Greater Toronto Area

CORDON COUNT PROGRAM

TRANSPORTATION TRENDS 1991 - 2006

Technical Report

MMM GROUP

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1.0 INTRODUCTION

1.1 Purpose of this Report

This report presents a comprehensive analysis that addresses the emerging trends and travel patterns for the entire Greater Toronto Area (GTA). The analysis is based on the available 1991 to 2006 GTA Cordon Count data. The focus is primarily on inter-regional transportation issues and trends.

This report also aims to inform government agencies, decision-makers, academics, the transportation community, and the public of the value in using the Cordon Count database for decision making and strategic planning on policy formation and investments in infrastructure.

In order to help raise awareness of the Cordon Count database, topical issues such as high occupancy vehicles (HOV), transit use, and truck traffic are included in the analyses.

1.2 Background

The Cordon Count program has been established to collect and monitor changes in commuting behaviours and travel patterns across the GTA. The trends and patterns developed through the Cordon Count program are a valuable tool in planning and decision-making.

The City of Toronto implemented the program in 1975. Similar counting programs were later initiated by other regions with the aim of assisting in the systematic identification of transportation trends in the GTA.

Historically, counts are conducted during May and early June (prior to the end of the school year) on weekdays (except Fridays). Therefore, data is as representative of the typical day as possible. Efforts have also been taken to ensure that schedules for the Cordon Count program are synchronized with other data collection programs, such as the Statistics Canada Census and the Transportation Tomorrow Survey (TTS).

1.3 What is the Cordon Count Program?

The Cordon Count program involves counts at over one thousand counting stations across the entire GTA.

The program provides an invaluable source of data on commuting behaviours and travel trends and patterns in the GTA. This data is useful in the public and private sectors for understanding past trends, understanding commuter response to factors beyond transportation supply, approximating future needs, developing new initiatives (such as High Occupancy Vehicle lanes), strategic planning, decisions making, policy formation, and planning.

1.4 Logistics of Collecting Cordon Count Data

Counting stations are established at key travel locations throughout the GTA. A series of stations are used to form a screenline. A screenline is a pre-determined imaginary line spanning a major road, municipal boundary, a man-made boundary (such as a railway) or a natural boundary (such as a river). Screenlines are currently established across key locations and boundaries in the regions of Peel, York, Halton, Durham, and the City of Toronto.

The Cordon Count program collects information on persons and vehicles, in addition to various modes of transportation, such as cars, buses, taxis, GO Trains, subways, streetcars, and bikes. Specific details on vehicle type and number of occupants per vehicle are gathered in order to capture a complete set of data regarding individual person and vehicular movements in the GTA.

All counts are stored at 15-minute intervals and grouped by station. This allows data to be aggregated at various levels for a more detailed analysis. Data has been collected for a number of years, over 30 years in some instances, allowing for a comprehensive trend analysis.

Currently, manual counting is the only practical method of obtaining the vehicle type and occupancy data required. Vehicle volume and classification data are increasingly being supplemented by automated methods and estimates. Ridership counts are provided by the Toronto Transit Commission and GO Transit.

1.5 Data Storage System

The GTA Cordon Count Committee consists of the following groups:

- Ministry of Transportation, Ontario
- Regional Municipality of Durham
- Regional Municipality of Halton
- Regional Municipality of Peel
- Regional Municipality of York
- City of Toronto
- Toronto Transit Commission
- GO Transit

This committee meets on a regular basis to share knowledge, ensure consistency between program partners, and to decide on technical issues related to the collection, analysis and dissemination of the database.

The DMG currently houses the Cordon Count database. The database is accessible to government agencies, consultants, and the public through the internet Cordon Count Data Retrieval System (CCDRS). The CCDRS allows users to search, aggregate, cross-reference, and retrieve information such as the number of automobiles with two passengers transgressing the York-Toronto boundary in 24 hours.

Currently, the dataset covers detailed information for forty-three cordon count programs from the regions of Peel, Halton, Durham, York and the City of Toronto spanning a time period from 1975 to 2006.

1.6 Organization of this Report

The analysis of the trends and issues pertaining to this study is organized in the following format:

- Overall Trend Analysis
- Mode of Transportation
- Transit
- Commercial Vehicles
- Use of Major Roads and Transit Facilities
- Topical Issues
  - Peaking Characteristics and Peak Hour Spreading
  - Auto Occupancy and High Occupancy Vehicles
  - School Bus Usage
  - Reverse Commuting
- Review of the Cordon Count Data Collection Method

For the purpose of this analysis, key screenlines were developed across regional and significant boundaries. This was done to highlight the key travel trends in the GTA. **Figure 1.1** is a map of the screenlines used in this analysis.

The peak direction of travel on each screenline is shown in **Figure 1.2**. A stand-alone executive summary is provided in addition to this report.

Peak period definitions and Screenline Definitions are found in **Appendix A** and **Appendix B**, respectively.

This report serves as a compendium to the 2003 GTA Cordon Count Report (defining trends between 1991 and 2001), which can be downloaded from the University of Toronto Data Management Group website.

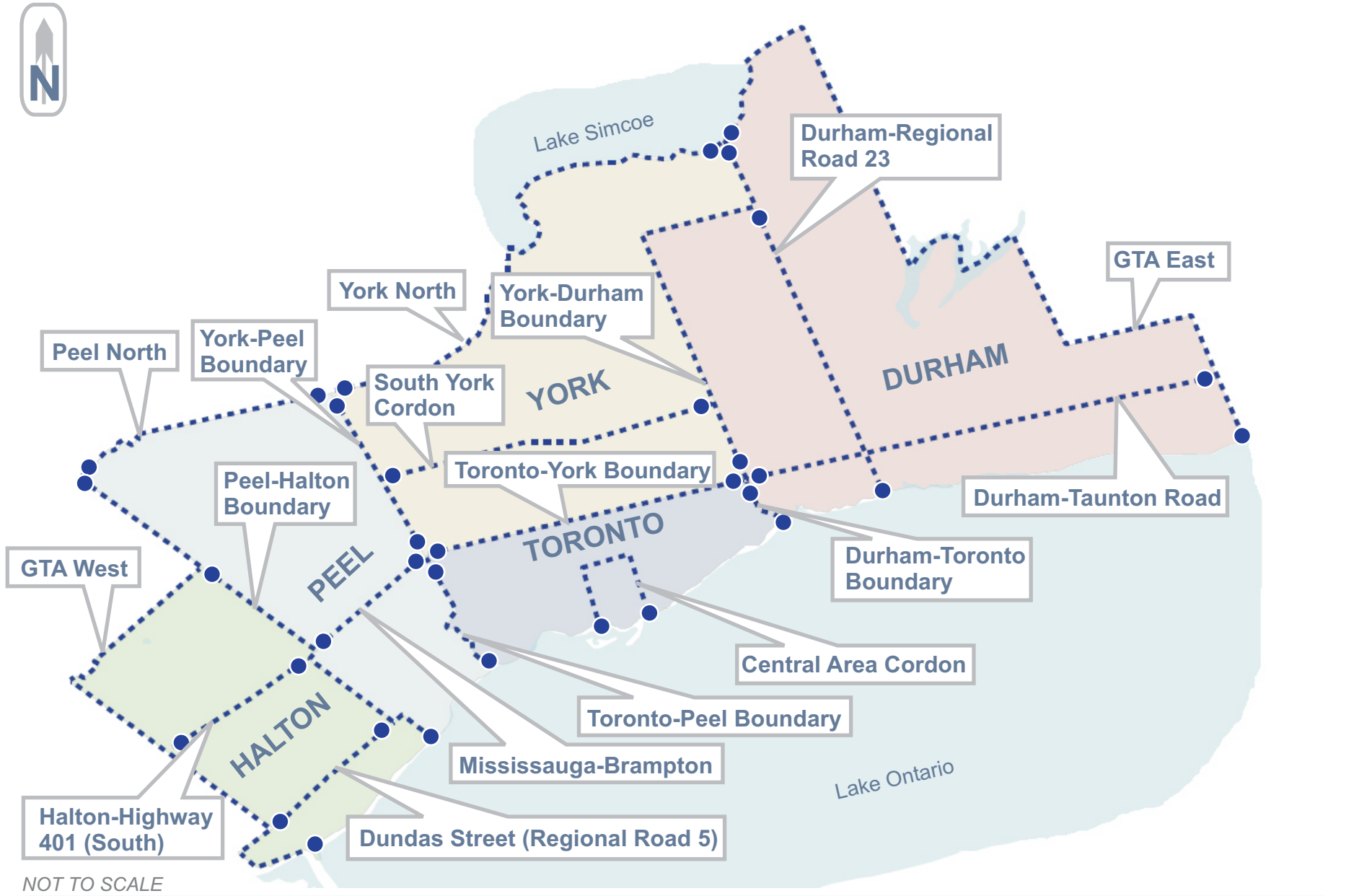

FIGURE 1.1
Screenlines Included in the Analysis

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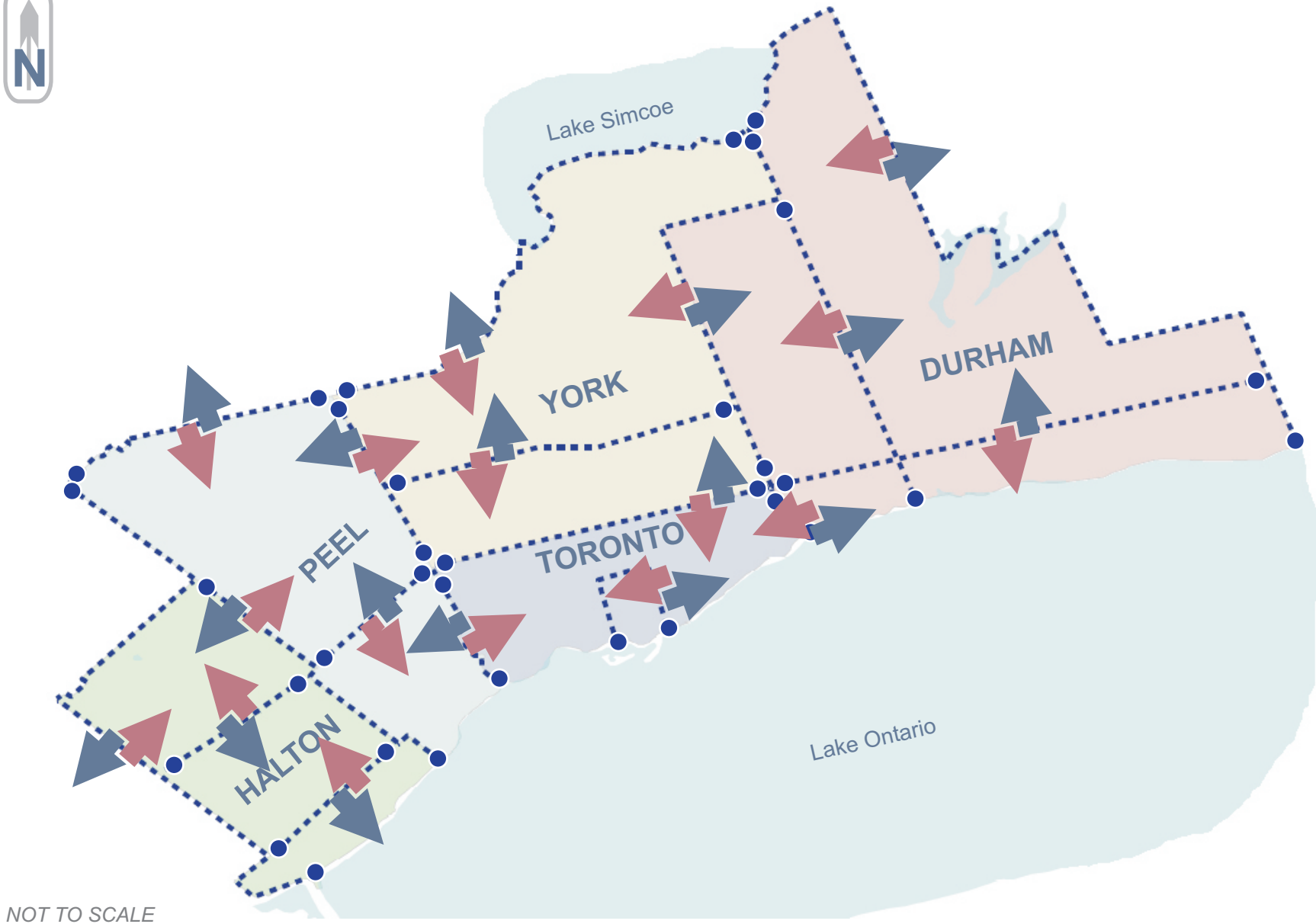

FIGURE 1.2
Screenline Peak Directions of Travel

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2.0 OVERALL TRENDS

2.1 Focus

This section presents the overall changes in person trips and vehicle trips across the GTA screenlines during the morning and afternoon peak periods as well as for the total count period. The counts represent the change in a typical weekday from 1991 to 2006.

Please refer to:

Table 2.1 *Change in of Person and Vehicle Crossings (Both Directions) – Total Count Period (1991 to 2006).*

Figure 2.1 *Change in Number of Person Crossings (Peak Direction) - Morning and Afternoon Peak Periods (1991 to 2006).*

Figure 2.2 *Change in Number of Vehicle Crossings (Peak Direction) - Morning and Afternoon Peak Periods (1991 to 2006).*

Figure 2.3 *Change in HBW Trips by Origin, Destination, and Remaining Within Each Region.*

2.2 Summary of Trends

2.2.1 Total Count Period

The screenlines do not have a definitive peak direction during the total count period, therefore both directions are considered in this overall analysis. Tables showing peak direction volumes are included in **Appendix C**. It is expected that the count periods vary by region; therefore a total count period is examined in this analysis. The total count period helps to capture the spatial separation in trips.

The five screenlines with the highest numerical and percentage growth in person trips are shown below.

Toronto-York Boundary	+311,838
Peel-Halton Boundary	+199,965
GTA West	+186,719
Mississauga-Brampton	+164,966
York-Peel Boundary	+146,945

York-Peel Boundary	+243%
Halton-Highway 401	+119%
Peel-Halton Boundary	+61%
GTA West	+60%
York North	+59%

The five screenlines with the highest numerical and percentage growth in vehicle trips are shown below.

Toronto-York Boundary	+322,269
Peel-Halton Boundary	+226,675
Mississauga-Brampton	+176,167
GTA West	+169,242
York-Peel Boundary	+137,810

York-Peel Boundary	+282%
Halton-Highway 401	+142%
Peel-Halton Boundary	+87%
Durham-Taunton Road	+83%
York North	+76%

The results show a strong increase in vehicle and person trips between the regions west and north of Toronto on both a percentage and absolute basis. All of the above screenlines, except for the York-Peel Boundary and GTA West, have experienced a higher numerical increase in vehicle trips than person trips. In addition, the Toronto-Peel Boundary has experienced a decrease in the number of person trips whereas the vehicle trips have increased. The Central Area Cordon

has experienced a decrease in the number of trips in both directions between 1991 and 2006. In all cases, the percentage increase in vehicle trips was higher than the percentage increase in person trips.

The 2003 GTA Cordon Count Report (documenting trends between 1991 and 2001) highlights a high change in growth for trips between "905" regions and only a small change in vehicles entering and leaving Toronto's Central Area between 1991 and 2001. This trend was also demonstrated from 1991 to 2006, with an overall 2% decline in vehicles across the Central Area Cordon and a 43% change in vehicles across regional screenlines from 1991 to 2006.

2.2.2 Morning Peak Period

The five screenlines with the highest numerical and percentage growth in **person trips** in the peak direction during the Morning Peak Period are shown below.

Toronto-York Boundary	+66,849
Peel-Halton Boundary	+31,569
York-Peel Boundary	+29,374
GTA West	+28,774
Mississauga-Brampton	+21,208

York-Peel Boundary	+314%
Halton-Highway 401	+156%
York-Durham Boundary	+101%
York North	+83%
Durham-Taunton Road	+78%

The five screenlines with the highest numerical and percentage growth in **vehicle trips** in the peak direction during the Morning Peak Period are shown below.

Toronto-York Boundary	+59,769
Peel-Halton Boundary	+29,470
York-Peel Boundary	+27,476
GTA West	+26,411
Mississauga-Brampton	+22,432

York-Peel Boundary	+353%
Halton-Highway 401	+168%
York-Durham Boundary	+118%
York North	+95%
Durham-Taunton Road	+88%

In all the above cases, except for Mississauga-Brampton, the numerical growth in person crossings was greater than for vehicle crossings. As was the case for the total count period, the highest growth was in the north and west of the GTA.

2.2.3 Afternoon Peak Period

The five screenlines with the highest numerical and percentage growth in **person trips** in the peak direction during the Afternoon Peak Period are shown below.

Toronto-York Boundary	+68,303
Peel-Halton Boundary	+30,313
York-Peel Boundary	+30,006
GTA West	+28,235
Mississauga-Brampton	+27,143

York-Peel Boundary	+265%
Halton-Highway 401	+123%
York-Durham Boundary	+96%
York North	+76%
South York Cordon	+57%

The five screenlines with the highest numerical and percentage growth in **vehicle trips** in the peak direction during the Afternoon Peak Period are shown below.

Toronto-York Boundary	+58,640
Peel-Halton Boundary	+31,513
York-Peel Boundary	+26,273
Mississauga-Brampton	+25,543
South York Cordon	+23,217

York-Peel Boundary	+296%
Halton-Highway 401	+136%
York-Durham Boundary	+116%
York North	+104%
Durham Regional Road 23	+76%

In all the above cases, except the Peel-Halton Boundary, the numerical growth in person crossings was greater than for vehicle crossings. The Central Area Cordon has experienced a decrease of approximately 5% in person crossings in the peak direction between 1991 and 2006.

The afternoon and morning peak periods show a high degree of commonality in terms of the highest five person trips and vehicular trips.

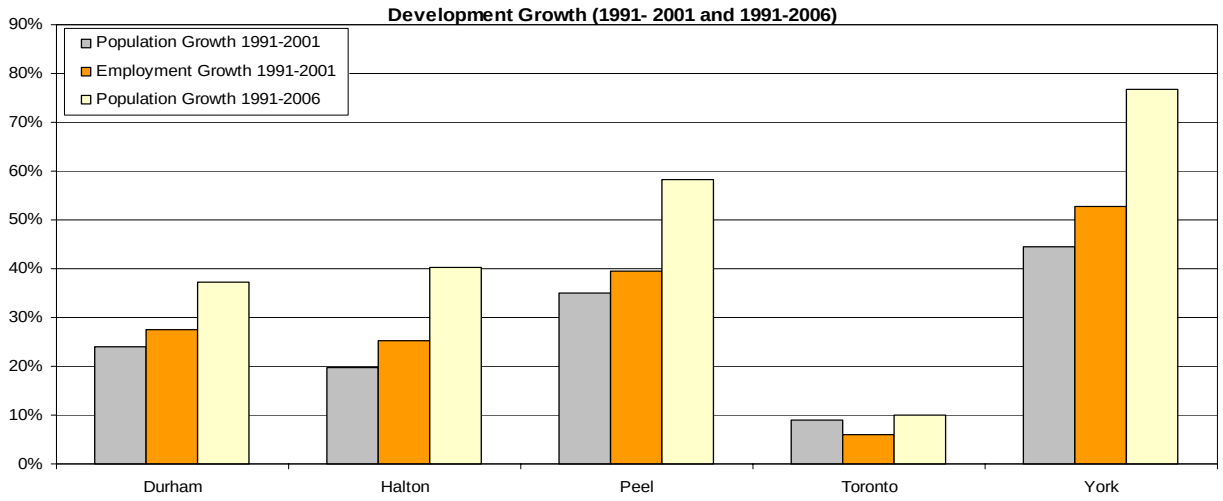
2.3 Demographic Trends and Issues

The summary of trends indicates significant growth in travel across the regions between 1991 and 2006. In general, during the morning and afternoon peak periods the growth in person trips was only marginally higher than growth in vehicle trips for both directions combined. This is an encouraging trend although the difference is very minor. There could be a number of reasons for this such as commuter response to better transit services and high sustained gas prices at the pump, which is effectively reducing the consumer surplus. Of note is the Toronto-York Boundary, where the relatively higher increase in person trips could be a response to increasing gas prices and newer and well integrated transit services (VIVA, GO) with the rest of the GTA, specifically the City of Toronto.

The significance of the above trend could be far reaching and is addressed in more detail in the sections of mode choice and auto occupancy.

Strong transportation growth is indicative of a growing population and employment base and a healthy economy. However, high growth in vehicular traffic has created issues of traffic congestion and air quality.

The graph below (labeled "Development Growth") shows the change in population from 1991 to 2001 and 1991 to 2006, and the change in employment from 1991 to 2001 for the various regions in the GTA. Statistics Canada 2006 employment data was not available when this report was undertaken.



Source: Transportation Tomorrow Survey Data and Statistics Canada
Note: Employment data was not available from Statistics Canada when this figure was developed

York Region, followed by Peel Region, has recorded the highest percent growth in both employment and population. This growth is reflected in the fact that major screenlines in these two regions (Toronto-York and York-Peel boundary) have experienced high numerical increases in person and vehicle crossings during the morning, afternoon and total count periods, compared to all other screenlines.

Of particular significance in understanding travel patterns across the GTA is the growing "cross commuting" between the '905' regions. The tables below show the percentage change in home-based work (HBW) trips in the GTA from 1991 to 2001 and 2001 to 2006, broken down into trips between each origin-destination pair.

The City of Toronto is the major producer / attractor of HBW trips within the GTA. However, with new employment centres outside the "traditional" downtown and relocation of population to suburban locales, the '905' regions are increasingly influencing travel patterns across the GTA. There is an increasing number of trips taking place between the '905' regions giving rise to significant east-west traffic patterns. This has been facilitated by the construction of Highway 407 and other major capacity upgrades to the arterial network in the GTA.

Change in Home-Based Work (HBW) Trips (1991-2001)

		DESTINATION				
		Toronto	Durham	York	Peel	Halton
ORIGIN	Toronto	-1%	16%	33%	10%	9%
	Durham	17%	12%	74%	55%	166%
	York	33%	60%	58%	91%	162%
	Peel	11%	68%	93%	41%	66%
	Halton	15%	45%	92%	50%	7%

Change in Home-Based Work (HBW) Trips (2001 - 2006)

		DESTINATION				
		Toronto	Durham	York	Peel	Halton
ORIGIN	Toronto	-7%	1%	6%	2%	0%
	Durham	1%	7%	12%	11%	16%
	York	5%	14%	14%	15%	16%
	Peel	3%	6%	14%	12%	21%
	Halton	1%	19%	17%	26%	14%

Source: Preliminary 2006 Transportation Tomorrow Survey Data

The change in HBW trip origins and destinations, and those remaining within each region are shown in **Figure 2.3**.

All regions, except the City of Toronto, experienced an increase in HBW trip origins and destinations, and those within each region from 1991 to 2001, 1991 to 2006, and from 2001 to 2006.

The highest numerical and percent increases in HBW trips from 1991 to 2001 and from 1991 to 2006 were experienced by the Regional Municipalities of York and Peel. From 2001 to 2006, the highest numerical increase was experienced by the Regional Municipality of Peel and the highest percentage increase was experienced by the Regional Municipality of Halton. These increases are in accordance with the growth recorded across the screenlines.

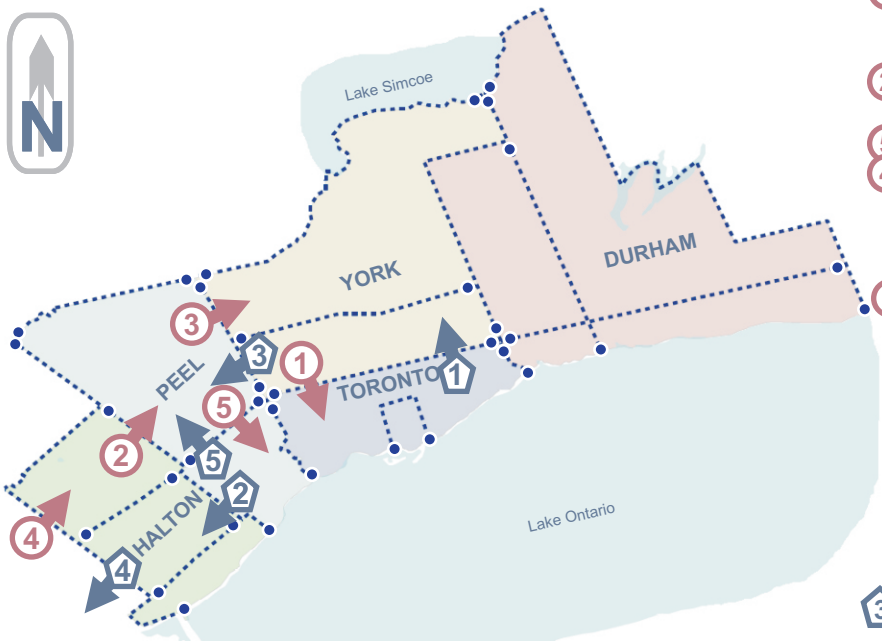
TOTAL PERSONS-Total Count Period-Both Directions

	1991	2006	Change	%
Durham-Taunton Road	126,188	200,438	74,250	59%
Durham-Regional Road 23	153,863	222,434	68,571	45%
GTA East	80,468	85,950	5,482	7%
York-Durham Boundary	55,428	81,021	25,593	46%
York-Peel Boundary	60,542	207,487	146,945	243%
York North	75,250	119,625	44,375	59%
South York Cordon	225,480	299,934	74,454	33%
Peel-Halton Boundary	327,095	527,060	199,965	61%
Peel North	39,135	45,285	6,150	16%
Mississauga-Brampton	291,717	456,683	164,966	57%
GTA West	311,794	498,513	186,719	60%
Halton-Highway 401 (South)	57,655	126,222	68,567	119%
Dundas Street (Regional Road 5)	183,684	258,818	75,134	41%
Durham-Toronto Boundary	211,487	267,049	55,562	26%
Toronto-York Boundary	933,616	1,245,454	311,838	33%
Toronto-Peel Boundary	981,855	963,924	-17,931	-2%
Central Area Cordon	1,803,798	1,696,982	-106,816	-6%

TOTAL VEHICLES-Total Count Period-Both Directions

	1991	2006	Change	%
Durham-Taunton Road	99,849	182,835	82,986	83%
Durham-Regional Road 23	124,238	208,887	84,649	68%
GTA East	65,601	81,250	15,649	24%
York-Durham Boundary	44,143	70,156	26,013	59%
York-Peel Boundary	48,922	186,732	137,810	282%
York North	55,691	97,854	42,163	76%
South York Cordon	178,245	252,112	73,867	41%
Peel-Halton Boundary	260,283	486,958	226,675	87%
Peel North	32,649	43,732	11,083	34%
Mississauga-Brampton	252,103	428,270	176,167	70%
GTA West	234,234	403,476	169,242	72%
Halton-Highway 401 (South)	46,087	111,652	65,565	142%
Dundas Street (Regional Road 5)	146,607	221,461	74,854	51%
Durham-Toronto Boundary	172,374	244,543	72,169	42%
Toronto-York Boundary	794,309	1,116,578	322,269	41%
Toronto-Peel Boundary	797,315	862,069	64,754	8%
Central Area Cordon	804,864	790,790	-14,074	-2%

TABLE 2.1
Change in Person and Vehicle Crossings (Both Directions)
Total Count Period (1991 to 2006)



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TOTAL PERSONS-Morning 3-Hour Peak Period-Peak Direction

	1991	2006	Change	%
Durham-Taunton Road	13,351	23,727	10,376	78%
Durham-Regional Road 23	24,700	37,392	12,692	51%
GTA East	8,102	10,083	1,981	24%
York-Durham Boundary	10,644	21,358	10,714	101%
(3) York-Peel Boundary	9,342	38,716	29,374	314%
York North	12,454	22,813	10,359	83%
South York Cordon	51,382	68,484	17,102	33%
(2) Peel-Halton Boundary	54,446	86,015	31,569	58%
Peel North	5,856	7,058	1,202	21%
(5) Mississauga-Brampton	52,553	73,761	21,208	40%
(4) GTA West	43,804	72,578	28,774	66%
Halton-Highway 401 (South)	8,106	20,787	12,681	156%
Dundas Street (Regional Road 5)	28,784	33,879	5,095	18%
Durham-Toronto Boundary	37,694	53,724	16,030	43%
(1) Toronto-York Boundary	118,870	185,719	66,849	56%
Toronto-Peel Boundary	134,809	142,739	7,930	6%
Central Area Cordon	310,938	328,940	18,002	6%

TOTAL PERSONS-Afternoon 3-Hour Peak Period-Peak Direction

	1991	2006	Change	%
Durham-Taunton Road	21,734	31,295	9,561	44%
Durham-Regional Road 23	29,643	42,933	13,290	45%
GTA East	11,710	14,281	2,571	22%
York-Durham Boundary	11,789	23,086	11,297	96%
(3) York-Peel Boundary	11,314	41,320	30,006	265%
York North	15,024	26,504	11,480	76%
South York Cordon	46,076	72,421	26,345	57%
(2) Peel-Halton Boundary	60,047	90,360	30,313	50%
Peel North	6,653	9,183	2,530	38%
(5) Mississauga-Brampton	50,547	77,690	27,143	54%
(4) GTA West	52,017	80,252	28,235	54%
Halton-Highway 401 (South)	9,628	21,498	11,870	123%
Dundas Street (Regional Road 5)	30,494	39,797	9,303	31%
Durham-Toronto Boundary	35,618	52,140	16,522	46%
(1) Toronto-York Boundary	132,055	200,358	68,303	52%
Toronto-Peel Boundary	153,843	162,295	8,452	5%
Central Area Cordon	343,400	327,343	-16,057	-5%

Morning 3-Hour Peak Direction
Afternoon 3-Hour Peak Direction
(5) Morning Largest Magnitude Numerical Change (1 = Largest)
(4) Afternoon Largest Magnitude Numerical Change (1 = Largest)

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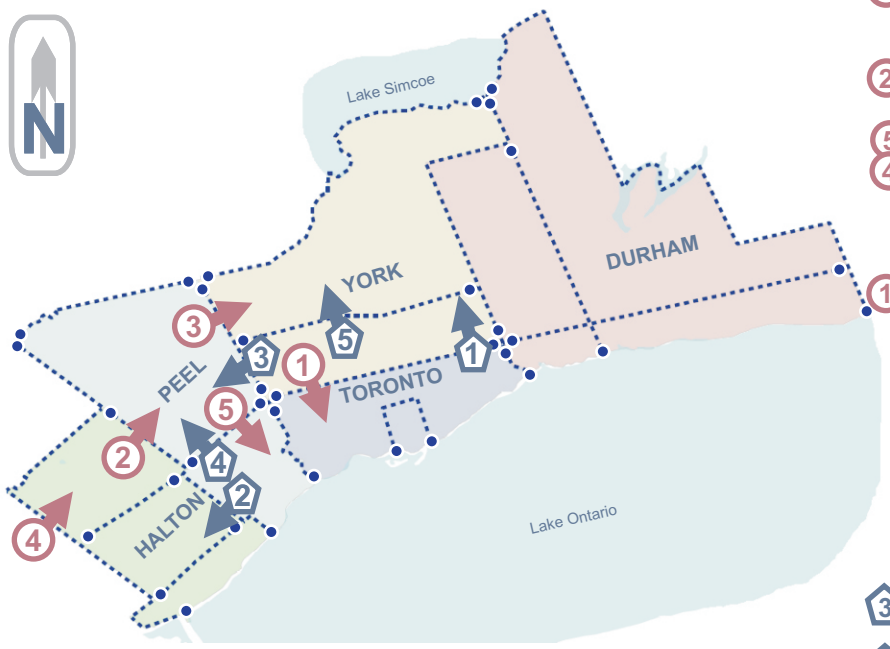
FIGURE 2.1
Change in Number of Person Crossings (Peak Direction)
Morning and Afternoon Peak Periods (1991 to 2006)



TOTAL VEHICLES-Morning 3-Hour Peak Period-Peak Direction

	1991	2006	Change	%
Durham-Taunton Road	11,596	21,854	10,258	88%
Durham-Regional Road 23	19,305	36,151	16,846	87%
GTA East	7,256	10,283	3,027	42%
York-Durham Boundary	9,108	19,826	10,718	118%
(3) York-Peel Boundary	7,791	35,267	27,476	353%
York North	10,041	19,570	9,529	95%
South York Cordon	40,982	58,377	17,395	42%
(2) Peel-Halton Boundary	40,341	69,811	29,470	73%
Peel North	5,303	7,015	1,712	32%
(5) Mississauga-Brampton	43,082	65,514	22,432	52%
(4) GTA West	34,097	60,508	26,411	77%
Halton-Highway 401 (South)	6,977	18,673	11,696	168%
Dundas Street (Regional Road 5)	23,420	30,051	6,631	28%
Durham-Toronto Boundary	27,526	43,388	15,862	58%
(1) Toronto-York Boundary	100,767	160,536	59,769	59%
Toronto-Peel Boundary	99,758	106,577	6,819	7%
Central Area Cordon	100,538	107,286	6,748	7%

TOTAL VEHICLES-Afternoon 3-Hour Peak Period-Peak Direction

	1991	2006	Change	%
Durham-Taunton Road	16,116	27,547	11,431	71%
Durham-Regional Road 23	22,217	39,083	16,866	76%
GTA East	9,411	12,590	3,179	34%
York-Durham Boundary	9,314	20,091	10,777	116%
(3) York-Peel Boundary	8,865	35,138	26,273	296%
York North	11,210	22,843	11,633	104%
(5) South York Cordon	37,059	60,276	23,217	63%
(2) Peel-Halton Boundary	43,552	75,065	31,513	72%
Peel North	5,597	8,393	2,796	50%
(4) Mississauga-Brampton	40,878	66,421	25,543	62%
GTA West	40,762	63,863	23,101	57%
Halton-Highway 401 (South)	8,016	18,886	10,870	136%
Dundas Street (Regional Road 5)	25,127	33,041	7,914	31%
Durham-Toronto Boundary	24,931	41,274	16,343	66%
(1) Toronto-York Boundary	107,602	166,242	58,640	54%
Toronto-Peel Boundary	110,548	119,443	8,895	8%
Central Area Cordon	109,154	112,058	2,904	3%

NOT TO SCALE

Morning 3-Hour Peak Direction
Afternoon 3-Hour Peak Direction
(5) Morning Largest Magnitude Numerical Change (1 = Largest)
(4) Afternoon Largest Magnitude Numerical Change (1 = Largest)

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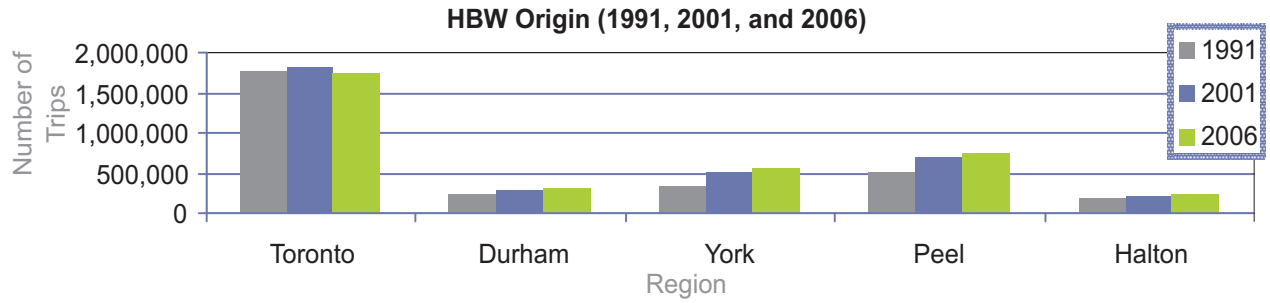
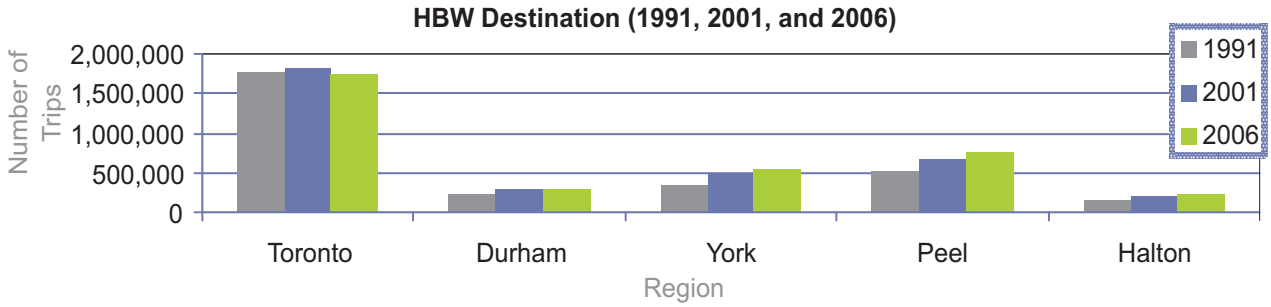
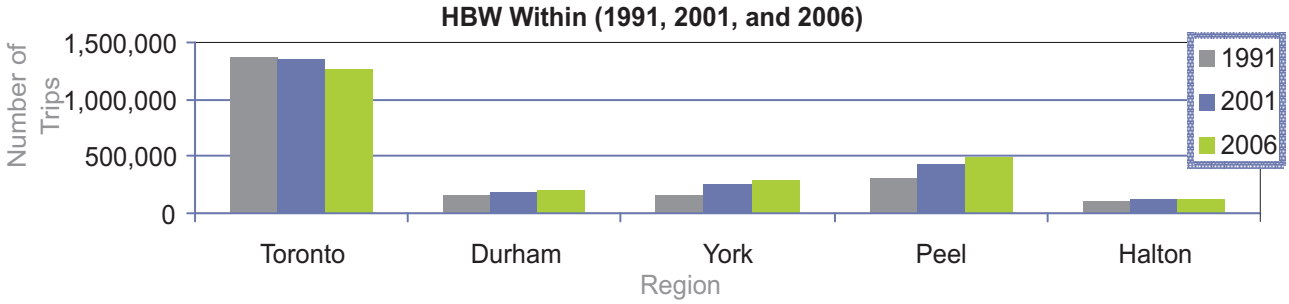
FIGURE 2.2
Change in Number of Vehicle Crossings (Peak Direction)
Morning and Afternoon Peak Periods (1991 to 2006)







Change in HBW Trips (1991 to 2001, 1991 to 2006 and 2001 to 2006)

	1991 to 2001					
	HBW Origin		HBW Destination		HBW Within Region	
	Change	%	Change	%	Change	%
Toronto	56,609	3%	61,154	3%	-17,659	-1%
Durham	40,322	17%	37,566	16%	19,875	12%
York	166,592	50%	166,750	50%	90,571	58%
Peel	179,348	36%	175,538	34%	126,236	41%
Halton	29,019	17%	30,882	18%	7,770	7%
	2001 to 2006					
	HBW Origin		HBW Destination		HBW Within Region	
	Change	%	Change	%	Change	%
Toronto	-76,289	-4%	-76,633	-4%	-91,257	-7%
Durham	17,102	6%	17,486	6%	13,666	7%
York	52,791	10%	53,564	11%	34,534	14%
Peel	71,119	10%	72,811	11%	51,763	12%
Halton	29,224	15%	26,719	13%	16,706	14%

Figure 2.3
Change in HBW Trips by Origin, Destination, and Remaining Within Each Region*

** Based on Preliminary 2006 Transportation Tomorrow Survey Data*

3.0 MODE OF TRANSPORTATION

3.1 Focus

This section presents the changes in the use of different modes of travel across the GTA. The modes analyzed are as follows: Auto (Auto Driver and Auto Passenger), GO Rail, GO Bus, and Other Transit. Other Transit consists primarily of bus and subway service excluding GO Rail, GO Bus, and School Buses. Other travel modes such as bicycles, walking, taxis etc. have not been recorded in sufficient detail between the two years (1991 and 2006), and their volumes are not significant enough to warrant a detailed analysis.

GO Bus was separated as a mode because it represents cross commuting patterns between municipalities. The analysis was completed for the morning peak period. GO Bus is further detailed in the figures in **Section 4.0** for both the morning and afternoon 3-hour peak periods.

The tables below present the numerical increase in crossings. Although the percentage increase for some of the screenlines was very high, the actual change in the number was relatively small. The modal shares as percentages and numerical values are highlighted in Table 3.1 and Table 3.2.

Please refer to:

Table 3.1 *Percent Modal Shares of Person Trips (Both Directions) – Morning Peak Period (1991 to 2006).*

Table 3.2 *Numerical Modal Shares of Person Trips (Both Directions) – Morning Peak Period (1991 to 2006).*

Figure 3.1 *Graphs of Modal Shares of Person Trips (Both Directions) – Morning Peak Period (1991 to 2006).*

3.2 Summary of Trends

3.2.1 Auto

The five screenlines with the highest numerical growth in auto (including both driver and passenger) crossings in the peak direction from 1991 to 2006 are shown below with their respective percent growth.

Toronto-York Boundary	+54,307 (53%)
Peel-Halton Boundary	+27,499 (67%)
GTA West	+27,008 (89%)
York-Peel Boundary	+26,384 (317%)
Central Area Cordon	+24,050 (22%)

3.2.2 GO Rail

The five screenlines with the highest numerical growth in person crossings by GO Rail in the peak direction from 1991 to 2006 are shown below with their respective percent growth.

Central Area Cordon	+23,773 (62%)
Toronto-Peel Boundary	+11,955 (58%)
Toronto-York Boundary	+7,442 (228%)
Peel-Halton Boundary	+5,254 (65%)
Durham-Toronto Boundary	+3,517 (50%)

3.2.3 GO Bus

The five screenlines with the highest numerical growth in person crossings by GO Bus in the peak direction from 1991 to 2006 are shown below.

Toronto-York Boundary	+2,086
South York Cordon	+764
Toronto-Peel Boundary	+708
GTA West	+669
Durham-Regional Rd 23	+667

No GO Bus service was recorded across the above screenlines in 1991.

3.2.4 Other Transit

The five screenlines with the highest numerical growth in person crossings by Other Transit service in the peak direction from 1991 to 2006 are shown below with their respective percent growth. These numbers do not include services offered by GO.

Toronto-York Boundary	+223 (2%)
York North	+129 (61%)
York-Peel Boundary	+78 (28%)
Durham-Taunton Road	+21 (10%)
GTA East	-13 (-8%)

3.2.5 Proportion of Person Crossings by Mode

The number and percentage of person trips crossing the screenlines in both directions by each mode are presented below for the morning peak period.

	1991	%91	2006	%06
Auto Driver	802,500	61%	1,269,764	69%
Auto Passenger	148,253	11%	132,497	7%
GO Bus	2,648	0%	10,946	1%
GO Rail	85,288	6%	145,908	8%
School Bus	6,783	1%	35,477	2%
Other Transit	277,499	21%	258,205	14%

3.2.6 Growth in Crossings by Mode

The total number of person crossings and the change in percentage share by each mode is shown below.

	1991	2006	% Chg
Auto Driver	802,500	1,269,764	58%
Auto Passenger	148,253	132,497	-11%
GO Bus	2,648	10,946	313%
GO Rail	85,288	145,908	71%
School Bus	6,783	35,477	423%
Other Transit	277,499	258,205	-7%
Total	**1,322,971**	**1,852,797**	**40%**

Transit is discussed in greater detail in **Section 4.0**.

3.3 Conclusions

As expected, from 1991 to 2006, auto was the dominant mode of travel in the morning peak period (both directions). The number of person trips by the transit modes (GO Rail, GO Bus and Other Transit) has increased by approximately 14% (49,600) from 1991 to 2006; however, there has been a decrease in the transit modal split of approximately 5% from 1991 to 2006. The highest percent growth in transit person trips in both directions was GO Bus followed by GO Rail. This decrease in transit modal split reflects the increased spatial dispersion of development across the GTA, and the challenges of serving it with transit.

It should be noted that GO Bus was not a specific category for most agencies in 1991. This partly contributes to the significant increases in GO Bus ridership observed between 1991 and 2006. For example, in 1991, Durham and York GO Bus ridership was included in a category designated as other bus, which also included coaches and local transit. This would help explain why local transit showed a decrease in 2006. Halton, Peel, and Toronto do not have a separate category for school buses in 1991; consequently, school buses are lumped into the other bus category for the 1991 data and not the 2006 data.

The definition of other bus in the base data varies from 1991 to 2006 (i.e. GO Bus and school buses were

included in the other bus category for some regions in 1991). This is an inherent limitation in the 1991 data, however the 2006 data separates the school bus and GO Bus categories for all regions. The 2006 Other Transit category used in this analysis includes all transit service (excluding GO Bus, School Bus, and GO Rail).

There has been a general and significant increase in auto driver trips and a decrease in auto passenger trips from 1991 to 2006. This increase in auto driver person trips may be attributed to increasingly auto-dependent lifestyles, urban development, increased population within and adjacent to the GTA regions, and a lack of convenience and availability of other modes of travel in some areas. There was an 11% decrease in auto passenger trips from 1991 to 2006 for the morning peak period (both directions). This decline in auto passengers and increase in auto drivers indicates that auto occupancy rates have decreased from 1991 to 2006. This trend is discussed in **Section 8.0**.

There have been significant increases in GO Rail person trips from 1991 to 2006, but its modal share has increased only marginally (nearly 2%) in the morning peak period (both directions). The majority of GO Rail trips are destined for Toronto. This is not surprising, since Toronto has the most extensive transit service in the GTA to which GO Rail connects, as well as the downtown concentration of employment. The Central Area in the City of Toronto continues to remain the main attractor for GO Rail trips.

The Transportation Tomorrow Survey, a reputable source for trip information within the GTA, shows that a significant percentage of home-based work trips are made between the GTA regions as shown in the HBW Trip tables in **Section 2.0**. Therefore, cross commuting is a pattern that needs to be addressed.

In order to better understand trends in cross commuting, GO Bus person trips are analyzed separately. Overall, there has been an increase in cross commuting via GO Bus with some screenlines showing a proportionally larger change than others. This is likely due to the varying availability and convenience of GO Bus service between regions; additionally, the expansion of local transit services have likely taken some of the shorter trip riders away from the GO Bus service. GO Bus is further discussed in **Section 4.0**.

The 7% modal share decrease in Other Transit trips appears to be compensated by an increase in trips by other modes of travel, such as GO Rail and GO Bus service. The overall decrease in Other Transit trips is likely due to the level of service being offered and improved road access (i.e. new interchanges, increased lane capacity, etc), that make automobile travel more attractive. Therefore, the transit numbers may be very sensitive to changes near the screenlines and not the region as a whole. This analysis focuses primarily on regional and inter-urban screenlines and therefore does not fully reflect the extent of transit travel within the regions. A decline in Other Transit should not be used as an indication of a decrease in transit within and between regions and urban areas. Other Transit is further discussed in **Section 4.0**.

This analysis focuses primarily on regional and inter-urban screenlines and therefore does not fully reflect the extent of **school bus trips** in the GTA. School bus trips captured by the screenlines in the morning are likely to reflect trips to school and fieldtrips. The increase in school bus trips is likely the result of increased population and changing development patterns throughout the GTA; additionally, school bus trips captured in 2006, but not captured in the 1991 Cordon Count may also contribute to this high growth. School Bus trips are discussed in **Section 9.0**.

	Year	Auto Driver	Auto Passenger	GO Bus	GO Rail	School Bus	Other Transit
Durham-Taunton Road	1991	76.1%	16.2%	-	-	7.7%	-
	2006	80.2%	11.2%	0.7%	-	7.3%	0.6%
Durham-Regional Road 23	1991	72.6%	15.0%	-	8.7%	0.9%	2.7%
	2006	77.2%	9.6%	1.6%	9.4%	1.7%	0.5%
GTA East	1991	69.3%	23.0%	-	-	4.1%	3.5%
	2006	79.4%	10.1%	-	-	7.7%	2.8%
York-Durham Boundary	1991	80.9%	12.9%	-	-	5.8%	0.4%
	2006	89.9%	7.9%	0.2%	-	1.3%	0.7%
York-Peel Boundary	1991	84.3%	11.2%	-	-	2.2%	2.3%
	2006	90.1%	7.1%	0.6%	-	1.1%	1.1%
York North	1991	72.3%	15.2%	-	-	11.1%	1.4%
	2006	86.4%	8.5%	0.3%	1.2%	1.7%	1.9%
South York Cordon	1991	81.4%	14.1%	-	-	1.4%	3.1%
	2006	84.3%	8.1%	1.0%	2.9%	2.1%	1.6%
Peel-Halton Boundary	1991	68.2%	11.3%	1.8%	11.2%	-	7.6%
	2006	77.6%	7.5%	0.6%	10.5%	1.5%	2.4%
Peel North	1991	80.9%	17.5%	-	-	-	1.7%
	2006	86.8%	8.7%	0.2%	-	4.1%	0.1%
Mississauga-Brampton	1991	76.3%	12.3%	1.8%	4.2%	-	5.4%
	2006	82.0%	8.0%	0.8%	4.4%	1.4%	3.5%
Halton-Highway 401 (South)	1991	74.5%	13.0%	-	-	-	12.5%
	2006	88.5%	9.4%	0.0%	-	1.5%	0.6%
Dundas Street (Regional Road 5)	1991	79.0%	14.1%	-	-	-	6.9%
	2006	82.1%	9.4%	0.2%	-	6.9%	1.5%
Durham-Toronto Boundary	1991	68.2%	13.4%	-	14.3%	-	4.1%
	2006	74.8%	5.3%	1.0%	15.5%	2.2%	1.1%
Toronto-York Boundary	1991	76.0%	14.1%	-	1.7%	-	8.2%
	2006	79.1%	8.7%	0.8%	3.5%	1.4%	6.5%
Toronto-Peel Boundary	1991	69.0%	11.8%	-	9.9%	-	9.3%
	2006	71.8%	6.3%	0.5%	13.9%	1.6%	5.9%
Central Area Cordon	1991	32.3%	6.5%	-	9.5%	-	51.7%
	2006	35.7%	4.5%	0.2%	13.7%	0.8%	45.0%
GTA West	1991	72.1%	13.7%	-	-	-	14.3%
	2006	80.5%	9.2%	1.3%	0.7%	4.6%	3.7%

TABLE 3.1
Percent Modal Shares of Person Trips (Both Directions)
Morning Peak Period (1991 to 2006)

	Year	Auto Driver	Auto Passenger	GO Bus	GO Rail	School Bus	Other Transit
Durham-Taunton Road	1991	18,742	3,989	-	-	1,886	-
	2006	34,797	4,837	303	-	3,157	276
Durham-Regional Road 23	1991	26,134	5,392	-	3,143	336	968
	2006	45,824	5,705	966	5,604	999	284
GTA East	1991	9,369	3,110	-	-	557	475
	2006	13,019	1,660	-	-	1,270	451
York-Durham Boundary	1991	11,461	1,830	-	-	819	55
	2006	26,566	2,334	67	-	396	204
York-Peel Boundary	1991	11,671	1,548	-	-	306	325
	2006	56,667	4,471	379	-	671	719
York North	1991	13,249	2,792	-	-	2,032	253
	2006	26,042	2,557	86	351	523	570
South York Cordon	1991	50,520	8,755	-	-	847	1,941
	2006	77,957	7,459	910	2,714	1,896	1,504
Peel-Halton Boundary	1991	51,087	8,430	1,315	8,377	-	5,658
	2006	101,446	9,770	743	13,709	1,981	3,131
Peel North	1991	6,427	1,387	-	-	-	134
	2006	8,355	835	21	-	397	14
Mississauga-Brampton	1991	56,390	9,054	1,333	3,074	-	4,014
	2006	91,656	8,978	842	4,873	1,528	3,863
Halton-Highway 401 (South)	1991	8,954	1,566	-	-	-	1,504
	2006	28,218	2,999	5	-	491	188
Dundas Street (Regional Road 5)	1991	33,421	5,953	-	-	-	2,931
	2006	48,666	5,543	101	-	4,065	889
Durham-Toronto Boundary	1991	34,813	6,856	-	7,290	-	2,096
	2006	52,343	3,716	706	10,859	1,516	801
Toronto-York Boundary	1991	146,427	27,178	-	3,266	-	15,866
	2006	240,743	26,321	2,367	10,708	4,299	19,781
Toronto-Peel Boundary	1991	146,205	25,036	-	21,037	-	19,758
	2006	171,413	15,090	1,304	33,155	3,747	14,125
Central Area Cordon	1991	132,613	26,853	-	39,101	-	212,616
	2006	164,741	20,960	787	63,244	3,859	207,703
GTA West	1991	45,017	8,524	-	-	-	8,905
	2006	81,311	9,262	1,359	691	4,688	3,702

TABLE 3.2
Numerical Modal Shares of Person Trips (Both Directions)
Morning Peak Period (1991 to 2006)

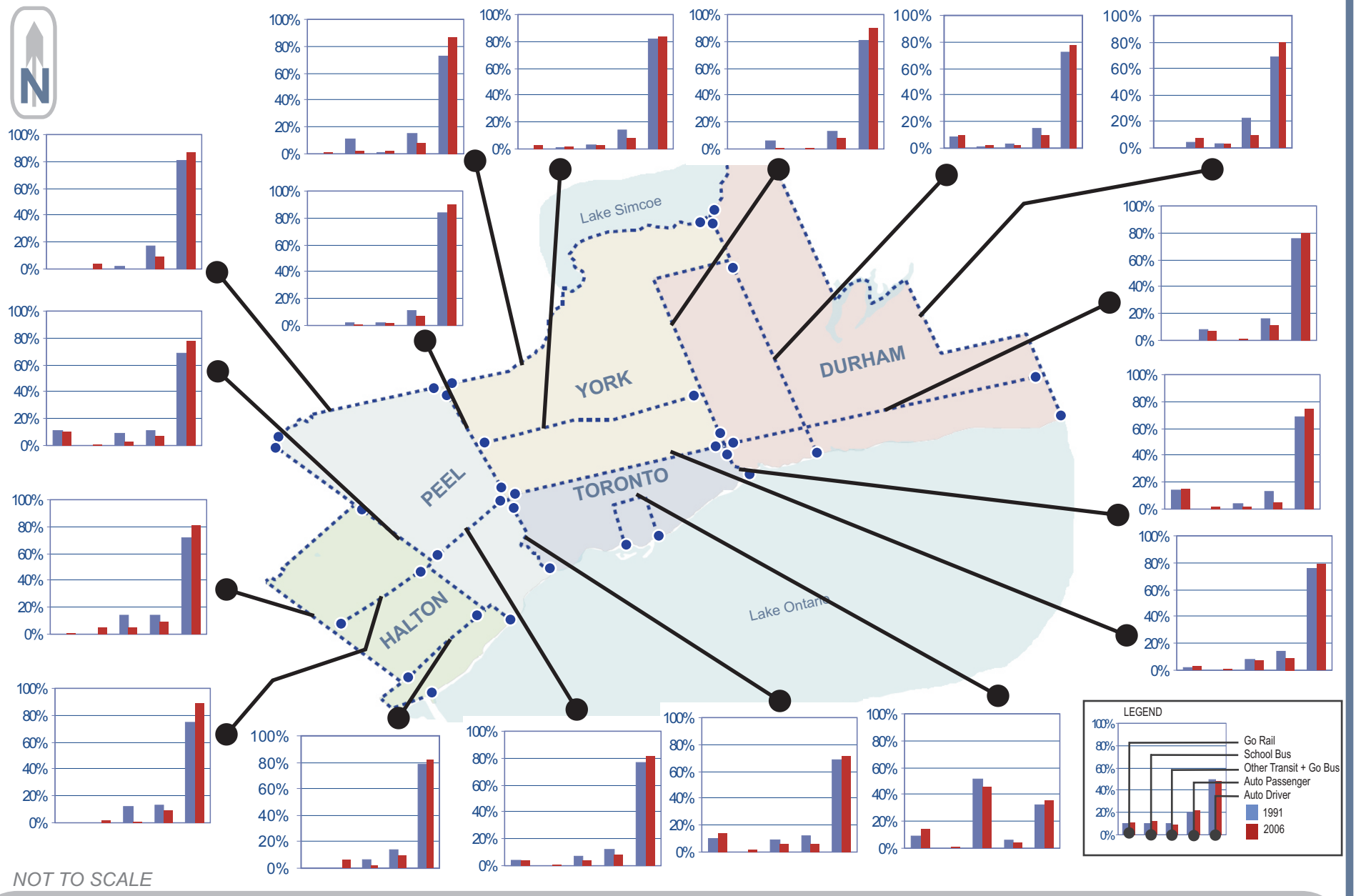


FIGURE 3.1
Graphs of Modal Shares of Person Trips (Both Directions)
Morning Peak Period (1991 to 2006)

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4.0 TRANSIT

4.1 Focus

This section focuses on transit trends in the GTA between 1991 and 2006. Because changes in transit patterns have not followed a simple straight-line relationship between 1991 and 2006, intermediate horizons of 1995 and 2001 were also addressed. In order to understand the impact of cross-commuting and inter-regional travel, GO Bus was maintained as a separate category. The tables below address the morning peak period since the trend in the data in the afternoon peak period was similar unless specifically noted. Figures 4.1 and 4.2 highlight both the afternoon and morning peak periods.

Please refer to:

Figure 4.1 *Change in GO Rail Passenger (Peak Direction) - Morning and Afternoon Peak Periods (1991 to 2006).*

Figure 4.2 *Change in GO Bus Passenger (Peak Direction) - Morning and Afternoon Peak Periods (1991 to 2006).*

4.2 Summary of Trends

4.2.1 GO Rail

The five screenlines with the highest numerical growth from 1991 to 2006 in person crossings by GO Rail in the morning 3-hour peak period in the peak direction are shown below.

Central Area Cordon	+23,773
Toronto-Peel Boundary	+11,955
Toronto-York Boundary	+7,442
Peel-Halton Boundary	+5,254
Durham-Toronto Boundary	+3,517

4.2.2 GO Bus

The five screenlines with the highest numerical growth from 1991 to 2006 in person crossings by GO Bus in the morning 3-hour peak period in the peak direction are shown below.

Toronto-York Boundary	+2,086
South York Cordon	+764
Toronto-Peel Boundary	+708
GTA West	+669
Durham-Regional Road 23	+667

4.2.3 Other Transit

The four screenlines with the highest numerical growth from 1991 to 2006 in person crossings by Other Transit service in the morning 3-hour peak period in the peak direction are shown below.

Toronto-York Boundary	+223
York North	+129
York-Peel Boundary	+78
Durham-Taunton Road	+21

4.2.4 Proportion of Total Transit Crossings

The table below shows the share of each transit mode in both directions across all screenlines combined during the morning peak period.

	1991	% 91	2006	% 06
GO Bus	2,648	1%	10,946	3%
GO Rail	85,288	23%	145,908	35%
Other Transit	277,499	76%	258,205	62%
Total Transit	365,435		415,059	

4.3 Conclusions

Transit modes account for approximately 415,000 (22%) of the total person trips crossing the screenlines in both directions in the morning peak period in 2006. Although 2006 transit ridership has increased from the 1991 value, transit as a mode share has dropped from approximately 365,400 (28%) in 1991.

Of note is the increase in the share of GO Rail and GO Bus crossings in the overall number of transit trips. The share of GO Rail ridership in total transit has increased from approximately 23% in 1991 to nearly 35% in 2006. A majority of these are destined to the Central Area and use GO Rail. The GO trips headed to areas outside the Central Area use GO Bus, reflecting an increase in cross-commuting patterns across the GTA.

Over the past fifteen years GO Rail service was expanded to serve Oshawa, Hamilton, and Newmarket/Bradford, and increased train frequencies were introduced on numerous services. As a result, some of the highest growth in GO Rail ridership has been recorded on screenlines measuring travel from these new stations.

With municipalities concentrating new population and employment growth along existing transportation and transit corridors, the increase in GO ridership is expected to continue as the GTA intensifies. The GO Bus service presents increased flexibility in terms of routes and schedules while maintaining relatively similar travel times to the GO Rail service in corridors where both are available. As a result, GO Bus ridership has also increased nearly five fold from 1991 to 2006 in the morning peak period. **Figure 4.2** highlights decreasing GO Bus ridership at the Peel-Halton Boundary and Mississauga-Brampton. This decrease in GO Bus ridership is partly the result of some passengers switching to GO Rail. These screenlines in particular have shown increases in GO Rail ridership from 1991 to 2006.

The Other Transit services experienced a 19,300 (14%) decrease in ridership across the screenlines in the morning peak period from 1991 to 2006. Approximately 27% of this drop in ridership is due to a decrease in Other Transit ridership across the Central Area Cordon, and approximately 43% of the drop relates to screenlines between the City of Toronto and other municipalities.

A decline in Other Transit should not be used as an indication of a decrease in transit within and between regions and urban areas. The screenlines used in this analysis do not capture Other Transit in enough detail to analyse those trends. These values are only an indication of a decrease in Other Transit captured by the screenlines used in this analysis. A more detailed review would be required in order to fully assess the trends in Other Transit from 1991 and 2006.

The decrease in Other Transit across the screenlines is likely the result of many factors including changing development patterns, route changes, and complex trip behaviour; furthermore, the addition of new GO Rail and GO Bus services have likely resulted in people switching from Other Transit modes to GO Transit services over the 1991 to 2006 period.

The 2003 GTA Cordon Count Report (reporting trends between 1991 and 2001) highlights a steady growth in inter-regional trips on GO Rail, but a decline in use of Other Transit service for these trips. It is difficult to directly compare results with the 2003 GTA Cordon Count Report as the screenlines and definitions used

for this analysis differ; additionally, new transit routes captured across screenlines influence the results. There was an overall increase in GO Rail trips and a decrease in Other Transit from 1991 to 2006 across regional boundaries.

The screenlines outside the Central Area Cordon have experienced a significant drop in bus ridership levels. Bus ridership across those screenlines has dropped from approximately 37,700 in 1991 to 29,400 (22%) in 2006.

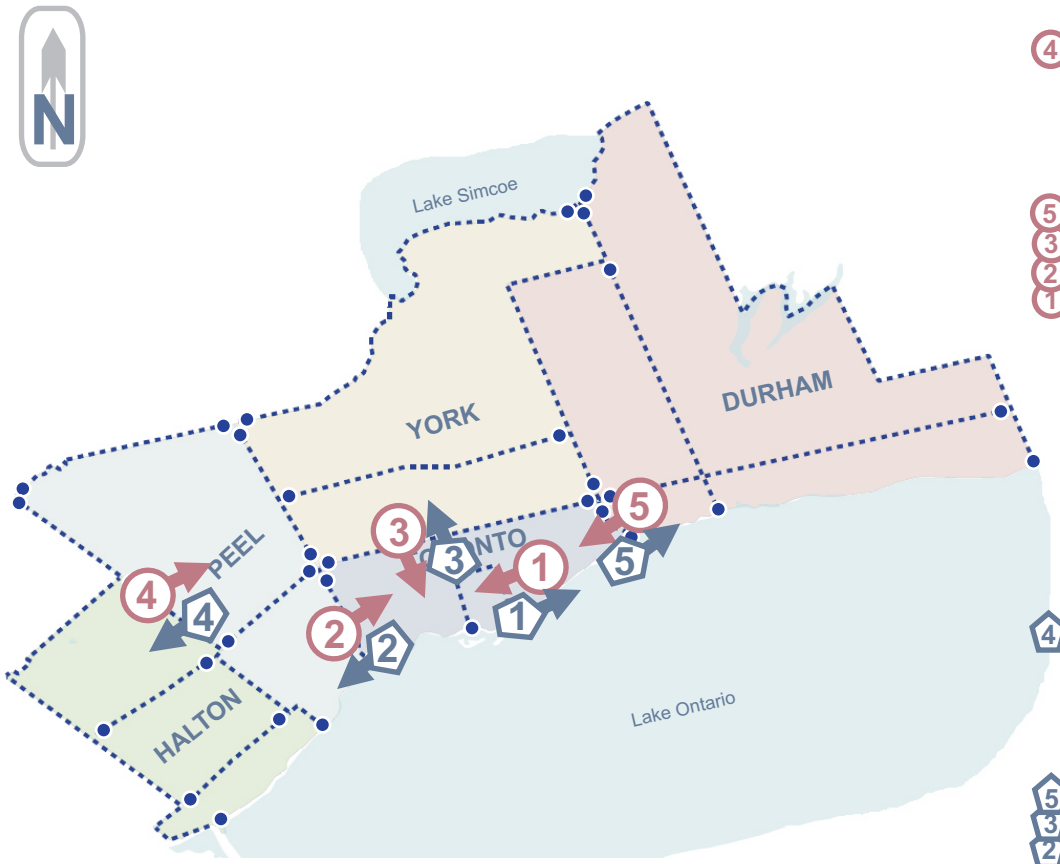
A further review of transit trends observed in the 1995 and 2001 Cordon Count data was carried out to understand intermediate changes in ridership patterns. These are shown in the table below, which highlights morning peak period trips in both directions for the area within and outside the Central Area Cordon (CAC). There was a decline in total ridership from 1991 to 1995. Total ridership starts to rebound in 2001 with streetcar and subway ridership approaching the 1991 levels. The highest increase has been experienced in TTC streetcar ridership, whereas total bus ridership has shown an overall decline in 2006 from its 1991 level. The drop in bus ridership from 2001 to 2006 is partly attributed to increased auto congestion and new transit resulting in a mode change from bus to other forms of transit. It should be emphasized that although bus ridership has decreased, the total transit volume is trending upward. This also serves as an indication that existing transit riders are altering their mode choice.

TTC streetcars have experienced a nearly 4,800 (23%) trip increase in ridership between 1991 and 2006, which can be mainly attributed to major new services like the Spadina Streetcar and improvements in the service. Subway ridership has already begun to move up to 1991 ridership levels with the opening of major new subway lines (i.e. Sheppard Subway and the extension of the Spadina Subway north to Downsview).

The trends for municipal transit services in the '905' regions present a challenge to document since they are mainly contained within their respective regional boundaries. The decrease in ridership there can be partly attributed to the introduction of improved GO Rail and GO Bus services serving the downtown Toronto core and other destinations. A more detailed analysis will need additional screenlines that are located to effectively capture trends in local ridership.

		Outside CAC*	CAC	Total
1991	**Streetcar**	0	20,977	20,977
	Subway	0	179,341	179,341
	Bus	37,720	12,298	50,018
1995	**Street Car**	0	13,603	13,603
	Subway	0	165,089	165,089
	Bus	23,151	12,902	36,053
2001	**Streetcar**	0	16,609	16,609
	Subway	0	172,257	172,257
	Bus	21,806	20,163	41,969
2006	**Streetcar**	0	25,752	25,753
	Subway	0	175,910	175,910
	Bus	29,383	6,041	35,424
	% (91-95)	-39%	-10%	-14%
	% (95-01)	-6%	9%	7%
	% (01-06)	35%	-1%	3%

** This reflects the area outside the Central Area Cordon (CAC) but within the City of Toronto boundary*



GO RAIL PASSENGERS-Morning 3-Hour Peak Period-Peak Direction

	1991	2006	Change	%
Durham-Taunton Road	-	-	-	-
Durham-Regional Road 23	2,983	5,417	2,434	82%
GTA East	-	-	-	-
York-Durham Boundary	-	-	-	-
York-Peel Boundary	-	-	-	-
York North	-	351	351	-
South York Cordon	-	2,714	2,714	-
(4) Peel-Halton Boundary	8,083	13,337	5,254	65%
Peel North	-	-	-	-
Mississauga-Brampton	3,074	4,873	1,799	59%
GTA West	-	691	691	-
Halton-Highway 401 (South)	-	-	-	-
Dundas Street (Regional Road 5)	-	-	-	-
(5) Durham-Toronto Boundary	7,006	10,523	3,517	50%
(3) Toronto-York Boundary	3,266	10,708	7,442	228%
(2) Toronto-Peel Boundary	20,734	32,689	11,955	58%
(1) Central Area Cordon	38,622	62,395	23,773	62%

GO RAIL PASSENGERS-Afternoon 3-Hour Peak Period-Peak Direction

	1991	2006	Change	%
Durham-Taunton Road	-	-	-	-
Durham-Regional Road 23	2,753	4,473	1,720	62%
GTA East	-	-	-	-
York-Durham Boundary	-	-	-	-
York-Peel Boundary	-	-	-	-
York North	-	309	309	-
South York Cordon	-	2,160	2,160	-
(4) Peel-Halton Boundary	6,992	10,392	3,400	49%
Peel North	-	-	-	-
Mississauga-Brampton	2,585	4,759	2,174	84%
GTA West	-	533	533	-
Halton-Highway 401 (South)	-	-	-	-
Dundas Street (Regional Road 5)	-	-	-	-
(5) Durham-Toronto Boundary	7,282	9,600	2,318	32%
(3) Toronto-York Boundary	2,738	9,971	7,233	264%
(2) Toronto-Peel Boundary	18,833	30,907	12,074	64%
(1) Central Area Cordon	35,511	57,233	21,722	61%

NOT TO SCALE

Morning 3-Hour Peak Direction
Afternoon 3-Hour Peak Direction
(5) Morning Largest Magnitude Numerical Change (1 = Largest)
(4) Afternoon Largest Magnitude Numerical Change (1 = Largest)

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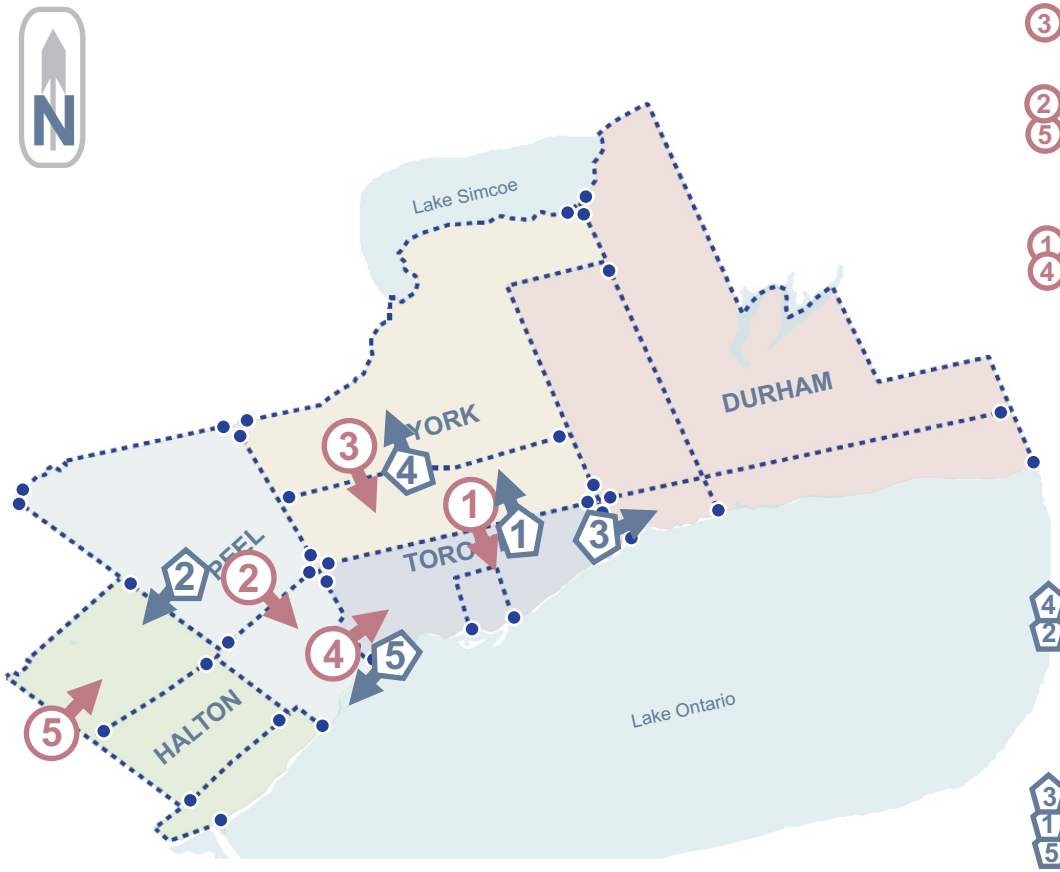
FIGURE 4.1
Change in GO Rail Passenger (Peak Direction)
Morning and Afternoon Peak Periods (1991 to 2006)



GO BUS PASSENGERS-Morning 3-Hour Peak Period-Peak Direction

	1991	2006	Change	%
Durham-Taunton Road	-	98	98	-
Durham-Regional Road 23	-	667	667	-
GTA East	-	-	-	-
York-Durham Boundary	-	4	4	-
York-Peel Boundary	-	322	322	-
York North	-	62	62	-
(3) South York Cordon	-	764	764	-
Peel-Halton Boundary	975	415	-560	-57%
Peel North	-	20	20	-
(2) Mississauga-Brampton	1,155	384	-771	-67%
(5) GTA West	-	669	669	-
Halton-Highway 401 (South)	-	3	3	-
Dundas Street (Regional Road 5)	-	48	48	-
Durham-Toronto Boundary	-	612	612	-
(1) Toronto-York Boundary	-	2,086	2,086	-
(4) Toronto-Peel Boundary	-	708	708	-
Central Area Cordon	-	227	227	-

GO BUS PASSENGERS-Afternoon 3-Hour Peak Period-Peak Direction

	1991	2006	Change	%
Durham-Taunton Road	-	69	69	-
Durham-Regional Road 23	-	491	491	-
GTA East	-	-	-	-
York-Durham Boundary	-	7	7	-
York-Peel Boundary	-	430	430	-
York North	-	89	89	-
(4) South York Cordon	-	818	818	-
(2) Peel-Halton Boundary	1,632	191	-1,441	-88%
Peel North	65	8	-57	-88%
Mississauga-Brampton	859	560	-299	-35%
GTA West	-	587	587	-
Halton-Highway 401 (South)	-	1	1	-
Dundas Street (Regional Road 5)	-	136	136	-
(3) Durham-Toronto Boundary	-	974	974	-
(1) Toronto-York Boundary	-	2,663	2,663	-
(5) Toronto-Peel Boundary	-	658	658	-
Central Area Cordon	-	561	561	-

NOT TO SCALE

Morning 3-Hour Peak Direction
Afternoon 3-Hour Peak Direction
(5) Morning Largest Magnitude Numerical Change (1 = Largest)
(4) Afternoon Largest Magnitude Numerical Change (1 = Largest)

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FIGURE 4.2
Change in GO Bus Passenger (Peak Direction)
Morning and Afternoon Peak Periods (1991 to 2006)

5.0 COMMERCIAL TRAFFIC

5.1 Focus

The effect of commercial traffic on roads is becoming increasingly crucial in planning for many areas of the GTA, especially with the increase in traffic volumes attributed to Just-in-Time Delivery (JIT).

This section presents the quantity of commercial vehicle trips (medium and heavy trucks) across the GTA screenlines during the combined morning and afternoon peak periods as well as the total count period.

Please refer to:

Table 5.1 *Commercial Vehicle Traffic (Both Directions) – Total Count Period (1991 to 2006).*

Table 5.2 *Commercial Vehicle Traffic (Both Directions) – Combined Morning and Afternoon Peak Period (1991 to 2006).*

Figure 5.1 *Time of Day Profile for Commercial Vehicles Crossing Screenlines – Total Count Period (1991 to 2006).*

5.2 Summary of Trends

5.2.1 Total Count Period

The five screenlines with the highest numerical growth in commercial vehicle traffic in both directions during the total count period between 1991 and 2006 are shown below.

GTA West	+27,863
Toronto-York Boundary	+21,385
York-Peel Boundary	+19,235
Mississauga-Brampton	+15,964
Peel-Halton Boundary	+13,589

The five screenlines with the highest percentage growth in commercial vehicle traffic in both directions during the total count period between 1991 and 2006 are shown below.

York-Peel Boundary	+447%
York North	+124%
York-Durham Boundary	+109%
Halton-Highway 401	+105%
GTA West	+100%

The five screenlines with the highest 2006 percentage of commercial vehicle traffic in both directions combined during the total count period are shown below.

GTA East	15%
GTA West	14%
York-Peel Boundary	13%
York-Durham Boundary	11%
York North	10%

The five screenlines with the lowest 2006 percentage of commercial vehicle traffic in both directions during the total count period are shown below.

Central Area Cordon	3%
Toronto-York Boundary	5%
Dundas Street (Regional Road 5)	5%
Durham-Taunton Road	5%
Toronto-Peel Boundary	7%

5.2.2 Combined Peak Period Traffic

The five screenlines with the highest numerical growth in commercial vehicle traffic in both directions during the combined morning and afternoon peak periods between 1991 and 2006 are shown below.

GTA West	+9,421
York-Peel Boundary	+7,665
Toronto-York Boundary	+7,440
Mississauga-Brampton	+6,529
Peel-Halton Boundary	+5,609

The five screenlines with the highest percentage growth in commercial vehicle traffic in both directions during combined morning and afternoon peak periods between 1991 and 2006 are shown below.

York-Peel Boundary	+405%
Mississauga-Brampton	+101%
York North	+98%
Halton-Highway 401	+96%
York-Durham Boundary	+84%

The five screenlines with the highest 2006 percentage of commercial vehicle traffic in both directions during the combined morning and afternoon peak period are shown below.

GTA East	11%
GTA West	11%
York-Peel Boundary	8%
Halton-Highway 401	6%
Peel-Halton Boundary	6%

The five screenlines with the lowest 2006 percentage of commercial vehicle traffic in both directions during the combined morning and afternoon peak period are shown below.

Central Area Cordon	2%
Toronto-York Boundary	4%
Dundas Street (Regional Road. 5)	4%
Durham-Taunton Road	4%
South York Cordon	5%

5.3 Conclusion

The results show a broadening of commercial traffic within the GTA and also crossing its boundaries. It is important to recognize that a significant number of commercial vehicle trips occur outside the total count period analysed. As discussed in the 2003 GTA Cordon Count Report, the 1999/2000 Commercial Vehicle Survey indicates that 30 to 50 percent of truck movements on major highways occur during the nighttime period, which is not collected by the cordon count stations.

The 2003 GTA Cordon Count Report (defining trends between 1991 and 2001) noted that commercial traffic was particularly strong in the western part of the GTA. This was apparent in the 1991 to 2006 analysis, with the GTA West accounting for the largest numerical growth in commercial traffic for both the total count period and the combined peak period.

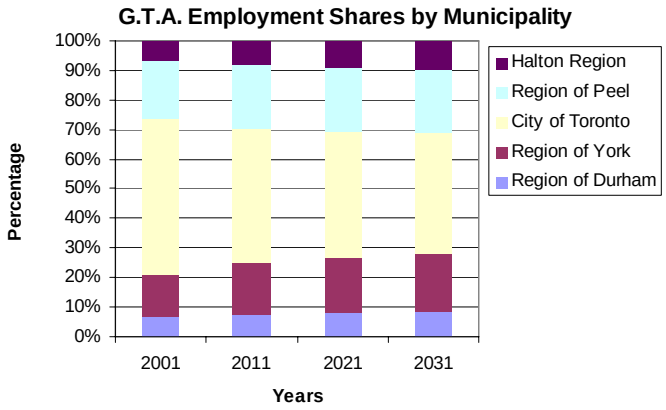
The numerical difference between 1991 and 2006 for the total count period ranges from -2,860 to 27,863 commercial vehicles, with an average numerical growth of 8,530 commercial vehicles. The combined morning and afternoon peak periods shows a range of -1,057 to 9,421 and an average numerical growth of 3,120 between 1991 and 2006.

The volume growth in the combined morning and afternoon peak periods (a 6-hour period) represents only 37% of the growth in commercial traffic from 1991 to 2006. Therefore, the proportionally largest growth in commercial vehicle trips has been outside the morning and afternoon peak periods. This is likely due to commercial vehicles staggering their delivery times in order to avoid traffic congestion and to deliver goods in a more timely fashion. Further, a large number of the commercial vehicles have their origins and destinations outside the GTA (i.e. long haul freight trips). These vehicle operators have more flexibility in

choosing their travel times in order to avoid congestion and generally prefer to travel outside the total count period.

The only screenline showing a decrease in commercial traffic was the Central Area Cordon. The Central Area Cordon experienced a decrease of 1,060 (11%) and 2,860 (11%) during the combined morning and afternoon peak period and the total count period, respectively. This decrease may be attributed to the following factors:

- The spatial distribution and quantity of warehouse and manufacturing space has changed between 1991 and 2006. This is evident in the fact that Peel has become a major centre for multi-modal yards (i.e. CPR Vaughan Intermodal Yard, etc.); furthermore, there has been a shift in employment activity and development from the Central Area to other regions in the GTA from 1991 to 2006. This has likely resulted in some freight trips relocating to the outer suburbs and surrounding municipalities;
- Big-box retailers and power-centres have been developing outside the densely populated Central Area Cordon, where land is relatively inexpensive and more readily available. The number of big-box retailers is continuing to grow in the "905" area and by nature, big-box retailers tend to have a large supply of goods (thus generating a great deal of commercial traffic in order to remain stocked); and,
- An increasing amount of employment is being located outside the Central Area Cordon, as shown in the figure below. This growth as well as population increases would result in some retail activity following suit in order to take advantage of the emerging markets.



Source: Information obtained from the Places to Grow - Growth Plan for the Greater Golden Horseshoe (2006)

Also of note is the impact of major highway infrastructure on commercial vehicular traffic. The flow of commercial vehicle traffic has benefited from the construction of Highway 407, which straddles the GTA. The York-Peel Boundary and York-Durham Boundary have experienced 447% and 109% growth in total count period commercial vehicular traffic, respectively. This parallels the growth in non-commercial traffic described in previous chapters, compounding the challenges facing the '905' regions.

	1991	2006	Numerical Change	% Change	% of Total Vehicles 1991	% of Total Vehicles 2006
Durham-Taunton Road	6,368	9,888	3,520	55%	6%	5%
Durham-Regional Road 23	10,137	17,550	7,413	73%	8%	8%
GTA East	9,580	11,798	2,218	23%	15%	15%
York-Durham Boundary	3,772	7,897	4,125	109%	9%	11%
York-Peel Boundary	4,301	23,536	19,235	447%	9%	13%
York North	4,198	9,393	5,195	124%	8%	10%
South York Cordon	11,488	20,178	8,690	76%	6%	8%
Peel-Halton Boundary	25,104	38,693	13,589	54%	10%	8%
Peel North	2,337	3,776	1,439	62%	7%	9%
Mississauga-Brampton	17,859	33,823	15,964	89%	7%	8%
Halton-Highway 401 (South)	4,297	8,789	4,492	105%	9%	8%
Dundas Street (Regional Road 5)	9,859	11,509	1,650	17%	7%	5%
Durham-Toronto Boundary	14,113	17,360	3,247	23%	8%	7%
Toronto-York Boundary	35,703	57,088	21,385	60%	4%	5%
Toronto-Peel Boundary	50,286	58,081	7,795	16%	6%	7%
Central Area Cordon	25,157	22,297	-2,860	-11%	3%	3%
GTA West	27,973	55,836	27,863	100%	12%	14%

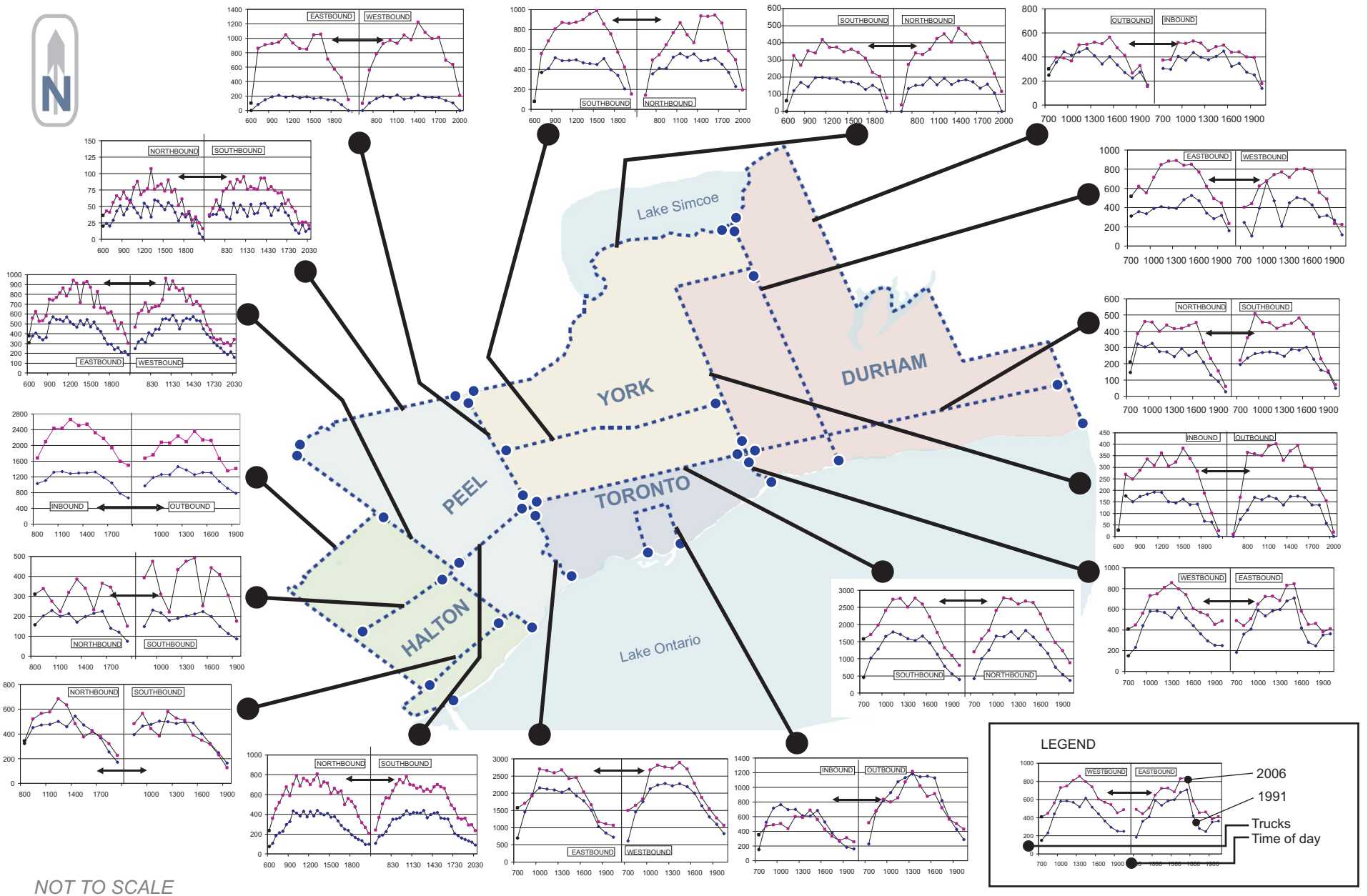
**Commercial Vehicles Refers to Medium and Heavy Trucks*

TABLE 5.1
Commercial Vehicle Traffic (Both Directions)
Total Count Period (1991 to 2006)

	1991	2006	Numerical Change	% Change	% of Total Vehicles 1991	% of Total Vehicles 2006
Durham-Taunton Road	2,428	3,956	1,528	63%	5%	4%
Durham-Regional Road 23	3,958	6,480	2,522	64%	6%	6%
GTA East	3,631	4,298	667	18%	12%	11%
York-Durham Boundary	1,634	3,004	1,370	84%	6%	5%
York-Peel Boundary	1,891	9,556	7,665	405%	7%	8%
York North	1,844	3,659	1,815	98%	6%	6%
South York Cordon	4,977	7,845	2,868	58%	5%	5%
Peel-Halton Boundary	8,977	14,586	5,609	62%	7%	6%
Peel North	923	1,291	368	40%	6%	6%
Mississauga-Brampton	6,456	12,985	6,529	101%	5%	6%
Halton-Highway 401 (South)	2,087	4,094	2,007	96%	8%	6%
Dundas Street (Regional Road 5)	4,470	4,686	216	5%	5%	4%
Durham-Toronto Boundary	4,333	6,037	1,704	39%	5%	5%
Toronto-York Boundary	13,319	20,759	7,440	56%	4%	4%
Toronto-Peel Boundary	18,750	21,146	2,396	13%	5%	5%
Central Area Cordon	9,427	8,370	-1,057	-11%	3%	2%
GTA West	12,934	22,355	9,421	73%	10%	11%

**Commercial Vehicles Refers to Medium and Heavy Trucks*

TABLE 5.2
Commercial Vehicle Traffic (Both Directions)
Combined Morning and Afternoon Peak Period (1991 to 2006)



NOT TO SCALE

FIGURE 5.1
Time of Day Profile for Commercial Vehicles Crossing Screenlines
Total Count Period (1991 to 2006)

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6.0 USE OF MAJOR ROADS AND TRANSIT FACILITIES

6.1 Focus

An urban area generally relies on a network of high-speed and well-connected highway and transit infrastructure to allow for efficient movement of people and goods. The 400 series highways in the GTA along with the GO Rail and municipal transit networks play a major role in ensuring that mobility is maintained.

Please refer to:

Figure 6.1 *Highway and Transit Infrastructure Usage - Morning Peak Period (Peak Direction - 2006).*

6.2 Summary of Trends

6.2.1 Morning Peak Period

The five screenlines where the major highways carried the highest 2006 percentage of vehicles across the screenlines in the peak direction are shown below.

Durham-Toronto Boundary	89%
GTA West	76%
Toronto-Peel Boundary	64%
York North	63%
South York Cordon	56%

The five screenlines where major transit facilities (GO Rail and TTC Subway) carry the highest 2006 percentage of total persons across the screenline in the peak direction are shown below.

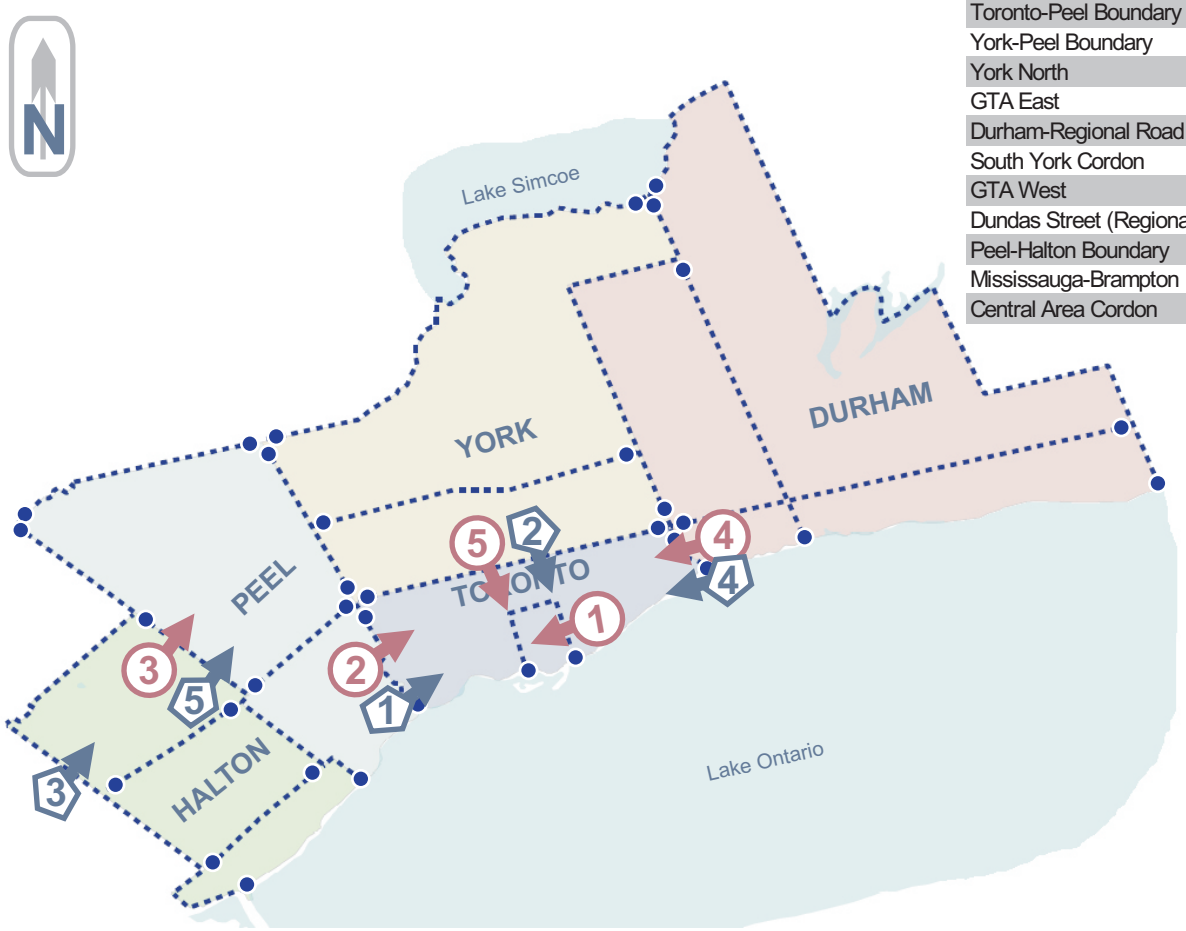
Central Area Cordon	59%
Toronto-Peel Boundary	23%
Durham-Toronto Boundary	22%
Peel-Halton Boundary	16%
Durham-Regional Rd 23	14%

6.3 Conclusions

The 400 series highways along with the GO Rail and TTC subway networks provide a high speed transportation network connecting the various GTA regions. The efficiency of the system can be gauged from the fact that both cross and reverse commuting in the GTA has become extensive over the past decade, with the continuing development and expansion of the major transportation network.

On screenlines that include a major highway, the major highway facilities attract nearly 38% (395,300) of the total traffic in the peak direction during the morning peak period. Further, of the total vehicles crossing all the screenlines in the peak direction during the morning peak period, nearly 40% (326,400) use the 400 series highways. Of note is York North where Highway 400 accounted for nearly 63% of the total vehicles crossing the screenline in the peak direction. A higher usage of highway facilities is experienced in cases where there is more than one such facility or there is a lack of alternative routes in the form of major arterials.

The major transit infrastructure has attracted nearly 26% (276,400) of the total person trips crossing the screenlines in the peak direction during the morning peak period. The Central Area Cordon is served by both the regional transit network as well as a comprehensive local network, and thus nearly 59% of the inbound morning peak period person trips crossing to the Central Area Cordon are made by transit. Where GO Rail service crosses a screenline, the percentage of total person trips using the service ranges from 1% to 23%. The TTC subway system accounts for nearly 40% of the person trips crossing the Central Area Cordon in the peak direction during the morning peak period.



HIGHWAY AND TRANSIT-Morning 3-Hour Peak Period-Peak Direction

	Person Crossings - GO Rail & TTC	Vehicle Crossings-Major Highways
York-Durham Boundary	-	5,996
Durham-Toronto Boundary	(4) 11,637	(4) 38,598
Toronto-York Boundary	(5) 11,453	(2) 66,390
Toronto-Peel Boundary	(2) 32,222	(1) 68,498
York-Peel Boundary	-	13,708
York North	351	12,403
GTA East	-	3,551
Durham-Regional Road 23	5,417	17,046
South York Cordon	2,752	32,915
GTA West	691	(3) 46,237
Dundas Street (Regional Road 5)	-	7,431
Peel-Halton Boundary	(3) 13,337	(5) 36,167
Mississauga-Brampton	4,873	18,633
Central Area Cordon	(1) 193,615	27,683

NOT TO SCALE

Morning 3-Hour Peak Direction

(5) Largest Magnitude Numerical Change in Person Crossings - GO Rail & TTC (1 = Largest)

(4) Largest Magnitude Numerical Change in Vehicle Crossings - Major Highways (1 = Largest)

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FIGURE 6.1
Highway and Transit Infrastructure Usage
Morning Peak Period (Peak Direction - 2006)

7.0 PEAKING CHARACTERISTICS

7.1 Focus

As a metropolitan region, the GTA continues to grow, the transportation infrastructure faces increasing pressure, and commuters respond by shifting their trip start times towards the "shoulders" of the traditional peak hour / peak period. Additionally, with an increasing number of office and commercial establishments offering flexible work hours, travel outside the traditional peak period is increasing relative to travel within the peaks.

This section analyzes the changes in travel by time of day across the GTA between 1991 and 2006.

Please refer to:

Table 7.1 *Ratio of Travel During Peak Hour to Peak 3-Hour Period (1991 to 2006).*

Table 7.2 *Ratio of Travel During Combined Peak Periods to Total Count Period (1991 to 2006).*

Figure 7.1 *Peak Hour Spreading - Ratio of Travel During Peak Hour to 3-Hour Peak Period - Morning and Afternoon Peak Periods (1991 to 2006).*

Figure 7.2 *Vehicle Peaking Characteristics by Time of Day – Total Count Period (1991 to 2006).*

7.2 Summary of Trends

7.2.1 Morning Peak Period

The five screenlines with the lowest 2006 ratios of morning peak hour to morning peak 3-hour period vehicle crossings in the peak direction are shown below.

Durham-Toronto Boundary	33%
Toronto-Peel Boundary	34%
GTA East	36%
York-Peel Boundary	36%
GTA West	36%

The five screenlines that have experienced the largest drop in the ratio of morning peak hour to morning peak 3-hour period vehicle crossings in the peak direction from 1991 to 2006 are shown below. Thus these are the five with the greatest peak demand spreading.

Mississauga-Brampton	-6%
Durham-Regional Road 23	-4%
Toronto-Peel Boundary	-4%
Durham-Toronto Boundary	-3%
Dundas Street (Regional Road 5)	-3%

7.2.2 Afternoon Peak Period

The five screenlines with the lowest 2006 ratios of afternoon peak hour to afternoon peak 3-hour period vehicle crossings in the peak direction are shown below.

Central Area Cordon	34%
GTA East	35%
Toronto-York Boundary	35%
Toronto-Peel Boundary	35%
York-Peel Boundary	36%

The five screenlines that have experienced the largest drop in the ratio of afternoon peak hour to afternoon peak 3-hour period vehicle crossings in the peak direction from 1991 to 2006 are shown below.

Mississauga-Brampton	-4%
York-Durham Boundary	-3%
York North	-3%
York-Peel Boundary	-3%
Dundas Street (Regional Road 5)	-2%

7.2.3 Overall Peak Period

The ratio of the combined morning and afternoon 3-hour peak periods to total count period vehicle crossings indicates the percentage of trips occurring during the peak periods relative to the total count period. For example, a low ratio indicates a large percentage of trips occur during the off-peak period.

The five screenlines with the lowest ratio of the combined morning and afternoon 3-hour peak periods to total count period vehicle crossings in both directions for 2006 are shown below.

Halton-Highway 401	43%
Central Area Cordon	48%
GTA East	48%
Toronto-Peel Boundary	49%
Peel-Halton Boundary	50%

The five screenlines with the largest decrease in the ratio of combined morning and afternoon peak periods to total count period vehicle crossings in both directions from 1991 to 2006 are shown below.

Dundas Street (Regional Road 5)	-9%
GTA West	-5%
Mississauga-Brampton	-1%
Halton-Highway 401	-1%
Durham-Taunton Road	0%

7.2.4 Peak Period Variation

The two tables below show the morning and afternoon 3-hour peak period times for each region.

	Morning 3-Hour Peak Period	
	1991	**2006**
Durham	6:31-9:30	6:16-9:15
Halton	7:01-10:00	6:31-9:30
Peel	6:31-9:30	6:31-9:30
Toronto	6:46-9:45	6:46-9:45
York	6:31-9:30	6:31-9:30

	Afternoon 3-Hour Peak Period	
	1991	**2006**
Durham	15:31-18:30	15:16-18:15
Halton	15:16-18:15	15:46-18:45
Peel	15:31-18:30	15:31-18:30
Toronto	15:31-18:30	15:46-18:45
York	15:31-18:30	15:31-18:30

7.3 Conclusions

During the morning peak period, east-west traffic volumes across the screenlines exhibit the lowest peak hour to peak period ratio for 2006. The majority of this traffic is traveling to the City of Toronto. However an increasing employment base in regions outside the City of Toronto has resulted in cross-commuting patterns. These patterns have been further boosted by the high speed and relatively reliable connection provided by Highway 407, which connects the surrounding municipalities.

Similar trends are observed in the afternoon peak period, during which east-west travel again dominates. The only screenline capturing north-south vehicle crossings where the ratio of peak hour traffic to peak period traffic was relatively low is the Toronto-York Boundary. That the Toronto-York Boundary

experiences a prolonged "rush hour" in the afternoon peak period is expected, given that there are three 400 series highways crossing it and substantial development occurring in York Region.

The trends observed in the changing peak hour characteristics are also influenced in large part by development patterns across the GTA. The commutershed has expanded with significant growth in urban centres within and adjacent to the GTA between 1991 and 2006, which were previously outside the commutershed. Additionally, travel distances that earlier would have been considered only for occasional recreational trips are now part of the daily home to work commute (e.g. the current commutershed for the GTA has expanded as far north as the City of Barrie). These trends have in some cases resulted in the inability of the transportation network to keep pace with the growth in traffic. As a result, screenlines in these outlying areas have experienced the largest decrease in the ratio of peak hour to peak period traffic, which indicates a more uniform distribution of traffic in the peak period and more prolonged periods of congestion.

Of note are the screenlines comprising the GTA boundary - the peak hour spreading observed at these screenlines is a function of trips with a higher than average trip length as well as commercial traffic.

Another important trend observed in the cordon count data is the phenomenon of increasing travel in the off-peak period. This trend is likely the result of a number of factors such as:

- Increasing peak period congestion, forcing trips to move into off-peak travel;
- Changing land use patterns (e.g. historic bedroom communities have become more self contained attracting commercial, office, industrial type land uses and the resulting off-peak trips);
- Demographic variables such as retirement of "baby boomers", increase in part-time or temporary workers, and increasing recreational trips; and,
- Flexible work hours adopted by employers in response to congestion.

All the screenlines, except the York-Durham Boundary, have a ratio of combined morning and afternoon 3-hour peak periods travel to total count period travel of between 42% and 68% for 1991 and 2006. In 2006, this ratio for the York-Durham Boundary was approximately 84%, which represents an increase of approximately 25% over the 1991 value. This is a significant change compared to other values observed across the GTA as well as within York Region, and it warrants a further investigation in terms of validating the cordon count for that screenline. Both the Regional Municiaplity of York (except for the York-Durham Boundary) and the City of Toronto have experienced an increase in the ratio of combined 3-hour peak period crossings to the total count period vehicle crossings, ranging between 3% and 9%.

Variations in the time at which peak periods occur across the GTA are likely the result of driver behaviour, traffic conditions, and distance to the destination; for example, Durham Region has the earliest 2006 morning 3-hour peak of all five regions. This may be the result of Durham having less transportation infrastructure to support trips to and from Toronto relative to the other four regions; consequently, drivers from Durham to Toronto may have to leave earlier in order to avoid congestion on their limited choice of routes. From 1991 to 2006, Halton's morning peak period starts earlier and the afternoon peak period begins later. This is likely due to longer commutes and more congested highways.

These trends have an important bearing on transportation operations across the GTA (i.e. towards transit schedules, traffic operations, toll costs, etc.).

	Morning Peak Hour to Morning Peak 3-Hours		Afternoon Peak Hour to Afternoon Peak 3-Hours	
	1991	2006	1991	2006
York North	39.4%	36.6%	40.0%	37.2%
York-Durham Boundary	41.6%	40.4%	42.2%	39.1%
York-Peel Boundary	39.6%	36.4%	38.5%	35.6%
South York Cordon	40.9%	37.8%	39.3%	38.1%
Durham-Taunton Road	36.8%	40.4%	35.3%	36.0%
Durham-Regional Road 23	41.1%	36.8%	36.3%	36.3%
GTA East	36.8%	35.6%	35.6%	35.0%
Peel-Halton Boundary	38.0%	38.3%	37.5%	37.0%
Peel North	36.3%	37.6%	38.4%	37.2%
Mississauga-Brampton	42.8%	36.9%	41.3%	37.0%
Halton-Highway 401 (South)	43.1%	42.2%	37.0%	39.0%
GTA West	39.7%	36.4%	37.4%	36.1%
Dundas Street (Regional Road 5)	42.4%	39.0%	38.7%	36.5%
Toronto-Peel Boundary	37.9%	34.3%	36.7%	35.4%
Toronto-York Boundary	39.0%	37.2%	36.2%	35.4%
Durham-Toronto Boundary	36.5%	33.1%	36.5%	37.5%
Central Area Cordon	38.5%	37.8%	35.5%	33.9%

TABLE 7.1
Ratio of Travel During Peak Hour to Peak 3-Hour Period (1991 to 2006)

	1991	2006
York-Durham Boundary	59.2%	84.2%
York-Peel Boundary	57.7%	66.3%
York North	55.1%	63.0%
South York Cordon	60.4%	68.2%
Durham-Taunton Road	51.7%	52.2%
Durham-Regional Road 23	52.3%	53.7%
GTA East	46.3%	48.5%
Peel North	48.4%	50.8%
Mississauga-Brampton	51.7%	50.8%
Halton-Highway 401 (South)	59.2%	58.7%
Dundas Street (Regional Road 5)	51.4%	42.5%
Durham-Toronto Boundary	46.7%	50.1%
Toronto-York Boundary	46.3%	50.9%
Toronto-Peel Boundary	45.9%	48.8%
Central Area Cordon	42.4%	48.1%
GTA West	57.1%	52.5%
Peel-Halton Boundary	49.1%	50.0%

**Combined Peak Period Reflects the Total Vehicles Crossing Screenlines for the Peak 3-Hour Morning and Afternoon Periods*

TABLE 7.2
Ratio of Travel During Combined Peak Periods to Total Count Period (1991 to 2006)

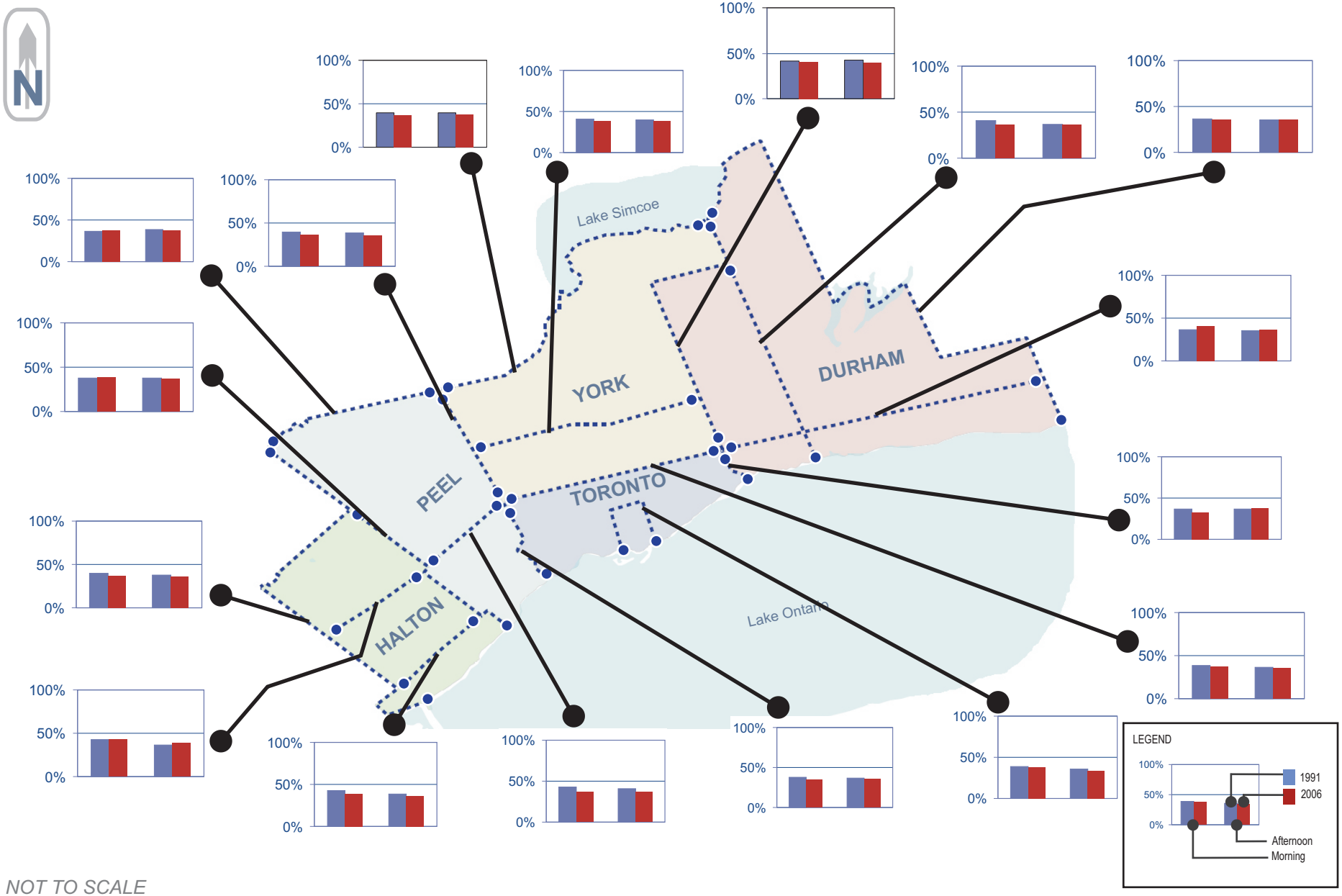

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FIGURE 7.1
Peak Hour Spreading - Ratio of Travel During Peak Hour to 3-hour Peak Period
Morning and Afternoon Peak Periods (1991 to 2006)

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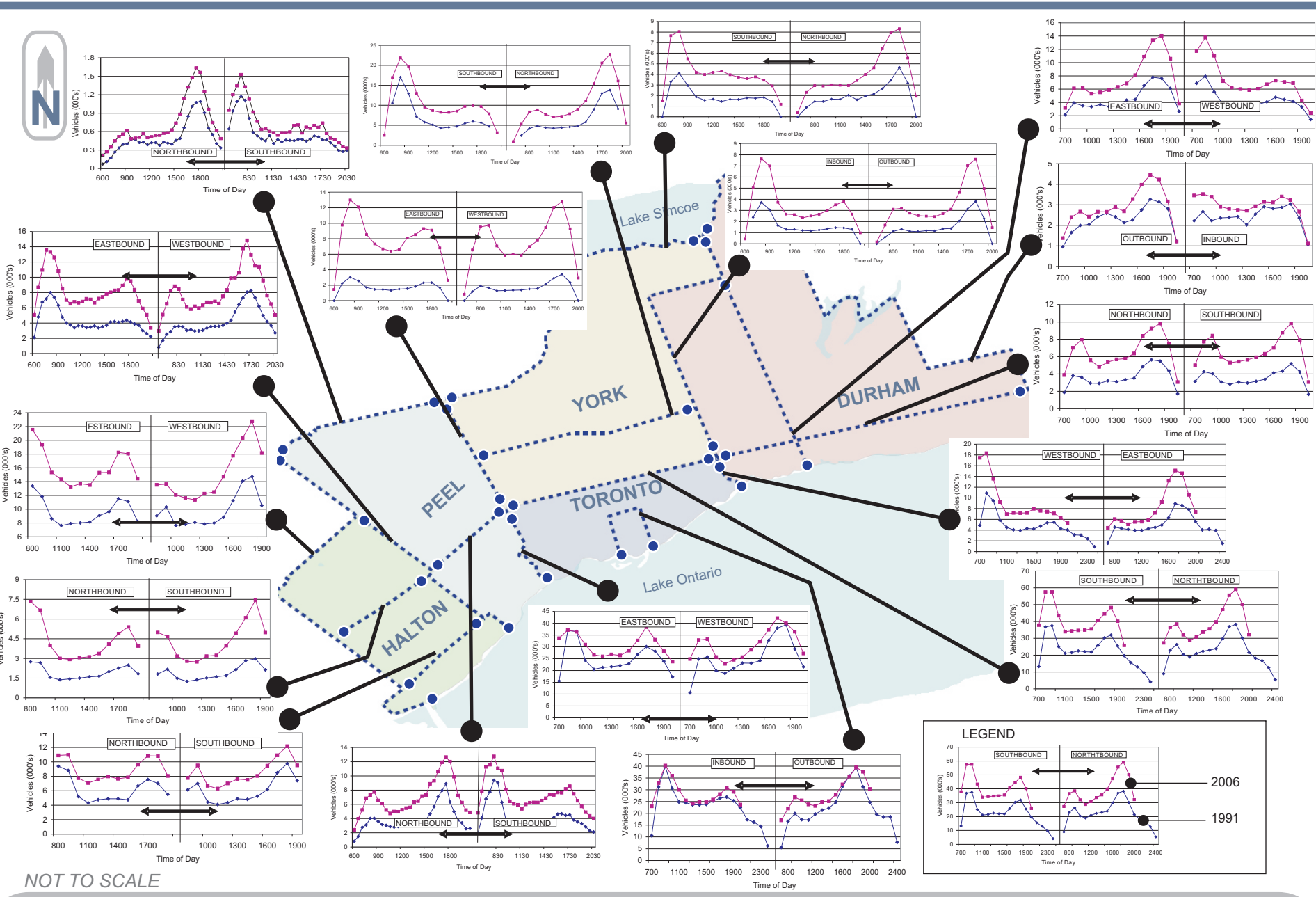

FIGURE 7.2
Vehicle Peaking Characteristics by Time of Day
Total Count Period (1991 to 2006)

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8.0 AUTO OCCUPANCY AND HIGH-OCCUPANCY VEHICLE LANES

8.1 Focus

As noted in the previous section on "Mode of Transportation", from 1991 to 2006, the auto trips across the screenlines have grown by nearly 451,500 (47%) during the morning 3-hour peak period for both directions. Additionally, due to the growing popularity of the personal automobile, travel by auto now accounts for nearly 1,402,300 (76%) of the person trips crossing the screenlines, compared to 950,800 (72%) in 1991 for the morning 3-hour peak period in both directions.

This section studies the trends being observed in auto occupancy and number of High Occupancy Vehicles (HOV) crossing screenlines, in the context of current policy initiatives related to expansion of the HOV network, new and improved local and inter-regional transit services, and location choices made by people and corporations.

Please refer to:

Figure 8.1 *Average Auto Occupancy (Peak Direction) - Morning and Afternoon Peak Periods (1991 to 2006).*

Figure 8.2 *Change in Number of HOV 2+ Vehicles (Peak Direction) - Morning and Afternoon Peak Periods (1991 to 2006).*

Figure 8.3 *Change in Number of HOV 3+ Vehicles (Peak Direction) - Morning and Afternoon Peak Periods (1991 to 2006).*

8.2 Summary of Trends

8.2.1 Morning Peak Period Auto Occupancy

In 2006, the five screenlines with the highest average auto occupancy in the peak direction during the morning were as follows:

Durham-Taunton Road	1.15
Central Area Cordon	1.13
GTA East	1.12
GTA West	1.11
Durham-Regional Road 23	1.11

The five screenlines with the lowest 2006 morning average auto occupancy in the peak direction are shown below.

Durham-Toronto Boundary	1.06
York-Peel Boundary	1.07
York-Durham Boundary	1.08
Toronto-Peel Boundary	1.09
South York Cordon	1.09

The five screenlines with the largest percentage change in auto occupancy from 1991 to 2006 in the morning peak direction are shown below.

GTA East	-15.0%
Durham-Toronto Boundary	-11.6%
Toronto-York Boundary	-8.7%
Central Area Cordon	-8.7%
Peel North	-8.6%

8.2.2 Morning Peak Period High Occupancy Vehicles

The five screenlines with the highest 2006 percentage of 2+ person HOV in the morning peak direction are shown below.

Central Area Cordon	14.7%
Durham-Taunton Road	13.3%
GTA East	11.4%
Durham-Regional Road 23	10.7%
GTA West	10.1%

The five screenlines with the highest 2006 percentage of 3+ person HOV in the morning peak direction are shown below.

Durham-Taunton Road	1.5%
Dundas Street (Regional Road 5)	1.1%
Central Area Cordon	1.1%
Mississauga-Brampton	1.0%
GTA West	0.9%

8.2.3 Afternoon Peak Period Auto Occupancy

The five screenlines with the highest 2006 average auto occupancy in the afternoon peak direction are shown below.

GTA East	1.28
Durham-Taunton Road	1.25
Central Area Cordon	1.21
Dundas Street (Regional Road 5)	1.19
Durham-Regional Road 23	1.18

The five screenlines with the lowest 2006 average auto occupancy in the afternoon peak direction are shown below.

Durham-Toronto Boundary	1.09
Peel-Halton Boundary	1.10
York North	1.13
Toronto-Peel Boundary	1.14
South York Cordon	1.14

The five screenlines with the largest percentage change in auto occupancy in the afternoon peak direction from 1991 to 2006 are shown below.

York North	-13.2%
Peel-Halton Boundary	-11.5%
Durham-Toronto Boundary	-11.3%
Durham-Taunton Road	-10.4%
GTA East	-10.2%

8.2.4 Afternoon Peak Period High Occupancy Vehicles

The five screenlines with the highest 2006 percentage of 2+ person HOV in the afternoon peak direction are shown below.

GTA East	24.0%
Central Area Cordon	20.9%
Durham-Taunton Road	20.6%
Durham-Regional Road 23	16.7%
Dundas Street (Regional Road 5)	16.2%

The five screenlines with the highest 2006 percentage of 3+ person HOV in the afternoon peak direction are shown below.

GTA East	3.3%
Central Area Cordon	1.5%
Durham-Taunton Road	3.0%
Durham-Regional Road 23	1.4%
Dundas Street (Regional Road 5)	2.4%

8.3 Conclusions

This analysis addresses both the morning and afternoon peak periods in the peak direction. On average, auto occupancy was 5% higher in the afternoon peak period (1.16) than in the morning peak period (1.10).

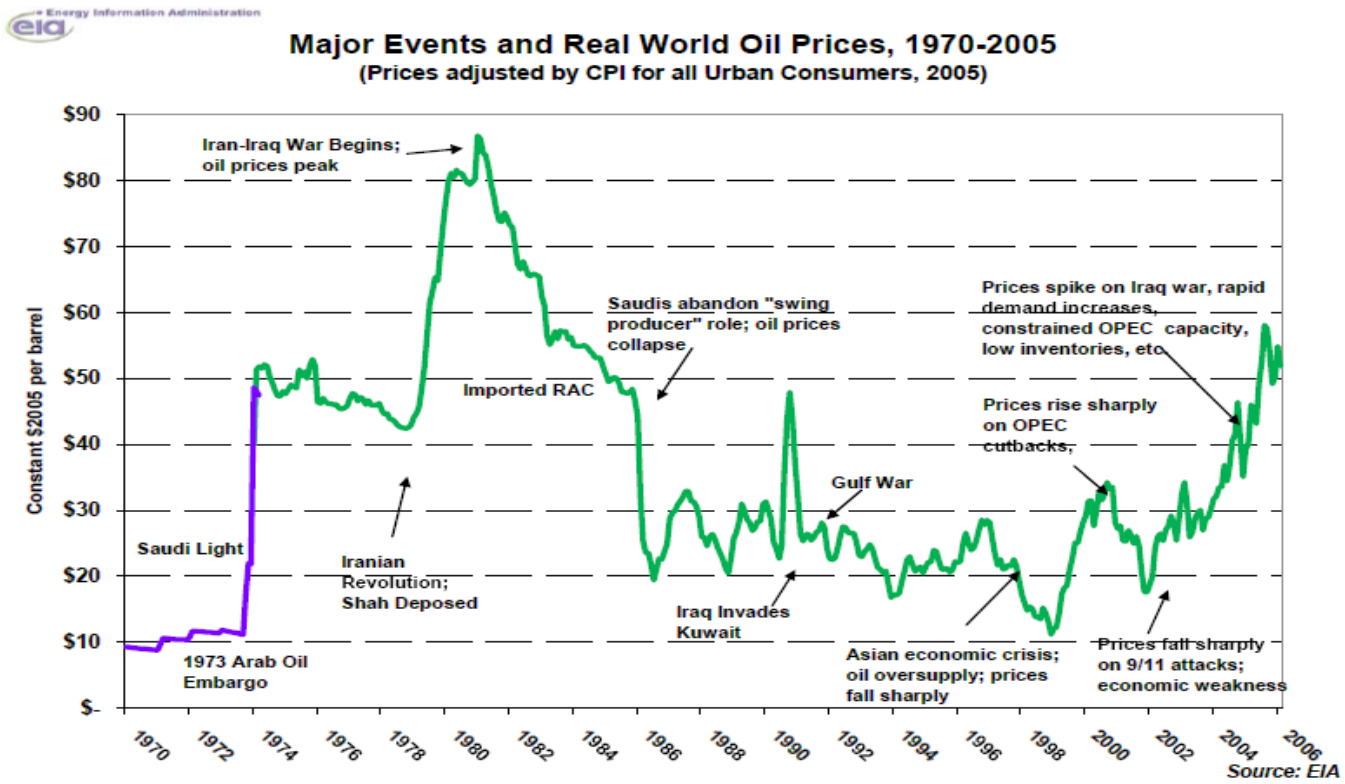
The sheer number of vehicles, the speed of the traveling vehicles and other practical considerations such as increased number of vehicles with tinted windows make it difficult in collecting auto occupancy data. The numbers are approximate and reflect the overall trend in auto occupancy.

An important trend is that every screenline in both the morning and afternoon peak periods shows a drop in auto occupancy between 1991 and 2006 for the peak and off-peak directions. On average, auto occupancy has declined by approximately 0.09 (8%) in the morning peak period and approximately 0.11 (9%) in the afternoon peak period from 1991 to 2006. This is consistent with the 2003 GTA Cordon Count Report, which highlights that auto occupancy has declined from 1991 to 2001.

The drop in auto occupancy is not surprising given that oil prices have on average remained stable between 1991 and 2001 and only as recently as 2004 have started experiencing an increase as seen in the figure below. Consumer reaction to the price of oil is not as rapid as it is for other commodities.

Thus, although people have started making location and transportation choices to minimize their transportation costs, the impacts due to these actions is long term and should be more visible in subsequent cordon count reports. A key indicator that showcases the small change in auto ownership due to stable oil prices between 1991 and 2001 is the average auto ownership in different regions of the GTA, as shown below.

Other than the City of Toronto (9% decrease from 1991 to 2006), changes in auto ownership rates in the GTA regions have been minor. None of the changes in the '905' regions are significant enough to hypothesize that people have changed their behavior towards auto ownership.



AVERAGE AUTOMOBILES PER HOUSEHOLD			
	1991	2001	2006
Toronto	1.18	1.09	1.07
Durham	1.74	1.73	1.74
York	1.89	1.90	1.84
Peel	1.71	1.70	1.67
Halton	1.76	1.74	1.76
GTA Overall	1.43	1.41	1.41
(Source: Preliminary 2006 Transportation Tomorrow Survey)			

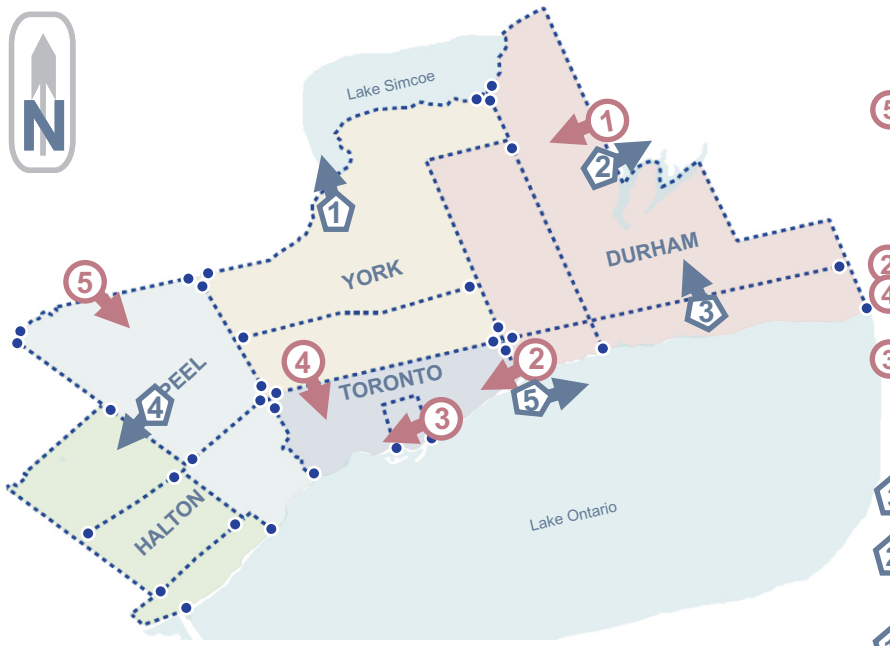
These drops in auto occupancy could be the result of a number of factors. Some trends that could be the cause of this drop in auto occupancy are as follows:

- Family size has been reducing and family members have generally become more independent of each other. Family members tend to partake in increasingly more separate activities with different destinations;
- Commuting patterns have become increasingly more diverse (varied work hours, distance, and location), making it more difficult to organize shared rides; and,
- With trip times and trip lengths having substantially increased and employment having become more disaggregated and auto-oriented, carpooling becomes less attractive as the feasibility of two or more people sharing the same vehicle decline.

Overall, there are higher percentages of HOV 2+ and HOV 3+ trips during the afternoon peak period than in the morning peak period. This trend may be attributed to the fact that during the morning peak period there are two main trip purposes - home based work (HBW) and home based school (HBS), whereas during the afternoon peak period, individuals are more likely to participate in discretionary trips that will result in higher auto occupancy, such as picking children up from school and participating in group activities, shopping, or other non-work activities.

Determining the percentages of HOV 2+ and HOV 3+ is very useful in planning the occupancy restrictions and locations for HOV lanes; politicians, planners, and decision makers are likely to benefit from a deeper understanding of how many vehicles may occupy a new HOV lane, in addition to the origin and destination of these vehicles. The percentages of HOV 2+ and HOV 3+ vary by screenline. The percentage of HOV 3+ for the 2006 morning peak direction ranges from 0.2% to 1.5%; in the afternoon peak direction, it ranges from 0.6% to 3.3%. This is consistent with the 2003 GTA Cordon Count Report, which notes that HOV 3+ represents only 2% of all vehicles during peak periods at most screenlines. The percentage of HOV 2+ for the 2006 morning peak direction ranges from 5.5% to 14.7%, and in the afternoon peak, it ranges from 8.7% to 24.0%. Although the HOV 3+ percentages seem low relative to the HOV 2+ percentages, it should be noted that HOV is analyzed by vehicular trips rather than person trips. Three HOV 2 vehicle trips represent six person trips, whereas two HOV 3 vehicle trips also represent six person trips.

Trends shown in **Section 5.0** indicate that employment is generally decreasing in Toronto and increasing in the other municipalities in the GTA. Based on the trends observed in the cordon count data along with forecasted employment growth, greater HOV success stands to be gained by developing a consolidated GTA HOV network that not only focuses on the City of Toronto but also serves the increasing cross and reverse commuting taking place across the GTA.



NOT TO SCALE

AUTO OCCUPANCY-Morning 3-Hour Peak Period-Peak Direction

	1991	2006	Change	%
Durham-Taunton Road	1.21	1.15	-0.06	-4.6%
Durham-Regional Road 23	1.21	1.11	-0.10	-7.9%
(1) GTA East	1.32	1.12	-0.20	-15.0%
York-Durham Boundary	1.15	1.08	-0.07	-6.2%
York-Peel Boundary	1.15	1.07	-0.07	-6.4%
York North	1.21	1.10	-0.10	-8.6%
South York Cordon	1.18	1.09	-0.09	-7.6%
Peel-Halton Boundary	1.15	1.10	-0.06	-5.0%
(5) Peel North	1.21	1.11	-0.10	-8.6%
Mississauga-Brampton	1.17	1.11	-0.06	-5.5%
GTA West	1.19	1.11	-0.08	-6.6%
Halton-Highway 401 (South)	1.15	1.11	-0.04	-3.3%
Dundas Street (Regional Road 5)	1.17	1.10	-0.07	-6.3%
(2) Durham-Toronto Boundary	1.19	1.06	-0.14	-11.6%
(4) Toronto-York Boundary	1.21	1.10	-0.10	-8.7%
Toronto-Peel Boundary	1.17	1.09	-0.08	-7.0%
(3) Central Area Cordon	1.24	1.13	-0.11	-8.7%

AUTO OCCUPANCY-Afternoon 3-Hour Peak Period-Peak Direction

	1991	2006	Change	%
(3) Durham-Taunton Road	1.39	1.25	-0.14	-10.4%
Durham-Regional Road 23	1.28	1.18	-0.09	-7.3%
(2) GTA East	1.43	1.28	-0.15	-10.2%
York-Durham Boundary	1.24	1.15	-0.09	-7.1%
York-Peel Boundary	1.24	1.16	-0.08	-6.6%
(1) York North	1.30	1.13	-0.17	-13.2%
South York Cordon	1.20	1.14	-0.06	-4.9%
(4) Peel-Halton Boundary	1.24	1.10	-0.14	-11.5%
Peel North	1.27	1.17	-0.10	-8.1%
Mississauga-Brampton	1.22	1.16	-0.06	-5.3%
GTA West	1.25	1.16	-0.09	-6.8%
Halton-Highway 401 (South)	1.24	1.14	-0.10	-7.7%
Dundas Street (Regional Road 5)	1.23	1.19	-0.04	-3.1%
(5) Durham-Toronto Boundary	1.23	1.09	-0.14	-11.3%
Toronto-York Boundary	1.27	1.15	-0.12	-9.3%
Toronto-Peel Boundary	1.25	1.14	-0.11	-9.1%
Central Area Cordon	1.33	1.21	-0.13	-9.5%

Morning 3-Hour Peak Direction
Afternoon 3-Hour Peak Direction
(5) Morning Largest Magnitude Numerical Change (1 = Largest)
(4) Afternoon Largest Magnitude Numerical Change (1 = Largest)

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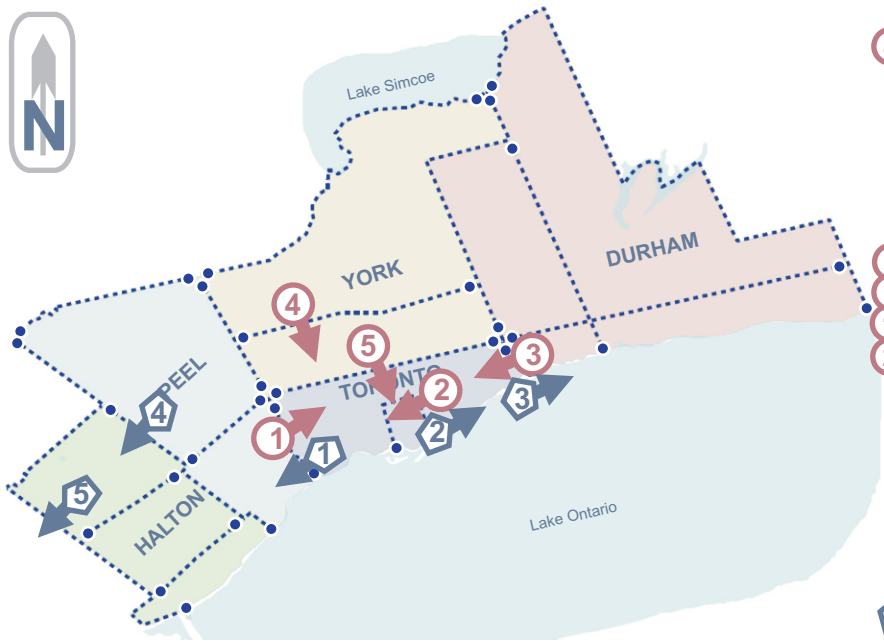
FIGURE 8.1
Average Auto Occupancy (Peak Direction)
Morning and Afternoon Peak Periods (1991 to 2006)



NOT TO SCALE

2+ HOV's-Morning 3-Hour Peak Period-Peak Direction

	1991	2006	Change	%
Durham-Taunton Road	1,794	2,427	633	35.3%
Durham-Regional Road 23	3,264	3,472	208	6.4%
GTA East	1,475	926	-549	-37.2%
York-Durham Boundary	1,128	1,248	120	10.6%
York-Peel Boundary	904	1,807	903	99.9%
York North	1,755	1,547	-208	-11.9%
(4) South York Cordon	5,955	4,274	-1,681	-28.2%
Peel-Halton Boundary	4,842	5,748	906	18.7%
Peel North	894	603	-291	-32.6%
Mississauga-Brampton	5,684	5,405	-279	-4.9%
GTA West	4,013	5,190	1,177	29.3%
Halton-Highway 401 (South)	632	1,647	1,015	160.6%
Dundas Street (Regional Road 5)	2,722	2,385	-337	-12.4%
(3) Durham-Toronto Boundary	4,273	2,143	-2,130	-49.8%
(5) Toronto-York Boundary	15,524	13,848	-1,676	-10.8%
(1) Toronto-Peel Boundary	13,793	8,405	-5,388	-39.1%
(2) Central Area Cordon	19,851	14,489	-5,362	-27.0%

2+ HOV's-Afternoon 3-Hour Peak Period-Peak Direction

	1991	2006	Change	%
Durham-Taunton Road	4,531	4,944	413	9.1%
Durham-Regional Road 23	4,694	5,912	1,218	25.9%
GTA East	2,698	2,527	-171	-6.3%
York-Durham Boundary	1,833	2,439	606	33.1%
(3) York-Peel Boundary	1,640	4,110	2,470	150.6%
York North	2,668	2,315	-353	-13.2%
South York Cordon	5,919	6,739	820	13.9%
(4) Peel-Halton Boundary	7,996	6,307	-1,689	-21.1%
Peel North	1,152	1,207	55	4.8%
Mississauga-Brampton	6,944	8,112	1,168	16.8%
(5) GTA West	6,439	8,069	1,630	25.3%
Halton-Highway 401 (South)	1,225	2,207	982	80.2%
Dundas Street (Regional Road 5)	3,976	5,096	1,120	28.2%
Durham-Toronto Boundary	4,587	3,263	-1,324	-28.9%
Toronto-York Boundary	21,145	21,230	85	0.4%
(1) Toronto-Peel Boundary	21,007	13,734	-7,273	-34.6%
(2) Central Area Cordon	27,244	21,963	-5,281	-19.4%

Morning 3-Hour Peak Direction
Afternoon 3-Hour Peak Direction
(5) Morning Largest Magnitude Numerical Change (1 = Largest)
(4) Afternoon Largest Magnitude Numerical Change (1 = Largest)

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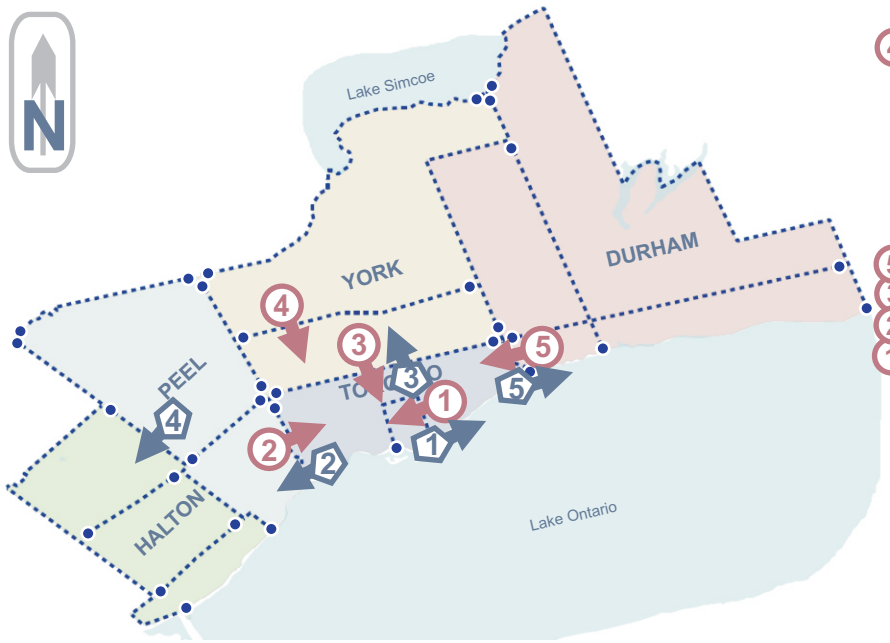
FIGURE 8.2
Change in Number of HOV 2+ Vehicles (Peak Direction)
Morning and Afternoon Peak Periods (1991 to 2006)



NOT TO SCALE

3+ HOV's-Morning 3-Hour Peak Period-Peak Direction

	1991	2006	Change	%
Durham-Taunton Road	229	274	45	19.7%
Durham-Regional Road 23	299	159	-140	-46.8%
GTA East	270	69	-201	-74.4%
York-Durham Boundary	102	56	-46	-45.1%
York-Peel Boundary	105	67	-38	-36.2%
York North	166	140	-26	-15.7%
(4) South York Cordon	868	208	-660	-76.0%
Peel-Halton Boundary	500	247	-253	-50.6%
Peel North	92	44	-48	-52.2%
Mississauga-Brampton	695	560	-135	-19.4%
GTA West	618	470	-148	-23.9%
Halton-Highway 401 (South)	91	119	28	30.8%
Dundas Street (Regional Road 5)	458	296	-162	-35.4%
(5) Durham-Toronto Boundary	436	65	-371	-85.1%
(3) Toronto-York Boundary	2,161	1,267	-894	-41.4%
(2) Toronto-Peel Boundary	1,509	534	-975	-64.6%
(1) Central Area Cordon	2,156	1,042	-1,114	-51.7%

3+ HOV's-Afternoon 3-Hour Peak Period-Peak Direction

	1991	2006	Change	%
Durham-Taunton Road	924	721	-203	-22.0%
Durham-Regional Road 23	731	502	-229	-31.3%
GTA East	527	346	-181	-34.3%
York-Durham Boundary	235	283	48	20.4%
York-Peel Boundary	239	315	76	31.8%
York North	362	182	-180	-49.7%
South York Cordon	802	576	-226	-28.2%
(4) Peel-Halton Boundary	1,132	464	-668	-59.0%
Peel North	156	83	-73	-46.8%
Mississauga-Brampton	962	1,095	133	13.8%
GTA West	970	745	-225	-23.2%
Halton-Highway 401 (South)	222	202	-20	-9.0%
Dundas Street (Regional Road 5)	673	750	77	11.4%
(5) Durham-Toronto Boundary	584	241	-343	-58.7%
(3) Toronto-York Boundary	3,387	1,967	-1,420	-41.9%
(2) Toronto-Peel Boundary	3,149	1,214	-1,935	-61.4%
(1) Central Area Cordon	4,722	1,607	-3,115	-66.0%

Morning 3-Hour Peak Direction
Afternoon 3-Hour Peak Direction
(5) Morning Largest Magnitude Numerical Change (1 = Largest)
(4) Afternoon Largest Magnitude Numerical Change (1 = Largest)

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FIGURE 8.3
Change in Number of HOV 3+ Vehicles (Peak Direction)
Morning and Afternoon Peak Periods (1991 to 2006)

9.0 SCHOOL BUS VOLUMES AND OCCUPANCY

9.1 Focus

The majority of school trips are primary and secondary school trips, which are completed either by auto or school buses. This section analyzes and compares the trends in school bus volumes and school bus occupancy across the GTA.

Please refer to:

Table 9.1 *Number of School Bus Crossing Screenlines in Both Directions - Morning and Afternoon Peak Periods (2006).*

Table 9.2 *School Bus Occupancy in Both Directions - Morning and Afternoon Peak Periods (2006).*

9.2 Summary of Trends

9.2.1 Morning Peak Period

The five screenlines with the highest 2006 school bus vehicle volumes in both directions are shown below.

South York Cordon	535
Durham-Taunton Road	428
Dundas Street (Regional Road 5)	427
Toronto-York Boundary	411
Central Area Cordon	390

The five screenlines with the highest 2006 school bus occupancy rates in both directions are shown below.

GTA West	19.8
Durham-Toronto Boundary	18.5
Toronto-Peel Boundary	11.6
Toronto-York Boundary	10.5
York North	10.3

The five screenlines with the lowest 2006 school bus occupancy rates in both directions are shown below.

York-Durham Boundary	3.0
Peel North	3.1
South York Cordon	3.5
Halton-Highway 401	4.5
Mississauga-Brampton	4.9

9.2.2 Afternoon Peak Period

The five screenlines with the highest 2006 school bus volumes in both directions are shown below.

Central Area Cordon	336
Durham-Taunton Road	306
South York Cordon	275
Peel-Halton Boundary	224
Toronto-York Boundary	174

The five screenlines with the highest 2006 school bus occupancy rates in both directions are shown below.

GTA West	13.8
Peel-Halton Boundary	10.8
Toronto-Peel Boundary	10.4
Central Area Cordon	9.8
Durham-Toronto Boundary	8.7

The five screenlines with the lowest 2006 school bus occupancy rates in both directions are shown below.

Peel North	2.2
York-Durham Boundary	2.6
Mississauga-Brampton	4.1
South York Cordon	4.2
Dundas Street (Regional Road 5)	4.8

9.3 Conclusions

Only two regions (Durham and York) have data recorded for school buses and school bus occupancy in both 1991 and 2006. Thus a meaningful comparison across all the screenlines is not possible.

Of note from the above analysis is the inclusion of screenlines on regional boundaries that are capturing high volumes of school buses and school bus occupancy. This suggests either that a number of children are going to private schools in other regions, or that public schools in a given region allow in-take of students from other regions.

On average, 2006 school bus occupancy is higher in the morning peak period at approximately 8.1, compared to 7.2 in the afternoon peak period. This is mainly because school timings do not coincide with the afternoon peak period, which results in far fewer school buses and students crossing the screenlines in the evening. Some screenlines show significantly fewer school bus trips in the afternoon than in the morning. After-school programs, where students get picked up by their parents, contribute in part to the reduced afternoon school bus trips. This is also evident in the fact that auto occupancy tends to be higher in the afternoon. Additionally, the afternoon peak period for school buses is not the same as the afternoon peak period used for the overall analysis. The GTA West screenline has the highest school bus occupancy in the morning and afternoon peak periods.

Although screenlines include both regional and inter-urban boundaries, school trips tend to be local in nature and cannot be fully captured on the screenlines used in the analysis. The highest school bus vehicle volumes have occurred over inter-urban boundaries, indicating that a significant number of school children are traveling longer distances and from rural areas to attend school. A portion of school trips captured by the screenlines may also be attributed to school fieldtrips.

The latest available census data (2001 Census) estimates nearly 808,000 children attending school in the GTA. The analysis completed for this report suggests that just over 21,500 school children (2.7%) are going to schools in other regions based on the school bus occupancy recorded at the screenlines. This trend should be documented in future cordon count reports because it represents further evidence of cross-commuting between regions, albeit for a different trip purpose.

	Morning Peak Period	Afternoon Peak Period
Durham-Taunton Road	428	306
Durham-Regional Road 23	154	111
GTA East	145	119
York-Durham Boundary	134	68
York-Peel Boundary	82	51
York North	51	26
South York Cordon	535	275
Peel-Halton Boundary	294	224
Peel North	126	57
Mississauga-Brampton	312	169
GTA West	132	73
Halton-Highway 401 (South)	108	58
Dundas Street (Regional Road 5)	427	164
Durham-Toronto Boundary	82	27
Toronto-York Boundary	411	174
Toronto-Peel Boundary	323	152
Central Area Cordon	390	336

TABLE 9.1
Number of School Bus Crossing Screenlines in Both Directions
Morning and Afternoon Peak Periods (2006)

	Morning Peak Period	Afternoon Peak Period
Durham-Taunton Road	3,157	1,912
Durham-Regional Road 23	999	696
GTA East	1,270	899
York-Durham Boundary	396	175
York-Peel Boundary	671	386
York North	523	222
South York Cordon	1,896	1,165
Peel-Halton Boundary	1,981	2,413
Peel North	391	127
Mississauga-Brampton	1,528	696
GTA West	2,608	1,010
Halton-Highway 401 (South)	491	351
Dundas Street (Regional Road 5)	4,065	791
Durham-Toronto Boundary	1,516	235
Toronto-York Boundary	4,299	1,283
Toronto-Peel Boundary	3,747	1,588
Central Area Cordon	3,859	3,295

TABLE 9.2
School Bus Occupancy in Both Directions
Morning and Afternoon Peak Periods (2006)

10.0 REVERSE AND CROSS COMMUTING

10.1 Focus

There is an increasing trend of reverse and cross commuting in large metropolitan areas that contain more than one dominant attractor or producer. This trend has become evident in the GTA over the past fifteen years with the development of major employment centres in the Regions of York and Peel, resulting in commuters traveling in the opposite direction of the traditional commuting patterns i.e. inbound to Toronto.

Please refer to:

Table 10.1 *Reverse Commuting – Ratio of Off-Peak to Peak Direction Vehicle Crossings (1991 to 2006).*

Figure 10.1 *Reverse Commuting – Ratio of Off-Peak to Peak Direction Vehicle Crossings (1991 to 2006).*

10.2 Summary of Trends

10.2.1 Morning Peak Period

The five screenlines with the highest 2006 ratio of off-peak direction to peak direction vehicle crossings are shown below.

Durham-Taunton Road	90.5%
Toronto-Peel Boundary	87.5%
Dundas Street (Regional Road 5)	78.9%
York-Peel Boundary	76.3%
Halton-Highway 401	72.1%

The five screenlines that have experienced the largest increase in the 2006 ratio of off-peak direction to peak direction vehicle crossings are shown below.

Peel-Halton Boundary	37.4%
South York Cordon	34.7%
Central Area Cordon	30.0%
Mississauga-Brampton	26.4%
Toronto-Peel Boundary	22.8%

10.2.2 Afternoon Peak Period

The five screenlines with the highest 2006 ratio of off-peak direction to peak direction vehicle crossings are shown below.

Durham-Taunton Road	95.5%
Dundas Street (Regional Road 5)	92.1%
Toronto-Peel Boundary	84.7%
Toronto-York Boundary	80.7%
Central Area Cordon	78.4%

The five screenlines that have experienced the largest increase in the 2006 ratio of off-peak direction to peak direction vehicle crossings are shown below.

Peel-Halton Boundary	23.8%
York-Durham Boundary	11.4%
Durham-Taunton Road	10.9%
Mississauga-Brampton	10.6%
Toronto-Peel Boundary	10.4%

10.3 Conclusions

As the ratio of off-peak to peak direction vehicle crossings approaches 100%, there no longer exists a significant peak travel direction. As seen in the analysis, a number of screenlines are experiencing very high ratios and large increases in this ratio during both morning and afternoon peak periods.

Over the past decade, there has been rapid and significant development in the '905' area, which has resulted in a shift in travel patterns. The GTA has

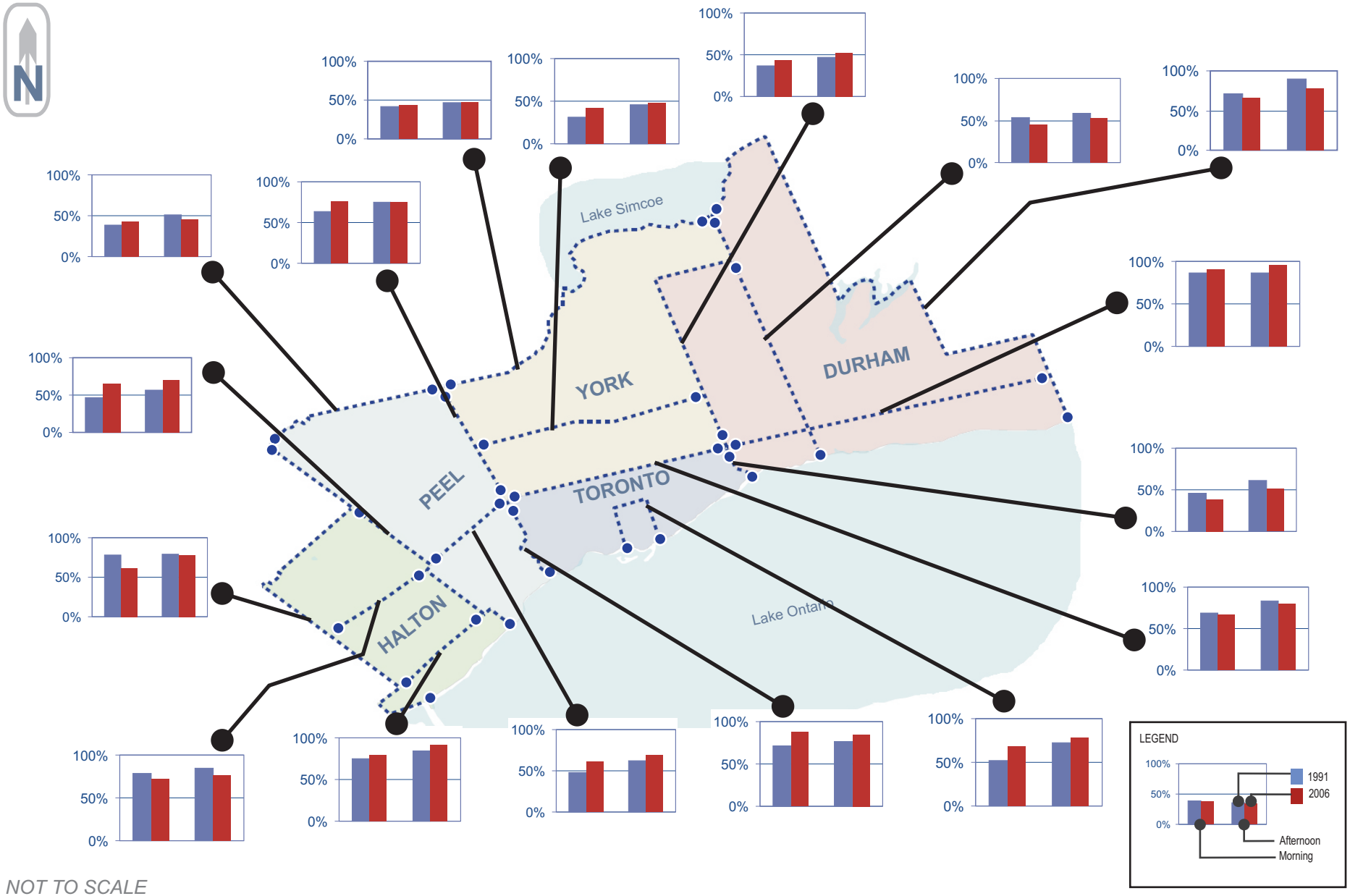
gradually moved to a polycentric development pattern with significant employment centres located outside the traditional Central Business District of the City of Toronto. The construction of significant new transportation infrastructure like Highway 407 has also played a critical role in shifting travel patterns, with more people adjusting their home / work locations to take advantage of the facility.

A number of internal regional screenlines have experienced large increases in the ratio of off-peak to peak direction vehicle crossings e.g. Mississauga-Brampton, and the South York Cordon. A number of factors could be responsible for the improvements in the ratios at these screenlines, including increasing self-containment within local municipalities, and relocation of major businesses and institutions into previous greenfields.

Finally, the GTA commutershed is expanding and now includes surrounding municipalities such as Hamilton to some extent. This could explain the high ratios experienced along the western screenlines that are at the edge of the GTA boundary.

	Morning Peak Period		Afternoon Peak Period	
	1991	2006	1991	2006
Durham-Taunton Road	86.8%	90.5%	86.1%	95.5%
Durham-Regional Road 23	53.9%	45.4%	58.6%	52.4%
GTA East	71.4%	66.0%	90.6%	77.2%
York-Durham Boundary	37.2%	44.2%	46.5%	51.8%
York-Peel Boundary	63.2%	76.3%	75.1%	75.3%
York North	42.3%	43.7%	46.3%	46.6%
South York Cordon	31.0%	41.8%	45.7%	47.8%
Peel-Halton Boundary	47.2%	64.8%	57.2%	70.8%
Peel North	38.5%	42.5%	51.3%	45.6%
Mississauga-Brampton	48.1%	60.7%	62.6%	69.3%
GTA West	78.5%	62.0%	78.8%	78.1%
Halton-Highway 401 (South)	78.4%	72.1%	85.1%	76.9%
Dundas Street (Regional Road 5)	75.0%	78.9%	84.6%	92.1%
Durham-Toronto Boundary	46.4%	38.7%	61.4%	51.0%
Toronto-York Boundary	69.2%	67.2%	83.4%	80.7%
Toronto-Peel Boundary	71.3%	87.5%	76.7%	84.7%
Central Area Cordon	52.4%	68.1%	72.4%	78.4%

TABLE 10.1
Reverse Commuting
Ratio of Off-Peak to Peak Direction Vehicle Crossings (1991 to 2006)



NOT TO SCALE

FIGURE 10.1
Reverse Commuting
Ratio of Off-Peak to Peak Direction Vehicle Crossings (1991 to 2006)

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11.0 METHODOLOGY ISSUES

During the course of the analysis completed for this study, a number of issues regarding the manner of collection of data and its storage were identified. The issues are separated in two main categories - first, data collection and summary, and second, data storage.

11.1 Data Collection and Summary

Classification of Heavy Trucks

In the Regional Municipality of Peel, at least five categories of trucks have been counted in 2006, excluding light trucks. In the rest of the municipalities a maximum of three categories, excluding light trucks, were counted in 2006. This does not pose any problems but the analyst needs to be aware of the additional categories while summing up the total volumes for commercial vehicles.

Commercial Vehicle Data Counting Period

A majority of the commercial vehicle traffic occurs during off-peak periods, both within and outside the total count period. In order to account for the volume of commercial traffic beyond the total count period, consideration should be given to a full 24 hour counting program at selected stations. The 24 hour count program in all likelihood would have to be conducted using automated counters set up along the 400 series highways.

This data would be very useful in identifying the impact of heavy commercial traffic on the major road network within the GTA and also in understanding the impact of congestion on freight shipper choices.

Person Trips Definition

As noted in the report prepared on the 2001 cordon count program, the definition of total person and total person auto trips varies among the regions in the GTA.

It would be worthwhile to review these definitions and strive to achieve consistency throughout the GTA. In some cases, truck, bus, and taxi drivers are included in the calculation of person trips. These numbers are not sufficiently high enough to have a major impact on the trends. There could be some impact on auto occupancy levels. However, the impact is expected to be minimal and not significant enough to change the direction of the trends.

In the future, as these modes of transport become more important, this issue will need to be taken into account.

Count Scheduling

Currently, the cordon count program is being conducted to coincide with the TTS and the Census. This provides the analyst, planner and decision maker a unique perspective from three different comprehensive data collection programs that target the travel trends, transportation patterns and demographic characteristics of the GTA.

It is recommended that a minimum five-year cycle should be maintained for conducting GTA wide cordon counts. Further, intermediate counts should be carried out in fast-growing areas at the discretion of each region based on resources and needs.

It would also be important that before future cordon count programs are undertaken, a thorough analysis of the screenlines should be completed. New screenlines that will help answer the questions on travel behavior and the success of certain transportation initiatives should be incorporated. At the same time, redundant

screenlines that no longer can shed light on the trends and topical transportation issues should be removed from the counting program.

11.2 Data Storage

In the course of this analysis a number of issues presented themselves relating to the style of data storage. The aim of this section is to present a possible direction for effectively storing the cordon count data in a more GIS based environment, which will allow for easier interpretation and display of the data. This will by no means negate the need for the user to understand the logistic and data management issues that arise with conducting such a comprehensive count program.

Some of the suggestions for more effective management of the data are as follows:

- Implement the relational database management system (RDBMS) in a GIS based environment. Currently, an overly simplified map is provided of the location of screenlines. This screenline map requires the user to interpret the location of screenlines based on unlabelled roads and features. No map is provided of counting stations. This requires users to interrupt the location of stations using the sometimes vague naming convention. It would be helpful to be able to determine the location of stations visually using a GIS based mapping system;
- The GIS based environment could be developed on the ARC IMS (Internet Mapping Service) platform, which will allow for dynamic querying of the database as well as allow for downloading the entire base cordon count network, including the screenlines, stations and the cordon count data;
- Under this system the inclusion or exclusion of stations and screenlines would be decided by the respective municipality, but the data preparation and recording process will be common across the GTA; and
- In future, any modification to the data fields in terms of redefining them, adding or deleting will have to take place under the rules established by the RDBMS, which will limit errors in data compatibility and interpretation to a great extent.

Through the use of a RDBMS system in a GIS based environment (ARC IMS), the end user will be immensely benefited. The end user will be in a position to concentrate more effort toward interpreting the data and its trends with far less time spent on displaying it appropriately and checking it for discrepancies arising due to different data definitions or other issues.

GLOSSARY

'905' Region - The Regional Municipalities of Durham, Halton, Peel, and York

Afternoon Peak Period – The 3-hour p.m. peak period shown in Appendix A

Auto Occupancy – Average number of occupants in an automobile, including the driver

Commercial Traffic – Heavy trucks (a truck with more than two axles) and Medium trucks (truck with more than four tires touching the road but with only two axles). Light trucks are not included in this definition.

Home-Based Work (HBW) Trips – Trips with one terminal at work and the other at home, with no intermediate stop

HOV (High-Occupancy Vehicle) – Automobiles with at least two occupants

Just-in-time delivery (JIT) – Goods arrive when needed, which helps reduce cost and the need for storage.

Major Roads – Includes Highways 400, 401, 403, 404, 407, 409, 410, and 427, the Queen Elizabeth Expressway, and the Gardiner Expressway.

Morning Peak Period – The 3-hour a.m. peak period shown in Appendix A

Off-Peak Period – The time of day occurring outside the peak period

Other Transit – includes all bus and subway service excluding GO Rail, GO Bus, and School Bus.

Peak-Hour Spreading (Peak Demand Spreading) - A reaction of drivers to road network conditions and increased congestion in the peak hours leading to the spread of trips over a longer time period.

Polycentric Development - A large centre surrounded by high density employment and population sub-centres.

Reverse Commuting – A trip in the direction opposite to the heaviest traffic flow.

Screenline - A series of stations used to form a screenline. A screenline is a pre-determined imaginary line spanning a major road, municipal boundary, a man-made boundary (such a railway) or a natural boundary (such as a river). This analysis uses this screenlines defined in Figure 1.1.

Stations - Counting stations established at key travel locations throughout the GTA.

Total Count Period – The total count period shown in Appendix A

Vehicles – All auto, taxi, truck, transit, and school bus vehicles traveling on the surface road network.

APPENDIX A – PEAK PERIOD DEFINITIONS

PEAK PERIOD DEFINITIONS

Morning Peak Period

	1991	1993	1995	1996	1998	2001	2004	2006
Durham	631-930			631-930	631-930	631-930	631-930	616-915
Halton	701-1000		701-1000		646-945	646-945	631-930	631-930
Peel	631-930	631-930	631-930		631-930	631-930	631-930	631-930
Toronto	646-945	701-1000	646-945		646-945	646-945	701-1000	646-945
York	631-930	631-930	631-930		631-930	701-1000	631-930	631-930

Afternoon Peak Period

	1991	1993	1995	1996	1998	2001	2004	2006
Durham	1531-1830			1531-1830	1501-1800	1516-1815	1531-1830	1516-1815
Halton	1516-1815		1531-1830		1531-1830	1531-1830	1531-1830	1546-1845
Peel	1531-1830	1531-1830	1531-1830		1531-1830	1531-1830	1531-1830	1531-1830
Toronto	1531-1830	1531-1830	1531-1830		1546-1845	1546-1845	1601-1900	1546-1845
York	1531-1830	1531-1830	1531-1830		1531-1830	1531-1830	1531-1830	1531-1830

Counting Period

	1991	1993	1995	1996	1998	2001	2004	2006
Durham	600-1945			600-1945	600-1900	600-1930	600-1930	600-1930
Halton	700-1900		700-1900		600-1900	600-1900	600-1900	600-1900
Peel	530-2130	530-2130	530-2130		530-2130	545-2030	545-2030	530-2030
Toronto	630-2330	545-2330	545-2330		600-2330	600-2000	600-2000	600-2000
York	600-1900	600-1900	600-1900		600-1900	600-2000	600-1900	545-1930

APPENDIX B – SCREENLINE DEFINITIONS

DETAILS ON SCREENLINES USED

	Region	Screenlines	Additional Notes
Durham-Taunton Road	Durham	11, 12, 13, 14, 15, 16, 17	-
Durham-Regional Road 23	Durham	34, 35, 36, 37, 39	-
GTA East	Durham	22, 25, 53, 56, 57, 58	-
York-Durham Boundary	York	2	-
York-Peel Boundary	York	3	-
York North	York	1	-
South York Cordon	York	5	-
Peel-Halton Boundary	Peel	31	Peel Stations 94 and 100 Removed
Peel North	Peel	32	-
Mississauga-Brampton	Peel	42	-
Halton-Highway 401 (South)	Halton	S-C1	-
Dundas Street (Regional Road 5)	Halton	S-B3 and S-O3	Halton Stations 1019, 1020, 5007 Removed
Durham-Toronto Boundary	Toronto	1003	-
Toronto-York Boundary	Toronto	1002	-
Toronto-Peel Boundary	Toronto	1001	-
Central Area Cordon	Toronto	1014, 1035, 1058	-
GTA West	Halton	S-L1, S-L2, S-F1, and S-A3	Peel Stations 94 and 100 Added and Halton Stations 1019, 1020, and 5007 Added

Some stations were removed from screenlines to form an accurate GTA West screenline, which was created for the purpose of this analysis.

APPENDIX C – TOTAL COUNT PERIOD PEAK DIRECTION

TOTAL PERSONS AND VEHICLES-Total Count Period-Peak Direction

	TOTAL PERSONS- Total Count Period-Peak Direction				TOTAL VEHICLES-Total Count Period-Peak Direction			
	1991	2006	Change	%	1991	2006	Change	%
Durham-Taunton Road	61,537	101,546	40,009	65%	49,467	92,323	42,856	87%
Durham-Regional Road 23	77,784	113,576	35,792	46%	63,054	106,172	43,118	68%
GTA East	42,768	44,275	1,507	4%	33,936	41,173	7,237	21%
York-Durham Boundary	27,359	42,270	14,911	55%	21,613	36,320	14,707	68%
York-Peel Boundary	29,770	101,574	71,804	241%	23,950	93,369	69,419	290%
York North	38,518	61,668	23,150	60%	28,738	49,821	21,083	73%
South York Cordon	120,494	151,442	30,948	26%	93,764	127,599	33,835	36%
Peel-Halton Boundary	161,745	260,584	98,839	61%	128,914	243,824	114,910	89%
Peel North	20,890	23,108	2,218	11%	17,132	22,002	4,870	28%
Mississauga-Brampton	150,060	233,137	83,077	55%	130,380	219,896	89,516	69%
GTA West	155,402	258,927	103,525	67%	115,547	211,381	95,834	83%
Halton-Highway 401 (South)	28,918	63,904	34,986	121%	23,113	55,954	32,841	142%
Dundas Street (Regional Road 5)	94,059	131,622	37,563	40%	73,799	114,078	40,279	55%
Durham-Toronto Boundary	106,148	140,754	34,606	33%	85,323	128,970	43,647	51%
Toronto-York Boundary	469,026	634,273	165,247	35%	397,161	569,231	172,070	43%
Toronto-Peel Boundary	499,891	489,732	-10,159	-2%	407,773	433,759	25,986	6%
Central Area Cordon	896,027	868,251	-27,776	-3%	413,221	399,024	-14,197	-3%