

2023

Halton Region
Transportation Progress
Report



Executive Summary

Halton Region is focused on making investments that optimize the Regional transportation network and maintain our infrastructure in a state-of-good repair. The 2023 Transportation Progress Report provides an overview of activities related to the operation and maintenance of the Regional Transportation System.

The Comprehensive Road Safety Action Plan (CROSAP), DriveSAFE (Safety Awareness For Everyone) and other safety programs and initiatives continue to provide improvements for all road users in Halton. In comparison to previous years, traffic volumes increased in 2023 but Regional road infrastructure growth and traffic signal optimization work helped us provide stable levels of service.

The COVID-19 pandemic continued into 2023 with fewer public health restrictions. As a result, we saw a stabilizing of post-pandemic traffic operations and a return to typical travel volumes and patterns in 2023. Reduced traffic volumes and collisions that happened over the last few years were statistical anomalies and 2023's performance is more comparable to results from 2017, 2018 and 2019. Continued analysis of 2023 traffic conditions will contribute to additional insights as we assess post-pandemic traffic operations.

Halton Region continues to follow maintenance standards, review pavement conditions and maintain roads in a state-of-good-repair to ensure residents and visitors can enjoy safe and efficient travel in our region. Overall, the Regional Road Transportation System is operating efficiently, offering a convenient and safe mode of travel to accommodate continued growth in Halton.



Table of Contents

1.0 Introduction	1
1.1 Purpose	1
1.2 Background	1
1.3 System profile	1
2.0 Halton Region statistics	2
3.0 Road Safety	3
3.1 Comprehensive Road Safety Action Plan Program (CROSAP)	3
3.2 2023 Collisions Overview	6
3.3 2023 Road Safety Initiatives	12
3.4 Intersection Traffic Control Improvements	13
3.5 Annual Speed Review	14
3.6 Red Light Camera Program	16
3.7 Drive SAFE Program	18
4.0 Operational Performance	19
4.1 Travel Speed and Delay Study	19
4.2 Traffic Signal Corridor Optimization	21
5.0 Transportation Operations and Maintenance	22
5.1 Minimum Maintenance Standards	22
5.2 Roadway Asset Management	22
5.3 Pavement Management	23
5.4 Road Needs	24
5.5 Bridges, Major Culverts, Retaining Walls and Noise Walls	25
6.0 Conclusion	26

List of appendices

Appendix A	27
Appendix B	28
Appendix C	29
Appendix D	30

List of figures

Figure 1:	The 2023 Regional Road Network	1
Figure 2:	CROSAP and other safety programs compared to Vision Zero	3
Figure 3:	Total number of fatal collisions vs. average annual daily vehicle km travelled	5
Figure 4:	Total number of fatal collisions vs. average annual daily vehicle km travelled	5

Figure 5:	Comparison of collisions, 2018 to 2023	6
Figure 6:	Comparison of collision severity by municipality, 2023	7
Figure 7:	Collision impact types - intersections & midblocks, 2023	7
Figure 8:	Collision impact types at intersections, 2023	7
Figure 9:	Collision impact types at midblocks, 2023	8
Figure 10:	Collision impact types by municipality, 2023	8
Figure 11:	Driver's action in collisions - intersections & midblocks, 2023	8
Figure 12:	Monthly collision severity, 2023	9
Figure 13:	Seasonal collision severity, 2023	9
Figure 14:	Collisions by road surface conditions, 2023	9
Figure 15:	Top 15 high frequency collision days, 2023	10
Figure 16:	Collisions by day-of-week, 2023	10
Figure 17:	Weekday collisions by time-of-day, 2023	11
Figure 18:	Weekend collisions by time-of-day, 2023	11
Figure 19:	Number of collisions involving pedestrians on Regional Roads, 2004 - 2023	12
Figure 20:	Number of collisions involving cyclists on Regional Roads, 2004 - 2023	12
Figure 21:	Annual speed review, 2023	14
Figure 22:	Comparison of 85th percentile speeds, 2021-2023	15
Figure 23:	Priority speed enforcement locations for 2024	15
Figure 24:	Speed feedback sign locations	16
Figure 25:	Red light camera collisions	17
Figure 26:	Red light camera infraction rate, 2018 - 2023	17
Figure 27:	Top five locations for red light infractions, 2018 - 2023	17
Figure 28:	RLC Locations	18
Figure 29:	2023 a.m. and p.m. peak period levels of service	19
Figure 30:	Percentage of network by level of service (a.m.), 2019 - 2023	20
Figure 31:	Percentage of network by level of service (P.m.), 2019 - 2023	20

1.1 Purpose

The Region’s Road Operations team continues to review the performance of Halton’s Road network to:

- maintain a safe and efficient road system;
- identify existing and future capacity issues;
- identify opportunities for improvement to safety and service levels; and
- evaluate state-of-good repair requirements.

Halton completes annual programs to ensure Regional Roads are operating in the safest, most efficient manner possible, and that the service life of Halton’s infrastructure is optimized. Consistent with these objectives, staff continue to monitor the overall performance of the Region’s Transportation System and to report annually to Council.

The purpose of the annual Transportation Progress Report is to summarize the system’s performance and highlight some of the key accomplishments in the operations and maintenance of the system. Key system indicators provided in the report will enable the overall state of the Regional Road System to be tracked and measured over time.

Continued monitoring of our transportation system will help us determine what improvements to make and when they should be implemented.

1.2 Background

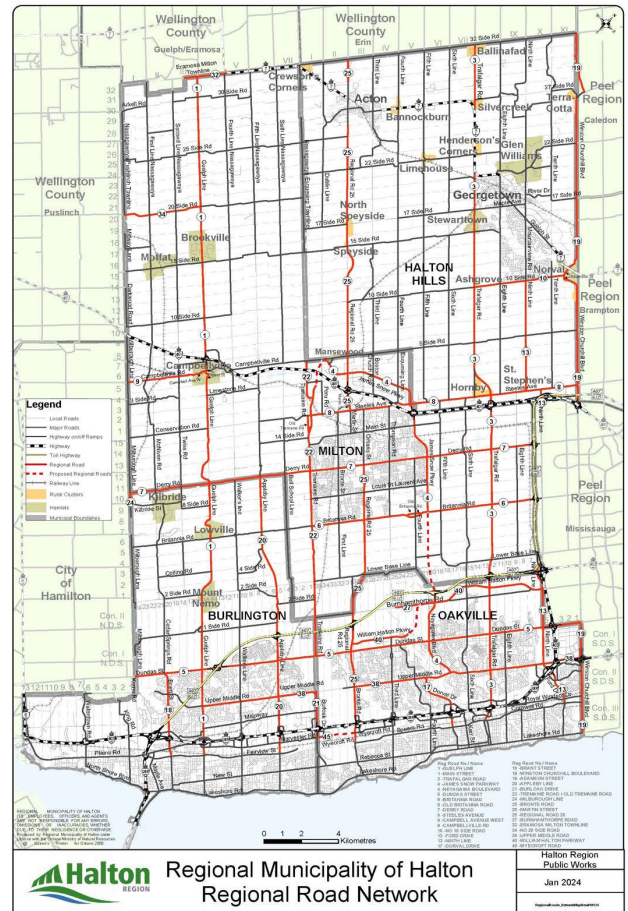
The 2023 Transportation Progress Report provides an update and summary of the activities completed to ensure the Regional Road System is operating safely and efficiently.



1.3 System Profile

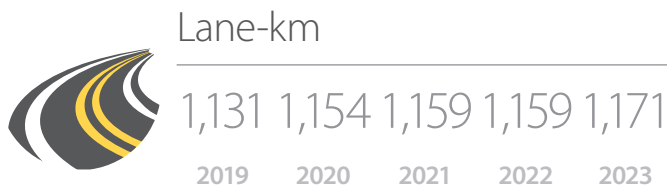
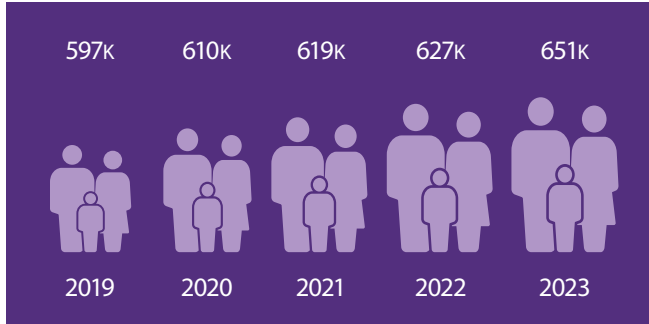
The Regional Road Network in Halton (2022) is shown in Figure 1 below.

Figure 1 - The 2023 Regional Road Network (See appendix A for more detail)

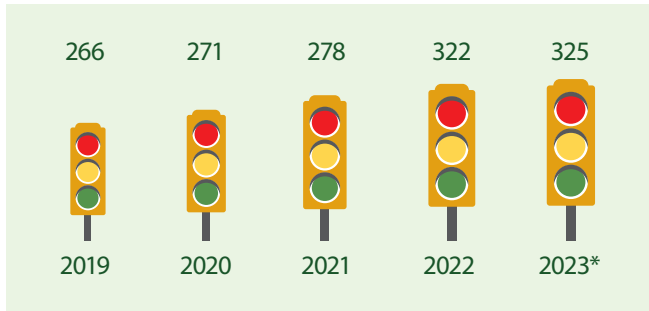


2.0 Halton Region 2023 statistics

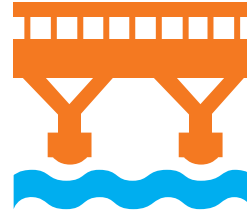
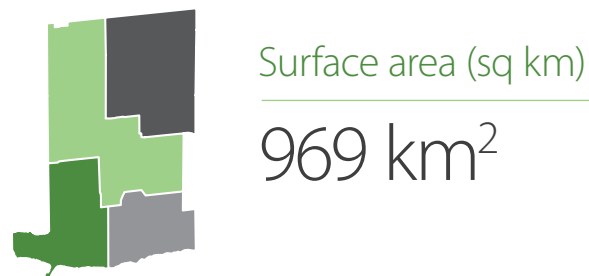
Population



Signalized Intersections on Regional Roads



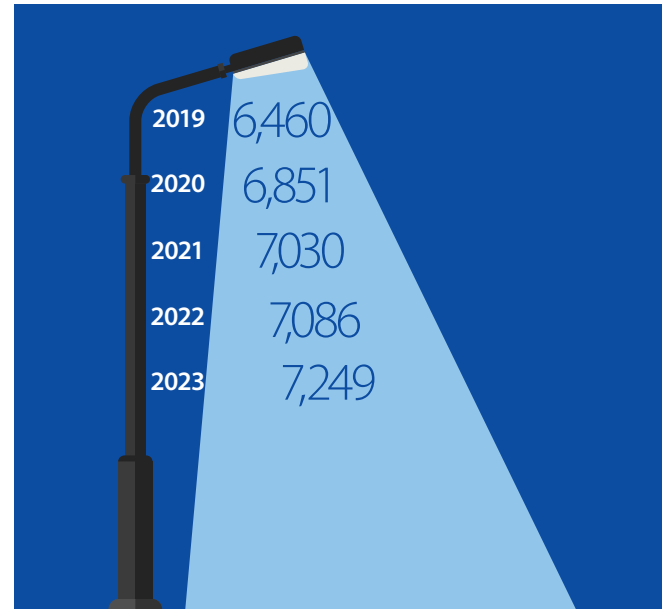
*282 Signalized intersections are Regionally owned



Bridges/Major Culvert Structures (greater than 3m)

186

Street lights



On road active transportation facilities (km)

76 Lane km of ON-ROAD DEDICATED BIKE LANES

130 Lane km of OFF-ROAD MULTI-USE TRAILS

209 Lane km of ON-ROAD PAVED SHOULDERS

146 Lane km of OFF-ROAD SIDEWALKS

3.0 Road Safety

The Regional Road Network includes major and minor arterial roads. Arterial roads support the movement of through-traffic and provide limited driveway access points. Arterial roads commonly have high traffic volumes and support all vehicle types including bicycles, passenger vehicles and heavy trucks. Traffic flow on arterial roads is designed to be uninterrupted except at signals and crosswalks. Managing the flow of traffic in a safe manner is a main goal of managing the road network. This section describes the Region’s road safety programs, projects and initiatives. When monitoring the Regional Road Network, Halton’s transportation staff focus on supporting the safe and efficient movement of people and goods, through ongoing maintenance and continuous improvement. We continually assess road performance and implement infrastructure improvements to maximize road safety and efficiency while minimizing traffic delays. For over two decades, Halton has implemented many initiatives to support the safe and efficient movement of people and goods across the region.

3.1 Comprehensive Road Safety Action Plan Program (CROSAP)

Following the same principles as the Vision Zero road safety strategy, the Comprehensive Road Safety Action Plan (CROSAP) is an ongoing, continuous improvement program focused on facilitating a safe and efficient Regional Road Network. The Action Plan is proactive and managed by the Region which allows us to ensure road safety is given high priority. The program incorporates engineering, enforcement and educational components and is one piece of an overall road safety strategy to minimize the risk of collisions. Ultimately CROSAP strives to eliminate traffic-related injuries and fatalities by incorporating data-driven countermeasures to collision risks in the road network.

CROSAP and other safety programs vs Vision Zero

Figure 2 – CROSAP and other safety programs compared to Vision Zero

Old Style Thinking	Vision Zero	Halton Region Programs - CROSAP & Other Safety Programs
Responsibility to prevent crashes, injuries and deaths rests with individuals.	Responsibility to prevent crashes, injuries, and death rests with transportation system designers.	Halton Region seeks to prevent crashes, injuries, and death by addressing the root causes with the transportation system design and recommends changes to the existing design as needed. Road design incorporates features such as high friction pavement, guiderails, and left-turn offsets.
Focuses on what causes 'accidents'.	Focuses on what causes safety.	Through a combination of Education, Engineering, and Enforcement, Halton seeks to affect driver behaviour to encourage safe driving.
Allows individual errors to kill and harm.	It is unethical to allow individual failures to lead to death or serious injuries.	Fatal and serious injury collisions are investigated if individual failures in the road system contributed to the collision and to determine measures to eliminate failure.
Majority of the problem is people and not driver error.	A majority of solutions involve speeds, roads, and vehicles.	Halton seeks to prevent crashes, injuries and death by addressing root causes with transportation system design and recommends change to the existing design as needed. Speed limits are reviewed annually and monthly enforcement is coordinated with Halton Regional Police.
Studies the effects of single road safety interventions one at a time.	Understanding that road safety interventions work best together or in bundles.	As part of the Regional Traffic Operations and Safety Study, Halton undertook a Region-wide visual inspection of deficiencies that are programmed for upgrades as part of upcoming capital works. Halton undertook a Region-wide review of vulnerable land uses to designate over a dozen Community Safety Zones.
Can only justify making improvements based on a cost-benefit analysis.	Understanding the default is to make the motor vehicle and the road system safe.	Halton recognizes motor vehicles are being manufactured with increased safety features. Halton also recognizes and continues to make continued improvements to the road system.
Only works on problems with large number of collisions.	Makes the system safe everywhere.	Improvements to enhance safety are considered during routine operating maintenance and capital construction projects. Routine road patrol identifies and remove risks to the Regional road network as they emerge.
Believes in the need for further "study" - waits for crashes and coroner report to identify problems.	Recognizes that the evidence to act already exists. Proactively takes actions using data, crash testing, simulations, physics, etc.	The Region-wide visual inspection was a proactive review to identify and recommend corrective action to deficiencies.
Ignores exposure to the motor vehicle as an injury risk factor. Ignores the carbon and pollution by-products of transportation.	Embraces multi-modal transportation for better safety and environmental sustainability.	Halton Region considers and incorporates active transportation facilities in road construction projects. These improvements include multi-use paths/ trails, on-street cycling facilities, and enhanced separation between the sidewalk and road.

CROSAP includes three elements:

1. Road Network Screening and identification of locations with Potential For Safety Improvement (PSI)
2. Diagnostic review
3. Implementation of preferred solutions

Road Network Screening and identification of locations with Potential for Safety Improvement:

This task is achieved by comparing similar intersections and road segments within our road network and calculating their safety performance. The intersections and road segments are then ranked based on an index called the Potential for Safety Improvement (PSI).

The PSI index considers collision history based on statistically significant variables and traffic volume. In 2023, new safety performance functions (SPFs) were developed by a consultant for the Region and local municipalities. A safety performance function is an equation used to predict the average number of collisions per year at an intersection or midblock as a function of exposure (e.g., traffic volume) and intersection or roadway characteristics. The Empirical Bayes method is used to estimate the expected collision experience for a location, which is a weighted average of the observed collisions at a location and the predicted collisions from an SPF. The potential for safety improvement is equal to the difference between the expected and predicted collisions for a location. With new SPFs, the Region was able to conduct network screening with updated PSIs derived from the new SPFs.

Diagnostic review:

A diagnostic review includes:

- formal road safety assessments of the top-ranked locations from the network screening task;

- identification and selection of possible solutions; and
- a cost/benefit analysis to compare the potential societal benefits and cost of the potentially feasible solutions.

Implementation of preferred solutions:

This task consists of the implementation of feasible solutions, particularly considering societal benefits. Where possible, solutions are implemented in alignment with infrastructure improvements. This process encourages wise planning and spending and ensures proactive consideration of safety in design. Improvements are funded through the Regional capital budget.

CROSAP Program Performance

Since the inception of CROSAP in 2001, Halton Region has formally assessed over 140 locations (intersections and road segments) along the Regional Road Network. These locations were specifically identified to have safety improvement potential through a network screening process.

The Region has implemented a significant number of improvements related to roadway signage, positive guidance for road users, pavement markings, traffic signals and phasing, road geometry, and roadside safety; recently, the Region installed pedestrian crossovers, rumble strips and smart right-turn channels. These improvements have been implemented as part of the Region's capital construction projects. Over two decades, a significant downward trend has been observed in the safety improvement potential, indicating that Regional Roads are operating more safely and efficiently year-over-year, while traffic volumes continue to increase through population and business growth. Figures 3 and 4 below present the annual total number of injury- and fatal- related collisions on Regional Roads and the average annual vehicle kilometres travelled (exposure) between 2004 and 2023. Note the increase in exposure and decrease in collision trend lines.



Figure 3 - Total number of injury and fatal collisions vs. average annual daily vehicle km travelled

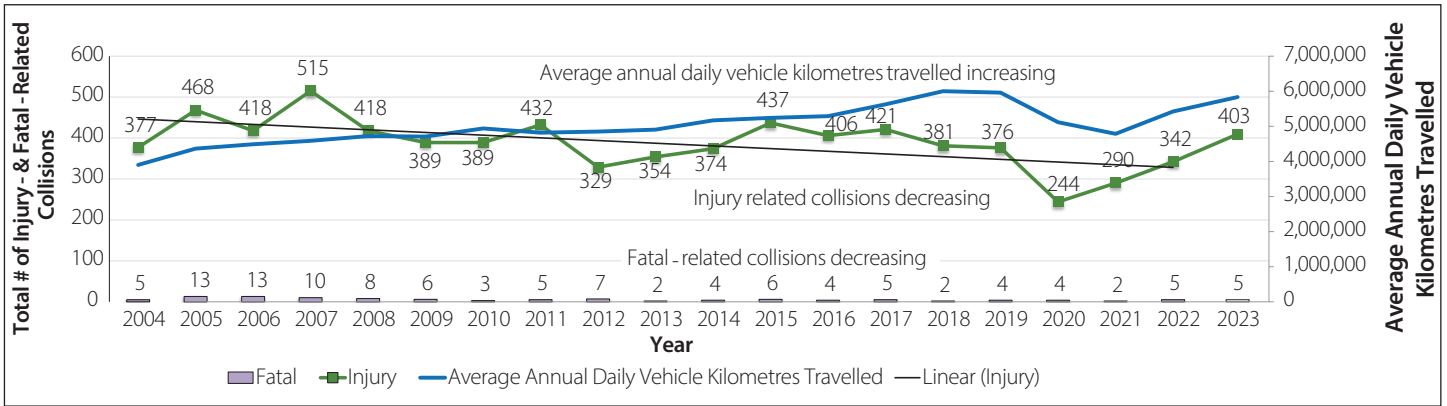
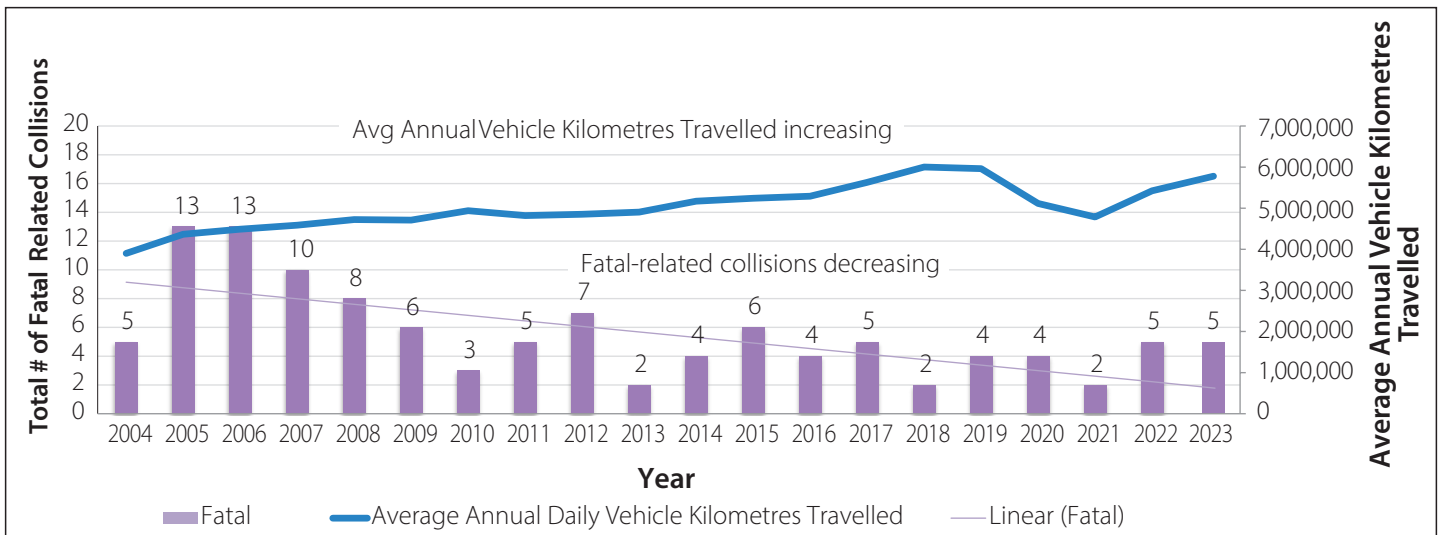


Figure 4 - Total number of fatal collisions vs. average annual daily vehicle km travelled



3.2 2023 Collisions Overview

The COVID-19 pandemic impacted traffic volumes and collisions from 2020 through 2023. In 2020 and 2021, Halton experienced reduced traffic volume and collisions while 2022 saw an increase relative to the lows experienced during the height of widespread public health measures. 2023 traffic volumes and collisions indicate COVID-19 is no longer affecting driving behaviours with overall volumes and collisions returning to pre-pandemic levels. In total, there was 3,267 collisions on Regional roads in 2023 which was an increase compared to 2022.

Figure 5 below compares different collision criteria from 2018 to 2023. As 2020 and 2021 were during the pandemic, these years are highlighted due to abnormal traffic patterns. Collision trends suggest that the COVID-19 pandemic still impacted 2022 collisions and volumes which explains the overall increase in collisions in 2023. Although there was an increase, the collision stats for 2023 are similar to the stats reported for 2018 and 2019 which suggests the reduced collisions in recent years can be attributed to COVID-19 and public health measures.

Figure 5 – Comparison of collisions, 2018 to 2023

Year	2018	2019	2020	2021	2022	2023	Change (2022 - 2023)
Number of Collisions	3238	3272	1998	2057	2787	3267	17%
Number of Fatal Collisions	2	4	4	2	5	5	0%
Number of Injury Collisions	381	376	244	290	342	403	18%
Number of Property Damage Only or Non Reportable Collisions	2855	2892	1750	1765	2440	2859	17%
Number of Collisions Involving Pedestrians	24	26	19	14	13	25	92%
Percentage of Collisions Involving Pedestrians Injuries or Fatalities	83%	77%	89%	79%	85%	92%	7%
Number of Collisions Involving Cyclists	25	29	36	23	25	32	28%
Percentage of Collisions Involving Cyclists Injuries or Fatalities	88%	66%	67%	70%	56%	59%	3%
Collision Rate Per 100,000 Population	570	566	340	345	456	502	10%
Fatal Collision Rate Per 100,000 Population	0.352	0.692	0.68	0.335	0.797	0.768	-4%
Day With Highest Number of Collisions	Tuesday	Friday	Friday	Friday	Friday	Wednesday	-
Month With Highest Number of Collisions	November	January	February	November	November	November	-
Hour With Highest Number of Collisions	5 to 6 pm	4 to 5 pm	5 to 6 pm	4 to 5 pm	3 to 4 pm	5 to 6 pm	-
Most Common Collision Type	Rear End	Rear End	Rear End	Rear End	Rear End	Rear End	-
Most Frequently Recorded Improper Driving Action	Following Too Close	Following Too Close	Following Too Close	Following Too Close	Following Too Close	Following Too Close	-
Intersection with the Highest Number of Collisions	Dundas Steet and Trafalgar Road	Brant Street and North Service Road	Guelph Line and Fairview Street	Dundas Street and Appleby Line	Guelph Line and Fairview Street	Upper Middle Road and Appleby Line	-
Midblock with the Highest Number of Collisions	Trafalgar Road between Lower Base Line and Britannia Road	Britannia Road between Fifth Line and Sixth Line	Regional Road 25 between Britannia Road and Etheridge Avenue	Steeles Avenue between Wilson Drive and Thompson Road	Trafalgar Road between Britannia Road and Derry Road	Trafalgar Road between Leighland Avenue/Iroquois Shore Road and White Oaks Boulevard, and Trafalgar Road between 5 Side Road and 10 Side Road	-
Percentage of Collisions Occurring at Intersections	78%	76%	79%	78%	75%	73%	-2%
Percentage of Collisions Occurring at Midblocks	22%	24%	21%	22%	25%	27%	2%
Percentage of Collisions Occurring During Winter Driving (Snow/ Ice Road Surface) Conditions	9%	11%	8%	4%	7%	5%	-22%
Population	583,000	597,000	610,000	619,000	627,000	651,000	7%

Severity

Collisions are divided into three categories based on severity:

- **Property damage only (PDO) and non-reportable (NR)** collisions are the least severe and are grouped together because neither one involve bodily injuries; however, they differ in that NR collisions are self-reported at a collision reporting centre.
- **Non-fatal collisions** are the second most severe and involve bodily injuries.
- **Fatal collisions** are the third category and most severe.

In 2023, the majority of collisions on Regional roads were PDO/NR collisions with 2,859 followed by 403 non-fatal injury collisions, and 5 fatal collisions. Proportionally, PDO/NR collisions made up 87.5% of all collisions in 2023 while non-fatal and fatal collisions made up 12.3% and 0.2%, respectively. Even with the reduced number of collisions in the last three years, this proportion of collision severity has been consistent with previous years.

The Town of Oakville experienced the most collisions on Regional roads. In total, there were 1107 collisions resulting in four fatalities and 120 non-fatal injuries in Oakville. The City of Burlington experienced 919 collisions with one fatality and 110 non-fatal injuries. The Town of Milton experienced 903 collisions with zero fatalities and 124 non-fatal injuries. Finally, the Town of Halton Hills experienced 338 collisions with zero fatalities and 49 non-fatal injuries. Figure 6 below shows the total number of collisions and severity for each local municipality.

Figure 6 – Comparison of collision severity by municipality, 2023

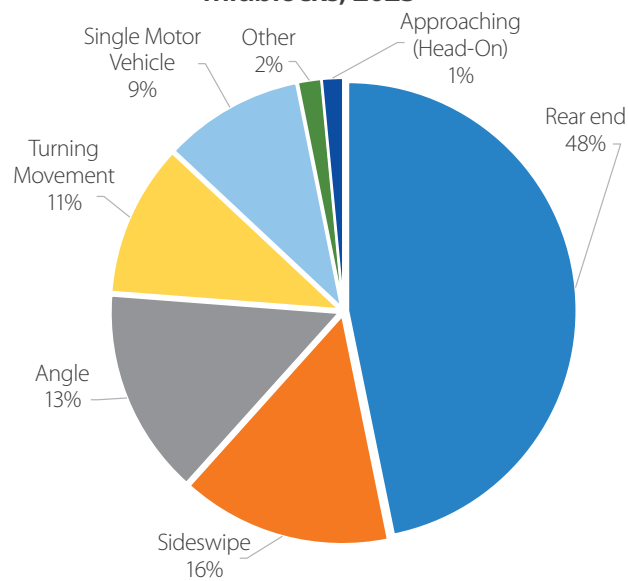
Municipality	Fatal	Non-Fatal Injury	Property Damage Only & Non-Reportable	Total
Oakville	4	120	983	1107
Burlington	1	110	808	919
Milton	0	124	779	903
Halton Hills	0	49	289	338

Collision Impact Types and Driver Action

Collisions are classified based on their impact type. Typical collision impact types on Regional roads are rear end, angle (e.g., t-bone), sideswipe, turning movement (e.g., collisions involving opposing turning movements), approaching (e.g., head-on), single motor vehicle, and other.

Rear end collisions have been the most frequent collision type in the last five years and accounted for 48% of all collisions in 2023. Following rear end collisions, both angle and sideswipe collision types each accounted for 15% and 13% of all collisions, respectively. The overall proportion of collision impact type is consistent with 2022. Figure 7 shows the proportion of collision impact types.

Figure 7 – Collision impact types - intersections & midblocks, 2023



Figures 8 and 9 show the proportion of collision impact types experienced at intersections and midblocks (road segments between intersections). At intersections, rear end collisions account for 51% of all collisions followed by angle and turning movement collisions with 15% and 14%, respectively. At midblocks, rear end collisions account for 39% of all collisions followed by sideswipe and single motor vehicle collisions with 26% and 22%, respectively. Generally, intersections see a greater proportion of angle and turning movement collisions compared to midblocks due to perpendicular movements and turning maneuvers performed at intersections and turning movement collisions compared to midblocks due to perpendicular movements and turning maneuvers performed at intersections.

Figure 8 – Collision impact types at intersections, 2023

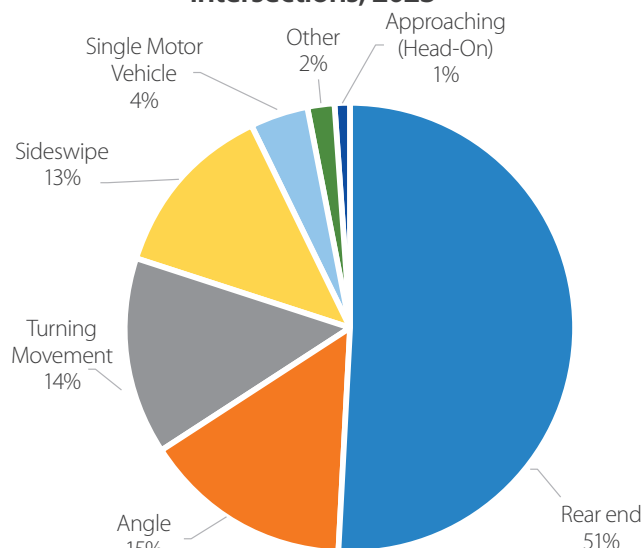
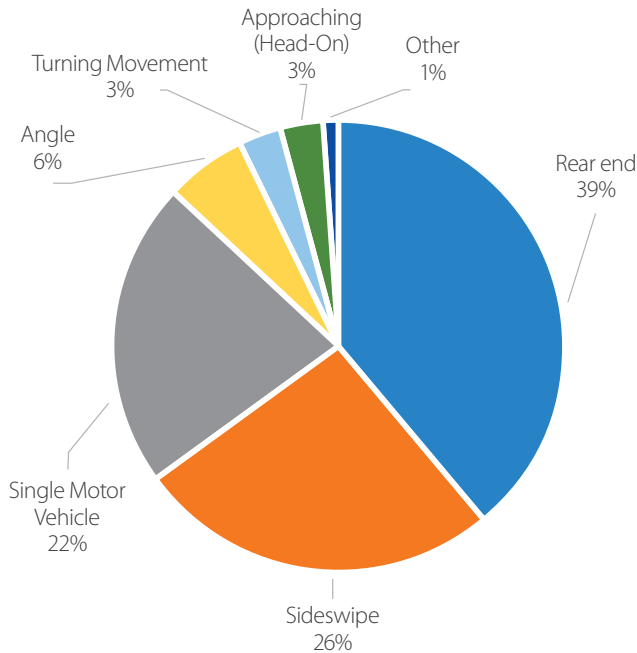


Figure 9 – Collision impact types at midblocks, 2023

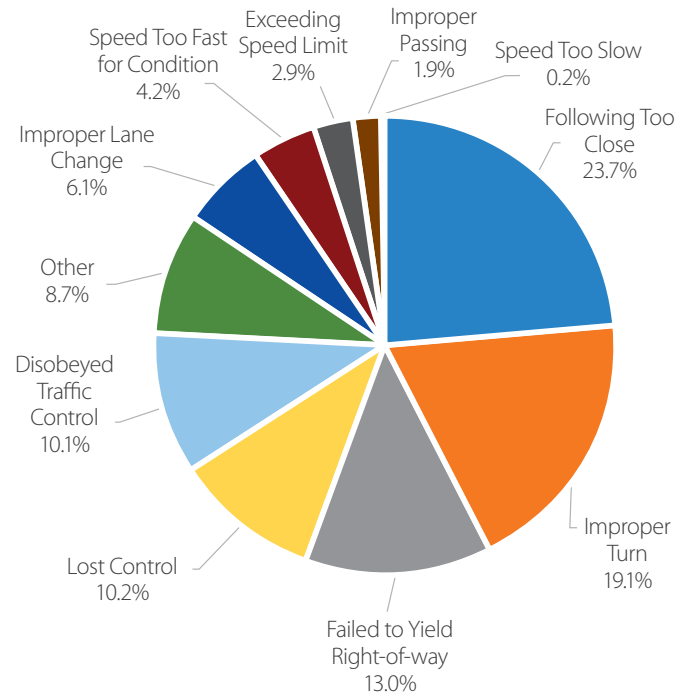


Midblocks do experience angle and turning movement collisions; however, these occur at low volume driveways and private accesses points.

Figure 10 below compares collision impact types by local municipality. The Town of Oakville experienced the most rear end, sideswipe and turning movement collisions while the Town of Milton experienced the most approaching, angle and single motor vehicle collisions.

Driver action directly relates to collision impact type. For example, rear end collisions are primarily caused by a vehicle following another too close or tailgating and is unable to react to sudden stops while angle collisions are typically preceded by a vehicle disobeying traffic control before the collision occurs. With rear end collisions being the most common collision type in 2023, the most common at-fault action of collisions was following too close. Figure 11 shows the proportion of at-fault actions in collisions. Rear end collisions and following too close have been the most

Figure 11 – Driver's action in collisions - intersections & midblocks, 2023



common collision type and at-fault action for the last five years. These findings stress the importance of targeting drivers that aggressively follow too closely to other vehicles with education and enforcement.

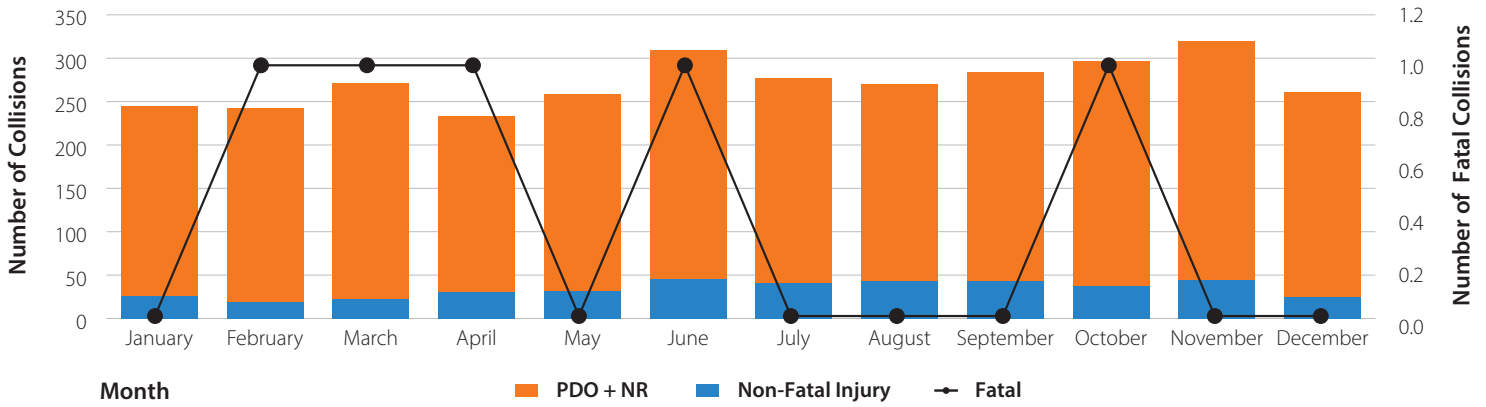
Collisions by Month, Day, Time

In terms of overall collisions, the three months with the most collisions in 2023 were November, June, and October. The three months with the lowest collisions were April, January, and February. In terms of collision severity, June and November have highest incidents of injury and fatal collisions while August and September were equal for the third highest month. February, March, and December have the lowest amount of injury collisions. Figure 12 shows a breakdown of monthly collisions comparing severity.

Figure 10 – Collision impact types by municipality, 2023

Municipality	Approaching	Angle	Rear end	Sideswipe	Single motor vehicle	Turning movement	Other
Oakville	6	126	548	210	76	119	22
Burlington	9	107	466	139	76	109	13
Milton	13	137	393	143	95	97	25
Halton Hills	9	39	157	44	48	37	4

Figure 12 - Monthly collision severity, 2023



Seasonally, this translates to most collisions occurring during autumn followed by summer, spring, and then winter. In terms of severity, summer experienced the highest number of non-fatal injury collisions while winter experienced the lowest. Winter saw the most fatal collisions with two while spring, summer, and autumn each had one fatal collision. Figure 13 shows a breakdown of seasonal collisions.

Although 81% of collisions on Regional roads occurred with dry road surface conditions, there is a correlation between snow and rain events and daily collision frequency. The three highest days for collision occurrences occurred during snowfall while just only four of the top 15 days occurred during clear conditions. Figures 14 and 15 show the difference in road surface conditions as well as the top 15 days that experienced the most collisions with weather events noted.

Figure 13 - Seasonal collision severity, 2023

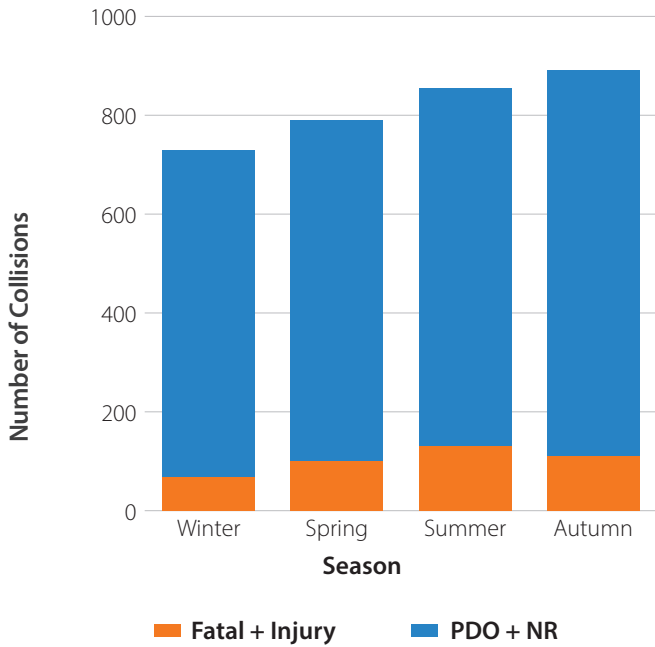


Figure 14 - Collisions by road surface conditions, 2023

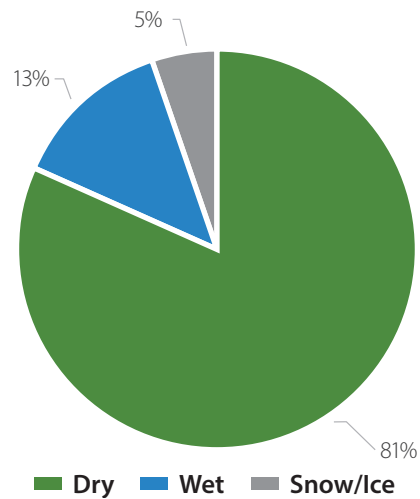


Figure 15 - Top 15 high frequency collision days, 2023

Date	Number of Collisions	Snow	Rain	Clear
Friday, March 10, 2023	43	✓		
Wednesday, February 22, 2023	29	✓		
Wednesday, January 25, 2023	28	✓		
Monday, February 27, 2023	22	✓		
Wednesday, September 20, 2023	22			✓
Tuesday, December 12, 2023	22			✓
Friday, April 28, 2023	21		✓	
Wednesday, November 22, 2023	20		✓	
Thursday, June 1, 2023	19			✓
Friday, June 2, 2023	19			✓
Tuesday, June 13, 2023	19		✓	
Thursday, July 20, 2023	19		✓	
Thursday, August 31, 2023	19			✓
Wednesday, November 15, 2023	19			✓
Wednesday, January 4, 2023	18		✓	
Friday, October 20, 2023	18		✓	

There is also a correlation between the time-of-day trend with typical daily traffic volume patterns. Figure 17 shows collisions on weekdays concentrated around typical morning and afternoon commute hours with the most collisions occurring between 3 p.m. and 6 p.m. and 32% of all weekday collisions occurring during this three- hour period. In the morning hours, 8 a.m. to 9 a.m. had the highest numbers of collisions which coincides with school drop-offs and morning commutes. Compared to weekdays, Figure 18 shows collisions on weekends mostly occurred between 12 and 5 p.m. with 52% of all weekend collisions occurring within this time frame. Weekends also experienced a greater proportion of collisions between midnight and 6 a.m. compared to weekdays. During the weekends, 6% of weekend collisions occurred between midnight and 6 a.m. while 3% occurred on weekdays.

The day of collision occurrences shows that Sundays have the least collisions while Wednesdays have the most, as shown in Figure 16. Sundays have consistently experienced the least number of collision occurrences while Fridays have had the highest number of collision occurrences the last four years. 2023 is the first year since 2018 where Friday did not have the highest number of collision occurrences. Although Saturdays and Sundays have the lowest daily collisions, one fatal collision occurred on each of these weekdays and one occurred on a Wednesday, a Thursday, and a Friday.

Figure 16 - Collisions by day-of-week, 2023

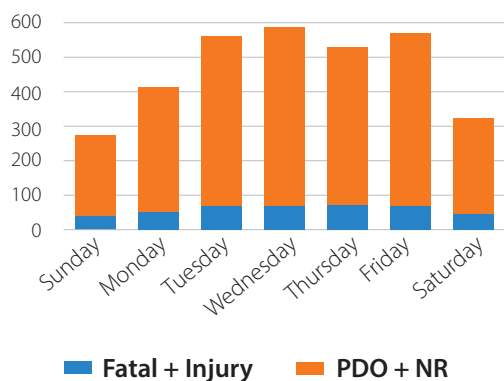


Figure 17 - Weekday collisions by time-of-day, 2023

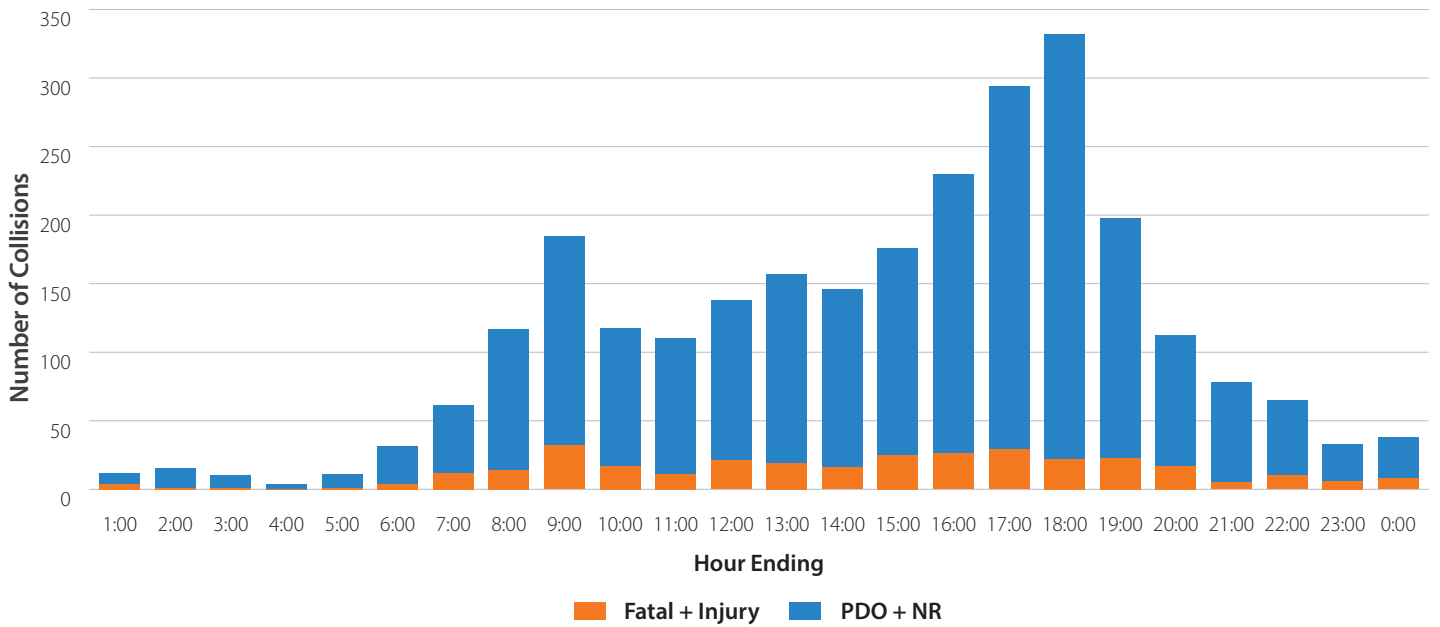
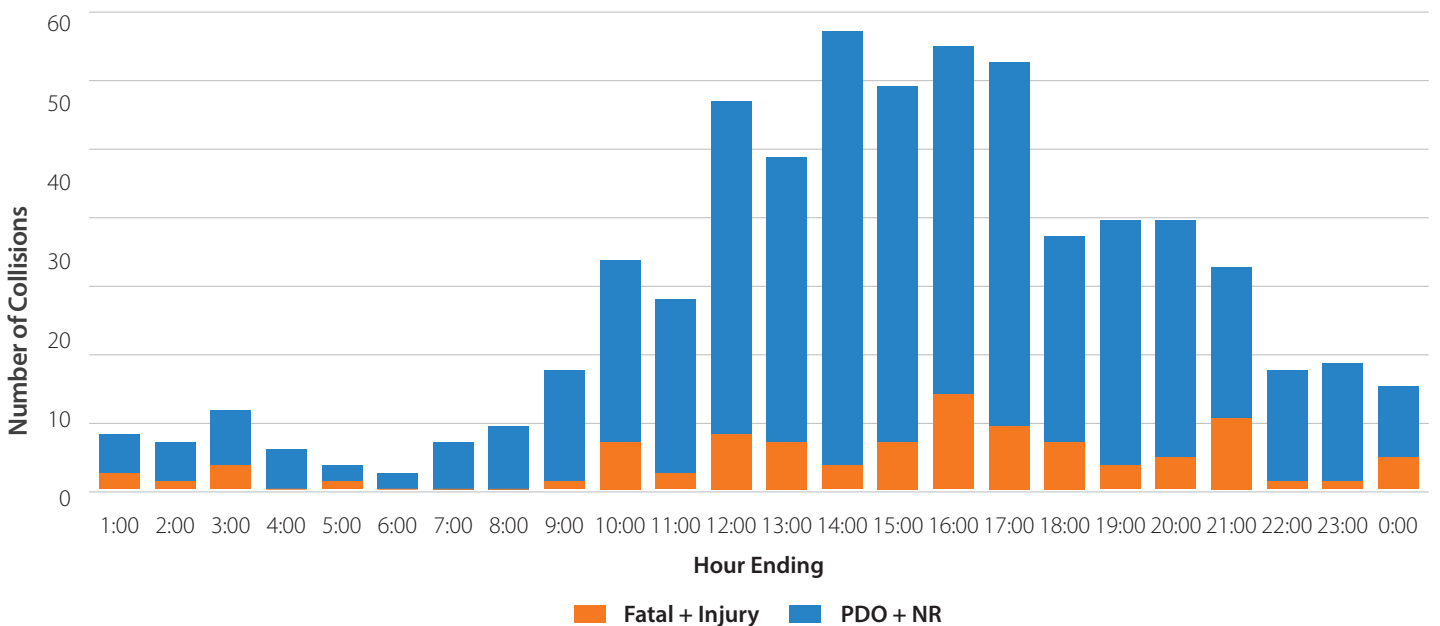


Figure 18 - Weekend collisions by time-of-day, 2023



Pedestrian and Cyclist Collisions

Halton has expanded active transportation facilities to encourage walking and cycling. In 2023, pedestrian collisions remained at the same level as 2021 and were less than the average number of pedestrian collisions between 2017 and 2019. Cyclist collisions increased compared to 2021 but were less than the average for 2017 – 2019.

Although collisions involving pedestrians and cyclists have declined, it is important to remember that the majority of these collisions result in injuries. Figures 19 and 20 compare annual collisions involving pedestrians and cyclists based on severity. While there has been a steady reduction in pedestrian-related collisions with some fluctuations, during the mid- 2010s there was an increase in cyclist-related collisions. This is likely attributed to the growth and urbanization of Regional roads. This also

underscores the need to continue to improve and expand active transportation facilities.

3.3 2023 Road Safety Initiatives

The Region continues to complete road safety and operational reviews of locations identified with significant improvement potential from the network screening report. Where feasible improvements are identified, we will program them for implementation to the road network. Halton Region completes road safety reviews with the recommendations to update and expand roadway information signs including advanced street name signs, street name signs on signal mast arms, and advanced and turnoff trailblazer signs for MTO, 407, and GO Transit facilities.

Figure 19 - Number of collisions involving pedestrians on Regional Roads, 2004 - 2023

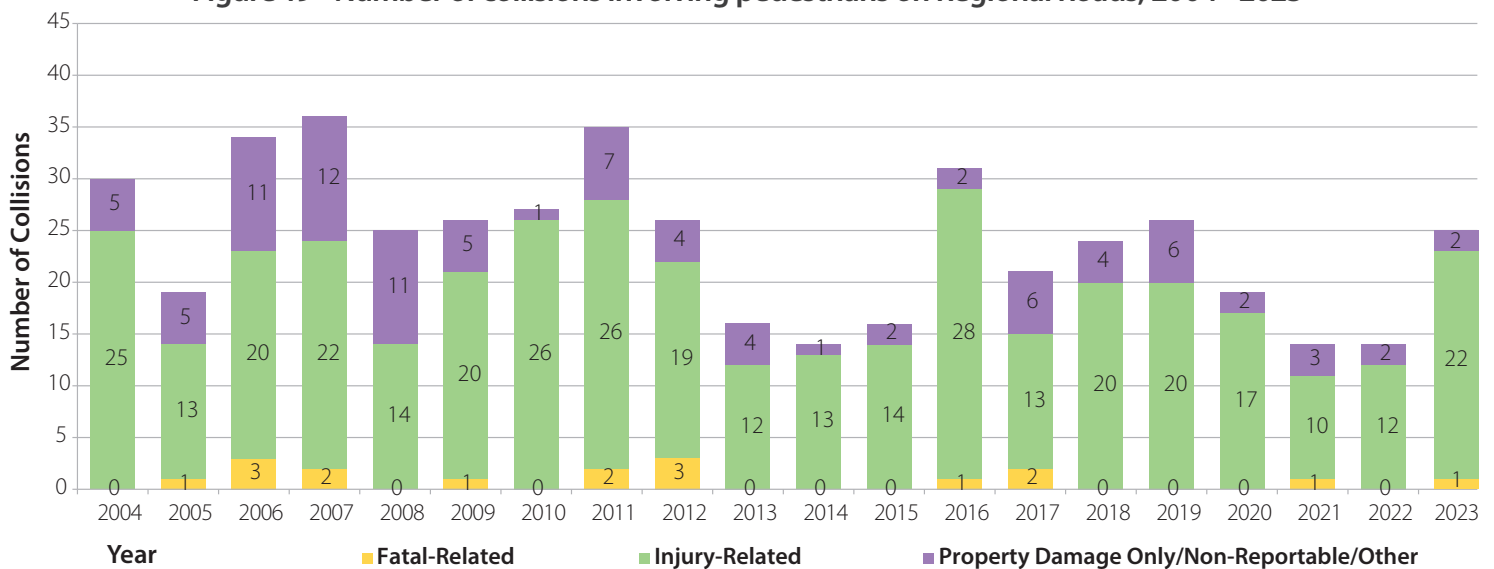
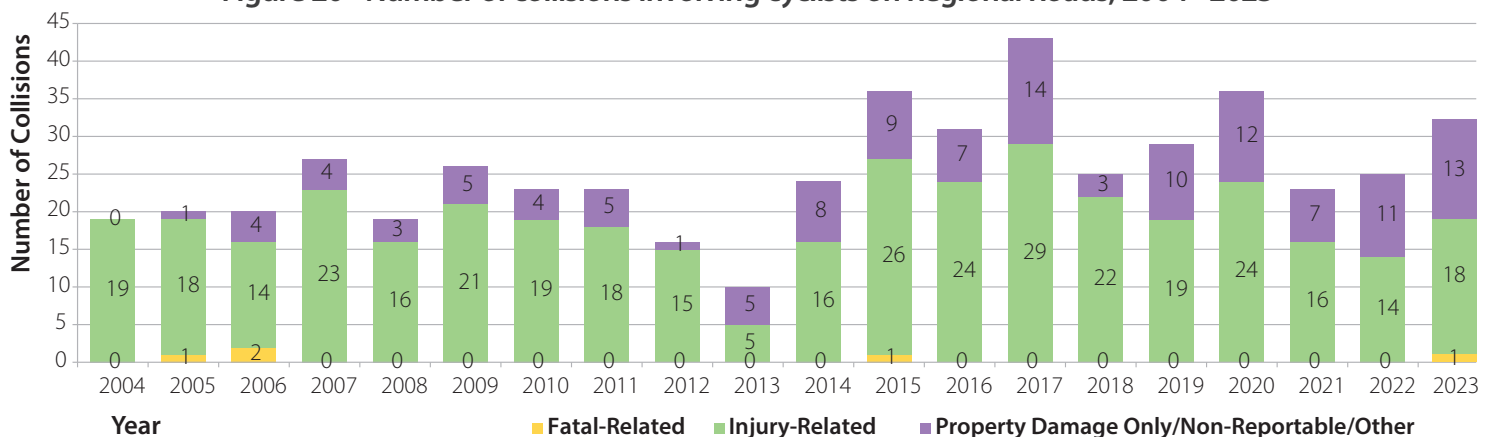


Figure 20 - Number of collisions involving cyclists on Regional Roads, 2004 - 2023



Upgrades from right-turn channels to smart channels are recommended and are being implemented for upcoming capital projects.

Traffic Operations Safety Study (TOSS) – Visual Inspection

In 2023, staff prioritized improvements and recommendations from the Region-wide Traffic Operations Safety Study (TOSS). As part of TOSS, a five-year implementation plan was developed to replace and update existing traffic control devices such as signs and pavement markings. Within the City of Burlington, Town of Oakville, and Town of Halton Hills, the Region is ahead of schedule to have these work orders completed within the five year period. Improvements are being carried out by the local municipalities or third party contractors.

As part of the 2024 budgeting process in 2023, funding was secured to carry out capital improvements at locations without capital reconstruction or resurfacing projects on the horizon.

The capital improvements include:

- modifications to driveway headwalls and centre-island medians; and installation of turning lanes, smart right-turn channels, and protective barriers around retaining walls.

3.4 Intersection Traffic Control Improvements

Traffic control improvements (e.g., traffic signals or roundabouts) improve the safety of intersections. Traffic signals provide orderly phasing for conflicting movements by assigning right-of-way to different traffic movements. Generally, signals reduce the number of severe right-angle collisions compared to an all-way/two-way stop controlled intersection. Roundabouts improve intersection safety by:

- requiring a slow entry speed;
- reducing vehicle-to-vehicle and vehicle-to-pedestrian conflict points; and
- having traffic flow in a single direction.

Typical high-speed right-angle or head-on collisions do not occur in a roundabout.

To determine if traffic signals are required at an intersection, a signal warrant analysis is undertaken annually for all un-signalized intersections. The signal warrant is a provincially accepted standard developed by the Ministry of Transportation and outlined in the Ontario Traffic Manual. The methodology behind the warrant utilizes the most up-to-date traffic volume (vehicular and pedestrian) and road user collision experience, and locations are

individually analyzed to determine if standards or warrants, related minimum traffic and/or delay to cross traffic, are met.

The signal warrant also considers the number of “preventable” collisions that occurred within the previous consecutive three-year period at the intersection. Preventable collisions are those involving traffic which, under signalized conditions, would move on separate phases (for example, left turns).

Although the warrant analysis considers the benefits of signalizing an intersection, the Region also considers other forms of intersection control, such as roundabouts. Consideration of these types of intersection traffic control measure also involves planning-level programs and future plans. Therefore, the analysis results of the traffic signal justification warrant are reviewed with Asset Management to support budgeting.

In 2023, the Region constructed three traffic signals at Derry Road and Bell School Line, Guelph Line and 20 Side Road, and Eramosa Milton Townline and Guelph Line. As part of the Britannia Road Widening (PR-2670B), the intersection of Britannia Road and Fourth Line was realigned south of its original location. New signals were required for the newly realigned intersection.

In 2023, construction began for a Pedestrian Crossover (PXO) at the intersection of Main Street and Crawford Crescent in Campbellville. The Region acquired land to satisfy AODA requirements so that the PXO poles would not obstruct people with mobility issues. The PXO was completed in May 2024. Other than PXOs at right-turn channels and roundabouts, this is the second PXO at an unsignalized intersection to be installed on a Regional road. The Region strictly follows the warrant process and guidelines for PXOs as defined in the Ontario Traffic Manual (OTM) Book 15 and the *Highway Traffic Act* (HTA).

Along with intersection traffic control improvements, the Region annually resurfaces road segments and intersections. Newly paved road has greater friction compared to older road surfaces which affords greater contact between the vehicle and roadway.

3.5 Annual Speed Review

Speeding is a major factor in collisions and overall road safety. Although the frequency of collisions due to speeding on Regional roads is low, it is well documented that higher speeds leads to higher injury severity in a collision. In June 2000, Regional Council approved Report PPW46-00, which outlined a speed control policy for Regional Roads. The policy recommends the undertaking of an annual review of posted speed limits throughout the Regional Road System. The annual speed review provides a proactive, systematic approach to ensuring that speed limits within the Regional Road Network are set and maintained at appropriate levels. Figure 21 illustrates the results of the 2023 Annual Speed Review.

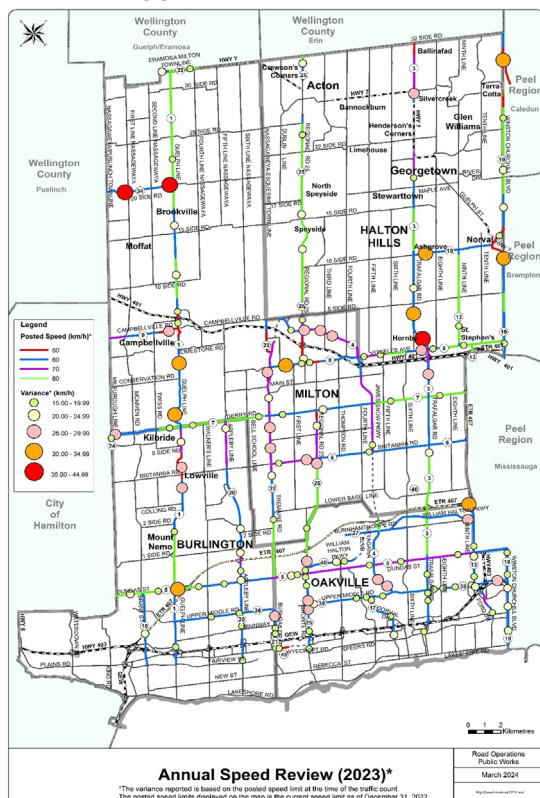
The annual speed review involves the measurement of actual speeds at selected locations and compares the 85th percentile of the measured (operating) speeds to the posted speed limits. The 85th percentile speed is a commonly used threshold in transportation engineering. The definition of 85th percentile speed is “The speed at or below which 85 percent of all vehicles are observed to travel under free flowing conditions”. Where there are significant variances between these two speed values, a review of the posted speed limit will be conducted.

The review of individual locations may or may not result in a recommendation to increase or decrease the posted speed limit. Recommendations may also be made to undertake specific actions, such as increased enforcement, education programs, installation of countermeasures such as driver speed feedback signs, and physical changes to the roadway

Figure 22 illustrates a comparison of the measured speeds in different speed zones between 2021 and 2023. Overall, there has been a slight reduction in operating speeds in 2023 compared to 2022.

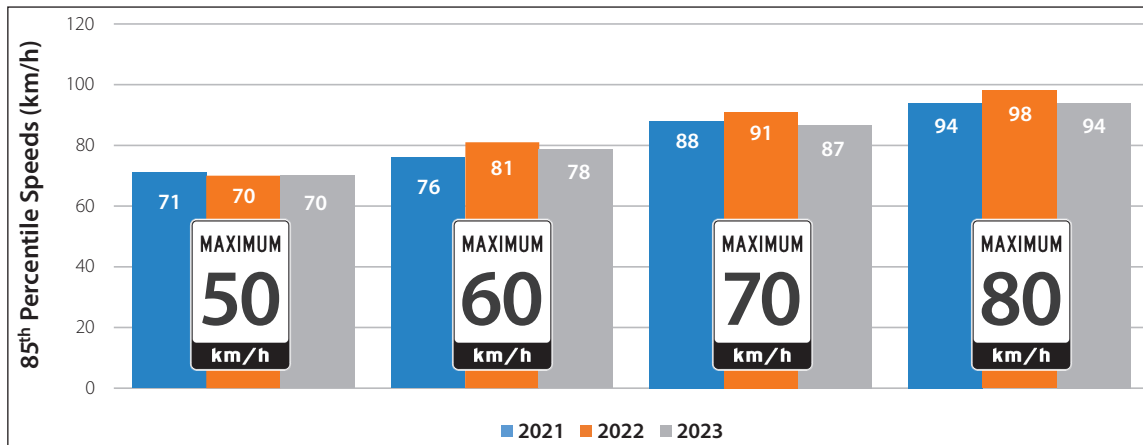
Figure 23 and the list below document the top 20 roadway segments that were identified as having the highest variances between posted speed limit and 85th percentile operating speeds.

Figure 21 - Annual speed review, 2023
(See appendix B for more detail)



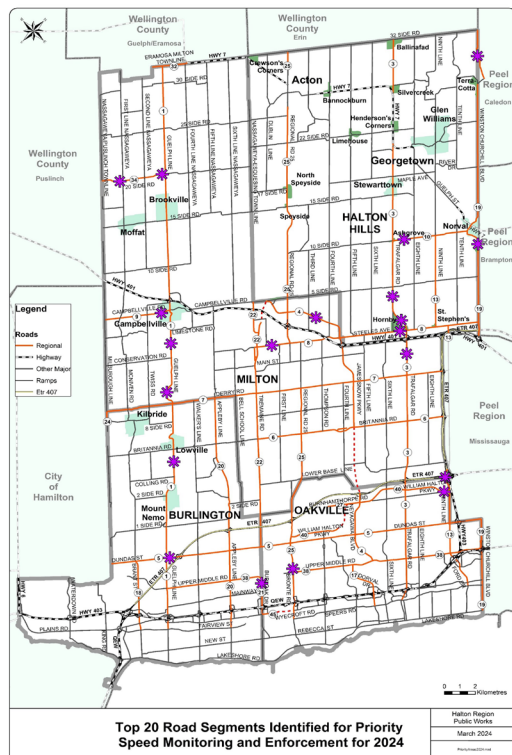
1. Trafalgar Road - between Steeles Avenue and Hornby Road
2. 20 Side Road - 200 m west of First Line
3. 20 Side Road - 200 m west of Guelph Line
4. Steeles Avenue - between Peru Road and Industrial Drive
5. Dundas Street - between Guelph Line and Highway 407 Westbound Off-Ramp
6. Winston Churchill Boulevard - between King Street and 32 Side Road/Ballinafad Road
7. 10 Side Road - between Trafalgar Road and Eighth Line
8. Trafalgar Road - between Hornby Road and 5 Side Road
9. Ninth Line - between William Halton Parkway and Lower Base Line
10. Winston Churchill Boulevard - between 5 Side Road and 10 Side Road
11. Guelph Line - between Derry Road and Conservation Road
12. Guelph Line - between Conservation Road and Limestone Road
13. James Snow Parkway - between Boston Church Road and Esquesing Line
14. Campbellville Road - between Twiss Road and Kingsbury Circle
15. William Halton Parkway - between Burnhamthorpe Road and Ninth Line
16. Burloak Drive - between Mainway and Upper Middle Road
17. Trafalgar Road - between CP Rail and Auburn Road
18. Steeles Avenue - between Hornby Road and Trafalgar Road
19. Bronte Road - between Upper Middle Road and Richview Boulevard/West Oak Trails Boulevard
20. Guelph Line - between Colling Road and Britannia Road

Figure 22 - Comparison of 85th percentile speeds, 2021 - 2023



The information gathered in Halton’s annual speed review provides Regional staff with locations on Halton Region’s road network which require detailed review and possibly the implementation of countermeasures to assist in the reduction of road user speeds. Although there has been increased instances of speeding on Regional roads, collisions attributed to excessive speeding have seen a minor reduction in the last five years.

Figure 23 – Priority speed enforcement locations for 2024 (See appendix C for more detail)



Annual Requests for Posted Speed Limit Review

To encourage compliance with the posted speed limit, both a consistent message and reasonable speed limit must be posted. The ideal speed limit is impacted by factors including roadside environment, prevailing operating speeds, horizontal or vertical alignment, traffic volume, density of driveways, presence of pedestrians/cyclists, and adjacent land use. When a posted speed is too low or too high for a particular road segment, motorists’ compliance with the posted speed limit is low. Visual cues from the road and adjacent environment, such as pavement width, shoulder width, and pavement quality, can contribute to operating speeds deviating from the posted speed limit. A large speed discrepancy between vehicles in the traffic flow is undesirable from a traffic operations perspective.

The Region’s policy on posting speed limits aligns with the *Highway Traffic Act* and Ontario Traffic Manual, which are recognized industry wide. Halton’s policy recommends defining speed zones based on a number of criteria including those noted above. To determine compliance with the posted speed, the Region conducts an annual assessment of road user operating speeds. Staff then determines the 85th percentile operating speed and assess the requirement to adjust posted speeds. This is a proactive approach to ensuring speed limits are appropriately and reasonably set on Regional Roads.

In 2023, Halton Region did not modify any speed limits.

Speed Management Countermeasures

The Region implements the following initiatives to promote the reduction of road user speeds on Regional Roads where identified speeding problems exist. Countermeasures include:

- NC300 traffic counters
- Driver speed feedback signs
- Police enforcement
- Portable Variable Message Sign (PVMS) Trailers

In 2023 Halton Region purchased two additional PVMS trailers. These trailers are to be used for communicating traffic safety related messages, operating speeds, and to record data for analysis and enforcement. These two units allow for remote access through a cloud server where staff can remotely change messages and download data. An additional benefit of these trailers is that they are smaller, allowing staff to park them where shoulder and boulevard space are limited.

The Region owns a fleet of driver speed feedback signs. This program aims to:

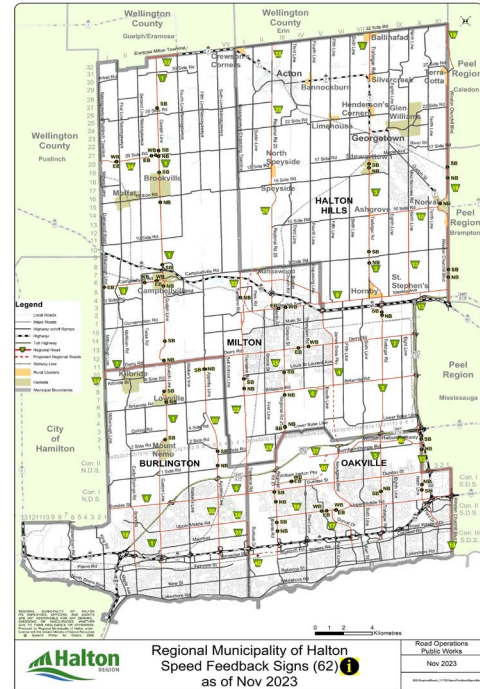
- alert motorists of their approaching speeds;
- identify speeding trends; and
- identify when enforcement is required on Regional roadways.

This speed detection/feedback sign project was initiated as an effective cost measure to obtain speeding information on various Regional road segments and assist to in reducing the approaching and operating speeds of vehicles, which in turn saves both lives and money.

The signs are configured to detect the travel speeds of approaching traffic and provide feedback to the road users on their speeds relative to the posted limit. The Region conducts compliance assessments to determine the effectiveness of the signs and justify the continuation of the program. The assessments continue to show that the signs help to reduce speeds, and therefore, are a benefit to the Region's road network. The signs continue to remain a significant part of Halton's speed management toolbox. With these signs, Halton is able to connect remotely, retrieve real time data using cloud-based software to create reports. The combined data and reports help to identify speeding trends and the 50th and 85th percentiles, average and median speeds at these locations. Staff are then able to identify and share the ideal times for enforcement with the Halton Regional Police Service.

There are now 62 signs in Halton Region's fleet at locations identified for priority speed monitoring and enforcement as shown in Figure 24. Two additional speed detection/feedback sign units were installed on Trafalgar Road between Upper Middle Road and Rosegate Way in the Town of Oakville.

Figure 24 - Speed feedback sign locations (See appendix D for more detail)



Police Enforcement

Results from the annual speed review, speed feedback signs and spot speed studies are shared regularly with the Halton Regional Police Service for consideration of targeted speed enforcement through the local District Response Units (DRU's). On a monthly basis, staff collaborates with police by sharing data reports so that enforcement can be coordinated at locations where speeding is most prevalent.

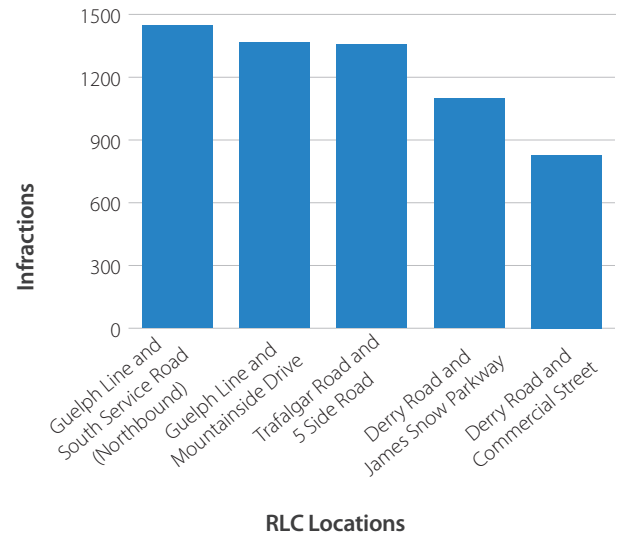
3.6 Red Light Camera Program

Halton continues to participate in the Provincial Red Light Camera (RLC) program. The goal of the RLC program is to reduce the frequency of red light running and high-severity angle-type collisions at signalized intersections. The program utilizes an enforcement technique targeted at reducing red light running associated with specific movements known to result in angle collisions to improve both driver and pedestrian safety.

Halton Region has participated in the Provincial-wide RLC program since 2012 installing 23 RLCs within the Regions jurisdiction at signalized intersections. In previous years the program has proven to show progress in reducing the frequency of collisions due to red light running. There has been an approximate 21% reduction of angle type collisions at intersections with a RLC since 2017. This can be seen in Figure 25 which compares the frequency of angle-type collisions caused by a vehicle disobeying the traffic control or failing to yield to the right-of-way before and after RLC was activated.

In 2023, there was an average of 2 infractions per day which is a slight reduction from 2022. Figure 26 shows the total annual infractions and average daily infraction rates from 2018 to 2023. The data shows COVID-19 impacted overall infractions during 2020 and 2021; this is consistent with overall Regional collisions. Figure 27 shows the five highest locations for infractions. The RLC monitoring the northbound direction at Guelph Line and South Service Road recorded the most infractions with 1,447 followed by Guelph Line and Mountainside with 1,367 infractions. Trafalgar Road and 5 Side Road was third highest with 1,357 infractions. The fourth and fifth highest infractions occurred at Derry Road and James Snow Parkway, and Derry Road and Commercial Street with 1,098 and 829 infractions, respectively.

Figure 27 - Top five locations for red light infractions, 2018 - 2023



RLC Locations

In July 2023, the Region installed and activated five new RLCs. These new RLCs use radar detection rather than inductive loops which allows the camera to be operational in construction zones. The use of radar detection will help the longevity of the asphalt and improve construction zone safety. RLCs were installed at the following locations:

- Dundas Street and Trafalgar Road (monitoring westbound traffic)
- Guelph Line and South Service Road (monitoring southbound traffic)
- James Snow Parkway and Main Street (monitoring northbound traffic)

Figure 26 – Red light camera infraction rate, 2018 - 2023

	2017	2018	2019	2020	2021	2022	2023
Number of Active Cameras	17	17	20	18	18	18	23
Total Infractions	11,568	14,715	12,880	9,593	11,207	13,010	14,558
Total Active Days	4,457	5,532	6,080	6,406	6,552	6,336	7,290
Average Daily Infraction Rate	2.6	2.66	2.12	1.5	1.71	2.05	2.00

Figure 25 – Red light camera collisions

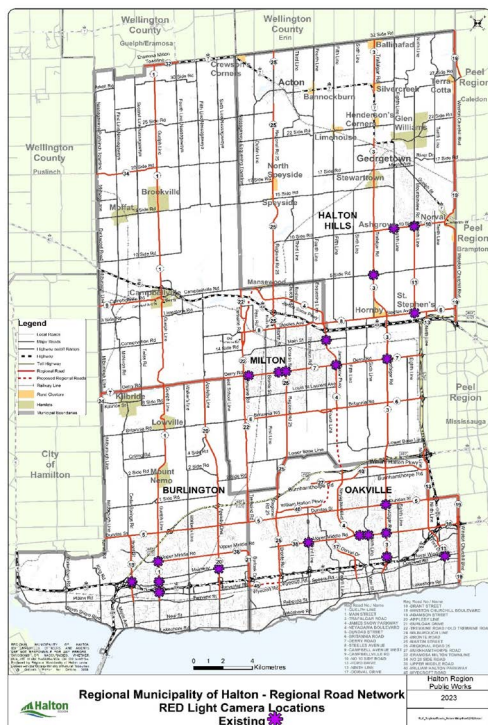
Location	Activation Date	Angle Collisions Before RLC Deployment	Angle Collisions After RLC Deployment	Difference	Percentage Change
Derry Road and Commercial Street	July 21, 2017	6	3	-3	-50%
10 Side Road and Eighth Line	August 3, 2017	4	1	-3	-75%
Guelph Line and South Service Road	October 6, 2017	15	22	7	47%
Derry Road and Savoline Boulevard		5	2	-3	-60%
Upper Middle Road and Sixth Line		7	5	-2	-29%
<i>Comparison above shows 6 years before and after activation date</i>					
Upper Middle Road and Third Line	August 27, 2019	5	3	-2	-40%
Steeles Avenue and Ninth Line North		4	4	0	0%
Ford Drive and Royal Windsor Drive	September 19, 2019	7	2	-5	-71%
<i>Comparison above shows 4 years before and after activation date</i>					
Total		53	42	-11	-21%

- Trafalgar Road and Upper Middle Road (monitoring northbound traffic)
- Trafalgar Road and Leighland Avenue (monitoring southbound traffic)

For a map of all RLC locations, please refer to Appendix D.

Overall, the RLC Program shows positive results in reducing severe angle-type collisions. Subject to budget availability, Halton intends to expand the program to further improve safety at signalized intersections.

**Figure 28 - RLC Locations
(See appendix D for more detail)**



3.7 Drive SAFE Program

The Drive SAFE (Safety Awareness For Everyone) public awareness program is an initiative targeting speeding, aggressive driving, and generally unsafe behaviour on Halton roads. To promote safe driving to the public, the Region has completed several initiatives in previous years, such as:

- Poster campaigns
- Safety brochures
- Cyclist safety commercials
- Emergency Medical Services (EMS) safety commercials

- Winter driving tips on the Weather Network
- 911 call program
- Driver speed feedback roadway signs

A major component of the Drive SAFE program is the Region's targeted speed monitoring and enforcement program noted herein. The Drive SAFE program also assists other Regional departments and divisions to promote safe roads in Halton. In 2023, the Region purchased two new portable speed trailers to compliment the Drive SAFE program.

The Drive SAFE program requires collaboration with the Region's Communications division so that safety initiatives can be promoted through digital channels such as social media and halton.ca.

Portable Speed Message Sign Boards

Similar to the driver speed feedback signs, five portable variable message display signs are used as a speed compliance tool to display vehicle traveling speeds to motorists. The signs are strategically placed on the Regional Road Network at known areas of concern based on high-speed locations and requests from the public.

In 2023, the signs were deployed to the following locations:

1. Dorval Drive between Monastery Drive and Old Abbey Lane
2. Brant Street between Cavendish Drive/Beaufort Drive and Greenbank Trail/Hazelton Boulevard
3. Steeles Avenue, between Sixth Line North and Sixth Line South
4. James Snow Parkway, between Trudeau Drive and Main Street
5. Tremaine Road, between Dymott Avenue and Derry Road
6. Tremaine Road, between the 401 Overpass and Campbellville Road
7. Tremaine Road, between Derry Road and Landsborough Avenue
8. Guelph Line, between 15 Side Road and 20 Side Road
9. Derry Road, between Miller Way/Armstrong Boulevard and Sauve Street
10. Guelph Line, between Upper Middle Road and Mountain Grove Avenue/Pinemeadow Drive
11. Dundas Street, between Tim Dobbie/Weslock Common and Millcroft Park Drive
12. Upper Middle Road, between Deer Park Road and Fourth Line/Nottingham Gate

4.0 Operational Performance

- 13. Neyagawa Boulevard, between River Oaks Boulevard and Munn's Avenue
- 14. Campbell Avenue, between Kingsbury Circle and Main Street
- 15. Guelph Line, between Limestone Road and McLaren Road

Staff also deployed portable message trailers adjacent to schools on Guelph Line, Derry Road, Neyagawa Boulevard, Dundas Street, and Upper Middle Road as part of the Project Safe Start program in conjunction with the Halton Regional Police Service at the beginning of September to remind motorists to watch for students and stop for school buses when required.

Portable message trailers were also deployed at the same locations the week before and after Daylight Savings Time ended to remind motorists to stay alert and slow down as it gets dark early. Following the end of Daylight Savings Time, messages were provided to alert motorists to prepare for winter conditions, use snow tires, and to keep a safe distance between vehicles.

4.1 Travel Speed and Delay Study

This section provides a snapshot of the operational performance of the Regional Road network in 2023. Halton Region conducts annual travel speed and delay studies along its roadway corridors to determine the travel time and overall level of service (LOS). Travel time is measured by comparing (a.) the average time



to travel between two points on a roadway corridor during periods of peak traffic volumes, with (b.) the time required to travel the corridor at the posted speed limit, free of delay. Figure 29 summarizes the a.m. and p.m. peak LOS for selected study corridors for 2023.

The Transportation Research Board's Highway Capacity Manual defines Level of service (LOS) as a qualitative measure describing operational conditions within a traffic stream, generally described in terms of service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience.

Figure 29 – 2023 a.m. and p.m. peak period levels of service

Level of Service	A.M. Peak Period	P.M. Peak Period
A/B	57%	44%
C	42%	49%
D	1%	7%
E	0%	0%
F	0%	0%

Note: Measured (observed) speeds associated with Levels of Service A - F are indicated in the table below. For example, where the observed travel speed is 70 percent or greater of the posted speed, the level of service is "A/B".

Average Travel Speed (% of posted speed)	Level of Service
90%	A
70%	B
50%	C
40%	D
32%	E
Less than 32%	F

In 2022, 57% of corridors had a LOS of A/B during a.m. peak periods and 44% had a LOS of A/B during p.m. peak periods. See Figure 29 for details. Other than the height of the pandemic in 2020, the 2023 level of service has improved compared to previous years. Figures 30 and 31 show the percentage of the road network by LOS for the a.m. and p.m. peak periods. The 2023 results for both peak periods show a greater proportion of the Regional road network with an LOS of A or B. Also, there has been a clear reduction in road segments with an LOS of D, E and F. Most notably, the 2023 LOS results show 0% of the Regional road network with an LOS of E or F. The results suggest continued efforts to optimize corridors and intersections along with capital reconstruction projects are having a positive impact on improving travel times and reducing gridlock.

Figure 30 - Percentage of network by level of service (a.m.), 2019 - 2023

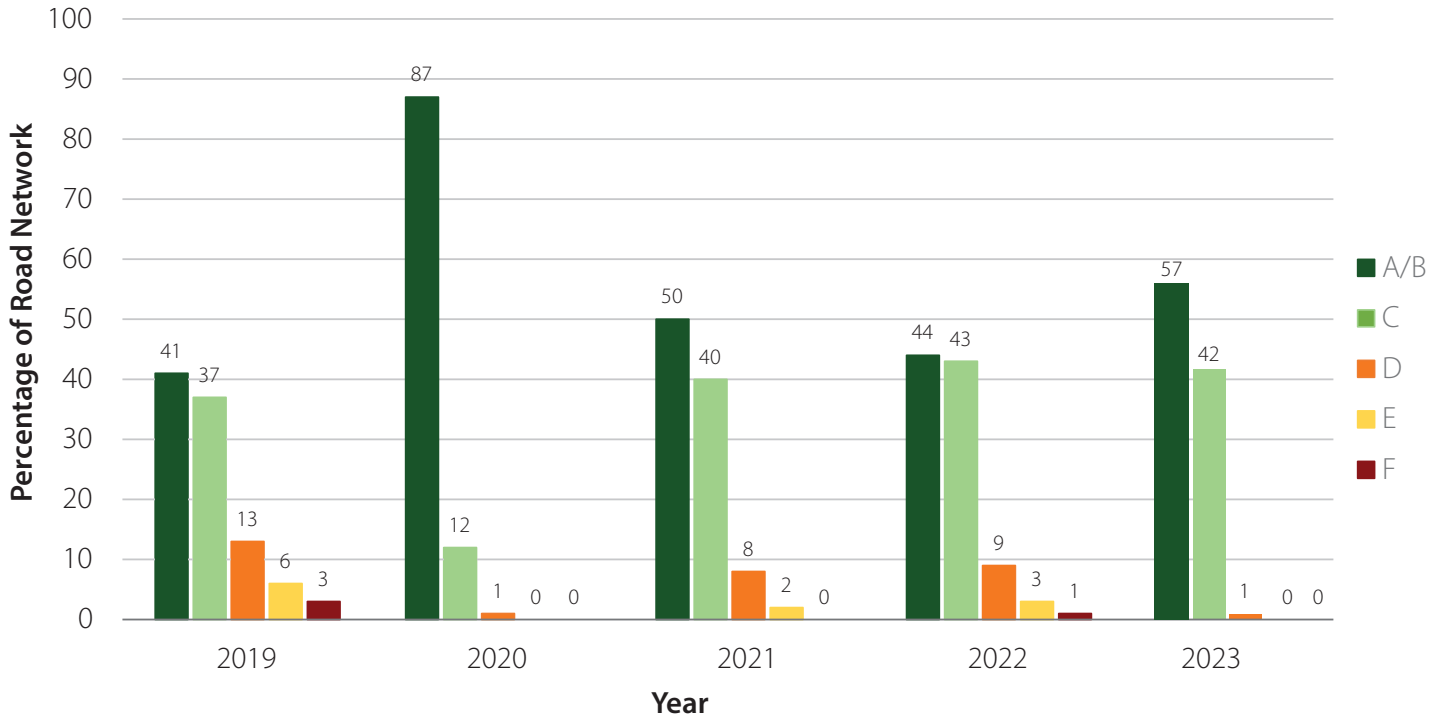
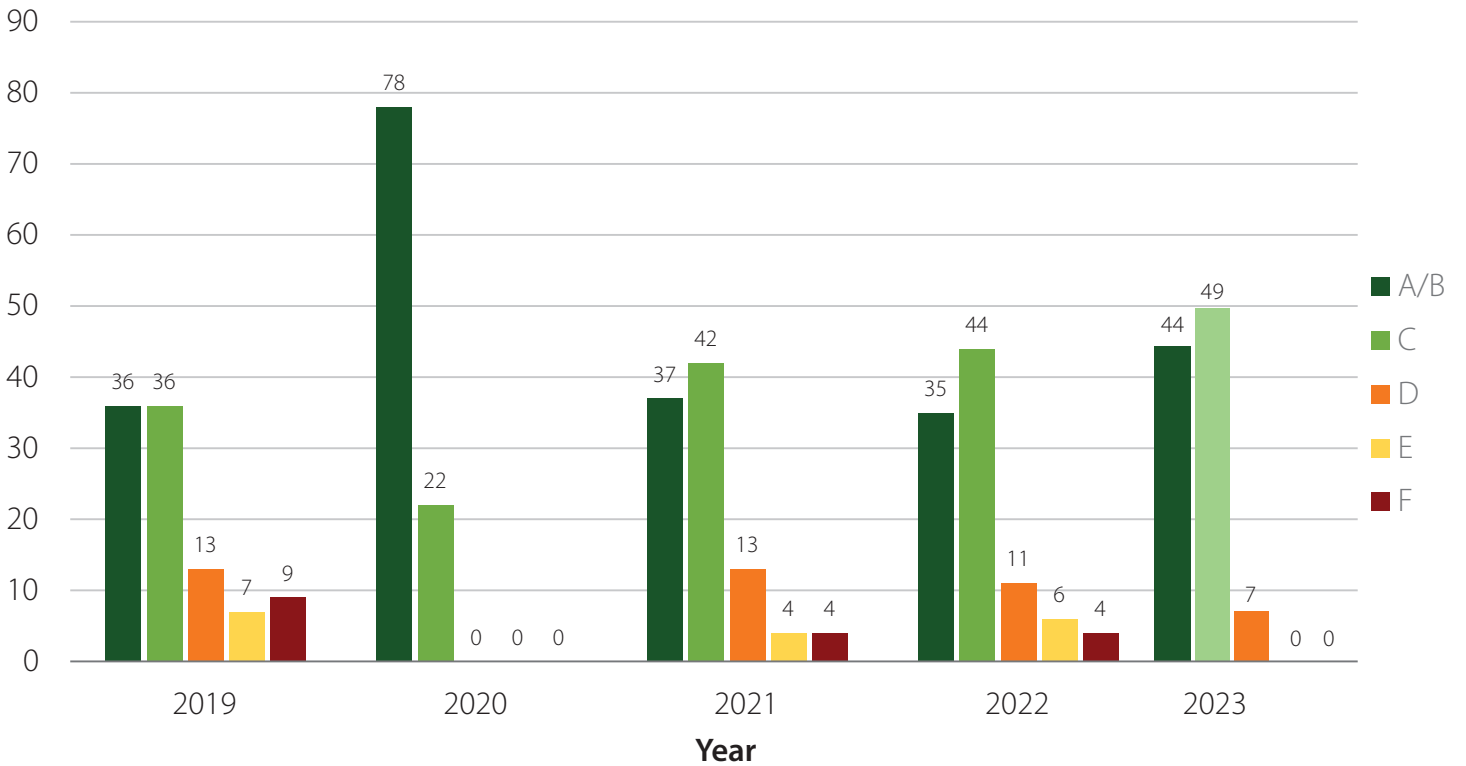


Figure 31 - Percentage of network by level of service (p.m.), 2019 - 2023



4.2 Traffic Signal Corridor Optimization

A key component to maintaining a safe and efficient road network is the effective management of traffic through major road corridors. To achieve this, traffic signal timings are coordinated to minimize vehicular delay. To ensure Halton's signals are coordinated in the most efficient manner, the Region commissions studies aimed at optimizing the signal network along major Regional corridors. To ensure the best possible service on Halton's roads, the Region has completed these studies on an annual basis since 2011 and optimized a number of corridors.

Due to the provincial lockdowns and sporadic traffic patterns caused by COVID-19, optimization studies were put on hold until traffic patterns returned to normal. In 2023, the program resumed and the following corridors were optimized:

- Dundas Street, from Neyagawa Boulevard to William Cutmore Boulevard
- Neyagawa Boulevard, from Munn's Avenue to Burnhamthorpe Road
- Steeles Avenue, from Industrial Drive to James Snow Parkway
- Martin Street / Regional Road 25, from Steeles Avenue to 5 Side Road

Through the optimization studies, the Region reviews the existing traffic conditions and optimizes the traffic signals for flow during the directional peak hours. In Halton, this is typically the eastbound and southbound direction in the a.m. peak period, and westbound and northbound during the p.m. peak period. These studies review each intersection within a corridor and the corridor

Traffic signal timing adjustments developed from the optimization studies aim to reduce road user delay along the study corridors. This is important along corridors where:

- Congestion is problematic;
- Progression is difficult to achieve due to traffic volumes; or
- Major traffic generators and freeway systems are nearby.

As capital improvements are completed along Halton's major corridors, state-of-the-art traffic signal interconnect infrastructure is being provided to ensure we achieve the long-term goal of an efficient traffic signal network.



5.0 Transportation Operations and Maintenance

5.0 Transportation Operations and Maintenance

5.1 Minimum Maintenance Standards

To ensure that monitoring and maintenance of the Regional Road Network is undertaken in accordance with established Provincial standards, Halton adopted the road classification system used by the Ministry of Municipal Affairs and Housing in O.Reg. 239/02 called the Minimum Maintenance Standards for Municipal Highways (MMSMH), made under the *Municipal Act, 2001*. The regulation was amended and updated on May 3, 2018 under O.Reg. 366/18. The MMSMH establishes six road classifications based on the Average Annual Daily Traffic (AADT) and the posted speed limit.

The frequency of road patrols is based on the road classification, with higher road classes having more frequent patrols. Annual traffic counts are used to re-evaluate the Road Classifications to ensure compliance with the Regulation.

To comply with the Provincial standards, road patrol activities must be conducted.

The objectives of road patrolling are:

- That road surface conditions are monitored, recorded, and reported without delay if adverse conditions or problems exist;
- That all roads are inspected on a regular basis;
- That all roads are in a safe condition;
- That all road deficiencies are recorded for subsequent actions and compliance monitoring;
- That road deficiencies exceeding limits specified in the Regulation are addressed timely in accordance to the Regulation;
- That citizens' needs are respected; and,
- Compliance with the MMSMH requirements.

5.2 Roadway Asset Management

Halton Region is responsible for the management of the Regional Road System and related roadway system infrastructure assets including bridges, culverts, storm, retaining walls, noise walls, streetlight system, safety devices and traffic control devices, but excluding sidewalks and multi-use paths which are owned and maintained by the Local Municipalities.

The overall condition of the Regional Road System is monitored through the Pavement Management Application, Road Assessments and Structure Inspections Biennially for Bridges, Culverts, Retaining Walls and Noise Walls. Each of these tools/assessments provide an inventory of assets, quantitative condition and performance measures, performance prediction, and engineering and economic analysis tools to provide costs for needs such as resurfacing, rehabilitation, replacement and reconstruction.

The Pavement Management Application is a tool to manage and predict pavement conditions. The Road Needs Study and Structure inspections are completed through field investigations to determine work required to ensure Regional assets are preserved in a state-of-good repair in coordination with ongoing growth and non-growth projects. Road Operations oversees the operation and maintenance of all roadway infrastructure assets daily as part of asset management.

As identified in the Capital Plan, the Region's transportation infrastructure is in a state of growth, expansion and transition with more urbanization and road widening taking place. Recent road infrastructure additions and increased demands on the Regional Road System caused by growth-related development, are driving the need for operational, maintenance and capacity improvements on roads and structures. In 2021 as part of the Asset Management Lifecycle Management Study, it was noted that 73% of all existing road infrastructure is in good to very good condition. Infrastructure that is categorized as being in poor to critical condition is being addressed through current and future planned capital improvement projects. Work within the capital program replaces and rehabilitates a portion of the overall road infrastructure annually to minimize deterioration and maximize its remaining service life.

5.3 Pavement Management

Halton Region utilizes a Pavement Management Application (Road Matrix) to evaluate, analyze and help develop a proposed list of roads for the road resurfacing program for the Regional Road Network.

This computer-based pavement management system utilizes pavement information collected and assembled from the road network such as pavement distress, ride quality and pavement condition. The pavement data and subsequent data analysis help to prioritize the maintenance and rehabilitation work for the network based on observed pavement conditions. The result is a list of road sections requiring rehabilitation and/or resurfacing that is used in the development of coordinated capital programs. Road Operations also reviews current and future planned Public Works programs from internal and external agencies as part of asset planning and life cycle management to prioritize projects.

Using Road Matrix as a part of asset management enables staff to make long-term decisions to manage the life of the roadway surface and base. The system ensures that informed decisions are being made by keeping up-to-date information and tracking changes to the roads that occur on a regular basis. This is the optimum way of measuring how well road pavements are performing over time.

The data gathered for each road section is given a Pavement Quality Index (PQI) rating which provides an overall indication of pavement condition based on surface distresses and rider comfort. This rating uses a scale of one to ten, with ten being an optimum or the highest performance rating.

Every three years, pavement condition data is collected by an automatic road analyzer vehicle that measures pavement roughness, ruts, pavement distresses and cracks. Road Matrix uses these measurements to calculate a PQI. The average PQI was 78.2 out of 100 in 2023 compared to 78.6 in 2022. PQI has not increased significantly with current works due to the backlog of resurfacing and growth projects that are ongoing. The last major pavement condition data collection update occurred in November 2022. The next major updates are scheduled for fall 2025. A three-year survey cycle was adopted to enable comparison with historical data collected in previous surveys to update the pavement management

system and continue asset management planning for the entire Regional Road Network. Annually, all major changes made to the road network through road reconstruction, widening, additions, resurfacing, major spot repairs and other capital works projects are captured within the system.

In 2023, only \$1.375M of works were completed from the total \$10.46M worth of pavement resurfacing was completed due to a late tender. In 2023, the remainder of the 2022 resurfacing program completed the remaining \$6.849M worth of pavement resurfacing in 2023. As part of the forthcoming budget for 2024, additional resurfacing candidate roads were budgeted and planned from 2024 to 2034. The investment in resurfacing extends the life of the pavement and assists in the deferral of more expensive reconstruction works. The Region will continue to invest in resurfacing, spot repair and crack sealing to ensure that state-of-good-repair objectives continue to be met. From 2010 to 2023, the Regional Road Network expanded approximately 23%, from 934 to 1,171 lane kilometres.

Staff will continue to monitor the quality of Halton's road pavements and provide recommendations to Council regarding required resurfacing investment through the annual transportation capital budget submissions.



5.4 Road Needs

A Road Needs Study is performed annually through a visual examination of inventory and an assessment of improvement needs within each road section (independent of future projects). The study provides an overall rating of the road system by section, including factors such as surface type, surface width, capacity, structural adequacy, drainage and geometry. The study reports on the deficiencies, needs and conditions captured through the Road System Inventory and Road Appraisal Sheets.

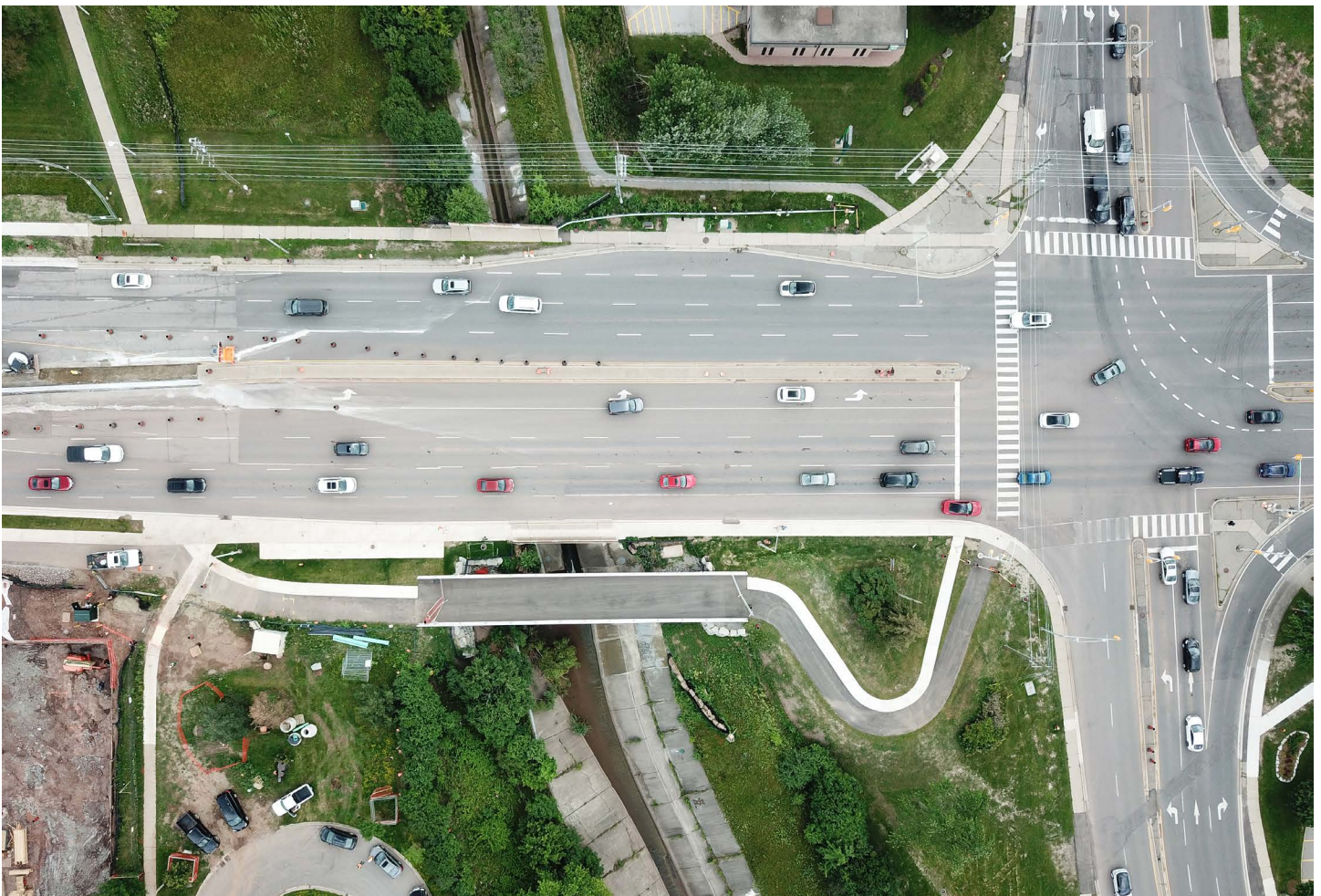
The study also identifies recommended timing and proposed construction and/or rehabilitation improvements. The recommendations guide the scheduling of improvements to ensure that preservation, upgrading, and timely replacement of roadway assets are undertaken through cost effective management and programming in conjunction with the annual capital works in progress.

In 2022, the Road Needs Study inventory was updated internally by staff. As part of the internal update, staff focused on the state-of-good-repair and reviewed the metrics previously updated with changes that occurred with current capital works in progress in the current road network.

The overall Regional Road System adequacy in 2023 was 75.9% compared to 68.8% in 2022 based on lane kilometres.

The percentage of lane kilometres of roads rated good to very good increased from 65.8% in 2022 to 70.1% in 2023.

Based on the forthcoming resurfacing and roads capital program proposed as part of the 2024 capital budget, the carryover of some 2023 resurfacing being done in spring, and extensive growth projects under construction, it is expected that the overall network system adequacy and percentage of assets rated good or very good will continue to increase and stabilize in the coming years.



5.5 Bridges, Major Culverts, Retaining Walls and Noise Walls

Halton Region's bridges, major culverts, retaining walls and noise walls are inspected as per the Ontario Structural Inspection Manual (OSIM) inspections. Provincial Legislation O.Reg. 104/97 'Standard For Bridges' requires that inspections be undertaken on a biennial basis for all bridge and culvert structures that have a span greater than three metres under the direction of a professional engineer.

An engineering consulting firm (or firms) is retained to update and keep an inventory of the bridges, culverts, retaining walls and noise walls through a close-up visual inspection and appraisal of each structure. An OSIM inspection report is completed for each structure including material and performance ratings, functional data and recommendations for engineering investigations, rehabilitations, repairs and/or replacements. The overall inventory and report summarizes the results of the inspections, weight limit assessment, structure priorities, recommendations and estimated cost for rehabilitation or replacement of each asset by its time of need. The recommendations ensure that preservation, upgrading, and timely replacement of bridges, major culverts, retaining

walls and noise wall assets are performed through cost-effective management and programming. The last OSIM inspections were performed in 2022.

The year-end 2023 Average Bridge Condition Index for 89 bridges and 97 major culverts with a span of three metres and greater along Regional Roads in Halton was 80.26 out of 100 in 2023 compared to 78.3 out of 100 in 2022.

The year-end 2023 Average Condition Index for retaining walls along Regional Roads in Halton was 75.1 out of 100 in 2023, compared to 74.8 out of 100 in 2022.

The year-end 2023 Average Condition Index for noise walls along Regional Roads in Halton was 79.21 out of 100 compared to 78.94 out of 100 in 2022.

In 2023, all condition indexes for structures increased due to replacements and new structures from current capital works programs. It is anticipated with the current capital works in progress that all indexes will increase in the coming years.

In 2024, Halton Region will re-inspect all bridges, major culverts, retaining walls and noise walls through an OSIM inspection as previously done in 2022.



6.0 Conclusion

The Region will continue to invest in bridges, major culverts, retaining walls, and noise walls as the Regional Road Network expands and existing assets decline due to age to ensure we continue to meet state-of-good-repair objectives. Staff will continue to monitor the rehabilitation and replacement requirements with the current and future planned Public Works improvement projects and provide recommendations with respect to required rehabilitation and replacement investment through the annual transportation capital budget submissions.

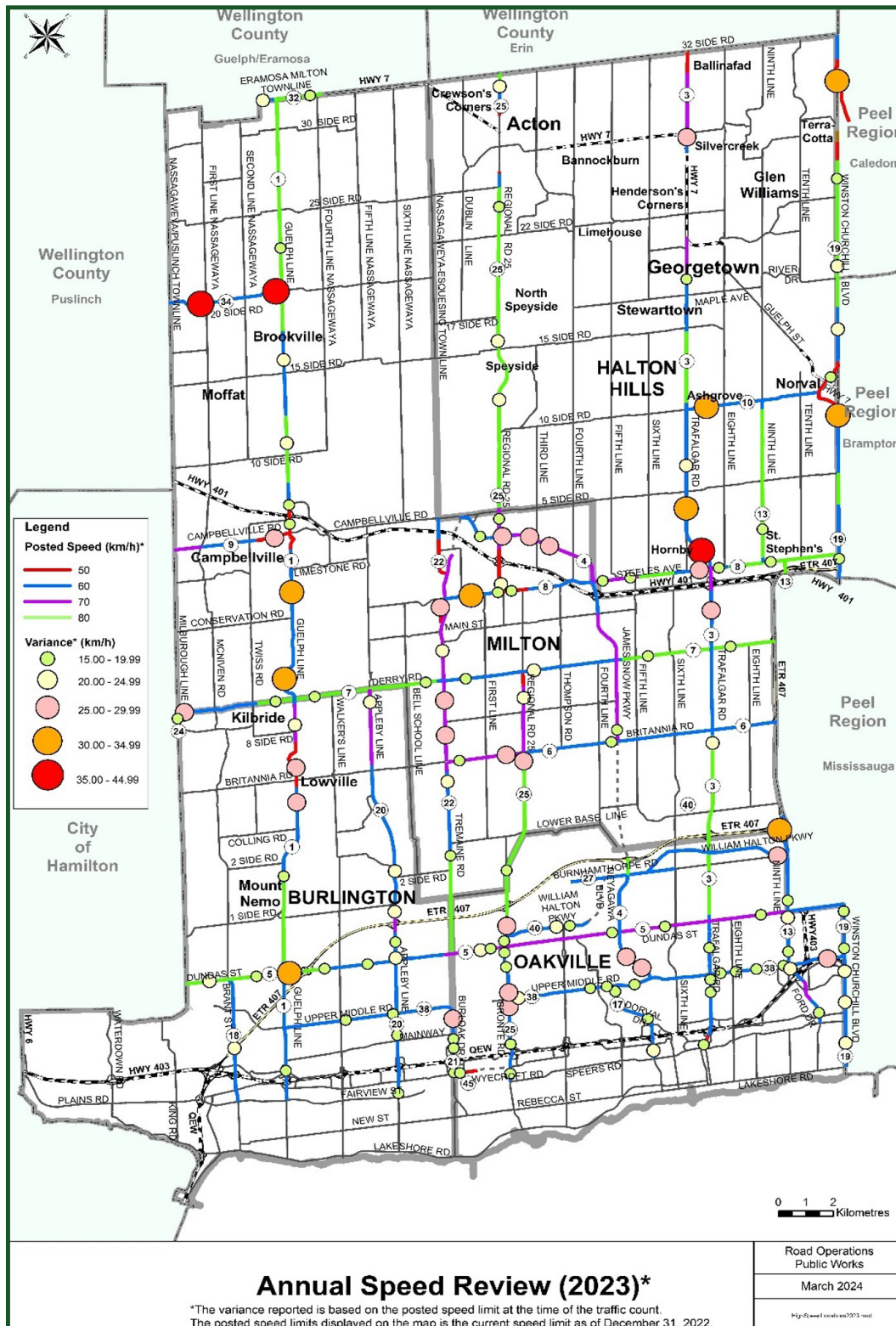
6.0 Conclusion

The 2023 Transportation Progress Report provides an overview of the performance of the Regional Road Network, and some of the current projects and initiatives in progress.

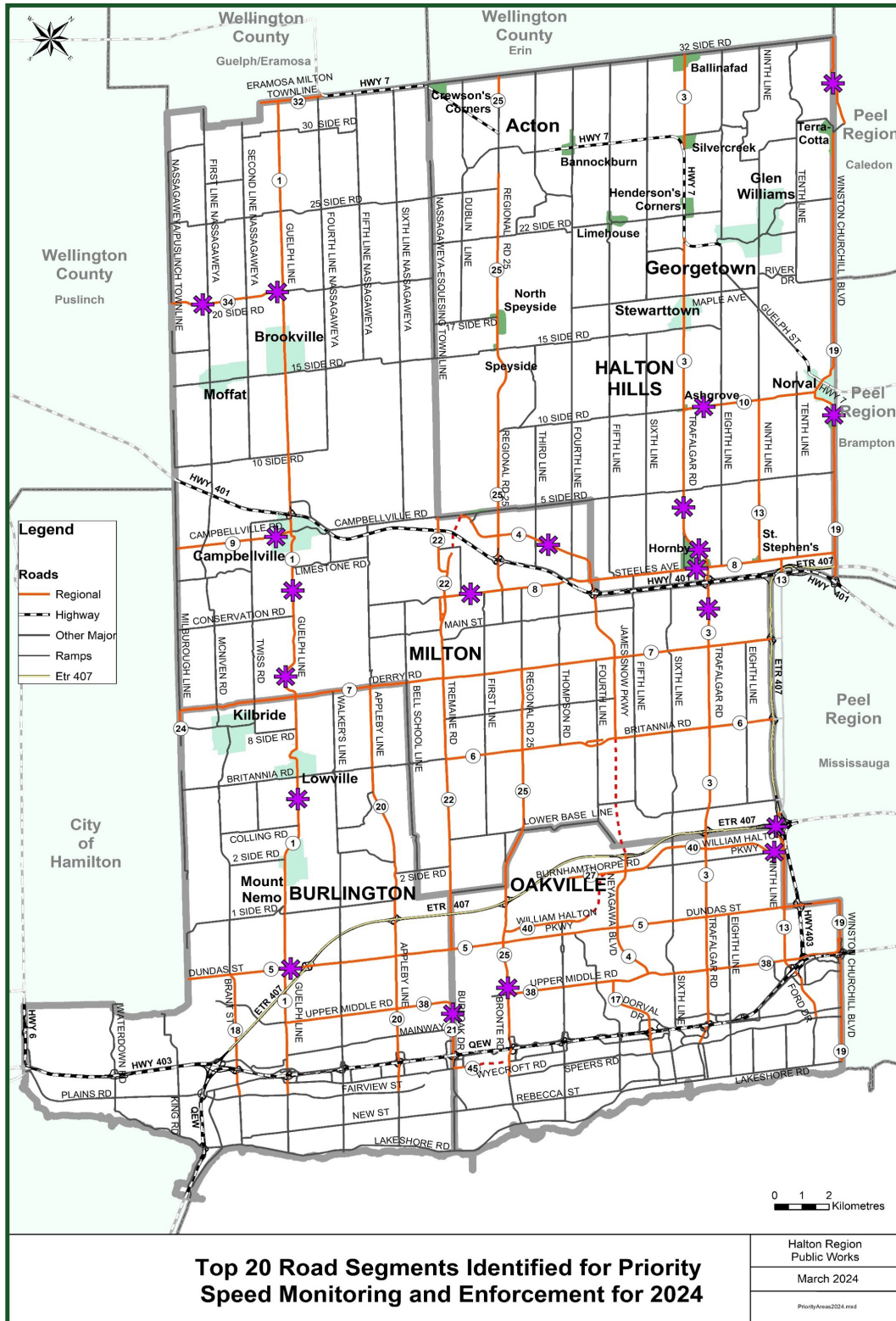
- 2023 traffic volumes and collisions indicate COVID-19 is no longer affecting driving behaviours with overall volumes and collisions returning to pre-pandemic levels.
- The TOSS Visual inspection that identified over 500 deficiencies to be addressed over a five year implementation plan has been programmed for completion and is anticipated to be finished ahead of schedule.
- The procurement of additional portable variable message trailers to assist with Drive SAFE campaigns.
- The installation and activation of five red light cameras.
- The resumption of annual corridor optimization program.
- An average level of service of C or higher on Regional corridors.



Appendix B



Appendix C



Appendix D

