



Document 1: Automated Speed Enforcement Pilot – Technical Memo

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INTRODUCTION

The Safer Roads Ottawa program and the Road Safety Action Plan's primary goal is to reduce or eliminate road death and serious injuries for all people in the City of Ottawa. Speeding has been identified as a major contributor to collisions and injuries on roadways as shown by studies done internationally and within Canada. The main purpose of automated speed enforcement is to reduce the speed of vehicles, and thus the risk of fatal or major injury (FMI) collisions.

Automated speed enforcement has been used in several cities within Canada. An assessment of the programs in Calgary, Edmonton, Winnipeg, and Gatineau, show that all have reported significant improvements following the implementation of automated speed enforcement, in reductions in total collisions; reductions in fatal collisions; reductions in injuries related to collisions; and increased compliance to posted speed limits.

An Automated Speed Enforcement (ASE) pilot project was conducted in the City of Ottawa between July 2020 and July 2021 to determine the effectiveness of speed cameras as a device to help reduce speeding on roadways within the city. The pilot focused on roadways adjacent to eight schools at the following locations:

- Innes Rd between Provence Ave and Trim Rd;
- Bayshore Dr near 50 Bayshore Dr;
- Smyth Rd between Haig Dr and Edgecomb St;
- Meadowlands Dr W between Winthrow Ave and Thatcher St;
- Katimavik Rd between Castlefrank Rd and McGibbon Dr;
- Ogilvie Rd between Appleford St and Elmlea Gate;
- Watters Dr between Charlemagne Blvd and Roberval Ave; and,
- Longfields Dr between Highbury Park Dr and Via Verona Ave.

The pilot project started with four cameras: two cameras were deployed as fixed sites at Innes and Bayshore, while the other two cameras rotated between the other six sites, listed above. In late 2020, an additional four cameras were procured to convert all sites to fixed locations as of February 16, 2021.

Speed data were collected at all sites throughout the pilot project to determine changes in traffic speeds at the sites resulting from implementation of the speed cameras. A review of speeds at comparable sites without speed cameras (control sites) was also undertaken to determine if there were any changes in speeds at those sites to help rule out other factors that could account for any observed speed reductions at the pilot sites. The review looked at three main indicators related to speeding:

- **Compliance:** The percentage of traffic travelling at or below the speed limit of the roadway. If cameras are effective, this percentage increases;
- **85th Percentile Speed:** Typically referred to as the operating speed, it is the speed at which 85% of the traffic is travelling at or below. If cameras are effective, this value decreases; and,
- **Percentage of High-end Speeders:** The percentage of traffic travelling 15 km/h or more over the speed limit of the roadway. If cameras are effective, this percentage also decreases.

METHODOLOGY

To measure the effectiveness of the ASE cameras, speed studies were conducted using Huston Radar Armadillo units to establish existing baseline traffic speeds at the ASE sites before implementation of the speed cameras. The data used as the existing baseline data were those used in the site selection process to identify pilot locations and were collected in 2018 and 2019. Speed studies were conducted at six of the sites on a monthly basis starting in March 2020 and continued throughout the pilot. Data collection started in April 2020 at the remaining two sites but prior to the start of enforcement at those locations. All data studies were conducted over a 24-hour period on weekdays. Based on the trends in the three main indicators related to speeding from these studies, the decision to start the ASE pilot in July 2020 was made.

Seven sites that did not have speed cameras installed were identified as control sites to help rule out other factors that may affect speed changes at the pilot sites. If comparable changes in speeds occur at the control sites and the pilot sites over the same period, then other factors are likely responsible for the changes in speeds. If changes occur only at the pilot sites where cameras were installed but not at the control sites, then it is more likely that the changes in speeds can be attributed to the implementation of speed cameras at the pilot sites.

Sites were selected as control sites if they shared similar characteristics of posted speed limit, average annual daily traffic, roadway cross-section and classification, and adjacent land use to the pilot sites. The seven sites that met the aforementioned criteria were:

- Meadowlands Dr E from Eagle Lane and Beliveau St;
- Castlefrank Rd from Hungerford Dr and Parsons Ridge Rd;
- Fisher Ave from Falaise Rd and Normandy Cres;
- Merivale Rd from Raven Ave and Larose Ave;
- Tenth Line Rd from Amiens St and Des Epinettes Ave;
- Jeanne D'Arc Blvd from Kinglet Way and Kingfisher Cres; and
- Orleans Blvd from Beausejour Dr and Boyer Rd.

Speed data for the control sites were obtained from existing speed boards that were located at the sites for at least a year prior to the start of the pilot.

Compliance with the speed limit, 85th percentile speed and percentage of high-end speeders were calculated each month at each site to evaluate the effectiveness of the sites throughout the duration of the pilot.

RESULTS

Baseline Data

The baseline data consisted of data collected as part of the original site selection process and was collected during the Fall 2018 and Spring 2019, depending on the site. **Table 1** shows the average daily traffic volume in vehicles per day, the posted speed limit in kilometers per hour, and data on the main indicators of speeding at each of the pilot sites.

Table 1 - Baseline Speed Data for Automated Speed Enforcement Pilot Sites (2018 / 2019)

Location	Average Daily Traffic Volume (vpd*)	Posted Speed Limit (km/h)	Compliance (%)	85 th Percentile Speed (km/h)	Percentage of High-end Speeders (%)
Bayshore	9,566	40	14%	54	12%
Innes	14,482	60	23%	74	11%
Meadowlands	15,454	40	16%	52	8%
Smyth	15,552	50	28%	63	9%
Katimavik	7,312	40	12%	56	17%
Ogilvie	16,136	50	16%	66	17%
Watters	4,884	40	14%	58	12%
Longfields	9,136	40	10%	55	22%
Average	11,565	N/A	16%	N/A	14%

* vpd = vehicles per day

The following was observed at the ASE pilot sites during the baseline period:

- Compliance ranged between 10% and 28% with a compliance of less than 20% at six of the eight sites;

- The 85th percentile speed ranged between 12 km/h to 18 km/h over the speed limit at all sites with the Watters site showing the highest 85th percentile speed over the speed limit; and,
- The percentage of high-end speeders was as low as 8% at the Meadowlands site and as high as 22% at the Watters site.

Pilot Data

Pilot data were collected starting in March 2020 and continued through July 2021. Pilot data includes two periods:

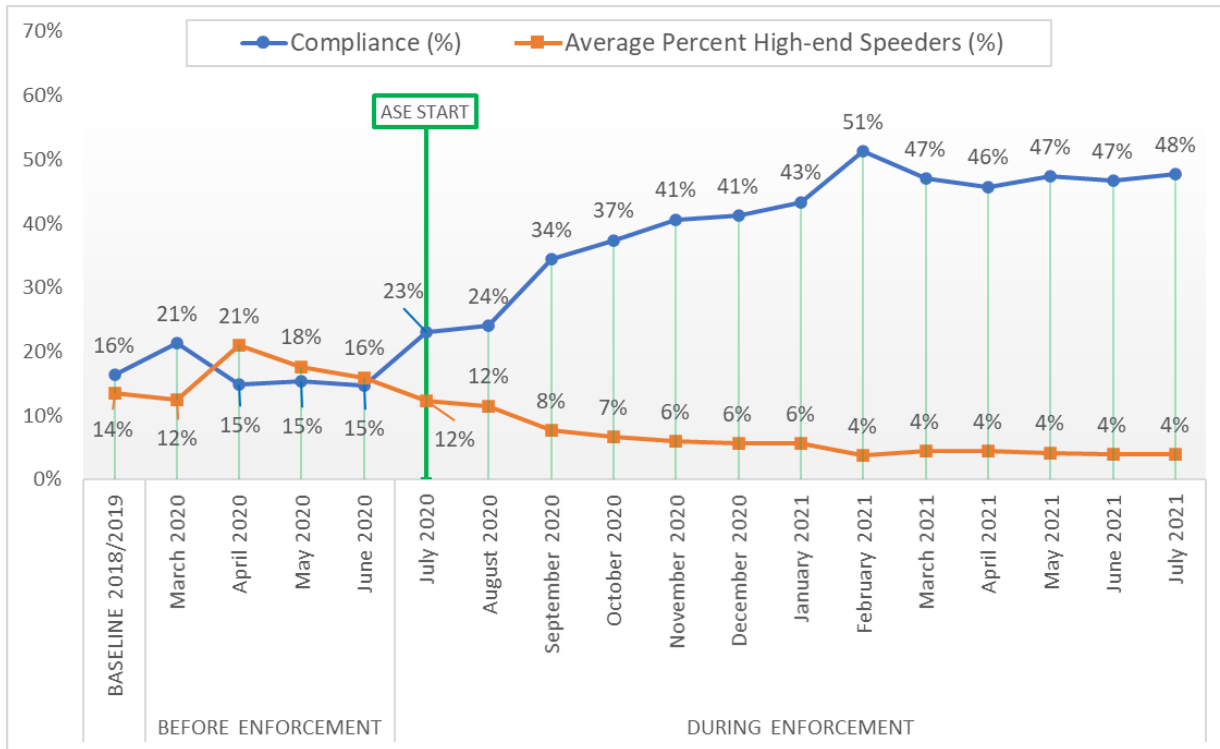
- Before Enforcement: March 2020 – June 2020, the period before ASE enforcement started; and,
- During Enforcement: July 2020 – July 2021, the period during which ASE enforcement was underway.

A review of the data from before ASE cameras started enforcing, showed that starting in April of 2020, there was an increase in speeds and a reduction in compliance at all sites when compared to the baseline data. This was likely due to the change in traffic patterns during the first COVID-19 Pandemic lockdown that started in mid-March 2020. The following was observed:

- The average compliance declined from 21% in March 2020 to 15% in April 2020;
- The 85th percentile speed increased by 4% in April 2020 compared to March 2020; and
- The average percentage of high-end speeders went from 12% in March 2020, to 21% in April 2020 to 16% in June 2020.

Once the cameras were deployed and enforcement began on July 13, 2020, speeds started to decrease immediately and continued to do so for several months before stabilizing. Site specific data are summarized in Attachment 1 - Site Specific Speed Data Summaries. Figure 1 below shows the compliance and percent of high-end speeders, month-over-month averaged across all sites.

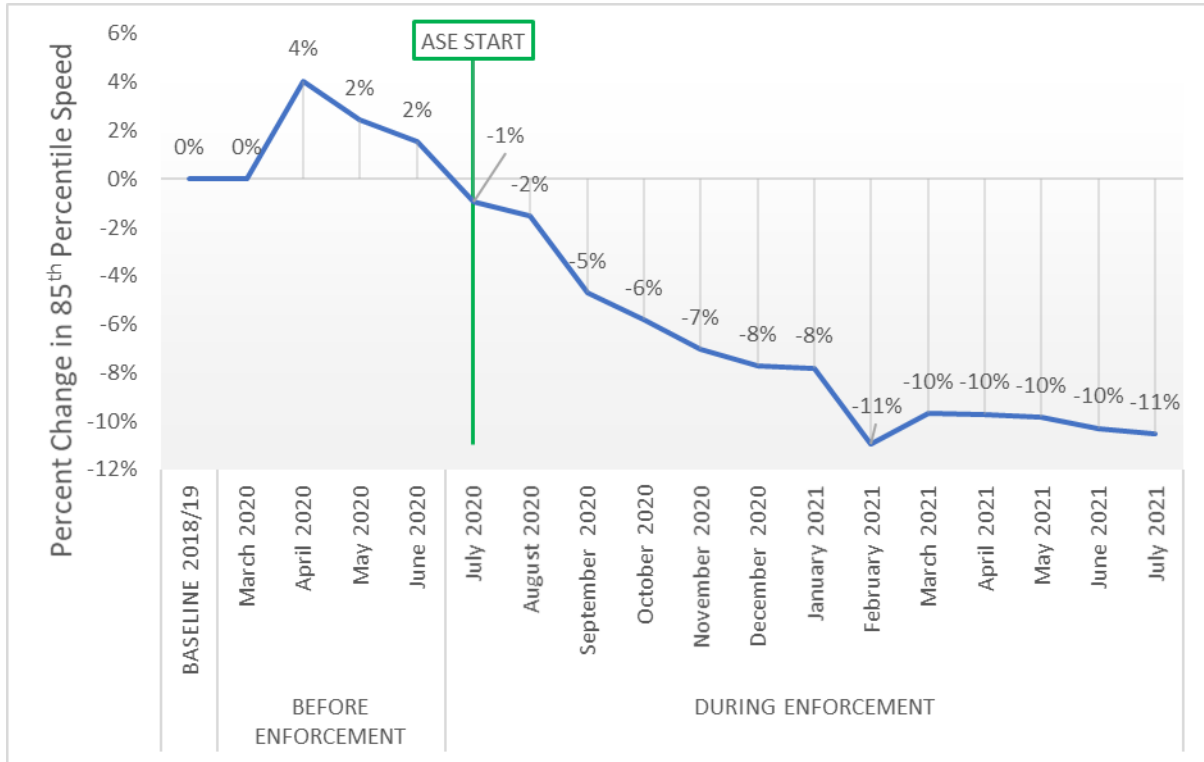
Figure 1- Average Compliance and Percent High-end Speeders for all ASE Pilot Sites by Month



Compliance steadily rose throughout the pilot. The data show that on average, only 16% of the drivers were obeying the speed limit before the implementation of ASE cameras compared to 48% by the end of the pilot. Additionally, 14% of the traffic was travelling 15 km/h or more over the speed limit prior to the start of the pilot, with only 4% travelling at this rate of speed by the end of the pilot. This indicates that speeds are going down at the pilot sites with more drivers following the speed limit and fewer drivers driving at excessive speeds past the cameras. In terms of percent change there was a 200% increase in compliance with the speed limit and a 72% decrease in the percent of high-end speeders.

Figure 2 shows the percent change in 85th percentile speed (commonly referred to as operating speed) month-over-month averaged across all sites. Typically, the 85th percentile speed is expressed in km/h but when summarizing the data across sites with different initial operating speeds, it is more meaningful to express the data in terms of percent change from the baseline value of 0%. A positive value indicates an increase in speed from the baseline and a negative value indicates a decrease in operating speed from the baseline value.

Figure 2: Average Percent Change in 85th Percentile Speed for all ASE Pilot Sites by Month



The data indicated that the operating speed started to decline once enforcement started and continued to decline until stabilizing in March 2021. When comparing the most recent speed data (July 2021) to the baseline data, the 85th percentile operating speed decreased by 11%. The 85th percentile operating speeds are shown for each site in Attachment 1 - Site Specific Speed Data Summaries.

Control Site Data

In order to evaluate whether changes in speed characteristics were attributable to the implementation of ASE at the pilot sites, a review of control site data was undertaken. The control site data from April 2020 through July 2021 are summarized by month in Table 2. Baseline data from June 2019 is also included. Table 2 shows a summary of the data evaluated at the seven control sites and includes average compliance, percentage of high-end speeders and the 85th percentile speed for each site.

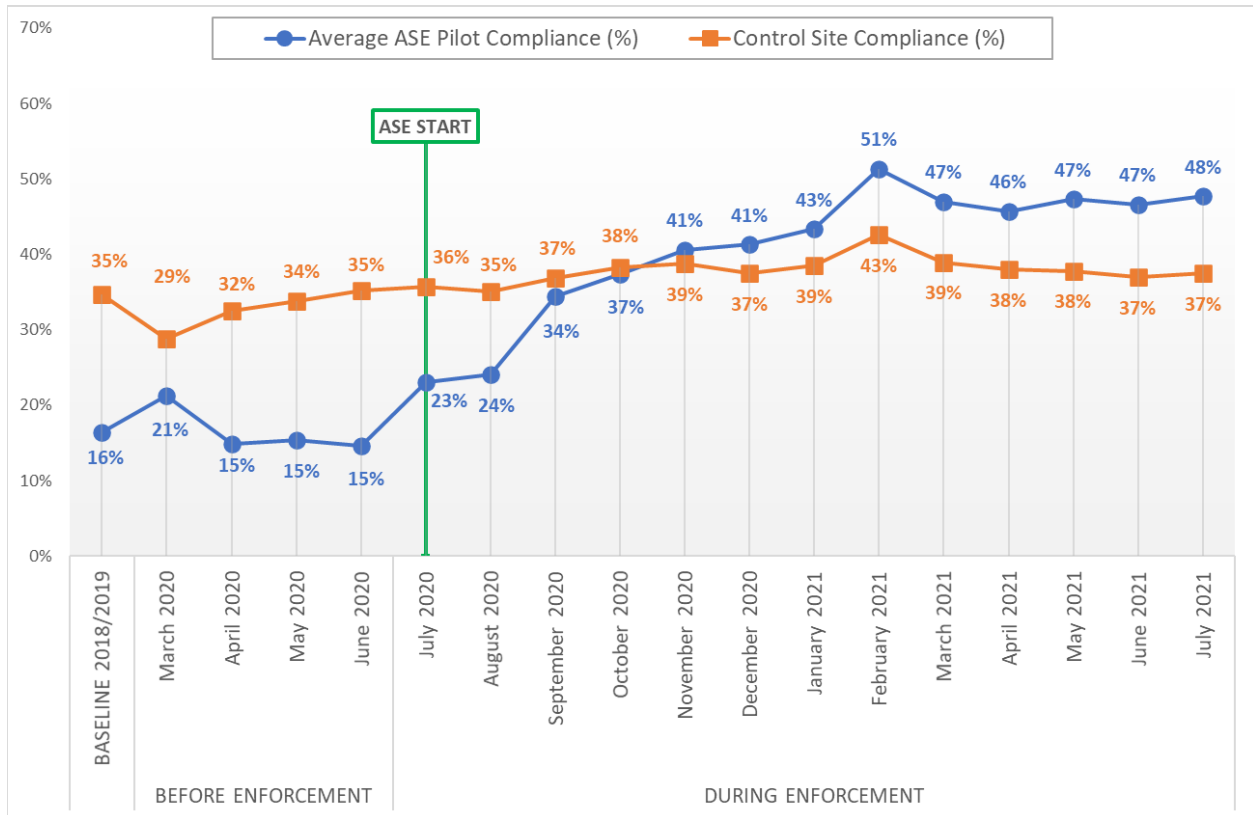
Table 2: Average Speed Data at Control Sites by Month

Period	Month	Average Compliance (%)	Average Percent High-end Speeders (%)	Average 85th Speed Above Posted (km/h)
Baseline	June 2019	35%	8%	11
Before Enforcement	March 2020	29%	11%	14
	April 2020	32%	9%	13
	May 2020	34%	8%	12
	June 2020	35%	6%	11
During Enforcement	July 2020	36%	6%	11
	August 2020	35%	8%	11
	September 2020	37%	7%	11
	October 2020	38%	7%	11
	November 2020	39%	7%	10
	December 2020	37%	8%	11
	January 2021	39%	7%	10
	February 2021	43%	6%	9
	March 2021	39%	6%	10
	April 2021	38%	5%	10
	May 2021	38%	5%	10
	June 2021	37%	5%	10
July 2021	37%	5%	10	

The control sites showed a fairly consistent average compliance of 34 to 37% from May 2020 to July 2021 which was comparable to the 35% compliance during the baseline timeframe of June 2019. The percentage of high-end speeders was also fairly consistent, ranging from 5 to 8% between May 2020 and July 2021. Higher levels of speeding were observed at the control sites in March and April 2020, similar to the changes observed in the pilot site data.

Figure 3 shows a comparison between the average compliance at the ASE pilot sites and control sites for the baseline data and between March 2020 and July 2021. Overall average compliance to the posted speed limits at ASE locations improved considerably while the average compliance at the control sites remained the same, indicating that it is likely that the introduction of speed cameras at the ASE pilot sites resulted in the reduction in speeds at those locations.

Figure 3 - Average Compliance for ASE and Control Sites by Month



Conclusion

The evaluation of the ASE sites provides strong evidence that the automated speed enforcement pilot has resulted in a substantial reduction in speeds at the sites. The change in the 85th percentile speed, compliance, and percent of high-end speeders have all trended towards safer driving behaviours. The ultimate goal of the ASE sites is to reduce speeding and thus the risk of collision or the severity of a collision. Due to the short duration of the pilot, it was not possible to assess impacts on collision trends at the ASE sites. Traffic Services will be monitoring collision data on these roadways over the following years which will provide insight into the direct effects of ASE on collision frequency and severity. Industry best practice is to review the three or five-year collision history immediately prior to the installation of a new traffic control measure and compare it against the three or five-year collision history occurring at this same location immediately following the installation of the control measure.

Continuing to collect and evaluate data at all sites will help provide further insight into the long-term performance of ASE cameras. The data collected to date during the pilot leads to the conclusion that at a minimum, there is a reduction in speeding where ASE cameras are implemented.



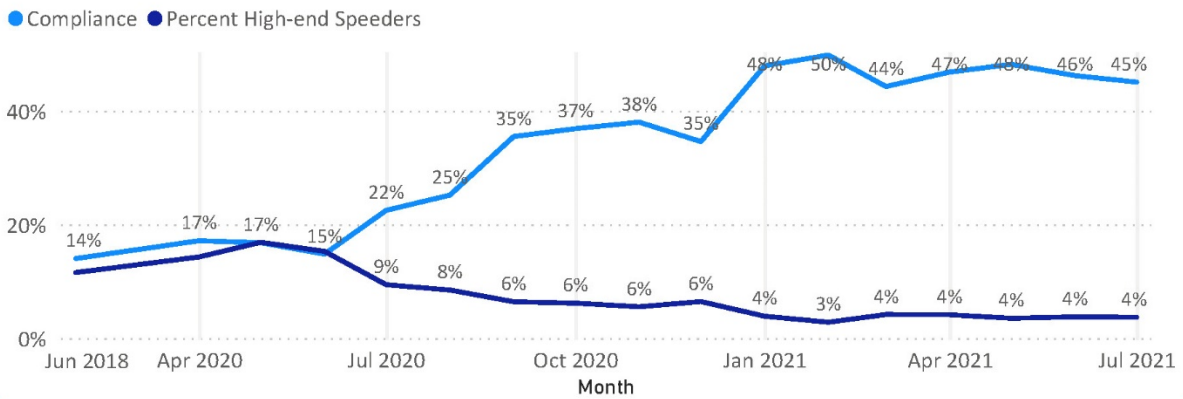
Attachment 1: Site Specific Speed Data Summaries

Bayshore Dr near 50 Bayshore Dr

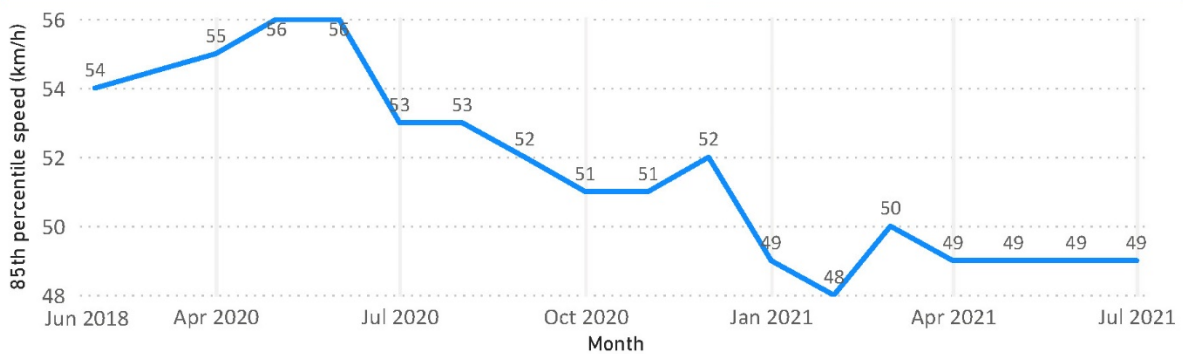
Automated Speed Enforcement Evaluation
Posted Speed limit - 40 km/h

	Compliance	85th Percentile Speed (km/h)	% High-End Speeders
Baseline Data (June 2018)	14%	54	12%
During Enforcement (July 2021)	45%	49	4%
Percent Change (June 2018 - July 2021)	221%	-9%	-68%

Compliance and Percent High-end Speeders by Month

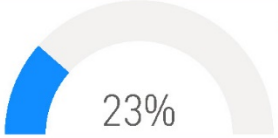
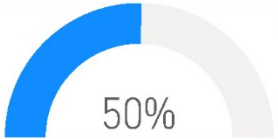

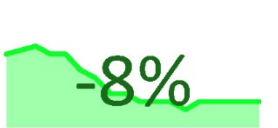



85th Percentile Speed by Month

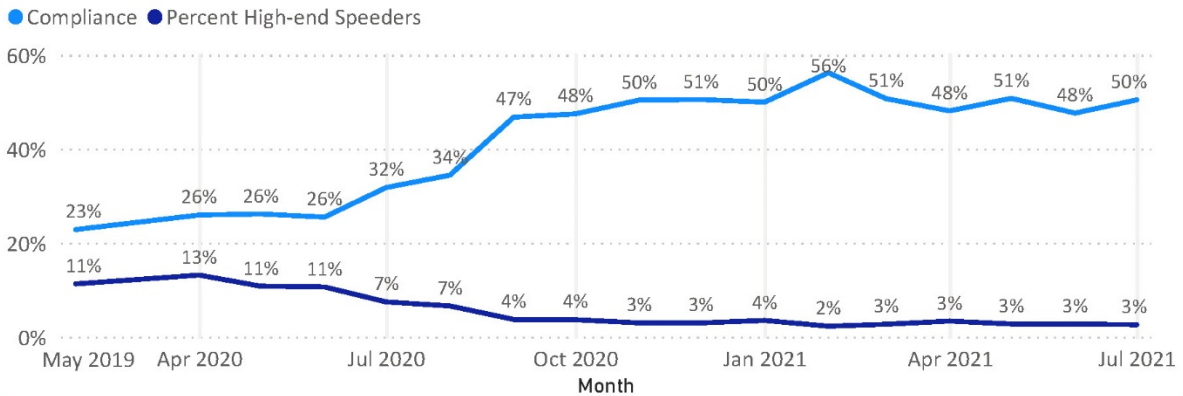


Innes Rd. between Provenance Ave. and Trim Rd.

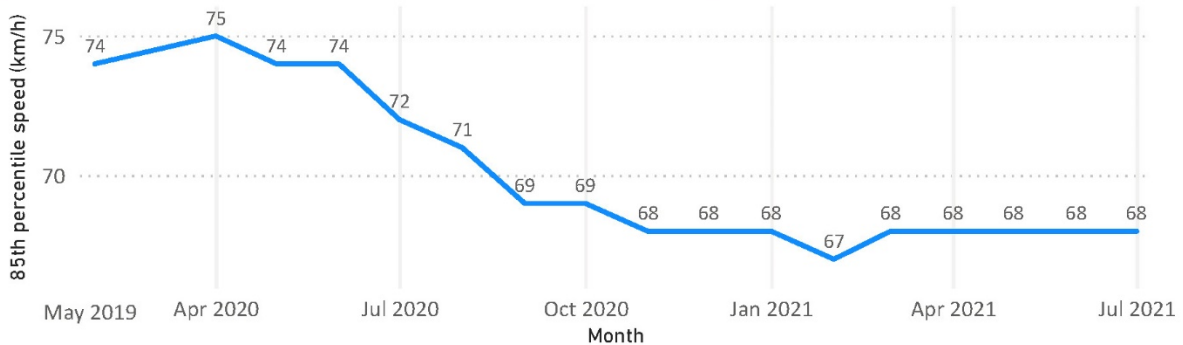
Automated Speed Enforcement Evaluation
Posted Speed limit - 60 km/h

	Compliance	85th Percentile Speed (km/h)	% High-End Speeders
Baseline Data (May 2019)	 23%	74	11%
During Enforcement (July 2021)	 50%	68	3%
Percent Change (May 2019 - July 2021)	 121%	 -8%	 -77%

Compliance and Percent High-end Speeders by Month



85th Percentile Speed by Month

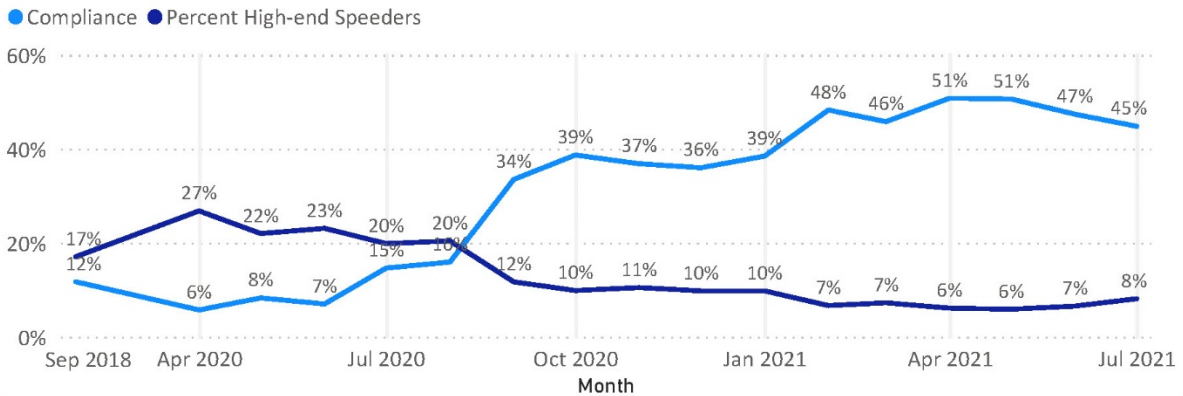


Katimavik Rd. between Castlefrank Rd. and McGibbon Dr.

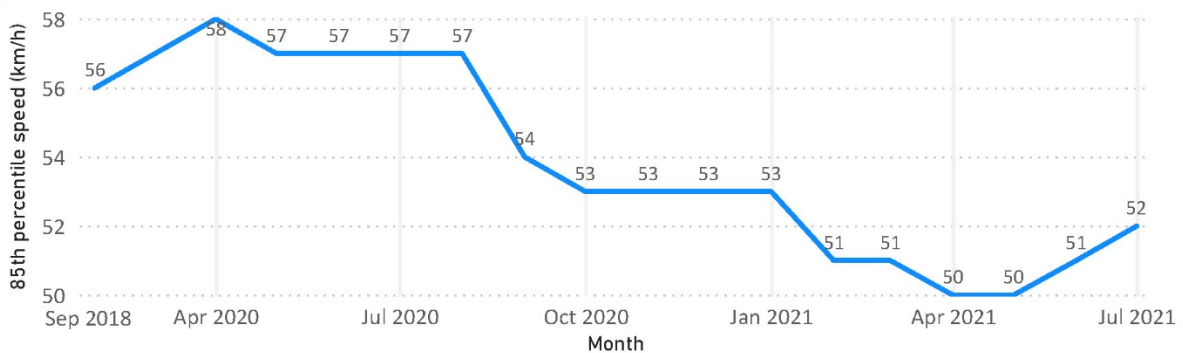
Automated Speed Enforcement
Posted Speed limit - 40 km/h

	Compliance	85th Percentile Speed (km/h)	% High-End Speeders
Baseline Data (September 2018)	12%	56	17%
During Enforcement (July 2021)	45%	52	8%
Percent Change (September 2018 - July 2021)	281%	-7%	-52%

Compliance and Percent High-end Speeders by Month



85th Percentile Speed by Month

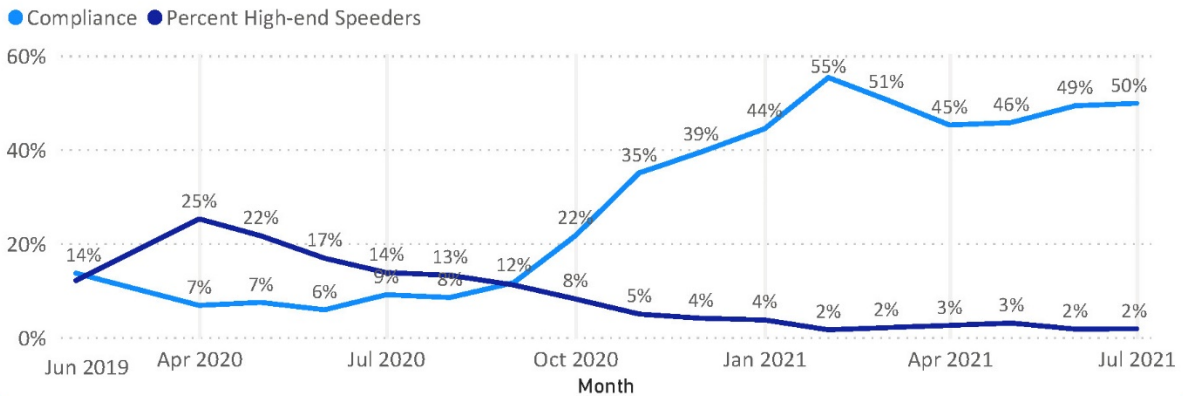


Longfields Dr. between Highbury Park Dr. and Via Verona Ave.

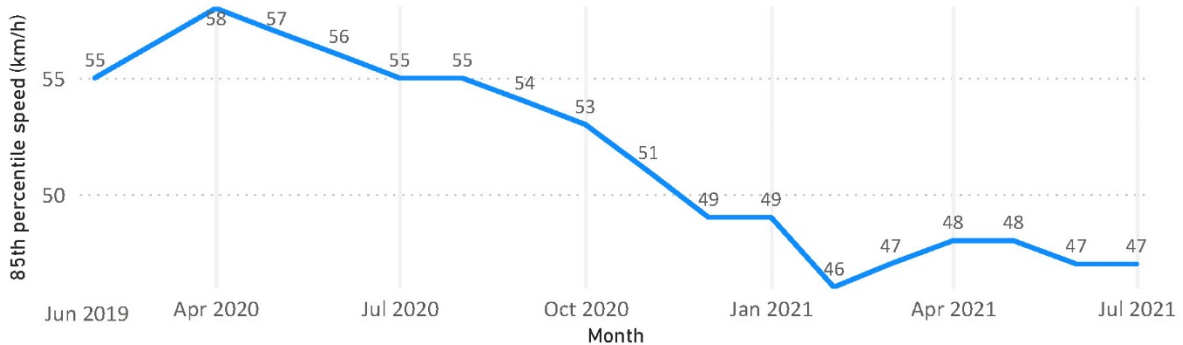
Automated Speed Enforcement Evaluation
Posted Speed limit - 40 km/h

	Compliance	85th Percentile Speed (km/h)	% High-End Speeders
Baseline Data (June 2019)	14%	55	12%
During Enforcement (July 2021)	50%	47	2%
Percent Change (June 2019 - July 2021)	265%	-15%	-85%

Compliance and Percent High-end Speeders by Month



85th Percentile Speed by Month



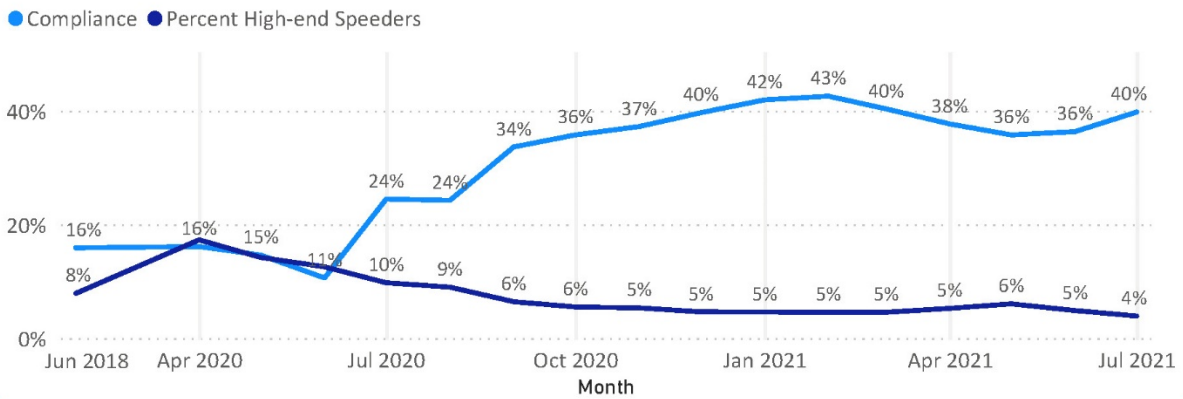
Meadowlands Dr. W. between Winthrow Ave. and Thatcher St.

Automated Speed Enforcement Evaluation

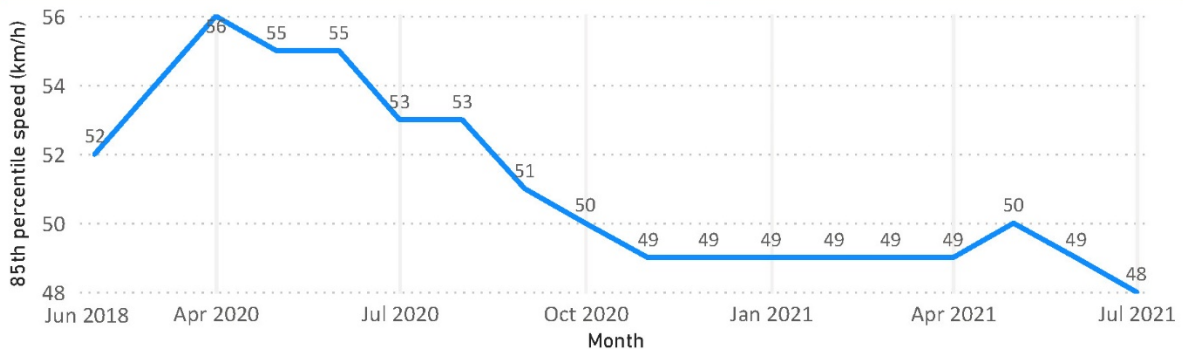
Posted Speed limit - 40 km/h

	Compliance	85th Percentile Speed (km/h)	% High-End Speeders
Baseline Data (June 2018)	16%	52	8%
During Enforcement (July 2021)	40%	48	4%
Percent Change (June 2018 - July 2021)	150%	-8%	-50%

Compliance and Percent High-end Speeders by Month

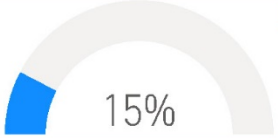
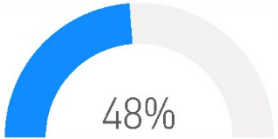





85th Percentile Speed by Month

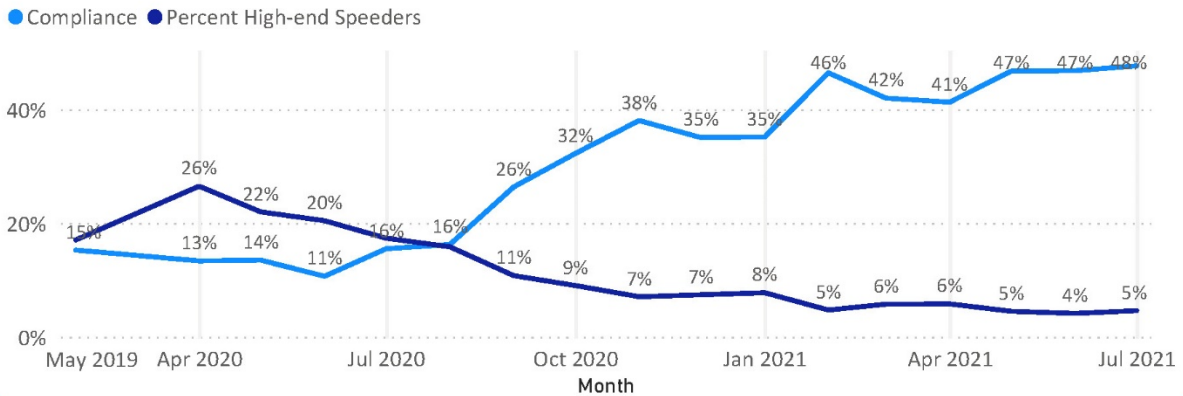


Ogilvie Rd between Appleford St. and Elmlea Gate

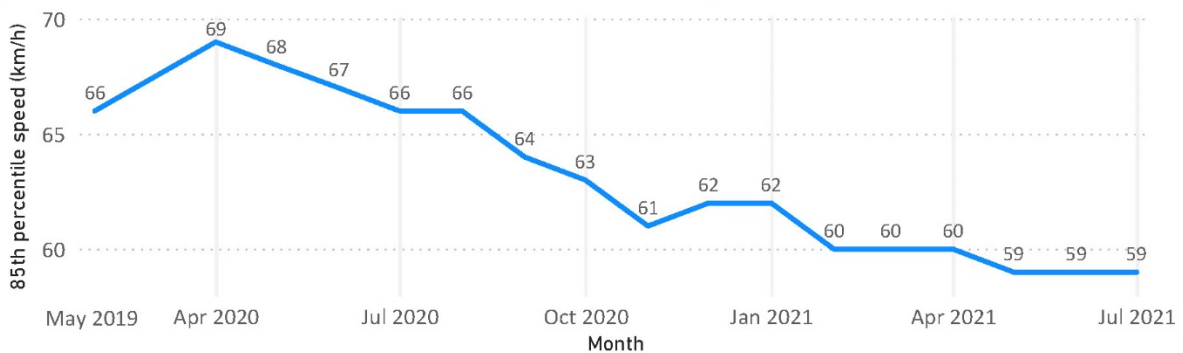
Automated Speed Enforcement Evaluation
Posted Speed limit - 50 km/h

	Compliance	85th Percentile Speed (km/h)	% High-End Speeders
Baseline Data (May 2019)	 15%	66	17%
During Enforcement (July 2021)	 48%	59	5%
Percent Change (May 2019 - July 2021)	 212%	 -11%	 -73%

Compliance and Percent High-end Speeders by Month

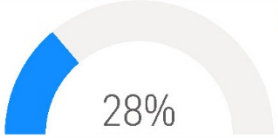
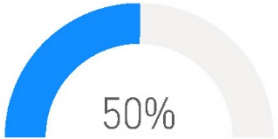

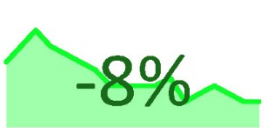



85th Percentile Speed by Month

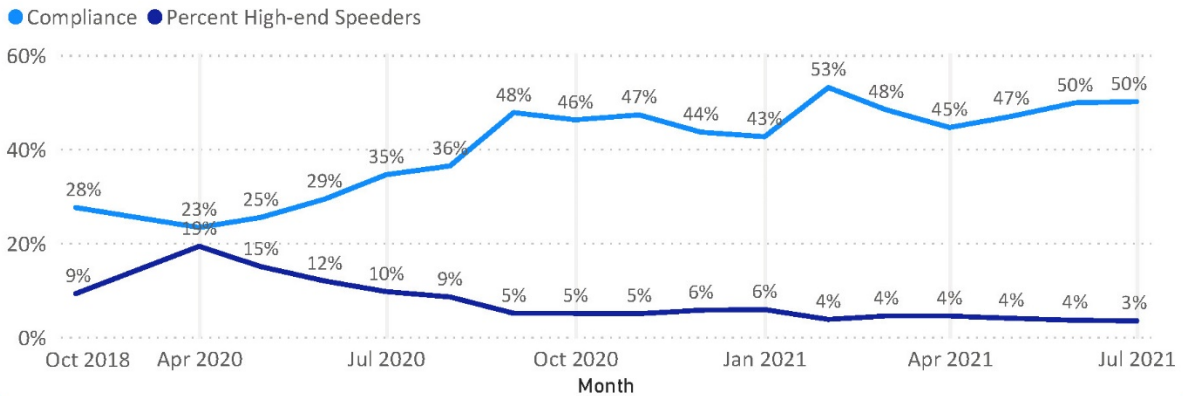


Smyth Rd. between Haig Dr. and Edgecomb St.

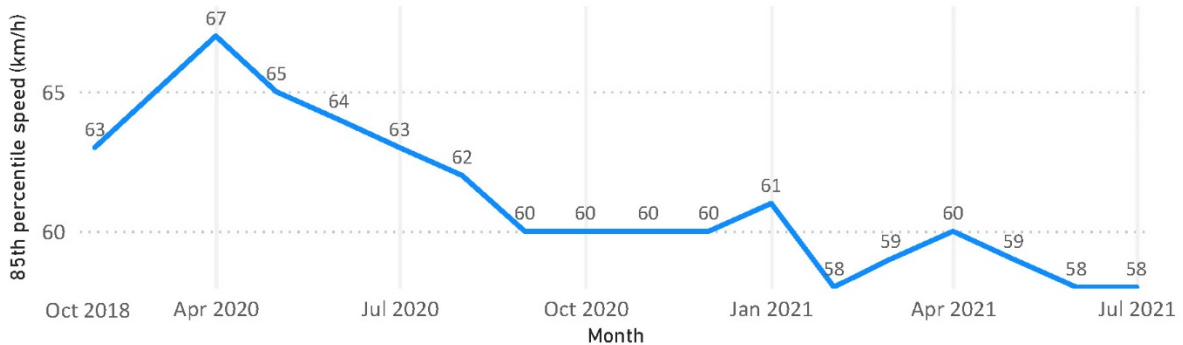
Automated Speed Enforcement Evaluation
Posted Speed limit - 50 km/h

	Compliance	85th Percentile Speed (km/h)	% High-End Speeders
Baseline Data (October 2018)	 28%	63	9%
During Enforcement (July 2021)	 50%	58	3%
Percent Change (October 2018 - July 2021)	 82%	 -8%	 -63%

Compliance and Percent High-end Speeders by Month



85th Percentile Speed by Month

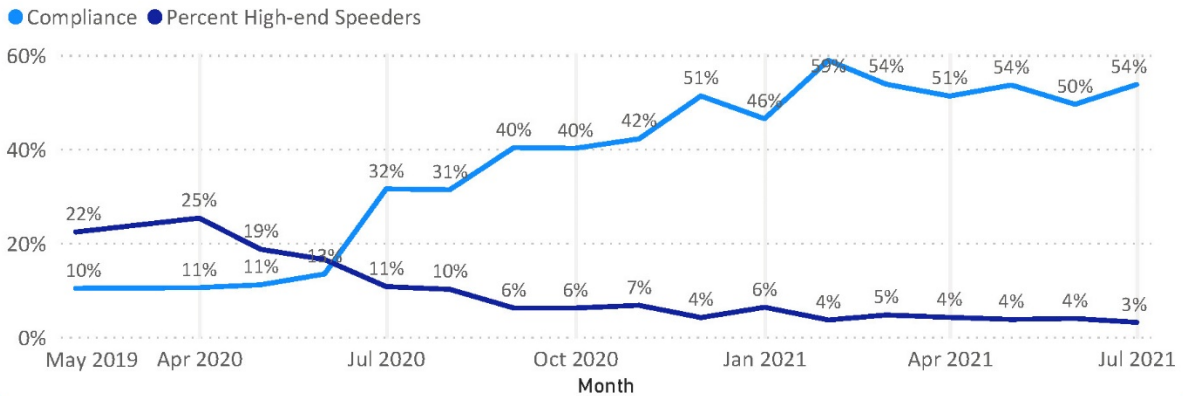


Watters Dr. between Charlemagne Blvd. and Roberval Ave.

Automated Speed Enforcement Evaluation
Posted Speed limit - 40 km/h

	Compliance	85th Percentile Speed (km/h)	% High-End Speeders
Baseline Data (May 2019)	10%	58	22%
During Enforcement (July 2021)	54%	47	3%
Percent Change (May 2019 - July 2021)	418%	-19%	-86%

Compliance and Percent High-end Speeders by Month



85th Percentile Speed by Month

