TORONTO

STAFF REPORT
ACTION REQUIRED

Road Safety Plan (RSP) 2017-2021

Date:	June 10, 2016
To:	Public Works and Infrastructure Committee
From:	General Manager, Transportation Services
Wards:	All
Reference Number:	P:\2016\Cluster B\TRA\TMC\Pw16002tmc.docx

SUMMARY

The purpose of this report is to set forward a comprehensive Road Safety Plan (RSP) to improve road safety, and to request City Council's endorsement of the plan. This report also responds to a number of City Council and Public Works and Infrastructure Committee motions linked to road safety, including the expansion of the "Watch Your Speed" pilot program in school zones, an investigation of requirements for expanding automated enforcement, a review of posted speed limits, the development of a user-friendly traffic calming guide, and the identification of safety improvements for school children, older pedestrians and persons with disabilities.

The proposed RSP is a comprehensive, collaborative, and data-driven action plan for reducing the number of traffic-related deaths and serious injuries on Toronto's roads over the next 5 years (2017-2021). The comprehensive nature of the plan entails the shared responsibility, involvement, and commitment of all road safety partner agencies in the City, consideration for all types of road users, identification of the City's key safety priorities, and the inclusion of a variety of engineering, education, and enforcement countermeasures.

The RSP emphasizes protection for the most vulnerable road users, such as pedestrians, cyclists, older adults, and school children, and leverages the experiences of other major North American jurisdictions that have embraced the "Vision Zero" philosophy that was first introduced in Europe and is gaining widespread adoption.

RECOMMENDATIONS

The General Manager, Transportation Services recommends that City Council:

1. Endorse in principle the proposed Road Safety Plan (2017-2021).

2. Authorize the General Manager, Transportation Services to expand the "Watch Your Speed" Program to include the use of permanent speed display signs exclusively in school zones.

3. Approve the proposed mandatory requirements and prioritization guidelines for selecting and prioritizing candidate schools for the installation and operation of permanent speed display signs, as outlined in Appendix 8 attached to this report.

4. Authorize the General Manager, Transportation Services, to request the Ontario Ministry of Transportation to allow the City of Toronto to implement a mobile automated speed enforcement pilot project in school zones and construction zones.

5. Authorize the General Manager, Transportation Services, to request the Ontario Ministry of Transportation to allow the City of Toronto to implement "School Safety Zones" which would double fines for speeding and other traffic infractions in school zones.

6. Approve the reduction in the posted speed limit for those street locations identified in Appendix 6, attached to this report.

7. Direct the City Manager to forward a copy of this report, dated June 10, 2016, to the Disability, Access and Inclusion Advisory Committee, Board of Health, and Toronto Police Services Board for information.

8. Direct the City Manager to request the Toronto Police Services Board to request the Chief of Police to submit a report to the Toronto Police Services Board:

    a) Confirming support for the Vision and Goal of the Road Safety Plan;

    b) Outlining specific existing, enhanced, and new enforcement measures to be undertaken by the Toronto Police Service in support of the Road Safety Plan; and

    c) Discussing the required funding and staffing levels required to meet the Vision and Goal of the Road Safety Plan.

9. Authorize and direct the appropriate City Officials to take the necessary action to give effect to Council's decision, including the introduction of in Council of any Bills that may be required.

FINANCIAL IMPACT

The total financial implications for Transportation Services as a result of the proposed five-year RSP (2017-2021) is estimated at $68.1 million overall, representing $28.2 million in previously approved funding for existing programs, $35.4 million of additional Capital funding, and $4.5 million of additional Operating funding (2017-2021) which after the first year is on average approximately $1.0 million a year, as described in Appendix 1 and Table 1 below.

Table 1: Road Safety Plan Budget

Year	Capital previously-authorized	Capital Additional	Operating net additional
2017	$ 7,233,000	$ 4,531,000	$ 372,000
2018	$ 5,233,000	$ 8,916,000	$ 994,000
2019	$ 5,233,000	$ 7,616,000	$ 1,014,000
2020	$ 5,233,000	$ 7,176,000	$ 1,034,000
2021	$ 5,233,000	$ 7,196,000	$ 1,054,000
TOTAL	**$ 28,165,000**	**$ 35,435,000**	**$ 4,468,000**

The additional funding requirements are not included in the 2016 Capital Budget and 2017-2025 Capital Plan or the 2016 Operating Budget for Transportation Services. Future capital and operating funding for the five-year RSP (2017-2021) will be considered against other unfunded City priorities in concert with the development of a financing strategy that will include various City sources.

In order to deliver on an increased budget for road safety initiatives, Transportation Services would require increased capacity particularly in the area of capital project delivery. The recommended Road Safety Plan identifies the need for ten new capital-funded staff, with an additional four operational-funded staff.

The Deputy City Manager & Chief Financial Officer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

At its meeting of August 25, 26, 27 and 28, 2014, City Council directed Transportation Services to purchase, install, operate, and evaluate ten (10) speed measurement and display signs on a permanent basis, as a pilot expansion of the "Watch Your Speed" Program (WYSP) in school zones. Council also directed staff to report back to Public Works and Infrastructure Committee on the effectiveness of the pilot project, and the costs and resources required to operate the pilot project.

http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2014.MM55.38

At its meeting of February 10 and 11, 2015, City Council directed the City Solicitor and Transportation Services to report to the Public Works and Infrastructure Committee on

the feasibility and mechanism to double the fine for speeding on residential streets, in school zones, and around playgrounds and daycare centres.

http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.MM3.4

At its meeting of May 5, 6 and 7, 2015, City Council directed Transportation Services staff to lead a task force, in cooperation with Ministry of Transportation, Ministry of the Attorney General, Toronto Police Service Court Services and Legal staff, to investigate the technical, evidentiary, regulatory and prosecutorial and financial requirements related to expanding automated enforcement for the purposes of reducing speed, stop sign and turn violations at warranted locations. City Council also directed Transportation Services staff and the City Solicitor, in consultation with Toronto Police Service, to report to the Public Works and Infrastructure Committee as a component of the Road Safety Plan for Toronto, the task force results and recommendations related to an automated enforcement pilot project within the City of Toronto.

http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.PW3.17

At its meeting of May 5, 6 and 7, 2015, City Council requested that, "… the General Manager, Transportation Services to report back to the Public Works and Infrastructure Committee on the following:

a. what implications the Ministry of Transportation's proposal to amend the current default speed limit, in the Highway Traffic Act, would have on the City of Toronto; and

b. as part of the Road Safety Plan, on the creation of "school safety zones" which may include elements such as lower speed limits, increased enforcement, higher fines, improved pavement markings, flashing signage, and/or a public awareness campaign, such report to include capital costs, annual operating costs, and legislative changes required to implement creation of such zones."

http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.PW3.3

At its meeting of June 10, 11 and 12, 2015, City Council directed Transportation Services staff, in consultation with other City Divisions, to report to Public Works and Infrastructure Committee with a comprehensive plan to improve road safety that would include: a review of best practices from comparable jurisdictions; a review of existing City road safety policies, strategies and guidelines; an enhanced analysis of City-wide traffic collision data; specific recommendations to improve road safety for pedestrians and cyclists over the short, medium and long-terms; an implementation plan and funding strategy; a regular reporting mechanism to track progress; the creation of a Road Safety Advisory Group to engage key internal partners and external stakeholders; and the creation of a Road Safety Task Force to be developed and led by Transportation Services. City Council also directed staff to conduct audits of intersections with high pedestrian volumes and to report to Public Works and Infrastructure Committee on the audit results and recommendations for enhancing pedestrian safety and walkability.

http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.PW5.9

At its meeting of June 29, 2015, the Toronto Board of Health directed the Medical Officer of Health to work with Transportation Services and its Road Safety Advisory Group to identify effective ways to reduce speeds and improve safety on arterial and local roads by reducing posted speed limits, exploring strategies to increase speed limit compliance, enhancing public education about road safety, with a focus on motor vehicle drivers and vulnerable groups including youth and older adults, improving road design to better protect pedestrians and cyclists and identifying opportunities to raise awareness of pedestrian safety in private driveways and parking lots.

http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.HL5.6

At its meeting of October 7, 2015, Public Works and Infrastructure Committee directed Transportation Services staff to consider the inclusion of motorcyclists as vulnerable road users during the development of the Road User Safety Strategy.

http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.PW8.4

At its meeting of November 12, 2015, Public Works and Infrastructure Committee, requested the General Manager, Transportation Services to include, as part of the upcoming Toronto Road Safety Plan, an easy-to-use traffic calming manual, including among other things, a discussion of typical traffic calming options, such as speed humps, line markings and signage as well as their impacts, costs and effectiveness and an overview of applicable Council policies and warrants.

http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.PW9.16

At its meeting of December 9 and 10, 2015, City Council directed Transportation Services staff to report to Public Works and Infrastructure Committee on intersections without automatic pedestrian signals which are close to facilities for older adults and options to increasing safety.

http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.CD8.1

At its meeting of January 21, 2016, Public Works and Infrastructure Committee directed Transportation Services staff to include, as part of the upcoming Toronto Road Safety Strategic Plan, a Seniors Strategy that identifies specific counter measures aimed at improving the safety of older residents on local and arterial roads and reducing the number of fatalities and serious injuries.

http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.PW10.8

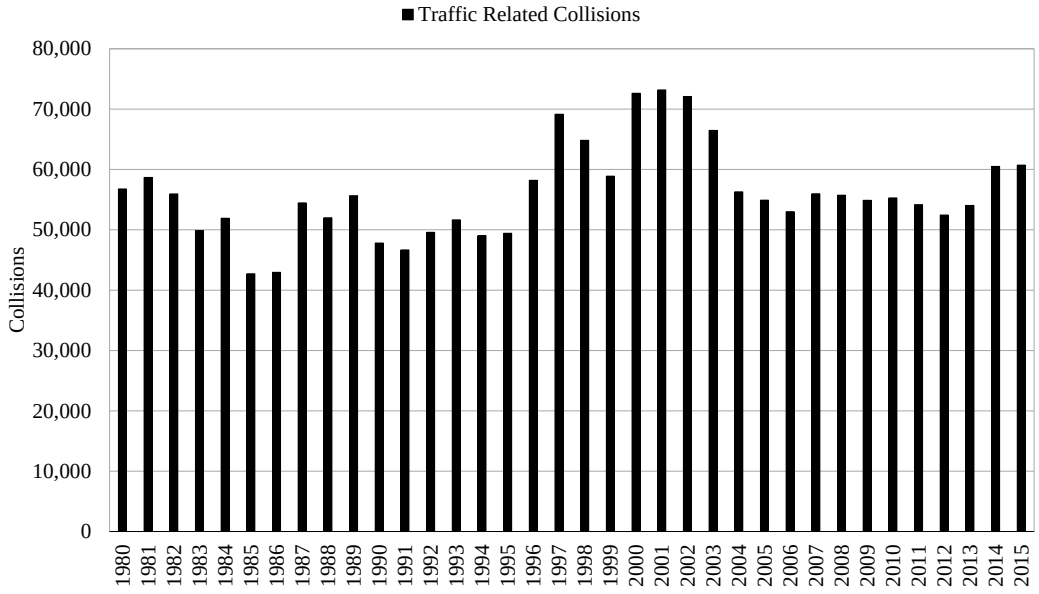
ISSUE BACKGROUND

Current State of Road Safety

As part of its role and mandate to build and maintain a safe and efficient road system for all road users, Transportation Services continuously makes improvements that have proven to be effective in addressing road safety, such as zebra markings at pedestrian crossings and red light running cameras. In addition, there are currently many other organizations and agencies in Toronto also involved in road safety, including Toronto Police Service, Toronto Public Health, Toronto District School Board (TDSB), Toronto Catholic District School Board (TCDSB) and the Canadian Automobile Association (CAA). These agencies have and continue to deliver various road safety programs and initiatives, but often independently or with limited collaboration.

The total number of traffic-related collisions in Toronto has remained fairly steady since 2004, as shown in Figure 1. During this last decade, total collisions fluctuated between 52,000-60,000 per year, averaging 56,000 per year. During this period, vehicle-kilometers travelled is estimated to have increased by approximately 14% and population and employment in Toronto has increased by 8% and 13% respectively, indicating a slight decrease in collision *rates* depending on which normalization metric is used.

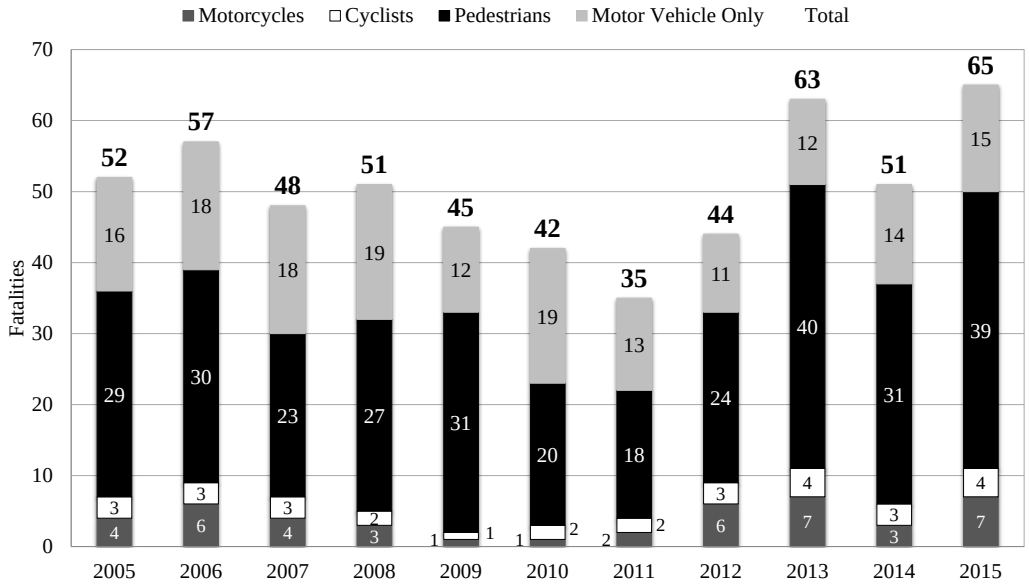
Figure 1: Total Collisions in Toronto, 1980-2015



Note: Toronto Police Service reporting practices changed slightly in 2014

After remaining fairly steady from 2005-2012, with an average of 44 persons killed per year, traffic fatalities have increased over the last 3 years, with 65 traffic-related fatalities in 2015 representing a 10-year high. These trends are shown in Figure 2.

Figure 2: Traffic Fatalities in Toronto, 2005-2015



Note: Toronto Police Service reporting practices changed slightly in 2014.

This recent increase in fatal collisions has resulted in heightened attention by the public, elected officials, and City staff and was a primary driver for the creation of a comprehensive road safety plan. Due to better design and engineering, vehicular occupants are better protected than ever. However, recent increases in the number of fatalities in vulnerable road users has resulted in a greater emphasis on safety measures to protect those outside of vehicles. Vulnerable road users are defined as the road users who are most at risk of being seriously injured or killed when they are involved in a motor-vehicle-related collision. These groups would be pedestrians, cyclists and motorcyclists.

It should be noted that starting in 2014, the Toronto Police Service made slight amendments to collision reporting practices, in particular ceasing to report collisions involving minor injury and property-damage-only (PDO). For this reason, there may be slight inconsistencies in data between years prior to 2014 and those after. The impact on those numbers presented in this report are assumed to be minor, as practices surrounding serious collisions have generally not changed.

Vision Zero and a Shift to KSI

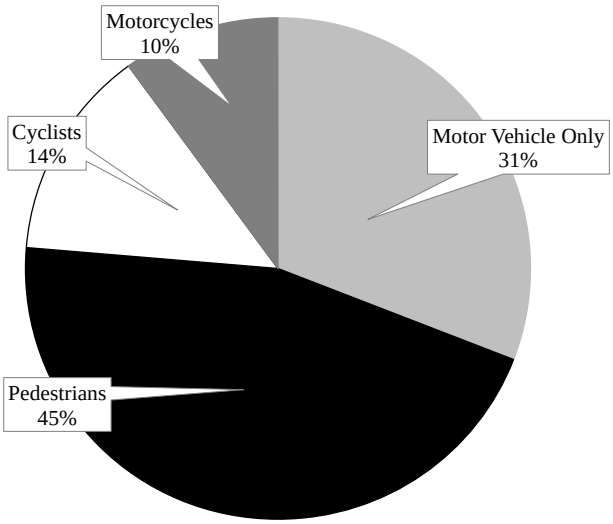
In recent years, many jurisdictions in North America and abroad have begun to better co-ordinate efforts and resources among agencies and stakeholders under a unified road safety plan, working collaboratively to achieve a shared vision and goal. Many of these cities have joined a movement called Vision Zero, which aims to significantly reduce traffic-related fatalities and serious injuries.

Historically, road safety analyses conducted in North America examined and targeted a reduction in all collisions, including less serious property-damage-only collisions. In contrast, Vision Zero plans focus on reducing collisions resulting in death and serious

injuries (injuries that require admittance to hospital), referred to as "killed and seriously injured" (KSI) collisions. The RSP will target KSI collisions. Staff support the shift to a KSI-based approach because:

- The factors and circumstances that differentiate a fatal collision from a serious injury collision are often marginal;
- It places greater emphasis on vulnerable road users, as is apparent in the over-representation of vulnerable road users in Figure 3; and
- KSI collisions carry the highest overall societal costs.

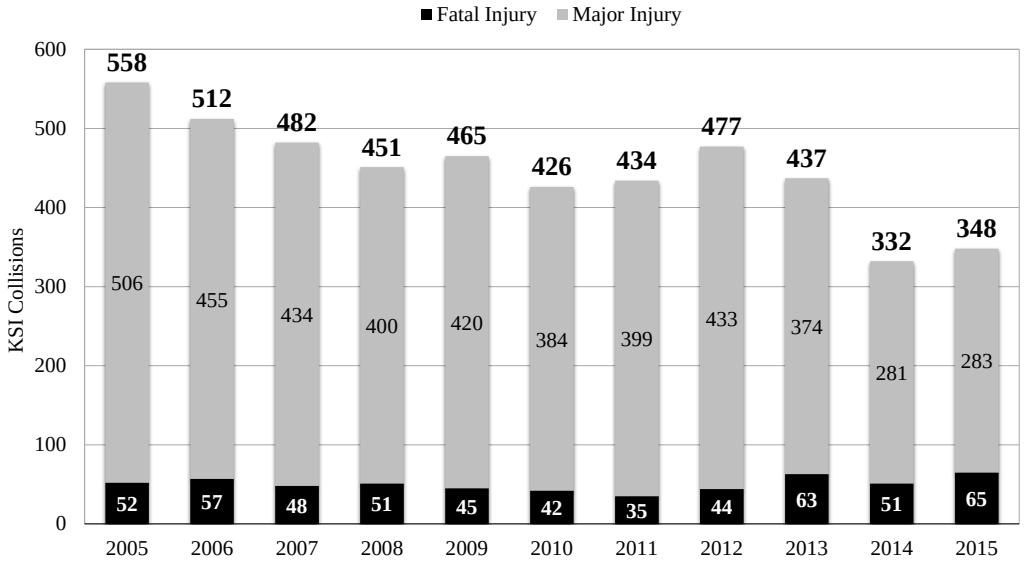
Figure 3: KSI Collisions by Road User, 2011-2015



Note: Toronto Police Service reporting practices changed slightly in 2014.

Figure 4 shows KSI collision trends in the City of Toronto and indicates that these collisions have been declining since 2005,

Figure 4: KSI Collisions in Toronto, 2005-2015



Note: Toronto Police Service reporting practices changed slightly in 2014.

COMMENTS

Overview of the RSP

The RSP is a comprehensive five year (2017-2021) action plan aimed at reducing fatal and serious injury collisions in the City of Toronto. It gives consideration for all road users, but places particular emphasis on vulnerable road users. It also follows a widely accepted, holistic approach to improving road safety which includes engineering, education and enforcement solutions. The plan also fosters a sense of shared responsibility among institutions involved in road safety to improve effectiveness, reduce redundancy and prioritize new investments to improve road safety in Toronto.

The plan was developed in partnership with many agencies that have a role in various aspects of road safety in the City. These agencies have all declared their commitment to sharing responsibility and lending support to the plan, including leading implementation, and knowledge sharing. These RSP partner agencies include Toronto Police Service, Toronto Public Health, the Disability Issues Committee, CARP (formerly the Canadian Association of Retired Persons), CAA, Cycle Toronto, Walk Toronto, TDSB, TCDSB, Sunnybrook Health Sciences Centre and the Toronto Centre for Active Transportation.

The plan includes the following major components:

- Vision and Goal;
- Collision data analysis to target and prioritize areas requiring attention;
- Key safety priorities (referred to as Emphasis Areas);
- New and enhanced countermeasures for addressing each key safety priority;
- Lead and support agencies to implement countermeasures;

- Public engagement; and
- The establishment of an RSP Task Force.

In addition to identifying new countermeasures, the plan also aligns and augments current safety programs and initiatives to better focus efforts and resources to address key priorities.

The development of the RSP included extensive KSI collision data analysis, particularly trending and geospatial analysis. The data analysis supports the on-going evaluation of safety priorities, on-going monitoring of safety trends and issues, and evaluation of the impacts and effectiveness of countermeasures.

This plan also calls for the creation of an RSP Task Force, comprised of representatives from all partner agencies. The task force will meet quarterly to provide updates, review progress, re-assess priorities, plan future actions and discuss and resolve issues. The Traffic Safety Unit in Transportation Services, will organize the task force, and provide oversight for the RSP.

Key Highlights in the Development of the Plan

In 2015, Transportation Services initiated and facilitated the development of the RSP, modelled on the U.S. Department of Transportation Federal Highway Administration (FHWA) guides for road safety plans and approaches adopted by other jurisdictions. The plan was developed collaboratively with partner agencies through a series of workshop meetings conducted between October 2015 and May 2016. In addition, key external stakeholders and advocacy groups provided input on aspects of the plan, such as the emphasis areas and suggested countermeasures, through a roundtable chaired by Councillor Jaye Robinson on January 25, 2016.

A public opinion poll of Toronto residents was also conducted in August, 2015, to determine attitudes and opinions about road safety issues and priorities. The results of the poll showed general agreement between the public's perception about the City's safety priorities and the priorities identified through a review of the KSI collision data. Key findings of the poll can be found in Appendix 2.

Vision and Goal

One of the key aspects to a successful strategic plan is establishing a clear, shared vision and goal at the outset. The vision and goal keeps the plan focused on a common objective. Both were developed collaboratively and supported by all partner agencies.

The **Vision** represents the ideal outcome and long-term view of road safety for the City:

> **VISION: The City of Toronto, with the commitment of all partners, aims to eliminate all fatalities and serious injuries on city streets to create a safe and healthy city."**

The **Goal** is a realistic and measureable shorter-term target:

> **GOAL: To reduce the number of fatal and serious injury collisions by 20% by 2026.**

Although the RSP is a 5-year implementation plan for 2017-2021, the goal's 10 year timeframe provides an additional 5 years to allow the countermeasures to take effect. It is important to set an aggressive but realistic goal in order to ensure that expectations of the public and partner agencies will be met and that success will translate into further interest and encouragement for continuation of the plan beyond 2026.

It is estimated that approximately 90% of traffic-related collisions involve human error. While occupants of motorized vehicles have an elevated responsibility for driving carefully as motor vehicles are the predominantly cause of KSIs, there is a behavioural aspect of all road users that must be recognized. The RSP, particularly, the education campaigns will target actions individuals can take – as drivers, cyclists or pedestrians – to reduce the risk of KSI collisions.

Emphasis Areas

The key safety priorities for the RSP are referred to as Emphasis Areas. In determining the emphasis areas, the partner agencies took into consideration the following:

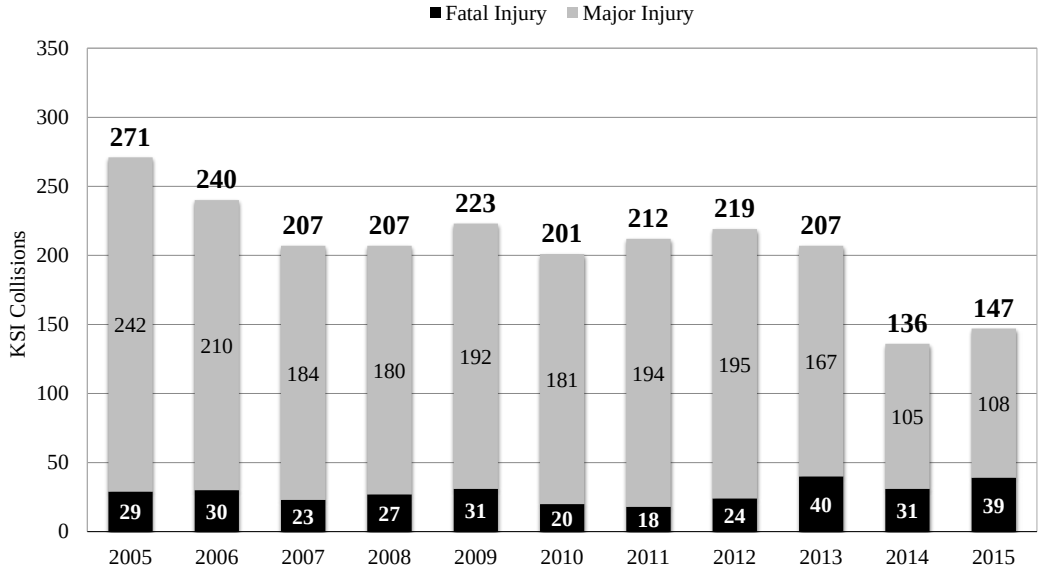
- KSI collision data for the last 11 years (2005-2015), with focus on the most recent five years,
- Public input based on the results of an online opinion poll of Toronto residents conducted in August 2015; and
- City Council directions given to staff over the past several years.

It should be noted that there is overlap in the number of KSI collisions among all the emphasis areas due to the fact that a collision event often involves multiple road users and multiple actions.

After consideration of the above-noted factors, the partner agencies coalesced around the following five emphasis areas for the RSP:

Pedestrians

Figure 5: Pedestrian KSI Collisions in Toronto, 2005-2015

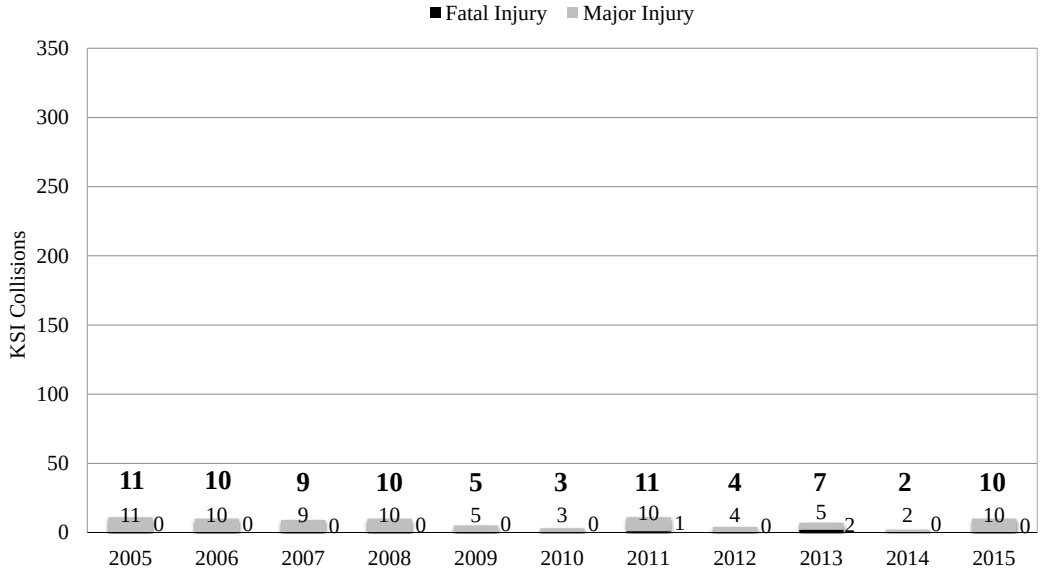


Note: Toronto Police Service reporting practices changed slightly in 2014.

Pedestrian collisions involve any person that is not riding in or on a vehicle. As shown in Figure 5, a total of 921 pedestrian KSI collisions occurred in the recent 5-year period between 2011 and 2015, which accounted for 45% of the total KSI collisions in the City during this period. As a result, pedestrians were the second-most common aspect of KSI collisions. Although there has been a general decline in the number of pedestrian KSI collisions since 2005, pedestrians remain the most frequent road user group to be killed or seriously injured. Pedestrians were also the third-most frequently identified road safety concern in the public opinion poll.

School Children

Figure 6: School Children KSI Collisions in Toronto, 2005-2015

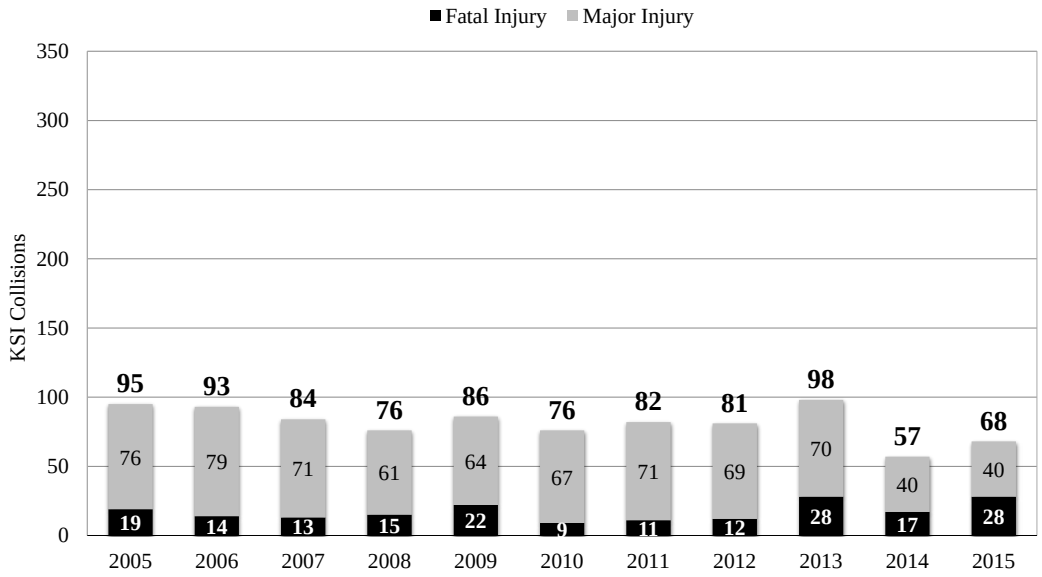


Note: Toronto Police Service reporting practices changed slightly in 2014.

As shown in Figure 6, there were 34 KSI collisions involving pedestrians and cyclists between ages 4-19 travelling to and from school from 2011-2015. These collisions occurred during school months, during weekday school hours and within 1 kilometer of a school. Given their lack of experience, skills and physical development, children are often less able to protect themselves from harm. Council has continually indicated through several directions that children travelling to school must remain an emphasis for the plan.

Older Adults

Figure 7: Older Adult KSI Collisions in Toronto, 2005-2015

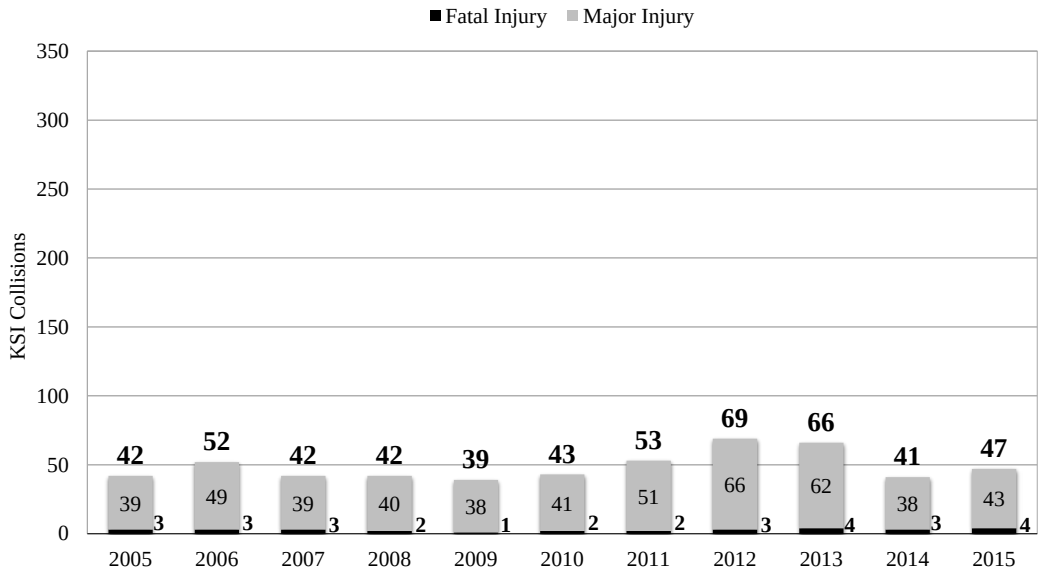


Note: Toronto Police Service reporting practices changed slightly in 2014.

As shown in Figure 7, KSI collisions involving pedestrians over the age of 55 totalled 386 between 2011-2015. While only 26% of the population, pedestrians over 55 years old represented 40% of all pedestrian KSI collisions and 63% of all pedestrian fatal collisions, indicating they are among the most vulnerable and highest risk road user group. Fatalities involving pedestrians over age 55 have trended upward significantly over the past three years. In 2016, older adults have accounted for 82% of the pedestrian fatalities. While older adults were not included in the public opinion poll as a specific safety concern or group, Council has placed priority on addressing safety for older adults through several Council directions.

Cyclists

Figure 8: Cyclist KSI Collisions in Toronto, 2005-2015



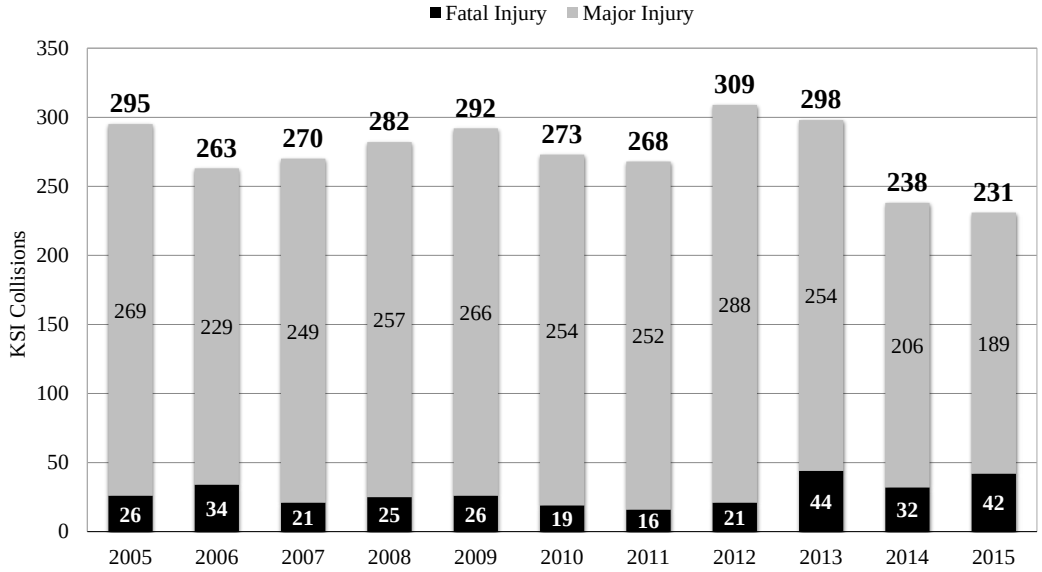
Note: Toronto Police Service reporting practices changed slightly in 2014.

Cyclist collisions involve a motor vehicle striking a person riding a bicycle. As shown in Figure 8, there were 276 cyclist KSI collisions between 2011-2015, which accounted for 14% of all KSI collisions. Over the long-term, cyclist KSI collisions have been fairly stable since 2005 despite increases in cycling mode share (from 1.7% in 2006 to 2.2% in 2011).

However, recent spikes in 2012 and 2013 suggest that further steps could be taken to make to protect cyclists. In the public opinion poll, cyclists were the fourth-most frequently selected road safety concern. City Council has given numerous directions regarding cyclist safety. In addition, the Toronto Board of Health has asked Public Health and Transportation Services staff to identify improvements to increase cyclist safety.

Aggressive Driving & Distraction

Figure 9: Aggressive Driving and Distraction KSI Collisions in Toronto, 2005-2015



Note: Toronto Police Service reporting practices changed slightly in 2014.

Aggressive driving collisions include collisions resulting from the following driver actions: following too close; exceeding the speed limit; speed too fast for conditions; disobeying a traffic control; failing to yield the right-of-way; and improper passing. Distraction collisions are collisions in which a person involved was inattentive, regardless of road user type (pedestrian, cyclist or driver). As shown in Figure 9, a total of 1,344 KSI collisions resulted from aggressive driving and distraction from 2011-2015, which was a factor in 66% of all KSI collisions and represent the most common factor in KSI collisions. Distraction was also the most frequently identified road safety concern in the public opinion poll. Council has directed staff to take various actions which are directed at speeding and other aggressive driving behaviours which indicates that this is a priority for the City.

68% of all KSI collisions were at intersections. Intersections was also the second-most selected road safety concern in the public opinion poll. However, intersections are deemed a locational aspect of aggressive driving, distraction, pedestrian and cyclist collisions and therefore are not addressed as a separate emphasis area. Instead, intersections will be addressed in the targeted implementation of countermeasures for the five emphasis areas to locations where the data analysis suggests that needs are greatest.

Existing Road Safety Countermeasures

Over the past two decades, in an effort to continuously improve road safety in Toronto, there have been many initiatives and countermeasures implemented by the various partner agencies that have collectively contributed to the reduction of KSI collisions. A review of existing countermeasures was conducted as part of the development of the plan to identify those that align with the 5 emphasis areas of the RSP and to identify opportunities for enhancement. The complete list of existing countermeasures can be found in Appendix 3 of this report. The review showed that there is an extensive complement of road safety-related engineering, enforcement and education activities targeting the five emphasis areas, including the following:

- **Engineering –** Transportation Services has implemented numerous engineering and technological improvements to address safety for all road users. Among the recent, current initiatives are:
    - Geometric safety improvement program that proactively identifies and implements safety enhancements (such as bulb-outs, reduced lane widths, reduced curb radii, etc.) in planned Capital Works Program projects;
    - Transportation Safety and Local Improvements Program (TSLIP) which implements minor road and intersection design changes to address safety and operational issues;
    - Accessible pedestrian signals (APS) that uses audible tones to guide pedestrians with low or no vision and deafblind pedestrians across signalized intersections;
    - Traffic calming program which implements mitigating measures such as speed humps, to address aggressive driving on local streets;
    - "Missing Links" program that constructs new sidewalks on streets undergoing reconstruction that do not currently have sidewalks;

- **Education –** Transportation Services and a number of its partner agencies are responsible for delivering various education and awareness programs targeting different road users. Among these are:

    Toronto Police Service
    - "March Break March Safe" and "Back to School" safety campaigns targeting unsafe drivers in school zones and educating drivers, parents and students about road safety;
    - Bringing an Awareness of Senior Safety Issues to the Community (B.A.S.S.I.C.) outreach initiative and YouTube pedestrian safety videos for older adults which educates older adults about road safety issues.

    Transportation Services
    - "Stay Alert – Stay Safe" campaign which promotes awareness and shared respect among pedestrians, drivers and cyclists;
    - "Stay Safe, Stay Back" campaign which promotes safer interaction between cyclists and large trucks;

- "Steer It, Clear It" campaign which encourages broken down vehicles or vehicles that have been in a minor collision on the City's freeways to remove their vehicle from the road as quickly as possible to reduce the chance of secondary collisions;
- Cycling helmet safety educational videos;
- Pedestrian countdown signals safety video;
- “Please Slow Down” campaign which provides residents free lawn signs to encourage drivers to slow down on residential roads.

Canadian Automobile Association

- School Safety Patrol Program aimed at protecting and educating elementary school children on safe practices for crossing streets.

Toronto Public Health

- Cycling & Pedestrian Safety classroom curriculum to support schools involved in active transportation, that raises awareness of safety issues and provides knowledge and skill building activities for young vulnerable road users;
- Bicycle helmet initiative for schools that includes activities promoting helmet use and wheel safety (with Toronto Police Service, school boards and Toronto Sick Kids Hospital).

Toronto Transit Commission

- Safe Service Action Plan which includes a number of actions aimed at improving user safety while on the TTC system;
- "Stay Focused, Stay Safe" campaign which addresses various pedestrian safety issues such as jaywalking and night time visibility.

Cycle Toronto

- Toronto Cyclists Handbook which teaches inexperienced cyclists about traffic laws and safe cycling habits;
- "Get Lit!" program which educates cyclists on importance of staying visible when cycling in darkness and provides free bike lights.

- **Enforcement –** In addition to the red light camera automated enforcement program operated by the City, which enforces driver compliance to traffic signals at key signalized intersections, Toronto Police Service also delivers many other enforcement programs. These include:
  - "That Text Could End It All" campaign which involves using a hearse to pull over distracted drivers to highlight the dangers of distracted driving;
  - Aggressive Driving campaign which targets speeding, Highway Traffic Act violations, commercial vehicles and distracted driving;
  - "Step Up Be Safe" education and enforcement campaign which coincides with Daylight Savings Time and focuses on motorists, cyclists and pedestrians who commit offences near pedestrian crossovers (PXOs),

crosswalks, intersections, school zones and crossing areas frequented by older adults;
- Reduced Impaired Driving Everywhere (RIDE) year-round impaired driving enforcement program which involves conducting spot-checks to deter drinking and driving;
- "Right 2 Bike" bike lane enforcement blitz.

New and Enhanced Countermeasures for the RSP

Through a series of RSP workshop meetings and meetings within their own organizations, the partnering agencies identified existing countermeasures worthy of enhancement and new engineering, education and enforcement countermeasures for addressing each of the five (5) emphasis areas. The new and enhanced countermeasures identified are those that have demonstrated to be effective at, or have a greater likelihood of contributing to, the reduction of KSI collision frequency or severity. Enhancements of existing countermeasures mainly include providing additional funding and resources to expand existing programs, as well as, supporting existing programs by using better data analysis to target areas of need.

All new and enhanced countermeasures for the RSP are sorted by emphasis area below. Many countermeasures address more than one emphasis area and in those cases, the intervention is listed under the emphasis area that would benefit the most. These are referred to as primary emphasis areas in the table in Appendix 4. All other emphasis areas that a countermeasure addresses are referred to as secondary in the table.

(i) New Pedestrian Countermeasures:

Pedestrian Safety Corridors

A central element of the road safety plan for pedestrians is the creation of pedestrian safety corridors. The locations for these corridors have been identify based on occurrences of pedestrian KSIs from 2010-2014. While not carrying any legal definition, and recognizing that they will likely change over time, a suite of countermeasures will be investigated to reduce risks to vulnerable road users.

Such countermeasures may include, but would not be limited to:

- Targeted speed limit reductions, coupled with corridor signal re-timings to improve traffic flow at safe and context-appropriate speeds;
- Off-peak, speed management signal timing plans;
- Enhanced pedestrian crosswalk markings;
- Consideration of Leading Pedestrian Intervals;
- Consideration of "No Right Turn on Red".

Targeted Speed Limit Reductions on Arterials

On June 29, 2015, the Toronto Board of Health directed the Medical Officer of Health to work with Transportation Services to identify effective ways to reduce

speeds and improve safety for vulnerable road users on arterial and local roads. One recommendation was to reduce posted speed limits on Toronto streets.

The rationale for lowering speed limits includes:

- Improved safety for vulnerable road users, as severity of injuries are generally reduced at lower speeds;
- Improved visibility and reduces stopping distance for motorists;
- Safer and more uniform traffic flow through the reduction in the variation among vehicular speeds;
- A more comfortable pedestrian and cycling environment, thereby encouraging more active transportation.

Transportation Services has always faced the challenging task of balancing transportation safety and mobility. Evidence supports that vulnerable road users are more likely to survive at lower collision speeds. As the majority of pedestrian KSIs are on arterial roads, there is a strong rationale that targeted speed limits reductions – based on data – could and should reduce the risk posed to vulnerable road users.

In addition, to improve uniformity, an additional 18 road segments are proposed for reduced speed limits, simply to bring them into consistency with adjacent sections of the same road.

A map depicting pedestrian KSI collisions and road segments for proposed speed limit reductions can be found in Appendix 5. A complete list of road sections where speed limit changes are being proposed is contained in Appendix 6.

It should be noted that the speed limit changes may impact TTC travel times along several of these corridors (particularly King Street, Queen Street, Dundas Street, College Avenue, Spadina Avenue, Bathurst Street, and Bay Street) which may potentially result in additional operating costs. It is expected that peak period travel times will not be impacted significantly, as transit vehicles – which stop frequently for boarding and alighting – travel above 40 kph for only short durations. In off-peak hours, when transit vehicles experience less congestion and may not stop at every stop, the impact could be more pronounced. To mitigate against impacts to travel times for TTC and vehicles, it is being proposed that the changes in speed limits be coupled with corridor signal timing reviews. Based on results from retiming on other corridors, we should see improvements in travel times along the corridor in the range of 3-7%. This may be sufficient to offset any additional travel time associated with a lower speed limit.

If approved, staff will prepare separate reports with appropriate by-law amendments to City Council as the roll-out of the new speed limit signage proceeds.

Pedestrian Street Lighting Improvements

With the assistance of Toronto Hydro, street lighting will be reviewed at targeted locations including intersections with high pedestrian/cyclist traffic, collision-prone locations and intersections around schools and facilities for older adults for opportunities to improve street lighting.

Automated Pedestrian Detection

Automated pedestrian detectors are used to compliment pushbutton detectors, optimize intersection operations and improve safety by reducing conflicts between vehicles and pedestrians and by reducing the risk of a pedestrian being unable to clear an intersection while crossing during shorter vehicle-only traffic signal cycles. These technologies can also be an effective tool in collecting pedestrian data. A study will be conducted on the feasibility and effectiveness of automated pedestrian detectors and, if deemed feasible, detectors will be implemented at signalized intersections in high pedestrian volume areas.

Pavement Marking Improvements

Pavement marking specification and standards will be reviewed with consideration for modifying stop bar/setback distances, crosswalk widths and the implementation of zebra markings at pedestrian safety corridors, all way stops and unsignalized intersections around schools, and around facilities for older adults. Additional and improved pavement markings will provide better guidance to drivers of potential safety hazards and improved visibility of vulnerable road users.

Accessibility Improvements

The City has developed and is implementing standards for its public spaces such as sidewalks, walkways, stairs, signalized intersections and curb ramps to better address the needs of persons with disabilities. A review will be conducted to proactively identify locations such as intersections and mid-block crossings, where these standards can be applied to improve accessibility for people with disabilities.

Pedestrian Education and Awareness Initiatives

New or enhanced educational materials will be developed to further awareness of the safety risks and leading causes of collisions involving pedestrians. A communications strategy will be developed in support of new and existing pedestrian safety campaigns using these newly developed materials that would be made available through targeted efforts such as: a dedicated RSP website, social media, print media articles, online videos, and bus shelter/TTC advertising. The messaging and means of distribution will be targeted towards specific age groups and road users, depending on the campaign.

Enhanced Pedestrian Safety Enforcement Strategies

Using a data-driven approach, targeted locations will be selected for police enforcement with a focus on motorists, cyclists and pedestrians who commit

offences near PXOs, crosswalks, intersections, school zones and crossing areas frequented by older adults. In addition to current enforcement campaigns, additional enforcement support will also be provided for newly designated pedestrian safety corridors, new pedestrian crossing facilities, new leading pedestrian interval installations, new right-turn-on-red restrictions and other pedestrian countermeasures. Police enforcement of traffic laws increase safety by promoting compliance and deterring dangerous road user behaviour through fines and demerit point deductions.

Enhanced Existing Pedestrian Countermeasures:

Advanced Green for Pedestrians (Leading Pedestrian Intervals)
Leading Pedestrian Intervals is a feature at traffic signals which displays the pedestrian "Walk" signal a few seconds earlier than the green signal for vehicles, giving pedestrians a head start into the intersection. A program will be developed to expand implementation of leading pedestrian intervals beyond the current 9 signalized intersections to 20 additional intersections per year, focusing on locations with high pedestrian demand, school zones and areas with high older adult trip generation rates. Leading pedestrian intervals increase driver visibility to pedestrians and can reduce the likelihood of left turn collisions with pedestrians at signalized intersections.

New Corner Radius Design
The curb radii guideline offers several design templates and look-up tables based on factors such as design and control vehicle types (e.g., trucks, buses, etc.), turning truck volume, road classification, vehicle speeds and vehicle envelope clearance buffers. A new program with dedicated budget will be developed which would involve identifying and prioritizing intersections and co-ordinating construction at 2 intersections per year. Smaller corner radii results in shorter pedestrian crossing distances and times, thereby reducing pedestrian exposure to vehicular traffic and safety risk. Smaller radii also deters drivers from making right turns at higher speeds.

No Right-Turn-On-Red Prohibition
No right-turn-on-red prohibitions will be implemented at key high pedestrian volume locations where right turns on red have been a contributing factor to KSIs. These prohibitions protect pedestrians at intersections by restricting vehicles facing a red signal from turning right across the path of pedestrians having the right-of-way with a walk signal.

Accessible Pedestrian Signals (APS)
APS are devices which use audible tones to advise pedestrians with low or no vision and deafblind pedestrians, when they have the right-of-way to cross a signalized intersection and in which direction they may cross. The City currently has over 700 intersections equipped with APS. APS will be expanded to 5

additional intersections per year and a retrofit program will be implemented to include tactile plates, ramps etc.

Missing Links Sidewalk Program
The existing Missing Links sidewalk program will be expanded and staff will develop a policy regarding construction of new sidewalks at road reconstruction projects on streets with no sidewalks or sidewalks on one side only, particularly in school zones and areas with high older adult trip generation rates.

(ii) New School Children Countermeasures:

Automated Enforcement – Advocacy and Pilot
On May 5th, 2015, City Council requested staff to contact the Province of Ontario and request their participation in a task force to be led by the City of Toronto to investigate the technical, evidentiary, regulatory and prosecutorial and financial requirements related to expanding automated enforcement of speeding, stop sign running and turning violations within the City of Toronto. City Council also requested staff to report on the task force results as a component of the Road Safety Plan.

In September, 2015, the Minister of Transportation of Ontario (MTO) responded to the City's request, indicating that MTO is not considering the reintroduction of automated speed enforcement or the allowance of other automated enforcement technologies at this time and declined participation in the task force. However, in a subsequent meeting with the Premier of Ontario in February, 2016, the Mayor of Toronto requested the Province to reconsider their position and was advised that they are open to discussion so long as municipalities initiate a formal request.

Further to City Council's request, staff undertook a preliminary review of the technical, evidentiary, regulatory and prosecutorial and financial requirements of automated enforcement related to speeding, stop sign running and turn violations, which can be found in Appendix 7. Some of the key highlights are:

- There is very little literature available on automated enforcement of stop sign and turning violations and the effectiveness of these particular strategies;
- There were a number of issues identified in association with using automated enforcement technology for stop sign running or turning violations making the charges less defensible in court. As a result, there is a high possibility that automated enforcement of stop sign and turning violations may not be financially self-sufficient and would therefore require subsidy;
- By comparison, there are less issues associated with automated speed enforcement, such that it may prove economically feasible in the long-term to reduce speeds in targeted areas such as school and construction zones;
- Automated speed enforcement was found to be an effective strategy in a number of other jurisdictions in reducing vehicle speeds, reducing collisions resulting in fatalities or serious injuries and reducing the overall number of collisions;

- Deployment of speed enforcement equipment can be mobile so as to address a greater number of areas of safety concern and provide a wider-ranging deterrence effect. Mobile operations also provides an added benefit that drivers are less likely to know where and when speed cameras are operating and as a result, are less likely to take alternate routes or comply only at individual known sites.

The Province of Ontario previously operated a photograph-based automated speed enforcement program on provincial highways in 1984, which was subsequently cancelled in 1985. As a result, the Province has past experience with the technical, legislative, evidentiary and prosecutorial requirements for "photo radar". Coupled with the fact that automated speed enforcement has been used extensively and effectively elsewhere, the Province is more likely support this type of automated enforcement than others. Staff will continue to discuss these other emerging types of automated enforcement with the Province, but recommend focusing on "photo radar" in the immediate future.

In order to move forward with automated speed enforcement, formal support from the Province of Ontario would be required to amend provincial laws to allow municipalities to use automated speed enforcement. As part of the RSP, Transportation Services will continue to work with other Ontario municipalities to advocate the Province for support in reintroducing automated speed enforcement.

In the interim, Transportation Services recommends that approval be sought from the Province to pilot the use of mobile automated speed enforcement in school zones and construction zones. Considerations for pilot locations will be given to school zones with confirmed speeding issues and school children KSI collisions and long-term construction zones. Mobile automated speed enforcement devices, rather than stationary installations, could be used to rotate the pilot to various locations at the City's discretion and allow staff to evaluate performance and effectiveness in different scenarios and conditions.

Creation of "School Safety Zones"

A study will be conducted on the requirements of creating and clearly defining "school safety zones" which will include such elements as lower speed limits, increased enforcement, higher fines, improved pavement markings, flashing signage and/or public awareness campaigns. In order to increase fines, the City would need to seek and obtain approval from the Province for amendments to the HTA. The combined use of these measures will enhance safety for school children by reducing the likelihood of aggressive driving and promoting driver recognition of "school safety zones" as sensitive areas that require greater attention and respect for traffic laws.

School Zone Reviews and Enhancements

Based on data analysis, proactive and targeted school zone safety reviews would be conducted which would also consider on-road and on-site pick-up/drop-off

traffic management programs at schools. The reviews and corrective actions will reduce risk around schools by ensuring that the proper traffic control devices are in place and in good condition.

Enhanced Existing School Children Countermeasures:

School "Watch Your Speed" Program

At its meeting of August 25, 2014, City Council directed staff to purchase, install, operate and evaluate 10 speed display signs on a permanent basis, as a pilot expansion of the "Watch Your Speed" Program (WYSP) in school zones.

Staff collected and monitored speed data at each location throughout the course of the 1-year pilot program to compare speeds pre-activation and post-activation. The metrics compared were operating speed, volume over the speed limit and volume greater than 10 km/h over the speed limit.

The 4 locations with the highest operating speeds were selected for an evaluation of the impact of police enforcement on the effectiveness of the signs. Police enforced speed limits over a 3 month period at 2 locations and speed data was compared with 2 locations where police enforcement was withheld over the same period.

At locations where the pilot operated for more than 4 months, the results showed a reduction in operating speeds, volume of traffic travelling over the speed limit and volume of traffic travelling more than 10 km/h over the speed limit. These effects were consistent at all locations and over a long-term basis.

Key findings after 11 months of operation include:

- Decrease in operating speeds, ranging from 1 km/h to 9 km/h;
- Decrease in the number of vehicles travelling over the speed limit, ranging from 2.6% to 33.8%;
- Decrease in the number of vehicles speeding excessively (greater than 10 km/h over the speed limit), ranging from 0.5% to 18.1%;
- Increase in the number of vehicles travelling near the speed limit;
- Speed reduction effects were more pronounced at locations with higher initial operating speeds;
- There did not appear to be additional long-term benefit from police enforcement.

Given the success of the pilot program in reducing excessive speeds, staff recommends the expansion of the WYSP to include the use of permanent speed display signs exclusively in school zones and that this program be included in the RSP. Staff also recommends the adoption of the mandatory requirements and guidelines found in Appendix 8**,** for assessing and prioritizing candidate schools. The RSP includes capital and operating budget to continue the program to install

signs at 10 schools per year over the next five years, at schools which satisfy the mandatory requirements and in accordance with the prioritization guidelines.

School Crossing Guard Program

The adult school crossing guard program will be expanded to additional schools based on collision data. Staff will work with Toronto Police Service to review existing warrants and consider using volunteers, high school students, etc. Adult school crossing guards donning protective personal equipment and a stop paddle provide additional protection for children crossing streets by reinforcing the right-of-way for pedestrians and increasing their visibility through the crosswalk. Toronto Police Service manages the adult school crossing guard program and will lead the expansion of the program, in coordination with Transportation Services, as part of their role in the RSP.

School Travel Planning (STP) and Active and Safe Routes to School

This community-based initiative that promotes active transportation for the daily commute to school will be expanded. Active transportation can improve health, safety and the environment. These initiatives, which brings together community stakeholders at each school to identify travel issues faced by staff and students and possible solutions, are currently being piloted at some Toronto schools. In addition to supporting these initiatives, enhanced curriculum support and in-school safety education/training focusing on distraction, intersections, crossing at mid-block, rules of the road and right-of-way, will be developed and made available to schools to add to their curriculum. Increasing active transportation in school travel can reduce vehicular traffic congestion and safety risk around schools during arrival and departure times. The costs associated with providing support for school travel plans are included in Transportation Services' current operating budget.

School Children Education and Awareness Initiatives

New, or enhancements to existing, education materials and messaging will be developed focusing on school zone related safety risks and basic skills and safe behaviours for school-aged vulnerable road users. The materials, messaging and means of communication will be targeted towards children, such as colouring books, artwork contests, free bicycle bells, reflective slap bracelets and zipper pulls with printed safety messaging.

Enhanced School Zone Enforcement Strategies

School zones will be targeted using a data driven approach for police enforcement with a focus on offences related to PXOs, school zone speed limits, signalized and stop controlled intersections, school crossing guards, stopped school buses and parking regulations in front of schools during school start and dismissal times. In addition to the current Back-To-School campaign, additional enforcement support will also be provided for school children countermeasures such as newly designated school safety zones, new pedestrian crossing and cycling facilities around schools and School WYSP locations.

(iii) New Older Adult Countermeasures:

Increase Older Adult Crossing Times

A program will be developed to implement modified walk speeds and re-time traffic signals near facilities for older adults and schools to allow more time for older adults and children to cross signalized intersections. Alternative actuation methods for older adults will also be piloted. Longer walk signal times and automated pedestrian detection reduces the risk of an older adult pedestrian being unable to finish crossing an intersection during a traffic signal cycle.

Support New Senior Citizens Strategy

A program will be developed dedicated to implementing the new safety improvements identified in the upcoming update to the Senior Citizens Strategy, which is currently under development.

Enhanced Existing Older Adult Countermeasures:

New Mid-Block Pedestrian Crossings

The current pedestrian crossing warrants will be revised to include criteria for maximum distance between adjacent traffic signals and a review of collision history. A program will be developed to identify potential locations based on the revised warrants and install 5 new mid-block pedestrian crossings per year. The selection of locations for installation will place emphasis on collision prone locations, school zones and areas of high older adult trip generation rates. Controlled pedestrian crossings, such as mid-block pedestrian signals and PXOs, require traffic to stop when activated and provides greater protection for vulnerable road users at mid-blocks than uncontrolled crossings.

Reduced Crossing Distance

A program will be developed for implementing curb extensions, also known as neckdowns, to reduce crossing distances on local and collector roads near schools and areas frequented by older adults. This provides additional visibility and protection for older adults and/or children in addition to slowing traffic.

Education and Awareness Initiatives for Older Adults

New, or enhancements to existing, public education and training materials will be developed dedicated to building skills, educating and raising awareness of safety risks and leading causes of collisions for older adults. This includes planning and co-ordinating a communications strategy in support of new and existing safety campaigns which is effective for older adults including printed brochures and posters and bus and shelter posters for public transit users. This strategy will also include teaching and presentation materials for public health nurses that visit older adult facilities.

Enhanced Enforcement Strategies

Through a data-driven approach locations near facilities for older adults and areas frequented by older adults will be identified for targeted police enforcement of dangerous driving activities, such as speeding and aggressive driving. Additional enforcement support will also be provided for older adult countermeasures such as new pedestrian crossing facilities and at signalized intersections with increased older adult pedestrian crossing times.

(iv) New Cyclist Countermeasures

Advanced Green for Cyclists (Leading Cyclist Interval)

Leading cyclist interval is a feature at signalized cyclist crossings which allow cyclists to proceed through the intersection a few seconds earlier than vehicles in order to increase drivers' visibility of cyclists and reduce the likelihood of collisions with left turning vehicles. A pilot study will be conducted on the technological and financial requirements of implementing an advanced green for cyclists at signalized cyclist crossings.

Enhanced Existing Cyclist Countermeasures

Automated Cyclist Detection

Automated cyclist detectors are used to optimize intersection operations and improve safety by reducing the risk of a cyclist being unable to clear an intersection before conflicting vehicular traffic proceeds. These technologies are also an effective tool in collecting valuable data. A program will be created for implementing automated cyclist detection at high cyclist volume intersections.

Signalized Crossings for Cyclists

A program will be developed to expand the use of dedicated traffic signals to facilitate cyclist crossings at intersections and across roadways. Bicycle signals improve safety for cyclists and provide direct connections for off-street and on-street cycling infrastructure. The City has installed approximately 50 new bike signals as part of the Rail/Hydro Corridor trails and downtown cycle track projects and this will be expanded to 5 additional intersections per year.

Enhanced Cycling Facilities

The Ten Year Cycling Network Plan proposes new dedicated and connected cycling facilities across the City. An additional safety enhancement program will implement improvements to existing cycling routes and facilities using cyclist collision data to identify high risk corridors and intersections. Improvements and enhancements could include additional pavement markings, signs and bollards and construction of raised or separated cycling facilities. This also includes pilot studies/evaluations of new and emerging designs, applications, countermeasures and technologies for cyclist safety. Dedicated and separated cycling facilities, such as buffered bike lanes, cycle tracks, bike trails, bike boxes, signage and

pavement markings, provides greater guidance and protection for cyclists from vehicular traffic than shared and unmarked facilities.

Cycling Education and Awareness Initiatives
New, or enhancements to existing, public education materials will be developed dedicated to promoting safe cycling, as well as the safe interaction between cyclists and motorists. This includes developing a communications strategy in support of new and existing cyclist safety campaigns. Effective messaging and means of distribution to target specific age groups and road users will be used, through no- or low-cost means such as social media.

Enhanced Cyclist Safety Enforcement Strategies
Through a data-driven approach, targeted locations for police enforcement of driver behaviours impacting cyclist safety, such as dooring and car use in bicycle lanes, will be identified on major cycling corridors and intersections. In addition to driver infractions, enforcement efforts should also include campaigns focused on cyclist infractions to promote cyclists' understanding, compliance and respect for traffic laws.

(v) Enhanced Existing Aggressive Driving & Distraction Countermeasures:

Traffic Calming Guide for Toronto
On November 12, 2015, Transportation Services was requested by the Chair of the Public Works and Infrastructure Committee, to create an easy-to-use traffic calming manual for use by neighbourhood groups and City Councillors. A "Traffic Calming Guide for Toronto" has been developed and includes discussion of typical traffic calming options available, their impacts, cost and their effectiveness. The Guide also provides an overview of the traffic calming process including applicable Council policies and warrants. The Guide is included in Appendix 9 of this report and has been identified as an immediate action for 2016 of the RSP.

Mobile "Watch Your Speed" Program (WYSP)
WYSP is an on-going education and awareness program which uses mobile radar speed display signs to advise motorists of their speed. Current program operation consists of four portable units that are rotated on a weekly basis throughout the city based on requests from the public, Councillors, Transportation staff and Toronto Police. The proposed plan is to enhance the current program to add additional trailers which will be deployed based on a targeted data-driven approach. Expansion of the program will first involve the procurement of new devices, which will include vendor-provided maintenance and operation services in the first year, and on-going maintenance and operation services starting in the second year. The program addresses speeding behaviour by reminding drivers to be mindful of their speed as they travel through local neighbourhoods.

Geometric Safety Improvements

This initiative would leverage and build upon the existing Transportation Safety and Local Improvements Program (TSLIP) which will be enhanced through the addition of a proactive and data-driven component. Improvements will include implementation of new lane width standards, right-turn channelization removals, painted and textured intersection corner bump-outs and removal of crossing overlaps at intersections. These physical changes reduce safety risk for all road users at intersections by limiting a driver's ability to speed and drive aggressively.

LED Blank-Out Signs

LED signs are currently used at 9 signalized intersections to supplement static left-turn prohibition signs by illuminating during times when left turns are prohibited. Guidelines will be developed for expanded use of LED blank-out signs at signalized intersections to include prohibited left turn, right turn and no-right-turn-on-red and implement a program to install at 5 intersections per year. These signs provide additional protection to road users by providing more visible and clearer guidance to drivers to increase compliance to turn restrictions.

Aggressive Driving and Distraction Education and Awareness Initiatives

New, or enhancements to existing, public education materials will be developed aimed at raising awareness and reducing aggressive driving behaviour and road user distraction. This includes education and awareness campaigns directed at both motorcyclists and drivers on safety risks and challenges facing motorcyclists. As well, distraction education will include messaging directed towards drivers, cyclists and pedestrians about risks and consequences.

Enhanced Aggressive Driving and Distraction Enforcement Strategies

Through a data-driven approach, targeted locations for police enforcement will be identified with a focus on ticketing aggressive driving behaviour and road user distraction such as speeding, texting/using hand held devices while driving etc. Greater emphasis will be placed on enforcement of aggressive driving behaviours and road user distraction in priority pedestrian areas, school zones, on major cycling corridors and near older adult facilities. Distraction enforcement campaigns will not only target drivers, but will also include pedestrian and cyclist distraction.

Role of Transportation Services

Road safety improvements have always been embedded within the many programs and services lead and implemented by Transportation Services. To date, the majority of engineering improvements have been opportunistic, taking advantage of already planned road reconstruction projects. Achieving the 20% reduction in KSI collisions goal proposed by the RSP requires a fundamental shift from opportunistic delivery of programs to a more proactive, data-driven, strategic planning and implementation of proposed countermeasures. The subsections below outline the additional actions to be taken to support all countermeasures.

Enhanced Data Analysis, Reporting

Transportation Services will significantly improve upon the level of data analysis, reporting and transparency through a number of new actions, including:

- Safety reviews at locations of recent fatal collisions, which consists of analyzing a deficiency checklist and hosting quarterly joint reviews of fatal collision events with Toronto Police Service (fatal collision and collision reconstruction reports), Toronto Public Health (hospital trauma centre reports and data) and Transportation Services (collision data, engineering solutions) to identify potential causal factors and countermeasures to reduce the risk and/or severity of serious injury collision events;
- Work collaboratively with Toronto Police Service to develop a strategy to provide collision data through City's Open Data portal;
- Analysis and safety audits of collision prone locations in the City;
- Use KSI collision density mapping to define key locations for engineering improvements and targeted police enforcement opportunities;
- Proactive reviews of traffic collision and volume data for implementation of traffic control and safety measures;
- Conducting before/after evaluations of countermeasures, where feasible;
- An upgrade to the City's existing collision analysis software; and
- Enhancements to the existing Toronto Traffic Safety website to provide additional information regarding safety statistics, the ongoing programs, safety audits and evaluations.

Enhanced Data Collection (Permanent Count Stations)

A data collection strategy and plan will be developed to identify key areas and corridors where permanent data count stations can be deployed using the latest technology in vehicle, cyclist and pedestrian detection systems. Emphasis will be placed on utilizing non-intrusive technologies that avoid issues of pole clutter and on technologies that can serve multiple purposes (e.g. integrated counting/way-finding or information totems). Enhancing and improving staff ability to collect and analyze traffic and safety-related data will improve their ability to determine causal factors, identify and respond to changing trends, target the deployment of countermeasures and improve the overall efficiency and effectiveness of the RSP and its various countermeasures.

Evaluation and Monitoring

Another key aspect of the plan involves the on-going evaluation of the outcomes of the plan. On a macro level, this would entail the development of a strategy for the on-going monitoring of City-wide collision data through various reports and maps to track and report on the City's progress towards achieving the overall goal of reducing KSI collisions.

On a micro level, staff will also work with partner agencies that have technical expertise and experience in evaluating programs and improvements to develop a strategy to evaluate the effectiveness of various specific countermeasures in affecting traffic collisions. The strategy will include evaluating engineering, enforcement and education

countermeasures from each emphasis area and their impacts on KSI collisions for each road user type.

Education and Community Partnerships

Transportation Services will also lead the development of an overall education and communications strategy that consolidates efforts jointly undertaken by Transportation Services, Toronto Police Service and Toronto Public Health under one common banner with high recognition across the City. A new group within Transportation Services dedicated to road safety communications and messaging would:

- Create a comprehensive communications strategy focused on shifting driver, cyclist and pedestrian behaviour, as well building support for road safety infrastructure improvements;
- Develop targeted safety campaign materials including print media, promotional materials, social media messages, images, radio ads and online videos in support of each of the five RSP emphasis areas;
- Implement the communications strategy in support of the new engineering and enforcement campaigns as identified in the RSP (e.g. creation of "School Safety Zones" and Pedestrian Safety Corridors);
- Lead in the co-ordinated dissemination of information regarding the various engineering, enforcement and educational programs underway, the benefits associated with those programs and the upcoming plans to continue improving road safety in Toronto;
- Provide leadership and ongoing maintenance support in the development of the public facing Road Safety Plan website that would allow the public to see the various implementations either underway or planned and allow for online public input and surveys regarding road safety;
- Lead in the development of the Road Safety Calendar which would identify monthly or weekly themes towards road safety and to regularly disseminate road safety information relevant to each monthly theme. An example of a road safety calendar can be found in Appendix 10; and
- Provide oversight for community projects relating to road safety so as to enable broader penetration and uptake of road safety messaging.

Staff Implications

Current staffing levels are already committed to supporting existing programs and to meet current service levels. The operating budget considerations for the RSP identified above in the Financial Implications include additional staff resources for the RSP that will be required to fulfill new roles as follows:

- Enhanced data analysis, safety auditing reviews;
- Oversight of development of education/awareness programs, safety messaging, communications and public outreach; and
- Capital programming, co-ordination and design of engineering improvements including curb radii reductions, channelized right turn removals, intersection neck-downs as well as operational improvements such as timing plan changes, installation of new detection devices, etc.

Role of Toronto Public Health

Toronto Public Health views road safety and the protection of vulnerable road users as a serious and important health and injury prevention issue for the City. From a public health perspective, walking and cycling are important forms of active transportation that have significant health benefits including lower all-cause mortality and reductions in many chronic illnesses such as diabetes, cardiovascular disease and some cancers. Despite the many health benefits, people who walk and cycle are at increased risk of serious injury or death as a result of collisions with motor vehicles compared to people traveling in cars or using public transit.

As such, Toronto Public Health is committed to their role as a partner agency and to supporting the RSP through its research and policy expertise on traffic injuries and their prevention, and through strengthening its community-focused educational programs targeted at school children, youth and seniors. In addition to helping to develop the plan, Toronto Public Health will collaborate with Transportation Services and other partner agencies in the development and communication of education/awareness messaging, campaigns and programs by leveraging their experience in marketing and communications campaigns, public education, community partnerships and data analysis.

Role of Toronto Police Service

Existing road safety enforcement campaigns are conducted periodically through the year and coordinated by the existing Traffic Services Unit in Toronto Police Service. Officers on regular duty are typically required to focus their efforts on enforcement campaigns in between radio calls rather than being specifically dedicated to the campaign.

Having been involved throughout the development process for the RSP and having heard the lessons learned from police forces in other jurisdictions running similar road safety, "Vision Zero" type strategies, Toronto Police Service is proposing to create a dedicated Road Safety Task Force.

This new task force would provide the following services over and above what is currently done:

- Dedicated, data-driven and targeted enforcement towards dangerous driving behaviours such as aggressive and distracted driving;
- Speed enforcement in the areas surrounding schools in support of the creation of "School Safety Zones";
- Speed and prohibited turn movement enforcement in support of the creation of pedestrian safety corridors and near senior citizen facilities;
- Targeted enforcement campaigns for dangerous driving behaviours that impact the safety of cyclists along new and existing cycle tracks, where warranted;
- Participation in the development of road safety educational campaigns targeted towards each of the proposed emphasis areas in the RSP;

- Participation and leadership in quarterly meetings with Transportation Services and Toronto Public Health regarding the review of Motor Vehicle Collision Reports (MVCR) for fatalities and serious injuries for more thorough investigations into potential road safety countermeasures against emerging trends;
- Participation and leadership in the development of a Road Safety Calendar that outlines the specific enforcement themes throughout the year in parallel to the ongoing enforcement support of new RSP implementations;
- Participation, overall support and leadership in a potential pilot for automated speed enforcement pending approval from the Ministry.

Conclusion

Despite the fact that overall traffic collisions in Toronto has been stable for over a decade, Toronto has seen a recent increase in traffic-related fatalities - most notably pedestrians, cyclists and older adults. This trend has emphasized the need for a comprehensive and coordinated road safety strategy that will further protect vulnerable road users and reduce the number of collisions resulting in death and serious injury.

Transportation Services has worked with key partner organizations involved in road safety in the City to develop such a plan, which leverages the experiences from other North American cities that have already joined an international movement to eliminate serious traffic collisions. These plans place emphasis on committed partnerships among road safety agencies and on killed and serious injury (KSI) collisions, which prioritizes vulnerable road users who compose the largest proportion of the KSI experience.

The RSP identifies and addresses five emphasis areas, which were determined through collision data analysis, public engagement and Council direction. They include Pedestrians, School Children, Older Adults, Cyclists and Aggressive Driving and Distraction. For each of these emphasis areas, the plan outlines a diverse range of both new and enhancements to existing countermeasures that includes engineering, education and enforcement programs and initiatives. In order to effectively implement these countermeasures, enhanced geospatial and trending analysis will be used to identify and prioritize areas of need. As well, the RSP calls for a data-driven strategy to evaluate and monitor the effectiveness of countermeasures and the plan's progress towards achieving its goal.

The RSP also includes a strategy for marketing, communications and public outreach which will be the key means of delivering public education/awareness safety messaging, interacting with the public and disseminating information about RSP improvements. The strategy includes public engagement events, a dedicated interactive RSP website, as well as an online and social media presence.

The RSP also calls for the creation of a RSP Task Force, composed of representatives from key partner agencies, such as Transportation Services, Toronto Public Health and Toronto Police Service.

The Road Safety Plan is a made-for-Toronto, data-driven safety strategy that unifies and co-ordinates all the various efforts of all the key partner agencies under one banner with one common goal, to reduce the number of KSI collisions by 20% by 2026. The RSP will reduce redundancies, increase the efficiency and effectiveness of efforts and foster greater collaborations among partner agencies who have all committed to sharing responsibility and lending support to the plan. It is expected that these steps will make all road users in Toronto safer, reverse the recent trend of increasing road user fatalities, and establish Toronto as a national and international leader in urban road safety.

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SIGNATURE

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APPENDICES

Appendix 1: Road Safety Plan (2017-2021) – Detailed Capital and Operating Cost Summary Table
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Appendix 1
Road Safety Plan (2017 - 2021)
Detailed Capital and Operating Cost Summary Table

No.	Projects / Initiatives	2017		2018		2019		2020		2021		Total Estimated Cost	
		Capital Cost	Operating Cost	Capital Cost	Operating Cost	Capital Cost	Operating Cost	Capital Cost	Operating Cost	Capital Cost	Operating Cost	Capital Cost	Operating Cost
A. Key Existing Road Safety Countermeasures													
1	Geometric Safety Improvements (Traffic Safety Unit)	$ 2,000,000										$ 2,000,000	$ -
2	Transportation Safety and Local Improvements Program (TSLIP)	$ 1,050,000		$ 1,050,000		$ 1,050,000		$ 1,050,000		$ 1,050,000		$ 5,250,000	$ -
3	Accessible Pedestrian Signals (APS)	$ 2,003,000		$ 2,003,000		$ 2,003,000		$ 2,003,000		$ 2,003,000		$ 10,015,000	$ -
4	Traffic Calming	$ 280,000		$ 280,000		$ 280,000		$ 280,000		$ 280,000		$ 1,400,000	$ -
5	Annual Sidewalks Capital Program	$ 1,900,000		$ 1,900,000		$ 1,900,000		$ 1,900,000		$ 1,900,000		$ 9,500,000	$ -
6	Reduced Speed Limts on Local and Collector Roads in TEY *											$ -	$ -
B. Proposed New Countermeasures													
7	Pedestrian Safety Corridors	$ 660,000		$ 660,000								$ 1,320,000	$ -
8	Pedestrian Street Lighting Improvements			$ 725,000	$ 20,000	$ 725,000	$ 40,000	$ 725,000	$ 60,000	$ 725,000	$ 80,000	$ 2,900,000	$ 200,000
9	Automated Pedestrian Detection	$ 180,000		$ 100,000		$ 100,000		$ 100,000		$ 100,000		$ 580,000	$ -
10	Pavement Marking Improvements	$ 200,000		$ 200,000		$ 200,000		$ 200,000		$ 200,000		$ 1,000,000	$ -
11	Accessibility Improvements			$ 150,000		$ 150,000		$ 150,000		$ 150,000		$ 600,000	$ -
12	Automated Enforcement Advocacy and Pilot	$ 200,000										$ 200,000	$ -
13	Creation of "School Safety Zones"	$ 150,000										$ 150,000	$ -
14	School Zone Reviews and Enhancements	$ 200,000		$ 200,000		$ 200,000		$ 200,000		$ 200,000		$ 1,000,000	$ -
15	Increase Older Adult Crossing Times	$ 60,000		$ 160,000		$ 100,000						$ 320,000	$ -
16	Support New Senior Citizens Strategy			$ 100,000		$ 100,000		$ 100,000		$ 100,000		$ 400,000	$ -
17	Advanced Green for Cyclists (Leading Cyclist Interval)	$ 100,000										$ 100,000	$ -
18	Transportation Services Program Delivery (13 FTEs)	$ 1,020,600	$ 371,700	$ 1,020,600	$ 623,700	$ 1,020,600	$ 623,700	$ 1,020,600	$ 623,700	$ 1,020,600	$ 623,700	$ 5,103,000	$ 2,866,500
C. Proposed Enhanced Countermeasures													
19	Education and Awareness Initiatives (All Emphasis Areas)				$ 200,000		$ 200,000		$ 200,000		$ 200,000	$ -	$ 800,000
20	Advanced Green for Pedestrians (Leading Pedestrian Intervals)	$ 120,000		$ 120,000		$ 120,000		$ 120,000		$ 120,000		$ 600,000	$ -
21	New Corner Radius Design			$ 240,000		$ 240,000		$ 240,000		$ 240,000		$ 960,000	$ -
22	No Right-Turn-On-Red Prohibition *											$ -	$ -
23	Accessible Pedestrian Signals (APS)	$ 300,000		$ 300,000		$ 300,000		$ 300,000		$ 300,000		$ 1,500,000	$ -
24	Missing Links Sidewalk Program			$ 500,000		$ 250,000		$ 250,000		$ 250,000		$ 1,250,000	$ -
25	School "Watch Your Speed" Program	$ 150,000		$ 170,000		$ 190,000		$ 210,000		$ 230,000		$ 950,000	$ -
26	School Crossing Guard Program *											$ -	$ -
27	School Travel Planning (STP) and Active and Safe Routes to School *											$ -	$ -
28	New Mid-Block Pedestrian Crossings	$ 80,000		$ 750,000		$ 750,000		$ 750,000		$ 750,000		$ 3,080,000	$ -
29	Reduced Crossing Distance			$ 180,000		$ 180,000		$ 180,000		$ 180,000		$ 720,000	$ -
30	Sidewalk Extensions			$ 150,000		$ 150,000		$ 150,000		$ 150,000		$ 600,000	$ -
31	Automated Cyclist Detection	$ 80,000		$ 100,000		$ 100,000		$ 100,000		$ 100,000		$ 480,000	$ -
32	Signalized Crossings for Cyclists			$ 180,000		$ 180,000						$ 360,000	$ -
33	Enhanced Cycling Facilities			$ 180,000		$ 180,000						$ 360,000	$ -
34	Traffic Calming Guide for Toronto *											$ -	$ -
35	Mobile "Watch Your Speed" Program (WYSP)	$ 120,000			$ 150,000		$ 150,000		$ 150,000		$ 150,000	$ 120,000	$ 600,000
36	Geometric Safety Improvements			$ 1,800,000		$ 1,800,000		$ 1,800,000		$ 1,800,000		$ 7,200,000	$ -
37	LED Blank Out Signs	$ 380,000		$ 380,000		$ 380,000		$ 380,000		$ 380,000		$ 1,900,000	$ -
38	Road Safety Audits at High-Risk Locations	$ 200,000		$ 200,000		$ 200,000		$ 200,000		$ 200,000		$ 1,000,000	$ -
39	Enhanced Data Analysis and Reporting	$ 180,000		$ 200,000								$ 380,000	$ -
40	Enhanced Data Collection (Permenant Count Stations)	$ 150,000		$ 150,000								$ 300,000	$ -
	TOTALS												
A	**Key Existing Road Safety Countermeasures**	**$ 7,233,000**	**$ -**	**$ 5,233,000**	**$ -**	**$ 5,233,000**	**$ -**	**$ 5,233,000**	**$ -**	**$ 5,233,000**	**$ -**	**$ 28,165,000**	**$ -**
B	**Proposed New Countermeasures**	**$ 2,770,600**	**$ 371,700**	**$ 3,315,600**	**$ 643,700**	**$ 2,595,600**	**$ 663,700**	**$ 2,495,600**	**$ 683,700**	**$ 2,495,600**	**$ 703,700**	**$ 13,673,000**	**$ 3,066,500**
C	**Proposed Enhanced Countermeasures**	**$ 1,760,000**	**$ -**	**$ 5,600,000**	**$ 350,000**	**$ 5,020,000**	**$ 350,000**	**$ 4,680,000**	**$ 350,000**	**$ 4,700,000**	**$ 350,000**	**$ 21,760,000**	**$ 1,400,000**
	Total Proposed New and Enhanced Countermeasures	**$ 4,530,600**	**$ 371,700**	**$ 8,915,600**	**$ 993,700**	**$ 7,615,600**	**$ 1,013,700**	**$ 7,175,600**	**$ 1,033,700**	**$ 7,195,600**	**$ 1,053,700**	**$ 35,433,000**	**$ 4,466,500**
											New Program Total:		**$ 39,899,500**

* Funding is either (a) already included within 2016 budget, (b) funded by others, or (c) accommodated through existing program.

Results of Public Opinion Poll on Road Safety

Data analysis is the main driving factor in the selection of emphasis areas, but it is not the only factor as consideration must also be given to social, economic, and political constraints. Therefore, identification of emphasis areas for analysis requires input from the City's residents. CIMA+, with the assistance of Research Now, surveyed 1,253 Toronto-residents regarding traffic safety and road safety improvement priorities.

For the purpose of this assignment, Research Now was instructed to exclude respondents with a place of residence outside of the City of Toronto and the sample size of the survey was limited to 1,253 fully completed survey responses.

This appendix summarizes the results and analysis of the survey and illustrates the public's concerns and recommended emphasis areas. Results from the survey are provided, when relevant, for comparison purposes. The actual survey has been provided at the end of this summary document.

General Information on Survey Respondents

In order to ensure fair and unbiased responses the survey's respondents were a group of diverse individuals of all ages, genders and from various locations throughout the City of Toronto. In the survey, respondents were asked to identify the first three (3) letters/numbers of their postal code. As evidenced by the spatial distribution of respondents throughout the City, as illustrated in Figure 1, each jurisdiction within Toronto was proportionally represented in the survey.

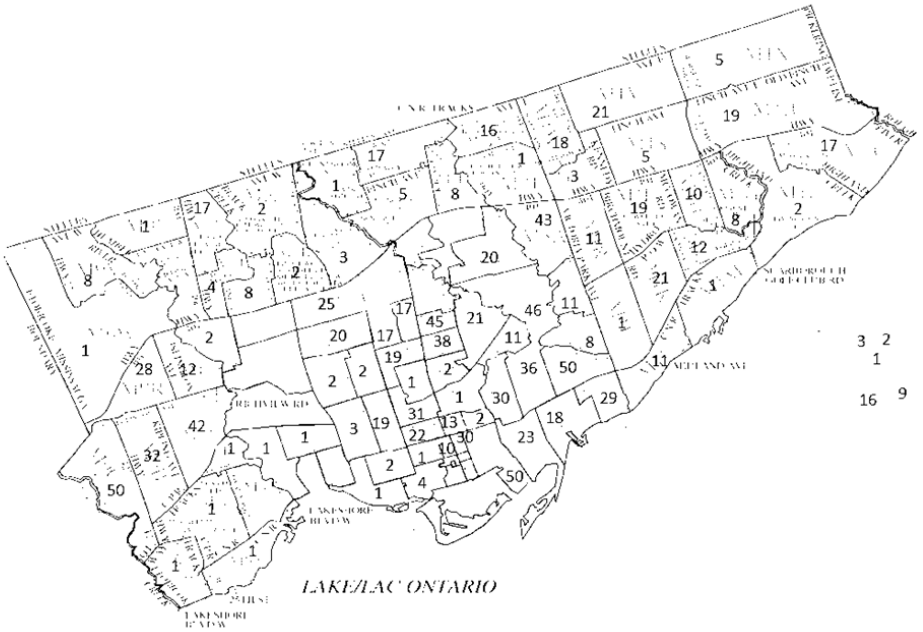


Figure 1 - Spatial Distribution of Survey Participants by Postal Code

Furthermore, respondents were asked to identify their gender, license type and age. According to the results approximately 56% of respondents were female, with the remaining respondents (44%) identifying themselves as male.

With regards to driver's licenses, 83% of respondents reported having a Full License; 13% of respondents reported not having a driver's license, whereas the remainder of the respondents (4%) reported having a Graduate License.

Figure 2 illustrates the age distribution of respondents. It is evident that each age group is proportionally represented in the survey.

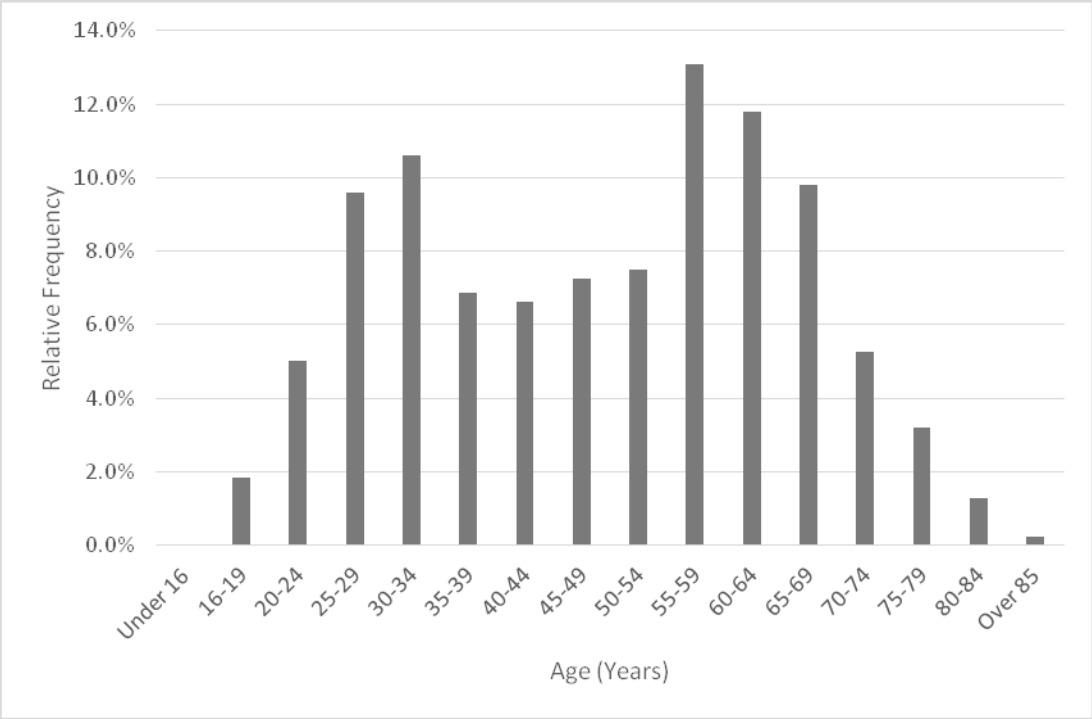


Figure 2 - Survey Participant Age Distribution

Survey Results & Analysis

In order to evaluate the public's recommended emphasis areas, respondents were asked to rank a list of priorities regarding potential traffic safety improvements for the City of Toronto. Respondents felt as if the most important traffic safety improvement for the City of Toronto should be related to distracted road users followed by improving intersection safety. The results of this question are tabulated in Table 1.

Table 1 - Participant's Recommended Safety Priority for the City of Toronto

Traffic Safety Priority	Average Ranking	Overall Ranking
Reducing the number of distracted drivers, pedestrians, and cyclists	2.98	1
Improving intersection safety	3.58	2
Red light running at intersections	4.00	3
Improving pedestrian safety	4.50	4
Improving cycling safety	5.08	5
Increasing the amount of traffic enforcement	5.49	6
Improving snow clearing operations	5.72	7
Improving school zone safety	6.67	8
Reducing speed of traffic (aggressive driving)	6.97	9

Respondents were also given the opportunity to suggest their own traffic safety improvement area. The most commonly requested traffic safety improvements, which did not overlap those above, were:

- Improved driver, pedestrian, and cyclist education on the rules of the roadway; and
- Improved traffic management during roadway construction/closures.

Summary of Findings

The results of the survey analysis can be summarized as follows:

- A total of 1,253 Toronto residents completed the survey;
- Respondents were of all ages, gender, and lived throughout the City of Toronto;
- The primary road safety concerns identified by the residents of Toronto were:
  - Distracted Driving;
  - Intersection-related Safety;
  - Pedestrian Safety; and
  - Cyclist Safety;
- Secondary road safety concerns of the public were:
  - Lack of Traffic Enforcement.

Existing Road Safety Countermeasures

In a continuous effort to improve road safety in Toronto, there have been many initiatives and countermeasures implemented by the various partner agencies throughout the years that have collectively contributed to the reduction of KSI collisions. A review of existing countermeasures was conducted as part of the development of the plan to identify those that align with the 5 emphasis areas of the RSP and to identify opportunities for enhancement. The review showed that there is already a very rich complement of road safety related engineering, enforcement and education activities in the City and its partnering agencies. Below is the complete list of current countermeasures:

Pedestrians:

- Geometric safety improvement program – A capital program proactively identifies and implements safety enhancements;
- Traffic Safety Local Improvement Program (TSLIP) – A capital program for minor roadway reconstructions, such as removing unnecessary right turn channels and reducing corner radii, to correct deficiencies or increase safety;
- Accessible pedestrian signals (APS) – Installation of tactile surfaces and signal heads that emit an audible tone at signalized intersections to assist blind, visually impaired or deaf-blind in safely crossing roadways;
- "Missing Links" Program (Annual sidewalks capital program) – A capital program for the construction of new sidewalks at locations where sidewalks are missing;
- Pedestrian countdown signals – Installation of pedestrian signal heads that displays time remaining for pedestrians to safely complete their crossing at signalized intersections;
- Zebra crossing pavement markings – Installation of broader, striped pedestrian crossing pavement markings at signalized intersections to increase the visibility of the pedestrians to drivers;
- Leading pedestrian intervals – Implementation of a traffic signal control feature which displays the pedestrian "Walk" signal before the green signal for drivers, giving pedestrians a head start into the intersection to increase their visibility to drivers;
- Pedestrian crossover (PXO) enhancements – Implementation of various upgrades at PXOs, including zebra crossing pavement markings, amber beacons, reflectors, pushbuttons and additional signs;
- "March Break March Safe" – An annual March Break pedestrian safety campaign designed to promote public awareness of pedestrian safety;
- "Stay Focused Stay Safe" – A campaign by Toronto Transit Commission which addresses various pedestrian safety issues such as jaywalking and night time visibility;
- "Step Up Be Safe" – An education and enforcement campaign which coincides with Daylight Savings Time, focuses on motorists, cyclists and pedestrians who commit offences near pedestrian crossovers, crosswalks, intersections, school zones and crossing areas frequented by seniors.

School Children:

- School Zone Safety Strategy – A plan for improving safety around schools which includes engineering, education and enforcement components;
- School "Watch Your Speed" Pilot Program – Pilot program for using permanent speed display signs to address speeding issues in school zones;
- Adult School Crossing Guard Program – A program provides adult school crossing guard based on existing warrants review to navigate and protect children crossing streets around their schools;
- Teen Driving Safety Education Presentations – Presentations by Toronto Police Traffic Services dedicated to educating and heightening awareness amongst youth on the leading causes of traffic collisions that result in death and serious injury;
- CAA School Safety Patrol Program – A program developed to protect and educate elementary school children on safe road-crossing practices;
- "Youth in Control" (YIC) Leadership Program – A high school peer leadership program which focuses on safer partying and safer driving;
- Cycling and pedestrian safety curriculum support – Classroom skill building activities developed for schools who participate in active transportation and intended to raise awareness and recognize situations where injuries to pedestrians and non-motorized wheeled travel can be reduced;
- Bicycle helmet initiative for schools that includes activities promoting helmet use and wheel safety;
- "At Home Alone" – A family workshop for parents and children that helps prepare children to travel to and from school safely as well as being at home alone safely;
- School Travel Planning – A pilot initiative (involving 10 Toronto schools) to implement active school travel using a planning model consisting of local stakeholder engagement, travel surveys and risk assessments.

Older Adults:

- Toronto Seniors Strategy – A plan for implementing various improvements focused on senior mobility and safety needs, such as extended pedestrian crossing times at traffic control signals;
- Lower walking speeds at traffic signals – Improved standards for traffic signal timing that allows lower walking speeds to be used to provide more pedestrian walking time;
- Mid-block pedestrian crossing – Installation of pedestrian traffic signals and pedestrian crossovers (PXO) at mid-block locations to provide protected crossing opportunities for pedestrians;
- Priority Snow Removal – Increased priority for snow removal on roads and sidewalks near areas with high older adult trip generation rates as well as school zones. Keeping facilities clear of snow reduces the likelihood of weather related collisions.
- Senior Driving Education Presentations – Various presentations by Toronto Police Traffic Services aimed at improving road safety for seniors;
- Bringing an Awareness of Senior Safety Issues to the Community (B.A.S.S.I.C.) – An initiative aimed at raising awareness to senior safety issues;

- YouTube Seniors Pedestrian Safety Video – YouTube video aimed at reducing pedestrian collisions by reminding pedestrians, especially seniors to cross at designated crosswalks and traffic lights, and make sure drivers can see you when you cross;
- iNavigait – An education campaign targeted toward seniors which reinforces messaging about mobility, hearing and vision aids, and provides information and resources regardless of physical, intellectual, sensory, psychiatric or other medical conditions.

Cyclists:

- Cycle tracks – Installation of physically separated lanes for cyclists;
- Green cycling areas – Installation of painted conflict areas at and near intersections and driveways along bike lanes and cycle tracks to improve visibility of cyclists to drivers;
- Bike boxes – Installation of painted areas for cyclists at signalized intersections that provide a protected space to wait in front of drivers, allowing them to proceed ahead of vehicles on the green signal;
- Automated cyclist detection – Installation of automated cyclist detectors to optimize intersection operations and improve cyclist safety at high cyclist volume intersections;
- Signalized crossings for cyclists – Installation of dedicated traffic signals to facilitate cyclist crossings at intersections and across roadways;
- "Stay Safe, Stay Back" campaign – A public awareness campaign promoting safer interaction between cyclists and motorists;
- Back-To-School Campaign – An annual road safety campaign which educates drivers, parents and students with back-to-school road safety tips and targets the enforcement of unsafe drivers in school zones;
- Helmet Safety Education Videos – Videos aimed at bringing awareness to the benefits of wearing a helmet when cycling;
- SPACE to Cycle Campaign – An education and enforcement campaign to help cyclists ride safely through city streets, without fear of having car doors opened in front of them or vehicles invading their lanes;
- Toronto Cyclists Handbook which teaches inexperienced cyclists about traffic laws and safe cycling habits;

Aggressive Driving:

- Traffic calming – Installation of physical features (e.g. speed humps) on roads to address various safety and operational issues such as speeding;
- "Watch Your Speed" Program (WYSP) – A program for promoting speed limit compliance using mobile radar speed display trailers that are rotated to requested locations throughout the City;
- LED blank-out signs – Implementation of illuminated signs at signalized intersections to provide visible and clear guidance to drivers as to when turns are prohibited;
- "Please Slow Down" campaign – A public awareness campaign for encouraging drivers to slow down on residential roads using temporary lawn signs offered to residents free of charge;

- Red light cameras – Automated enforcement of driver compliance to traffic signals at key signalized intersections;
- Aggressive Driving Campaign – A service-wide aggressive driving campaign which targets speeding, HTA violations, commercial vehicles, distracted parking etc.;
- "You Know You Shouldn't… So Don't" Gridlock Campaign – An enforcement and education campaign aimed at reducing gridlock and congestion in the City targeting prohibited turns, pedestrians stepping onto the roadway in advance of a walk signal or green light and vehicles blocking intersections;
- Operation Impact – A Canada-wide Thanksgiving long weekend enforcement campaign which targets speeding, aggressive driving, distracted driving, impaired driving and failing to wear a seatbelt;
- Canada Road Safety Week – An annual awareness campaign which focuses on behaviours that put drivers, passengers and other road users most at risk;
- Radio Program – A live, one hour radio program with a Portuguese radio station where police take the opportunity to educate the listeners about various road safety issues.

Distraction:

- "Stay Alert – Stay Safe" campaign – A public education campaign encouraging pedestrians, drivers and cyclists to be more aware of each other;
- "That Text Could End It All" campaign – A one-week safety campaign which used a hearse to pull over distracted drivers to highlighting the dangers of distracted driving.

Others:

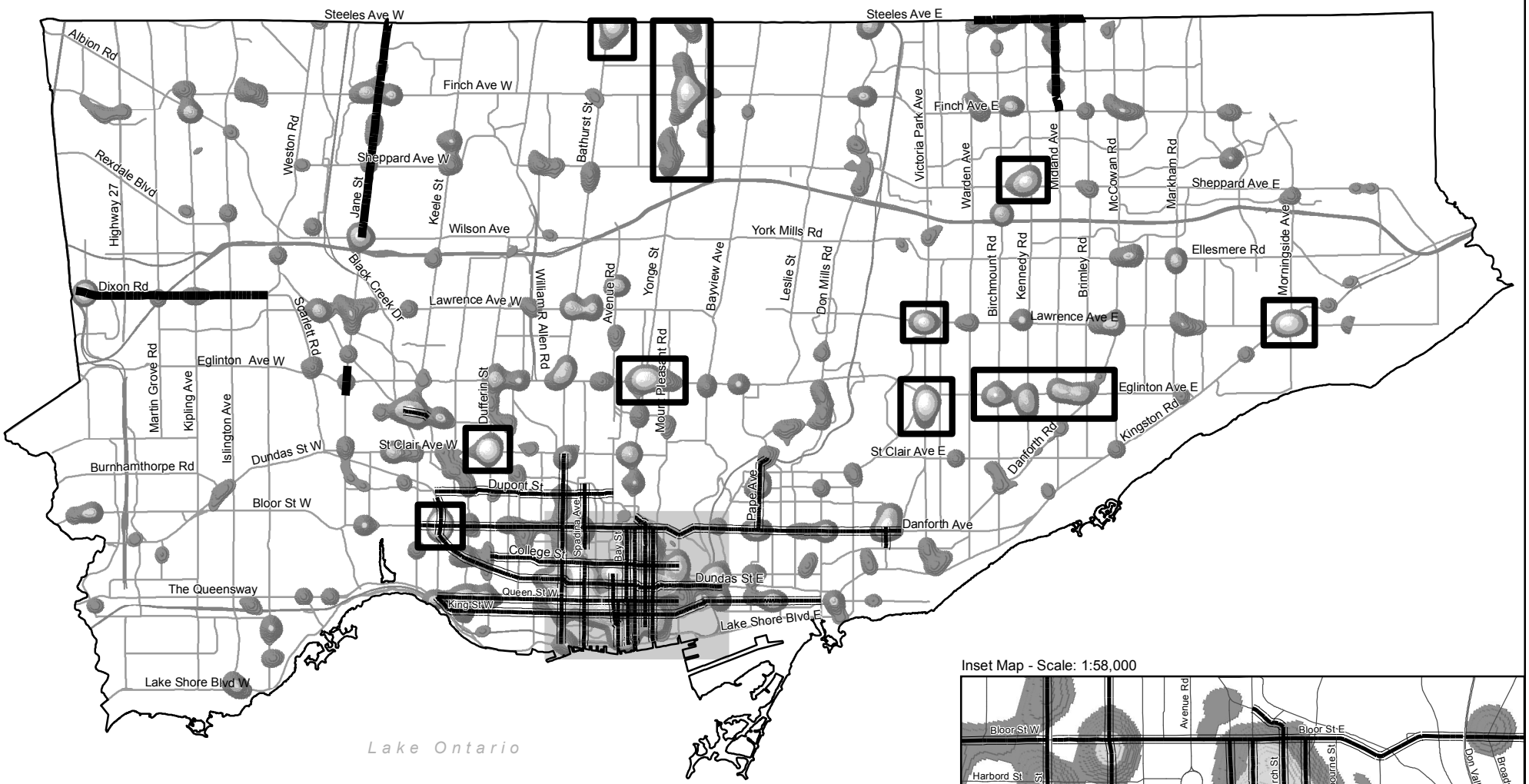
- Complete Streets Guidelines – A technical design standard for redesigning roads to better accommodate and address the needs of all road users and abilities;
- Traffic signal enhancements – Installation of reflective backboards on traffic signal heads and uninterrupted power supply (UPS) systems to improve visibility and safety during power outages at key signalized intersections;
- Improved road maintenance standards –Improved standards for snow clearance on roads, cycling facilities, sidewalks and bus stops;
- TTC Safe Service Action Plan – Safety plan for TTC which includes a number of actions aimed at improving the safety performance of the Toronto Transit Commission fleet;

Appendix 4
Road Safety Plan (2017 - 2021)
New and Enhanced Existing Countermeasures by Emphasis Area

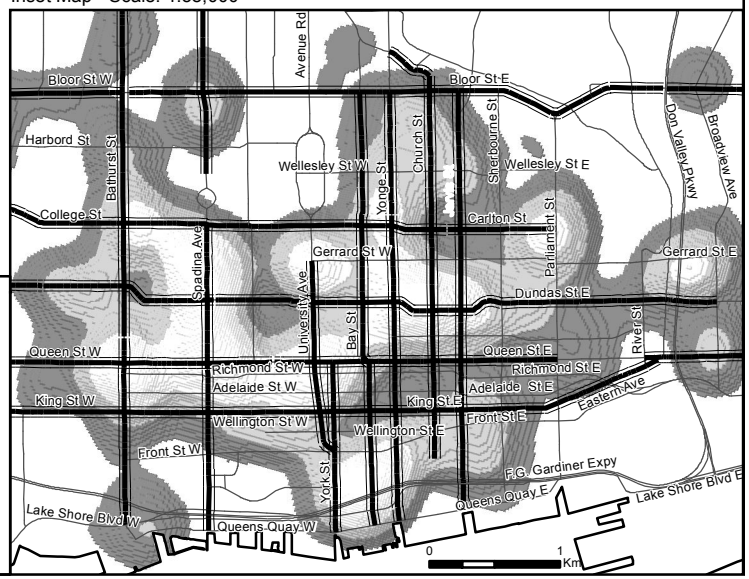
P - Primary Emphasis Area; S - Secondary Emphasis Area(s)

No.	Projects / Initiatives	Emphasis Area				
		Pedestrians	School Children	Older Adults	Cyclists	Aggressive Driving & Distraction
A. Key Existing Road Safety Countermeasures						
1	Geometric Safety Improvements (Traffic Safety Unit)	S	S	S	S	**P**
2	Transportation Safety and Local Improvements Program (TSLIP)	S	S	S	S	**P**
3	Accessible Pedestrian Signals (APS)	**P**	S	S		
4	Traffic Calming	S	S	S	S	**P**
5	Annual Sidewalks Capital Program	**P**	S	S		
6	Reduced Speed Limts on Local and Collector Roads in TEY	S	S	S	S	P
B. Proposed New Countermeasures (RSP 2017-2021)						
7	Pedestrian Priority Zones	S	S	S	S	**P**
8	Pedestrian Street Lighting Improvements	**P**	S	S	S	
9	Automated Pedestrian Detection	**P**	S	S		
10	Pavement Marking Improvements	**P**	S	S	S	S
11	Accessibility Improvements	**P**	S	S		
12	Automated Enforcement Advocacy and Pilot		**P**			S
13	Creation of "School Safety Zones"		**P**			S
14	School Zone Reviews and Enhancements		**P**			S
15	Increase Older Adult Crossing Times	S	S	**P**		
16	Support New Senior Citizens Strategy			**P**		
17	Advanced Green for Cyclists (Leading Cyclist Interval)				**P**	S
18	Transportation Services Program Delivery (13 FTEs)	S	S	S	S	**P**
C. Proposed Enhanced Countermeasures (2017-2021)						
19	Education and Awareness Initiatives (All Emphasis Areas)	**P**	**P**	**P**	**P**	**P**
20	Advance Green for Pedestrians (Leading Pedestrian Intervals)	**P**	S	S		
21	New Corner Radius Design	**P**	S	S	S	S
22	No Right-Turn-On-Red Prohibition	**P**	S	S	S	S
23	Accessible Pedestrian Signals (APS)	**P**	S	S		
24	Missing Links Sidewalk Program	**P**	S	S		
25	School "Watch Your Speed" Program	S	**P**			S
26	School Crossing Guard Program	S	**P**			S
27	School Travel Planning (STP) and Active and Safe Routes to School	S	**P**			
28	New Mid-Block Crossings	S	S	**P**	S	
29	Reduced Crossing Distance	S	S	**P**		
30	Sidewalk Extensions	S	S	**P**		
31	Automated Cyclist Detection				**P**	
32	Signalized Crossings for Cyclists				**P**	
33	Enhanced Cycling Facilities				**P**	
34	Traffic Calming Guide for Residents	S	S	S	S	**P**
35	Mobile "Watch Your Speed" Program (WYSP)	S	S	S	S	**P**
36	Geometric Safety Improvements	S	S	S	S	**P**
37	LED Blank Out Signs	S			S	**P**
38	Road Safety Audits at High-Risk Locations	**P**	S	S	S	S
39	Enhanced Data Analysis and Reporting	S	S	S	S	**P**
40	Enhanced Data Collection (Permenant Count Stations)	S	S	S	S	**P**

Appendix 5 - Map of Pedestrian KSIs



Inset Map - Scale: 1:58,000



Map of Pedestrian KSIs

Proposed Speed Limit Reductions and Road Safety Audit Locations Based on Average Annual Pedestrians Killed or Seriously Injured (KSI) 2010 - 2014

TORONTO Transportation Services
Traffic Safety Unit

Legend

Proposed Speed Limit Change

- 60 km/h to 50 km/h
- 50 km/h to 40 km/h

Average Annual Pedestrian KSI (2010 - 2014)

1 2 3 4 >4

Proposed Road Safety Audit Location

APPENDIX 6

Proposed Amendments to Speed Limits

Highway	Between	Current Speed Limit (km/h)	Proposed Speed Limit (km/h)
Albion Road	Armel Court and Bankfield Drive	60	50
Bathurst Street	Lake Shore Boulevard West and St. Clair Avenue West	50	40
Bay Street	Queens Quay West and Bloor Street West	50	40
Bayview Avenue	Rosedale Valley Road and River Street Ramp	60	50
Bayview Avenue	Post Road and Cummer Avenue	60	50
Bayview Avenue	Pottery Road (south intersection) and Pottery Road (north intersection)	60	50
Bayview Avenue	Pottery Road (south intersection) and Rosedale Valley Road	60	50
Belfield Road	Kipling Avenue and Highway 27	60	50
Bellamy Road North	Grace Street and Burnview Crescent	60	50
Bellamy Road North	Lawrence Avenue East and Progress Avenue	60	50
Bloor Street East	Yonge Street and Don Valley Parkway	50	40
Bloor Street West	Keele Street and Yonge Street	50	40
Carlton Street	Yonge Street and Parliament Street	50	40
Church Street	Conger Coal Lane and Davenport Road	50	40
College Street	Dufferin Street and Yonge Street	50	40
Danforth Avenue	Don Valley Parkway and Dawes Road	50	40

Highway	Between	Current Speed Limit (km/h)	Proposed Speed Limit (km/h)
Dixon Road	A point 122 metres west of Kelfield Street and a point 195 metres east of Kelfield Street	60	50
Dixon Road	A point 147 metres west of Bridesburg Drive and Royal York Road	60	50
Dixon Road	A point 280 metres west of Carlingview Drive and Skyway Avenue	60	50
Dundas Street East	Yonge Street and Broadview Avenue	50	40
Dundas Street West	Humberside Avenue and Yonge Street	50	40
Dupont Street	Dundas Street West and Avenue Road	50	40
Eglinton Avenue West	Renforth Drive and the Etobicoke Creek	70	60
Islington Avenue	Beaumonde Heights Drive and Steeles Avenue West	60	50
Jane Street	Lambton Avenue and Pinehill Crescent	60	50
Jane Street	Wilson Avenue and Steeles Avenue West	60	50
Jarvis Street	Front Street East and Charles Street	50	40
King Street East	Yonge Street and Queen Street East	50	40
King Street West	Strachan Avenue and Yonge Street	50	40
Kipling Avenue	Rowntree Road and Steeles Avenue West	60	50
Lower Jarvis Street	Queens Quay East and Front Street East	50	40
Main Street	A point 120 metres north of Danforth Avenue and Gerrard Street East	50	40
Midland Avenue	Finch Avenue East and Steeles Avenue East	60	50

Highway	Between	Current Speed Limit (km/h)	Proposed Speed Limit (km/h)
Midland Avenue	Lawrence Avenue East and Sheppard Avenue East	60	50
Mount Pleasant Road	Crescent Road and Inglewood Drive	60	50
Pape Avenue	Danforth Avenue and Donlands Avenue	50	40
Progress Avenue	Consilium Place/Grangeway Avenue and Markham Road	60	50
Progress Avenue	Kennedy Road and Brimley Road	60	50
Queen Street East	Yonge Street and Parliament Street	50	40
Queen Street East	River Street and Coxwell Avenue	50	40
Queen Street West	Roncesvalles Avenue and Yonge Street	50	40
Rogers Road	Weston Road and Old Weston Road	50	40
Spadina Avenue	Queens Quay West and College Street	50	40
Spadina Avenue	Willcocks Street and Bloor Street West	50	40
Spadina Road	Bloor Street West and Davenport Road	50	40
Steeles Avenue East	Warden Avenue and Brimley Road	60	50
Steeles Avenue West	Albion Road and a point 300 metres west of Martin Grove Road	70	60
Ted Rogers Way	Charles Street East and Bloor Street East	50	40
The East Mall	West Deane Park Drive and Eglinton Avenue West	60	50
University Avenue	Front Street West and Gerrard Street West	50	40

Highway	Between	Current Speed Limit (km/h)	Proposed Speed Limit (km/h)
Weston Road	Finch Avenue West and Steeles Avenue West	60	50
Yonge Street	A point approximately 44.1 metres north of McNairn Avenue and Highway 401	60	50
Yonge Street	Queens Quay and Bloor Street	50	40
York Street	Queens Quay West and Queen Street West	50	40

Review of Considerations and Requirements for Automated Enforcement

Summary:

The purpose of this report is to provide information related to expanding the use of automated enforcement in the City of Toronto, with the intention of reducing speed and other traffic violations.

Aggressive driving is a major contributing factor in 41% of all collisions in the City of Toronto resulting in fatalities or serious injuries and it has been identified and will be addressed within the Road Safety Plan (RSP) with a series of proposed program countermeasures. Automated enforcement of traffic violations is a common approach used as an alternative to manned enforcement around the world. The most common types of enforcement technology are used to enforce speeding and red light running violations. Most recently, a number of major North American jurisdictions have deployed automated enforcement strategies with varying degrees of success including Washington DC, New York City, City of Chicago, City of San Francisco, City of Edmonton and the City of Calgary.

History of Automated Enforcement in Ontario

In August 1994, "photo radar" for speed enforcement was used on provincial highways in Ontario and although preliminary results showed reduced speeding on highways, the program was subsequently cancelled 11 months later in July 1995. To date, the use of "photo radar" has not been authorized on municipal roadways in Ontario. Moving forward, there would be a number of provincial legislative changes required in order to permit municipalities the authority to charge vehicle owners for speeding violations detected by automated enforcement systems. Other forms of automated enforcement such as stop sign and turning violations require video evidence to be processed as opposed to still photographs and will therefore require more significant legislative revisions in order to make these types of automated enforcement legally possible to implement.

Decision History:

At its meeting of May 5-7, 2015, City Council requested that Transportation Services lead a task force to further investigate the technical, evidentiary, regulatory and prosecutorial and financial requirements related to expanding automated enforcement for the purpose of reducing speed, stop sign and turning violations. City Council also directed staff, in consultation with Toronto Police Service, to report to the Public Works and Infrastructure Committee as a component of the Road Safety Plan on the task force results and recommendations related to an automated enforcement pilot in the City of Toronto.
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.PW3.17

Discussion:

In addition to speeding and red light running, automated enforcement has been used for other types of traffic violations including:

- Stop sign violations
- Turning violations
- Railway crossing violations
- School bus violations

Stop Sign Running and Turning Violation Enforcement

The use of these particular automated enforcement strategies are still relatively new and there are currently no reports or studies on its effectiveness. Several smaller municipalities in Alberta and a few jurisdictions in the United States, most prominently Washington D.C. have begun using automated enforcement cameras to detect vehicles who fail to stop at a stop sign and there are several municipalities in the U.K. using automated enforcement for turning violations. These types of automated enforcement require the use of video evidence or multiple cameras in order to process the violations. In consultation with the Ministry of the Attorney General of Ontario, the following issues related to the use of automated enforcement for these types of violations were identified:

- Video evidence may not be admissible in court. As a result, the associated charges can be very easily challenged.
- It is much more difficult to prepare evidence for disclosure. A photograph cannot be mailed to the registered owner of the vehicle with the use of video. Sending a link to a website, which is the disclosure method for municipalities using this technology, creates a social barrier which assumes that everyone can afford and has access to the internet.
- Additional trained Provincial Offences Officers will be required to process the additional citations.
- Additional court room resources are required including staff, space and the availability of a video player in every court room.
- Approval from the Information and Privacy Commissioner of Ontario is required in order to use video for automated enforcement.

In addition to the required provincial legislative changes and the issues identified above, the number of expected violations challenged in court compared to the anticipated number of charges laid would be very high, and as a result, the use of automated enforcement for stop sign and turning violations would not be feasible at this time.

Speed Enforcement

In a report produced by the World Health Organization, speed is identified as a key contributing factor in traffic related injuries, influencing both the risk of a collision as well as the severity of

the injuries that result from collisions. It was noted that in high-income countries, approximately 30% of fatal collisions were related to speeding [1]. Setting and enforcing speed limits is one of the most effective countermeasures for managing and controlling vehicle speed. Automated speed enforcement or "photo radar" is the most commonly used method of automated enforcement in the world, and in addition to traditional enforcement, has proven to reduce speeding and collisions worldwide.

Based on a number of published reports and case studies, all jurisdictions reported a decrease in collisions resulting in injuries as well as collisions overall, at locations where "photo radar" cameras were deployed. The following are effectiveness results from some the major jurisdictions using "photo radar":

- City of Edmonton – A study conducted in 2014 by the University of Alberta concluded that the use of mobile automated speed enforcement resulted in a 32.1% city-wide reduction in fatal and injury collisions; 27.7% reduction in total collisions; and 26.7 % reduction in speed related collisions [2].

- City of Calgary – Before and after studies at locations with Intersection Safety Cameras (detects both speed and red light running) showed a 7% decrease in total collisions; 4% decrease in injury collisions; and 100% decrease in fatal collisions [3].

- City of Winnipeg – A study in 2011 of automated speed enforcement in school, playground and construction zones indicated a 24% decrease in speed related collisions at intersections equipped with cameras [4].

- Washington D.C. – The Washington D.C. Metropolitan Police Department reported a decrease of 65% in traffic fatalities which they attribute to the use of automated enforcement [5].

- New York City – A study conducted by a public organization found a 13.4% decrease in injury collisions at locations within 500m of an automated speed enforcement camera [6].

- City of Chicago – Chicago's Department of Transportation reported a 31% decline in the number of speeding vehicles [6].

Unlike red light camera systems which have very strict legal and technical requirements, "photo radar" requirements are less stringent. For example, a "photo radar" system does not rely on a traffic signal and photographed images require less detail for the disclosure of evidence. There is also a greater number of vehicles speeding compared to vehicles running red lights, therefore the number of images that require processing will be substantially higher. In order for the City to undertake the automated enforcement of speed, the following concerns would need to be addressed:

- Any type of automated enforcement will need to be regulated by the Ministry of Transportation and reviewed by the Ministry of the Attorney General.
- Additional Provincial Offenses Officers will be required to review and process the increased number of images.
- Court rooms do not have the existing capacity to undertake "photo radar" charges in addition to red light camera charges. Additional court room resources will be required including officers, prosecutors, Justice of the Peace, security, administrative staff, office space etc.
- All equipment/technology used must meet provincial requirements.
- The process will need to be reviewed and approved by the Information and Privacy Commissioner of Ontario.

Notwithstanding the challenges previously identified, the use of automated speed enforcement as a supplement to traditional police enforcement has proven to be a worthwhile and effective countermeasure for the purposes of improving road safety by reducing vehicle speeds in targeted areas such as school zones, constructions zones and high collision locations.

Fixed vs. Mobile Automated Speed Enforcement

Automated speed enforcement units can be fixed or mobile. Fixed cameras are usually mounted on existing infrastructure or share space with red light cameras and are generally used in areas which require constant enforcement such as school zones and senior areas. Mobile cameras are often mounted on vans, can have an operator inside and are able to move to various locations. Mobile cameras can be deployed easily and are able to address a greater number of areas with safety concerns, providing a more generalized deterrent effect. Mobile speed enforcement also provides an added benefit that drivers are less likely to know precisely where and when speed cameras are operating and as a result, are less likely to take alternate routes or slow down as they approach a camera.

Provincial and Legislative Requirements

In order to expand automated enforcement beyond red light cameras, formal support from the Province of Ontario would be required to amend provincial laws to allow municipalities to use automated speed enforcement. As per Council direction, the City approached the province of Ontario on May 26, 2015 requesting a ministry representative to join a committee to review options for expanding automated enforcement technology. The Province responded on September 16, 2015 and indicated in particular, that while they appreciate the City's support for the use of automated enforcement technology; they are not considering the reintroduction of automated speed enforcement or the allowance of other automated enforcement technologies at this time. It is therefore recommended that Transportation Services, along with support from other municipalities in Ontario, continue to advocate the Province of Ontario for the use of automated speed enforcement and the potential benefits associated with such an initiative.

Implementation Plan

Assuming the Province of Ontario allows the reintroduction of automated speed enforcement, the following steps would need to be taken in order to implement a "photo radar" program in the City of Toronto:

- Create and issue for tender a Request for Proposal (RFP) for the installation, maintenance and support of automated speed enforcement equipment and technology (1 – 1.5 years).
- Hire and train additional staff (1 year).
- Acquire or build a processing centre facility (0.5 – 2 years).
- Expand Court Services to include additional court rooms, officers, prosecutors, Justice of the Peace, administrative staff etc. (1 – 2 years).
- Create and review process for program operation (0.5 year).
- Legal review of program (0.5 year).
- Create warrants and guidelines for the selection of targeted enforcement sites (0.5 year).
- Conduct traffic studies of potential enforcement sites (0.5 year)

If approval is granted from the Ministry of Transportation to reintroduce automated speed enforcement and given that some of the above steps can be undertaken concurrently, the estimated timeline to implement the program would be approximately 2-3 years.

Financial Impacts:

There is not enough information at this time to assess the costs related to an automated speed enforcement program given the involvement and requirements of the provincial government and the expected increase in demand for Court Services. The projected costs that would be associated with an automated speed enforcement program are not parallel in comparison to the City's current red light camera program. A higher number of violations are expected in relation to the red light camera program and in order to facilitate the larger number of images that require processing, additional staff will need to be appointed, hired and trained. Furthermore, additional court resources will be required including court room space, prosecutors, Justice of the Peace, administrative staff etc. to accommodate the anticipated increase in the number of trials.

Conclusions:

- There is very little literature available on automated enforcement of stop sign and turning violations and the effectiveness of these particular strategies. In consultation with the Ministry of the Attorney General of Ontario, a number of difficulties associated with using these types of automated enforcement were identified which would make it very easy to challenge in court. Therefore, there is a high possibility that automated enforcement of stop sign and turning violations may not be economically feasible.

- Although automated speed enforcement presents similar challenges as stop sign and turning violations with respect to support from the Ministry of Transportation of Ontario, "photo radar" was found to be an effective countermeasure for improving road safety in targeted areas such as school zones and construction zones.

- Automated speed enforcement was found to be an effective strategy in a number of other jurisdictions in reducing vehicle speeds, reducing collisions resulting in fatalities or serious injuries and reducing the overall number of collisions.

- Mobile speed enforcement can be deployed to address a greater number of areas with safety concerns and provide a more general deterrent effect. It also provides an added benefit that drivers are less likely to know precisely where and when speed cameras are operating and as a result, are less likely to take alternate routes or slow down as they approach a camera.

- In order to move forward with the expansion of automated speed enforcement, formal support from the Province of Ontario would be required to amend provincial laws to allow municipalities to use automated speed enforcement. Given the Province's past experience with "photo radar" and its effectiveness in other jurisdictions, the Province is more likely to support this type of automated enforcement rather than other types such as stop sign violations and turn prohibitions. However, staff will continue to pursue these other emerging types of automated enforcement technologies with the Province, but recommend focusing on automated speed enforcement in the immediate future.

- As part of the RSP, Transportation Services will continue to work with other Ontario municipalities to advocate the Province for support in reintroducing automated speed enforcement. The automated enforcement of speed limits can increase compliance with posted speed limits through fines and may reduce the risk of fatal and serious injury resulting from a collision.

- Transportation Services recommends that approval be sought from the Province to pilot the use of "photo radar" in school zones and construction zones. Considerations for pilot locations will be given to school zones with confirmed speeding issues and long-term construction zones. In addition, mobile "photo radar" devices rather than stationary installations could be used to rotate the pilot to various locations at the City's discretion and allow staff to evaluate performance and effectiveness in different scenarios and conditions.

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[2] Ran Li, Dr. Karim El-Basyouny, Dr. Amy Kim, University of Alberta, A City-Wide Safety Analysis of Mobile Speed Enforcement

[3] Calgary Police Service, Speed on Green and Red Light Cameras

[4] Traffic Injury Research Foundation, Winnipeg Photo Enforcement Program Effective: Report

[5] Automated Traffic Enforcement Unit, Washington D.C. Metropolitan Police Department

[6] Automated Speed Enforcement Implementation: Survey Findings and Lessons Learned From Around the Country, City and County of San Francisco

School "Watch Your Speed" Program Pilot Project

Summary:

The purpose of this report is to provide the results of an evaluation of the effectiveness of permanent radar speed display signs in reducing traffic speeds in school zones, which was part of a pilot expansion of the "Watch Your Speed" Program (WYSP), conducted between November 2014 and October 2015.

These devices have shown to be effective in reducing the speed of traffic and reducing excessive speeding (over 10 km/h above the speed limit) over a long-term application. As a result, this report recommends that permanent speed display signs be considered as a countermeasure for speeding issues in school zones under the Toronto Road Safety Plan (RSP). It also sets forward a series of mandatory requirements and prioritization guidelines for assessing candidate schools should the RSP recommend deployment.

Decision History:

At its meeting of August 25, 2014, City Council directed Transportation Services to purchase, install, operate and evaluate ten (10) speed measurement and display signs on a permanent basis, as a pilot expansion of the WYSP in school zones, with the results to be reported back in the Fall of 2015.
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2014.MM55.38

Discussion:

Background

Radar speed display signs are electronic devices composed of a radar speed detector and an LED display, which are typically attached to poles or trailers installed on the side of the road, facing oncoming traffic. They are used to measure and display the speed of oncoming vehicles as a means of affecting driving behaviour by alerting motorists of their speed. They are not a form of automated speed enforcement and thus, do not contain photographic equipment and do not result in speeding offences.

The City currently operates the WYSP, which involves the weekly re-deployment of four (4) trailer-based speed display signs to locations based on complaints and requests from the public, Councillors, Transportation Services staff, and police. As a result of growing interest, the most recent pilot expanded this program to study the effects of pole-mounted speed display signs on a permanent basis, particularly around school zones. In both cases, the objective of the program is to educate drivers and increase awareness to local speeding concerns.

Pilot Initiation

In August 2014, Transportation Services purchased ten (10) solar-powered, radar speed display signs which were installed in September and October, 2014, on approach to schools at various locations. The signs were activated on October 30, 2014 following a three week period in which pre-activation speed data was collected.

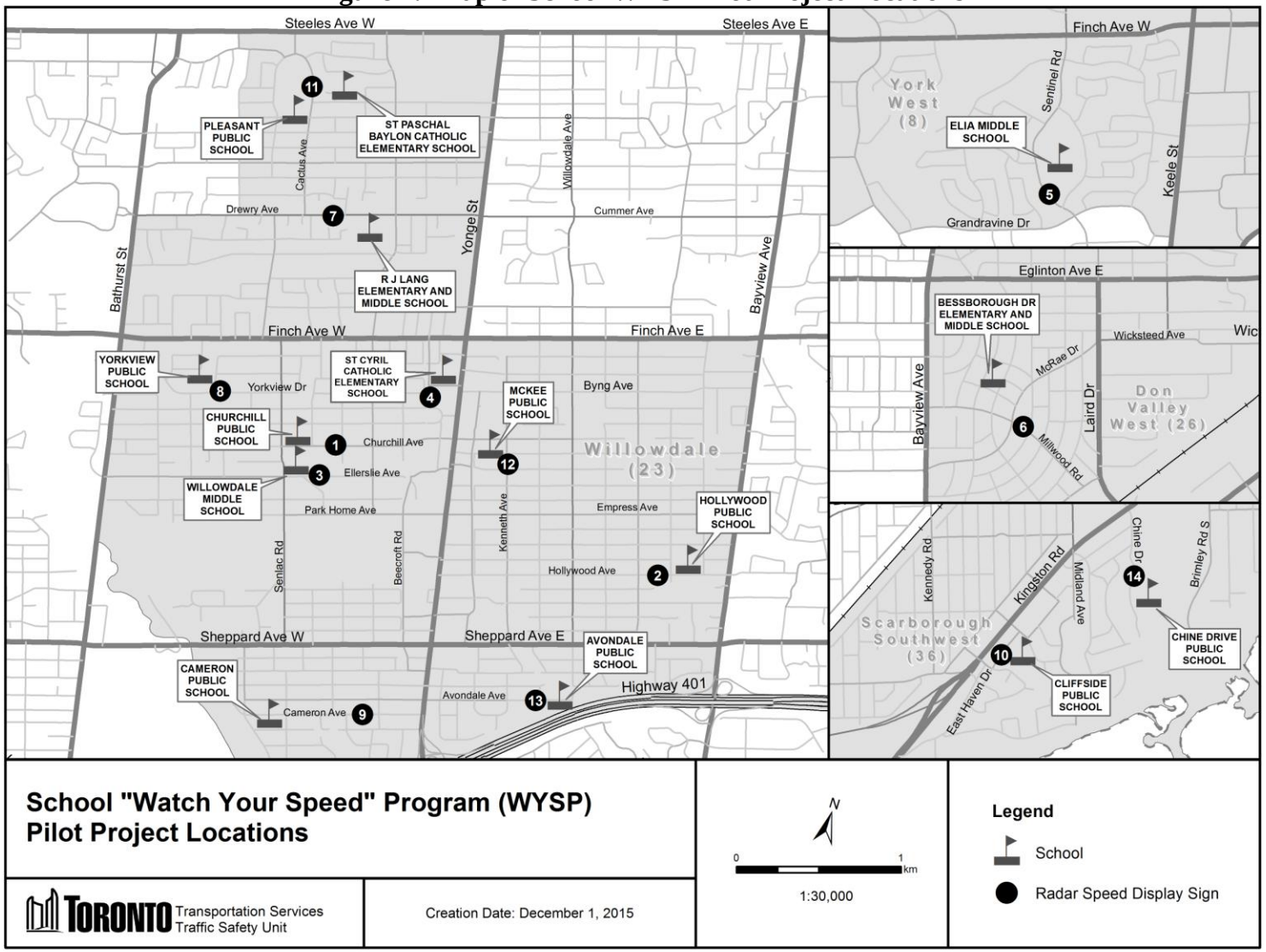
Consistent with the current WYSP, the pole-mounted signs were only operational between 7 a.m. and 9 p.m. However, unlike the WYSP trailers which operate solely on batteries that require weekly recharging, the signs operate using a solar panel that continuously recharges the batteries. As a result, the signs were allowed to operate 7 days per week. Given that the solar-powered signs have the capability of operating 24 hours a day, 7 days a week, consideration may be given to continuous operation where it is deemed necessary in future applications.

Three (3) of the schools selected for the pilot were located in Wards 8, 26 and 36, close to the site of a fatal pedestrian collision event involving school-age pedestrians travelling to or from school. The remaining schools were all located in Ward 23. Mid-way through the pilot, four (4) signs were relocated to new school locations to meet initial interest from the schools to participate in the pilot. Three (3) of the relocated sites were selected because of scheduled road resurfacing operations which would have interrupted normal traffic operations. One (1) additional site was selected based on low traffic speeds. In total, the signs were installed and operated at 14 school locations for periods ranging from 2 months to 11 months. The locations and schools involved in the pilot are depicted in Figure 1 on the following page and listed in Table 1 below. The posted speed limit at all locations was 40 km/h.

Table 1: Pilot Locations

No.	Street Name	Duration Of Pilot (Mon.)	School
1	Churchill Ave.	11	Churchill Public School
3	Hollywood Ave.	11	Hollywood Public School
5	Ellerslie Ave.	11	Willowdale Middle School
7	Beecroft Rd.	11	St. Cyril Catholic School
8	Sentinel Rd.	11	Elia Middle School
9	Millwood Rd.	11	Bessborough Drive Elementary and Middle School
2	Drewry Ave.	4	R.J. Lang Elementary and Middle School
4	Yorkview Dr.	4	Yorkview Public School
6	Cameron Ave.	2	Cameron Public School
10	East Haven Dr.	4	Cliffside Public School
11	Cactus Ave.	6	St. Paschal Baylon Catholic School and Pleasant Avenue Public School
12	Kenneth Ave.	6	McKee Public School
13	Avondale Ave.	6	Avondale Public School
14	Chine Dr.	6	Chine Drive Public School

Figure 1: Map of School WYSP Pilot Project Locations



Effectiveness Evaluation

Staff collected and monitored speed data at each location throughout the course of the pilot to compare speeds pre-activation and post-activation. The metrics compared were operating speed, volume over the speed limit and volume greater than 10 km/h over the speed limit. The results of the analysis are summarized in Table 2 on the following page and illustrated in Figure 2.

Pre-activation speed data was collected at each location over a three (3) week period with the LED display turned off and without a reflective "Your Speed" sign border. Upon activation, the LED display was switched on and the sign border was mounted.

At locations where the pilot operated for more than 4 months, the results showed a reduction in operating speeds, volume of traffic travelling over the speed limit and volume of traffic travelling more than 10 km/h over the speed limit. These effects were consistent at all locations and over a long-term basis.

Key findings after 11 months of operation include:

- Decrease in operating speeds, ranging from 1 km/h to 9 km/h;
- Decrease in the number of vehicles travelling over the speed limit, ranging from 2.6% to 33.8%;
- Decrease in the number of vehicles speeding excessively (greater than 10 km/h over the speed limit), ranging from 0.5% to 18.1%;
- Increase in the number of vehicles travelling near the speed limit;
- Speed reduction effects were more pronounced at locations with higher initial operating speeds.

The four (4) locations with the highest operating speeds were selected for an evaluation of the impact of police enforcement on the effectiveness of the signs. Police enforced speed limits over a three (3) month period at two (2) locations and speed data was compared with two (2) locations where police enforcement was withheld over the same period. As shown in Attachment B, there were similar long-term speed reduction effects on the operating speed and volume of traffic over the speed limit at both sets of locations, indicating that police enforcement did not result in any additional benefit.

Table 2: School WYSP Pilot Project Before/After Analysis – Summary of Findings
(Speed and % volume data averaged over 3 mid-week days from 7 a.m. – 9 p.m.)

Location	Posted Speed Limit (km/h)	Operating (85th Percentile) Speed (km/h)				% Volume > Speed Limit				% Volume > 10 km/h > Speed Limit			
		Before	1 Month	6 Months	11 Months	Before	1 Month	6 Months	11 Months	Before	1 Month	6 Months	11 Months
Churchill Ave *	40	51	47 (-4)	46 (-5)	47 (-4)	72.2	56.8 (-15.4)	53.5 (-18.7)	53.7 (-18.5)	22.4	10.8 (-11.6)	8.4 (-14)	8.9 (-13.5)
Beecroft Rd *	40	57	54 (-3)	53 (-4)	53 (-4)	82.3	74.6 (-7.7)	73.8 (-8.5)	72.8 (-9.5)	44.8	30.8 (-14.0)	28.2 (-16.6)	27.5 (-17.3)
Hollywood Ave	40	47	45 (-2)	45 (-2)	45 (-2)	53.1	47.2 (-5.9)	42.3 (-10.8)	42.6 (-10.5)	10.9	5.9 (-5.0)	5.8 (-5.1)	6.6 (-4.3)
Ellerslie Ave	40	51	47 (-4)	47 (-4)	42 (-9)	60.7	57.2 (-3.5)	59.9 (-0.8)	26.9 (-33.8)	21.4	11.4 (-10.0)	12.0 (-9.4)	3.3 (-18.1)
Sentinel Rd	40	47	46 (-1)	45 (-2)	46 (-1)	56.3	53.9 (-2.4)	49.5 (-6.8)	53.7 (-2.6)	8.7	8.2 (-0.5)	6.7 (-2.0)	8.2 (-0.5)
Millwood Rd	40	47	44 (-3)	44 (-3)	44 (-3)	50.8	36.6 (-14.2)	38.6 (-12.2)	37.9 (-12.9)	8.1	3.6 (-4.5)	4.4 (-3.7)	3.9 (-4.2)
Avondale Ave **	40	45	42 (-3)	40 (-5)	N/A	42.1	30.2 (-11.9)	21.9 (-20.2)	N/A	5.7	2.0 (-3.7)	3.3 (-2.4)	N/A
Kenneth Ave **	40	45	43 (-2)	42 (-3)	N/A	39.0	30.3 (-8.7)	24.8 (-14.2)	N/A	4.6	2.7 (-1.9)	2.8 (-1.8)	N/A
Cactus Ave **	40	51	50 (-1)	45 (-6)	N/A	81.6	71.6 (-10.0)	45.1 (-36.5)	N/A	26.6	19.0 (-7.6)	8.0 (-18.6)	N/A
Chine Dr **	40	39	39 (0)	34 (-5)	N/A	16.5	13.9 (-2.6)	3.0 (-13.5)	N/A	1.0	1.0 (0)	0.1 (-0.9)	N/A
Drewry Ave ***	40	52	51 (-1)	N/A	N/A	86.2	82.0 (-4.2)	N/A	N/A	27.4	23.5 (-3.9)	N/A	N/A
East Haven Dr ****	40	23	22 (-1)	N/A	N/A	1.3	0.2 (-1.1)	N/A	N/A	0.9	0.1 (-0.8)	N/A	N/A
Yorkview Dr ****	40	41	44 (3)	N/A	N/A	22.4	38.5 (16.1)	N/A	N/A	2.6	5.7 (3.1)	N/A	N/A
Cameron Ave ****	40	38	38 (0)	N/A	N/A	12.9	11.3 (-1.6)	N/A	N/A	0.4	0.4 (0)	N/A	N/A

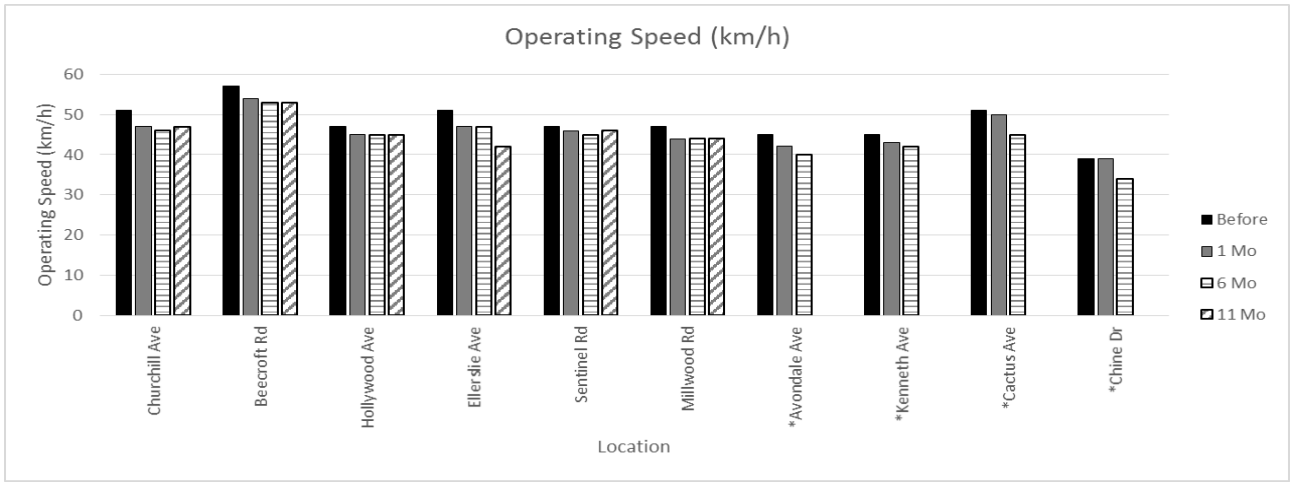
Table 2 Notes

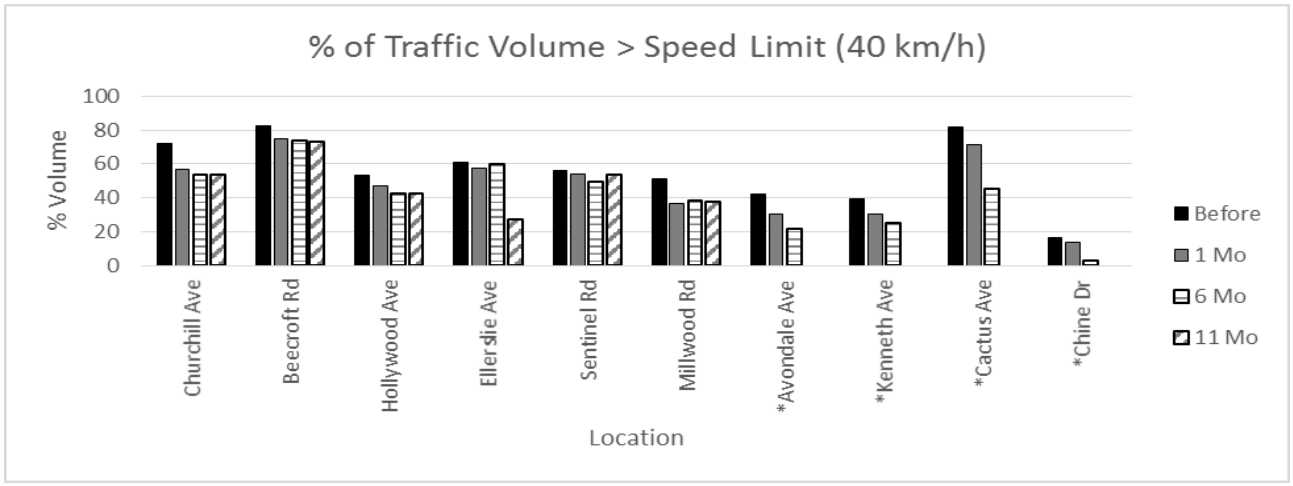
() Difference from "before" period
* Police enforcement during 6 months "after" period
** Phase 2 of pilot (installed March 2015)
*** Removed due to scheduled maintenance
**** Phase 1 of pilot (removed March 2015)

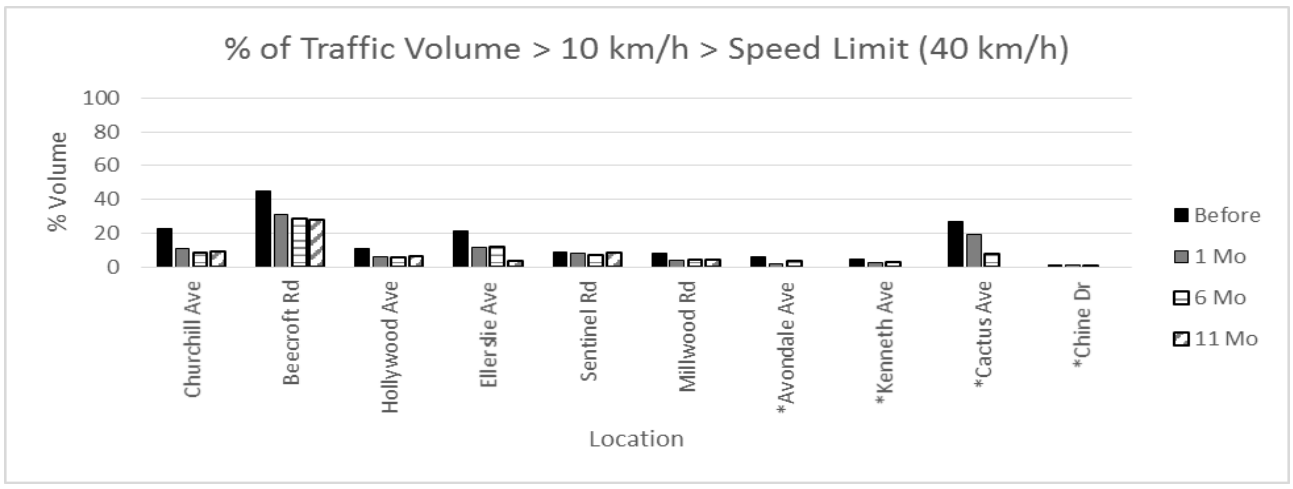
Definitions

Operating (85th Percentile) Speed – The speed at or below which 85% of vehicles are observed travelling.

Figure 2: School WYSP Pilot Project Before/After Analysis Summary Charts







Costs

The resources and costs required to purchase, install, evaluate and operate the signs for one year as part of the pilot are summarized in Table 3 below. The costs are exclusive of taxes and separated into capital and operating costs. Capital costs include one-time cost for supply of each radar speed display sign. Operating costs include both the one-time cost for installation of each sign and the annual costs for on-going monitoring, maintenance and troubleshooting.

Table 3: Pilot Costs

Capital Costs			
Description	Cost Per Sign	Qty.	Extended
One-Time Costs			
Supply of 1 Radar Speed Display Sign	$4,915.50	10	$49,155.00
Total:	**$4,915.50**	10	**$49,155.00**
Operating Costs			
One-Time Costs			
Staff Effort (including on-site inspection, programming and supervision)	$927.74	10	$9,277.40
Contracted Services (including installation)	$1,133.23	10	$11,332.30
Total:	**$2,060.97**	10	**$20,609.70**
Annual Costs			
Contracted Services (including troubleshooting)	$264.79	10	$2,647.90
Staff Effort (including monitoring, monthly inspections, troubleshooting and analysis)	$1,459.33	10	$14,593.30
Remote Sign and Data Management Service	$360.00	10	$3,600.00
Total:	**$2,084.12**	10	**$20,841.20**
Grand Total:	**$9,060.59**	10	**$90,605.90**

Based on the pilot program, the estimated cost to expand the WYSP to include permanent speed display signs is outlined in Table 4. The costs are divided into five scenarios depending on the number of signs purchased, taking into account discounts given for bulk purchases and economies of scale regarding staffing requirements.

It is assumed that one FTE is required for the management of up to 500 signs, based on current staffing levels for similar traffic device contracts. Considering previous experience with WYSP trailers and similar permanent technology on City roads, the estimated life expectancy of the signs is approximately 10 years.

The costs are comprised of a capital cost attributed to the supply and installation of the signs and an annual operating cost, which includes troubleshooting, routine inspections/maintenance, programming and general administration. Excluded from the cost summary is the annual operating cost for the online remote sign and data management service, which was only included for the pilot for the purpose of evaluating effectiveness.

There are approximately 850 schools (elementary and high school) in the Toronto District School Board and Toronto Catholic District School Board combined. Given that there are 44 Wards and assuming that 2 signs are installed at each school, there could potentially be an average of 40 signs installed per Ward.

Table 4: Expanded Program Cost (Estimated life expectancy of 10 years):

Scenario 1: 10 Signs			
Description	Cost Per Sign	Qty.	Total
Capital Cost (Supply and Install)	$6,100	10	$61,000
Annual Operating Cost	$800	10	$8,000
Grand Total:	**$6,900**	**10**	**$69,000**
Scenario 2: 100 Signs			
Description	Cost Per Sign	Qty.	Total
Capital Cost (Supply and Install)	$5,400	100	$540,000
Annual Operating Cost (Includes 0.2 FTE)	$800	100	$8,000
Grand Total:	**$6,200**	**100**	**$620,000**
Scenario 3: 250 Signs			
Description	Cost Per Sign	Qty.	Total
Capital Cost (Supply and Install)	$5,200	250	$1,300,000
Annual Operating Cost (Includes 0.5 FTE)	$900	250	$225,000
Grand Total:	**$6,100**	**250**	**$1,525,000**
Scenario 4: 500 Signs			
Description	Cost Per Sign	Qty.	Total
Capital Cost (Supply and Install)	$5,200	500	$2,600,000
Annual Operating Cost (Includes 1 FTE)	$900	500	$450,000
Grand Total:	**$6,100**	**500**	**$3,050,000**
Scenario 5: 1000 Signs			
Description	Cost Per Sign	Qty.	Total
Capital Cost (Supply and Install)	$5,200	1000	$5,200,000
Annual Operating Cost (Includes 2 FTE)	$900	1000	$900,000
Grand Total:	**$6,100**	**1000**	**$6,100,000**

Guidelines for Future Installations

Based on the results of the pilot evaluation, speed display signs should be considered as a potential countermeasure for addressing speeding issues. However, similar to traffic calming measures and other traffic control devices, individual potential installation locations should be reviewed and assessed based on technical criteria to determine suitability and to ensure effectiveness. As with other traffic control devices, the proliferation and inappropriate use of these signs could potentially reduce compliance and diminish their effectiveness.

This pilot focused on safety and speeding issues around schools, as children are among the most vulnerable road users in the road network. As a result, the use of these signs should be limited to roadways in front of schools in order to ensure that drivers make a strong association with these signs and the need to reduce speeds near schools.

With these criteria in mind, staff propose a set of mandatory requirements which schools must satisfy in order for permanent speed display signs to be installed. These include the following:

- **School must be on a local or collector road, or on an arterial road with 2 or more KSI collisions –** Consistent with the City's current traffic calming policy, use of these signs should be limited to local and collector roads only, which primarily serve residential communities. However, consideration will also be given to schools on arterial roads where 2 or more KSI collisions have occurred within the last 5 years.

- **Operating speed of road must be minimum 10 km/h over the speed limit** – Also consistent with the current traffic calming policy, signs should only be used on roads with a confirmed speeding issue. Each road fronting an entrance to the school should be assessed for operating speed.

Recognizing that there may be great interest and demand for these signs, but that resources may be limited, staff also propose a point scoring system for prioritizing schools which meet the mandatory requirements to ensure that signs are first installed where they are most effective and the needs are greatest. Considerations include the conditions shown below in Table 5.

Table 5: School WYSP Prioritization Conditions

Condition	Motivation
1. Elementary school	Younger children still learning rules of the road and basic safety skills are at greater risk than older students.
2. Active transportation or school safety related initiative or program	Safety in school zones should be a shared responsibility and engineering measures, such as traffic calming and traffic control devices, should be considered one component in a multi-faceted strategy for addressing safety concerns around schools. Elementary schools that make an effort to help ease traffic conditions and improve safety will be given greater consideration.
3. Fronting onto a street with higher traffic volumes.	Safety risk for pedestrians is generally higher on streets with higher traffic volumes.
4. Abuts or is located within 200m of a park or community centre.	Parks and community centres close to schools result in additional school-age pedestrian traffic.
5. Fronting onto a street where there is no sidewalk or has sidewalk on one side only.	Safety risk for pedestrians is generally higher on streets without physical separation between traffic and pedestrians.

The installation of signs should be limited to a maximum of one sign in each direction of traffic and only on roads fronting school entrances used for student pick-up and drop-off activity, where the mandatory operating speed requirement is satisfied. A proposed form to assess and prioritize candidate schools is shown on the following page.

Form 1: School WYSP Mandatory Requirements and Prioritization Guidelines

School: _____

Address: _____

District: _____

Request Initiated by: _____

Date Requested: _____

1. Mandatory Requirements – School must satisfy BOTH of the following requirements to be considered.

Requirement	Description	Requirement Met?
1.0 Road classification	School is located on a local or collector road, or on an arterial road with 2 or more KSI collisions.	☐
1.1 85th percentile speed	School is located on a road with an 85th percentile speed at least 10 km/h above the speed limit.	☐

2. Prioritization Guidelines – Greater consideration will be given to schools with higher scores.

Guideline	Description	Point System	Score
2.0 Elementary school	Priority will be given to elementary schools (grades K-6, K-8, 7-8).	Elementary school = 4 pts High school = 2 pts	
2.1 Active transportation or related school safety initiative	School is involved in one of the following active transportation or school safety related initiative or program: ☐ Active & Safe Routes to School ☐ Walk-A-Block ☐ Walking Wednesdays ☐ Walking School Bus ☐ Walking Buddies ☐ Parent Safety Program ☐ Other: _____	4 pts	
2.2. 24 hour traffic volume	Priority will be given to schools located on a street with higher traffic volumes.	1 pt for every 2,000 vehicles per day	
2.3 Proximity to park or community centre	School abuts a park or community centre, or is within 200m of a park or community centre.	Abuts = 4 pts Within 200m = 2 pts	
2.4 Sidewalks	School is located on a street with no sidewalk or a sidewalk on one side only.	No sidewalk = 4 pts One sidewalk = 2 pts	
		Total Score:	

Financial Impacts:

There are both Capital and Operating costs associated with the proposed expansion of the WYSP to add permanent speed display signs in school zones, including purchase, installation, operation and maintenance costs. Annual costs will vary depending on the number of signs installed. The estimated annual capital and operating cost is approximately $69,000 to install 10 signs, $620,000 for 100 signs, $1,525,000 for 250 signs, $3,050,000 for 500 signs and $6,100,000 to install 1000 signs. Annual operating costs include one full-time equivalent (FTE), which based on current staffing levels for similar traffic device contracts, is required for the management of up to 500 signs.

Currently, the WYSP operates with no dedicated budget and staff. Therefore, additional Capital and Operating funds would be required for an expanded program. Once Council approves the specific plan, additional budget funding and staff complement would be identified and submitted for consideration during the annual budget process.

The Deputy City Manager and Chief Financial Officer has reviewed this report and agrees with the financial impact information.

Conclusions:

- The Division has conducted and completed its review of a pilot expansion of the WYSP in school zones. The results showed that the use of radar speed display signs can be an effective, long-term strategy for reducing operating speeds and excessive speeding (greater than 10 km/h over the speed limit).

- Assuming expansion of the WYSP, it would be anticipated that the total capital and annual operating costs would be approximately $69,000 to install 10 signs, $620,000 for 100 signs, $1,525,000 for 250 signs, $3,050,000 for 500 signs and $6,100,000 to install 1000 signs. Annual operating costs include one FTE which is required for the management of up to 500 signs (based on current staffing levels for similar traffic device contracts).

- Staff recommends that the WYSP be expanded under the RSP to include permanent speed display signs as one of the countermeasures for addressing safety in school zones and that a set of mandatory requirements and prioritization guidelines be adopted for assessing candidate schools.

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Appendix 9

TRAFFIC CALMING GUIDE FOR TORONTO

CITY OF TORONTO
TRANSPORTATION SERVICES DIVISION

TABLE OF CONTENTS

INTRODUCTION

As part of its role and mandate to build and maintain a safe and efficient road system for all road users, the City of Toronto continuously makes improvements that have proven to be effective in addressing road safety. One of the primary programs through which this goal is to be accomplished is via the targeted implementation of traffic calming measures, which when applied appropriately can have a positive impact on travel speeds, traffic volumes, and road safety generally.

The purpose of this guide is to provide an overview of what traffic calming is, when and where it can best be used, and what the positive and negative impacts of applying traffic calming measures can be. It also contains a description of the different measures available in the City, their estimated costs, information on how to request traffic calming, and the process which must be followed.

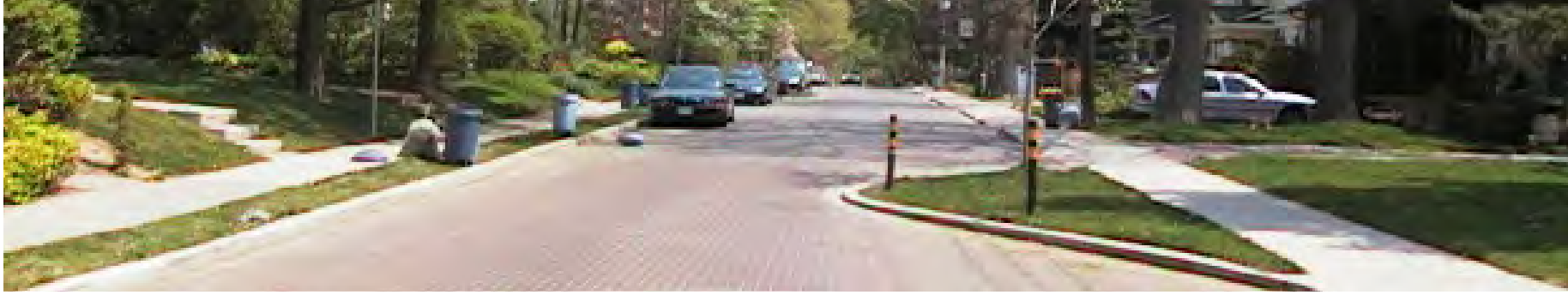
It is hoped that this guide will be an effective education tool, used to foster a greater understanding of traffic calming in Toronto, and how it can support the goal of making our streets safer for all road users.

WHAT IS TRAFFIC CALMING?

Traffic calming is a term commonly associated with physical features such as: speed humps, pinch-points, and chicanes. They are installed on a road to reduce the speeds at which vehicles travel, to discourage through traffic, to improve traffic safety, and to improve comfort levels for all road users.

WHY USE TRAFFIC CALMING MEASURES?

Traffic calming is intended to improve the quality of life for residents on traffic calmed streets, achieve slower speeds for motor vehicles, and increase the safety for non-motorized users of the street. Traffic calming solutions should be looked at as a community-wide strategy (as opposed to on a street by street basis) to ensure that volume and speed concerns are not transferred to adjacent streets.



WHERE TRAFFIC CALMING MEASURES CAN BE APPLIED

Physical traffic calming measures are considered only on roads classified as local or collector streets, as defined in the City of Toronto Road Classification System, and conforming to established technical criteria in the Traffic Calming Policy. Local and collector roads can also be referred to as residential streets and they carry a maximum of 2,500 and 8,000 vehicle per day, respectively. Table 1 describes the main characteristics of the various classes of roads found in the City of Toronto.

Table 1: Road Classification

Road Classification	Characteristics	Volume (vehicle/day)	Typical Right –of-way Width (metres)	Speed (km/h)	Suitable for Traffic Calming
Local Roads	• Provide access to properties • Low traffic speed • Generally no bus routes • Truck restrictions preferred	Less than 2,500	15 – 22	30 – 50	Yes
Collector Roads	• Provide access to properties and traffic movement • Signalized intersections at arterial roads • Truck restrictions permitted	2,500 – 8000	20 – 27	30 – 50	Yes
Minor Arterial Roads	• Traffic movement is a primary function • Some property access control • No “Stop” signs • No Truck restrictions	8,000 – 20,000	20 – 30	40 – 60	No
Major Arterial Roads	• Traffic movement is a primary function • Subject to property access control • Special cycling facilities preferred	Greater than 20,000	20 – 45	50 – 60	No
Expressways	• Traffic movement is a primary function • No property access • Grade-separated intersections (no traffic signals) • Pedestrian and cyclist access prohibited	Greater than 40,000	Greater than 45	80 – 100	No

TRAFFIC CALMING POLICY

In April 2002, City Council approved a new Traffic Calming Policy following the amalgamation of the former Municipalities of Toronto, North York, Etobicoke, Scarborough, York and East York to form the new City of Toronto. A Traffic Calming Policy Summary report is available on the City's website for more detailed information on the Policy.

WARRANTS

To comply with the Policy the following Warrants/Technical criteria should be met.

WARRANT 1 - PETITION		
1.1 PETITION	Consideration for physical traffic calming is initiated in one of three ways: i) by the local Councillor following a public meeting; ii) upon receipt of petition signed by at least 25% of affected households (or 10% in the case of multiple family rental dwellings); or iii) by a survey conducted by the Ward Councillor.	Yes / No
Impacts to Adjacent Streets	Should the District Traffic Operations Manager anticipate that the proposed traffic calming will have significant traffic impacts on adjacent streets, the review of the traffic calming proposal shall be modified to include the proposed street as well as adjacent streets where traffic is expected to divert.	
	WARRANT 1 MET?	**Yes / No**
	Warrants 2 and 3 will not be considered until Warrant 1 is satisfied.	

WARRANT 2 – SAFETY REQUIREMENTS		
	ALL OF THE FOLLOWING CRITERIA MUST BE MET	
2.1 SIDEWALKS	On streets where traffic calming is proposed, there must be continuous sidewalks on at least one side of the street (both sides for collector). **OR** On streets where there are no sidewalks, the installation of sidewalk on at least one side of the street must have first been considered.	Yes / No
2.2 ROAD GRADE	Traffic calming measures may be considered at or near locations where the road grade is up to 5%. Traffic calming measures may be considered at or near locations where the road grade is between 5%and 8%.	Yes / No
2.3 EMERGENCY RESPONSE	On streets where traffic calming is proposed, impacts on Emergency Services will not be significant (as determined in consultation with Emergency Services (Fire, Ambulance, and Police) staff).	Yes / No
	WARRANT 2 MET?	**Yes / No**

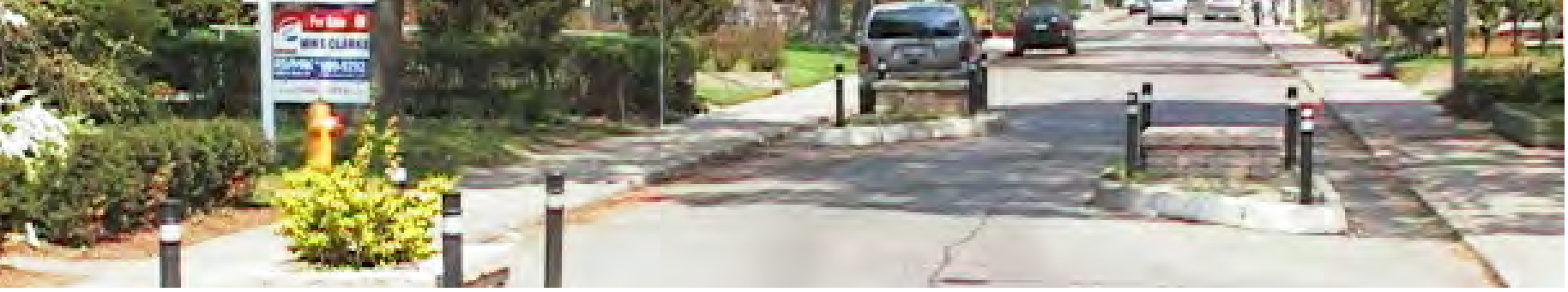
WARRANT 3 - TECHNICAL REQUIREMENTS		
ALL OF THE FOLLOWING CRITERIA MUST BE MET		
3.1 MINIMUM SPEED	On streets where traffic calming is proposed, the 85th percentile speed must be a minimum of 10 km/h (but less than 15 km/h) over the warranted speed limit, and the traffic volume requirements of Warrant 3.2 must be fulfilled. **OR** On streets where the 85th percentile speed exceeds the warranted speed limit by a minimum of 15 km/h, there is no minimum volume required in Warrant 3.2.	Yes / No
3.2 MINIMUM AND MAXIMUM TRAFFIC VOLUME	Local Roads For streets where traffic calming is proposed, the traffic volume must be between 1,000 vehicles per day and 8,000 vehicles per day.	Yes / No
3.3 MINIMUM BLOCK LENGTH	On streets where mid-block traffic calming measures are proposed, the block length must exceed 120 metres.	Yes / No
3.4 TRANSIT SERVICE	On streets where traffic calming is proposed, impacts on regularly scheduled Toronto Transit Commission (TTC) services will not be significant (as determined in consultation with TTC staff).	Yes / No
	WARRANT 3 MET?	**Yes / No**

Traffic Calming measure is warranted:	
WARRANT 1 AND 2 AND 3 MET?	**Yes / No**

Physical traffic calming measures increase the response time for all emergency vehicles.

Warrants 1, 2 and 3 must all be satisfied in order to proceed with the installation of traffic calming measures.

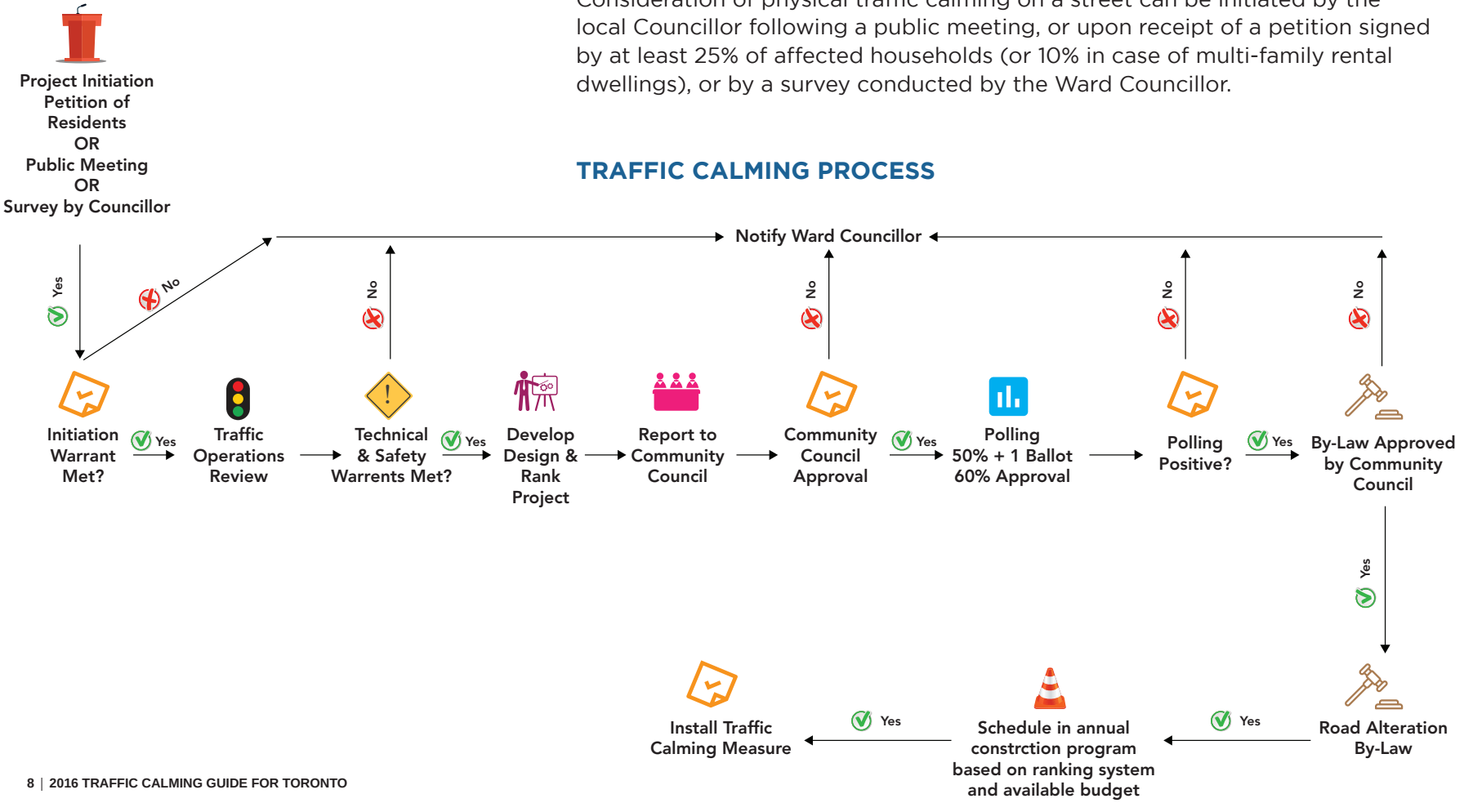
In conjunction with the installation of the traffic calming measure, the speed limit would be reduced to 30 km/h.



HOW TO REQUEST TRAFFIC CALMING MEASURES

Consideration of physical traffic calming on a street can be initiated by the local Councillor following a public meeting, or upon receipt of a petition signed by at least 25% of affected households (or 10% in case of multi-family rental dwellings), or by a survey conducted by the Ward Councillor.

TRAFFIC CALMING PROCESS

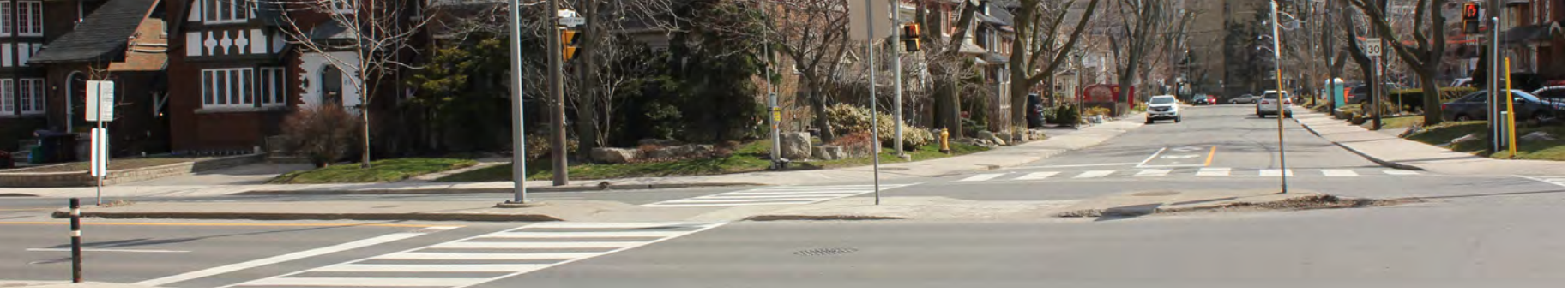


Council has the final decision on all traffic calming issues, regardless of the poll results.

PROCEDURE FOR TRAFFIC CALMING MEASURES INSTALLATION

Community Council approves the installation of traffic calming devices depending on a favourable poll of residents on the affected street(s). The City Clerk conducts a poll, which to be successful, requires half of the ballots plus one to be returned, of which at least 60% should be in favour of the installation of traffic calming devices.

If the poll is successful a Highway Alteration By-law is then submitted to Community Council for consideration. If approved, the project is then ranked with similar approved projects and prioritized for installation subject to funds being available in the Transportation Services' Annual Traffic Calming Budget.



TYPES OF TRAFFIC CALMING

There are **two types** of measures that can be used in the City of Toronto for traffic calming.

Vertical Measures

- Speed humps;
- Raised intersections – for two-way stop control;

Horizontal Measures

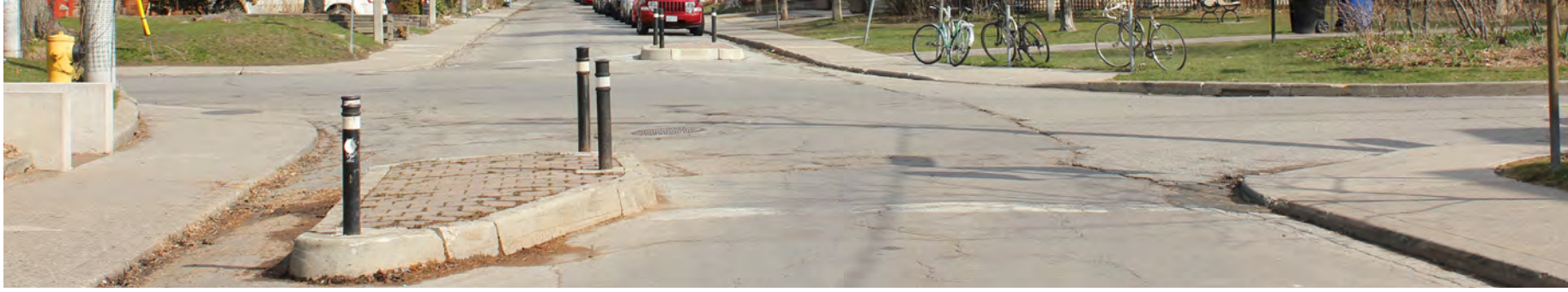
- Chicanes;
- Curb extensions (Mid-block pinch Point);
- Traffic islands;
- Traffic circles.

The most common traffic calming measure used in the City of Toronto is the speed hump because of its effectiveness and low cost. However, there are a number of other traffic calming measures that can be successful at:

- Speed reduction;
- Volume reduction;
- Safety – reducing vehicle-vehicle, vehicle-pedestrian, and vehicle-cyclist conflicts.

The following pages detail the various traffic calming measures, including a visual illustration, description, purpose, effectiveness, cost range, and advantages/disadvantages.

While cost range estimates are provided for each measure, these can vary on a project-to-project basis depending on the quantity, materials used, and the amount of construction effort required. In addition, there would be cost associated with undertaking data collection (e.g., speed studies, traffic volume data) and polling of residents.



TRAFFIC CALMING MEASURE OPTIONS

Table 2 summarizes the different measures that can be installed through the traffic calming process, their effectiveness, and estimated cost.

Table 2: Traffic Calming Measures

	EFFECTIVENESS			ROAD CLASSIFICATION			
Measures	Speed Reduction	Road Volume Reduction	Safety	Local	Collector	Cost Per Measure	Page
Vertical Measures							
Speed Humps	●	●	●	✓	✓	$1,000 - $5,000	12
Raised Intersections - Two-way Stop Control	◐	○	◐	✓	✓	$50,000 - $100,000	13
Horizontal Measures							
Chicanes - One-Lane	●	●	●	✓	✓	$15,000 - $50,000	14
Chicanes - Two-Lane	◐	○	◐	✓	✓	$15,000 - $50,000	14
Curb Extensions - Mid-block pinch-point	◐	○	◐	✓	✓	$50,000 - $100,000	15
Traffic Islands	◐	○	◐	✓	✓	$5,000 - $15,000	16
Traffic Circles	●	◐	○	✓	✓	$15,000 - $50,000	17

SPEED HUMPS

MEASURE

Vertical Measure

PRIMARY PURPOSE

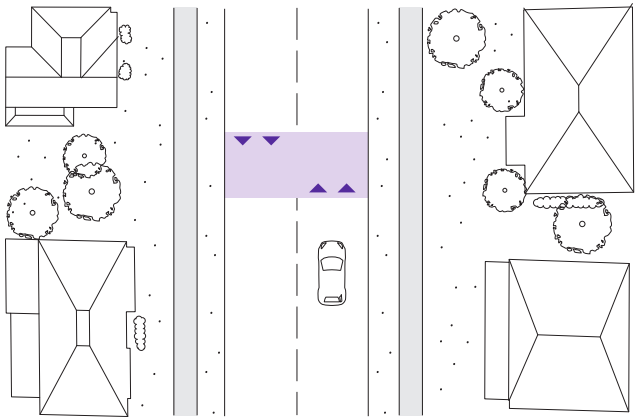
Speed Reduction

TRAFFIC CALMING SIGNS

SPEED HUMP

TRAFFIC CALMING

SPEED LIMIT



SPEED HUMPS

Speed humps are raised sections of the roadway designed to discourage motor vehicle drivers from travelling at excessive speeds.

EFFECTIVENESS

Speed Reduction	●
Road Volume Reduction	●
Safety	●

COST PER MEASURE

$1,000—$5,000

(Physical speed hump, signage, pavement markings, polling)

ADVANTAGES

- Speed reduction
- Minimal impact on cyclists
- Minimal impact on snow clearing
- Self enforcing

DISADVANTAGES

- Negative impact on Emergency Services (i.e., Ambulance, Fire, and Police), by slowing down response time and impacting the comfort of patients being transported

RAISED INTERSECTIONS - TWO-WAY STOP CONTROL

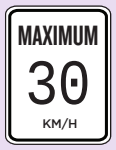
MEASURE

Vertical Measure

PRIMARY PURPOSE

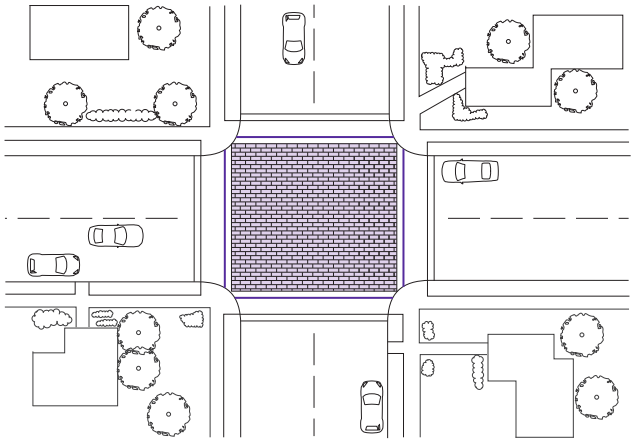
Speed Reduction

TRAFFIC CALMING SIGNS



SPEED LIMIT

TRAFFIC CALMING



RAISED INTERSECTIONS - TWO-WAY STOP CONTROL

A raised intersection is defined as an intersection constructed at a higher elevation than the adjacent roadway.

EFFECTIVENESS

Speed Reduction	◐
Road Volume Reduction	○
Safety	◐

ADVANTAGES

- Speed reduction
- Better definition of pedestrian areas
- Self-enforcing
- Reduce pedestrian-vehicle conflict

COST PER MEASURE

$50,000—$100,000

(Cost varies due to size of intersection, pavement material, relocation of catch basins)

DISADVANTAGES

- Negative impact on Emergency Services (i.e., Ambulance, Fire, and Police), by slowing down response time and impacting the comfort of patients being transported

CHICANES

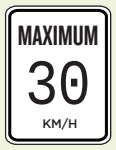
MEASURE

Horizontal Measure

PRIMARY PURPOSE

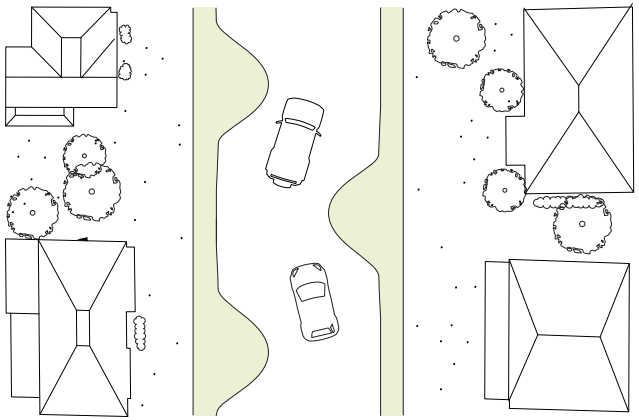
Speed Reduction

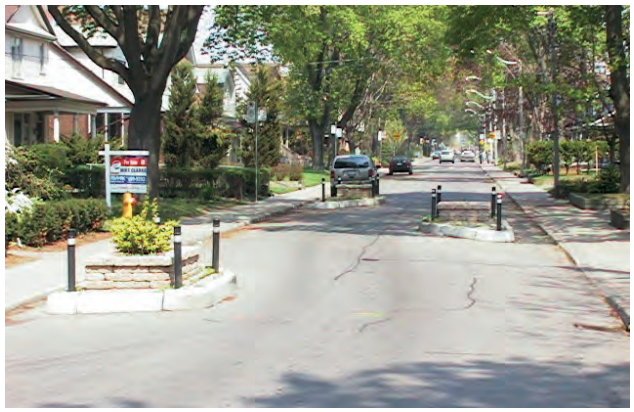
TRAFFIC CALMING SIGNS



SPEED LIMIT

TRAFFIC CALMING





CHICANES

A chicane is a series of curb extensions on alternate sides of a roadway which narrow the roadway and requires drivers to steer from one side to the other to travel through the chicane.

EFFECTIVENESS

	One-lane	Two-lane
Speed Reduction	●	◐
Road Volume Reduction	●	○
Safety	●	◐

ADVANTAGES

- Speed reduction
- Discourage shortcutting and through traffic
- Opportunity for landscaping

COST PER MEASURE

$15,000—$50,000

(Cost varies due to size and number of chicanes, installation of bollards and reflective signs, relocation of catch basins)

DISADVANTAGES

- Not recommended on bike routes
- Ineffective on low volume roads. There are safety concerns when installing on high volume roads. Therefore, suggested for mid-range traffic volumes.

CURB EXTENSIONS

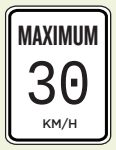
MEASURE

Horizontal Measure

PRIMARY PURPOSE

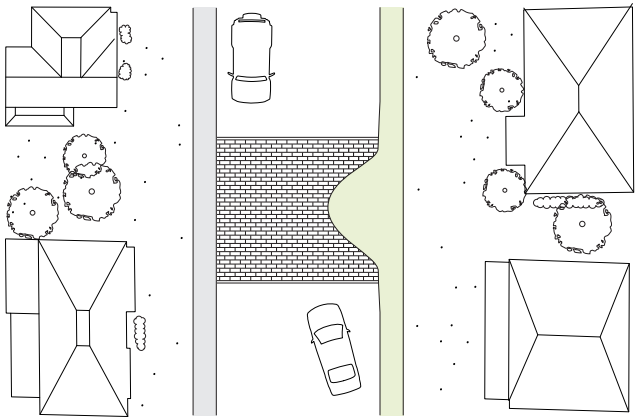
Speed Reduction

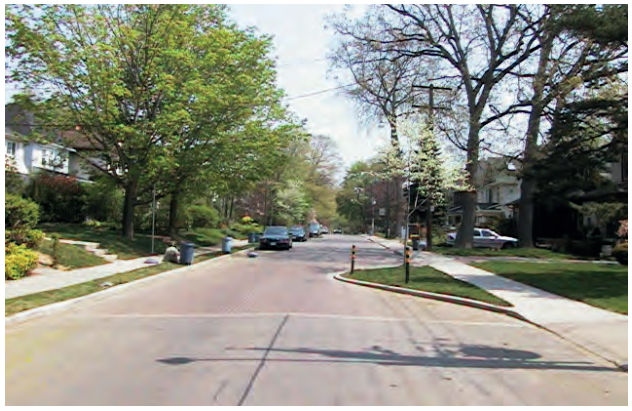
TRAFFIC CALMING SIGNS



SPEED LIMIT

TRAFFIC CALMING





CURB EXTENSIONS - MID-BLOCK PINCH POINT

A curb extension is a horizontal intrusion of the curb into the roadway, resulting in a narrower section. Curb extensions installed mid-block must follow the traffic calming process.

EFFECTIVENESS

Speed Reduction	◐
Road Volume Reduction	○
Safety	◐

ADVANTAGES

- Speed reduction
- Increase pedestrian visibility
- Opportunity for landscaping

COST PER MEASURE

$50,000—$100,000

(Cost varies due to size and number of curb extensions, type of boulevard material, relocation of catch basins, installation of bollards)

DISADVANTAGES

- May not be compatible with bike lanes
- May require removal of on-street parking spaces

TRAFFIC ISLANDS

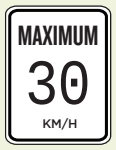
MEASURE

Horizontal Measure

PRIMARY PURPOSE

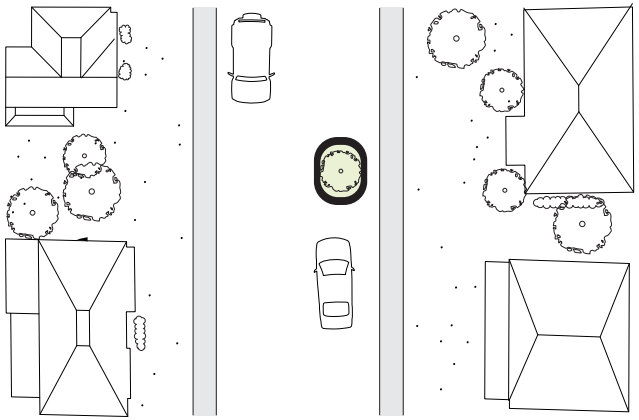
Speed Reduction

TRAFFIC CALMING SIGNS



SPEED LIMIT

TRAFFIC CALMING



TRAFFIC ISLANDS

Traffic Islands have the effect of narrowing the road and reducing the speed of passing traffic. They are not intended for pedestrians, as they have no dropped curbs and tactile paving.

EFFECTIVENESS

Speed Reduction	◐
Road Volume Reduction	○
Safety	◐

ADVANTAGES

- Speed reduction
- Prevents over-taking
- Opportunity for landscaping

COST PER MEASURE

$5,000—$15,000

(Costs varies due to modular or in-place construction, type of material, installation of bollards)

DISADVANTAGES

- Maintenance cost
- May require the removal of some on-street parking

TRAFFIC CIRCLES

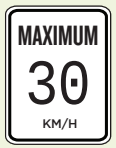
MEASURE

Horizontal Measure

PRIMARY PURPOSE

Speed Reduction

TRAFFIC CALMING SIGNS

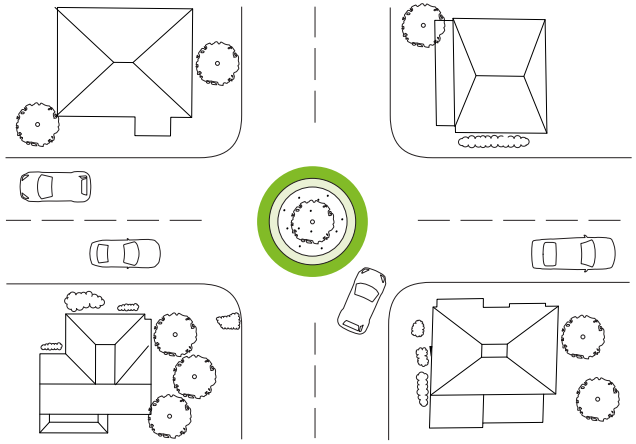


SPEED LIMIT

TRAFFIC CALMING

ROTARY

ROTARY AHEAD



TRAFFIC CIRCLES

A traffic circle is a raised island located in the centre of an intersection which requires vehicles to travel through the intersection in a counter-clockwise direction around the island. Used to calm roads with relatively low volumes of traffic.

EFFECTIVENESS

Speed Reduction	●
Road Volume Reduction	◐
Safety	○

ADVANTAGES

- Speed reduction
- Reduce vehicle-vehicle conflicts at intersections
- Opportunity for landscaping

COST PER MEASURE

$15,000—$50,000

(Physical traffic circle depends on size of intersection, material and signage)

DISADVANTAGES

- Restricts turning movements by large vehicles
- May increase Emergency Services response time

TRAFFIC CALMING MEASURES IN LANEWAYS

Residents may experience speeding in some laneways. To address this issue, Transportation Services can install speed bumps to slow down traffic. For a speed bump to be installed the lane must satisfy one or more of the following conditions:

1. The average speed is greater than 20 km/h;
2. The traffic volume is more than 100 vehicles per day; or
3. The lane is used as a frequent pedestrian passageway

In addition, the lane must be paved and have surface drainage that will not be impeded by the speed bump.

Speed bumps in laneways can be requested through resident's Ward Councillor.

Following the initiation of a request and an investigation by Transportation Services' staff, a Staff Report is submitted to Community Council for approval.

SPEED BUMPS IN LANEWAYS

MEASURE

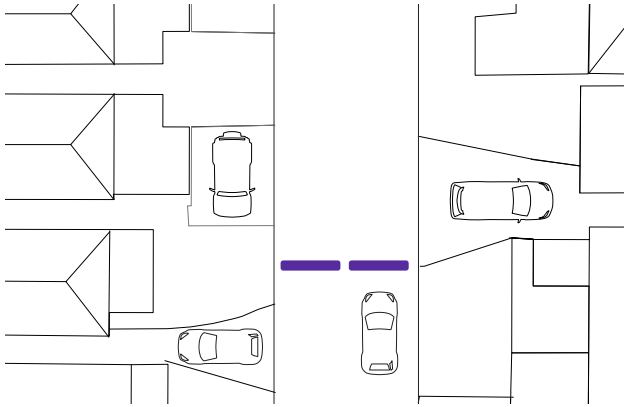
Vertical Measure

PRIMARY PURPOSE

Speed Reduction

TRAFFIC CALMING SIGNS

LANEWAY SIGNS



SPEED BUMPS IN LANEWAYS

Speed bumps are raised sections of the roadway designed to discourage motor vehicle drivers from travelling at excessive speeds. They are considerably shorter than humps. Speed bumps encourage drivers to cross at no more than 10 km/h.

EFFECTIVENESS

Speed Reduction	●
Road Volume Reduction	◐
Safety	●

ADVANTAGES

- Speed reduction
- Minimal impact on cyclists
- Self enforcing

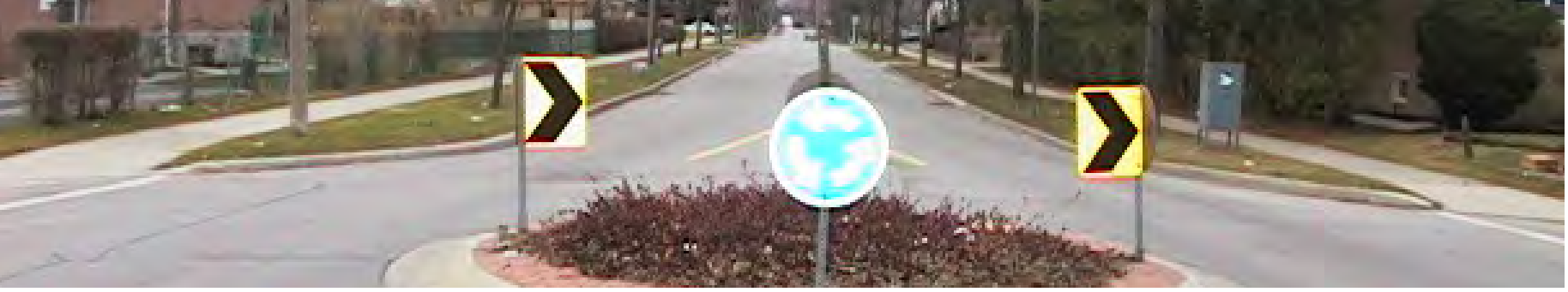
COST PER MEASURE

$1,000—$5,000

(Physical speed bump and signage)

DISADVANTAGES

- Negative impact on Emergency Service (i.e., Ambulance, Fire, and Police) by slowing down response time and impacting the comfort of patients being transported



ALTERNATIVE OPTIONS TO TRAFFIC CALMING

In addition to traffic calming measures that follow the Traffic Calming Process, there are a number of other options that can be used to influence driver behaviour and discourage through traffic. Some of the options listed below may be applied to roads other than locals and collectors. These options can be assessed through Transportation Services' Traffic Operations staff at the relevant district office in consultation with the Councillor's office.

Stop signs and traffic signals are often requested; however, are not intended for use as speed control devices, as they are not the most effective way to manage speed. Therefore, are not included as options in this Guide.

POSTED SPEED LIMIT REDUCTION

The City of Toronto has two policies, a 40 km/h speed limit policy and a 30 km/h speed limit policy, that allow the posted speed limit to be reduced. Both of these policies contain a number of criteria that must be met for a reduction in the posted speed limit to be warranted.

If all the required Warrants are met, a report is submitted by Transportation Services staff to the appropriate Community Council for the approval of the speed limit reduction and required By-law change.

40 km/h Speed Limit Warrant

The City's 40 km/h Maximum Speed Limit Warrant was adopted in 2002. The warrant was developed with the primary emphasis on the safety of pedestrian and cyclists. The 40 km/h Warrant applies to local, collector, and minor arterial roads.

A 40 km/h maximum speed limit may be implemented on any of the applicable classes of road where one or more of the following Warrants B or C is met. In the case of streets 10.5 metres or more in width, Warrant A must also be satisfied.

Warrant A - WIDE ROADS		
1	Pavement width equal to or more than 10.5 metres, where the operating speed 85 percentile is equal to or less than 50km/h.	Yes / No

Warrant B - PEDESTRIAN ENVIRONMENT		
ONE OF THE FOLLOWING		
1 (i)	Elementary or junior high school abuts the road.	Yes / No
(ii)	Parkland abuts the road which is contiguous to and used to gain access to an elementary or junior high school.	
(iii)	No sidewalk on either side of the road or a major portion of the road.	
OR		
2	The sidewalk is immediately adjacent to and not separated from the flow of motor vehicles by long-term parking (>3 hours) or bike lanes, where the travelled portion of the road width is less than 5.7 metres for two-way operation, or less than 4.0 metres for one-way operation.	Yes / No
	WARRANT B1 or B2 MET?	**Yes / No**

Warrant C - ROAD AND TRAFFIC ENVIRONMENT		
ONE OF THE FOLLOWING		
1 (i)	Two or more locations of concern where: - Grades are greater than 5%; and/or - Safe speed on curves is less than 50 km/h.	Yes / No
(ii)	Lack of sufficient distance to stop safely at two or more locations when travelling at 50 km/h	
(iii)	Pattern of collisions where vehicle speed was identified as a factor: - Local streets – 3 or more over 3 years. - Other streets – 5 or more over 3 years.	
OR		
2	Where long-term parking (>3 hours) is permitted on one or both sides, and the remaining travelled portion of the road is less than 5.7 metres for two-way operation, or 4.0 metres for one-way operation	Yes / No
	WARRANT C1 or C2 MET?	**Yes / No**

40 km/h Maximum Speed Limit Is Warranted:		
	WARRANT B or C MET?	**Yes / No**

ALTERNATIVE OPTIONS TO TRAFFIC CALMING cont.

30 km/h Speed Limit Policy

City Council approved in 2015 the 30 km/h Speed Limit Policy. The purpose of this policy was to recommend a set of criteria under which the implementation of a 30 km/h speed limit could be recommended on local and collector streets in the absence of traffic calming measures.

A 30 km/h maximum speed limit may be implemented when Warrants A, B, C, and D are met.

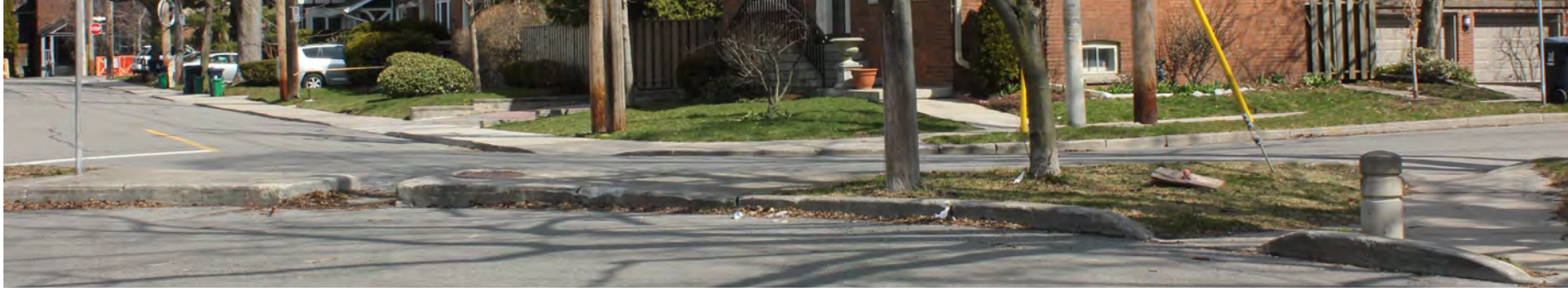
If all the required Warrants are met, a report is submitted by Transportation Services staff to the appropriate Community Council for the approval of the speed limit reduction and required By-law change.

Warrant A - PETITION

Consideration of 30km/h speed limit on a street upon receipt of a petition signed by at least 25% of affected households (or 10% in the case of multiple family rental dwellings).

Warrants “B “, “C” and “D” will not be considered until Warrant “A” is satisfied.

Warrant B - ROAD ENVIRONMENT		
ALL OF THE FOLLOWING CRITERIA MUST BE MET		
1	Local or Collector road	Yes / No
AND		
2	Pavement width less or equal to 8.5 metres	Yes / No
AND		
3	Operating speed 85th percentile no greater than 50 km/h	Yes / No
AND		
4	Maximum traffic volume Local & Collector – less than 8,000 vehicles/day	Yes / No



Warrant C - SCHOOL AND CYCLING ENVIRONMENT		
At least ONE of the following criteria must be met		
1	Elementary or junior high school abuts the road - (The 30 km/h maximum speed limit must extend at a minimum 150 metres beyond the boundary of school property and can be extended to include full road section)	Yes / No
AND		
2	Improved parkland abuts the road that is contiguous to and used to gain access to an elementary or junior high school - (The 30 km/h maximum speed limit must extend at a minimum 150 metres beyond the boundary of the parkland and can be extended to include full road section)	Yes / No
AND		
3	Presence of cycling facilities identified by means of a contra-flow bicycle lane, mid-block sharrows or signed bicycle route	Yes / No

Warrant D - PEDESTRIAN AND TRAFFIC ENVIRONMENT		
At least ONE of the following criteria must be met		
1	Absence of continuous sidewalk on both sides of the road or major portion of the road	Yes / No
OR		
2	'Significant parking activity' that results in cars being parked most of the time on both sides of the road or parked on one side, and the pavement width is less than 6.5 metres	Yes / No
OR		
3	2 or more curves in short distance from each other (< 200 metres) with a safe operating speed less than 30 km/h	Yes / No
OR		
4	Lack of sufficient safe stopping distance (65 metres) based on the operating speed of 40 km/h at two or more locations	Yes / No

30 km/h Maximum Speed Limit is Warranted:		
WARRANTS "B" and "C" met OR "B" and "D" met		**Yes / No**

SAFETY AND OPERATIONAL IMPROVEMENT MEASURES

POLICE ENFORCEMENT

Where measures implemented (i.e., traffic calming measures, posted speed limit reduction, etc.) are not sufficient in changing driver behaviour, police enforcement may be an option. Toronto Police Service has a Traffic Safety Program that focuses on education, awareness, and enforcement.

There are other measures that can be installed to address safety and operational issues. These are typically identified by Transportation Services staff in consultation with the Councillor's office. They can be based on specific problems or opportunities for improvement based on scheduled resurfacing or reconstruction or part of a wider safety program. Transportation staff will evaluate these options depending on area needs, necessary approvals, available resources, and budget. Table 3 lists some of these measures.

Table 3: Safety and Operational Improvement Measures

	EFFECTIVENESS			ROAD CLASSIFICATION				
Measures	Speed Reduction	Road Volume Reduction	Safety	Local	Collector	Arterial	Cost Per Measure	Page
Vertical Measures								
Raised Intersections - All-way stop control	◐	○	◐	✓	✓		$50,000 - $100,000	26
Horizontal Measures								
Curb Extensions - at intersection	◐	○	○	✓	✓		$50,000 - $100,000	27
Curb Radius Reductions	◐	○	○	✓	✓	✓	$50,000 - $100,000	28
On-Street Parking	◐	◐	○	✓	✓	✓	$1,000 - $5,000	29
Raised Median Islands / Textured Median	◐	○	◐	✓	✓	✓	$15,000 - $50,000	30
Obstruction Measures								
Directional Closures	○	●	◐	✓	✓		$15,000 - $50,000	31
Diverters	○	●	◐	✓	✓		$50,000 - $100,000	32
Full Closures	○	◐	◐	✓	✓		$50,000 - $100,000	33
Raised Median Through Intersections	○	●	◐	✓	✓	✓	$15,000 - $50,000	34

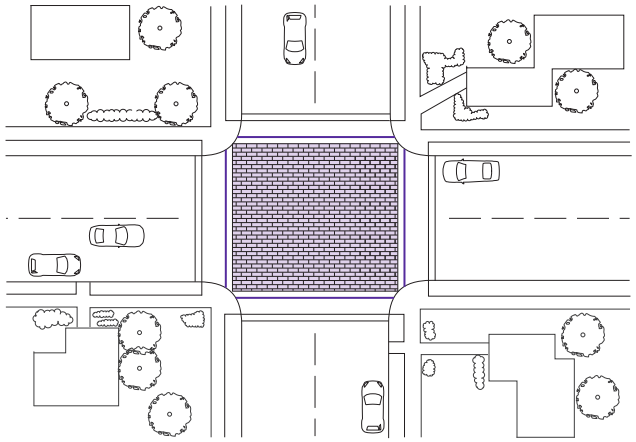
RAISED INTERSECTIONS - ALL-WAY STOP CONTROL

MEASURE

Vertical Measure

PRIMARY PURPOSE

Speed Reduction



RAISED INTERSECTIONS - ALL-WAY STOP CONTROL

A raised intersection is defined as an intersection constructed at a higher elevation then the adjacent roadway. All-way stop control intersections do not follow the traffic calming process.

EFFECTIVENESS

Speed Reduction	◐
Road Volume Reduction	○
Safety	◐

ADVANTAGES

- Speed reduction
- Pedestrian area is better defined
- Self-enforcing
- Reduce pedestrian-vehicle conflict

COST PER MEASURE

$50,000—$100,000

(Cost varies due to size of intersection, pavement material, relocation of catch basins)

DISADVANTAGES

- Negative impact on Emergency Services (i.e., Ambulance, Fire, and Police) by slowing down response time and impacting the comfort of patients being transported

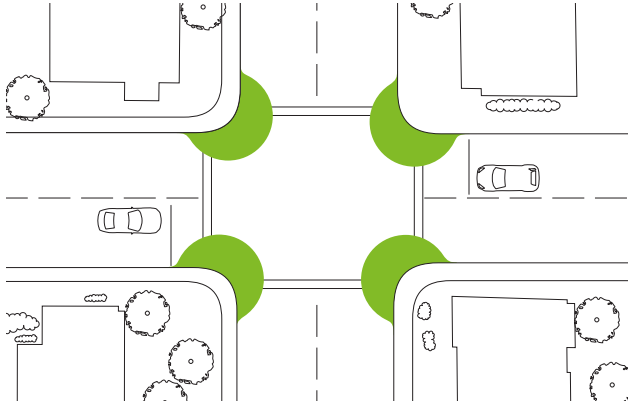
CURB EXTENSIONS

MEASURE

Horizontal Measure

PRIMARY PURPOSE

Speed Reduction



CURB EXTENSION S - AT INTERSECTIONS

A curb extension is a horizontal intrusion of the curb into the roadway resulting in a narrower section of the roadway. It can be installed mid-block or near an intersection.

EFFECTIVENESS

Speed Reduction	◐
Road Volume Reduction	○
Safety	○

ADVANTAGES

- Speed reduction
- Reduce crossing distance for pedestrians at intersections
- Increase pedestrian visibility
- Prevent parking close to an intersection

COST PER MEASURE

$50,000—$100,000

(Cost varies due to size and number of curb extensions, type of boulevard material, relocation of catch basins, installation of bollards)

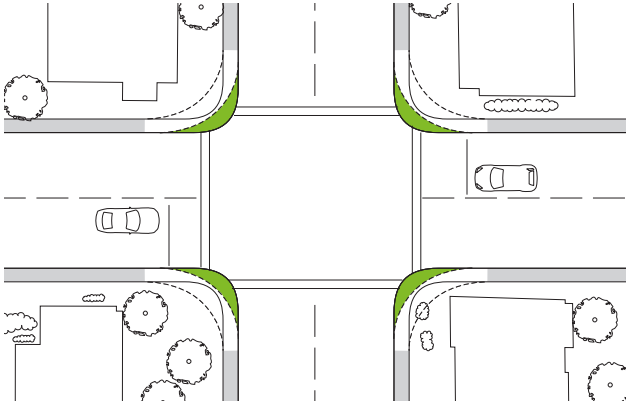
CURB RADIUS REDUCTIONS

MEASURE

Horizontal Measure

PRIMARY PURPOSE

Speed Reduction



CURB RADIUS REDUCTIONS

A curb radius reduction is the reconstruction of an intersection corner with a smaller radius. Often installed as part of an intersection improvement. More detailed information can be found in the City's Curb Radii Guidelines.

EFFECTIVENESS

Speed Reduction	◐
Road Volume Reduction	○
Safety	○

ADVANTAGES

- Slow right-turning vehicles
- Reduce crossing distance for pedestrian
- Improve pedestrian visibility

COST PER MEASURE

$50,000—$100,000

(Reconstruction of curb and sidewalk, installation of tactile strips, relocation of catch basins, repair of pavement)

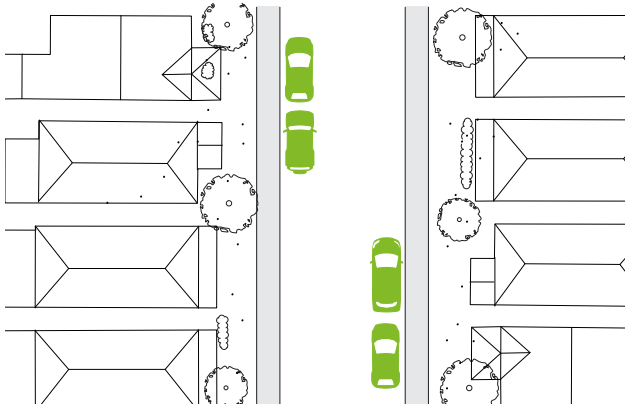
ON-STREET PARKING

MEASURE

Horizontal Measure

PRIMARY PURPOSE

Speed Reduction



ON-STREET PARKING (ALTERNATING SIDES/CHICANE EFFECT)

On-street parking is the reduction of the roadway width available for vehicle movement by allowing motor vehicles to park adjacent and parallel to the curb.

EFFECTIVENESS

Speed Reduction	◐
Road Volume Reduction	◐
Safety	○

ADVANTAGES

- Speed reduction
- Possible reduction in short-cutting traffic or through traffic

COST PER MEASURE

$1,000—$5,000

(Pavement line markings and signage)

DISADVANTAGES

- Potential impact on cyclists

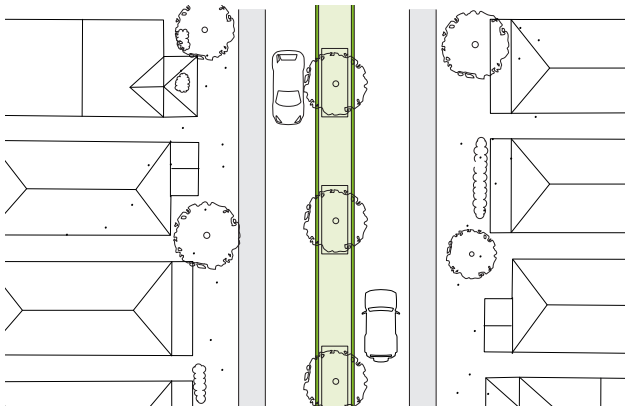
RAISED MEDIAN ISLANDS

MEASURE

Horizontal Measure

PRIMARY PURPOSE

Speed Reduction



RAISED MEDIAN ISLANDS / TEXTURED MEDIAN

A raised median is an elevated median constructed on the centerline of a two-way roadway to reduce the overall width of the adjacent travel lanes. If required, bike lanes can be included to prevent motorists from intruding into path of cyclist.

EFFECTIVENESS

Speed Reduction	◐
Road Volume Reduction	○
Safety	◐

ADVANTAGES

- Speed reduction
- Reduce pedestrian-vehicle conflict
- Safer pedestrian crossing

COST PER MEASURE

$15,000—$50,000

(Length and width of median, material, removal and repair of pavement)

DISADVANTAGES

- Potential driveway access restriction
- Potential loss of parking

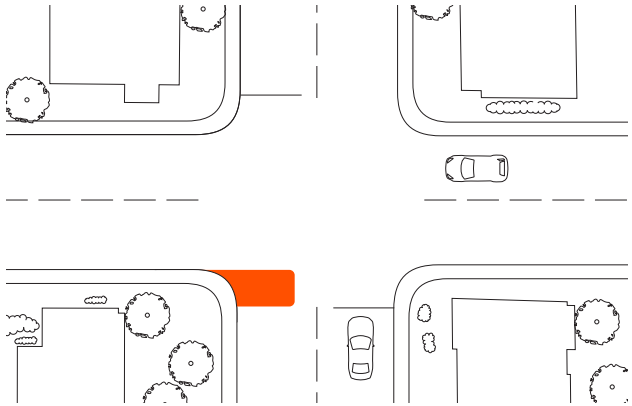
DIRECTIONAL CLOSURES

MEASURE

Obstruction Measure

PRIMARY PURPOSE

Volume Reduction



DIRECTIONAL CLOSURES

A directional closure is a curb extension or vertical barrier extending to approximately the centerline of a roadway, effectively obstructing (prohibiting) one direction of traffic.

EFFECTIVENESS

Speed Reduction	○
Road Volume Reduction	●
Safety	◐

ADVANTAGES

- Obstruct short-cutting or through traffic

COST PER MEASURE

$15,000—$50,000

(reconstruction of curb and sidewalk, installation of tactile strips, relocation of catch basins, installation of bollards)

DISADVANTAGES

- May increase traffic on adjacent streets
- May increase trip length for some residents

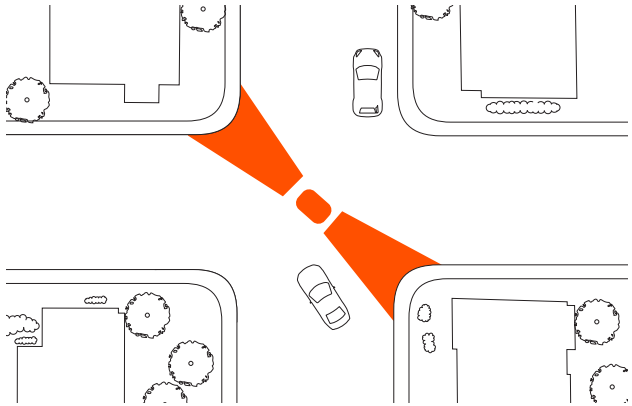
DIVERTERS

MEASURE

Obstruction Measure

PRIMARY PURPOSE

Volume Reduction



DIVERTERS

A diverter is a raised barrier placed diagonally across an intersection that forces traffic to turn and prevents traffic from proceeding straight through the intersection. Diverters can incorporate gaps for pedestrians, wheelchairs and bicycles, and can be mounted by emergency vehicles.

EFFECTIVENESS

Speed Reduction	○
Road Volume Reduction	●
Safety	◐

ADVANTAGES

- Obstruct short-cutting or through traffic

COST PER MEASURE

$50,000—$100,000

(Cost of physical measure depends on size of intersection, material and signage)

DISADVANTAGES

- May increase traffic on adjacent streets
- May increase trip length for some residents

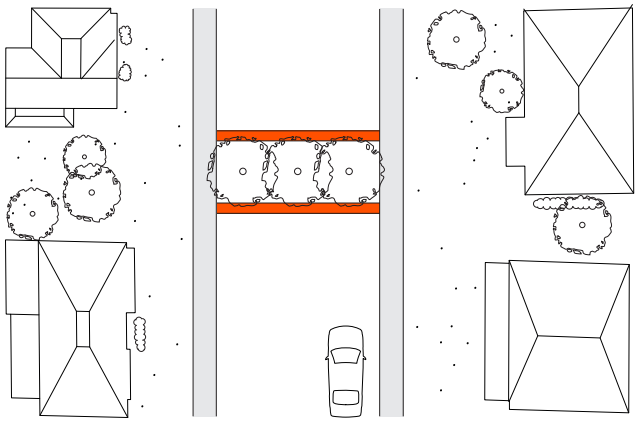
FULL CLOSURES

MEASURE

Obstruction Measure

PRIMARY PURPOSE

Volume Reduction



FULL CLOSURES

A full closure is a barrier extending the entire width of a roadway, which obstructs all motor vehicle traffic movement from continuing along the roadway. Gaps can be provided for cyclists and they are typically passable by emergency vehicles.

EFFECTIVENESS

Speed Reduction	○
Road Volume Reduction	◐
Safety	◐

ADVANTAGES

- Speed reduction
- Reduce pedestrian-vehicle conflict
- Obstruct short cutting or through traffic

COST PER MEASURE

$50,000—$100,000

(cost of physical measure depends on width of the road, material and signage)

DISADVANTAGES

- May increase traffic on adjacent streets
- May increase trip length for some residents

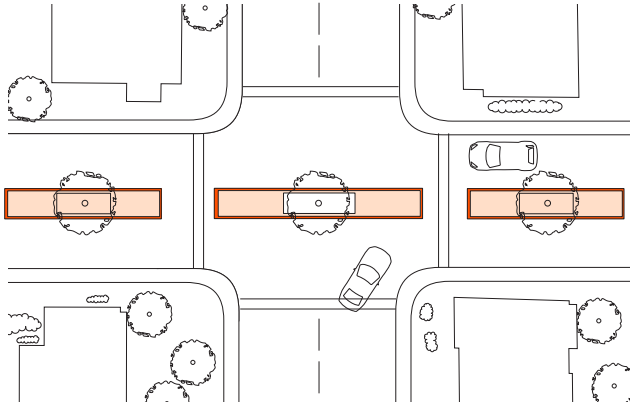
RAISED MEDIAN THROUGH INTERSECTIONS

MEASURE

Obstruction Measure

PRIMARY PURPOSE

Volume Reduction



RAISED MEDIAN THROUGH INTERSECTIONS

A raised median through an intersection is an elevated median located on the centerline of a two-way roadway through an intersection, which prevents left turns and through movements on one of the roadways.

EFFECTIVENESS

Speed Reduction	○
Road Volume Reduction	●
Safety	◐

ADVANTAGES

- Obstruct short-cutting or through traffic
- Reduce crossing distance for pedestrians
- Provide refuge for pedestrians
- Maintain access for cyclists and pedestrians

COST PER MEASURE

$15,000—$50,000

(Length and width of median, material, removal and repair of pavement)

DISADVANTAGES

- May increase traffic on adjacent streets
- May increase trip length for some residents

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Example of Road Safety Calendar

The Road Safety Calendar identifies monthly road safety themes based on the five emphasis areas of the Road Safety Plan (RSP). The goal is to regularly disseminate road safety information relevant to each monthly theme through a comprehensive communication strategy and police enforcement support. Targeted safety campaign materials will be developed in support of each monthly theme. Materials could include one or a combination of print media, promotional materials, social media messages, images, radio ads, etc.

Table 1 outlines the current themes throughout the year and includes various on-going public education and police enforcement campaigns.

Table 1: Example of Road Safety Calendar

January	February	March
WINTER DRIVING • School Safety Patrol Program (Canadian Automobile Association)	DISTRACTED PEDESTRIANS • "Distracted Driving" Campaign – Feb 15-21, 2016 (Toronto Police Service)	SCHOOL AGE PEDESTRIANS • "March Break March Safe Pedestrian Safety" Campaign – Mar 14-20, 2016 (Toronto Police Service)
April	**May**	**June**
AGGRESSIVE DRIVING / WORK ZONES • Aggressive Driving Campaign • "Please Slow Down" (Transportation Service)	MOTORCYCLE SAFETY • Canada Road Safety Week – May 17-23, 2016 (Toronto Police Service)	BICYCLE SAFETY & DISTRACTED CYCLISTS • Bike Month Toronto • "SPACE to Cycle" Campaign – Jun 13-19, 2016 (Toronto Police Service)
July	**August**	**September**
VULNERABLE ROAD USERS • "Stay Alert – Stay Safe" campaign (Transportation Services)	WATCH FOR OLDER ADULTS • Bringing an Awareness of Senior Safety Issues to the Community (B.A.S.S.I.C.)	BACK TO SCHOOL SAFETY • "Back to School" Campaign – Sep 6-9, 2016 (Toronto Police Service) • Cycling & Pedestrian Safety Curriculum Support (Toronto Public Health)
October	**November**	**December**
DISTRACTED DRIVING • Operation Impact – TBA (Toronto Police Service)	LOW-LIGHT VISIBILITY • "Step Up Be Safe" Campaign – Nov 7-13, 2016 (Toronto Police Services)	AGGRESSIVE & IMPAIRED DRIVING • R.I.D.E program – year-round (Toronto Police Service)