TORONTO

REPORT FOR ACTION

Update on Council Requested Road Safety Initiatives

Date: November 17, 2020
To: Infrastructure and Environment Committee
From: General Manager, Transportation Services
Wards: All

SUMMARY

The purpose of this report is to respond to a number of requests made by City Council of the General Manager, Transportation Services concerning the following road safety items:

A. Evaluation of city-wide major arterial speed limit reductions;
B. Review of student project idea: Pedestrian Avoidance Warning System (P.A.W.S.);
C. MOVE update and sharing traffic volume and collision data;
D. Right Turn on Red Prohibition Strategy, including research on the impact of driver frustration on road safety;
E. Improving road safety of school age children through Automated Speed Enforcement; and
F. 2020 collision trends to date.

In addition to responding to Council's requests, Transportation Services is also recommending the following items as part of the continued implementation of the Vision Zero 2.0 Road Safety Plan:

- Additional major arterial speed limit changes to support the Speed Management Strategy;
- Prohibition of right-turn-on-red movements at one location, with an additional 15 locations tentatively identified for future implementation; and
- Designation of additional Community Safety Zones at private high schools to support school safety and Automated Speed Enforcement.

A. Update on Speed Management Strategy Evaluation: Transportation Services staff have assessed the impacts of the city-wide major arterial speed limit reductions that were implemented as part of the Vision Zero 2.0 - Road Safety Plan update approved in July 2019. This report outlines that, while the available data is limited, there is evidence that the speed limit reductions have resulted in some reductions in operating speeds of

vehicles compared to similar control segments. The results support a continued pursuance of the Speed Management Strategy. Additional major arterial speed limit changes to support the Speed Management Strategy are recommended in this report.

B. Review of Student Project Idea: Pedestrian Avoidance Warning System (P.A.W.S.): After review of the idea and looking at the potential benefits and drawbacks, this report does not recommend the development of a pilot, but highlights other ongoing initiatives aimed at addressing vulnerable road user safety at signalized intersections.

C. MOVE Update and Sharing Traffic Volume and Collision Data: In December 2019, City Council approved a non-competitive contract with Code for Canada to supply a development team that will work over an 18 month period to transition a prototype software, MOVE to an active application used by over 100 city staff in their daily work, while retiring the legacy systems CRASH and FLOW. When fully deployed, MOVE will significantly reduce the data collection bottleneck, reducing service delivery times across a number of key programs including neighbourhood traffic investigations, school crossing guard investigations, corridor safety audits, reviews of road classification, signal coordination studies and road designs. Once developed, the MOVE platform will allow staff to manage volume data from all multi-modal data collection devices in the city and aggregate it to provide a summarized view of current trends.

D. Right Turn on Red Prohibition Strategy, including Impact of Driver Frustration on Road Safety: Transportation Services staff have considered a blanket city-wide ban on right-turns-on-red (RTOR) and found that there would be a potential safety benefit at some locations, but that at other locations, introducing RTOR prohibitions may result in less safe conditions for people walking and cycling. To that end, staff have developed a strategy to identify intersection locations that would benefit from proactive RTOR prohibitions. Transportation Services staff have performed a literature review and have found no evidence that driver frustration, from practices such as RTOR prohibitions or speed limit reductions, result in increased safety concerns. This report recommends the prohibition of RTOR at 15 locations.

E. Improving Road Safety of School Age Children through Automated Speed Enforcement: This report outlines the process for determining the allocation of Automated Speed Enforcement (ASE) cameras at schools within designated Community Safety Zones. In addition, the report identifies ongoing capacity challenges with having a greater share of ASE cameras at schools that are on major arterial roads.

F. 2020 Collisions Trends to Date: Transportation Services staff have been closely monitoring the traffic patterns and collision data in 2020 to determine the impacts of the COVID-19 pandemic. The overall collision numbers have shown a significant reduction in serious injury and fatality collisions to date. It is suspected that the majority of this decrease is due to the reduced traffic volumes that resulted from the pandemic.

RECOMMENDATIONS

The General Manager, Transportation Services recommends that:

1. City Council authorize amendments to community safety zones as set out in Attachment 1 to the report dated November 17, 2020 from the General Manager, Transportation Services.

2. City Council reduce the speed limit from 60 km/h to 50 km/h on the following road segments:

- a. Lawrence Avenue East, between Don Mills Road and Woodcliff Place
- b. York Mills Road, between Bayview Avenue and Don Mills Road

3. City Council prohibit southbound right turns on a red signal at all times on Keele Street at York Boulevard/Canarctic Drive.

FINANCIAL IMPACT

The cost to implement the speed limit signs, no right turn on red signs, community safety zone signs and the MOVE platform are estimated to be $400,000.00. Funding is available within the approved 2020 – 2029 Capital Budget & Plan for Transportation Services in account CTP717-58.

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

DECISION HISTORY

At its meeting of July 16, 17 and 18, 2019 City Council unanimously approved the Vision Zero 2.0 - Road Safety Plan Update, as amended. At this time, City Council approved speed limit reductions from 60 km/h to 50 km/h on nearly 250 kilometers of major arterial roadways across the City as part of the Speed Management Strategy. At the same meeting, City Council also directed the General Manager, Transportation Services to review compliance with the speed limit reductions introduced on major and minor arterials to inform recommendations about further changes. The Council decision can be found at:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2019.IE6.8

At its meeting of December 17, 2019, the Infrastructure and Environment Committee approved a Non-Competitive Contract with Code for Canada for the Development of MOVE, a data platform for traffic collision and volume data and requested the General Manager, Transportation Services to report twice a year to the Infrastructure and Environment Committee on traffic collision and volume data, in a manner that is easy to understand. The Committee decision can be found at:

http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2019.IE10.3
At its meeting of January 8, 2020 the Infrastructure and Environment Committee directed the General Manager, Transportation Services to review and report by the fourth quarter of 2020, on the feasibility of creating a pilot program to test the Pedestrian Avoidance Warning System (P.A.W.S.) at a number of selected major intersection(s) throughout the city. The Committee decision can be found at:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2020.IE11.19

At its meeting of January 8, 2020 the Infrastructure and Environment Committee requested the General Manager, Transportation Services to report on revising the process for determining which schools are allocated Automated Speed Enforcement (ASE) cameras including consulting with the local councillor and examining the viability of prioritizing schools that are on major arterial roads The Committee decision can be found at:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2020.IE11.12

At its meeting of March 11, 2020 the Infrastructure and Environment Committee requested the General Manager, Transportation Services to provide an update on the status, and strategy to, proactively use right-turns-on-red prohibitions In addition, the General Manager, Transportation Services was asked to report on:

- The impact that right turn prohibitions, and other changes to roadways that delay traffic have cumulatively had on travel times and delays in the city,
- The impact that travel delays and increased congestion and gridlock have on increased stress on drivers, increased aggressive behavior and accidents and
- Conducting research, as part of Vision Zero, on the causes of aggressive driver behaviour.

The Committee decision can be found at:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2020.IE12.14

COMMENTS

The purpose of this report is to respond to a number of requests made by City Council concerning various road safety items. This report provides information and responses on:

A. Evaluation of city-wide major arterial speed limit reductions;
B. Review of student project idea: Pedestrian Avoidance Warning System (P.A.W.S.);
C. MOVE update and sharing traffic volume and collision data;
D. Right Turn on Red Prohibition Strategy, including research on the impact of driver frustration on road safety;
E. Improving road safety of school age children through Automated Speed Enforcement; and
F. 2020 collision trends to date.

In addition to responding to Council's requests, Transportation Services is also recommending the following items as part of the continued implementation of the Vision Zero 2.0 Road Safety Plan:

- Additional major arterial speed limit changes to support the Speed Management Strategy;
- Prohibition of right-turn-on-red movements at 1 location, with an additional 15 locations tentatively identified for future implementation; and
- Designation of additional Community Safety Zones at private high schools to support school safety and Automated Speed Enforcement.

Each of these items is reviewed below.

A. Update on Speed Management Strategy Evaluation

The Vision Zero 2.0 - Road Safety Plan Update report highlighted how higher speeds contribute to higher risk of serious injuries and fatalities, and that setting lower speed limits is one tool in reducing operating speeds on Toronto's roadways. As part of the report, City Council approved speed limit reductions from 60 km/h to 50 km/h on nearly 250 kilometers (km) of major arterial roadways across the City as part of the Speed Management Strategy[1].

The major arterial speed limit reductions were implemented in November and December 2019, except for a few segments where implementation was delayed due to active construction.

As part of the second phase of the Speed Management Strategy, speed limit reductions on approximately 250 km of minor arterial and collector roadways were approved by Community Councils in December 2019 and January 2020. The implementation of these speed limit reductions began in June 2020 and is expected to be completed before the end of the year.

Transportation Services was directed by Council to report back on effectiveness of the speed limit reductions that were implemented as part of the Vision Zero 2.0 - Road Safety Plan update approved in July 2019.

The traditional approach for evaluating measures that impact travel speeds is to collect spot speed data at mid-block locations that represent locations of highest speed along road segments. In order to determine the baseline "before" speeds, studies were conducted at select locations from across the city in September and October, 2019.

Due to the impacts on travel patterns as a result of the COVID-19 pandemic, the evaluation approach needed to be revisited. As an alternative approach, staff have utilized GPS trace data (collected from connected cars, trucks, and other devices) that provides estimates of observed speeds of segments of the road network.

"Before" data was obtained for September and October 2019 while "after" data was obtained for January and February 2020. This ensured that the pandemic traffic impacts were excluded from the analysis. No data was collected during the period that speed limit sign changes were being rolled out across the city. Typical peak hour periods were excluded to capture mostly free flow conditions. The road segments where speed limit

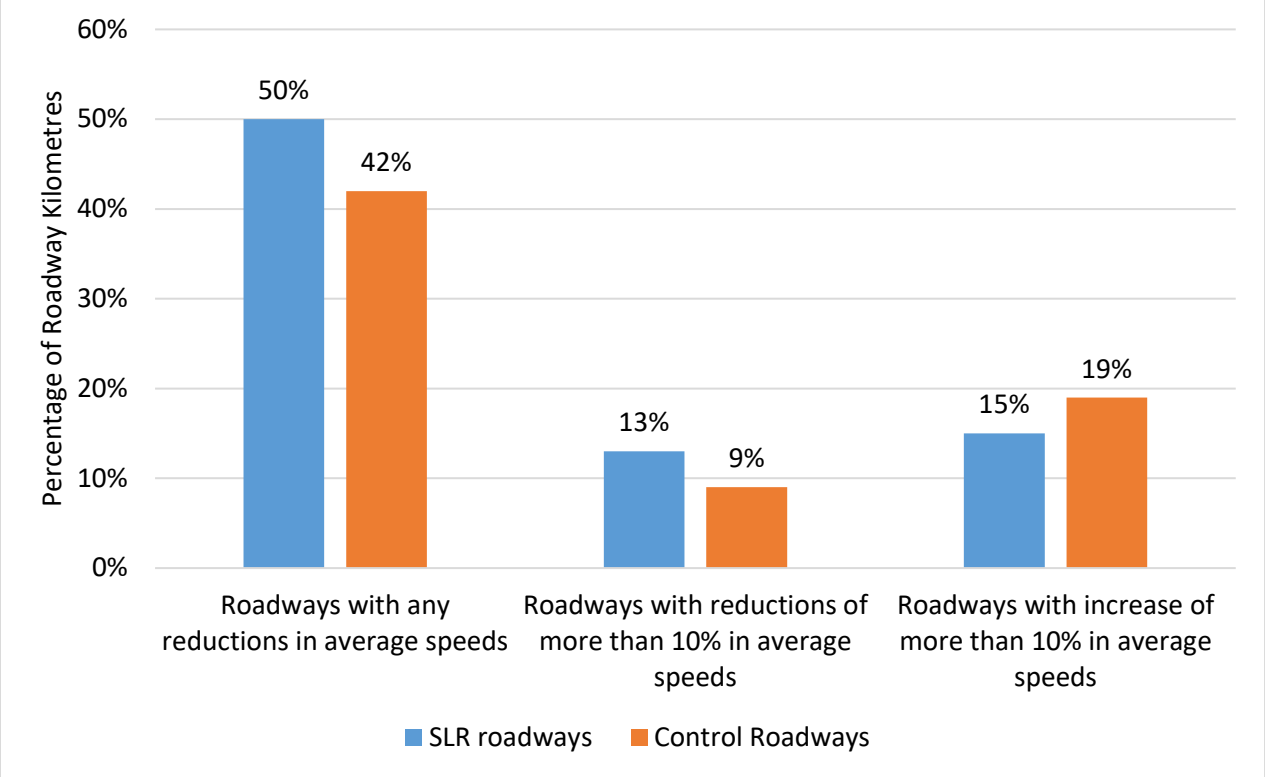
1 An additional 1 km of major arterial was reduced from 70 km/h to 60 km/h as part of that same report but due to the short length of this segment, it is not included in this evaluation.

reductions were implemented were then compared to segments in a "control" network, which is a set of major arterials where the speed limit remained at 60 km/h.

Results of Evaluation

When comparing the before and after speeds, a greater percentage of the roadways that had speed limit reductions implemented saw a reduction in average travel speed over the study period than the control roadways where the speed limit was not reduced. Most notably, a greater share of roadways with speed limit reductions showed a reduction of over 10% in average speed compared to the control roadways. Similarly, a smaller share of roadways with speed limit reductions had an increase of over 10% in average speed compared to the control roadways. The details of the comparative travel speeds can be found as Figure 1.

Figure 1. Detailed Findings of Speed Limit Reduction (SLR) Evaluation



Both samples of roadways had examples of segments with increases in average speeds as well as those with decreases in average speeds observed between the before and after study periods.

Limitations to this Evaluation Approach

Due to the impact of the pandemic on travel behaviour, the approach that was used for this analysis differs from what is typically used for these types of evaluations. The typical approach compares spot speeds at midblock sections that represent the fastest speed along the analyzed segment. The approach used for the analysis in this report captures average speeds across a segment so it includes accelerations and

decelerations due to any starting or stopping. A few limitations to this evaluation approach have been identified and are as follows:

- It is not possible to report on the actual speeds on a road segment because the speeds in the available database are average speeds for road segment, which are typically lower than the spot speeds at mid-block locations;
- Given the nature of the available data, it is not possible to report on changes in excessive speeding, an indicator that studies of speed limit reduction efforts by other cities have found to drop noticeably;
- Driver compliance to the new posted speed limits cannot be evaluated using this approach. However, it is possible that depending on the extent of reductions in actual speeds, a higher portion of drivers are driving over the new reduced speed limits. Compliance with speed limits will be aided through enforcement by the Toronto Police Service; and
- Some variables in locations that are being compared such as geographic factors cannot be isolated given the nature of the available data.

Attempts have been made to overcome some of these limitations through developing a robust evaluation methodology, but staff plan to conduct a more robust data collection exercise in the future, as originally planned, once comparable traffic conditions return. This will also assist to confirm the results from both evaluation methods.

The goal of the Speed Management Strategy is to mitigate the risk of injuries and fatalities on Toronto's roads by reducing the speed of vehicles. To that end, this report outlines that there is evidence that the reductions have had a positive impact on reductions in operating speeds of vehicles.

It is important to note that speed limit reductions are just one part of the Speed Management Strategy. The holistic strategy also includes modifications to the design of roadways, automated and manual speed enforcement, proactive deployment of Watch Your Speed Signs, and revised speed limit setting practices as key tools in order to achieve sustained, effective speed management.

Local Road Speed Limit Reductions

For the third phase of the Speed Management Strategy, staff are developing the program for reducing speed limits on local roads to 30 km/h on a neighbourhood basis.

Based on changes to the province's Highway Traffic Act (HTA), the City has the ability to change the default speed limit at the neighbourhood level. Accordingly, the City is no longer required to sign every individual street within that neighbourhood but only the streets that enter and exit the designated area at the boundary of the designated area.

The large-scale reduction in local road speed limits will be a multi-year program with significant amount of by-law amendments and new signage. This is planned to start in 2021. The reductions will be rolled out on a systematic, ward-by-ward basis using a data driven approach.

Additional Major Arterial Speed Limit Changes to Support the Speed Management Strategy

In order to support the Speed Management Strategy as outlined in the Vision Zero 2.0 Road Safety Plan, staff have continued to investigate and recommend additional speed limit changes on select streets, as appropriate.

The following segments are being recommended to be reduced from 60 km/h to 50 km/h:

- Lawrence Avenue East between Don Mills Road and Woodcliffe Place; and
- York Mills Road, between Bayview Avenue and Don Mills Road.

B. Review of Student Project Idea: Pedestrian Avoidance Warning System (P.A.W.S.)

At the January 9, 2020 meeting of the Infrastructure and Environment Committee, a student team at The Bayview Glen School "All Systems Code" gave a presentation on their school project entitled the "P.A.W.S. - Pedestrian Avoidance Warning System". This is a creative idea for a system that could provide a warning light to let drivers at signalized intersections know when they would potentially come in conflict with a crossing pedestrian while making a turning movement. Transportation Services staff contributed to this school project by meeting with the group, reviewing the conceptual idea, and providing technical feedback to enhance the proposal.

While the concept is creative and the students' passion regarding road safety is commended, the introduction of a non-standard system such as the one presented requires the consideration of many factors, including technical considerations as well as provincial standards for such systems.

Pedestrian detection technology currently has a high rate of missed detections. There may also be errors in detection of the direction of intended crossing by a pedestrian. Drivers may not be able to react to unexpected situations when the warning system is not triggered due to detection errors. Furthermore, false positive detections (e.g. detection of an animal as a pedestrian, detection of a pedestrian without the intention to cross or false detection of the direction of intended crossing) could, over time, reduce the reliance and trust of drivers on such warning system.

Drivers are expected to always be looking for the presence of pedestrians at pedestrian crossings. Overreliance on a warning light for making drivers aware of crossing pedestrians may result in complacent drivers expecting pedestrians to only cross when the warning light is illuminated.

Notwithstanding the above considerations, this idea for signal treatment is outside of the guidance provided by the Ontario Traffic Manual which calls for standardized use of traffic control devices. After review of the idea and looking at the potential benefits and drawbacks, this report does not recommend the development of a pilot of the P.A.W.S idea.

Transportation Services continues to work to increase safety for pedestrians crossing at crosswalks by reducing collisions with vehicles and the primary focus of this work is to address conflicts with turning vehicles. Efforts like the expanded Pedestrian Head Start

program and the upcoming left-turn calming pilot will help to mitigate conflicts between vulnerable road users and left-turning vehicles.

The Pedestrian Head Start (also known as Leading Pedestrian Intervals (LPI) program has seen a significant expansion with the feature being considered as a default for new signals as well as a part of signal coordination studies. This expansion, in addition to proactive identification of high priority candidate locations, has increased the forecasted delivery of pedestrian head starts from approximately 100 per year to potentially installing 300 per year, greatly accelerating the rate of expansion. Cyclists Head Start is also a feature that is being installed along with Pedestrian Head Starts where bicycle-specific traffic signals are in place.

In addition, staff are currently planning a left-turn calming pilot project. Left-turn calming treatments, a proven safety measure in other Vision Zero cities encourage left-turning drivers to approach a crosswalk at a sharper angle, resulting in slower turning speeds and better visibility of pedestrians in the crosswalk and cyclists on the road. In the first quarter of 2021, Transportation Services will pilot left-turn calming treatments and evaluate their impact on mitigating safety risks associated with left turns.

Transportation Services has also committed to review and revise the criteria for adding fully protected turn phases to signalized intersections with the lens of vulnerable road user safety. This signal feature fully separates the movement of vulnerable road users and left-turning vehicles by permitting turns only during a dedicated turn phase when all other conflicting directions of traffic, including pedestrians and cyclists, are stopped. This eliminates potential safety conflicts and is currently in place at about 20 intersections across the city.

To help to address conflicts with right-turning vehicles at intersections, staff continue to implement curb radii modifications, channelized right-turn lanes removals, and proactive right turn on red prohibitions, as a part of the strategy proposed in this report.

The MoveTO 2021-22 Action Plan presented to the November 5 Infrastructure and Environment Committee described a plan to implement 100 Intelligent Intersections over the next two years. This program will bring multi-modal intelligence to intersections including automatic detection of pedestrians and cyclists for improved safety by providing more time at traffic lights to pedestrians and cyclists in real time and as demand warrants. These intersections use video-based technology that will also have the ability to measure safety conflicts such as near misses as well as red light running and intersection blocking.

C. MOVE Update and Sharing Traffic Volume and Collision Data

Background

The Vision Zero program since first-adopted in July 2016 has had a strong data-driven focus. This was re-affirmed with the endorsement of the Vision Zero 2.0 program in July 2019 which places an emphasis on data-driven decision making and prioritization at the core of the program delivery. There are no data sets that are more fundamental to this data-driven decision making than collision data and multi-modal traffic volume data.

These datasets act as a fundamental input to all engineering evaluations, conducted by City staff, whether evaluating the need for a new traffic signal, a new crossing guard, the location of a red light camera, conducting Vision Zero safety studies, or retiming traffic signals. The first step in all evaluations across all of these domains is the collection of traffic collision and volume data.

These critical datasets have been managed by Transportation Services staff using legacy software systems called CRASH and FLOW that were first built in 1991 and urgently need replacing. The inability to manage these data sources through modern tools and platforms results in considerably slower turnaround times for studies and data collection impacting the capacity of the division to deliver programs. These existing systems are a true hindrance to staff being able to provide the timely, accurate multi-modal focused analysis that is demanded by council and residents to support decision making and to prioritize transportation programs.

In December 2019, City Council approved a non-competitive contract with Code for Canada to supply a development team that will work over an 18 month period to transition a prototype software, MOVE to an active application used by over 100 city staff in their daily work, while retiring the legacy systems CRASH and FLOW.

The MOVE platform is currently in development, with Transportation Services and Code for Canada working together with Technology Services on deploying the first version to staff by the end of 2020, with subsequent releases to add additional features over the course of 2021. Initial feedback from users in Transportation Services that have been working to test the software in development have already shown a significant body of evidence that the program will make enormous strides in terms of transforming access to timely information for staff. Further development will be completed throughout 2021 to add a complete set of features.

Changes that will be enabled by MOVE

The COVID-19 pandemic has reinforced the need for access to reliable and current data on the volumes of residents travelling by all modes across the City. This data has been critical for tailoring the transportation pandemic response programs, and for tracking how volumes and congestion have evolved throughout the various stages of recovery. While the information has proved to be essential to business during the COVID-19 pandemic, this period has also highlighted many of the current challenges with managing and analyzing this data that will be largely addressed through the new MOVE platform.

When fully deployed, MOVE will be a catalyst for improvement for a number of Transportation Services programs and initiatives, centered on reducing manual work for over 100 staff, simplifying processes, automating tasks, increasing the level of data quality control and standardizing some analytical processes across the Division. Data collection and management are currently bottlenecks in several important processes and when fully delivered, MOVE will reduce delivery timelines for the following key programs (among others):

- Neighbourhood traffic investigations (studies for new traffic control signals, pedestrian crossovers, traffic calming, speed limit changes);

- Studying school crossing guard locations;
- Managing road classification;
- Conducting corridor road safety audits and other Vision Zero safety studies;
- Signal coordination and timing studies; and,
- Road and intersection designs.

For these studies, data collection needs will often add 3-6 months at the beginning of a study before other work can be initiated. In particular, process improvements being enabled by the transition to MOVE will be necessary for staff to reduce the turnaround time for the deployment of new traffic signals from 18 to 8 months.

At its meeting of December 17, 2019, the Infrastructure and Environment Committee requested the General Manager, Transportation Services to report twice a year to the Infrastructure and Environment Committee on traffic collision and volume data in a manner that is easy to understand. The MOVE platform under development will fulfill this role, in particular by managing volume data from all multi-modal data collection devices in the city and aggregating it to provide a summarized view of current trends. Future developments of the program will explore providing access to public in addition to the initial City staff access to provide easier access to this information to residents and to academic institutions, lessening the burden on staff to supply data through one-off data requests. In addition to providing public summary-level information, the MOVE platform will automate data processes that feed in to the City's Open Data Portal, making timely and disaggregate traffic volume and collision data widely available to the public.

Need for Sustainment

While the MOVE application is still currently in development and will be throughout 2021, there will be a need to transition to operational sustainment in 2022. As part of the MOVE project, Code for Canada is assisting Transportation Services in transitioning skills in-house to maintain and support MOVE together with Technology Services. The MOVE product team has been embedded within the Transportation Services Policy & Innovation Section Big Data Innovation Team for two years, and the benefits to knowledge transfer, digital product management and software development best practices have been enormous.

MOVE is being built as a set of independent modules using modern, cloud-based, platforms and systems. This will facilitate the continued development of new features as needed while minimizing maintenance efforts and avoiding many problems associated with vendor lock-in. Unlike many off-the-shelf or legacy software applications (including CRASH and FLOW) this will allow the City to contract out the development of new features or maintenance activities as small procurements or through in-house development.

The sustainment of the product will require dedicated staffing in 2022 to ensure that the program can continue to serve the over 100 staff and other users of collision and traffic volume data. This staff would be needed to manage the MOVE product including:

- Adding new features to the application as required and continuing to test and refine based on feedback from its users;
- Providing technical support to users;
- Maintaining and updating the underlying platforms together with Technology Services to be consistent with corporate standards and to address any security vulnerabilities;
- Managing the flow of data from data collection contractors to internal clients; and,
- Managing the flow of collision data from the Toronto Police Service into the platform.

D. Right-Turn-on-Red Prohibition Strategy and Addressing Driver Frustration

Right turn on red (RTOR) prohibitions may improve safety for some pedestrians and cyclists at intersections by restricting vehicles facing a red signal from turning right across the path of pedestrians or cyclists having the right-of-way. Historically about 2% of serious injury or fatal collisions with pedestrians and 4% of serious injury or fatal collisions with cyclists have been with right turning vehicle turning on a red signal.

As part of Vision Zero 2.0 Road Safety Plan, Transportation Services, has begun assessing strategic implementation of RTOR prohibitions. This includes an assessment of historical collision patterns and conflicts between right turning vehicles and pedestrians/cyclists in addition to prioritizing intersections with geometric and operational conditions that typically lead to conflicts between right turning drivers and vulnerable road users.

The assessment considered a blanket city-wide ban on RTOR and found that there would be a potential safety benefit at some locations, but that at other locations, introducing RTOR prohibitions may result in less safe conditions for people walking and cycling. Staff have developed a strategy to identify locations that could benefit from proactive RTOR prohibitions such as:

- Locations with a historic trend of collisions or conflicts between people driving and walking/cycling observed during a RTOR movement;
- Skewed intersections where sightline limitations may result in the inability to make right-turn movements safely while noticing and reacting to the presence of crossing vehicles, pedestrians or cyclists;
- Intersections with RTOR movements that could potentially conflict with opposing dual left-turn movements without sufficient receiving lanes to separate the two movements; and
- A combination of operational parameters that increase the exposure of pedestrians and cyclists (i.e. locations where crossing pedestrians and cyclists significantly out-number right-turning vehicles, particularly trucks).

Prohibiting the movement of right-turning vehicles during the red phase of a traffic signal inevitably concentrates the entire volume of right-turning vehicle demand to the green phase of the signal. At some locations, introducing RTOR prohibitions can result in less safe conditions by shifting right-turn conflict to crossings with higher volume pedestrian and cyclists. Moreover, vehicles pick up more speed as they complete their turn and approach pedestrians or cyclists crossing with the green signal.

Transportation Services is recommending RTOR prohibitions at about 15 intersections across the city and to evaluate the results of the implementation before expanding out to a larger roll-out. Staff will be evaluating the safety impact of RTOR restrictions in various scenarios, including the one noted above. Results of the evaluation will help determine conditions when RTOR restrictions are most effective to inform future recommendations for RTOR restrictions.

The following recommended RTOR prohibitions is located on a shared boundary roadway between multiple Community Council Areas and is therefore presented in this report:

- Southbound traffic on Keele Street at York Boulevard/Canarctic Drive

Additional proposed RTOR prohibitions will be presented in reports to individual Community Councils in the coming months.

Research on the Impact of Driver Frustration on Road Safety

In March 2020, the Infrastructure and Environment Committee requested Transportation Services to report on the impact that RTOR prohibitions, and other changes to roadways that delay traffic have cumulatively had on travel times and delays in the city. In addition, the committee requested an investigation into to the impact that travel delays, increased congestion and gridlock have on increased stress on drivers, increased aggressive behaviour and accidents and to report back on conducting research, as part of Vision Zero, on the causes of aggressive driver behavior.

To investigate this issue, Transportation Services staff have performed a literature scan and have found studies that show a link between traffic congestion and stress - these studies typically focus on rush hour congestion. In some studies, some drivers are found to have increased level of stress in high-congestion conditions. Other studies suggest that the increased stress is caused by travel time unpredictability.

Experience of Toronto Police Service enforcement staff is that drivers engage in aggressive driving infractions (e.g., unsafe/ improper lane change, disobeying red light, disobeying stop signs, etc.) because they are rushing and not allowing themselves enough time. As such, Police messaging is always to encourage road users to expect the unexpected and give themselves enough time to arrive at their destination. It was also noted that even during the low congestion period following the start of the COVID-19 pandemic where several instances of excessive speeding were observed there were still many speeders on the road. This suggests that congestion is not always the cause of the aggressive driving amongst road users.

Drive aggression can manifest itself in varying degrees: from cursing and honking to behaviours that could impact safety of other road users. However, the literature review is inconclusive on the degree to which driver stress impacts such behaviours. The review did not find evidence that driver frustration from features such as RTOR prohibitions or speed limit reductions, result in increased safety concerns.

Travel time unpredictability, as a potential source of driver stress, is typically caused by factors that are irregular and not present at all times, such as construction activity, inclement weather, special events, and traffic collisions. The majority of the engineering measures in the Vision Zero toolbox, however, aim at applying safety features consistently at similar environments and at all times and would not contribute to travel time unreliability.

E. Improving Road Safety of School Age Children through Automated Enforcement

In December 2019, the Province of Ontario enacted the necessary regulations allowing municipalities to operate Automated Speed Enforcement (ASE). The City of Toronto operates 50 mobile ASE systems that are rotated every three to six months. Each ward is allocated two ASE systems. Under the *Highway Traffic Act*, ASE systems may only be placed in School Zones or Community Safety Zones (CSZ).

The selection of ASE sites is a data-driven approach which consists of a two-staged process that was developed based on best practices and provincial guidelines.

Stage 1: An initial screening of all CSZ locations near schools are identified and prioritized based on the following data:

a) Collisions involving children;
b) Collisions where a vulnerable road user was killed or seriously injured;
c) Vehicle speed data;
d) 24-hour traffic volume;
e) Percent of students within walking distance; and
f) Requests from Police and the public.

Stage 2: Once the sites are prioritized, a manual review of the site is conducted which include the following considerations:

a) No obstructions or impediments to the equipment;
b) Adequate boulevard space to accommodate the equipment;
c) No planned road work, as construction can conflict with the ASE system due to reduced space to accommodate the camera unit and potential lane reductions or realignments that will affect the system's operation;
d) No sharp curves or extreme grading changes that may reduce the range of operation for the speed measurement device;
e) No planned speed limit reductions in order to give motorists enough time to adjust to the change;
f) Adequate distance from speed limit transitions in order to give motorists enough time to adjust to the change; and
g) Cannot have the presence of a flashing 40km/h speed limit reduction sign, as the speed limit change is in effect only when the sign is flashing and the system is unable to see or detect whether the sign is flashing.

Consultation with Local Councillor

Based on the above considerations, sites are selected and "Coming Soon" signage is posted 90 days in advance of the ASE system placement, which is in accordance with

the City's agreement with the Province. Prior to installing the warning signs, Councillors are advised of the future ASE placements within their ward and have the opportunity to report back on any local or community issues that staff may not be aware of.

Consultation with the local community and Councillor on their safety concerns is essential to staff when determining the placement of ASE systems. An online form is available at toronto.ca/ASE where CSZ locations can be suggested for the consideration of future ASE deployments.

It is important to note that the ASE systems are mobile, and as long as the regulatory, technical and operational requirements are met, the intention is that ASE will be rotated among all CSZs in the City; the order of which is determined by a data-driven approach.

The ASE program is an enforcement initiative and similar to law enforcement activities performed by other agencies, Members of Council and Employees of the City are bound by the City of Toronto Conflict of Interest Standards in Relation to Administration of the Provincial Offences Courts. A key principle being that the justice process operates independently and free of political intervention; this includes all aspects of the ASE program.

Allocation of ASE Sites by Road Classification

Similar to the City's Red Light Camera program which was implemented over 20 years ago, the initial plan for ASE was to start gradually so that staff can get a better understanding of ticketing volumes and the resources required to process and support the anticipated number of charges. As the program matures, staff will continue to evaluate the effectiveness of the program as well as the approach to site selection.

While the safety concerns surrounding arterial roads are largely understood, provincial legislation limits ASE installation to CSZs or School Zones. Currently, only 18% of eligible locations are on arterial roads. ASE is intended to alter driver behaviour to decrease speeding and increase safety in areas around schools. The ASE program was developed with an approach to enforcement that includes all road environments including local, collector, and arterial roads. It is important to include the various roadway environments as motorists may take alternate routes in order to avoid ASE which could potentially result in shifting safety concerns from arterial roads to local or residential roads. The table below shows the current proportion of CSZs by road classification.

Table 1. Proportion of Community Safety Zones by Road Classification

Road Classification	Percentage of CSZs
Arterial	18%
Collector	25%
Local	57%

During the initial deployment of ASE, seven arterial sites were selected, which accounted for approximately 14% of all ASE sites. The second deployment scheduled for the fall, will see the number of arterials increase to ten, which represents approximately 20% of all sites. The table below shows the distribution of ASE sites by road classification:

Table 2. Total number of Automated Speed Enforcement Sites by Road Classification

Road Classification	Deployment 1		Deployment 2	
	No. of Sites	%	No. of Sites	%
Arterial	7	14%	10	20%
Collector	16	32%	17	34%
Local	27	54%	23	46%

ASE Program, Joint Processing Centre Capacity

The ASE program 2020 budget was developed based on the resources required (including staff, office space, postage, supplies etc.) to support a projected number of charges. The allocation of a higher percentage of sites on arterial roads would result in a higher volume of charges, than was projected for this program, and therefore additional resources would be required in order to process the charges within the 30-day limitation period legislated by the Province.

The ASE municipal Joint Processing Centre (JPC) is currently located in a temporary facility that can only accommodate a limited number of staff. Any substantial increase in the volume of charges will require additional officers to process the charges and at the moment, there is no space to accommodate any additional staff. Transportation Services is currently working with Corporate Real Estate Management to explore options for a permanent facility that could accommodate future growth of this program.

With the implementation of physical distancing requirements due to COVID-19, the capacity for staff at the JPC has been reduced significantly. Transportation Services staff are currently working on implementing an additional shift in order to maintain current service levels and agreements with partnering municipalities. Due to security

and privacy, the software used to process and lay charges is stand-alone with no outside connections and therefore remote work options are not available.

Impact to Court Services and Legal Services

Both Court Services' and Legal Services' 2020 Budgets were forecasted based on the staff and other resources required to support ASE based on a projected number of charges. Any increases to the volume of charges would require additional resources by both divisions.

Financial projections for 2020 for Court Services were based on budgeted costs per ASE courtroom. Court Services is taking a digital-first approach to the administration of ASE charges to minimize these costs and provide better service to the public. Court Services currently supports online early resolution meetings, electronic submission of court-related documents, and public transparency by allowing those who receive an ASE ticket to view their offence images through the City's online Court Case Lookup application.

On July 30, 2019, City Council requested the Province to make legislative amendments to permit the City to administer ASE offences through an Administrative Penalty System (APS) and to ensure revenue from those offences are payable to the City of Toronto to cover program costs. There are numerous benefits to administrative dispute resolution under the regulatory framework for parking matters. These include faster processing timelines, online service delivery, and building capacity in the court system for more serious offences. The City's APS for parking violations demonstrates the customer service and operational value of removing matters from the provincial court system.

At the time of this report, APS enabling legislation for ASE offences does not exist. Provincial enactment of the required legislation in a timely manner and the ongoing development of a new APS case management system will allow the City to implement an APS for the ASE program as soon as possible. While the implementation of an APS will enable Court Services system to process ASE offences more expeditiously, in order to increase the number of charges processed, Transportation Services would require additional Provincial Offenses Officers and office space in order to process the additional charges.

Moving Forward

Staff will continue to rotate the ASE systems based on a data-driven approach and within the context of capacity constraints of the JPC, Court Services, and Legal Services. This could include rotating cameras back to sites where they have previously been operating. As the program matures, staff from various partnering divisions will continue to work together to evaluate the effectiveness of the program and ensure that program objectives are met in terms of altering driver behaviour to reduce speeding and increase safety.

The Province will be conducting a review to ensure that the ASE program is operating as intended and will determine if further legislative, regulatory or policy changes are required to ensure municipal ASE programs are meeting provincial objectives.

Designation of additional Community Safety Zones to support school safety and Automated Speed Enforcement

In 2018, City Council lifted the moratorium on the creation of new CSZs and designated the frontages of all elementary (kindergarten to grade 8) Toronto District School Board (TDSB) and Toronto Catholic District School Board (TCDSB) schools within the City as CSZ. In 2019, Council approved designation of CSZs at all private elementary schools in the City as well as TDSB and TCDSB secondary schools.

In order to continue to support the School Safety Zone program as well as Automated Speed Enforcement, the designation of additional Community Safety Zones to include private high schools are recommended in this report.

In addition, this report recommends some corrections to existing Community Safety Zones that were initially approved with minor errors either with the names of roadways or the specific extents. These corrections will ensure that the Community Safety Zones are enforceable. The above Community Safety Zone designations are listed in Attachment 1.

F. 2020 Collisions Trends to Date

The main objective of the Vision Zero Road Safety Plan is to eliminate serious injury and fatal collisions and to provide further protection for vulnerable road users. The primary way of assessing the impact of the plan is to monitor the trends in killed and serious injury collisions over time. 2020 has proven to be challenging in this regard since the COVID-19 pandemic has resulted in a reduction in traffic volume and congestion as the travel patterns of a majority of to, from and within Toronto have changed.

In line with the change in traffic patterns, so far, 2020 has seen a significant reduction in traffic fatalities. As of October 30, there have been 30 traffic fatalities in Toronto, representing a year-to-date drop of 41% compared to the 5-year average number of fatalities at this point in the year of 50.8.

This reduction is most significant in driver/passenger fatalities, at 71% below average, followed by pedestrians at 47% below average. Cyclist fatalities have not seen any change and motorcyclists fatalities have seen an increase of 29% (9 incidents). It is worth nothing that as the cycling network expands (Toronto had the largest single-year expansion of the cycling network in 2020), and more cycling trips are made in the city, the absolute number of collisions with people cycling might initially rise while the collision rate will drop due to improved facilities. Weekend cyclists volumes in September, for instance, are much higher (+50% to +80%) than those observed on similar weekends in previous years.

It is anticipated that majority of this drop in fatalities is likely associated with the drop in overall travel activity during the COVID-19 pandemic. Some other North American cities with similar reductions in travel activity during the pandemic have seen similar drops in fatalities and serious injuries while others have seen no change. Other jurisdictions,

such as Peel Region, have seen an increase in traffic fatalities this year in spite of significant drops in overall collisions.

Collision data for early 2020 in Toronto, prior to the effects of the pandemic, seemed to show measurable reductions in collisions compared to 2019. However, it is difficult to develop strong conclusions about trends for the year based on only a few months of collision data. Staff will continue to monitor trends as travel activity returns to pre-COVID-19 conditions in the future to best assess the effectiveness of the Vision Zero safety measures.

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ATTACHMENTS

Attachment 1 - Amendments to Community Safety Zones