PEDESTRIAN SAFETY PLAN

Flower City

brampton.ca

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1 1.0 INTRODUCTION

Walking is the oldest, most basic mode of travel and the only choice for many

Walking is the oldest and most basic mode of travel and is a fundamental part of the transportation system. It offers many opportunities to promote good health, social well-being, personal independence and mobility, while minimizing negative environmental impacts.

The decision of whether or not to walk usually takes into account the distance of the trip, perceived safety of the route, and the comfort and convenience of walking versus an alternative mode. For many, it is the only available option and at various times all road users are pedestrians.

The official Plan outlines the vision of a "pedestrian friendly" transportation network

Brampton's Official Plan provides objectives related to planning for pedestrians within the transportation system. It calls for a "pedestrian-friendly" "transit-oriented environment. Neighbourhoods such as the Mount Pleasant Subdivision are now being designed and built as pedestrian friendly and public transportation oriented.

The Works and Transportation Department is responsible for the safe and efficient operation of the road network including traffic control and pedestrian facilities within the public right-of-way. There are a number of reasons to consider an overall improvement of safety for pedestrians, including:

- An expanded **Transit network** including ZÜM will result in additional pedestrians;
- Intensification of **central area** with high density residential, attractions, special events, and business district;
- Increased **traffic volume** is projected requiring the need to widen the existing road network.
- Expanding an already extensive **Pathways** network.
- Brampton has been given a **safe community designation** by the World Health Organization.

Several factors contribute to an increase in pedestrian travel

Safety is a key consideration in the planning, design and operation of pedestrian facilities. Because pedestrians are the most vulnerable of all transportation facility users, particular attention to pedestrian safety is needed. Accessibility and usability are also key considerations for pedestrian facilities, which should accommodate pedestrians of all abilities.[1]

[1] *Guide for the Planning, Design, and Operation of Pedestrian Facilities*. American Association of State Highway and Transportation Officials. Washington, DC, 2004

1.1 Purpose

This document is intended to serve as the overall planning framework to improve safety conditions for pedestrians. The plan is to be used by staff when considering solutions to pedestrian problems on existing roadways or in new development areas. It also serves to raise public awareness about existing conditions, current practices and new initiatives aimed at improving pedestrian safety.

This document can serve as the planning framework for staff

1.2 Scope

Pedestrians are defined in this report as people who travel on foot or who use assistive devices, such as wheelchairs, for mobility. Cyclists are not included in the context of this review as they have different characteristics than pedestrians and are considered a vehicle under the Highway Traffic Act. A separate cycling safety plan will be developed to address the increased usage of bicycles in the City of Brampton.

This plan focuses exclusively on the protection of pedestrians

The review of legislation and guidelines includes anything related to or for the protection of pedestrians. The current situation section provides statistical analyses of collisions for a glance at the safety performance on Brampton roads.

The initiatives aimed at improving pedestrian safety are primarily within the scope of the City of Brampton. To support these initiatives, key partnerships have been identified as a means to synthesize and broaden the message of pedestrian safety.

1.3 Objectives

The objectives related to the development of this plan include the following:

The objectives are aimed at improving pedestrian safety

- Examine existing pedestrian traffic control devices
- Review pedestrian collision history to identify areas for improvement
- Identify initiatives to improve safety for pedestrians within the existing transportation network
- Identify design alternatives to provide a proactive approach to pedestrian safety in new development areas
- Propose an achievable implementation plan

2 APPLICABLE LEGISLATION AND GUIDELINES

When considering pedestrian traffic control, it is important to realize there is governing legislation and guidelines to follow.

The legislation prescribes the rules of the road, the roles of driver and pedestrians and in many cases stipulates the requirements of traffic control devices. Adherence to guidelines when designing and implementing traffic control measures will ensure a consistent and recognizable message for all road users.

Pedestrian traffic control is governed by legislation and guidelines

2.1 Highway Traffic Act

The Highway Traffic Act (HTA) is an Ontario law which regulates the licensing of vehicles, classification of traffic offences, administration of loads, classification of vehicles and other transport related issues. First introduced in 1990s, there have been amendments due to changes to driving conditions and new transportation trends.

The Highway Traffic Act is the law

2.2 *Transportation Statute Law Amendment Act*

Provisions under the *Transportation Statute Law Amendment Act*, which came into force on March 31, 2006; increased the fines and sanctions at pedestrian crossings:

- Increased minimum fines and synchronized demerit points for motorists who don't stop or yield to pedestrians at pedestrian crossings. (Fines increased from a minimum of $60 to $150, and 3 demerit points apply if convicted for offences at pedestrian crossings, school crossings and pedestrian crossovers. All fines are doubled in community safety zones.)
- Gave all municipalities authority to set a 30 km/hr speed limit where traffic calming is in place.
- Required drivers to remain stopped at school crossings until children and the crossing guards have left the half of the roadway where the vehicle is traveling and require crossing guards to display stop sign until all children have left the crossing.
- Expanded the function of school crossing guards to cover the movement of all persons crossing a highway – not just children.

2.3 Ontario Traffic Manual

In Ontario, the Ontario Traffic Manual (OTM) series provides information and guidance to transportation practitioners to promote uniform traffic control devices and systems across the province. In addition, the OTM provides a set of guidelines consistent with the intent of the Highway Traffic Act and to provide a basis for road authorities to generate or update their own guidelines and

The OTM promotes uniform traffic control across the province

standards.

The OTM is made up of a number of Books, which are being generated over a period of time, and for which a process of continuous updating is planned. The following books deal with pedestrian crossing control:

- Book 5 – Regulatory Signs
- Book 6 – Warning Signs
- Book 8 – Information Signs
- Book 11 – Pavement Markings
- Book 12 – Traffic Signals

OTM Book 15 – Pedestrian Traffic Control and Protection is being developed

In addition to the above OTM Books, Book 15 – Pedestrian Control and Protection is being developed to bring together the application of signals, signs and pavement markings pertaining to pedestrian control and protection.

2.4 Ontario Traffic Conference – School Crossing Guard Guide

The Ontario Traffic Conference "School Crossing Guard Guide" was developed based on common and best practices with an objective to provide province-wide uniformity of school crossings. The guide provides the framework for crossing guard programs and the associated legislative authority, equipment, warrants and traffic control devices.

The Crossing Guard Guide provides best practices

2.5 City of Brampton Traffic By-law 93-93

By-law 93-93 is the General Traffic by-law to regulate the use of highways in the City of Brampton. The Highway Traffic Act stipulates some forms of traffic control, others, such as pedestrian crossovers require road authorities to designate them as such by municipal by-law.

Traffic By-law 93-93 regulates the use of roads in Brampton

2.6 Transportation Association of Canada

The Transportation Association of Canada (TAC) is a national association with a mission to promote the provision of safe, secure, efficient, effective and environmentally and financially sustainable transportation services in support of Canada's social and economic goals.

TAC reviews, conduct analysis, develop and approve various traffic related standards and guidelines referenced by many municipal and transportation related professionals.

2.7 Institute of Transportation Engineers

The Institute of Transportation Engineers (ITE) is an international educational and scientific association of transportation professionals who are responsible for meeting mobility and safety needs. ITE facilitates the application of technology and scientific principles to research, planning, functional design, implementation, operation, policy development and management for any mode of transportation. Through its products and services, ITE promotes professional development of its members, supports and encourages education, stimulates research, develops public awareness programs and serves as a conduit for the exchange of professional information.

3 PEDESTRIAN CHARACTERISTICS

Planning for pedestrian safety must include an understanding of the characteristics of pedestrians. With this understanding, those involved in pedestrian safety planning can more effectively interpret how new and existing facilities must operate, as well as how pedestrians will act when faced with certain conditions. Applying a practical understanding of pedestrian characteristics will provide insights when considering appropriate safety solutions and will particularly help to ensure that facilities are inviting to pedestrians.

Important characteristics include understanding why and where pedestrians walk, what types of design features create a safer pedestrian environment, and what types of behavioural decisions pedestrians are likely to make. In addition, pedestrians also consist of specific populations with different characteristics, including children, persons with mobility impairments and senior citizens. The characteristics and challenges with respect to these pedestrian types are discussed in greater detail below.

It is important to understand the characteristics of pedestrians when planning for safety

3.1 Children Pedestrians

As walking is a primary method of travel for children, they represent a large proportion of pedestrian trips, especially in residential areas.

Children have fewer capabilities than adults as they are early in their development and lack experience. Compared to adults, children tend to exhibit the following characteristics[2]:

- One-third less peripheral vision
- Less accuracy in judging speed and distance
- Difficulty localizing the direction of sounds
- Overconfidence
- Inability to read or comprehend warning signs and traffic signals
- Unpredictable or impulsive actions
- Lack of familiarity with traffic patterns and expectations
- Trust that others will protect them
- Inability to understand complex situations

Walking is a primary mode of travel for children, especially in residential areas

[2] *Designing Sidewalks and Trails for Access*. Federal Highway Administration. Washington, DC. 1999

3.2 Seniors

Many of the characteristics commonly associated with aging might limit mobility. Because the attenuated reflexes and physical limitations of older adults might prohibit them from driving automobiles, they are more likely to rely on public transit or walking than other adults.

The aging process frequently causes a general deterioration of physical, cognitive, and sensory abilities. These changes intensify over time and are most pronounced for individuals over 75 years of age[3].

Mobility is one of the greatest challenges for seniors

Characteristics of many older adults may include the following:

- Vision problems, such as degraded acuity, poor central vision, and reduced ability to scan the environment
- Reduced range of joint motion
- Reduced ability to detect, localize, and differentiate sounds
- Limited attention span, memory, and cognitive abilities
- Reduced endurance
- Reduced tolerance for extreme temperature and environments
- Decreased agility, balance, and stability
- Inability to quickly avoid dangerous situations
- Excessive trust that fellow drivers will obey traffic rules
- Slower reflexes
- Impaired judgment, confidence, and decision-making abilities

3.3 Disabled Pedestrians

Pedestrians with ambulatory impairments may use devices such as wheelchairs, crutches, canes, walkers, and/or prosthetic limbs to enhance their mobility. When using such assistive devices, they require sufficient space to manoeuvre around barriers and hard, smooth, level surfaces to allow for easier manoeuvrability[4].

Disabled pedestrians includes anyone with an impairment

An understanding of how all pedestrians, including the elderly, the young and those with disabilities, perform as pedestrians can help to establish appropriate traffic control and design to assist pedestrian travel.

[3] *Designing Sidewalks and Trails for Access*. Federal Highway Administration. Washington, DC. 1999
[4] *Guide for the Planning, Design, and Operation of Pedestrian Facilities*. American Association of State Highway and Transportation Officials. Washington, DC, 2004

4 CURRENT CONDITIONS

The following section discusses existing conditions related to pedestrian safety. Collision statistics are used to identify problems related to when, where, and why collisions occur. This information will be used to identify problem trends and as support for the pedestrian safety initiatives proposed later in the document.

4.1 Collision Statistics

Worldwide, road traffic crashes are the eighth leading cause of death, according to the World Health Organization (WHO). Due to the alarming increase in road related injuries, the WHO declared road safety the theme for the 2004 World Health Day. Rates in North America are amongst the lowest, perhaps because there is relatively less pedestrian traffic than most other areas in the world.

Road traffic crashes are the eighth leading cause of death worldwide

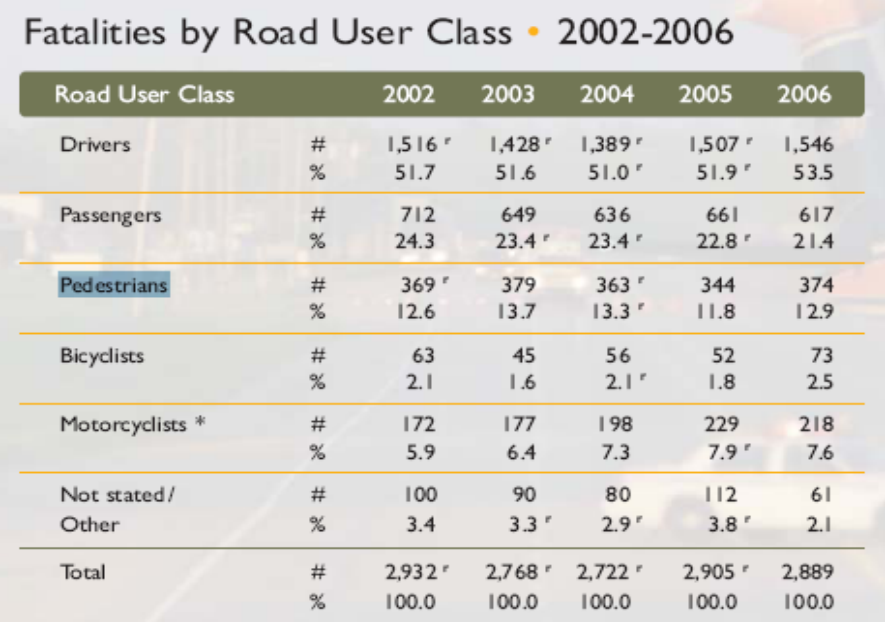
4.1.1 Canadian Statistics

In Canada, there were 2,889 deaths due to motor vehicle traffic collisions in 2006. Thirteen percent of these involved pedestrians (Transport Canada, 2007).

Furthermore, Transport Canada (2004) states that of all the pedestrians involved in collisions in urban areas during 2001, over 25% were killed and almost 45% were seriously injured at signalized road locations.

The most relevant information regarding pedestrian collisions on a Canada-wide basis is provided by Transport Canada in a report entitled Pedestrian Fatalities And Injuries, 1992-2001. This document presents pedestrian fatalities and injuries resulting from collisions with motor vehicles on a roadway. The report reviews the number of pedestrian fatalities and injuries by age group and gender, by jurisdiction, time of day and month[5].

[5] *Pedestrian Fatalities And Injuries*, 1992, Transport Canada, 2004



Fatalities by Road User Class • 2002-2006

Road User Class		2002	2003	2004	2005	2006
Drivers	#	1,516 r	1,428 r	1,389 r	1,507 r	1,546
	%	51.7	51.6	51.0 r	51.9 r	53.5
Passengers	#	712	649	636	661	617
	%	24.3	23.4 r	23.4 r	22.8 r	21.4
Pedestrians	#	369 r	379	363 r	344	374
	%	12.6	13.7	13.3 r	11.8	12.9
Bicyclists	#	63	45	56	52	73
	%	2.1	1.6	2.1 r	1.8	2.5
Motorcyclists *	#	172	177	198	229	218
	%	5.9	6.4	7.3	7.9 r	7.6
Not stated / Other	#	100	90	80	112	61
	%	3.4	3.3 r	2.9 r	3.8 r	2.1
Total	#	2,932 r	2,768 r	2,722 r	2,905 r	2,889
	%	100.0	100.0	100.0	100.0	100.0

SOURCE: MOTOR VEHICLE TRAFFIC COLLISION STATISTICS: 2006, TRANSPORT CANADA

Percentage of Fatalities and Serious Injuries by Road User Class

Road User Class	Fatalities	Serious Injuries
Drivers	53.5	48.4
Passengers	21.4	25.8
Pedestrians	12.9	12.0
Bicyclists	2.5	3.3
Motorcyclists	7.6	8.7
Not Stated/Other	2.1	1.8
Total	**100.0**	**100.0**

SOURCE: MOTOR VEHICLE TRAFFIC COLLISION STATISTICS: 2006, TRANSPORT CANADA

Summary Findings

Over the 10-year period, 1992-2001:

- Pedestrian fatalities averaged 416 per year and decreased 24.1 percent over the 10-year period.
- Pedestrian injuries averaged 14,252 per year and decreased 10.2 percent from 1992 to 2001.
- Overall males represented 61 percent of pedestrian fatalities while females accounted for 39 percent of fatalities.
- The 65+ age group accounted for 27 percent and 39 percent of male and female pedestrian fatalities, respectively. Over the period, male fatalities over 64 years old decreased 12.7 percent and over 64 year old female fatalities decreased 30.4

percent.

- Pedestrian fatalities decreased 24.1 percent compared to a decrease of 20.7 percent for all road users including pedestrians. Pedestrian fatalities were down 20 percent among males and down 30 percent among females.
- Pedestrian fatalities in urban areas represented 69.5 percent of all pedestrian fatalities over the 10 years.
- For pedestrians over 64 years of age, 85 percent of the fatalities occurred in an urban area.
- Pedestrian injuries dropped 10 percent – decreases of 13 percent in male injuries and 7 percent in female injuries, while all road user injuries decreased 11.5 percent.
- An average of 95 percent of pedestrian injuries occurred in urban areas.

Researchers believe the decline in child pedestrian injuries relates to children walking less

Researchers believe that one major reason for the decline in child pedestrian injuries is that children are walking less. A 1998 study found that, while almost half (45%) of Canadian children lived within 2 km of their school, less than one-third (29%) usually walked to school and only 2% usually cycled. Levels of obesity among Canadian children ages 7 to 13 have nearly tripled in the past 20 years. The need to ensure that children recapture active lifestyle habits – without increasing their risk of serious injury – has never been more vital[6].

4.1.2 Collisions in Ontario

Between 2001 and 2005, the Ministry of Transportation estimates that more than 15,500 pedestrians were killed or injured while crossing the street – many while crossing at traffic lights, crosswalks or school crossings. Pedestrian fatalities increased by 20 per cent, from 105 in 2005 to 126 in 2006. This rise in the number of fatalities among our most vulnerable road users is a very serious concern, as is the fact that these deaths represented approximately 16 per cent of all motor vehicle fatalities in the province.

52.4 % of pedestrian fatalities occurred at, an intersection or marked crossing

[6] *Making it Happen.* Safe Kids Canada. 2004

Category of Involved Person by Severity of Injury in Fatal and Personal Injury Collisions, 2006						
	Severity of Injury					
Category of Involved Person	None	Minimal	Minor	Major	Fatal	Total
Driver	37,439	21,487	16,474	1,672	383	77,455
Passenger*	20,008	11,119	7,799	949	169	40,044
Pedestrian	197	1,845	2,395	489	126	5,052
Bicyclist	35	1,026	946	119	32	2,158
Bicycle Passenger	17	160	174	15	0	366
All-Terrain** Vehicle Driver	3	11	14	5	1	34
All-Terrain Vehicle Passenger	2	3	3	4	0	12
Snow Vehicle Driver	3	1	6	7	3	20
Snow Vehicle Passenger	0	1	1	3	0	5
Motorcycle Driver	84	345	642	232	48	1,351
Motorcycle Passenger	38	93	202	57	5	395
Moped Driver	8	12	15	5	0	40
Moped Passenger	6	1	1	0	0	8
Hanger On	55	71	109	29	0	264
Other	538	145	95	11	2	791
Total	58,433	36,320	28,876	3,597	769	127,995

SOURCE: MINISTRY OF TRANSPORTATION ONTARIO

This table excludes individuals involved in property-damage-only collisions.

- **Fatal Injury:** Person killed immediately or within 30 days of the motor vehicle collision.
- **Major Injury:** Person admitted to hospital. Also, includes person admitted for observation.
- **Minor Injury:** Person went to hospital and was treated in the emergency room but was not admitted.
- **Minimal Injury:** Person did not go to hospital when leaving the scene of the collision. Includes minor abrasions, bruises and complaint of pain.
- **None:** Uninjured person.

In 2006, 52.4 per cent (66 out of 126) of pedestrian fatalities occurred when the person was crossing a road at an intersection or marked pedestrian crossing. This proportion is up from 2005, when 46.7 per cent (49 out of 105) pedestrian fatalities occurred at an intersection or marked crossing.

As with speeding, drivers who fail to stop for pedestrians at crosswalks and school crossings or fail to yield the right-of-way to pedestrians crossing at intersections are a serious problem on our roads.

Apparent Pedestrian Action by Severity of Injury, 2006		
Apparent Pedestrian Action	*Killed*	*Injured*
Crossing Intersection With Right of Way	16	1,949
Crossing Intersection Without Right of Way	20	703
Crossing Intersection No Traffic Control	23	364
Crossing Pedestrian Crossover	1	132
Crossing Marked Crosswalk Without Right of Way	6	110
Walking on Roadway With Traffic	7	86
Walking on Roadway Against Traffic	4	64
On Sidewalk or Shoulder	8	353
Playing or Working on Highway	2	43
Coming from Behind Parked Vehicle or Object	2	107
Running onto Roadway	10	324
Getting On/Off School Bus*	0	8
Getting On/Off Vehicle	0	61
Pushing/Working on Vehicle	1	10
Other	26	415
Total	126	4,729

Pedestrian Condition by Severity of Injury, 2006		
Condition of Pedestrian	Killed	Injured
Normal	62	3,243
Had Been Drinking	7	233
Ability Impaired Alcohol Over .08	24	10
Ability Impaired Alcohol	1	53
Ability Impaired Drugs	5	20
Fatigue	0	4
Medical or Physical Defect	11	76
Inattentive	8	657
Other	0	54
Unknown	8	379
Total	126	4,729

SOURCE: MINISTRY OF TRANSPORTATION ONTARIO

4.1.3 City of Toronto Statistics

For the five year period 2001-2005, an average of 2,279 pedestrians was injured annually in collisions with motor-vehicles. During this same period there were, on average, there were 36 pedestrian fatalities annually.

Pedestrian Injuries and Fatalities, 2001-2005		
Year	Total	Total
	Pedestrian Injuries	Pedestrian Fatalities
2001	2,455	32
2002	2,397	50
2003	2,326	43
2004	2,102	28
2005	2,113	29
Annual Avg.	2,279	36.4

SOURCE CITY OF TORONTO "LARGE TRUCKS AND CYCLIST/PEDESTRIAN SAFETY" STAFF REPORT

4.1.4 Region of Peel Statistics

For the period between 2006 and July of 2009 pedestrian fatalities have slightly increased in the Region of Peel.

Region of Peel Fatality Comparison 2006 -July 2009							
	Automobiles			Motorcycles			
Year	Driver	Passenger	Pedestrian	Cyclist	Driver	Passenger	Total Deaths
2006	13	11	11	3	4	1	43
2007	16	8	12	1	0	0	37
2008	14	7	12	1	0	0	34
2009	5	4	4	0	1	0	14
Total	48	30	39	5	5	1	128

SOURCE : REGION OF PEEL (INCLUDES ALL MUNICIPALITIES WITHIN THE REGION)

TRAFFIC FATALITY COMPARISON YEAR END TOTAL							
	Automobiles			Motorcycles			
	Driver	Passenger	Pedestrian	Cyclist	Driver	Passenger	Total Deaths
2005	17	8	5	0	2	0	32
2006	10	4	10	3	3	1	31
2007	10	6	11	1	0	0	28
2008	9	6	12	1	0	0	28
2009							

SOURCE PEEL REGIONAL POLICE (DOES NOT INCLUDE CALEDON)

PEEL REGIONAL POLICE TRAFFIC SERVICES MAJOR COLLISION BUREAU TRAFFIC FATALITY COMPARISON Year To Date July 23							
	Automobiles			Motorcycles			
Year	Driver	Passenger	Pedestrian	Cyclist	Driver	Passenger	Total Deaths
2005	10	4	3	0	0	0	17
2006	6	3	5	3	0	0	18
2007	6	3	5	0	0	0	14
2008	2	4	4	1	0	0	11
2009	5	3	4	0	1	0	13
	All Deaths in Brampton			8			
	Pedestrian Deaths Brampton			2			
	All Deaths in Mississauga			5			
	Pedestrian Deaths Mississauga			2			

SOURCE PEEL REGIONAL POLICE (DOES NOT INCLUDE CALEDON)

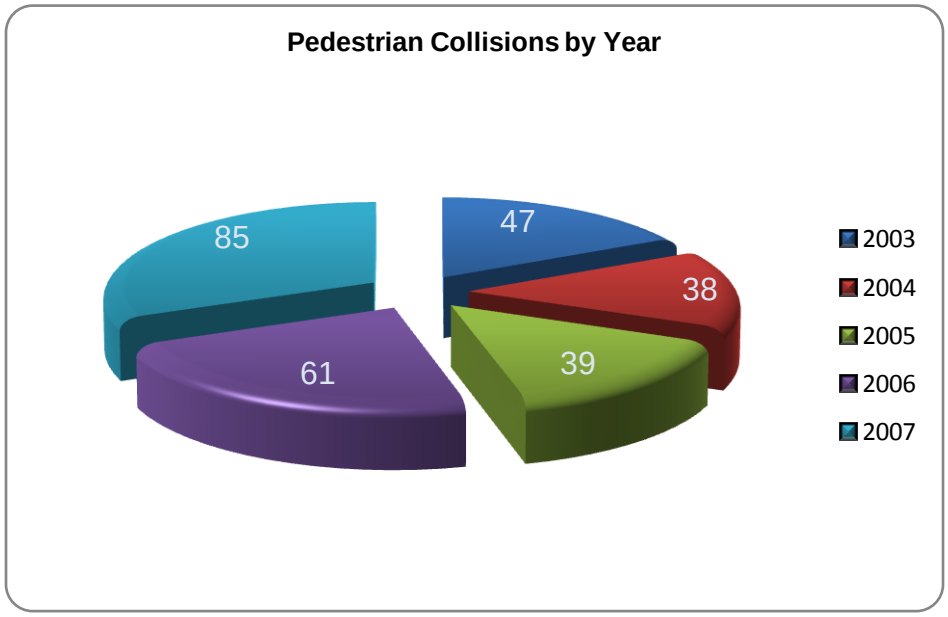
4.1.5 Brampton Statistics

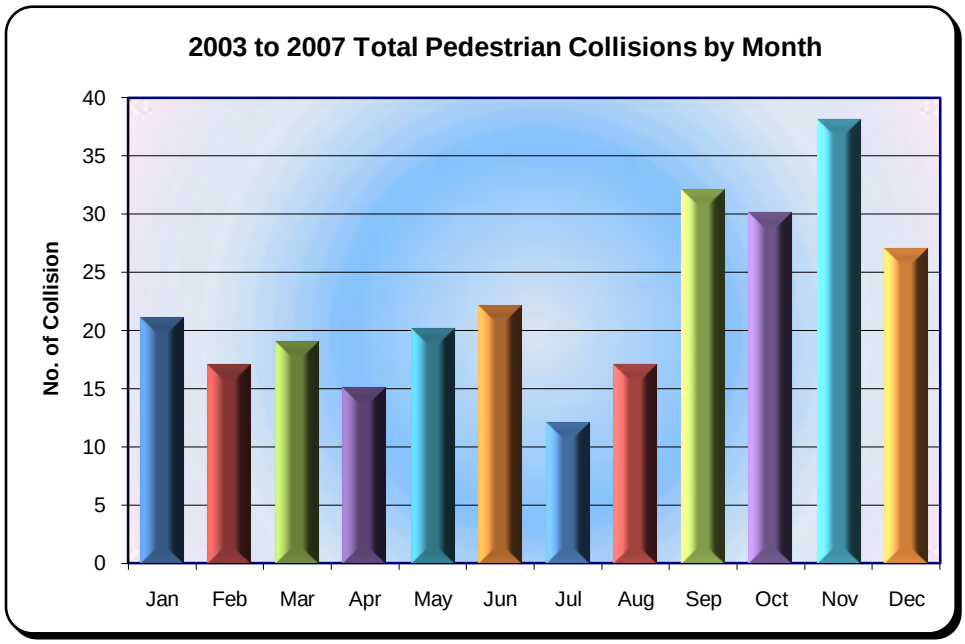
Understanding who is most at risk for pedestrian injury, and where, when, and why pedestrian crashes occur is the first step to designing and implementing an effective community initiative to improve pedestrian safety. An analysis of collision records provides insight into where, when and why pedestrian collisions are occurring.

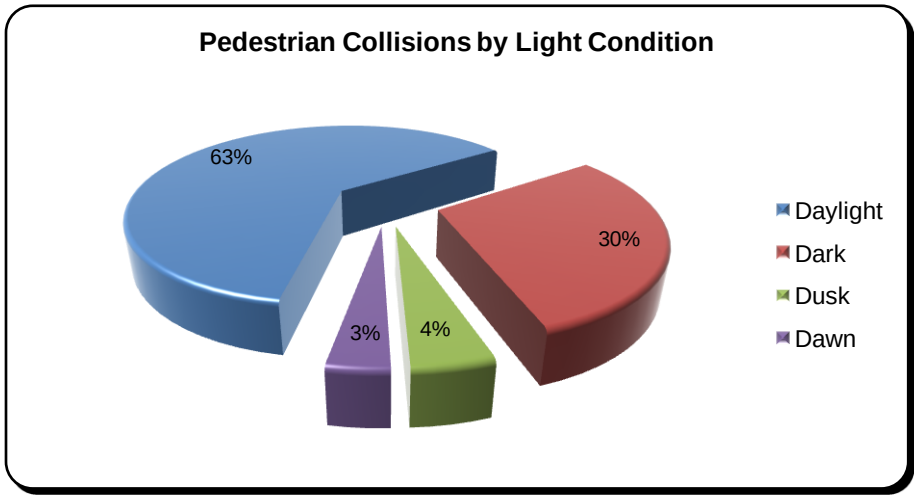
The collisions analysed are those on Brampton roads only

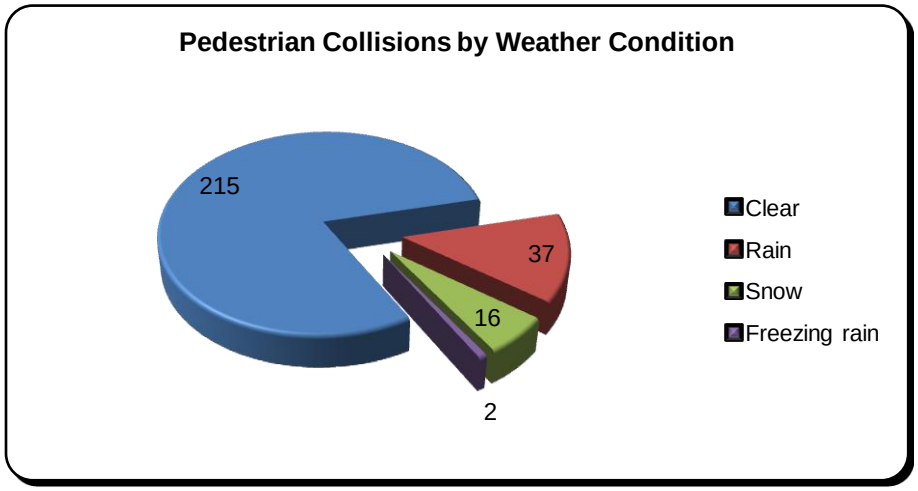
The collisions used for analysis and reporting are those occurring on Brampton roads only. Recognizing Brampton roads alone do not make up the complete road network, the records are considered a representative sample and a means to identify pedestrian specific collision trends.

When Do They Happen?

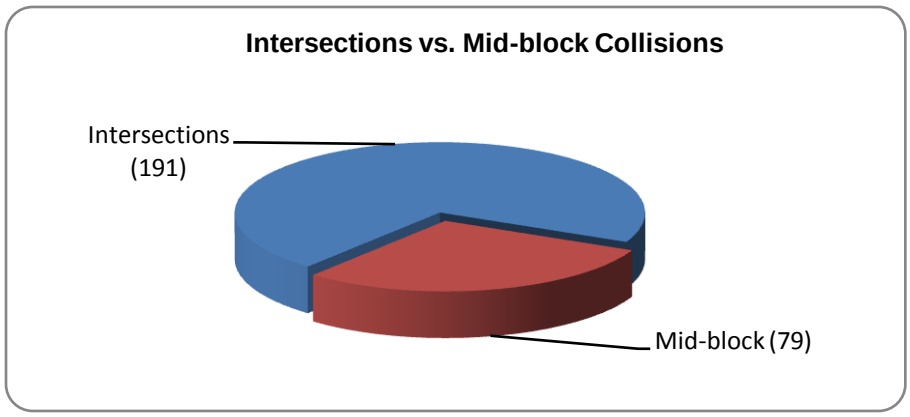


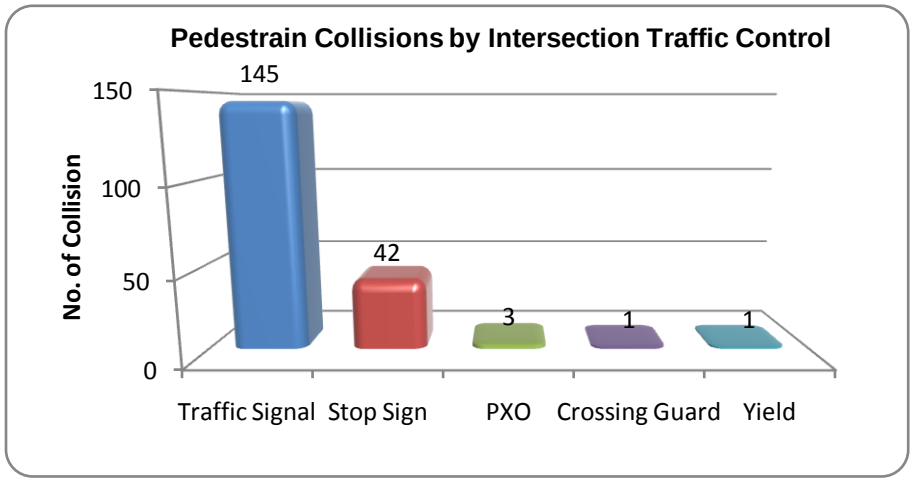




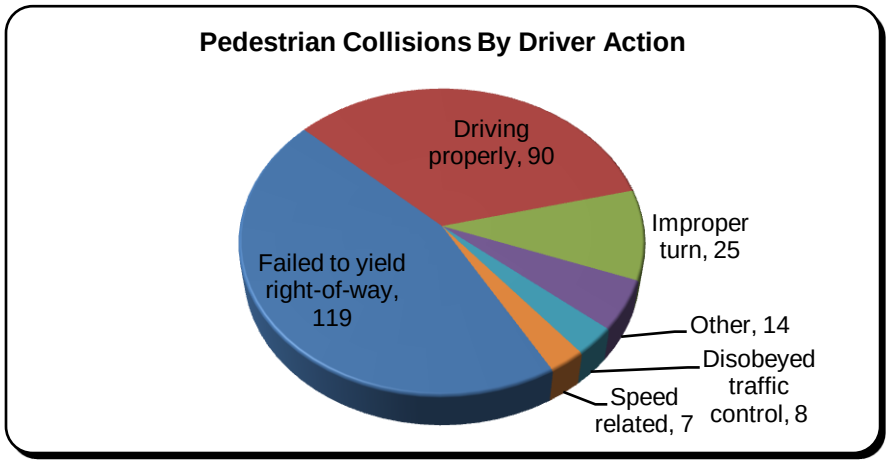


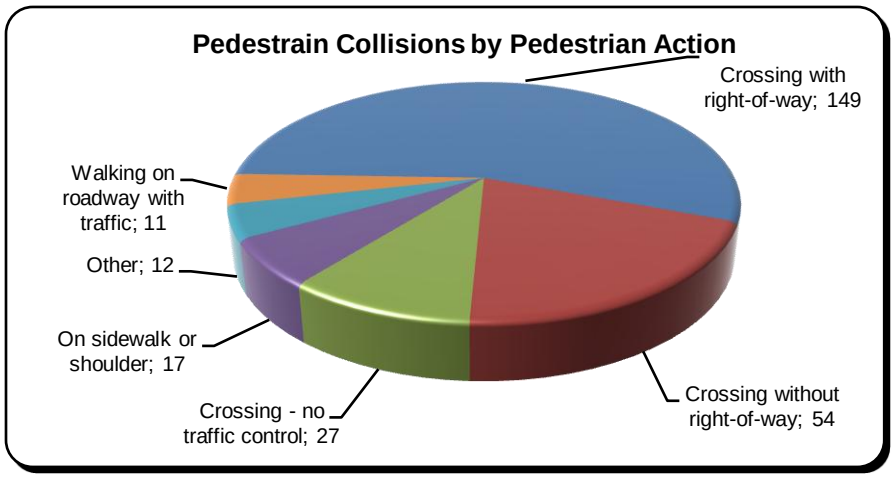
Where do Collisions Happen?



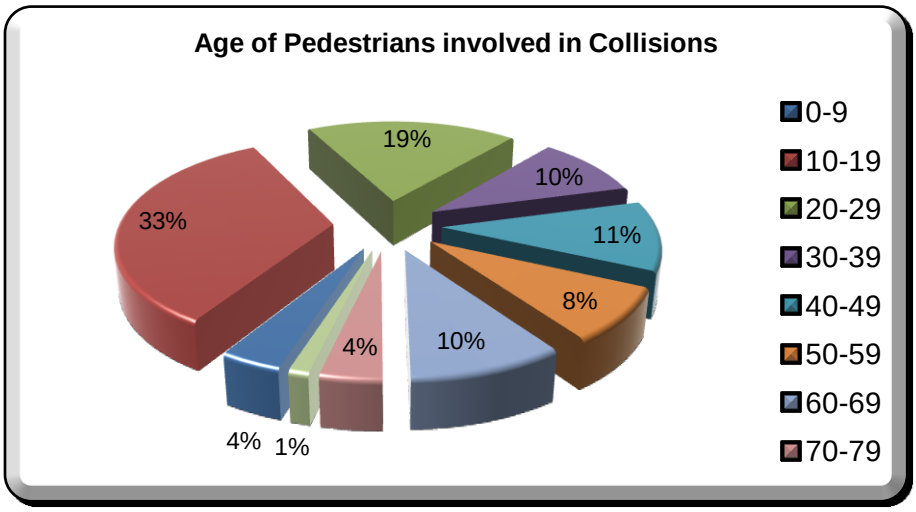


Why Do They Happen?





Who is involved?



Key Findings

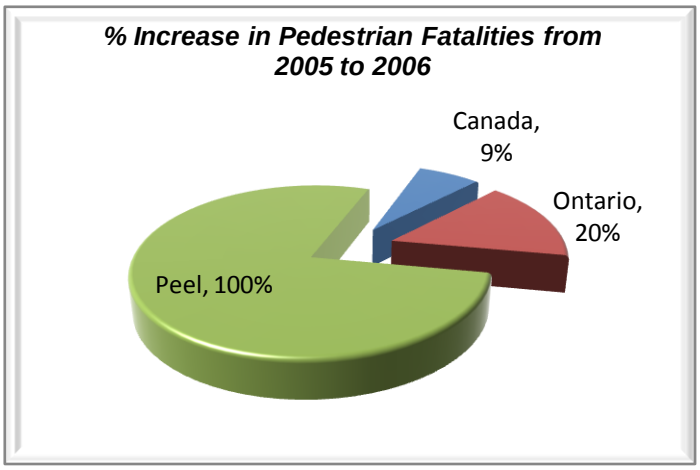
A review of collisions occurring between 2003 to 2007 for Brampton roadways reveals the following conclusions:

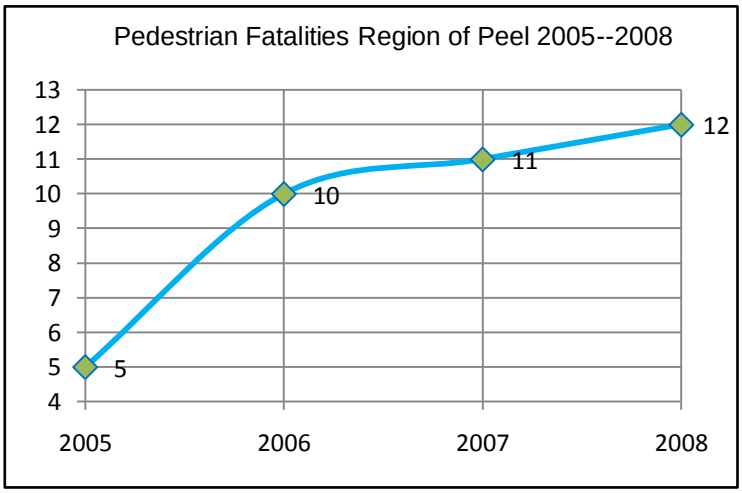
- The annual trend of pedestrian collisions is increasing
- Pedestrian collisions are most common in the month of November
- 63% of pedestrian collisions occur in daylight
- 71% of pedestrian collision occur at intersections
- 76% of intersection related collisions involving pedestrians occurred under traffic signal control
- Drivers failed to yield the right-of-way in 44% of pedestrian collisions
- The age of pedestrians most involved in collisions was the 10-19 age range

* percentages are based on 270 pedestrian collisions over a 5 year period

4.2 Conclusions

In the Province of Ontario pedestrian fatalities have increased by approximately 20% from 2005 to 2006 (105 to 126 pedestrian fatalities). Of the 126 pedestrian fatalities in Ontario approximately 10 (8%) occurred within the Region of Peel (Mississauga & Brampton). However,if we compare pedestrian fatalities between 2005 to 2006, fatalities within the Region of Peel have doubled, and have been increasing steadily each year.





While the City of Brampton has had very few pedestrian fatalities in the past 4 years (1 in 2005 and 1 in 2008), the statistics indicate that the trend in pedestrian related collisions is on the rise. This rise in pedestrian related collisions could be attributed to the increase in population within the City of Brampton along with the increasing numbers of people who choose to walk instead of drive along with many others who are unable to drive.

The following sections will discuss the existing practices used in the City of Brampton along with recommended pedestrian related initiatives which could be implemented.

5 EXISTING PRACTICES

One of the most vital strategies to prevent collisions involving pedestrians is to ensure they cross the street at the safest location and to ensure that the locations where pedestrians are likely to cross are as safe as possible. Traffic control devices, pavement markings and geometric design standards are used to make crossing the road safe.

This section is a compilation of existing traffic controls, systems and devices used to protect and assist pedestrians as they travel. The following details existing practices related to pedestrian crossing treatments.

5.1 Pedestrian Related Traffic Control

In Ontario, the importance of uniform and recognizable traffic control devices as a means to provide safe pedestrian crossing is very apparent. Traffic control devices are intended to assign the right-of-way to all road users and to reduce conflicts such as those involving pedestrians and vehicles. The installation of additional traffic control has the potential to increase delays for both pedestrian and vehicle traffic. As a result, there exists the challenge of balancing the priorities related to providing safety and operational efficiency.

Traffic control devices are designed and implemented with pedestrian safety in mind

The Highway Traffic Act gives the right-of-way to pedestrians in the presence of and adherence to the following traffic control devices:

- Pedestrian crossover
- Traffic Control Signals
- Mid-block Pedestrian Signal
- School Crossing Guard
- Stop sign controlled intersection

Each of the above traffic controls has specific pedestrian considerations, which are described in further detail in the following sections.

5.1.1 Pedestrian Crossovers

A pedestrian crossover (or PXO) provides mid-block traffic control through the use of pedestrian actuated flashing yellow beacons, overhead signage and pavement markings, all prescribed in Reg.615 of the Highway Traffic Act.

A PXO is recommended for installation when the minimum traffic and pedestrian volumes meet the criteria outlined in the Ontario Manual of Uniform Traffic Control Devices (MUTCD). The warrant method considers adjustment factors to account for vulnerable

pedestrians including senior citizens, disabled pedestrians and children unaccompanied by an adult or unassisted by a crossing guard. Volumes of vehicles and pedestrians and pedestrian delay due to lack of gaps in traffic are also key considerations.

Although PXO's provide traffic control to allow pedestrians to cross the street, there were safety concerns amongst City staff as well as other municipal practitioners. Based on observed incidents of non-compliance with PXO operation by motorists and pedestrians, staff recommended to City Council in 2004 that PXO's no longer be used. It was decided that the existing locations be removed and replaced with an alternate type of pedestrian control device such as IPS, mid block or full signal installations as deemed appropriate by staff. One PXO device has not been replaced due to road geometrics and other physical constraints.

PXO's are no longer being installed in Brampton

5.1.2 Traffic Control Signal

The function of a traffic control signal is to alternate the right-of-way between conflicting streams of vehicular traffic, or vehicular traffic and pedestrians crossing a roadway, with maximum safety and efficiency. Safety requires that the traffic control signal operate at the minimum hazard to all road users, including vehicle occupants, bicyclists and pedestrians. Maximum efficiency implies the minimum delay to traffic.

Traffic signals provide a controlled crossing for pedestrians

The City standard for the installation of traffic signals adhere to the guidelines provided in the OTM. Traffic signals include pedestrian signal heads to control pedestrians and two solid parallel white lines marking both edges of the crosswalk.

5.1.2.1 Pedestrian Timing Practice

The timing of pedestrian signal heads is calculated using the length of the longest crosswalk distance multiplied by the average walking speed of 1.2m/s. The standard "Walk" time is 8 seconds in length with the remaining pedestrian time flashing DON'T WALK. For example, if a crosswalk is 15 metres in length and requires 18 seconds to safely cross a pedestrian the display is provided as follows:

- WALK time = 8 seconds
- flashing DON'T WALK time = 10 seconds

However, in areas where there are higher numbers of pedestrians who are senior citizens or children longer walk times may be required. Walking speeds of 1.0m/s or lower are currently being used in these areas to provide adequate walk times for these pedestrians.

Pedestrian timing is based on walking speed and distance

5.1.2.2 Pedestrian Countdown Signals

The pedestrian countdown signal (PCS) is a supplement to the pedestrian signal, facing pedestrians at a signalized crosswalk with high pedestrian traffic volumes crossing the street. It starts a descending numerical countdown in seconds once the "Don't Walk" flashing amber outline of a hand starts, following the "Walk" steady white outline of a pedestrian, and indicates how many seconds are available for pedestrians to safely cross an intersection before the amber vehicle signal will appear.

The PCS is programmed to countdown to zero during the clearance time (or flashing amber outline of the hand interval). This allows proper signal timings for vehicle progression and emergency pre-emption operation to be unimpeded.

The PCS is an enhancement at traffic signal installations to improve pedestrian safety and encourages pedestrians to not start their crossing when there is insufficient time remaining on the traffic signal for them to complete their crossing.

A PCS provides a visual indication of time remaining to cross

Installation of PCS is based on the following criteria:

- Adjacent to pedestrian traffic generators (e.g. schools, major shopping centers, senior citizen's facilities)
- In areas of pedestrian traffic generators which attract people with slower walking speeds (e.g. elementary students, senior citizens, physically challenged persons)

As directed in its staff report to City Council dated October 1, 2007, Works & Transportation staff install PCS at all new signalized and existing locations throughout the City to enhance pedestrian safety when the above criteria is met.

5.1.3 Mid-block Pedestrian Signal

Mid block Pedestrian signals are similar to standard traffic signals except that there are only two approaches for which signal heads are required. They are pedestrian actuated with similar pedestrian signal head timing philosophy as traffic signals. The justification for the installation of Mid-block pedestrian signal is based on the same criteria as that used for the PXO.

Mid-block pedestrian signals have replaced the PXO

5.1.4 Intersection Pedestrian Signal

The intersection pedestrian signal (IPS) has one or more crosswalks; pedestrian walk and don't walk signals; push buttons for pedestrians; and, traffic signal lights on the main road only. Stop signs control traffic on the smaller, less busy crossroad.

An IPS can be confusing for drivers and are not

These devices are considered to be confusing for motorist,

particularly on the side street. As such, this configuration is no longer used. Instead, if pedestrians warrant signals, the intersection is fully signalized in accordance with standard installation practices.

preferred

5.1.5 Audible Pedestrian Signals (APS)

An Audible Pedestrian Signals (APS) is defined as a device that communicates audible, tactile, vibrotactile and visible methods to provide crossing information to people who are blind, visually impaired or deaf at traffic signals. Different audio signals are emitted for the east-west and north-south directions at the intersection crosswalks.

An APS will provide crossing information to people with disabilities

The City of Brampton utilizes operational guidelines and APS terminology from The Canadian National Institute for the Blind (CNIB) report 'Accessible Pedestrian Signals' (APS) dated October 2003.

APS provides the necessary audible indication to safely cross at complex intersections.

APS is typically installed at the following signalized locations:

1. In close proximity to major pedestrian generators (Senior Centres, Schools and Shopping Malls);
2. Low volume local roads (inadequate noise levels);
3. Midblock intersections;
4. T-Intersections;
5. Multi-phase traffic signal intersections.

5.1.6 School Crossing Guard

The function of a school crossing guard is to assist Kindergarten to Grade 5 students cross the road safely as they travel to and from school. Crossing guards are in the vicinity of schools at mid-block locations, uncontrolled intersections, all way stops and signalized intersections.

Crossing Guards assist Kindergarten to Grade 5 students across the road

A school crossing guard warrant is used to determine if a crossing guard is necessary. The warrant identifies the number of safe gaps in traffic available for children to cross, number of children and any vehicle conflicts.

For the safety of the children utilizing the crossings and the drivers in the vicinity, the signage, pavement markings and operation of the school crossing guard locations must be consistent. Both the HTA and the OTM provide legislative guidance and uniformity for the use of school crossing guards.

Both the HTA and the OTM provide legislative guidance for the use of crossing guards

5.1.7 Stop Controlled Intersection

Drivers must stop before the crosswalk, when it exists

Stop sign controls are the most common form of traffic control at intersections. The HTA provides the following with respect to stopping at a stop sign:

Stop at through highway	136. (1) Every driver or street car operator approaching a stop sign at an intersection,
	(a) shall stop his or her vehicle or street car at a marked stop line or, if none, then immediately before entering the nearest crosswalk or, if none, then immediately before entering the intersection; and
	(b) shall yield the right of way to traffic in the intersection or approaching the intersection on another highway so closely that to proceed would constitute an immediate hazard and, having so yielded the right of way, may proceed. R.S.O. 1990, c. H.8, s. 136 (1).

An all-way stop controlled intersection is one where traffic from all approaches must come to a complete stop. Pedestrian crosswalks are provided on all approaches for pedestrians.

5.2 Pedestrian Warning Signs

Pedestrian related signs are primarily used as a warning of the presence of pedestrians.

When considering signs for installation, all attempts are made to use signs specified in the Ontario Traffic Manual (OTM). Adherence to the signs in the OTM creates consistency and uniformity and in turn, increased driver recognition and compliance.

5.2.1 School Area sign

Purpose:

Used to warn drivers about the presence of pedestrians around schools

The SCHOOL AREA sign is designed to attract driver attention to potentially increased hazards or dangers related to the unpredictable behaviour of school children near traffic. Where children from a school adjacent to a road walk along or cross that road, road users need advance warning of this situation so that they are prepared to exercise caution and foresight in proceeding through these areas. The Purpose of the SCHOOL AREA sign is to provide advance warning of this nature, by informing motorists that they are approaching a school area.

Guidelines For Use:

SCHOOL AREA signs should be used where the school is adjacent to a major highway or arterial road that school children walk along and cross. An advance warning sign for a school area is not necessary, since the SCHOOL AREA sign is itself an advance sign, warning motorists that they are approaching a school area, where

children may be walking along or crossing the road.

5.2.2 School Crossing Ahead sign

Provides advanced warning of school crossing

Purpose:

The SCHOOL CROSSING AHEAD sign is used in conjunction with the SCHOOL CROSSING sign to provide advance warning to drivers of a school crossing location.

Guidelines For Use:

The SCHOOL CROSSING AHEAD sign must be located upstream of the supervised school crossing location and should be used where the posted speed upstream of the school speed zone is 60 km/h or less.

Consistency in the usage of SCHOOL CROSSING AHEAD signs coinciding with SCHOOL CROSSING signs is important to satisfy the safety of children who use the crossings and the expectancies of drivers who regularly drive past the crossings.

5.2.3 School Crossing Sign

Identifies and warns of school crossing

Purpose:

The SCHOOL CROSSING sign, located downstream from the SCHOOL CROSSING AHEAD sign, is used to provide warning at an actual school crossing location.

Guidelines For Use:

Signs must be located at the supervised school crossing location, and should be used where the posted speed upstream of the school speed zone is 60 km/h or less.

SCHOOL CROSSING signs must be used directly at the painted crosswalk, one on each side of the roadway, for both directions of travel. Signed school crossings must not be located at pedestrian crossovers, at intersections with traffic signals, or at intersections with pedestrian signals.

5.2.4 Playground Advance sign

Warning of unexpected presence of pedestrians around playgrounds

Purpose:

To provide advance warning of a locally designated playground that is located adjacent to a downstream section of road. The presence of children on or near the road traveling to or from the playground may present an unexpected hazard to motorists unless they are warned in advance by the PLAYGROUND AHEAD sign.

Guidelines For Use:

The PLAYGROUND AHEAD sign may be installed in advance of playgrounds adjacent to the road where, in the opinion of the Road Authority, safety considerations for drivers and pedestrians alike require the placement of a warning sign.

5.2.5 Pedestrian ahead sign

Warning of unexpected presence of pedestrians

Purpose:

To provide advance warning to motorists that pedestrians may be in the area. It is normally used in rural areas where, from visual observation, the presence of pedestrians in rather uninhabited areas would come as a surprise to the motorist.

Guidelines for use:

The pedestrians ahead sign should be installed where field observations have indicated that a significant number of pedestrians frequently cross the road or walk adjacent to it, provided that pedestrian volumes are not high enough to justify the installation of a pedestrian crossover.

5.2.6 "Deaf Child" warning sign

Purpose:

To provide advance warning to motorists to the possibility of a hearing impaired child playing in the area, and to be more aware as hearing impaired children cannot hear an approaching passenger car, school bus, or truck.

Guidelines for use:

The City of Brampton provides the "Deaf Child" warning signs on the local roadway approaches to the residence of a hearing impaired child who is between the ages of 2 and 16 providing that the required guidelines are met.

5.2.7 "Caution - Watch for Children" sign

Advise drivers to use caution as they enter a residential neighbourhood

Purpose:

A 'made in Brampton' sign to advise drivers to use caution as they enter a residential neighbourhood where the risk of encountering pedestrians, and specifically children, is significantly increased.

Guidelines For Use:

The "Watch for Children" signs will be considered on streets meeting all of the following criteria:

- Two lane collector road
- Contains direct residential frontage
- Intersects with an arterial road
- Has evidence of non-local traffic

Specific placement of "Watch for Children" signs is to be determined by staff taking into consideration exposure, visibility and the proximity and impact on other regulatory, warning and guide signs. Where it is determined that a sign is not effective or it interferes with existing signage, alternatives, including non-placement will be considered.

5.3 Neighbourhood Traffic Management

Traffic calming reduces speed improves safety

Neighbourhood Traffic Management is undertaken for two key reasons: it improves the safety and the liveability of neighbourhoods. It helps to preserve and enhance neighbourhood streets by minimizing negative impacts of traffic, such as noise, pollution, and visual intrusion. It also seeks to improve safety for pedestrians, cyclists, motorists and all other road users by implementing a wide range of measures. Successful traffic management measures effectively modify driver behaviour and some of them are self-enforcing.

Neighbourhood Traffic Management has the following benefits:

- It reduces vehicle speeds
- It discourages through traffic on local roads
- It minimizes conflicts

Research shows that traffic calming reduces speed and reduced speeds mean greater safety. The priority guide scoring systems weighs heavily on areas with pedestrian activity. This places priority on improving pedestrian safety.

6 RECOMMENDED PEDESTRIAN RELATED INITIATIVES

The safety of pedestrians is a priority. The following new initiatives are proposed to improve safety for pedestrians of all types. For implementation details refer to Page 41 Table 8.1-A Implementation Plan.

6.1 School Walking Route Program

The School Walking Route (SWR) program is an initiative to further encourage walking to school.

In recent years, there has been increased congestion in school areas as a result of parents driving their children to and from school. This congestion creates safety concerns caused by reduced sight visibility, driver frustration, and impeded emergency vehicle access.

The School Walking Route (SWR) program is an initiative to further encourage walking to school. The SWR project consists of placing “School Walking Route” signs along designated walking routes to schools. By designating school routes for children, we can increase awareness of child safety among drivers and reduce the number of vehicle trips to schools.

The benefits of the SWR program are:

- Informs drivers they are on a designated walking route
- Encourages parents to walk their children along the designated routes
- Encourages pedestrians to cross only at designated intersections
- Provides a safety assessment of walking routes
- Reduces traffic congestion at schools
- Reduced noise and air pollution
- Encouragement of a healthy and active lifestyle

SWR pilot programs will be implemented in two Brampton schools (St. Stevens Separate School and Morton Way Public Schools) beginning in 2009. This initiative can have positive impacts to the current traffic conditions at these schools and many schools Citywide in the future. Once these pilot programs have been completed they will be evaluated and a plan for implementation will be developed.

6.2 School Crossing Ahead Signage

School Crossing Advance" signs will provide additional warning of pedestrians

Currently, School Crossing Ahead signs are not located at approaching intersections with all-way stop and traffic signal control. Research of best practices within the OTC School Crossing Guard Guide reveals that these advanced warning signs are recommended. With this in mind, Advanced School Crossing signs will be installed on both approaches to the school crosswalks located at all-way stop and traffic signal intersections.

The installation of "School Crossing Ahead" at all-way stop locations and traffic controlled locations in Brampton will provide consistency throughout the City and the Region. In addition, the advance signs will provide an increase awareness of school crossing areas and potentially improve safety at the crossing. There are approximately 32 all-way stop and 37 traffic controlled school crossing locations in the City of Brampton. In order to provide 2 school crossing ahead signs at all of these locations it would cost approximately $20700 based on a cost of $150/ sign.

6.3 Two School Crossing Guards on Four Lane Roads

Currently, there are many school crossing guard locations on four lane roadways controlled by one Crossing Guard. It is difficult for a crossing guard to stop four lanes of traffic because drivers in the curb lane may not see the guard in the center of the roadway based on the drivers' line of sight or obstructions caused by other vehicles. It is also challenging for the guard to control all lanes of traffic while also control turning vehicles and pedestrians approaching form both sides. The demand on the crossing guard can result in a potential risk to pedestrians and the guard.

An additional crossing guard on 4-lane roads will improve safety

For the reasons above, two guards are recommended on four lane crossing locations. The assignment of two adult crossing guards on roadways supporting four or more lanes of traffic would increase the awareness of the school crossing and improve the safety of pedestrians and drivers at the crossing.

Currently there are approximately twenty two (22) uncontrolled 4 lane roadways in the City of Brampton with school crossings. The cost for an additional crossing guard would be approximately $8,000.00 per year per location. Therefore it is recommended that each location be individually evaluated prior to the assignment of a second crossing guard.

6.4 Audible Pedestrian Signal Placement Guidelines

In co-operation with the City's Accessibility Advisory Committee (AAC), staff been pro-active in examining ways to assist disabled persons through the use of Audible Pedestrian Signals' (APS) at signalized intersections.

An APS will be used to assist disabled pedestrians cross at intersections

TAC has provided comprehensive guidelines for the installation of APS. The recommendations of the guidelines include the following:

1. An integrated single unit push button, using delay activation with a vibrating arrow pointing in the direction of travel;
2. North/South WALK phase using an audible cuckoo sound;
3. East/West WALK phase using an audible chirp sound;
4. Audible sounds used during Walk Interval only;
5. Automatic sound adjustment above the ambient noise level;
6. Signage must be either on the housing or above the pushbutton;
7. Pedestrian timing measurements based on pedestrian pole location or curb to curb crossing distance;
8. Minimum of 3 meters separation is required between APS units when multiple units are installed on the same corner;
9. Curb ramps adjacent to crosswalk landing;
10. APS to operate 24 hours a day, 7 days a week.

In recognition that the above TAC guidelines are best practices and in support of accessibility citywide, Brampton will be developing a policy related to the installation of APS.

6.5 Enhanced Crosswalk Markings

Enhanced crosswalk markings are a technique that is used to heighten driver awareness of pedestrian crossings and increase crosswalk visibility. Two methods for enhancing crosswalk visibility are zebra markings and decorative thermoplastic markings.

6.5.1 Zebra Crosswalk Markings

Zebra marking crosswalks will improve the visibility of crosswalks

Zebra crosswalk markings are longitudinal lines installed within the pedestrian crosswalk parallel to the driver's direction of travel. The white bands are 60 cm wide and spaced 60 cm apart. Zebra crosswalks increase drivers' visibility of crosswalks during daylight and at night.

There have been several studies related to the effectiveness of zebra crosswalks in the improvement of crosswalk visibility. Based on this, the City will use zebra crosswalks as a means to improve pedestrian safety.

The following guidelines will be used to determine appropriate locations for Zebra Crosswalks in Brampton:

- The crossing location must be controlled by a traffic signal or stop sign.
- Where pedestrian crossing volumes are high
- In the presence of high right or left turn vehicle volumes
- Where there is a higher than expected number of pedestrian collisions

Zebra Striped Crosswalks will not be installed at locations without a traffic control device or at mid-block school crossings.

6.5.2 Decorative Thermoplastic Markings

Decorative thermoplastic pavement markings is a mixture of glass beads, binder, pigment, filler materials and thermoplastic that becomes liquid when heated. When properly applied, thermoplastic should last from five to eight years under normal traffic conditions. Decorative thermoplastic markings can be used to provide improved crosswalk visibility for both pedestrians and drivers. The installation of decorative thermoplastic markings are more costly than the use of more traditional methods of delineating

pedestrian crossings and should be used in areas where enhanced urban design is desired.

The following guidelines will be used to determine appropriate locations for Decorative thermoplastic pavement markings in Brampton:

- The crossing location must be controlled by a traffic signal or stop sign.
- Where pedestrian crossing volumes are high
- In the presence of high right or left turn vehicle volumes
- Where there is a higher than expected number of pedestrian collisions
- In Decorative thermoplastic pavement markings for crosswalks will not be installed at locations without a traffic control device or at mid-block school crossings.

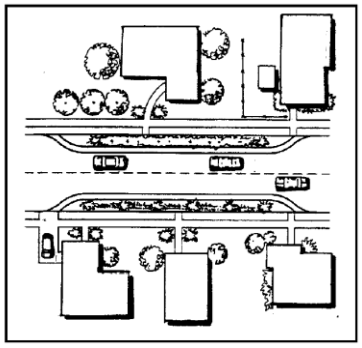
6.6 Traffic Calming Measures

In general Traffic calming can be used to enhance pedestrian safety by reducing vehicular speeds and reducing traffic volumes. Specific traffic calming measures can be utilized as a tool to further enhance pedestrian safety at crossings by increasing crossing visibility and reducing pedestrian crossing distances. In order for any traffic calming measures to be effective they must be placed under the right circumstances and in warranted locations, in April 2007, the City of Brampton approved the Neighborhood Traffic Management Guide (NTMG) to ensure that the implementation of traffic calming measures are warranted and a proper fit for the area.

Therefore, any traffic calming measures that are to be used for enhancing pedestrian safety should adhere to the criteria set out in the Neighborhood Traffic Management Guide.

6.6.1 Chokers (intersection & midblock narrowing)

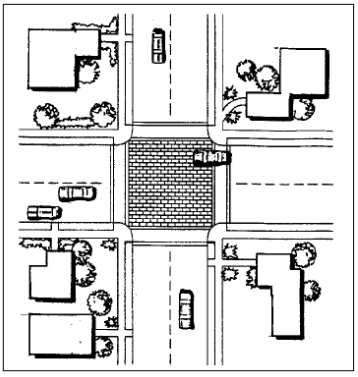
A choker is a narrowing of a street, either at an intersection or midblock, in order to reduce the width of the traveled portion of the street. Chokers are curb extensions that narrow the traveled portion of the street by widening the sidewalk or planting strip. Bulb type chokers can improve the safety of an intersection by providing pedestrian and drivers with an improved view of one another. They also reduce pedestrian crossing distance thereby lowering their exposure time to vehicles.



HOWARD COUNTY, MD

6.6.2 Raised Intersections

Raised intersections are flat raised areas covering entire intersections, with ramps on all approaches and often with textured materials on the flat section and usually rise to sidewalk level, or slightly below to provide a “lip” for the visually impaired. They can make the entire intersection, including crosswalks a pedestrian territory by making the intersection and crosswalk more visible to drivers.



6.7 Revised Geometric Design

When designing roadways, staff work from widely accepted design principles that create a road environment that is safe for all road users, including pedestrians, bicyclists, motorcycles, cars and trucks. The goals of safe roadway design include:

- All users of the roadway have consistent information about the road ahead, provided in sufficient time to respond to it.
- Visibility is adequate, and visual barriers eliminated.
- Warning will be given for any changes in the road condition or for substandard features in the roadway.
- Warning and guidance is given for unusual changes in the road.
- All roadway users will be alerted to conflict points such as intersections, and control users’ progress through these.
- Appropriate property is available to accommodate the design.

To enhance these considerations in relation to pedestrian safety, adjustments will be made during the road design process that consider a more pedestrian safe environment. Further, new adaptive design standards to further enhance pedestrian safety will be considered. To ensure proper fit of design, any enhancements to

geometric design standards must adhere to the overall principles of road design within a growing urban environment. Some examples of innovative initiatives that will improve safety for pedestrians through design are:

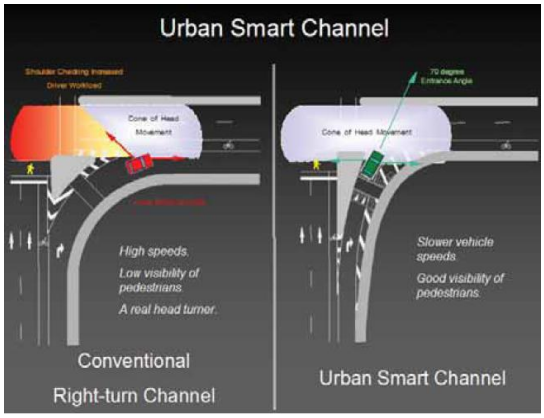
- Removal/reduction of channelized turn lanes, where appropriate
- Smart Channels
- Pedestrian refuge Islands

These examples have specific design considerations for pedestrians, which are described in further detail in the following sections.

Staff will also work in cooperation with the Region of Peel to incorporate this approach to providing a safe pedestrian environment through the road design process on roads under the jurisdiction of the Region of Peel, thus maintaining a consistent road design that enhances pedestrian safety throughout the City of Brampton.

6.7.1 Smart Channels

Smart channels are similar to the conventional right turn channel however the angle of the channel is less acute, typically 70^{o} to the cross street which provides the driver with a clearer view of the cross traffic and pedestrians, it also forces drivers to slow down as they make the turn.



Characteristics:

- Dedicated parallel right-turn lane
- No departure taper
- Corner pork-chop island
- Yield sign for traffic control at the departure end of the pork-chop
- Nominal intersection angle at the Yield of 70°

Benefits:

- Separates right-turning traffic

- Slows turning-vehicle speeds and improves safety
- Reduces the viewing angle for drivers so they can see approaching cross-street traffic more clearly
- Improves pedestrian visibility
- Reduces the crossing distance for pedestrians

Conventional right turn channels cause drivers to look back between 120^{o} and 150^{o} to see approaching traffic which creates a situation where drivers may not be aware of pedestrians at the intersection.

6.7.2 Pedestrian Refuge Island

Pedestrian refuge islands are protected areas between opposing lanes of traffic where pedestrians may safely wait until vehicular traffic clears so that they can cross. With a pedestrian refuge island in place, a pedestrian would only have to look in one direction to cross to the median, and in the opposite direction to complete their crossing from the median to the far side of the street.

When evaluating whether a refuge island is needed, both crossing time and safety must be considered. Refuge islands are commonly found along wide, multi-lane streets where pedestrian crossing is common. The typical conditions where refuge islands are most beneficial include:

Refuge islands reduce the distance for pedestrians crossing major roads

- Wide, two-way streets (four lanes or more) with high traffic volumes, high travel speeds, and large pedestrian volumes.
- Wide streets where the elderly, people with disabilities, and children cross regularly.

Pedestrian refuge islands must be visible to motorists at all times and should be delineated by curbs, guideposts, signs, or other treatments. Refuge islands should be designed to minimize the potential hazard to motorists and pedestrians.

The disadvantages of pedestrian refuge islands include:

- A false sense of security or safety to pedestrians.
- Street sweeping or snowplowing problems.
- Damage to vehicles if struck.
- Installation costs will be higher.
- Generally, more right-of-way is required.

Where feasible pedestrian refuge islands will be considered when there is a significant presence of pedestrian crossing activity but less than that required to warrant pedestrian traffic signals.

6.8 Maintenance of Pedestrian Facilities

One key element in providing a safe environment for pedestrians is to ensure that pedestrian facilities are adequately maintained, be it sidewalks or pedestrian crossings.

Ensure pedestrian facilities are adequately maintained.

In order to provide a safe environment for pedestrians the City currently inspects all sidewalks on an annual basis.

To further enhance pedestrian safety a yearly winter inspection program shall be implemented to ensure that sidewalks and pedestrian crossings remain safe and free from hazards.

In June 2008, Council approved the following winter maintenance service level improvements:

- Local roads with schools will receive a high level of salting and plowing, similar to arterial & major collector roads
- Local roads without sidewalks will receive salt application, rather than sand

Sidewalks on roads serviced by Brampton Transit will be plowed.

6.9 School Travel Planning (Stepping Up Program)

A new pilot project has been initiated in Canada by the Public Health Agency of Canada to utilize a community based approach to get more children to walk and bike to school.

School Travel Planning is a community-based approach that aims to increase the number of children choosing active transportation modes to get to and from school, thereby addressing the issues of sustainability, safety and health.

Through a five-step process, each school writes a School Travel Plan, with assistance from the community stakeholders, that includes an action plan describing steps they plan to implement such as:

- introduction of school infrastructure—e.g. bike shelters, bike racks, lockers;
- education—e.g. safety training for walking and cycling, awareness raising;
- community mobilization—e.g. walking school buses, walking buddies, ride sharing;
- encouragement—e.g. celebrations of physical activity and environment, event days, recognition and rewards for

walking/biking; and

- engineering improvements at or near school sites—e.g. pedestrian crossings, adult crossing guards, repairs/upgrades to sidewalks, signage.

6.10 Public Awareness, Communications and Education

There is a requirement for pedestrians to realize their role to ensure their own safety. We must inform the public about the available traffic control and educate on their use. This section discusses the strategic implementation of the initiatives previously discussed. Key partnerships and communication strategies have been identified in order to raise awareness about pedestrian safety.

Communication is important to raise awareness about pedestrian safety issues

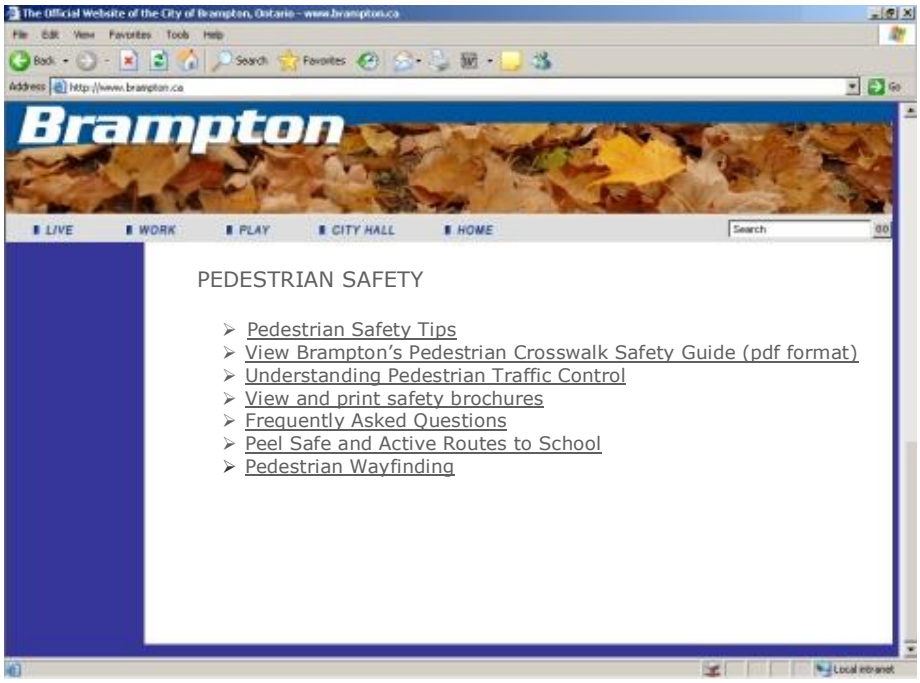
The communications planned to raise the awareness of pedestrian safety includes educating the public through printed material and the City's website.

6.10.1 Flyers/brochures

The pedestrian plays an important role in keeping themselves safe. There is much published information related to the things pedestrians can do to ensure they are safe. An effective means to convey this message of safety is through a brochure which can be distributed to the appropriate target audience.

6.10.2 Web site

The City's website is a valuable tool to raise awareness about pedestrian safety. In addition to the content within this document, safety tips related to pedestrian safety will be provided.



The City's website will provide the public with pedestrian safety information

7 PARTNERSHIPS

A partnership with the various safety-based organizations is important in communicating the message of pedestrian safety. These partnerships can broaden the exposure and prioritize pedestrian safety amongst so many public safety issues.

7.1.1 Brampton Safe City: Road Safety Committee

The Brampton Road Safety Committee supports Brampton residents in reducing dangerous and aggressive driving by developing strategies, programs and activities to promote safe driving behaviour, and to reduce traffic related concerns. The committee strives to establish effective partnerships among the police, government and other stakeholders involved in road safety education, enforcement and engineering.

Brampton Road Safety Committee was instrumental in achieving the World Health Organization's designation as a Safe Community. Its strategic approach to road safety includes an annual campaign focussed on safety for children, adults, teenagers, and seniors. The partnership with and Brampton Safe City includes contributions to localized educational campaigns.

7.1.2 Brampton Safety Council

This committee advises City Council on matters relating to students school bus and street patroller programs, school routes, school bussing and bicycle safety, school crossing guard locations and on any other matter related to school safety requiring the application of engineering standards and warrants, specialized expertise or enforcement.

7.1.3 Peel Safe and Active Routes to School

They provide school pedestrian initiative in an effort to promote a healthy and active lifestyle

The Walk to School days will be supported

7.1.4 Children's Safety Village

The Peel Children's Safety Village is an innovative community project that was launched in 1994 with a goal to reduce the alarming rate of preventable traffic accidents, the leading cause of death for children aged one to nine. The philosophy of the Peel Children's Safety Village is:

> *Tell me and I'll forget; show me and I may remember;*
> *involve me and I will understand.*

The Safety Village gives youngsters a facility where they can practice the safety rules they've learned at school and at home. Until recently, the only place to formally teach elementary school children about safety was the classroom.

7.1.5 Accessibility Advisory Committee

The Accessibility Advisory Committee advises City Council regarding the preparation, implementation and effectiveness of the annual Accessibility Plan. They provide a forum for persons with disabilities, many of who are pedestrians, to raise issues and concerns and to provide advice and guidance to City Council on matters relating to policies, practices, services and programs

8 CONCLUSIONS

Pedestrians are among the most vulnerable of road users, and as previously discussed collisions involving these users has been on the rise over the past few years, especially those where there has been a pedestrian fatality.

In order to try and reduce the number of collisions involving pedestrians City staff has been working to enhance pedestrian safety through the use of such things as pedestrian warning signs, pedestrian countdown signals, neighbourhood traffic management, etc. However, through innovative design, and education it is possible to provide for an even safer environment for pedestrians.

It is therefore recommended that a set of design criteria and guidelines be prepared for the implementation of the initiatives described in this document.

8.1 Implementation

The initiatives that have been outlined in this document are planned to be implemented over the next 5 years. Several factors such as cost of implementation, appropriateness of initiative and development of warrants or implementation criteria will affect the timing for implementation. The various initiatives and possible implementation procedures/timelines is outlined in table 8.1-A.

Table 8.1-A Implementation Plan

Initiative	Outline of Initiative	Implementation Process	Timeline for Implementation	Cost/Budget
SCHOOL WALKING ROUTE PROGRAM	Program to encourage children to walk to school using a designated signed route	In 2009 two schools have been chosen as a pilot for this initiative—once the pilot program has been completed and evaluated a program will be created to implement this program at other schools in the City.	Pilot program currently underway.	The Pilot program was partially subsidized by "The Toronto Safe & Active Route to School Committee." Future school route signage required for the implementation of this program will be incorporated in the Works & Transportation operating budget
SCHOOL CROSSING AHEAD SIGNAGE	Provide School Crossing Ahead signage at intersections with all-way stop and traffic signal control.	The 34 all-way stop and 37 traffic controlled school crossing locations will be evaluated and prioritized 2010, a plan for the installation of the signage will then be created.	The number of signs required per location (anywhere from 2 to 4) will determine how many locations can be implemented each year with the intent of having signs at all locations within 5 years.	Currently there are 71 school crossings at signalized and all-way stop intersections that will require advanced school crossing signs (approximate cost $30,000) which will be incrementally proposed in the Works & Transportation operating budget annually for the next five years.
TWO SCHOOL CROSSING GUARDS ON FOUR LANE ROADS	Providing two adult crossing guards on roadways with four or more lanes of traffic will increase the awareness of the school crossing and improve the safety of pedestrians and drivers at the crossing.	A warrant for the assignment of additional guards on a 4 lane roadway will be created. The twenty two (22) uncontrolled 4 lane roadways in the City of Brampton that have school crossings will be evaluated and locations that meet the criteria outlined in the warrant will have additional guards assigned.	This initiative is currently underway with 11 of the 22 current locations having 2 crossing guards. The remaining locations will be implemented over the next 3 years.	The additional cost for providing an extra guard at uncontrolled crossings on 4 lane roads will be incorporated into the school crossing guard budget on an annual basis over the next 3 years (approximate cost $8,000/location).
AUDIBLE PEDESTRIAN SIGNAL PLACEMENT GUIDELINES	Audible Pedestrian Signals (APS) will be used to advise pedestrians who are blind, visually impaired, and deaf/blind when they have the right-of-way to cross at signalized intersections.	A policy and warrant for the installation of Audible Pedestrian Signals will be developed. Once requested, intersections will then be evaluated to determine if the minimum warrant criteria has been met.	The creation of a policy and warrant will be completed in 2010. Implementation will be ongoing and will be based on whether the intersection meets the required warrants.	Installation of Audible Pedestrian Signals will be on an as needed basis and will be included in the Works & Transportation budget and reconstruction projects. (Approximate cost $8,000/location).
ENHANCED CROSSWALK MARKINGS	Enhanced Crosswalk Markings will be used to heighten driver awareness of pedestrian crossings and increase crosswalk visibility at intersections.	A policy and warrant for the installation of Enhanced Crosswalk Markings will be developed. Once requested, intersections will then be evaluated to determine if they meet the minimum warrant criteria.	The creation of a policy and warrant will take place to allow for the implementation in the summer of 2010 based on intersections meeting the required warrants.	The installation of Enhanced Crosswalk Markings at intersections will be incorporated in the Works & Transportation pavement marking budget and where possible as part of road improvement projects. Higher order crosswalk treatments (e.g. Decorative Thermoplastic) require additional funding and will be identified separately as part of annual budget submissions.
TRAFFIC CALMING MEASURES	Traffic Calming Measures can be utilized to enhance pedestrian safety at pedestrian crossings by increasing pedestrian visibility and reducing pedestrian crossing distances	Any Traffic Calming Measure that is to be implemented will adhere to the criteria set out in the Neighbourhood Traffic Management Guide.	Implementation of this initiative will coincide and adhere to the criteria set out in the City of Brampton Neighbourhood Traffic Management Guide.	Traffic Calming Measure will be part of the implementation of the Neighbourhood Traffic Management Program and will continue to be submitted as part of the annual Works & Transportation budget submissions.
REVISED GEOMETRIC DESIGN	Innovative design initiatives such as the Pedestrian Refuge Island & Smart Channels , which are outlined in the plan will require geometric changes to the roadway.	Work with city and regional staff to incorporate design initiatives into future road reconstruction projects. Modify the City of Brampton Design Standards to include pedestrian related design alternatives where appropriate and present these design alternatives to the Standards Committee for approval.	This initiative will require City of Brampton staff to work in conjunction with Region of Peel staff over the next year to incorporate design changes where applicable.	The Revised Geometric Design (e.g. Smart Channels & Pedestrian Refuge Island) will be incorporated into road improvement projects where applicable. Funding will be included in the project budgets and submitted as part of the annual Works & Transportation budget submissions
MAINTENANCE OF PEDESTRIAN FACILITIES	Maintenance of pedestrian facilities is a key element in providing for the safety of pedestrians.	In June 2008, Council approved winter maintenance service level improvements for various types of roadways. In addition to the previously noted maintenance improvements a yearly inspection program will be implemented to ensure that sidewalks and pedestrian crossings remain safe and free from hazards.	A policy and checklist for yearly inspections of pedestrian facilities will be developed and used for each annual winter operation.	Any additional cost for this initiative is incorporated into the Works & Transportation annual winter maintenance budget.
SCHOOL TRAVEL PLANNING (STEPPING UP PROGRAM)	A pilot project initiated by the Public Health Agency of Canada to get more children to walk and bike to school. School Travel Planning is a community-based approach that aims to increase the number of children choosing active transportation modes to get to and from school.	Since this initiative involves participation from the respective school boards, the surrounding communities and the city, public information centers as well as a school/community committee will need to be created for those schools/communities that wish to participate in the program.	This initiative will require that City of Brampton staff to work in conjunction with the Region of Peel and Metrolinx. The "Stepping It Up Project" will implement a school travel plan for 5 schools in Brampton over the next 2years	Signage requirements will be required on a case by case basis and will be identified as part of the annual Work & Transportation budget submissions.
PUBLIC AWARENESS, COMMUNICATIONS AND EDUCATION	One of the main tools in providing a safe pedestrian environment is Public Awareness, Communications and Education.	This initiative requires the City of Brampton to provide on its WEB site a page dedicated to providing pedestrian related information. The City would also have to create flyers/brochures that would be made available to the general public, and provide pedestrian education seminars if requested by the public.	The implementation of this initiative is immediate, the web site and flyers/brochures will be developed and included on the City of Brampton web site.	Additional funding is required for this initiative as implementation progresses and will be identified as part of the annual Works & Transportation budget submissions.