



Report to

Edmonton Police Commission

Program Delivery Review
Photo Enforcement Traffic Safety

Final Report



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Confidentiality/Validity

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1. COST ANALYSIS – PROGRAM DELIVERY

In the course of the review, Sierra Systems reviewed the process and costs used in the delivery of photo enforcement services by researching organizations that provide services under a number of different service delivery models.

There were three potential service delivery models identified 1) In-house delivery by the Edmonton Police Service (EPS), 2) a combination of the EPS-Outsourced, and 3) a combination of the EPS-City of Edmonton. The EPS-Outsourced and the EPS-City of Edmonton models have to include the EPS because Alberta Provincial Regulations require the local police service (in this case the EPS) to conduct photo enforcement analysis. The same regulation provides criteria for identifying candidate locations where photo enforcement may occur, as well as the need for peace or police officers to operate mobile enforcement units. In some other jurisdictions, notably Scottsdale Arizona, the system is completely outsourced.

The costs developed are for models that do not currently exist within either the EPS or the City of Edmonton. The costs used in the models for these organizations are based on proxies and assumptions from comparator organizations or similar processes.

In the case of the City of Edmonton, a review was conducted of the by-law enforcement process because it is similar in nature to photo enforcement processes, with the understanding that bylaw enforcement is a less complex process. These alternative service delivery models are further explained in Appendix A. The cost analysis that follows is based in part on the data provided during this research.

In their current contract with the City of Edmonton for photo enforcement services, ACS Public Sector Solutions Inc. (ACS) charges a combination of a fixed fee and a per violation ticket fee for each violation notice paid. To allow for a comparison of the different service delivery models costs, the total price of the existing contract for the period from January 1, 2005 to December 31, 2005 was used as a benchmark. This price is \$2,515,517. It must be pointed out that this is not the total price of the photo enforcement program but just the portion that ACS provides. Costs borne by other agencies involved in the program, such as the EPS and the City of Edmonton are not included in the contract amount.

1.1. Cost assumptions

Information obtained from the EPS, Calgary Police Service (CPS), ACS and the City of Edmonton was used in the cost analysis. The overall cost for In-house and the EPS-City of Edmonton and the overall price for the EPS-Outsourced is the most reliable data that was obtained. The breakdown of costs into individual steps of the photo enforcement processes is based on the FTEs involved in the process for In-house and the EPS-City of Edmonton. The price of the process for the EPS-Outsourced model is not broken down into individual steps in the process.

Factors impacting the reliability of the data are that most of the organizations we interviewed do not track the data in a form that is usable for our purposes nor do they actually provide a service that is identical to photo enforcement as carried out in Edmonton. We have made assumptions and/or proxies have been used to overcome these barriers. The results of the process costing are based on these assumptions. Changes in these assumptions will affect the results.

The following outlines cost data assumptions used in the evaluation. Three possible models were identified for cost analysis: In-house, the EPS-Outsourced and the EPS-City of Edmonton:

- The cost of the equipment and installation of the equipment for photo radar vans and intersection safety cameras is assumed to be the same for In-house, the EPS-Outsourced or City of Edmonton. Cost data for the installation of intersection and photo radar equipment is assumed to be on a bid basis and representative of the market rate.
- It is assumed that the cost of photo enforcement deployment and the cost of photo enforcement analysis is the same in all three models, as the EPS is responsible for deployment and analysis independent of which model is used. Inherent in this assumption is no change in the current technology.
- The cost for delivery and issuance of violation tickets for In-house and the EPS-City of Edmonton are based on the number of FTEs required to provide the service from activity information supplied by ACS and the City of Calgary.
- In developing the costs for the EPS-In house and the EPS-City of Edmonton models it is assumed that the hours of efforts required by ACS and the City of Calgary would be similar to the amount of effort needed by the EPS and/or the City of Edmonton to complete the process.
- The City of Edmonton does not have any comparable photo enforcement processes in place. After investigating the bylaw enforcement process it was found that the differences in their processes were too great to allow us to use their costs. Therefore for the EPS-City of Edmonton costs were developed using the number of FTEs required and an average FTE cost.
- From information provided by the City of Edmonton it is assumed that the average FTE cost is \$51,420 and the average hours worked per FTE is 1,650 hours, based on 220 days of work and 7.5 hours per day. Sick days, vacation, etc. are included in the 1,650 hours per year.
- The cost data provided for the In-house model does not contain all of the corporate services costs – such as human resources and information technology. In both organizations there are corporate services such as human resources and information technology support costs provided to photo enforcement that were not specifically costed into the process. To develop a realistic value for these costs we have calculated the percentage of civic program costs allocated to corporate services within the City of Edmonton and the percentage of cost allocated to administrative services within the EPS. The percentage allocated to corporate services is approximately 18% and the percentage allocated to administrative services is approximately 20%.
- Management supervisory costs are based upon a supervisor to staff ratio of 1:10 as identified by the EPS. Our studies indicated that 19 FTEs would be required for the photo enforcement process. The data for supervisory costs has been provided by the City of Edmonton and the EPS.

- The number of violations issued was provided by the EPS and is based on the actual number of ticket violations from January 1, 2005 to December 31, 2005. The actual costs and number of violations issued in any given year could vary from year to year but all models were compared using the same number of violations to allow for comparison on an equal basis.
- The In-house model and the EPS-City of Edmonton model are based on a digital camera system that does not include wet film costs. The cost model assumes that the In-house and the EPS-City of Edmonton model use wet film and therefore we have added the cost for wet film to these two models. The additional costs for the use of wet film in photo enforcement are related to the development costs for the film and the processing costs to digitize the wet film images. We have calculated the cost of the additional processes needed for wet film development and processing using the effort involved based on an FTE cost. The cost is added to the delivery process for the In-house model and the EPS-City of Edmonton model. The FTE costs have been inputted based on the overall cost of the process. Specific staffing costs for this activity were not collected.
- For the sake of consistency and comparability across all models, it is assumed that one intersection safety camera and equipment was purchased and installed and one piece of photo radar equipment was purchased and installed.
- The cost per square foot for facilities is assumed to be \$20/sqaure foot, which approximates the current market rate for office space in downtown Edmonton. It is assumed that the square footage required for office and storage space is 2,300 square feet and we have used this for the In-house and EPS-City of Edmonton models.
- Each FTE required in the Photo Enforcement process would require a computer, workstation, etc. and the cost for one computer workstation would be \$5,000 amortized over three years using straight-line amortization.
- It is assumed that the cost of purchasing software for photo enforcement is amortized over three years using straight-line amortization.
- It is assumed that photo radar vans are operated in two shifts, eight hours each shift for all models.
- It is assumed the total cost for a supervisor working for the EPS is \$82,200 and a supervisor working for the City of Edmonton is \$73,500.

1.2. Cost data

Three possible models were identified for cost analysis: In-house, the EPS-Outsourced and the EPS-City of Edmonton. The costs within the table associated with photo enforcement are broken into two sections, Model Dependent and Model Neutral Elements.

Model Dependent Elements

- Model dependent elements are those elements that have a different cost depending on the model. These include the fixed costs associated with the individual models and the variable costs associated with delivery and issuance of violation.

The following are explanations of the differences and similarities between the costs of the three models for the process.

- Facilities
 - The In-house and the EPS-City of Edmonton models cost for facilities is the same because we have assumed that both processes would use the same square footage at the market rate cost for space in downtown Edmonton. The facilities cost for ACS is included in the price of the contract for photo enforcement.
- Supervisory costs
 - The supervisory costs for the EPS-Outsourced model are included in the price of the photo enforcement contract. The supervisory costs are different for the In-house model compared to the EPS-City of Edmonton model because of salary differences.
- Hardware and Software costs
 - The hardware and software costs are included in the price of the photo enforcement contract for the EPS-Outsourced model. The hardware costs for the In-house and the EPS-City of Edmonton model are \$5,000 per workstation amortized over a three year period. The software costs are \$1,000,000 amortized over a three year period. The cost for maintenance is an average of 100 hours of maintenance at a cost of \$100/hour for service.
- Corporate Service costs
 - Corporate service costs are all of the normal overhead costs needed to run a business including human resources, information technology and administrative support. The corporate service cost for the EPS-Outsourced model is included in the price of the photo enforcement contract. The cost for the In-house and the EPS-City of Edmonton model is based on the percentage of cost for corporate services in the EPS and the City of Edmonton. The costs are approximately 20% for the EPS and 18% for the City of Edmonton.
- Delivery and Issuance
 - The costs for delivery in the In-house and the EPS-City of Edmonton model are based upon the estimated number of FTEs needed to complete the processes. The costs for delivery in the EPS-Outsourced model are included in the price of the photo enforcement contract with the City of Edmonton.
 - The differences in the cost for the delivery and issuance processes between the In-house and the EPS-City of Edmonton models occurs because the hours of effort for the In-house model was provided by the CPS and the hours of effort for the EPS-City of Edmonton process were assumed to be the same as the hours of effort for the EPS-Outsourced model. Note: There is very little difference between the cost of the In-house and the EPS-City of Edmonton models for delivery and issuance.
- Model Neutral Elements
 - Model neutral elements are elements of the process that are independent of the model used. The cost of the element is the same for all of the models regardless of which model is chosen. The EPS is required to deliver the following elements of the process:
 - Deployment
 - Analysis
 - Final quality check of photos

The cost model is shown in the following table.

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Model Options	In-House	EPS- Outsourced	EPS-City of Edmonton
Model Dependent Elements			
Fixed Costs			
Facilities	\$ 46,000	Included in price of contract	\$ 46,000
Supervisory Costs	\$ 167,041	Included in price of contract	\$ 124,919
Hardware and Software Costs (software purchase/development, licence and maintenance and computer workstation cost)	\$ 375,000	Included in price of contract	\$ 375,000
Outsourced Contract Fixed Fees	\$ -	\$ 311,640	-
Corporate Services Costs (HR, IT @ 20% for EPS and 18% for City of Edmonton)	\$ 203,255	Included in price of contract	\$ 179,407
Sub-total	\$ 791,296	\$ 311,640	\$ 725,326
Variable (process costs)			
Delivery			
Download data from data card	\$ 6,763	Included in price of contract	\$ 6,763
Collect Film from intersections safety cameras	\$ 47,805	Included in price of contract	\$ 47,805
Scan photos to create a digitized image	\$ 387,582	Included in price of contract	\$ 387,582
Conduct first check of photos for possible violations	\$ 319,413	Included in price of contract	\$ 315,625
Quality Assurance check #2 - photos are checked again for quality and to ensure that a violation has occurred	\$ 94,688	Included in price of contract	\$ 78,906
Sub-total	\$ 856,250	Included in price of contract	\$ 836,681
Issuance			
Notice of offense and violation ticket printed and mailed to registered owner	\$ 151,921	Included in price of contract	\$ 151,921
List of license plates to identify registered owners of possible violations sent to Alberta Motor Vehicles and returned	\$ 8,103	Included in price of contract	\$ 8,103
Sub-total	\$ 160,024	Included in price of contract	\$ 160,024
Adjudication			
Sub-total	\$ 95,229	Included in price of contract	\$ 46,801
Other Processes			
Installation of Intersection Safety Cameras	\$ 80,000	Included in price of contract	\$ 80,000
Installation of photo radar van (equipment and installation)	\$ 50,000	Included in price of contract	\$ 50,000
Intersection Safety Camera Equipment	\$ 20,000	Included in price of contract	\$ 20,000
Sub-total	\$ 150,000	Included in price of contract	\$ 150,000
Variable Element Total	\$ 1,261,502	\$ 2,203,877	\$ 1,193,505
Per Ticket Value of Variable Elements	8.30	14.51	7.86
Sub-total Cost of Model Dependent Elements	\$ 2,052,798	\$ 2,515,517	\$ 1,918,831
Per Ticket Value of Model Dependent Elements	\$ 13.51	\$ 16.56	\$ 12.63
Model Neutral Elements			
Photo radar van purchase	\$ 30,000		
Photo radar van operation	\$ 416,000		
Deployment			
Deployment of photo radar vans	\$ 10,400		
Deployment of intersection safety cameras	\$ 1,200		
Analysis			
Final quality check of photos	\$ 32,400		
Training Costs	\$ 140,400		
Film Development	\$ 1,600.00		
Total Cost of Model Neutral Elements	\$ 683,515		

1.2.1. Summary of Program Cost Data

The following table summarizes the results of the cost analysis of photo enforcement from the above table. The model is based upon the number of violation tickets provided by the EPS issued from January 1, 2005 to December 31, 2005. During this time period there were 141,439 photo radar tickets and 10,482 intersection safety tickets within Edmonton. These costs include a composite of all of the processes involved in photo enforcement including those conducted by the EPS and the Peace Officers who operate the photo radar vans. For this reason, care should be taken when comparing the total cost of the EPS-Outsourced option to the basic price in the ACS contract.

Model Options	In-House	EPS- Outsourced	EPS- City of Edmonton
Model Dependent Elements			
Fixed Costs	\$ 791,296	\$ 311,640	\$ 725,326
Variable Costs			
<i>Delivery</i>	\$ 856,250	Included in price of contract	\$ 836,681
<i>Issuance</i>	\$ 160,024	Included in price of contract	\$ 160,024
<i>Adjudication</i>	\$ 95,229	Included in price of contract	\$ 46,801
<i>Other Processes</i>	\$ 150,000	Included in price of contract	\$ 150,000
Total Variable Costs	\$ 1,261,502	Included in price of contract	\$ 1,193,505
Total Cost of Model Dependent Elements	\$ 2,052,798	\$ 2,515,517	\$ 1,918,831
Total Cost of Model Neutral Elements	\$ 683,515	\$ 683,515	\$ 683,515
Total cost of Model Option	\$ 2,736,313	\$ 3,199,032	\$ 2,602,346
Total Cost per Ticket of Model Options	\$ 19.35	\$ 22.62	\$ 18.40

The EPS-Outsourced delivery costs include some of the fixed costs that are separated from delivery costs in the In-house and the EPS-City of Edmonton costs. The fixed costs included in the delivery costs for the EPS-Outsourced model are – facilities, supervisory costs, hardware and software costs and corporate overhead costs. It is important to note that these cost figures are derived from the approximate estimates of labour effort and the validity of the underlying assumptions that were described earlier. Sensitivity analysis indicates that changes to the labour effort and/or the assumptions would cause the results for the In-house and the EPS-City of Edmonton models to change.

The difference in total fixed and total variable costs between options is in great part attributed to the difference in costing approaches behind the business models. It should also be noted that at this stage in the process review the variability in the range of plus or minus 25 percent on the per-ticket cost for the In-house and the EPS-City of Edmonton models should be anticipated. There are two variables that could have a significant impact on the results of the cost model. The two variables are the Total Cost of Model Dependant Elements and the software costs. The following table outlines the impact of a plus or minus 25% variability for the Total Model Dependent Elements and variability in the software development costs ranging from \$500K to \$2 million.

Model Options	25% increase to Model Dependent Elements		25% decrease to Model Dependent Elements		Low Software Costs (\$500,000 for software development)		High Software Costs (\$2,000,000 for software development)	
	In-House	EPS- City of Edmonton	In-House	EPS- City of Edmonton	In-House	EPS- City of Edmonton	In-House	EPS- City of Edmonton
Fixed Costs	\$ 989,120	\$ 906,657	\$ 593,472	\$ 543,994	\$ 624,629	\$ 558,659	\$ 1,124,629	\$ 1,058,659
Total Cost of Model Dependent Elements	\$ 2,565,998	\$ 2,398,539	\$ 1,539,599	\$ 1,439,123	\$ 1,886,132	\$ 1,752,164	\$ 2,386,132	\$ 2,252,164
Total cost of Model Option	\$ 3,249,513	\$ 3,082,054	\$ 2,223,114	\$ 2,122,638	\$ 2,569,647	\$ 2,435,679	\$ 3,069,647	\$ 2,935,679
Total Cost per Ticket of Model Options	\$ 22.97	\$ 21.79	\$ 15.72	\$ 15.01	\$ 18.17	\$ 17.22	\$ 21.70	\$ 20.76
Percentage Difference from Base Cost	19%	18%	-19%	-18%	-6%	-6%	12%	13%
Percentage Difference from EPS-Outsourced Cost	2%	-4%	-31%	-34%	-20%	-24%	-4%	-8%

(Note: software development costs have been amortized over 3 years using straight-line amortization)

The shaded section of the Total Cost of Model Dependent Elements row indicates the impact of increasing or decreasing the overall cost of the models by 25%. The range in the overall cost for the In-house model is a high of \$3,249,513 or \$22.97 per ticket and a low of \$2,223,114 or \$15.72 per ticket. A 25% increase in the Total Cost of Model Dependent Elements increases the total cost of the In-house model 2 % above the total estimated cost for the EPS-Outsourced model. The range in the overall cost for the EPS-City of Edmonton model is a high of \$3,082,054 or \$21.97 per ticket and a low of \$2,122,638 or \$15.01 per ticket. A 25% increase in the overall cost increases the total cost of the EPS-City of Edmonton model, however the total cost is still 4% lower than the total cost of the EPS-Outsourced model.

Software development costs have also been identified as an area where there may be high variability compared to the estimates used in the model. Software development costs were assumed to be \$1,000,000 for development and implementation of the software needed for a photo enforcement delivery process. Based on input from several sources, the cost of development could range from as low as \$500,000 to at least \$2,000,000 because of the large variability in the process for creating and developing software.

The impact of the software development costs (indicated in the table in the shaded section of the fixed costs row) decreasing to \$500,000 is a 6 % decrease in cost for the In-house model and a 6 % decrease in cost for the EPS-City of Edmonton. The impact of the software development costs increasing to \$2 million is a 12% increase in total cost for the In-house model and a 13% increase in cost for the EPS-City of Edmonton model. If the In-house or EPS-City of Edmonton model were chosen and the software costs were \$2 million dollars then the total cost of the In-house and EPS-City of Edmonton model would be within 4% and 8%, respectively, of the total cost of the EPS-Outsourced model compared to a the low software development cost which is 20% and 24%, respectively, lower than the EPS-Outsourced cost.

1.3. Conclusions

The difference in the cost for the EPS-Outsourced model compared to In-house model and the EPS-City of Edmonton model can in part be attributed to costs that are included in the calculation for the EPS-Outsourced model and not taken into account in the In-house or the EPS-City of Edmonton model. These costs include:

- The EPS-Outsourced model includes research and development costs that are not included in the In-house and the EPS-City of Edmonton models. The delivery costs for In-house and the EPS-City of Edmonton are based upon an average FTE cost which does not include research and development costs. Public sector organizations by and large have difficulty investing in research and development. The value of innovation provided through an external contractor should be considered.
- Because there were not similar enough processes in the EPS or City of Edmonton to use as proxies, ACS's resource requirements were used as a starting point for costs in all models, the premise being that City of Edmonton or the EPS employees could be as efficient as the private sector. ACS, and other private organizations with multiple clients do however, have the ability to take advantage of scale and efficiency factors. Sensitivity analysis suggests that taken alone, the public sector models would need to be approximately 15% to 20% less efficient to match the outsourced costs.
- The estimate of \$1 million to develop the custom software that is normally provided by the outsourced vendor could be higher. Software development costs, especially in custom environments pulling from several systems, can be risky and take time. Significant changes in these costs will affect the model substantially. As indicated above, the software costs have the potential to have a significant impact on the total cost – an increase of 12 to 13% of the total cost.

Taken individually, none of these factors can account for the more than 15% higher costs in the model. Collectively, however, these factors may account for most, if not all of the difference.

The sensitivity analysis demonstrates the sensitivity of the underlying assumptions of the cost model. A 25% increase or decrease in the assumed costs in either the In-house or EPS-City of Edmonton model has a significant impact on the overall total cost. The impact is great enough to bring the total cost of the In-house and EPS-City of Edmonton models very close to the total cost of the EPS-Outsourced model. Other factors, such as transition costs, could easily surpass the difference in total cost between the EPS-Outsourced model and the In-house and EPS-City of Edmonton models. Decisions based on the cost model will need to factor in the sensitivity of the model to changes in the Model Dependent Elements and the software development costs.

2. CURRENT STATE ASSESSMENT

The following section identifies the similarities and differences in the photo enforcement process between the City of Edmonton and four comparators: The City of Calgary, the State of Victoria, Australia, the City of Scottsdale, Arizona and the City of Winnipeg, Manitoba. Calgary was chosen as a comparator because it operates under the same guidelines that are used within Edmonton but uses a different model for photo enforcement. Scottsdale was chosen because it is of similar size to the other municipal jurisdictions and the photo enforcement process is almost completely outsourced. The State of Victoria was chosen as a comparator because of the length of time photo enforcement has been in operation within the State and it is considered a leader in photo enforcement. Winnipeg was chosen as a comparator because of the similarity in the photo enforcement process. The information has been summarized in the following table. A full discussion of the current state in the City of Edmonton and the four comparators is provided in Appendix A in this document.

2.1. Current State Comparison Table

Type of Comparison	Edmonton	Calgary	Victoria, Australia	Scottsdale, Arizona	Winnipeg
Type of photo enforcement model used within the City/State for photo enforcement	EPS-Outsourced	In-house	VPS-Outsourced	Outsourced	WPS-Outsourced
The size of the community where the police service provides photo enforcement	712,391 CoE 1,016,000 CMA	991,759 CoC 1,060,300 CMA	5,037,700	223,835	650,100 City of Winnipeg 706,900 CMA
Organizations involved in providing photo enforcement within the City/State	EPS, City of Edmonton, ACS (vendor)	CPS, City of Calgary	VPS, Department of Justice, Tenix Pty Limited (vendor)	Scottsdale Police Service (SPS), Redflex (vendor)	WPS, City of Winnipeg, ACS, Government of Manitoba
Explanation of the vendor's contract terms for delivering photo enforcement services	Fixed fee plus \$/ticket for each successful ticket	No vendor	Flat fee plus \$ per percentage of successful tickets	Contract information unavailable. Approximately \$34.00/ticket	Flat fee

Type of Comparison	Edmonton	Calgary	Victoria, Australia	Scottsdale, Arizona	Winnipeg
<p>Scope of photo enforcement operations. Identifies the allowable area that is covered by photo enforcement</p> <p>Photo enforcement guidelines which are used for deployment to decide the locations where photo enforcement will be deployed</p>	<p>City of Edmonton</p> <p>Set by Provincial Guidelines and EPS - criteria include areas where conventional enforcement is unsafe, areas or intersections with a history of collisions or identifiable, documented history of speeding problems, intersections with an identifiable, documented history of red light offenses, high-speed, multi-lane arterials, school and playground zones or areas, areas of public or community concerns and construction zones</p>	<p>City of Calgary</p> <p>Similar to Edmonton guidelines - set by Provincial Guidelines and CPS</p>	<p>State of Victoria</p> <p>Similar to Edmonton guidelines, although the guidelines do not require as much public information and driver notification of locations - set by VPS</p>	<p>City of Scottsdale and the interstate traveling through municipality</p> <p>Guidelines set by the Scottsdale Police Service - criteria include citizen complaints, observations by officers, traffic volume and collision history</p>	<p>City of Winnipeg</p> <p>Guidelines set by Provincial Government and WPS - similar to Edmonton guidelines</p>

Type of Comparison	Edmonton	Calgary	Victoria, Australia	Scottsdale, Arizona	Winnipeg
<p>Photo radar enforcement policies used to determine where photo enforcement will be deployed, determining whether a violation has occurred by setting tolerance limits</p>	<p>Photo radar tolerances determined and set by EPS. Policies to determine if a violation has occurred set for ACS by EPS. EPS does not ticket out of province violations. Signs are used to indicate areas of photo enforcement and all possible photo enforcement sites are made public.</p>	<p>Photo radar tolerances determined by CPS. Policies to determine if a violation has occurred is set by CPS. Signs are used to indicate areas of photo enforcement and all possible photo enforcement sites are public knowledge. One policy difference compared to Edmonton is that any photo radar photos with two vehicles in the picture frame are removed as a possible violation. Also, CPS currently tickets out of province violations.</p>	<p>Photo radar speed tolerances are set by VPS and have been lowered without informing the public, VPS is able to use fixed (no operator) photo radar cameras.</p>	<p>Photo radar tolerances are set by SPS. SPS is able to use fixed photo radar cameras. Signs are used to indicate where photo enforcement is being used.</p>	<p>Photo radar tolerances determined and set by WPS. Policies to determine if a violation has occurred set for ACS by WPS. Signs are used to indicate areas of photo enforcement and all possible photo enforcement sites are made public.</p>
<p>Type of camera used in photo enforcement</p>	<p>Wet film camera</p>	<p>Digital camera</p>	<p>Digital camera</p>	<p>Digital camera</p>	<p>Wet film camera</p>

Type of Comparison	Edmonton	Calgary	Victoria, Australia	Scottsdale, Arizona	Winnipeg
Implications of using wet film versus digital film on photo enforcement process	Wet Film more resource intensive data capture process	Digital film more efficient data capture process. Reduced reliance on single equipment provider	Digital film most efficient data capture process. Also takes advantage of networked installations for data transfer. Increased use in analysis and traffic safety programs	Digital film more efficient data capture process	Wet film more resource intensive data capture process
Number of photo radar vans and the number of possible photo radar locations	6 Mobile Vans, approximately 400 sites	6 Mobile Vans, approximately 400 sites	Number of units unknown, 2500 to 3000 locations. This includes fixed camera photo radar sites.	4 Mobile Vans, 470 approved sites. This includes 9 fixed camera photo radar sites.	5 Mobile Vans, with 156 possible sites.
Number of intersection safety cameras and the number of possible intersection safety camera locations	24 cameras rotated through 60 sites	36 cameras rotated through 48 locations	80 intersections of combined speed/red light cameras	Unknown	30 cameras rotated among 42 sites
Locations where photo enforcement can be used to monitor speed and red light infractions	Anywhere within the municipality.	Anywhere within the municipality	Anywhere within the State including rural roads and highways	Anywhere within the municipality including the section of the interstate that passes through the City	Only permissible in intersections controlled by traffic lights, school zones, playgrounds and construction zones

Type of Comparison	Edmonton	Calgary	Victoria, Australia	Scottsdale, Arizona	Winnipeg
The type of enforcement used within the City/State for photo radar and intersection safety cameras	Mobile photo radar vans and intersection safety cameras	Mobile photo radar vans and intersection safety cameras	Mobile photo radar vans, fixed photo radar cameras, intersection safety cameras which also monitor speed on green and point to point speed cameras for use on rural roads	Mobile photo radar vans, fixed photo radar cameras, intersection safety cameras	Mobile photo radar vans and intersection safety cameras
The organizations involved in Deployment	EPS	CPS	VPS	SPS and Redflex	WPS
The organizations involved in Delivery	ACS, Peace Officers (supplied by the CORPS of commissionaires)	CPS, Peace Officers (supplied by the CORPS of commissionaires)	Tenix, Department of Justice	Redflex	WPS, Peace Officers (supplied by the CORPS of commissionaires)
Photo radar van operators	Contracted peace officers	Contracted peace officers	Contracted through Tenix	Contracted through Redflex	Contracted peace officers

Type of Comparison	Edmonton	Calgary	Victoria, Australia	Scottsdale, Arizona	Winnipeg
<p>The method used to collect data from photo radar vans and intersection safety cameras.</p>	<p>Photo radar film brought to EPS by peace officers at the end of their shift. Film is then passed to ACS by EPS. ACS technicians collect intersection safety camera film.</p>	<p>Peace officers return flashcard from photo radar vans at the end of their shift. CPS technicians collect flashcards from intersection safety cameras</p>	<p>Images taken by cameras downloaded daily through telephone lines to a central processing area</p>	<p>Flashcards collected by Redflex employees</p>	<p>Photo radar film brought to WPS by peace officers at the end of their shift. Film is then passed to ACS by WPS. ACS technicians collect intersection safety camera film</p>

Type of Comparison	Edmonton	Calgary	Victoria, Australia	Scottsdale, Arizona	Winnipeg
<p>Quality assurance checks conducted during the operation of photo enforcement equipment</p>	<p>Peace officers check photo quality during van set up. ACS technician check photo quality of intersection safety cameras after initial installation, each time the film is changed</p>	<p>Peace officers check photo quality during van set up. There is an additional quality check conducted automatically between the software and hardware in the photo radar vans. The software checks the data signal between the laptop and camera after every photo is taken or five to seven seconds have elapsed. If there is a disconnect between the laptop and camera the data collected will be discarded. CPS technicians check intersection safety camera photo quality every time a flashcard is changed.</p>	<p>Cameras are recalibrated and resealed on a regular basis</p>	<p>The accuracy of the equipment to measure speed is tested at installation and on an ongoing basis.</p>	<p>Peace officers check photo quality during van set up. ACS technician check photo quality of intersection safety cameras after initial installation, each time the film is changed</p>

Type of Comparison	Edmonton	Calgary	Victoria, Australia	Scottsdale, Arizona	Winnipeg
<p>Organization that provides registered owner vehicle information and the organizations that have direct access to registered vehicle owner information</p>	<p>Information provided by Alberta Motor Vehicles and accessed electronically by EPS</p>	<p>Information provided by Alberta Motor Vehicles and accessed electronically by CPS. Calgary also accesses CPIC to determine the vehicle's registered owner information for out of province drivers</p>	<p>Information provided by state of Victoria and accessed by VPS</p>	<p>Redflex has the ability to access a description of the registered owner provided by the State. If the description of the registered owner does not match the photograph of the driver in the violation Redflex sends the photo to the SPS. SPS can access the actual photograph of the registered owner which is also provided by the State.</p>	<p>Information provided by the Manitoba Motor Vehicles and accessed by WPS</p>
<p>The organizations which are involved in Issuance</p>	<p>EPS, ACS</p>	<p>CPS</p>	<p>VPS, Tenix</p>	<p>Redflex, SPS</p>	<p>WPS, ACS</p>
<p>Number of quality assurance checks and who is completing the checks while processing photos</p>	<p>3 Total: 2 quality assurance checks completed by ACS, 1 final quality assurance check completed by EPS</p>	<p>3 quality assurance checks completed by CPS.</p>	<p>Unknown</p>	<p>3 quality assurance checks completed by Redflex. The Chief of Police has granted Redflex staff members who conduct the final quality check</p>	<p>2 Total: 1 quality assurance check completed by ACS, 1 final quality assurance check completed by WPS</p>
<p>The organizations involved in Adjudication</p>	<p>ACS, Peace Officers, EPS</p>	<p>CPS</p>	<p>VPS, Peace Officers</p>	<p>Redflex</p>	<p>WPS, Peace Officers</p>

Type of Comparison	Edmonton	Calgary	Victoria, Australia	Scottsdale, Arizona	Winnipeg
The organizations involved in Analysis	EPS	CPS	VPS	Redflex	WPS
The level of analysis and the amount of effort used for analysis by the police service	Analysis and effort focused on where to place vans and intersection cameras	Analysis and effort focused on where to place vans and intersection cameras	Effort and level of analysis is more detailed than all other organizations considered as a comparator	Analysis focused on where to place vans and intersection cameras	Analysis and effort focused on where to place vans and intersection cameras
The organizations involved in Maintenance of Equipment	ACS	CPS	Tenix, Department of Justice	Redflex	WPS
The organizations involved in the Installation of Equipment	ACS, EPCOR contracted by ACS, City of Edmonton providing engineering diagrams and permits	CPS, City of Calgary, Vendor who supplied the intersection safety equipment	VPS, Department of Justice, Tenix	SPS, Redflex, City of Scottsdale supplies and authorizes permits for construction	WPS, ACS, City of Winnipeg
Models that currently have the ability to undertake Research and Development re: innovation in photo enforcement	Yes	Unknown	Yes	Yes	Yes

Type of Comparison	Edmonton	Calgary	Victoria, Australia	Scottsdale, Arizona	Winnipeg
Identifies the organizations that supply traffic data to the police service for use in deployment and analysis	EPS, ACS, City of Edmonton	CPS, City of Calgary	VPS, Department of Justice, Tenix	SPS, Redflex	WPS, City of Winnipeg
The frequency of reports required using photo enforcement data for the police service and where the traffic data for the reports is obtained	Monthly by ACS, the City of Edmonton supplies traffic data to the EPS upon request	CPS creates reports from a database when needed. They have the ability to query their database when information is needed	Monthly reports produced by Tenix, Victoria Roads provides collision data to VPS when needed	Daily reports provided by Redflex	Monthly reports provided by ACS

Type of Comparison	Edmonton	Calgary	Victoria, Australia	Scottsdale, Arizona	Winnipeg
<p>Identifies who collects the payment of fines and where the money collected for fines is used.</p>	<p>Fines are paid to Government of Alberta Justice Department; portion goes to provincial general revenue, municipal portion is a revenue source to the City of Edmonton not dedicated to any program.</p>	<p>Fines are paid to Government of Alberta Justice Department; portion goes to provincial general revenue, municipal portion is split within CPS--intersection safety fines are returned to CPS for use in the intersection safety camera program and photo radar fines become part of City of Calgary general revenue.</p>	<p>Fines are paid to the Department of Justice and become part of general revenue for the government</p>	<p>Fines are paid to the Scottsdale City Court and the revenue is split between the City of Scottsdale, Arizona State and a small part of the fines are used for court enhancement.</p>	<p>Fines are paid to the Government of Manitoba Department of Justice. All fine revenue is returned to the City of Winnipeg with a portion of the photo enforcement fine used for court costs, a victim surcharge, administration and a justice service surcharge.</p>

2.1.1. Current State Analysis Recommendations

Based on the analysis of the photo enforcement processes within the City of Edmonton and the identified comparator organizations, we have identified opportunities to improve photo enforcement. The recommendations are improvements to the photo enforcement process that should be considered regardless of the service delivery model chosen. In addition, the Steering Committee conducted a subjective evaluation of key factors based on information developed during the review. Finally, cost information and a sensitivity analysis are summarized at the end of the section.

There is an opportunity to implement improvements based upon the successes of leading practice organizations in comprehensive traffic safety programs and analysis. One example would be Victoria, Australia. The State of Victoria is considered an international leader in photo enforcement, and much can be learned from their analytical practices. Victoria conducts in-depth analysis of the data they collect on a regular basis, devoting more time and resources to this process than any other jurisdiction considered in this study. As a result, they are able to quantify the impact individual cameras have on specific traffic patterns or the overall impact of photo enforcement across a neighborhood, City or State. Victoria uses this data to aggressively target specific areas for photo enforcement that includes adapting speed tolerances. Through the reduction in speed tolerances, Victoria has seen a reported a 5 km/h overall reduction in traffic speed and is likely to continue to decrease their tolerances over time.

Increasing coordination of data capture and access is another potential means to improve traffic safety. Currently, traffic safety data is collected by the EPS, ACS, the City of Edmonton and the Government of Alberta. The data collected is similar between these entities; it would be beneficial to consolidate all of the data collected and use the information for planning and reference. One option would be to create a central database accessible by all parties. This would eliminate the redundancy currently experienced and provide consistent data for decision-making. This would enable efficiencies and provide an opportunity to develop better analysis mechanisms. Improved analysis could allow the EPS to increase traffic safety through targeted enforcement efforts as well as empirically demonstrate the effects of photo enforcement on traffic safety.

Process improvements could reduce operating costs by switching from wet film to digital imaging. Wet film adds three steps (manual collection, film processing, and digital scanning) to the delivery process versus digital imaging. This has a substantial impact on process efficiency. Eliminating these three steps through the use of a digital imaging system, increases the efficiency of the process, and should translate into an operating cost savings. In the short term, a vendor in an outsourced model may be able to provide photo enforcement using wet film at a lower price than using digital technology. While the initial cost may be higher for digital imaging, the digital technology would increase efficiency, reduce violation processing turnaround time, and reduce operating costs accordingly.

- When using wet film for intersection safety cameras, a technician or officer has to collect and bring the film back to the office for processing, whereas comparator jurisdictions such as Victoria demonstrates that digital camera can be wired through telephone or ADSL lines to transfer images directly from the camera to a central collection point. Downloaded

information decreases the amount of time required to complete delivery and should translate into operating cost savings.

- Currently, ACS is digitizing wet film photographs of offenders so that violation notices can include a photograph of the offending vehicle at time of offence. A digital imaging system would eliminate this step. Eliminating this step decreases the amount of time required to complete delivery and should translate into operating cost savings.
- Wet film is currently sent to Eastern Canada for developing. A digital imaging system allows for images to be produced at point of processing and should translate into operating cost savings.

3. FACTORS TO CONSIDER

The following five factors were considered:

1. *Accountability*

Accountability is based upon two factors

- Clarity of outcomes and the ability to measure outcomes – clarity of outcomes is based on the ability to clearly define the results expected for photo enforcement. Once the results are defined, the Commission has to have the ability to measure the process and determine if the process is meeting the defined goals or is in need of remediation.
- Ability of the Commission to enforce consequences when problems occur in the process – The amount of control the Commission has on the terms and conditions within the process impacts the Commission's ability to enforce consequences when problems arise within the process.

2. *Transparency*

Transparency is based upon the ability of the public, politicians, Commission and City of Edmonton to understand and have access to the process used for photo enforcement. The public needs to understand that the purpose of photo enforcement is aimed at increasing traffic safety and decreasing traffic collisions. The photo enforcement process would need to be auditable and the results available to the public.

3. *Quality*

Quality can be broken down into three different categories: availability of equipment in case of failure or malfunction; conviction rate; spoilage.

- **Availability of equipment** – this is a measurement of the downtime needed for equipment repair and maintenance. A second part of this measure is the estimated cost for maintenance and repair of the equipment.
- **Conviction rate** – this is a measurement of violations captured through photo enforcement that result in the payment of a fine.
- **Spoilage** – spoilage represents recorded violations that cannot be processed. Factors include poor photo quality, obscured license plates, policy decisions or other factors.

4. *Efficiency*

Efficiency is a measurement of the turnaround time required from capturing an offense to sending out a violation notice. The current contract between ACS and the City of Edmonton calls for a maximum time limit of six days from the time the photo is taken to the time the violation ticket is mailed to the offender.

5. Innovation

Innovation is the ability of an organization to undertake research, develop new technologies and implement increased efficiency in the application of current technology. This ability is influenced by the incentives that are in place to stimulate and support research and development. The incentives for innovation are linked to increased profit margins. Innovation is also influenced by how an organization can complete, adopt and implement new technology. Both public and private organizations have the capability for innovation; however, public organizations are geared towards providing public service and may lack the capital required to conduct research and development. In the area of innovation, private industries are motivated by a duty to increase profit for shareholders and view research and development as a means to increase profitability.

Private organizations within the automated traffic safety enforcement industry have incentives to be innovative. Their core business is based upon providing photo enforcement services. When a private organization develops a new technology it has the ability, the capital, and the profit motive to implement the new technology. Most of the organizations that provide photo enforcement services have multiple customers, allowing them to offer new technologies to a large customer base and quickly recoup their research and development costs. This also allows them to spread development costs over multiple clients. Often in public organizations the capital needed for implementing new technologies is obtained from a pool of capital that is shared across the organization.

6. Business Risk

Business risk is related to the level of program control the Edmonton Police Service has over the photo enforcement process.

4. CONCLUSION

There are a number of conclusions that can be drawn from the analysis and evaluation conducted in this report. Regardless of which proposed model is chosen there are a number of opportunities to improve the current model. These opportunities were identified in the current state and leading practice review and are briefly discussed below.

4.1. Conclusions from Current State and Leading Practice Reviews

A number of key conclusions were developed as the Sierra Systems team conducted the current state and leading practice reviews, the highlights of those reviews are provided below. A complete summary is included in Section 2 of this report.

Using digital film may reduce operating costs. When wet film is used in photo enforcement there are three steps added to the delivery process for photo radar and intersection cameras. The effort involved in collecting and developing the wet film and then digitally scanning those photographs is substantial and has an impact on the efficiency of the process. Eliminating these three steps increases the efficiency of the process. Efficiency is increased by a reduction in the time used in the process, and the increased efficiency should translate into an operating cost savings. In the short term, a vendor in an outsourced model may be able to offer a contract that provides photo enforcement using wet film technology at a lower price than using digital technology. The operating cost savings realized by a more efficient process could be offset by the cost of changing over to new technology. In the long term it is likely that digital technology would provide operating cost savings because of the increased efficiency.

More coordinated data capture and access could improve traffic safety. Currently, there are separate collections of traffic safety data being held by the EPS, ACS, the City of Edmonton and the Government of Alberta. Improving data capture and access will create opportunities to develop better analysis by allocating more time and resources to the process. This could allow the EPS to increase their ability to target problem areas in the city and to quantify the effects of photo enforcement on traffic safety.

Leading practice organizations apply sophisticated data analyses to develop comprehensive traffic safety programs. The State of Victoria, Australia is widely considered a leader in photo enforcement and there is an opportunity to learn from their practices, particularly around analysis. Victoria State Police devote more time and resources to analysis than anyone else considered in this study. The increased analysis enables the Victoria State Police to aggressively target specific locations using photo enforcement.

4.2. Subjective option evaluation

The Steering Committee’s evaluation of the strengths and weaknesses of each of the overall models is provided in the following table.

Model	Strengths	Weaknesses
In-house	<ul style="list-style-type: none"> Accountability: reporting and analysis on photo enforcement are conducted by EPS Potential to reduce some duplication in input and data capture. Access to additional data sources (CPIC for out of province) could increase the number of tickets issued 	<ul style="list-style-type: none"> Less efficient because EPS would only be providing these services to a single client and would not be able to take advantage of economies of scale Financial and process constraints in implementing new technology Transition costs will be significant.
EPS-Outsource	<ul style="list-style-type: none"> Both organizations accountable for problems Delivery is a core business of external vendor Transparency Incentives for efficiency in private sector Economies of scale for vendor increases efficiency and lowers cost Ease of maintenance and installation Potential for innovation and new technology 	<ul style="list-style-type: none"> Accountability for analysis and reporting Potential public perception issues due to past history with an outsourced model.
EPS-City of Edmonton	<ul style="list-style-type: none"> City could adjust to include photo enforcement as a core business similar to bylaw enforcement Integrate intersection safety camera installation into planning processes Ease of maintenance and installation 	<ul style="list-style-type: none"> Reduced accountability <ul style="list-style-type: none"> The city’s reporting and decision making structures would need to be respected. Once processes are established it will be difficult to choose a different alternative. Financial and process constraints in developing and implementing new technology Accountability for analysis and reporting Transition costs will be significant.

4.3. Model Cost analysis

The following table summarizes the results of the cost analysis of photo enforcement from the above table. The total cost of the highest option (EPS-Outsourced) is between 15% and 22% higher than the In-house and EPS-City of Edmonton option, or approximately \$460K to \$600K on a total cost of \$2.7 and \$2.6 million respectively. The total cost of the EPS-Outsourced model is \$3.2 million. These results are shown in the table below.

Model Options	In-House	EPS- Outsourced	EPS- City of Edmonton
Model Dependent Elements			
Fixed Costs	\$ 791,296	\$ 311,640	\$ 725,326
Variable Costs			
<i>Delivery</i>	\$ 856,250	Included in price of contract	\$ 836,681
<i>Issuance</i>	\$ 160,024	Included in price of contract	\$ 160,024
<i>Adjudication</i>	\$ 95,229	Included in price of contract	\$ 46,801
<i>Other Processes</i>	\$ 150,000	Included in price of contract	\$ 150,000
Total Variable Costs	\$ 1,261,502	Included in price of contract	\$ 1,193,505
Total Cost of Model Dependent Elements	\$ 2,052,798	\$ 2,515,517	\$ 1,918,831
Total Cost of Model Neutral Elements	\$ 683,515	\$ 683,515	\$ 683,515
Total cost of Model Option	\$ 2,736,313	\$ 3,199,032	\$ 2,602,346
Total Cost per Ticket of Model Options	\$ 19.35	\$ 22.62	\$ 18.40

The difference in the cost for the EPS-Outsourced model compared to In-house model and the EPS-City of Edmonton model at least in part can be attributed to a number of factors that differentiate the models. The only model that specifically takes into account the cost of innovation is the EPS- Outsourced model; public sector organizations by and large lack incentive to invest in R&D. The public sector organizations would likely have to work through efficiency and scale issues that the private provider has already taken advantage of; this could increase the actual cost of the public sector options on implementation. Software development costs represent a level of risk and uncertainty to replicate the functionality of the existing services. A sensitivity analysis revealed that a 25% increase in variable costs brings the costs very close, while increases in software development costs can increase the total cost by more than 12%. Taken individually, none of these factors can account for the more than 15% higher costs in the model. However, taken together these factors could account for most, if not all of the difference.

4.4. Transition Costs

Moving from the current EPS-Outsourced model for photo enforcement delivery to either the In-house or the EPS-City of Edmonton model will have additional costs associated that are not captured in the cost model. Disentangling photo enforcement delivery from ACS could be a complicated process involving a transition period that might extend over a significant period of time. The following is a list of transition cost factors that will need to be considered if photo enforcement delivery is moved to an In-house or EPS-City of Edmonton model.

- Capital costs related to purchasing or replacing the current hardware (cameras, photo radar equipment, intersection safety poles and housing) owned by ACS.
- Capital cost related to the acquisition or development of computer software, workstations, office furnishings and vehicles associated with automated enforcement.
- Costs associated with the training needed for photo enforcement delivery which includes the training of analysts who will be analyzing and issuing violation tickets and notices of offense and training and certification of technicians who will service the equipment.
- Possible impact on service delivery and increased risk of an initial learning curve for all resources involved with the photo enforcement process.

As part of the contract between ACS and the City of Edmonton, ACS owns the equipment used in the photo radar vans as well as the equipment used in intersection safety cameras including the poles, housings and cameras. Moving to the In-house or the EPS-City of Edmonton model would require the acquisition of the equipment involved with the automated enforcement program. The transition process could involve a negotiated contract with ACS to purchase some or all of the infrastructure and equipment currently in use. A move towards digital imaging at this juncture should be a strong consideration. In either case there will be a considerable up front capital investment to replace or purchase all 24 intersection safety cameras, 60 poles and housings currently in use.

Transitioning to the In-house model for photo enforcement delivery will also require the acquisition or development of computer software (estimates of software costs range from \$500,000 to in excess of \$2,000,000), workstations, office furnishings, training for the analysts who will be analyzing and issuing violation notices, training for technicians to service the equipment as well as the acquisition of intersection safety cameras, poles construction installations and mobile speed cameras, vehicles and associated automated enforcement equipment. Replacement software is likely to be a custom developed application which can be a significant and costly undertaking. Initially, there will be a learning curve for all resources involved which may impact service delivery and increase risk management.

Transitioning to the EPS-City of Edmonton model will face similar challenges as the In-house model. One difference between the In-house model and the EPS-City of Edmonton model is that the City of Edmonton does have experience with the by-law enforcement process that is similar, although much less complex, to the photo enforcement process. In this case there may be a shorter time required to purchase and implement the photo enforcement process if the process can be added on or integrated into existing processes. Custom development of the software would still be required. The challenges detailed in the In-house model will also apply.

4.5. Summary

Taking into account the recommendations from the current state analysis can enhance the delivery of photo enforcement. The cost analysis does reflect at least the potential to reduce costs in-house, but with some business risk in the ability to deliver on those costs; scale/efficiency, transition costs, software development, and innovation are all factors that should be considered in the transition. The costs of transition must also be considered and may in fact negate the potential upside of moving away from an out-sourced model.

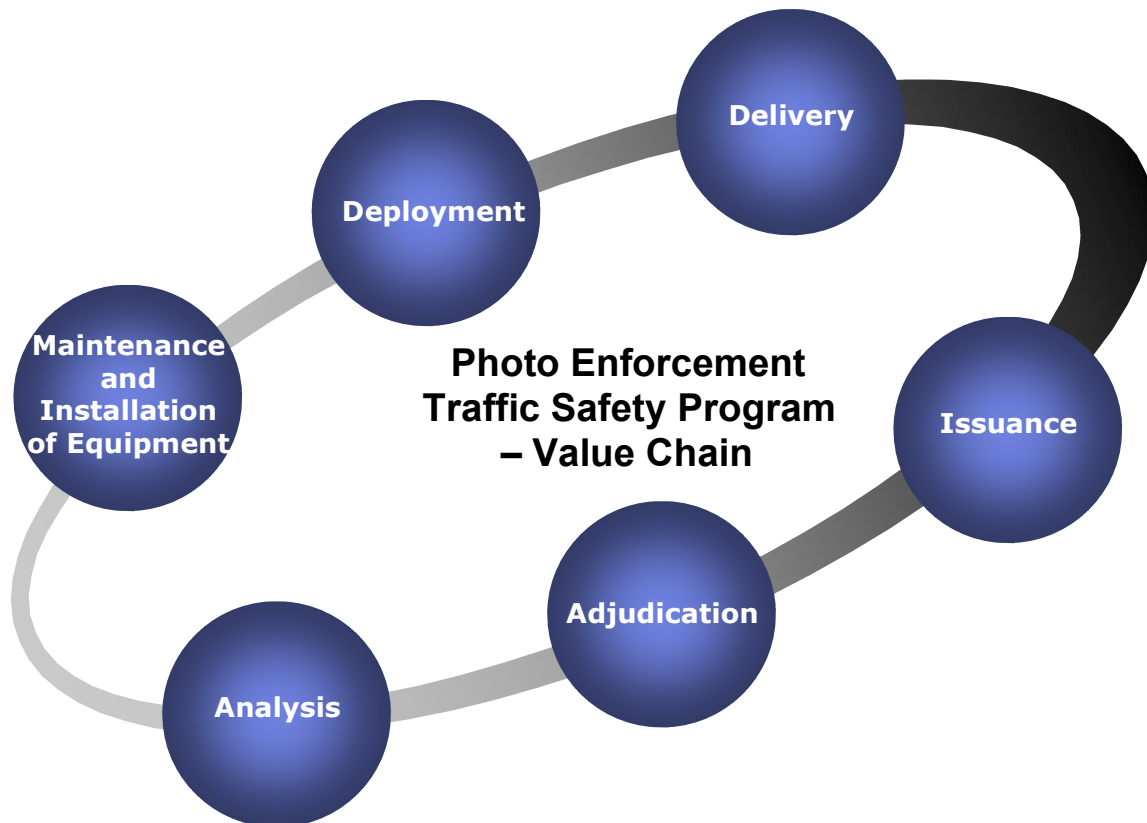
In reaching a final decision, the Edmonton Police Commission will have to consider several intangible factors including accountability, innovation, and the overall strengths and weaknesses of the available options.

Appendix A. Current State Assessment

The current state assessment captures the information collected about the photo enforcement process through research and interviews. Interviews were conducted with the police service and outsource vendor (where applicable) in each comparator jurisdiction. In the case of Edmonton, interviews were conducted with the EPS, City of Edmonton and ACS.

A.1. Value Chain

The delivery of photo enforcement has been broken into several elements based on the process involved. Each segment of the value chain is one high-level process required for photo enforcement. The following section identifies each value chain segment and outlines the functions provided by the City of Edmonton, the EPS and ACS.



A.2. City of Edmonton

The EPS has used photo radar since 1993 and intersection safety cameras since 1998. The Edmonton Photo Enforcement Program is administered by the EPS and operated in large part by ACS Public Sector Solutions Inc. The City of Edmonton manages the contract with ACS. There are currently six mobile photo radar vans rotated through 400 possible photo radar locations

within the city and twenty four intersection safety cameras rotated through sixty possible locations. The population of Edmonton is 712,390, but the population of the Central Metropolitan Area that impacts on Edmonton's photo enforcement program is about 1,016,000. The following is a description of photo enforcement in Edmonton, broken into the processes outlined by the value chain.

Deployment

THE EPS

The EPS uses the Alberta Provincial Guidelines to manage the deployment of photo enforcement. Other factors, further detailed below, that guide photo enforcement deployment are directly related to the type of enforcement; for instance, there are somewhat different processes involved in the deployment of photo radar and intersection safety cameras:

Photo Radar Deployment

Provincial regulations require that all deployment decisions must be made by the EPS. Three factors determine the deployment of photo radar cameras in addition to the Provincial Guidelines:

- Locations with high collision rates where speed is a factor.
- High-speed and high-volume locations (freeways and main roadways with speed limits of 70 km/h or more).
- Areas that are the subject of citizen/community complaints.

Other criteria considered for photo enforcement includes:

- Construction zones – deployment may be guided by the City of Edmonton for current construction sites.
- School zones.
- Collision rates identified through information supplied by Alberta Infrastructure and Transportation.

Intersection Safety Camera Deployment

Intersection safety camera sites are determined by the EPS based on factors similar to photo radar sites:

- The number of collisions.
- The type of collisions (rear ends, t-bone, etc.).
- The geographic dispersal of intersection safety cameras across the city.

Once the EPS analysis consolidates the factors, a list of potential sites is provided to ACS for a technical analysis of whether an intersection safety camera can physically be placed at a given intersection.

ACS

ACS plays a minor role in deployment, limited to the provision of information to the EPS. ACS provides the EPS with information by request, as well as in monthly reports about photo radar and intersection safety camera locations. These monthly reports include information such as the number of emergency vehicles that passed a particular location, the speed of vehicles, the number of photos taken that cannot be used, and summaries of activity at one location and/or of the whole system.

CITY OF EDMONTON

The City of Edmonton's main role in deployment is to provide information on traffic patterns and collision rates for traffic corridors and intersections to the EPS. Decisions about deployment rest with the EPS; however, the EPS is also often contacted regarding specific sites of interest to the City of Edmonton Transportation such as construction zones.

Delivery

Intersection safety camera photo enforcement and photo radar enforcement involve separate delivery processes, including the equipment used, its operation, the development of pictures, and identification of violations for photo enforcement.

THE EPS

The EPS oversees the operation of intersection safety cameras and directs ACS in matters of policy, business rules, and criteria for violations and tolerances.

Peace officers, who are sub-contracted to the EPS through the Corps of Commissionaires, are responsible for several functions in photo radar, including setting up photo radar vans at deployment sites and testing the quality of the equipment to ensure units have the proper orientation with respect to traffic. During operation, these peace officers record information about every photo taken on a control sheet. This includes the lane the vehicle was in, the relationship of the vehicle to the rest of traffic, the type of vehicle, and a description of the situation. When film is changed, the peace officers again test the equipment for quality control purposes. At the end of each shift, the peace officers bring the film, data card and control sheets to the EPS, who subsequently pass on film and data cards to ACS. The peace officers also enter the information from their control sheets into a database at the EPS; these records serve to track traffic statistics and as a legal record of each shift.

ACS

The role of ACS in the delivery of photo enforcement can be broken into two broad processes: intersection safety camera delivery and violation processing.

Intersection Safety Camera Delivery

During regular operation ACS staff collects the intersection safety camera film for processing.

Violation Processing

Once a film has been brought to ACS from an intersection safety camera or photo radar van, the film is marked and goes to a processing center in Brampton, Ontario for development. ACS uses wet film in their cameras. Once developed, the film is shipped back to ACS, where it is digitized for electronic transfer and storage. ACS processes and stores all violations using their proprietary software (called CiteWeb). Additionally, ACS downloads all of the information from the data cards that collect information during the operation of photo radar vans. Photos are then reviewed for violations and information from the data cards is matched to the appropriate pictures. A second, “blind” review of violations is conducted by a different ACS employee – this requires someone other than the original reviewer – who checks the initial data collected at the violation site and verifies that a violation has in fact occurred. All photos where a license plate cannot be identified are removed from the pool of potential violations. The number of photographs that cannot be identified are reported to the EPS monthly.

CITY OF EDMONTON

The City of Edmonton provides ACS with the technical and engineering diagrams needed to install intersection safety cameras, as well as the permits required for the installation.

Issuance

THE EPS

The pool of potential violators is sent to the EPS to confirm violations, which normally takes one night of processing. For intersection safety camera violations, an officer reviews the violation through CiteWeb and makes a determination. If the officer confirms a violation, they sign an affidavit confirming the violation and an electronic signature is attached to the notice of offence and the violation ticket. Photo radar peace officers review each photograph and sign an affidavit stating the photographed vehicle was in violation of traffic speed laws and confirm the lane the vehicle was in.

The EPS sends a list of the potential violators’ license plates to Alberta Motor Vehicles (AMV) to identify the owners of the offending vehicles. AMV sends the vehicle registrant’s information back to the EPS, who then pass it to ACS.

ACS

Once vehicle registrant information is returned to ACS, a technician from ACS also signs an affidavit stating that the camera was functioning properly at the time of the offense. ACS is then responsible for issuing the notice of offence and the violation ticket – the violation ticket is the

actual legal document issued for a violation. The notice of offense provides extra information of the offense for the vehicle's registered owner, including a picture of the offense, vehicle license plate and the identity of the registered owner.

CITY OF EDMONTON

The City of Edmonton does not have a role in issuance.

Adjudication

The Government of Alberta, through the Alberta Justice department, collects all fines.

THE EPS

If a photo radar violation is challenged in court, the peace officer who witnessed the event must appear. For intersection safety camera offenses, the signed affidavits of the technician and officer reviewing the offense are all that is normally required.

ACS

ACS is responsible for providing a package of required evidence and information to the EPS for court appearances, as well as supplying a technical expert witness if required. The photo radar package includes four full photos of the vehicle, 4 photos of the license plate and the control sheet of the operator, which includes information such as which frame of the film the violation was captured in, the lane the vehicle was traveling in and the vehicle description itself. The intersection safety camera package includes 4 sets each of the vehicle on the loops (before the intersection), the vehicle traveling through the intersection, the vehicle exiting the intersection and the license plate of the vehicle. The affidavit of a technician stating the camera was working properly and an affidavit of the officer who reviewed the pictures of the offense are also included.

CITY OF EDMONTON

The City of Edmonton does not have a role in adjudication.

Analysis

THE EPS

The EPS is required to provide an analysis of photo enforcement every year to the Government of Alberta. By request, the EPS provides data to the traffic department in the City of Edmonton from sites that fall within identified traffic corridors. There are a total of approximately 400 sites that are monitored. Analysis of this data is used to make informed decisions about deployment in the next time period.

ACS

ACS provides a monthly report to the EPS including the number of violations, traffic volume, the percentage of photos taken that could not be processed for a violation, the percentage of photos removed because of photo radar van operator errors and an emergency vehicle list. ACS can also provide a location summary, which includes the number of violations issued and the percentage of photos taken that could not be used at a specific site. ACS provides data to the City of Edmonton when requested.

CITY OF EDMONTON

The City of Edmonton can request data from ACS. The City of Edmonton also collects traffic data, which is shared with the EPS and is used in analysis. This data helps inform decisions about traffic patterns, traffic volume and road construction and maintenance.

Maintenance and Installation of Equipment

MAINTENANCE

In Edmonton, ACS is responsible for equipment maintenance and replacement. ACS has an engineering and maintenance facility in Sherwood Park for this purpose. Also, ACS provides a construction manager for installing intersection safety camera poles, and an image quality specialist who monitors photo quality for all equipment. A technician is on call at all times for all repairs and maintenance required. ACS also maintains an inventory of spare parts and equipment to reduce the downtime of equipment. If equipment cannot be repaired in a timely manner, it is replaced.

INSTALLATION

In the installation of intersection safety cameras ACS supplies technical expertise and engineering. Once a potential site has been chosen by the EPS, ACS analyzes the site to determine if an intersection safety camera is feasible at that location. It is physically impossible to place an intersection safety camera in some locations because of conflicting infrastructure, such as underground pipes, that cannot be moved. ACS works with the City of Edmonton to obtain the proper permits, engineering diagrams and plans to install the camera. ACS then subcontracts the work, usually to EPCOR in Edmonton, for the installation of the infrastructure needed for the camera, including a pole, electrical connection and electro-magnetic loops. Once installed, the camera is then tested by a technician from ACS to ensure picture quality and that the camera is installed as per design. Finally, ACS provides the City of Edmonton with the technical engineering diagrams and drawings of record (as built) for the intersection safety camera site.

In the installation of photo radar equipment ACS custom fits the photo radar camera and equipment to the van and provides a radar control for each unit. The radar control contains a data card which collects traffic information of every vehicle that passes the van during the operation of the unit.

Innovation

ACS has demonstrated an ability to develop new innovations for photo enforcement. These include a camera that can monitor speed in both directions at the same time, and a speed trailer (mainly used in construction zones) that is able to monitor and display the speed of passing vehicles as well as photograph vehicles that are beyond the speed tolerance levels. In addition, new innovation items not specifically included in the formal contract requirements are:

- *Bus Lane Priority.* As a result of an EPS request, research, data collection and system implementation process for Bus Lane priority enforcement are provided.
- *CanCam Development.* In response to parking restrictions being an impediment to photo radar deployment, ACS developed and delivered a remote photo radar unit and video link monitoring system to the EPS.
- *CiteWeb Enhancements.* Pursuant to a 2004 Request for Proposal item, ACS has provided a PIN number access system so that an accused person could view their respective violation photo securely online. (System subject to the EPS request for delivery).
- *Dual Camera Enforcement System.* As in the case with the CanCam, it was identified by ACS that parking restrictions inhibited two-way speed enforcement. ACS developed the DCES system which allows an operator to conduct enforcement in both directions from a single deployment location.
- *E-Ticket Development Project.* Alberta Justice, like many government agencies, has requested a paperless offence notice system to streamline the adjudication process. ACS has – without a contract requirement – provided IT development to deliver this service for the EPS, which is in the final stage of testing.

A.3. City of Calgary

The CPS photo enforcement program is provided “in-house”. There are no outside contractors directly responsible for any elements of the process, although Calgary uses multiple vendors to provide equipment, some film development and some installation. Currently, there are six mobile photo radar vans in use in Calgary and with thirty-six intersection safety cameras rotated through 48 locations. The population covered by photo enforcement in Calgary is approximately 992,000. The following is a description of photo enforcement in Calgary, broken into the processes outlined by the value chain.

Deployment

PHOTO RADAR

The CPS manages the deployment of photo enforcement using the Provincial Guidelines. Other factors considered in photo enforcement deployment are:

- Collision data gathered from the police information system.
- The roadway under consideration.

- The amount of traffic on the roadway.
- Speed of vehicles on the roadway.
- Community feedback.
- Number of lanes on the road.

The CPS identifies target roadways for photo enforcement, but operators in photo radar vans have the ability and the authority to move between locations during a single shift.

INTERSECTION SAFETY

The CPS, using factors similar to those used for photo radar deployment, determines intersection safety deployment. Potential locations are selected based on criteria including:

- Provincial guidelines.
- Construction requirements.
- Future road development or planned changes to existing intersections.
- Number of lanes on the road.
- Number of traffic offenses.

The CPS uses a categorized rating system to determine whether an intersection may need an intersection safety camera. Points are assigned based on three criteria:

- Property damage.
- Injuries.
- Fatalities.

Those intersections with the highest number of assigned points are then considered for an intersection safety camera.

Delivery

Delivery of intersection safety camera photo enforcement and photo radar enforcement are two separate processes.

PHOTO RADAR DELIVERY

Peace officers contracted through a private company are responsible for quality assurance, on-location testing and equipment operation. The peace officer records information on a tracking sheet every time a photo is taken.

Photographs are stored on the flashcard in the camera and the recorded speed is stored on the data card, both of which are merged onto a laptop to ensure the image and the data card match.

During operation, information is passed between the camera and data card after every photo is

taken or whenever a period of four to six minutes elapses. If there is a break in the link between the camera and data card, then all photos taken are deemed unusable by the software.

The peace officers return to the CPS facility one hour before their shift is completed to load images and data card information into the database and ensure that the data and the photos match up with the proper numbers on the tracking sheet. The software is able to identify if there has been a violation automatically from the data and the image. The image is stored in the database and on a CD.

CPS analysts confirm that a violation has occurred and verify the license plate number, as well as checking other data and gathering the license plate numbers to be sent to the Alberta Motor Vehicle Registry. The required information is returned, usually overnight, and the resulting information packet is transferred to the Traffic and Ticket Control Office in downtown Calgary with a copy of the tracking sheet and a CD of images. The original tracking sheet is stored at the CPS.

INTERSECTION SAFETY CAMERA DELIVERY

CPS officers collect the flashcards from the cameras every three to four days, depending on how many photos are normally taken at a location. The officer who originally installed the flashcard in the camera must be the one who removes the flashcard from the camera, so that they can attest in court that the camera was functioning properly. Once the flashcard is removed, the images are downloaded onto the CPS database and the images are saved to a CD as well as on the system. Each image needs to be manually checked in order to confirm a violation. Wet film cameras add an additional step to this process, as wet film is sent to Lavalle, Quebec to be processed and returned to the CPS, which normally takes four days.

A review of the image and the data is conducted by the CPS analyst to identify whether a violation has occurred and they verify the license plate number via a computer link to the AMV. This information is usually processed overnight and transferred to the Traffic and Ticket Control Office in downtown Calgary.

Issuance

Once the vehicle's registered owners are identified, the violation data is downloaded by the Traffic and Ticket Control Office, a notice of offense and a violation ticket are printed and mailed to the vehicle's registered owner and to the Alberta Justice for use in court.

Notices of offense from intersection safety cameras are sent without a photograph of the offense. Currently, the CPS has not developed software to automate the process of printing violation tickets for intersection safety camera offenses; therefore, some of the data must be entered manually which adds an additional step to the process compared to photo radar notice of offenses.

The Traffic and Ticket Control Office deal with public complaints about tickets. Technical questions are passed on to the CPS. If a citizen would like to view the photo of their violation,

they can view the photo at this Office. There is an average of approximately 500 tickets produced by the office per day, requiring approximately 6.25 hours of processing time.

OUT-OF-PROVINCE TICKETS

The CPS tickets out-of-province drivers for speed and intersection safety offenses committed within Calgary. The CPS enters the out-of-province data into the database, and the vehicle's registered owner data returns blank from AMV. The Traffic and Ticket Control Office then enters the data supplied by the CPS from CPIC and mails the violation ticket. There are approximately 200 out of province violations per week in the summer and 84 per week on average for the rest of the year. Approximately 50 per cent of the out-of-province violations issued by the CPS are paid.

Adjudication

The Government of Alberta through the Alberta Justice department collects all fines. Intersection safety camera fines are returned to CPS and are used for the intersection safety camera program. Currently, these funds are used to purchase and provide maintenance for poles, cameras and equipment, and to cover the cost of CPS technicians.

If a violation is challenged, a package of disclosure is created and given to both the Crown and the defendant. The Crown package contains more detailed information, including the tracking sheet and information recorded by the operator for photo radar that can be used in court. Both packages include:

- An explanation of the details of the photograph.
- A photo of the offending vehicle.
- A photo of the license plate.
- Affidavits signed by the photo radar operator swearing that the event took place or the intersection safety camera technician indicating the camera was functioning properly and the officer reviewing the photos indicating an offense occurred.

Analysis

The CPS gathers traffic information about roadways through their own database. They have a decoy program in place, where a van is used to record traffic data, but does not issue tickets. The decoy program is used to deter speeders in a location, collect traffic data, and increase awareness of photo enforcement. This data is then added to their database. Analysis and deployment decisions are based on all available information.

The CPS is required to provide an analysis of photo enforcement every year to the Government of Alberta, and regularly reviews information collected on intersection safety and photo radar enforcement. The information included in the analysis provided to the Government of Alberta is determined by the Provincial Guidelines and includes a minimum of:

- The impact of automated traffic enforcement technology, over time, on reducing the speeds of violators at sites being monitored by photo radar.
- The number of collisions at the sites being monitored in those municipalities where this information is available.
- The number of sites monitored through automated enforcement.

The database is updated daily, and reports can be created on request with the most recent data on the number of violations issued, percentage of photos taken that could not be used and percentage of operator errors.

Maintenance and Installation of Equipment

MAINTENANCE

The CPS carries out maintenance of equipment. There is a staff officer who is responsible for installation and maintenance of the photo radar equipment. Also, there are three technicians in place to service intersection safety cameras. Maintenance is relatively simple, because the cameras are modular; if there is a problem with a camera or piece of equipment, it is removed and replaced. The CPS maintains a small inventory of spare equipment in case there are problems. The equipment used by the CPS is available locally and can be quickly purchased and replaced in an emergency.

INSTALLATION

The CPS is responsible for equipping and installing all of the technology used in the photo radar vans. Currently there are 6 vans, one van that acts as a community response van it is clearly marked as a photo radar vehicle and is used to increase awareness and respond to community complaints.

The equipment used in the photo radar vans are purchased as a package from a vendor:

- Laptop and camera mounts.
- 12 volt gel cells for power.
- If digital, a laptop (Toughbook) is used to control the system.
- 2 GB flashcards for the digital cameras.
- Radar and radar control software from a software vendor.

One CPS officer is trained to install and troubleshoot the equipment. The equipment is modular, allowing the officer to easily remove and replace parts, which contributes to reducing down time and increasing the number of hours a photo radar van can be on the street.

In the installation of intersection safety cameras the City of Calgary installs loops in roadways and runs power to the camera pole. The vendor, who supplies the camera, connects the camera and the loops and to the power installed by the City of Calgary. One of three government-

certified CPS technicians installs and tests the camera to ensure picture quality and that the photo taken will completely photograph the whole lane. To assist in installation and service of the intersection safety cameras, CPS has a truck equipped with a bucket to allow easy access to the cameras. At present, the cameras are one directional. CPS is in the process of moving from wet film to digital film, with the goal that all wet film cameras will be converted to digital cameras by the end of the 2006.

Innovation

The CPS does not invest in photo enforcement innovation, but has the flexibility to quickly adapt to new technology.

A.4. State of Victoria, Australia

Photo enforcement in Victoria is a statewide program that is not focused on a single community. The photo enforcement operation is on a much larger scale of operation than in Edmonton. Victoria is considered a leader in photo enforcement and employs mobile photo radar vans, fixed photo radar cameras and intersection safety cameras that include “speed on green” violations. Another type of photo enforcement uses point-to-point cameras on rural roads to photograph a vehicle passing a stationary camera at one point on the road and 60 km down the road a second photograph is taken. The time needed to travel from the first camera to the second camera at the speed limit is calculated and if the vehicle passes the second camera before the calculated time elapses a photograph is taken for a speeding offence. This type of photo enforcement is used to decrease the point in time measurement of a vehicles speed and to mitigate against drivers increasing and decreasing their speed along rural roads. As long as the average speed of the vehicle across the 60 km is equal to the speed limit a second photograph will not be taken. If a second photograph is not taken the first is automatically deleted from the memory card to protect the individual’s identity. The State of Victoria currently has identified almost 3,000 photo radar locations as well as eighty intersection camera locations that monitor speed through the intersection and red light infractions. Currently, the total number of hours of operation of all cameras is 7,500 hours/month with a predominant distribution of cameras in urban rather than rural areas. The population covered by photo enforcement in the State of Victoria is approximately 5 million people. Victoria’s operation is much more “covert” than Edmonton’s. The presence of photo enforcement is not indicated by signage and units are hidden from the sight of drivers. The following is a description of photo enforcement in the State of Victoria, broken into the processes outlined by the value chain.

Deployment

Deployment is under the control of the Victoria Police Service (VPS). The VPS has created operational policy guidelines, similar to Alberta’s guidelines, which are used to determine locations for photo enforcement. These guidelines include:

- Trauma history.
- Risk of road trauma.

- Consideration of local conditions relating to technical operational feasibility.
- History and risk of motorists breaking the law at a particular location.

Guidelines specifically for mobile speed camera locations include:

- A documented history of serious and major injury collisions within the previous 12 months.
- The subject of a validated written complaint of excessive speeds, resulting in a written assessment by a Victoria Police Traffic Management Unit officer indicating that driver behavior demonstrates a significant risk of speed related collisions.
- Assessed by a Victoria Police Traffic Management Unit officer as posing a significant risk of speed related collisions.

Guidelines specifically for fixed photo radar camera locations include:

- Confirmed high incidence of speeding.
- High traffic volume.

Victoria Roads assist in deployment by supplying crash and collision data to the VPS.

Delivery

Photos taken by the intersection safety cameras and the fixed cameras are downloaded daily from the location to a central site for processing. As well, van operators bring the photos and data from the mobile cameras back to the central site for processing. Tenix Pty Limited (Tenix) is responsible for processing the photos and determining if a violation has occurred. Once the photos have gone through final processing they are linked to Victoria Roads database, which brings up the data for the vehicle's registered owner to check against the photo and the recorded data from mobile cameras. If there is any doubt about the vehicle in the photo or there are obstructing objects the photo is discarded.

Issuance

Violation tickets are printed by Tenix and include the actual speed measured and the alleged speed, which is three kilometers below the measured speed. The violation ticket is sent to the vehicle's registered owner without a photograph. The vehicle's registered owner has the option to nominate a different person as the driver and the nominated individual receives the demerits with the fine.

Adjudication

The person nominated for the violation ticket is able to pay their fine through a virtual court system. If the fine is paid within 28 days there are no additional charges. If the fine is not paid within 28 days then an administrative fee is added to the fine and another 28 days are granted for payment. Following this period the violation is referred to court.

Fines are paid to the Department of Justice and become part of general revenue that is allocated to all areas of the government.

Analysis

Tenix produces monthly reports that include:

- The number of cars passing a given camera;
- The percentage of cars exceeding the speed limit by
 - 7 km/h
 - 10 km/h
 - over 10 km/h
- Graphs of the percentage of offenders in an area over time;
- The number of hours of camera use in a zone; and
- Spider graphs are used to analyze crash rates and the number of hours cameras are used in an area. Spider graphs plot aggregate data over a 24-hour period for a single day. The graph displays concentric circles indicating the number of hours of camera use against the crash rate in a zone. A mismatch in the number of camera hours and the crash rates in the area indicate the need for increased enforcement in the area.

Maintenance and Installation of Equipment

The Department of Justice is responsible for calling tenders, developing the required specifications for the photo enforcement site, executing contracts and ensuring that installation is correct as per design. Justice is also responsible for camera installation and operation quality assurance and for maintaining the equipment, although maintenance is currently contracted out to Tenix. Maintenance and installation is the responsibility of Tenix and they maintain all photo enforcement equipment. Cameras are recalibrated and sealed by Tenix and the accuracy of the photo radar equipment is validated by the VPS to ensure that the equipment is accurate.

Innovation

The VPS contract with Tenix provides an incentive for innovation. The contract consists of two parts: (1) a flat fee structure; (2) a sum of money that is tied to the percentage of successful traffic violation tickets. The higher the percentage of successful tickets (those tickets without spoilage) the more money Tenix receives from its photo enforcement contract. This provides an incentive for Tenix to identify and use the latest technology that provides the best quality for photo enforcement. This has moved Tenix to use the most recent digital technology for their cameras phasing out wet film cameras.

A.5. Scottsdale, Arizona

There are ten Redflex Traffic Systems Inc. photo enforcement cameras and four mobile speed vans in the City of Scottsdale. The vans are used for two shifts per day, six days a week. There are 470 approved photo radar sites that include 70 locations within school zones. Scottsdale employs fixed camera sites where sensors in the pavement track intersection safety violations as well as speed on green where drivers are ticketed if they speed through the intersection. Scottsdale has also installed fixed cameras on part of an interstate that runs through the municipality. The following is a description of photo enforcement in Scottsdale, broken into the processes outlined by the value chain.

Deployment

The guidelines used by the Scottsdale Police Service (SPS) for deployment of photo enforcement are:

- Citizen complaints;
- Observations by officers;
- Traffic volume; and
- Collision history.

Photo enforcement placement is determined with City of Scottsdale engineering staff approval.

Delivery

Delivery of photo enforcement is contracted out to Redflex, including intersection safety cameras, photo radar van operation and photo processing.

System accuracy is established at the time of installation and on an ongoing basis by comparing the speed indicated by the system with a calibrated detection device. The system is configured to an accuracy of +/- 1 MPH of the calibrated detection device reading. A variety of devices are used to verify accuracy:

- Vehicle speed test and verification;
- Radar detection systems;
- Certified speedometers; and
- Laser speed detection systems.

Redflex verifies system accuracy annually and after equipment maintenance to ensure proper equipment operation.

When a photo radar camera takes a “picture,” a 12 second video of the vehicle is stored. Redflex extracts still frames of the vehicle front and back and the driver. Intersection safety cameras capture images of the vehicle entering and exiting the intersection.

Three Redflex employees check each photo to determine whether there is a possible violation, whether the driver in the vehicle matches the description of the registered owner of the vehicle, and to ensure the photo meets the set standard for photo quality. Currently, the Scottsdale Chief of Police has granted police privileges to two Redflex staff members although it is likely that in the future the final step will reside within the SPS.

Issuance

Redflex is responsible for printing and issuing violation tickets as well as notices of offense depending on whether the description of the driver matches the photo taken. In each case, a photo of the front and back of the vehicle is sent to the vehicle's registered owner. The photo includes the face of the driver and the license plate. If the description of the vehicle's registered owner does not match the photo of the driver, a notice of violation is sent out to the owner rather than a violation ticket. In these cases, Redflex sends a picture of the driver of the offending vehicle to the SPS to access the photographs of the vehicle's registered owners to make a comparison of the photo. In some cases, the description of the vehicle's registered owner that Redflex has access to is out of date and the SPS is able to match the photo to more current information. A notice of violation asks the registered owner to nominate the person who was actually driving the vehicle. Redflex currently does not have access to photos of drivers, only the driver's license description.

Adjudication

If the registered owner or the nominee does not pay the violation ticket within the prescribed time Redflex contracts with a process service claim firm to serve the registered owner with the violation in person. The case then moves to small claims court and a court date is set. The Redflex technician who provided the most recent maintenance on the camera serves as a witness and Redflex provides a case package to the court, prosecutor and defendant.

Any vehicle traveling 20 mph over the speed limit is considered to reckless endangerment and the driver is charged with a criminal offense. Similarly, those vehicles, which are traveling in excess of 100 mph, are considered reckless drivers and the drivers are charged with a criminal offense. In both cases, Redflex contacts the SPS and criminal procedures are initiated against the drivers of the offending vehicles.

Analysis

Redflex provides daily reports to the SPS on the number of photos taken, those drivers who are exceeding the speed limit by 20 mph or are traveling over 100 mph and those drivers who are deliberately hiding from the camera. Redflex also provides management reports to the SPS that include:

- The total number of incidents (violations) that are currently being processed by Redflex;
- The total number of photos removing photos taken when emergency vehicles pass the camera;
- Photo enforcement processing statistics from Redflex.

Maintenance and Installation of Equipment

All equipment maintenance, installation and supply are the responsibility of Redflex. The City of Scottsdale supplies and authorizes the permits that are required for construction of the fixed camera sites.

Innovation

Redflex has demonstrated the ability to provide innovative solutions to its clients by providing the most recent technology. They have developed mid block fixed cameras, some of the first in the United States, as well as fixed cameras for the freeway passing through the City of Scottsdale.

A.6. Winnipeg Police Service

The WPS contracts with ACS to provide a large portion of the Winnipeg photo enforcement program. The WPS Photo Enforcement Section, peace officers and ACS share an office to maximize process efficiency. The head WPS officer and ACS program and office manager work closely to ensure seamlessness. In addition to the head officer, one WPS constable and three clerks are present. Currently, there are five mobile photo radar vans used in photo enforcement across 156 possible locations and 30 intersection cameras rotated among 42 sites within the City of Winnipeg. The current population within Winnipeg CMA is 650,000. The following is a description of photo enforcement in Winnipeg, broken into the processes outlined by the value chain.

Deployment

The deployment of photo enforcement units involves the selection of unit locations by the WPS and their installation by ACS. Photo enforcement is only permissible in intersections controlled by traffic lights, schools, playgrounds and construction zones. Additional factors include:

- High rates of violations;
- High risk areas;
- High accident rates;
- Community concerns; and
- Technical viability.

Delivery

Delivery of intersection safety camera photo enforcement and photo radar enforcement are two separate processes.

PHOTO RADAR DELIVERY

Photo radar units are operated by peace officers who, at the end of each shift, deliver camera data cards, notes on perceived violations, and camera film to ACS for processing. Peace officers are contracted by the WPS.

ACS processes camera film, downloads information from the data card, makes initial confirmations of offence and forwards this information to the provincial motor vehicle registry for license plate verification. When verification is received, a second confirmation of offence is done by the WPS. If a file is removed because of errors, it is forwarded to the head WPS officer on site to ensure that no violation has occurred.

INTERSECTION SAFETY CAMERA DELIVERY

An ACS technician removes camera film and tests intersection safety camera units. Once film is removed and delivered to ACS it is sent out for processing. If a violation is confirmed, the provincial motor vehicle registry is contacted for license plate verification. When verification is received, a second confirmation of offence is done by the WPS. If a file is removed because of errors it is forwarded to the head WPS officer on site to ensure that no violation has occurred.

Issuance

ACS issues notices of violations and the violation ticket is mailed to the vehicle's registered owner.

Adjudication

If either a photo radar violation or an intersection safety violation is challenged, ACS provides court packages with the signatures of key witnesses, such as the intersection safety camera technician. Also included in the packages are copies of testing certificates and notes from the issuing officer. The peace officer present in the van when the photo radar violation occurred is required to be present during adjudication. In the case of intersection safety violations, an affidavit by the viewing officer and camera technician are sufficient.

Analysis

ACS generates reports monthly. The WPS issues an annual report to the Government of Manitoba that provides information about the photo radar program and the intersection safety program.

Maintenance and Installation of Equipment

INSTALLATION

ACS owns and is responsible for all equipment maintenance. They are responsible for installing all equipment for photo radar vans, as well as coordinating the installation of intersection safety cameras. ACS works with city engineers to determine whether installing red light camera units is viable in selected locations. Unsuitable locations generally have too much underground infrastructure where the camera needs to be installed.

MAINTENANCE

ACS provides regular maintenance for the vans and equipment. Every three days technicians from ACS retrieve data from the intersection safety cameras and perform quality assurance tests to ensure that the equipment is maintained.

Innovation

ACS has demonstrated an ability to develop new innovations for photo enforcement. As in Edmonton, ACS provides the WPS with the opportunity to request new technology from ACS.