City of Brampton

Appendix C:

Transportation and Transit Master Plan Sustainable Update 2009 - Existing Conditions and Trends Report

Brampton, ON

November 2009

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Project # 4587

TABLE OF CONTENTS

Tables

Exhibits

1. INTRODUCTION

The purpose of this report is to provide a comprehensive synopsis of transportation and travel with Brampton now and in the past. The discussion presented in this report will summarize the existing road and transit conditions, travel trends concerning transportation to, from, and within the City of Brampton, current transportation deficiencies, and the existing as well as potential future modal splits between auto, transit, and non-motorised travel.

The analyses presented in the report are based largely on transit data provided by the City of Brampton, travel characteristics data extracted from the 1996, 2001, and 2006 Transportation Tomorrow Survey, and the results of the simulation of the 2006 PM Peak Hour traffic and travel conditions provided by Brampton's Travel Demand Forecasting Model.

2. OPPORTUNITIES AND CONSTRAINTS RELATED TO TRANSPORTATION

The review of studies and issues completed and documented in the Start-up Report, discussions with City staff, and input from the stakeholders received via City staff were used to identify opportunities and challenges to transportation system growth that need to be addressed in the Brampton TTMP Sustainable Update 2009. A number of opportunities and constraints that have been identified are directly related to the provision of new infrastructure, capacity improvements for the existing network, and enhancements to the transit system in support of future development. The areas of special interest are illustrated in **Exhibit 2.1**.

Opportunities and constraints to transportation system growth identified at this stage in the study include:

- Timing, function and cost of the provision of the road network in North-West Brampton
- Timing, location, cost, role and classification of the North-South corridor
- Timing and cost of the road network in BramWest
- Impact of environmental features and Greenbelt designated areas on the shape and function of the road network
- Further evolution of high-order transit in Brampton
- Enhanced connectivity between Brampton Transit, Mississauga Transit, York Region Transit and GO Transit
- Impact of Metrolinx transit plan including the implementation of the 407 ETR transitway and Mississauga transitway
- Existing congestion levels on area roads
- Need for additional road capacity crossing Hwy 410
- Need for improved connectivity with York Region roads
- East-west road requirements in the Central Area / Queen Street Corridor, with and without a Clark / Eastern Wellington connection
- Impact of the future East-West corridor

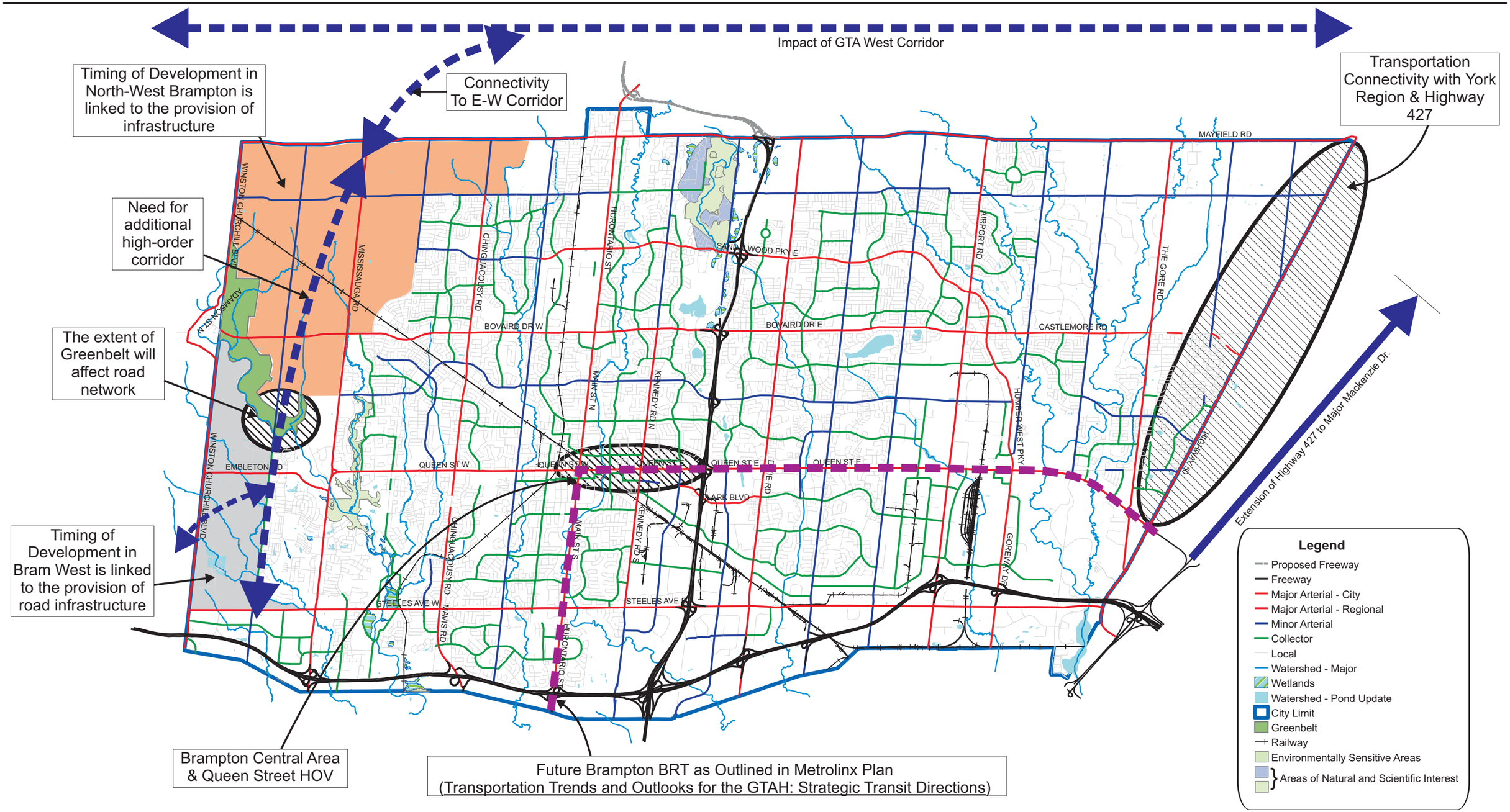

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Exhibit 2-1
Constraints and Opportunities

3. EXISTING TRANSPORTATION SYSTEM

This Chapter discusses the extent, characteristics, and travel conditions observed on the existing transportation network in the City of Brampton.

3.1 Road Network

Exhibit 3.1 shows the existing Brampton road network and classification. At present, the major freeway links are Highway 410, running north-south through the centre of the City, and Highways 401 and 407 running east-west along the southern border with Mississauga. (Highway 407 is just north of the border and Highway 401, not shown on the map, is just south). The Brampton arterial road network is connected to Highway 410 through interchanges at Mayfield Road, Sandalwood Parkway, Bovaird Drive, Williams Parkway, Queen Street and Steeles Avenue. The north-south arterials connecting to Highways 401 and / or the 407 ETR are Winston Churchill Blvd, Mississauga Road, Main / Hurontario Road, Dixie Road, Bramalea Road, Airport Road and Goreway Drive. Highway 427, just east of Brampton, provides additional access to Queen Street and Steeles Avenue.

The exhibit also shows the authority that has jurisdiction over each of the roads, most of which are divided between the City of Brampton and the Region of Peel. The arterial and collector road network is divided with a ratio approximately two to one between City and Region (1020 lane-km to 560).

Exhibit 3.2 shows the number of lanes on major roads and the locations of intersections. From this we can see that high-capacity roads are essentially limited to the central and southern parts of Brampton. There are few continuous high-capacity roads. The arterial road network does not run all the way across the city from east to west, but is concentrated between McLaughlin Road and Airport Road. There is no high-capacity link with western Brampton or Halton Region north of Highways 401 and 407, and the four-lane roads that do exist are widely spaced outside the central area. Congestion on arterial roads also leads to traffic spilling over onto residential collector roads, raising residents' concerns over traffic infiltration, safety, and speeding in residential areas.

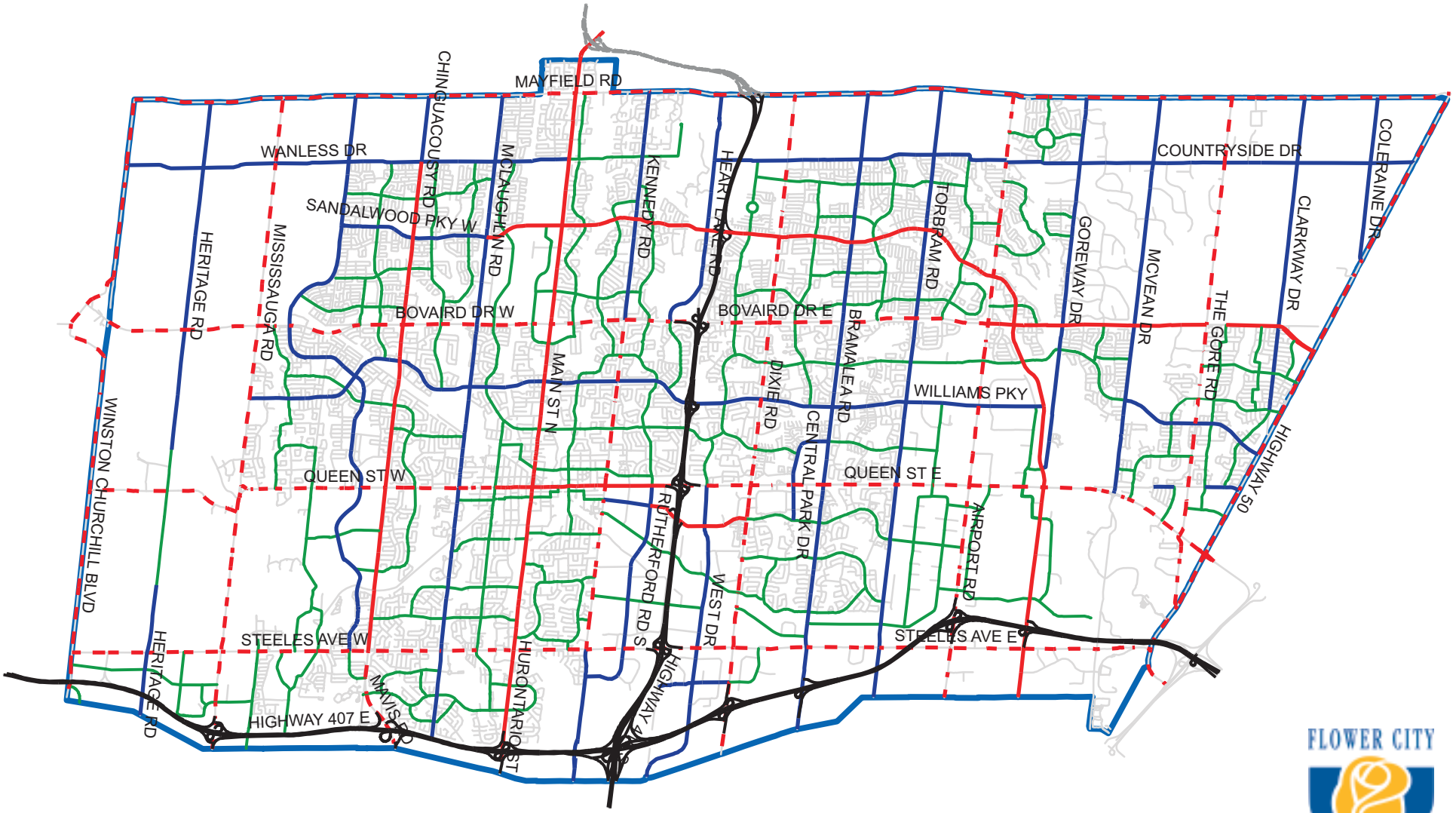

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Exhibit 3-1
Road Hierarchy and Road Jurisdiction

November 2009

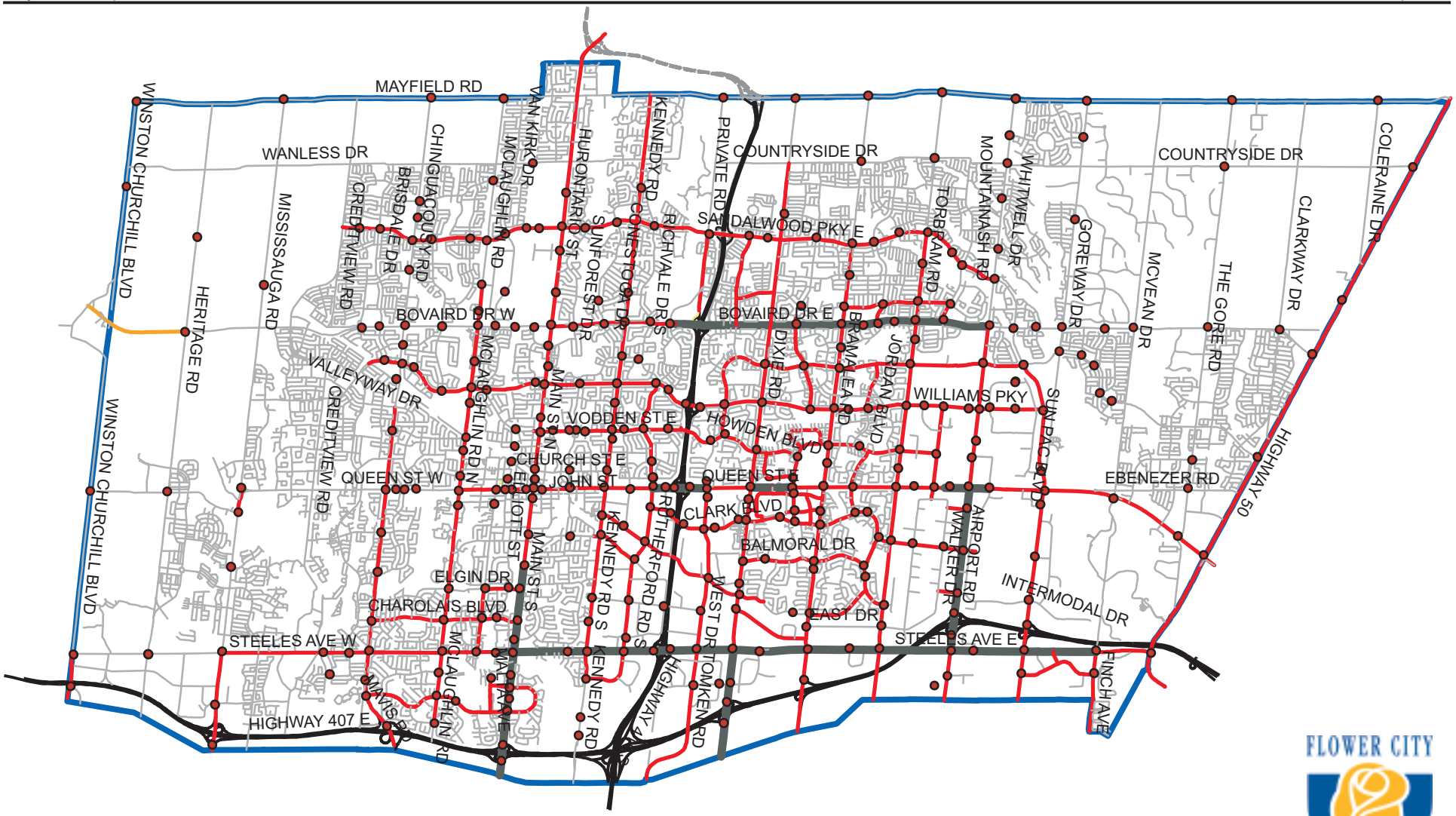

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Exhibit 3-2

Number of Lanes and Signalized Intersections

3.2 Transit Network

3.2.1 Brampton Transit System Characteristics

Brampton Transit service is designed to facilitate passenger transport within Brampton and to Mississauga, Vaughan, Toronto, and Halton Region. The transit system has been growing since 1996 in every way growth can be defined such as ridership, service hours, etc. The growth is tied to Brampton's rapidly growing population from less than 270,000 people only 13 years ago to one of Canada's largest urban centres with over 450,000 people today.

Brampton Transit provides conventional fixed route transit service throughout the urban area of Brampton, as seen in **Exhibit 3.3**. Accessible service for persons with disabilities is provided through conventional Brampton Transit service and specialized service provided by Peel Transhelp.

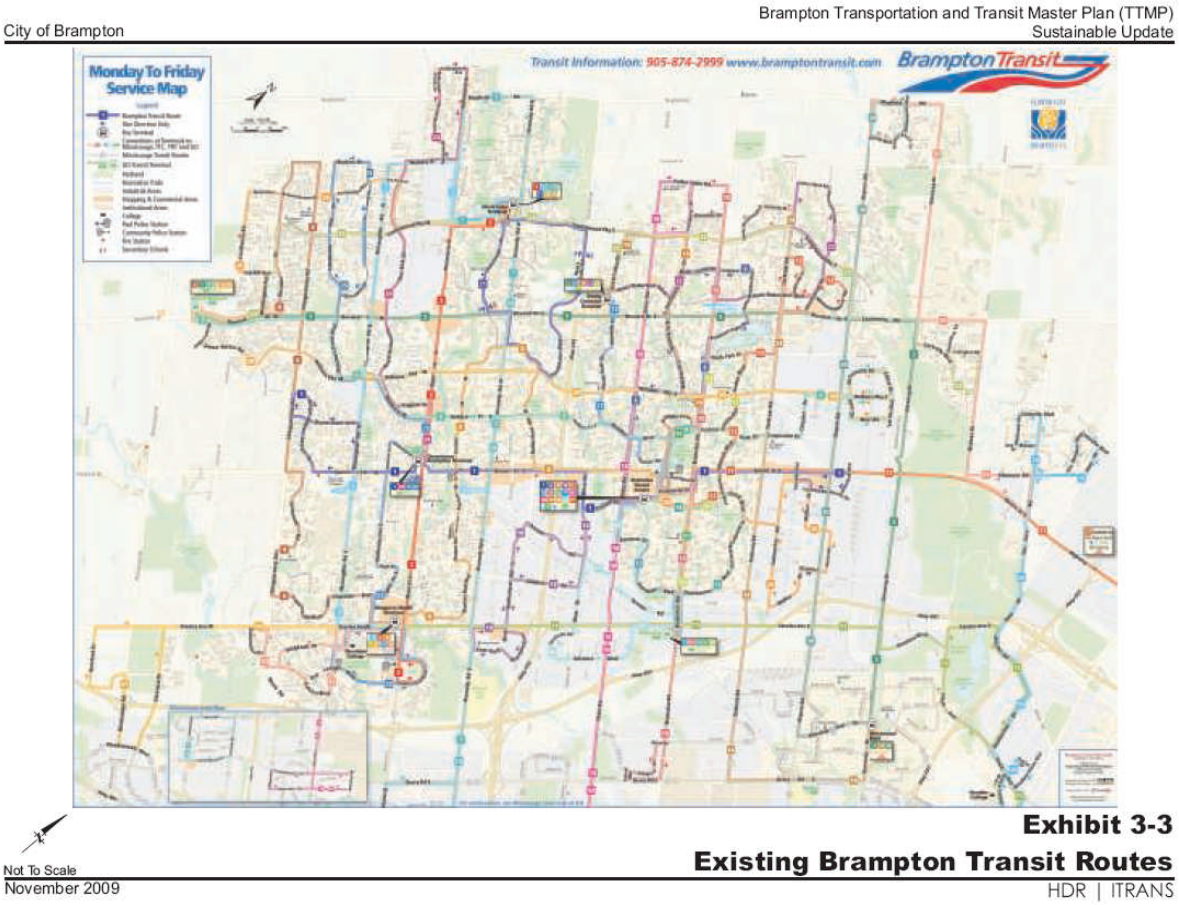


Exhibit 3.3: Existing Brampton Transit Routes

As of January 2009, Brampton Transit operates 38 high-floor and 196 low floor buses on 36 fixed routes. Of these 36 fixed routes, 24 are accessible. A summary of 2006 Brampton Transit's system characteristics is presented in **Table 3-1**.

Table 3-1: Brampton Transit System Profile (2006)

Year	Active Vehicles	Total Operating Expenses	Cost / Recovery Ratio	Per Capita Service Area Ridership	Per Capita Operating Expenses
2006	183	$46,294,038	46%	24.48	$106
2007	195	$48,860,910	49%	25.76	$108

3.2.1.1 Service Hours and Frequencies

Brampton Transit provides service on weekdays from 04:00 to 01:00, Saturday from 04:45 to 01:30, and Sunday / Holidays from 06:45 to 00:30. Of Brampton Transit's 36 routes, 22 operate from morning to night, and ten operate during peak periods only as seen in **Table 3-2**.

Table 3-2: Hours of Service

		Morning	AM Peak	Midday	PM Peak	Evening	Night
	ROUTE	04:00 to 05:59	06:00 to 09:30	09:31 to 14:29	14:30 to 18:59	19:00 to 21:59	22:00 to 01:00
1	Queen	√	√	√	√	√	√
2	Main	√	√	√	√	√	√
3	McLaughlin	√	√	√	√	√	√
4	Chinguacousy	√	√	√	√	√	√
5	Bovaird	√	√	√	√	√	√
6	Mackay		√		√		
7	Kennedy	√	√	√	√	√	√
8	Centre	√	√	√	√	√	√
9	Vodden	√	√	√	√	√	√
10	South Industrial		√		√		
11	Steeles	√	√	√	√	√	√
12	Grenoble	√	√	√	√	√	√
13	Avondale	√	√	√	√	√	
14	Torbram	√	√	√	√	√	√
15	Bramalea	√	√	√	√	√	√
16	Southgate	√	√	√	√	√	√
17	Howden	√	√	√	√	√	√
18	Dixie	√	√	√	√	√	√
19	Fernforest	√	√	√	√	√	√
20	East Industrial		√		√		
21	Heart Lake		√		√		
22	Springdale		√		√		

		Morning	AM Peak	Midday	PM Peak	Evening	Night
	ROUTE	**04:00 to 05:59**	**06:00 to 09:30**	**09:31 to 14:29**	**14:30 to 18:59**	**19:00 to 21:59**	**22:00 to 01:00**
23	Sandalwood	√	√	√	√	√	√
24	Van Kirk Industrial	√	√	√	√	√	
25	Edenbrook		√		√		
26	Fletcher's Meadow		√		√		
29	Williams	√	√	√	√		
30	Airport Road	√	√	√	√	√	√
31	McVean		√		√		
40	Central Industrial	√	√	√	√	√	
50	Gore Road		√	√	√	√	
51	Steeles West	√	√	√	√	√	√
52	McMurchy	√	√	√	√	√	√
53	Kingknoll	√	√	√	√	√	√
77	Highway 7	√	√	√	√	√	√
91	GO Shuttle A		√		√		
92	GO Shuttle B		√		√		

As seen in **Table 3-3**, service frequencies during the peak periods include six minutes on Steeles, seven on Dixie, ten on Main, Queen, and Kennedy, and 60 minute service on McVean, which operates as a peak period neighbourhood circulator. The average route frequency during the peaks is approximately 20 minutes. During the midday period, service frequencies range from ten to 45 minutes, and during the evening service frequencies for routes still in operation range from 20 to 60 minutes.

Table 3-3: Service Frequencies (Minutes)

		Morning	AM Peak	Midday	PM Peak	Evening	Night
	ROUTE	**04:00 to 05:59**	**06:00 to 09:30**	**09:31 to 14:29**	**14:30 to 18:59**	**19:00 to 21:59**	**22:00 to 01:00**
1	Queen	10	10	10	10	20	20
2	Main	20	10	20	10	30	30
3	McLaughlin	20	20	40	20	40	40
4	Chinguacousy	15	15	30	15	30	30
5	Bovaird	15	15	30	15	30	30
6	Mackay		20		20		
7	Kennedy	20	10	20	10	30	30
8	Centre	20	20	40	20	40	40
9	Vodden	30	30	45	30	45	45
10	South Industrial		20		20		

		Morning	AM Peak	Midday	PM Peak	Evening	Night
	ROUTE	**04:00 to 05:59**	**06:00 to 09:30**	**09:31 to 14:29**	**14:30 to 18:59**	**19:00 to 21:59**	**22:00 to 01:00**
11	Steeles	15-10	6	15	10-6	30	30
12	Grenoble	30	30	30	30	30	30
13	Avondale	30	30	30	30	30	
14	Torbram	20	20	30	20	30	30
15	Bramalea	30	30	30	30	40	40
16	Southgate	20	20	40	20	40	40
17	Howden	20	20	40	20	40	40
18	Dixie	15	7	15	7	30	30
19	Fernforest	30	30	30	30	30	30
20	East Industrial		20		20		
21	Heart Lake		30		30		
22	Springdale		30		30		
23	Sandalwood	30	30	40	30	60	60
24	Van Kirk Industrial	30	30	30	30	60	
25	Edenbrook		30		30		
26	Fletcher's Meadow		30		30		
29	Williams	30	30	45	30		
30	Airport Road	20	20	30	20	30	30
31	McVean		60		60		
40	Central Industrial	20	20	40	20	40	
50	Gore Road		30	30	30	30	
51	Steeles West	20	20	20	20	20	20
52	McMurchy	15	15	20	15	30	30
53	Kingknoll	20	20	30	20	30	30
77	Highway 7	20	15	30	15	20	30
91	GO Shuttle A		15-25		30		
92	GO Shuttle B		15-25		30		

3.2.1.2 Terminals

Brampton Transit services five of their own terminals plus the Westwood Mall terminal in Mississauga, providing connections to other local routes. Three GO Transit terminals provide connections to both inter-regional and local routes. These terminals are listed in **Table 3-4**.

Table 3-4: Terminals and Routes Served

TERMINALS	NUMBER OF ROUTES	ROUTES
Bramalea Transit Centre	15	1, 6, 8, 10, 12, 13, 15, 16, 17, 18, 19, 20, 40, 77, 91
Shoppers World Terminal	7	3, 4, 8, 11, 51, 52, 53
Heart Lake Terminal	6	2, 3, 7, 21, 23, 26
Mount Pleasant GO Station	6	4, 5, 9, 23, 26, 29
Trinity Common Terminal	5	5, 17, 19, 22, 23
Bramalea GO Station	5	13, 15, 16, 91, 92
Downtown Brampton Terminal	4	1, 24, 25, 52
Westwood Mall	3	5, 14, 30

Of the five Brampton Transit terminals, Bramalea Transit Centre facilitates the most connections while the remaining terminals facilitate connections for a similar number of routes. Of particular interest is the geographic location of these terminals which are spread throughout the City. This suggests that Brampton Transit and its grid-based fixed route system are designed to service a relatively high number of major nodes within the City. This aspect indicates that Brampton Transit facilitates connections between non-Downtown Brampton nodes.

3.2.1.3 Inter-Municipal Transit Service

Brampton Transit provides direct inter-municipal transit service with adjacent municipalities, via the following routes:

- Mississauga Transit
  - 19A Hurontario: Connects to Shoppers World in Brampton

- Brampton Transit
  - Route 5 on Goreway Drive, connecting to Mississauga at Westwood Mall
  - Route 7 on Kennedy Road, connecting to Mississauga
  - Route 14 on Torbram Road, connecting to Mississauga at Westwood Mall
  - Route 15 on Bramalea Road, connecting to Mississauga
  - Route 18 in Dixie Road, connecting to Mississauga
  - Route 30 on Airport Road, connecting to Mississauga at Westwood Mall
  - Route 101 on Bramalea Road, Derry Road, and Airport Road, connecting to Mississauga at Pearson Airport, Terminal 1
  - Route 11 on Steeles Avenue, connecting to Toronto at Humber College
  - Route 50 on The Gore Road, also connecting to Toronto at Humber College
  - Route 51 on Mississauga Road, connecting to Mississauga
  - Route 77 on Highway 7, connecting to York Region Viva service on Highway 7 and the City of Toronto at Finch Station

3.2.2 GO Transit System Characteristics

3.2.2.1 GO Rail

GO Transit services Brampton with one rail line: the GO Georgetown line. The Georgetown GO Train runs between Georgetown GO Station in Halton Hills and Union Station in downtown Toronto. The line carried 6,991 A.M. peak period passengers in 2006 and 7,085 in 2007. There are three stations located in the City of Brampton: Bramalea GO Station, Brampton GO Station, and Mount Pleasant GO Station. In 2006, approximately 70 percent of eastbound passengers disembarking from the Georgetown Line at Union Station boarded at Bramalea GO Station, Brampton GO Station, and Mount Pleasant GO Station. Some key information is shown in **Table 3-5**.

Table 3-5: Ridership and Mode Share along the Georgetown Rail Corridor

Georgetown GO Rail Corridor		Egress Mode					
GO Station	**Daily Ridership**	**Drive**	**Kiss n' Ride**	**Brampton Transit**	**GO Bus**	**Walk**	**Bicycle**
Bramalea	2,636	73%	15%	8%	2%	4%	0%
Brampton	1,949	66%	15%	7%	1%	10%	1%
Mount Pleasant	765	72%	17%	6%	0%	4%	1%

Along the Georgetown corridor, GO Transit runs six eastbound A.M. peak trips servicing all stations and four off-peak trains between Bramalea GO Station and Union GO Station. Westbound, GO Transit runs one A.M. peak trip, two off-peak trips, and six P.M. peak trips.

The corridor is supplemented by train-bus service between Georgetown and Union Station. In 2006, the Georgetown train-bus daily ridership was 840 compared to GO Georgetown's rail daily ridership of approximately 15,000.

3.2.2.2 GO Bus

In 2006, GO Transit serviced Brampton with five routes:

1. Brampton Trinity Common GO Bus: Brampton, Bramalea, Hwy 407, Thornhill and Toronto
2. Brampton Local, Hwy 27, & Hwy 427 GO Bus: Brampton, Bramalea, Malton, Pearson Airport, Yorkdale and York Mills
3. Georgetown GO Bus: Guelph, Georgetown, Brampton and Toronto
4. Hwy 407 West GO Bus: Guelph, Hamilton, McMaster University, Oakville, Meadowvale, Streetsville, Square One, Bramalea and York University
5. Orangeville GO Bus: Orangeville, Caledon, Victoria, Snelgrove, and Brampton

Together, these five routes generated a total daily ridership of 2,987 which represented 9% of GO's total daily bus ridership in 2006. Some key information can be found in **Table 3-6**.

Table 3-6: Ridership and Mode Share along the Georgetown Bus Corridor

Brampton GO Bus Corridor		Egress Mode					
GO Bus Stops	**Daily Ridership**	**Drive**	**Kiss n' Ride**	**Brampton Transit**	**GO Bus**	**Walk**	**Bicycle**
All GO Brampton Stops	1,949	26%	21%	16%	2%	34%	1%

3.2.3 Brampton Transit Ridership

Since 1996, Brampton Transit's annual transit ridership has grown approximately at the same rate as its service area population, displayed in **Exhibit 3.4**. This indicates – in the absence of other data – that ridership growth and service area population growth have a positive correlation.

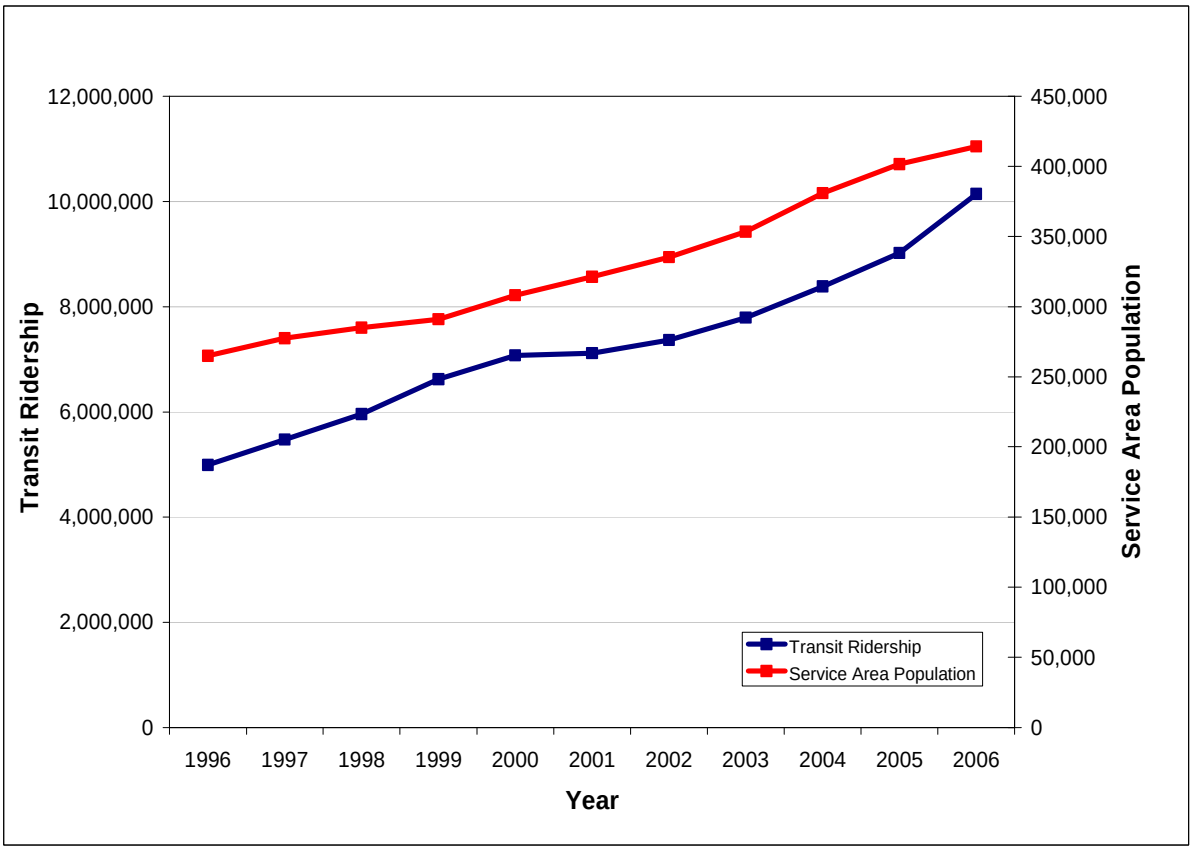


Exhibit 3.4: Transit Ridership vs. Service Area Population (1996-2006)

Brampton Transit's ridership growth compared to the average ridership growth of similar sized Canadian systems (Population 150,000-400,000)[1] puts Brampton Transit's growth in perspective.

As illustrated in **Exhibit 3.5**, Brampton Transit's ridership has grown at an average of seven percent between 1996 and 2006 while similar sized Canadian transit systems have grown at an average rate of two percent with decreases in 1998 and 2005.[2]

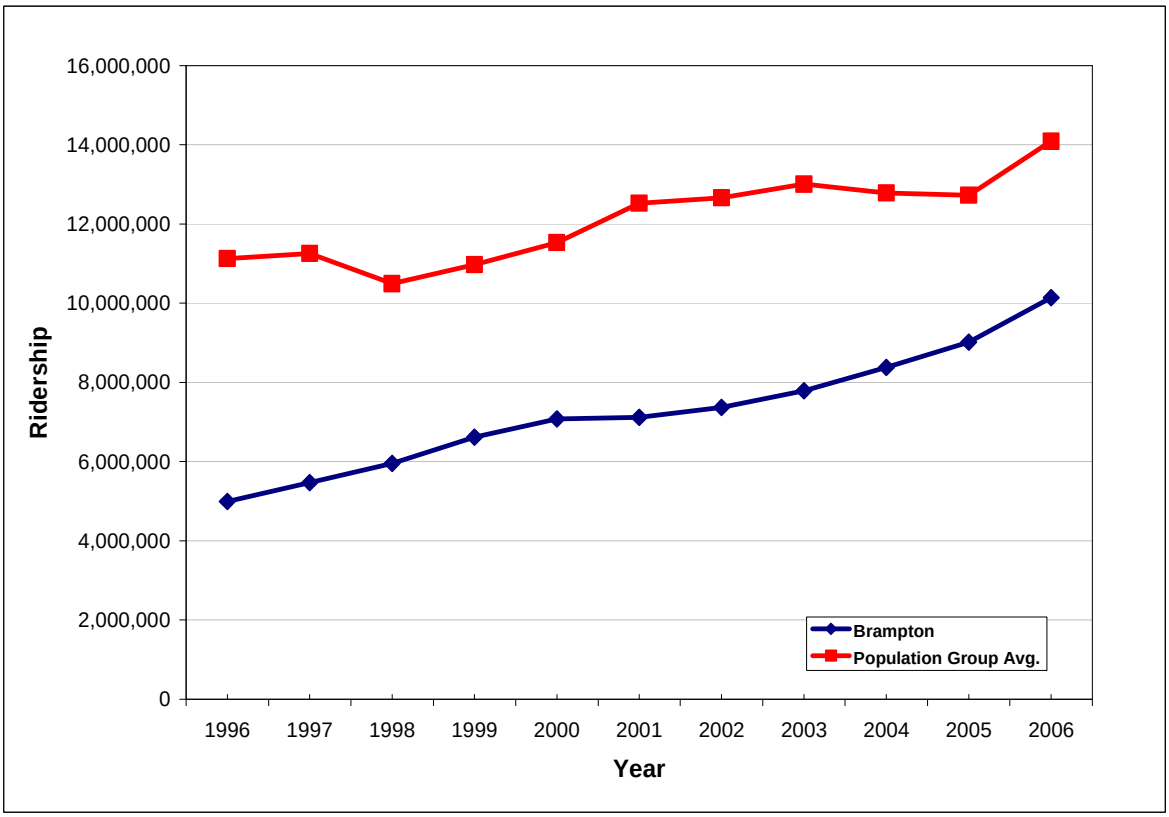


Exhibit 3.5: Ridership Trends Compared to Population Group (1996-2006)

[1] This population group is defined by the Canadian Urban Transit Association as a population group

[2]. In 2004, the City of Brampton's population was 400,965, moving the system into population group 1 (400,000+). However, since the population group includes the Toronto Transit Commission (TTC), Societe de transport de Montreal (STM), Vancouver (Translink), Calgary, Edmonton, and Ottawa among others, the disparity in population made for an ineffective comparison. This is partially due to the fact that population group 1 systems operate multi modes of transit including rapid transit. As Brampton's population grows and When the AcceleRide is implemented it will be fair to compare Brampton to its population group one peers.

Focusing back on Brampton Transit's ridership, **Exhibit 3.6** on the following page is a snapshot of monthly ridership growth between July 2005 and June 2008.

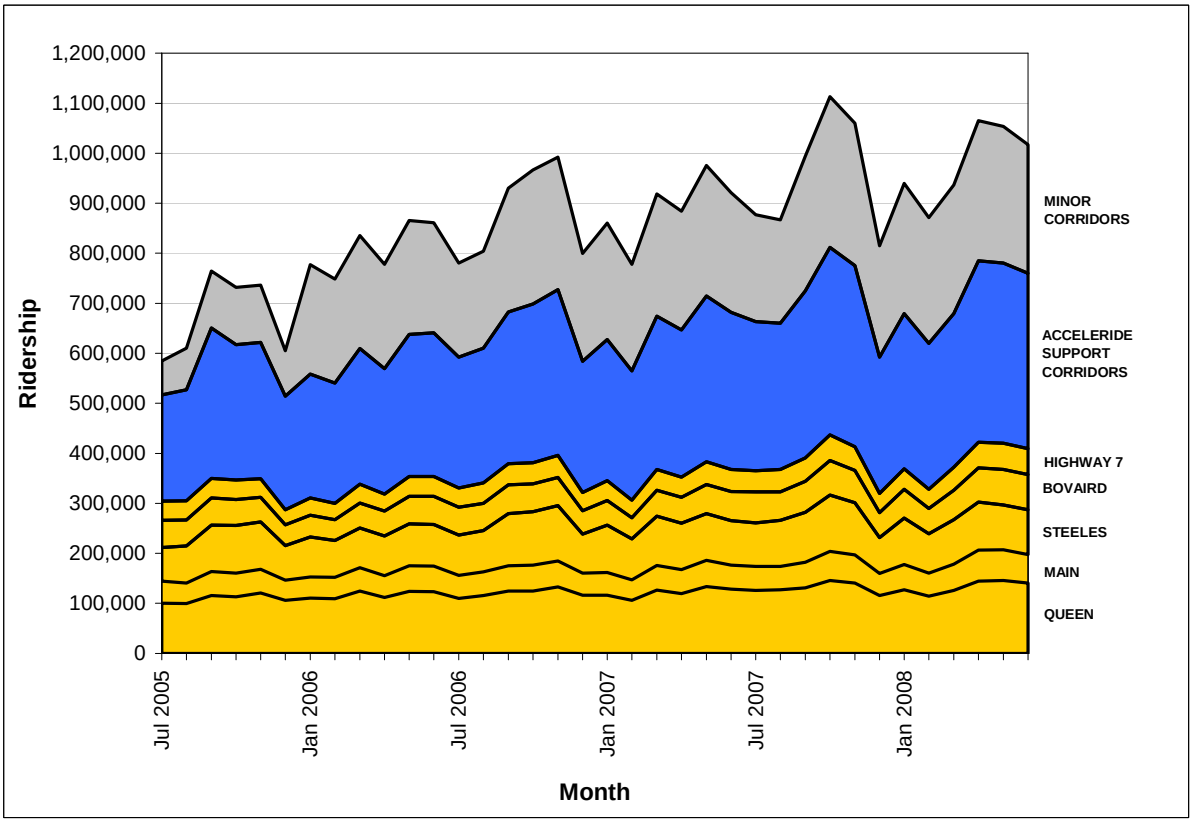


Exhibit 3.6: Monthly Ridership by Corridor (July 2005 - June 2008)

The chart identifies the following types of corridors:

1. AcceleRide Corridors: Queen, Main, Bovaird, Steeles, and Highway 7
2. AcceleRide Support Corridors
3. Minor Corridors

Of note is the minimal, yet steady, growth on the established corridors identified as AcceleRide and AcceleRide support. Of greater significance is the steep growth in minor corridors. This is of importance since each of these corridor types has a significant function in Brampton Transit's future service plan. AcceleRide Corridors will have frequent service, five minute headways and priority right-of-ways at certain intersections to accommodate great passenger flows relative to other routes. AcceleRide Support Corridors will have frequent service, ten to 15 minute headways, and operate in mixed traffic. Minor Corridors will provide community feeder service by operating in AM and PM peaks at 30 minute headways.

However, it would be misleading to suggest that ridership is the only factor that determines the function of a corridor. As seen in **Exhibit 3.7** the five AcceleRide corridors are not

selected strictly based on ridership. For example, average annual ridership between July 2005 and June 2008 is greater on Kennedy and Dixie than on the AcceleRide corridors of Main, Highway 7, and Bovaird / Goreway. This means that Brampton Transit is strategically planning its future services. To make the point *reductio ad absurdum*, imagine a higher-order transit network strictly dictated by ridership. This would result in a network that includes Kennedy and Dixie instead of Main, Bovaird and Highway 7. A system as previously described would fail to make key strategic links to Brampton GO Station, VIVA, and the airport.

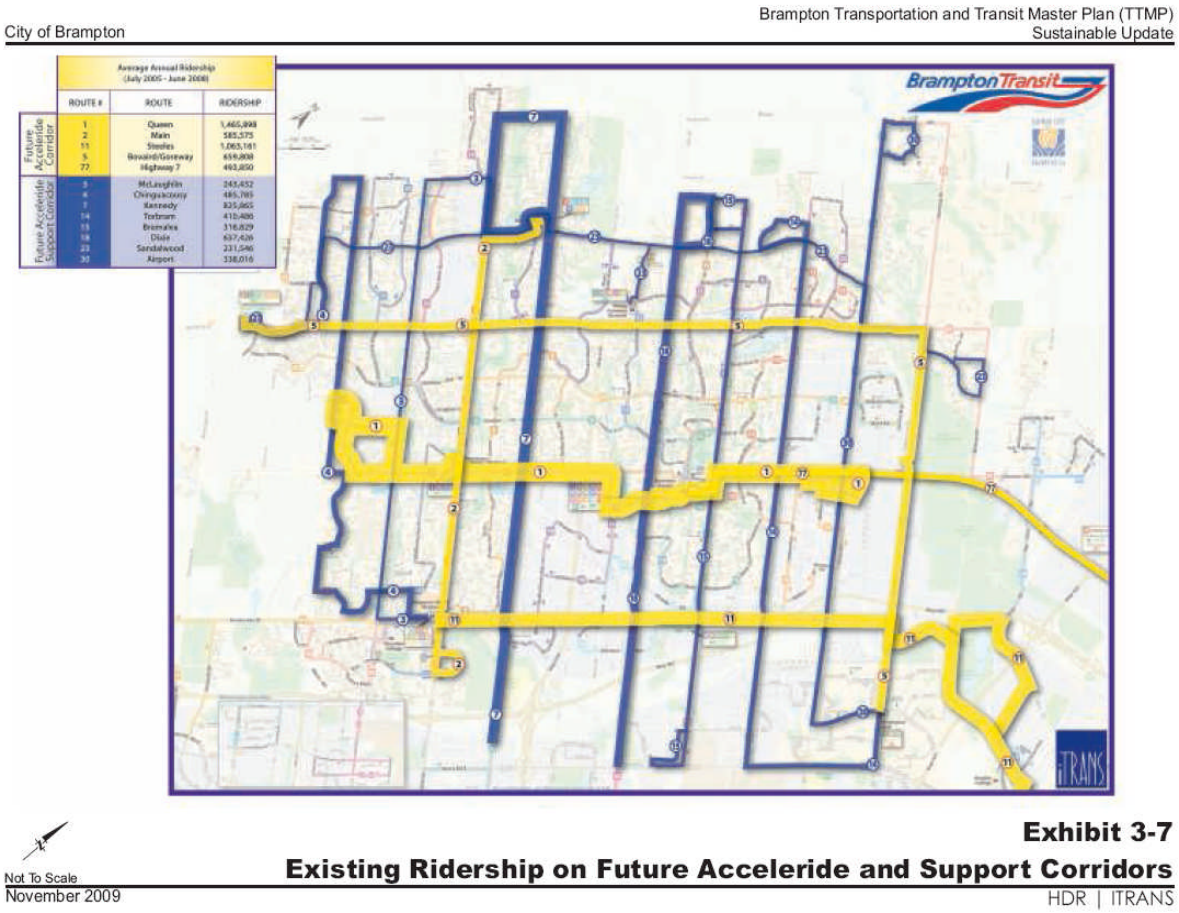


Exhibit 3.7: Existing Ridership on Future AcceleRide and Support Corridors

Despite the growth in ridership, Brampton Transit's per capita ridership is lower than similar sized systems in Canada. **Exhibit 3.8** below shows the City of Brampton's per-capita ridership from 1996 to 2006 as compared to the population group average.

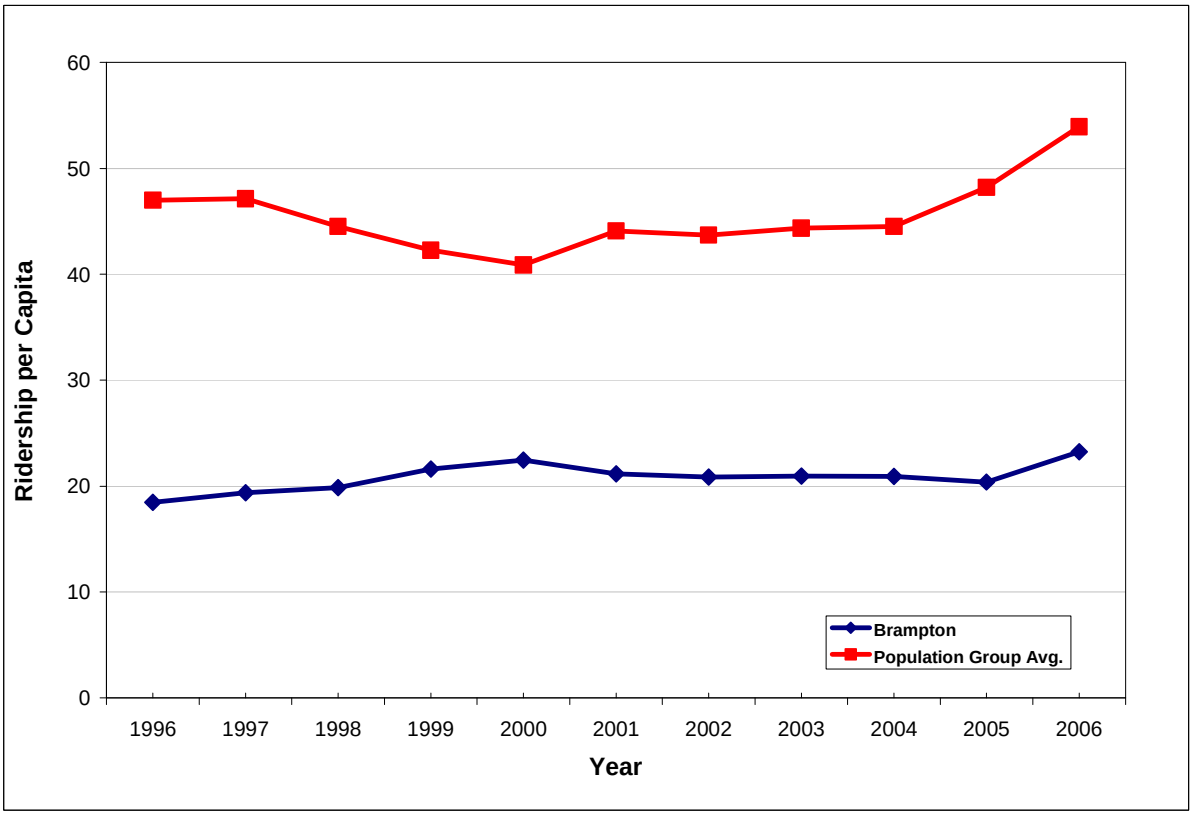


Exhibit 3.8: Per Capita Ridership Trends (1996-2006)

The growth in Brampton Transit's ridership has increased at the same rate as the City's population as seen earlier in **Exhibit 3.4**. This explains, as illustrated in **Exhibit 3.8,** the consistent 21 ridership per capita from 1996 to 2006. The population group average, for similar sized Canadian transit systems, has taken a different path with a steady annual average decrease of 3% between 1996 and 2000 followed by an annual average increase of 5% between 2001 and 2006. This suggests that Brampton Transit's ridership is not as volatile as its peers, which in effect allows Brampton Transit to steadily grow service (cost) without fear of ridership (revenue) shortfalls. It also suggests that there is room for greater ridership growth as is expected in Brampton via AcceleRide that would essentially bridge the gap between Brampton transit and its peers. The annual ridership per capita for the three specific types of corridors in Brampton is shown below in **Exhibit 3.9**.

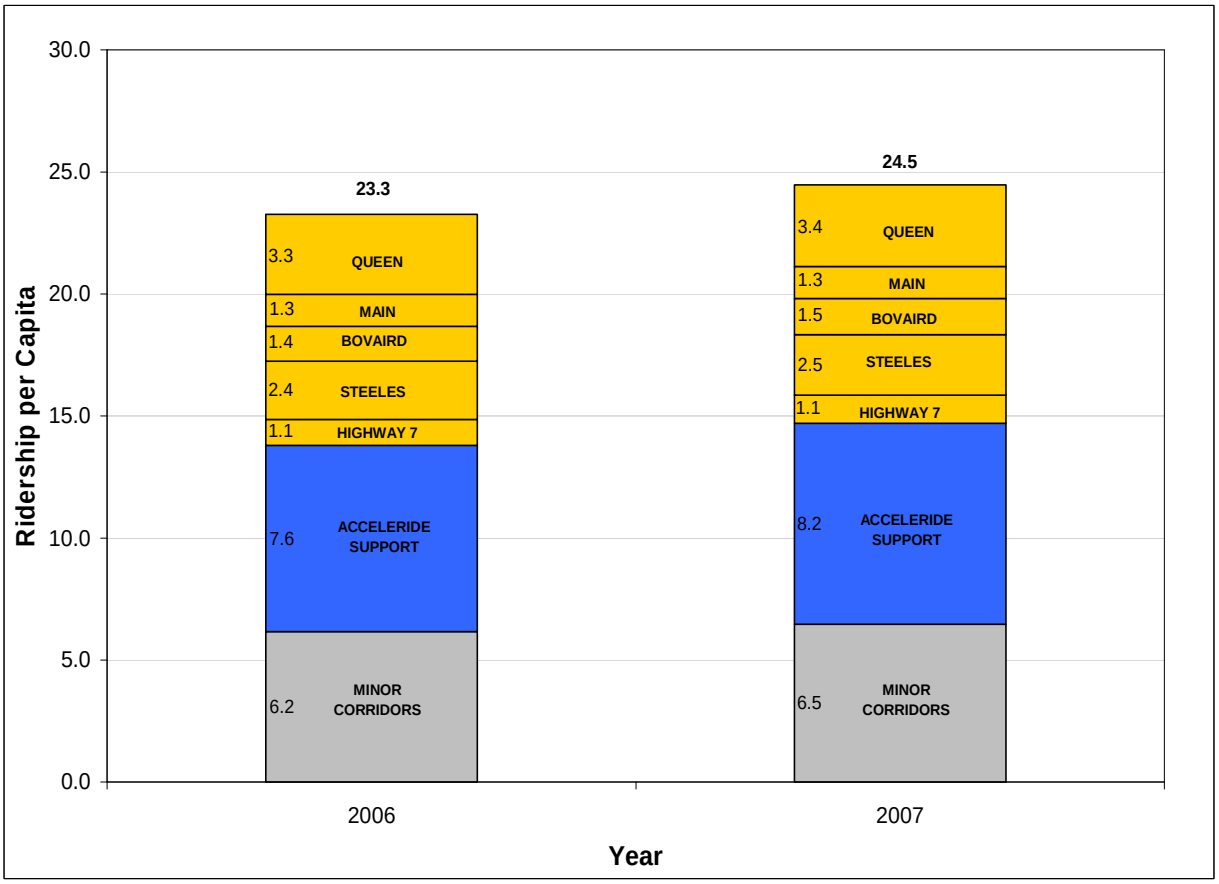


Exhibit 3.9: Annual Ridership per Capita by Major Corridor and System (2006-2007)

In 2006 and 2007, the distribution of transit riders per capita were divided equally among the three types of transit corridors, even though, the number of corridors themselves are disproportionate in number.

3.2.4 Brampton Transit Revenue Service Hours and Kilometres

Since 1996, Brampton Transit has grown its service as seen in the increases in revenue hours and revenue kilometres, shown below in **Exhibit 3.10.**

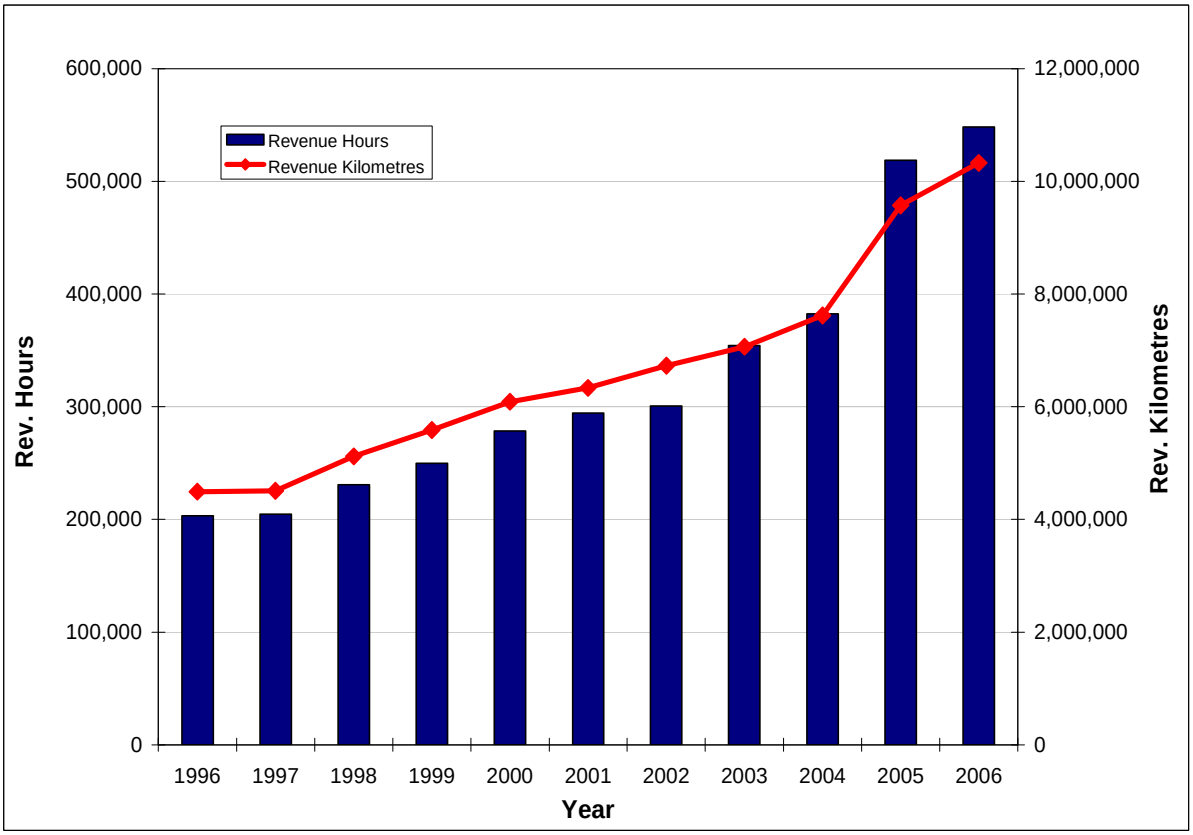


Exhibit 3.10: Revenue Service Hours and Revenue Kilometres (1996-2006)

This increase in the transit service provided from 1996 and 2004 mirrors the growth in ridership and population. In 2005 and 2006, the graph shows aggressive increases in revenue service and revenue kilometres. This reflects, as one would expect, Brampton Transit's ramping up service to grow ridership in preparation for AcceleRide's scheduled commencement of operations in 2009.

3.2.5 Brampton Transit Revenue Hours per Capita

Revenue service hours per capita have grown between 1996 and 2006 at an average annual rate of six percent. This average annual six percent growth rate is greater than the average annual population growth rate of five percent which means Brampton Transit's service is growing faster than the population. This can be explained by Brampton Transit increasing service to the residential developments along the western and northern City boundaries which increases the amount of time (revenue hours) to these areas. Revenue service hours per capita from 1996 to 2006 are shown below in **Exhibit 3.11**.

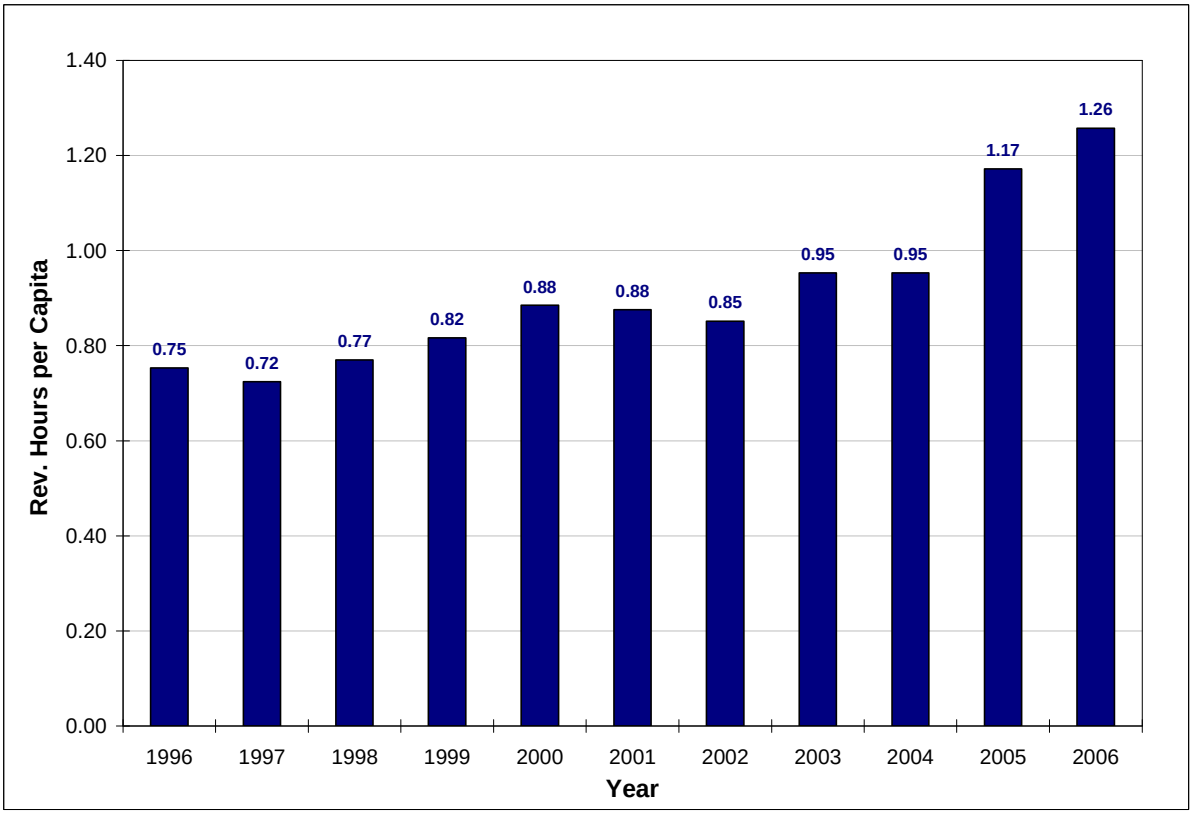


Exhibit 3.11: Revenue Service Hours per Capita (1996-2006)

3.2.6 Brampton Transit Passengers per Hour

While ridership has grown steadily at an average of seven percent annually since 1996, revenue service hours has grown at an average rate of 11%. This difference in growth rates is illustrated in **Exhibit 3.12** below which shows declining passengers per hour. In 2005 and 2006, in anticipation of AcceleRide, Brampton Transit commenced increasing service as a first step towards bus rapid transit (BRT). This increase in service has outpaced ridership. However, this is typical in pre-BRT ramp ups as it is meant to allow riders to become more accustomed to the increases in service.

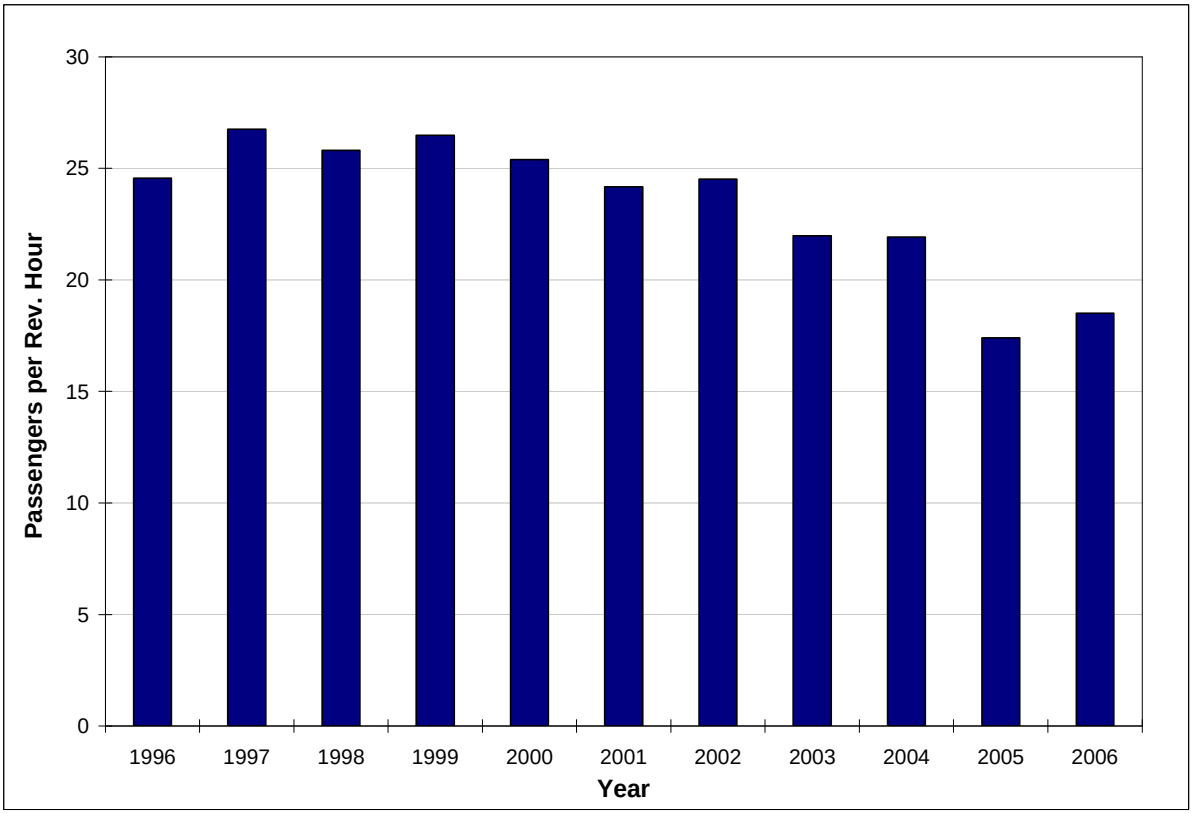


Exhibit 3.12: Passengers per Revenue Hour (1996-2006)

3.2.7 Brampton Transit Revenue / Cost Ratio

Between 1996 and 2006, Brampton Transit's revenue / cost (R/C) ratio has been slowly declining, as has the group average for similar sized Canadian transit systems. In 2005 and 2006, Brampton Transit's R/C ratio dipped below the group average, as is expected with the increase in revenue service outpacing the increase in ridership growth. This is illustrated below in **Exhibit 3.13.**

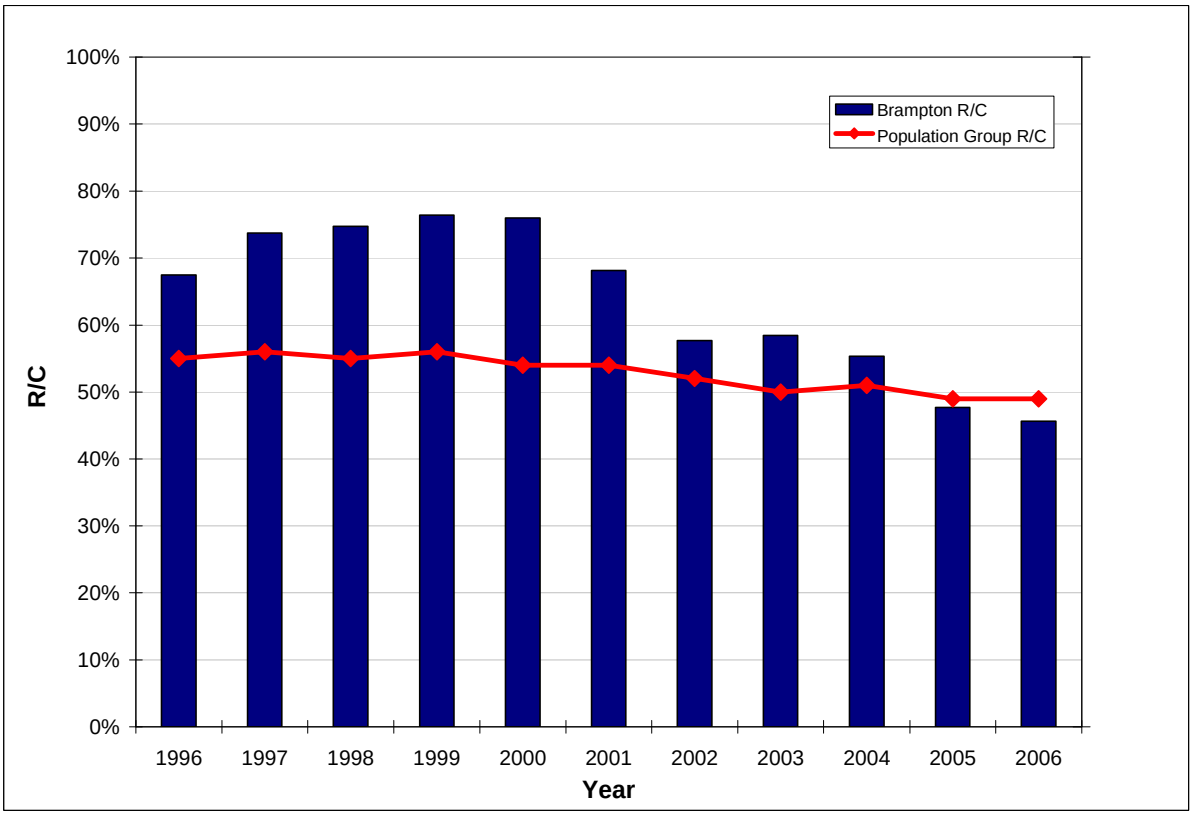


Exhibit 3.13: Revenue Cost Ratio (1996-2006)

The revenue / cost ratio graph is based on the figures presented in **Table 3-7** below. As seen in the table, in 2001 and 2002 Brampton Transit's operating costs grew significantly relative to revenue, as well as in 2005 and 2006.

This increase in operating costs is a direct result of a policy decision by the City and Brampton Transit to increase investment in public transit to recently developed areas and in preparation of higher-order transit. This policy decision is a typical ridership growth strategy. Transit systems across North America invest in service with consideration for the projected long-term ridership return. The time between initial investment and the return on investment is reflected in a declining R/C ratio.

Table 3-7: Revenue and Operating Cost (1996-2006)

Year	Revenue		Operating Cost	
	Total	Growth	Total	Growth
1996	$8,726,000		$12,934,000	
1997	$9,699,000	11%	$13,151,000	2%
1998	$10,703,000	10%	$14,316,000	9%
1999	$11,654,000	9%	$15,260,000	7%
2000	$12,849,000	10%	$16,910,000	11%
2001	$13,790,000	7%	$20,244,000	20%
2002	$14,378,000	4%	$24,922,000	23%
2003	$15,383,000	7%	$26,322,000	6%
2004	$16,890,000	10%	$30,526,000	16%
2005	$18,344,000	9%	$38,472,000	26%
2006	$21,034,000	15%	$46,084,000	20%

Source: Canadian Transit Fact books (1996, 1997, 1998 … 2006)

3.3 Goods Movement

The road network in Brampton is significantly restricted for freight vehicles, as illustrated in **Exhibit 3.14** below. Trucks are required to use specific segments of arterial roads that link industrial areas and intermodal goods terminals to the freeway network in order to protect residential communities from the impact of heavy vehicle traffic.

Major industrial areas in Brampton are located in the southwest corner near the interchange of Highways 401 and 407, in the Highway 410 and Steeles Avenue area, and along Airport Road and the adjoining intermodal terminal. Other than on the freeways, cordon count data indicates that the heaviest truck volumes are on the arterial roads south of Steeles Avenue, in the vicinity of Highway 410 and along Airport Road.

On Queen Street / Highway 7, Steeles Avenue, and Mayfield Road, 200 – 600 trucks were counted in each direction during the peak periods, forming a significant proportion of the overall traffic volume (around 15% on Steeles Avenue, over 20% on Highway 7 and 25-30% on Mayfield Road). The Airport Road volumes were in a similar range, reaching a maximum of 645 trucks northbound in the PM peak. These routes can be identified as trucking corridors, in addition to the freeway network, with most of the remaining road network allowing limited or no heavy vehicle movement. The arterial road links with the highest daily truck volumes and / or percentage of total vehicles are shown in **Table 3-8**.

Table 3-8: 2006 Brampton Heavy Vehicle Cordon Counts

2006 Brampton Truck Counts	Total Volume			Truck Percentage		
East-West Routes	**AM Peak**	**PM Peak**	**15 hour**	**AM Peak**	**PM Peak**	**15 hour**
Highway 7 East of Highway 10	761	925	6,606	21.1%	21.4%	24.3%
Steeles Avenue East of Airport Road	932	652	6,070	15.8%	8.2%	15.5%
Queen Street East of Highway 410	929	513	5,598	14.6%	6.4%	11.5%
Highway 7 West of Highway 50	566	717	4,938	11.1%	11.3%	14.2%
Steeles Avenue East of Highway 410	630	638	4,937	7.4%	7.9%	9.5%
Williams Parkway East of Airport Road	654	388	3,452	17.7%	12.0%	17.7%
Bovaird Drive East of Highway 410	497	312	2,978	9.2%	5.8%	9.1%
Williams Parkway East of Highway 410	344	438	2,921	8.4%	8.7%	9.8%
Mayfield Road West of Highway 50	448	426	2,632	30.1%	24.8%	30.5%
Castlemore Road West of Highway 50	517	330	2,299	21.6%	13.4%	17.4%
Mayfield Road East of Airport Road	212	519	2,216	11.6%	22.6%	19.6%
Queen Street East of Highway 10	263	334	2,059	7.6%	11.7%	10.3%
	Total Volume			**Truck Percentage**		
North-South Routes	**AM Peak**	**PM Peak**	**15 hour**	**AM Peak**	**PM Peak**	**15 hour**
Dixie Road South of Mayfield Road	929	439	5,499	18.6%	6.8%	17.5%
Airport Road South of Bovaird Drive	554	1,008	4,833	10.7%	15.7%	14.9%
Mississauga Road South of Steeles Avenue	746	511	3,733	14.9%	9.6%	15.6%
Winston Churchill Blvd. North of Highway 401	267	970	3,689	7.9%	19.2%	16.3%
Highway 10 South of Mayfield Road	427	278	2,537	13.5%	9.3%	14.4%
Bramalea Road South of Steeles Avenue	303	367	2,535	7.8%	10.6%	14.3%
Mississauga Road South of Bovaird Drive	449	402	2,351	17.5%	19.3%	19.9%
Dixie Rd South of Bovaird Drive	403	464	2,308	10.9%	13.4%	12.5%

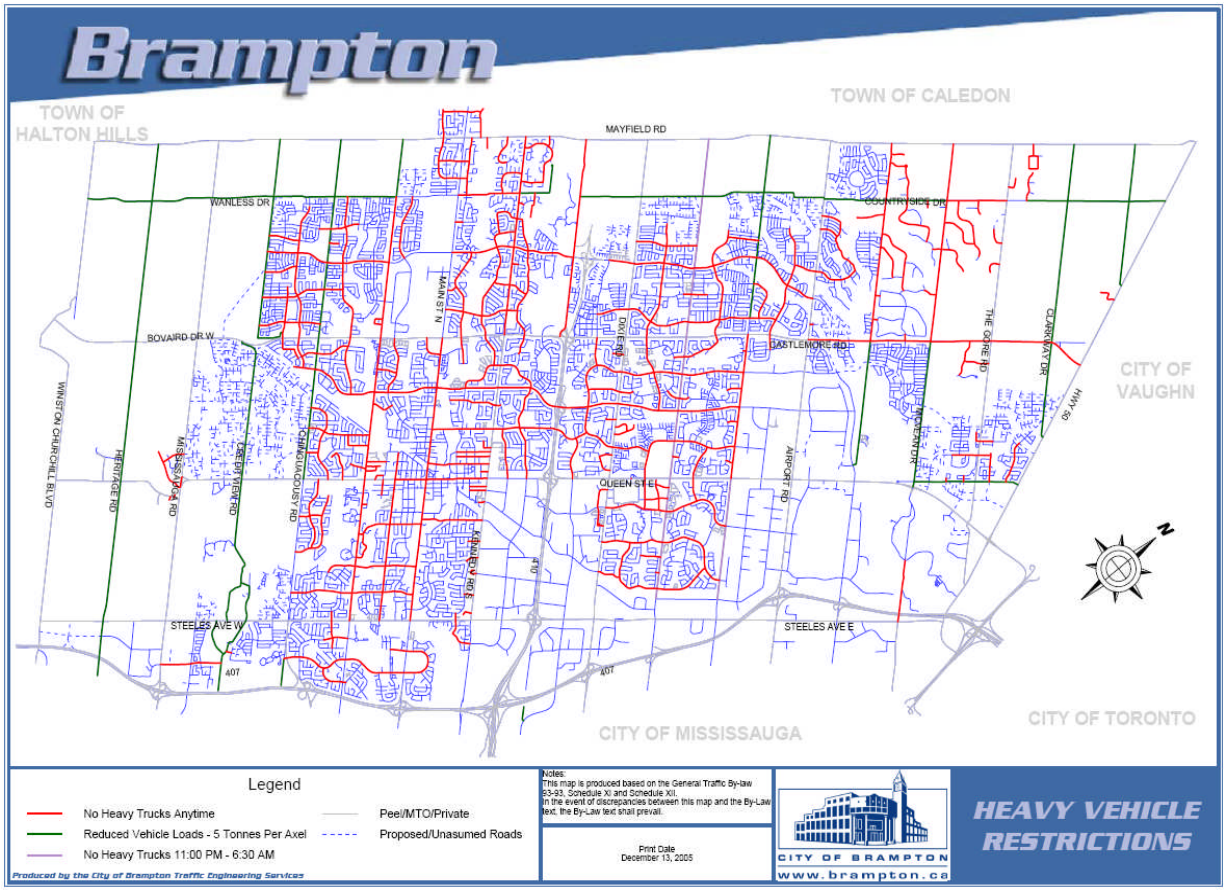


Exhibit 3.14: Heavy Vehicle Restrictions in Brampton

3.4 Railways and Railway Crossings

Rail companies operating in Brampton include GO Transit (commuter passenger connections to Georgetown and Toronto from Bramalea, Brampton and Mount Pleasant stations), VIA Rail (passenger connections at Brampton Station for the Toronto-Sarnia route twice-daily and the Toronto-London route daily), CN Rail (freight) and the CP Orangeville-Brampton Railway (freight and tourism).

The predominant rail line crossing Brampton is the CN Halton subdivision, which runs from the southeast corner, through downtown and crosses into Halton at Winston Churchill Boulevard south of Wanless. CN Rail operates the Brampton Intermodal Terminal, their major terminal serving the GTA, located northeast of Airport Road and Highway 407. The Orangeville-Brampton railway operates weekly between Orangeville and Brampton under an agreement between the Town of Orangeville, CP Rail and local manufacturers. This line crosses Brampton from south to north, west of the centre.

Crossings are evaluated for safety and improved annually two or three at a time by the City in conjunction with the rail operators. There is a mixture of at-grade (in the more rural west end) and grade-separated crossings.

3.5 Pedestrian and Bicycle Networks

In accordance with the 2006 Revised Pathways Master Plan, there are five types of trails in Brampton:

1. Multi use paths – 510 km
2. Boulevard paths – 211 km
3. Paths with Valley Land – 168 km
4. Bike lanes – 71 km, and
5. Signed Route paths – 60 km

The locations of existing and planned trails are shown below in **Exhibit 3.15**. The green lines represent the existing trails, most of which are concentrated in residential neighbourhoods and away from major roads. These serve a useful recreational purpose but do not facilitate commuting; however, some routes such as the Class I boulevard along Bovaird Drive do help in this regard. Expanding the network to an effective grid system as planned should encourage greater use.

To date, the City has approximately 83 kilometres of trails, 17 kilometres of Class I boulevard trails, and 65 kilometres of Class I valleyland trails. The Works and Transportation department installed Brampton's first Class II bike lane on Birchbank Drive in southern Bramalea in 2005.

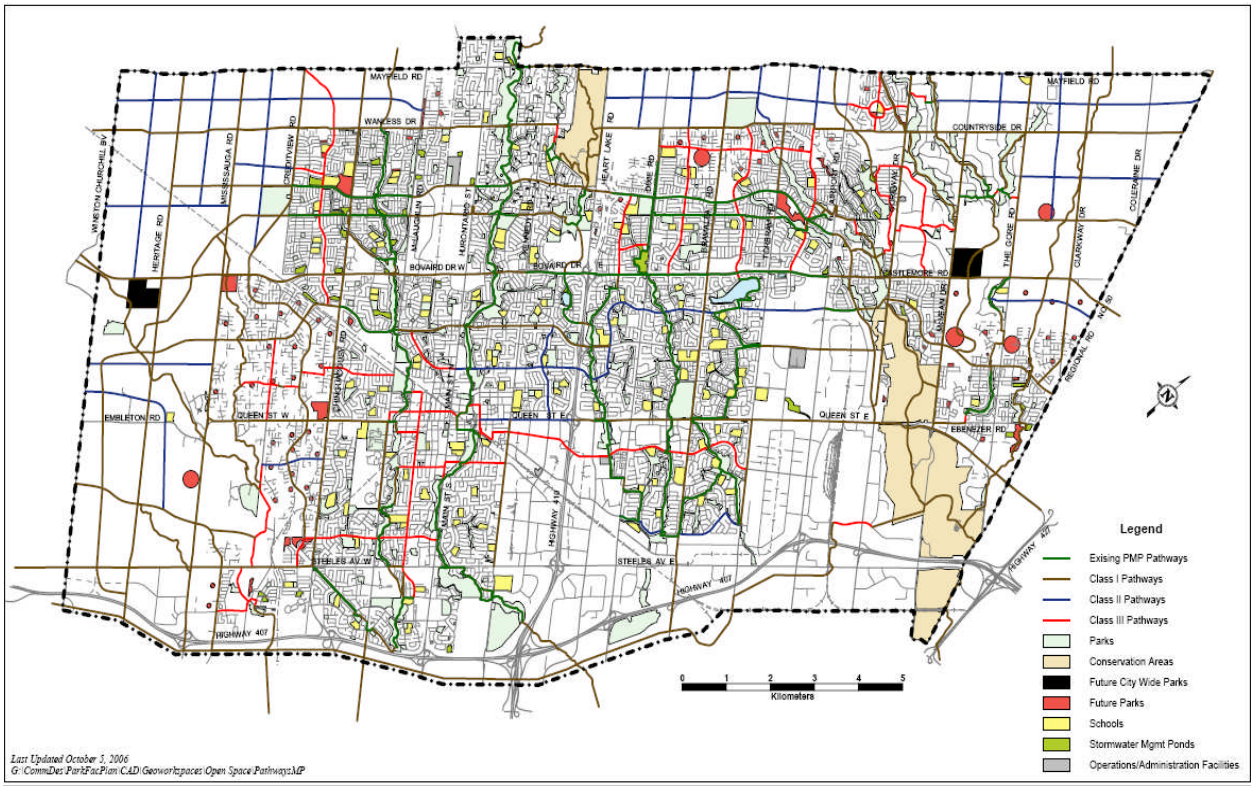


Exhibit 3.15: Pathway Network in Brampton

3.6 Travel Demand Management

TDM programs are carried out in conjunction with the Town of Caledon under the Smart Commute banner, as shown in **Exhibit 2.1** below.

Smart Commute
BRAMPTON-CALEDON

Exhibit 3.16: Smart Commute Banner

This is designed to combine with the GTA-wide Smart Commute Initiative, which aims to reduce congestion, reduce greenhouse gas emissions and improve air quality across the region by encouraging people to find alternatives to commuting by driving alone. The Brampton-Caledon component of the plan was set up in 2004 with participation from public and private stakeholders including government agencies, employers, trade associations, and

property companies. The stated Brampton-Caledon aims are to improve travel options, reduce commute times, and encourage sustainable, balanced and innovative transportation solutions.

Elements of the Smart Commute Initiative include:

- Creating a rideshare database and ride-matching programs
- Establishing an emergency ride home program
- Developing a "menu" of affordable alternative transportation options
- Encouraging employer participation in establishing alternative work arrangements or teleworking

4. TRAVEL CHARACTERISTICS

This section identifies the leading destinations for trips originating in Brampton, the leading origins for trips destined to Brampton, and how the trips break down by mode, vehicle occupancy and average length. Historical trends are evaluated based on the results of the Transportation Tomorrow Survey (TTS) for 1996 and 2001, with preliminary TTS results used for 2006.

4.1 Trip Origins and Destinations

City of Brampton travel patterns are important in gaining a broad understanding of where people are going to and coming from. Based on the 2006 Transportation Tomorrow Survey, travel patterns are established for the afternoon peak period – the time of day when the City of Brampton sees the highest demand for travel. **Exhibit 4.1** and **Exhibit 4.2** below illustrate typical travel patterns to and from the City of Brampton during the PM peak hour in 2006. The numerical values can be found in **Table 4-1** and **Table 4-2**.

Table 4-1: Travel Distribution to Brampton, PM Peak, 1996-2006

Trips From:	1996	1996 %	2001	2001 %	2006	2006 %
Downtown Toronto	5558	4%	6993	4%	8612	4%
Rest of Toronto	18613	14%	19585	12%	21774	11%
Durham	347	0%	273	0%	450	0%
York	5035	4%	6784	4%	8288	4%
Caledon	2219	2%	2662	2%	3665	2%
Brampton	76366	56%	93823	56%	109912	56%
Mississauga	24628	18%	32871	20%	40048	20%
Halton and Hamilton	2555	2%	4027	2%	5108	3%
Total	**135321**	**100%**	**167018**	**100%**	**197857**	**100%**

The distribution of trips was very consistent between 1996 and 2006. As employment grew in Brampton, a similar proportion of employees commuted from the surrounding regions.

Table 4-2: Travel Distribution from Brampton, PM Peak, 1996-2006

Trips To:	1996	1996 %	2001	2001 %	2006	2006 %
Downtown Toronto	827	1%	1040	1%	1220	1%
Rest of Toronto	9271	8%	11612	8%	11478	7%
Durham	294	0%	655	0%	664	0%
York	2335	2%	4370	3%	5419	3%
Caledon	3398	3%	4420	3%	4710	3%
Brampton	76366	70%	93823	68%	109912	69%
Mississauga	12207	11%	16200	12%	17692	11%
Halton and Hamilton	4741	4%	5458	4%	7497	5%
Total	**109439**	**100%**	**137578**	**100%**	**158592**	**100%**

Like the travel distribution to Brampton, the travel distribution of trips from Brampton was very consistent between 1996 and 2006. As of 2006, 69% of trips during the PM Peak hour were destined to a location in Brampton.

In the PM peak hour, the majority of travel consists of people returning home from work. Approximately 110,000 trips or 56% of travel to Brampton also originates in Brampton. 40,000 trips or 20% of travel comes from Mississauga while about 30,000 trips or 15% of travel comes from the City of Toronto. In total, 91% of travel to Brampton is from Brampton itself, Mississauga, and Toronto.

In contrast, the 110,000 trips that begin and end in Brampton constitute 69% of travel from Brampton (as opposed to 56% of travel to Brampton). This indicates that Brampton employment is highly self-contained, whereas the population is more likely to work outside of the City. The same strong attraction between Brampton and Mississauga-Toronto is seen in travel from Brampton, though to a lesser degree.

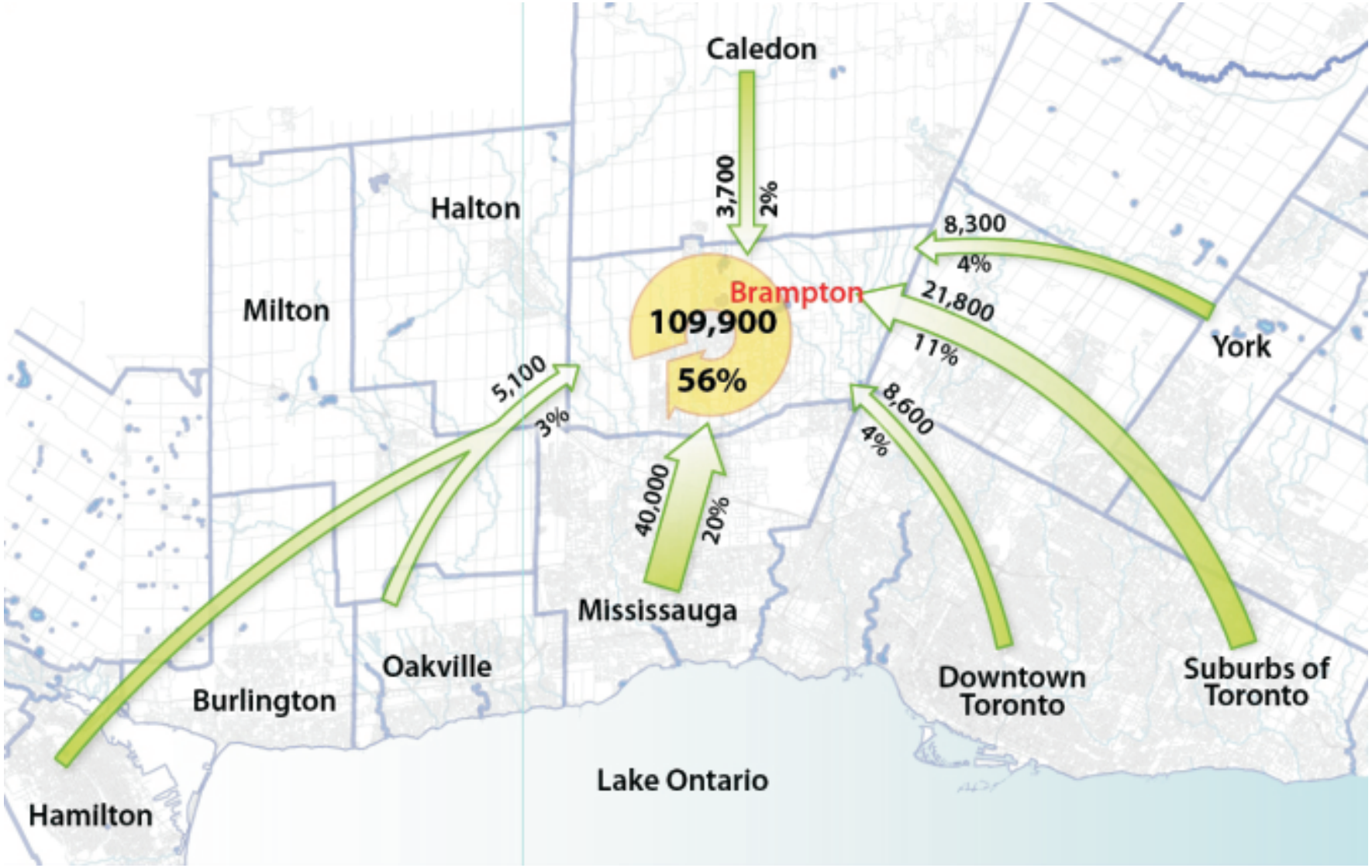


Exhibit 4-1

Travel to Brampton - PM Peak Period

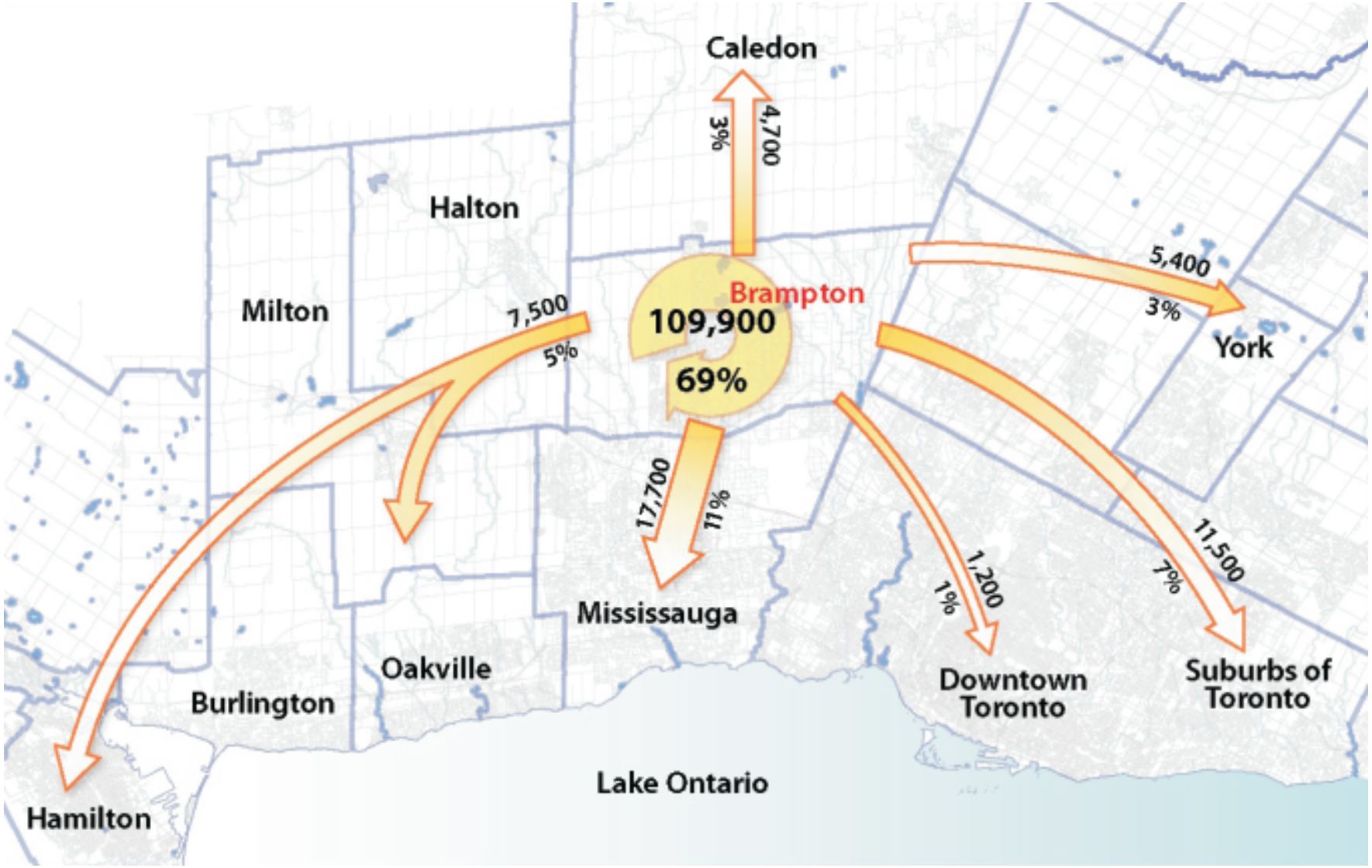


Exhibit 4-2

Travel from Brampton - PM Peak Period

4.2 Travel by Mode

The total number of trips by mode in each of 1996, 2001, and 2006 for PM peak period trips starting in and headed to Brampton is illustrated in **Exhibit 4.3** and **Exhibit 4.4**, respectively. The travel modes considered are auto driver, auto passenger, transit (with and without park-and-ride), non-motorized (walk and cycle), and other. Travel to and from Brampton is largely dominated by the personal automobile. Interestingly, while there is an overall increase in total trips, non-motorized trips do not increase at all over the ten-year span for either trips to or from Brampton. Also of note, the total number of trips made to Brampton seems to level off between 2001 and 2006 compared to trips between 1996 and 2001.

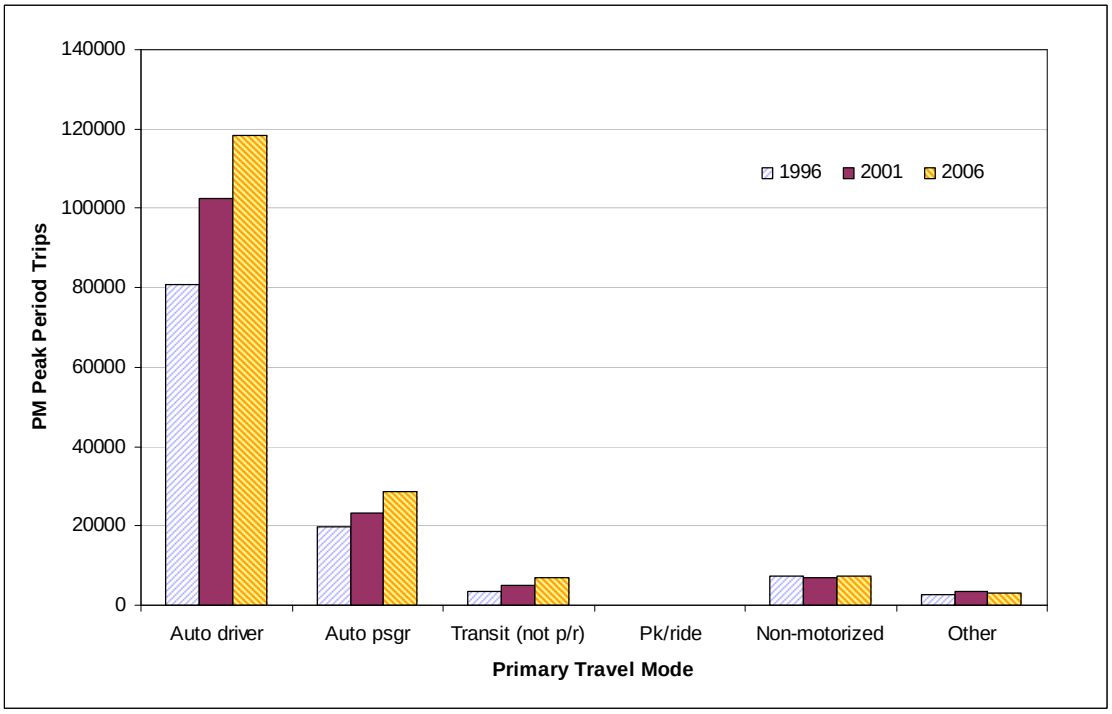


Exhibit 4.3: PM Trips from Brampton by Mode (1996-2006)

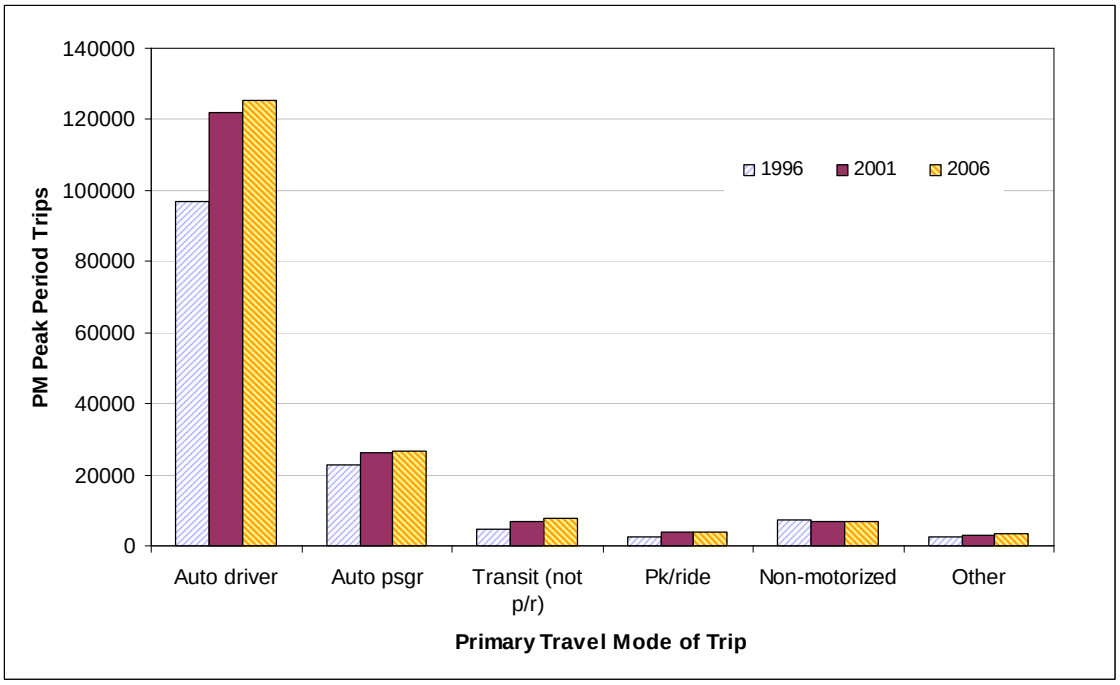


Exhibit 4.4: PM Trips to Brampton by Mode (1996-2006)

A more detailed look at how the non-auto driver trips vary over time is seen in the following two exhibits, where the overwhelming influence of the very popular auto-driver mode is excluded.

Exhibit 4.5 and **Exhibit 4.6** illustrate the lack of upward progress in park-and-ride, non-motorized and other trips, while auto passenger and transit trips show a trend of gradual increase for travel in both directions. In 2006, transit trips exceeded non-motorized trips for the first time. Overall, transit has the highest growth rate, though the considerably greater number of auto trips may make this characteristic difficult to notice. **Table 4-3**, however, shows how transit is outpacing the other modes despite a reduced growth rate in 2001 to 2006.

Table 4-3: PM Five-Year Growth Rates by Mode (1996-2006)

	From Brampton		To Brampton	
Growth rates (PM)	**1996-2001**	**2001-2006**	**1996-2001**	**2001-2006**
Auto driver	26.8%	15.3%	25.8%	15.5%
Auto passenger	18.9%	22.8%	13.6%	31.3%
Transit (not park & ride)	48.1%	36.0%	50.8%	45.9%
Park and ride	N / A	N / A	50.4%	38.2%
Non-motorized	-4.1%	6.4%	-6.6%	8.2%
Other	32.5%	-11.1%	19.4%	14.2%

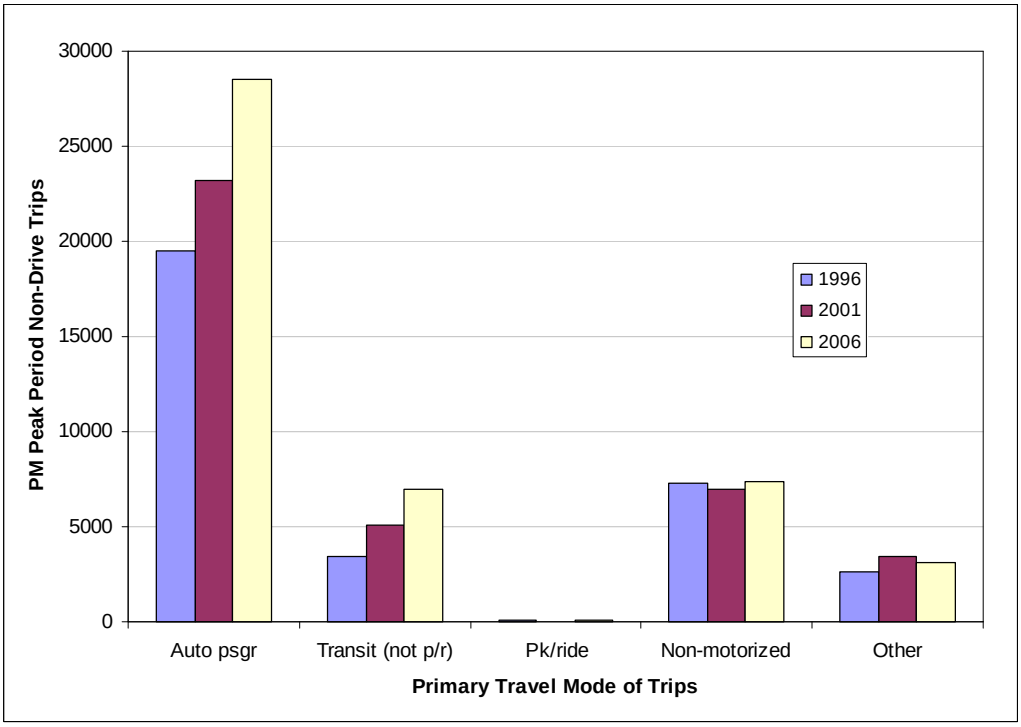


Exhibit 4.5: PM Non-Drive Trips from Brampton by Mode (1996-2006)

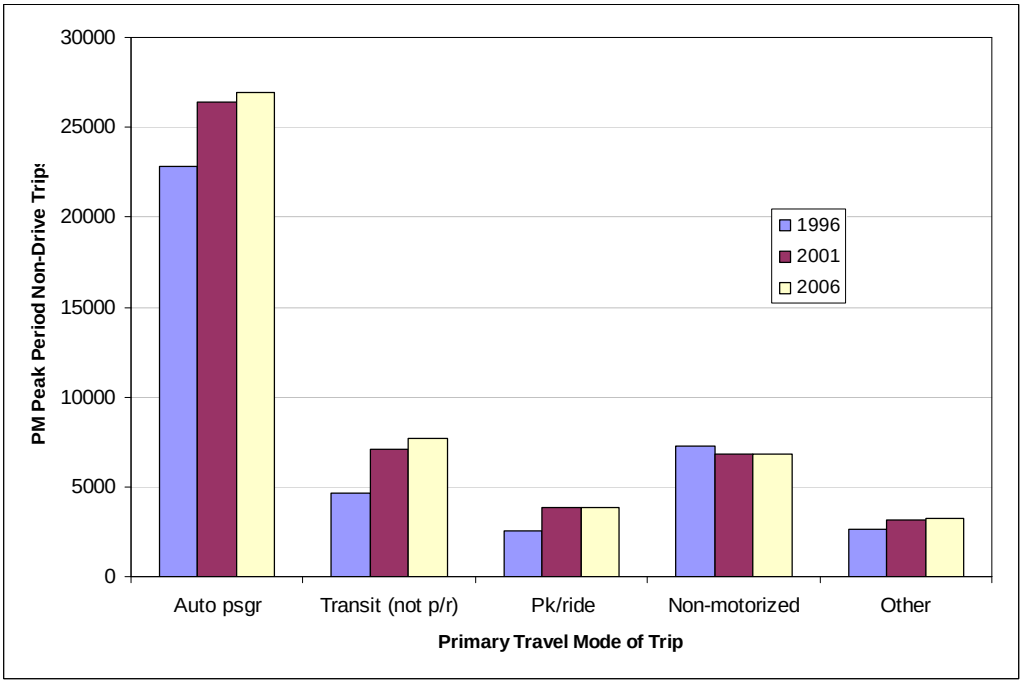
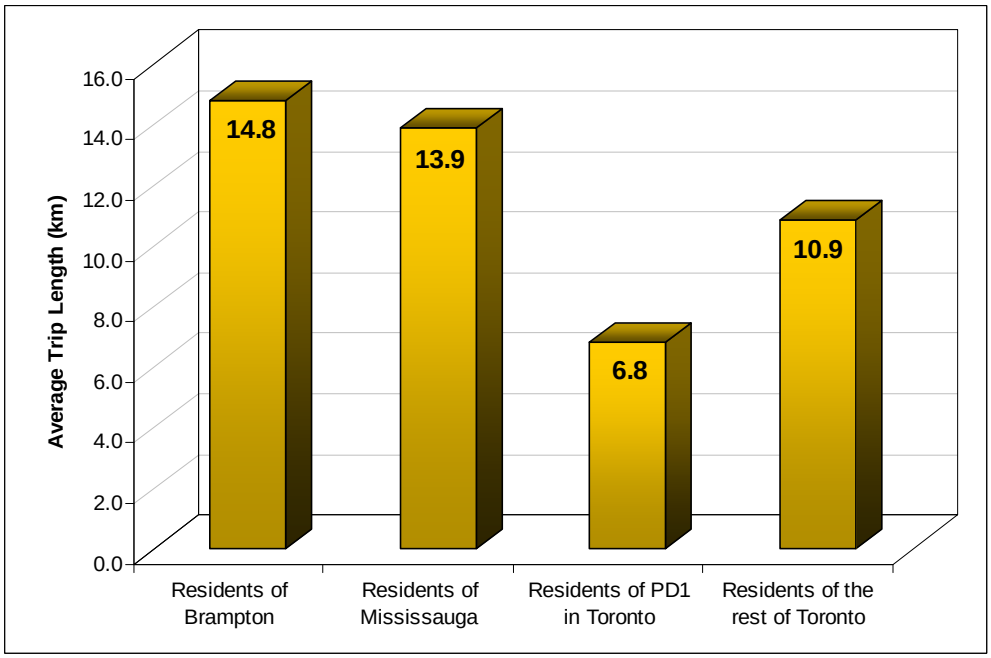


Exhibit 4.6: PM Non-Drive Trips to Brampton by Mode (1996-2006)

4.3 Average Trip Length

The average trip length for all-day trips between home and work for Brampton residents, compared with residents of other selected cities in the GTA, is shown below in **Exhibit 4.7**.



Source: 2006 TTS

Exhibit 4.7: Average Daily Trip Length for Work Trips by Residents of Selected Cities

On average, Brampton residents are travelling slightly farther to work than Mississauga residents and significantly farther than Toronto and downtown Toronto (Planning District 1) residents. This can be attributed to lower density in Brampton and the significant percentage of Brampton residents, as shown in the analysis in **Section 4.1**, who make PM trips that originate in other municipalities, especially Mississauga and Toronto.

4.4 Trip Generation

City of Brampton trip generation rates are summarized below in **Table 4-4**.

Table 4-4: Trip Generation by Time Period (1996-2006)

Year	Population	Trips made to Brampton	Ratio	Trips made by Residents of Brampton	Ratio	Trips made from Brampton	Ratio
Daily Travel							
1996	255656	482045	1.89	528906	2.07	482148	1.89
2001	312992	604234	1.93	661750	2.11	604602	1.93
2006	416369	748678	1.80	837530	2.01	748956	1.80

AM Peak Period (600-859)							
1996	255656	103086	0.40	132074	0.52	129727	0.51
2001	312992	134736	0.43	170883	0.55	166968	0.53
2006	416369	168216	0.40	218598	0.53	212889	0.51
PM Peak Period (1530-1829)							
1996	255656	136824	0.54	141778	0.55	113844	0.45
2001	312992	169109	0.54	173734	0.56	141379	0.45
2006	416369	200596	0.48	209776	0.50	164331	0.39

Source: 1996, 2001, 2006 TTS

Rates have decreased slightly from 1996 to 2006, after in most cases increasing from 1996 to 2001. This is despite a large increase in the absolute numbers of trips, because the rate of increase in population from 2001 to 2006 (33%) is so high. Overall, the change in trip rates is not of large significance compared with the overall population and numbers of trips changes.

4.5 Auto Occupancy

Average auto occupancies in 1996, 2001, and 2006 for trips to and from Brampton, made by Brampton residents, and across Brampton cordons or screenlines, are summarized below in **Table 4-5** and **Exhibit 4.8**.

The difference in the cordon values is likely due to the different collection method used (counts as opposed to the more reliable interview surveys) and the fact that these trips do not have to have any specific connection to Brampton but could just be passing through. They are included in order to show the full range of data available; however, the other values are all reasonably close, from 1.22 to 1.27. A slight increase in auto occupancy can be seen over time, which fits in with the increase in auto passenger mode share observed in the **Travel by Mode** section. In general, the PM occupancies are lower than those for other times of day, which likely reflects a lower preponderance of school and other facilitate-passenger type trips in the PM peak.

Table 4-5: Average Auto Occupancy (1996-2006)

	1996			2001			2006		
	Day	**AM**	**PM**	**Day**	**AM**	**PM**	**Day**	**AM**	**PM**
From Brampton	1.25	1.22	1.24	1.25	1.23	1.23	1.27	1.26	1.24
To Brampton	1.25	1.23	1.24	1.25	1.24	1.22	1.27	1.26	1.24
Brampton Residents	1.25	1.22	1.24	1.25	1.23	1.21	1.26	1.25	1.24
Brampton Cordons				1.18	1.13	1.17	1.17	1.13	1.17

Source: 1996, 2001, 2006 TTS

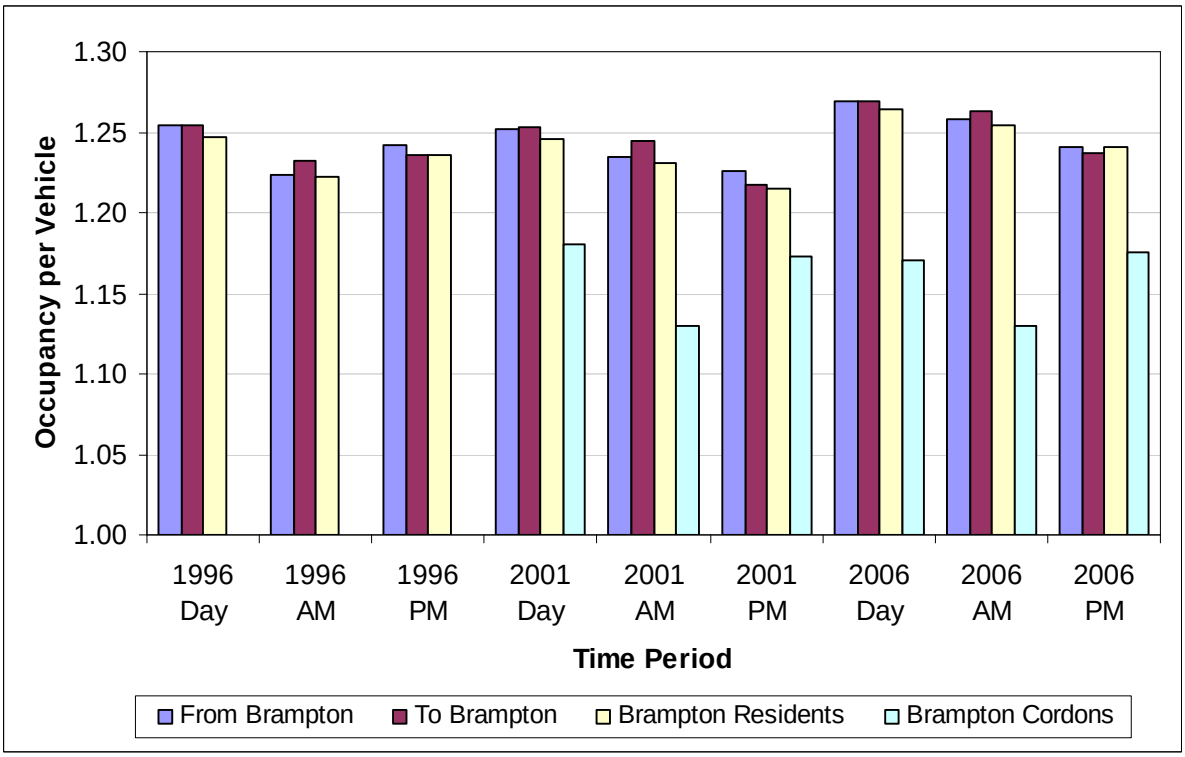


Exhibit 4.8: Brampton Average Auto Occupancies by Time of Day (1996-2006)

4.6 Population and Household Characteristics

Auto ownership, considered a household rather than individual characteristic, has remained approximately constant in the 1.7 vehicles / household range for Brampton from 1996 to 2006, as seen in **Exhibit 4.9** below. This trend is reflected in other parts of Peel Region and the GTA, with no area showing a significant increase or decrease during this time. Brampton's figure is higher than the overall GTA figure of 1.4, but this is largely due to the low ownership in downtown Toronto with its high density and multiple transit options. Within Peel, Mississauga has a similar ownership level and Caledon's is somewhat higher.

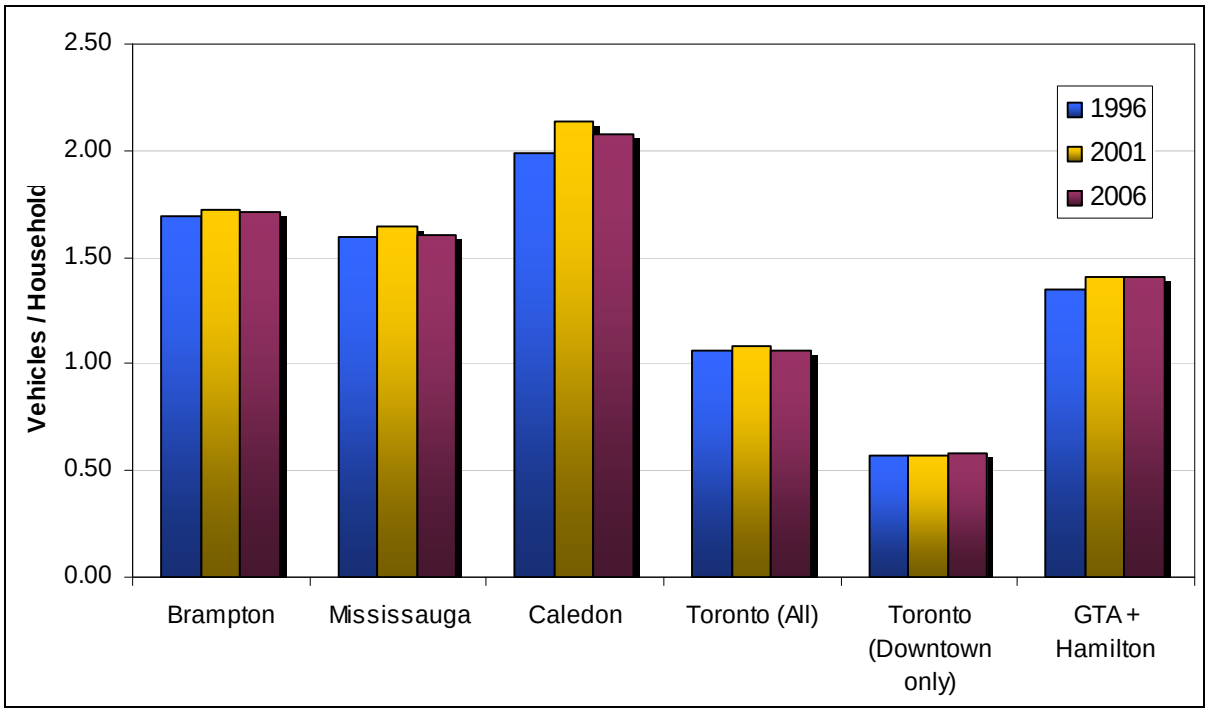


Exhibit 4.9: Auto Ownership Trends 1996-2006

In line with constant auto ownership levels, the number of trips per household has not changed significantly between 1996 and 2006, although there is a 20% increase in the percentage of households with high numbers (11 – 15 daily) of trips, though these remain a small percentage of overall households. Most (almost 80%) of households continue to generate one to ten daily trips.

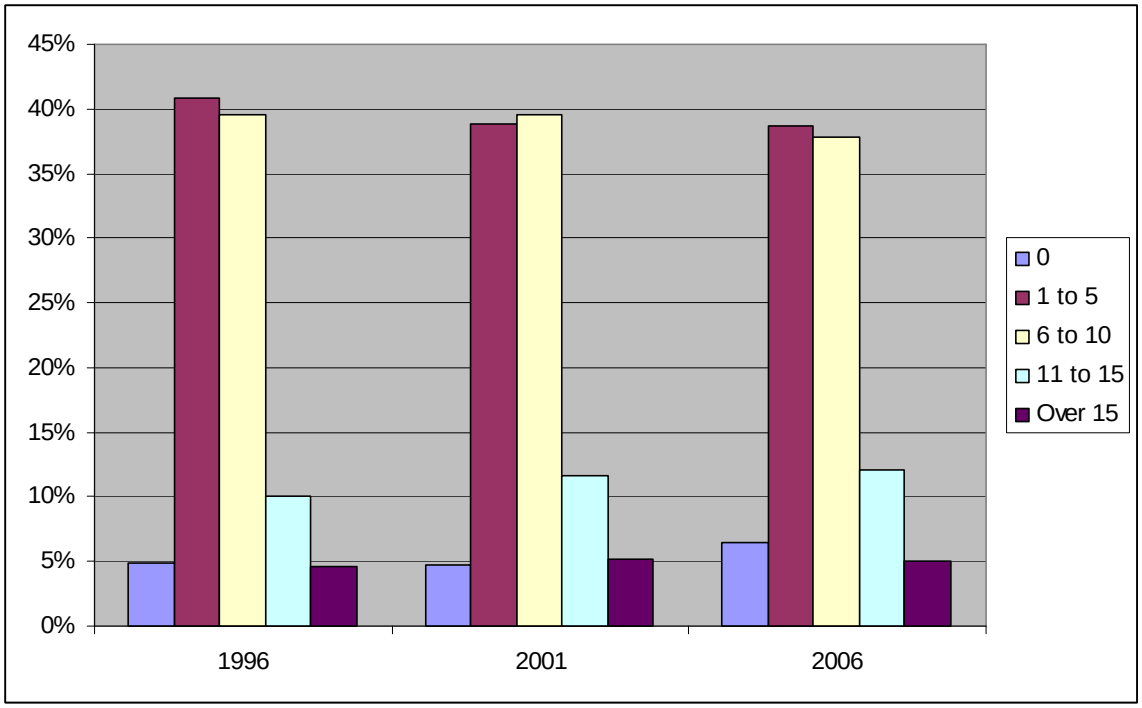


Exhibit 4.10: Daily Trips per Brampton Household 1996-2006

The percentage of the population of Brampton employed decreased marginally from 2001 to 2006 to 51%, placing it equal with Mississauga and slightly higher than the GTA as a whole, as seen in
Exhibit 4.11 and **Exhibit 4.12**. The distribution of occupations also approximately reflects that of the GTA, except for a somewhat higher percentage of manufacturing and construction jobs. However, from 2001 to 2006 these decreased markedly, along with professional and management and were replaced by sales and service jobs. **Exhibit 4.13** shows how the sales and service category increases from representing 19% of Brampton workers to 36% during this time, and the corresponding decreases elsewhere.

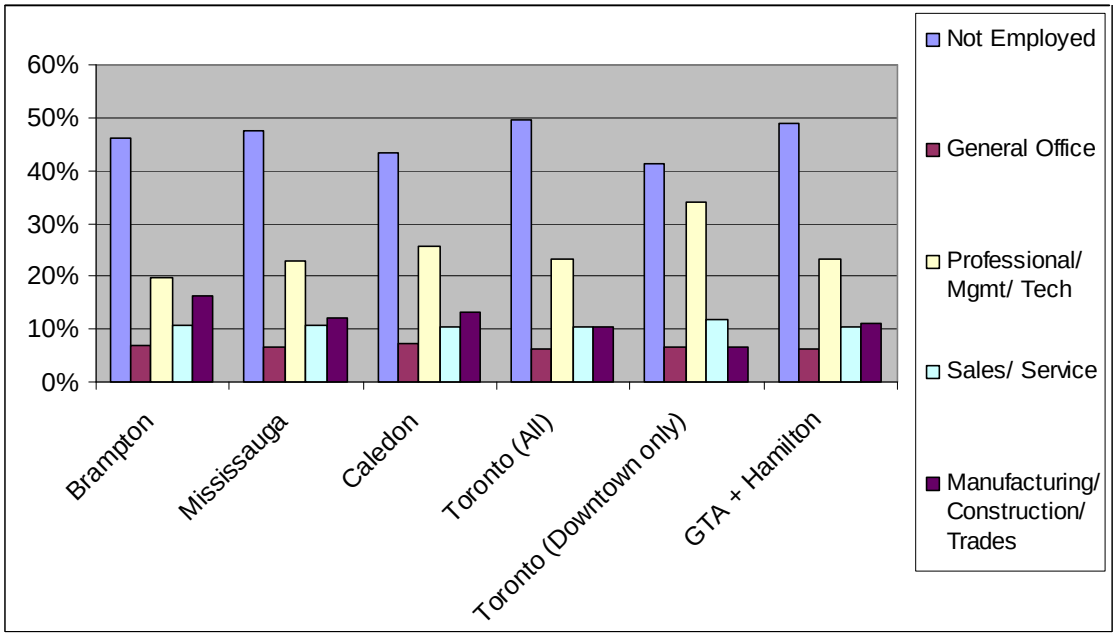


Exhibit 4.11: 2001 Employment Status by Occupation Type and Place of Residence

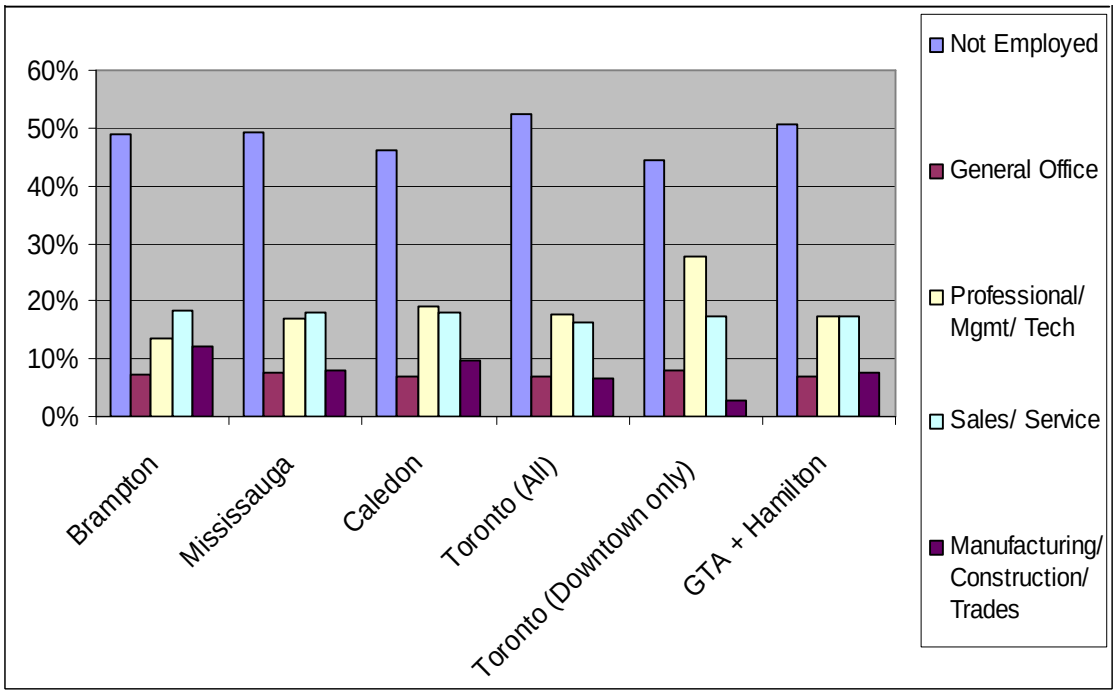


Exhibit 4.12: 2006 Employment Status by Occupation Type and Place of Residence

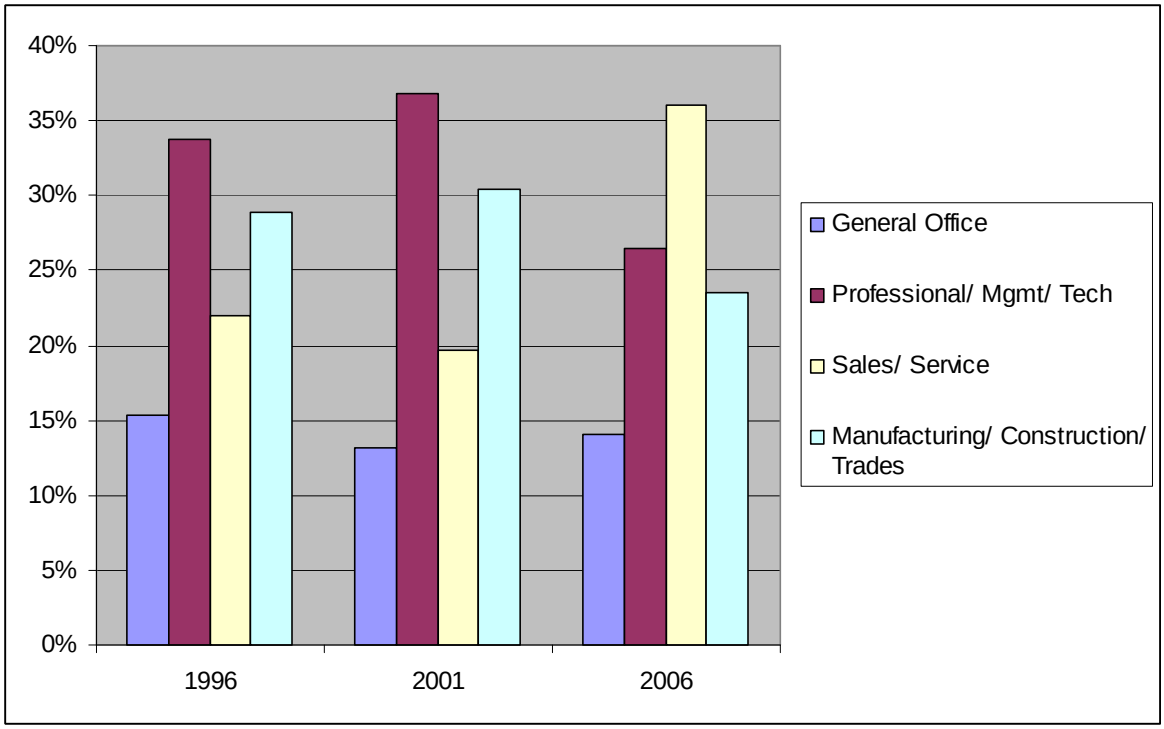


Exhibit 4.13: Employment Categories 1996-2006

This increased transit level of service implies a need to revisit the mode share analysis for local transit throughout Brampton.

4.7 Modal Split

Looking at Brampton residents' daily travel, total transit share increases steadily from 5.6% in 1996 to eight percent in 2006. Likewise, auto passenger trips increase from 17.2% to 17.9%, while auto driver trips decrease from 69.9% to 67.7% over the same time frame. All are positive indications that as the City of Brampton develops and matures, it is moving towards sustainability. Non-motorized travel, however, decreased from 5.9% in 1996 to 5.1% in 2006. Further work on policies and programs to increase the viability of non-motorized travel must be done. **Exhibit 4.14** and **Exhibit 4.15** demonstrate the modal share for PM trips from and to Brampton, respectively.

From 1996 to 2006, there was a 63% increase in Brampton's population, leading to an increase in the number of residents / hectare and, following the patterns described above, an increase in transit mode share resulted. The corresponding increase in employment, according to the TTS, was 49%, and the number of jobs in Brampton as a whole is only approximately a third of the number of residents. As employment is consequently less dense than population, this may explain why the transit mode share is lower for trips from Brampton (employment-driven) than for trips to Brampton (population-driven). As both population and employment density increase, transit mode share should increase accordingly, provided that the transit infrastructure is in place to handle increased demand.

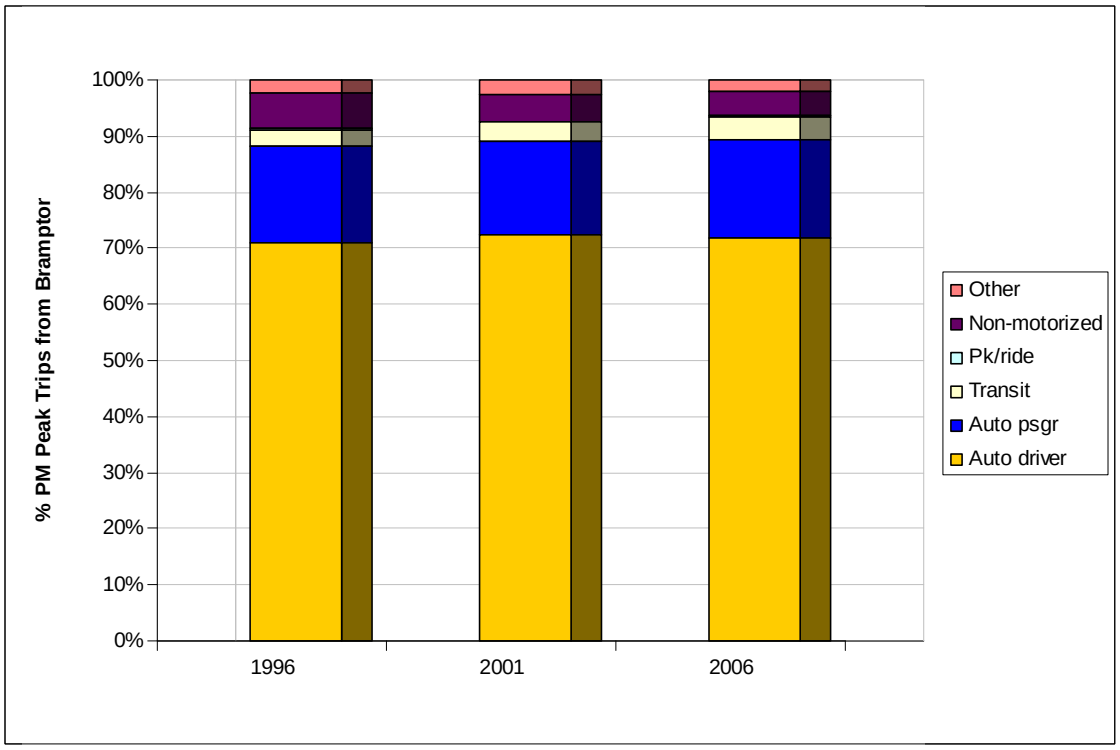


Exhibit 4.14: Mode Share for PM Peak Trips from Brampton

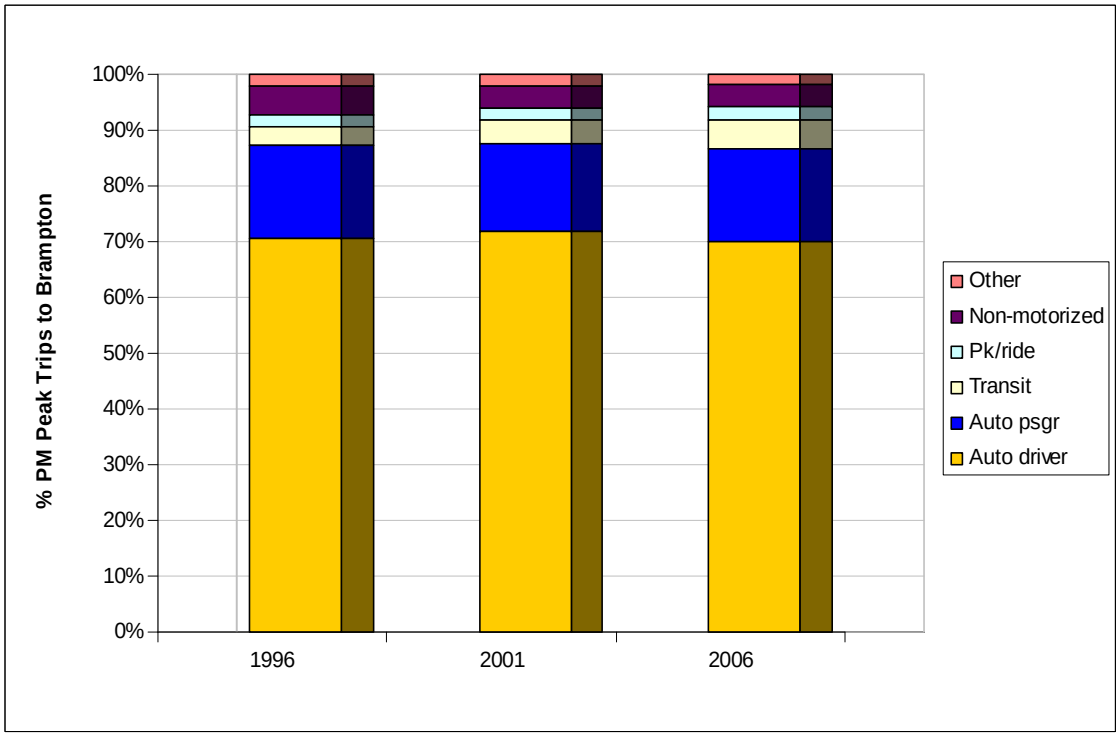


Exhibit 4.15: Mode Share for PM Peak Trips to Brampton

5. TRANSPORTATION DEFICIENCIES

The ability for the City of Brampton's road network to service travel demand is measured by the use of volume to capacity ratios across screenlines. A screenline is an imaginary line crossing a number of roads, and they are placed at strategic locations, usually across municipal boundaries or major physical boundaries such as a freeway or river. The analysis screenlines to be used for this TTMP are illustrated below in **Exhibit 5.1**.

Volume to capacity ratios on road and freeway links can be described in terms of level of service. These definitions are summarized below in **Table 5-1**. For a particular road link or section, a v/c ratio of less than 0.80 represents flow conditions in which little delay is experienced. Between 0.81 and 0.90, as the link reaches capacity, congestion and a high amount of delay is experienced. At v/c ratios between 0.91 and 0.99, the link is at capacity and major delays and queuing are occurring consistently during the peak periods. At a v/c ratio of 1.00 or higher, there are stop-and-go conditions and traffic flow breaks down.

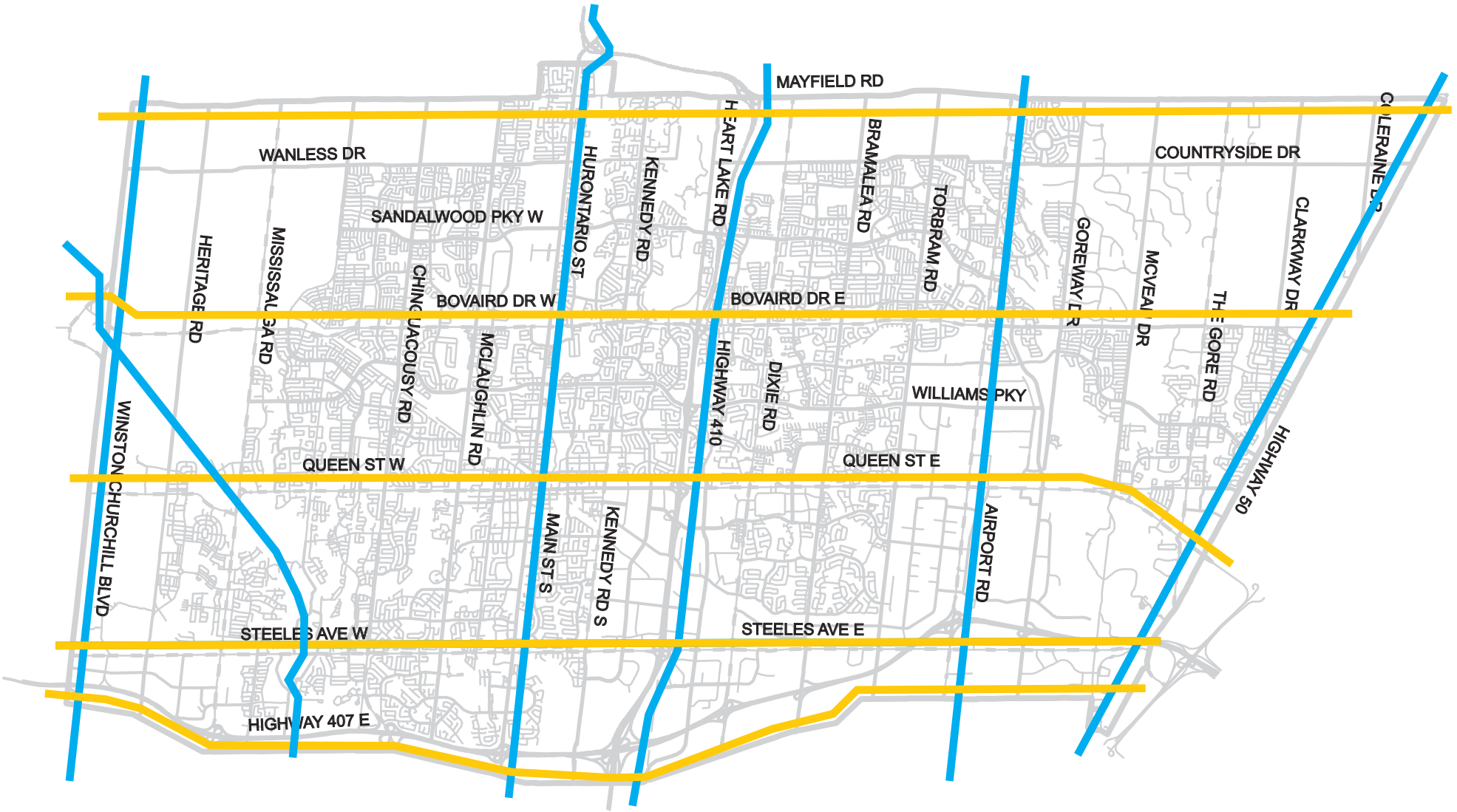
The per-lane capacities coded into the City of Brampton EMME/2 model provided a foundation for the assessment of existing and future road network operations and needs. Professional judgment and knowledge of the study area assisted in determining an accurate value for per-lane capacity to be used in link and screenline calculations.

Table 5-1: Link Volume to Capacity Ratio Definitions

v/c Ratio	Level of Service	Operating Condition
Less than 0.80	LOS A-C	Free-flow, very little, to moderate delay
Between 0.81 and 0.90	LOS D	Congested conditions, users experience delays and queuing
Between 0.91 and 0.99	LOS E	Approaching or at capacity, significant delays and queuing
Greater than 1.00	LOS F	Over capacity, severe delays and queuing

Existing (2006) screenline analysis based on these definitions is illustrated graphically in **Exhibit 5.1**, **Exhibit 5.2**, and **Exhibit 5.3** below.

The City of Brampton appears to be servicing its travel demand fairly well in general, with the majority of screenlines at the free-flow condition, and no screenlines above capacity. However a few problem locations do appear in the peak directions of travel, which are northbound and westbound in the PM peak hour. The eastern and western screenlines north of Queen Street and the southern screenlines east of Main / Hurontario Street, east of Highway 410, and east of Airport Road are all approaching capacity.



Not To Scale

Exhibit 5-1
Screenline Analysis Locations

Exhibit 5-2
Existing (2006) Screenline V/C Ratios
PM Peak Hour, North-South Traffic, Peak Direction

Exhibit 5-3
Existing (2006) Screenline V/C Ratios
PM Peak Hour, East-West Traffic, Peak Direction