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RED LIGHT CAMERAS AND PHOTO RADAR

The Transportation Services Committee recommends the adoption of the recommendations contained in the following report dated April 4, 2012, from the Commissioner of Transportation and Community Planning.

1. RECOMMENDATIONS

It is recommended that:

1. Council re-confirm its support of the use of red light cameras as a tool to reduce red light running at signalized intersections on the Regional road network.
2. Red light camera program costs be included for consideration in the 2013 Business Plan and Budget process.
3. The Regional Clerk circulate this report to the Clerks of the local municipalities.

2. PURPOSE

This report provides information regarding the use of red light cameras and photo radar for automated enforcement on the Regional road network in response to a November 2, 2011 request from Transportation Services Committee.

3. BACKGROUND

The use of photo radar for automated speed enforcement was approved for use in Ontario in 1994

An automated speed enforcement program was first started on the Provincial 400-series Highways by the Ontario Provincial Police on August 15, 1994. In 1995, cabinet passed Ontario Regulation 333/95 revoking Section 2 of the Photo Radar System Regulation (500/94), which designated municipalities where photo radar could be used. Consequently, use of photo radar in Ontario ceased in 1995. The Premier of Ontario indicated that the resurrection of automated speed enforcement in Ontario could become a reality if cities, municipalities and local politicians were to ask for it.

On December 18, 1998, the Province enacted the *Red Light Camera Pilot Projects Act (Bill 102)* to enable municipalities to use evidence obtained from red light cameras to issue violation notices

The *Red Light Camera Pilot Projects Act, 1998 (Bill 102)* amended the *Highway Traffic Act* to enable municipalities, for a period of two years, to use evidence obtained from red light cameras to issue violation notices. On November 20, 2000, Bill 102 was proclaimed by the Lieutenant Governor starting the two-year operational period for the use of red light cameras in Ontario.

On November 20, 2000, six municipalities in Ontario were named as red light camera pilot areas. York Region chose not to participate in this pilot project

The six municipalities that were designated by the Ministry of Transportation as red light camera pilot areas were City of Hamilton, City of Ottawa, City of Toronto, The Regional Municipality of Halton, The Regional Municipality of Peel, and The Regional Municipality of Waterloo.

The purpose of the pilot project was to conduct a comprehensive statistical study to assess the combined benefits of stepped-up police enforcement and red light cameras on the frequency of red light running. The Ministry of Transportation retained a consultant to conduct the before and after evaluation study. York Region chose not to participate in the pilot and to wait until the Province made a final decision as to the permanent use of red light cameras and the introduction of new digital camera technology which was in testing stages.

On November 19, 2002, the Ontario Government extended the Red Light Camera Pilot Project for an additional two years

In 2002, five of the six participating municipalities requested the Province to extend the red light camera pilot project for an additional two years, for the following reasons:

- Initial results from the first year of operating the red light cameras showed a reduction in the frequency of red light running.
- There was strong public support for red light cameras.

The Regional of Municipality of Halton was excluded from participation in the pilot project extension for the following reasons:

- The low number of violations occurring in Halton Region did not contribute significantly to the overall need for the pilot project.
- Safety was not an issue at locations where the cameras were installed.

- The additional funding each year was thought to be better utilized towards other safety initiatives.

On November 19, 2002, the Province enacted legislation, Bill 149, to extend the Red Light Camera Pilot Project for an additional two years until November 20, 2004

On September 18, 2003, Council adopted a report to support the use of red light camera and photo radar technologies

On September 18, 2003, Council directed staff to request the Province to enact the legislation to remove the pilot project status and allow permanent use of the red light cameras. Council also directed staff to investigate the use of automated speed enforcement technology as a tool to combat speeding on the Regional road network.

On August 1, 2004, the Province amended legislation Bill 149 to allow permanent use of red light cameras by designated municipalities

On August 1, 2004, Bill 149 was amended to allow permanent use of red light cameras by designated municipalities under the *Highway Traffic Act*. These designated municipalities included the City of Hamilton, City of Ottawa, City of Toronto, The Regional Municipality of Halton, The Regional Municipality of Peel, and The Regional Municipality of Waterloo.

The Regional Municipality of Halton, which opted out of the extension of the pilot project, remained as members of the Provincial Steering Committee with five other participating municipalities. Therefore, when the Province passed legislation allowing municipalities to operate red light cameras indefinitely, The Regional Municipality of Halton remained as one of the six designated municipalities to allow permanent use of red light cameras. No new municipalities have joined the program since 2004. The Regional Municipality of Halton resumed its participation in the Provincial Red Light Camera Program in 2011 because they realized that the low number of violations captured through the original pilot project did not reflect the potential benefits of the Red Light Camera Program.

On October 21, 2004, Council adopted a report to support the use of red light cameras as a tool to improve safety at signalized intersections on Regional roads

Council requested staff to develop a business plan and budget process, as well as cost revenue arrangement with the participating local municipalities for its review. Preliminary steps were taken, however; a decision was made to not proceed due to the film-based red light camera technology that was available at that time. Film-based technology occasionally produced poor quality images and therefore some violations could not be processed.

On October 19, 2006, Council endorsed a report requesting the Province to enact legislation to allow provincial and municipal police services in Ontario to use automated speed enforcement

On October 19, 2006, Council endorsed a report regarding the authorization of the use of digital camera technology for automated speed enforcement (i.e. photo radar). This report is based on the message made in August 2004, from the Premier of Ontario that the resurrection of automated speed enforcement could occur in Ontario if municipalities request its implementation.

On December 13, 2007, Council adopted the Intelligent Transportation System Strategic Plan which included automated enforcement initiatives

On December 13, 2007, Council adopted the Intelligent Transportation System Strategic Plan that identified automated enforcement being one of the initiatives that can improve safety on the Regional road network. The Intelligent Transportation System Strategic Plan included an estimated capital cost of \$1.2 million for the implementation of automated enforcement technology. However, due to film camera technology, the Region opted to wait before proceeding with red light cameras as an intelligent transportation system element until digital camera technology was made available.

On November 22, 2010, a private member's bill was introduced into the Ontario legislature calling for the use of photo radar and safety cameras in construction and community safety zones.

On November 22, 2010, a private member's bill was introduced into the Ontario legislature by a Member of Provincial Parliament that calls for change to all references in the *Highway Traffic Act* to allow the use of photo radar systems and safety cameras. The bill supported the use of safety cameras to enforce speed limits near schools, community centres, and construction zones. Unfortunately, the bill did not proceed beyond first reading. The Member of Provincial Parliament who introduced the private member's bill has since retired from the legislature.

At the November 2, 2011 Transportation Service Committee, staff was requested to report back regarding red light camera technology and photo radar

In response to a November 2, 2011 report and presentation on Safety Performance on the Regional Road Network, Transportation Services Committee requested that staff report back to Committee in April 2012 regarding red light camera technology and photo radar.

4. ANALYSIS AND OPTIONS

RED LIGHT CAMERAS

Red light cameras have proven successful in reducing collisions at signalized intersections, particularly right angle collisions that often result in injuries and fatalities

According to the 2011 *Highway Safety Manual*, installing red light cameras at signalized intersections can reduce right angle collisions, (involving through and left turning vehicles) by as much as 26 percent. Right angle collisions at intersections are generally the most severe resulting in serious injury or death to vehicle occupants.

The findings of the provincial “before and after” evaluation of the pilot project, confirmed that red light cameras significantly reduced right angle collisions resulting in injury and fatalities by 25 percent. However, the number of minor rear end collisions increased by 50 percent (see Table 1).

Table 1
Collision frequency comparison at 48 Provincial pilot project study sites

Collision Type	Percentage Difference “After” compared to “Before”	
	Injury and Fatal Collisions	Property Damage Collisions
All Collisions	- 6.8%	+ 18.5%
Angle Collisions	- 25.3%	- 17.9%
Rear End Collisions	+ 4.9%	+ 49.9%

Supplementary collision frequency analysis conducted by the City of Toronto supports the reduction of right angle collisions resulting in injury and fatalities by 48 percent and the number of minor rear end collisions increased by 10 percent, which is significantly lower than the Provincial experience of 50 percent (see Table 2).

Table 2
Collision frequency comparison at City of Toronto’s 38 red light camera sites

Collision Type	Percentage Difference “After” compared to “Before”	
	Injury and Fatal Collisions	Property Damage Collisions
All Collisions	- 18.2%	+ 4.0%
Angle Collisions	- 48.0%	- 26.2%
Rear End Collisions	-2.3%	+ 10.1%

As indicated in Tables 1 and 2, the operation of red light cameras can increase the number of rear end collisions by 10 to 50 percent. However, the majority of rear end collisions resulted in property damage only, which is significantly less severe than the right angle collisions that normally result in personal injury or fatality.

York Region's collision experience identifies 32 percent of right angle collisions resulting in injury and fatalities

Table 3 illustrates the right angle and rear end collision frequency and severity between 2008 and 2010 in York Region at all signalized intersection.

Table 3
Rear end and right angle collision frequency and severity at signalized intersections between 2008 and 2010, 3 years total

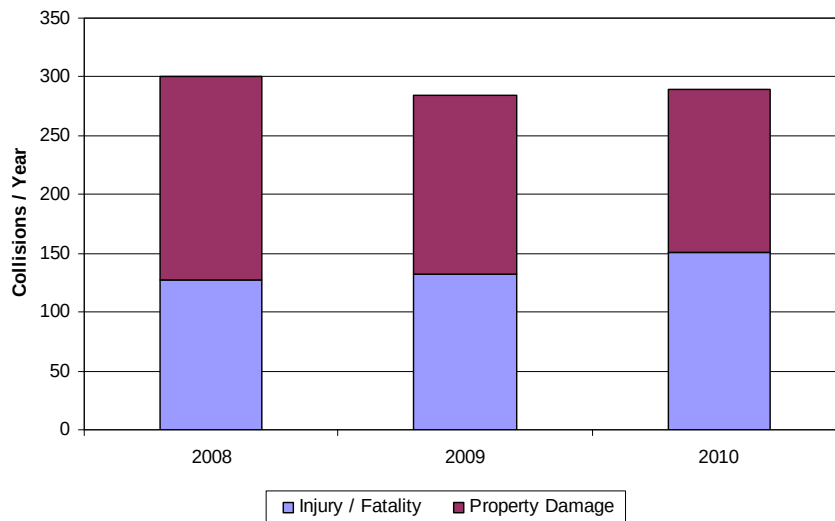
Collision Type	<u>Rear End Collisions</u>		<u>Right Angle Collisions</u>	
	No. of Collisions	Percentage	No. of Collisions	Percentage
Injury and Fatal	1,278	14 %	887	32 %
Property Damage	7,668	86 %	1,898	68 %
Total	8,946	100 %	2,785	100 %

As shown, there were approximately 3,000 right angle and 9,000 rear end collisions that occurred at all Regional signalized intersections. Of those rear end collisions, only 14 percent resulted in personal injury or fatality. This is much lower as compared to the 32 percent of right angle collisions which resulted in personal injury and fatality.

Red light running is a major contributing factor to serious and fatal collision in York Region at signalized intersections

Figure 1 illustrates the red light running collision frequency by severity between 2008 and 2010. Of all red light running collisions, approximately 47 percent result in injuries or fatalities. This is significantly higher than the overall average of 19 percent of all motor vehicle collisions. These large numbers of injury and fatal collisions could have been prevented if motorists stopped for the red light signal indication.

Figure 1
Red light running collision frequency by severity between 2008 and 2010



The Red Light Camera Program is managed by the City of Toronto, equipment is installed and maintained by a red light camera supplier/vendor and infraction notices are administered by each participating municipality

In order to implement the red light camera program, the Region is required to enter into necessary agreements with the following sectors:

- **City of Toronto** for the operation and cost-sharing of the centralized municipal processing centre, which issues offence notices.
- **Ministry of Transportation** to enact the legislation to include the Region in the Provincial Red Light Camera Program and grant the Region access and use of licence plate registration information that is necessary to lay charges under the program.
- **Red light camera supplier/vendor** for the supply, installation, operation, and maintenance of the red light cameras within York Region.

In order to use red light camera images to issue an offence notice, the digital camera technology recording the infraction must be processed and authorized by a police officer or a Provincial Offences Officer. The vehicle owner needs to be identified through a license plate trace and a ticket is issued to the owner. All this takes place at a City of Toronto Processing Centre. Centralizing resources was in response to the Attorney General's Office suggestion that the municipalities should all act together and harmonize resources through a Joint Processing Centre. Doing so helps ensure all infractions receive consistent review by a Provincial Offences Office.

The City of Toronto has established the Joint Processing Centre for all the participating municipalities and indicated that the Region and other municipalities are more than welcome to use the Processing Centre on a cost-shared basis.

Red Light Cameras take two photographs in sequence to determine if a violation occurred

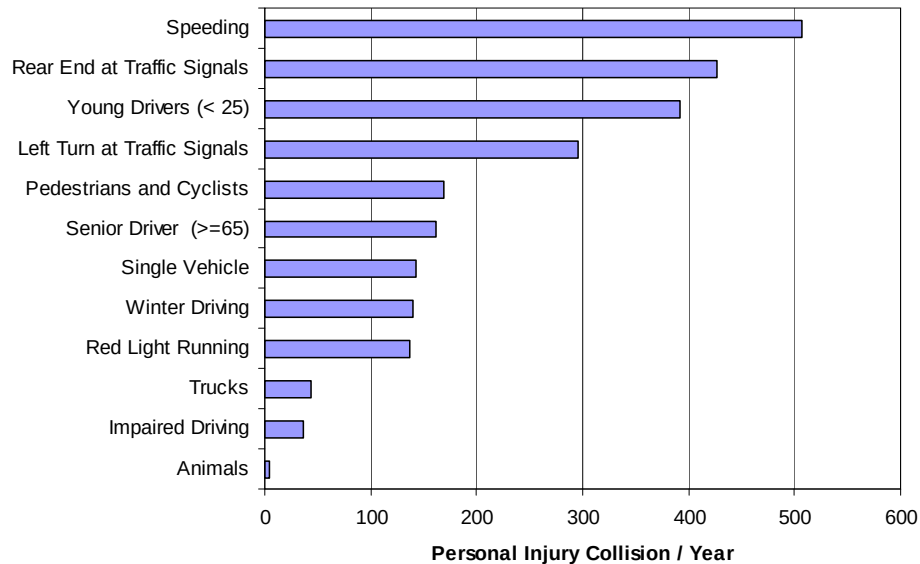
Compared to film cameras, digital cameras have the capability to produce higher resolution and more sharply detailed images of vehicles. They are equipped to prevent reflections or headlights from smearing the image. The captured image can also be electronically transmitted directly to the processing centre and immediately incorporated into a citation. In addition, the digital cameras eliminate costs of film, processing, and the personnel required for daily film handling.

The red light camera system employs two closely spaced inductive loops embedded in the pavement to measure the speed of vehicles. Using the speed measured, the system predicts if a particular vehicle will not be able to stop before entering the intersection, and takes two photographs of the event. The first photo is taken when a vehicle is entering the intersection with its measured vehicle speed higher than threshold speed, typically posted speed, and the red signal is activated. The second photo is taken when the vehicle is in the intersection at a time interval 10 meters of travel based on vehicle speed. The event is captured as a series of photographs that show the vehicle before it enters the intersection on a red light signal and its progress through the intersection. Some red light camera systems allow a "grace period" of up to half a second for drivers who pass through the intersection just as the light turns red.

A high degree of non-compliance to the speed limit is another significant concern contributing to collisions in York Region

Speeding is one of the most frequent complaints received by municipal staff and remains the top contributing factor resulting in motor vehicle collisions in York Region (see Figure 2). A high degree of non-compliance of the speed limit is a source of concern as collisions are more likely to result in fatalities and serious injuries – the faster the speed, the more serious the collisions.

Figure 2
Average annual collisions by contributing factors between 2008 and 2010



York Regional Police and the Transportation and Community Planning Department are continually using various enforcement and education strategies in an attempt to direct the public to drive at the posted speed limits, with limited success. Photo radar is an automated speed enforcement tool that has been successfully used by a number of agencies in Canada, for example, the Cities of Calgary and Edmonton since its inception in 1993, to reduce travel speeds and to increase safety.

PHOTO RADAR

Photo radar should be used at high-risk locations where the safety of residents and police officers are at risk

As automated speed enforcement is often perceived by the public as yet another means of generating revenue, it is important that York Region follows a process that details site selection criteria and a public awareness strategy. Photo radar should be used at high-risk locations where the safety of citizens and police officers are at risk. These locations include:

- Where conventional enforcement is unsafe or ineffective
- Areas with a history of collisions
- Areas with a documented history of speeding problems
- High speed, multi-lane arterials
- School and playground zones
- Construction zones

- Areas where the public or a community has expressed concerns related to speeding and these problems are assessed and confirmed by the enforcement agency responding to the public concern

This photo radar technology can be used as an aid in controlling speeding at locations where conventional enforcement is unsafe or has proven to be ineffective to reduce speeds and/or collisions, especially in potentially high-risk areas such as school and playground zones, construction zones and high speed, multi-lane arterial roads.

The Speed Watch Program has been developed to identify, address, and respond to excessive speeding concerns raised by residents

In response to speeding concerns raised by residents, York Region has developed a Speed Watch Program to identify, address and respond to concerns. The Speed Watch Program uses detection technology to measure the speed of approaching vehicles and display those speeds back to drivers. They serve as a road safety measure to encourage drivers to voluntarily reduce their speed.

Residents can now complete an on line request form which provides the necessary information to deploy the speed boards and to track on going compliance of the posted speed limit. Staff will deploy radar speed boards to address the concern raised and collect data for analysis. The information and data collected from the radar speed boards will be posted and maintained on the website along with enforcement statistics provided by York Regional Police for targeted enforcement.

York Regional Police is in support of the use of red light cameras and photo radar for automated enforcement

Automated enforcement allows York Regional Police to better deploy limited resources to respond to community demands and complaints. It also allows them to enforce speed laws in a non-discriminatory way and to provide substantial evidence that strengthens officer-court testimony. York Regional Police is in support of automated speed enforcement. A photo radar report is planned for the April 25, 2012 Police Services Board meeting.

Link to Key Council-Approved Plans

Vision 2026 – promoting safety on York Region roads through effective policing, education and sensitive design.

5. FINANCIAL IMPLICATIONS

The implementation of red light cameras in York Region would require additional budget and physical resources

Red light cameras are used to improve safety of signalized intersections by reducing the number of red light runners. They are not intended to be a source of revenue and in fact do not pay for themselves. Revenue from successful red light camera programs decrease over time. Based on the City of Toronto's experience, motorists become aware of the technology and therefore the number of offences decreases. The installation, operation and maintenance costs of a red light camera system are estimated in Table 4.

Table 4
Red Light Camera Costs

Component	Start Up Costs *	Annual Costs *
Operation & Maintenance Equipment	-	\$ 7,000 per site
Provincial Costs	-	\$ 1,000 per site
Court Costs	-	\$ 10,000 per site
Processing Fees	-	\$ 10,000 per site
Public Awareness	\$ 50,000	-

* Costs estimated based on the City of Toronto's five year contract.

Based on the City of Toronto's current five year contract, the annual operating costs are estimated to be \$28,000 with a one time start up cost of \$50,000 for each camera site. The operating costs of a camera system consist of the maintenance of the cameras and to download and transfer digital photos to the processing centre. This field operation will be contracted out to a qualified vendor. The processing fees include the digital image processing, identification and issuance of the ticket. As noted, the City of Toronto has established the Joint Processing Centre for all the participating municipalities.

A partnership with the Regional Court Services is required due to the administration of charges issued

Due to the expected increase in the number of charges issued, there will be cost implications in administration of the Regional court system for such items as additional court administration clerks and court room staff. However, the fine revenues generated have the potential to offset some of the operating costs. Any surplus fine revenue would possibly help address an overall deficit in the costs of maintaining provincial offences court.

Based on the City of Toronto's experience, for each \$325.00 ticket issued, the municipality retains \$260.00. Staff of the City of Toronto estimate that approximately 180 convictions per year per site are necessary in order for the program to be 100 percent cost recoverable. On average, the City of Toronto issues approximately 30 to 60 red light running infraction notices per site per month. The infraction rate is a function of traffic

behaviour and varies from site to site. The dispute rate for the City of Toronto red light camera program is approximately 45 percent. The conviction rate across the province is approximately 95 percent.

6. LOCAL MUNICIPAL IMPACT

The local municipalities are permitted under the current legislation to apply to the Ontario Government to use red light cameras on local road intersections. If any local municipality plans to proceed with this initiative, Regional staff would work with local municipal staff to coordinate the implementation of red light cameras, and ensure that a harmonized program can be achieved.

If permitted, automated speed enforcement technology could be used to control speeding. An automated speed enforcement program will likely be more effective than many traffic calming initiatives introduced to date, with no negative impacts to transit and emergency vehicles.

7. CONCLUSION

Current legislation is in place to allow the permanent use of red light cameras to assist in reducing injury and fatal collisions at signalized intersections. This report provides information on the details of the program and associated costs.

Automated speed enforcement could allow for more efficient deployment of limited enforcement resources. However, current Provincial legislation does not permit police services to use automated speed enforcement in the Province of Ontario.

For more information on this report, please contact Steven Kemp, Director, Traffic Management and Intelligent Transportation Systems at Ext. 5226.

The Senior Management Group has reviewed this report.