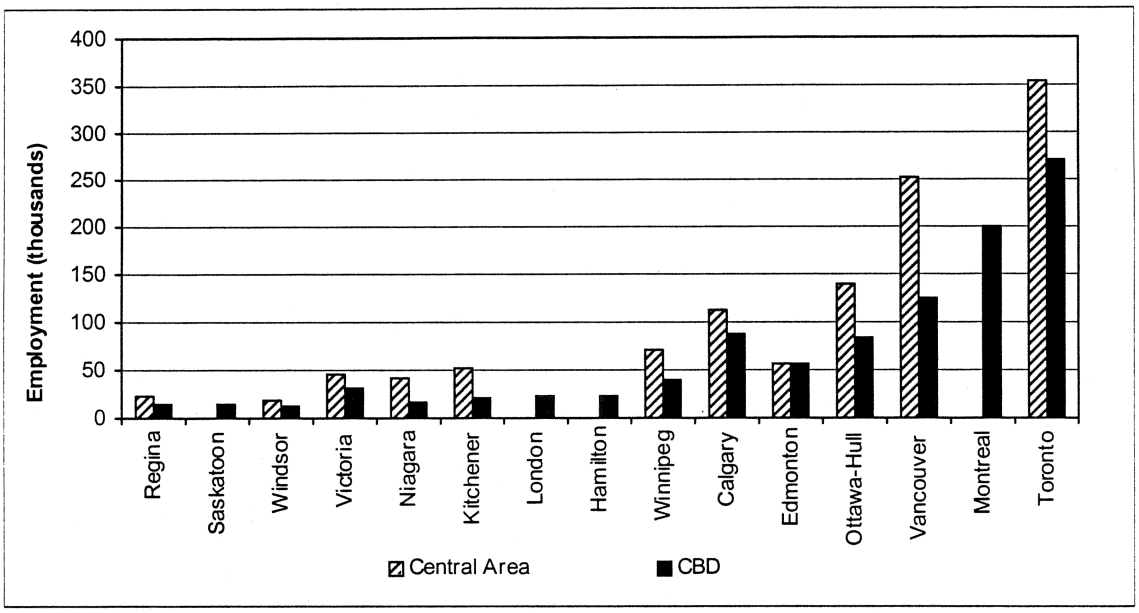
Note: Where population is displayed as zero, data were not provided.
Winnipeg Central Area population is for 1991.

Exhibit 3.4: Employment

a. EMPLOYMENT FOR REGION & EUA, 1996 Study Year



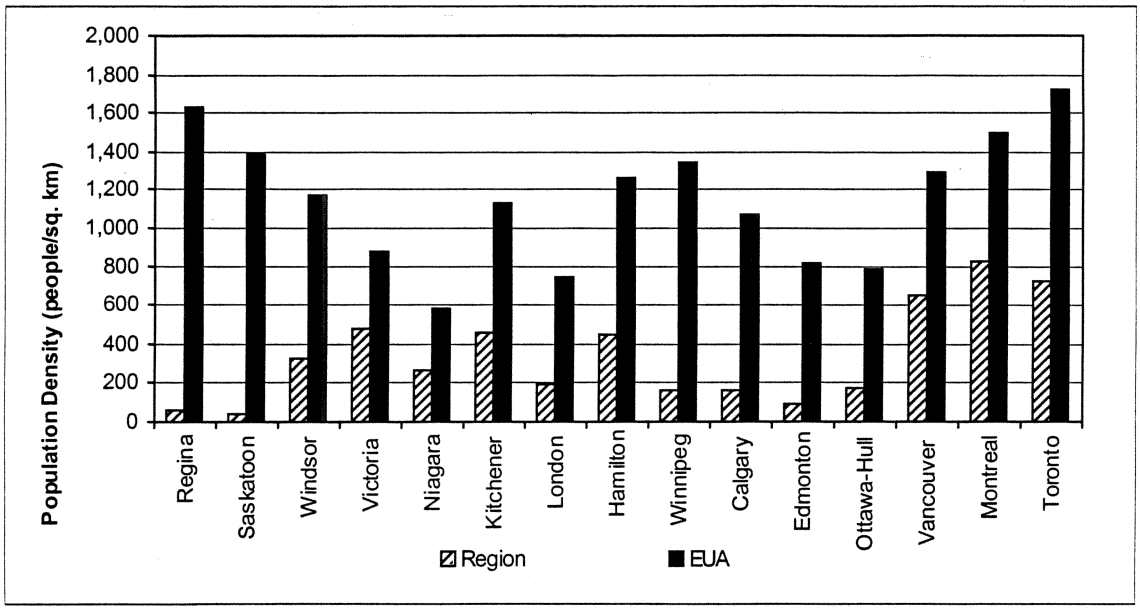
b. EMPLOYMENT FOR CENTRAL AREA & CBD, 1996 Study Year



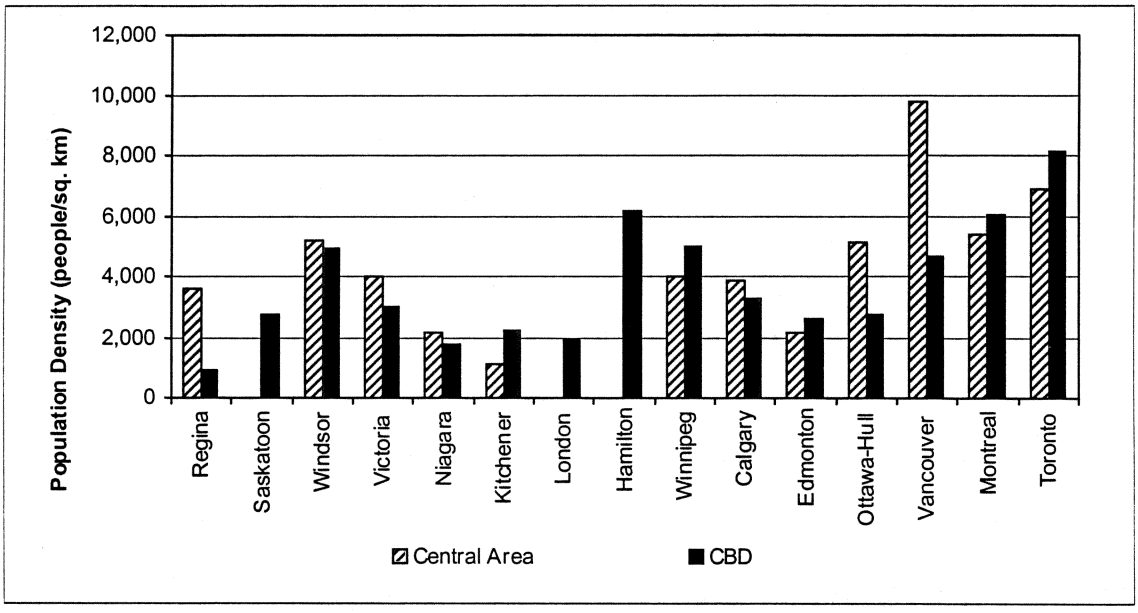
Note: Where employment is displayed as zero, data were not provided.

Exhibit 3.5: Population Density

a. POPULATION DENSITY FOR REGION & EUA, 1996 Study Year



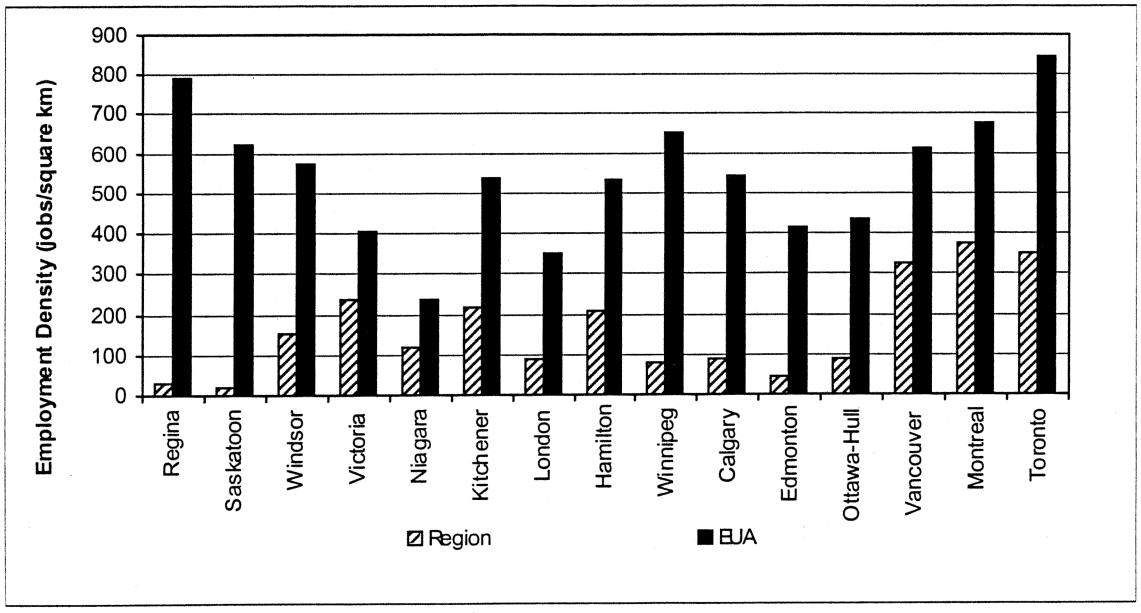
b. POPULATION DENSITY FOR CENTRAL AREA & CBD, 1996 Study Year



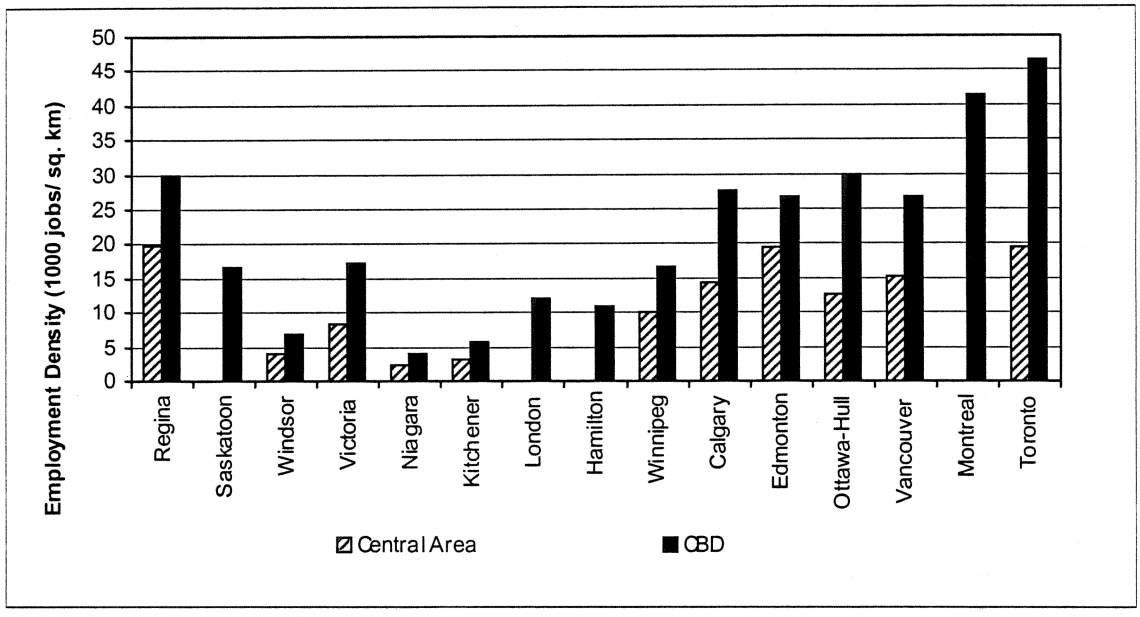
Note: Where population density is displayed as zero, data were not provided.

Exhibit 3.6: Employment Density

a. EMPLOYMENT DENSITY FOR REGION & EUA, 1996 Study Year



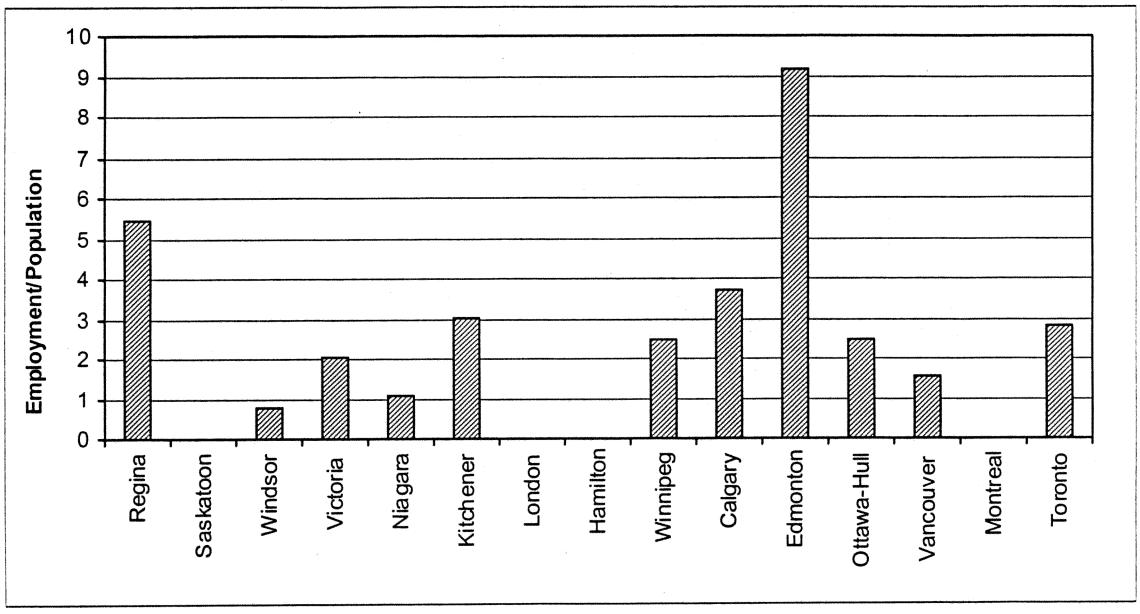
b. EMPLOYMENT DENSITY FOR CENTRAL AREA & CBD, 1996 Study Year



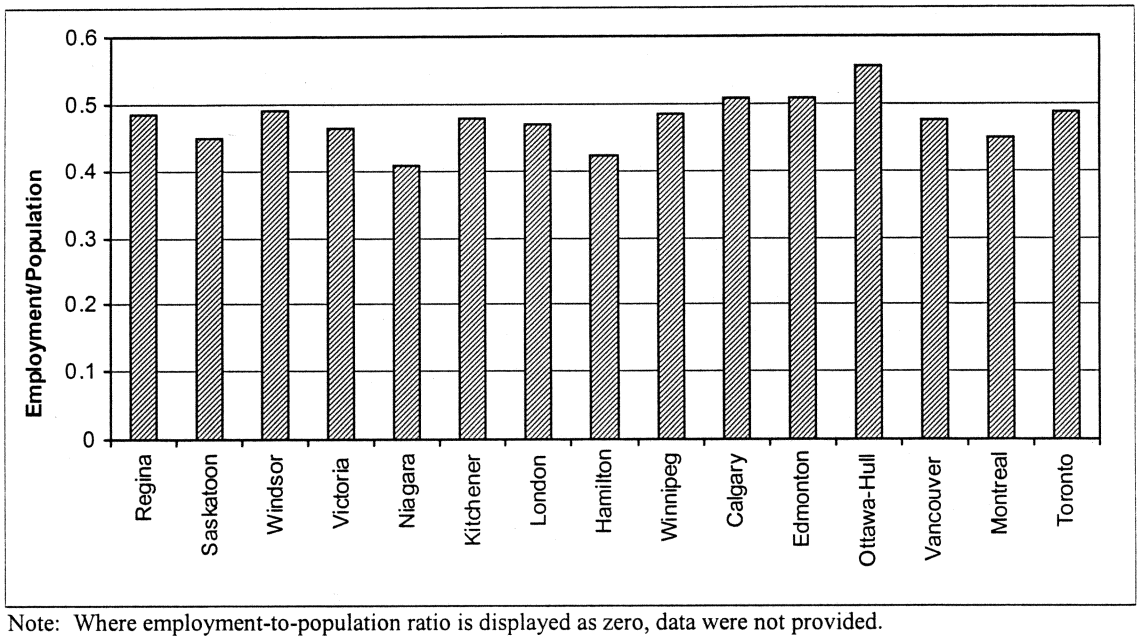
Note: Where employment density is displayed as zero, data were not provided.

Exhibit 3.7: Employment to Population Ratio

a. EMPLOYMENT TO POPULATION RATIO FOR CENTRAL AREA, 1996 Study Year



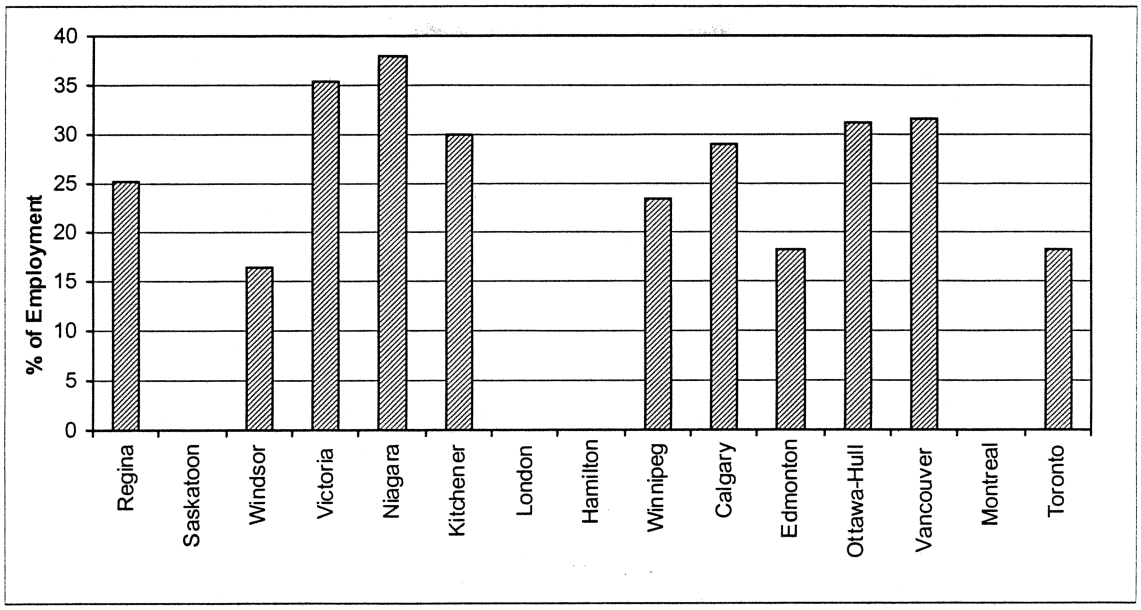
b. EMPLOYMENT TO POPULATION RATIO FOR EUA, 1996 Study Year



Note: Where employment-to-population ratio is displayed as zero, data were not provided.

Exhibit 3.8: Employment in Central Area as Percentage of Employment in EUA

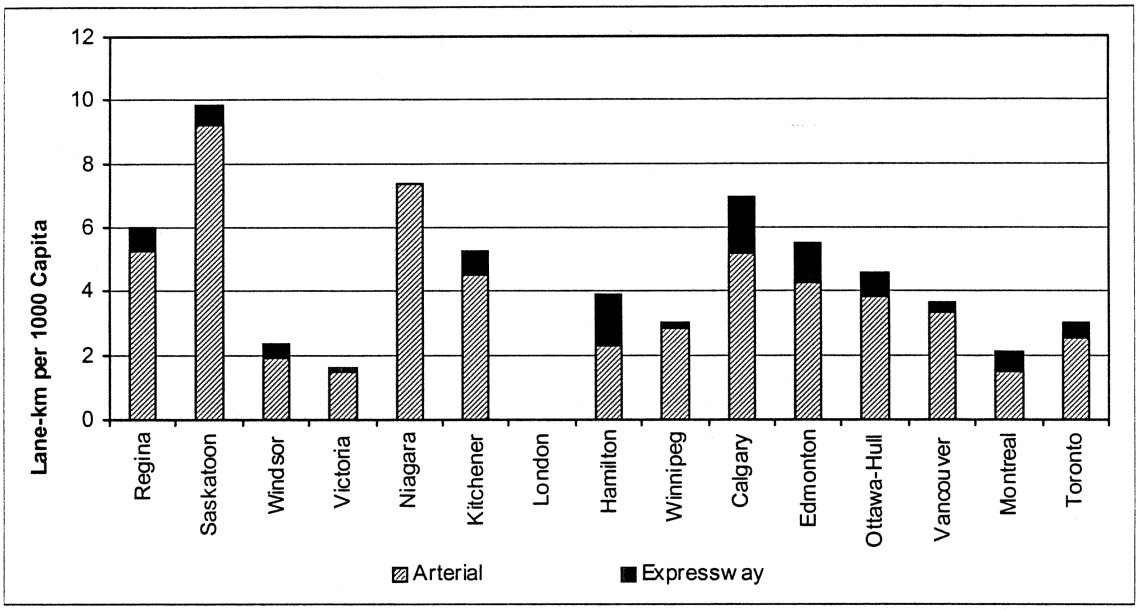
1996 Study Year



Where ratio is displayed as zero, data were not provided.

Exhibit 3.9: Arterial + Expressway Lane-km per 1,000 Capita for EUA

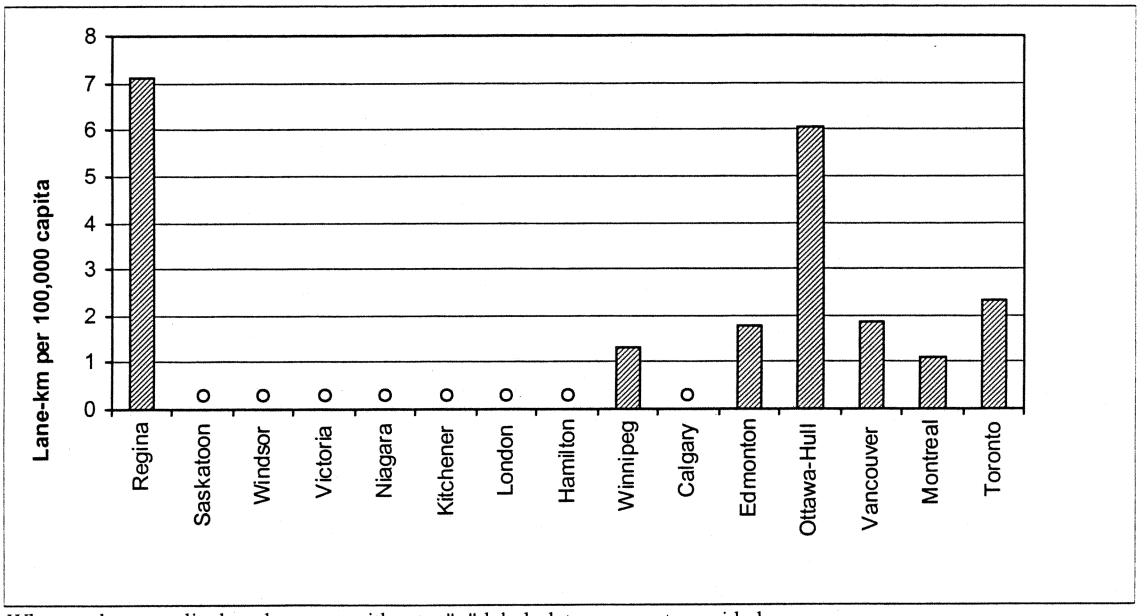
1996 Study Year



Kitchener data are for 1999; Edmonton, Hamilton, Niagara and Winnipeg data are for 1998; Montreal data are for 1993; Niagara expressway lane-km were not provided.

Exhibit 3.10: HOV Lanes

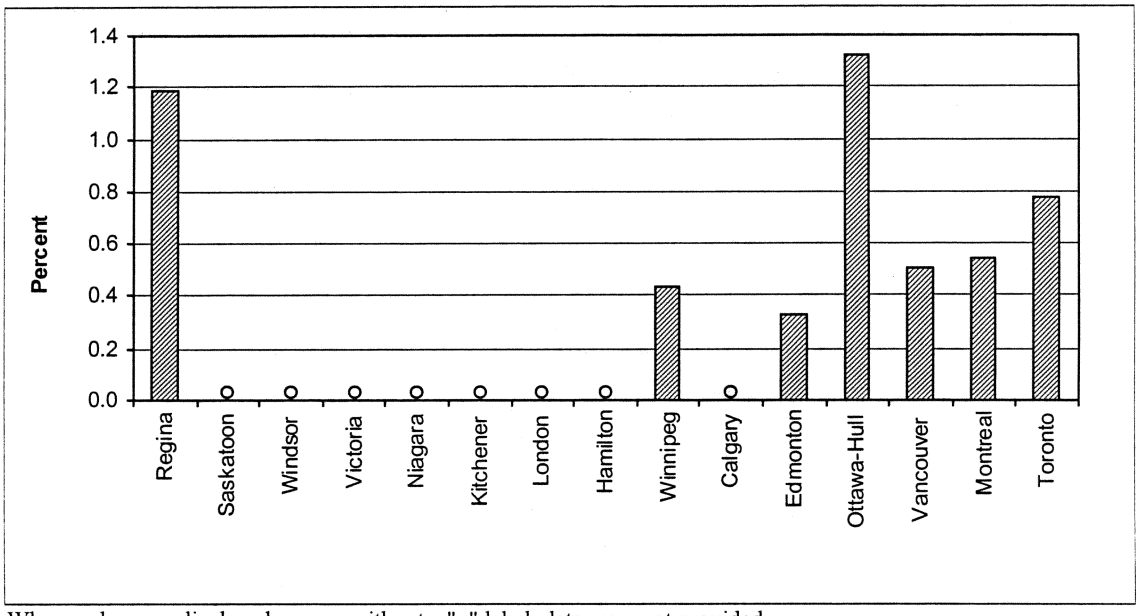
a. HOV LANE-KM PER CAPITA FOR EUA, 1996 Study Year



Where values are displayed as zero without a "o" label, data were not provided.

Kitchener and Windsor data are for 1999; Edmonton, Hamilton and Winnipeg data are for 1998; Montreal data are for 1993; Ottawa-Hull value does not include bus-only Transitway.

b. HOV LANE-KM AS PERCENT OF ARTERIAL+EXPRESSWAY LANE-KM FOR EUA, 1996 Study Year

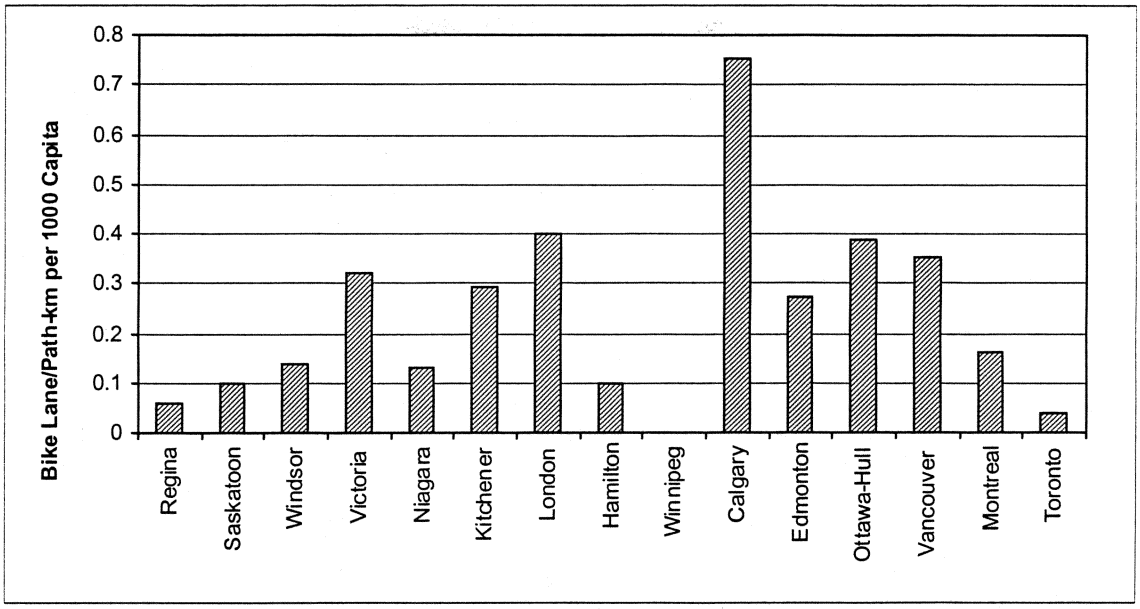


Where values are displayed as zero without a "o" label, data were not provided.

Kitchener and Windsor data are for 1999; Edmonton, Hamilton and Winnipeg data are for 1998; Montreal data are for 1993; Ottawa-Hull value does not include bus-only Transitway.

Exhibit 3.11: Bike Lane/Path-km per 1,000 Capita for EUA

1996 Study Year

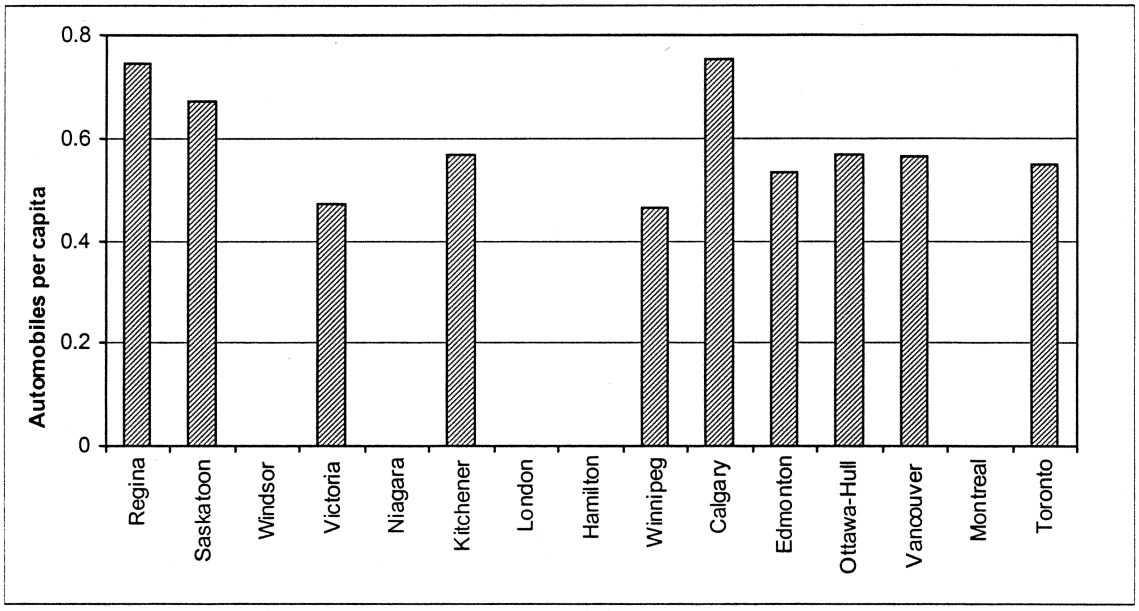


Where values are displayed as zero, the data were not provided.

Calgary, Kitchener and Windsor data are for 1999; Edmonton, Vancouver and Victoria data are for 1998; Montreal data are for 1993; Toronto reported 1998 lane-km and 1996 path-km; Saskatoon value represents bike paths only and does not include bike lanes.

Exhibit 3.12: Automobiles per Capita for EUA

1996 Study Year

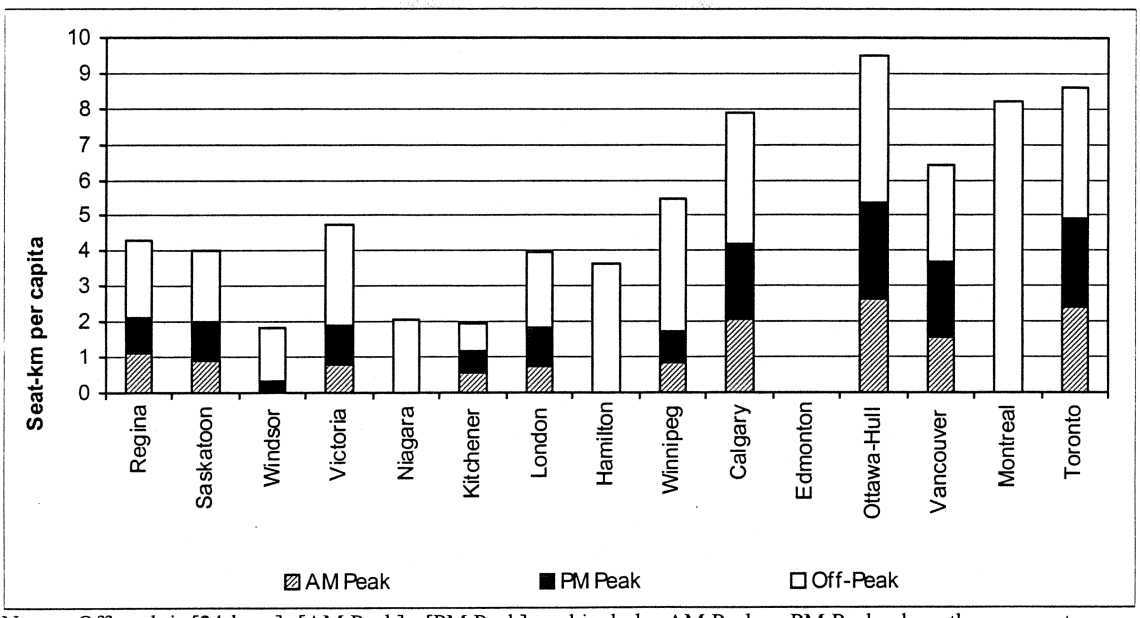


Where values are displayed as zero, the data were not provided.

Calgary value is for 1998; Edmonton, Regina and Saskatoon values are for 1997.

Exhibit 3.13: Weekday Transit Seat-km per 1,000 Capita for EUA

1996 Study Year

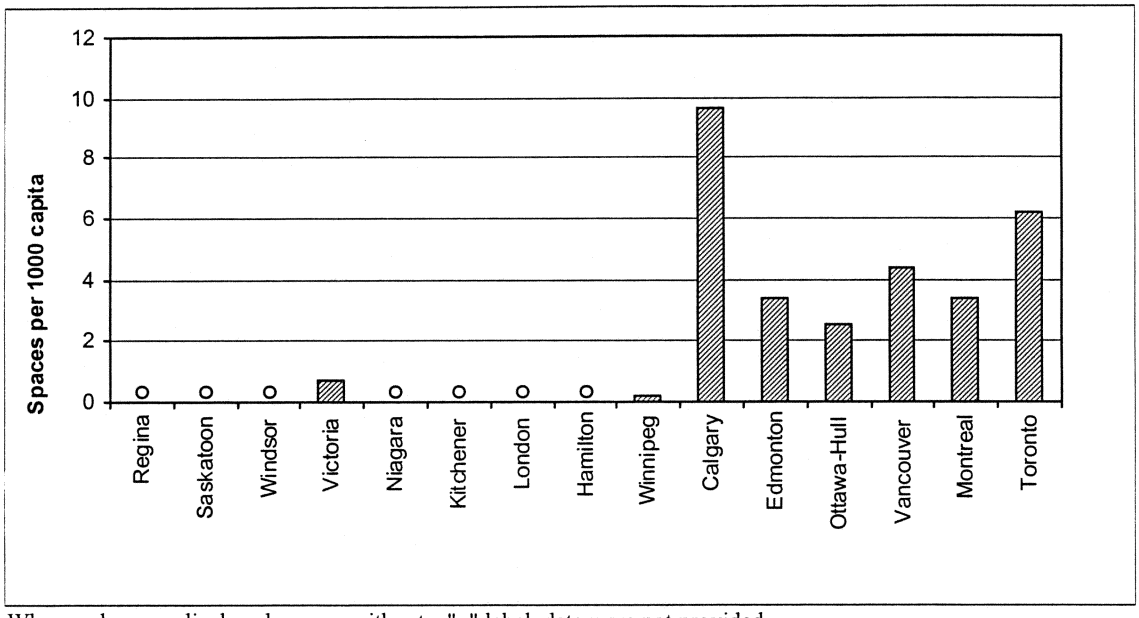


Notes: Off-peak is [24-hour]- [AM Peak] - [PM Peak], and includes AM Peak or PM Peak where these are not explicitly provided. Where any of the values are displayed as zero, the data were not provided.

Calgary, Winnipeg and Victoria data are for 1998; Montreal data are for 1993; Toronto data exclude GO transit; Vancouver data are for 1996-1997; Victoria data are for CMA only; Windsor data are for 1999; London used 2-h AM peak and 3-h PM peak; Winnipeg used 2-h peak periods; Ottawa-Hull used 2.5-h peaks; Regina used 3-h peak periods.

Exhibit 3.14: Park-and-Ride Spaces per 1,000 Capita for EUA

1996 Study Year

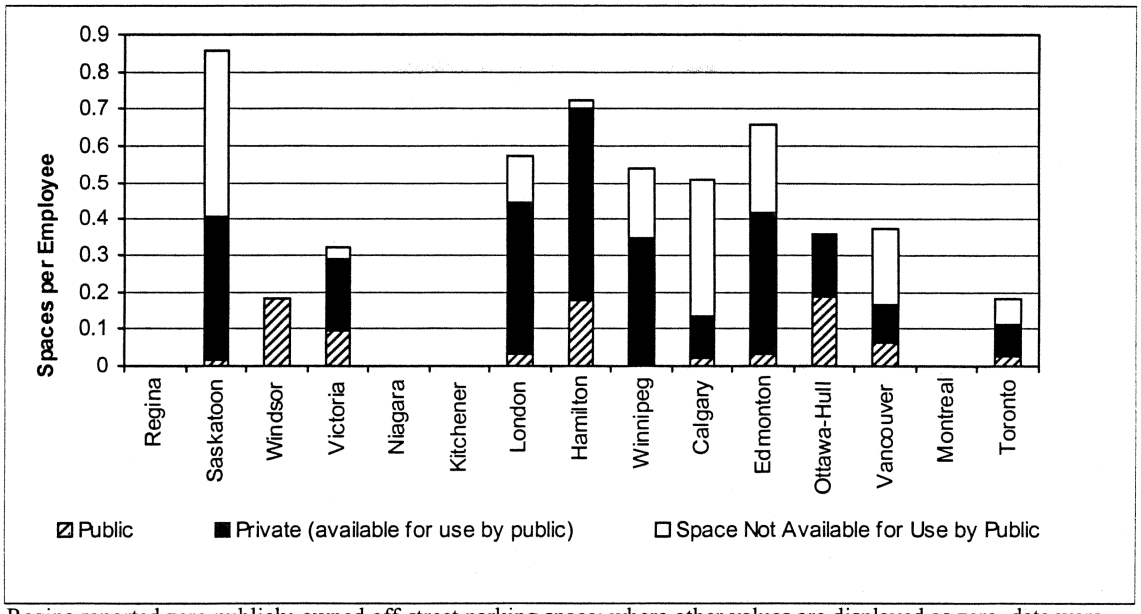


Where values are displayed as zero without a "o" label, data were not provided.

Calgary, Edmonton and Winnipeg data are for 1998; Montreal data are for 1993; Toronto value is for 1991.

Exhibit 3.15: Off-Street Parking Spaces per Employee in the CBD

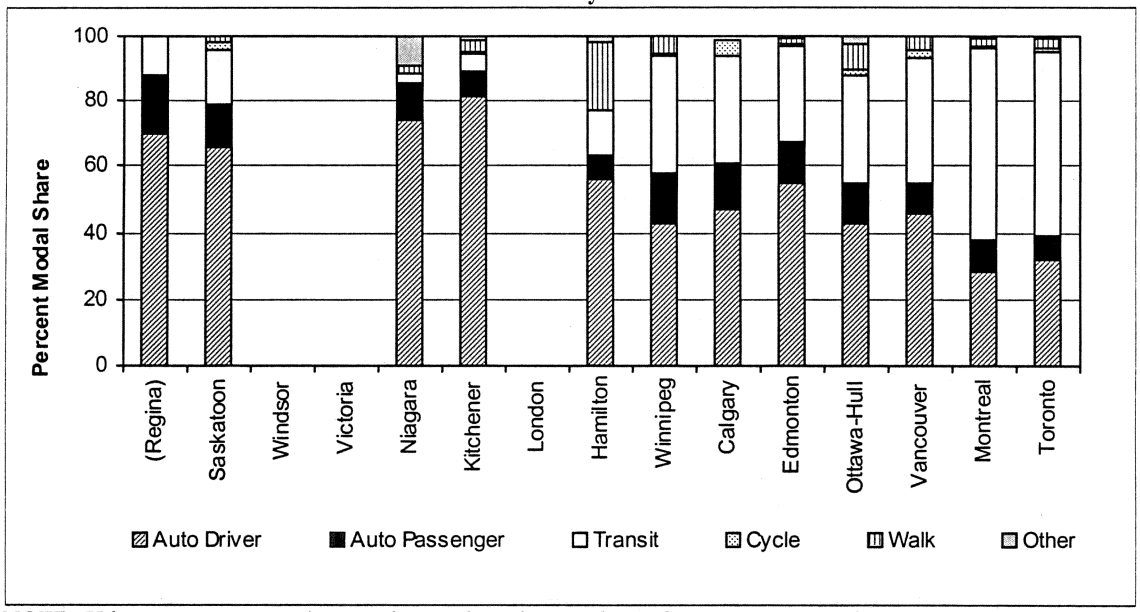
1996 Study Year



Regina reported zero publicly-owned off-street parking space; where other values are displayed as zero, data were not provided; Calgary data are for 1998; Edmonton data are for 1997; Hamilton data are for 1999; Toronto data are for 1994; Vancouver data are for 1995; Ottawa-Hull differentiated only between public and private spaces, and therefore does not have any spaces listed separately as 'Spaces Not Available for Use by Public'.

Exhibit 3.16: Modal Shares to and from the CBD - AM Peak Period

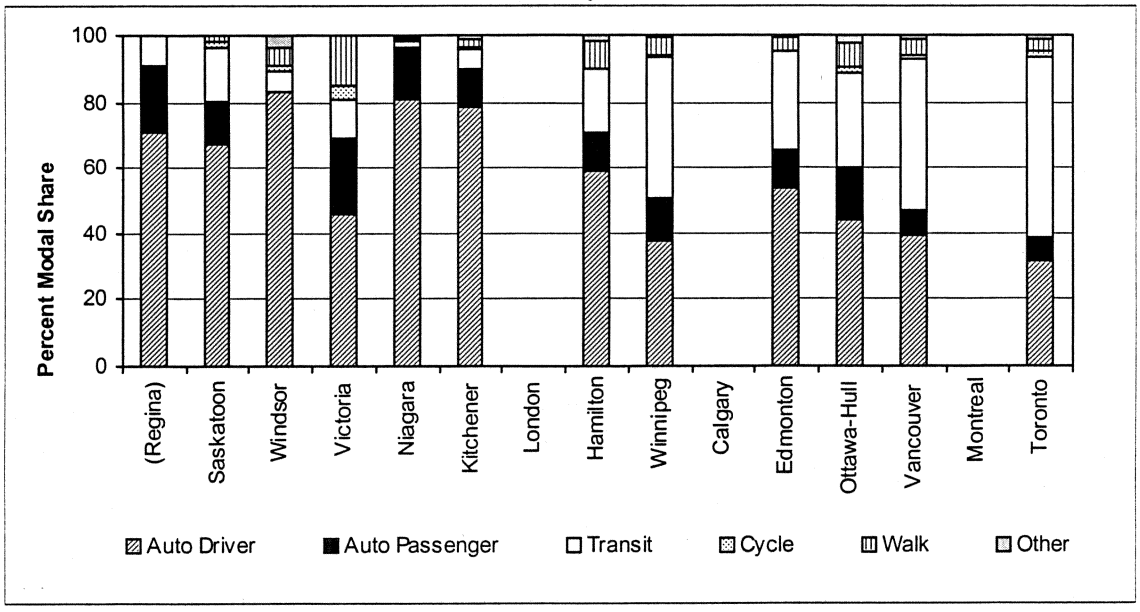
1996 Study Year



NOTE: Urban Area names are in parentheses where data are drawn from pre-1991 travel surveys; Calgary 'Cycle' category includes both cycle and walk modes; Regina data are based on 1989 survey data, factored for changes in land use, and did not consider cycle, walk or 'other' modes; Montreal data are for 1993; Edmonton and Vancouver data are for 1994; Ottawa-Hull data are for 1995; Saskatoon data are for 1997; Niagara 'other' category includes 8.6% school bus trips; Winnipeg data are for 1992 and include only work trips; Calgary, Hamilton and Saskatoon used 1-h peak periods; Regina and Winnipeg used 2-h peak periods; Ottawa-Hull used 2.5-h peak period; Toronto used 3-h peak period.

Exhibit 3.17: Modal Shares to and from the CBD - PM Peak Period

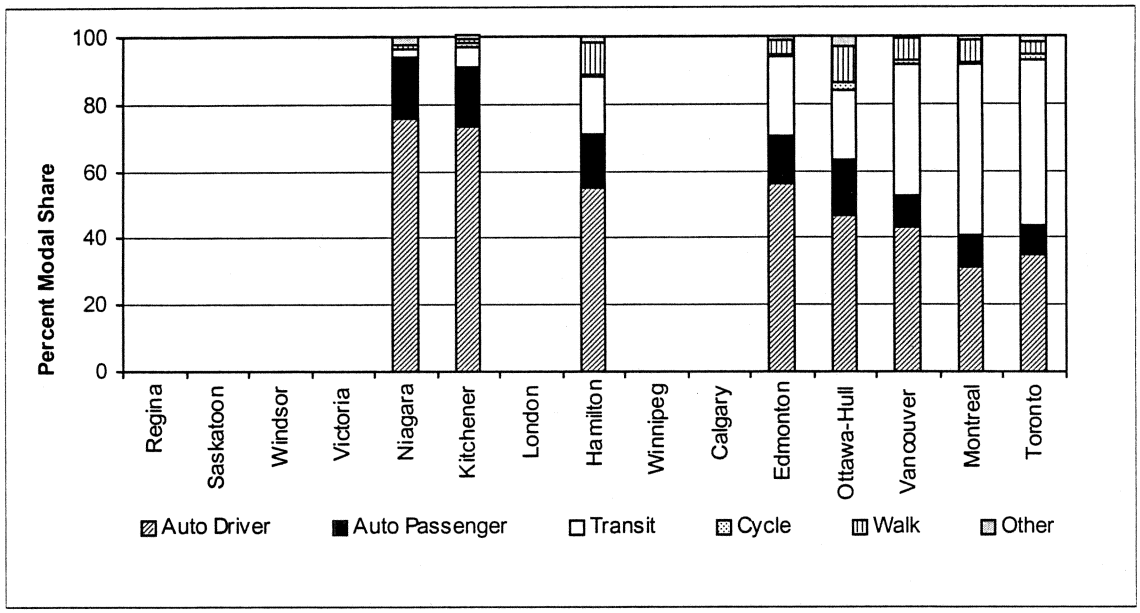
1996 Study Year



NOTE: Urban Area names are in parentheses where data are drawn from pre-1991 travel surveys; Regina data are based on 1989 survey data, factored for changes in land use, and did not consider cycle, walk or other modes; Windsor 'Auto Driver' response includes both auto driver and auto passenger modes; Edmonton and Vancouver data are for 1994; Ottawa-Hull data are for 1995; Saskatoon data are for 1997; Hamilton, Saskatoon and Windsor used 1-h peak periods; Regina and Winnipeg used 2-h peak periods, Ottawa-Hull used 2.5-h peak period; Toronto used 3-h peak period; Winnipeg data are for 1992 and include only work trips.

Exhibit 3.18: Modal Shares to and from the CBD - 24 hours

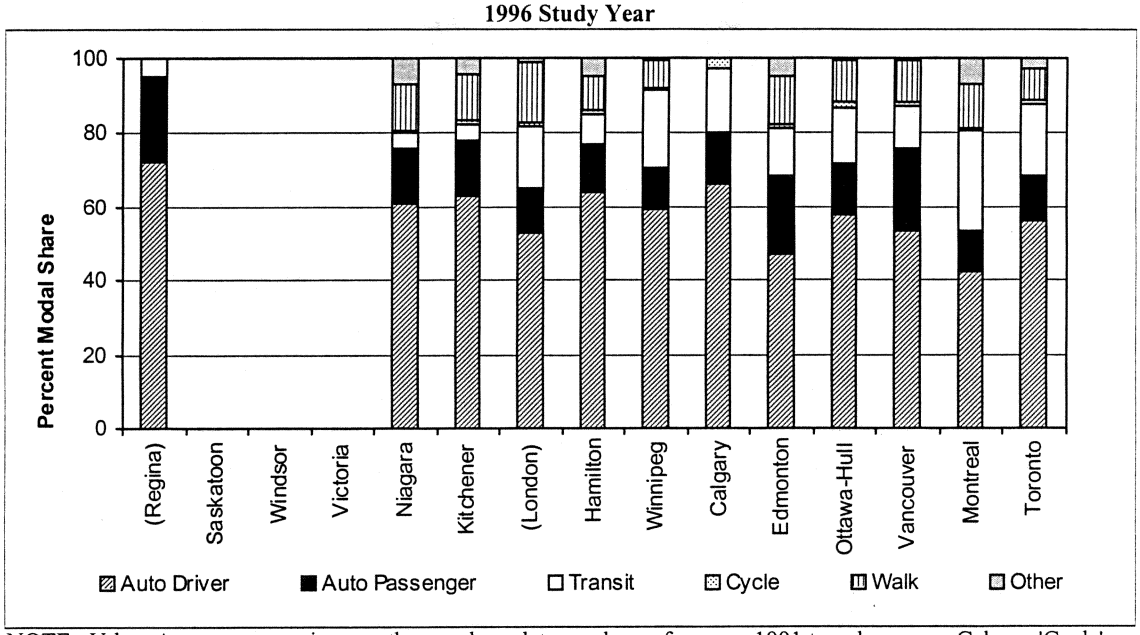
1996 Study Year



Edmonton and Vancouver data are for 1994; Ottawa-Hull data are for 1995.

Exhibit 3.19: Modal Shares to, from and within the EUA - AM Peak Period

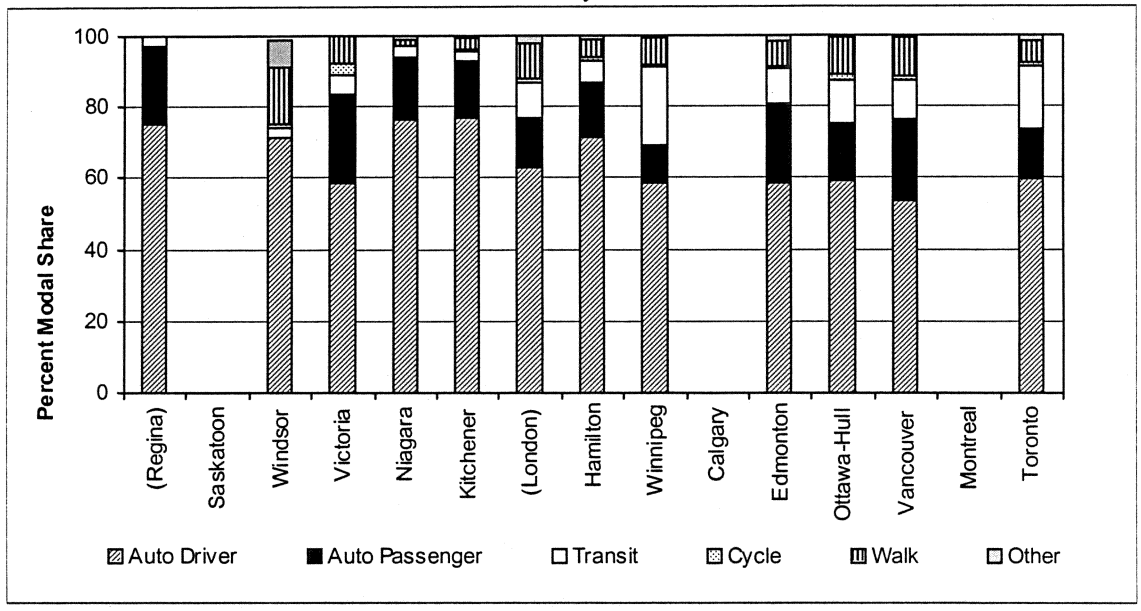
1996 Study Year



NOTE: Urban Area names are in parentheses where data are drawn from pre-1991 travel surveys; Calgary 'Cycle' category includes cycle + walk nodes; Regina data are based on 1989 survey data, factored for changes in land use, and did not consider cycle, walk or other modes; London data are for 1987; Winnipeg data are for 1992 and include work trips only; Montreal data are for 1993; Edmonton and Vancouver data are for 1994; Ottawa-Hull data are for 1995; Niagara used 1-h peak periods; Regina and Winnipeg used 2-h peak periods; Toronto used 3-h peak periods.

Exhibit 3.20: Modal Shares to, from and within the EUA - PM Peak Period

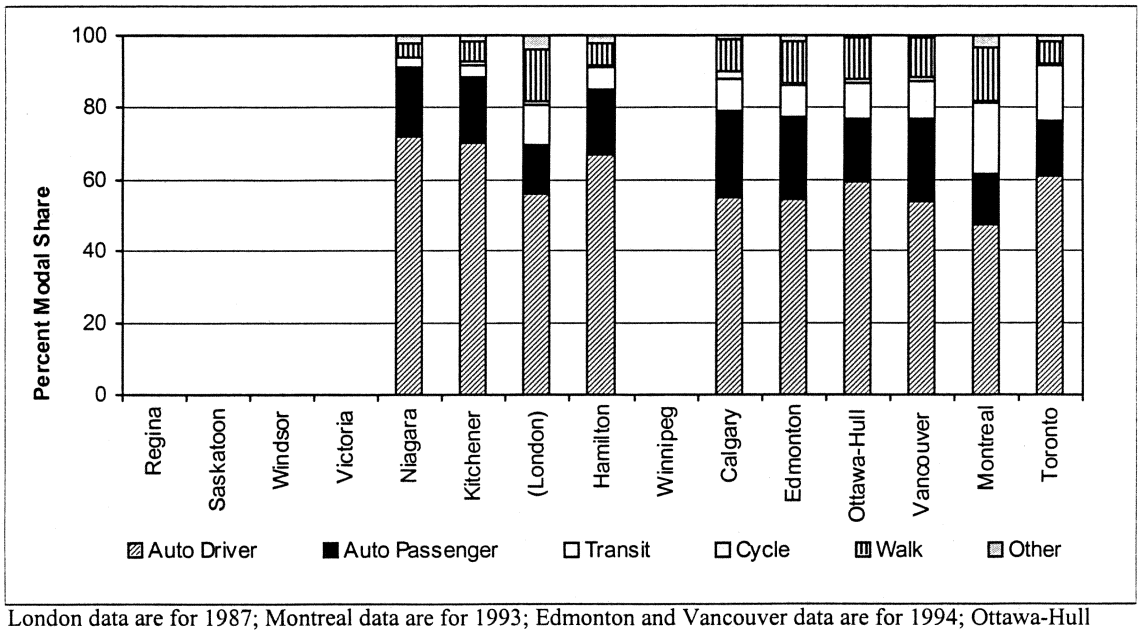
1996 Study Year



NOTE: Urban Area names are in parentheses where data are drawn from pre-1991 travel surveys; Regina data are based on 1989 survey data, factored for changes in land use, and did not consider cycle, walk or other modes; London data are for 1987; Windsor's 'Auto driver' category includes auto driver + auto passenger modes; Windsor's data are for 3-4 p.m. and include a significant proportion of school bus trips; Edmonton and Vancouver data are for 1994; Ottawa-Hull data are for 1995; Winnipeg data are for 1992; Hamilton and Niagara used 1-h peak periods; Regina and Winnipeg used 2-h peak periods; Toronto used 3-h peak period.

Exhibit 3.21: Modal Shares to, from and within the EUA - 24 hours

1996 Study Year



London data are for 1987; Montreal data are for 1993; Edmonton and Vancouver data are for 1994; Ottawa-Hull data are for 1995.

Exhibit 3.22: Modal Shares for Journey to Work in the Region - Census Data

1996 Study Year

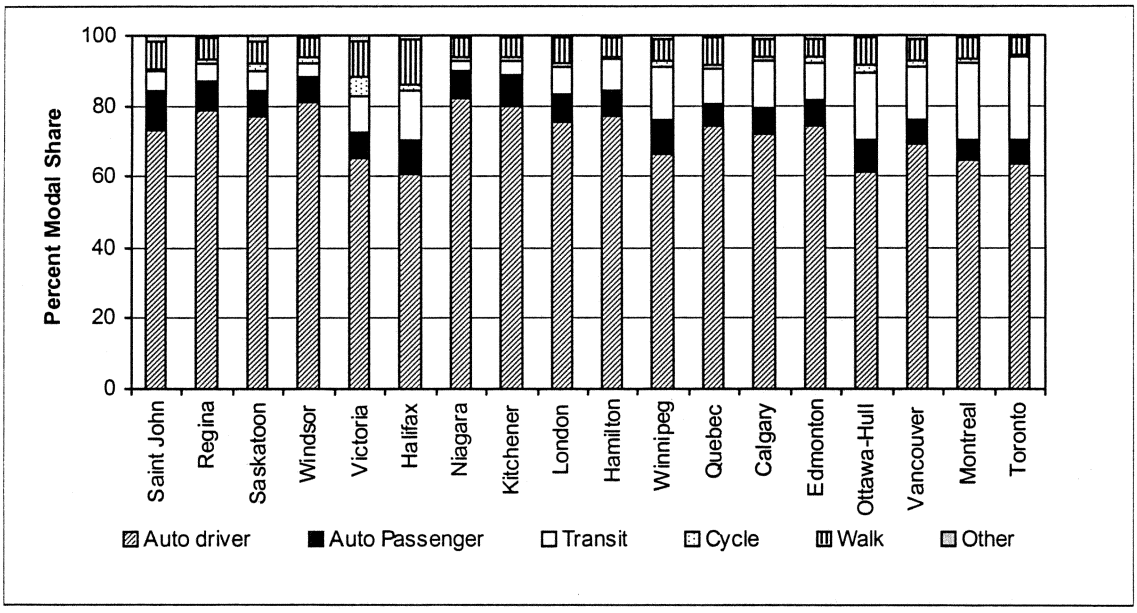
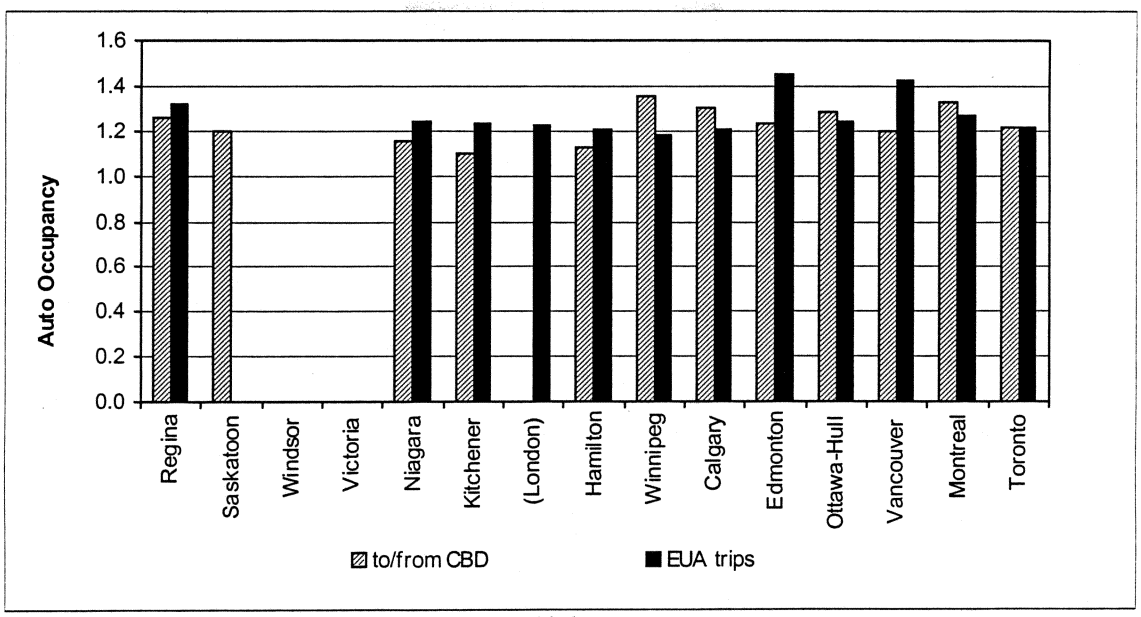


Exhibit 3.23: Auto Occupancies for AM Peak Period Trips

1996 Study Year

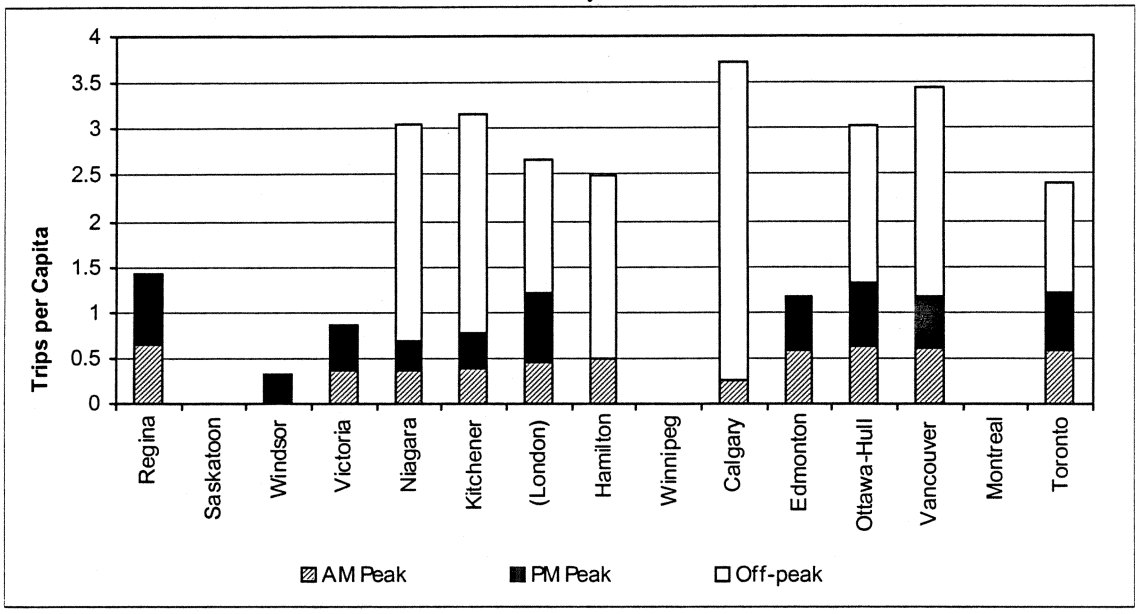


Where values are displayed as zero, data were not provided.

See notes for Exhibits 3.16 and 3.19 regarding traffic data on which these figures are based.

Exhibit 3.24: Daily and Peak Period Person Trips per Capita in EUA

1996 Study Year

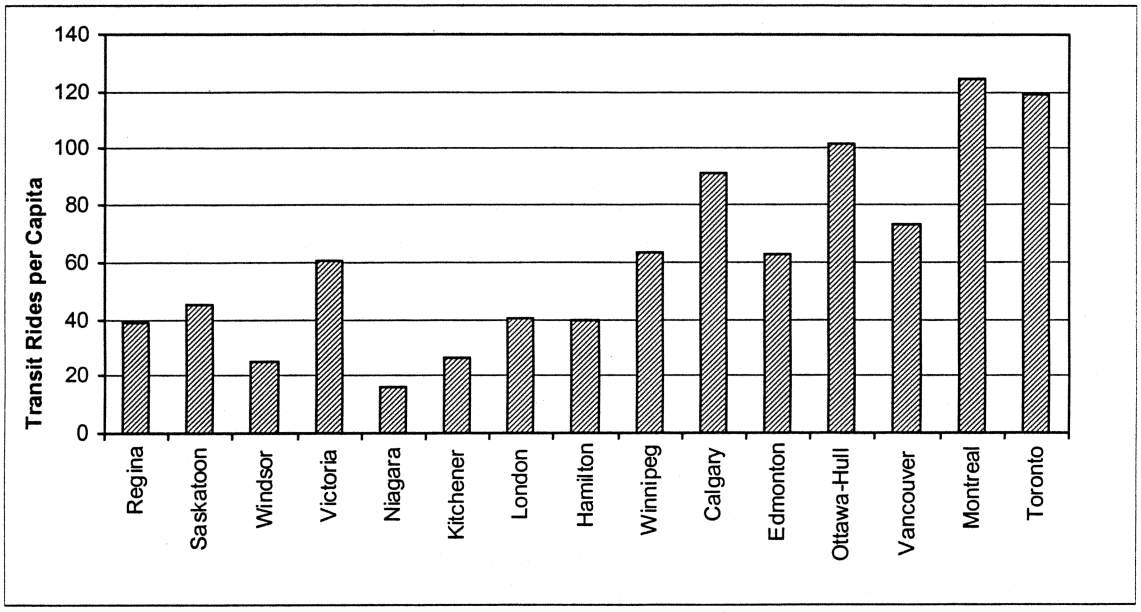


Note: Off-peak is [24-hour] - [AM Peak] - [PM Peak], and includes AM Peak or PM Peak where these are not explicitly provided. Where any of the values are displayed as zero, the data were not provided.

London data are based on 1987 trip rates, factored for increase in population to 1996; Calgary data are for 1997 and based on population age 5+; Edmonton data are for 1994; Ottawa-Hull data are for 1995, based on population age 10+; Hamilton, Kitchener, Niagara and Toronto data based on population age 11+ ; Calgary and Niagara used 1-h peak periods; Edmonton, Kitchener, Regina, Toronto and Windsor used 2-h peak periods; Ottawa-Hull used 2.5-h peak periods; Hamilton used 3-h peak periods.

Exhibit 3.25: Transit Ridership - Annual Rides Per Capita in EUA

1996 Study Year

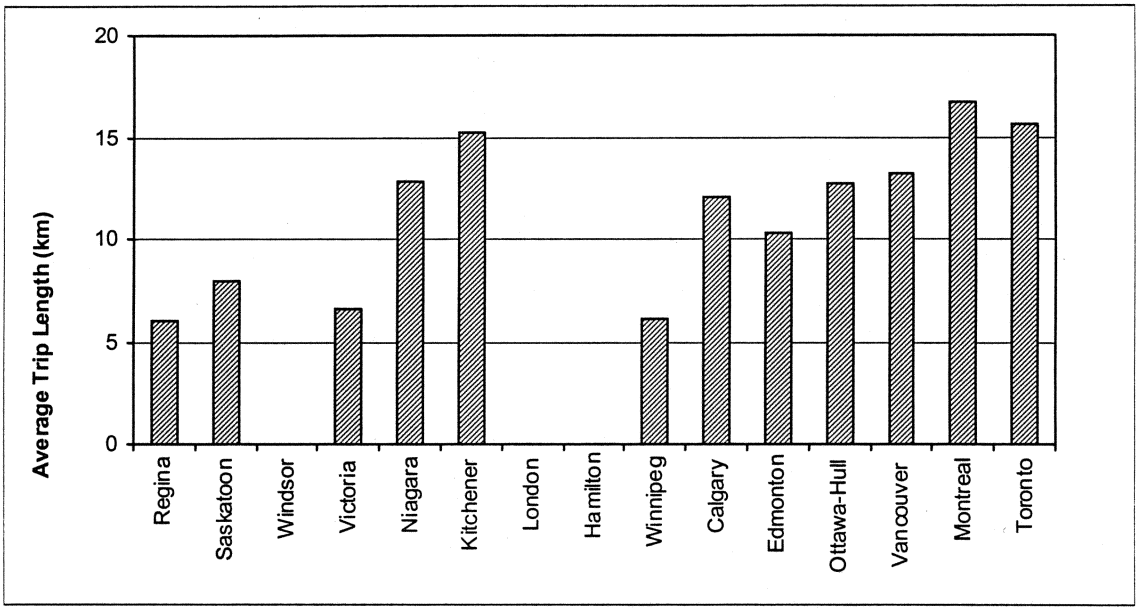


Where transit rides per capita are displayed as zero, data were not provided.

Calgary, Edmonton, Kitchener, Victoria, Windsor and Winnipeg data are for 1998; Vancouver value includes Handy Dart rides.

Exhibit 3.26: Average Home-Work Trip Distance in EUA

1996 Study Year

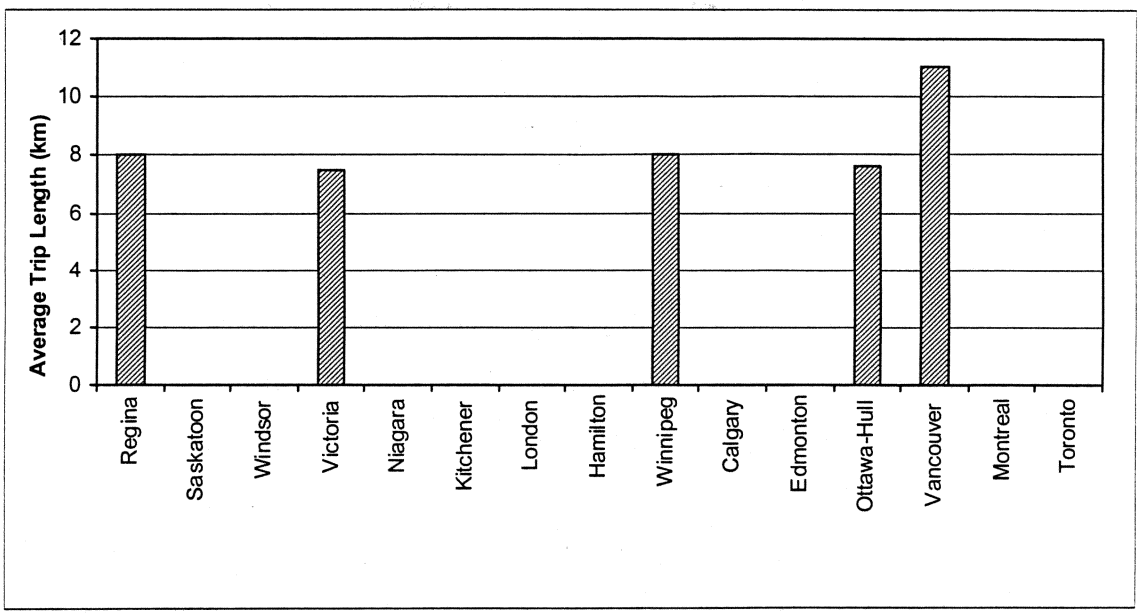


Where trip distances are displayed as zero, data were not provided.

Montreal value is for 1991; Edmonton and Vancouver data are for 1994; Ottawa-Hull value is for 1995.

Exhibit 3.27: Average Weekday Transit Trip Length

1996 Study Year



Where trip lengths are displayed as zero, data were not provided.

Saskatoon data are for 1997; Victoria and Winnipeg data are for 1998.

Exhibit 3.28: Average-Day Vehicle-km per Capita in EUA, Estimated from Fuel Sales Data

1996 Study Year

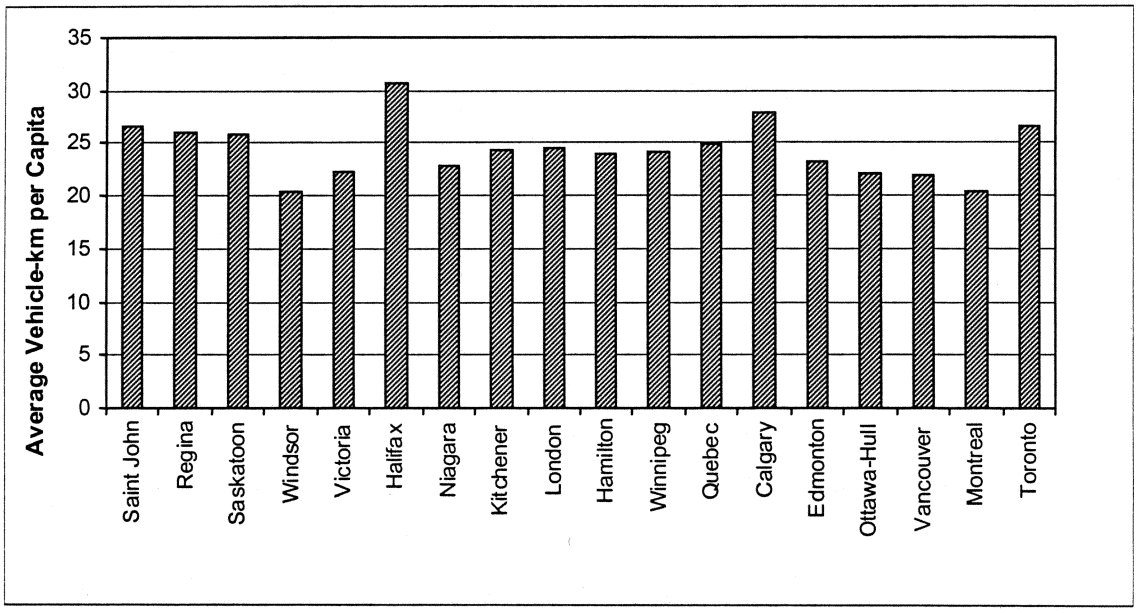
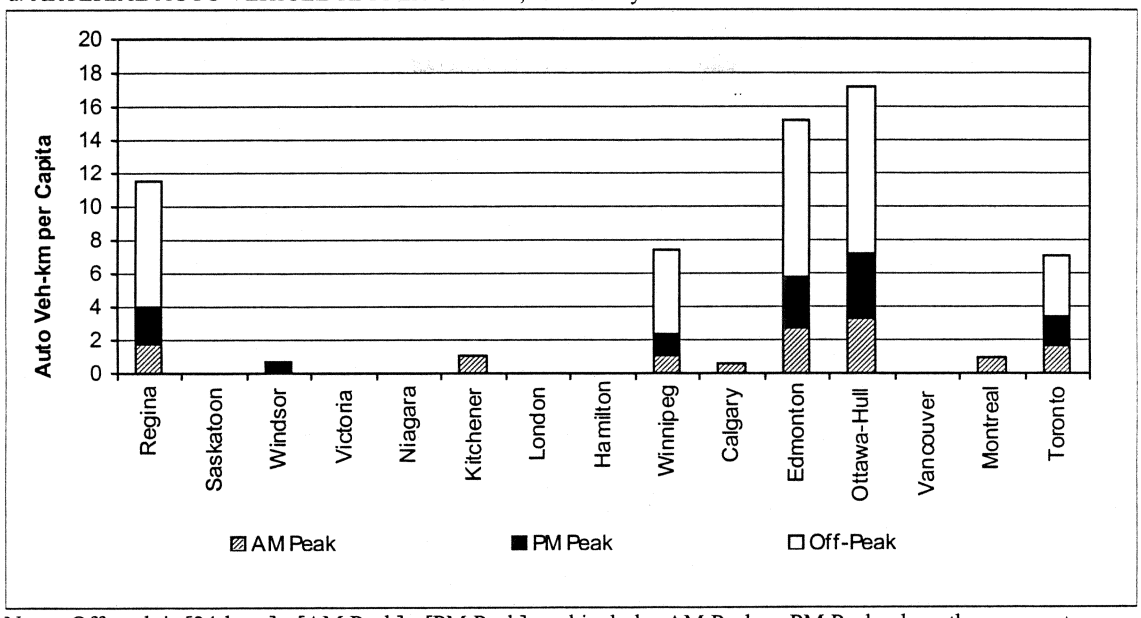


Exhibit 3.29: Weekday Arterial and Expressway Vehicle-km per Capita in EUA

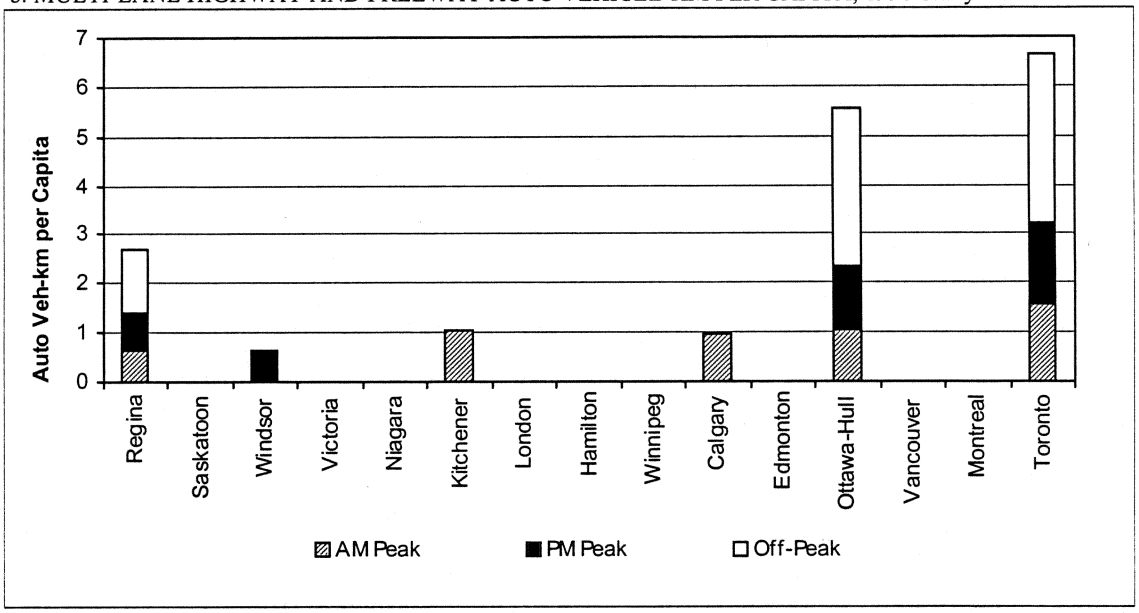
a. ARTERIAL AUTO VEHICLE-KM PER CAPITA, 1996 Study Year



Note: Off-peak is [24-hour] - [AM Peak] - [PM Peak], and includes AM Peak or PM Peak where these are not explicitly provided.
Where any of the values are displayed as zero, the data were not provided.

Montreal data are for 1993; Edmonton data are for 1994; Windsor data are for 1997; Kitchener data are for 1998; Calgary and Windsor used 1-h peak periods; Ottawa-Hull used 2.5-h peak periods; Regina and Winnipeg used 2-h peak periods.

b. MULTI-LANE HIGHWAY AND FREEWAY AUTO VEHICLE-KM PER CAPITA, 1996 Study Year

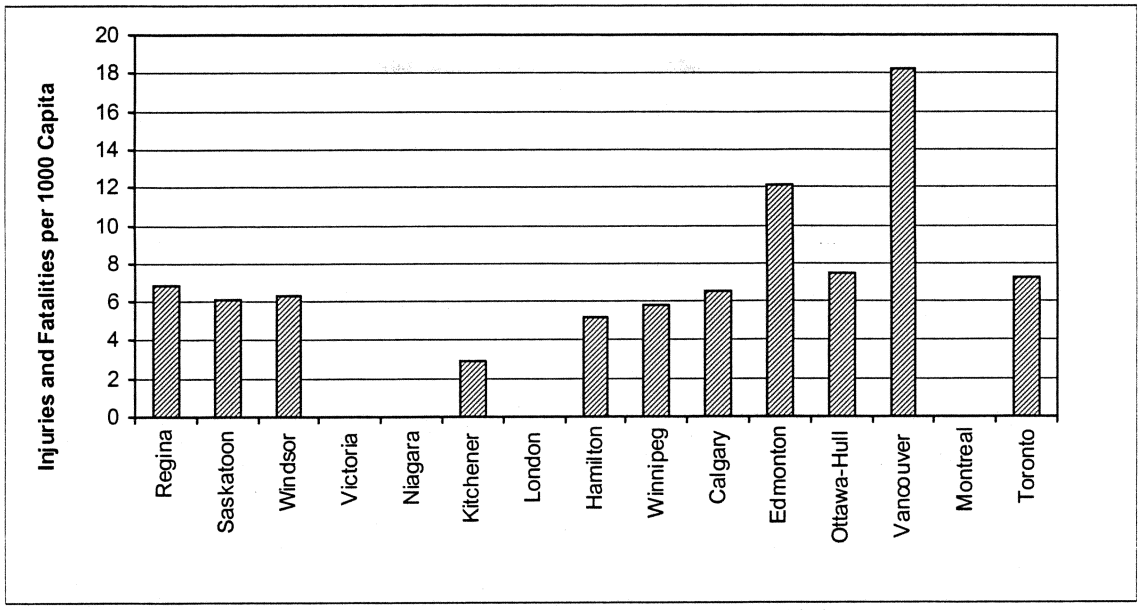


Note: Off-peak is [24-hour] - [AM Peak] - [PM Peak], and includes AM Peak or PM Peak where these are not explicitly provided.
Where any of the values are displayed as zero, the data were not provided.

Montreal data are for 1993; Edmonton data are for 1994; Windsor data are for 1997; Kitchener data are for 1998.

Exhibit 3.30 Annual Injuries and Fatalities per 1000 Capita in EUA

1996 Study Year



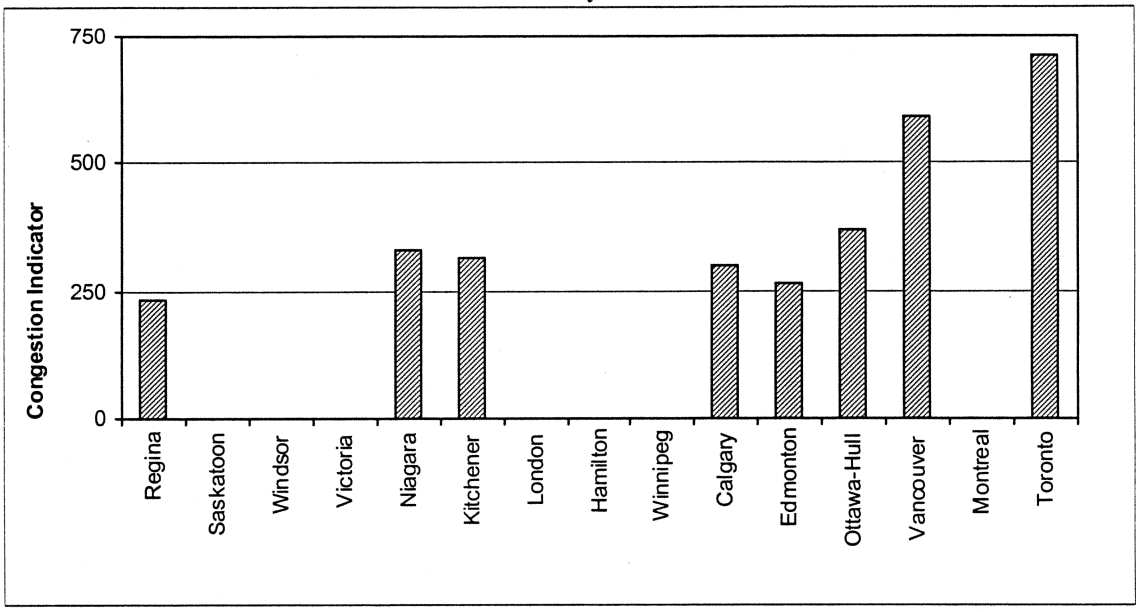
Where annual injuries and fatalities are displayed as zero, the data were not provided.

Edmonton, Hamilton, Kitchener and Windsor data are for 1998; Niagara, Saskatoon, Vancouver and Victoria data were not available; Toronto value is based on City of Toronto only.

Exhibit 3.31: Road Utilisation Indicator

(average work trip distance x AM peak period (1-h) auto vehicle trips/arterial & expressway lane-km in EUA)

1996 Study Year



Note: Where values are displayed as zero, the congestion indicator could not be calculated due to missing data.

Niagara indicator is based on arterial lane-km only.

Exhibit 3.32: Annual Gasoline Consumption and Gasoline-based Carbon Dioxide Emissions per Capita in EUA, 1996 Study Year

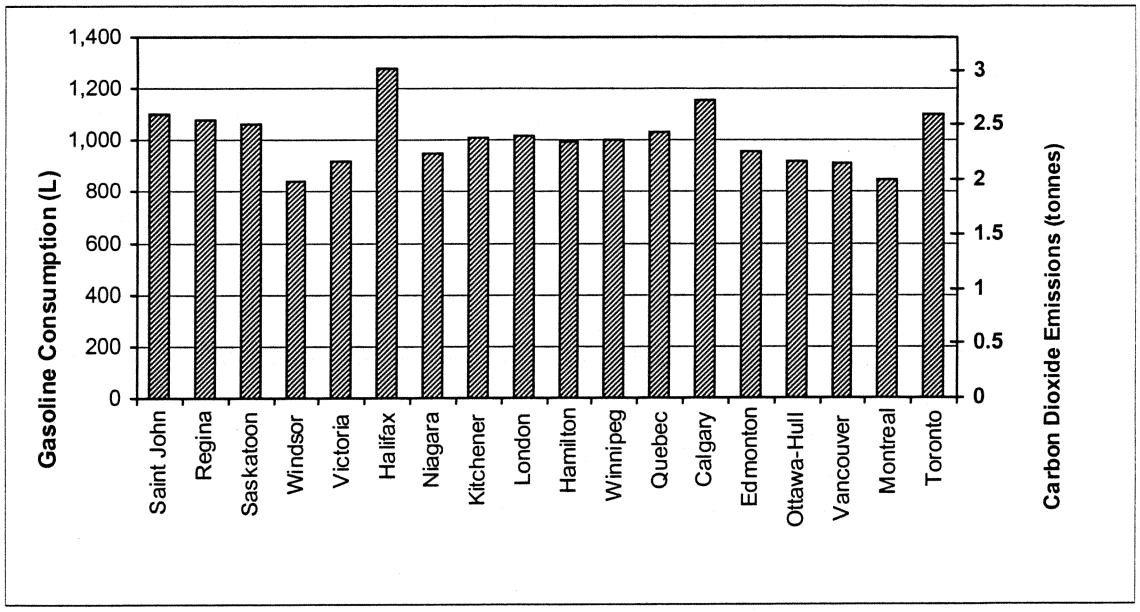
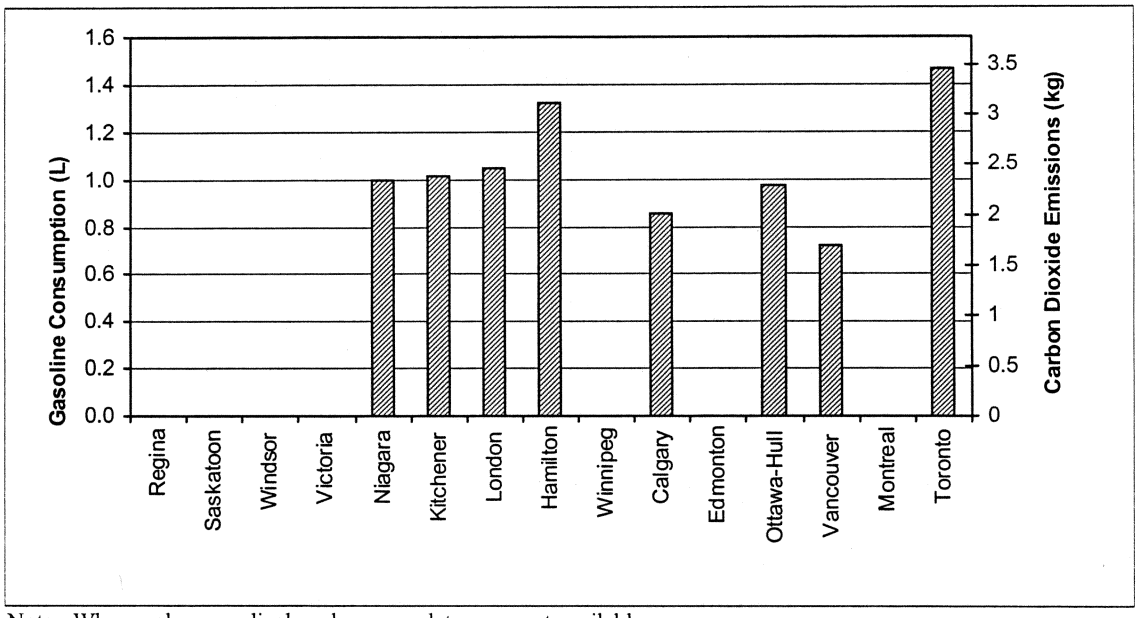


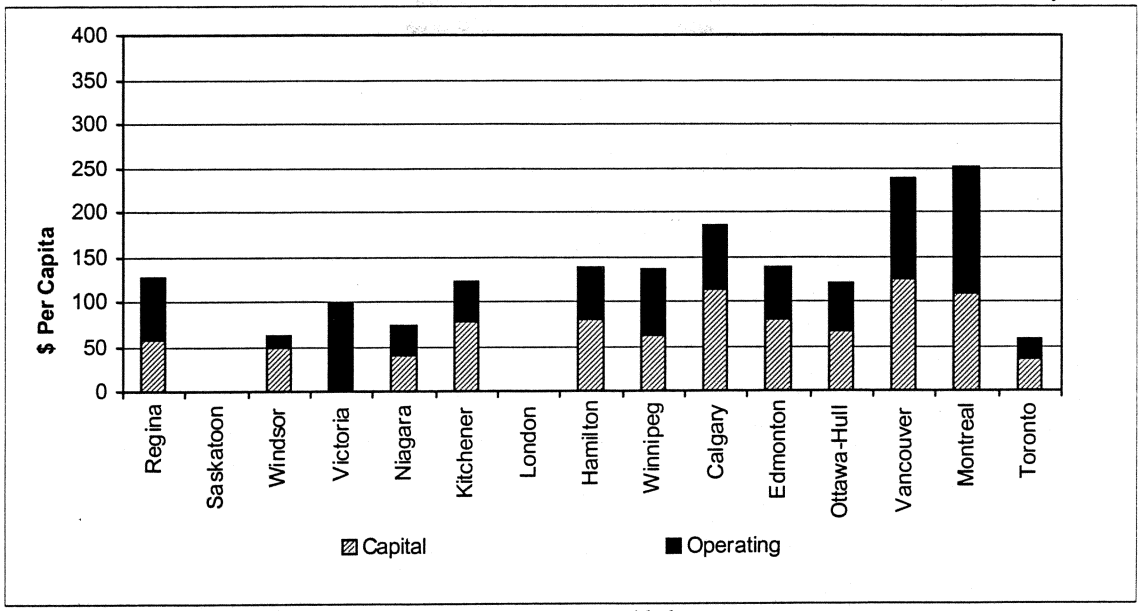
Exhibit 3.33: Gasoline Consumption and Gasoline-Based Carbon Dioxide Emissions per Person Trip in EUA, 1996 Study Year



Note: Where values are displayed as zero, data were not available.

Exhibit 3.34: Road and Transit Expenditures per Capita

a. ANNUAL ROAD CAPITAL & OPERATING EXPENDITURES PER CAPITA IN REGION, 1996 Study Year

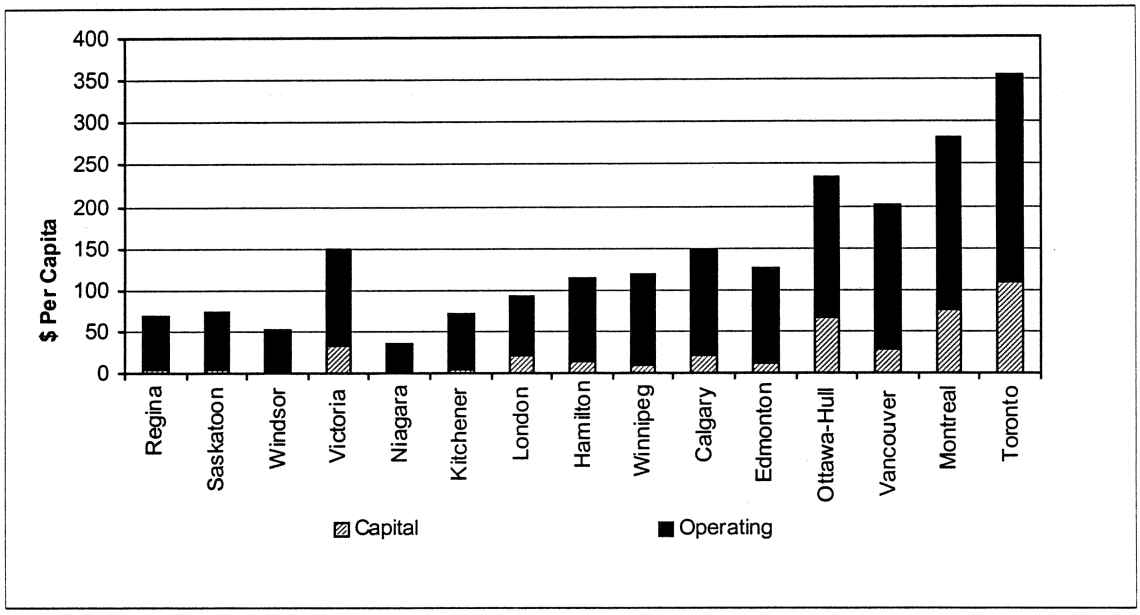


Where expenditures are displayed as zero, the data were not provided.

Calgary data are for 1999; Hamilton capital costs are for 1998 and operating costs are for 1997; Niagara and Victoria data are for 1997; Montreal data are for 1993; Toronto data do not include data from lower-tier municipalities; Victoria's road capital expenditures were not available; Windsor data do not include Lasalle.

b. ANNUAL TRANSIT CAPITAL & OPERATING EXPENDITURES PER CAPITA IN REGION, 1996 Study Year

(Total transit operating costs are shown; fare revenues have not been netted out.)



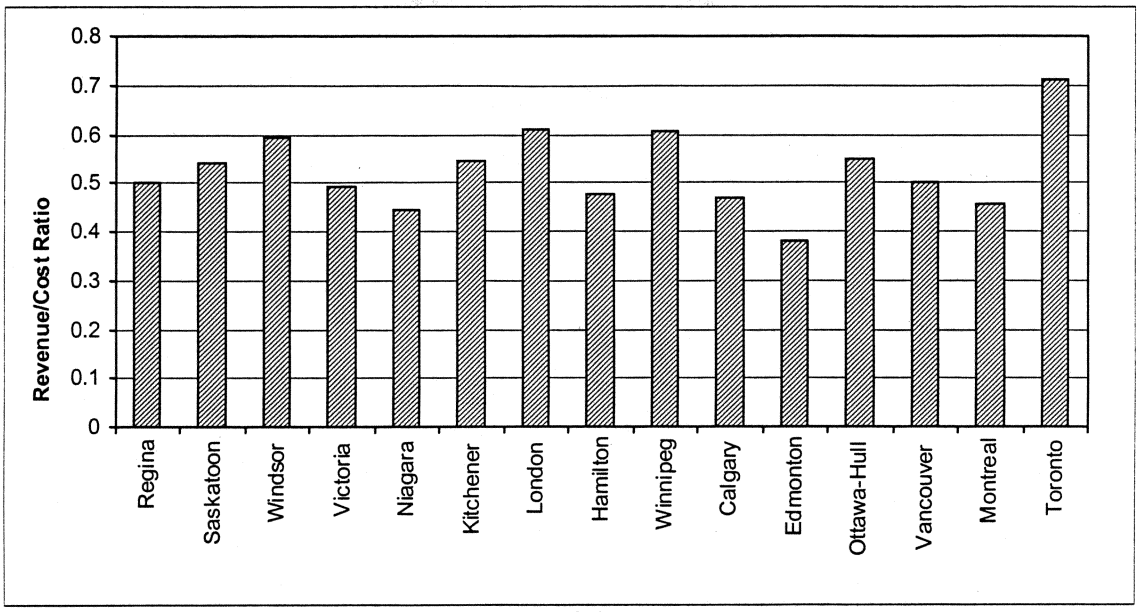
Where expenditures are displayed as zero, the data were not provided.

Toronto capital expenses include capital costs average for 1987-1997 for TTC.

Exhibit 3.35: Transit Revenue/Cost Ratio

(fare box revenue/operating & maintenance budget)

1996 Study Year



Where ratios are displayed as zero, the data were not provided.

Exhibit 3.36: Summary of Use/Non-Use of Funding Sources by Urban Area

FUNDING SOURCE	No response (freq.)	Used freq.	Used %	Not Used freq.	Not Used %	How Funding Source is Used (% Users) [1] i. Placed in general revenue account	ii. Dedicated to transit	iii. Dedicated to road improvements	iv. Dedicated to other transportation improvements	Why Source is Not Used (% Non-Users) [1] i. No need to use	ii. No legislative authority to use	iii. Has not been considered	iv. Not available to municipality
a Federal/Provincial subsidies/grants													
Federal subsidy	0	2	13%	13	87%	0%	50%	100%	100%	0%	0%	0%	100%
Provincial subsidy	0	7	47%	8	53%	14%	86%	57%	43%	0%	0%	0%	100%
special Federal or Provincial grants	0	11	73%	4	27%	9%	55%	82%	36%	0%	0%	0%	100%
b User fees/parking taxes/surcharges													
surcharge on public parking rates	0	0	0%	15	100%	0%	0%	0%	0%	0%	33%	33%	33%
tax on private parking revenues	0	1	7%	14	93%	0%	100%	100%	100%	0%	43%	29%	29%
transit user fees	0	15	100%	0	0%	27%	80%	7%	7%	0%	0%	0%	0%
road system user fees	0	2	13%	13	87%	50%	0%	50%	50%	8%	54%	31%	15%
municipal vehicle registration tax	0	0	0%	15	100%	0%	0%	0%	0%	7%	60%	7%	27%
c Municipal taxes/surcharges/etc.													
municipal property tax	0	15	100%	0	0%	87%	20%	20%	13%	0%	0%	0%	0%
municipal fuel tax	0	1	7%	14	93%	0%	100%	100%	100%	0%	57%	7%	36%
hydro surcharge	0	2	13%	13	87%	0%	100%	50%	50%	0%	38%	23%	46%
emissions-related tax	0	0	0%	15	100%	0%	0%	0%	0%	7%	60%	13%	27%
d Development levies/cost recovery													
benefit-sharing levy on development	3	5	42%	7	58%	40%	40%	80%	0%	14%	14%	71%	0%
frontage levy on development	3	5	42%	7	58%	40%	0%	60%	0%	14%	29%	57%	0%
cost recovery from new development	0	15	100%	0	0%	13%	7%	73%	13%	0%	0%	0%	0%

[1] Responses within each category may total more than 100% because more than one response could be given for each urban area.

Exhibit 3.37a: Summary of How Funding Sources are Used by Urban Areas

1996 Study Year

Funding Source	How Source of Funding is Used in the Urban Area														
	Regina	Saskatoon	Windsor	Victoria	Niagara	Kitchener	London	Hamilton	Winnipeg	Calgary	Edmonton	Ottawa-Hull	Vancouver	Montreal	Toronto
Federal/Provincial subsidies/grants															
a Federal subsidy													3 4	2 3 4	
b Provincial subsidy					3			2	2	2 4			1 2 3 4	2 3 4	2 3
c special Federal or Provincial grants	3	2 3 4	2 3	3	3		1		3	2 4	2 3		2 3 4	2 3 4	
User fees / parking taxes / surcharges															
d surcharge on public parking rates															
e tax on private parking revenues													2 3 4		
f transit user fees	2	1	2	2	2	1 2	2	2	2	2	1	2	2 3 4	1	2
g road system user fees					1 3					4					
h municipal vehicle registration tax															
Municipal / taxes/surcharges															
i municipal property tax	1	1	1 2	1	1 3	1 3	1	1	1	2 4	1	1	2 3 4	1	1
j municipal fuel tax													2 3 4		
k hydro surcharge				2									2 3 4		
l emissions-related tax															
Development levies / cost recovery															
m benefit-sharing levy on development				3	NR	1 2 3	3	2 3		NR	NR			1	
n frontage levy on development		1	3	3	NR				3	NR	NR			1	
o cost recovery from new development	3	3	3	3	3	1	3	3	3	4	3	4	3	1	2 3

LEGEND:

NR - no response

[Blank] - funding source is not used

1 - Placed in general revenue account
2 - Dedicated to transit
3 - Dedicated to road improvements
4 - Dedicated to other transportation improvements

Exhibit 3.37b: Summary of Why Funding Sources are Not Used by Urban Area
1996 Study Year

Funding Source	Why Source of Funding is Not Used in the Urban Area														
	Regina	Saskatoon	Windsor	Victoria	Niagara	Kitchener	London	Hamilton	Winnipeg	Calgary	Edmonton	Ottawa-Hull	Vancouver	Montreal	Toronto
Federal/Provincial subsidies/grants															
a Federal subsidy	4	4	4	4	4	4	4	4	4	4	4	4			4
b Provincial subsidy	4	4	4	4		4	4				4	4			
c special Federal or Provincial grants						4		4				4			4
User fees / parking taxes / surcharges															
d surcharge on public parking rates	4	3	3	4	4	3	3	2	3	4	2	2	4	2	2
e tax on private parking revenues	4	3	2	3	4	4	3	2	3	4	2	2		2	2
f transit user fees															
g road system user fees	4	2 3	2	3		1	3	2	2		2	2	4	3	2
h municipal vehicle registration tax	4	3	2	4	4	2	2	2	2	4	2	2	1	2	2
Municipal / taxes/surcharges															
i municipal property tax															
j municipal fuel tax	4	4	3	4	4	2	2	2	2	4	2	2		2	2
k hydro surcharge	4	4	3		4	2	3	2	2 3	4	4	2		2	4
l emissions-related tax	4	3	2	4	4	2	2	2	2 3	4	2	2	1	2	2
Development levies / cost recovery															
m benefit-sharing levy on development	3	3	3		NR				3	NR	NR	2	1		3
n frontage levy on development	3				NR	3	3	2		NR	NR	2	1		3
o cost recovery from new development															

LEGEND:

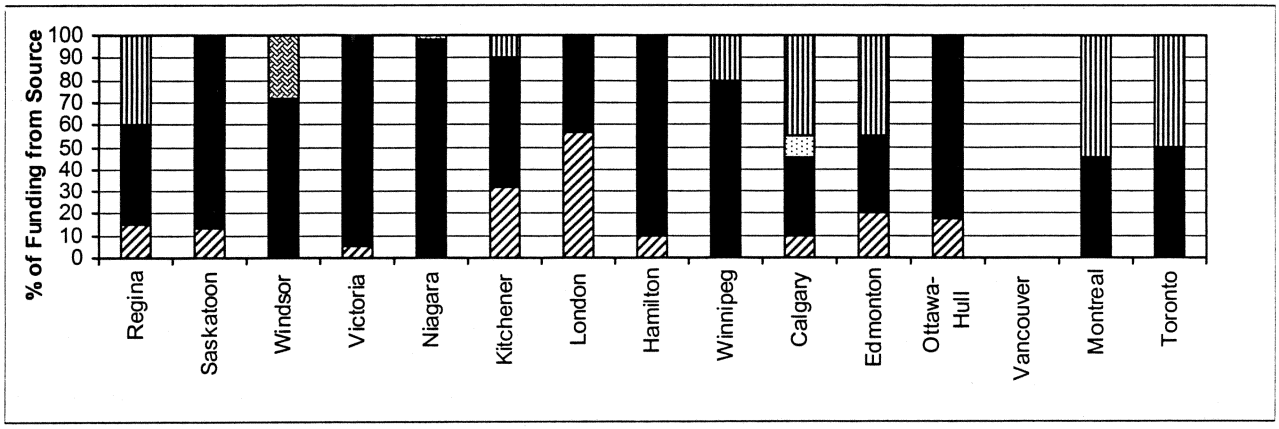
NR - no response

[Blank] - funding source is used

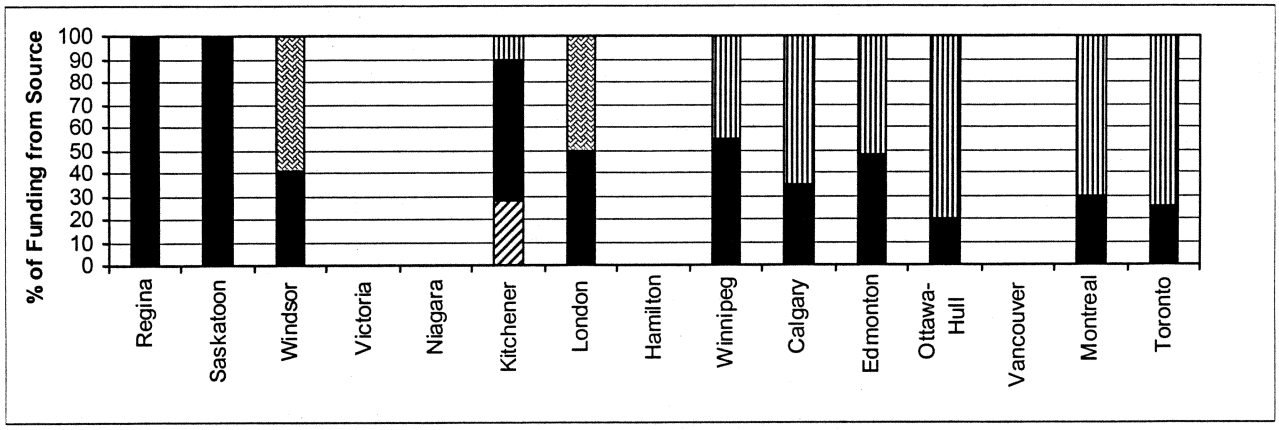
1 - No need to use
2 - No legislative authority to use
3 - Has not been considered
4 - Not available to municipality

Exhibit 3.38: Sources of Financing for Transportation Expenditures
1996 Study Year

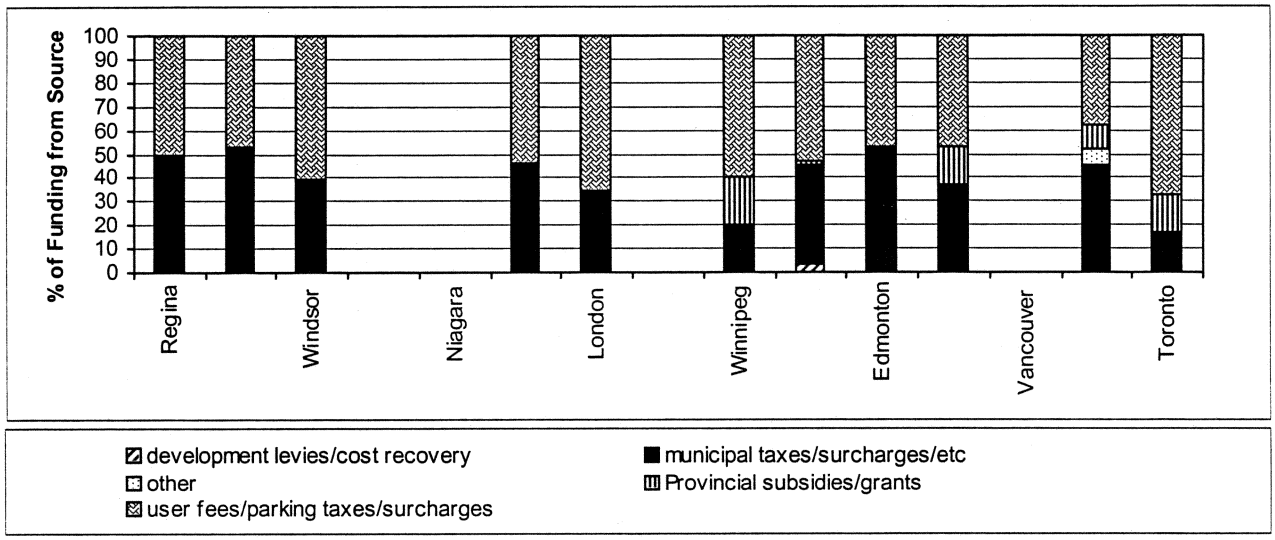
a. ROAD SYSTEM CAPITAL EXPENDITURES



b. TRANSIT SYSTEM CAPITAL EXPENDITURES



c. TRANSIT SYSTEM OPERATING EXPENDITURES



Edmonton data are for 1998; Edmonton data excludes disabled transit system; Ottawa-Hull data are for Regional Municipality of Ottawa-Carleton only; 1996 was an exceptional year for Regina due to the National Infrastructure Program.

Exhibit 3.39: New Sources of Revenue Being Considered

New Revenue Sources Considered	Urban Areas
Fuel tax (may include negotiating revenue sharing with provincial governments)	- Winnipeg, Calgary, Edmonton, Montréal, Ottawa-Hull, Vancouver, Toronto
Vehicle registration fees/surtax	- Winnipeg, Calgary, Edmonton, Ottawa-Hull (and newly implemented in Montréal, dedicated to transit)
Increased developer charges dedicated to transportation funding	- Windsor, Niagara, Kitchener, Edmonton
Parking taxes	- Ottawa-Hull
Parking charges at rapid transit stations	- Calgary
Road pricing/toll roads	- Windsor, Vancouver
Public/private partnerships (at least for specific projects)	- London, Toronto
Emission credits/trading	- Calgary
Increased advertising/charter revenue for transit	- Kitchener
Employee-subsidised transit passes	- Kitchener
Special taxes on businesses for local improvements (e.g. parking, sidewalks)	- Victoria

Exhibit 3.40: Types of Financial Analysis

Type of Financial Analysis	Urban Areas where Applied in General Practice	Urban Areas where Applied for Specific Projects	
		Urban Area	Application
Cost/benefit analysis (as part of assessment or all of assessment)	Niagara, Kitchener, Calgary, Edmonton, Toronto	Victoria	- Provincial projects and transit agencies
		Montreal	- required for major transit infrastructure projects for provincial investment
Cost-effectiveness analysis		Kitchener	- new transit services
Infrastructure management program		Kitchener	- prioritise road rehabilitation projects
Budgeting analysis based on capacity issues	London		
Annual review of economic performance indicators for bus routes, based on Maximum Permissible Subsidy (MPS)		Saskatoon	- transit service
Impact to tax base	Victoria		
Assessment of long-term operating and capital costs to full build-out		Victoria	- regional-level projects
Transportation Improvement Priority Study		Calgary	- prioritise future road and transit capital projects
Multiple Account Evaluation (MAE)	Vancouver		
Strategic Roadway Improvement Priority Study	Windsor (City of Windsor)		
No financial analysis		Montreal	- road projects

Exhibit 3.41: Estimation of Costs Due to Congestion

Method	Urban Area	Notes/Results
Transportation demand models	Niagara, Winnipeg, Edmonton	- estimate travel time delay for auto users
	Calgary	- Microscopic Traffic Simulation Model estimates travel delays, pollution, emissions, capital and operating costs, air quality, etc.
Multiple Account Evaluation Model (MAE)	Calgary	(applications were not specified)
BC Transit studies	Victoria	- estimated congestion costs for transit and auto users
Deferral of road improvements due to increased transit use	Kitchener	
City Transportation Plan Review overall environmental impact	London	- no dollar value was estimated
Study to establish the relationship of road congestion and costs to private vehicle users, commercial traffic, and transit	Ottawa-Hull	- auto and commercial travel times are estimated to increase about 50% if roads were allowed to operate at 95% capacity rather than 90%
Consulting firm assessment of cost of congestion to motorists	Montreal	- estimated as hundreds of millions of dollars
Statement by provincial Minister of Transportation regarding costly loss of time of the trucking industry due to congestion	Montreal	
Various studies on costs of congestion, most recent being "Funding Transportation in GTA and Hamilton-Wentworth"	Toronto	- estimated capital investment rates at which congestion could continue to increase, be stabilised, or be reduced, respectively

Exhibit 3.42: Summary of Status of Transportation/Land-Use Initiatives

CATEGORY	*No response/ not applicable (freq.)*	Response Frequency (% Responding & Applicable Urban Areas)					
		Not a priority at present	Studying the issue	Adopted policies/ guidelines	Implement-ing pilot projects	Implementing in specific case(s)/area(s)	Implementing throughout muncipality
1 Urban Structure/Land Use							
a long-term, integrated municipal land-use/transportation plan	*(0)*	0	27	20	0	0	53
b transit-related high-density, mixed-use centres/nodes	*(0)*	0	20	20	0	53	7
c higher-density, mixed-use transit corridors	*(0)*	7	27	27	0	27	13
d designated limits on urban development	*(0)*	20	7	47	0	7	20
e re-urbanisation/intensification of transit corridors	*(0)*	13	20	33	0	27	7
f relating density to level of transit service	*(0)*	20	27	20	0	13	20
g appropriate population/employment ratio at municipal level	*(0)*	53	20	13	0	0	13
h appropriate population/employment ratio at node/community level	*(0)*	47	27	13	0	7	7
i promotion of residential uses in/near downtown area	*(0)*	0	7	13	0	67	13
2 Urban Design							
a transit-supportive urban design (macro level)	*(0)*	7	20	20	0	27	27
b transit-supportive site/building design (micro level)	*(0)*	0	7	20	0	53	20
c cycling-supportive streetscaping	*(0)*	0	7	0	0	73	20
d pedestrian-supportive streetscaping	*(0)*	0	13	0	0	67	20
3 Walking							
a enhanced pedestrian micro-climate (e.g. weather protection)	*(0)*	40	0	7	0	53	0
b adequate road crossing facilities (e.g. crossovers, signal timing)	*(0)*	7	0	7	0	33	53
4 Cycling							
a network of on-street cycling lanes/specially-widened curb lanes	*(0)*	0	0	13	0	47	40
b network of off-street cycling paths	*(0)*	0	0	20	0	40	40
c requirements for provision of secure parking for cycles	*(0)*	20	13	7	7	47	7
d municipal participation on cycling advisory/awareness committees	*(0)*	0	0	20	0	20	60
e cycling amenities in new development (e.g. storage, showers)	*(0)*	27	20	0	7	47	0
5 Transit							
a transit priority by means of HOV or reserved bus lanes	*(0)*	33	7	7	7	40	7
b other transit priority measures (e.g. pre-emptive signals, queue jumps)	*(0)*	13	27	7	0	53	0
c stops within walking distance of places of residence/employment	*(0)*	7	0	13	0	20	60
d park'n'ride lots	*(0)*	40	7	0	0	27	27
e kiss'n'ride facilities	*(0)*	40	7	0	7	33	13
f bike'n'ride enhancements	*(0)*	33	7	0	7	47	7
g inter-municipal service coordination	*(3)*	25	25	0	0	17	33
h inter-municipal fare coordination	*(3)*	25	17	0	0	17	42
i "seamless" transit across region	*(3)*	33	25	8	0	0	33
j transit safety/security programs	*(0)*	13	0	7	0	13	67
k integration of urban transit with inter-city services	*(2)*	38	0	15	8	15	23
6 Parking							
a parking standards related to level/proximity of transit service	*(0)*	20	27	0	0	27	27
b maximum parking standards	*(0)*	53	13	7	0	20	7

Exhibit 3.42 (continued)

CATEGORY	No response/ not applicable (freq.)	Response Frequency (% Responding & Applicable Urban Areas) Not a priority at present	Studying the issue	Adopted policies/ guidelines	Implement-ing pilot projects	Implementing in specific case(s)/area(s)	Implementing throughout muncipality
c cap on overall parking supply	(0)	80	13	7	0	0	0
d pricing to discourage use of public parking lots by commuters	(0)	53	13	7	0	27	0
e tax or other measure to discourage use of private lots by commuters	(0)	80	13	0	0	7	0
f restrictions on on-street parking on arterial roads in peak hours	(0)	13	0	0	0	20	67
7 Road System Optimisation							
a recognising all road user needs in planning of road system	(0)	0	13	7	7	7	67
b considering person-capacity as well as vehicular capacity	(0)	27	13	13	0	20	27
c HOV lanes and promotion/facilitation of ridesharing	(0)	47	27	7	0	13	7
d transportation systems management program (operational improvements)	(0)	7	7	0	7	60	20
e intersection improvement program	(0)	7	0	0	0	53	40
f real-time traffic signal control	(0)	20	13	7	0	27	33
g incident management system	(0)	27	13	7	0	40	13
8 Goods Movement							
a consideration of goods movement in transportation system planning	(0)	20	0	13	0	7	60
b consultation with goods movement industry to identify/resolve issues	(0)	27	0	0	0	27	47
c provision of adequate, accessible off-street loading facilities	(0)	0	7	7	0	40	47
d designation of appropriate truck routes	(0)	7	0	0	0	13	80
9 Special User Needs							
a transit vehicles accessible to physically challenged	(0)	0	7	0	0	33	60
b transit stations/stops accessible to physically challenged	(0)	7	0	0	0	40	53
c paratransit to supplement regular transit for special needs	(0)	0	7	7	0	20	67
d curb cuts/ramps on pedestrian facilities	(0)	7	0	0	0	20	73
e designated parking spaces for physically challenged	(0)	7	0	0	0	0	93
f audible pedestrian signals	(0)	7	0	0	7	67	20
10 Energy, Environment, and Travel Demand Management							
a alternative fuels for municipal vehicles	(0)	7	20	7	20	20	27
b alternative fuels for transit vehicles	(1)	7	43	7	7	29	7
c fuel-efficient vehicles for municipal fleets	(1)	7	14	14	7	36	21
d promoting higher fuel-efficiency standards	(0)	47	20	13	7	7	7
e promoting emissions control maintenance and inspection	(0)	47	7	13	7	7	20
f environmental assessment for new transportation facilities/services	(0)	13	0	27	0	27	33
g environmental assessment for land-use plans, development proposals	(0)	20	0	33	0	27	20
h overall municipal TDM strategy	(0)	27	40	13	0	13	7
i TDM strategy includes road pricing initiatives	(0)	47	53	0	0	0	0
j promoting TDM education programs	(0)	13	60	7	7	7	7
k promoting flextime, telecommuting, compressed work weeks, etc.	(0)	20	33	13	0	33	0
l Transportation Management Associations	(0)	60	20	0	20	0	0
m TDM outreach/advisory programs for employers	(0)	33	27	7	13	13	7
n TDM programs for municipal employees	(0)	33	27	7	13	20	0

Exhibit 3.43: Status of Land-Use/Transportation Initiatives by Urban Area

CATEGORY	URBAN AREA														
	Regina	Saskatoon	Windsor	Victoria	Niagara	Kitchener	London	Hamilton	Winnipeg	Calgary	Edmonton	Ottawa-Hull	Vancouver	Montreal	Toronto
1. Urban Structure/Land Use															
a long-term, integrated municipal land-use/transportation plan	7	7	3	3	7	4	4	7	3	7	7	7	4	3	7
b transit-related high-density, mixed-use centres/nodes	6	6	3	6	6	4	3	4	3	7	6	4	6	6	6
c higher-density, mixed-use transit corridors	6	6	3	3	4	4	3	4	3	7	2	4	7	6	6
d designated limits on urban development	2	7	3	4	4	7	4	7	4	4	2	4	6	2	4
e re-urbanisation/intensification of transit corridors	4	6	3	3	4	4	2	4	3	7	2	6	4	6	6
f relating density to level of transit service	2	6	3	3	4	4	2	3	3	7	7	7	4	2	6
g appropriate population/employment ratio at municipal level	2	2	3	3	2	2	2	3	2	7	2	7	4	2	4
h appropriate population/employment ratio at node/community level	2	4	3	3	2	2	2	3	2	6	2	7	3	2	4
i promotion of residential uses in/near downtown area	7	6	4	6	4	6	3	6	6	6	7	6	6	6	6
2. Urban Design															
a transit-supportive urban design (macro level)	4	7	3	3	6	6	3	4	6	7	7	7	4	2	6
b transit-supportive site/building design (micro level)	4	6	6	6	7	6	3	4	6	7	6	7	4	6	6
c cycling-supportive streetscaping	6	6	6	7	6	6	3	6	6	6	6	7	6	7	6
d pedestrian-supportive streetscaping	7	6	3	7	6	6	3	6	6	6	6	7	6	6	6
3. Walking															
a enhanced pedestrian micro-climate (e.g. weather protection)	6	6	2	2	2	2	2	2	6	4	6	6	6	6	6
b adequate road crossing facilities (e.g. crossovers, signal timing)	7	7	6	7	7	6	2	6	7	4	7	7	6	6	7
4. Cycling															
a network of on-street cycling lanes/specially-widened curb lanes	7	6	4	7	6	7	4	7	6	7	6	7	6	6	6
b network of off-street cycling paths	7	6	4	6	7	7	4	7	6	4	6	7	6	6	7
c requirements for provision of secure parking for cycles	4	2	2	6	5	3	2	3	6	6	6	6	6	7	6
d municipal participation on cycling advisory/awareness committees	7	4	4	6	7	7	4	7	7	6	7	7	7	6	7
e cycling amenities in new development (e.g. storage, showers)	2	2	6	6	3	3	2	2	6	6	6	6	6	3	5
5. Transit															
a transit priority by means of HOV or reserved bus lanes	7	2	2	3	4	2	2	2	6	5	6	6	6	6	6

LEGEND:

0 - No response
1 - Not applicable
2 - Not a priority at present
3 - Studying the issue
4 - Have adopted policies/guidelines
5 - Implementing pilot project(s)
6 - Implementing in specific cases/areas
7 - Implementing throughout municipality

Exhibit 3.43 (continued)

CATEGORY	URBAN AREA														
	Regina	Saskatoon	Windsor	Victoria	Niagara	Kitchener	London	Hamilton	Winnipeg	Calgary	Edmonton	Ottawa-Hull	Vancouver	Montreal	Toronto
b other transit priority measures (e.g. pre-emptive signals, queue jumps)	6	3	3	3	3	4	2	2	6	6	6	6	6	6	6
c stops within walking distance of places of residence/employment	7	4	6	7	4	6	2	7	7	7	7	7	7	7	6
d park'n'ride lots	2	2	3	6	2	2	2	2	7	6	6	7	7	6	7
e kiss'n'ride facilities	2	2	3	2	2	2	2	5	6	6	6	7	6	6	7
f bike'n'ride enhancements	2	2	3	7	2	5	2	2	6	6	6	6	6	6	6
g inter-municipal service coordination	2	1	1	7	1	3	3	2	2	3	7	7	7	6	6
h inter-municipal fare coordination	2	1	1	7	1	3	2	6	2	3	7	7	7	7	6
i "seamless" transit across region	2	1	1	7	1	3	2	2	2	3	7	7	7	4	3
j transit safety/security programs	7	6	7	7	4	2	2	7	7	7	7	7	7	6	7
k integration of urban transit with inter-city services	2	1	1	4	2	5	4	2	2	6	2	7	7	6	7
6. Parking															
a parking standards related to level/proximity of transit service	7	3	3	6	6	2	2	2	3	7	6	3	6	7	7
b maximum parking standards	2	2	3	2	2	2	2	3	2	7	6	4	6	2	6
c cap on overall parking supply	2	2	2	2	2	2	2	2	3	4	2	2	2	2	3
d pricing to discourage use of public parking lots by commuters	2	2	3	6	4	2	2	2	2	6	2	6	6	2	3
e tax or other measure to discourage use of private lots by commuters	2	2	2	2	2	2	2	2	2	6	2	3	2	2	3
f restrictions on on-street parking on arterial roads in peak hours	7	6	6	2	7	7	2	6	7	7	7	7	7	7	7
7. Road System Optimisation															
a recognising all road user needs in planning of road system	4	7	7	3	7	7	7	7	3	7	7	7	5	6	7
b considering person-capacity as well as vehicular capacity	2	3	2	6	2	4	7	6	3	2	7	7	4	6	7
c HOV lanes and promotion/facilitation of ridesharing	2	3	2	2	3	2	2	2	3	3	2	6	4	7	6
d transportation systems management program (operational improvements)	6	7	3	6	2	7	6	6	7	6	6	6	5	6	6
e intersection improvement program	6	7	7	6	2	7	6	6	7	6	6	7	6	7	6
f real-time traffic signal control	3	4	7	2	7	7	7	6	2	2	3	7	6	6	6
g incident management system	2	4	2	2	3	6	7	7	2	6	6	3	6	6	6
8. Goods Movement															
a consideration of goods movement in transportation system planning	7	7	4	2	2	2	7	7	6	7	7	7	4	7	7

LEGEND:

0 - No response
1 - Not applicable
2 - Not a priority at present
3 - Studying the issue
4 - Have adopted policies/guidelines
5 - Implementing pilot project(s)
6 - Implementing in specific cases/areas
7 - Implementing throughout municipality

Exhibit 3.43 (continued)

CATEGORY	URBAN AREA														
	Regina	Saskatoon	Windsor	Victoria	Niagara	Kitchener	London	Hamilton	Winnipeg	Calgary	Edmonton	Ottawa-Hull	Vancouver	Montreal	Toronto
b consultation with goods movement industry to identify/resolve issues	7	7	7	2	2	2	6	6	6	7	7	6	2	7	7
c provision of adequate, accessible off-street loading facilities	7	7	6	6	7	4	3	7	7	7	7	6	6	6	6
d designation of appropriate truck routes	7	7	7	6	7	7	2	7	7	7	7	7	7	7	6
9. Special User Needs															
a transit vehicles accessible to physically challenged	7	6	7	7	6	6	3	7	7	7	7	7	6	7	6
b transit stations/stops accessible to physically challenged	7	6	7	7	6	6	2	7	7	7	7	7	6	6	6
c paratransit to supplement regular transit for special needs	7	7	7	7	7	6	3	4	7	7	6	7	7	7	6
d curb cuts/ramps on pedestrian facilities	7	6	7	7	7	7	2	7	7	7	7	7	6	7	6
e designated parking spaces for physically challenged	7	7	7	7	7	7	2	7	7	7	7	7	7	7	7
f audible pedestrian signals	6	6	2	6	5	7	6	6	6	7	6	6	7	6	6
10. Energy, Environment, and Travel Demand Management															
a alternative fuels for municipal vehicles	7	3	7	6	7	4	3	5	6	7	3	2	6	5	5
b alternative fuels for transit vehicles	5	3	4	3	7	6	2	6	3	0	3	3	6	3	6
c fuel-efficient vehicles for municipal fleets	7	3	4	6	7	6	3	5	2	0	7	6	6	4	6
d promoting higher fuel-efficiency standards	2	3	4	2	2	4	3	5	2	2	2	2	6	3	7
e promoting emissions control maintenance and inspection	6	2	4	2	2	4	7	5	2	2	2	2	7	3	7
f environmental assessment for new transportation facilities/services	6	2	4	2	7	7	7	4	4	4	6	7	6	6	7
g environmental assessment for land-use plans, development proposals	6	2	4	2	7	2	7	4	4	4	6	7	6	6	4
h overall municipal TDM strategy	2	2	3	3	6	7	3	2	3	3	2	6	4	3	4
i TDM strategy includes road pricing initiatives	2	2	3	3	2	2	3	2	3	2	2	3	3	3	3
j promoting TDM education programs	2	3	3	5	3	4	3	3	3	3	2	6	7	3	3
k promoting flextime, telecommuting, compressed work weeks, etc.	2	6	3	6	2	4	3	4	3	6	2	6	6	3	3
l Transportation Management Associations	2	2	2	2	3	2	3	2	2	2	2	5	5	3	5
m TDM outreach/advisory programs for employers	2	2	3	6	3	4	3	2	2	6	2	5	7	3	5
n TDM programs for municipal employees	2	5	3	6	3	4	3	3	2	6	2	2	6	2	5
Total Responses (Total Questions=68):	68	68	68	68	68	68	68	68	68	66	68	68	68	68	68

LEGEND:

0 - No response
1 - Not applicable
2 - Not a priority at present
3 - Studying the issue
4 - Have adopted policies/guidelines
5 - Implementing pilot project(s)
6 - Implementing in specific cases/areas
7 - Implementing throughout municipality

Exhibit 3.44: Status of Transportation/Land-Use Initiatives by Urban Area, 1991-1996

CATEGORY	URBAN AREA - 1991 vs. 1996 Responses					
	London	Hamilton	Edmonton	Ottawa-Hull	Vancouver	Toronto
1. Urban Structure/Land Use						
a long-term, integrated municipal land-use/transportation plan	4 to 7	3 to 7	3 to 7	7	4	7
b transit-related high-density, mixed-use centres/nodes	4 to 6	3 to 4	3 to 6	3 to 4	6	6
c higher-density, mixed-use transit corridors	3 to 4	3 to 4	3 to 2	3 to 4	7	4 to 6
d designated limits on urban development	3 to 4	7	3 to 2	3 to 4	6	4
e re-urbanisation/intensification of transit corridors	4	4	3 to 2	5 to 6	6 to 4	6
f relating density to level of transit service	3 to 4	3	3 to 7	3 to 7	4	4 to 6
g appropriate population/employment ratio at municipal level	2	3	3 to 2	7	4	4
h appropriate population/employment ratio at node/community level	2	2 to 3	3 to 2	7	3	4
i promotion of residential uses in/near downtown area	4	4 to 6	3 to 7	6	6	6
2. Urban Design						
a transit-supportive urban design (macro level)	4 to 6	3 to 4	7	7	4	4 to 6
b transit-supportive site/building design (micro level)	7	3 to 4	6	7	4	4 to 6
c cycling-supportive streetscaping	3 to 6	5 to 6	6	3 to 7	6	4 to 6
d pedestrian-supportive streetscaping	4 to 6	4 to 6	6	3 to 7	6	4 to 6
3. Walking						
a enhanced pedestrian micro-climate (e.g. weather protection)	2	6 to 2	6	6	6	6
b adequate road crossing facilities (e.g. crossovers, signal timing)	4 to 7	7 to 6	7	6 to 7	6	7
4. Cycling						
a network of on-street cycling lanes/specially-widened curb lanes	6	6 to 7	6	7	6	5 to 6
b network of off-street cycling paths	6 to 7	6 to 7	6	7	6	7
c requirements for provision of secure parking for cycles	-1 to 5	-1 to 3	-1 to 6	-1 to 6	-1 to 6	-1 to 6
d municipal participation on cycling advisory/awareness committees	-1 to 7	-1 to 7	-1 to 7	-1 to 7	-1 to 7	-1 to 7
e cycling amenities in new development (e.g. storage, showers)	2 to 3	3 to 2	7 to 6	3 to 6	6	5
5. Transit						
a transit priority by means of HOV or reserved bus lanes	3 to 4	3 to 2	6	5 to 6	6	6
b other transit priority measures (e.g. pre-emptive signals, queue jumps)	3	3 to 2	6	5 to 6	6	6
c stops within walking distance of places of residence/employment	7 to 4	6 to 7	7	7	7	6
d park'n'ride lots	2	3 to 2	6	7	7	7
e kiss'n'ride facilities	2	4 to 5	6	7	6	7
f bike'n'ride enhancements	3 to 2	3 to 2	6	6	6	4 to 6
g inter-municipal service coordination	1	6 to 2	7	7	7	4 to 6
h inter-municipal fare coordination	1	6	7	7	7	4 to 6
i "seamless" transit across region	1	7 to 2	7	7	7	3
j transit safety/security programs	7 to 4	6 to 7	7	7	7	7
k integration of urban transit with inter-city services	2	6 to 2	2	7	7	3 to 7
6. Parking						
a parking standards related to level/proximity of transit service	3 to 6	3 to 2	3 to 6	3	6	4 to 7
b maximum parking standards	3 to 2	3	6	6 to 4	6	4 to 6
c cap on overall parking supply	3 to 2	3 to 2	3 to 2	1 to 2	2	3

NOTE: If responses for both years are the same, one code is given.
If responses vary between the years, the first is the 1991 survey response, the second, 1996.

LEGEND:

-1 - Not asked
0 - No response
1 - Not applicable
2 - Not a priority at present
3 - Studying the issue
4 - Have adopted policies/guidelines
5 - Implementing pilot project(s)
6 - Implementing in specific cases/areas
7 - Implementing throughout municipality

Exhibit 3.44 (continued)

CATEGORY	URBAN AREA - 1991 vs. 1996 Responses					
	London	Hamilton	Edmonton	Ottawa-Hull	Vancouver	Toronto
d pricing to discourage use of public parking lots by commuters	3 to 4	3 to 2	3 to 2	1 to 6	6	3
e tax or other measure to discourage use of private lots by commuters	3 to 2	3 to 2	3 to 2	1 to 3	2	3
f restrictions on on-street parking on arterial roads in peak hours	3 to 7	6	7	7	7	7
7. Road System Optimisation						
a recognising all road user needs in planning of road system	4 to 7	3 to 7	3 to 7	7	5	4 to 7
b considering person-capacity as well as vehicular capacity	4 to 2	6	3 to 7	7	4	4 to 7
c HOV lanes and promotion/facilitation of ridesharing	4 to 3	3 to 2	3 to 2	3 to 6	6 to 4	6
d transportation systems management program (operational improvements)	3 to 2	3 to 6	3 to 6	7 to 6	5	6
e intersection improvement program	3 to 2	7 to 6	7 to 6	7	6	6
f real-time traffic signal control	7	6	3	7	6	6
g incident management system	6 to 3	2 to 7	3 to 6	3	6	6
8. Goods Movement						
a consideration of goods movement in transportation system planning	2	4 to 7	3 to 7	7	4	4 to 7
b consultation with goods movement industry to identify/resolve issues	2	6	6 to 7	7 to 6	2	4 to 7
c provision of adequate, accessible off-street loading facilities	6 to 7	6 to 7	2 to 7	6	6	6
d designation of appropriate truck routes	7	7	3 to 7	7	7	6
9. Special User Needs						
a transit vehicles accessible to physically challenged	6	5 to 7	7	7	6	5 to 6
b transit stations/stops accessible to physically challenged	6	6 to 7	7	6 to 7	6	5 to 6
c paratransit to supplement regular transit for special needs	3 to 7	7 to 4	7 to 6	7	7	6
d curb cuts/ramps on pedestrian facilities	7	6 to 7	7	7	6	6
e designated parking spaces for physically challenged	0 to 7	7	7	7	7	7
f audible pedestrian signals	-1 to 5	-1 to 6	-1 to 6	-1 to 6	-1 to 7	-1 to 6
10. Energy, Environment, and Travel Demand Management						
a alternative fuels for municipal vehicles	7	6 to 5	3	6 to 2	6	5
b alternative fuels for transit vehicles	7	7 to 6	3	6 to 3	6	5 to 6
c fuel-efficient vehicles for municipal fleets	7	6 to 5	3 to 7	3 to 6	6	5 to 6
d promoting higher fuel-efficiency standards	2	7 to 5	3 to 2	7 to 2	6	4 to 7
e promoting emissions control maintenance and inspection	2	6 to 5	3 to 2	7 to 2	7	4 to 7
f environmental assessment for new transportation facilities/services	7	7 to 4	6	7	6	7
g environmental assessment for land-use plans, development proposals	6 to 7	6 to 4	6	7	6	4
h overall municipal TDM strategy	3 to 6	3 to 2	3 to 2	3 to 6	4	4
i TDM strategy includes road pricing initiatives	-1 to 2	-1 to 2	-1 to 2	-1 to 3	-1 to 3	-1 to 3
j promoting TDM education programs	3	3	3 to 2	3 to 6	5 to 7	3
k promoting flextime, telecommuting, compressed work weeks, etc.	3 to 2	3 to 4	3 to 2	5 to 6	6	3
l Transportation Management Associations	3	2	3 to 2	3 to 5	5	3 to 5
m TDM outreach/advisory programs for employers	3	3 to 2	3 to 2	5	4 to 7	3 to 5
n TDM programs for municipal employees	3	3	3 to 2	5 to 2	6	3 to 5

NOTE: If responses for both years are the same, one code is given.
If responses vary between the years, the first is the 1991 survey response, the second, 1996.

LEGEND:

-1 - Not asked
0 - No response
1 - Not applicable
2 - Not a priority at present
3 - Studying the issue
4 - Have adopted policies/guidelines
5 - Implementing pilot project(s)
6 - Implementing in specific cases/areas
7 - Implementing throughout municipality

4. RECOMMENDATIONS FOR FUTURE SURVEYS

4.1 GENERAL RECOMMENDATIONS FOR SURVEY PROCESS

In general, implementing the survey went rather well and sets a good platform for future surveys. Most municipalities were very helpful regarding follow-up contacts for clarification of various items. A few suggestions to make the survey process more efficient are discussed below.

The process of coding survey responses could be side-stepped by having responding municipalities use the Access database forms that have already been created, which could be accessed at a common web-site. Alternatively, each municipality could be sent a pared-down version of the database including only the components (i.e. forms and blank tables) required to answer the survey. The individual responses then would be entered in tables that could be easily be appended to the current tables. The database can easily produce graphical and tabular summaries of the responses and indicators for each survey year of data using the queries and "reports" that are already in place.

The data validation process would be more efficient if stricter response deadlines could be achieved. Although data validation began as the first surveys were received, many of the anomalies in the data were not discovered until the data set was considerably more complete. Enforcing the response deadline would be a courtesy to the responding municipalities, as it would reduce the length of the validation process and the number of times that they would be contacted to clarify various items.

If possible, the survey process should be timed so that the data validation component of study does not occur in mid- to late summer. This would minimise the probability that municipal contacts are on vacation and not easily accessible.

The Canadian Urban Transit Association (CUTA) statistics provide much of the transit data that was requested for the municipalities in Part C. Where the specific data items relating to transit were not provided, the municipalities were contacted individually to see whether they were in agreement with the use of the CUTA statistics. Just as population and employment data were presented to the municipalities for three of the four geographic regions for verification of these numbers, the transit statistics should be presented as a starting point for the municipalities. This would reduce the follow-up required to make the database as complete as possible.

One of the most frequent obstacles reported by the responding municipalities was the need to consult other agencies or municipalities within their urban area to provide or verify certain data items. Some of the respondents have indicated that they will try to streamline the exchange of information within their Regions in time for the next survey. Such increased co-operation could be encouraged where appropriate by TAC. Regional coordinating bodies such as the Greater Toronto Services Board (GTSB) in greater Toronto, the Agence Metropolitaine de Transport (AMT) in Greater Montreal, TRANS in the National Capital Region, and the Greater Vancouver Transportation Authority (GVTA) in greater Vancouver will, it is hoped, be more operational by the time of the next survey.

4.2 SPECIFIC CHANGES TO SURVEY QUESTIONNAIRE

4.2.1 Part A - Status of Land-Use/Transportation Initiatives

A number of urban areas provided more than one response to the status of the various initiatives, although the method of summarising the data uses only the most action-oriented response. It should be made clearer in the questionnaires that only one response should be chosen per initiative.

To minimise wrong answers due to misinterpretation of the questions, some more detail and examples could be added. For example, for 7(e) "intersection improvement program," the question might specify whether this includes traffic signal co-ordination and optimization.

One aspect of implementing the ***New Vision for Urban Transportation*** is with respect to the layout of both local streets, and highways and arterial roads. A grid layout of local streets is more transit- and pedestrian-friendly than a curvilinear road layout with cul-de-sacs, and a grid pattern of highways and arterials can accommodate travel demand that cannot be handled by walking, cycling or transit. This should be an additional item in the questionnaire. To keep the questionnaire from becoming too long and onerous, 1(e) "re-urbanization/intensification of transit corridors," which seems to be a sub-set of 1(c) "higher-density, mixed-use transit corridors," and was answered in much the same way as was 1(c), could be combined into one question with 1(c).

4.2.2 Part B - Transportation Financing

In the current questionnaire, Questions 1 and 3 refer to the same funding sources, but are located on different pages, and one has to check back and forth between the questions to see whether an answer has been provided for one of the two questions. This was the likely cause of a number of items being missed by the responding urban areas. A simpler format would combine these questions, so that one would indicate on the same line either how the funding source was used or why the funding source was not used, with no need to cross-reference between pages.

The wording of the "dedicated to transit improvements" option in Question B1 is problematic. One urban area noted that it cannot use transit fares for transit *improvements* per se, because the transit fares do not even cover transit operating costs. It appears that the spirit of the question is to find out whether the different funding sources are applied toward **any** transit expenditures, either operating costs or capital costs. This appears to have been the way the other urban areas interpreted the question. Hence, the wording of this option should simply be "dedicated to transit."

A reordering of the items in Question 1/3 is suggested, to correspond with the order of the funding categories in Question B. This is, in fact, the order in which the summaries for Question B appear in the report. The revised question would be ordered as follows (original ordering is indicated by the letters in parentheses):

Federal/Provincial subsidies/grants
- a (a) Federal subsidy
- b (b) Provincial subsidy
- c (c) special Federal or Provincial grants

User fees/parking taxes/surcharges
- d (g) surcharge on public parking rates

e (h) tax on private parking revenues
f (i) transit user fees
g (j) road system user fees
h (n) municipal vehicle registration tax

Municipal taxes/surcharges

i (d) municipal property tax
j (e) municipal fuel tax
k (f) hydro surcharge
l (o) emissions-related taxes

Development levies/cost recovery

m (k) benefit-sharing levy on development
n (l) frontage levy on development
o (m) cost recovery from new development

p (p) other

In Part B, it is assumed that respondents are providing data for 1996. However, as the responses to Part C indicate, in many cases the responses are from other years. Urban areas need to be asked explicitly what year the data provided in the responses to Part B are for.

4.2.3 Part C – Land Use and Transportation Data

Definitions of AM and PM peak travel periods vary by urban area. Therefore, participating urban areas should be asked to specify the start and end times of these peak periods for Questions 10, 11, 12, 14 and 15. It is especially important to know the length of the AM peak period in Question 12, as the "road utilization indicator" presented in Exhibit 3.29 is based on trips in one hour during the AM peak period to allow for comparison across urban areas.

A note should be included in Question 11 that we are now using journey-to-work travel mode data from Census Canada in addition to the data elicited in the survey. This should prevent urban areas from trying to use the same data to answer Question 11, which asks for travel mode data for all trip purposes.

Questions 14 and 15 were worded more clearly in the Pilot Survey. Currently, Question 14 is worded as follows:

14 Arterial vehicle-km
(a) AM peak period (% Private Vehicles)
(b) PM peak period (% Private Vehicles)
(c) AM & PM Peak periods (% Commercial Vehicles)
(d) 24-hour vehicle-km (Private Vehicles)
(e) 24-hour vehicle-km (Commercial Vehicles)

The result was that some of the responses included the percentage of private vehicles where the vehicle-km of travel were desired. A rewording that would better capture the intent of the questions is as follows:

14 Arterial vehicle-km

(a) AM peak period vehicle-km (Private Vehicles)
(b) PM peak period vehicle-km (Private Vehicles)
(c) % Commercial Vehicles in AM & PM Peak periods
(d) 24-hour vehicle-km (Private Vehicles)
(e) 24-hour vehicle-km (Commercial Vehicles)

Question 15 is currently worded in a very similar way to Question 14 and the same recommendations apply.

As a general comment, it is suggested that TAC contact the participating urban areas (and others if an expanded sample is contemplated), perhaps at the time this report is distributed, to suggest that an attempt be made to time any future travel surveys so that they fall on the Census years (e.g., 2001, 2006, 2011, etc.). This would contribute significantly to the reliability and timeliness of travel demand and related data reported in future Urban Transportation Indicator surveys.

5. CONCLUSIONS

5.1 AVAILABILITY OF DATA

Building on lessons learned from the Pilot Survey carried out in 1995, the second survey of 15 urban areas, carried out in early 1999, has produced an on-line database of standardised urban transportation and land use indicators. Population, fuel sales and journey-to-work modal split data were acquired for these 15 urban areas plus three additional urban areas. Including urban areas of a variety of sizes assisted comparison of the indicators among urban areas of similar size and the ability to identify correlations of various indicators with urban area size.

The resulting database of survey responses to the 1996 study year survey represents a significant improvement in data availability. Responses to Parts A and B of the survey were virtually complete. For Part C of the survey, 73% of the requested data were received, which is quite good considering that several medium-sized urban areas were included that often do not have the same extent of travel survey data and other resources available to larger urban areas. Individual urban areas provided 48 to 100% of the requested data for Part C.

5.2 RELIABILITY OF DATA

Responses to the survey and summaries of indicators based on these responses have been reviewed by the participating urban areas, the Steering Committee, and IBI staff. Through this data validation process, a number of anomalies were spotted and corrected.

For the most part, the responding urban areas described the conditions for 1996 in their survey responses. There was some variation in the year represented by various data items due to the timing of travel surveys, parking inventories, etc., from which the data were drawn. As long as there were no major changes between the 1996 survey year and the year described by the data used, comparisons between urban areas are not considered to be compromised significantly. However, because of changes in the amount of Provincial funding available to urban areas for transportation that took place following 1996, the participating municipalities were urged to - and did - provide 1996 funding and financing data as much as possible, rather than 1998 or 1999 data, which were more readily available to the municipalities.

5.3 DATA CONSISTENCY OVER TIME

One major finding of the Pilot Survey, carried out in 1995 and based on the 1991 survey year, was that when urban areas were asked to define their own Regions, Existing Urban Areas, Central Areas and Central Business Districts, very different degrees of urbanization were represented by these geographic definitions across the urban areas. Hence, for the 1996 study year survey, municipalities were presented with standardised Region, EUA and CBD definitions to verify, and asked to define only their Central Areas, based on certain guidelines. This is a major improvement over the previous survey, and provides a solid basis on which comparisons between urban areas can be made for the 1996 survey year, and on which to build future comparisons.

Unfortunately, because of large differences between the 1991 and 1996 definitions for the geographic areas, credible temporal comparisons could not, in most cases, be carried out for those urban areas that

participated in both surveys. Comparisons over time were in general carried out only regarding the status of transportation and land use initiatives (Part A of the survey).

5.4 URBAN TRANSPORTATION INDICATORS: KEY FINDINGS

Chapter 3 presents and discusses urban transportation and land use indicators for the participating municipalities. These are categorized as follows:

- urban structure
- transportation supply
- transportation demand
- transportation system performance
- environmental impact
- transportation costs and finance
- transportation funding sources
- status of transportation/land-use initiatives

Some of the key findings resulting from a review of these indicators across the urban areas for the 1996 study year are as follows:

- **Population density** - It is generally agreed that intensified and mixed-use urban development encourages transit, cycle and walk trips and reduces dependence on travel by private auto. The survey results suggest that higher population densities are achievable regardless of urban area size. The two urban areas with the highest EUA population densities are Toronto and Regina (Exhibit 3.5a), which represent the largest and smallest urban areas among the participating municipalities. Some of the smaller urban areas have also achieved population densities in their CBDs and CAs that are as high as those of the larger urban areas. It is important to encourage residential uses in the CBDs to make for a more vibrant and safe urban core area. In 1996, only three urban areas had higher population densities in the CBD than in the CA (Exhibit 3.5b).

- **HOV lanes** - Making transit service more attractive through the use of HOV or bus lanes is an initiative that has not gained much momentum in Canadian urban areas, especially in those with a population less than 650,000, except for Regina (Exhibit 3.10).

- **Transit modal share and parking supply** - All of the urban areas with populations of 650,000 or more achieved an AM peak period transit modal share of 30% or more for trips to and from the CBD, whereas those in smaller urban areas are no more than 17% (Exhibit 3.16). Among the larger urban areas, an inverse correlation can be seen between off-street parking supply and transit modal share for trips to and from the CBD (Exhibit 3.15). The use of pricing, tax or other measures to discourage the use of private lots by commuters is generally of low priority across the urban areas, as are setting a cap on the overall parking supply and the setting of maximum parking standards (Exhibits 3.42, 3.43).

- **Auto occupancies** - There is much room for decreasing auto emissions per capita by increasing auto occupancies, the normal range for AM peak period trips being between 1.15 and 1.3 persons per vehicle, although in some cases occupancies of over 1.4 are achieved (Exhibit 3.23). Encouraging ridesharing is not yet a high priority in Canadian urban areas (Exhibit 3.42).

- **Congestion levels** - Values for an EUA road utilisation or congestion indicator, essentially vehicle-km per arterial and expressway lane-km for an hour in the AM peak, do not show much variation for urban areas with populations less than 850,000, but show a trend of increasing congestion with increasing urban area size for the larger urban areas (Exhibit 3.31).

- **Relationship between transit supply, ridership and expenditures** - There is a striking resemblance in the profiles across all the responding urban areas of three transit-related indicators: transit seat-km per capita, transit ridership per capita, and transit expenditures per capita. These are shown in Exhibits 3.13, 3.25 and 3.34, respectively. Although the direction of causation in these relationships could be interpreted in various ways, it does suggest that capturing a larger transit market is related to the level of investment in transit services. It should also be kept in mind, of course, that many other factors affect transit ridership in addition to the amount of service, not the least of which are transit fare structure, the extent to which transit travel times compete with those by auto, central area parking supply/rates, and the extent to which land use and streetscape design are transit-supportive.

- **Current investment priorities** - A comparison of investment priorities, evidenced by the roads and transit capital and operating expenditures in 1996 across the urban areas, shows that only in three urban areas is there a greater investment in transit than in roads, and two urban areas had comparable investments between roads and transit (Exhibit 3.34).

- **Current gasoline consumption levels** - Gasoline consumption and the resulting gasoline-based carbon-dioxide emissions per capita are quite high. The range of values is about 850 to 1,280 L of gasoline per capita, resulting in 2 to 3 tonnes of carbon-dioxide emissions per capita (Exhibit 3.32).

- **Transportation financing** - Transportation financing is facing major changes due to reduced transfer payments and increased pressure on municipal governments to focus on social and other services. In 1996, transit revenue/operating cost ratios were 45% to 60% across Canada, and 71% in the case of Toronto (Exhibit 3.35); the change in these ratios between 1996 and the next survey year will be of special interest. Many urban areas are investigating new sources of revenue for transportation expenditures, especially the use of fuel taxes and vehicle registration taxes or surcharges dedicated to transportation (Exhibit 3.39). These potential new sources are very much in keeping with the TAC Vision of transportation expenditures being increasingly borne by users of the transportation system.

- **Long-term planning** - Urban areas should be encouraged to develop a long-term land-use/transportation plan to ensure the kind of development that is needed to implement TAC's ***New Vision for Transportation*** on a macro scale. In 1996, eight of the fifteen responding municipalities had adopted such a plan, although only three of these included designated limits on urban development to help achieve more transit-supportive development (Exhibit 3.43).

- **Travel demand management (TDM) initiatives** - TDM programs are at various levels of implementation throughout the urban areas. Initiatives such as an overall municipal TDM strategy, promotion of TDM education programs, and the formation of TDM associations are generally under study, while five or six urban areas are implementing work-related TDM programs such as promoting flextime, telecommuting, and employer or employee TDM strategies (Exhibit 3.43). As pointed out in the TAC Vision TDM is a cost-effective way to achieve more efficient use of existing transportation facilities and services, thereby relieving pressure for system expansions and reducing negative impacts of transportation on the urban environment.

5.5 COMMENTS ON KEY INDICATORS AND PROGRESS TOWARDS TAC'S NEW VISION FOR URBAN TRANSPORTATION

What have we learned from TAC's second survey on urban transportation indicators in Canadian Cities? Is there measurable progress towards achieving TAC's ***New Vision for Urban Transportation***? Is it worth proceeding with future surveys of this type to monitor progress? In this final section we provide comments regarding the above "bottom line" questions. In doing so, we differentiate between **performance** indicators (measuring actual on-the-ground changes in transportation system performance and contributing land use factors), indicators relating to **financing** urban transportation, and findings regarding various transportation and land use **initiatives** being taken in the responding urban areas. The latter two sets of indicators measure **input** activities, while the former measures **output** in terms of what is actually being achieved on the ground. As noted below, we find that there is evidence of reasonable progress on the input side, but the output results are not as encouraging. In short, Canadian urban areas still have a long way to go in achieving the ***New Vision for Urban Transportation.***

5.5.1 Performance Indicators: Transportation and Land Use

The 1995 report on the Pilot Survey presented a table ranking the importance of the numerical indicators (i.e. derived from Part C of the questionnaire). These key indicators correspond to those presented in Exhibit 3.1 of this report, with the exception of three new indicators that were added in Exhibit 3.1: auto occupancies in the AM peak periods for trips to/from the CBD and for EUA trips, and EUA vehicle-km of travel estimated from fuel-sales data. These thirty-five indicators should continue to be the focus of future data collection efforts and analysis.

We feel that of these key indicators, two are especially significant in monitoring the extent to which more sustainable transportation is being achieved in Canadian urban areas: gasoline-based carbon-dioxide emissions per capita in the EUA and annual transit ridership per capita in the EUA. These two indicators are presented graphically in Exhibits 5.1 and 5.2, respectively, for 1996 and for 1991 where available from the previous survey. Another principal indicator is the amount of transit supply, expressed as transit seat-km, but the 1991-96 trends in this indicator are not included here because it was felt that it is more sensitive to changes in the geographic area definitions which occurred between the two surveys.

The indicator shown in Exhibit 5.1 is truly a bottom line output indicator in that it is a direct measure of a key environmental impact affecting global warming and which is the subject of intense policy consideration by senior levels of government as they consider how best to meet Canada's Kyoto commitment. It is also an indirect measure of energy consumed per capita in urban transportation and (because automobiles are the overwhelmingly predominant contributors to transportation emissions and

energy consumption) an indirect measure of progress (or lack of progress) towards reducing the level of automobile dependence in Canadian urban areas. Annual transit ridership per capita, as shown in Exhibit 5.2, is singled out as the other key bottom line output indicator, since it measures the extent to which transit's share of the travel market is increasing (or not) on a per capita basis, which is a must if automobile dependence is to be reduced (or even stabilized) as a fundamental step towards the TAC Vision. It is for these reasons that we present a comparison of the 1991 and 1996 results for these two indicators, in spite of the smaller number of urban areas for which the earlier data is available and concerns which must be recognized in interpreting the comparison owing to changes in the definitions of geographic areas, in particular the existing urban area (EUA) boundaries.

Exhibit 5.1: Gasoline-Based Carbon-Dioxide Emissions per Capita in EUA, 1991-1996

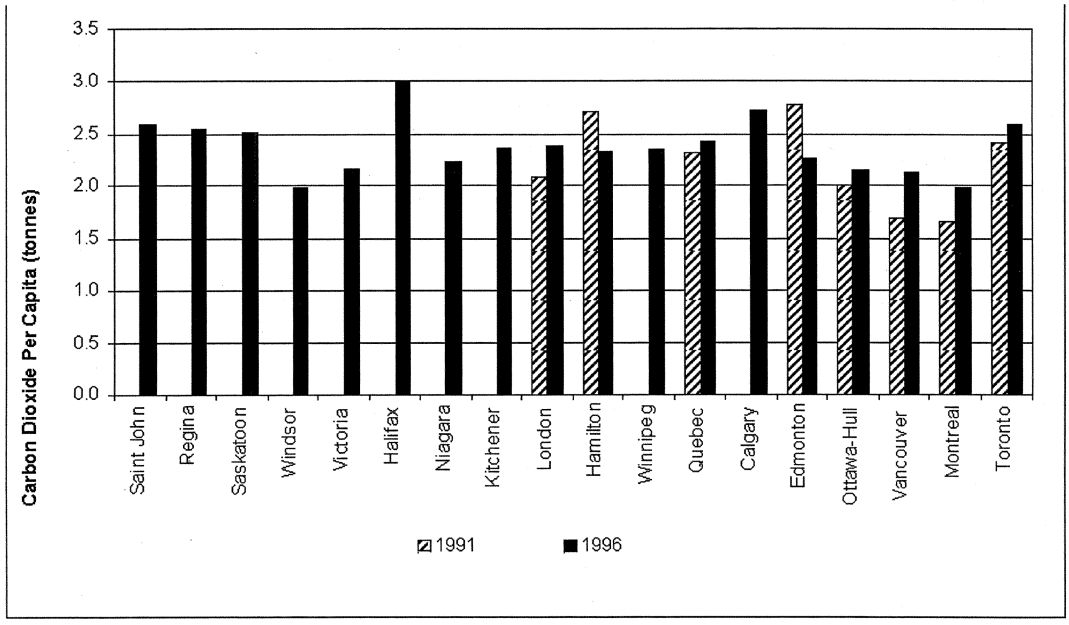
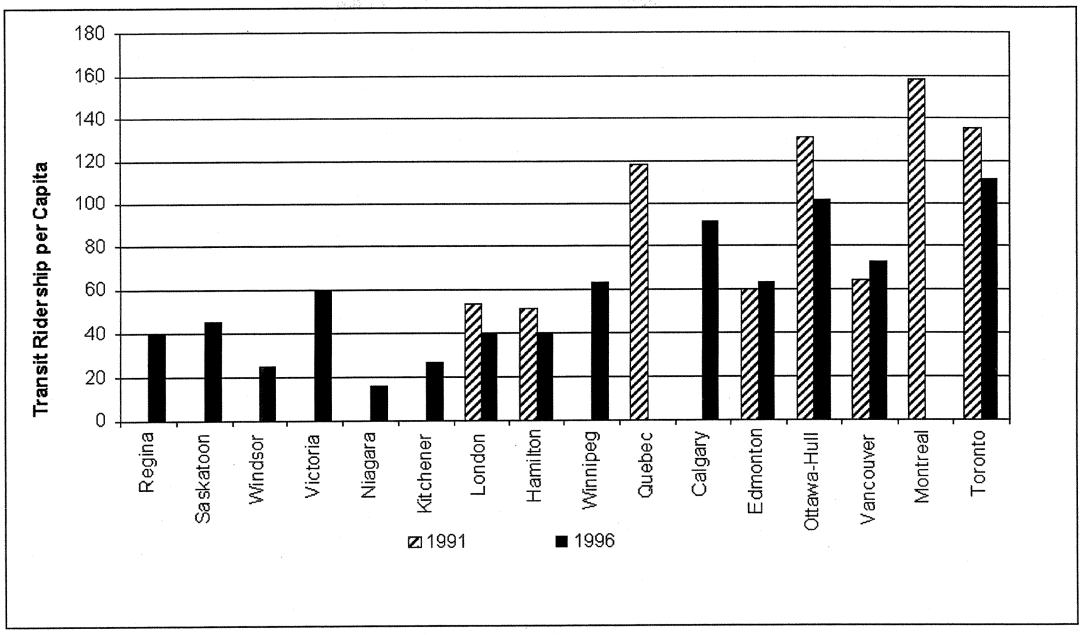


Exhibit 5.2: Annual Transit Ridership per Capita in EUA, 1991-1996



Due caution should be taken in interpreting these exhibits, owing to the changes in geographic area boundaries that have occurred between the survey years (as discussed earlier in Section 2.2). The differences in these definitions between 1991 and 1996 are partially mitigated by the fact that the indicators are expressed on a per capita basis, but the EUAs still reflect different degrees of urbanisation between the two periods studied. Nevertheless, Exhibit 5.1 shows that, of the eight urban areas for which gasoline-based carbon-dioxide emissions were available in both survey years, six experienced an increase in per capita auto emissions from 1991 to 1996. Turning to Exhibit 5.2, four of the six urban areas for which transit ridership data is available for both survey years show a decline in per capita ridership, while two show a marginal increase. (The increase shown for Vancouver probably reflects the reduction in EUA size between 1991 and 1996, while the reduction shown for Toronto is overstated because the 1991 data was for the TTC only while the 1996 data also includes ridership on other GTA municipal transit properties, reflecting a major increase in size of the EUA.)

Neither of these temporal trends (both of which are corroborated by trend data from other sources) paints an encouraging picture of the direction that transportation systems seem to be heading in Canadian urban areas. If a third urban transportation indicator survey can be carried out for 2001 and with the same geographic area definitions as used in the 1996 study year survey, this will provide a firmer basis for monitoring urban transportation trends and the extent to which TAC's ***New Vision for Urban Transportation*** and more sustainable transportation are being achieved.

5.5.2 Financing Urban Transportation

Part B of the questionnaire elicited information on transportation funding sources currently used and their relative contributions, funding sources currently not used and the reasons for this, new funding sources being considered and the types of financial analyses employed as part of the transportation planning and programming process.

Two comments are worthy of note. First, as pointed out in TAC's 1997 briefing, ***Financing Urban Transportation***, achieving the Vision will require more stable and reliable funding sources than are available in most Canadian areas and an infusion of additional funding - particularly to improve public transportation - if the Vision is to be achieved. As pointed out by a number of respondents, and as documented in other reports, changes in transportation funding arrangements and responsibilities have affected urban areas in some provinces, in particular since the 1996 study year. Reduced funding in some cases, coupled with the infeasibility of raising property taxes (currently the major source of municipal funding for urban transportation) has put considerable financing pressure on the affected urban areas.

This leads to the second comment, recognition of an encouraging trend among many urban areas to investigate new sources of funding for transportation, particularly revenue derived from transportation **user charges** such as fuel taxes, vehicle registration fees, parking revenues and/or road pricing. As pointed out in TAC's financial briefing, greater reliance on transportation user charges will provide a reliable source of funding (which increases as travel demand levels increase) and, if properly designed, can significantly moderate the use of single occupant autos on congested roads in peak periods, thereby contributing to more sustainable transportation and the 13 principles of TAC's 1993 Vision.

While current thinking among many of the survey respondents regarding new funding sources is encouraging, progress has been slow since 1996 (with the important exceptions of the Greater Vancouver Transportation Authority and the Agence Metropolitaine de Transport in Montreal) and very considerable, persistent effort will be required to show bottom line results.

5.5.3 Transportation and Land Use Initiatives

As described earlier in Section 3.8, transportation/land use initiatives reported by the urban areas (in response to Part A of the questionnaire) are quite encouraging in a number of cases. These include the creation of a long term land use/ transportation plan (necessary as a means of defining and working towards the Vision and helping to ensure that transportation funding is well-directed), urban design and streetscape initiatives to encourage transit, cycling and pedestrian-trips, providing increased priority for surface transit operations in some cases, relating parking standards to the levels/proximity of transit services, designing and operating roads to increase capacity for moving people and goods rather than just vehicles, providing accessible off-street loading facilities, designated truck routes and other initiatives to facilitate goods movement, making transit and pedestrian facilities more accessible to the physically-challenged, encouraging more environmentally-friendly technologies, requiring environmental assessments for new transportation facilities/services, and applying or encouraging transportation demand management programs including flex time, compressed work weeks and telecommuting. In most cases, there has been an increase in the priority of these initiatives between 1991 and 1996.

On the other hand, most of the urban areas are assigning low priorities to initiatives such as facilitating compact, mixed use development at key nodes and in transit corridors, taking specific steps such as reserved bus lanes or HOV lanes to provide transit priority, implementing parking supply and demand management, or promoting/facilitating ridesharing and more widespread application of transportation demand management.

In summary, the picture regarding transportation/land use initiatives is mixed. Some excellent initiatives are being taken, but there are noticeable gaps, particularly in terms of urban structure/land use (e.g. approval processes and incentives to achieve more compact mixed use development) improved transit service levels and coverage (limited by current financial constraints), and more widespread application of transportation demand management (including direct user pricing), greater operational priority for surface transit vehicles, and other measures aimed at achieving more efficient use of the transportation system.

5.5.4 Closing Comments

The database of urban transportation indicators described in this report provides a valuable and increasingly reliable source of information which municipalities and other planning agencies can draw on in working towards achieving the Vision. It is hoped that the success of the current study will encourage all fifteen of the participating municipalities to continue their involvement in this program, such that in future years, temporal analyses as described by Exhibits 5.1 and 5.2 can be carried out with greater confidence. It is also hoped that the number of participating urban areas will increase to provide more comprehensive monitoring of transportation trends across Canadian urban areas.

The picture that emerges is one of good intentions, creative thinking and some excellent initiatives but, as yet, little significant impact on the bottom line performance indicators discussed in Section 5.5.1 above. It is all the more important, therefore, that the program of Urban Transportation Indicators surveying begun by TAC for the 1991 and 1996 study years be continued on a consistent basis for the 2001 study year and, it is hoped, at each five year point beyond that. In addition to their considerable value as a source of information for municipal leaders/planners and government at all levels across Canada, the performance indicator results will help separate fact from rhetoric in terms of actual progress, and the results regarding transportation financing and the many transportation/land use initiatives stemming from Sections B and A of the survey will provide a common body of knowledge which, it is hoped, will encourage leaders at all levels of government to persist in working towards the ***New Vision for Urban Transportation*** and more sustainable urban transportation and development across Canada.

APPENDIX A

Questionnaires

Guidelines for Filling out the Survey Questionnaire

PART A Questionnaire consists of 4 pages and deals with the status of transportation and land use initiatives inside the Existing Urban Area (EUA). See map attached.

Please place an 'X' in those boxes that indicate the appropriate status of each of the listed initiatives with respect to your municipality (and any other municipalities inside the EUA) at the present time. If the particular initiative/box is not relevant to your municipality, insert N/A in the box.

Several questions mention "municipal". If the area you are dealing with consists of several municipalities, then use your judgement to provide an answer that would be representative to all the municipalities inside the EUA combined.

PART B Questionnaire consists of 3 pages and deals with transportation finances inside the EUA (see map attached).

Please place an "X" in those boxes that indicate the situation in your municipality at the present time.
If you use the "other" category, please describe the initiative in the space provided.

The same approach used in PART A should be used to interpret the meaning of "municipal".

PART C Questionnaire consists of 4 pages and requests data on land use and transportation in four geographic areas.

Land use, residential population and total employment are already provided for the Region (CMA), Existing Urban Area (EUA) and the Central Business District (CBD). You are asked to define the Central Area (CA) on the base map provided and provide 1996 estimates of land area, population, and employment. The Central Area map indicates the CBD boundaries to assist you in defining the Central Area.
The Central Area boundaries you define should be based on the following guidelines:

a) It should be 2 to 3 times larger in geographic size than the CBD.
b) The area should contain relatively high employment and population densities.
c) To support data compatibility with census information, the Central Area boundaries should coincide with Census tract boundaries.

The transportation data is required for weekday travel demand. In questions 7 and 12 to 15, private vehicles consists of cars, pick-up trucks and family vans used for non-commercial travel. This would include people traveling to and from work, school, shopping and personal business. Commercial vehicles include vehicles used to provide the movement of " goods or services". This would include cars, pick-up trucks and vans used by people to provide a service (repairman, couriers,etc), as well as heavy vehicles to move goods.

For question 6, transit seat-km is based on the service frequency (vehicles per peak period) multiplied by the route length (km) and then by the number of seats per vehicle.

For question 7, number of registered vehicles can be obtained from travel surveys or may require analysis of provincial motor vehicle records.

For questions 14 and 15, the percent commercial vehicles are calculated on a vehicle - km basis. If this is not possible, the percent commercial may be calculated as an average based on traffic classification counts. These percentages should be of total vehicular traffic.

PART A of Questionnaire- Status of Transportation and Land Use Initiatives

IMPORTANT: Step 1: Read "Guidelines for Filling out the Survey Questionnaire" before proceeding further.

		Not a priority at present	Studying the issue	Have adopted policies/ guidelines	Implementing pilot project(s)	Implementing in specific case(s) or area(s)	Implementing throughout municipality
1	**URBAN STRUCTURE/LAND USE**						
	(a) long-term, integrated municipal land-use/transportation plan						
	(b) transit-related high-density, mixed-use centers/nodes						
	(c) higher-density, mixed-use transit corridors						
	(d) designated limits on urban development						
	(e) re-urbanization/intensification transit corridors						
	(f) relating density to level of transit service						
	(g) appropriate population/employment ratio at municipal level						
	(h) appropriate population/employment ratio at node/community level						
	(i) promotion of residential uses in/near downtown area						
	(j) other (please describe below)						
	description of "other":						
2	**URBAN DESIGN**						
	(a) transit-supportive urban design (macro level)						
	(b) transit-supportive site/ building design (micro level)						
	(c) cycling-supportive streetscaping						
	(d) pedestrian-supportive streetscaping						
	(e) other (please describe below)						
	description of "other":						
3	**WALKING**						
	(a) enhanced pedestrian micro-climate (eg. weather protection)						
	(b) adequate road crossing facilities (eg. crossovers, signal timing)						
	(c) other (please describe below)						
	description of "other":						

4	**CYCLING**	Not a priority at present	Studying the issue	Have adopted policies/ guidelines	Implementing pilot project(s)	Implementing in specific case(s) or area(s)	Implementing throughout municipality
	(a) network of on-street cycling lanes/ specially widened curb lanes						
	(b) network of off-street cycling paths						
	(c) requirements for provision of secure parking for cycles						
	(d) municipal participation on cycling advisory/awareness committees						
	(e) cycling amenities in new development (eg. storage, showers)						
	(f) other (please describe below)						
	description of "other":						
5	**TRANSIT**						
	(a) transit priority by means of HOV or reserved bus lanes						
	(b) other transit priority measures (eg. pre-emptive signals, queue jumps)						
	(c) stops within walking distance of places of residence/employment						
	(d) park'n'ride lots						
	(e) kiss'n'ride facilities						
	(f) bike'n'ride enhancements						
	(g) inter-municipal service coordination						
	(h) inter-municipal fare coordination						
	(i) "seamless" transit across region						
	(j) transit safety/security programs						
	(k) integration of urban transit with inter-city services						
	(l) other (please describe below)						
	description of "other":						

6	PARKING	Not a priority at present	Studying the issue	Have adopted policies/ guidelines	Implementing pilot project(s)	Implementing in specific case(s) or area(s)	Implementing throughout municipality
	(a) parking standards related to level/ proximity of transit service						
	(b) maximum parking standards						
	(c) cap on overall parking supply						
	(d) pricing to discourage use of public parking lots by commuters						
	(e) tax or other measure to discourage use of private lots by commuters						
	(f) restrictions on on-street parking on arterial roads in peak hours						
	(g) other (please describe below)						
	description of "other":						
7	**ROAD SYSTEM OPTIMIZATION**						
	(a) recognizing all road user needs in planning of road system						
	(b) considering person-capacity as well as vehicular capacity						
	(c) HOV lanes and promotion/ facilitation of ridesharing						
	(d) transportation systems management program (operational improvements)						
	(e) intersection improvement program						
	(f) real-time traffic signal control						
	(g) incident management system						
	(h) other (please describe below)						
	description of "other":						
8	**GOODS MOVEMENT**						
	(a) consideration of goods movement in transportation system planning						
	(b) consultation with goods movement industry to identify/resolve issues						
	(c) provision of adequate, accessible off-street loading facilities						
	(d) designation of appropriate truck routes						
	(e) other (please describe below)						
	description of "other":						

9	SPECIAL USER NEEDS	Not a priority at present	Studying the issue	Have adopted policies/ guidelines	Implementing pilot project(s)	Implementing in specific case(s) or area(s)	Implementing throughout municipality
	(a) transit vehicles accessible to physically challenged						
	(b) transit stations/stops accessible to physically challenged						
	(c) paratransit to supplement regular transit for special needs						
	(d) curb cuts/ramps on pedestrian facilities						
	(e) designated parking spaces for physically challenged						
	(f) audible pedestrian signals						
	(g) other (please describe below)						
	description of "other":						

10	ENERGY, ENVIRONMENT, AND TRAVEL DEMAND MANAGEMENT (TDM)						
	(a) alternative fuels for municipal vehicles						
	(b) alternative fuels for transit vehicles						
	(c) fuel-efficient vehicles for municipal fleets						
	(d) promoting higher fuel-efficiency standards						
	(e) promoting emissions control maintenance and inspection						
	(f) environmental assessment for new transportation facilities/services						
	(g) environmental assessment for land-use plans, development proposals						
	(h) overall municipal TDM strategy						
	(i) TDM strategy includes road pricing initiatives						
	(j) promoting TDM education programs						
	(k) promoting flextime, telecommuting, compressed work weeks etc.						
	(l) Transportation Management Associations						
	(m) TDM outreach/advisory programs for employers						
	(n) TDM programs for municipal employees						
	(o) other (please describe below)						
	description of "other":						

PART B OF Questionnaire - Transportation Financing

IMPORTANT: Step 1: Read "Guidelines for Filling out the Survey Questionnaire" before proceeding further.

1 Which of the following revenue sources does your municipality utilize to finance (directly or indirectly) transportation system improvements and how is it applied?

	Placed in general revenue account	Dedicated to transit improvements	Dedicated to road improvements	Dedicated to other transportation improvements
(a) Federal subsidy				
(b) Provincial subsidy				
(c) special Federal or Provincial grants				
(d) municipal property tax				
(e) municipal fuel tax				
(f) hydro surcharge				
(g) surcharge on public parking rates				
(h) tax on private parking revenues				
(i) transit user fees				
(j) road system user fees				
(k) benefit-sharing levy on development				
(l) frontage levy on development				
(m) cost recovery from new development				
(n) municipal vehicle registration tax				
(o) emissions-related taxes				
(p) other (please describe below)				
description of "other"				

2 Approximately what percentage of your transportation funding for different types of expenditures is derived from the categories of sources listed?

	Road system capital expenditures	Transit system capital expenditures	Transit system operating expenditures	Other transportation expenditures
(a) Federal/Provincial subsidies/grants (a,b,c from ques. 1)				
(b) user fees/parking taxes/surcharges (g,h,i,j,n from ques. 1)				
(c) municipal taxes/surcharges/etc. (d,e,f,o from ques. 1)				
(d) development levies/cost recovery (k,l,m from ques. 1)				
Total	100%	100%	100%	100%

3 If any of the sources listed in Question 1 are not used by your municipality, please indicate why.

	No need to use	No legislative authority to use	Has not been considered	Not available to municipality
(a) Federal subsidy				
(b) Provincial subsidy				
(c) special Federal or Provincial grants				
(d) municipal property tax				
(e) municipal fuel tax				
(f) hydro surcharge				
(g) surcharge on public parking rates				
(h) tax on private parking revenues				
(i) transit user fees				
(j) road system user fees				
(k) benefit-sharing levy on development				
(l) frontage levy on development				
(m) cost recovery from new development				
(n) municipal vehicle registration tax				
(o) emissions-related taxes				

4 What new revenue sources, if any, are you currently considering to meet any shortfalls in your transportation budget?

5 Does your municipality conduct cost-effectiveness, cost/benefit, or similar financial analysis as part of your assessment of the suitability and/or priority of transportation projects? What type of analysis do you use? Is this done generally or only in specific cases? - please explain.

6 Has your municipality attempted to estimate the costs incurred as a result of congestion to transit service? auto users? commercial goods movement? If so, briefly describe such efforts.

PART C of Questionnaire- Land Use and Transportation Data

IMPORTANT: Step 1: Read "Guidelines for Filling out the Survey Questionnaire" before proceeding further.

	URBAN STRUCTURE	AREA	DATA	YEAR	NOTES	YOUR REMARKS (SOURCES)
1	Land area (sq.km.)	Region (CMA)	5,900	1996		Stats. Canada Data
		EUA	2,300	1996		
		Central Area			#1-3: Please define your central	
		CBD	5.8	1996	area on the map provided. See	
2	Residential population	Region (CMA)	4,265,000	1996	instruction sheet to assist	
		EUA	3,970,000	1996	you in defining this area.	
		Central Area				
		CBD	47,000	1996		
3	Total employment	Region (CMA)	2,060,000	1996	#3: Total employment includes	
		EUA	1,940,000	1996	both full and part-time employment.	
		Central Area				
		CBD	270,000	1996		

	TRANSPORTATION SUPPLY	AREA	DATA	YEAR	NOTES	YOUR REMARKS (SOURCES)
4	(a) Arterial lane-kilometers (km)	EUA				
	(b) Non HOV multi - lane highways/freeways lane-km				#4c: HOV lane-kms includes reserved	
	(c) HOV (including exclusive transit) lane-km				transit lanes.	
5	Bike lane/bike path km	EUA			#5: Bike lane/bike path-kms.	
6	Transit seat-km	EUA			apply to designated or marked	
	(a) AM peak period				on-street or off-street facilities.	
	(b) PM peak period					
	(c) 24 -hr transit seat-km					
7	Private vehicles registered (leased & private)	EUA			#6-7: See instruction sheet	
8	Designated park-and -ride spaces	EUA				
9	Off-street parking spaces	CBD				
	(a) -publicly owned (available for use by pubic)					
	(b) -privately owned (available for use by public)					
	(c) -spaces not available for use by public					

TRANSPORTATION SYSTEM USE	AREA	DATA	YEAR	NOTES	YOUR REMARKS (SOURCES)
10 (a) AM peak modal shares [%]					
-Private vehicle driver	CBD			#10: If no CBD data available, then provide CA data instead. Modal shares are for trips to and from the CBD (excludes trips within the CBD)	
-Private vehicle passenger					
-Transit					
-Cycle					
-Walk					
-Other (taxi, motorcycle etc.)					
		100%			
(b) PM peak period modal shares					
-Private vehicle driver	CBD				
-Private vehicle passenger					
-Transit					
-Cycle					
-Walk					
-Other (taxi, motorcycle etc.)					
		100%			
(c) 24-hour modal shares					
-Private vehicle driver	CBD				
-Private vehicle passenger					
-Transit					
-Cycle					
-Walk					
-Other (taxi, motorcycle etc.)					
		100%			
11 (a) AM peak period modal shares					
-Private vehicle driver	EUA			#11: Modal shares are for trips to, from and within the EUA.	
-Private vehicle passenger					
-Transit					
-Cycle					
-Walk					
-Other (taxi, motorcycle etc.)					
		100%			

TRANSPORTATION SYSTEM USE (continued)	AREA	DATA	YEAR	NOTES	YOUR REMARKS (SOURCES)
11 (b) PM peak period modal shares					
-Private vehicle driver	EUA				
-Private vehicle passenger					
-Transit					
-Cycle					
-Walk					
-Other (taxi, motorcycle etc.)					
		100%			
(c) 24-hour modal shares					
-Private vehicle driver	EUA				
-Private vehicle passenger					
-Transit					
-Cycle					
-Walk					
-Other (taxi, motorcycle etc.)					
		100%			
12 Weekday person trips (all modes)	EUA				
(a) AM peak period				#12: Trips are to, from and within the EUA.	
(b) PM peak period					
(c) 24-hours					
13 (a) Annual transit riders	EUA			#13: One ride represents a trip for which a single fare was paid.	
(b) Riders on a typical weekday					
(c) 24-hour transit passenger - km					
14 Arterial vehicle - km	EUA			#14 & 15: See instruction sheet for definition of private and commercial vehicles. The method to use for estimating % commercial vehicles is also outlined in the instruction sheet.	
(a) AM peak period (% Private Vehicles)					
(b) PM peak period (% Private Vehicles)					
(c) AM & PM Peak periods (% Commercial Vehicles)					
(d) 24-hour vehicle-km (Private Vehicles)					
(e) 24-hour vehicle-km (Commerical Vehicles)					

TRANSPORTATION SYSTEM USE (continued)	AREA	DATA	YEAR	NOTES	YOUR REMARKS (SOURCES)
15 Multi-lane highways/freeway vehicle - km	EUA				
(a) AM peak period (% Private Vehicles)					
(b) PM peak period (% Private Vehicles)					
(c) AM & PM Peak periods (% Commercial Vehicles)					
(d) 24-hour vehicle-km (Private Vehicles)					
(e) 24-hour vehicle-km (Commerical Vehicles)					

TRANSPORTATION SYSTEM PERFORMANCE	AREA	DATA	YEAR	NOTES	YOUR REMARKS (SOURCES)
16 Average home-work trip distance (km)	EUA			#16: Trip distance should be for trips to, from & within the EUA. Average home-work person trip distance can be derived from travel behaviour surveys or Stats Canada POR-POW data. The actual distance is preferred over the straight-line distance.	
17 Annual injuries & fatalities	EUA				

TRANSPORTATION COSTS & FINANCE	AREA	DATA	YEAR	NOTES	YOUR REMARKS (SOURCES)
18 (a) Annual Road capital budget	EUA				
(b) Annual Road operating & maintenance budget					
19 (a) Annual transit capital budget	EUA				
(b) Annual transit operating & maintenance budget					
20 Annual transit Fare Box Revenue	EUA				

TORONTO- Existing Urban Area

Area ID	Municipality		Population	Dwellings	Area	Employment
3518005	Ajax	T	64430	20388	67.7	18070
3519046	Aurora	T	34857	11165	49.16	13480
3521010	Brampton	C	268251	81178	265.04	96800
3520006	East York	BOR	107822	45285	21.26	24975
3520019	Etobicoke	C	328718	120455	123.93	157885
3519036	Markham	T	173383	49368	211.53	92490
3521005	Mississauga	C	544382	172724	273.86	282240
3519048	Newmarket	T	57125	18181	35.91	25240
3520008	North York	C	589653	211035	176.87	286735
3524001	Oakville	T	128405	43130	138.18	56990
3518001	Pickering	T	78989	24048	226.52	25190
3519038	Richmond Hill	T	101725	31521	99.42	39225
3520001	Scarborough	C	558960	184475	187.7	177450
3520004	Toronto	C	653734	289178	97.15	537540
3519028	Vaughan	C	132549	36914	275.34	77600
3520014	York	C	146534	57776	23.18	28665
	Total		3969517	1396821	2272.75	1940575

TORONTO - CBD

Census Tract	Population	Dwellings	Area	Employment
14.00	453	288	0.44	93580
35.00	4013	2246	0.65	41475
11.00	945	483	0.98	26020
62.00	8285	4958	0.73	21170
15.00	1877	1094	0.28	18840
89.00	1530	1066	0.31	14040
34.00	6637	3047	0.52	12315
13.00	5299	3487	0.73	11940
36.00	4194	2091	0.39	9360
63.01	6597	4595	0.31	8335
88.00	1948	1008	0.23	7130
63.02	5118	3527	0.23	4145
Total	46896	27890	5.8	268350

Population, Dwellings Employment and Area of Census Metropolitan Areas (CMA), 1996.

CMA	CMA Population	CMA Dwellings	CMA Employment	CMA Area sq km
Toronto	4,263,757	1,494,498	2,061,610	5867.7
Montreal	3,326,510	1,350,677	1,502,380	4024.2
Vancouver	1,831,665	697,429	908,325	2820.7
Ottawa-Hull	1,010,498	388,977	502,070	5686.5
Edmonton	862,597	321,258	434,015	9536.6
Calgary	821,628	306,588	441,575	5083.3
Quebec	671,899	279,432	315,045	3149.7
Winnipeg	667,209	262,673	324,745	4077.6
Hamilton	624,360	236,342	294,225	1358.5
London	398,616	157,739	190,405	2105.1
Kitchener	382,940	141,739	192,055	823.6
St Catharines-Niagara	372,406	145,655	165,230	1399.8
Halifax	332,518	128,618	163,035	2503.1
Victoria	304,287	130,119	148,890	633.4
Windsor	278,685	106,701	130,770	861.7
Saskatoon	219,056	85,616	107,145	5322.1
Regina	193,652	75,115	96,405	3421.6
St John's NF	174,051	61,156	74,930	789.7
Saint John NB	125,705	47,294	53,385	3509.3

Source: 1996 Census, Statistics Canada

APPENDIX B

Areas Included in Fuel Sales Market Areas

Appendix B: Areas Included in Fuel Sales Market Areas

CALGARY
Calgary

EDMONTON
City of Edmonton

HALIFAX/DARTMOUTH

Bedford/Waverly	City of Halifax	Dartmouth	Sackville/Windsor Junction

HAMILTON

Burlington	City of Hamilton	Dundas	Saltfleet Stoney Creek

KITCHENER/WATERLOO

Bridgeport	Galt	Kitchener	Waterloo
Doon	Hespeler	Preston	

LONDON

City of London	Lambeth

MONTREAL

Anjou	Dorval	Montreal Est	St. Genevieve
Baie d'Urfe	Greenfiled Park	Montreal Nord	St. Hubert/Lafleche
Beaconsfield	Ile Bizard	Montreal Ouest	St. Julie
Blainville	Ile Perrot	Otterburn Park	St. Mathias
Bois des Filions	Kahnawake	Outremont	St. Lambert
Boucherville	Kirkland	Pierrefonds	St. Laurent
Brossard	La Prairie Lachine	Pincourt	St. Leonard
Candiac	Lasalle	Pointe aux Trembles	St. Pierre
Chambly	Laval	Pointe Claire	Ste. Anne de Bellevue
Charlemagne	Lemoyne	Repentigny	Ste. Catherine
Chateauguay	Lery	Rosemere	d'Alexandrie
Cote Saint Luc	Longueuil	Roxboro	Ste. Marthe sur le Lac
Delson	Maple Grove	St. Basile le Grand	Terrebonne
Deux Montagnes	Mascouche	St. Charles de la Chenaie	Vaudreuil
Dollard des Ormeaux	Mont Royal	St. Constant	Verdun
Dorion	Montreal City	St. Eustache	Westmount

NIAGARA

St. Catharines	Welland	Niagara Falls

OTTAWA

Aylmer	City of Hull	Gatineau	Kanata
Bell's Corners/Nepean	City of Ottawa	Gloucester/Orleans	

Appendix B: Areas Included in Fuel Sales Market Areas

QUEBEC CITY

Ancienne Lorette	Charny	Notre Dame des Laurentides	St. Nicolas
Beauport	City of Levis	Orsainville	St. Redempteur
Belair	Courville	Pintendre	St. Romauld
Bernieres	Giffard	Qebec City	Ste Foy
Boischatel	Lac St. Charles	Sillery	Ste. Therese de Lisieux
Charlesbourg	Lauzon	St. David de l'Auberniere	Val Saint Michel
Charlesbourg Est	Loretteville	St Emile	Vanier
Charlesbourg Ouest	Montmorency	St. Felix de Cap Rouge	Villeneuve

REGINA

Regina

SAINT JOHN

City of Saint John	Quispamsis	Rothesay

SASKATOON

Saskatoon

TORONTO

Ajax	East York	Oak Ridges	Scarborough
Aurora	Etobicoke	Oakville	Streetsville
Bramalea	Markham	Oshawa	Vaughan
Brampton	Mississauga	Pickering	Whitby
City of Toronto	Newmarket	Port Credit	York
	North York		

VANCOUVER

Burnaby	Mission	Port Coquitlam	Union Bay/Tsawwassen
City of North Vancouver	New Westminster	Port Moody	Vancouver
Coquitlam	North Vancouver	Richmond	West Vancouver
Delta/Ladner	Township	Surrey	White Rock
Langley			

VICTORIA

City of Victoria	Esquimalt	Metchosin	Saanich
			Sidney

WINDSOR

Sandwich West	Windsor

WINNIPEG

Charleswood	North Kildonan	St. Boniface	Transcona
East Kildonan	Old Kildonan	St. Jame/Assiniboia	Winnipeg
Fort Garry	Springfield	St. Vital	West Kildonan

APPENDIX C

Database Description

Appendix C: Database Description

The database of survey responses and derived urban transportation indicators was developed in Microsoft Access. This software allows the data to be stored as a relational database for efficient data storage and to facilitate data manipulation. With Access, one also has the capability to allow very user-friendly data entry/viewing forms to be created and used.

C.1 DATABASE CONTENTS

The database contains four classes of objects: data tables, forms, queries and reports. These are described below.

C.1.1 DATA TABLES

The data tables hold the raw data and descriptions of the questions. A relational database allows different tables of data to be linked via common "fields" or columns of data to minimise redundant information. Hence there are separate tables for Parts A, B(1,3), B(2), B(4-5) and C, linked by fields that describe the urban area names and survey years. This was done because different sections of the survey are most efficiently stored in tables with different types of table structures. Other tables hold the map data.

C.1.2 FORMS

Data forms make viewing data easier, as the data can be summarised or organised in a more meaningful way. There are two main forms in the database, descriptively named Data and Maps:

- **Data** shows the survey response data for all survey years and for all the urban areas for which data are available for that year. The data for each section of the questionnaire can be viewed through the use of page tabs showing the questionnaire sections. An example of a page of this form is shown in Exhibit C.1.

- **Maps** contains the graphical data. For each municipality, there are two maps, one showing the EUA boundaries, the other showing the CBD and the CA. This form is shown in Exhibit C.2 for the Ottawa-Hull CBD and CA.

A **switchboard** is a type of form that allows for easy navigation between database objects, and is especially helpful for those users that are less familiar with Access. In the final database, the switchboard will open whenever the database is opened. The main switchboard is displayed here as Exhibit C.3.

C. 1.3 QUERIES

Queries can be used to organise or extract information from tables or combinations of tables and to carry out data manipulation. The database contains many queries that underlie its tables and reports.

Exhibit C.1: Data Form

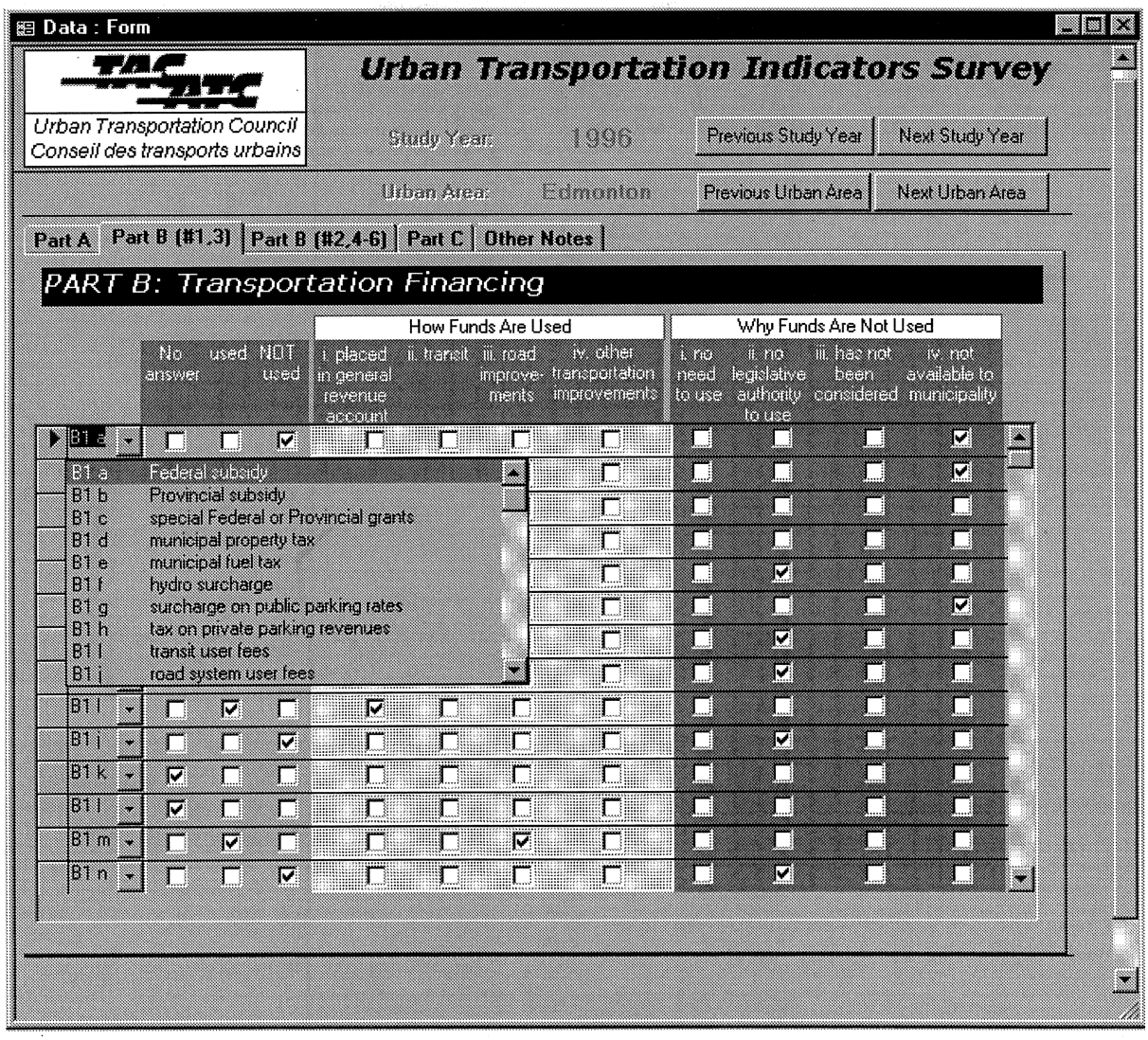


Exhibit C.2: Maps Form

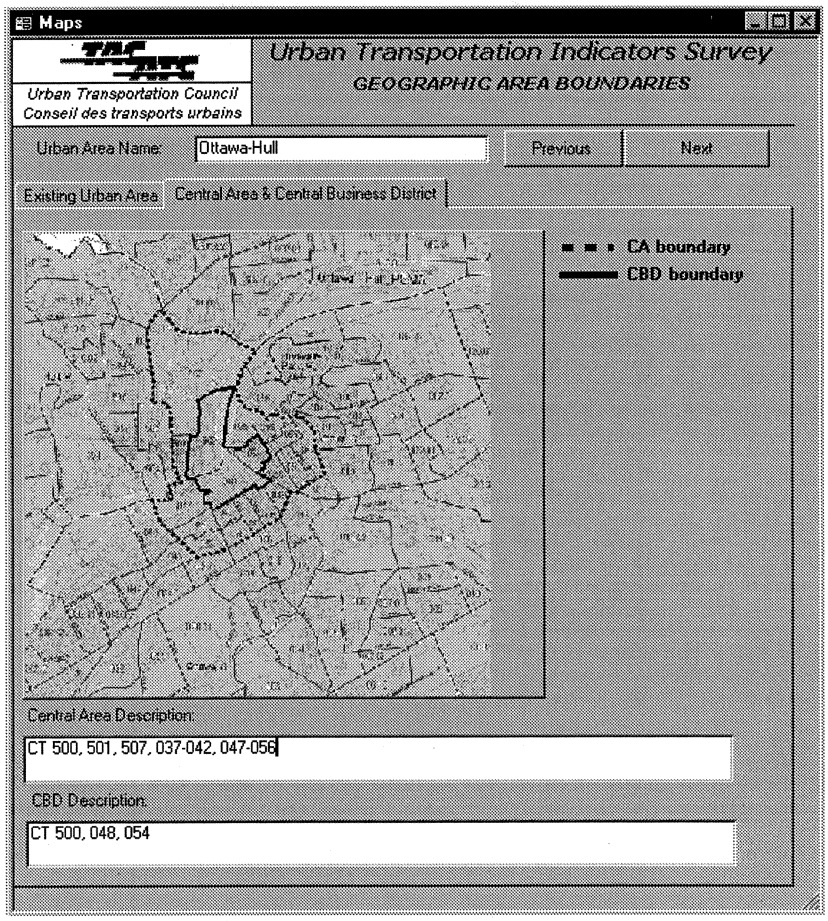
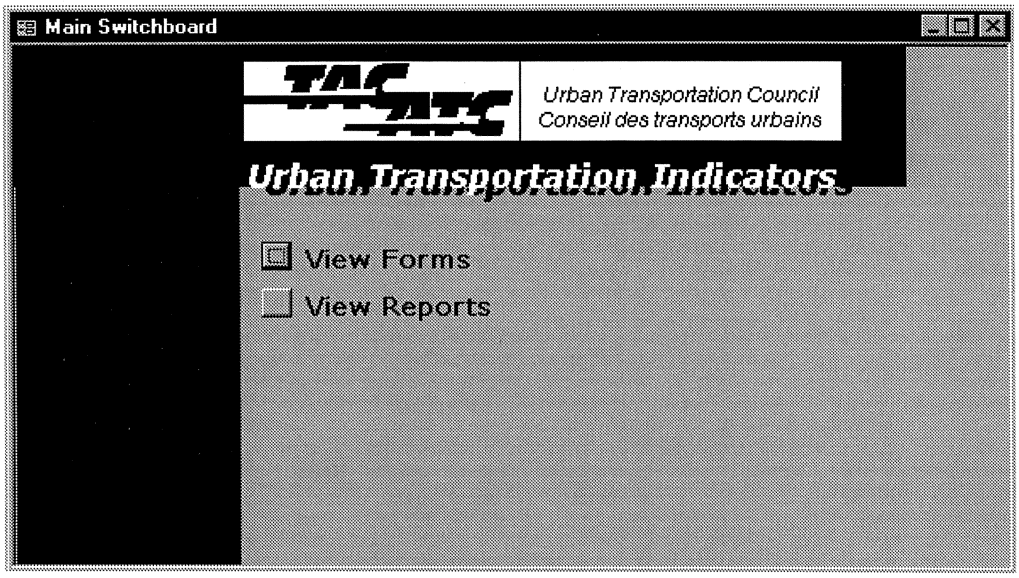


Exhibit C.3. Main Switchboard



C.1.4 "REPORTS"

"Reports" are used to present data in a way that is suitable for printed reports. They allow the designer to have control over the organization, size and appearance of data items so that information can be displayed effectively. The sources of a report's data are the underlying tables and queries, as well as information stored in the report's design.

Access "reports" were used to create the majority of exhibits in the Report on Survey #2. These include tabular summaries and graphical displays. Although only summaries of the 1996 data were included in the printed report, the same Access "reports" also contain 1991 summaries and, when new survey year data are included in the future, the "reports" will automatically include summaries for the new years' data as well. "Reports" presenting these summaries will be retained in the final database as provided for distribution.

The database has an open design, as is the nature of Access databases by default. Its contents are visible and accessible to all authorized users so that they can add their own queries and reports to suit their specific needs.

C.2 USE OF DATABASE FOR FUTURE SURVEY YEARS

The database currently contains all available data from the 1991 and 1996 study years, and can easily incorporate data from future surveys as well. Where there were differences in question numbering between the two surveys to date, 1996 numbering was retained; i.e., the 1991 question identifications were changed to 1996 numbering. Questions introduced in 1996 are marked "not asked" in the 1991 results.

Adding a new survey year to the table "Survey Year" (which currently has two entries, 1991 and 1996), will allow the database to include data describing that year. The majority of data summaries will automatically include the new survey years' data. Some of the queries and reports have been set up to include only 1996 summaries or comparisons between 1991 and 1996. These queries and reports can be copied, and minor adjustments made to summarise the data for future survey years in the same way.

C.3 USER ACCESS TO THE DATABASE

It will be TAC's responsibility to include the Urban Transportation Indicators databases on its website. We understand that TAC intends to establish access privileges for users of the database, with the expectation that free access will apply for urban areas which took part in the 1996 study year survey and paid access by other users.

APPENDIX D

Summary of Responses to Part C

Exhibit D.1: Summary of Responses to Part C

	AREA	Regina	Saskatoon	Windsor	Victoria	Niagara	Kitchener	London	Hamilton
URBAN STRUCTURE									
1 Land Area (sq km)	CMA	3,400	5,322	860	630	1,400	838	2,100	1,400
Land Area (sq km)	EUA	110	140	200	327	470	317	440	423.2
Land Area (sq km)	CA	1.11		4.58	5.68	18	15.6		
Land Area (sq km)	CBD	0.5	0.9	1.9	1.8	4	3.6	1.9	2.1
2 Residential Population	CMA	194,000	219,056	279,000	304,000	372,000	383,000	399,000	624,000
Residential Population	EUA	180,000	193,647	235,000	286,100	274,000	358,000	327,000	536,771
Residential Population	CA	4,035		23,825	22,900	39,000	17,105		
Residential Population	CBD	460	2,500	9,400	5,400	7,200	8,000	3,600	13,000
3 Total Employment	CMA	96,000	107,145	131,000	149,000	165,000	182,350	190,405	294,000
Total Employment	EUA	87,000	87,000	115,000	132,500	112,000	171,040	154,000	227,000
Total Employment	CA	22,000		18,975	46,800	42,650	51,365		
Total Employment	CBD	15,000	15,000	13,000	31,000	16,000	20,470	23,000	23,000
TRANSPORTATION SUPPLY									
4 Arterial Lane-km	EUA	947	1,780	450	424	2,009	1,613		1,216
Non-HOV multi-lane expressways		129	120	105	34		260		866
HOV lane-km		13	-	-	-	-	-	-	-
5 Bike lane/bike path km	EUA	11	19	33	92	36	104	131	53
6 AM Peak	EUA	202,000	167,886		221,000		199,830	235,613	
PM Peak		182,500	217,285	169,334	318,000		219,331	358,267	
24 hours		777,000	775,164	428,790	1,360,000	564,000	692,163	1,290,000	1,960,000
7 Private Vehicles Registered (leased & private)		134,167	130,000		135,400		203,550		
8 Designated Park-and-Ride Spaces		-	-	-	200	-	-	-	-
9 Privately Owned			210	2,346	3,000			800	4,126
Not Available for Public Use			5,900	-	6,000			9,488	12,000
Publicly Owned			6,716	-	1,000			2,893	500
TRANSPORTATION DEMAND									
10 AM Peak Modal Shares (%)	CBD								
Private Vehicle Driver		70	65.7			74.3	81.1		56
Private Vehicle Passenger		18	13.1			11.4	8.1		7
Transit		12	17.1			2.6	5.4		14
Cycle			2.2			0.1	0.8		0
Walk			1.7			2.6	3.1		21
Other (taxi, motorcycle, etc.)			0.2			8.8	1.5		2
PM Peak Modal Shares (%)	CBD								
Private Vehicle Driver		71	67.1	83.3	46	81.2	78.5		59
Private Vehicle Passenger		20	13.4		22.9	15.1	11.5		12
Transit		9	16	5.7	12.2	2.2	5.9		19
Cycle			1.7	1.9	3.9	0.3	0.7		0
Walk			1.7	5.8	15	0.9	2		8
Other (taxi, motorcycle, etc.)			0.1	3.3	0	0.3	1.4		2
24-hour Modal Shares (%)	CBD								
Private Vehicle Driver						75.5	73.5		55
Private Vehicle Passenger						18.7	17.9		16
Transit						2.2	5.9		17
Cycle						0.2	0.8		1
Walk						1.2	1.3		9
Other (taxi, motorcycle, etc.)						2.2	0.9		2

Exhibit D.1 (continued)

	AREA	Winnipeg	Calgary	Edmonton	Ottawa-Hull	Vancouver	Montreal	Toronto
URBAN STRUCTURE								
1 Land Area (sq km)	CMA	4,100	5,100	9,500	5,700	2,800	4,024	5,900
Land Area (sq km)	EUA	460	720	750	1027	1300	2026	2300
Land Area (sq km)	CA	7.05	7.9	2.9	11	16.7	10	18.1
Land Area (sq km)	CBD	2.4	3.2	2.1	2.8	4.7	4.81	5.8
2 Residential Population	CMA	667,000	822,000	892,000	1,010,000	1,830,000	3,326,510	4,265,000
Residential Population	EUA	618,000	768,000	616,000	807,555	1,680,000	3,045,979	3,970,000
Residential Population	CA	28,230	30,403	6,200	56,000	163,000	54,376	125,000
Residential Population	CBD	12,000	10,423	5,500	7,700	22,000	28,876	47,000
3 Total Employment	CMA	325,000	442,000	434,000	502,000	908,000	1,502,380	2,060,000
Total Employment	EUA	300,000	390,000	313,000	448,175	797,000	1,371,940	1,940,000
Total Employment	CA	70,300	112,855	57,000	140,000	252,000		354,000
Total Employment	CBD	40,000	88,264	56,000	84,000	125,000	199,590	270,000
TRANSPORTATION SUPPLY								
4 Arterial Lane-km	EUA	1,740	4,011	2,625	3,080	5,578	4,520	10,000
Non-HOV multi-lane expressways		120	1,333	763	625	558	1,816	2,000
HOV lane-km		8	-	11	49	31	34	93
5 Bike lane/bike path km	EUA		577	168	315	595	495	162
6 AM Peak	EUA	527,940	1,591,428		2,100,000	2,674,000		9,610,000
PM Peak		534,780	1,608,312		2,210,000	3,555,000		9,910,000
24 hours		3,400,650	6,057,420		7,690,000	10,790,000	25,019,230	34,200,000
7 Private Vehicles Registered (leased & private)		287,000	579,900	329,100	460,000	945,000		2,179,100
8 Designated Park-and-Ride Spaces		109	7,414	2,100	2,030	7,362	10,256	24,500
9 Privately Owned			1,814	1,800	15,900	7,754		7,900
Not Available for Public Use		14,000	9,835	21,700	14,200	12,994		23,000
Publicly Owned		7,600	33,153	13,500	-	26,312		18,300
TRANSPORTATION DEMAND								
10 AM Peak Modal Shares (%)	CBD							
Private Vehicle Driver		42.7	46.7	55	42.9	45.7	28.4	32.1
Private Vehicle Passenger		15.3	14.2	12.7	12.1	8.9	9.4	6.8
Transit		36	33.1	29.5	32.8	38.7	58.4	56.1
Cycle		0.4	4.6	0.1	1.9	2.4	0.6	1.2
Walk		5.4		2.2	7.8	4.4	2.7	3.2
Other (taxi, motorcycle, etc.)		0.3	0	0.5	2.4	0	0.5	0.6
PM Peak Modal Shares (%)	CBD							
Private Vehicle Driver		37.4		53.5	44.2	39.1		31.3
Private Vehicle Passenger		13		12.2	16.2	8		7.3
Transit		43		29.5	28.5	45.7		55
Cycle		0.4		0.1	1.5	1.1		1.5
Walk		5.8		4.1	7.4	5.1		3.8
Other (taxi, motorcycle, etc.)		0.4		0.6	2.3	1		1.1
24-hour Modal Shares (%)	CBD							
Private Vehicle Driver				56.2	46.7	43.4	31.2	34.8
Private Vehicle Passenger				14.5	16.5	9.4	9.7	8.8
Transit				23.6	21	39	50.7	49.1
Cycle				0.1	2	1.3	0.9	1.8
Walk				4.4	10.7	6.4	6.4	3.7
Other (taxi, motorcycle, etc.)				1.2	3.2	0.5	1.1	1.8

Exhibit D.1 (continued)

	AREA	Regina	Saskatoon	Windsor	Victoria	Niagara	Kitchener	London	Hamilton
11 AM Peak Modal Shares (%)	EUA								
Private Vehicle Driver		72				61	63.3	53	64
Private Vehicle Passenger		23				15	15	12	13
Transit		5				4	4.2	17	8
Cycle						1	1	1	1
Walk						12	12.2	16	9
Other (taxi, motorcycle, etc.)						7	4.3	1	5
PM Peak Modal Shares (%)	EUA								
Private Vehicle Driver		75		71	58.6	76	76.7	63	71
Private Vehicle Passenger		22			25.1	18	16.3	14	16
Transit		3		3	5	3	2.5	10	6
Cycle				1	3.7	0	0.7	1	1
Walk				16	7.5	2	3.3	10	5
Other (taxi, motorcycle, etc.)				8	0	1	0.5	2	1
24-hour Modal Shares (%)	EUA								
Private Vehicle Driver						72	70.3	56	67
Private Vehicle Passenger						19	18.3	14	18
Transit						3	3.4	11	6
Cycle						0	0.7	1	1
Walk						4	5.5	14	6
Other (taxi, motorcycle, etc.)						2	1.8	4	2
12 Person-trips	EUA	115356			108200	84709	122133	150100	228900
AM Peak		140,070		78,003	138,500	79,499	116,507	248,500	
PM Peak						712,895	969,415	868,900	1,144,200
24-hour		2	1			1	2		3
13 Annual Transit Riders	EUA	7,070,875	8,781,464	5,850,064	17,336,416	4,314,271	9,527,433	13,176,400	21,166,000
Riders on a Typical Weekday		23,865	37,000	13,386	55,000		36,100	64,351	
24-hour Transit Passenger-km		190,920			412,500				
14 Arterial Vehicle-km	EUA								
AM Peak Period (Private Vehicles)		324,860					394,036		
PM Peak Period (Private Vehicles)		403,744		172,429					
AM & PM % Commercial Vehicles		8			1				
24 hours (Private Vehicles)		2,072,000							
24-hour % Commercial Vehicles									
15 Expressway Vehicle-km	EUA								
AM Peak Period (Private Vehicles)		117,630					371,174		
PM Peak Period (Private Vehicles)		133,396		148,129					
AM & PM % Commercial Vehicles		8			1				
24 hours (Private Vehicles)		488,100							
24-hour % Commercial Vehicles				-					
TRANSPORTATION SYSTEM PERFORMANCE									
16 Average Home-Work Trip Distance (km)	EUA	6	8		7	13	15		
17 Annual Injuries & Fatalities	EUA	1,236	1,185	1,478			1,044		2,779
TRANSPORTATION COSTS AND FINANCE									
18 Annual Road Capital Budget ($)	EUA	11,292,000		13,850,000		14,909,110	29,784,000		50,107,000
Annual Road Operating & Maintenance Budget ($)		13,239,700		3,300,000	29,461,000	12,082,350	16,674,000		36,015,130
19 Annual Transit Capital Budget ($)	EUA	1,100,000	1,088,900	475,000	10,073,263	684,972	1,706,000	8,389,900	8,634,000
Annual Transit Operating & Maintenance Budget ($)		12,257,500	14,816,429	13,907,177	35,413,469	12,628,560	25,072,000	28,902,300	62,035,120
20 Annual Transit Fare Box Revenue ($)	EUA	6,145,200	8,040,451	8,247,389	17,494,792	5,621,673	13,714,000	17,600,900	32,087,000

Exhibit D.1 (continued)

	AREA	Winnipeg	Calgary	Edmonton	Ottawa-Hull	Vancouver	Montreal	Toronto
11 AM Peak Modal Shares (%)	EUA							
Private Vehicle Driver		59.6	66.2	47.2	57.9	53.5	42	56.4
Private Vehicle Passenger		10.8	13.8	21.4	13.8	22.7	11.3	12.1
Transit		20.8	17.2	12.9	15	11	27.3	19.4
Cycle		0.7	2.8	0.7	1.6	1	0.7	0.7
Walk		7.8	0	12.8	11.1	11.5	11.8	8.7
Other (taxi, motorcycle, etc.)		0.3	0	5	0.6	0.3	6.9	2.7
PM Peak Modal Shares (%)	EUA							
Private Vehicle Driver		58.4		58.4	59	53.5		59.9
Private Vehicle Passenger		10.4		22.4	16.4	22.8		13.6
Transit		22.1		9.7	12.1	10.9		17.8
Cycle		0.7		0.7	1.6	1		0.8
Walk		8.1		7.3	10.2	11.5		6.4
Other (taxi, motorcycle, etc.)		0.3		1.5	0.6	0.3		1.5
24-hour Modal Shares (%)	EUA							
Private Vehicle Driver			55	54.3	59.1	53.9	47.5	60.9
Private Vehicle Passenger			24	23.4	17.6	22.8	14	15.2
Transit			9	8.6	10.1	10.7	19.7	15.6
Cycle			2	0.5	1.3	1	0.8	0.8
Walk			9	11.5	11.1	11.2	14.7	5.7
Other (taxi, motorcycle, etc.)			1	1.7	0.7	0.3	3.3	1.8
12 Person-trips	EUA		200000	370000	463000	1029000		1940800
AM Peak				376,000	527,000	947,000		2,188,100
PM Peak			2,849,000		2,258,000	5,779,000		8,137,200
24-hour		2	1	2	3	2		2
13 Annual Transit Riders	EUA	39,200,000	70,100,000	38,700,000	81,950,000	122,428,167	379,252,164	471,500,000
Riders on a Typical Weekday		138,000	362,000	276,000	307,000	408,100	1,345,000	1,218,000
24-hour Transit Passenger-km		1,104,000			2,336,000	4,500,000		
14 Arterial Vehicle-km	EUA							
AM Peak Period (Private Vehicles)		670,000	454,408	1,638,600	2,638,000		3,004,908	6,531,000
PM Peak Period (Private Vehicles)		780,000		1,917,300	3,194,000			6,894,000
AM & PM % Commercial Vehicles		5			9			
24 hours (Private Vehicles)		4,600,000		9,384,000	13,890,000			27,804,000
24-hour % Commercial Vehicles		400,000			1,423,000			
15 Expressway Vehicle-km	EUA							
AM Peak Period (Private Vehicles)			735,576		853,000			6,262,000
PM Peak Period (Private Vehicles)					1,032,000			6,477,000
AM & PM % Commercial Vehicles					9			
24 hours (Private Vehicles)					4,490,000			26,407,000
24-hour % Commercial Vehicles					465,000			
TRANSPORTATION SYSTEM PERFORMANCE								
16 Average Home-Work Trip Distance (km)	EUA	6	12	10	13	13	17	16
17 Annual Injuries & Fatalities	EUA	3,600	5,009	7,485	6,060	30,681		17,200
TRANSPORTATION COSTS AND FINANCE								
18 Annual Road Capital Budget ($)	EUA	42,000,000	93,360,000	70,900,000	67,000,000	228,140,000	365,000,000	151,193,000
Annual Road Operating & Maintenance Budget ($)		48,000,000	58,070,000	52,500,000	55,000,000	205,147,000	467,000,000	91,015,000
19 Annual Transit Capital Budget ($)	EUA	6,600,000	17,395,000	9,800,000	68,000,000	52,475,000	252,187,000	462,730,000
Annual Transit Operating & Maintenance Budget ($)		72,100,000	102,429,000	101,700,000	169,000,000	317,651,074	684,681,000	1,050,150,000
20 Annual Transit Fare Box Revenue ($)	EUA	43,600,000	47,937,000	38,800,000	93,000,000	159,403,000	312,315,981	741,531,000

Exhibit D.2: Journey-to-Work Modal Shares (1996)

Urban Area	Modal Share (%)					
	Private Vehicle - Driver	Private Vehicle - Passenger	Transit	Cycle	Walk	Other (taxi, motorcycle, etc.)
Saint John	72.9	11.5	5.7	0.3	7.9	1.7
Regina	78.9	8.0	5.4	1.1	5.8	0.8
Saskatoon	76.9	7.3	5.7	2.2	6.5	1.4
Windsor	80.9	7.5	4.0	1.3	5.5	0.8
Victoria	65.4	6.9	10.6	5.2	10.4	1.4
Halifax	60.8	9.6	13.9	1.4	13.1	1.2
Niagara	82.2	7.9	2.5	1.0	5.6	0.9
Kitchener	79.5	9.0	4.1	1.1	5.6	0.7
London	75.5	7.9	7.4	1.6	6.9	0.7
Hamilton	76.8	7.4	8.8	0.8	5.6	0.6
Winnipeg	66.6	9.2	15.5	1.5	6.4	0.9
Quebec	74.2	5.9	10.5	0.9	7.8	0.6
Calgary	71.9	7.3	13.3	1.1	5.5	0.9
Edmonton	74.2	7.1	11.1	1.3	5.4	1.0
Ottawa-Hull	61.5	8.6	19.4	2.3	7.5	0.7
Vancouver	69.3	6.6	15.3	1.7	6.1	1.0
Montreal	64.8	5.4	21.9	1.1	6.1	0.6
Toronto	63.7	6.6	23.6	0.8	4.7	0.7

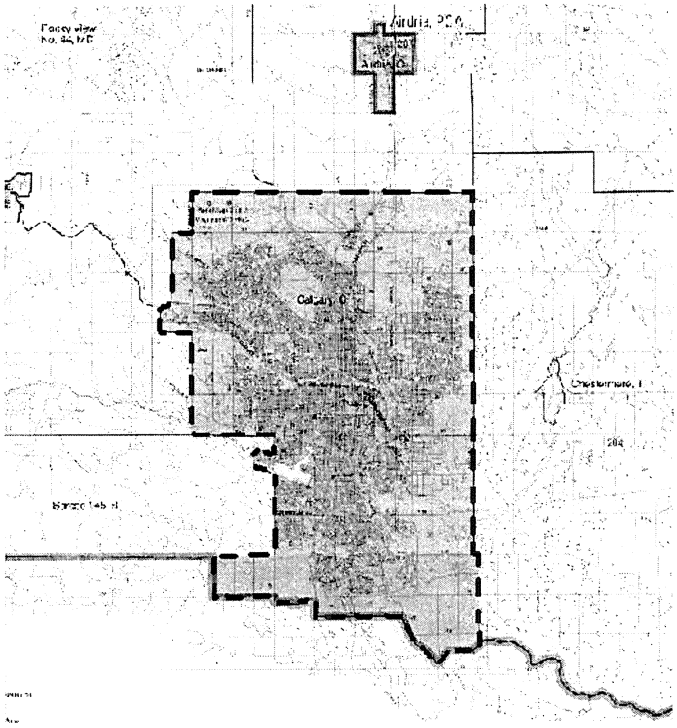
APPENDIX E

Geographic/Map Responses

Appendix E: Maps of Study Areas

Calgary

REGION AND EXISTING URBAN AREA

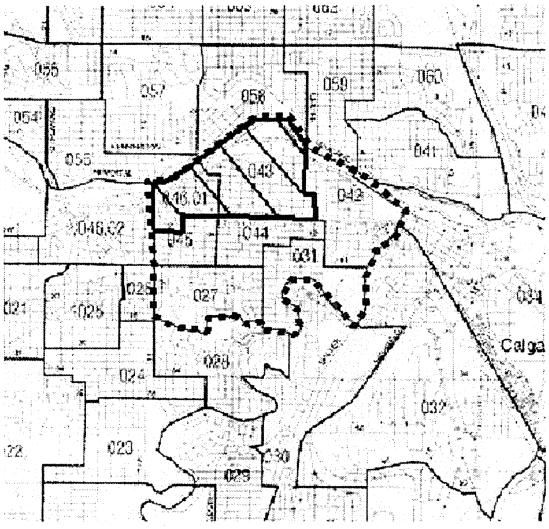


EUA boundary

EUA Notes:

City of Calgary only

CENTRAL AREA AND CENTRAL BUSINESS DISTRICT



CA boundary

CBD boundary

Central Area Notes:

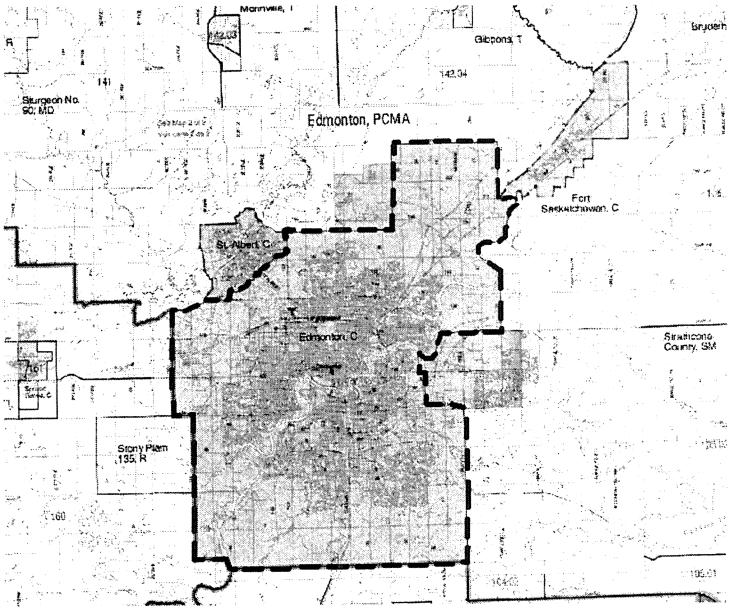
CT 27, 31, 42-45, 46.01

Central Business District Notes:

CT 43, 46.01

Edmonton

REGION AND EXISTING URBAN AREA

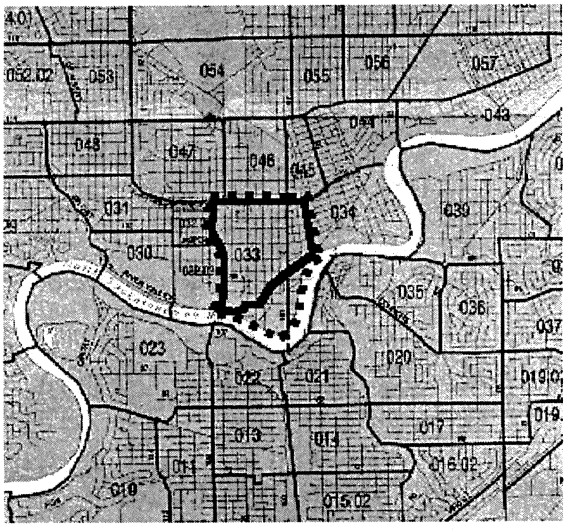


EUA boundary

EUA Notes:

City of Edmonton only (excludes St. Albert and Fort Saskatchewan)

CENTRAL AREA AND CENTRAL BUSINESS DISTRICT



CA boundary

CBD boundary

Central Area Notes:

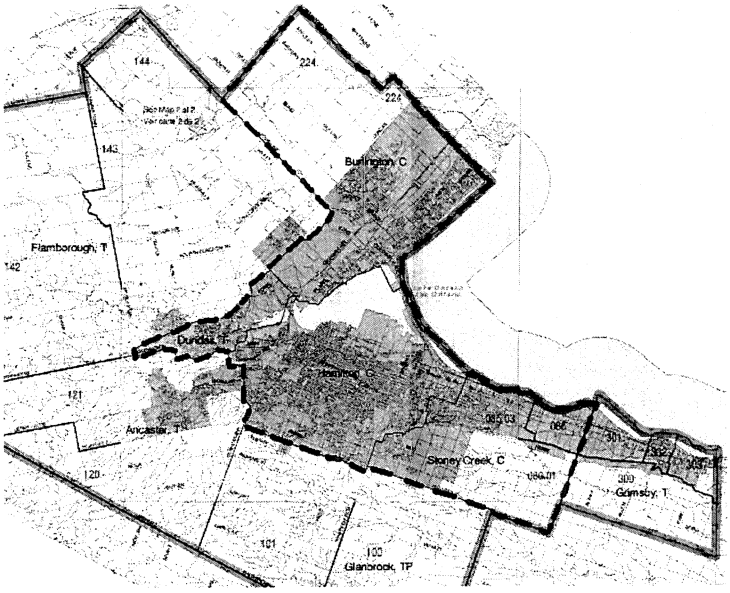
Portion of CT 33,34

Central Business District Notes:

Portion of CT 33,34

Hamilton

REGION AND EXISTING URBAN AREA

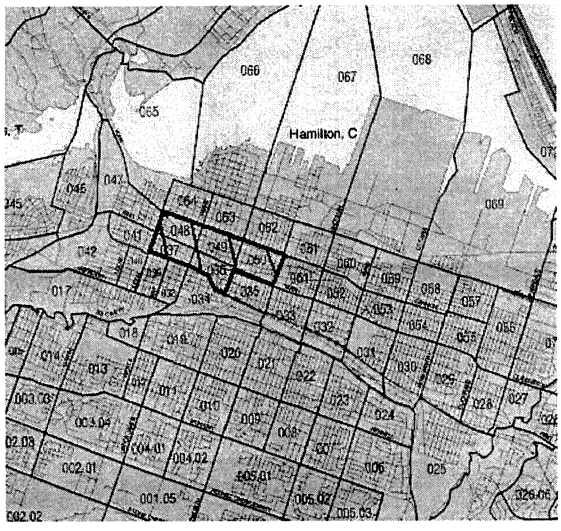


EUA boundary

EUA Notes:

Hamilton, Burlington, Dundas, Stoney Creek

CENTRAL AREA AND CENTRAL BUSINESS DISTRICT



CA boundary

CBD boundary

Central Area Notes:

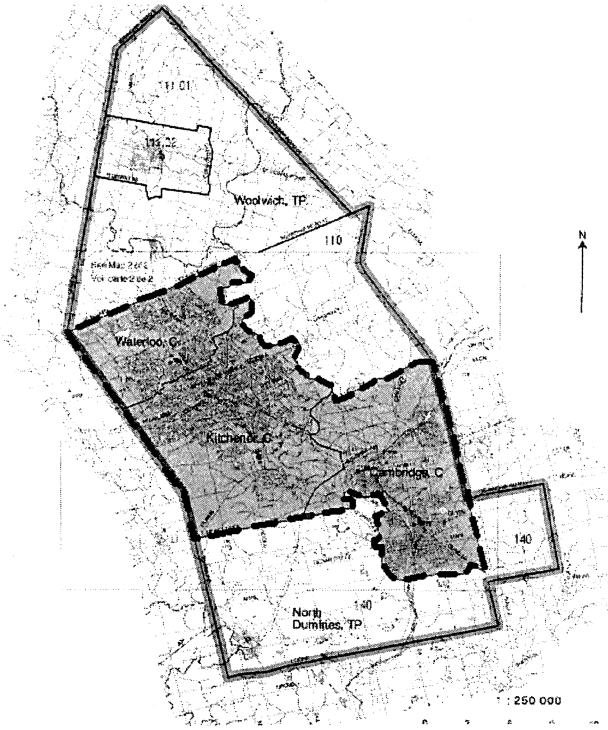
None defined

Central Business District Notes:

CT 36, 37, 48, 49, 50

Kitchener

REGION AND EXISTING URBAN AREA

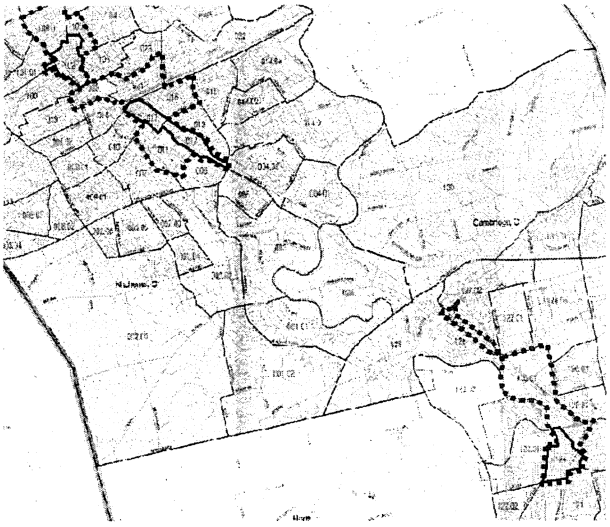


EUA boundary

EUA Notes:

Kitchener, Waterloo, and Cambridge

CENTRAL AREA AND CENTRAL BUSINESS DISTRICT



CA boundary

CBD boundary

Central Area Notes:

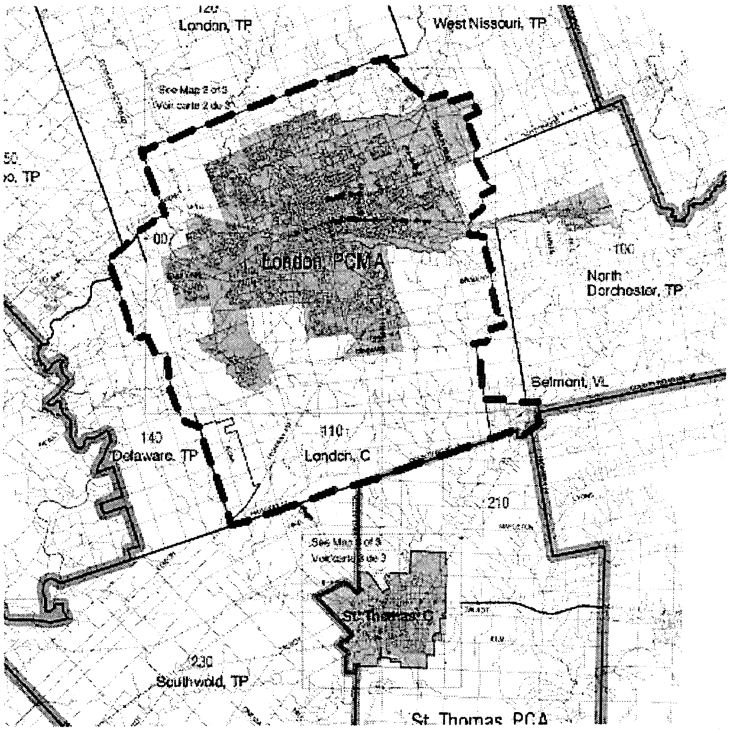
CT 124, 126.01, 128 (Galt-Preston area of Cambridge); 011, 012, 016, 017, 020, 021, 102, 105, 106.01 (Kitchener-Waterloo)

Central Business District Notes:

CT 12 & 17 (Kitchener), 102 (Waterloo), 124 (Cambridge)

London

REGION AND EXISTING URBAN AREA



EUA boundary

EUA Notes:

CENTRAL AREA AND CENTRAL BUSINESS DISTRICT

CA boundary

CBD boundary

Central Area Notes:

None defined

Central Business District Notes:

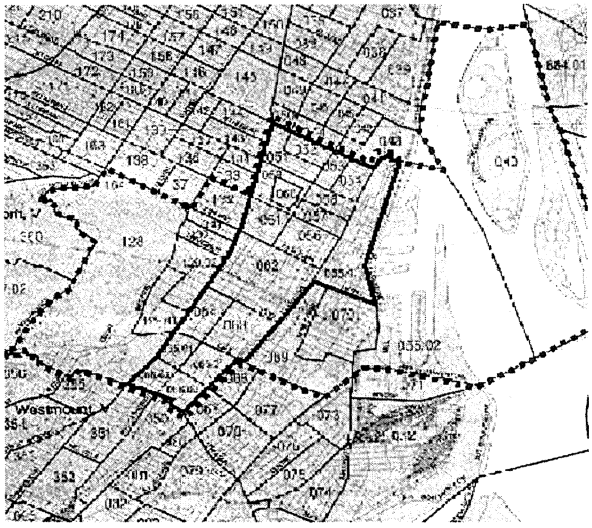
Montreal

REGION AND EXISTING URBAN AREA

EUA boundary

EUA Notes:

CENTRAL AREA AND CENTRAL BUSINESS DISTRICT



CA boundary

CBD boundary

Central Area Notes:

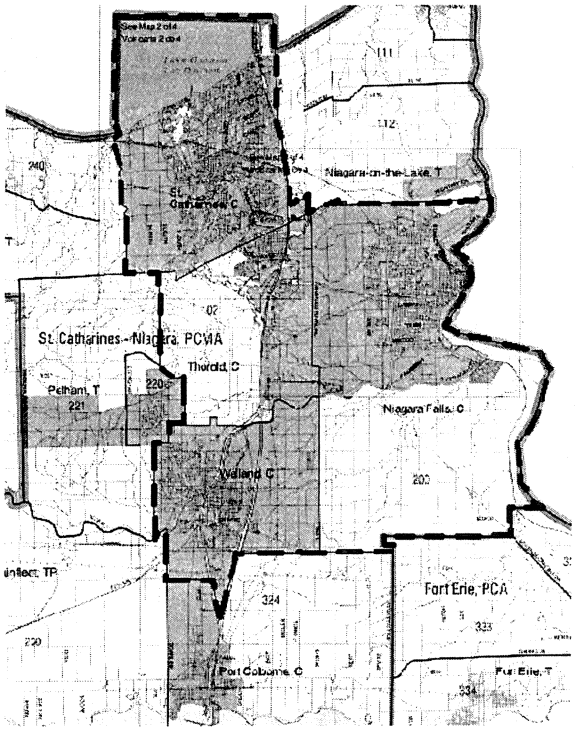
CT 40, 51-64, 65.01, 65.02, 66.01, 66.02, 69, 70, 128, 129.01, 129.02, 130-132

Central Business District Notes:

CT 51-64, 65.01, 65.02, 66.01, 66.02

Niagara

REGION AND EXISTING URBAN AREA

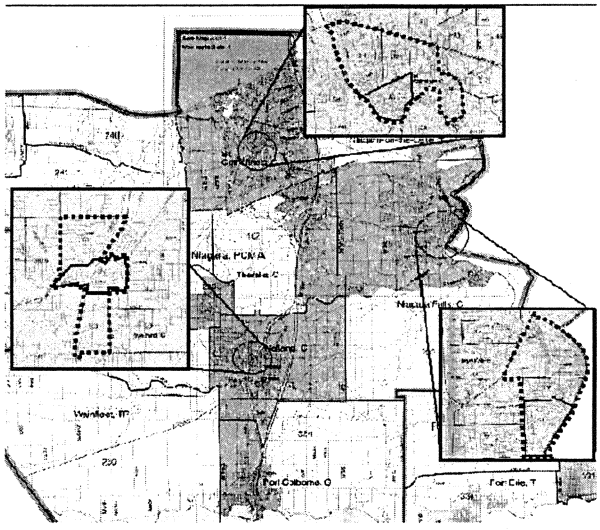


EUA boundary

EUA Notes:

St. Catharines, Niagara Falls, Welland

CENTRAL AREA AND CENTRAL BUSINESS DISTRICT



CA boundary

CBD boundary

Central Area Notes:

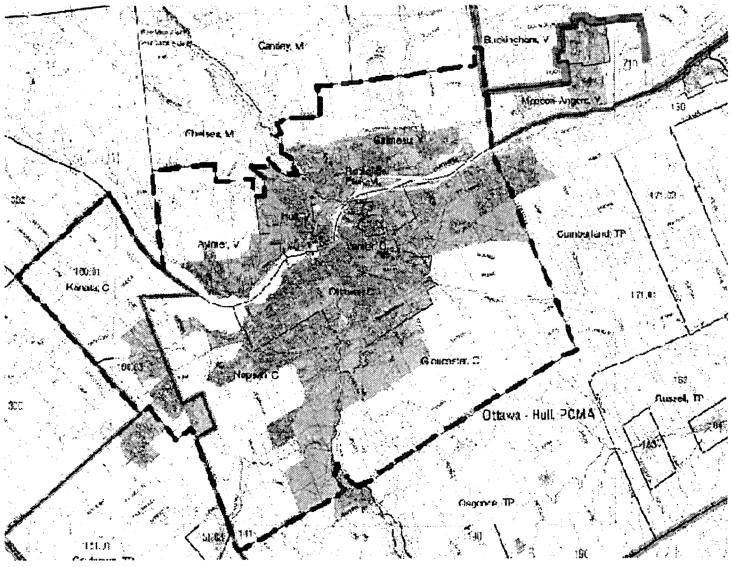
St Catharines - CT 5, 9,10,11
Welland - CT 305, 306, 309
Niagara Falls - CT 205, 206

Central Business District Notes:

St Catharines - CT 5
Welland - CT 306
Niagara Falls - CT 205

Ottawa-Hull

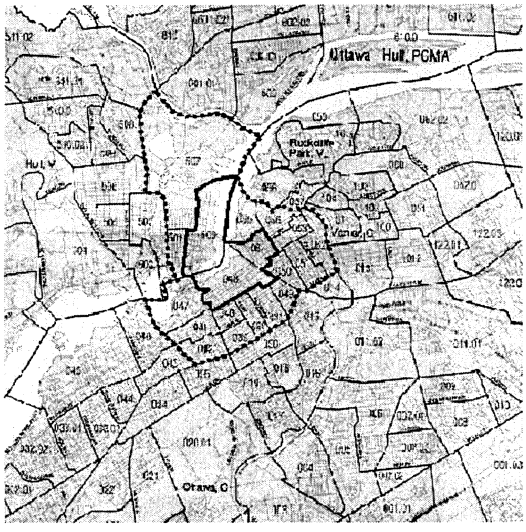
REGION AND EXISTING URBAN AREA



EUA boundary

EUA Notes:

CENTRAL AREA AND CENTRAL BUSINESS DISTRICT



CA boundary

CBD boundary

Central Area Notes:

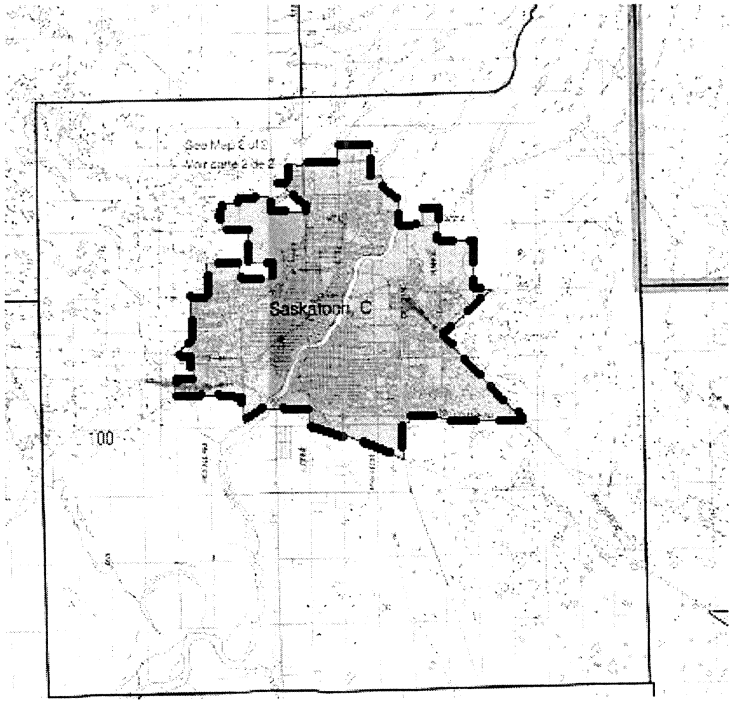
CT 500, 501, 507, 037-042, 047-056

Central Business District Notes:

CT 500, 048, 054

Saskatoon

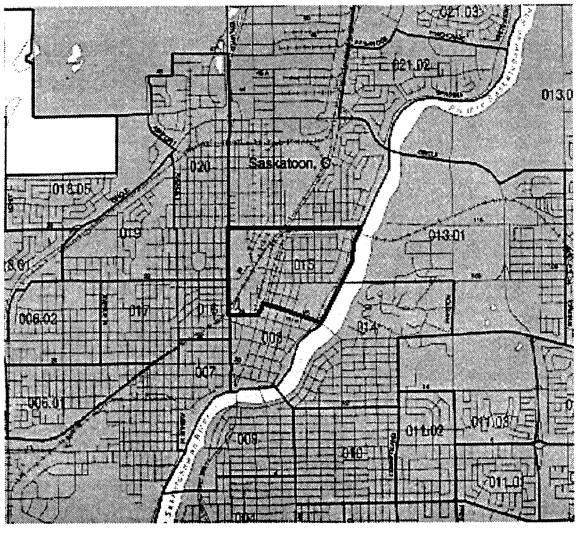
REGION AND EXISTING URBAN AREA



EUA boundary

EUA Notes:

CENTRAL AREA AND CENTRAL BUSINESS DISTRICT



CA boundary

CBD boundary

Central Area Notes:

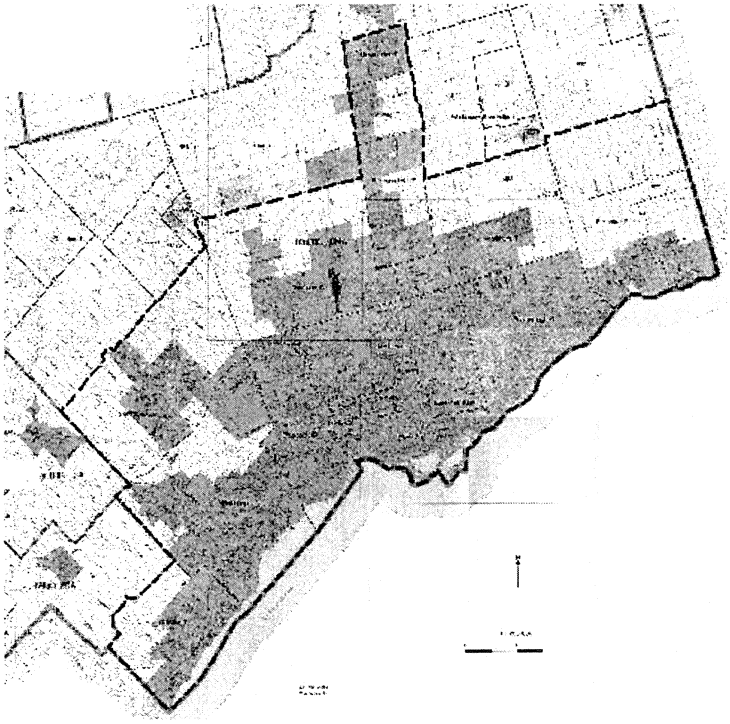
None defined

Central Business District Notes:

CT 015

Toronto

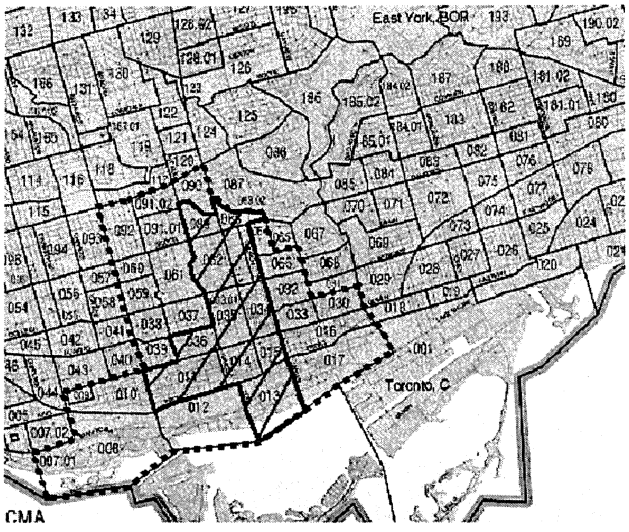
REGION AND EXISTING URBAN AREA



EUA boundary

EUA Notes:

CENTRAL AREA AND CENTRAL BUSINESS DISTRICT



CA boundary

CBD boundary

Central Area Notes:

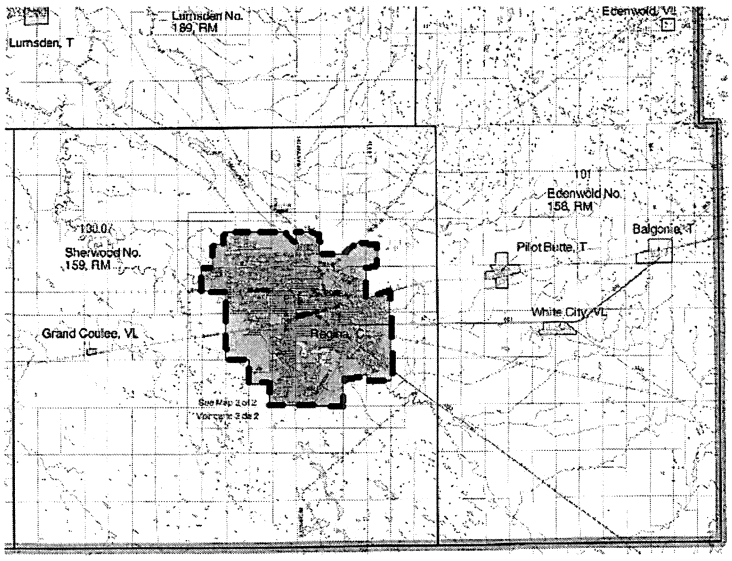
CT 7.01, 8, 9, 10, 11, 13, 14, 15, 16, 17, 30, 32, 33, 35, 36, 37, 38, 39, 59, 60, 61, 62, 63.01, 63.02, 64, 66, 88, 89, 90, 91.01, 91.02

Central Business District Notes:

CT 11, 13, 14, 15, 35, 36, 62, 63.01, 63.02, 88, 89

Regina

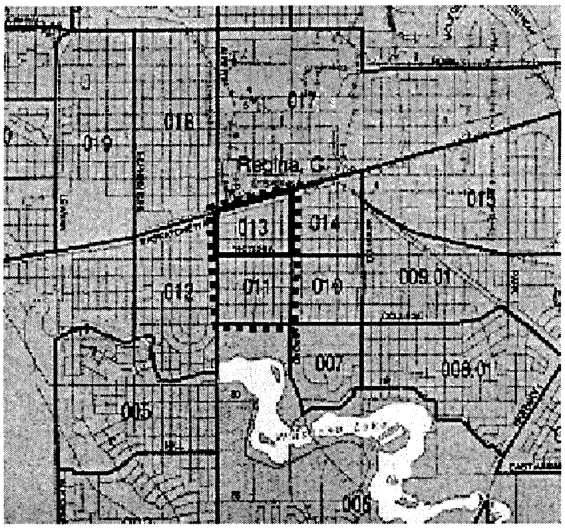
REGION AND EXISTING URBAN AREA



EUA boundary

EUA Notes:

CENTRAL AREA AND CENTRAL BUSINESS DISTRICT



CA boundary

CBD boundary

Central Area Notes:

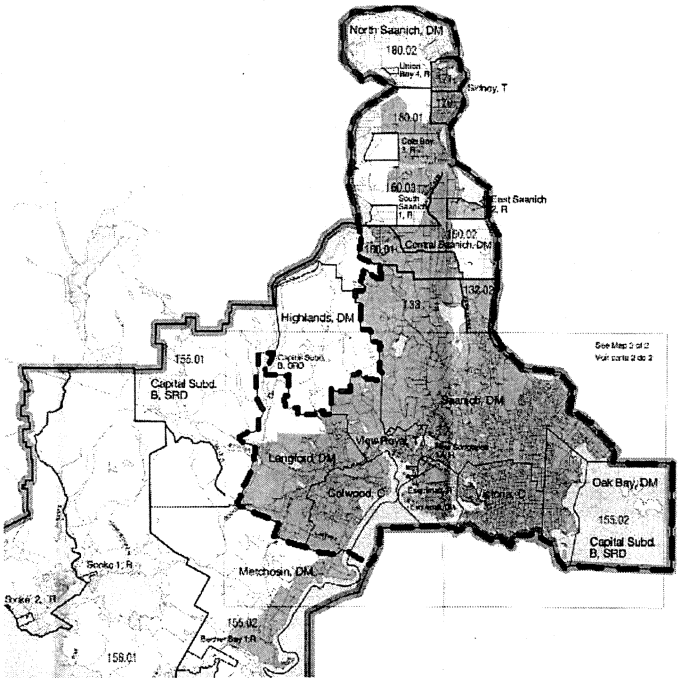
CT 013 and CT 011

Central Business District Notes:

CT 013

Victoria

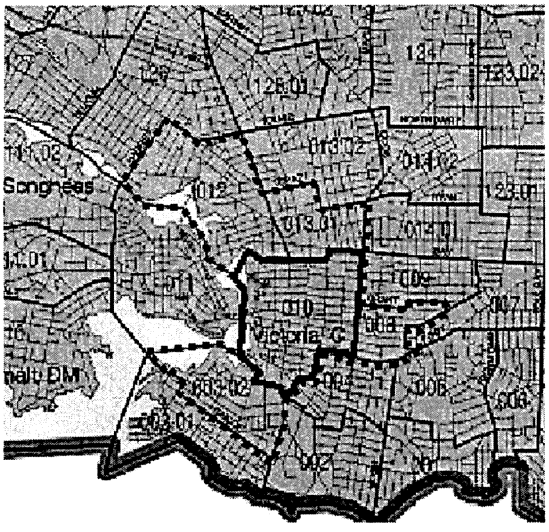
REGION AND EXISTING URBAN AREA



EUA boundary

EUA Notes:

CENTRAL AREA AND CENTRAL BUSINESS DISTRICT



CA boundary

CBD boundary

Central Area Notes:

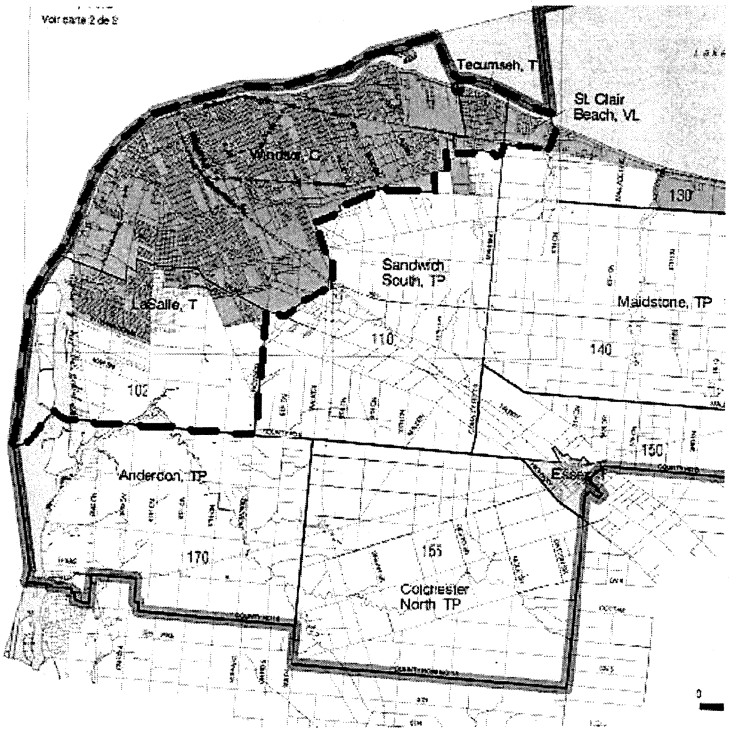
CT 3.02, 8, 10, 12,13.01

Central Business District Notes:

CT 10

Windsor

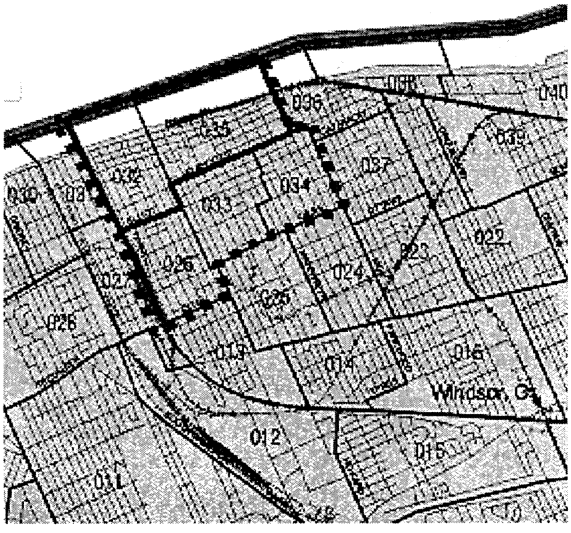
REGION AND EXISTING URBAN AREA



EUA boundary

EUA Notes:

CENTRAL AREA AND CENTRAL BUSINESS DISTRICT



CA boundary

CBD boundary

Central Area Notes:

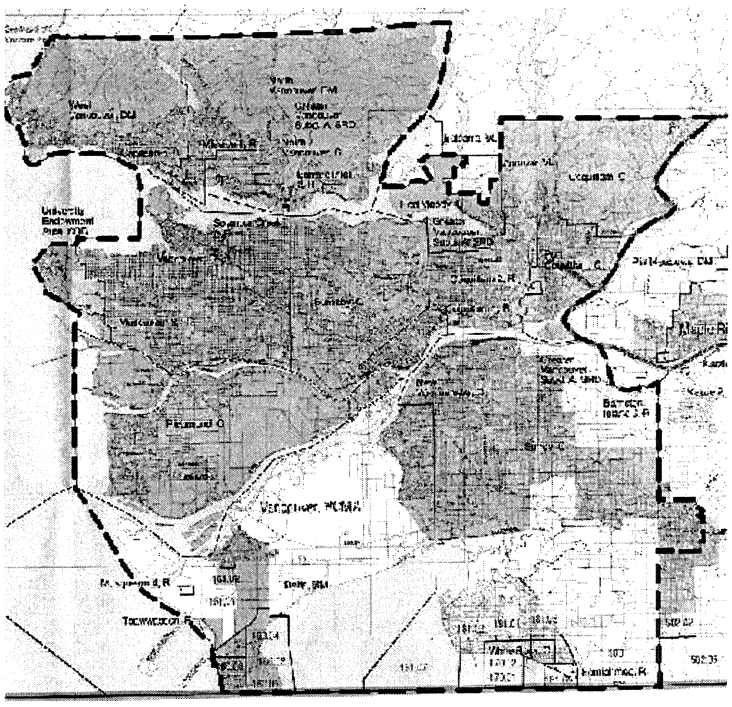
CT 026, 032, 033, 034, 035

Central Business District Notes:

CT 032, 035

Vancouver

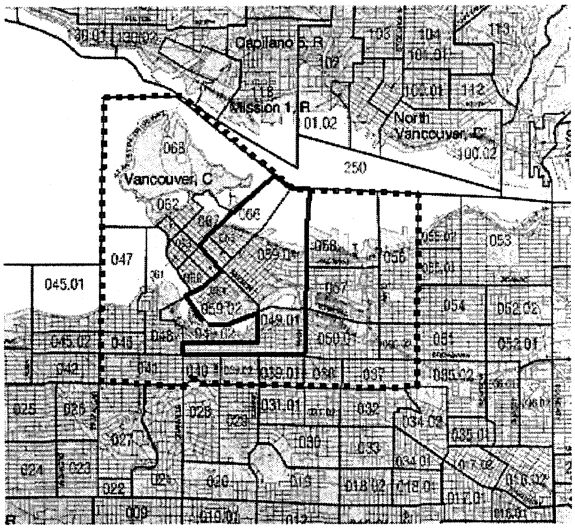
REGION AND EXISTING URBAN AREA



EUA boundary

EUA Notes:

CENTRAL AREA AND CENTRAL BUSINESS DISTRICT



CA boundary

CBD boundary

Central Area Notes:

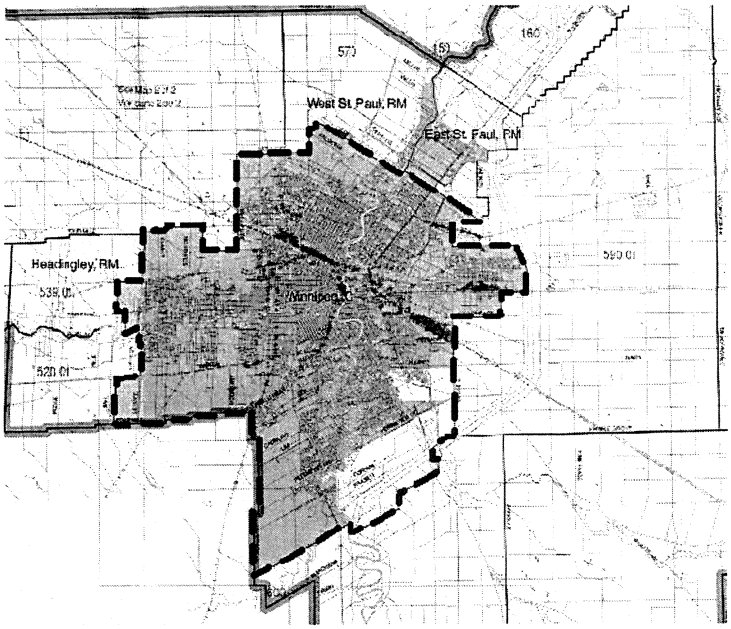
CT 037, 038, 039.01, 039.02, 040, 041, 046, 048, 049.01, 049.02, 050.01, 050.02, 056, 057, 058, 059.01, 059.02, 061-068,

Central Business District Notes:

CT 049.01, 059.01, 059.02, 065, 066

Winnipeg

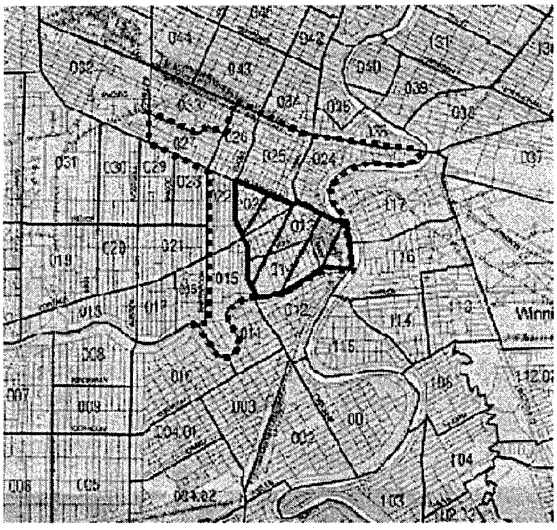
REGION AND EXISTING URBAN AREA



EUA boundary

EUA Notes:

CENTRAL AREA AND CENTRAL BUSINESS DISTRICT



CA boundary

CBD boundary

Central Area Notes:

CT 013-015, 022-027

Central Business District Notes:

CT 013, 014, 023

APPENDIX F

Responses by Urban Areas to Questions Regarding Transportation Funding

Exhibit F.1: Responses by Urban Area to Part B, Questions 4, 5, 6

Urban Area	B4. What new REVENUE SOURCES are you currently considering to meet any shortfalls in your transportation budget?	B5. Do you use some kind of financial analysis as part of assessing transportation projects? What type? Is this done in general or in specific?	B6. Have you attempted to estimate the costs incurred as a result of congestion to transit service? Auto Users? Commercial goods movement?
1996 STUDY YEAR			
Regina	Provincial Infrastructure Program	Condition Survey Books Transportation Impact Studies Traffic Counts	No
Saskatoon	n/r	Transit service is evaluated annually to gather ridership and economic performance data. A full boarding count is completed for each route and each stop (loading/unloading). The data are analyzed using the most current budget information. A system average economic performance indicator (average subsidy per boarding) is determined. From this, the Maximum Permissible Subsidy (MPS) is set. The MPS is currently set at 3 times the average subsidy per boarding. Each route and time period (AM peak, Mid-day, PM peak and Evening) is reviewed to ensure maximum effectiveness. Routes are ranked by economic performance and are classified as either "above average roues" (avove the average subsidy per boarding) "below average routes" (subsidy per boarding higher than avg. but less than 3x the avg. subsidy per boarding) and "poor routes" (subsidy per boarding higher than 3x the avg. subsidy per boarding). "Above average routes" are reviewed to ensure maximum effectiveness, but no remedial measures are required. The focus is on improving customer service to increase ridership and revenue, while minimizing costs. "Below average routes" are thoroughly reviewed to identify changes that could improve the economic performance while maintaining service to current riders. Possible measures include reducing service ours, changing the route structure, or reducing service frequency. "Poor routes" are thoroughly reviewed to identify changes that will improve the economic performance to below the MPS level. Possible measures are idental to those for "below average routes." If the economic performance can not be improved through these measures, the route would be recommended for termination.	n/r
Windsor	Revision of Development Charges Toll Roads	Strategic Roadway Improvement Priority Study - Windsor RIMS - outside of Windsor	No
Victoria	For the downtown core(s), agencies have	1) Generally, at a municipal level, no analysis occurs	1) Yes, congestion on transit and auto has been

Exhibit F.1 (continued)

Urban Area	B4. What new REVENUE SOURCES are you currently considering to meet any shortfalls in your transportation budget?	B5. Do you use some kind of financial analysis as part of assessing transportation projects? What type? Is this done in general or in specific?	B6. Have you attempted to estimate the costs incurred as a result of congestion to transit service? Auto Users? Commercial goods movement?
	used business area boundaries to raise special taxes for local improvements such as malls, sidewalks, and parking.	on projects other than the impact to the tax base. 2) The Province and Transit agencies do cost-benefit analysis as part of each project. 3) At a regional level, the long-term planning will assess operating & capital costs to full build out.	assessed by BC Transit . 2) No asessment of commercial goods movement have been considered since most of this movement is in off-peak hours.
Niagara	Development charges, part of which can be used for transportation-related expenses, are being updated. Apart from that, we have no specific information. However, local transit authorities (St. Catharines, Niagara Falls, Welland, Thorold) are continually exploring sources of new revenue.	To some degree, these are carried out for pavement condition analysis (Sheffland curves). In other situations, such as particular transportation facilities, these are carried out as part of the general background analysis as a reference for decision-making.	In a specific sense, the answer is no. However the transportation model does indicate some of the effects, and other factors, such as communication between parts of the area, have encouraged consideration of a Regional transit system.
Kitchener	Developing programs and strategies to increase advertising and charter revenue for transit, such as revenue sharing between bus shelter advertising company and local municipality: supplier provides bus shelter at no cost to municipality in exchange for being permitted to place ads at one end of the panel shelter. Investigating employee subsidised transit passes. Increasing the contributions to the roads capital levy reserve fund to provide for the shortfall in revenue provided by developers under the development charge by-law.	Cost-effectiveness analysis is conducted prior to implementation of new transit services. Generally use cost-benefit analyses but decisions are not based on financial analysis alone. Recently completed a transportation master plan which looks at the need and justification for operational improvements, road widening and new roads. Projects have been prioritised in the 0-5 year period, 5-10 year period and 20+ years. Implementing an infrastructure management program which will prioritise road rehabilitation projects.	In 1994 transit users represented 22,088 vehicles that would have been on the roadway on a typical weekday. Increasing the transit modal share 5-7% in the peak hours over the next 20 years could result in road widening or operational improvements being deferred in the roads capital program.
London	Public/private partnerships (for specific projects)	Budgeting Analysis - priority based on capacity issues Process to assess transportation improvements under review	Impact considered in City Transportation Plan Review (1994) in terms of overall environmental impact related to increase in congestion (no dollar value assigned)
Hamilton		Pavement Management analysis for rehabilitation programme. Use IMS pavement management system cost/benefit analysis for safety-related improvements.	No.
Winnipeg	Additional fuel tax and vehicle registration fees.	Yes, some cost/benefit and financial impact analysis. User benefits vs. construction/operating/maintenance costs. Done for specific cases such as major projects.	Auto users - reduced/increased congestion as measured by travel time is calculated by a transportation planning modelling system for new facilities or future networks.
Calgary	- Fuel Tax - Municipal vehicle registration tax - Parking charges at LRT stations - emission credits/trading	Consumer benefits and capital cost ratios are used in determining viability of projects. Have used a Transportation Improvement Priority Study (TIPS) to prioritise both road and transit capital projects for up	Yes. Multiple Account Evaluation Model. Microscopic Traffic Simulation Model (VISSIM) calculated delays, incorporates cost of pollution, emissions, capital costs, operating costs, air quality, etc.

Exhibit F.1 (continued)

Urban Area	B4. What new REVENUE SOURCES are you currently considering to meet any shortfalls in your transportation budget?	B5. Do you use some kind of financial analysis as part of assessing transportation projects? What type? Is this done in general or in specific?	B6. Have you attempted to estimate the costs incurred as a result of congestion to transit service? Auto Users? Commercial goods movement?
		to the year 2008. Developing a new TIPS process for projects beyond 2008 to 2018. Evaluating evaluation criteria and criteria weighting using Decision Support System (DSS) methodologies. All projects will be prioritised using criteria and consumer benefits. EMME/2 is used for modeling purposes (AM peak hour now but planning	
Edmonton	Dedicated Fuel Tax; Vehicle Registration Fees; Developer Contributions	Cost/Benefit Analysis is used	Personal travel time delay component is built into the assessment of traveller mobility benefits through a logit-based model.
Ottawa-Hull	New revenue sources are currently being investigated. For the most part they require obtaining provincial approval and legislation for the following: Fuel tax transfer from the province, a percentage or surtax for private vehicle registration fees and driver's licences, as well as a parking tax.	Road construction projects (lane additions, resurfacing, etc.) are analysed based on a cost /benefit analysis, transit use, level of service, traffic growth rates, area growth intensity, co-ordinated with other projects and project continuations. New and proposed roads are analyzed based on traffic growth intensity, cost effectiveness, road system continuity, location factors, and their ability to provide a commercial/industrial service to the community.	Work was carried out to establish the relationship of road congestion to private vehicle users, commercial traffic and transit users.The results concluded that auto and commercial travel times would increase in the order of 1.5 times if roads were allowed to operate with a volume to capacity ratio of 0.95 rather than 0.9. Cost estimates were estimated for the increased time based on vehicle operating costs and the value of the traveler's time.
Vancouver	Road Pricing Fuel Tax	Multiple Account Evaluation (MAE)	Yes, see Transport 2021 Report No. 11: "Cost of Transporting People in the B.C. Lower Mainland"
Montreal	There is a proposal to increase the provincial fuel tax dedicated to transit operations. Now listed in Question B1 and now new, Quebec motorists pay $30 on their vehicle registration fees, which is dedicated to transit	All major infrastructure projects (HOV lanes, LRT, subway, ...) are assessed with cost/benefit analysis in order to be financed by the provincial transit investment program. No such analysis of a financial nature is done to assess road projects.	The provincial minister of transportation has made a statement on the costly loss of time of the trucking industry due to congestion. A study performed by a consulting firm has assessed the cost of congestion to motorists as being several hundred million dollars per year.
Toronto	- Increased funding participation with higher levels of government. - Revenue sharing with higher levels of government e.g. fuel taxes - Public/Private participation	- Yes, cost-benefit analysis is generally done for most transportation projects. - Depending on the size of the project, the type and level of analysis may vary.	- Various studies have looked into the impacts of congestion. - The most recent study (to be published Spring 1999) is a joint effort by GTA Regions & the City of Toronto called: "Funding Transportation in GTA & Hamilton-Wentworth" (estimated capital investment rates at which congestion levels would continue to increase, be stabilised, or be reduced, respectively)