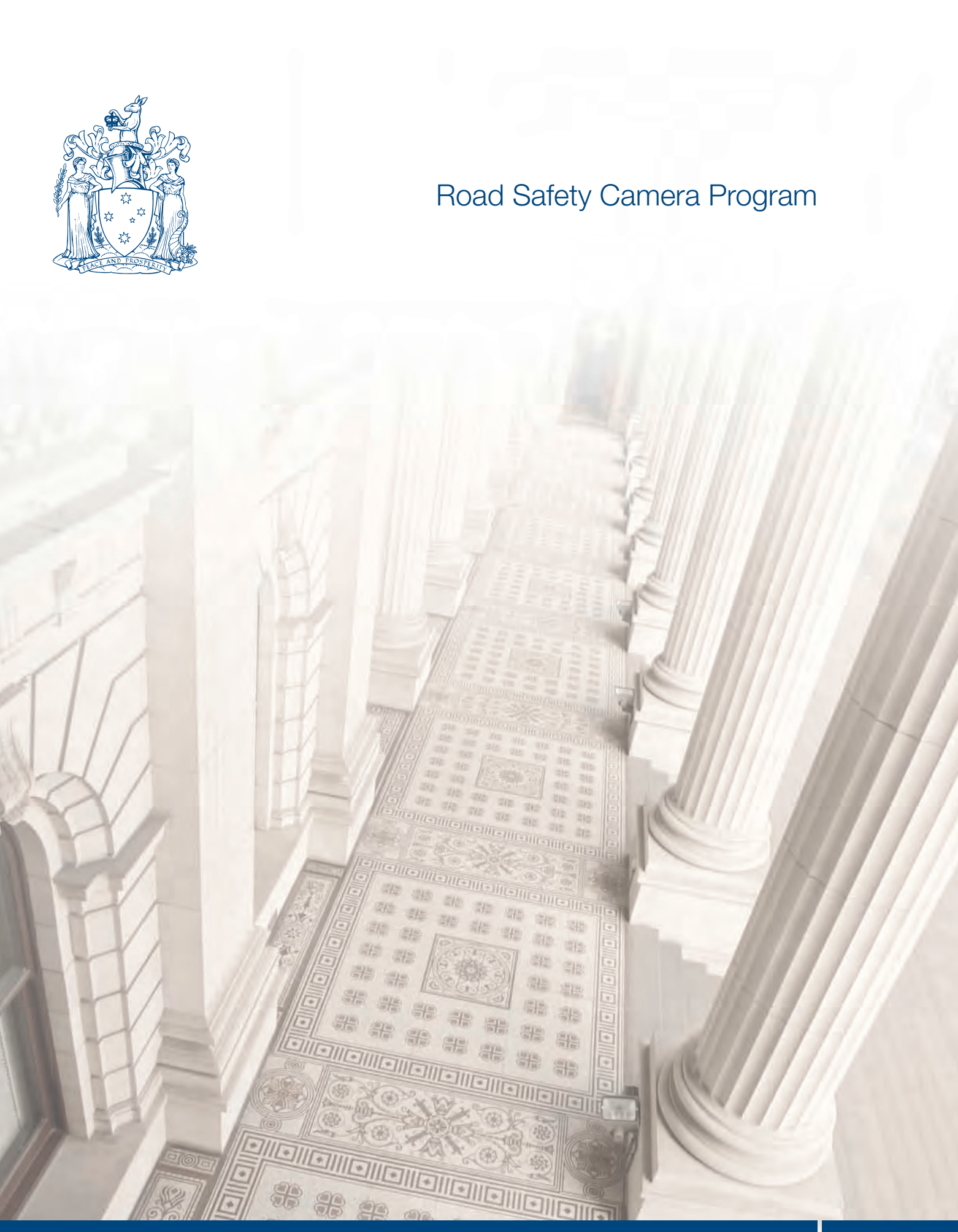
Road Safety Camera Program



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Auditor-General

Road Safety Camera Program

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VAGO

Victorian Auditor-General's Office

Auditing in the Public Interest

The Hon. Bruce Atkinson MLC
President
Legislative Council
Parliament House
Melbourne

The Hon. Ken Smith MP
Speaker
Legislative Assembly
Parliament House
Melbourne

Dear Presiding Officers

Under the provisions of section 16AB of the *Audit Act 1994*, I transmit my performance report on the *Road Safety Camera Program.*

Yours faithfully

D D R PEARSON
Auditor-General

31 August 2011

Contents

Audit summary

Road trauma is a significant concern of the community and government. In 2010, there were 4 503 crashes on public roads that resulted in fatality or serious injury, with 288 people dying on Victoria's roads. Road trauma costs the Victorian economy an estimated $3.8 billion a year.

While road crashes are caused by a variety of interacting factors, speeding and red-light running have been identified as significant factors. Speeding is identified as the primary cause of about a third of road casualties each year. Speeding increases the likelihood of a crash, with even small increases above the speed limit resulting in a significantly greater risk of crashing. Furthermore, the faster a vehicle is travelling, the greater the severity of the crash and the likelihood of fatality and serious injury. Red-light running is similarly linked with crash risk and severity. Crashes at major metropolitan intersections account for around 20 per cent of all fatal and serious injury crashes. Around 20 per cent of injury crashes that occur at intersections involve red-light running.

The road safety camera program has been operating since 1983 and is a component of Victoria's current road safety strategy, *arrive alive 2008–2017*, which aims to reduce road trauma by 30 per cent. Road safety cameras are an enforcement approach that is intended to improve the behaviour of road users. Mobile and fixed speed cameras aim to enforce speed limits and deter drivers from speeding, and fixed red-light cameras aim to deter drivers from running red lights.

In 2009–10, 1 156 673 infringements were issued from road safety cameras for speeding and 147 505 for red-light running. These numbers will vary if infringements are withdrawn or reissued. Revenue collected from these infringements amounted to $211.3 million, which is 0.47 per cent of the total general government revenue for 2009–10.

Sections of the community and media have shown significant interest in the road safety camera program, voicing concerns about whether using cameras is appropriate, the accuracy of cameras, and the validity of infringements. Some allege that the purpose of the road safety camera program is to raise revenue, while major faults such as those of the Western Ring Road fixed speed cameras in 2003 and the nine incorrect fines issued on the Hume Freeway point-to-point cameras in 2010 have served to erode public confidence in the program.

The audit examined whether there is a sound rationale for the road safety camera program and whether the cameras are sited for road safety outcomes. It also examined the accuracy of the camera system and whether the public can be confident that an infringement is valid.

Conclusions

Road safety cameras improve road safety and reduce road trauma, and their ongoing use as an enforcement tool remains appropriate. The supporting technology used and the way the camera system operates provide a high degree of confidence that infringements are issued only where there is clear evidence of speeding or red-light running.

A strong body of research shows road safety cameras improve the behaviour of road users, and reduce speeding and road crashes. Cameras cannot differentiate between different road-users groups with varying levels of road trauma risk. However, at-risk groups are appropriately targeted by non-camera approaches within the broader *arrive alive 2008–2017* road safety strategy.

Any program that aims to deter dangerous and risky behaviour through the use of fines will generate revenue, but this is demonstrably not the primary purpose of the road safety camera program. In fact, more revenue could be raised through tightening operational policies that provide for some leniency to speeding drivers and therefore reduce the number of infringements issued.

The deployment and siting of fixed and mobile cameras is based on the road safety objectives of the program. Further revisions to operational approaches, such as random deployment of mobile cameras, should however strengthen the program.

While there can be no absolute guarantee over the accuracy of any system, the processes and controls in place provide a particularly high level of confidence in the reliability and integrity of the road safety camera system.

There are aspects of the program that can be further strengthened to allay public perceptions about its integrity and purpose. First, the lack of past evaluations of fixed speed cameras on freeways, and failure to provide for the ongoing, systematic review of their efficacy is a gap in Victoria's evaluation program. Second, mobile cameras warrant a program of independent testing of their accuracy under actual operating conditions—as is the case for fixed cameras.

The Department of Justice (DOJ) can also more purposefully develop and manage its communication and public education programs to specifically address the widely held misconceptions that the road safety camera program's primary purpose is to raise revenue and that the cameras are inaccurate. In addition, greater attention to promoting the positive contribution the road safety camera program makes to Victoria's road safety is needed.

Findings

Rationale for the road safety camera program

The road safety camera program is part of a broader road safety strategy, *arrive alive 2008–2017*, that is based on the road safety principles of the *Safe System* approach. The *Safe System* approach forms the basis of the *National Road Safety Strategy 2011–2020* and is acknowledged by the Organisation for Economic Cooperation and Development, the World Health Organisation and the United Nations as the optimal approach for improving road safety.

Of *arrive alive's* three focus areas, the road safety camera program is a component of safer road users, which aims to improve the behaviour of road users. The rationale for attempting to change driver behaviour to reduce speed and red-light running is sound. Both behaviours increase the risk and severity of crashes, and improvements in these behaviours should result in less road trauma. Enforcement mechanisms, including road safety cameras, are effective in changing dangerous driver behaviour.

Australian and international evaluations strongly support using road safety cameras to improve road safety. These evaluations have consistently found that cameras improve road safety outcomes through reduced speeding, fewer crashes and less road trauma.

Evaluations of Victoria's mobile cameras and fixed speed/red-light cameras demonstrate their effectiveness in reducing the frequency and severity of road trauma. However, there are gaps in Victoria's research program. Fixed speed cameras on freeways have not been extensively evaluated in Victoria, and point-to-point cameras have never been evaluated.

Cameras cannot differentiate between road user groups that may have different levels of road trauma risk. At-risk road user groups are appropriately targeted by a range of road safety measures, which can include cameras. Motorcyclists are 30 times more likely to experience road trauma. However, because some cameras can only record front numberplates, camera coverage over motorcyclists is limited by the lack of front numberplates with which to identify risky road users.

Siting cameras for road safety outcomes

Since 2007, fixed camera siting has been informed by sound criteria based on road safety outcomes and not on maximising revenue. These criteria address factors known to increase crash risk and severity, as well as considering the physical suitability of a site.

DOJ systematically prioritises sites for fixed cameras at intersections. However, due to the lack of available research evidence, it does not have a similar systematic approach for prioritising sites for other types of fixed camera sites.

Mobile cameras are deployed across about 2 000 sites that must be physically suitable and satisfy at least one of four deployment criteria. Deployment criteria are based on a site's crash likelihood and crash severity risk. The use of such criteria is consistent with other jurisdictions. However, using deployment criteria limits the ability of police to site cameras 'anywhere, any time'. Furthermore, these criteria could create and reveal siting patterns, which local drivers could identify and then adjust their behaviour accordingly. Application of deployment criteria could reduce the effectiveness of the mobile camera program in reducing speeds generally across the road network. There has been no research in Victoria to determine whether the current approach for siting mobile cameras is optimal.

Local police determine the monthly deployment of mobile cameras to approved sites based on local priorities. However, this approach may also reduce the effectiveness of mobile cameras, in comparison to other approaches such as random deployment. Mobile cameras are not deployed often enough at night, are deployed in discernible patterns and are being used in effect as 'fixed cameras' by being regularly located at single locations. Consequently, there is an increased likelihood that the general deterrence effect of the mobile camera system would be diminished.

Publishing the weekly roster of mobile camera sites is also inconsistent with the program's aim to create general deterrence. Given the connection between speeding and road trauma, and the demonstrated effect of cameras in reducing speeding, there is a likelihood of increased adverse road safety outcomes as a result of this practice. This is particularly so in areas of country Victoria where residents can identify local areas where there is no mobile camera enforcement.

Accuracy and reliability of the camera system

DOJ has developed appropriate specifications for fixed and mobile camera equipment so that they measure speed accurately and reliably. All camera equipment is tested extensively against these specifications and must demonstrably comply with the specifications before becoming operational.

Maintenance and testing of fixed cameras is comprehensive and methodologically sound. Testing is conducted by appropriately accredited independent organisations. Testing and maintenance of fixed camera equipment, including annual certification testing, is frequent enough to maintain accuracy and reliability.

Maintenance and testing of mobile cameras is sound. During the set up for each mobile camera session, the camera's speed measurement is required to be tested. This session testing, together with yearly maintenance and certification testing, is frequent enough to maintain a high level of assurance over the accuracy of the cameras. Notwithstanding the fundamental strength of the testing and maintenance regime, even greater assurance could be provided by a program of independent testing under roadside operating conditions.

DOJ has a strong, systematic approach to monitoring the fixed camera network for faults and degradation. The rigour of this approach has increased in response to the major faults detected in the Western Ring Road fixed cameras in 2003. DOJ gets information on camera performance from a comprehensive range of sources including test reports and evidence monitoring. This provides assurance that any faults or degradation of fixed cameras will be identified and rectified quickly.

Performance of mobile camera equipment is monitored and managed by the mobile program provider. Regular robust mechanisms for detecting equipment faults and degradation, including session checks, continuous monitoring of evidence, and annual workshop maintenance provide confidence that cameras are only used if they are operating in accordance with technical specification requirements.

Validity of infringements

The road safety camera system has a number of mechanisms to provide additional assurance that infringements issued are valid.

A police discretionary enforcement threshold is applied to all speeding infringements detected by speed cameras. This provides a very high level of confidence that drivers issued with an infringement exceeded the speed limit. This enforcement threshold is above that required by the *Road Safety Act 1986.*

Since 2004, all fixed speed cameras except point-to-point have two separate, independently-designed speed measurement methods. Regardless of how far over the speed limit the primary device records a driver, if the secondary corroborating measurement is not within 2 km/h, an infringement will not be issued. This significantly reduces the likelihood that infringements from fixed speed cameras are invalid.

At the start of each mobile speed camera session, the camera operator is required to compare the camera's speed measurement against a radar of independent design. If this comparative test does not read within a defined tolerance the session should not proceed. The operator is required to declare in writing each time that this test was performed successfully, and can be called upon to confirm this in court. Nonetheless, independent assurance, such as photographic evidence of the test being carried out, would provide stronger evidence that the test was conducted.

Point-to-point cameras measure average speed. A driver measured by point-to-point cameras as having exceeded the speed limit would have had to maintain a travelling speed significantly above the speed limit for the duration of the camera zone. A secondary corroboration system is currently being installed to provide greater assurance over the validity of infringements issued from this system. Had this been in place since activation, it is unlikely that the nine incorrect Hume Freeway infringements would have been issued in 2010.

For red-light infringements, cameras record two images, one of a vehicle entering the intersection on a red light and a second as the driver continues through the intersection on that red light. Vehicles are only detected and photographed shortly after the change to red. An infringement is issued only if the two photos show that this incident occurred. Furthermore, there can be additional confidence in red-light infringements as drivers can review both photographs.

Before an infringement is issued, the evidence is reviewed to make sure it is valid. There are robust processes in place to verify infringements. These processes are designed to promote verification accuracy, with contractual incentives based on accuracy of verification as opposed to maximising infringements and revenue. After the evidence is verified, Victoria Police further review a sample of lower-level speeding incidents and red-light incidents, and all loss of licence incidents before infringements are issued.

All cameras are subject to independent certification testing, which is used as evidence of camera accuracy in court. Two certification providers are used by DOJ and both meet the requirements of the *Road Safety Act 1986*. While the record keeping and transparency of documentation of one of the certification providers needs to be improved, VAGO found no shortcomings with certification testing.

Public communications about the program

In contrast to the integrity and strength of the road safety camera program, the road safety partners have not adequately addressed public concerns surrounding the program's purpose, effectiveness and integrity. Some common misconceptions are shown in Figure 1, including references to the sections of the report that relate to these misconceptions.

One of the most persistent public misconceptions surrounds the purpose of road safety cameras. Government and departmental documents consistently demonstrate that the road safety camera program's objective is to reduce road trauma and improve road safety outcomes. There is no evidence that the primary purpose of the program is to raise revenue.

On the contrary, reasonable police operational decisions and the discretionary enforcement threshold afford leniency to speeding drivers that reduces potential revenue.

Prior to 2011, the road safety partners had not developed an adequate, coordinated communication strategy to counter negative misconceptions. However, DOJ has progressively increased the amount of information available about the program to the public. During the conduct of this audit, DOJ developed a communication strategy aimed at addressing public concerns regarding road safety cameras. This meets the requirements of a sound communications strategy, and includes a plan to evaluate all future communications initiatives.

Figure 1
Common misconceptions concerning the road safety camera program

Misconception	VAGO's evidence against misconception	Page
The purpose of the road safety camera program is to raise revenue	Government and departmental documents consistently state the purpose of the road safety camera program is improving road safety outcomes and that decisions around camera siting are based on improving road safety outcomes. Operational procedures limit the total potential revenue generated by the program. A police discretionary enforcement threshold above the speed limit is applied. More revenue could be raised if this was not applied.	59–60
Low-level speeding is safe	Even small increases above speed limits are dangerous. Research shows that driving 5 km/h over the limit in a 60 km/h zone doubles the risk of crashing. For pedestrians, cyclists and motorcyclists, small increases in speed substantially increase the severity of road trauma experienced.	14–16
Road safety cameras don't reduce road trauma	An extensive body of research and evaluations both throughout Australia and overseas have demonstrated that road safety cameras result in improved road safety outcomes including lower speeds and reductions in fatalities and serious injuries from crashes.	17–20
Road safety cameras are sited to maximise revenue	Fixed and mobile road safety cameras are sited according to criteria based on road safety objectives. There are no incentives for police or other agencies involved in siting decisions to encourage siting based on maximising revenue.	26–28, 30–32
Speed cameras should not be placed on freeways because freeways are safe	While freeways are often well designed and constructed roads, the large traffic volumes and high speeds of freeways reduce the inherent safety of these roads and mean that crashes are likely to have serious road trauma consequences. Between 2006 and 2010, 122 people died as a result of crashes on roads in metropolitan Melbourne 100 km/h zones, which are typically freeways.	27
The cameras are faulty, as shown by the fines withdrawn from the *Road Safety Act 1986.*	There are rigorous equipment management processes including frequent testing and maintenance. Additional policies and procedures around detecting faults and equipment degradation have been put in place since 2004, including the requirement for two separate speed measurements. This reduces the chance of an incorrect fine to close to zero. This requirement was introduced in response to the Western Ring Road faults.	38–48, 51, 61

Note: These misconceptions have been selected based on examination of media articles, public surveys and submissions received for this audit.
Source: Victorian Auditor-General's Office.

Recommendations

Number	Recommendation	Page
1.	The Department of Justice should continue its focus on evaluation, though priority should be given to evaluating the effectiveness of both fixed freeway cameras and point-to-point camera systems.	23
2.	VicRoads, in partnership with the Department of Justice, Victoria Police and the Transport Accident Commission should address the gap in speed enforcement for motorcyclists.	23
3.	To determine the optimal deployment approach for mobile cameras, Victoria Police should conduct and evaluate pilots of the following alternative approaches: • site selection based only on physical criteria, not deployment criteria • random rostering.	35
4.	To increase the effectiveness of the mobile camera program: • the Department of Justice should review the impact of publishing the list of weekly rostered sites for mobile cameras on road safety • Victoria Police should establish a target number of sites required across Victoria and within police divisions to provide sufficient geographic coverage, and establish a procedure for getting assurance that permanently unsuitable sites are replaced with new sites • Victoria Police should determine a target proportion of monthly hours to be allocated at night.	35
5.	To strengthen assurance, the Department of Justice should establish regular independent testing of the accuracy and reliability of speed measurement by mobile speed cameras under actual operating conditions.	48
6.	To increase assurance over the accuracy of infringements from mobile cameras, the Department of Justice should get stronger assurance that mobile camera operators comply with critical procedures.	56
7.	To increase transparency of certification, the Department of Justice should require that all certification service providers comply with appropriate quality control and documentation standards, and are subject to regular audits against these standards conducted by appropriately qualified measurement experts.	56
8.	The Department of Justice should expedite the implementation of its communication strategy with a particular emphasis on addressing misconceptions about the program.	64

Submissions and comments received

In addition to progressive engagement during the course of the audit, in accordance with section 16(3) of the *Audit Act 1994* a copy of this report was provided to the Department of Justice, Victoria Police, VicRoads and the Transport Accident Commission with a request for submissions or comments.

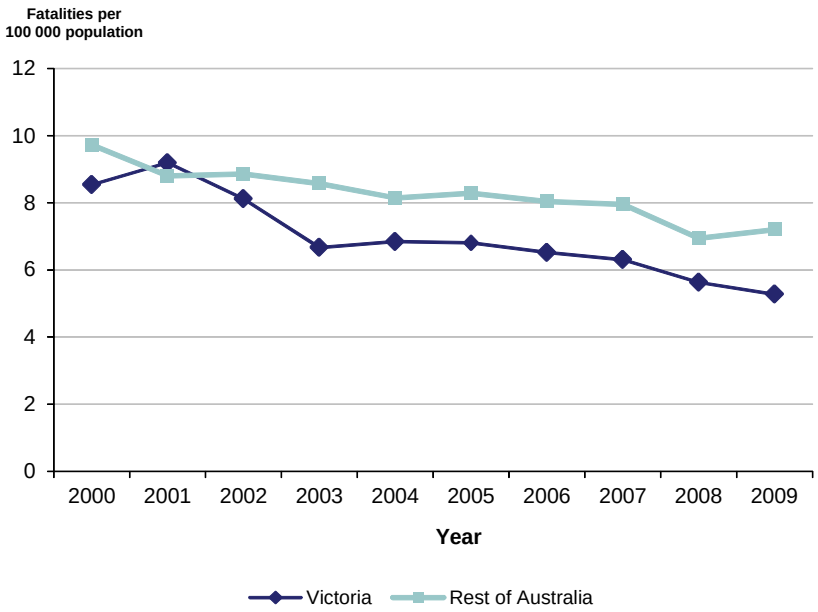
Agency views have been considered in reaching our audit conclusions and are represented to the extent relevant and warranted in preparing this report. Their full section 16(3) submissions and comments, however, are included in Appendix A.

1 Background

1.1 Road trauma

Victoria's road toll has consistently been below the national average and, particularly in recent years, lower than most other jurisdictions. From a peak of 1 061 deaths in 1970, the road toll fell to 288 in 2010. Figure 1A shows the road toll of Victoria compared to the rest of Australia between 2000 and 2009, per 100 000 population. The road toll does not include deaths on private roads and is adjusted down by Victoria Police to exclude deaths it judges either to be intentional or from natural causes.

Figure 1A
Road toll of Australian states and territories (excluding Northern Territory) by 100 000 population between 1999 and 2009



Source: Victorian Auditor-General's Office based on data from the Australian Bureau of Statistics and the Federal Department of Infrastructure and Transport.

1.1.1 Causes of road trauma

Road crashes are caused by interacting factors. Road safety research has shown factors that can influence the likelihood and seriousness of a road crash include:

- speed of vehicle
- running red lights
- driver alcohol or drug consumption
- driver fatigue
- driver inexperience
- design of the road
- quality of road surface
- volume of traffic
- design of the vehicle and protection it provides passengers
- type of object hit, e.g., concrete barricade vs a wire fence.

Speed and road trauma

Speed is the main cause of about a third of road casualties, equating to about 100 deaths and 2 000 serious injuries a year.

There are many ways speed increases the likelihood of a crash. According to a 2006 *Austroads* report, as the speed of a vehicle increases:

- the driver is more likely to lose control
- the driver is more likely to miss important hazard cues
- the vehicle will travel further before the driver brakes in response to a hazard
- the vehicle will travel further after braking before it stops
- other road users are more likely to misjudge the vehicle's speed.

Crash severity describes the seriousness of the trauma to the people in a crash and is determined by how much energy the occupant absorbs on impact. There are direct relationships between the severity, the speed at which the vehicle or vehicles were travelling, and the protection afforded to those in the crash. The more energy absorbed by those involved, the more serious the road trauma. In 2010, there were 4 503 road crashes on public roads in Victoria that resulted in fatality or serious injury.

Recent research in Western Australia estimates that if all vehicles on that state's roads slowed by 1 km/h, it would result in 10 fewer fatalities a year or 5 per cent of the road toll, and in 90 fewer people experiencing serious injuries.

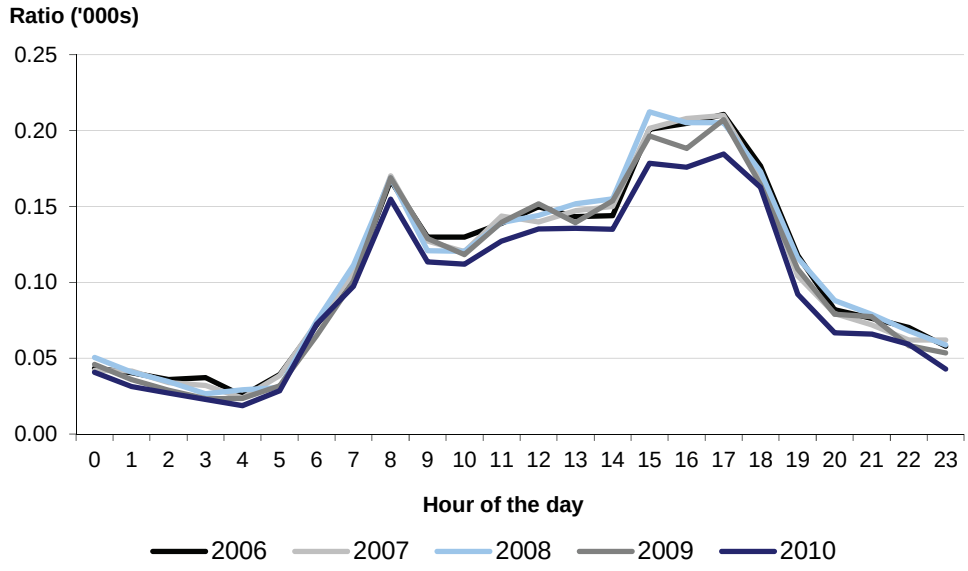
Red-light running and road trauma

Major metropolitan intersections are the site of 20 per cent of all fatal and serious injury crashes. Around 20 per cent of injury crashes that occur at intersections involve red-light running. This high incidence of road trauma is partly because intersection crashes are often side-impact collisions and involve speed.

Time of day and road trauma

There is a consistent pattern in the time of day when crashes occur. Crashes peak at around 8 am and between 3 pm and 5 pm as shown in Figure 1B.

Figure 1B
Ratio of the number of crashes to the Victorian population by time of day, 2006–2010



Source: Victorian Auditor-General's Office based on VicRoads data.

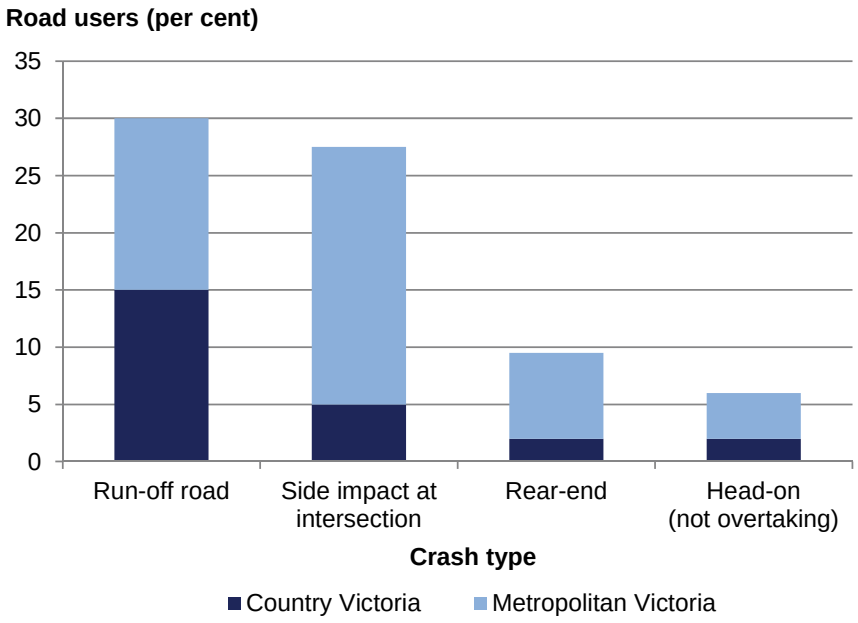
Crash type and road trauma

The most common types of crashes are:

- run-off road
- side-impact at intersection
- rear-end
- head-on.

These account for around 72 per cent of all fatal and serious injury crashes each year. Of metropolitan fatal and serious injury crashes, side-impact at intersection and run-off road crashes are the most common crash types, while run-off road crashes are the most likely crash type for rural Victoria. This is shown in Figure 1C.

Figure 1C
Most common crash types for fatal and serious injury crashes



Source: Victorian Auditor-General's Office based on VicRoads data.

1.1.2 Impact of road trauma

Despite the reductions in the road toll, road trauma is still of concern to the community and government.

Road crash fatalities and serious injuries burden the community socially and economically. The cost is estimated at $3.8 billion a year when opportunity costs, such as lost earnings are considered. Caring for people with spinal cord and brain injuries is also costly. Every year, about 90 people suffer severe brain injury and around 1 000 suffer less severe brain injuries as a result of road crashes. The Transport Accident Commission (TAC) concluded that on average, across a lifetime, it costs $2.1 million to support a person with traumatic brain injury, $1.2 million for a person with paraplegia and $6.4 million for a person with quadriplegia.

Over and above this are the personal costs for the individuals involved in road crashes, their family and friends, and the community.

1.2 Policy response

Successive governments have worked to improve road safety and reduce the road toll. In 1970 Victoria was the first jurisdiction in the world to require the wearing of seatbelts, and in 1976 the first to introduce random breath testing for blood alcohol concentration.

Strategies have focused on addressing the causes of road trauma, including speeding and driver fatigue, as well as measures to reduce the severity of the trauma, such as vehicle safety improvements.

1.2.1 *arrive alive*

The *arrive alive 2002–2007* strategy was Victoria's first integrated road safety strategy. To reduce the road toll, the strategy named 17 challenges, including speeding, drink driving, fatigue and occupant protection. It proposed an integrated suite of measures to address these challenges, including ongoing enforcement using road safety cameras.

The next phase of the road safety strategy, *arrive alive 2008–2017,* is based on the *Safe System* approach. This approach recognises that even with the best preventative measures in place, human error will result in crashes; therefore, measures are needed to reduce the impact of these mistakes. The strategy has three focus areas: safer roads and roadsides, safer vehicles, and safer road users. Road safety cameras are a measure under the safer road users focus area.

1.3 Road safety cameras

Red-light cameras were first installed in 1983 and mobile speed cameras were introduced in 1989. Before this, police officers were the sole enforcers of speeding and red-light running, issuing on-the-spot fines for offences.

The camera program has since expanded to:

- 213 sites with fixed digital cameras (with 32 installed but awaiting Ministerial approval to be turned on):
  - 37 highway speed sites
  - 175 speed/red-light sites at intersections
  - 1 speed/red-light site at a railway level crossing site in Bagshot, near Bendigo
- 26 fixed wet film (non-digital) red-light cameras rotated through 40 intersections
- 4 point-to-point zones on the Hume Freeway across 10 of the 37 highway speed sites
- 85 mobile speed camera cars used across 2 030 approved sites.

The cameras detect alleged violations of road laws and capture an image of the offending vehicle. The driver of the vehicle can then be fined and receive demerit points. Unregistered vehicles and companies that fail to nominate a driver for a road safety offence can also be fined using evidence obtained from road safety cameras.

1.3.1 Camera types and purposes

There are four types of road safety camera used in Victoria, for the following purposes:

- **Fixed highway speed cameras**—used to deter drivers from speeding on a discrete length of road. As such, they are targeted to black spots and locations where a crash would have very serious consequences. They are used on major arterial roads, freeways and in tunnels and in circumstances where it is not safe or practical to undertake other types of speed enforcement. While freeways are generally well designed and inherently safer roads, the high traffic volumes and travel speeds increase the risk of crashes and their severity. Camera locations are typically known and published on the 'Cameras Save Lives' website.
- **Fixed intersection speed/red-light cameras or red-light only cameras**—used to create a location-specific effect on red-light running, and speeding where relevant, at dangerous intersections. Intersections have a higher crash risk than other parts of roads. Victoria is one of the few jurisdictions to use combined speed/red-light cameras.
- **Mobile speed cameras**—used to create the perception among drivers that they can be caught anywhere, any time. To do this, mobile cameras are moved around many sites. The threat of detection and punishment across the road network is intended to persuade drivers to reduce their speed consistently, not just at specific locations.
- **Point-to-point speed cameras**—used to reduce speeding over a stretch of road rather than at one specific location. Speeding is measured by recording how long a vehicle takes to pass through a zone, calculating the average speed and comparing it to the speed limit.

Road safety cameras are used in all other Australian states and territories, to varying degrees. Most jurisdictions have both mobile and fixed cameras. Historically, Victoria has had a more intensive road camera program than other Australian jurisdictions. It was the first Australian jurisdiction to implement a point-to-point camera system applicable to all road users.

1.3.2 Acceptance of the camera program

The community and media have shown significant interest in the use of cameras for road safety enforcement, voicing concerns about the appropriateness of camera use, and the integrity and fairness of the program.

Elements of the community and media question the main purpose of the camera program. Some allege that it is about revenue-raising rather than road safety. A 2009 survey of Victorians by the then Australian Department of Infrastructure, Transport, Regional Development and Local Government found that 59 per cent of respondents believed that 'fines for speeding are mainly intended to raise revenue'.

Major system faults erode public confidence, and receive significant media coverage. The failure of the fixed camera system on the Western Ring Road in 2003, and the nine incorrect fines issued from the Hume Freeway point-to-point cameras in 2010 are cases in point.

Recent studies of social acceptability show that excessive speeding is considered socially unacceptable and on a par with drink driving. However, the studies also suggest there is greater acceptance of lower-level speeding of up to 10 km/h over the limit and that it is perceived as lower-risk behaviour.

1.3.3 Fines and revenue

During 2009–10, 1 156 673 speeding infringements and 147 505 red-light running infringements were issued from road safety cameras.

The fine structure for 2011–12 is shown in Figure 1D. Legislation determines that the value of a speeding fine depends on the number of kilometres above the speed limit the vehicle was travelling.

Figure 1D
Penalties for road safety infringements

Traffic offence	Fine ($)	Demerit points	Automatic suspension
Exceeding the speed limit in a car by:			
Less than 10 km/h	153	1	n/a
10 km/h – 15 km/h	244	3	n/a
16 km/h – 24 km/h	244	3	n/a
25 km/h – 29 km/h	336	4	1 month
30 km/h – 34 km/h	397	4	1 month
35 km/h – 39 km/h	458	6	6 months
40 km/h – 44 km/h	519	6	6 months
45 km/h or more	611	8	12 months
Red-light running	305	3	n/a
Unregistered vehicle	611	n/a	n/a

Note: The fines and demerit points are the same for exceeding the speed limit by 10–15 km/h and 16–24 km/h. These are presented separately because they have different review criteria.
Source: Victorian Auditor-General's Office based on information from the 'Cameras Save Lives' website, Department of Justice.

Revenue from road safety cameras represented about 0.47 per cent of the total general government revenue in 2009–10. This proportion is consistent with the last three financial years where revenue from cameras has represented around 0.50 per cent of total general government revenue.

In 2009–10, revenue from fines for speed and red-light running (excluding police patrols) was $211.3 million. Of this:

- $116.8 million (55 per cent) was from fixed cameras
- $92.5 million (44 per cent) was from mobile cameras
- $2.0 million (1 per cent) was from point-to-point cameras.

Additionally, $18.3 million of revenue in 2009–10 was derived from fines issued for unregistered vehicles and companies failing to nominate a driver.

Drivers can ask to have their infringements withdrawn and Victoria Police has the discretion to issue an official warning instead. In 2010–11, 50 342 fines were withdrawn and an official warning issued in its place, which represents around $8.4 million.

All revenue raised by road safety cameras is allocated to the Better Roads Victoria Trust Account. The account funds projects to improve roads and thereby:

- improve the efficiency of roads
- improve safety for all road users
- reduce transport costs for business
- improve access for local communities.

1.4 Legislation and administration

Road safety rules and the use of road safety cameras are legislated under the *Road Safety Act 1986*, and the *Road Safety (General) Regulations 2009*. They cover:

- the general obligations of road users for responsible road use
- penalties for traffic infringements
- devices, systems and procedures for obtaining evidence of vehicle speed and other traffic offences.

1.4.1 Road safety partners

Four agencies work together on road safety policy, including developing and implementing both phases of *arrive alive*:

- VicRoads
- the Department of Justice
- Victoria Police
- the Transport Accident Commission.

VicRoads

VicRoads is the statutory authority that administers the *Road Safety Act 1986.* It manages the public road infrastructure, including building new roads, maintaining the road network, and implementing road safety infrastructure projects. VicRoads sets speed limits, manages the registration and driver licensing databases, and the crash statistics database, which is used to report the road toll.

VicRoads is also responsible for developing road safety policy and is the lead agency in developing the road safety strategies and supporting action plans.

Department of Justice

The Department of Justice's Infringement Management and Enforcement Services unit is responsible for delivering and monitoring the road safety camera program, which includes both fixed and mobile cameras. The unit engages contractors to:

- supply and maintain equipment, including cameras
- evaluate and test sites for fixed road safety cameras
- manage and operate mobile road safety cameras
- certify the accuracy of speed measurement devices
- process and verify the evidence collected from fixed and mobile cameras, including photographs
- manage the issuing of an approved infringement notice.

The unit manages these contracts and assures performance quality. It has other functions, including involvement in site selection for fixed road safety cameras.

Victoria Police

Victoria Police is responsible for enforcing the road safety laws, including incidents recorded by road safety cameras. Before an infringement can be issued, Victoria Police further verifies the accuracy and validity of infringements. It also manages reviews of infringements and is responsible for identifying mobile camera sites and allocating the mobile camera hours.

Transport Accident Commission

TAC funds treatment and benefits for people injured in road crashes. It also promotes road safety through campaigns and road infrastructure projects aimed at reducing road trauma. In coordination with the other road safety agencies, it develops public campaigns targeting road safety issues such as drink driving and speeding.

TAC funds road safety infrastructure projects managed by VicRoads. These projects are part of the *arrive alive 2008–17* strategy. In 2009–10, TAC spent $86.5 million on road safety infrastructure improvements.

1.5 Previous reviews

In August 2004 the former Auditor-General, Ches Baragwanath AO, completed an *Inquiry into the Western Ring Road Fixed Digital Speed Camera System Contract and its Management*. The inquiry was conducted in response to concerns regarding the accuracy of fixed cameras.

While highly critical of the failure to scrutinise the financial viability of the contractor, the choice of detection system, the inadequate contract supervision and unclear corporate governance arrangements, the report was unequivocal in its endorsement of safety cameras as having a positive impact on road safety:

> 'The widespread use of safety cameras in Victoria marked the beginning of significant reductions in road trauma in Victoria. It also represented a shift away from traditional labour intensive methods of traffic law enforcement towards the use of semi-automated techniques. Scientific evaluations of these new techniques have demonstrated the positive contribution of automated enforcement technologies in reducing road trauma.'

In July 2006 VAGO tabled *Making travel safer: Victoria's speed enforcement program*, which found that cameras were directed at reducing road trauma, not raising revenue, and they had contributed to reductions in road trauma. It also found that quality control measures give sufficient assurance that infringements from cameras are not issued to motorists who comply with road rules.

1.6 Audit objective and scope

The audit objective was to determine whether the road safety camera system is effective. The audit assessed:

- whether the road safety program is current and reflects better practice
- whether tactical deployment of cameras optimises road safety outcomes
- whether the integrity of the road safety camera systems is adequately assured
- the extent to which cameras, as part of the overall road safety program, contribute to achieving road safety outcomes.

The audit did not examine road enforcement conducted directly by Victoria Police, as this is not part of the camera program.

1.7 Report structure

The rest of this report is structured as follows:

- Part 2 examines the rationale for the road safety camera program
- Part 3 examines the siting of cameras for road safety outcomes
- Part 4 examines the accuracy of the camera system
- Part 5 examines the validity of infringements issued
- Part 6 examines the communication strategy for the program.

1.8 Audit method and cost

The audit was performed in accordance with the Australian Auditing and Assurance Standards. The total cost of the audit was $570 000.

2 Rationale for the road safety camera program

At a glance

Background

Road safety cameras have been used in Victoria since 1983. Fixed and mobile cameras are used at intersections, on freeways, in tunnels and in metropolitan and residential areas. The road safety camera program is part of the broader *arrive alive 2008–2017* road safety strategy. Drivers caught speeding or running red lights can receive an infringement notice to deter them from these behaviours.

Conclusion

There is a sound rationale for using road safety cameras as part of a broader road safety strategy to improve road safety outcomes and reduce road trauma. Cameras have been repeatedly shown to be effective in reducing crashes and speeding. While cameras cannot differentiate between road user groups with different levels of risk of road trauma, they are appropriately complemented by targeted non-camera approaches within the *arrive alive 2008–2017* strategy.

Findings

- Road safety cameras are part of a broader road safety strategy that is based on recognised road safety principles of the *Safe System* approach.
- Evidence from Australian and international jurisdictions strongly supports the use of road safety cameras to reduce road trauma.
- While point-to-point cameras are a sound concept, there is less evidence available about their effectiveness in improving road safety. Similarly, there are also gaps in the research on the effectiveness of fixed cameras on freeways.
- Cameras cannot identify a large proportion of speeding motocyclists.

Recommendations

- The Department of Justice should continue its focus on evaluation, though priority should be given to assessing the effectiveness of both fixed freeway cameras and point-to-point cameras.
- VicRoads, in partnership with the Department of Justice, Victoria Police and the Transport Accident Commission, should address the gap in speed enforcement for motorcyclists.

2.1 Introduction

Road safety cameras have been used in Victoria since 1983 and form a part of the current road safety strategy *arrive alive 2008–2017*. Drivers receive infringements if they are detected speeding or running a red light. This is intended to deter them from behaving in an unsafe manner and reduce the likelihood of contributing to increased road trauma.

This section examines whether there is a sound rationale, from a road safety perspective, for using cameras.

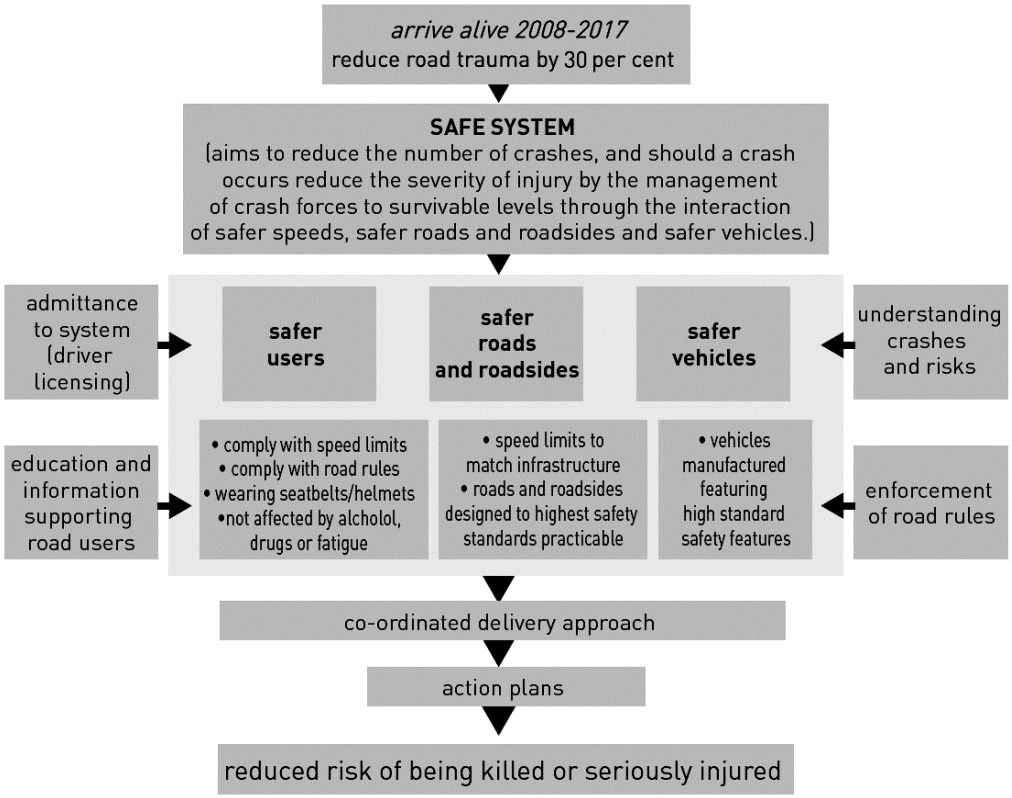
2.2 Conclusion

There is a sound rationale for using road safety cameras as part of a broader road safety strategy to improve road safety outcomes and reduce road trauma. Cameras have been repeatedly shown to be effective in reducing crashes and speeding. While cameras cannot differentiate between road user groups with different levels of risk of road trauma, they are appropriately complemented by targeted non-camera approaches within the *arrive alive 2008–2017* strategy.

2.3 Rationale for a *Safe System* approach

Road safety cameras are part of Victoria's road safety strategy, *arrive alive 2008–2017*. The strategy has three focus areas: safer roads and roadsides, safer vehicles, and safer road users. To improve each of these focus areas, the strategy describes a range of measures. Figure 2A shows the strategy's focus areas and some of its associated measures, including road safety cameras.

Figure 2A
The *arrive alive 2008–2017* strategy and its components



Source: VicRoads.

The design of the strategy is soundly based on the principles of the *Safe System* approach. This approach recognises that prevention efforts notwithstanding, road users will still make mistakes and crashes will still occur. The basic method of the *Safe System* approach is to make sure that in the event of a crash, the physical impact is lessened to reduce the risk of death or serious injury.

This approach has been implemented throughout Australia and is the basis of the *National Road Safety Strategy 2011–2020*. It has been implemented internationally including in the leading road safety jurisdictions of Sweden and the Netherlands. The approach is recognised by the Organisation for Economic Cooperation and Development, the World Health Organisation and the United Nations as the optimal approach for improving road safety and achieving a zero road toll.

Using this approach, the road safety partners developed *arrive alive 2008–2017* based on existing research and widespread consultation with road safety experts. The Monash University Accident Research Centre (MUARC) was engaged to develop a model that estimated the road safety outcomes of various policy initiatives. This model heavily informed the development of the strategy and has been used to track its progress. This model has formed the basis for road safety strategies in other Australian jurisdictions.

The previous version of the strategy, *arrive alive 2002–2007,* focused on and achieved considerable gains in improving road user behaviour through initiatives including enforcement and education. In recognition of the fact that additional significant gains are likely to be achieved through other strategies, the road safety partners placed a stronger focus on other areas of the *Safe System* approach in developing *arrive alive 2008–2017*, in particular safer roads and roadsides. The MUARC model forecast that considerable gains in road safety could be made through investment in road and roadside infrastructure, and $650 million was allocated to these initiatives. Nevertheless, the strategy continued to emphasise the importance of maintaining and further improving safe road-user behaviour.

2.4 Rationale for improving road-user behaviour

One of the three areas of focus of the *arrive alive 2008–2017* strategy is road-user behaviour. There is a sound basis for focusing on improving road-user behaviour to achieve road safety outcomes, because of the relationships between unsafe behaviours such as speeding and red-light running, and crash likelihood and severity. These relationships have been well established by road safety research and there is a sound basis for pursuing this policy goal.

There is a causal relationship between:

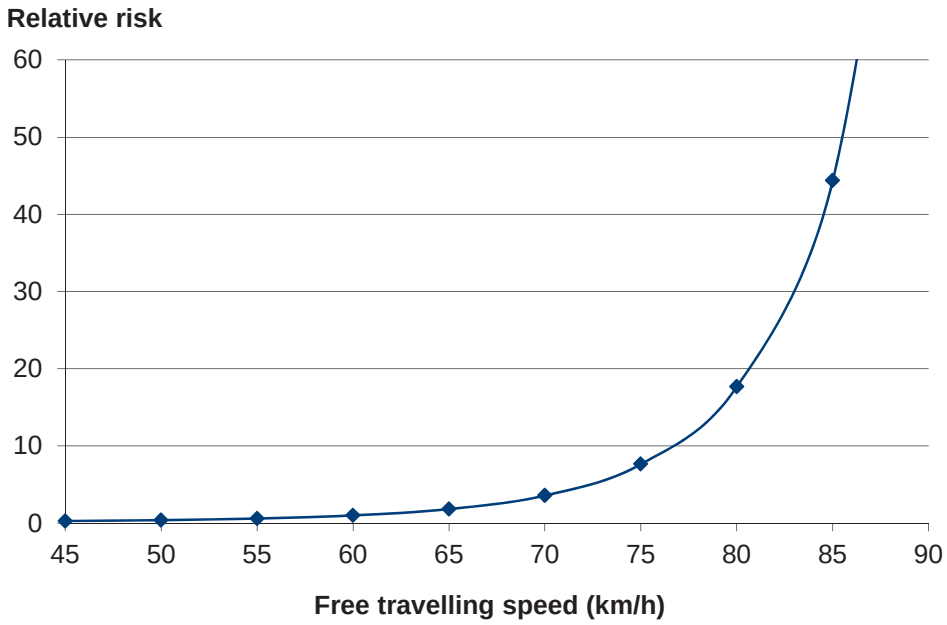
- speeding and the likelihood of a crash occurring
- speed and the severity of a crash when it does occur
- red-light running and the likelihood and severity of crashes.

Speed and likelihood of a crash

The link between speed and the likelihood of a crash is strongly supported by research evidence.

A seminal study conducted in 2001 by the University of Adelaide found that in rural areas in South Australia, the risk of crash doubled with a 10 km/h increase in speed in 100 km/h zones. Another study by the same university conducted in 2002 found that in metropolitan areas, when travelling between 60 and 80 km/h, the vehicle occupants' risk of a fatality or serious injury crash doubled for each 5 km/h increase in travelling speed. As such, small increases in speed have significant impacts on crash risk along with more excessive speeding, as shown in Figure 2B.

Figure 2B
Free travelling speed and the risk of involvement in a crash resulting in fatality or serious injury in a 60 km/h speed zone relative to travelling at 60 km/h



Source: Victorian Auditor-General's Office based on data from the Road Accident Research Unit, University of Adelaide, 2002.

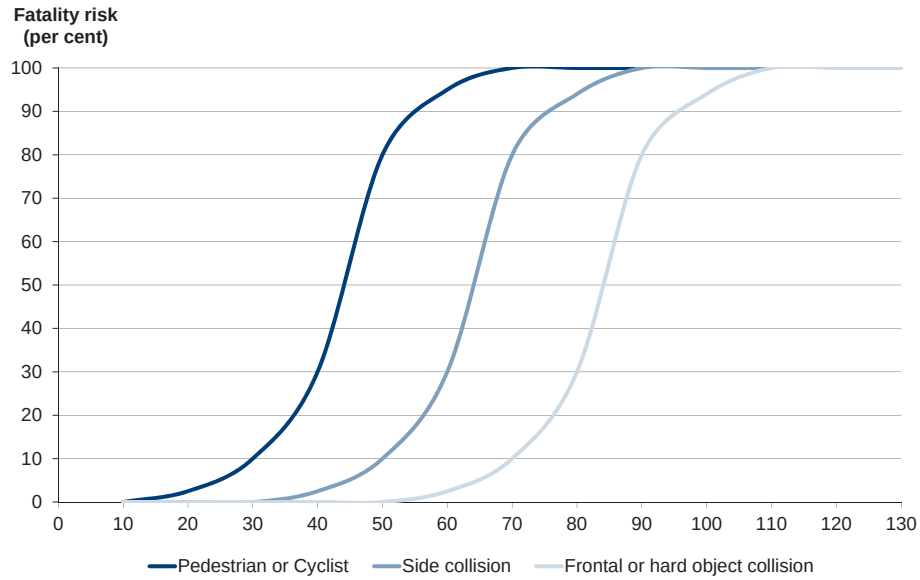
This research has been repeatedly validated by other researchers, including a report conducted in Sweden in 2004 which found that a 5 per cent increase in speed led to an increase in all injury crashes of about 10 per cent and an increase in fatal crashes of around 20 per cent.

Speed and severity of a crash

There is a causal link between speed and severity of a crash, because when a crash occurs, the greater the travelling speed, the greater the impact energy which is transferred to the road users involved.

In a head-on crash, the likelihood that occupants will survive decreases rapidly if the vehicle is travelling above 70 km/h. For side-impact collisions, the chance of survival decreases rapidly above 50 km/h. While helmets give some protection to motorcyclists and cyclists, the likelihood that a pedestrian will survive being hit by a vehicle decreases rapidly if the vehicle is travelling over 30 km/h. This further demonstrates the increased risk of death with small increases in speed. Figure 2C shows the relationship between impact speed and likelihood of fatality for different road users and crash types.

Figure 2C
Relationship between impact vehicle speed and chance of fatality for different road users and crash types



Source: VicRoads.

Red-light running and road trauma

Red-light running is strongly linked with crash risk and severity due in part to the nature of the crashes that tend to occur at intersections.

For intersection crashes, the high incidence of road trauma is partly because side-impact collisions and speed are often involved. As noted above, side-impact collisions are particularly dangerous to the vehicle occupants because the body of the car offers less protection than in head-on or rear-end crashes. In a side-impact collision, the car cannot provide sufficient protection above speeds of 50 km/h.

2.4.1 Rationale for enforcement

Given the strong evidentiary links between speeding and red-light running and road trauma, this has been an area of focus for the strategy. One of the ways it attempts to modify these behaviours is through enforcement. Road safety cameras are one mechanism of enforcement, alongside police patrolling.

There is a sound rationale for attempting to improve driver behaviour through enforcement. Criminological research shows that to deter people from illegal behaviours, the perceived risk of detection and the level of punishment must exceed the potential gains of these behaviours. Increasing the level of enforcement will increase the perceived risk of detection and lead to reductions in illegal behaviour. Therefore, as for other illegal behaviours, enforcement is a critical element for reducing unsafe road-user behaviours. *arrive alive 2008–2017* is consistent with this approach and adopts enforcement to change road-user behaviour as part of its road safety management.

The extent to which enforcement is effective depends on the level of perceived risk that it can create. To create a high level of perceived risk, a significant number of road users and a significant amount of the road network must be exposed to enforcement. If enforcement is too small, is reduced, or is removed, the perceived risk will fall and there will be less deterrence. As such, to be effective, enforcement activities must be ongoing and of sufficient scale.

2.4.2 Evidence base for using road safety cameras

There is a strong argument for using road safety cameras to change driver behaviour and reduce road trauma.

Road safety cameras have been evaluated extensively and the body of research has consistently found that cameras improve road safety and reduce road trauma. Key studies including Victorian evaluations are discussed below.

It is inherently difficult to precisely quantify the direct effects of safety cameras on road safety across the road network because there are many different factors that influence road safety, and most evaluations will measure the total impact of the efforts. However, the research shows that, while the precise contribution cannot yet be determined, cameras have resulted in significant improvements in road safety and their use as part of a broader road safety strategy is justified.

Meta-analysis of evaluations

In 2010 a meta-analysis of 35 evaluations from Australian and international jurisdictions was conducted by the Cochrane Collaboration, a group that conducts systematic reviews of evaluations and interventions in health-related fields.

A meta-analysis combines the research findings of related studies on a particular subject to produce a more statistically powerful conclusion. To be included in the meta-analysis, each evaluation must satisfy a range of criteria that check whether the evaluation meets methodological standards. For example, to make sure the evidence used was the highest possible quality, the meta-evaluation included only studies with before–after trials with control or comparison areas. Other criteria assessed the studies based on types of participants included, interventions applied, and outcome measures used. Consequently, there can be a high degree of confidence in the conclusions of a meta-analysis.

The Cochrane Collaboration's meta-analysis strongly supported the use of road safety cameras for reducing road fatalities and injuries. It found that road safety cameras reduce:

- the frequency of all crash types, particularly those resulting in fatalities and serious injuries
- the proportion of drivers travelling over the speed limit
- average speeds.

Evaluations in Victoria and other jurisdictions

Road safety cameras have been extensively evaluated in Victoria and other Australian and international jurisdictions. These evaluations have consistently found that the use of road safety cameras is associated with:

- reductions in crash frequency and severity
- reductions in excessive speeding
- increases in compliance with speed limits.

Evaluation of Victoria's road safety camera program has primarily been conducted by MUARC. The most recent Victorian road safety camera initiative to be evaluated was the new fixed intersection cameras, which both measure speed, and detect red-light running. It is the first major evaluation of combined speed and red-light camera technology—previous evaluations have only assessed either red-light or fixed speed cameras.

The evaluation, completed in 2011, examined the impact of the introduction of 77 speed/red-light cameras installed across Victoria. This relatively large number of sites allowed the evaluation to come to a more robust conclusion. Examining the before and after effects of a single site cannot give as robust a result, because it might be affected by chance. By having a larger sample size, there can be greater confidence that any differences observed are due to the cameras.

The evaluation found that, on average, after cameras were installed at these sites, there was a statistically significant reduction in casualty crashes of 47 per cent on the leg of the intersection where cameras were situated. The evaluation also examined the rate of crashes for all roads leading to the intersection, not just the road where the camera is. It found there was a 26 per cent fall in casualty crashes for these roads. This demonstrates that the cameras are having a positive effect on road safety even on drivers who are not directly exposed to the camera. Additionally, there was a 44 per cent fall in right-turn crashes, where two vehicles hit at a right angle, which is a particularly serious type of crash as the vehicle occupants have less protection.

The evaluation estimated that, across the 77 intersections, the cameras had led to reductions of 17 fatal or serious injury crashes and 36 minor injury crashes per year. Based on these outcomes, the evaluation recommended that the use of speed/red-light cameras at intersections should be continued and expanded in Victoria.

VAGO examined the MUARC evaluation to determine the level of reliance that could be placed on its results and found that:

- The methodology was sound, with a large number of camera sites appropriately compared to a larger sample of control sites, over extended pre- and post-camera periods.
- The design assessed all crashes at the intersections, as well as those most likely to be affected by the initiative such as right-angle, right-turn and rear-end crashes. It has been common for evaluations of this type to only assess crashes that occur on the leg of the intersection where the camera is situated and only consider specific crash types.
- Findings are consistent with findings of evaluations of independent red-light cameras and fixed speed camera programs in other jurisdictions.
- Conclusions drawn based on the findings and results were appropriate.

As such, there can be a high level of confidence in the results of the evaluation.

These results, supporting the use of cameras to reduce road trauma, are consistent with the findings of other published evaluations of other aspects of the Victorian camera program. Examples include evaluations of:

- **fixed cameras**—fixed speed cameras were first used in Victoria in 2000, in the Domain Tunnel on the Monash Freeway. MUARC found that, in the tunnel, the cameras contributed to a fall in average speeds from 75.1 km/h to 72.5 km/h. It also found that the proportion of vehicles travelling over the speed limit fell from 17.5 per cent to 6 per cent.

- **mobile cameras**—in December 2001, a package of road safety initiatives that focused on the intensification of mobile camera operations was introduced. Initiatives included a 50 per cent increase in the number of mobile camera hours, a lower speed detection threshold, reduction of the default speed limit in residential areas to 50 km/h, and the 'Wipe Off 5' campaign. MUARC found a clear reduction in the number of casualty crashes attributable to the package, particularly in 40, 50 and 60 km/h zones. The strongest results were in the last six months of the evaluation, when all of the initiatives had been implemented. Between July and December 2004, there was a highly statistically significant fall of 26.7 per cent in fatal crashes and a 10 per cent fall in casualty crashes.

Examples of findings from studies in other jurisdictions are shown in Figure 2D. These findings are consistent with the Victorian evaluations.

Figure 2D
Evaluations of road safety cameras in other jurisdictions

New South Wales

In 2005, an evaluation of New South Wales' fixed speed cameras was conducted by ARRB Transport Research. The evaluation examined changes in crashes and speeding at 28 camera sites on metropolitan and rural freeways and highways. Along the stretches of road where the cameras were located, there was an 89.8 per cent fall in fatal crashes. The percentage of vehicles exceeding the speed limit fell by 71.8 per cent and the percentage of vehicles speeding by more than 10 km/h fell by 87.9 per cent. Effects on speed and road trauma lasted up to 4 km from the camera sites.

Queensland

In 2009, MUARC evaluated the performance of Queensland's mobile speed camera program. The evaluation found a 40.4 per cent fall in fatal and serious injury crashes, 50.7 per cent fall in crashes requiring medical treatment and a 31.2 per cent fall in all crashes.

United Kingdom

In 2005, a national evaluation of 502 fixed camera sites and 1 448 mobile camera sites was completed. The evaluation found that fatal and serious injury crashes fell by 42.1 per cent. There was an overall fall in free speeds and a 31 per cent fall in the number of vehicles exceeding the speed limit.

France

In 2003, France introduced road safety cameras to combat a high road toll and by 2007 it had 2 000 cameras. Between 2002 and 2005, fatalities on French roads fell by over 30 per cent. Fatal and serious injury crashes fell by between 40 and 65 per cent within 6 km of camera sites. Average speeds fell by 5 km/h and the number of drivers speeding by more than 30 km/h fell by 80 per cent.

Source: Victorian Auditor-General's Office based on reports by ARRB Transport Research, Monash University Accident Research Centre, Department for Transport (United Kingdom), and World Health Organisation.

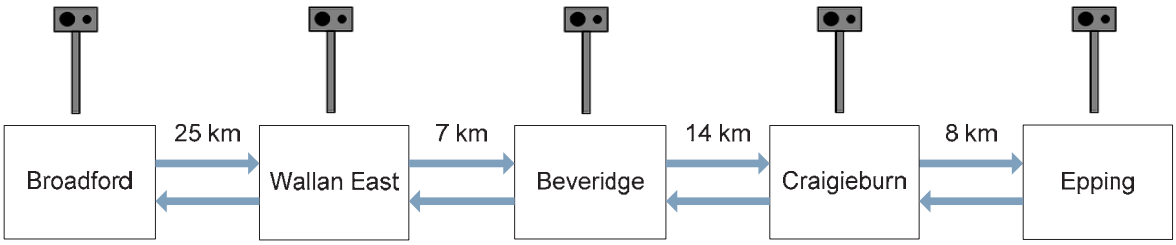
Gaps in the evidence base

Throughout the history of Victoria's road safety camera program, there has been a strong emphasis on evaluation of the impact of cameras on road safety outcomes, in particular intersection cameras. Compared to other aspects of the program, however, the effectiveness of Victoria's fixed speed cameras on freeways has not been extensively evaluated. As noted in Figure 2D, evaluations in other jurisdictions have found that fixed freeway cameras improve road safety outcomes and reduce road trauma.

Cameras are sometimes installed at the time of freeway construction as a preventative measure in anticipation of predicted road trauma. It is inherently difficult to evaluate the effectiveness of such cameras, as it is not possible to make a before and after comparison. However, alternative evaluation approaches are possible, such as assessing freeways against different comparable freeways, or determining whether cameras have had a deterrent effect across the entire freeway or only near the location of the cameras.

Point-to-point cameras are a recently-developed technology, introduced in Victoria on the Hume Freeway. Cameras are placed at either end of a zone. Using numberplate-recognition technology, these cameras record how long it takes a vehicle to pass through a zone, calculate the average speed and compare it to the speed limit. The four zones on the Hume Freeway are shown in Figure 2E.

Figure 2E
Four point-to-point camera zones on the Hume Freeway



Source: Victorian Auditor-General's Office based on Department of Justice documentation.

As a concept, point-to-point cameras are soundly-based. The use of point-to-point cameras was endorsed in the *National Road Safety Strategy 2011–2020*. By measuring average speed across a stretch of road, point-to-point cameras target persistent speeding and, therefore, discourage drivers from reducing their speed only in the area surrounding a fixed camera. This technology was initiated as part of the first *arrive alive 2002–2007* strategy with the intention that it would be expanded if found to be successful.

At this stage, as it is a newer technology, research into the use and effectiveness of point-to-point cameras in improving road safety is not as advanced as for other road safety camera technology. International evaluations have shown positive results, with increased compliance with speed limits, reductions in travelling speeds and reductions in crash rates including fatal and serious injury crashes. However, there are reservations about the rigour and independence of this research.

It is important that Australian evaluations into point-to-point cameras are conducted; however, none have been published yet. MUARC has submitted an evaluation proposal to assess the effectiveness of the point-to-point system on the Hume. However, although they are fully installed, Victoria's point-to-point cameras are not currently operational. They were turned off in 2010 after a software fault was detected and have not yet been reactivated, therefore the evaluation cannot proceed. This is discussed in Part 4.

2.4.3 Targeting at-risk road user groups

While cameras are effective at changing road-user behaviour and reducing road trauma, they cannot differentiate between road users who have different risks of experiencing road trauma.

arrive alive 2008–2017 recognises that some road-user groups are more at risk than others. In particular, the following user groups are identified in the strategy as requiring tailored approaches to improve their safety:

- young drivers
- older drivers
- motorcyclists
- pedestrians
- cyclists
- heavy vehicle drivers
- public transport users
- country road users.

For road users who are not subject to the camera program, such as cyclists, it is appropriate that cameras are part of a broader strategy that has initiatives to differentiate and provide specific approaches for higher-risk groups.

Camera coverage of motorcyclists

Motorcyclists and pillion passengers are approximately 30 times more likely to sustain a fatal or serious injury per kilometre travelled than other vehicle occupants.

There are some road safety cameras that, because of the direction they face, can record only front numberplates. However, motorcycles are not required to have front numberplates. Road safety camera incidents rejected because of the lack of a numberplate on a motorcycle represented 52.4 per cent of all 'non-plate' rejections in 2009–10, whereas motorcycles make up only 4 per cent of registered vehicles. As a consequence, the potential for the camera program to deter motorcyclists from speeding is substantially reduced.

If motorcycles could be identified by all cameras, it would be possible to evaluate any changes in road safety outcomes for motorcyclists in comparison to an established baseline at the time of the introduction of the initiative.

Recommendations

1. The Department of Justice should continue its focus on evaluation, though priority should be given to evaluating the effectiveness of both fixed freeway cameras and point-to-point camera systems.
2. VicRoads, in partnership with the Department of Justice, Victoria Police and the Transport Accident Commission should address the gap in speed enforcement for motorcyclists.

3 Siting cameras for road safety outcomes

At a glance

Background

Fixed road safety cameras are used in a variety of locations, and decisions on where to site them are made by the Fixed Camera Site Selection Committee. Every month, 9 300 mobile camera hours are rostered across approximately 2 000 approved sites by local police highway patrols. Camera sessions are conducted by the mobile program provider, contracted by the Department of Justice.

Conclusion

Siting of fixed and mobile cameras is clearly based on road safety outcomes. While siting could be strengthened to optimise these outcomes, the deployment criteria used to identify and approve sites have a clear road safety justification for camera placement. Rostering practices have not maximised the deterrence effect of mobile cameras with, in some instances, discernible patterns in their deployment and gaps in coverage at night.

Findings

- The criteria for siting fixed cameras are soundly based on crash risk, and all decisions since they were developed have adhered to these criteria.
- The Fixed Camera Site Selection Committee prioritises candidate intersection sites systematically, but not freeways and highways.
- Using deployment criteria for siting mobile cameras limits the extent to which they create general rather than location-specific deterrence from speeding. The effectiveness of this approach has not been evaluated.
- Gaps in coverage and discernible patterns in rostering of mobile cameras limit their effectiveness.

Recommendations

- Victoria Police should pilot and evaluate alternative approaches for mobile camera site selection and rostering, such as random rostering.
- The Department of Justice should review the impact of publishing the list of weekly rostered sites for mobile cameras on road safety.
- Victoria Police should identify a minimum number of required mobile sites.
- Victoria Police should identify a minimum number of hours to be rostered at night.

3.1 Introduction

Given limited resources, the number and types of cameras available should be deployed in the way that is most likely to achieve the best road safety outcomes possible.

Currently, there are 171 operational fixed camera sites. A further 32 fixed cameras are installed but not yet operational, and the 10 point-to-point cameras on the Hume system remain deactivated. Decisions on where to site these cameras are based on recommendations made by the Fixed Camera Site Selection Committee, which is chaired by Victoria Police. Additionally, there are 85 specially-designed mobile digital speed camera cars, which are deployed across approximately 2 000 Victoria Police approved sites. Victoria Police roster 9 300 camera hours a month to these sites.

This Part examines the appropriateness of site selection for fixed and mobile cameras and monthly rostering of mobile cameras to determine whether deployment of these cameras is maximising road safety outcomes.

3.2 Conclusion

Siting of fixed and mobile cameras is clearly based on road safety outcomes. While siting could be strengthened to optimise these outcomes, the application of deployment criteria used to identify and approve sites for cameras have a clear road safety justification for camera placement.

Rostering practices have not maximised the deterrence effect of mobile cameras with, in some instances, discernible patterns in their deployment and gaps in coverage at night.

3.3 Siting fixed cameras

The 2006 VAGO performance audit *Making travel safer: Victoria's speed enforcement program* found that guidelines for selecting fixed cameras sites were not sufficiently detailed, and recommended that more detailed fixed camera site selection criteria be developed.

In 2007, Victoria Police and the Department of Justice (DOJ) established the Fixed Camera Site Selection Committee (the Committee). The Committee's terms of reference included developing and implementing more detailed site selection guidelines for fixed cameras.

VAGO assessed whether criteria:

- were soundly based
- were applied in subsequent site selection
- helped decision-makers prioritise candidate sites.

3.3.1 Basis for the criteria

Fixed cameras create localised changes in driver behaviour, and their effect is therefore likely to be most beneficial in places where problems relating to crashes and speeding are confined to an immediate area. Given this, there is a sound argument for placing fixed cameras at locations that have known crash risks or a demonstrated speeding problem.

To inform the siting of fixed cameras, the Committee developed criteria in 2007. The criteria are soundly based because they relate to the crash risk of the location and have a clear relationship with crash likelihood, crash severity, or both. This is described in Figure 3A.

Figure 3A
Fixed camera site selection criteria and analysis of the relationship with crash risk

Criterion	Description	Analysis of relationship with crash risk or severity
Casualty crash history	The number of crashes at a particular location that resulted in fatalities or serious injuries, over three years.	There are locations that have a higher number of crashes than others, and where crashes have had a more serious outcome. These can be identified by analysis of crash statistics. These trends can be used to predict future crashes.
Driver behaviour	Reports from local police, councils, Members of Parliament and the community about driver behaviour, such as speeding at a particular location.	Research shows that speeding is strongly linked with crash likelihood and severity. This criterion allows decision-makers to place a camera at a particular location where driver behaviour has been identified as risky and is increasing the likelihood of a crash occurring, without having to wait for a history to develop. Such reports are substantiated by the Committee and the site is assessed before it is allocated a camera based on this criterion.
General location suitability and risk factor	Assessment of whether the site has existing road safety systems, the proximity of schools or other amenities, pedestrian use of the intersection, and whether there is the potential for significantly high speeds or a catastrophic crash.	While some locations may not have a crash history or high crash likelihood, the outcome of a crash at that particular location would likely be catastrophic. For example, if there was a crash in a tunnel it would likely involve multiple vehicles and be very difficult for emergency vehicles to access. Similarly, while freeways are well-designed, high traffic volumes and speeds increase the likely severity of a crash. Additionally, certain road user groups are particularly vulnerable, including pedestrians and children in school zones. Speed management in locations where these user groups are common is critical.
Road capacity	Assessment of whether the location links to other road systems that are potentially high speed areas, given the road and lane types.	The design of some road systems and linkages with other roads can enable some road users to speed excessively. This is particularly the case on freeways. Similar to the 'driver behaviour' criterion, this criterion allows placement of a camera at a location that does not have an established crash history but where there is evidence of a higher likelihood of crashing.

Source: Victorian Auditor-General's Office.

The Committee included a fifth criterion, relating to the technical suitability of a site, which establishes the feasibility of locating a camera at a particular site. There may be a strong justification for installing a camera at a particular site based on crash risk. However, this may not be possible or appropriate, due to other factors such as planned infrastructure projects, where installation of a camera would be a waste of resources if it were removed shortly after to allow for the construction of these projects. This criterion also evaluates the suitability of different technologies to different locations or road types. For example, variable speed limits along certain freeways may preclude the use of point-to-point technology, because this technology requires the measurement of average speed within the same speed zone.

3.3.2 Application of the criteria

Siting decisions for fixed cameras are required to meet at least one of the criteria in Figure 3A. Since the development of the criteria in 2007, there have been three siting decisions involving 38 fixed cameras. VAGO examined documentation surrounding these decisions and found that, for all these decisions, siting has met these criteria. This is shown in Figure 3B.

Figure 3B
Fixed camera siting decisions since development of criteria

Year	Siting decision	Basis for new site	Criterion
2008	Redeployment of a camera from an unused site to a new site	Reports from police, the local member and the community	*Driver behaviour*
2008	Redeployment of cameras from seven deactivated sites to new sites	Ranking based on crash history	*Casualty crash history*
2009	Installation of an additional 30 digital speed/red-light cameras at new sites	Ranking based on crash history and reports about driver behaviour	*Casualty crash history; Driver behaviour*

Source: Victorian Auditor-General's Office.

In cases where a request for a camera was made, the Committee substantiated the validity of the request before deciding to site a camera in that location. For example, in one case a camera was placed at an intersection that did not then rank high on the crash statistics. However, a request was made for a camera because of a crash at the intersection in which two children were killed. The Committee examined the intersection and determined that there was a valid case for an intersection camera, due in part to the poor line of sight when approaching it.

It was not possible for VAGO to retrospectively confirm that these criteria apply to all siting decisions made before the development of criteria. Apart from selected cases such as the decisions to place cameras on the EastLink and Hume freeways, which were based on rationale that would satisfy the above criteria, documentation regarding siting for other fixed cameras was not available. This was also commented on in VAGO's 2006 report *Making travel safer: Victoria's speed enforcement program*.

3.3.3 Prioritising sites

The site selection criteria in Figure 3A are high level and make sure that there is a sound basis for all decisions. They do not provide for ranking of potential sites, to assist in the optimal allocation of limited camera resources.

There is currently no systematic way that the Committee prioritises potential sites, except intersection sites. Without a systematic way of prioritising between competing sites that all satisfy the criteria, it is difficult to determine whether decisions to place cameras at one site instead of another will optimise outcomes with limited resources.

There is not sufficient research evidence available on how to deploy a limited number of cameras to achieve optimal road safety outcomes. To contribute to this evidence, siting decisions in Victoria should be evaluated as part of the ongoing evaluation program. However, before it can examine the impact of siting decisions, the evaluation program should first focus on getting more information about the effectiveness of using fixed cameras on different types of roads such as freeways, as discussed in Part 2.

To prioritise potential intersection sites, the Committee developed a formula to identify intersections with a higher crash risk. This formula is discussed in Figure 3C.

Figure 3C
Prioritising intersection sites for fixed cameras

The formula for prioritising sites was developed in collaboration with the Monash University Accident Research Centre and Victoria Police. It analysed crash statistics, allocating a weighting of 80 per cent to crashes resulting in fatalities and/or serious injuries, and 20 per cent to crashes resulting in minor injuries. Minor injuries were included to help identify trends in crash incidence. The formula also accorded weightings to how recent the crashes were, with 60 per cent allocated to crashes with the past three years, and 40 per cent allocated to crashes in the seven years prior to this three-year period. According to the formula, an intersection which has had serious crashes more recently will be ranked higher than an intersection which has had less serious crashes less recently. The collaborating road safety specialists agreed that this weighting represented an appropriate balance of these key road safety indicators.

Source: Victorian Auditor-General's Office based on Department of Justice documentation.

The formula gave the Committee a basis for siting intersection cameras that was more sophisticated than the previous approach of siting based on crash frequency over a period of years with no further analysis. This formula was used to inform the siting decisions for the instalment of 30 new speed/red-light cameras in 2009. As part of the ongoing evaluation program, the effectiveness of this siting approach for intersection cameras should be evaluated.

The formula for intersection cameras provides a systematic way to prioritise between eligible intersections. Its development demonstrates the significant steps taken in relation to fixed camera siting based on VAGO's 2006 audit. Nonetheless, it is still primarily dependent on crash history. Sites have to have a demonstrated long-term poor crash history before being considered for a camera.

The limitation inherent in this approach is that an intersection will not be considered until there is a pattern or history of crashes. Consequently, areas experiencing changes in traffic flow and volume, such as growth areas, would not be eligible for a camera and the associated positive road safety outcomes until there was an established crash risk, despite the presence of inherent risk factors.

The Committee has recognised this limitation and is developing a predictive model for the siting of fixed intersection cameras. This model will take into consideration factors such as traffic volumes, road geometry or traffic manoeuvres. This will provide a more comprehensive and proactive basis for the siting of cameras at intersections. When developed, the predictive model could be used alongside the existing crash formula.

3.4 Siting and rostering mobile cameras

Victoria Police's highway patrols are located in 56 police services areas, which are grouped in 20 divisions across Victoria. Highway patrols are responsible for identifying and evaluating potential sites for mobile camera deployment. Sites must meet evaluation criteria before approval, and highway patrols are required to audit all approved sites against these criteria every six months.

The same highway patrols are responsible for deciding the monthly roster for camera deployment. Every month, 8 300 camera hours are scheduled in sessions of between two and five hours. These hours are distributed using 85 specially-designed camera cars across the state by region. Highway patrols choose the site, date, time, duration and direction of camera deployment. There are a further 1 000 hours available for rostering, which regions can bid for if they need additional hours to target risk areas.

3.4.1 Site selection criteria

Across Victoria, there are around 2 000 sites that have been approved as suitable to locate a mobile speed camera. To be approved, a site must meet criteria contained in Victoria Police's *Mobile Digital Speed Camera Policy and Operations Manual*.

Sites must satisfy two separate categories of criteria:

- **physical field criteria**—a site must satisfy all criteria
- **deployment criteria**—a site must satisfy at least one criterion.

Physical field criteria

Victoria Police have developed physical field criteria to make sure that cameras are rostered to locations only where it is physically possible to set up a camera that will measure speed accurately and take a photograph of sufficient quality. These criteria are soundly based on technical limitations of the cameras, and cover aspects including evaluation of the site to identify sources of reflection that may incorrectly trigger the camera. The application of these criteria contributes to providing assurance over the integrity of infringements issued.

The physical field criteria also make sure that a camera operator can safely access the site. The criteria also include 'fairness' aspects, for example, cameras should not be located on a downwards slope of a certain gradient without a strong rationale and approval, which is then subject to six-monthly audits. The application of these fairness aspects are not related to the validity of the speed measurement.

Over time, changes to roads, for example upgrades or installation of new traffic signals or roundabouts, have meant that some sites no longer satisfied the physical field criteria and they have been removed as a site. This has resulted in a significant fall in the number of available sites.

The effectiveness of mobile cameras increases as the number of available sites increases. Victoria Police have not established a target number of sites for the mobile camera program. Furthermore, there is no overall review of whether lost sites are being replaced and a sufficient number of sites maintained. It is up to the local highway patrols to replace any sites which have become permanently unsuitable, and they currently have no guidance on the optimal target number of sites for their police service areas.

Without a target specified number of sites, and no review of whether lost sites are being replaced, Victoria Police can have no assurance that the mobile program has a sufficient number of sites to optimise its outcomes.

In April 2011, DOJ recommended that mobile camera sites should no longer be at locations opposite large brick walls. DOJ advised that legal challenges were being mounted to contest infringements issued when a camera was located opposite large brick walls. Our technical assessment indicates that cameras can still accurately measure speed opposite these walls. The basis for discontinuing the use of these cameras was based on the time and cost of legal arguments.

The extent to which this decision will reduce the number of sites is not yet known, but interviews with highway patrols indicate that this will result in large reductions in the number of sites suitable for mobile camera placement. This decision therefore has the potential to reduce the coverage of the mobile camera program.

Deployment criteria

While evidence supports the use of mobile cameras to improve road safety, there is limited research available about where best and when to deploy these cameras.

In terms of where to locate cameras, like many other jurisdictions, Victoria requires that sites meet deployment criteria. Sites must satisfy at least one of the following criteria:

- documented history of serious and major injury collision in the last three years
- subject of a complaint of excessive speed which has then been validated by police; for example, from the general public or local councils

- identified by police and substantiated by intelligence to be a speed-related site
- proposed speed enforcement to address unsafe driver behaviour by other means has been deemed impractical or unsuitable.

As with the criteria for fixed camera sites, these criteria have a clear relationship with crash risk, through the strong evidentiary link between road trauma, speed and the impact of cameras in reducing speed and road trauma. Given the limited number of cameras for deployment, the decision to restrict siting to locations with a crash risk is reasonable. Furthermore, it clearly demonstrates that cameras are located at sites based on road safety objectives.

However, there has been no evaluation of the effectiveness of only using sites with a crash risk, in comparison with other approaches such as using sites based solely on physical suitability.

There is some support for using sites based only on physical criteria, not crash or speed risk. The general deterrence effect is the primary purpose of the mobile camera program, in contrast to the location-specific effect of fixed cameras. However, the use of narrow deployment criteria can limit the extent to which siting of mobile cameras has a general deterrence effect, particularly if the number and geographic spread of sites across the network is insufficient.

If there is a systematic pattern of deployment, regular road users can identify this and adjust their behaviour according to their knowledge of where a camera is likely to be. As the perceived risk of detection falls, the deterrence effect of mobile cameras is also diminished.

Siting based on physical criteria alone reduces the likelihood of an identifiable pattern and therefore potentially heightens the level of general deterrence. This approach would also increase the number of sites available for cameras.

While currently there is not sufficient research evidence to determine the optimal way of choosing sites, siting without deployment criteria has some merit. This model could be piloted and evaluated in Victoria in a single police division, to examine both a before and after comparison within the division, and compare the results to another division based on current deployment criteria.

Documenting site approval processes

Highway patrols are required to retain evidence supporting sites that have been approved on the basis of, for example, a speed complaint by general public or advice from police. However, two of the four highway patrols interviewed by VAGO reported that they did not have documentation for some sites to demonstrate that they met deployment criteria. This is despite a 2005 review by the Office of Police Integrity which found inconsistent record keeping across regions and recommended audits to check that speed camera site documentation was being retained.

While VAGO found no evidence that highway patrols are using speed cameras sites that do not satisfy the criteria, the extent of the lack of documentation should be determined and steps taken to address this where possible so that documentary evidence is maintained.

3.4.2 Rostering cameras

Since shortly after the mobile camera program began in 1989, police have made decisions on the deployment of mobile cameras. Each highway patrol rosters sessions in its service area. These constitute 8 300 mobile camera hours. There are another 1 000 mobile special hours, which any police unit including the highway patrols can bid for to support road policing activities.

VAGO analysed 12 months of mobile camera rosters and found that some rostering approaches are reducing the level of general deterrence from speeding that mobile cameras are intended to produce. These were:

- **Lack of rostering at night**—There are major gaps in the hours covered by camera rosters. Over 12 months, 13 of the 20 police divisions did not roster any camera sessions between 10 pm and 4 am. For the mobile camera program to be optimally effective in creating general deterrence from speeding there needs to be some amount of coverage across all hours. Victoria Police advised that operator safety was at risk during night sessions because the camera flash alerted the public to the location of the car and operators were being attacked. Highway patrols were therefore not rostering at night. Victoria Police has recently approved the use of infra-red technology, which does not produce a visible flash. As these are rolled out, highway patrols can schedule more sessions at night, subject to being satisfied that operators are safe.
- **Discernible patterns in rostered days and times**—Discernible patterns in rostering cameras reduce the general deterrence of the mobile camera program. Statewide, and at the divisional level, patterns were identified in the days of the week to which cameras were rostered. At the site level, there were patterns in the starting time for camera sessions. For example, some sites only had camera sessions rostered to start at either 6 or 10 am.
- **Using mobile cameras as fixed cameras**—Regularly allocating a camera to a single location effectively removes it from the mobile camera program, reduces the potential for greater geographic spread of cameras, and undermines the program's potential to create a higher level of general, network-wide deterrence. VAGO found that for 69 sites, a camera was rostered more than once a week. One site was rostered 202 times in 12 months, on average every 1.8 days. Frequent rostering of a site indicates that these locations should be candidates for the siting of a fixed camera, but there is currently no systematic approach for assessing mobile camera sites for fixed camera installation or point-to-point operations.

There has been no evaluation of whether the current approach to rostering, where highway patrols are responsible for rostering sessions every month, is the most effective approach. The issues identified above demonstrate that the current approach has some shortcomings.

There is some evidence supporting random scheduling, where the site, day and time of each session is randomly assigned. An evaluation of Queensland's mobile speed camera program by MUARC found that higher levels of randomness in the selection of speed camera sites for operation were associated with greater crash reductions. Random deployment of traffic police vehicles has also been demonstrated to contribute to reductions in crashes.

While this evidence may not yet be sufficient to conclude that random scheduling is better than the current approach, it does indicate the merit in investigating the effectiveness of random scheduling in Victoria. Random rostering would better align with the intention of mobile camera programs, to create the perception that speeding can be detected anywhere on the road network at any time.

Random rostering could be piloted in a single region and compared to both historic crash records in that region, and to current crash records of other regions. Police would retain the ability to target risk associated with events, such as the Grand Prix, through the 1 000 special hours held aside for this purpose.

3.4.3 Publishing the roster

Mobile cameras are intended to create the perception that if you speed, you will get caught. Since January 2011, DOJ has published a weekly list of sites that have a mobile speed camera rostered to it at some point that week. Publishing the weekly roster is designed to increase the transparency of the mobile camera program. This practice is inconsistent with the intention of the program.

As discussed above, the use of mobile speed cameras is intended to have a general deterrence effect. However, in regional areas, the weekly publishing identifies entire geographic areas that are not subject to camera coverage that week. As such, there is the opportunity for drivers to examine the weekly published list and identify areas where they are not going to get caught by mobile speed cameras. Furthermore, as the majority of fixed cameras are located in metropolitan Melbourne, speed enforcement in regional areas relies heavily on the mobile camera program and police patrolling.

VAGO analysed the published weekly rosters compared to the total list of active sites, and found there were areas of country Victoria that did not have a rostered camera for certain weeks. For example, for the week of 31 January to 6 February 2011, according to the weekly published list, none of the 20 mobile camera sites in Warrnambool were rostered. This would reveal to the public that there will be no mobile camera enforcement in Warrnambool that week.

3.4.4 Deploying mobile cameras

To implement Victoria Police's monthly roster, DOJ has engaged a contractor to deploy and operate the mobile speed cameras.

DOJ gets sufficient assurance that sessions occur as rostered. All mobile camera cars have a GPS navigation device, which is monitored by the contractor's communications team. This team monitors the movements of the cars to make sure they are compliant with the roster. DOJ has remote access to the navigation history of the cars according to the GPS. This allows DOJ to check any sessions to determine whether it was conducted as rostered. As part of DOJ's quarterly audits of the performance of the contract, DOJ inspects the GPS history of a sample of sessions. DOJ uses the GPS information as part of ongoing contract management.

DOJ also gets sufficient assurance that the session is conducted at the correct time. The time of a session is recorded as part of the camera's operations, and the system automatically compares this time to the rostered time. A compliant session is automatically accepted. All other sessions are manually checked by DOJ's contract management team. All changes to the roster must be approved by either a member of the local highway patrol or Victoria Police's Traffic Camera Office. Without this approval, DOJ will not pay the contractor for the session.

Recommendations

3. To determine the optimal deployment approach for mobile cameras, Victoria Police should conduct and evaluate pilots of the following alternative approaches:
   - site selection based only on physical criteria, not deployment criteria
   - random rostering.
4. To increase the effectiveness of the mobile camera program:
   - the Department of Justice should review the impact of publishing the list of weekly rostered sites for mobile cameras on road safety
   - Victoria Police should establish a target number of sites required across Victoria and within police divisions to provide sufficient geographic coverage, and establish a procedure for getting assurance that permanently unsuitable sites are replaced with new sites
   - Victoria Police should determine a target proportion of monthly hours to be allocated at night.

4 Accuracy and reliability of the camera system

At a glance

Background

The systems used in the road safety camera program are complex and are managed by many organisations. The Department of Justice's (DOJ) processes for procuring equipment, testing its accuracy, maintaining its condition, and identifying and addressing equipment faults and degradation are designed to make sure that the systems operate properly.

Conclusion

There is a high level of confidence in the accuracy and reliability of the equipment used in the road safety camera system. The equipment meets the needs of the system and legislative requirements for accuracy. Equipment condition is regularly tested and maintained against pre-determined standards. Furthermore, a variety of methods for detecting faults provides DOJ with assurance that any issues that emerge between routine testing and scheduled maintenance are identified and addressed.

Findings

- DOJ has adequately defined accuracy and reliability requirements for road safety camera equipment and has robust processes to determine compliance with these requirements before equipment will be used in the system.
- Maintenance and testing of equipment is thorough, frequent and appropriate, although there could be stronger assurance over these activities for mobile cameras.
- DOJ has a strong, systematic approach to monitoring the camera system for faults and equipment degradation.

Recommendation

- To strengthen assurance, the Department of Justice should establish regular independent testing of the accuracy and reliability of speed measurement by mobile speed cameras under actual operating conditions.

4.1 Introduction

In 2009–10, approximately 1.3 million infringements were issued from road safety cameras. Given this volume and the legal consequences of speeding and running red lights, it is critical that there can be a high level of confidence in the accuracy of the system and the infringements issued from it.

The camera system is complex, with many interacting components and pieces of equipment. Fixed cameras detect speed or red-light running or both, on freeways, highways and at intersections. Equipment comprises the camera unit as well as site components such as in-road sensors to monitor vehicle movements. Mobile cameras detect speed only, and equipment comprises the camera unit, the equipment for mounting the camera in the car and the car itself.

The accuracy and reliability of fixed and mobile camera equipment is managed throughout its life cycle:

- **procurement**—particular requirements are specified for equipment to be eligible for purchase
- **maintenance and testing**—scheduled maintenance and testing is undertaken to confirm ongoing accuracy and reliability of equipment
- **detecting faults and equipment degradation**—equipment faults and degradation are identified and corrected in a timely manner.

With many organisations involved in the management of the system, the Department of Justice (DOJ) has ultimate responsibility for system accuracy. This Part examines the accuracy of the system and whether DOJ gets sufficient assurance of this accuracy. VAGO assessed the arrangements for managing camera equipment and the mechanisms in place to get assurance that these mechanisms are sufficient and appropriate. To do this, VAGO examined departmental documentation and data including records of operations and camera incidents. Technical experts were engaged to assess, under VAGO's direction, the quality of DOJ's equipment specifications, and reports of testing and maintenance of cameras.

4.2 Conclusion

There is a high level of confidence in the accuracy and reliability of the equipment used in the road safety camera system. The equipment meets the needs of the system and legislative requirements for accuracy. Equipment condition is regularly tested and maintained against pre-determined standards. Furthermore, a variety of methods for detecting faults provides DOJ with assurance that any issues that emerge between routine testing and scheduled maintenance are identified and addressed.

4.3 Procuring appropriate camera equipment

Equipment used in the road safety camera system needs to be of an appropriate standard of accuracy and reliability. While regulatory requirements outline basic requirements for equipment including accuracy requirements, there are no international or Australian standards for road safety cameras. This means that DOJ operates in an environment where there are no widely recognised benchmarks in place.

In the absence of international or Australian standards, DOJ has defined its requirements for equipment for both fixed and mobile cameras.

4.3.1 Specifications for camera equipment

DOJ developed specifications for both the fixed and mobile camera systems. This includes camera equipment, sites and cars. These specifications adequately determine whether equipment for speed measurement and red-light running detection is accurate and reliable.

The specifications comprise a set of tests, shown in Figure 4A, that together adequately determine whether:

- accuracy of measurement is within the range required by the *Road Safety Act 1986*
- vehicles that are speeding or running red lights are reliably detected
- the camera operates correctly within the road safety camera system.

Specifications have been developed to cover the different equipment used in the system. The suite of specifications is comprehensive and covers:

- **for fixed cameras**—the camera unit, speed measurement devices for speed cameras, in-road sensors, and communication and support equipment
- **for mobile cameras**—the camera unit, speed-measurement radar, speed measurement calculation unit, the camera car and mounting equipment.

There are also adequate specifications for how the equipment operates within the system, including for the incident record and what it should contain, and requirements for storage and retrieval of information from equipment.

Figure 4A
Specification tests for camera equipment

Specification tests
Fixed cameras (speed and red-light)
Accuracy and reliability tests: • Accuracy and reliability of speed measurement is validated against another speed measurement device at a roadside site over 30 days and against at least 100 000 vehicles. • Measurement accuracy is validated at varying speeds up to the speed limit of the test site against vehicles with calibrated speedometers. *Operational and technical requirements:* • Camera must be capable of operating within the fixed camera system with correct photographic images, correct data format, correct data storage, retrieval and communication, and correct remote monitoring. • Internal clock must be verified as accurate and stable over a range of environmental conditions, such as temperature and humidity. • Measurement sensors must be shown to be reliable in light or darkness and under a range of environmental conditions, such as different weather conditions.
Fixed camera sites (speed and red-light)
Accuracy and reliability tests for speed camera sites: • Accuracy must be shown by comparison to another measurement device over 10 or more measurements at a range of speeds. • Reliability of detection and speed measurement to be shown over a period of at least four hours and at least 200 passing vehicles. • Certification of the speed measurement device to confirm it meets the requirements of the *Road Safety Act 1986*. *Accuracy and reliability tests for red-light camera site installations:* • Correct timing of the first image taken by the camera must be shown for at least 10 vehicles under actual conditions. *Operational and technical requirements for speed and red-light camera sites:* • Camera mounting equipment, including gantries and bridge mountings must be structurally sound. • Electrical characteristics of in-road sensors must be within defined ranges. • Physical condition of in-road sensors must be satisfactory, with no cracking or shifting. • Testing of speed measurement under actual traffic conditions to make sure that operation of primary and secondary measurement devices installed in the site is correct. • Documentation verifying factory tests undertaken, and the results of these tests. • System accurately communicates data to the evidence management system from a sample of test incidents, including records of each incident. • A sample of photographic evidence is reviewed to check that it is of sufficient quality and incident data must correctly identify the camera, date, time, location, lane, speed zone and vehicle speed.

Figure 4A
Specification tests for camera equipment – *continued*

Specification tests
Mobile speed cameras
Accuracy and reliability tests: • Accuracy and reliability of speed measurement is checked against another speed measurement device or speed-calibrated vehicle. • Accuracy and reliability testing is to be conducted at a roadside site and involve at least 1 000 speed measurements. • Accuracy tested for a range of speeds, for different vehicles types and for multiple vehicles separated at a range of distances. *Operational and technical requirements*: • Camera must operate correctly within the mobile camera system with correct photographic images, correct data format, and correct data storage, retrieval and data communication. • Internal clock must be verified as accurate and stable over a range of environmental conditions. • Measurement sensors must be shown to be reliable in light or darkness and under a range of environmental conditions. • Documentation verifying factory tests undertaken, and the results of these tests.
Mobile speed camera equipment and cars
Accuracy and reliability tests: • Accuracy of speed measurement to be verified by comparison with another calibrated speed measurement device or speed-calibrated vehicle. • Certification of the speed measurement device to confirm it meets the requirements of the *Road Safety Act 1986*. *Structural tests:* • Installation of the radar mounting system is checked to make sure daily usage will not affect its position or stability. • Camera mounts of every vehicle must align with the axis of the car within defined tolerances. *Operational and technical requirements for speed camera equipment and cars:* • Speed sensor system must be installed in accordance with the manufacturer's requirements and must meet requirements of the state's written test and acceptance criteria. • Speed measurement sensor system is to meet requirements for radar operation, radar signals, identification of target vehicles, self-testing and reliability of electronic components. • System accurately communicates data to the evidence management system from a sample of test incidents, including records of each incident.

Source: Victorian Auditor-General's Office.

A 2009 compliance review by a consulting firm commissioned by DOJ assessed the specifications against regulatory requirements. It found that all policies and procedures, including specifications, complied with regulations and compliance activities go beyond what is required in regulations, for example, by including additional speed accuracy and reliability tests.

Furthermore, a DOJ specification for road safety cameras formed the basis for the National Measurement Institute's development of an Australian standard, which is still ongoing.

4.3.2 Testing compliance with specifications

Before equipment is used in the road safety camera system, it must be demonstrated to comply with specifications under expected operating conditions.

All of the tests described in the equipment specifications are conducted on all equipment before it is used in the camera system. The testing is carried out over extended periods and under the environmental conditions expected in normal use, including actual roadside conditions and different types of weather and times of day. This means that the equipment is not used until it can satisfy requirements under actual conditions where infringements would be issued.

Testing is conducted by organisations that are independent of the camera vendor and are accredited by the National Association of Testing Authorities as testing and calibration laboratories.

Additionally, all test documentation is separately reviewed by an engineering organisation to verify that the testing and documentation is complete and conclusions are correct.

This provides confidence that test results are accurate and reliable.

4.4 Managing equipment

Once operational, equipment used in the road safety camera system is maintained and tested to make sure that vehicle speed measurements and detection of red-light running is reliable and continues to meet the accuracy requirements of the *Road Safety Act 1986*. The maintenance and testing program is designed to manage the factors known to lead to faults, and reduce their occurrence. Where they do occur, faults in road safety cameras should be detected quickly to avoid issuing invalid infringements.

Maintenance, testing and fault management of fixed road safety cameras is managed and overseen by DOJ and conducted by camera equipment vendors and separate testing organisations. For mobile cameras, the mobile program provider is responsible for equipment management.

Maintenance and testing should be:

- comprehensive and methodologically sound
- monitoring appropriate indicators that will reveal any changes in equipment condition due to ageing or degradation
- conducted at a frequency that is appropriate to the level of usage and degradation in the equipment
- conducted by organisations with appropriate technical competence
- independently assured.

Fault management should:

- continuously monitor whether equipment is operating correctly
- regularly monitor those indicators of equipment condition that provide early warning of emerging problems
- respond effectively when faults occur.

4.4.1 Fixed camera equipment

The maintenance and testing program for fixed cameras is comprehensive, methodologically sound and undertaken at appropriate intervals. This is complemented by a strong systematic approach to monitoring the fixed camera network for faults and equipment degradation.

Fixed cameras are unattended and are constantly exposed to the environment. The equipment comprises both a camera unit and in-road sensors that experience wear and tear from the environment and can be a target for vandalism. In the case of in-road sensors, a high volume of traffic driving over these sensors can affect the physical condition of the equipment.

As such, to maintain the quality of their operation, fixed cameras need both regular programmed site visits and continual surveillance of results to detect anomalies.

Maintenance and testing

DOJ has established a program of scheduled maintenance and testing that addresses equipment quality risks appropriately and gives confidence that testing results reliably reflect the actual condition of the equipment. A range of checks are conducted at various intervals, as shown in Figure 4B. VAGO examined testing and maintenance reports from four cameras over a 15-month period and a sample of individual test reports from a further six sites, and the quality of this work was sound.

DOJ has identified the maximum interval between maintenance and testing activities for different types of speed measurement and red-light camera equipment, as described in Figure 4B. VAGO found that this interval is appropriate as it reflects and anticipates the rate at which equipment degrades.

Figure 4B
Scheduled checks for fixed cameras

Frequency	Checks conducted
Monthly	• General physical site inspection • Site inventory • In-road sensor physical inspection • Camera and flash operation check • Camera settings check • Communications check
Quarterly	• Electrical testing of in-road sensors • Speed accuracy tests performed using calibrated standards • Speed reliability tests using normal traffic and a reference instrument
Annually	• Independent certification of speed measurement accuracy

Source: Victorian Auditor-General's Office based on Department of Justice documentation.

Maintenance and testing activities are scheduled effectively. All routine activities are scheduled in advance and VAGO's examination of a sample of schedules and test reports showed that activities were conducted as scheduled. DOJ gets a high level of assurance that scheduled activities are undertaken as planned, because service providers:

- prepare reports to DOJ on actions taken
- are required to advise DOJ of the actual times during which these activities are conducted
- communicate extensively with DOJ's Camera Operations group.

Consistent with the approach prior to procurement, operational testing is conducted by organisations with appropriate technical competence that are independent of the camera vendor. DOJ requires that testing providers are National Association of Testing Authorities accredited as testing and calibration laboratories, which means that they are subject to technical audits of procedures, document controls, quality controls and staff qualifications. Testing providers are contracted directly by DOJ and there are no contractual incentives for the testing provider that could compromise the reliability of their work.

Fault detection and management

DOJ receives information on the condition of the camera network at daily, monthly and quarterly intervals. In addition to information received from regular scheduled maintenance and testing activities, sources of information about possible faults are:

- **Daily electronic monitoring of the status of cameras**—provides alerts of power or communications failure, or gross faults in camera image.
- **Monthly report of camera system performance**—contains statistics on the operation of fixed cameras and provides an indicator of actual or emerging faults.
- **Reports from the public or Victoria Police of camera faults**—provide observations of cameras about physical camera condition.

The coverage and frequency of regular monitoring is sound and its effectiveness is strengthened by communication between staff of DOJ, equipment vendors and testers. DOJ has six dedicated technical officers for responding to actual or emerging fixed camera faults or problems.

VAGO assessed the effectiveness of DOJ's fault detection and management mechanisms through an examination of test reports and maintenance logs and found that this process was robust. The monthly camera system report provides an alternative means to identify faults not otherwise detected through regular testing. Records for individual fixed instantaneous speed camera sites were examined and showed that while minor faults did occur between maintenance and testing actions, these would not compromise speed measurement.

In 2010, a software fault in the Hume point-to-point camera system resulted in nine infringements being incorrectly issued. DOJ's response to this is discussed in the case study in Figure 4C.

Figure 4C
Responding to faults from the Hume point-to-point fixed speed cameras

The Hume point-to-point system measures the average speed of a vehicle travelling between two sites and records an incident if that average speed is above the speed limit.

On Thursday 14 October 2010, a police officer went to serve a notice for vehicle impoundment arising from a speed infringement on the Hume Freeway. The officer reported to the Traffic Camera Office that he thought that the driver was unlikely to have committed the offence.

On Friday 15 October, the Hume system was retrospectively deactivated as from Thursday 14 October. A review of infringements was initiated on the same day and completed by the morning of Monday 18 October. The review examined infringements detected around the times at which cameras in the system resynchronised their internal clocks as this was identified as the most likely cause of inaccurate readings. Over a period of time, all computer clocks can drift away from the true time. Computer clocks are corrected periodically from an external source. The normal drift in the camera clock has no effect on the accuracy of speed measurements taken over the short time required to travel between two camera sites. However, when an incident is detected at the instant a camera clock is resynchronised, the time correction may result in the travelling speed being recorded as higher than the actual speed.

The camera system was programmed to reject those incidents detected during the resynchronisation to prevent invalid speed measurement. However, a software error meant that a very small number of infringements were not correctly rejected.

To identify any incorrectly issued infringements, DOJ first identified infringements created close to the times at which clocks re-synchronised. The re-synchronisation data allowed DOJ to identify those infringements affected by re-synchronisation of the camera clocks. DOJ gained further confirmation that these infringements were incorrect by examining the images of the detected vehicles captured by the cameras. Where a vehicle is travelling at a speed significantly over the speed limit, it will be positioned further into the image frame than slower moving vehicles would be. Images for the incidents identified as being suspicious did not suggest the vehicles were travelling at the very high speeds that were recorded by the cameras.

DOJ then reviewed all infringements since activation of the system in 2007. Both the first and second reviews identified the same nine incidents as invalid. The total number of infringements issued since activation of the system in 2007 was around 68 000. The nine invalid infringements were withdrawn. The camera maker paid a significant fine as a result of the camera fault.

The camera vendor has developed changes to the software to correct the problem. DOJ has put in place a robust program to test the cameras to make sure new software operates correctly and the problem cannot occur again. The process is being overseen by an independent engineering firm with expertise in speed camera technology. DOJ has also initiated a project to introduce a secondary measurement system for the Hume point-to-point system similar to that employed in all other highway and intersection speed cameras.

The Hume system will remain deactivated until the Minister for Police approves the site for enforcement. DOJ has advised it will undertake significant testing of the system before it recommends the system be reactivated. Victoria Police has directed that the system will be operated and closely monitored for a month before any infringements are issued.

Source: Victorian Auditor-General's Office.

4.4.2 Mobile camera equipment

The testing and maintenance program for mobile cameras is sound. However, additional assurance could be provided by requiring that testing under actual operating conditions is conducted by an organisation independent of the mobile program provider. Robust fault detection mechanisms provide confidence that only cameras that are operating properly are used in speed enforcement.

Unlike equipment used in the fixed camera system, mobile camera equipment is less exposed to environmental effects and damage. As such, the equipment is less likely to degrade at the same rate as fixed cameras and the maintenance required is not as frequent or extensive. In addition, an operator is always in attendance and is always in contact with a central control centre.

Maintenance and testing

The main activity for monitoring mobile camera equipment functioning is the set-up test conducted by the camera operator at the start of every session. These tests provide indicators of faults or problems that are able to be identified by the camera operator or the mobile operations control room, which supports all the mobile sessions remotely. This provides regular assurance over the quality of mobile camera equipment, and maintenance activities can be scheduled and conducted in response to any faults identified.

Additionally, annual certification is conducted to test the accuracy of the speed measurement device. This is conducted in a laboratory by an independent organisation that meets the requirements of the *Road Safety Act 1986*. After certification, the mobile program provider conducts any required maintenance, such as replacing damaged or worn components. Given the very regular testing and fault monitoring by the mobile camera operators, the frequency of maintenance is sufficient and appropriate.

Mobile camera equipment includes the cars on which the radar is mounted during a camera session. It is important for accurate speed measurement that the radar is angled correctly in relation to the road. At commissioning, the alignment of the car and the camera mounting equipment is tested so that the angle is correct. Alignment may be affected if a vehicle is damaged. Any car that is damaged is realigned after repair. Misalignment may be detected during normal examination of images from the camera car, resulting in a fault report and withdrawal of the car and equipment.

In addition to alignment of all new and damaged camera cars, the alignment of a further 10 per cent of camera cars is tested each year. This procedure combined with the set-up test described above addresses risks that the radar may not be correctly aligned.

In contrast to fixed cameras, the mobile program operator conducts both maintenance and testing of mobile cameras. DOJ does not directly check the technical quality of maintenance activity. Independent assurance of speed measurement is provided by annual certification testing, where an independent body tests the devices in a

laboratory. The mobile program provider is also subject to audits of its quality systems which play an important role in the proper maintenance of equipment.

Independent testing of mobile cameras under actual operating conditions would, however, provide stronger assurance that all aspects of maintenance and operation of camera cars and camera equipment are at a satisfactory standard.

Fault detection

Equipment faults and degradation in mobile cameras is monitored and managed by the mobile program provider. VAGO found that monitoring mechanisms are conducted at an appropriate frequency given the nature of the equipment and how it is used. Sources of information about faults are:

- **Check of measurement accuracy**—conducted by the mobile camera operator at the start of every mobile session. This validates that the mobile camera equipment is operating correctly and is not producing measurement errors, which would indicate an equipment problem.
- **Check of test photographs**—the mobile camera operator takes an evaluation photograph at the start of each session. This photograph is checked by both the operator and the mobile operations control room immediately after it is taken. This validates that the camera is producing images and operating data correctly, that images are of sufficient quality and that there are no objects in the beam that could produce reflections and inaccurate measurement. Issues with the image could indicate an equipment problem. Also, at the start and end and at hourly intervals throughout a session, the mobile camera operator activates the test function of the mobile camera. This validates that the camera is continuing to operate correctly.
- **Continuous monitoring of evidence quality**—types of camera fault not detected during conduct of the mobile session can be identified during the evidence verification processes. If a large proportion of evidence from a mobile session is found to be of poor quality, this could indicate an equipment fault. VAGO examined data from the evidence verification process and found that DOJ successfully identified and rejected faulty images, for example, in relation to focus-related image problems.
- **Workshop maintenance**—annually, at certification, and each three months upon rotation of the camera between cars, equipment is checked for correct functioning and any worn or damaged components are replaced. This examination of equipment may reveal a fault.

Recommendation

5. To strengthen assurance, the Department of Justice should establish regular independent testing of the accuracy and reliability of speed measurement by mobile speed cameras under actual operating conditions.

5 Validity of infringements

At a glance

Background

The road safety camera system incorporates several features intended to give confidence that infringements issued are valid. These include a police discretionary enforcement threshold above that legally required, secondary corroboration of incidents, evidence review processes, and certification testing which provides evidence of accuracy that can be used in court.

Conclusion

There can be a high level of confidence that infringements issued by the road safety camera system are valid. There are extensive processes to make sure that the system only issues valid infringements, and that invalid infringements are identified and removed. Stronger assurance over certification and mobile camera testing would make the system even more robust.

Findings

- Police discretionary enforcement thresholds and legislative tolerances applied to all incidents provide a high degree of confidence that infringements are valid.
- Corroboration against secondary measurements provides a high level of confidence in the accuracy of detection and measurement. Mobile camera checks rely on operator compliance, but other checks mitigate the risk that may arise from human error.
- Evidence verification processes assess evidence of each incident against appropriate, thorough criteria and these processes promote verification accuracy.
- VAGO found no shortcomings in certification testing, however, the Department of Justice could receive stronger independent assurance of the quality of the work of one provider.

Recommendations

- The Department of Justice should get stronger assurance that mobile camera operators comply with critical procedures.
- The Department of Justice should require that all certification service providers comply with appropriate quality control and documentation standards, and are subject to regular audits against these standards conducted by appropriately qualified measurement experts.

5.1 Introduction

There are several features in the road safety camera system that are intended to give assurance that only drivers who commit a road offence are issued an infringement notice, with subsequent checks and balances to remove any remaining doubt.

This Part examines whether processes in the management of road incidents provide sufficient assurance that infringements issued are valid. In assessing the validity of infringements issued by road safety cameras, VAGO examined the system for recording incidents, and the checks within the system to make sure that each infringement is valid. This includes assessment of the design of the camera system, the evidence verification system and application of policy.

5.2 Conclusion

There can be a high level of confidence that infringements issued by the road safety camera system are valid. There are extensive processes to make sure that the system only issues valid infringements and that invalid infringements are identified and removed. Stronger assurance over certification and mobile camera testing would make the system even more robust.

5.3 Validity of incidents detected

To make sure that incidents detected can be issued as infringements, the Department of Justice (DOJ) and Victoria Police have introduced operational policies and procedures at the point of recording an incident. These provide greater confidence that incidents recorded are valid and that drivers who receive an infringement notice did commit a road offence. These processes and procedures include:

- application of discretionary enforcement thresholds
- independent corroboration.

5.3.1 Speed tolerances

The *Road Safety Act 1986* contains a measurement tolerance for speed measurement for fixed and mobile cameras. Victoria Police applies a discretionary enforcement threshold above the legislated tolerance. This provides a high level of confidence that infringements are issued only where the driver exceeded the speed limit.

The discretionary enforcement threshold is not published for law enforcement reasons.

5.3.2 Corroboration

To increase the confidence in the validity of infringements issued, DOJ has established the following processes for fixed and mobile cameras to corroborate the accuracy of speed measurements and red-light incidents detected.

Fixed speed cameras

The accuracy of speed measurement equipment used in the fixed camera system is strongly assured by the requirement that fixed instantaneous intersection and highway cameras have two separate speed measurements for every incident. These measurements must corroborate within a specified margin for a speed infringement to be successfully issued. This check, together with the police discretionary enforcement threshold, significantly reduces the likelihood that an infringement is issued based on inaccurate speed measurement.

The speed measured by the primary device is compared to the speed measurement by either a secondary device or a second measurement procedure. The two measurements must be within 2 km/h of each other. If not, the incident is rejected, regardless of whether the primary measurement is in excess of the speed limit. For example, if the two measurements recorded 113 km/h and 116 km/h in a 100 km/h zone, an infringement would not be issued.

The two speed measurement methods are of independent design, reducing the likelihood that both measure inaccurately. VAGO received information on camera sites and incident data from 2010. This provided evidence that speed incidents from fixed highway and intersection cameras are corroborated against a secondary device or method.

Mobile speed cameras

As discussed in Part 4, speed measurement by mobile cameras is tested against an independently-designed secondary device at the start of every camera session. These two measurements must corroborate within a defined margin for the session to proceed. Corroboration at the start of the session significantly minimises the possibility that speed measurement is inaccurate. Incidents are not individually corroborated as is the case with fixed camera speed measurement. However, mobile cameras are monitored during operation by the camera operator on site, and the camera equipment is not subject to the degradation that fixed camera in-road sensors are. For this reason, a single corroboration check at the start of the session is sufficient.

The effectiveness of this procedure relies on whether the mobile camera operator conducts the corroboration test as required. There is no direct validation that the speed measurement test is conducted as required. The operator is required to confirm on their operator statement that they conducted the test for each session, which represents the evidence that the test was undertaken. The operator can be called to appear in court under oath to confirm this statement.

Other checks and balances mitigate the risk of procedures not being followed and inaccuracy not being detected, which could lead to an invalid infringement being issued. These include:

- application of the police discretionary enforcement threshold
- checks during set up of each session
- checks of the operator's statement
- regular rotation of cars and equipment.

Nonetheless, validation that the operator conducted the corroboration check, such as photographic evidence of the check being conducted, would give additional assurance and strengthen public confidence in the validity of infringements issued from mobile cameras.

Point-to-point speed cameras

Point-to-point cameras measure the time taken for a vehicle to travel the distance between two camera sites. The average speed is determined and compared to the speed limit. An image of the vehicle is taken at the first camera site, together with the time at which the vehicle passed the camera. A second image and time is recorded at the second camera site. The two images and the time between the two images being taken is used to verify the vehicle's average speed between the camera sites.

Victoria Police's discretionary enforcement threshold means that a driver must be sustaining a travelling speed significantly over the speed limit for the whole distance between the two sites before an infringement is detected. This provides assurance that a driver who receives an infringement from the point-to-point system was exceeding the speed limit.

A secondary speed measurement and corroboration system is currently being installed on the Hume point-to-point system. If a secondary system had been in place since the activation of the system, it would have been extremely unlikely that the nine incorrect infringements prior to October 2010 would have been issued.

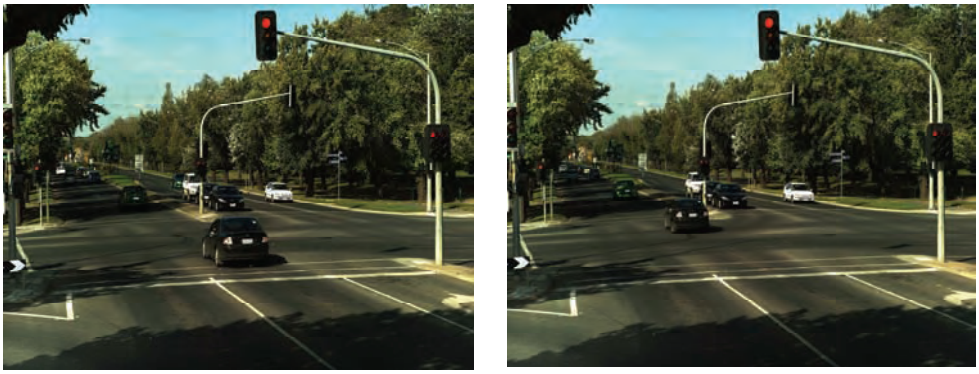
Fixed red-light cameras

Red-light incidents are recorded if a driver enters and crosses the intersection after the red light. If the driver enters the intersection before the red light, but completes the journey on the red light, an infringement is not issued.

To determine whether the driver completes their journey through the intersection against a red light, the red-light camera takes two successive photographs of the vehicle and the traffic light. The first photograph is taken when the driver enters the intersection on the red light. The photograph is triggered by the vehicle driving over in-road sensors, which only detect movement shortly after the signal turns red. As such, a red-light incident can only be recorded when a driver enters on the red.

A second photograph is taken shortly after to confirm whether the driver continued through the intersection against the red light. During the evidence verification process, these photographs are reviewed to confirm that an incident occurred. Because the production of two successive photographs shows that the incident is valid, a secondary measurement device is not required. This is shown in Figure 5A.

Figure 5A
Photographs demonstrating a red-light running incident



Note: Image quality and resolution modified by Department of Justice to protect privacy.
Source: Department of Justice.

Drivers can request to review the evidence of an infringement from any type of road safety camera, and in the case of red-light infringements, both photographs are provided on request and payment of a fee.

5.4 Evidence verification and validation

After an incident is recorded by either a fixed or mobile camera, the evidence is subjected to a number of checks to make sure that it is valid. The evidence for each incident is individually verified, and then Victoria Police further validates the incidents before infringement notices are issued. These processes provide further assurance that only valid infringements are issued.

5.4.1 Evidence verification

The evidence verification process is thorough and designed to promote high levels of accuracy of verification. The evidence verification provider has a financial incentive to accurately verify evidence.

Each incident is individually checked at least twice against a set of criteria. These checks are conducted by different operators who must have successfully undergone the required training for the type of infringements being verified. DOJ regularly audits the training records of evidence verifiers.

The system randomly assigns the incidents to operators. If the two operators do not make the same decision to either approve or reject the incident, it passes to a supervisor for assessment and a final decision.

The criteria against which the incidents are assessed are thorough and appropriate. Categories of rejections include:

- issues relating to operational testing and set up
- environmental factors
- application of discretionary policy
- data error
- evidence quality
- corroboration failure.

The number of rejection reasons provides ample criteria for rejection of incidents that might be doubtful. This level of conservatism increases the confidence that can be placed in the verification process.

In the case of incidents recorded by mobile cameras, the criteria include checks over a number of areas that have already been checked during the camera session. For example, the camera operator takes a 'site evaluation shot' to examine the whole field of view. The operator and the mobile control room check whether the shot contains evidence of metal objects or reflections in the field of view that could affect accuracy of measurement. They also check that beam lines in the photograph, between which a vehicle must be photographed for a valid infringement to be issued, are correctly positioned.

Before any evidence from a mobile camera session is verified, the operator's record of the session, including the site evaluation shot, is checked by evidence verifiers. This process is thorough and robust, and examines aspects of the mobile set-up procedure because the accuracy of the infringements is partly dependent on the set-up procedure being followed properly. For example, session checks examine whether the operator conducted the number of test shots required to be taken during camera sessions to check for correct operation. If this process shows that the validity of the mobile session is compromised, then all incidents are rejected.

VAGO analysed records for all speed incidents that were verified as infringements during 2010 and found that the data was free from gross errors in speed measurement. This analysis included examination of typical indicators of errors, including patterns of identical measured speeds, or unusual patterns in speed measurement such as a large number of instances of excessive speed measured by a particular camera. VAGO did not detect any patterns that were due to undetected faults or failures in evidence verification.

5.4.2 Evidence validation

After verification and approval by the evidence verification service provider, Victoria Police further selectively reviews the evidence to validate the incidents before infringements notices are issued. Victoria Police gains its own assurance that infringements are valid as it is accountable for their issue.

Victoria Police checks:

- all excessive speeding and 'hoon' speeding incidents, because these offences result in loss of licence and so have significant implications for the offender
- a sample of at least three speed incidents from each mobile session
- a sample of lower-level speeding and red-light incidents detected by fixed cameras
- all incidents involving emergency vehicles—the incident must be justified on operational grounds or an infringement is issued.

This sample size is appropriate, given the previous reviews of evidence. It is focused on high-risk incidents, as well as providing a check that no changes to the camera have occurred that would affect the validity of infringements.

5.5 Certification

Certification is an independent test of the accuracy of a camera's speed measurement device, the results of which can legally be used as evidence of accuracy in court. It is conducted in addition to routine equipment testing. Legislation requires that certification testing be conducted annually by an organisation that meets the requirements of the *Road Safety Act 1986*.

There are two certification providers used for the road safety camera system. Both meet the requirements of the *Road Safety Act 1986* and VAGO found no evidence that the quality of certification was inadequate.

One provider, while meeting the requirements of the *Road Safety Act 1986*, is not accredited by the National Association of Testing Authorities as a testing and calibration laboratory. Furthermore, while there is a longstanding informal arrangement, DOJ does not have a contract with this provider that incorporates quality standards and requirements for retention of documentation.

Better practice in testing and calibration is for a laboratory to comply with the requirements of the international standard ISO 17025:2005. This requires the laboratory to have a basic quality system to make sure that test results are fit for purpose, internal cross-checks and auditing are conducted, all work follows approved written test methods with associated uncertainty calculations, and regular testing of competency is conducted. Having a requirement that all certification providers demonstrate compliance with key aspects of this standard would provide stronger assurance of the quality of this work and associated test documentation.

Recommendations

6. To increase assurance over the accuracy of infringements from mobile cameras, the Department of Justice should get stronger assurance that mobile camera operators comply with critical procedures.

7. To increase transparency of certification, the Department of Justice should require that all certification service providers comply with appropriate quality control and documentation standards, and are subject to regular audits against these standards conducted by appropriately qualified measurement experts.

6 Public communications about the program

At a glance

Background

As part of the road safety strategy, *arrive alive 2008–17*, a range of campaigns are conducted to educate the public about road safety. The Transport Accident Commission coordinates communication and education campaigns, VicRoads provides community education and training programs and the Department of Justice (DOJ) and Victoria Police conduct public communications in response to issues as they arise.

Conclusion

Despite clear evidence to the contrary, there is ongoing public concern that the program is revenue-raising, inaccurate or not soundly grounded in improving road safety outcomes. The road safety partners have not adequately educated the public about many fundamental aspects of the program, including the impacts of lower-level speeding. This has placed the program's ongoing legitimacy at risk. DOJ will evaluate its new communications strategy aimed at addressing negative public perceptions to determine whether it has been successful in aligning public understanding with the evidence supporting the program, and its benefits from a road safety point of view.

Findings

- While recent surveys found the majority of the public believe the road safety camera program is primarily about raising revenue, Cabinet and departmental documents show that the program is clearly based on road safety outcomes. There is no evidence to suggest that the primary purpose of the program is to raise revenue.
- Police operational decisions and a discretionary enforcement threshold provide leniency to speeding drivers that reduce potential revenue.
- While DOJ has increased the amount of information available to the public about the program, a range of public misconceptions about the program persist.
- DOJ has recently developed a communications strategy to address negative perceptions. This strategy is sound and includes an evaluation plan to assess effectiveness of future communications activities.

Recommendation

- The Department of Justice should expedite the implementation of its communication strategy and address misconceptions about the program.

6.1 Introduction

The road safety camera program issued 1 304 178 speed and red-light infringements in 2009–10. Infringements comprise a monetary fine and, depending on the seriousness of the offence, demerit points against their licence. Revenue from these infringements is allocated to the Better Roads Victoria Trust Account, which funds projects to improve roads.

With many people being fined and receiving demerit points on their driver's licence, the road safety partners—VicRoads, Victoria Police, the Department of Justice (DOJ), and the Transport Accident Commission (TAC)—need to educate the community about the integrity and appropriateness of the use of road safety cameras. Public communications should both educate the public and address their concerns about the camera program.

Public opinion about road safety cameras is critical to the program's credibility and ongoing viability. If the weight of the negative public opinion becomes overwhelming, the program risks losing its legitimacy, resulting in the removal of cameras or the whole camera system. As such, it is important that the community is well-informed about the program, and that public perceptions are not skewed or misconstrued.

This section examines the extent to which the road safety partners communicated successfully about the road safety camera program.

6.2 Conclusion

Despite clear evidence to the contrary, there are ongoing public concerns that the program is revenue-raising, inaccurate or not soundly grounded in improving road safety outcomes. The road safety partners have not been successful in educating the public about many fundamental aspects of the program, including the impacts of lower-level speeding and the need for cameras on freeways. This has placed the program's ongoing legitimacy at risk.

DOJ will evaluate its new communications strategy aimed at addressing negative public perceptions to determine whether it has been successful in aligning public understanding with the evidence supporting the program and its benefits from a road safety point of view.

6.3 Managing negative public perceptions

There is a sound evidence base to support the use of road safety cameras to improve road safety, and this is reflected in siting decisions. There is no evidence that the program is revenue-raising and there can be a high level of confidence in the accuracy and validity of infringements issued.

However, the road safety camera program has persistently been viewed by some members of the community and media as revenue-raising and faulty, and there are a range of negative beliefs held about the program.

6.3.1 Perceptions about revenue-raising

An outcome of the road safety camera program is that fines are issued to deter drivers from unsafe driving behaviours. As with any fine-based system, this results in government revenue.

The road safety camera program has been subject to persistent negative public perceptions that it is operated primarily to raise revenue. In a 2010 survey by TAC, 69 per cent of respondents agreed that speed cameras are more about raising revenue than road safety. A 2009 survey for the then Australian Department of Infrastructure, Transport, Regional Development and Local Government found that 59 per cent of Victorian respondents believe that the aim of road safety enforcement is to raise revenue.

However, government and departmental documentation, including Cabinet material and internal DOJ and Victoria Police documentation, demonstrates consistently that the road safety camera program is designed to improve road safety outcomes, not raise revenue. Revenue is not a primary, or even secondary, objective of the road safety camera program.

In addition to the absence of documentary evidence of revenue-raising, very reasonable operational decisions that reduce potential infringement revenue have consistently been made. These relate to:

- Victoria Police's penalty review guidelines
- police discretionary enforcement threshold levels.

Victoria Police's penalty review guidelines

Victoria Police use discretion when enforcing road safety camera infringements. Its penalty review guidelines outline examples of circumstances where this discretion, which gives leniency to drivers, may be applied. These policies systematically reduce the total revenue that could have been generated by the road safety camera program.

These guidelines include:

- **Official warning notice**—Victoria Police can issue an official warning in lieu of a Traffic Infringement Notice, in certain circumstances. In 2010–11, as a result of this policy, 50 342 infringements from road safety cameras were withdrawn, representing around $8.4 million in foregone revenue.
- **Multiple infringement policies**—When a vehicle is detected speeding several times in a certain period of time within a certain area, and the incidents are all for lower-level speeding, only one infringement is issued, generally for the first incident. The system automatically removes the other incidents. Under legislation, the driver could legally receive an infringement for each separate incident.

Police discretionary enforcement threshold levels

The *Road Safety Act 1986* requires that a tolerance be applied before a speeding infringement may be issued. However, Victoria Police applies a discretionary enforcement threshold to all speed incidents that is greater than the legislated tolerance. If the legislative tolerance alone was strictly applied, more drivers would receive fines. The decision to apply an enforcement threshold that is greater than the legislative tolerance reduces the potential revenue raised.

The enforcement threshold is rightly not publicised for law enforcement reasons.

6.3.2 Perceptions about faults

Two major faults in the road safety camera system have raised doubts about the integrity of the program for some sections of the community and the media. Incorrect infringements from the Western Ring Road cameras in 2003 and the Hume point-to-point cameras in 2010 have been subject to significant public comment. The Hume case is discussed in Part 4.

Public confidence in the reliability and accuracy of the road safety camera program has been further undermined by the media reporting surrounding the high amounts of infringements on the EastLink Freeway, although there has been no evidence of incorrectly issued infringements.

Road safety cameras were installed during construction of the EastLink Freeway and were activated in September 2009, shortly after the freeway opened. In late 2010 and early 2011, a series of media articles reported a large number of speeding fines being issued from the EastLink cameras, with cameras at Wellington Road Bridge causing particular concern. These cameras have been the source of the highest number of infringements when compared to other camera locations. The cameras are mounted underneath the road bridge. In 2009–10, there were a higher number of infringements in the northbound direction with 42 113, in comparison to 33 726 for the southbound direction.

VAGO examined the testing and maintenance of camera equipment at the Wellington Road Bridge on the EastLink Freeway, and found there was no evidence that infringements issued from these cameras are invalid. This is discussed in Figure 6A.

Figure 6A
Testing camera accuracy on the EastLink Freeway

VAGO observed routine testing at EastLink Wellington Road Bridge. The accuracy of the primary and secondary speed measurement devices was tested against two other speed measurement devices:

- Infra-red beam speed measurement device—these are widely used as a secondary measurement device at intersection speed measurement sites.
- Speed-calibrated test vehicles—these are equipped with a calibrated speed measurement device that is independent of the vehicle speedometer. Tyre pressure is set to make sure speed measurement is accurate.

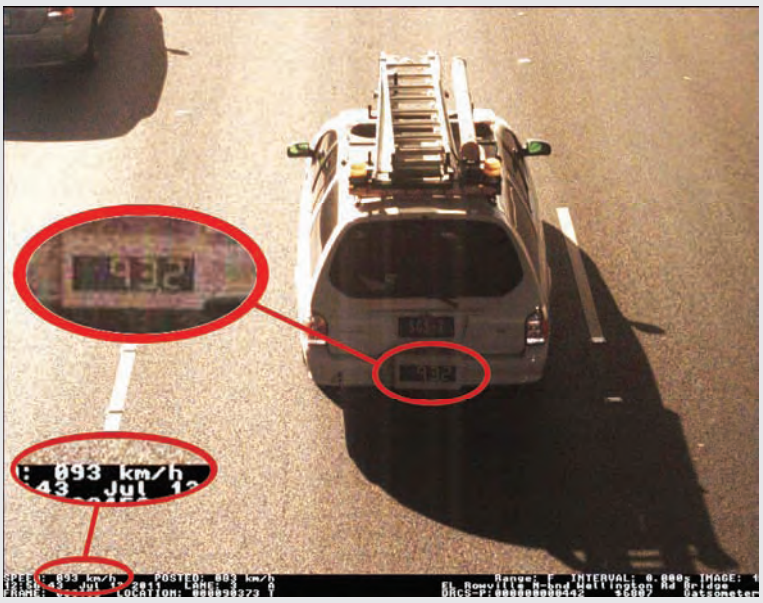
During testing, the speed camera at the site is configured to capture the speed of vehicles travelling over 90 km/h. This is to allow for speed-calibrated vehicles to be used for testing at speeds below the speed limit. No infringements are issued during the testing period. Three calibrated test vehicles were driven through each lane of the northbound and southbound directions at 90–100 km/h. This was repeated four times for each lane providing at least 10 sets of comparable measurements for each lane.

Calibrated test vehicles have a large speed display at the back of the vehicle. As the vehicle travels past the speed camera, it is detected and photographed by the speed camera. This allows the speed camera measurement and the calibrated vehicle measurement to be compared. This is shown in the photograph below.

Over the three-hour testing period, the infra-red device also logs the speed of hundreds of passing vehicles. This speed data is compared with the speed measurements taken by the primary and secondary speed measurement devices at the site to check that the devices are reliably measuring speed over a large number of individual assessments.

VAGO examined the results from this test and found that infringements issued from the site would be valid. VAGO also observed speed measurement over the speed limit in a marked police vehicle which had a calibrated speedometer and found that the cameras recorded accurately at these higher speeds for this subsequent test.

In addition to our site examination, VAGO examined the testing and maintenance records of these cameras for the 15 months between January 2010 and April 2011. Planned activities were conducted as scheduled. As such, VAGO found no evidence to suggest infringements from speed cameras at Wellington Road Bridge on EastLink between January 2010 and April 2011 could be invalid. VAGO is satisfied that testing of the Wellington Road Bridge site is thorough and conducted in a professional and competent manner.



Source: Victorian Auditor-General's Office based on Department of Justice data.

6.3.3 Common misconceptions

There are many commonly held negative beliefs about the program. VAGO conducted a review of the media coverage on road safety cameras, public surveys on road safety, and public submissions to this audit to identify common concerns. Figure 6B lists these common misconceptions, VAGO's evidence to demonstrate that these are not soundly based, and the page in the report where this evidence is stated and discussed.

Figure 6B
Common misconceptions concerning the road safety camera program

Misconception	VAGO's evidence against misconception	Page
The purpose of the road safety camera program is to raise revenue	Government and departmental documents consistently state the purpose of the road safety camera program is improving road safety outcomes and that decisions around camera siting are based on improving road safety outcomes. Operational procedures limit the total potential revenue generated by the program. A police discretionary enforcement threshold above the speed limit is applied. More revenue could be raised if this was not applied.	59–60
Low-level speeding is safe	Even small increases above speed limits are dangerous. Research shows that driving 5 km/h over the limit in a 60 km/h zone doubles the risk of crashing. For pedestrians, cyclists and motorcyclists, small increases in speed substantially increase the severity of road trauma experienced.	14–16
Road safety cameras don't reduce road trauma	An extensive body of research and evaluations both throughout Australia and overseas have demonstrated that road safety cameras result in improved road safety outcomes including lower speeds and reductions in fatalities and serious injuries from accidents.	17–20
Road safety cameras are sited to maximise revenue	Fixed and mobile road safety cameras are sited according to criteria based on road safety objectives. There are no incentives for police or other agencies involved in siting decisions to encourage siting based on maximising revenue.	26–28, 30–32
Speed cameras should not be placed on freeways because freeways are safe	While freeways are often well designed and constructed roads, the large traffic volumes and high speeds of freeways reduce the inherent safety of these roads and mean that crashes are likely to have serious road trauma consequences. Between 2006 and 2010, 122 people died as a result of crashes on roads in metropolitan Melbourne 100 km/h zones, which are typically freeways.	27

Figure 6B
Common misconceptions concerning the road safety camera program – *continued*

Misconception	VAGO's evidence against misconception	Page
The cameras are faulty, as shown by the fines withdrawn from the Western Ring Road and Hume Freeway and the large volume of fines being issued from Wellington Road Bridge on EastLink.	There are rigorous equipment management processes including frequent testing and maintenance. Additional policies and procedures around detecting faults and equipment degradation have been put in place since 2004, including the requirement for two separate speed measurements. This reduces the chance of an incorrect fine to close to zero. This requirement was introduced in response to the Western Ring Road faults.	38–48, 51, 61

Note: These misconceptions have been selected based on examination of media articles, public surveys and submissions received for this audit.
Source: Victorian Auditor-General's Office.

6.3.4 Public communications

The road safety strategy is supported by communications campaigns. These are developed by TAC and address road safety issues including 'hoon' driving, drink driving, fatigue and speeding. These campaigns are intended to educate the public about the importance of safer road-user behaviour and the effectiveness of these campaigns is assessed by the TAC.

However, there are ongoing perception issues specific to the road safety camera program, which demonstrate that the management of negative public perceptions has not been effective. This is despite the strength and consistency of the research evidence and the high level of confidence in the validity and accuracy of the camera system. In particular, the two major system faults have received significant media coverage and eroded public confidence.

To address negative perceptions, DOJ has progressively increased the amount of information made available to the public since problems with Western Ring Road fixed speed cameras in 2003. Examples include:

- announcements and electronic warning signs for new cameras including the EastLink and Geelong road safety cameras prior to their activation
- development of the website, 'Cameras Save Lives' (previously 'Cameras Cut Crashes')
- in conjunction with TAC, the 2008 education campaign specific to the road safety camera program, 'Pictures of You'
- publication of the locations of fixed speed/red light cameras
- publication of the weekly locations of mobile speed cameras.

However, this has not been part of a coherent and integrated approach and no evaluation has been undertaken by DOJ to determine their impact on public perceptions. The ongoing perception issues with the program suggest that these initiatives have had limited effectiveness in improving public confidence in the program.

Public opinion about road safety cameras is critical to the program's credibility and ongoing viability. The Organisation for Economic Cooperation and Development recognises that public opinion is a key stimulus to political will for road safety and concludes that political support for road safety should be an integral part of a fully comprehensive road safety strategy.

The National Road Safety Strategy, released in 2011, identified that there have been significant road safety gains from speed reduction measures over the past decade but there is still more that can be done. To do this, it is critical to better engage with the community about the role of speed in road safety. This is particularly relevant to Victoria in light of the ongoing negative public perceptions.

DOJ is taking steps to address this gap. During the conduct of the audit, DOJ has developed a structured communication strategy which sets out the framework for addressing negative public perceptions surrounding the road safety camera program. VAGO examined this strategy and found that it adequately establishes the key components of a communication strategy including objectives, targets, measurement methods, areas for focus and communication tools. It also includes an evaluation plan to assess the effectiveness of future communications initiatives. To measure the success of the program in changing entrenched negative perceptions, DOJ will need to adequately resource the implementation of the communication strategy and monitor the progress of the strategy throughout implementation against its objectives.

Recommendation

8. The Department of Justice should expedite the implementation of its communication strategy with a particular emphasis on addressing misconceptions about the program.

Appendix A.

Audit Act 1994 section 16—submissions and comments

Introduction

In accordance with section 16(3) of the *Audit Act 1994* a copy of this report was provided to the Department of Justice, Victoria Police, VicRoads and the Transport Accident Commission with a request for submissions or comments.

The submissions and comments provided are not subject to audit nor the evidentiary standards required to reach an audit conclusion. Responsibility for the accuracy, fairness and balance of those comments rests solely with the agency head.

RESPONSE provided by the Secretary, Department of Justice

Department of Justice

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11 AUG 2011

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VICTORIAN AUDITOR-GENERAL OFFICE

Our ref: CD/11/363544

Mr D D R Pearson
Auditor-General
Victorian Auditor General's Office
Level 25, 35 Collins Street
MELBOURNE, VIC, 3000

Dear Mr Pearson

PERFORMANCE AUDIT INTO VICTORIA'S ROAD SAFETY CAMERA PROGRAM

Thank you for the opportunity to make submissions or comments responding to the proposed report, provided on 21 July 2011. My comments are as follows.

I believe this is a fair and reasonable account of the government's road safety camera program. The level of technical detail about the end-to-end camera systems, including the testing and maintenance regimes, the detailed overview of national and international road safety research, and the use of case studies, make this a valuable independent reference document.

I note and support the recommendations in the report. The department will continue its evaluation and review of the various matters raised by the audit and complete the actions required to increase assurance and transparency across the system. As part of this, we will continue to work closely with our road safety partners, Victoria Police, VicRoads and TAC to expedite our communication strategy to improve the effectiveness of the road safety programs and monitor the effects of publishing mobile camera locations.

Yours sincerely

PENNY ARMYTAGE
Secretary

State Government Victoria

SECURITY-IN-CONFIDENCE

RESPONSE provided by the Acting Chief Commissioner, Victoria Police

VICTORIA POLICE

Chief Commissioner's Office

Victoria Police Centre
637 Flinders Street
Melbourne 3005
Victoria Australia
Telephone (61 3) 9247 6890
Facsimile (61 3) 9247 6869

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Melbourne 3005
Victoria Australia

Our Ref: 066613/11

Mr D D R Pearson
Auditor-General
Victorian Auditor-General's Office
Level 24, 35 Collins St
Melbourne Vic 3000

Dear Mr Pearson,

Performance Report - *Road Safety Camera Program*

Thank you for providing Victoria Police with the opportunity to comment on the findings of the proposed performance report on the ***Road Safety Camera Program***.

I would like to acknowledge the objectivity and diligence with which the audit team conducted the review. I welcome the insights and recommendations arising from this process as a constructive contribution to our commitment to improving road safety outcomes.

The report affirms the importance of the Road Safety Camera Program in reducing the impact of road trauma on the Victorian community. Victoria Police will continue to work tirelessly with our road safety partners to identify opportunities to improve safety on our roads.

The performance report outlines the complexity and robustness of the systems and processes that support the Road Safety Camera Program.

Victoria Police supports the findings in-principle and will assess the capacity of our front line road policing experts and the Traffic Camera Office to meet the challenges that are outlined in the recommendations. The report highlights the distinction between the methodology for fixed traffic cameras and the importance of having a more robust and random mobile speed camera program. Accordingly, it is important that we review the current approach to mobile speed camera deployment in accordance with our road policing strategies and the analysis of road trauma that underpins those objectives.

RESPONSE provided by the Acting Chief Commissioner, Victoria Police – continued

The report underscores the fairness of the approach that Victoria Police takes in the enforcement of infringements from the Road Safety Camera Program. The accountability for the use of discretion is fundamental to maintaining community confidence in the integrity of the program.

The strength of the findings in terms of the application and relevance of the Road Safety Camera Program in reducing road trauma and changes to driver behaviour provides Victoria Police with an opportunity to enhance the application of the program so that it will provide long term benefits to the community.

Yours sincerely,

Ken Lay
Acting Chief Commissioner
5/8/2011

RESPONSE provided by the Chief Executive, VicRoads

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Please Quote: VRPC003390
(File No: PC011142)

Mr D D R Pearson
Auditor-General
Victorian Auditor-General's Office
Level 24
35 Collins Street
MELBOURNE VIC 3000

Dear Mr Pearson

AUDIT ACT 1994 S16 (3) - PROPOSED AUDIT REPORT ROAD SAFETY CAMERA PROGRAM

I refer to your letter dated 21 July 2011, inviting VicRoads to provide submissions or comments for inclusion in the audit report on the road safety camera program.

VicRoads welcomes the detailed analysis and confirmation of the effectiveness of automated enforcement technology as a major element in an overall strategy to reduce road trauma in the Victorian community.

Our understanding is that research has consistently shown that camera enforcement is effective both here and in overseas jurisdictions, both in improving road safety at specific locations and as a general deterrent. The findings of the audit are in this regard consistent with our understanding.

Speeding and red light running are significant factors that contribute to the frequency and severity of crashes. Continued effort to change driver behaviour in these areas will considerably reduce the economic impost and personal burden on all Victorians.

VicRoads acknowledges that vehicle identification is an important part of a deterrent system. This applies to all vehicles that are subject to automated enforcement.

I understand that the findings of the proposed audit report have been discussed at senior officer level and that the recommendations, analysis and findings reflect VicRoads input in the Audit process and as such there is no need for any further comments to be included in the report.

Yours sincerely

GARY LIDDLE
CHIEF EXECUTIVE

5 /8/ 2011

State Government Victoria

VicRoads ABN 61 760 960 480

PSL7

RESPONSE provided by the Chief Executive Officer, Transport Accident Commission

TRANSPORT
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Janet Dore
Chief Executive Officer

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10 August 2011

Dr Peter Frost
Acting Auditor-General
VAGO
Level 24, 35 Collins Street
MELBOURNE 3000

Dear Dr Frost

RE: Performance Audit Road Safety Camera Program. Proposed report for final comments.

I am writing on behalf of the TAC in response to your letter dated 3 August 2011, addressed to the Chairman of the TAC Board of Management.

The work of your office has added to the body of evidence supporting the use of safety cameras as an important measure to reduce speeding behaviour and the incidence of death and injury on Victoria's roads.

The TAC is pleased to note VAGO's conclusion that there is no evidence that the safety camera program was developed for, or designed to, raise revenue. The TAC has also noted the recommendations about:

- strengthening the evaluation of fixed speed cameras on freeways
- strengthening the gap in speed enforcement for motorcyclists
- conducting and evaluating pilots based on different deployment criteria
- the need to expedite the implementation of a communication strategy addressing misconceptions about the safety camera program.

The TAC will work with its road safety partners to address these recommendations.

Should you have any further queries Samantha Cockfield will continue to be available to your team.

Yours sincerely

Janet Dore

cc: Mr Peter Stoppa, Director, VAGO
Mr Paul Barker, Chairman, TAC

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