MISSISSAUGA

Corporate Report

Clerk's Files

Originator's Files MG.23.REP

DATE: February 26, 2009

TO: Mayor and Members of Council
Meeting Date: March 11, 2009

FROM: Martin Powell, P. Eng.
Commissioner of Transportation and Works

SUBJECT: **Automated Speed Camera – Business Case**

RECOMMENDATION:

1. That the report entitled "A Request for Approval to use Photo Speed Enforcement Technology to Protect Lives and Reduce the Risk of Injury on Roads in the City of Mississauga", dated March 2009, be endorsed by Council as the basis of a request to the Province of Ontario to permit an Automated Speed Camera pilot program in Mississauga.

2. That the two year start-up costs estimated at $550,000 as detailed in the report entitled "Automated Speed Camera – Business Case", dated February 26, 2009 be approved in principal, subject to a positive response from the Province of Ontario to permit the use of automated photo speed enforcement in Mississauga.

3. That Mayor McCallion and appropriate staff present the report entitled "A Request for Approval to use Photo Speed Enforcement Technology to Protect Lives and Reduce the Risk of Injury on Roads in the City of Mississauga", dated February 26, 2009 to the Premier of Ontario, the Minister of Transportation Ontario, and the Attorney General with a request to permit automated photo speed enforcement pilot project in Mississauga.

BACKGROUND:

The City of Mississauga has identified a speeding problem on many of its roadways. Though many programs and initiatives have been implemented with some degree of success, including traditional police enforcement, the speeding problem persists. Automated photo speed enforcement has been used effectively in other jurisdictions to address excessive speeding. The Province of Ontario (Province) does not permit the use of automated speed enforcement and has denied requests from several municipalities such as Ottawa, Mississauga and Toronto for this application. City staff was directed by Council to prepare a business case that would support a request to the Province to permit the use of automated photo speed enforcement in Mississauga.

The Safe Driving Committee created an Automated Speed Compliance Committee to coordinate this effort. The actual project has recently been renamed the Automated Speed Camera (ASC) program. The ASC program is proposed to be operated by the City and is supported by the Peel Regional Police. The ASC business case has been drafted and is appended to this report (Appendix 2). It presents a solid case supporting the use of automated photo speed enforcement in Mississauga.

The purpose of this report is to present the business case to Council, and to highlight specific resources needed to make this project succeed, should the Province decide to make the necessary legislation changes.

COMMENTS:

The ASC business case provides an excellent overview of how automated photo speed enforcement can help to mitigate Mississauga's speed problem. It also provides a good overview of the process and costs to operate a successful program. If the Province agrees to allow Mississauga to proceed with the ASC program, there is a considerable amount of work that must be done during the start-up phase that is not detailed in the business case. This includes staff time for:

- reviewing and assisting in developing technical details and requirements for the needed equipment;
- meeting and working with the Province in drafting the needed legislative requirements;
- meeting with officials from municipalities such as Edmonton and Winnipeg that have successful programs in place;
- preparing the tenders etc. in order to purchase the necessary

equipment;

- negotiating and preparing various agreements that may be required from parties such as the Ministry of Transportation Ontario (MTO) and the Peel Regional Police;
- reviewing and determining how the infractions will be dealt with in the provincial court; and
- setting up the communications needed to ensure that this project remains transparent.

In order to help estimate the scope of the start-up work needed to make this project succeed, the Red Light Camera (RLC) project was reviewed since it shares much of the same technologies, processes and has similar legislation already in place. In fact, the RLC project provides a good roadmap for how the ASC project may proceed.

Red Light Camera Project

Prior to the RLC project being established, many municipalities requested the Province to allow automated red light photo enforcement to be used. The Province was resistant at first but eventually did allow a pilot project to take place. It is interesting to note that the Province invited a coalition of municipalities to participate in the pilot project. This satisfied the many municipalities that had requested use of the technology, and helped to ensure that the program parameters would satisfy the needs of municipalities throughout Ontario. The Province placed many conditions on the project, including provisions for Provincial staff monitoring the project progress, and the requirement that a statistically significant report was to be produced to clearly measure the project success. The costs of these conditions were paid for by the municipal coalition.

The Province effectively placed itself in the enviable position of permitting the program to proceed yet having the municipality assume the risk. There is a strong possibility that the Province may take this same approach with the ASC project. There have been a number of municipalities, including Mississauga, Ottawa, and Toronto to name a few, that have expressed interest in this application. This may present advantages to the City of Mississauga as the start-up and certain other project costs could be shared. The City would also get the recognition of having been leader in making it happen.

Start-Up Resources (2 Years)

If the Province decides to allow automated photo speed enforcement, the biggest impact for Mississauga will be if they permit a pilot project to proceed in Mississauga exclusively. Figure 1 in Appendix 1 is a diagram of the six major areas that needed to be developed for the RLC project and in Appendix 1, Figure 2 is the project development chronology. Though much of the RLC work can be used for the ASC program, many of the specific technology, legislative, legal, purchasing and communication work must still be developed.

The identified Start-Up Resources include:

- 1 Project Manager;
- Technologist ½ FTE staff person;
- Legal Services - 150 hours;
- Consultant Services - $100k per year = $200k;
- Communications - $25k; and
- Other Staff - Significant efforts from Materials Management, Prosecution and Clerks/Courts.

At the end of the start-up phase, more details will be known with respect to program design and the impact of possible conditions set by the Province. As there are many unknowns with such a complex project, a two year time frame was used for the cost schedule estimate (detailed in Appendix 3). City staff will report back to General Committee regarding the refined Automated Speed Camera pilot project following the start-up phase and a recommendation made regarding implementation.

Risks

The ASC project is very technically demanding and is much more controversial than its RCL counterpart. It is much easier to visualize the dangers of running a red light than it is to understand the dangers of speeding, particularly when speeding is so widespread. The main risk for the City is that the project will fail and that a significant amount of resources and effort will be wasted. The worst case scenario is that the first violation would be successfully challenged and thereby jeopardize the continuation of the project. To avoid this, much work will need to be devoted to ensure that the project is as legally solid as possible. There are also risks that the capture rate will be significantly lower than projected, resulting in reduced revenues and increased net

costs. The ASC has a distinguishing inclusion of advanced warning signage for automated speed camera locations. In theory, motorists are given advanced warning and have time to adjust their speeds prior to being exposed to speed cameras.

The ASC project should be viewed as a safety initiative and the pilot program is intended to further develop and evaluate the tool prior to further deployment. The Region of Peel adopted the RLC program, which has cost millions of dollars with limited revenue stream in return. It was approved as a safety initiative and the costs were absorbed.

Timing

If Council approves the ASC business case, it would be forwarded to the Province in March 2009 at the earliest. It is anticipated that the Province would require a significant amount of time to circulate and evaluate the proposal through its various Ministries that are impacted. There would likely be a series of meetings to refine the concept and to establish conditions. If a coalition of municipalities is to be included, the timelines would be further extended to allow further inter-municipal coordination to take place. At best guess, most of the start-up work would take place in 2010 and likely 2011 for the project to proceed to the procurement and detailed agreement stage.

The pilot project request includes a project time period of up to four years. This would allow for a two year operation period and the necessary evaluation of success. If successful, the extra two year period would allow for continuation of the program, while the results are circulated and the necessary legislation changes are made to make the program permanent.

Other Considerations

The City and Peel Regional Police have a number of programs to deal with speeding, including traditional enforcement and a number of awareness programs. One of the tools for addressing speeding, particularly at the neighbourhood level, is Traffic Calming. A number of residents and resident groups have actively petitioned for retrofit traffic calming but to date, Council has not supported a retrofit traffic calming. Traffic calming has been used in newly constructed neighbourhoods in Churchill Meadows with some degree of success.

Traffic Calming was the subject of a major report to Council dated November 15, 2002. It is well suited to neighbourhood collector and local roads with no transit routes, whereas automated speed cameras tend to be better suited to larger collector and arterial roadways. In short, they tend to compliment each other.

Traffic calming can be relatively expensive and definitely requires significant resources to evaluate problem areas and to lead residents through the approval process. It is likely that the issue of Traffic calming will be raised again if the ASC project proceeds. If net revenues from ASC were realized, they may be suitable for use for traffic calming applications (this would support the ASC condition that any net revenues be used for traffic safety programs). Either way, the City should be ready to address the issue of traffic calming in retrofit locations. Staff is very familiar with traffic calming applications and this should not present a problem.

The Safe Driving Committee is also reviewing the Speed I Program, which is a speed awareness program by the Halton Regional Police that is proposed for initiation in the Spring of 2009. Speed I uses radar technology coupled with video imaging to identify speeding vehicles. No violations are issued but letters can be sent from the police. This initiative requires significant resources and funding with no offsetting revenue source. This is being looked at as a separate project by the SDC.

FINANCIAL IMPACT: The start-up resources needed for the ASC program include dedicating a project manager, consulting services and significant staff time for technical, legal, purchasing, prosecution, and administration. The magnitude of this effort is highly dependant on the conditions from the Province should they approve the ASC project.

The ASC program is anticipated to have start-up costs of $550,000, which have not been identified in the budget process. The timing of the start-up phase is dependant upon a positive response from the Province and is anticipated to last about two years.

The start-up phase of the project would further refine the cost and revenue estimates for a two year pilot project. The preliminary cost estimates for a two year enforcement operation are as follows in Schedule 1:

Schedule 1: Financial Estimate for a Two Year Pilot Project

Duration (Years)	Phase	Cost/Revenue
1-2	Start-Up	$550,000
2	Active Photo Enforcement	
	Cost	$6,036,000
	Revenue	$5,077,000
	Net Cost	$1,509,000

A report with refined program cost estimates would be presented to Council following the start-up phase and a decision made at that time if Council wishes to proceed with active photo enforcement.

CONCULSION:

The business case for an Automated Speed Camera pilot project in Mississauga is complete and provides a good basis for a request to the Province to make the necessary legislative changes. The City is in a good position to carry out an automated photo speed enforcement program if the necessary start-up and operating costs are committed.

ATTACHMENTS:

Appendix 1: Figure 1 – Red Light Camera Steering Committee Structure
Figure 2 – Red Light Camera Chronology – 23 months

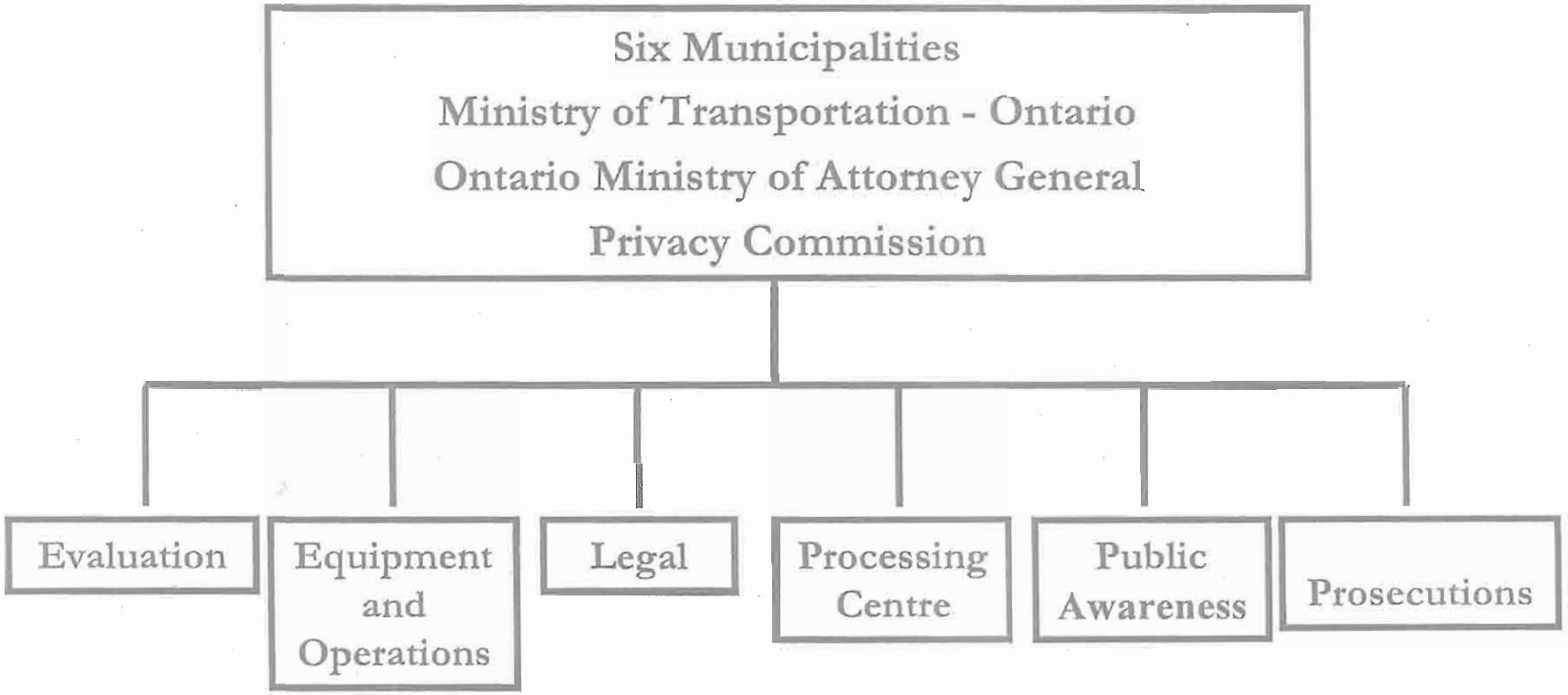
Appendix 2: Automated Speed Camera Business Case

Appendix 3: Automated Speed Camera Pilot Project Cost Estimate

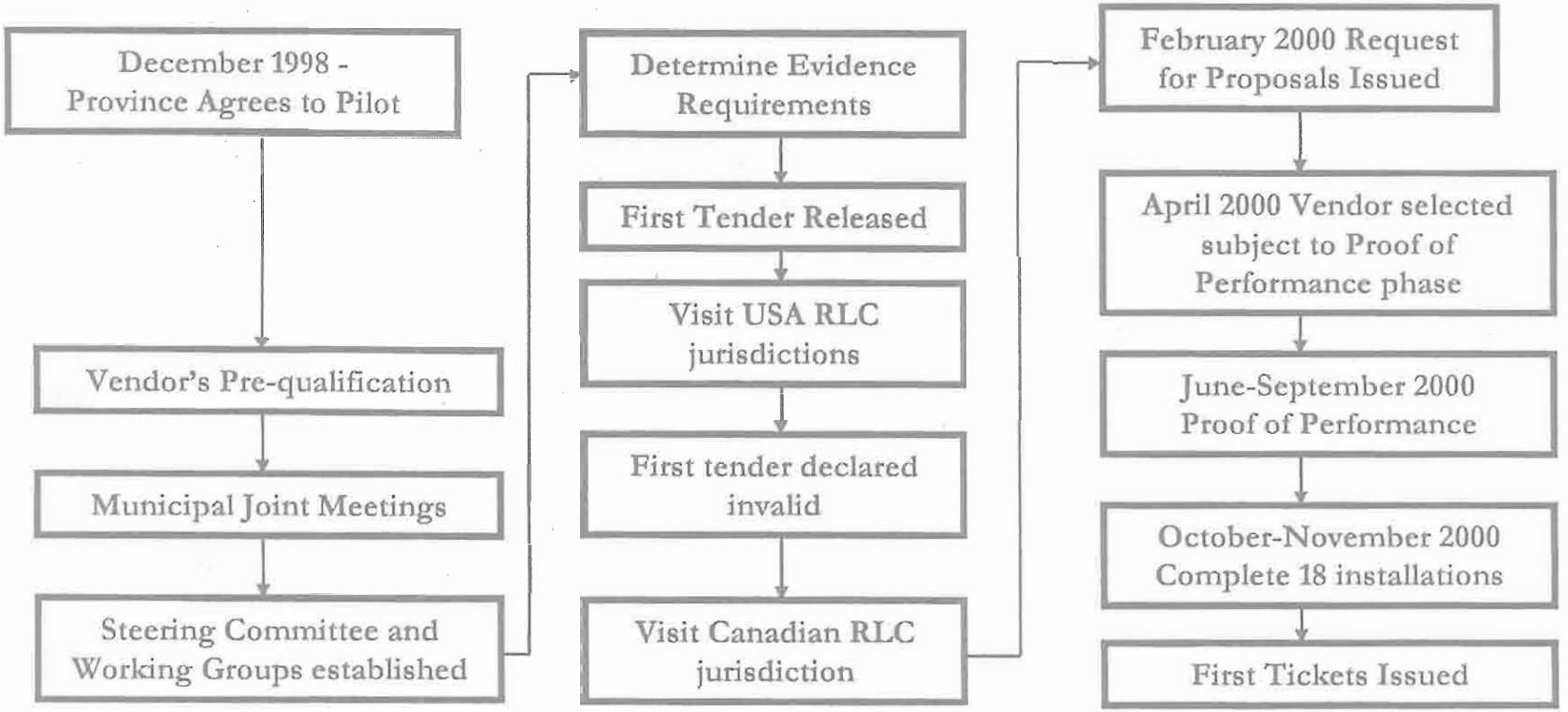
Martin Powell, P. Eng.
Commissioner of Transportation and Works

Prepared By: Andy Harvey, Manager, Traffic Engineering and Operations

Red Light Camera
Steering Committee Structure



Red Light Camera Chronology - 23 Months



Cost Projection for ASC Pilot Project

City Start-Up Costs (2 Years)		
ITEM	COST	COMMENT
Project Manager Full Time 2 Years	$160,000	
Technologist ½ FTE for 2 Years	$70,000	
Legal 150 Hrs	$45,000	
Other Staff:	$50,000	Includes Purchasing, Communications, Clerks, Prosecution, Management and miscellaneous (estimate figure)
Consultant Services (Start-Up Phase $100K/yr)	$200,000	
Communications Costs (start-up phase)	$25,000	
TOTAL Start-Up Costs	**$550,000**	

Annual Operating Cost		
ITEM	COST	COMMENT
Project Manager	$40,000	1/2 time druing evaluation period
Consulting Services	$25,000	$25K/yr during evaluation period
Subtotal Project Admin Cost	**$65,000**	
2 Fixed Units at Intersections	$72,000	Lease cost including installation, maintenance, and operations (field and central)
2 Mobile Units	$72,000	Lease cost including installation, maintenance, and operations (field and central)
2 Vehicles (Large vans)	$25,000	Lease costs
7 Operators for Mobile Units	$560,000	2 units xx14 hrs/shift x 365 days/yr =10,220hrs (7 ops x 1,600 hrs/yr = 11,200)
JP	$176,000	Required 80% of the time
1 Court Recorder/Monitor	$60,000	Required 80% of the time
1 Admin Supervisor	$85,000	
7 Admin Staff	$525,000	
8 Computers	$32,000	
ICON	$76,000	Based on approximately 37,000 charges at $1.96 plus GST per charge
Prosecution	$80,000	This is included in cost of court staff
MTO Data	$100,000	
Signing and Advertising	$400,000	As detailed in IBI Report
Evaluation and Assessment	$100,000	
Subtotal ASC Operation	**$2,363,000**	
25% Mark-Up	$590,000	25 % of annual operating cost
TOTAL Annual Operating Cost	**$3,018,000**	

2 Year Revenue	$5,077,000
Start-Up + 2 Year Operating Cost	$6,586,000
Net Revenue/Loss after 2 Operating Years	-$1,509,000

Note: The cost projection is based on a Start -Up phase of approximately 2 years followed by 2 years of enforcement.

A REQUEST FOR APPROVAL TO USE PHOTO SPEED ENFORCEMENT TECHNOLOGY TO PROTECT LIVES AND REDUCE THE RISK OF INJURY ON ROADS IN THE CITY OF MISSISSAUGA

Submission to the Government of Ontario

Submitted by the City of Mississauga

March 2009

MISSISSAUGA
Leading today for tomorrow

Acknowledgements

This submission was developed for Mississauga City Council by the Mississauga Automated Speed Compliance Committee, a sub-committee of the Mississauga Safe Driving Committee, based in part on research conducted by the IBI Group.

Members of the City of Mississauga Automated Speed Compliance Committee include:

- Chair Andy Harvey, Manager, Traffic Engineering and Operations
- Councillor Pat Saito, Safe Driving Committee
- Councillor Sue McFadden, Safe Driving Committee
- Jim Harries, Chair, Safe Driving Committee
- Alan Jones, Vice-Chair, Safe Driving Committee
- Staff Superintendent John Nielsen, Operations Services, Peel Regional Police
- Staff Sergeant Todd Ruston, Traffic Services, Peel Regional Police
- Michael Brady, Manager Traffic Safety, City of Toronto
- Mike Flanigan, Special Traffic Project Leader, Traffic Operations
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- Ivana Di Millo, Director, Communications, Corporate Services
- Gary Williams, Public Affairs Specialist, Communications, Corporate Services
- Karin Ann Brent, Legislative Coordinator, Office of the City Clerk

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Executive Summary

- The effective regulation and enforcement of driving speed on city roads is essential to the safety and security of the citizens of Mississauga.
- Under the authority of the *Highway Traffic Act of Ontario*, the City of Mississauga sets speed limits on City roadways at a level that is considered a reasonable and appropriate driving speed taking into account all of the risk factors that affect traffic safety.
- The City of Mississauga is using the full range of measures currently available to promote and gain compliance with posted speed limits, including: community awareness programs, signage, flashing lights, Speed Watch programs, traffic calming measures, targetted police enforcement initiatives, as well as regular police patrol.
- The analysis of speed data on Mississauga roads shows an alarming level of non-compliance with posted speed limits, endangering the lives and safety of many drivers and other road users on a daily basis.
- The risk to drivers and other road users due to speeding has reached an unacceptable level and has generated considerable concern within the community; three out of four residents surveyed support measures to control speeding on City roadways.
- Given the thousands of drivers daily that disregard posted speed limits within the city, the addition of photo speed enforcement technology to Mississauga's Traffic Safety Program represents the most practical and cost effective option that has proven to be effective in increasing the number of drivers who drive within the posted speed limits.
- Photo speed enforcement technology offers the most efficient option for cities to enhance speed enforcement, offering the capability to monitor, detect, record evidence, ticket, and prosecute speeding offences at an estmated average cost of only $91 per violation, substantially less than any other enforcement option currently avaiable to the City.
- The City of Mississauga's approach for using photo speed enforcement technology incorporates best practices from other jurisdictions, including: public communication, driver awareness measures, established site selection criteria, a review of speed limits, a reasonable margin of tolerance, regular program evaluation and public reporting on the results of the program.
- **The City of Mississauga is calling on the Government of Ontario to approve the use of photo speed enforcement technology in the City of Mississauga to protect lives and reduce the risk of injury on the City's roadways.**

Introduction

The use of photo speed enforcement technology has been given careful consideration by the City of Mississauga over the past four years. Research has been conducted on the safety implications of higher speeds, the extent to which speeding is a problem in the City of Mississauga, and the degree to which photo speed enforcement technology could be used to improve safety on City roads. Best practices have been explored, the technology has been reviewed, and an operating plan has been developed with a financial model and public communication plan.

The purpose of this submission to the Government of Ontario is to demonstrate that there is compelling evidence that supports the use of photo speed enforcement technology in the City of Mississauga. It is proven to be an effective and efficient way to address the unacceptable level of risk on city streets resulting from the large number of vehicles being driven at speeds that considerably exceed posted speed limits. This document outlines the City's current approach, the extent of the speeding problem, the rationale for using this technology to address this issue, and the intended objectives and direction for the City of Mississauga's proposed Automated Speed Camera (ASC) Program.

Mississauga residents want to know that they can drive or cycle on City roads and arrive at their destination safely; road construction crews need to feel that they work in a safe environment; and, the families of school children, seniors and the disabled should feel confident that their loved ones, and indeed all pedestrians, can safely cross City streets without the fear imposed by speeding traffic.

Mississauga City Council is strongly committed to the safety of our roads and neighbourhoods, and we recognize that effectively limiting the speed of traffic contributes to the overall quality of life for our community. As such, we are counting on the support of the Government of Ontario to provide the City with the additional tools we require for speed enforcement so that we may effectively protect the safety and security of our citizens.

1: The Current Approach

Under the *Highway Traffic Act*, the default municipal speed limit on municipal roadways is set at 50 km/h, and the City of Mississauga is given the authority to set speed limits ranging from 40 to 80 km/h in 10 km intervals, based on provincial guidelines. Speed limits that are set by the City are thoroughly reviewed taking into account of a number of safety factors.

City policy reserves the use of 40 km/h speed limits for roads in front of elementary schools and for roadways with geometric design that cannot support a 50 km/h or higher limit. On arterial and major collector roads where elementary schools are present, a School Safety Zone with a 40 km/h speed limit when flashing is used.

Established speed limits that exceed the 50km/h default in the City are based on a careful consideration of road design, driveway spacing, the location of signalized intersections, adjacent community uses, pedestrian activity, and collision history. Speed limits are set at a level that is considered a reasonable and appropriate driving speed, taking into account all of the risk factors that affect traffic safety. City Council approves speed limits based on the recommendations of a technical review of the circumstances. The decision making process is open and transparent, and the public has an opportunity to provide comment prior to a Council decision.

The extent to which day-to-day vehicle operating speeds are in compliance with the established limits determines the level of safety risk on City roadways. Speed limits are set to protect the safety of drivers, road construction crews, cyclists and pedestrians. Studies have shown that higher vehicle speeds increase the risk of collisions, the severity of injuries, and the potential for fatalities. Environmental factors such as pedestrian activity create additional safety risks. Evidence suggests that the effects of speeding on the collision avoidance abilities of drivers are comparable to those induced by alcohol and fatigue.

Traffic collisions, injuries and deaths caused by speeding impose a heavy social and economic cost to families and communities, and place a burden on our health care system. To protect lives and reduce the risk of injury on Mississauga roads, it is essential to effectively improve compliance with speed limits The Mississauga Safe Driving Committee has implemented a number of programs to increase the awareness of traffic safety issues and promote safe driving behaviours within the community. These programs are aimed at improving voluntary compliance with established speed limits, and include: neighbourhood entrance signs to slow down, neighbourhood Speed Watch Programs, School Speed Watch Program, the City of Mississauga's Road Watch Program, and the Mississauga Road Safety Handbook. These measures demonstrate the City's commitment to raise public awareness of traffic safety issues

and to emphasize the responsibility shared by all drivers to keep our roads safe for all that use them.

Traffic calming is also used by the City of Mississauga where appropriate. It introduces primarily physical measures that change the character of the road to alter driver behaviour. However, aggressive forms of traffic calming – such as speed humps, raised intersections, or road narrowing – are not suitable for implementation on major arterial roads with higher operating speeds, heavy truck traffic and with emergency response and transit service routes. As a result, these "active" traffic calming measures are not a practical option for the City of Mississauga's high-risk traffic safety corridors. However, passive forms of traffic calming, such as pavement treatments and on-street parking, are being used effectively in Mississauga.

The Highway Traffic Act of Ontario sets out fines for speeding in excess of the posted speed limit based on every km per hour that a vehicle is driven over the limit, with escalating rates in excess of established thresholds. Penalties are increased significantly in construction areas when workers are present and in the seven Community Safety Zones within the City of Mississauga. Speeding fines are an important deterrent to exceeding posted speed limits, but they are most effective when there is clearly a high probability of being caught and fined when speeding.

The City of Mississauga depends on Peel Regional Police Services to enforce speed limits within the City. There are three components to the Peel Regional Police Services approach to enforcement: the Regional Traffic Unit, the Divisional Traffic Unit and Platoon. The Regional Traffic Unit was formed in 2001 and is comprised of approximately 24 officers. They identify locations where the risk of speed-related critical collisions is greatest and then target enforcement and track the effectiveness of their programs. The Divisional Traffic Unit tracks complaints from the public and the City and responds with targeted speed enforcement efforts. Also, all officers in the field are responsible for a wide variety of enforcement activities including traffic infractions.

Enforcement activities are rarely dedicated to construction zone areas due to the potential danger associated with apprehending violators in these areas. Construction zones often do not allow room on the right-of-way to park a police vehicle or pull over a speeding vehicle.

2: The Problem

The risk to drivers and other road users due to speeding in the City of Mississauga has reached an unacceptable level and has generated considerable concern within the community. An online survey of Mississauga residents conducted in June 2008 shows that more than 80% of residents are concerned about speeding, and 76% support measures to control speeding on City roadways.

Analysis of speed data on 28 road segments, focusing on those with the highest levels of risk and/or community concern shows an alarming level of non-compliance with posted speed limits. Over a 24-hour period, on an average business day in the City, more than 113,000 drivers were travelling at speeds in excess of 10 km/h over the posted speed limits, and more than 27,000 drivers were found to be travelling at speeds in excess of 20 km/h over the posted limits in the study areas only. These behaviours endanger the lives and safety of all drivers and other road users, putting thousands of people at risk every day.

The City of Mississauga is currently using all available measures to get drivers in the City to understand the dangers of speeding and adjust their driving behaviours accordingly. Unfortunately, a significant number of drivers are not responding to the current approach. Measures such as flashing lights, increased signage, automated speed awareness signs and traffic calming are not able to effectively constrain speeding without the constant presence of enforcement.

We need to get the message across to motorists that have a clear disregard for road safety that exceeding the posted speed limit beyond reasonable tolerance levels will result in penalties – particularly in areas of the City that are of greatest concern from a safety perspective. Given the large number of drivers that put the safety of the public at risk every day, we believe the addition of photo speed enforcement technology to the City of Mississauga's Traffic Safety Program as a proven speed enforcement tool, represents the most practical and cost effective option for improving compliance with established speed limits.

3: The Solution

Studies clearly show that speed enforcement is most effective when there is a personal perception on the part of the driver that there is a reasonably high probability of being caught and fined if they exceed the speed limit.

Police enforcement is an important and necessary component of the City of Mississauga's Traffic Safety Program, and the City expects to continue to depend on the Peel Regional Police Force to enforce speed limits as they have done in the past. Police enforcement is effective in reducing speeding. Tickets are issued and when a police vehicle is present drivers do slow down. Peel Regional Council's approval of 42 additional officers in the police budget may result in more resources being available for speed enforcement in the future.

However, increasing police enforcement to the level that is required to create a lasting impact on driver behaviour - given the thousands of vehicles that are driven at speeds in considerable excess of the posted limits on a daily basis - would require significantly more Police Officers dedicated to Traffic Enforcement than is currently planned. Twenty-four hour coverage of four or more traffic corridors in the City on a continuous basis, and associated administration and court duties, would demand millions of dollars worth of additional dedicated officers. These resources, if available, could be more productively used to address policing issues that don't have a technological alternative that is readily available and confirmed to be effective.

Photo speed enforcement technology has proven to be an extremely accurate and effective deterrent to excessive speeding on roads with high volumes of traffic because it is capable of continuously monitoring, detecting and recording more than 100 speed violations per minute. The technology is able to calculate the rate of speed a vehicle is being driven every 30 seconds, and at the same moment take a photograph of the vehicle that can be used as evidence in court.

Photo speed enforcement technology clearly offers the most efficient option for the City to enhance speed enforcement. The full cost to detect speed infractions including the recording of evidence, issuing a violation, and prosecution is estimated at $91 per violation in the first two years of the program as planned. The cost associated with increasing police enforcement to achieve a comparable result would be substantially higher, and with minimal potential for new revenues to off-set the cost would place an unreasonable burden on taxpayers.

4: The City's Objectives

To bring clarity to its proposed ASC program, the City of Mississauga has prepared the following Statement of Objectives:

> In response to concerns expressed by its residents, the City of Mississauga proposes a full-time deterrent to drivers who choose to operate their vehicles at speeds that exceed posted limits, which would endanger the safety of other drivers, pedestrians and cyclists using Mississauga's road system.
>
> The City of Mississauga plans to introduce automated speed cameras as a supplement to traditional police enforcement. The ASC Program will combine increased speed enforcement with an extensive public information campaign and is supported by the Peel Regional Police.
>
> The primary objective of the ASC Program is to increase safety on Mississauga roadways by:
>
> - Increasing the number of drivers who drive within the posted speed limits;
> - Reducing the severity of collisions; and
> - Improving drivers' understanding of the dangers of speeding.
>
> The City of Mississauga will monitor the ASC Program to measure its effectiveness and demonstrate the impact on speed compliance, speeding charges, conviction rates, and the severity of injuries which result from high speed collisions.

5: The Proposed Plan

The City of Mississauga has consulted with our residents and we are confident that our proposed Automated Speed Camera Program effectively addresses public concerns that may exist with respect to the use of photo speed enforcement technology.

The City of Edmonton has been using photo speed enforcement technology to enforce speed limits on City streets since 1993. The photo enforcement Traffic Safety Study for the Edmonton Police Commission reported that the City of Edmonton recorded steady reductions in speeding violations and tickets per 100 vehicles monitored after photo enforcement was introduced. The conclusions of this study clearly demonstrate that photo speed enforcement technology can be an effective deterrent to speeding.

The City of Mississauga's proposed ASC Program is based on best practices to ensure the most effective program possible. The program will include a public communication campaign; driver awareness measures; established site selection criteria; a review of posted speed limits on roads to be included in the program to ensure they are fair and appropriate; a reasonable tolerance margin before fines are issued – subject to road, weather and traffic conditions; and a commitment to regular program evaluation with public reporting of results.

The suitability of potential ASC deployment locations will be carefully evaluated through comparison of location-specific quantitative and qualitative criteria, including speed criteria; collision history; roadway function; presence of vulnerable road users; and sight length and location. Only roads with a high safety risks will be included in the program.

A key element in the success of any enforcement practice is the implementation of a strong public awareness campaign. The City of Mississauga wants the public to be aware of speeding problems within its jurisdiction and the safety risks that are associated with exceeding posted speed limits. Our efforts to date and the proposed ASC Communications Plan will ensure that this is the case. The City of Mississauga plans to use brochures; an interactive web site; news releases; public meetings; tax bill inserts; facility posters; direct mail; newspaper advertisements; and signage in both deployment areas and at entrances to the City to launch the program and build public awareness on a continuous basis. Signs will be posted along the roads within the ASC Program at a reasonable distance upstream of the enforcement corridor, advising that speed is monitored by photo speed enforcement technology. The advance distance will be sufficient for drivers to slow down if necessary before they enter the enforcement corridor.

The City of Mississauga will evaluate the effectiveness of the ASC Program annually and report the results to the public. The evaluation will address the impact the Program has had on improving compliance with posted speed limits in high-risk areas.

Annual operating costs of the ASC Program are estimated at $3 million, based on the expectation that the City will operate two fixed photo enforcement units and two mobile units. Estimated first-year revenue from the program, based in part on the experience in the City of Winnipeg, is expected to be $2.9 million, decreasing to $2.2 million in the second year, due to expected adjustments in driving behaviour in response to the program.

It is a fundamental Council-approved directive of Mississauga's proposed ASC Program that any surplus revenues generated from ASC fines will be reinvested exclusively in road safety initiatives. In the event that there is net revenue realized from this program these resources will *not* be used to offset operating shortfalls in any other service area. This commitment should effectively reduce public concerns that this program will be used aggressively to generate as much revenue as possible for the City. The primary objective of the ASC Program is to reduce the number of motorists speeding on City of Mississauga roadways, which we fully expect will result in *reduced* revenues from this program over time as compliance with posted speed limits improves.

Once the ASC program is in place, and the community has had an opportunity to evaluate its effectiveness and to see the responsible way in which the City uses the technology, we are confident that support for the program will become even stronger than it is now.

In support of the proposed ASC program, the City of Mississauga has conducted a thorough review of the safety implications of vehicle speed; the nature and extent of speed related issues in the City; existing programs and opportunities; and best practices across the country. The results of this study are attached as Appendix 1 - **Proposed Mississauga Automated Speed Camera Program**, prepared with the assistance of IBI Group, 2009. The City of Mississauga's proposed **Communication Plan** for the ASC program is attached as Appendix 2.

6: Our Request

Based on our study findings and the plan proposed in this submission, the City of Mississauga is requesting approval from the Government of Ontario to proceed with a four-year pilot of the ASC Program to test the use of photo speed enforcement technology on roads in the community that present high safety risks, with the provision for regular reporting on results once the program is operational.

Photo speed enforcement technology is not new in Canada. It has been implemented in several jurisdictions for many years now with confirmed success. The City of Mississauga has benefitted from this accumulated experience and from the lessons learned. This allows us to propose an approach that has been proven to be effective, responsible and transparent.

Under section 228 of the *Highway Traffic Act*, The Government of Ontario has the option to allow for pilot projects such as the City of Mississauga's proposed ASC Program without the provision of new legislation. At the discretion of the Government of Ontario, a preferred approach may involve amendments to the existing provisions in the Act for the use of photo radar. Alternatively, special legislation could be adopted specifically to allow the City of Mississauga to proceed with this initiative.

The City of Mississauga is committed to working in partnership with the Government of Ontario and other stakeholders to achieve effective road safety results. This commitment has been demonstrated through the recent Red Light Camera initiative and many other successful joint projects over the years. We are just as committed to addressing any concerns or requirements that the Minister may consider appropriate to allow us to move forward with this important road safety program.

Mississauga City Council is strongly committed to the safety of our roads and neighbourhoods. We are counting on the support of the Government of Ontario to provide the necessary speed-enforcement tools to effectively deliver on that commitment.

Business Case
Appendix 1

City of MISSISSAUGA

City of Mississauga

PROPOSED MISSISSAUGA AUTOMATED SPEED CAMERA PROGRAM

FINAL REPORT

JANUARY 2009

IBI GROUP

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LIST OF EXHIBITS

1. INTRODUCTION

1.1 Background

In a March 2005 report to General Committee, City of Mississauga staff recommended that a Photo Radar Steering Committee be established to pursue the use of photo radar in Mississauga for automated speed compliance. The Province of Ontario currently does not permit the use of photo radar by any jurisdictions in Ontario. The March 2005 report was based on the Photo Radar Draft Implementation Strategy prepared by a Review Team of the Mississauga Safe Driving Committee.

In June 2007, the City of Mississauga tendered a Request of Proposal for the Development of a Business Case and Marketing Strategy for an Automated Speed Camera (ASC) Program*. IBI Group was retained in July 2007 to complete this assignment.

1.2 Scope and Objectives

The assignment includes the following components with objectives as indicated:

Project Justification and Design

- **Problem Justification** – To demonstrate the safety implications of higher speeds, the scale of the speeding problem in Mississauga, the need for an automated speed enforcement program, and the potential benefits of implementing such a program;
- **Application of Photo Radar** – To develop a structured program for the application of automated speed enforcement; and
- **Evaluation of Impacts** – To identify a methodology to assess the before and after measures of effectiveness of automated speed enforcement in order to evaluate the success of the program.

Business Plan

- **Technology Review** – to provide current information on the technology and systems best suited for the project;
- **Program Operation** – To develop a complete description of activities, roles and resources required to operate a pilot project, and ultimately a full deployment of an automated speed camera program; and
- **Financial Model** – To identify the financial aspects of the program by illustrating a revenue neutral deployment model.

Marketing Strategy

The objective of the marketing component is to develop a proposed strategy to address public and government officials' enquiries and concerns.

* In previous versions of this report the Automated Speed Camera Program was referred to as the Automated Speed Compliance Program. The name was changed to improve public recognition of the proposed program.

2. PROJECT JUSTIFICATION AND DESIGN

The purpose of this task is to prepare a technically sound and defensible need and justification for automated speed cameras in Mississauga, and to draft a pilot study design for a rigorous before and after assessment at suitable pilot sites.

A technically sound and defensible need and justification for automated speed cameras in Mississauga has to be founded on research that demonstrates the safety implications of higher speeds, and data that convey a legitimate speeding problem on City roadways. These two essential criteria are addressed in **Sections 2.1** and **2.2**, respectively. In **Section 2.3,** the many tools currently being used in Mississauga to combat speeding are presented as further confirmation of the need for automated speed enforcement.

The primary requirement for the pilot study is that it be designed to accurately test the effectiveness of automated speed enforcement on Mississauga roadways. That implies the collection of easily accessible and quantifiable data, and the use of representative measures of effectiveness. A pilot study design founded on these key principles is presented in **Section 2.4**.

2.1 Road User Safety Implications of Vehicle Speed

The road user safety implications of speed presented in this section have been compiled from a review of relevant literature. Three primary issues are discussed:

- The effects of speed differentials;
- The impacts of speed on collisions rates; and
- The impacts of speed on collision severity.

2.1.1 SPEED DIFFERENTIALS

Most studies of speed differentials focus on their relative effect on collision rates, when compared to absolute speed values (represented by average through speeds). None of the studies reviewed would refute the effects of speed differentials outright; however, where most of the controversy occurred was in identifying what speed differentials were important, and to which types of collisions they contributed.

The studies of speed differentials cited most often in documents opposing speed limits (and their enforcement), or championing the establishment of minimum speed limits, were those conducted by Solomon in the 1960s. Solomon's work suggests that speed differentials involving vehicles travelling significantly above or below the average speed on a section of road are at greater risk of being involved in a collision, than vehicles travelling at or around the average speed[1]. More recent studies have concluded that the increased collision risk associated with vehicles travelling below the average speed is primarily attributable to vehicles slowing to turn, or turning across traffic[2]. The same study suggests that only at speeds of plus or minus two standard deviations from the average speeds do speed differentials pose a substantial risk of increased collisions rates for non-turning vehicles. Yet another study of the effects of speed differentials on collision rates concludes that only those vehicles travelling significantly above the average speed of traffic were at increased risk of being involved in a collision, and those travelling well below the average speed showed no increase in collision rate[3].

The general opinion appears to be that speed differentials do affect collision rates, particularly in urban environments where turning movements at intersections and/or accesses are frequent. The reduction in speed differentials that would likely result from the implementation of ASC would address only those travelling significantly above the average speed, and not those travelling significantly below the average speed.

2.1.2 SPEED AND COLLISION RATE

The debate over the effects of speed on collision rates is well established and well documented. Numerous studies regarding the relationship have been conducted over the past 40 years (the most often cited being from Australia and Scandinavia).

Of the studies that support the relationship between speed and collision risk, the most recognized seem to be the work Elvik and Nilsson. Nilsson examined the effects of changes in average speed (resulting from changes in the posted speed limits) on collision rates[4]. He later developed a Power model of the relationship between the percentage change in speed and the relative change in number of injury collisions, which is illustrated in **Exhibit 2-1**.

Exhibit 2-1: Change in Speed vs. Change in Injury Collisions[5]

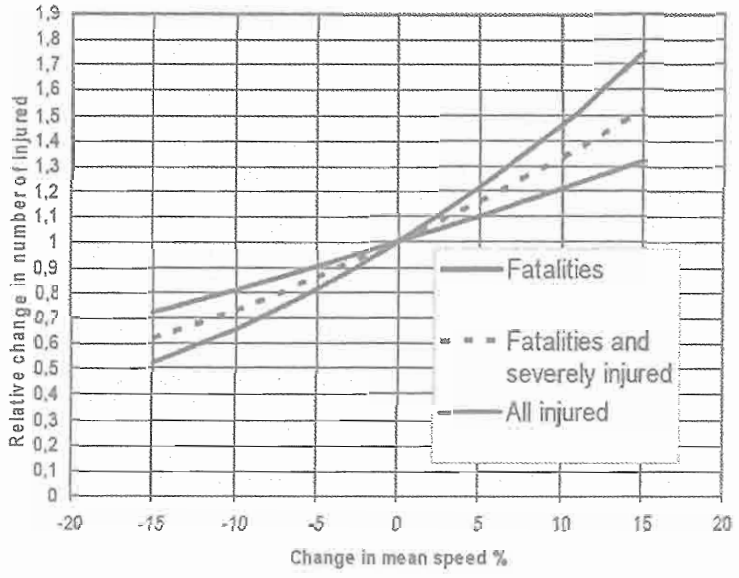
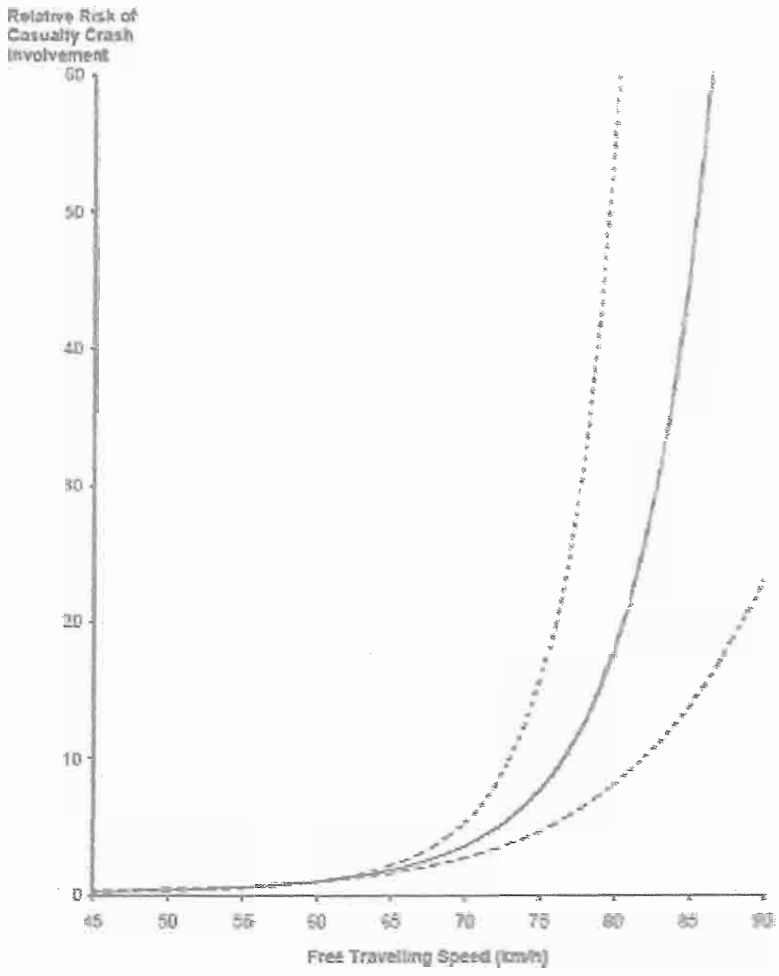


Exhibit 2-1 suggests a significant increase (10%) in injury collisions as a result of a relatively small (5%) increase in mean speed; the increase in the number of fatalities (20%) is even greater for the same increase in mean speed. A meta-analysis of published studies (edited by Elvik and Vaa) presented findings that also showed how relatively small changes in average speed (4.8 km/h) could result in a sizeable increase in the number of collisions (19%) overall[6]. Again, even greater increases were observed for fatal collisions (26% increase in collisions for a 4.2 km/h increase in mean speed). An equally compelling speed-relative risk relationship derived by the Road Accident Research Unit (RARU) at the University of Adelaide is illustrated in **Exhibit 2-2**.

Exhibit 2-2: Relative Risk of Collision by Free Travelling Speed[7]

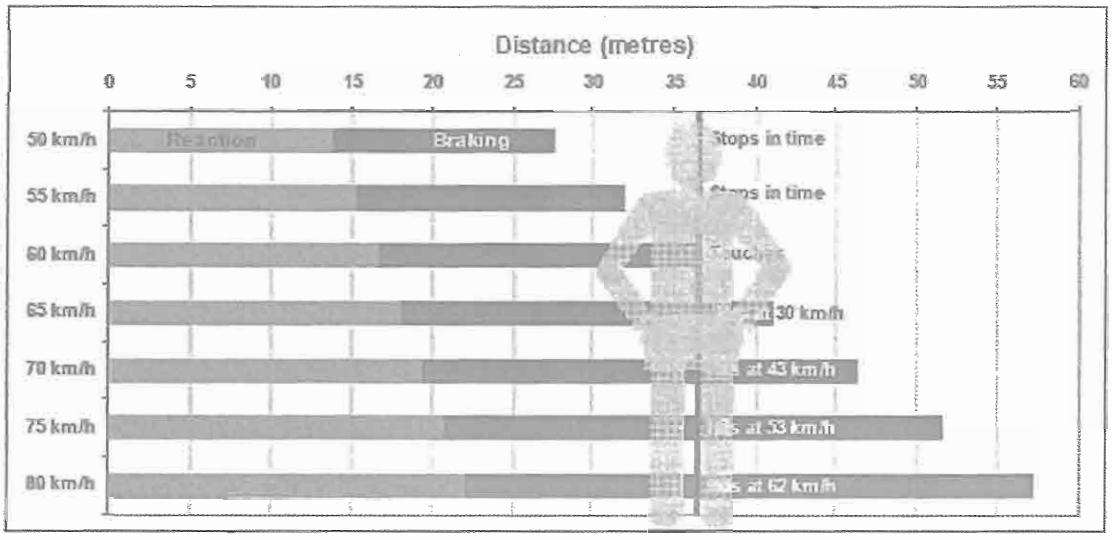


The relationship illustrated in **Exhibit 2-2** is for a 60-km/h speed zone in an urban area, and the dashed lines represent the 95% confidence interval. As with Nilsson's Power model, the RARU relationship presents an exponential link between speed and the relative risk of being involved in a fatal collision.

The two speed-relative risk relationships presented above represent the most commonly quoted evidence of the impacts of speed on collision rate/risk. However, there are numerous other studies that support their findings to some degree or another. Those studies often discuss observed reductions in collision rates that coincide with lowered speed limits.

Those who contest the link between speed and collision risk have generally focused on attempting to discredit the work of others by suggesting that speed alone does not cause collisions, and that only a small percentage of fatal collisions (2%-5%) are a direct result of speeding[8]. In some ways the opinion has merit; however, all of the implications of speeding (e.g., increased speed increases the distance travelled by a vehicle during the reaction period, increases the braking distance of a vehicle, and decreases manoeuvrability) need to be considered when evaluating its effects. **Exhibit 2-3** illustrates the stopping distance of a vehicle at various initial speeds.

Exhibit 2-3: Stopping Distance a Various Initial Speeds[9]



The exhibit shows how even seemingly minor increases in initial speed can have a significant effect on stopping distance and collision avoidance. As another example of how speeding contributes to collision potential, a study by Kloeden et al. investigated the links between speeding and collision rate and compared them to the relationship between blood alcohol content (BAC) and collision rate[10]; the resulting trends were incredibly similar. The results showed that, for a through road posted at 60 km/h, the increase in collision rate for drivers exceeding the speed limit by 5, 10 and 15 km/h was virtually the same as for drivers having BACs of 0.5, 0.8, and 1.2 g/l, respectively.

The precise relationship between speed and collision risk is complex and depends on a number of factors; however, the evidence seems to suggest that speeding has a definite impact on collision rate, and that the effects of speeding on the collision avoidance abilities of drivers are comparable to those inflicted by alcohol or fatigue. It also implies that attainable reductions in average speed (e.g., through reduced speed limits or enforcement of existing speed limits) can translate into significant collision reductions.

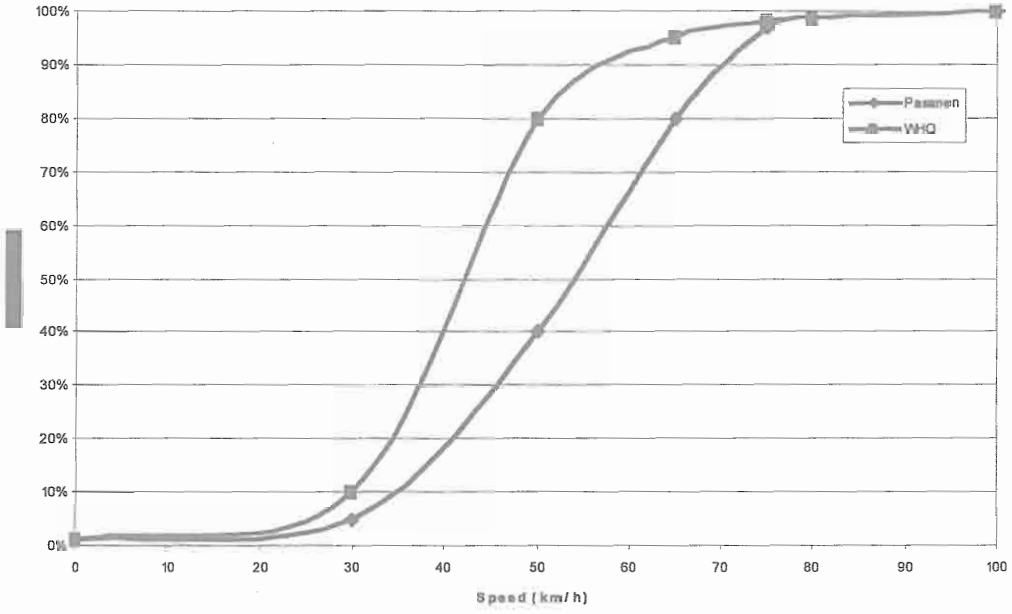
2.1.3 SPEED AND COLLISION SEVERITY

Unlike the relationship between speed and collision rate, the relationship between speed and collision severity is seldom disputed or denied. Speed is directly linked to injury severity in a collision, and the proof is founded solidly in the laws of physics. The energy released during a collision is proportional to the square of the speed of the objects at impact, and the colliding bodies must absorb that energy. Safety advancements made to vehicles (e.g., safety belts and airbags) have gone a long way in protecting vehicle occupants during collisions; however, a 1987 study by the Insurance Institute for Highway Safety (IIHS) indicated that the probability of a vehicle occupant fatality was twenty (20) times greater for an impact speed of 80 km/h versus an impact speed of 30 km/h[11]. The risk of serious injury or death is significantly higher when a collision involves a vulnerable road user; for example, a pedestrian or a cyclist

Based on three studies of vehicle-pedestrian collisions conducted by Pasanen, which relate collisions speed to injury severity, the likelihood of a pedestrian fatality occurring when struck by a vehicle travelling at approximately 30 km/h is 5 percent, about 40 percent for a vehicle going 50 km/h, about 80 percent for a vehicle travelling roughly 65 km/h, and nearly 100 percent for vehicles

traveling over 80 km/h[12]. A similar study, by the World Health Organization (WHO), suggested that the risk of a pedestrian fatality at a collision speed of 50 km/h is approximately 80 percent, and only 10 percent at a collision speed of 30 km/h[9]. The two relationships are illustrated in **Exhibit 2-4**.

Exhibit 2-4: Collision Speed Versus Pedestrian Fatality Probability



All of the literature reviewed indicates that the link between speed and collision severity is undeniable, and the most vulnerable road users are pedestrians. Therefore it is particularly important to maintain relatively low speeds in areas where vulnerable road users are present.

2.2 Nature and Extent of Speed-Related Issues In Mississauga

To evaluate the extent of the speeding problem in the City of Mississauga two tasks had to be completed: 1) speed data needed to be collected from across the City; and 2) a threshold or baseline for defining excessive speeding needed to be established. The definition of excessive speeding adopted for this study is explained below, and the speed data collected in Mississauga are detailed in **Sections 2.2.3** through **2.2.6**.

2.2.1 DEFINING EXCESSIVE SPEEDING

The point where speeds become a safety issue is not clear-cut. For the most part, on municipal roadways it is common practice to set guidelines and warrants for speed reduction measures at the point where typical operating speeds exceed the posted speed limit by 10 to 20 kilometres per hour. The lower limit of 10 km/h over the posted limit is typically reserved for local roadways and 15 km/h over the posted limit is used on higher order roadways. This assumes that the posted speed is appropriate for the roadway design and characteristics. For the purposes of defining an excessive speeding problem for this assignment, a subjective threshold of 20 km/h over the posted speed limit was established based on the following justifications/facts:

- **Design Speed** – Design speed is a critical input into many of the roadway geometric design elements, line marking assumptions, and signing decisions. The design speed of a roadway is a determinant of numerous factors, including expected operating speed, and anticipated posted speed. A common practice is to set the design speed at 10 to 20 km/h over the anticipated posted speed. Included in Exhibit 2-5 is a summary of typical design elements associated with 60 km/h and 80 km/h design speeds.

  By reviewing the design elements presented in **Exhibit 2-5**, the dramatically different vehicle operating characteristics and design guidelines related to a 20-km/h difference in operating speeds become apparent (as indicated, all values are based on the Transportation Association of Canada's Geometric Design Guide for Canadian Roads). Vehicles exceeding the posted speed on an arterial roadway by 20 km/h or more could, in some cases, be operating outside of the range of speed for which the road was designed, from a geometric and/or operations perspective.

Exhibit 2-5: Design Elements Versus Design Speed

Design Element	Design Speed	
	60 km/h	80 km/h
Stopping Sight Distance [1]	75 – 85 m	113 – 139 m
Minimum Decision Sight Distance [1]	160 m	240 m
Turning Sight Distance (Right Turn) [1]	155 m	250 m
Distance Travelled During Typical Perception and Reaction Time (2.5 s) [1]	41.7 m	55.6 m
Advance Placement of Warning Signs [2]	225 m	280 m
Typical Clear Zone [3]	3.0 m 0.5 (with curb)	5.0 m

Notes:
(1) Based on the Transportation Association of Canada's Geometric Design Guide for Canadian Roads
(2) Based on the Ontario Traffic Manual, Book 6
(3) Based on the MTO Roadside Safety Manual and mainly for rural applications. Noting that the majority of Mississauga's roadways have an urban cross-section, this design criterion is provided to show the relative distance of travel of an errant vehicle at the two design speeds.
(4) All values rounded

- **Fatality Rates** – As documented in **Section 2.1.3**, the probability that a collision will be fatal increases dramatically as the impact speed increases. Most notable are vehicle-pedestrian collisions where there is a 40% probability of a fatality with collision speeds of 50 km/h, 80% at 60 km/h and 100% at 80 km/h. For a posted speed of 40 or 50 km/h, 20 km/h over the speed limit more than doubles the probability that a vehicle-pedestrian collision will be a fatal.

- **Speed Differentials** – According to studies referenced in **Section 2.1.1**, the probability of a collision occurring increases substantially when a vehicle is driven at a speed that represents a divergence of more than two standard deviations from the mean travelling speed; a 20 km/h differential is sufficient to exceed that range on most urban roadways.

- **Motorist Expectations** – Motorists have the ability to make their decisions with the knowledge that some motorists may be exceeding the posted speed. However, safety issues arise when excessive speeding occurs, creating greater speed differentials

between successive vehicles. Vehicle manoeuvres involving gap selection, such as turning movements and lane changes, become more difficult to judge with large differentials in speed.

2.2.2 AREAS OF CONCERN

To varying degrees, speeding is common on all types of roadways and in all operating environments. Through independent evaluations of traffic operations, City of Mississauga staff identified some key areas that are of particular concern:

- School zones;
- Work zones; and
- Major arterials with a history of speeding issues and/or high collision risk.

2.2.3 DATA COLLECTION LOCATIONS

The City of Mississauga collected directional speed data through automatic traffic recorders (ATRs) on collector and arterial roadways. It should be noted that these locations were selected based on previous complaints and known speeding concerns. Therefore, they should be viewed to be indicative of these problem areas, as opposed to a "typical" Mississauga roadway. Speed data were provided for the road sections listed in **Exhibit 2-6**.

Exhibit 2-6: Study Locations Summary

Roadway	Extents	Type
Tenth Line West	Aquitaine to Vanderbilt	Major Collector
Trelawny Circle	Osprey to Doug Leavens	Major Collector
Glen Erin Drive	Rolling Valley to Folkway	Major Collector
	Castlebridge to Quail's Run	Major Collector
	Quail's Run to Peacock	Major Collector
	Windwood to Inlake	Major Collector
Rathburn Road West	Deer Run to Perivale	Major Collector
Central Parkway West	Confederation to Palgrave	Major Collector
Central Parkway East	Youngstown to Rathburn	Major Collector
Tomken Road	Homeric to Flagship	Major Collector
	Flagship to Bloor	Major Collector
Mavis Road	Highway 403 to Rathburn	Arterial
	Rathburn to Burnhamthorpe	Arterial
	Eglinton to Winterton	Arterial
	Winterton to Bristol	Arterial
	Bristol to Preston	Arterial
	Preston to Matheson	Arterial
Bristol Road	Mavis to Heatheleigh	Major Collector
	Ceremonial to Guildwood	Major Collector
	Fairwind to Swiftcurrent	Major Collector
	Hurontario to Trailwood	Major Collector
	Anthony to Grand Highland	Major Collector
Rathburn Road	Wilcox to Meadows	Arterial
	Alta to Chalfield	Arterial
Central Parkway West	Burnhamthorpe to Erindale	Arterial

Roadway	Extents	Type
Creditview Road	Rathkeale to Edenrose	Arterial
	Edenrose to Rose Haven	Arterial
	Rose Haven to Melia	Arterial

2.2.4 85TH PERCENTILE SPEEDS

The 85th percentile speed is the speed at which 85% of the motorists are travelling at or below. Accordingly, this also means that 15% of the motorists are travelling at speeds above this value. **Exhibit 2-7** presents the 85th percentile speeds for several road sections within the City of Mississauga.

Exhibit 2-7: Summary of Vehicles travelling within the 85th Percentile

Roadway	Extents	Posted Speed (km/h)	85th Percentile Speed NB/EB (km/h)	85th Percentile Speed SB/WB (km/h)
Tenth Line West	Aquitaine to Vanderbilt	50/40	62.3	61.5
Trelawny Circle	Osprey to Doug Leavens	50/40	58.2	59.9
Glen Erin Drive	Rolling Valley to Folkway	50/40	64.0	66.8
	Castlebridge to Quail's Run	50/40	63.6	64.8
	Quail's Run to Peacock	50/40	62.7	61.4
	Windwood to Inlake	50/40	59.7	63.4
Rathburn Road West	Deer Run to Perivale	50/40	62.9	63.7
Central Parkway West	Confederation to Palgrave	50/40	62.1	58.6
Central Parkway East	Youngstown to Rathburn	50/40	66.7	60.9
Tomken Road	Homeric to Flagship	50/40	58.6	58.4
	Flagship to Bloor	50/40	57.4	58.7
Mavis Road	Highway 403 to Rathburn	60	70.3	71.9
	Rathburn to Burnhamthorpe	60	68.3	70.5
	Eglinton to Winterton	70	75.6	76.6
	Winterton to Bristol	70	73.8	75.3
	Bristol to Preston	70	78.2	76.6
	Preston to Matheson	70	73.5	70.8
Bristol Road	Mavis to Heatheleigh	50	64.3	67.1
	Ceremonial to Guildwood	50	64.6	63.0
	Fairwind to Swiftcurrent	50	64.1	64.7
	Hurontario to Trailwood	50	63.1	59.6
	Anthony to Grand Highland	50	59.9	66.0
Rathburn Road	Wilcox to Meadows	50	65.9	64.2
	Alta to Chalfield	50	64.8	63.8
Central Parkway West	Burnhamthorpe to Erindale	50	64.6	64
Creditview Road	Rathkeale to Edenrose	60	67.2	67.6
	Edenrose to Rose Haven	60	64.9	67.5
	Rose Haven to Melia	60	74.3	78.2

Many jurisdictions use the 85th percentile speed as a guideline/starting point when evaluating the appropriateness of posted speed limits, because it is widely viewed as a solid indicator of the speed at which most of the driving population feels comfortable navigating a given road section. However,

since 85th percentile speeds are subject to congestion effects (i.e., heavy traffic congestion generally results in imposed lower travel speeds) their reported values can be artificially low. For example, the 85th percentile speeds shown in **Exhibit 2-7** represent the entire 24-hour period for which speed data were recorded. As a result, the heavy traffic congestion and related slower travel speeds experienced during the AM and PM peak periods translate into 85th percentile speeds that reflect how fast divers can travel rather than how fast they would otherwise chose to travel. This argument is supported by the fact that the recorded speeds were generally higher outside of the peak periods.

As an additional consideration, with the exception of the road sections with posted speed limits of 70 km/h, the 85th percentile speeds are generally in the range of 10-15 km/h above the posted speed limits for the given road sections. Based on the data, it appears that there is either a notable speed compliance issue or that the posted speed limits on the studied road sections are not representative of the perceived driving environment. Given the latter possibility, a review of the existing speed limits would be beneficial before proceeding with any proposed ASC initiative. In some cases, e.g., school speed zones, the speed limits might intentionally be set lower to reflect the added challenges of driving in those areas.

In order to gauge the extent and magnitude of speeding on the studied road sections, the percentage of vehicles travelling at various speeds above the posted speed limit was calculated (**Exhibit 2-8**).

Exhibit 2-8: Summary of Vehicles Travelling Over the Posted Speed

Location		Posted Speed Limit	Dir	Above Speed Limit		10 km/h Above Speed Limit		20 km/h Above Speed Limit	
				#	%	#	%	#	%
Tenth Line West	Aquitaine to Vanderbilt	50/40	S/E	4443	71%	1292	21%	236	4%
			N/W	4505		1346		229	
Trelawny Circle	Osprey to Doug Leavens	50/40	S/E	1433	52%	413	16%	106	4%
			N/W	1526		484		117	
Rathburn Road West	Deer Run to Perivale	50/40	S/E	3471	77%	1292	29%	300	6%
			N/W	3852		1445		311	
Central Parkway West	Confederation to Palgrave	50/40	S/E	5707	63%	1986	20%	395	4%
			N/W	4029		1130		231	
Central Parkway East	Youngstown to Rathburn	50/40	S/E	6524	74%	3554	32%	1353	10%
			N/W	6260		1885		341	
Tomken Road	Homeric to Flagship	50/40	S/E	3085	59%	922	16%	191	3%
			N/W	3685		955		191	
	Flagship to Bloor	50/40	S/E	3960	59%	948	16%	173	3%
			N/W	3914		1120		221	

Location		Posted Speed Limit	Dir	Above Speed Limit		10 km/h Above Speed Limit		20 km/h Above Speed Limit	
				#	%	#	%	#	%
Mavis Road	Highway 403 to Rathburn	60	S/E	15464	45%	5779	17%	1618	5%
			N/W	17290		6583		1725	
	Rathburn to Burnhamthorpe	60	S/E	10115	40%	3438	14%	1012	4%
			N/W	12781		4505		1287	
	Eglinton to Winterton	70	S/E	6815	28%	2022	9%	550	3%
			N/W	6702		2490		811	
	Winterton to Bristol	70	S/E	5654	25%	1320	7%	329	2%
			N/W	6032		1906		577	
	Bristol to Preston	70	S/E	5652	38%	1613	11%	316	3%
			N/W	6759		1961		531	
	Preston to Matheson	70	S/E	3651	20%	970	5%	325	1%
			N/W	4992		1098		267	
Bristol Road	Mavis to Heatheleigh	50	S/E	5801	78%	2128	33%	518	7%
			N/W	7056		3353		680	
	Ceremonial to Guildwood	50	S/E	4281	71%	1621	25%	351	6%
			N/W	3865		1293		283	
	Fairwind to Swiftcurrent	50	S/E	5289	77%	1968	29%	387	6%
			N/W	5175		1960		426	
	Hurontario to Trailwood	50	S/E	3263	57%	1163	18%	323	5%
			N/W	2882		757		191	
	Anthony to Grand Highland	50	S/E	2669	69%	666	25%	133	5%
			N/W	3921		1741		370	
Rathburn Road West	Wilcox to Meadows	50	S/E	5484	81%	2363	32%	495	6%
			N/W	6128		2175		376	
	Alta to Chalfield	50	S/E	5083	74%	2044	28%	426	6%
			N/W	5542		1969		383	
Central Parkway West	Burnhamthorpe to Erindale	50	S/E	6715	73%	2597	28%	530	6%
			N/W	6550		2452		483	
Creditview Road	Rathkeale to Edenrose	60	S/E	5833	42%	1198	9%	244	2%
			N/W	5801		1235		257	
	Edenrose to Rose Haven	60	S/E	4251	38%	904	8%	234	2%
			N/W	6758		1254		229	
	Rose Haven to Melia	60	S/E	11358	79%	4206	35%	894	8%
			N/W	13175		6525		1634	
Glen Erin Drive	Rolling Valley to Folkway	50/40	S/E	5397	75%	2229	34%	688	11%
			N/W	4615		2377		758	
	Castlebridge to Quail's Run	50/40	S/E	4964	75%	1902	32%	406	7%
			N/W	4629		2126		546	
	Quail's Run to Peacock	50/40	S/E	5150	75%	1794	25%	414	5%
			N/W	4565		1447		258	
	Windwood to Inlake	50/40	S/E	4515	71%	1277	24%	225	5%
			N/W	5677		2127		442	

Reviewing **Exhibit 2-8**, Mavis Road and two sections of Creditview Road are the only locations where the majority of the traffic is not travelling in excess of the posted speed limit. The difference between the percentage of vehicles exceeding the speed limit and the percentage of vehicles traveling 10 km/h or more above the speed limit is significant for every location (on average 39% less). This distribution of speeds suggests a driving culture where a moderate level of speeding is accepted, perhaps even expected, but "excessive" speeding is not commonplace.

The overall average percentage of vehicles travelling more than 20 km/h over the posted speed limit is approximately 5%. However, some road sections show upwards of 10% of vehicles travelling more than 20 km/h over the posted limit. The percentages of vehicles travelling more than 20 km/h in excess of the speed limits might not initially appear to be significant; however, numbers of vehicles that those percentages represent better illustrate the magnitude of the speeding issue. For example, on Mavis Road, between Highway 403 and Rathburn Road, 4% of the vehicles observed were travelling more than 80 km/h (in a area where the posted limit is 60 km/h), which represents over 3300 vehicles in a 24-hour period. Similarly, on Creditview Road, between Rose Haven and Melia, 2500 vehicles were observed traveling more than 20 km/h over the posted speed limit in one day. On the road segments that are equipped with the flashing 40 km/h signal, 6% of the vehicles are travelling 20 km/h over the speed limit on average (further analysis of the School Speed Zones is presented in **Section 2.2.6**). The road sections that consistently have the lowest percentage "excessive" speeding (1-2%) are those with posted speed limits of 70 km/h.

The levels of "excessive" speeding indicated in **Exhibit 2-8** are deserving of corrective action. The speeds represented in the exhibit, in some instances, correspond to speeds in excess of 90 km/h in a variety of mixed-use urban environments (the likelihood of vehicle-pedestrian collisions resulting in fatalities or serious injuries at various speeds are presented in **Section 2.1.3**). Spot checks of the speed data showed a significant number of vehicles travelling over 100 km/h in areas with posted speed limits as low as 50 km/h.

2.2.5 SPEEDING BY TIME-OF-DAY

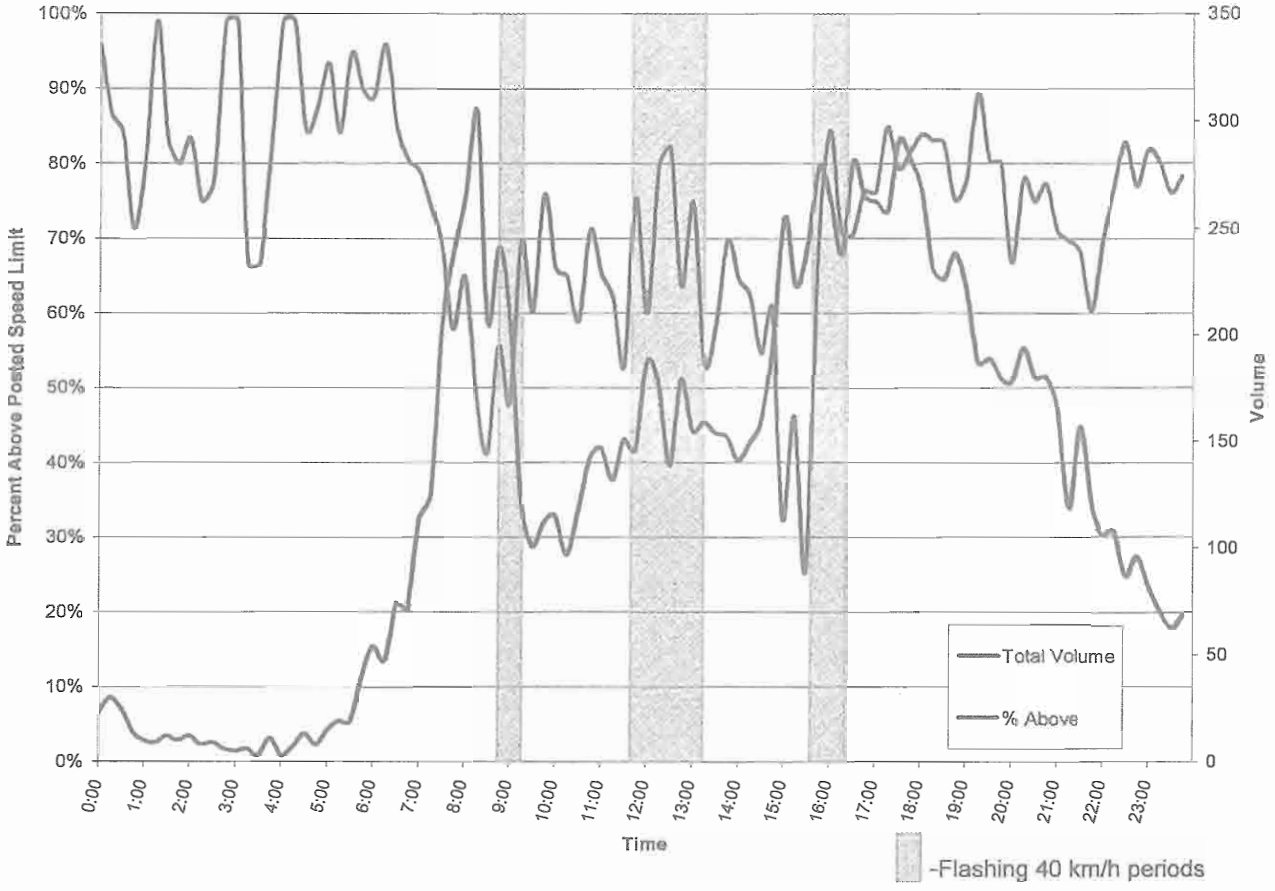
Exhibit 2-9 displays two data sets for a 24-hour period on the section of Mavis Road from Rathburn Road to Burnhamthorpe Road: 1) the two-way hourly traffic volumes, and 2) the percentage of vehicles exceeding the posted speed limit. This section of Mavis Road is an example of a typical arterial class road in the City of Mississauga. The posted speed limit is 60 km/h.

Exhibit 2-9: Arterial Road – Hourly Speeding Trends (Mavis Road from Rathburn Road to Burnhamthorpe Road)

Exhibit 2-9 clearly illustrates the impacts of congestion on travel speeds. During the hours of the day when the traffic volumes are at their heaviest (e.g., during the AM and PM peak periods) the percentage of vehicles in violation of the posted speed limit is at its lowest. Conversely, when the traffic volumes are light the percentage of speeding vehicles increases significantly, particularly during the overnight hours. One implication of this trend is that it could be used to determine the hours when ASC deployment could be best used to curb speeding.

Exhibit 2-10 displays two data sets for a 24-hour period on the section of Tenth Line West from Aquitaine Avenue to Bloomfield Drive. This segment of Tenth Line West represents a collector class road: 1) the two-way hourly traffic volumes, and 2) the percentage of vehicles exceeding the posted speed limit. The posted speed limit within the study section is 50 km/h, with flashing 40 km/h periods during the peak school drop-off and pickup times.

Exhibit 2-10: Collector Road – Hourly Speeding Trends (Tenth Line West from Aquitaine Avenue to Bloomfield Drive)



Similar to **Exhibit 2-9**, **Exhibit 2-10** illustrates the effects of time-of-day congestion patterns on travel speeds. Based on the example road section, the flashing 40 km/h periods do not appear to reduce the percentage of vehicles speeding. In fact, the percentage of vehicles exceeding the posted speed limit during the 40 km/h periods is greater than the percentage exceeding the limit during other times of the day (i.e., 79% versus 69%, respectively). The data presented in **Section 2.2.6** suggest that many drivers are adjusting their speeds during the 40 km/h periods; however, the majority are still exceeding the applicable speed limit.

2.2.6 40 KM/H ZONES

Exhibit 2-12 shows the average speeds that were recorded for a number of road sections in the City of Mississauga where part-time 40 km/h speed limits are used (in all cases the speed limits outside of the 40 km/h periods are 50 km/h).

Exhibit 2-11: Effects of 40-km/h Zones on Average Speed

Roadway	Extents	Average Speed 40 km/h Period (km/h)	Average Speed All Other Periods (km/h)
Tenth Line West	Aquitaine to Vanderbilt	46	54
Trelawny Circle	Osprey to Doug Leavens	41	50
Glen Erin Drive	Rolling Valley to Folkway	54	55
	Castlebridge to Quail's Run	47	55
	Quail's Run to Peacock	49	55
	Windwood to Inlake	48	54
Rathburn Road West	Deer Run to Perivale	49	55
Central Parkway West	Confederation to Palgrave	46	57
Central Parkway East	Youngstown to Rathburn	53	56
Tomken Road	Homeric to Flagship	45	52
	Flagship to Bloor	45	51

The average speed data presented in **Exhibit 2-12**suggest that there is some degree of compliance with the 40 km/h speed limits during the periods in which they are active. However, given that all of the average speeds during the 40 km/h periods are greater than the applicable speed limit, it implies that many drivers are still speeding.

Additional, speed data for the road sections with part-time 40 km/h speed limits are presented in **Exhibit 2-12.** Those data show the percentage and number of vehicles travelling at various speeds above the speed limit during the time periods when the 40 km/h speed limits are actuated versus during the time periods when the 50 km/h speed limits are in effect.

Exhibit 2-12: Effects of 40 km/h Zones on Speeding

Roadway	Extents	Above Speed Limit 40 km/h Period		Above Speed Limit All Other Periods		10 km/h Above Speed Limit 40 km/h Period		10 km/h Above Speed Limit All Other Periods		20 km/h Above Speed Limit 40 km/h Period		20 km/h Above Speed Limit All Other Periods	
		%	#	%	#	%	#	%	#	%	#	%	#
Tenth Line West	Aquitaine to Vanderbilt	79%	1554	69%	7394	17%	330	22%	2307	5%	89	4%	376
Trelawny Circle	Osprey to Doug Leavens	60%	662	50%	2297	22%	240	14%	657	5%	59	4%	164
Glen Erin Drive	Rolling Valley to Folkway	92%	1879	71%	8133	65%	1323	29%	3283	28%	572	8%	874
	Castlebridge to Quail's Run	79%	1831	72%	7472	41%	940	22%	2243	14%	327	6%	625
	Quail's Run to Peacock	89%	2279	72%	7436	36%	914	23%	2327	8%	205	5%	467
	Windwood to Inlake	86%	2405	68%	7787	33%	928	22%	2476	8%	236	4%	431
Rathburn Road West	Deer Run to Perivale	87%	1378	75%	5945	39%	627	27%	2110	10%	166	6%	445
Central Parkway West	Confederation to Palgrave	77%	2264	59%	7472	30%	873	18%	2243	7%	196	3%	430
Central Parkway East	Youngstown to Rathburn	88%	2681	71%	10103	49%	1489	28%	3950	18%	560	8%	1134
Tomken Road	Homeric to Flagship	79%	2621	51%	4149	22%	720	14%	1157	4%	136	3%	256
	Flagship to Bloor	77%	2962	52%	4912	23%	874	13%	1194	5%	176	2%	218

For the road sections presented in **Exhibit 2-12**, the percentage of vehicles exceeding the speed threshold is greater, almost without exception, for the 40 km/h periods than it is for the corresponding 50 km/h periods. Additionally, the percentage of vehicles speeding "excessively" (more than 20 km/h over limit) is in many cases significantly higher during the 40 km/h periods than at other times. As a result, greater speed differentials could be created during the 40 km/h periods, and increased speed differentials are associated with an increase in collision rate (**Section 2.1.1**).

In general, the speed data for School Seed Zones imply that on average motorists are adjusting their speeds based on the flashing 40 km/h signals, but a significant number of drivers are not reacting to the speed limit reduction. Some complimentary measures might be needed to address the "excessive" speeding issue.

2.3 Mississauga Speeding Countermeasures – Existing Programs and Opportunities

The City of Mississauga and Region of Peel, like other municipalities, use a number of "tools" to address speeding concerns on their roadways. Provided below is a summary of the engineering, enforcement and education/awareness programs within the City and their ability/effectiveness in addressing speed related issues.

2.3.1 TRADITIONAL POLICE ENFORCEMENT

2.3.1.1 Roles and Responsibilities

Speed enforcement in the City of Mississauga is the responsibility of Peel Regional Police Services. There are three components of the Peel Region Police Services approach to enforcement. Provided below is an overview of their role in speed enforcement activities:

Regional

This component of police services regularly completes analysis of high collision/speed locations with specific consideration of collision/conflict severity. They identify critical collision and speeding locations, target enforcement, and track the effectiveness of their programs. Visible presence is an important component of their duties. Enforcement is typically not "complaint-driven" at this level.

Division

The division receives a wide range of citizen complaints including speeding issues. A complaint-tracking database is used to target specific speeding enforcement efforts. The division level is responsible for the majority of the local road network (including school zones) speeding enforcement efforts. City of Mississauga Transportation staff, or Council member requests for site-specific speed enforcement would typically be fielded through this component of the police services.

Platoon

Officers in the field are responsible for a wide variety of enforcement activities including traffic infractions. They are expected to conduct regular speed enforcement activities; however, those activities are typically less targeted or dedicated to a specific issue.

2.3.1.2 Frequency and Duration

At the Regional level, targeted enforcement efforts would typically last for about one hour. For high priority areas or for specific awareness campaigns, a single location may receive three hours of dedicated enforcement for a period of time, i.e., a number of days, weeks or a month. Regional staff determines their highest-ranking sites per quarter based on collision performance, speed compliance history and other criteria. Approximately fifteen roadways and ten intersections are identified in the Region. Based on an example quarter summary in 2006, the roadway sections received approximately 30 to 35 hours of enforcement per month, on average. The intersections received about 15 hours per site per month, on average. These values do not include enforcement by the division or the patrols.

For a localized speeding complaint such as a specific school or arterial roadway, enforcement may be for one hour or peak period (e.g., arrival or departure period of a school). Given the number of complaint locations and other competing duties/time commitments, weekly visits or successive day visits cannot generally be accommodated, unless a special enforcement effort is identified and staffed.

Enforcement activities are rarely dedicated towards work zone areas. One explanation for the reluctance to conduct enforcement activities in work zones is the potential dangers associated with apprehending violators in these areas. Work zones often feature a confined right-of-way and vulnerable persons in close proximity to moving traffic.

2.3.1.3 Limitations of Speed Enforcement

The fundamental limitation of police enforcement is that its reach is limited by the availability of resources; only a small portion of the total road network can be enforced at any given time. Another limitation of speed enforcement in general is that it is founded in the theory of deterrence, and the only reason that speed compliance is achieved is that a significant percentage of the driving public fears the sanctions/punishment associated with being caught speeding[13]. As such, if there is no perceived threat of being caught drivers will exceed the posted speed limits. Therefore, for speed enforcement to be effective a regular presence must be observed and the threat of being caught must persist, which leads back to the initial limitation of enforcement that is the inability to be everywhere at all times. Research suggests that sustainable safety (no enforcement required) should aim at unintentional compliance with laws or compliance governed my inner motivation (i.e., drivers obey the laws more easily if they fit the road environment and/or they are perceived to be fair and just)[13].

2.3.2 ROAD WATCH

The City of Mississauga's Road Watch program relies on a private citizen's observations of noticeably aggressive driving, including excessive speeding by another motorist. A citizen report form is completed by the observer and forwarded to the police. The response from the police varies from a letter request to the registered owner of the vehicle to voluntarily cooperate and drive in a responsible manner on Mississauga roads (first offence), to a personal visit from Peel Region Police (third offence). Based on discussions with a Peel Regional Police representative, second offences are not commonplace, and third offences are rare.

The motorist is not charged with a traffic infraction as a direct result of being reported through the road watch program; however, upon the third offence police may actively monitor the motorist's activities.

These programs are generally targeted to specific individual speeding issues and are typically not intended to be a comprehensive speed compliance program.

While these programs have the potential to notify aggressive motorists of their actions, the frequency and extent of the reporting, coupled with the lack of immediate consequences does not lend itself to a widespread program to address speeding issues in Mississauga.

2.3.3 SPEED WATCH

The City of Mississauga has a number of resident and motorist awareness programs employing a radar message board (refer to **Exhibit 2-13**). The programs include:

- Neighbourhood Speed Watch – Device is operated by community members who have requested the device;
- Student Speed Watch – Mississauga students operate the device for education purposes or to earn volunteer hours; and
- Safe Driving Speed Watch – Traffic Operations staff operate the device at strategic and complaint locations throughout the City.

Exhibit 2-13: Example Radar Message Board

The Speed Watch Program is intended to serve as an awareness program, as opposed to an enforcement program. Its use is generally targeted at lower order and residential streets, where motorists may not be fully aware of their operating speeds. Overall, the Transportation and Works staff have received positive resident feedback and requests for more extensive use.

City Traffic Operations Staff provide assistance in scheduling and setting up the equipment.

While these programs assist in providing awareness to those motorists unintentionally speeding, it has little impact on those purposely speeding. Speed awareness alone does not appear to curb excessive speeding by the latter group, and additional tools are needed to combat deliberate or habitual speeding.

2.3.4 COMMUNITY SAFETY ZONES

The City of Mississauga implemented Community Safety Zones (CSZs) approximately eight years ago. The initial roadway and intersection applications were assessed on a combination of local and arterial road networks. Speed reductions were generally observed with concerted police presence and on the lower order roadways, where motorists recognized a need for the CSZ designation.

The CSZ locations were refined in 1999 and 2000 to reflect the need to address the higher potential for personal injury on arterial roadways. **Exhibit 2-6** provides the existing CSZ locations in Mississauga.

Exhibit 2-14: Existing Community Zone Locations

Roadway	Extents	Classification
Hurontario Street	Dundas Street to Eglinton	Six/Seven Lane Arterial
Hurontario Street	Mineola Road to South Service Road	Four/Five Lane Arterial
Dundas Street	Cawthra Road to the east City Limit	Seven Lane Arterial
Goreway Drive	Derry Road East to the north City Limit	Five Lane Arterial
Thorn Lodge Drive	Homelands Drive to Liruma Road	Two Lane Collector
Glen Erin Drive	Castlebridge Drive to Peacock Drive	Five Lane Arterial
Creditview Road	Eglinton Avenue to Highway 403	Five Lane Arterial

A comprehensive review of CSZs was completed in 2001 under the sponsorship of the City of Hamilton (Forbes 2001). The study included survey responses from 37 Ontario municipalities. Installation criteria and effectiveness were assessed for those municipalities having active CSZ programs. The concluding statement suggested:

> "Given the repeated attempts that have found CSZs have had no definitive impact on operating speed, and safety performance, and provided the same results from analogous studies on other regulatory changes that are conveyed to the driver by roadside signs (i.e. lowering speed limits), it is reasonable to conclude that CSZs are ineffective at changing travel speeds, or improving safety (i.e., decreasing collision frequency or severity)."

In a report to Mississauga City Council on October 8, 1999, similar findings relating to speed reduction in CSZs were detailed. The greatest impact (lower 85th percentile speeds) appeared to be on lower order collector roadways. Although not statistically conclusive, the reviews in Mississauga and other Ontario municipalities have shown that speed reductions are more a function of the enforcement efforts as opposed to the risk of the higher fines in CSZs.

In summary, there is nothing that limits the expansion of the CSZ program to more sites; however, its effectiveness is solely a function of the level of enforcement that can be dedicated to the sites. Therefore, an increase in the number of CSZ sites, without a proportional increase in enforcement resources, would result in a decrease in the enforcement frequency per site.

2.3.5 TRAFFIC CALMING

The following subsections describe the function of traffic calming measures, the primary environments where traffic calming can be applied, and the costs associated with implementation.

2.3.5.1 What is Traffic Calming?

Traffic calming is the implementation of mainly physical measures that change the character of the road to alter driver behaviour. Traffic calming measures can range from speed humps to complete road closures or diverters. The City of Mississauga does not generally support retrofit traffic calming to address speeding issues due to the costs and implementation issues. Other municipalities have found traffic calming as a viable option for lower order roadways and its "self-enforcing" potential. Included in **Exhibit 2-15** is a summary of the traffic calming measures that

have been implemented on Mississauga roadways, as retrofit measures and as part of new development, since 1995.

Exhibit 2-15: Traffic Calming Locations in Mississauga

Traffic Calming Measure	Location
Retrofit Traffic Calming Measures	
Chicanes and Pinch Points	Floradale Drive between Hurontario Street and Confederation parkway (approved in 1996 removed in 1997)
Speed Humps	Joymar Drive between Britania Road West and Thomas Street (approved in 1996 removed in 1997)
Pedestrian Islands	Truscott Drive west of Bodmin Road
	Erin Centre Boulevard east of Glen Erin Drive
	Goreway Drive south of Morning Start Drive
	King Street West west of Hurontario Street
Traffic Calming Measures with Included with New Development	
Traffic Circles	Churchill Meadows Boulevard at Quiet Creek Drive/Mocha Mews
	Churchill Meadows Boulevard at Rosanna Drive/Escada Drive
	Oscar Patterson Boulevard at Mission Hill Drive
Intersection Narrowing (Pinch Points)	Artesian Drive between Sebastian Drive and Long Acre Drive
	Aquinas Avenue between Sebastian Drive and Long Acre Drive
	Sebastian Drive between Southwick Street and Artersian Drive
	Long Acre Drive Southwick Street and Artersian Drive
	Angel Pass Drive between Ridgeway Drive and Colombo Crescent
	Tacc Drive between Ninth Line and Churchill Meadows Boulevard
	Deepwood Heights between Ninth Line and Churchill Meadows Boulevard
	McDowell Drive between Ninth Line and Churchill Meadows Boulevard
	McDowell Drive between Tenth Line West and Winston Churchill Boulevard
	Long Valley Drive between Britannia Road West and McDowell Drive
	Owls Foot Drive between Long Valley Drive and Winston Churchill Boulevard

As described in **Exhibit 2-15**, the City has proactively implemented traffic calming measures in the Churchill Meadows development which included road narrowing at key "slow points", road surface treatments, school zone designations and reduced road design standards.

2.3.5.2 Roadway Function and Areas of Key Concern

Collectors and School Areas

The application and benefits of traffic calming on local collector roadways is well documented in a number of Ontario and Canadian municipalities. The application and design of typical traffic calming features is provided through a number of Institute of Transportation Engineers (ITE) documents, including the Canadian Guide to Neighbourhood Traffic Calming (ITE, 1998). Included

Exhibit 2-16 is a summary of the potential benefits of traffic calming measures taken from the Canadian Guide.

Not shown in the above summary are many of the real and perceived benefits of some traffic calming measures including impacts on noise, emergency response times, transit vehicle operations, etc. These types of have been well documented in previous Mississauga committee reports.

The greatest barrier to widespread traffic calming treatments in most municipalities is implementation costs (Refer to **Section 2.3.5.3**). Notwithstanding this, for persistent problem areas where speeding, volumes, and road user safety cannot be effectively addressed through other education, engineering or enforcement efforts, traffic calming represents an effective and permanent solution on collector and local roadways.

Arterial Roadways

Based on state-of-the-practice, more aggressive forms of traffic calming such as speed humps, raised intersections, or road narrowing are not suitable for implementation on major arterial roadways, which have higher operating speeds, accommodate heavy truck traffic, and generally form part of emergency and transit service routes. Passive forms of traffic calming such as pavement treatments and on-street parking have been used in Mississauga and many other municipalities in Ontario.

Work Zones

Likewise, traffic calming in work zones is not commonplace. Work zones by their very nature are typically constrained as the road authority attempts to maintain traffic flow while providing enough area for the construction zone to function. Speed reduction techniques include: temporary speed limit reductions, doubling the fines for vehicles exceeding work zone speed limits, variable message signs displaying vehicle speeds, police conducting speed enforcement in work zones, reduced spacing of channelizing devices in the construction area and lane shifts/chicanes on the approach to the work area.

For larger and long-term work zone sites, City of Mississauga staff have contemplated having enforcement lay-by areas within the construction area to facilitate work zone speed compliance by Peel Regional Police. Unfortunately, it is often not possible or safe to allocate space for enforcement within these areas. As noted in **Section 2.2.2**, work zone speeding is one of the key issues of concern for Peel Regional Police and the City of Mississauga Transportation and Works staff. However, the inherent complexity of work zones makes it particularly challenging to deploy many of the existing speed compliance tools and traditional police enforcement therein.

Exhibit 2-16: Applicability of Traffic Calming Measures

TABLE 3.2: APPLICABILITY OF TRAFFIC CALMING MEASURES

Measure		POTENTIAL BENEFITS: Speed Reduction	Volume Reduction	Conflict Reduction	Environment	Page
Vertical Deflection	Raised crosswalk	●	○	◐	◐	3-5
	Raised intersection	◐	○	◐	◐	3-8
	Rumble strip	○	○	○	○	3-9
	Sidewalk extension	◐	○	◐	○	3-10
	Speed hump	●	◐	●	◐	3-12
	Textured crosswalk	○	○	◐	◐	3-15
Horizontal Deflection	Chicane — one-lane	●	●	●	◐	3-17
	Chicane — two-lane	◐	○	◐	◐	3-17
	Curb extension	◐	○	○	●	3-19
	Curb radius reduction	◐	○	○	◐	3-21
	On-street parking	◐	○	○	◐	3-22
	Raised median island	◐	○	◐	○	3-24
	Traffic circle	●	◐	●	●	3-25
Obstruction	Directional closure	○	●	◐	◐	3-29
	Diverter	○	●	◐	◐	3-30
	Full closure	○	●	●	◐	3-32
	Intersection channelization	○	◐	◐	◐	3-33
	Raised median through intersection	○	●	◐	◐	3-35
	Right-in/right-out island	○	●	◐	◐	3-36
Signing*	Maximum Speed	◐	○	○	○	3-39
	Right (Left) Turn Prohibited	○	◐	◐	◐	3-40
	One-Way	○	●	◐	◐	3-40
	Stop	○	◐	◐	○	3-41
	Through Traffic Prohibited	○	◐	◐	◐	3-43
	Traffic-Calmed Neighbourhood	○	○	○	◐	3-44
	Yield	○	○	◐	○	3-44

● = Substantial benefits ◐ = Minor benefits ○ = No benefit

* The primary purpose of signing is to regulate traffic movements, not to calm traffic.

2.3.5.3 Implementation Costs

In general, traffic calming features can be implemented in new construction or reconstruction projects with marginal increases in design and construction costs. Conversely, some traffic calming features such as traffic circles, chicanes and curb extensions have significant costs when being applied in retrofit situations. This is mainly due to the need to remove and/or significantly modify existing infrastructure to deal with placement, channelization, grading, and drainage issues. Included in **Exhibit 2-17**, is a summary of typical construction costs.

Exhibit 2-17: Typical Traffic Calming Constructions Costs

Traffic Calming Measure	Typical Costs [1]
Speed Hump	$2,000 to $3,000 per hump
Raised Crosswalk	$3,000 to $10,000 per crossing
Pedestrian Refuge Island	$3,000 to 10,000 per island
Raised Intersection	$60,000 to $100,000
Traffic Circle	$5,000 to $30,000
Curb Extensions	$5,000 to $10,000
Chicanes	$10,000 to $100,000 per series of three

Note:
(1) Values reflect typical construction costs based on experience in other jurisdictions. These values do not include other requirements such as engineering/EA studies, public consultation, balloting and signing/markings.

2.3.6 SCHOOL SPEED ZONING

The City of Mississauga currently uses part-time 40 km/h speed zones on major collector and arterial roadways with direct junior school frontages. The flashing 40 km/h designations are active during school arrival, mid-day, and school departure periods. At all other times the 50 km/h posted limited is in effect. The 40 km/h periods are site-specific and vary as a function of the schools operations.

Section 2.2.6 and specifically **Exhibit 2-12** provides a summary of the average vehicle speeds and the speeding during and outside of the 40 km/h periods specified. In general, the speed data for School Speed Zones imply that most motorists are adjusting their speeds based on the flashing 40 km/h signals, but a significant number of drivers are not reacting to the speed limit reduction. That is, there are a small percentage of motorist exceeding the posted speed by more than 20 km/h during the 40 km/h periods. Some complimentary measures might be needed to address the "excessive" speeding issue.

2.3.7 SUMMARY OF CURRENT SPEED COMPLIANCE EFFORTS

The City of Mississauga and Peel Regional Police are currently applying a complete range of the speed reduction "tools" that are in general use by, and available to, Ontario municipalities. For the most part, they appear to be applying these tools in accordance to standard practice and to the best of their abilities and financial resources. Notwithstanding the costs and implementation issues associated with traffic calming, enforcement and traffic calming appear to be the best tools for addressing speed related issues in Mississauga.

Based on our review of the speed management tools currently employed, the following have been concluded:

- The majority of the tools are applicable to all types of roadways. Two exceptions are traffic calming and school speed zones, which are typically reserved for lower order roadways and school areas, respectively;

- The road watch and speed watch programs focus on awareness, but do not provide a general deterrence motorists who speed deliberately, unless targeted enforcement is initiated based on the information that the programs generate;

- Community safety zones and school speed zone applications are founded on increased enforcement efforts, and generally have little effect alone in addressing "excessive" speeding;

- Under the most aggressive and targeted enforcement campaigns by the Regional level of the Peel Regional Police, a higher priority corridor can only be monitored for an average of 30 to 35 hours per month. This is less than 5% of the time. Likewise, a higher priority intersection will receive, on average, 15 hours of Regional enforcement per month, or 2% of the time;

- Enforcement and/or police services assistance are the cornerstone of all of the speed management initiatives in the City, except traffic calming.

- All recognize the benefits of traditional enforcement, including, but not limited to, police visibility in the community and the personal connection with the violator; however, the realities of traditional enforcement must be recognized:

  - The effectiveness of speed enforcement, in general, is limited by motorist's expectations of the probability of their being caught.

  - Enforcement efforts cannot be dedicated to a specific problem area for a extended period time or for successive days due to:

    - Competing demands for their time, i.e., court time, travel time, other locations, other police duties, etc.; and

    - Finite resources based on budget constraints and areas of priority.

  - The actual "enforcement time" versus the time they are in the field at a location reduces the amount of violators that can be affected by the enforcement efforts, i.e., the time required to apprehend and administer a speeding infraction represents the majority of the time spent in the field;

  - Traditional enforcement requires court time when infractions are contested and therefore reduce the "in-field" police presence; and

  - There are instances when traditional enforcement cannot be effectively or safely conducted, e.g., within work zones.

2.3.8 HOW EFFECTIVE IS PHOTO ENFORCEMENT?

Studies of the safety benefits of mobile and fixed speed enforcement cameras show varying degrees of success. A 2005 study found that reductions in collisions of 5-69% in the immediate vicinity of the camera sites; injuries decreased by 12-65%; and fatalities decreased by 17-71%[13]. The effects in urban areas were generally better than in rural areas, and the effects of automated speed compliance measures were greater than those achieved through traditional policing methods.

A recent review of speed enforcement measures by the Transportation Research Laboratory (TRL) came to the following conclusions:

- Speed cameras are more effective than physical policing methods in reducing speeds and crashes;

- Speed cameras are more effective in reducing crashes inside urban areas than on rural roads;
- Fixed speed cameras are more effective in reducing speeds and crashes than mobile speed cameras;
- Speed cameras appear to have safety benefits over a distance of 500 metres or more from the speed camera site; and
- Physical policing in combination with randomization of police checks leads to distance halo effects (the durability of an enforcement effect after drivers pass the enforcement site) that are minimally five times larger than those of speed cameras.

Some of the inherent advantages of ASC are:

- 24/7 presence at a particular site, for any desired duration;
- Citations issued to a greater proportion of violators; and
- Court/officer time requirements per infractions may be less compared to other programs.

Winnipeg and Edmonton represent two Canadian municipalities that have recently experimented with photo speed enforcement programs. According to the Photo Enforcement Program Review Final Report (February 2006), conducted by the Winnipeg Audit Department, the City experienced a 40% reduction in tickets issued per vehicle and a 40% reduction in speeding offences of over 25 km/h in excess of the posted speed limit when speed cameras were put on the streets. The Photo Enforcement Traffic Safety Study[14] for the Edmonton Police Commission reported that Edmonton showed steady reductions in speeding violations and tickets per 100 vehicles monitored after photo enforcement was introduced

2.4 Program Design for ASC Application in Mississauga

The following subsections present the processes and criteria that will be used to select sites for ASC deployment and evaluate the effectiveness of ASC at improving road user safety. The basic outline of a pilot study that would be used to evaluate those processes and criteria is also described below.

2.4.1 LOCATION CRITERIA

The suitability of potential pilot test locations will be evaluated through a relative comparison of several location-specific criteria, including speed criteria; collision history; roadway function; vulnerable road users; and site length and location visibility. A summary of the relative weightings assigned to each of these criteria is presented in **Exhibit 2-18**

Exhibit 2-18: Summary of Relative Criteria Weightings

Criteria	Weighting
Speed Criteria	45%
Collision History	40%
Roadway Function	5%
Vulnerable Road Users	10%
Site Length/Location Visibility	Pass/Fail

The **Sections 2.4.1.1** through **2.4.1.6** describe the location criteria that would be used to select sites for ACS application to ensure safe and efficient operation of the program.

2.4.1.1 Speed Criteria (45%)

The speed related criteria that would be used to qualify sites for ASC deployment include a number of qualitative characteristics and quantitative measures.

Qualitative Criteria/Requirements

- **Posted Speed** - Speed must be posted throughout the study site to be considered for ASC deployment.
- **Appropriate Posted Speed** – All project partners must agree that the posted speed at the study site is credible and appropriate.
- **Established Speed Profile** – For analysis purposes (particularly during the pilot testing period), the posted speed limit must not have changed in the past three years.
- **Operating Environment** – Study locations need to be divided to distinguish between neighbourhood/lower speed environments, and major collector and arterial road operations. The deployment sites will be separated into below 60 km/h posted speed (40 and 50 km/h zones) or 60 km/h and greater posted speed (all 60, 70 and 80 km/h roadways) groups.

Quantitative Criteria

Given that the qualitative criteria include the requirement that the posted speed limit at the study site be credible and appropriate, the percentage of the traffic volume exceeding the speed limit is a good indicator of overall motorist speed compliance. However, since (as discussed in **Section 2.2.4**) traffic congestion can impose slower travel speeds, it is proposed that the percentage of traffic volume exceeding the posted speed limit be calculated based on the twelve lowest volume hours of the day. As such, sites that experience heavy peak period congestion will not rank artificially low.

While the percentage of vehicles exceeding the posted speed limit provides a benchmark to gauge broad motorist characteristics, the evaluation methodology must also be able to distinguish sites that have a large percentage of vehicles exceeding the posted speed by 20 km/h or more. The 20 km/h over threshold is rationalized in **Section 2.2.1**.

Speed differentials between road users are a critical factor in collision potential and safety. It affects the predictability for gap acceptance, increases rear end collisions, introduces more over-taking manoeuvres, etc. It is an easy task to determine speed differentials between two successive vehicles; however, with speed data provided in an aggregate form, the task of quantifying speed differential is not clear-cut. Taking the extreme upper and lower operating

speeds observed, will not be representative of most situations, and it might not reflect vehicles travelling under similar operating conditions. It is our opinion that collectively the percentage speed violation and percent of vehicles travelling 20 km/h or more in excess of the posted speed limit indices serve as surrogates for the speed differential issue.

The two recommended quantitative speed criteria measures are outlined in **Exhibit 2-19**.

Exhibit 2-19: Speed Criteria

Criteria	Index	Weight	Total
Percentage of vehicles exceeding the posted speed limit (over the 12 lowest volume hours of the day)	Percentage Speed Violation Index: 1 = <15% 2 = 15-20% 3 = 21-25% 4 = 26-30% 5 = 31-35% 6 = 36-40% 7 = 41-45% 8 = 46-50% 9 = 51-55% 10 = >55%	0.25	
Percentage of motorist travelling more than 20 km/h in excess of the posted speed limit	Excessive Speed Index: 1 = <5% 5 = 5-10% 10 = >10%	0.20	
	Maximum Total	0.45	

2.4.1.2 Collision History (40%)

Similar to the speed criteria there are also qualitative and quantitative components to the collision history criteria.

Qualitative Criteria/Requirements

The number of collisions will provide another criterion for ranking road sections and intersections for ASC implementation. The focus should be on collisions that are correctable through better compliance with posted speeds; however, a common difficultly is determining which types of collisions are direct causes of speed. One cannot rely on the apparent driver actions of "exceeding speed limit", "speed too fast for conditions", and "speed too slow" identified in the police reports as the sole means of determining the speed related collisions.

Care has to be given to ensure that locations are selected that have a sustained collision concern, and that short-term trends do not become a focus. It is recommended that the site have three years of collision history under its current operations and physical geometry, and that the collision history be scrutinized for collisions that could be attributable to speeding.

Quantitative Criteria

Collision frequency and collision rate methods are the two most common basic rating criteria used by municipal governments, including Mississauga Transportation and Works and Peel Region Police.

An emerging method being adopted by some municipal road authorities is the Potential for Operational Improvement (POI) and Potential Safety Improvement (PSI) indices, which compare

the actual collision performance to the "expected" performance for similar facilities and exposure conditions. To implement this methodology in Mississauga in advance of the ASC site selection is not practical.

While both evaluation methods have their shortcomings, the majority of the comparisons between collision frequency and collision rate indicate that exposure is fundamental to defining collision risk and performance. Accordingly, collision rate will be a fundamental criterion in the evaluation methodology. Collision frequency is a primary concern, but the severity of collisions is also worth considering. Therefore, it is proposed that a collision rate based on only injury and fatal collisions be used as a second and more concentrated measure.

Road sections will be identified by major intersections at either end. The collision rate will be an aggregate of intersection and mid-block collisions with due consideration for greater intersection exposure. In general, most network screening processes separate intersections and road sections. As speeding concerns and automated speed enforcement sites will span numerous intersections and road sections, it is recommended that potential pilot test sections be representative of the intended deployment area characteristics.

Exhibit 2-20 shows how the two collision criteria will be weighted relative to one another. However, the specific collision rates that will correspond to the low, medium, and high levels on the index have not yet been identified.

Exhibit 2-20: Collision Criteria

Criteria	Index	Weight	Total
Collision Rate	Basic Collision Index: 1 = Low 5 = Medium 10 = High	0.15	
Injury and Fatal Collision Rate	Injury/Fatality Collision Index: 1 = Low 5 = Medium 10 = High	0.25	
	Maximum Total	0.40	

2.4.1.3 Exposure

Typically, roadway operational and safety improvement programs target locations where the most benefits can be attained. Therefore, locations with greater road user volume and conflict risk are given higher priority, all else being equal. It was determined that exposure is being adequately accounted for in a number of other location criteria and should not be a distinct criteria. Specifically, the exposure criteria will be reflected in the following criteria:

- **Collision Criteria** – Mid-block and intersection crossing volumes will be reflected in the collision rate; and
- **Vulnerable Road Users** – The level of pedestrian and other vulnerable road user activities will be accounted for in the roadway function and vulnerable road user criteria.

2.4.1.4 Roadway Function (5%)

The roadway function criteria are primarily qualitative measures of the operating environment and the roadway geometry. There should be no major physical/geometric or operational deficiencies within the study area; for example, substandard horizontal or crest vertical curves. The enforcement units should not be located in transition areas (e.g., the entrance to a residential area or where the road cross-section changes from constrained to unconstrained). Locations with atypical peak period conditions should be avoided. A qualitative assessment of access density should be conducted to gauge the relative level of turning movement control through the perspective deployment location. A relatively high degree of access management poses less of a conflict risk; therefore, locations with less access management are better candidates for ASC. Similarly, locations with on-street parking have greater conflict potential and are more in need of speed enforcement. The final roadway function criteria relates to heavy trucks, traditional speed enforcement is typically more challenging in areas with more than 10% heavy vehicles, which makes those areas good candidates for ASC.

The weightings for the roadway function criteria are presented in **Exhibit 2-21**.

Exhibit 2-21: Roadway Function Criteria

Criteria	Index	Weight	Total
Heavy Vehicle/Transit Corridor	Major transit corridor or Greater than 10% trucks=1 No transit and less than 10% trucks=0	0.0167	
On-Street Parking	Active on-street parking activity Yes=1 No=0	0.0167	
Access Density	Relatively good access management=1 No/poor access management=0	0.0167	
	Maximum Total	0.05	

2.4.1.5 Vulnerable Users (10%)

Injury potential is the highest for light vehicles and for unprotected road users. A location criterion is required to adequately reflect the presence of vulnerable road users including pedestrians, cyclists, construction workers, and motorcyclists. Each of these groups is discussed below.

- **Pedestrians** – Could use actual volumes or relative measure of activity (e.g., low, medium, high). Special attention road users such as elderly and school aged children will also be reflected in the "community use" criteria;

- **Cyclists** – The presence of bicycle activity and the nature of the bicycle facilities will impact the potential collision risk. The City should strive to ensure cyclist safety where they are designating bicycle routes and providing bicycle lanes.

- **Construction Workers** – Construction workers are placed in a unique position as they are pedestrians and motor vehicle operators, whose attention is not always available to perceive and react to conflicts with the motoring public, i.e., their work duties will govern their abilities to monitor vehicle movements. The use of ASC approaching and within lower protection work zones should be considered; however, given the nature of work zones, they need to be assessed on a site-by-site basis;

- **Motorcyclists** – Although motor cyclists are significant in terms of the definition of vulnerable road users, the volume of motorcycles will not overly influence the location criteria;

- **Community Uses** – The presence of schools, senior homes, parks, active public spaces, community centres and other community uses will result in increased pedestrian activity at adjacent to the corridor and at crossing intersections. The separation distance and access to the roadway sites will have an effect on the priority of the site.

Exhibit 2-22 provides a summary of the vulnerable road user criteria.

Exhibit 2-22: Vulnerable Road User Criteria

Criteria	Index	Weight	Total
Pedestrian Activity	Pedestrian Index: 1 = Low (<100 peak hour peds) 5 = Medium (100-200 peak hour peds) 10 = High (>200 peak hour peds)	0.0375	
Adjacent Community Uses	Community Use Index 1 = Community use tributary to site 5 = Community use accesses site 10 = Community use(s) fronts site	0.025	
Bicycle Activity	Bicycle Use Index: 1 = Occasional bicycle use 5 = Regular bicycle use 10 = On-street bicycle facility/designated bicycle route	0.0375	
	Maximum Total	0.10	

2.4.1.6 Site Length and Location Visibility (Qualitative Pass/Fail)

As the primary intention of the photo enforcement program is to reduce collisions, consideration must be given to the effect of the enforcement location on motorist behaviour, specifically causing abrupt braking due to an inconspicuous location. Enforcement locations should not be hidden behind structures, buildings, vegetation or other sightline impediments.

In addition, it is the intention that all fixed and mobile camera sites will have a photo-enforcement camera information sign placed upstream of the enforcement corridor or location. The advance distance must be sufficient for motorists to perceive and react to the information, i.e., slow down in a prudent manner, if required. Accordingly, it is recommended that the advance placement of the signs be in substantial compliance with Condition C: Speed Reduction Required in OTM Book 6 for warning signs. This Condition C requires driver reaction in the form of a speed reduction. Recommended advance placement distances are shown in **Exhibit 2-23**.

Exhibit 2-23: Ontario Traffic Manual Book 6 Warning Sign Placement – Condition C

Table 4 – Minimum Advance Placement of Condition B and C Warning Signs (Requiring Stopping or Speed Reduction)*

(km/h)	Final Speed	90	80	70	60	50	40	30	20	10	0
Posted (Initial) Speed	Minimum Advance Distance (m)										
100		250	295	335	370	400	420	440	455	460	465
90			230	270	300	330	355	370	385	395	395
80				205	240	270	290	310	325	330	335
70					185	210	235	255	265	275	275
60						160	185	200	215	225	225
50							95	115	130	135	140
40								80	90	100	100
30									60	70	70

* Based on 2.5 seconds brake reaction time (source: *Ontario Geometric Design Manual*) and 5.3 km/hr/s deceleration time (source: *ITE Transportation and Traffic Engineering Handbook*).

Based on the conditions described above and the distances outlined in **Exhibit 2-23**, all enforcement locations must be readily visible to road users at 250 metres on roadways with a posted speed of 60 km/h or less and 300 metres on roadways with a posted speed greater than 60 km/h. These advance distances are basically analogous with a 20-kilometre/hour reduction between typical initial and posted speed conditions. Additionally, no major intersections should be located between advance signing and the photo radar location (minor intersections are permissible). The placement of photo enforcement zone signing must not distract from nor occlude any other regulatory, warning or guide signs, particularly in the vicinity of intersections.

To encourage a greater safety benefit, the photo enforcement system should be located such that the priority road section, intersection, pedestrian crossing, work zone or other priority location is at the mid-point of the section. The intention of this positioning is to have the speed reduction occur before the critical location.

Effectively, the site length and visibility criteria described above necessitate a minimum site length of approximately 500 metres to one kilometre.

One additional consideration related to site selection is that the program operator must be able to identify the location through visual inspection of the violation photos. This criterion will have to be met to effectively defend the system, and improve the likelihood that citations are upheld in court.

2.4.2 EVALUATION OF EFFECTIVENESS

The measures of effectiveness (MOEs) used to evaluate the impacts of the Mississauga ASC program will be very similar to the speed and collision criteria used to select deployment sites. The speed MOEs will include:

- Percentage of traffic volume in excess of the posted speed limit over the 12 lowest volume hours of the day; and

- The percentage of vehicles speeding excessively (i.e., travelling more than 20 km/h over the posted speed limit).

The speed MOEs will provide an indication of the effectiveness of ASC as a deterrent to speeding. The percentage of speed violation data should provide a good measure of the impact of ASC on the general motoring population; whereas, the excessive speeding data will measure the impact of ASC on extreme speeds (and possibly speed differentials).

The collision MOEs will include the following:

- Simple Collision rates; and

- Collision rates for injury and fatal collisions.

The collision MOEs will provide an indication of the effectiveness of ASC in improving road user safety (i.e., the frequency and severity of collisions will serve as a surrogate measure of road user safety).

Combined, the speed and collision MOEs will provide an indication of the link between speeds and collisions in the City of Mississauga. By analyzing the speed and collision data it should be possible to devise some relationship between percentage of vehicles speeding, excessive speeding and/or speed differentials and collision frequency/severity.

Based on the changes in the MOEs that occur following the deployment of ASC, the City can determine whether or not the program was a success, and whether or not to seek to continue or expand the program.

2.4.3 PILOT TEST DESIGN

The proposed pilot study applies a two-pronged approach to testing and evaluating several different effects of photo enforcement. One stream will test the "halo" effect of ASC in reducing speeding on Mississauga roads. The other stream will test the effect of ASC on collision frequency and severity. The two streams could be operated simultaneously, but they will not necessarily have the same durations.

2.4.3.1 The Halo Effect of ASC

This stream of the pilot project will aim to determine the number of mobile photo enforcement units that is required to enforce a specific geographic area. The pilot test will evaluate the physical reach of mobile enforcement units by varying the enforcement presence/level of effort at a number of locations, and measuring the lasting effects of automated enforcement on speeds. This stream will primarily be used to collect speed MOEs.

The pilot test will involve rotating mobile units (most likely two units) to cover a predetermined, fixed number of locations. The level of photo enforcement will be varied (e.g., one day on, three days off or one day on, nine days off), and speed data will be collected continuously to measure the lasting impacts of ASC. It is intended that this stream of the pilot test will lead to the determination of a critical presence/level of effort required to maintain acceptable speeds.

The number of mobile locations selected will have a direct impact on the number of enforcement units required and the duration of the pilot study. It is envisioned that this stream will entail at least two phases lasting two to six months each.

2.4.3.2 The Effect of ASC on Collisions

This stream of the pilot study will measure the impacts of constant speed enforcement presence on collisions. The study will test the effects of ASC on collision frequency and severity by providing constant automated speed enforcement on a road corridor, and measuring the impact on collision rate and severity at the test site versus a control site. This stream will primarily focus on the collision MOEs, but it will also have a significant speed MOE component.

The pilot study will involve equipping a corridor with regularly spaced fixed camera enclosures, and rotating a lesser number of cameras (likely two) between the enclosures. This methodology will effectively provide constant photo enforcement along the entire corridor without requiring an excessive number of camera systems. This stream will require the collection of before and after data for the study corridor and a similar control corridor without ASC. Speed data measurements will also be collected for both the test and control corridors.

The number of camera enclosures required for the study will be directly related to the length of the study corridor. The collisions effects stream will require several (minimum three) years of "after" data to minimize temporal effects and issues of regression to the mean.

The control site should mirror the test site as much as possible. Roads of similar functional class, operating environment, posted speed, AADT, and collision history are desirable. Also, neither the test site nor the control site can be affected by major construction or traffic diversion during study duration.

2.4.3.3 Data Requirements

Both streams of the pilot study will require collecting a significant amount of before and after speed data. A statistically significant amount of before data will need to be recorded to establish accurate baseline speeds for all of the study and control locations. During the ASC deployment phase, regular, if not continual, speed data will have to be recorded to evaluate the impacts of ASC. As mentioned earlier, the stream that measures the halo effect of ASC will base MOEs on the changes in operating speeds both when ASC is present and when it is not present.

The most efficient means of collecting speed data, for both streams of the pilot study, might be to install permanent data recorders at all of the test locations. Permanent data recorders installed in the pavement (e.g., inductive loops or other in-pavement technologies) would likely provide greater reliability and greater protection against vandalism versus on-pavement technologies (e.g., pneumatic tubes). In-pavement technologies would also be less conspicuous than on-pavement technologies. Therefore, they would be less likely to influence/bias driver behaviour; which would in turn result in more accurate data.

In addition to speed data, data requirements for the effect of ASC on the collisions stream of the pilot study will include a minimum of three years of before and after collision data. Presumably, the three-year ("before") collision histories of both the study and control corridors will have been compiled and analysed as part of the site selection process. Data collection for the duration of the pilot test will involve collecting all of the collision records that pertain to the study and control corridors that occur over the three-year period following the deployment of ASC. Ideally, police would provide the raw collision reports, but as a minimum, the following information will be required for the collision data:

- Date
- Time
- Location
- Classification /severity
- Lighting conditions
- Initial impact type
- Driver actions at time of collision
- Road conditions
- Weather
- Initial direction of vehicles

Both speed and collision data will be collected under all weather conditions, and environmental/temporal influences will be identified and accounted for during the analysis of the data.

3. BUSINESS PLAN

The three components of the business plan include the technology review (**Section 3.1**), the program operation process (**Section 3.2**), and the financial model (**Section 3.3**).

3.1 Technology Review

The technology review for this assignment was designed to provide a brief overview of the types of photo enforcement systems and services that are available on the market. The technologies and services presented in this review represent some of the most commonly deployed systems from North America and around the world. Both fixed and mobile technologies have been reviewed, and product summaries are presented in **Exhibit 3-1** and **Exhibit 3-2**, respectively.

Exhibit 3-1: Fixed Photo Enforcement Systems

Manufacturer	Product	Description / Key Functions	Performance/ Reliability	References
LaserCraft Inc.	Digital TMS	• 30 FPS Camera, video capabilities. • No Flash • LIDAR (laser) detection technology - Narrow beam width (5m radius @ 1000m). • Configurable detection zone (min and max distances). • Programmable violation threshold speed • Up to three lanes simultaneously in one housing (3 camera and LIDAR sensors) • Network configurable, images sent to processing centre over network. • Local storage with seven day rolling buffer.	• Speed Accuracy to +/- 1 mph (1.6 km/h) • Open aperture with electronic shutter to operate in all roads with typical illumination. • No required flash – no charge time required between photos. • Shadowing (vehicles very close together), obstructing the camera's view of the second vehicle's license plate is an issue. • Detection zone makes LIDAR blind to other lanes, ensuring proper vehicle is identified • Not for use in areas with no illumination	• Atlanta • Madrid

Manufacturer	Product	Description / Key Functions	Performance/ Reliability	References
Sensys Traffic Information Engineering Group (IEG)	Speed Safety System (SSS)	• RADAR detection technology using wide beam width capable of tracking multiple vehicles in several lanes up to 150m away. • Video Capabilities • Programmable violation threshold speed • Network configurable, images sent to processing centre over network. • Ability to take multiple photos of offending vehicle. • Tracks and measures each vehicle over 20 times per second. • License plate and driver recognition. • Flash	• Accurate Doppler RADAR system (proven technology). • Continuous monitoring of vehicles between 150m and report line, as well as multiple photos confirm violation • Flash may slow time between photographs. • Shadowing (vehicles very close together), obstructing the camera's view of the second vehicle's license plate is an issue. • May be hard to distinguish offenders if multiple vehicles are at report line when photo taken	• Jonkoping, Sweden
Gatsometer BV	Gatso Digital RCS	• RADAR detection technology using narrow beam width capable of tracking multiple vehicles in several lanes up to 150m away. • Programmable violation threshold speed • Network configurable, images sent to processing centre over network. • Ability to take multiple photos of offending vehicle. • Infrared Flash	• Can only monitor one lane, but confirms the correct vehicle is captured. • Flash may slow time between photographs. • Shadowing (vehicles very close together), obstructing the camera's view of the second vehicle's license plate is an issue.	• Edmonton

Manufacturer	Product	Description / Key Functions	Performance/ Reliability	References
Robot Visual Systems	Traffipax Series	• Customizable – Optional camera (still motion / video / black and white / colour / digital) and detection technologies (Piezo / Loop) • Three sensors installed, three measurements taken • Video Capabilities • Programmable violation threshold speed • Network configurable, images sent to processing centre over network. • Can monitor Multiple Lanes • Ability to take multiple photos of offending vehicle. • Flash	• Not restricted to a certain camera or detection technology • Flash may slow time between photographs. • Shadowing (vehicles very close together), obstructing the camera's view of the second vehicle's license plate is an issue. • May be hard to distinguish offenders if multiple vehicles are at report line when photo taken • Detectors installed in the road are safe from sabotage • Three detection measurements confirm speeding violation	• Zurich • New South Wales

Exhibit 3-2: Mobile Photo Enforcement Systems

Manufacturer	Product	Description / Key Functions	Performance/ Reliability	References
LaserCraft Inc.	LaserCam II	• 30 FPS Camera, video capabilities. • No Flash • LIDAR (laser) detection technology - Narrow beam width (5m radius @ 1000m). • Typical capture range of 35 – 95 metres • Programmable violation threshold speed • Can be manned or unmanned. Unmanned camera takes two photos for accuracy and verification • Removable SmartMedia Storage or photos can be downloaded via USB • Can be handheld, mounted in car or on tripod.	• Speed Accuracy to +/- 1 mph (1.6 km/h) • When unmanned, two photos are taken, so that calculations can be made as to the distance travelled over the time period between photos to ensure the evidence is admissible in court. • Compact and Lightweight • Shadowing (vehicles very close together), obstructing the camera's view of the second vehicle's license plate is an issue. • May be limited by battery capacity	• Atlanta • Madrid

Manufacturer	Product	Description / Key Functions	Performance/ Reliability	References
Sensys Traffic Information Engineering Group (IEG)	Mobile Speed Safety System (MSSS)	• RADAR detection technology using wide beam width capable of tracking multiple vehicles in several lanes up to 150m away. • Video Capabilities • Ability to take multiple photos of offending vehicle. • Tracks and measures each vehicle over 20 times per second. • License plate and driver recognition. • Can be handheld, mounted in car or on tripod. • Infra Red Camera (Invisible Flash) • GPS Positioning	• Accurate Doppler RADAR system (proven technology). • Continuous monitoring of vehicles between 150m and report line, as well as multiple photos confirms violation. • Compact and Lightweight • Flash may slow time between photographs. • Shadowing (vehicles very close together), obstructing the camera's view of the second vehicle's license plate is an issue. • May be hard to distinguish offenders if multiple vehicles are at report line when photo taken • Limited battery capacity	• Jonkoping, Sweden
Robot Visual Systems	Traffipax SpeedoPhot Series	• Customizable – Optional camera (still motion / video / black and white / colour / digital) and detection technologies (RADAR / LIDAR) • Video Capabilities • Programmable violation threshold speed • Ability to take multiple photos of offending vehicle. • Handheld, vehicle mounted or tripod. • Traffipax SpeedoGuard mobile housing appears as roadside cabinet.	• Not restricted to a certain camera or detection technology • Short setup times with Speedoguard • Shadowing (vehicles very close together), obstructing the camera's view of the second vehicle's license plate is an issue. • May be hard to distinguish offenders if multiple vehicles are at report line when photo taken • May be limited by battery capacity	• Zurich • New South Wales

Through the technology review, two companies that provide system integration/operation services for photo enforcement programs were also identified. Brief summaries of the services provided by these companies are presented in **Exhibit 3-3**.

Exhibit 3-3: System Integrators

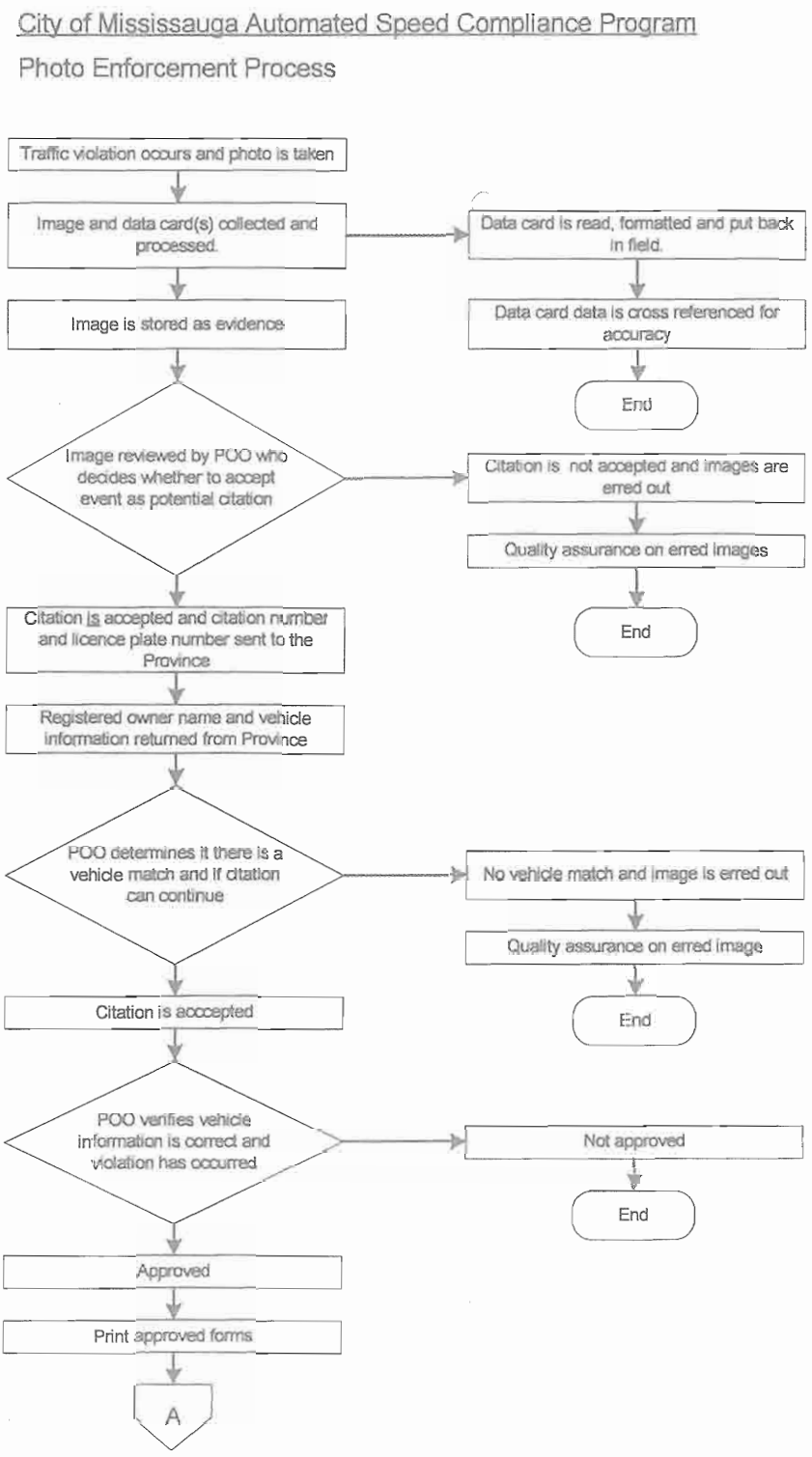
Service Provider	Products Used	Description	References
ACS Public Sector Solutions, Inc.	• Gatsometer (Primarily) • Other Vendors	• Flexibility on Products / Solutions, size of project • Not specific to one vendor • Can retrofit Red-light cameras to do speed enforcement • Can provide all system administration and operate processing centre	• Winnipeg • Edmonton • District of Columbia
EDS	• *Traffipax* Safety Solutions	• Customizable suite of services from project implementation to citation and court management • Flexibility to process all types of violation capture methods, including digital video, digital still photographs, and wet film • Can provide web hosting and electronic bill pay functionality and Courtroom access to recorded violations for reviewing appealed citations	• Bel Air, Maryland • Laurel, Maryland • State of Michigan • New Zealand

This review does not constitute an endorsement of any of the products/services listed, nor should it be viewed as an exhaustive summary of what is available. This review is simply intended as a discussion of the functional and performance characteristics of products that have been used to conduct photo speed enforcement in other jurisdictions.

3.2 Program Operation

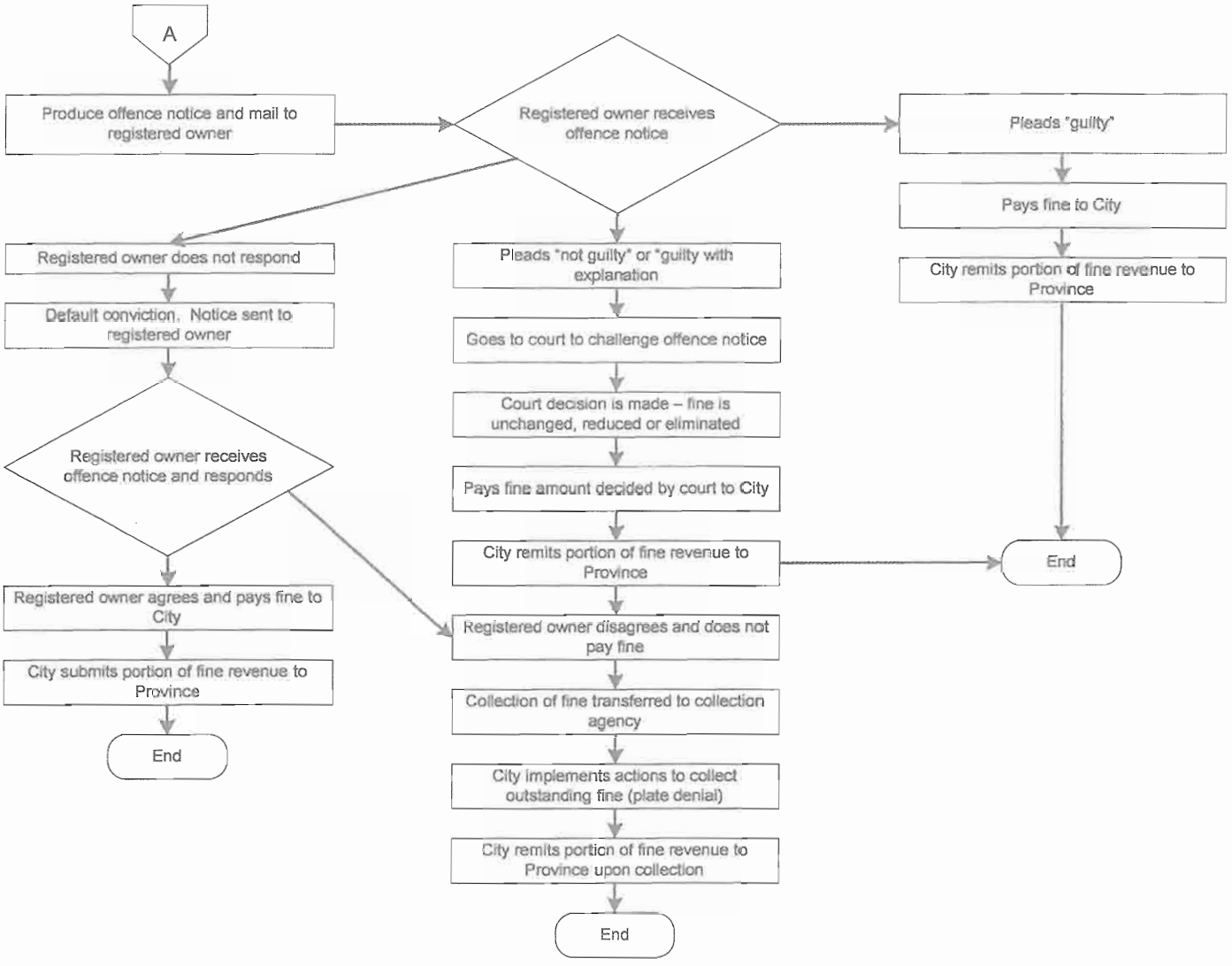
The process flow diagram presented in **Exhibit 3-4** illustrates the structure by which the Mississauga ASC program would be operated.

Exhibit 3-4: Mississauga ASC Process



City of Mississauga Automated Speed Compliance Program

Photo Enforcement Process continued



3.3 Financial Model

The financial model is based on estimates for the first two years of program operation. The cost profile presented in **Exhibit 3-5** is assumes a program operating two fixed photo enforcement units and two mobile units.

Exhibit 3-5: Estimated Annual Operating Costs

ITEM	ANNUAL COST	COMMENT
2 Fixed Units at Intersections	$ 72,000	Lease cost including installation, maintenance, and operations (field and central)
2 Mobile Units	$ 72,000	Lease cost including installation, maintenance, and operations (field and central)
2 Vehicles (Large vans)	$ 25,000	Lease costs
7 Operators for Mobile Units	$ 560,000	2 units xx14 hrs/shift x 365 days/yr =10,220hrs (7 ops x 1,600 hrs/yr = 11,200)
JP	$ 176,000	Required 80% of the time
1 Court Recorder/Monitor	$ 60,000	Required 80% of the time
1 Admin Supervisor	$ 85,000	
7 Admin Staff	$ 525,000	
8 Computers	$ 32,000	
ICON	$ 76,000	Based on approximately 37,000 charges at $1.96 plus GST per charge
Prosecution	$ 80,000	This is included in cost of court staff
MTO Data	$ 100,000	
Signing and Advertising	$ 400,000	
Evaluation and Assessment	$ 100,000	
Subtotal	$ 2,363,000	
25% Mark-Up	$ 590,000	
TOTAL	**$ 2,953,000**	

Based on the cost estimates presented in **Exhibit 3-5** the ASC program would have annual operating costs in the range of $2.953 million (including the 25% contingency). The estimated revenues for the first two years of program operation are presented in **Exhibit 3-6**. The number and distribution of offences is based on figures that were reported for the Winnipeg photo enforcement program

Exhibit 3-6: Estimated Two-Year Revenues

Speed Range Over Limit (km/h)	Distribution of Offences	Typical Speed Over Limit (km/h)	Speeding Fine ($)	Number of Offences* (Year 1)	Revenue ($)	Number of Offences* (Year 2)	Revenue ($)
0-19	80%	15	45.00	30,240	1,360,800	22,720	1,022,400
20-29	10%	25	112.50	3,780	425,250	2,840	319,500
30-39	9%	39	273.00	3,402	928,746	2,556	697,788
50 & Over	1%	50	487.50	378	184,275	284	138,450
TOTAL	**100%**			**37,800**	**2,899,071**	**28,400**	**2,178,138**

*Based on Winnipeg Average

Comparing the two-year operating costs ($5,906,000) and revenues ($5,077,000) estimates for the Mississauga ASC program from **Exhibit 3-5** and **Exhibit 3-6**, the program is expected to result in a net loss of approximately $829,000. This assumes that advertising would be included in both years, and includes a 25% cost overrun contingency. If in the event that net revenue was achieved, it is a fundamental directive of the proposed ASC program that any surplus revenues generated from ASC fines will be reinvested only in road safety programs.

4. MARKETING STRATEGY

This section describes a strategy for marketing the proposed ASC program to the public, and presents the results of two public surveys that were conducted by the City of Mississauga to gauge the current level of support for an automated speed camera program.

4.1 The Strategy

The over-arching marketing strategy will aim to build public understanding and support for an ASC pilot program in Mississauga. Without the support of the people of Mississauga it would be very difficult to move forward with the proposed ASC program. In order to achieve the required level of understanding and support, disclosure and program transparency will be paramount. To accomplish this end, the City will have to build public trust that ASC will be used fairly, be clear about how ASC program will work, and provide opportunities for public input. Being clear about how the program will work should include, but not be limited to, the following measures:

- Clear reasons for selecting pilot test zones;
- Clear rules for operating the pilot program;
- Clear rules on how revenues will be used;
- An open, transparent procurement process;
- Openly sharing program information with public; and
- Asking for public input on decisions.

Assuming that the strategy for engaging the public is successful, the next step would be to leverage that public support to make a case for ACS in Mississauga with the government of Ontario.

Other elements of the marketing strategy would involve finding credible, passionate spokespersons (at Council and at the staff and community levels), and enlisting allies and champions of the program. Some examples of possible allies include the Canada Safety Council, the CAA Ontario Chapter, officials/experts from Alberta, Manitoba, Quebec, and/or other area municipalities (e.g., Toronto, Hamilton, Ottawa, Durham Region, York Region or Richmond Hill).

4.2 The Audiences

The key audiences that will need to be addressed through the various stages of the marketing program development, application, and implementation include the following:

- Mississauga residents;
- Drivers in Mississauga/GTA;
- Mississauga Mayor and Council;
- Police services;
- Automobile insurers;
- Car rental and leasing companies;
- Road safety groups;
- Ministry of Transportation; and
- The government of the province of Ontario.

As the program moves forward, it will be important to stay aware of the changing and expanding audiences, and cater the marketing to the program to appeal to these diverse groups.

4.3 The Key Messages

The evolving marketing campaign for the Mississauga ASC program will feature several key messages designed to appeal to the various audiences affected by the proposal:

- Our proposal reflects council's strong commitment to safe roads and neighbourhoods.
- Speeding is a problem in Mississauga. Despite existing enforcement, too many vehicles on our roads travel well above the speed limit.
- Speeding is a hazard
  - A speeding vehicle requires more time and distance to stop, and drivers have less time to react. At higher speeds, the risk of collisions, injuries, and deaths rises sharply.
- Speeding can have a large social and economic cost

  - Traffic collisions, injuries, and deaths caused by speeding impose a heavy social and economic cost to families and communities, and place a burden on our health care system.

- Photo enforcement is a valuable safety tool
  - Police enforcement is the most effective way to combat speeding. But other tools are needed to supplement police resources.
  - Research shows that speed cameras are effective in slowing traffic in enforcement zones.
  - When drivers know there is a strong chance they will be fined for speeding, they slow down.
- Program operation will be a transparent process
  - We are committed to a transparent process that places a top priority on finding out how best to reduce speeding and promote safe driving.
  - Our pilot program will introduce speed cameras at selected sites in high-risk zones, to evaluate how ASC affects road safety.
  - Any surplus revenues generated from ASC fines will be reinvested only in road safety programs.
  - Study results will be made public.
- Submission to Province
  - We call on the province to support this proposal.
  - Ontario has changed since 1994. Our proposal is a completely different approach, one that builds on best practices and lessons learned.
  - Mississauga and all Ontario municipalities need ASC as one more tool to enforce the law and keep roads and neighbourhoods safe.

4.4 Media Outreach

The media will play an important role in communicating the key messages of the marketing campaign to the public. As such, a well-prepared approach to communicating with the media is essential. Some of the basic steps involved in engaging the media on ASC issues are outlined below:

- Train spokespersons for media interviews;
- Use targeted outreach to generate earned media;
- Conduct online editorial outreach; and
- Hold editorial boards or technical briefings.

The media has enormous power when it comes to shaping public opinion; therefore, it is imperative that the goals and key messages associated with this proposal are accurately presented to media outlets.

4.5 Information Products

Some eventual and/or potential information products that could be used to spread the message about the proposed Mississauga ASC program are as follows:

- Key messages/Questions & Answers brochures;
- Ads for public meetings and information centres;
- A Brochure/householder on the ASC program proposal;
- An interactive ASC web site;
- News releases/backgrounders;
- Signage, poster boards, maps, and other visuals; and
- The formal proposal to the government of Ontario.

As previously mentioned, the success of the City's proposal to the province will rely heavily on public support for the ASC program. Winning the support of the people of Mississauga will require communicating several key messages about the perils of excessive speeding and the proposed ASC program, and the media and the information products produced by the City will be the vehicles by which those messages are delivered to the public; as such their importance cannot be overstated.

4.6 Public Survey Results

Commencing June 2, 2008 an on-line survey was done to seek input on the ASC program proposal from the residents of Mississauga. As of Thursday, June 12, 2008, more than 1,000 responses to the survey had been received.

The margin of error for the survey (based on the 1,070 responses received as of June 12, 2008) was calculated to be +/-3.1% with 95% confidence. Given the availability of high-speed Internet access in Mississauga, the survey was determined to represent a significant, random sample of the population. A summary of the survey results is provided below:

- 80.6% of respondents indicated that they are concerned about speeding on Mississauga's roadways;
- 76.5% of respondents indicated that they support measures to control speeding on Mississauga's roadways;
- With the understanding that Council agrees to use any surplus revenue generated from fines to be reinvested only in road safety programs, 47.2% of respondents expressed support for an ASC program in Mississauga;

- When asked to indicate their familiarity with the existing speed management tools used in Mississauga (and described in detail in **Section 2.3**), survey respondents were most familiar with police enforcement (99%), school speed zones (98.2%), and community safety zones (90.5%);

- When asked to indicate how effective they believe the existing speed management tools are in managing speed within the City, the survey respondents indicated that police enforcement was most effective (94.3%), followed by school speed zones (88.5%);

- When asked to rate how effective they believe automated speed cameras would be in encouraging them to comply with the speed limit, 42.1% of respondents indicated that it would not be effective, 16.5% indicated a neutral response, and 41.4% indicated that it would be effective;

- Only 17.6% of respondents felt that the name Automated Speed Compliance best described the proposed program (as compared to the names Automated Speed Cameras or Speed Cameras); and

- 49.8% of survey respondents indicated support for the use of automated speed cameras as an additional tool to combat speeding in high-risk areas such as school zones.

With consideration for the 3.1% margin for error, the survey results show what is effectively a fifty-fifty split in public support for the proposed ASC program. Support for the use of photo enforcement in high-risk areas (49.8%) is virtually the same as for general use. The results of this survey suggest that the residents of Mississauga are concerned about speeding and the majority support measures to control speeding, but they are divided as to how to address the issue.

In an effort to continue to collect public input, an information display about the proposed ASC program, complete with statistics about the excessive speeding occurring on certain local roadways, was set up at the 2008 Road Safety Show. Visitors to the 2008 Road Safety Show were given the opportunity to complete response cards bearing questions similar to those presented in the on-line survey. A total of 420 responses were submitted, and the results were as follows:

- With the understanding that Council agrees to use any surplus revenue generated from fines to be reinvested only in road safety programs, 92.1% of respondents expressed support for an ASC program in Mississauga; and

- 94.3% of survey respondents indicated support for the use of automated speed cameras as an additional tool to combat speeding in high-risk areas such as school zones.

The statistical significance of the 2008 Road Safety Show responses was not computed, and the respondents do not necessarily represent a random sample of the residents of Mississauga.

5. CONCLUSIONS

The three main components of this study, as presented above, were the project justification and design, the business plan, and the marketing strategy. Through those three tasks IBI Group set out to accomplish a number of key objectives:

- Identify a connection between excessive speeding and road user safety;
- Describe the extent of the excessive speeding issue in the City of Mississauga;
- Show how photo enforcement could be used to supplement existing speed enforcement practices;
- Design a pilot study to test an ASC program in the City of Mississauga, and develop a means of evaluating its effectiveness;
- Review some of the photo enforcement technologies and systems that would be available to the City;
- Define a process for operating and administering an ASC program;
- Estimate expected operating costs and revenues for a two-year ASC program operating cycle; and
- Develop a strategy for presenting the idea of a Mississauga automated speed camera program to the public and the provincial government.

Through several rounds of data collection, literature review, stakeholder consultation, and program development, the results of which are presented in detail in the preceding sections of this report (**Sections 2-4**), all of the above-listed objectives were met. A brief summary of findings is provided below.

The justification for the use of photo enforcement in Mississauga focused primarily on identifying the link between speeding and road user safety. Through a comprehensive literature review, a number of reliable source documents were identified (all of which are referenced in this report) that show a direct relationship between vehicle speeds and both collision risk and collision severity. The vast majority of the research consulted and fundamental laws of physics and vehicle mechanics reason that the risk of occurrence and severity of collisions both increase as speed increases. The effects of speed differentials were also investigated, and the information gathered suggests that increased speed differentials also contribute to an increased risk of collisions occurring.

Analysis of speed data collected on Mississauga roads revealed a legitimate excessive speeding problem. On some collector and arterial roads, it was shown that thousands of vehicles travel at speeds that exceed the posted speed limit by more than 20 km/h on a typical day. Even school zones (with flashing 40 km/h periods) showed a significant number of vehicles travelling at excessive speeds (i.e., more than 20 km/h over the posted speed limit).

The City currently employs a number of tools in its fight against speeding, and Peel Regional Police are dedicated to enforcing the speed limits (and all other traffic laws). However, the speed data analysis suggests that the current tools for combating speeding are not enough to sufficiently curb excessive speeding. Therefore, photo enforcement is a potential tool that could be used to supplement the existing speed limit enforcement effort.

The pilot ASC study design employs a two-pronged approach to test both fixed and mobile ASC installations and a number of speed and collision related measures of effectiveness. One stream will test the "halo" effect of ASC in reducing speeding on Mississauga roads. The other stream will test the effect of ASC on collision frequency and severity. The halo effect stream will aim to determine the number of mobile photo enforcement units that is required to enforce a specific geographic area. The related pilot test will evaluate the physical reach of mobile enforcement units

by varying the enforcement presence/level of effort at a number of locations, and measuring the lasting effects of automated enforcement on speeds. The halo effect stream will primarily be used to collect speed MOEs. The collision effect stream of the pilot study will measure the impacts of constant speed enforcement presence on collisions. It will test the effects of ASC on collision frequency and severity by providing constant automated speed enforcement on a road corridor, and measuring the impact on collision rate and severity at the test site versus a control site. This stream will primarily focus on the collision MOEs, but it will also have a significant speed MOE component. The effectiveness of the ASC program will be evaluated based on before/after data for percentage of vehicles in violation of the speed limit, percentage of vehicles travelling more than 20 km/h in excess of the posted speed limit, collision rate, and injury/fatality collision rates.

The technology review provided a brief overview of the types of photo enforcement systems and services that are available on the market. The technologies and services reviewed in this report represent some of the most commonly deployed systems from North America and around the world, and in many cases, examples of jurisdictions where the technologies have been used are provided with the overview.

The ASC operation program that was developed for the City of Mississauga is based on similar programs developed in Winnipeg and Edmonton. It explains all of the potential procedural steps that might be involved in administering speeding violations issued via the proposed ASC program in the form of a process flow diagram.

Estimates for a two-year operating cost and revenue cycle were calculated using present day costs and expected violations based on the experiences of the City of Winnipeg. The estimates showed expected net loss in the range of $829,000 for the first two years of operation. This includes advertising in both years, and a 25% cost overrun contingency. City Council has vowed that any surplus revenues generated from ASC fines will be reinvested only in road safety programs.

The primary goal of the marketing strategy will be to build public understanding and support for the proposed ASC pilot program in Mississauga. Without the support of the people of Mississauga it would be very difficult to move forward with the proposed ASC program. To achieve the required level of understanding and support, the marketing strategy focuses on disclosure and program transparency. To accomplish this end, the City will have to build public trust that ASC will be used fairly, be clear about how ASC program will work, and provide opportunities for public input. Several initiatives for engaging the two main audiences (i.e., the public and the provincial government), promoting the key program messages, and public outreach, through the media and via information packages, are presented along with the overall marketing strategy.

An on-line survey was conducted to capture feedback and gauge public support for the implementation of speed enforcement cameras on Mississauga Roadways. Between June 2 and June 12, 2008, 1,070 responses to the survey were received. The survey results show what is effectively a fifty-fifty split in public support for the proposed ASC program. Support for the use of photo enforcement in high-risk areas (49.8%) is virtually the same as for general use. The results of this survey suggest that the residents of Mississauga are concerned about speeding and the majority of residents support measures to control speeding, but they are divided as to how to address the issue.

In general, the City appears to have a strong case for moving forward with its ASC proposal. The ASC program developed through this assignment shows a commitment on the part of the City to improving road user safety, and doing so in a way that is potentially highly efficient and effective. Photo enforcement has the capacity to be a valuable tool in the effort to increase the level of speed limit compliance on Mississauga's roads; however, transparent operation of the program and its subsequent reception by the public will ultimately determine the success of ASC in the City.

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COMMUNICATION PLAN

GOAL

Position Mississauga as a City for the 21st Century and a leader in increasing safety on roadways through the introduction of the new Automated Speed Camera program.

OBJECTIVE 1 **Inform and enhance the understanding of the merits of a Speed Enforcement Camera program.**

Strategy 1 Use external messaging opportunities to increase the understanding and perception of a Speed Enforcement Camera program.

Tactics
- Brochures
- Interactive Web Site
- News Release
- Public Meetings
- Active Mississauga Guide
- Tax Bill

OBJECTIVE 2 **Build public support of the ASC program in Mississauga**

Strategy 2

Tactics
- Interactive Web Site
- Backgrouder/FAQs
- News Release
- Posters in facilities
- Direct Mail Piece
- Rate Payer Groups
- Public Meetings
- Newspaper ads
- Mobile/Permanent signs at Speed Enforcement Camera locations
- Media launch / staged at Speed Enforcement Camera location

KEY MESSAGES

1 **Building a City for the 21st Century** **Maintaining a Safe City**	2 **Speed Enforcement Camera Steering Committee** **Pursuing Speed Enforcement Camera on Mississauga Streets**	3 **Engaging the Public** **Online survey to residents**	4 **Education and Awareness** **Communicating the facts and transparency of the Speed Enforcement Camera program**
Mississauga boasts is the safest city in Canada (based on comparative research undertaken annually by the Safe City Mississauga formally the Mississauga Crime Prevention Association). Mississauga benefits from the unparalleled commitment to community safety and strong leadership of Mayor McCallion and the members of City Council in this regard. Mississauga takes great pride in the outstanding work of the Peel Regional Police in keeping Mississauga safe and secure.	In a March 2005 report to General Committee staff recommended that a Speed Enforcement Camera steering committee be established to research and investigate the effective use of Speed Enforcement Camera on Mississauga streets. Committee engaged IBI Group to develop a Business Case and Marketing Strategy for an ASC program in Mississauga. The business case outlined that current tools employed by the City to combat speed are not enough to sufficiently curb excessive speeding.	The largest online survey conducted by the City of Mississauga concluded the following: - 80.6 % of residents are concerned about speed; - 76.5 % of residents indicated that they support measures to control speeding on Mississauga roadways; - With the understanding that Council aggress to use any surplus revenue generated from fines to be reinvested only in road safety programs, 47.2 % expressed support for an ASC program in Mississauga. - 49.8 % of residents indicated support for the use of automated speed cameras as an additional tool to combat speeding in areas such as school zones.	Speeding is a problem in Mississauga. Despite existing enforcement, too many vehicles on our roads travel well above the speed limit. Based on reports provided by Peel Regional Police from 2002 to 2007, there has been an average of 250 pedestrian related collisions on Mississauga roadways, which comprises nearly 25 per cent of all personal injury collisions. Speed Enforcement Camera is a proven speed deterrent that will achieve results.

Communications Tactics / Timing / Costs

Communications Tactic	Timing	Cost (approx.)
ASC brochures Distributed to key community groups and City facilities Quantity: 10,000	2 months	$5,000
Interactive Web site	1 month	$1,000
News Releases	- 1st release when project is approved - As needed	N/A
Public Meetings Outlining the program	1-3 months	$1,000
Ad in Active Mississauga Guide	Fall or Spring issue (dependant on start date)	$1,500
Tax bill insert	Dependant on start date	$600
Facility posters	2 months	$2,000
Direct Mail piece Sent to selected areas	1 month before program start	$3,000
Newspaper ads	1-3 months	$4,000
Mobile signage Located in program areas and at key entrances to the City	2 months before program start	$5,000
Media Launch Staged at a Speed Enforcement Camera location	Program start	$1,000
TOTAL		$24,100

Mississauga Automated Speed Camera (ASC) Program

Statement of Objectives

In response to concerns expressed by its residents, the City of Mississauga proposes a full-time deterrent to drivers who choose to operate their vehicles at speeds that exceed posted limits, which would endanger the safety of other drivers, pedestrians and cyclists using Mississauga's road system.

The City of Mississauga plans to introduce automated speed cameras as a supplement to traditional police enforcement. The Automated Speed Camera (ASC) Program will combine increased speed enforcement with an extensive public information campaign and is supported by the Peel Regional Police.

The primary objective of the ASC Program is to increase safety on Mississauga roadways by:

1. Increasing the number of drivers who drive within the posted speed limits;

2. Reducing the severity of collisions; and

3. Improving drivers' understanding of the dangers of speeding.

The City of Mississauga will monitor the ASC Program to measure its effectiveness and demonstrate the impact on speed compliance, speeding charges, conviction rates, and the severity of injuries which result from high speed collisions.