

THE AUDIT OFFICE
OF NEW SOUTH WALES



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OF NEW SOUTH WALES

New South Wales
Auditor-General's Report

Performance Audit

Improving Road Safety:
Speed Cameras

Roads and Traffic Authority

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In accordance with section 38E of the *Public Finance and Audit Act 1983*, I present a report titled **Improving Road Safety: Speed Cameras, Roads and Traffic Authority**.

A handwritten signature in black ink, reading 'Peter Achterstraat'.

Peter Achterstraat
Auditor-General
July 2011

Foreword

I would like to use this foreword to personally thank those citizens who responded to my request to tell me which speed cameras they were most concerned about. Over 1,700 people responded, some with detailed comments, and these have helped me to understand the strength of feeling around speeding and speed cameras, both for and against. I have also had submissions from road safety experts and organisations representing motorists and pedestrians.

The submissions have given me insights into wider road safety issues, not just those causing concern at specific camera locations. They have touched on topics ranging from revenue-raising to signs, from speed zones and police speed enforcement, to new technology and more. Many of these issues are outside the scope of the current audit, which was limited to two central questions:

- were speed cameras located where there was greatest road safety risk?
- do speed cameras reduce speeding and crashes?

I am anxious not to lose the insights and ideas that these submissions provide and so I have summarised those I found of particular interest in Appendix 8 to the report. I will consider them in future audits that I undertake in relation to road safety. I hope other readers find them useful too.

Personally I would prefer a position where no one speeds and no one gets fined. That would mean hundreds of families each year would be saved the grief of losing loved ones or caring for people who suffer long term disabilities from road crash trauma. The resulting reduction in fine revenue to the Government should be more than offset in the long run, by the reduction in the costs of health and emergency services that comes from safer roads.

Our roads are a lot safer than they used to be, but we are still some way from the ideal.

The Roads and Traffic Authority is about to undergo an organisational restructure. I recognise that the implementation and follow-up of my recommendations will need to be undertaken within the new structure.

Peter Achterstraat
Auditor-General

July 2011

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Executive summary

Background

Speed cameras are a key road safety measure used by the Roads and Traffic Authority (RTA). They aim to make our roads safer by reducing speeding and the number and severity of vehicle crashes.

However there is much public debate about their effectiveness. While some people see them as an essential element in a road safety program, others view them as having no impact on driver behaviour and as revenue-raisers only.

This audit assessed whether RTA's fixed, safety and mobile speed cameras are located in places that reduce speeding and make our roads safer. We answered the following questions:

- were speed cameras located in areas identified as having greatest road safety risk?
- do speed cameras reduce speeding and the number and severity of road crashes in these locations?

Fixed speed cameras and safety cameras aim to reduce speeding at specific locations, while mobile cameras aim to reduce speeding across the road network. Safety cameras are located at intersections and have a dual function. They can detect drivers running red lights and driving above the speed limit.

Conclusion

We found that fixed speed cameras were generally located in areas with high road safety risk. Likewise, safety cameras that enforced speed limits were initially placed at high risk sites. However as all safety cameras will now enforce speed, RTA no longer uses evidence of a speeding problem to select these sites.

We also found there may be other locations for mobile cameras with greater road safety risk than currently used by RTA. This is because it had a short timeframe to roll-out mobile cameras so it used sites based on former NSW Police Force locations. RTA has since identified other locations with higher crash numbers which it plans to use in the future roll-out of mobile cameras.

In general, speed cameras change driver behaviour and have a positive road safety impact. We found that the number of speeding offences, and the total number of crashes, injuries and fatalities reduced after the introduction of fixed speed cameras. However the results for individual cameras varied, with the number of crashes decreasing at some locations but not at others. It is too soon to determine the impact of safety and mobile speed cameras which were only introduced last year, although early results are encouraging.

Supporting findings

We examined how RTA assessed and selected the location of speed cameras. While key selection processes are in place, more could be done to ensure cameras are located in areas of greatest road safety risk. For example, there should be more analysis of vehicle speeds to help determine camera locations and regular monitoring of existing sites for changing conditions.

We found that RTA:

- developed site selection criteria for each camera type
- analysed crash data to determine black spots, but did limited analysis of vehicle speeds
- selected camera locations that broadly met their respective site selection criteria
- analysed crash data for some potential camera sites, but did not regularly monitor existing sites to see if cameras are best placed at these locations.

RTA's speed camera programs were developed at different times and are not part of an integrated framework. Site selection decisions relate to the type of camera to be used, rather than the nature of the black spot. Therefore there might be a more appropriate camera type for an identified black spot than the one currently in place. RTA advises that it is shifting focus from fixed speed cameras at black spots, to reducing speeding across the network using mobile cameras.

We also examined the effectiveness of speed cameras and how RTA assesses their impact. There have been some positive results:

- RTA found that at fixed speed camera locations, total crashes and injuries reduced by 26 per cent, and fatalities by 67 per cent, in the three years after installation
- in general, long term trends show that these reductions have been maintained
- the average number of speeding fines per camera has declined since the installation of fixed and safety cameras, which means less people are speeding at these locations.

While fixed speed cameras have a positive road safety impact overall, crash results vary for individual cameras. For some camera locations, the number of crashes did not reduce. This means that other road safety measures may be needed for these sites. RTA has identified 93 of 141 fixed speed camera locations as effective with a clear road safety benefit. It plans to review and relocate 38 of the remaining cameras. We support this, but think that crash analysis over a longer time period is needed before final decisions are made. This is because our crash analysis suggests that only 40 had statistically significant reductions.

The safety camera and mobile speed camera programs are too new to conclude if they have reduced crashes, although early results indicate drivers may be speeding less.

We also found that total fine revenue from fixed speed cameras reduces the longer they operate, which reflects changes in driver behaviour. But in the absence of public information on the effectiveness of each speed camera, people will continue to question their road safety value.

Recommendations

We recommend that the Roads and Traffic Authority:

1. by March 2012, develop an overarching strategy for speed cameras incorporating all camera types, which:
 - includes criteria to determine the appropriate camera type for each road with a high safety risk (page 13)
 - prioritises potential sites based on death or serious injury (page 13)
 - defines how the effectiveness of each camera type will be assessed, including the analysis timeframe, and key performance indicators on vehicle speed, infringements, and crash severity (page 24)
 - includes its new focus on reducing speeding across the road network, as well as at specific locations (page 13).
2. document the reasons for all future camera decisions where the location is inconsistent with site selection criteria (page 15)
3. by December 2011, annually review existing site locations to check if speed cameras are still appropriate (page 16)
4. by September 2011:
 - assess the crash impact of existing fixed speed cameras for a minimum of five years post installation (page 22)
 - where there has been no significant impact consider an alternative camera site and other road safety treatments for that site (page 22)
5. by March 2012, annually monitor the effectiveness of individual speed cameras (page 24)
6. by June 2012, publicise trends in crashes, revenue, and speeding or infringement data, for each speed camera, and update this annually (page 25).

Response from Roads and Traffic Authority



Mr Peter Achterstraat
Auditor-General
GPO Box 12
SYDNEY NSW 2001

RTA Response to the Performance Audit Report *Improving Road Safety: Speed Cameras*.

Dear Mr Achterstraat

I refer to the Performance Audit Report prepared on *Improving Road Safety: Speed Cameras*. The Roads and Traffic Authority (RTA) welcomes the detailed analysis of whether the RTA's fixed, safety and mobile speed cameras are located in places with significant road safety risk and whether they reduce speeding and the number and severity of road crashes.

The RTA notes that this investigation found speed cameras change driver behaviour and have a positive road safety impact, consistent with the RTA's policy objectives.

The report found fixed speed cameras are located in areas with a high road safety risk, and that the fixed speed camera program has significantly reduced fatalities and injuries. The Audit report notes that in addition to the significant crash reductions attributed to the overall fixed speed camera program, 93 individual camera locations experienced actual crash reductions, with reductions at 40 of these locations found to be statistically significant. However as recommended in section 3.1, a longer review period is needed to establish if crash reductions at other locations are also statistically significant.

This should not be interpreted as evidence that only these 40 locations, are improving road safety. In real terms each injury and fatality saved is of a profound value to the community, especially to families who would otherwise experience the tragic death or injury of a loved one. Overall, from 3 years pre to 3 years post installation the fixed camera sites show savings of 446 casualties.

While fixed and safety cameras address road safety issues at high risk locations, the Audit report recognises the need to also reduce speeding across the entire road network, Mobile speed cameras provide site specific road safety benefits and a general deterrence to speeding, leading to a reduction in the number and severity of crashes and casualties.

The provisional NSW road toll for the 2010/11 financial year is the lowest in NSW since 1933/34. Provisional figures for the year ending 30 June 2011 show 367 people died on NSW roads, a reduction of 18 per cent from 448 in 2009/10. The reintroduction of mobile speed cameras in July 2010 coincided with this general reduction. There has also been a significant reduction in speed related pedestrian fatalities with a 17 per cent reduction when compared to last financial year, demonstrating the broader benefits for these road users.

Roads and Traffic Authority of New South Wales

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However, speed related crashes remain the largest contributor to the NSW road toll and the cost in human and economic terms is very high.

Speed camera enforcement is only one element of the RTA's strategy to address speeding. Speeding is also addressed through school education programs, mass media campaigns and road engineering measures to improve the outcomes even in the event of a speed related crash.

The RTA and key partners are implementing a range of road safety initiatives including;

- Road development, upgrading and maintenance and targeted safety works including Highway Safety Reviews, safety barriers and works on local roads;
- Funding of high visibility policing through the Enhanced Enforcement Program;
- Educational and behavioural campaigns; and
- Influencing vehicle safety and regulating heavy vehicle activities.

While the Audit reinforces the road safety value of speed cameras the RTA acknowledges there are a number of areas where further improvements could be made. The following comments are provided on the recommendations included in the Report.

1. By March 2012, RTA develop an overarching strategy for speed cameras incorporating all camera types, which:

- includes criteria to determine the appropriate camera type for each road with a high safety risk,
- prioritises potential sites based on death or serious injury,
- defines how the effectiveness of each camera type will be assessed, including the analysis timeframe, and key performance indicators on vehicle speed, infringements, and crash severity,
- includes its new focus on reducing speeding across the road network, as well as at specific locations.

By March 2012 the Centre for Road Safety will develop an overarching NSW Speed Camera Strategy in consultation with key stakeholders such as NSW Police, NRMA Motoring Services and road safety experts to ensure the most appropriate camera is used for specific locations. As noted in the audit, the RTA is developing an evaluation framework for all road safety programs within the five year road toll response package, including mobile and safety cameras. This framework will outline how the effectiveness of each camera type will be measured.

The intention of all speed cameras is to reduce speeding in order to reduce crashes. While it is not always practical and cost-effective to measure actual before and after speeds at all camera locations, infringement data are effectively employed to measure driver behaviour. The RTA also conducts annual speed surveys to measure changes in driver speeding behaviour across the road network. Reducing infringements at camera locations combined with network-wide vehicle speed reductions are clear indicators of improved driver speeding behaviour.

The Audit recognises the mobile speed camera program was introduced in a short timeframe to address a rising road toll, with the initial site selection limited to locations previously used by police. As part of the ongoing planning for the mobile speed camera program, the RTA has since conducted an extensive crash analysis of NSW roads to identify potential new high risk locations. The RTA will review the current mobile speed camera locations and in consultation with NSW Police and NRMA Motoring and Services expand the selection criteria so that new locations with a higher road safety risk are prioritised for enforcement.

2. That by September 2011, the Roads and Traffic Authority document reasons for all future camera decisions where the location is inconsistent with site selection criteria.

The audit found the majority of speed cameras were located in accordance with site selection criteria. If future camera decisions are inconsistent with site selection criteria, the RTA will document the reason. Some cameras are installed to prevent a potential future crash problem. This includes locations that are deemed to be high risk such as tunnels and other locations that the police identify as being unsuitable for enforcement, high speed locations and locations where a speeding problem has been identified.

3. That by December 2011, the Roads and Traffic Authority annually review existing site locations to check if speed cameras are still appropriate.

The Centre for Road Safety has already conducted a number of crash based evaluations and reviews of speed camera programs¹ and regular ongoing reviews of mobile speed camera locations for operational suitability. These crash reviews have supported the audit findings that speed cameras change driver behaviour and have a positive road safety impact.

The RTA agrees that routine reviews of existing speed camera locations are important and will carry out annual reviews of existing camera locations to assess if a speed camera remains an appropriate method of improving road safety.

The evaluation of specific mobile camera locations is more complex as they are only enforced intermittently. Reviews of mobile speed camera locations need to consider that the key purpose of mobile speed cameras is to reduce speeding and crashes across the whole road network not just at specific camera locations. The success of mobile speed camera locations also needs to consider their part in the overall success of the program through anywhere, anytime enforcement.

The RTA will review the current mobile speed camera locations and in consultation with NSW Police and NRMA Motoring and Services expand the selection criteria so that new locations with a higher road safety risk are prioritised for enforcement.

4. That by September 2011 the RTA:

- **assess the crash impact of existing fixed speed cameras for a minimum of five years post installation**
- **where there has been no significant impact consider an alternative camera site and other road safety treatments for that site.**

The RTA agrees and has recently conducted a three year pre-post crash based analysis of existing fixed speed camera locations and will expand this analysis to include five years of post data where available.

While it is recognised that a minimum of five years data may be needed to identify statistically significant crash reductions, it should be noted that this longer analysis period can be affected by other factors and a shorter period may be suitable. Based on the initial three year analysis the RTA has already identified a number of cameras that should be reviewed and potentially relocated.

The RTA agrees that where a fixed speed camera has not had a significant impact on road safety the camera should be removed and other road safety treatments considered for that site.

¹ ARRB Fixed Speed Camera evaluation, ARRB School zone camera evaluation, Burringbar camera evaluation, NSW Speed Camera Review, 2011 Fixed Digital Speed Camera Analysis.

5. That by March 2012 the Roads and Traffic Authority annually monitor the effectiveness of individual speed cameras.

See response to Recommendation 3.

6. That by June 2012 the RTA publicise trends in crashes, revenue, and speeding or infringement data for each speed camera, and update this annually.

The audit has highlighted a number of concerns raised by the community about speed cameras. The RTA will investigate measures to improve community confidence in speed camera programs including the annual publication of trends in crashes, revenue, and speeding or infringement data for each speed camera.

The RTA will also develop a website to provide information to the public.

Thank you for the opportunity to provide this information.

Yours sincerely



Michael Bushby
Chief Executive

15 JUL 2011

Introduction

Each year more than 170 people die and 4,100 are injured from speeding, costing the community over \$870m

1. NSW speed camera programs

1.1 What are speed cameras and why are they used?

Speed cameras are a speed enforcement tool. They aim to make our roads safer by reducing speeding and the number and severity of vehicle crashes. Research shows that even a small reduction in vehicle speed can lead to a significant reduction in crashes and injuries.

Roads and Traffic Authority (RTA) reports that speeding is a factor in about 40 per cent of road deaths in NSW. This means more than 170 people die each year from speeding. In addition, more than 4,100 people are injured in speed-related crashes annually. RTA advises that this costs the community over \$870 million a year including health and vehicle repair costs, and lost income.

People caught by a camera driving over the speed limit are fined and accumulate demerit points on their driver's licence. Most drivers are detected exceeding the speed limit by 11-20 kilometres per hour. The greater the excess speed, the higher the fine and demerit points.

Exhibit 1: Proportion of fines issued for each speed band for fixed speed cameras

1-10 km/hr	11-20 km/hr	21-30 km/hr	31-45 km/hr	46 km/hr or more
20.0%	73.2%	6.0%	0.8%	0.1%

Source: Audit Office analysis of State Debt Recovery Office fine data. Refers to fines issued since camera installation.

1.2 What types of speed cameras are used in NSW?

RTA uses three types of speed cameras to encourage drivers to comply with the speed limit.

Exhibit 2: Speed cameras used by RTA

Type	Main purpose	Introduced	Number of speed cameras	Comments
Fixed	Location specific	1997	172 in 141 locations	This includes 65 school zone cameras. No further roll-out planned.
Mobile	General network deterrence	July 2010	6 deployed across 140 locations	Can be deployed on any road at any time across the State. Cameras currently provide up to 1,000 hours of enforcement per month. RTA plans to increase this in 2011 to over 12,000 hours per month.
Safety	Location specific	Mid-2010	77	Safety cameras are located at traffic signal intersections and can detect people driving above the speed limit as well as running red lights. Currently 77 safety cameras enforce speed. RTA plans to replace 183 existing red light cameras with safety cameras at 200 intersections.

Source: Roads and Traffic Authority. RTA lists all camera locations on its website www.rta.nsw.gov.au.

Note: RTA advises that the NSW Police Force managed a mobile speed camera program until December 2008.

While fixed and safety cameras aim to reduce speeding at specific locations, mobile cameras also aim to reduce speeding across the road network. This is because drivers cannot predict their location and might therefore reduce speeding at all times to avoid a fine, rather than only when approaching a known camera location.

The NSW Police Force also enforces speed limits using a variety of methods including radar, but it no longer operates speed cameras. The State Debt Recovery Office (SDRO) issues fines for speeding offences detected by RTA cameras and police.

1.3 What happens to revenue collected from speed cameras?

In 2010-11, SDRO issued over 370,000 speeding fines from RTA's speed cameras worth over \$58 million. Most revenue collected by SDRO from fines goes to the State's consolidated revenue for spending on all government programs. There is no direct link between the State's funding of RTA's speed camera programs and number of speeding offences they detect. RTA advises that only the revenue from school zone cameras is allocated for specific road safety purposes.

Overall RTA spends more on road safety programs than the government receives in camera and speeding fine revenue. In the five years to 2009-10, the value of speeding fines issued from RTA cameras and Police was \$616.2 million. In the same period, the RTA spent \$822.6 million on road safety programs including black spot and other road engineering programs, and education campaigns.

1.4 What does the public think about speed cameras?

There is much public debate about the effectiveness of speed cameras. While some people support speed cameras and believe they improve road safety, others view them as revenue-raisers only.

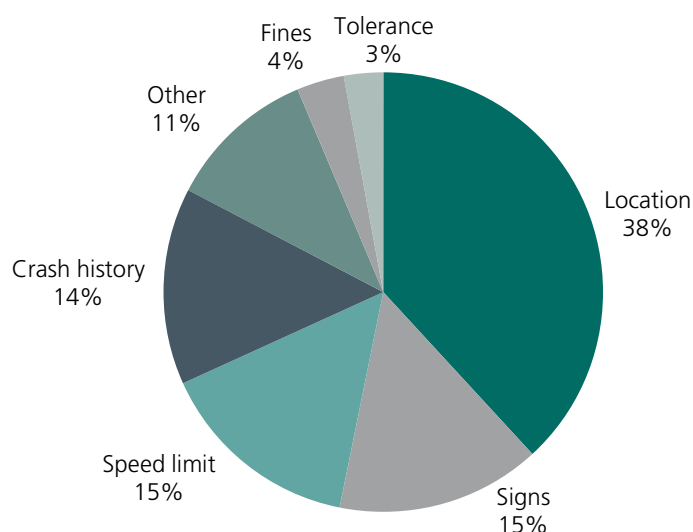
RTA advises that its 2011 community survey found a high level of support for speed cameras with:

- 91 per cent approving of school zone fixed cameras
- 79 per cent approving of safety cameras
- 72 per cent approving of marked mobile cameras
- 68 per cent approving of non-school zone fixed cameras.

We invited the public to nominate fixed speed cameras they were most concerned about and those they believed improved road safety. Over 1,700 people responded. Appendix 1 lists the top ten cameras across the State and the top for each RTA region from these responses.

We also received over 150 submissions from people and organisations who wanted to comment in more detail. Of these, 15 per cent of the submissions were in support of cameras, 69 per cent viewed them as revenue-raisers, with the remaining offering no opinion. The key concerns raised in submissions about the use of speed cameras related to their location, as well as signs and speed limits at camera sites.

Exhibit 3: Public concerns about speed cameras



Source: Audit Office public submissions about speed cameras

Over 5 years, RTA spent \$823m on road safety, which was more than the face value of speeding fines of \$616m

The public are most concerned about the location of speed cameras

1.5 Is NSW's approach similar to other States in Australia?

All jurisdictions in Australia have speed camera programs in place, but they vary regarding:

- the type and number of speed cameras
- the hours of mobile speed camera enforcement
- the value of fines and number of demerit points
- whether camera locations are overt or covert (ie whether they use signs or marked cars)
- the criteria for determining camera locations.

NSW currently has the highest number of fixed speed cameras of any Australian state, although the lowest number of mobile speed camera enforcement hours. NSW also has the highest fine for drivers exceeding the limit by more than 45 kilometres per hour. Appendix 2 compares the number of speed cameras and types of speeding offences with other States.

1.6 What is the focus of this audit?

This audit assessed whether RTA's speed cameras are located in places that reduce speeding and make our roads safer. We answered the following questions:

- were speed cameras located in areas identified as having greatest road safety risk?
- do speed cameras reduce speeding and the number and severity of road crashes in these locations?

We examined fixed, safety and mobile cameras. By 'road safety risk' we mean road lengths with frequent and severe road crashes and where people drive over the speed limit.

We engaged a road safety consultant to provide expert advice and guidance throughout the audit. This included advice on comparative practices and approaches in other jurisdictions.

The audit did not examine:

- signs or the accuracy of speed cameras
- speed enforcement by police
- the future roll-out of speed cameras
- other road safety measures such as road engineering and public education.

However, we may examine these issues in future audits as part of our work on road safety.

Key findings

2. Were cameras located in areas with greatest road safety risk?

2.1 Has RTA developed criteria to determine the location of cameras?

Conclusion

RTA has developed selection criteria for each camera type. The criteria for fixed and safety cameras are consistent with those used in other Australian states, but the criteria for mobile cameras, which are in draft form, are less comprehensive. There are no overall criteria to determine the most appropriate camera type for high risk roads.

RTA has developed site selection criteria for each speed camera type. The criteria for fixed speed cameras are more detailed than for mobile and safety cameras. However they all include criteria on speeding and/or crash history.

Fixed speed cameras

Site selection criteria for fixed speed cameras were developed in 2000 after the installation of the first two fixed speed cameras in NSW. RTA modified these in 2006 and added criteria for rural bends, tunnels and school zones.

Exhibit 4: Fixed speed camera site selection criteria

Criteria used to select fixed speed camera locations for urban and rural roads (non-school zone locations):

- crash rates (per 100 million vehicle kilometres) depending on whether it is a rural road (>40) or urban road (>80) or a freeway (>25) (calculated over the prior three years)
- speed surveys show 85% of vehicle speeds are more than 10% above the speed limit or mean speeds are greater than the speed limit
- casualty crash rate of over 0.5 per km per year (calculated over the prior three years)
- location is not within 300m of a speed zone change
- specific site conditions that allow access to cameras.

Additional criteria for:

- rural bends - speed surveys show that 95% of vehicle speeds are more than 10% above the speed limit, or the mean speed is greater than the speed limit
- tunnels - where emergency services access would be difficult if a crash occurred
- school zones - minimum traffic flow required, and more than 10 crashes within three years for the proposed site with one of these during school zone times. Speed history is not a criterion.

Source: Fixed Speed Cameras, Site Selection and Policy Manual, RTA, 2006; Crash Analysis of the NSW Fixed Speed Camera Program, May 2011

Our road safety consultant advised that the selection criteria for fixed cameras are more comprehensive than other jurisdictions. In NSW equal weight is given to the criteria on crash rates and fatality and injury numbers. In other jurisdictions more weight is given to crashes causing death or serious injury. RTA advises that it is developing a protocol for collecting serious injury data to address this.

There may be other potential mobile sites with greater road safety risk than currently used

Mobile speed cameras

RTA drafted site selection criteria for mobile speed cameras in mid-2010 which it used to select sites for its initial six mobile cameras.

Exhibit 5: Draft mobile camera site selection

Site criteria:

- location previously used by the NSW Police Force in their mobile camera program
- frequency and severity of crashes
- appropriate site conditions (ie technical and safety requirements)

and/or

- evidence of a speeding problem using police intelligence and/or vehicle speeds
- location is difficult to enforce using conventional police methods.

Source: Mobile Speed Camera Program, Deployment Policy, Interim Program, August 2010

Our consultant advised that the selection criteria for mobile cameras are less comprehensive than those used in other jurisdictions with longer-established mobile camera programs. By restricting sites to former Police locations, sites with greater road safety risk may not be given priority. RTA plans to broaden the criteria to include sites outside former Police locations which it will use for the future roll-out of mobile cameras. Our consultant agrees with this as it reinforces RTA's 'any road at any time' approach for mobile camera enforcement.

Safety cameras

Safety cameras have a dual function. They can detect vehicles running red lights and exceeding the speed limit. When the safety camera program was designed only some cameras were to enforce both speeding and red light offences. RTA developed separate criteria for speed enforcement.

Exhibit 6: Safety camera site selection criteria

General safety camera criteria:

- traffic light intersection
- frequency and severity of crashes – fatal, injury, total
- appropriate site conditions (ie technical and safety requirements)

Additional criteria for speed enforcement:

- evidence of a speeding problem (using police intelligence and/or vehicle speeds, and/or speed-related crashes)
- number of casualty crashes within 250m in each direction of the camera.

Source: RTA Ministerial memorandum, 24 July 2009

Our consultant advised that the general safety camera criteria are consistent with those used in other jurisdictions. RTA also advises that the speed enforcement criteria are appropriate because crashes reduce at these locations, particularly rear-end crashes. However we recognise that safety cameras are relatively new and there is ongoing research into the speed enforcement benefit from these cameras.

The above criteria were used to assess the first 50 sites for the new safety cameras with nine of these to enforce speed limits. In March 2010, the Minister for Roads recommended that all safety cameras would enforce speed limits which RTA advises is standard practice in other jurisdictions. Therefore it no longer applies the speed enforcement criteria for these sites.

No overall criteria to determine the most appropriate camera type for a black spot

Speed camera framework

We also found that there are no overall criteria to determine the most appropriate camera type for roads identified as a high safety risk. This is because each speed camera program was developed independently, with the last non-school zone fixed camera installed in 2007, while safety and mobile cameras were introduced in 2010. This means the camera type dictated site selection decisions, rather than the nature of the black spot. Therefore there might be more appropriate cameras than the ones currently in place.

We recognise cameras have different purposes, for example, mobile cameras cannot be used at safety camera intersections. But RTA should examine the mix of mobile and fixed speed cameras and develop a clear strategy for their use across NSW.

RTA advises that it is shifting focus from fixed speed cameras at black spots, to reducing speeding across the network using mobile cameras. Our road safety consultant supports this approach, particularly focusing on reducing speeding at all times on all roads, rather than just at specific locations.

Recommendation

We recommend that by March 2012, the Roads and Traffic Authority develop an overarching strategy for speed cameras incorporating all camera types, which:

- includes criteria to determine the appropriate camera type for each road with a high safety risk
- prioritises potential sites based on death or serious injury
- includes its new focus on reducing speeding across the road network, as well as at specific locations.

2.2 Does RTA analyse crash and speeding data to identify black spots?

Conclusion

RTA analysed crash data to identify potential locations for all camera types, however vehicle speeds were only reviewed for non-school zone fixed speed camera locations.

RTA analysed crash data to identify potential sites for all camera types. This included analysis of:

- crash and injury rates (non-school zone fixed cameras)
- the number of crashes resulting in injury or fatality (mobile, safety, school zone fixed)
- the number of people killed or injured (mobile, safety, non-school zone fixed cameras).

For safety cameras RTA also analysed the annual cost of crashes, the number of crashes at nearby intersections, and the number of pedestrian crashes.

However, RTA did less analysis of speeding data. It did not routinely examine speed-related crashes, and only examined vehicle speeds for non-school zone fixed cameras. RTA considers the type and severity of crashes an alternative measure for speeding, as the faster someone drives the greater the likelihood of injury or fatality.

We also found there may be other locations for mobile cameras with a greater road safety risk than currently used by RTA. This is because RTA had less than four months to roll-out the mobile camera program. Therefore it analysed crash data of former Police mobile sites only. Recent RTA analysis has found a large number of crashes occurring outside of these locations. It plans to assess these new locations when it expands the mobile camera program.

Locations for speed cameras broadly met their respective site selection criteria

2.3 Do camera locations match site selection criteria?

Conclusion

Locations for fixed and mobile cameras, and the initial safety cameras, broadly met their respective selection criteria. However as all safety cameras now enforce speed, RTA no longer applies the speed enforcement criteria for these sites.

RTA provided the original analysis for about two-thirds of the fixed cameras and most safety cameras. We found that these locations broadly met the criteria. Specifically:

- of 96 non-school zone fixed camera sites, 84 met the selection criteria, one did not meet the criteria, and there was no detailed information on the criteria for the remaining 11
- of 30 school zone fixed camera sites, two of the selection criteria were met, but RTA did not have data to allow us to assess the criterion on the number of crashes during school zone times
- of 20 safety camera sites originally selected for speed enforcement, 15 were among those ranked with the highest number of crashes.

Exhibit 7: Fixed speed cameras at Princes Highway, Berry, and Cleveland Street, Sydney



Source: Roads and Traffic Authority, June 2011

Notes: The Berry site had a 60 km/hr speed limit during the three year review period and was classified as an urban road. It met relevant site selection criteria. RTA reduced the speed limit to 50 km/hr in 2007.

The Cleveland Street camera is a school zone camera. There were 13 crashes at this site during the three year review period, including six crashes causing injury and seven tow-away crashes. Outside school zone times the speed limit is 50 km/hr.

RTA's analysis of safety camera locations does not include vehicle speeds or the number of speed-related crashes. Therefore we cannot confirm if speeding was a problem at these sites.

RTA also provided its original analysis of over 800 former Police mobile speed camera locations. It selected 140 of these locations based on the number and severity of crashes. We tested a sample of selected sites and found that they all had crashes at these sites, and at least one fatality.

While RTA did not prioritise sites by the number of speed-related crashes, it advised that police had selected these sites initially because speeding was a problem.

In addition, we found that some mobile locations with high crash numbers have not yet had cameras deployed. RTA advises that this is partly due to there being only one camera per region. This means if a region has many high risk roads, some will not be enforced, while lower risk roads in other regions will be.

Contractor payments are not related to the number of speeding offences

RTA plans to address this in the future roll-out of the mobile speed camera program by increasing the number of cameras and locations. Enforcement hours will also increase from up to 1,000 to more than 12,000 per month. RTA advises that it used Victoria's mobile camera program to guide its decision on the rate of enforcement hours per population.

We also reviewed the contracts for all three camera types to see whether they align with road safety objectives. We found that there are no incentives for contractors to generate more offences. That is, contractor payments do not relate to the number of speeding offences. Also RTA, not the contractor, decides site location and the roster for enforcement hours, including alternative deployment sites for mobile cameras.

2.4 Are the reasons for locations which do not meet criteria documented?

Conclusion

RTA has documented the reasons for some camera locations which are inconsistent with the site location criteria. However inadequate information means we cannot determine this for all locations.

RTA has documented the reasons for decisions on some camera locations which are inconsistent with the criteria. For example, some high risk safety camera sites were not selected because other road safety measures were more appropriate. And there were pedestrian overhead bridges already in place at some potential school zone sites.

The reasons for not deploying mobile cameras at scheduled sites are documented by contractors in their monthly performance report to RTA. These included:

- parked vehicles
- local flooding
- long grass
- vehicle crashes at sites.

RTA was unable to provide their original analysis for all fixed speed cameras, including school zone cameras. Therefore we cannot determine whether the reasons for sites that were inconsistent with the criteria were appropriate. Documenting this would help RTA justify its decisions on camera locations.

Recommendation

We recommend that the Roads and Traffic Authority document the reasons for all future camera decisions where the location is inconsistent with site selection criteria.

2.5 Does RTA review potential high risk and existing sites?

Conclusion

Reviews identifying potential high risk sites for safety cameras and mobiles were undertaken, but there is limited routine monitoring of existing camera sites for continued suitability.

The RTA has continued to review potential high risk locations for safety and mobile cameras. This included:

- reassessing existing red-light camera locations for the roll-out of safety cameras
- analysing crash data on all roads across NSW for its mobile camera program to identify high risk sites that were not former Police sites.

However RTA has not continued to review potential fixed camera sites after the majority were installed. RTA should consider this when developing its overarching strategy for its speed camera programs.

Regular reviews of existing sites are needed

Reviewing existing sites is also important to determine if changes in the operation or location of cameras are needed to improve road safety. We found that RTA has undertaken two evaluations of fixed speed cameras that assessed the impact of each camera. This included a review in 1999 of the first two cameras in NSW, and a 2011 review of 141 fixed camera locations. Mobile speed camera contractors also submit monthly performance reports to RTA which include site deployment issues.

RTA advises it conducts ad-hoc monitoring of vehicle speeds at some fixed speed camera sites to determine if more signs are needed to ensure drivers are aware of the camera. RTA has also deactivated a number of cameras on main highways following road upgrades. However it does not routinely monitor crash or speeding data for cameras at their existing sites to see if changes in the operation or location are needed.

Recommendation

We recommend that by December 2011, the Roads and Traffic Authority annually review existing site locations to check if speed cameras are still appropriate.

The number of fines trend downward following camera installation

Cameras do not change the behaviour of high level speeders

3. Do speed cameras reduce speeding and road crashes?

3.1 Do speed cameras improve road safety in NSW?

Conclusion

Overall speeding and crashes reduced after the introduction of fixed speed cameras. The results are mixed when examining individual cameras, with crashes decreasing at some locations but not at others. Safety and mobile speed camera programs are too new to conclude with any assurance, although early results indicate drivers may be speeding less.

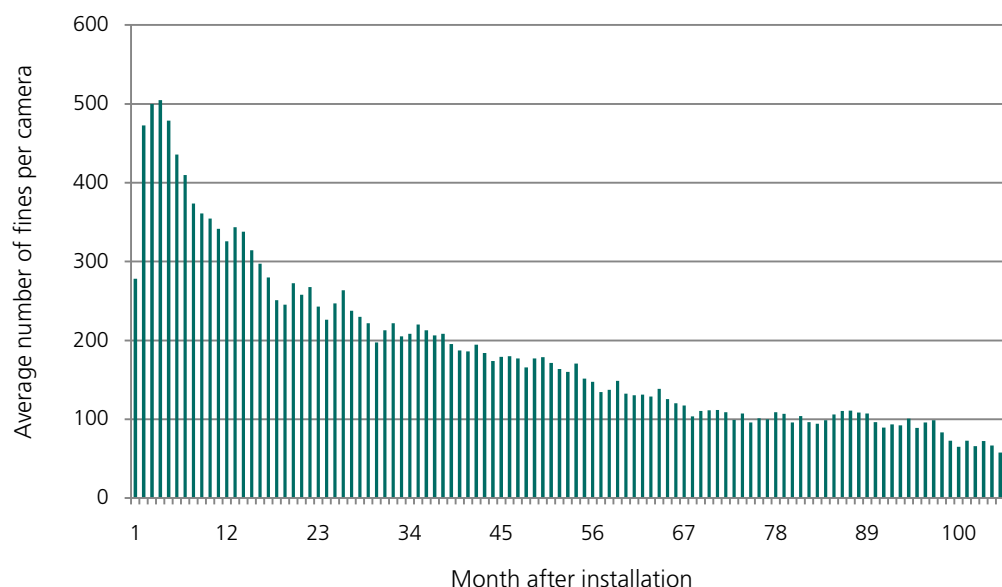
Ultimately, the aim of any speed camera program is to make our roads safer by reducing speeding and therefore the number and severity of vehicle crashes.

Speeding

RTA does not regularly monitor vehicle speeds at camera locations, therefore we cannot say whether average vehicle speeds reduced at these sites. However, as an alternative measure, we examined data on speeding fines issued after the introduction of fixed, safety and mobile cameras. We found that for fixed and safety cameras:

- the number of speeding fines reduced after installation which means less people are driving above the speed limit at these locations
- the number of fines in each speed band reduced after installation, except for offences involving speeds of more than 45 km/hr over the speed limit.

Exhibit 8: Speeding fines per camera following installation of fixed speed cameras



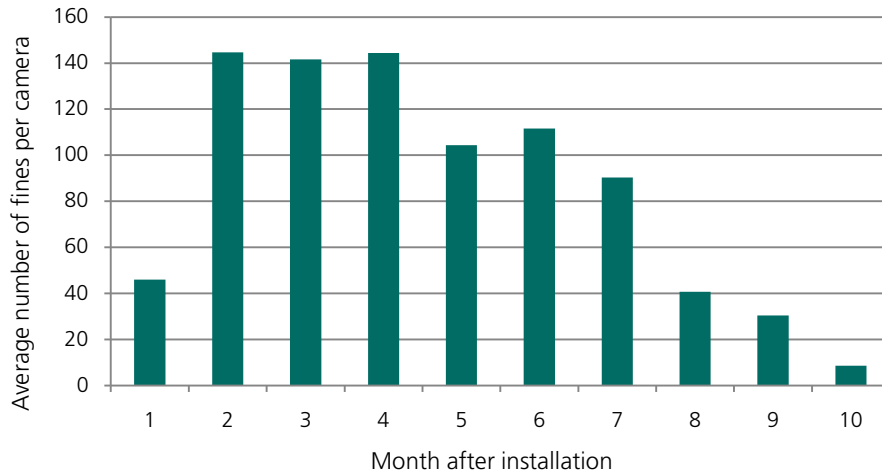
Source: Audit Office analysis of fine data from the State Debt Recovery Office

Note: Data has been normalised to factor in the different number of cameras issuing fines each month. Data does not include months where cameras did not issue infringements.

Although there are relatively few drivers speeding more than 45 km/hr over the limit, our findings suggest cameras are less likely to change the behaviour of people driving at these speeds. Such behaviour is more likely to cause crashes involving death or injury. See Appendix 3 for graphs on the number of fines issued for each speed band at fixed cameras.

KEY FINDINGS

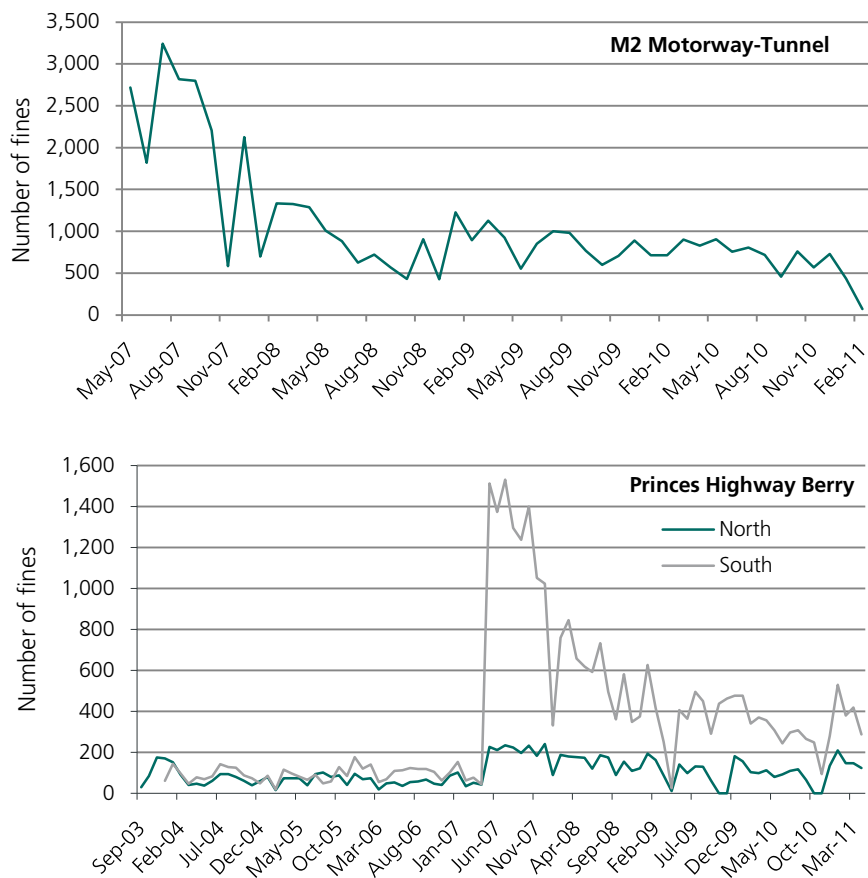
Fines reduced over time for 10 of the 14 fixed cameras of most concern in our survey

Exhibit 9: Speeding fines per camera following installation of safety cameras

Source: Audit Office analysis of fine data from the State Debt Recovery Office

Notes: Data has been normalised to factor in the different number of cameras issuing fines each month. Data does not include months where cameras did not issue infringements. Safety cameras have been operating since mid-2010.

While the reduction in fines is a good result overall, the results for individual cameras vary. This means not all cameras show a downward trend. Of the 14 cameras the public were most concerned about in our survey, ten show a downward trend in the number of fines issued. A metropolitan and a regional camera are shown below. See Appendix 4 for the remaining cameras.

Exhibit 10: Speeding fines since installation of M2 and Berry speed cameras

Source: Audit Office analysis of fine data from the State Debt Recovery Office

Note: M2 camera was deactivated in February 2011. RTA advises the increase in fines in 2007 at Berry coincided with a speed limit reduction from 60 to 50 km/hr.

The reduction in fines is more variable for mobile cameras

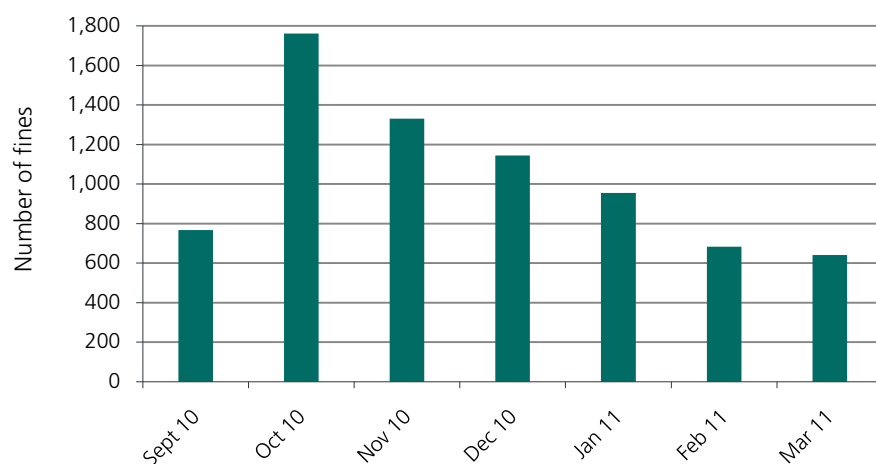
Unlike fixed and safety cameras, which do not change location, mobile speed cameras change location each session. Mobile cameras aim to reduce speeding across the road network. This is because drivers cannot predict their location and may reduce speeding at all times rather than only when approaching a known camera.

While RTA does not monitor vehicle speeds for individual camera locations, it reviews vehicle speeds across the road network. It found that the proportion of vehicles exceeding the speed limit reduced in 2010 after it introduced mobile speed cameras.

This is an encouraging result, although it is difficult to say whether this reduction is due to mobile cameras alone. For example, it may be due to other initiatives to reduce speeding such as public education campaigns and road improvements. RTA should also consider comparing vehicle speeds on roads where mobile cameras operated with other roads to see where drivers are slowing down across the road network.

RTA recently reviewed mobile camera infringements and found that the total number issued each month is declining. However our analysis of speeding fines suggests their impact at each location, at this early stage of their roll-out, is less clear.

Exhibit 11: RTA analysis of mobile camera speeding infringements

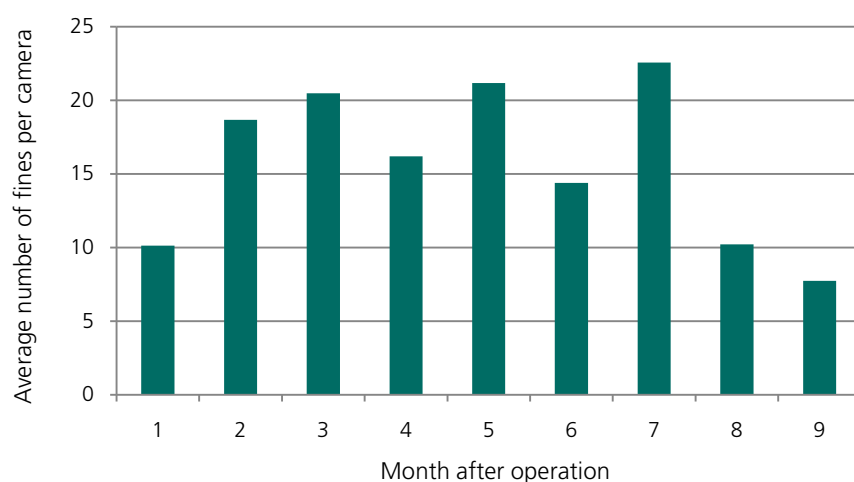


Source: NSW Speed Camera Review, RTA, May 2011

Notes: RTA advises that cameras were deployed for 930 hours each month, except for September 2010 because operational issues affected the number of infringements issued.

Infringements relate to the number of speeding offences before culling for factors such as image clarity. Therefore some infringements may not become fines.

Exhibit 12: Speeding fines per camera location following introduction of mobile cameras



Source: Audit Office analysis of fine data from the State Debt Recovery Office

Notes: Data has been normalised to factor in the different number of cameras issuing fines each month. Data does not include months where cameras did not issue infringements. Mobile cameras have been operating since July 2010.

RTA found total crashes and injuries reduced by 26% and fatalities by 67% 3 years after installation of fixed speed cameras

RTA plans to review and relocate 38 fixed speed cameras

The monthly average number of fines shows more variation. This could be because mobile cameras regularly move location. RTA also advises that it could be due to low enforcement hours compared to fixed cameras. This suggests that more time is needed to assess the impact of mobile cameras on speeding.

In Victoria the mobile speed camera program has been in place since the 1990s. A 2006 review found that the proportion of vehicles detected speeding reduced over time, even though enforcement hours increased.

Crashes

Overall it appears that speed cameras help reduce speeding, however do they also reduce crashes? This is RTA's key measure of success for speed cameras. To find out we reviewed crash data before and after speed camera installation for fixed, safety and mobile cameras.

We found that the total number of crashes reduced after installation of fixed speed cameras. However, as safety and mobile cameras were only rolled out from mid-2010 it is too early to assess the impact of these cameras. Early results show no significant improvement in the crash rate at each location at this stage.

Most fixed speed cameras have been in place for more than eight years. RTA's recent analysis of crashes at fixed speed camera locations shows the total number of crashes, fatalities and injuries reduced three years after installation.

Exhibit 13: Fixed speed camera crash results

	3 years pre-installation	3 years post-installation	% change
Total crashes	3,053	2,257	-26
Fatalities	36	12	-67
Injuries	1,625	1,203	-26

Source: Crash Analysis of the NSW Fixed Speed Camera Program, RTA, May 2011
Notes: Total crashes include fatal crashes, crashes causing injury, and non-fatal/non-injury crashes. Fatalities refer to the number of deaths. Injuries refer to the number of people injured.

Our road safety consultant reviewed RTA's analysis and found the overall reductions in crashes, fatalities and injuries were statistically significant. This means there was a real reduction in road safety risk as a result of fixed cameras overall.

Although the total number of crashes reduced, the results varied for individual camera locations with crashes, injuries or fatalities increasing at some while decreasing at others. Of 141 fixed speed camera locations, RTA assessed 93 as effective with a clear road safety benefit. Section 3.3 outlines RTA's definition of an effective camera. Another ten cameras were recently installed or road conditions had changed so it was too soon for RTA to determine their impact.

RTA proposes to review and relocate the remaining 38 cameras. See Appendix 6 for a list of these cameras. We support this, although we think a longer term analysis should be undertaken before final decisions are made. Our road safety consultant found that only 40 camera locations had statistically significant reductions. This is because RTA's review period of three years is too short to take into account the chance variation in crashes.

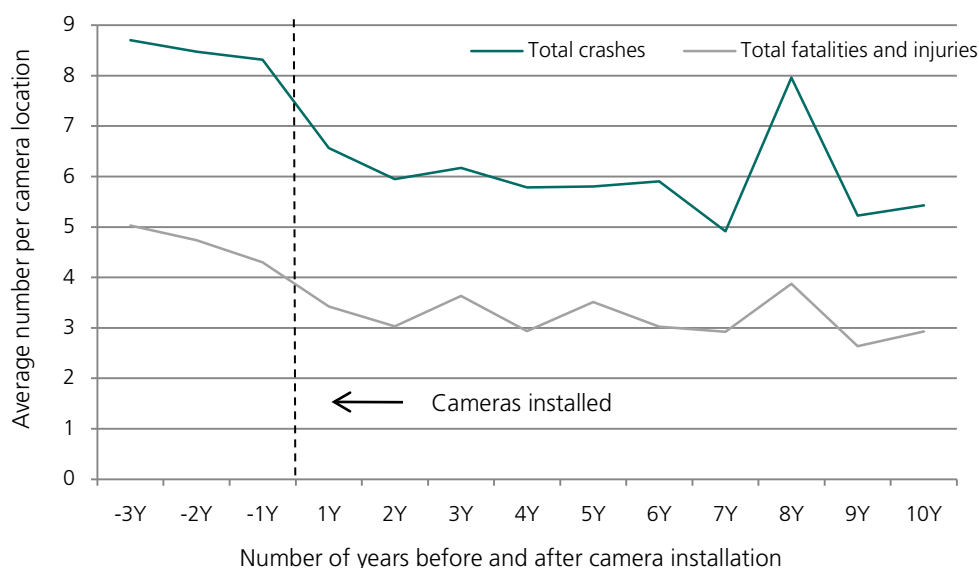
In addition, five of the cameras RTA judged effective are located in tunnels. RTA advises that it did not examine post-installation crash data for these sites because there is no pre-installation data for comparison. It also advised that only a small number of crashes occur in tunnels. Yet we think this would still be useful to determine if crash rate trends have changed.

We also examined long term trends to see if the overall reduction in crashes has been sustained for fixed speed cameras. We found that the number of crashes, fatalities and injuries reduced after camera installation and stayed low in the years after, except for a spike in year eight.

RTA says the increase in year eight reflects a rise in the annual road toll in 2009 which occurred because there were no mobile cameras and demerit points reduced for low level speeding. Our consultant advised that more research is needed before such conclusions can be made.

Long term
reductions in
crashes have been
maintained

Exhibit 14: Crashes, fatalities and injuries pre and post fixed speed camera installation



Source: Audit Office analysis of crash data from the Roads and Traffic Authority

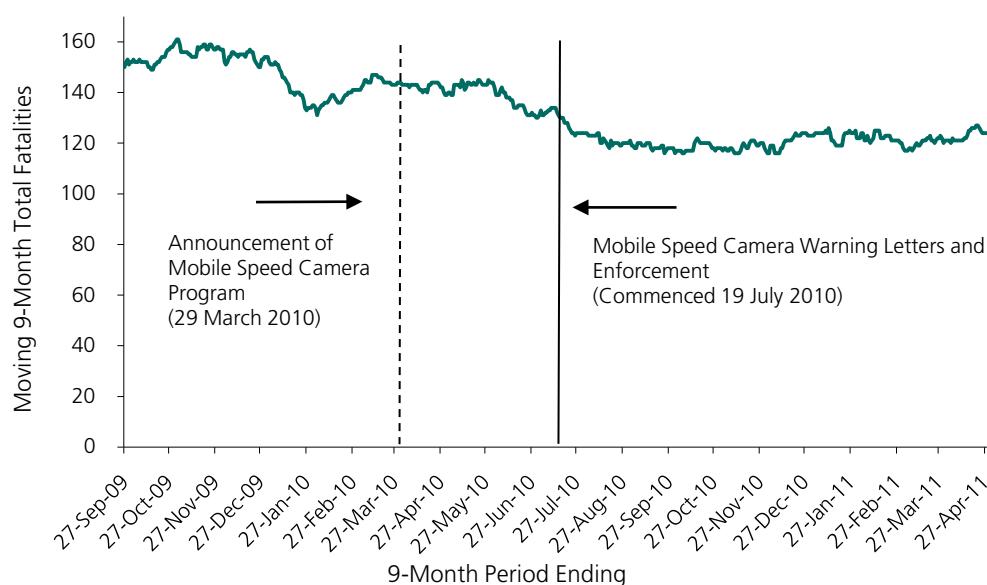
Notes: Data has been normalised to factor in the different number of cameras operating each year. Total crashes include fatal crashes, crashes causing injury, and non-fatal/non-injury crashes. Fatalities refer to the number of deaths. Injuries refer to the number of people injured.

While crashes appear to be falling in the three years before installation, our consultant advises that this time period is too short to determine a reliable trend.

Again the results varied for individual cameras, with some showing little impact in the immediate years after installation, with crashes either increasing or declining. See Appendix 7 for a list of crash results for the fixed speed cameras the public are most concerned about.

As previously discussed, the aim of mobile cameras is to reduce speeding across the road network, rather than a specific location as for fixed cameras. RTA recently reviewed crash data across NSW to see if mobile cameras were having an impact. It found that total speed-related fatalities reduced after their introduction.

Exhibit 15: Total speed-related fatalities in NSW, 2009-11 (moving 9 month results)



Source: NSW Speed Camera Review, RTA, May 2011

As with the annual speed survey results, it is not possible to say whether this reduction is the result of mobile cameras alone, or other factors.

There is no evidence that revenue is a factor in camera location decisions

Recommendations

We recommend that by September 2011, the Roads and Traffic Authority:

- assess the crash impact of existing fixed speed cameras for a minimum of five years post installation
- where there has been no significant impact consider an alternative camera site and other road safety treatments for that site.

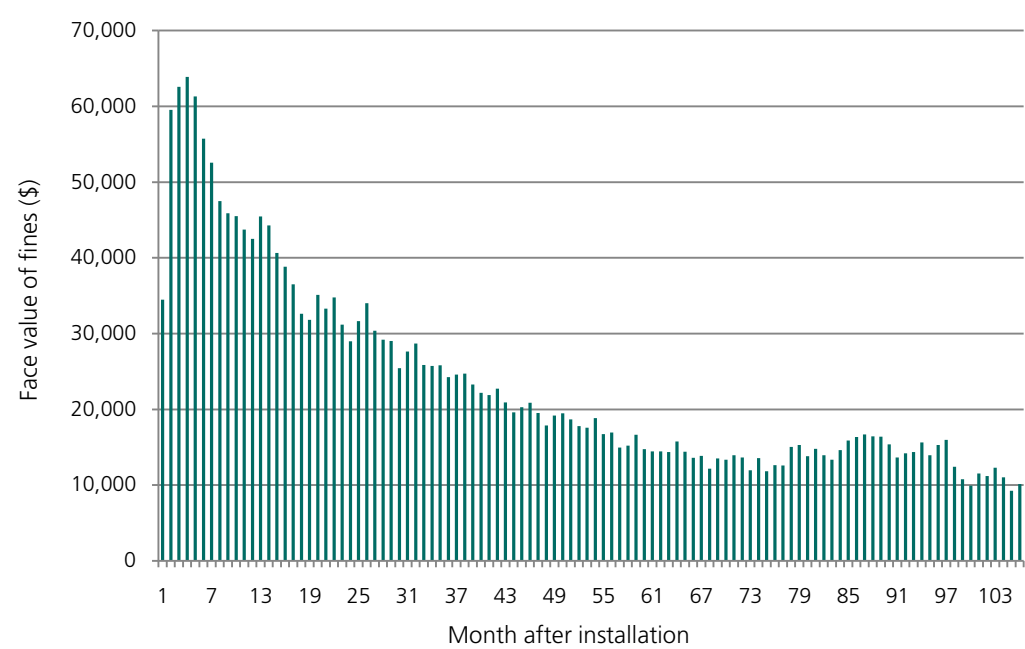
3.2 Does fine revenue from speed cameras reduce after installation?

Conclusion

Fine revenue from speed cameras reduces the longer they are in operation.

We found that the face value of fines from fixed speed cameras declines the longer they have been operating. We would therefore expect revenue collected to also decline. It is too early to judge the long-term trends for mobile and safety cameras, although initial results suggest a similar pattern is emerging.

Exhibit 16: Face value of speeding fines issued from fixed speed cameras



Source: Audit Office analysis of fine data from the State Debt Recovery Office
 Note: Data has been normalised to factor in the different number of cameras issuing fines each month. Data does not include months where cameras did not issue infringements.
 The face value of fines differs from revenue actually collected. This is because some people might not pay or successfully appeal fines.

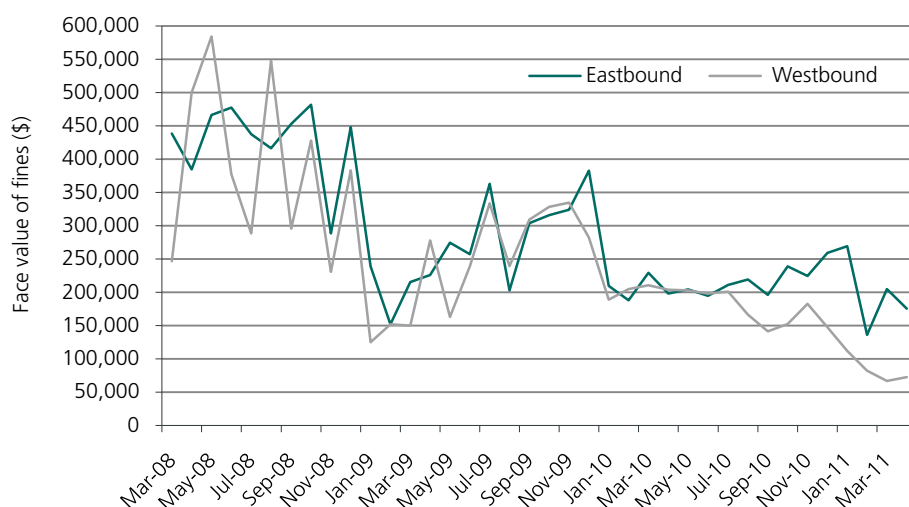
See Appendix 5 for data on the face value of fines for mobile and safety cameras, and Appendix 8 for information on the trends in the total face value of fines from all cameras.

We found no evidence that potential revenue is a factor in decisions on where cameras are located. The site selection criteria for all camera types focus on road safety.

We examined fine data for the cameras on Cleveland Street, Moore Park in Sydney which are reported to be the highest revenue-raisers in NSW. We found that the face value of fines has been declining since installation, which reflects the statewide trend.

The face value of fines decline the longer speed cameras operate

Exhibit 17: Face value of speeding fines issued from the Moore Park cameras, Sydney



Source: Audit Office analysis of fine data from the State Debt Recovery Office

3.3 Is an evaluation framework in place to assess camera effectiveness?

Conclusion

RTA has developed an evaluation framework for all camera types. However, it has not developed performance measures for assessing the effectiveness of its safety and mobile cameras. And it is unclear whether the evaluation framework for fixed cameras is still current.

RTA developed an evaluation framework to assess the impact of its fixed speed cameras in early 2000. This included speed surveys, crash and injury analysis, and community attitude surveys. RTA reported against this framework in 2005, but it has not done so since.

As part of its recent crash analysis of fixed cameras, RTA defined an effective speed camera in terms of its impact on crash rates and fatalities.

Exhibit 18: Definition of an effective fixed speed camera

An effective camera must meet one of the following criteria:

- have less casualties, the same or less number of crashes, and no fatalities when comparing three years before and after installation
- have less crashes, the same number of casualties, and no fatalities when comparing three years before and after installation
- if there is one or more fatality in the three years before and after installation, the combined community cost of fatalities and injuries must be less after installation
- is installed in a tunnel which means emergency services will have problems accessing the site.

The RTA will review and, if necessary, relocate fixed speed cameras which do not meet these criteria.

Source: Crash analysis of the NSW Fixed Speed Camera Program, RTA, May 2011

Given speed camera programs aim to reduce speeding, RTA should also consider including reduced vehicle speeds as a key performance measure. This could include changes in average and excessive vehicle speeds, or the number of infringements issued after installation.

Periodic evaluations are conducted but no routine review of individual cameras

Cameras within tunnels are automatically judged effective due to access problems should a crash occur. Crash data is not analysed. RTA advises that while the number of crashes in tunnels is relatively low, the confined space can result in more severe crashes and greater disruption to traffic.

RTA recently developed an evaluation framework for its Road Toll Response Package which includes mobile and safety cameras. However it does not include performance measures or targets regarding camera effectiveness in improving road safety. RTA advises it plans to complete this in future. This could be developed as part of the overarching strategy on speed cameras discussed in section 2.1.

Recommendation

We recommend that, as part of the overarching strategy on speed cameras, the Roads and Traffic Authority defines how the effectiveness of each camera type will be assessed, including the analysis timeframe, and key performance indicators on vehicle speed, infringements, and crash severity.

3.4 Does RTA monitor data on the effectiveness of each speed camera?

Conclusion

RTA does not routinely monitor the effectiveness of its speed cameras. However it has periodically reviewed its fixed cameras and recently reviewed its mobile camera program.

RTA has completed three evaluations of fixed speed cameras and a preliminary study of its mobile speed cameras. This included:

- an evaluation of the Burringbar and Sydney Harbour Tunnel fixed speed cameras, 1999
- an evaluation of the initial 28 fixed digital speed cameras in NSW, 2005
- crash analysis of NSW fixed speed cameras, May 2011
- a review of the mobile speed camera interim program, May 2011.

Formal evaluations are important in assessing overall program performance. But routine monitoring of the effectiveness of each camera is also important to promptly identify any changes in camera operation or location. Monitoring may include vehicle speeds, the number of infringements, crash data, and changing road or traffic conditions.

However, we found that RTA does not regularly monitor data on crashes and speeds at each camera site before and after installation. RTA agrees that this is important, but would prefer to monitor speeding infringements rather than vehicle speeds because this is more easily available.

Recommendation

We recommend that by March 2012, the Roads and Traffic Authority annually monitor the effectiveness of individual speed cameras.

3.5 Is information on the road safety impact of each camera publicly available?

Conclusion

Information on the road safety impact of each speed camera is not publicly available, although data on fines and revenue per camera is published by the State Debt Recovery Office.

There is currently no publicly available information on speeding or crash results for each speed camera. RTA published its 2005 evaluation on fixed speed cameras, but it did not include the results for individual cameras.

RTA plans to update its website to include more information on road safety. We believe that it should also include speeding and crash results for each camera.

The Victorian Government recently launched a new website on its speed camera programs. Although it does not include data on speeding or crash rates per camera, it is a convenient one-stop-shop for all information on speed cameras.

Exhibit 19: Victorian Government website *Cameras Saves Lives*

In April 2011 the Department of Justice launched its *Cameras Saves Lives* website. The website includes information on speed cameras including:

- the relationship between speed and road trauma
- camera testing and verification of infringements
- technical details about how cameras work
- a list of camera locations (fixed and mobiles).

It will also publish quarterly speed and red-light camera statistics, including:

- the dollar value of camera infringements
- camera locations with the highest number of infringements
- the number of infringements by speeding offence category
- the number of people who receive official warnings.

Source: www.camerassavelives.vic.gov.au

NSW residents can find information on the number and value of speeding fines for individual cameras on SDRO's website. However this does not show trends since camera installation, which would make it easy for the public to see their impact on speeding. When updating its website, RTA should include analysis of fine data for each camera over time to show changes in driver behaviour.

Recommendation

We recommend that by June 2012, the Roads and Traffic Authority publicise trends in crashes, revenue, and speeding or infringement data, for each camera, and update this annually.

There is no public information on the impact of each speed camera

Appendices

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NSW Auditor-General's Report

Improving road safety:

Speed cameras

APPENDICES

Appendix 1: Public survey feedback on speed cameras

Statewide

Top 10 'of concern' in NSW	Top 10 'improving road safety' in NSW
1. M2 Tunnel-M2 Motorway, Terry Creek and Norfolk Road	1. Sydney Harbour Tunnel, Cahill Expressway and Warringah Freeway
2. Sydney Harbour Tunnel, Cahill Expressway and Warringah Freeway	2. M2 Tunnel-M2 Motorway, Terry Creek and Norfolk Road
3. Lane Cove Tunnel, Mowbray Road and the Pacific Highway	3. Bankstown, Hume Highway, Rookwood Road and Stacey Street (school zone)
4. F3 Freeway, Ourimbah, Dogtrap Road Overpass and Ourimbah Creek Road	4. F3 Freeway, Ourimbah, Dogtrap Rd Overpass and Ourimbah Creek Road
5. The Spit, Spit Road, Parriwi Road and Upper Spit Road	5. Lane Cove Tunnel, Mowbray Road and the Pacific Highway
6. Moore Park, Cleveland St, Anzac Parade and South Dowling Street (school zone)	6. Wollongong, Princes Highway, Mt Keira Road and Highway Ave (school zone)
7. F3 Freeway, Bar Point, Jolls Bridge and Mount White Exit Ramp	7. The Spit, Spit Road, Parriwi Road and Upper Spit Road
8. Mascot, General Holmes Drive, Foreshore Road and M5 East Motorway	8. Bulli, Princes Highway, Grevillea Park Road and Black Diamond Place
9. M4 Motorway, Wentworthville/Greystanes, between Coleman Street and Cumberland Highway Overpasses	9. Liverpool, Bigge Street, Elizabeth Drive and Campbell Street (school zone)
10. Auburn, Parramatta Rd, Harbord Street and Duck Street	10. North Parramatta/Oatlands, Pennant Hills Rd, Masons Dr and Suttor Avenue (school zone)

Source: Audit Office analysis of public survey results

In each RTA region

Top camera 'of concern'	Region	Top camera 'improving road safety'
M2 Tunnel-M2 Motorway, Terry Creek and Norfolk Road	Sydney/ Blue Mountains	Sydney Harbour Tunnel, Cahill Expressway and Warringah Freeway
F3 Freeway at Ourimbah, Dogtrap Rd Overpass and Ourimbah Creek Road	Newcastle/ Hunter	F3 Freeway, Ourimbah, Dogtrap Road Overpass and Ourimbah Creek Road
Princes Highway, Berry, Kangaroo Valley Road and Victoria Street	Wollongong/ Illawarra	Wollongong, Princes Highway, Mt Keira Road and Highway Ave (school zone)
Hume Highway, Tarcutta, Tonja Settlement Road and Dellateroi Creek	Southern	Hume Highway, Tarcutta, Tonja Settlement Road and Dellateroi Creek
Pacific Highway, Macksville, Florence Wilmont Drive and Watt Creek	Northern/ Pacific	Pacific Highway, Macksville, Florence Wilmont Drive and Watt Creek
New England Highway, Murrurundi, Bernard and Adelaide Street	Northern/ New England	New England Highway, Scone, Eveleigh Circuit and Forbes Street

Source: Audit Office analysis of public survey results

Appendix 2: Number of speed cameras and types of speeding offences: interstate comparison

Number of cameras

Type	NSW	Victoria	Western Australia	Queensland	South Australia
Fixed	172 in 141 locations	62 plus 10 point-to-point	6 (planned)	9 plus 4 in a tunnel	1 - speed only
Mobile	6 deployed across 140 locations (currently up to 1,000 hours per month)	85 (up to 9,300 hours per month)	23 tripod or in-car, 14 hand held (KPI - 3,000 hours per month)	50 (6,215 hours per month)	18 (KPI - 3,060 hours per month)
Safety	Currently 77 - red light/speed	175	23 - red light/speed (plus 7 to be installed)	0	77 - red light/speed

Speeding offences and penalties

State	Excess speed band (km/hr)	Fine \$	Demerit points	Excess speed band (km/hr)	Fine \$	Demerit points	Excess speed band (km/hr)	Fine \$	Demerit points	Excess speed band (km/hr)	Fine \$	Demerit points	Excess speed band (km/hr)	Fine \$	Demerit points
NSW	10 & under	90	1	Over 10 to 20	211	3	Over 20 to 30	361	4	Over 30 to 45	692	5	Over 45	1,865	6
NSW	10 & under (school zone)	150	2	Over 10 to 20 (school zone)	271	4	Over 20 to 30 (school zone)	451	5	Over 30 to 45 (school zone)	892	6	Over 45 (school zone)	1,987	7
VIC	Under 10	153	1	10 to under 25	244	3	25 to under 30	336	4	30 to under 35	397	4	35 to under 40	458	6
QLD	Under 13	133	1	13 to 20	200	3	Over 20 to 30	333	4	Over 30 to 40	466	6	Over 40	933	8
WA	Not more than 9	75	0	Over 9 not more than 19	150	2	Over 19 not more than 29	150	3	Over 29 not more than 40	300	5	Over 40	1,000	7
SA	Under 15	196	1	15 to under 30	312	3	30 to under 45	468	4	45 and over	564	6			

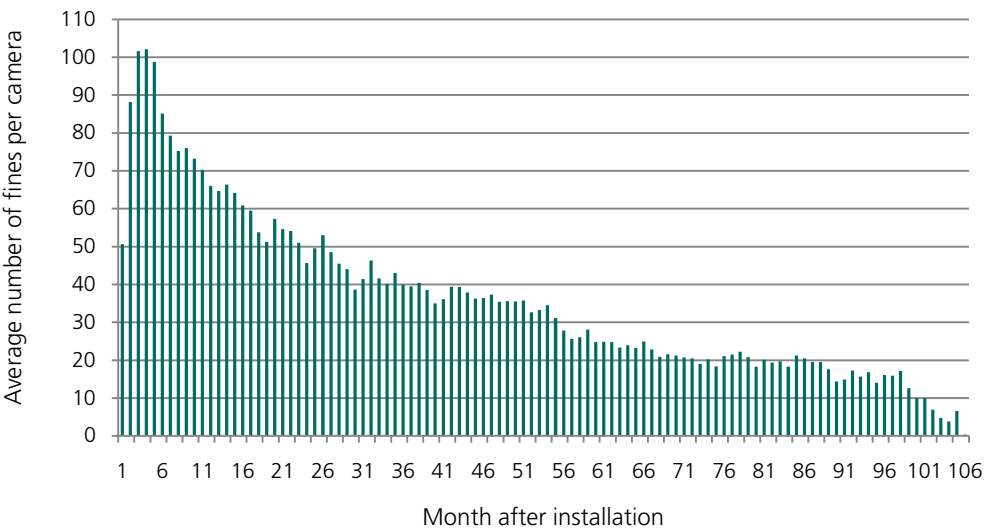
Source: Audit Office research of other jurisdictions.

Notes: In Victoria additional licence suspension penalties apply when driving more than 25 km/hr over the speed limit, starting at one month suspension.

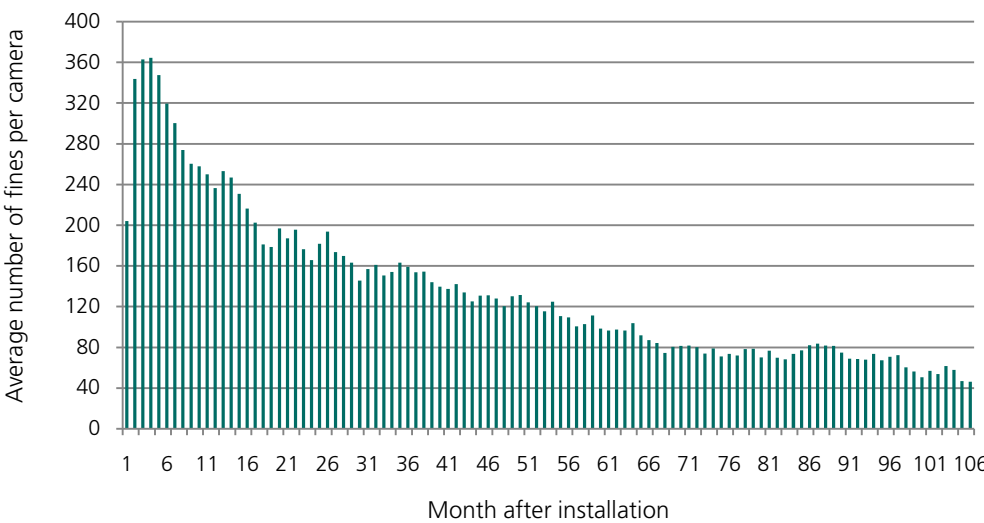
In Western Australia police can impound the vehicles of drivers who exceed the speed limit by more than 45 km/hr, and the driver is also charged and the matter referred to court.

Appendix 3: Speeding fines by speed band for fixed speed cameras

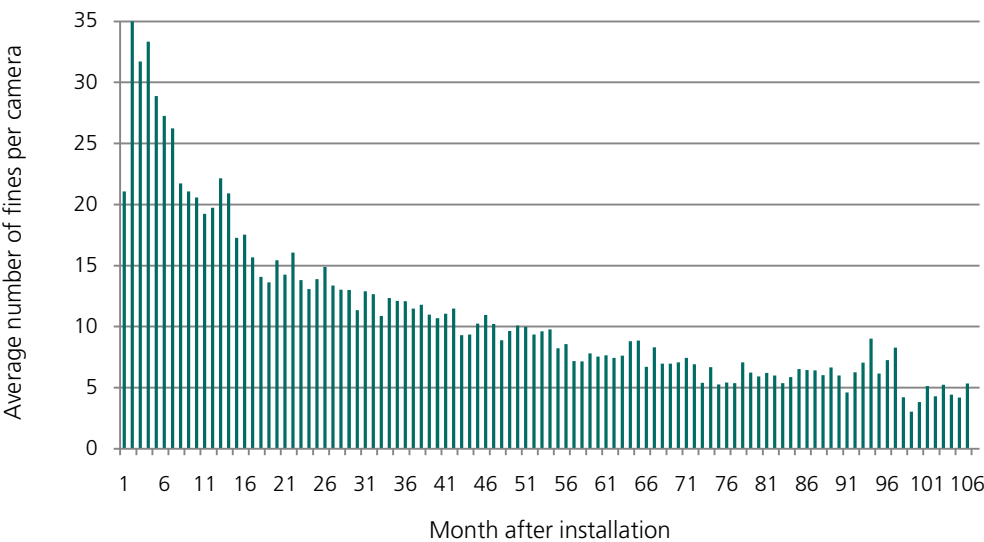
Fines issued for driving 1-10 km/hr above the speed limit



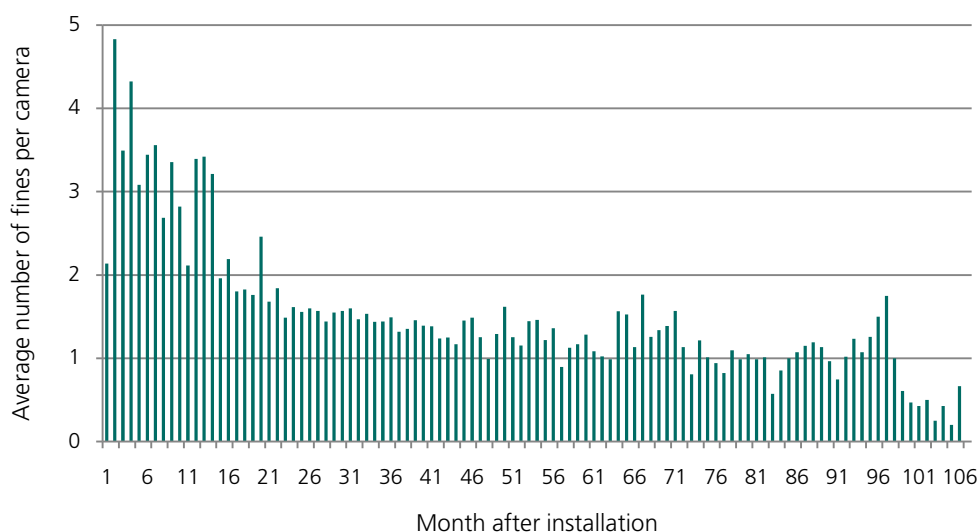
Fines issued for driving 11-20 km/hr over the speed limit



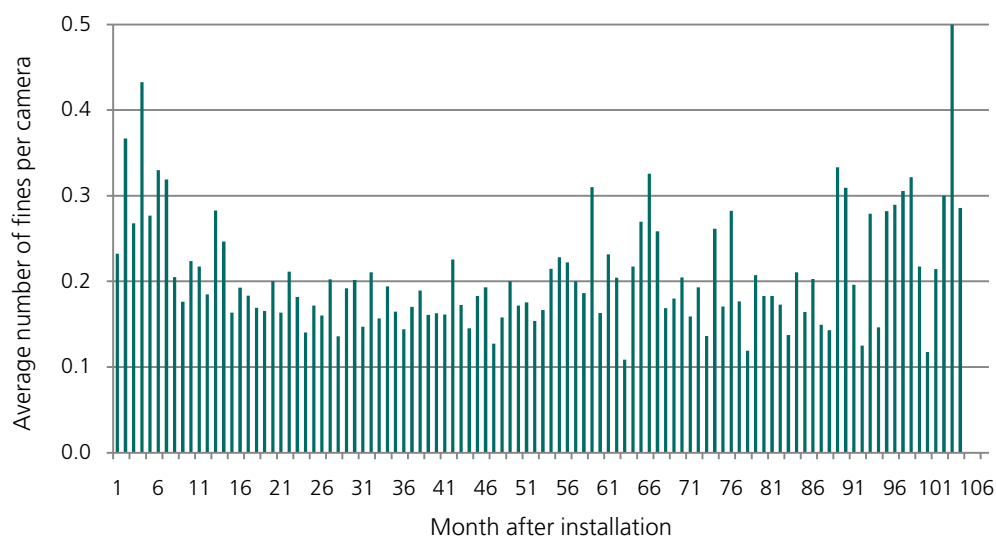
Fines issued for driving 21-30 km/hr above the speed limit



Fines issued for driving 31-45 km/hr above the speed limit



Fines issued for driving more than 45 km/hr above the speed limit

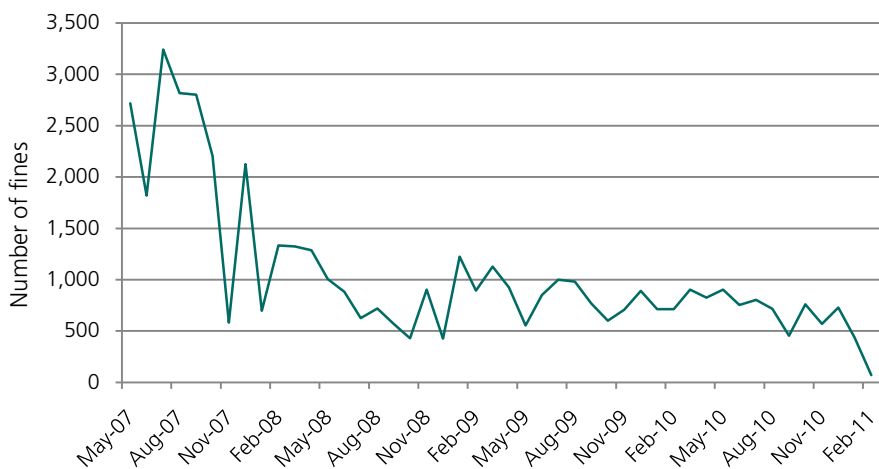


Source: Audit Office analysis of SDRO fine data

Note: Data has been normalised to factor in the different number of cameras issuing fines each month. Data does not include months where cameras did not issue infringements.

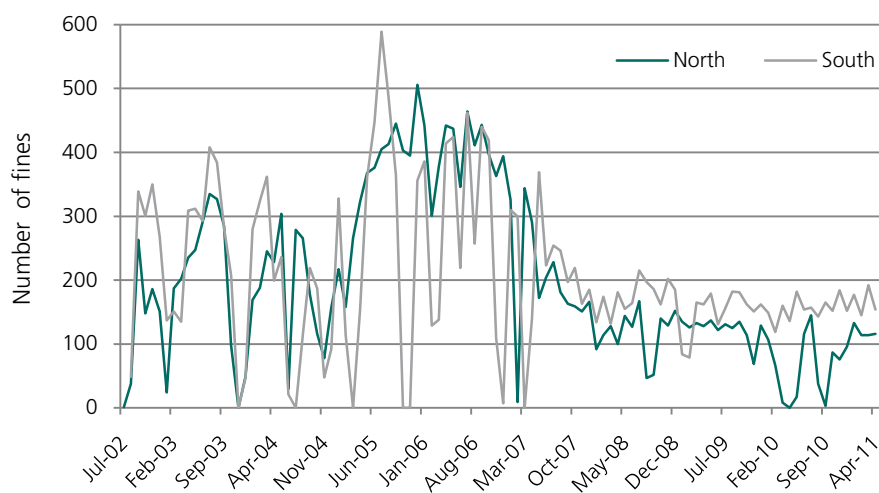
Appendix 4: Speeding fines by fixed speed camera: public survey cameras

M2 Motorway-Tunnel



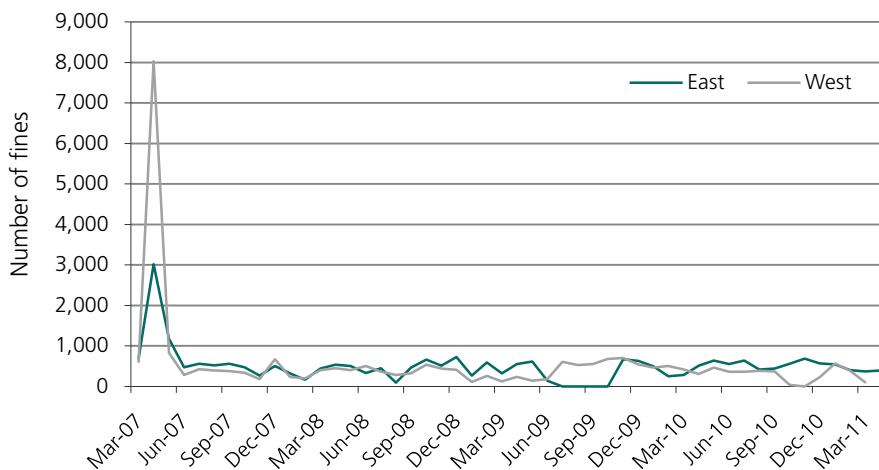
Note: Camera deactivated in February 2011.

Sydney Harbour Tunnel

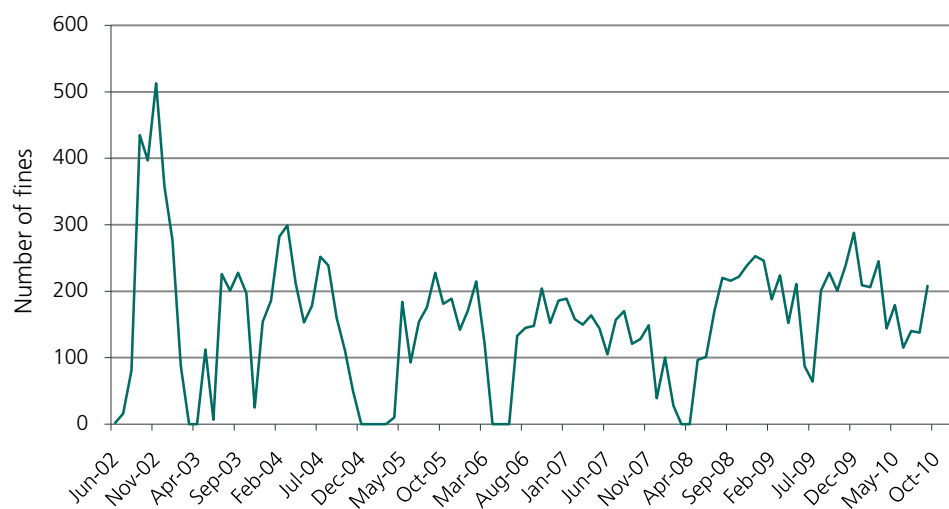


Note: Camera installed in 1997 therefore this does not represent the full operational history.

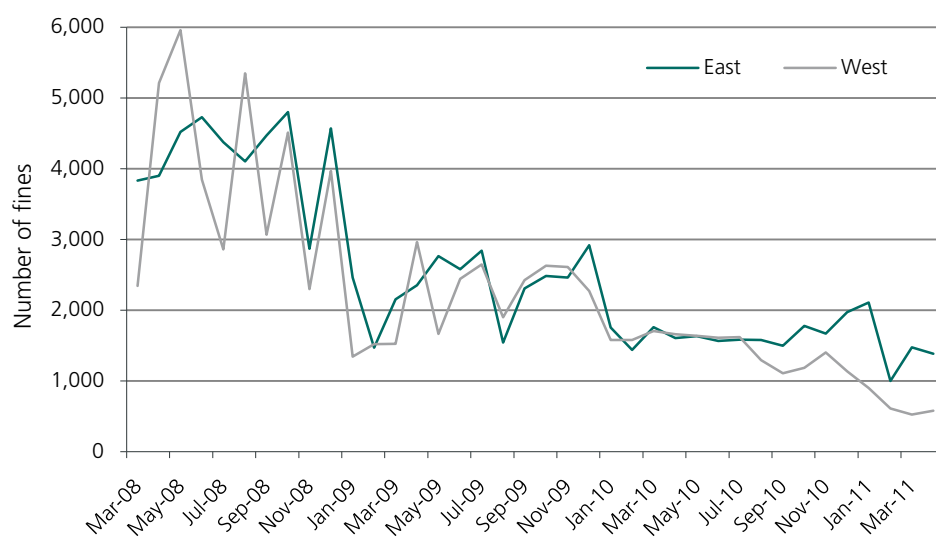
Lane Cove Tunnel



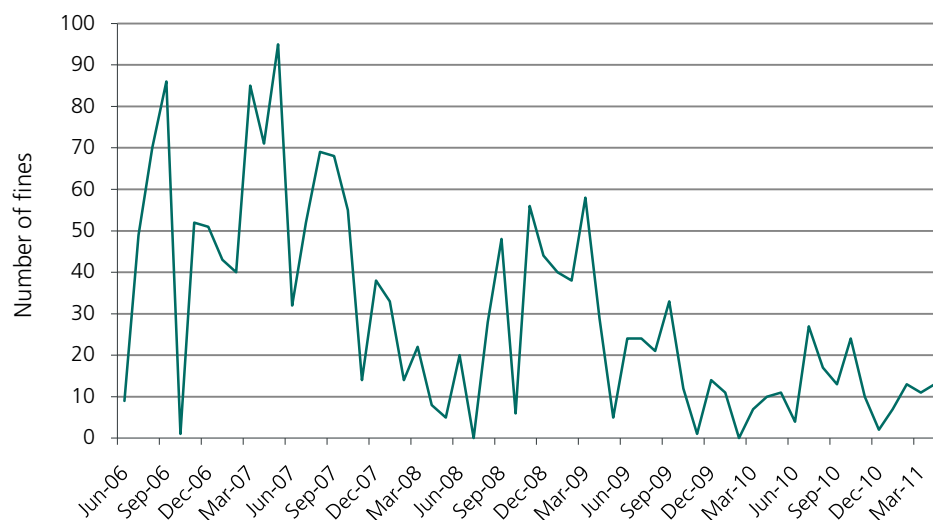
F3 Ourimbah



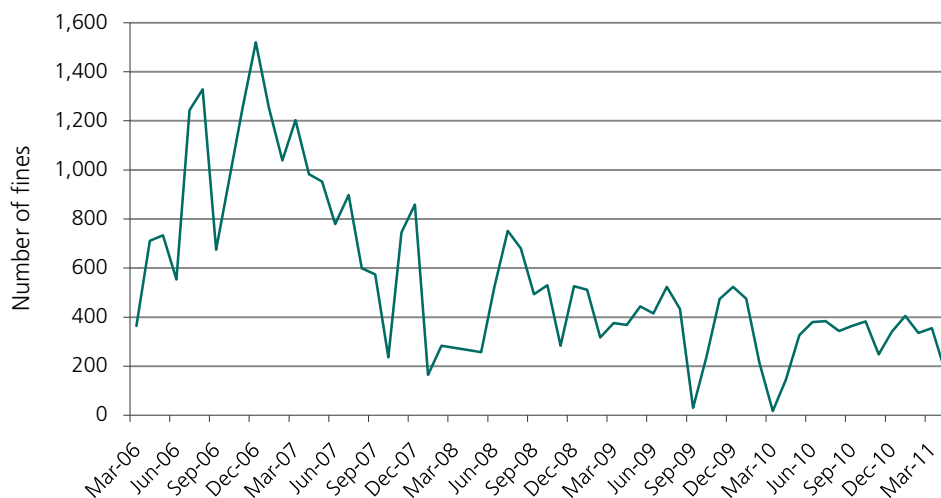
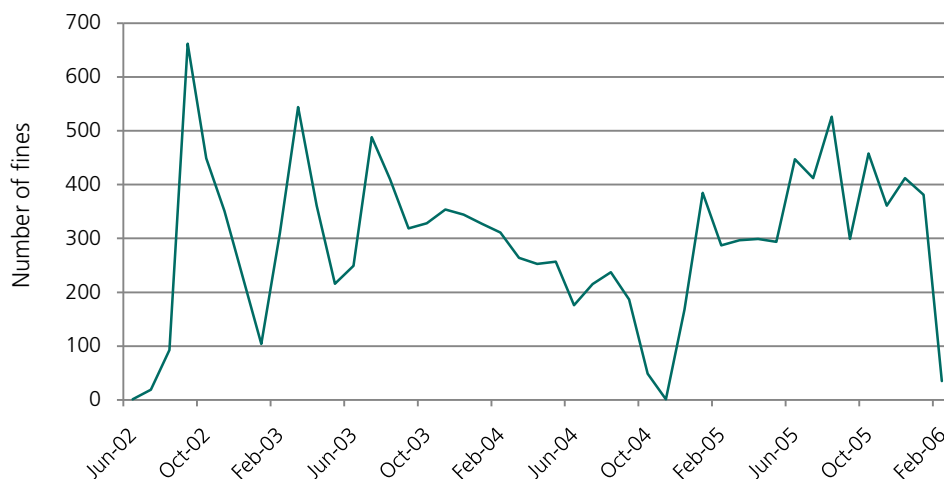
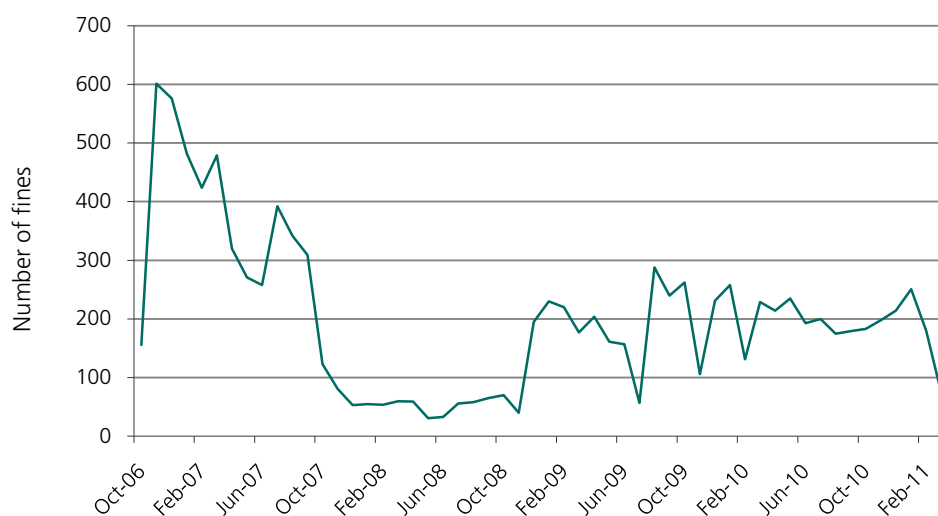
Moore Park Cleveland Street



F3 (Bar Point) North

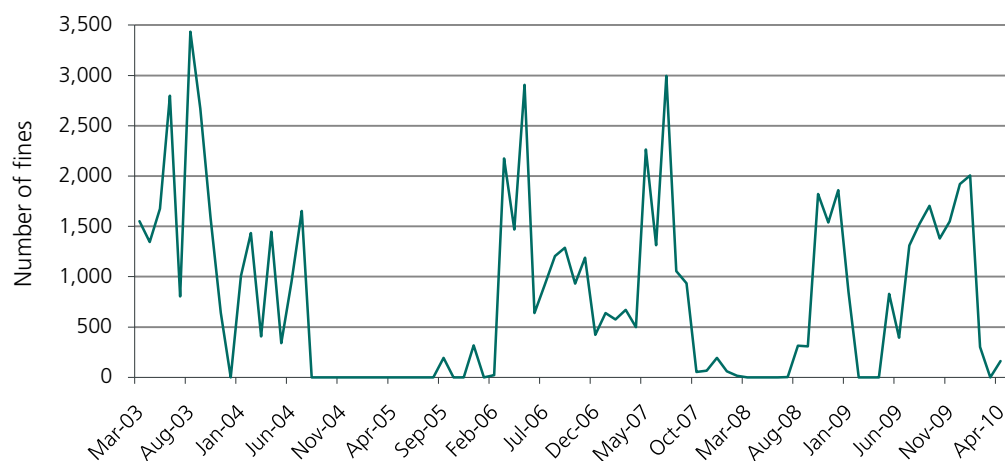


Note: RTA advises that this camera was introduced at the same time as a variable speed limit ie 100 km/hr in dry weather and 90 km/hr in wet weather.

Spit Road, The Spit Mosman, South bound**Spit Road Beauty Point North bound DP****Spit Road Beauty Point North bound**

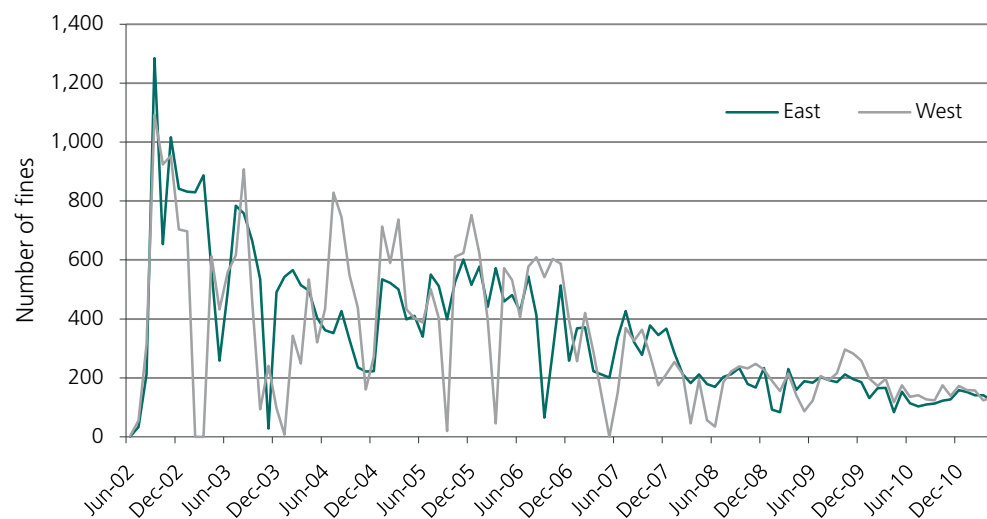
Note: The Spit Road camera at Mosman relates to our survey results. However we included Beauty Point as RTA combined these camera locations for their crash analysis. RTA advises that the two north bound Beauty Point graphs relate to one speed camera which was upgraded in 2006 and therefore has different SDRO location identifiers.

Mascot General Holmes Drive

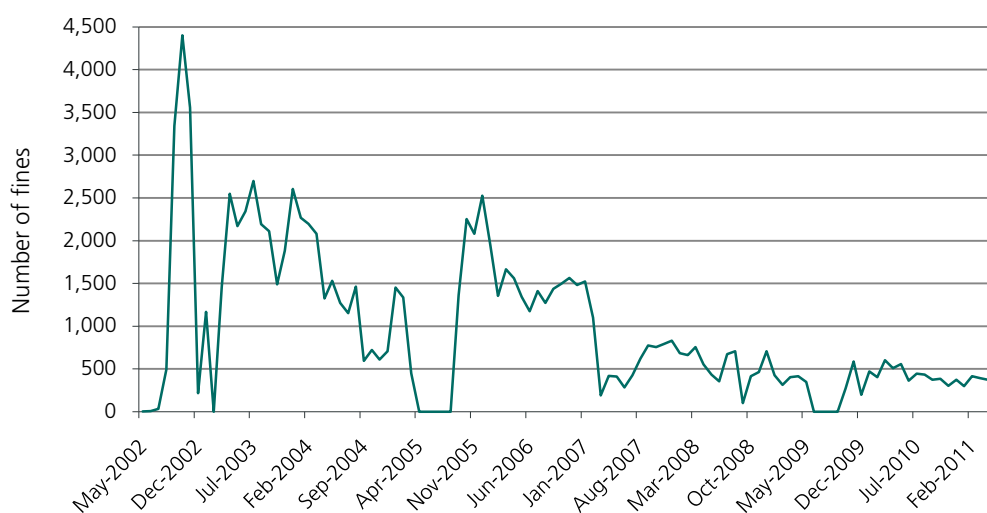


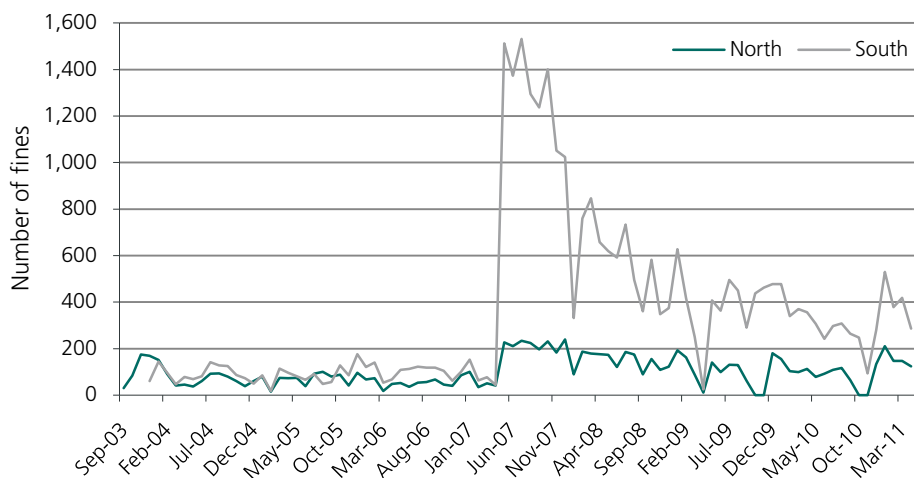
Note: RTA advises that this camera is on a road subject to regular roadwork and is sometimes inoperative.

M4 Motorway Wentworthville/Greystanes

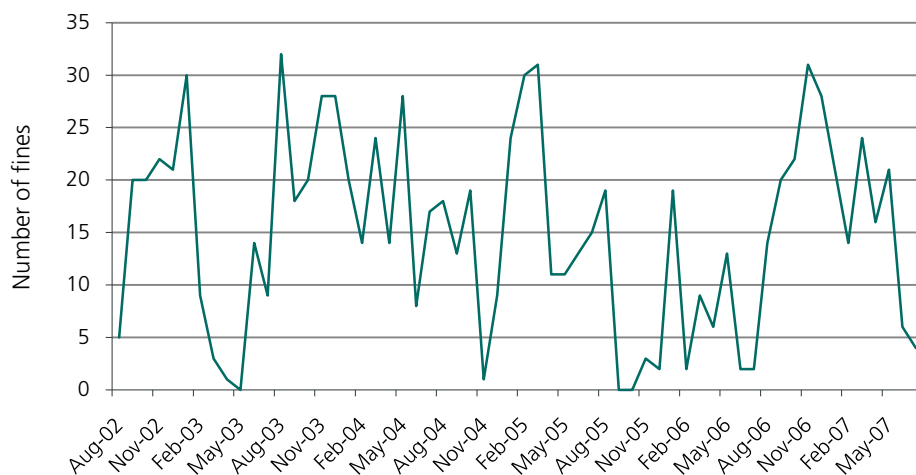


Auburn Parramatta Road

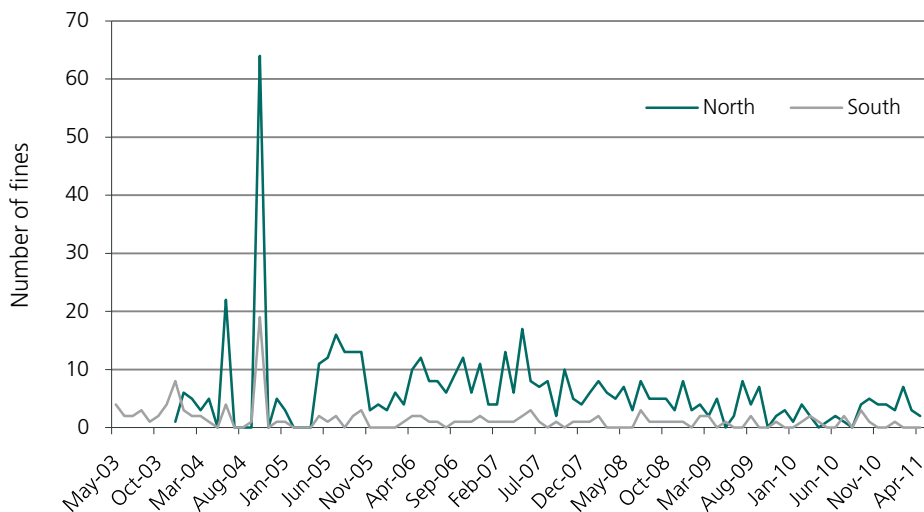


Princes Highway Berry

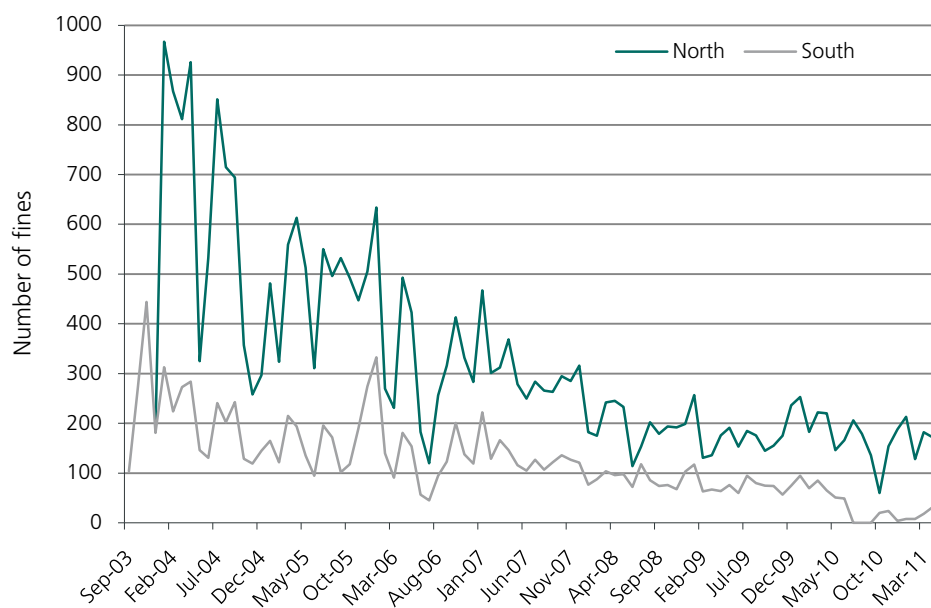
Note: RTA advises the increase in fines in 2007 coincided with a speed limit reduction from 60 to 50 km/hr.

Hume Highway Tarcutta

Note: RTA advises this speed camera was removed due to highway upgrades and that the large fluctuations reflect the small number of fines issued.

Pacific Highway Macksville

Murrurundi

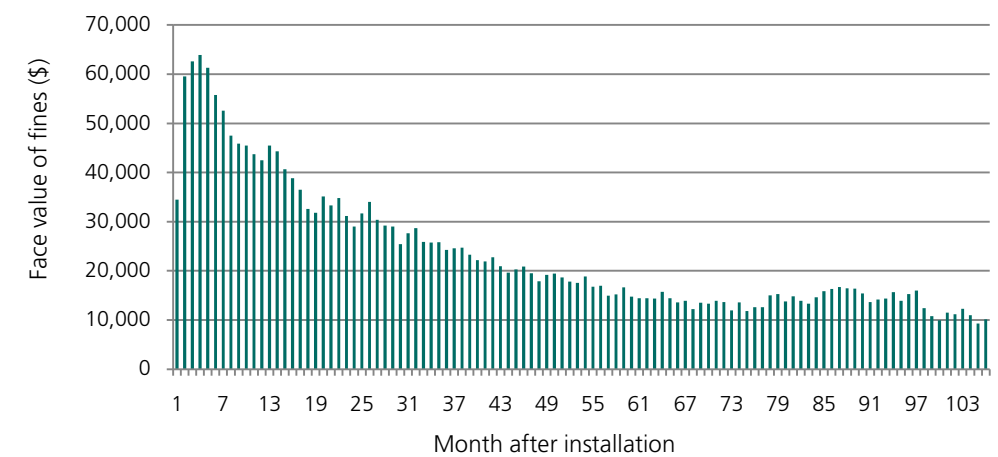


Source: Audit Office analysis of SDRO fine data.

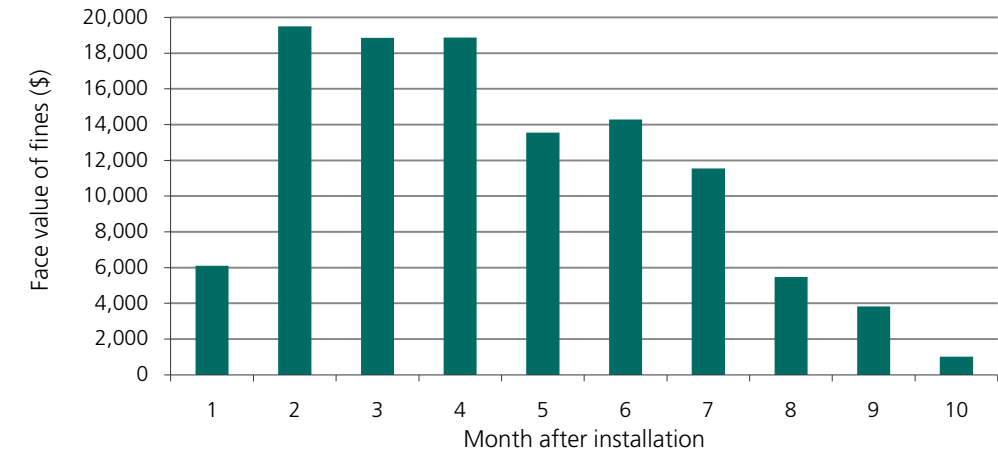
Note: RTA advises that cameras may not always operate due to road work or maintenance.

Appendix 5: Face value of speeding fines from speed cameras

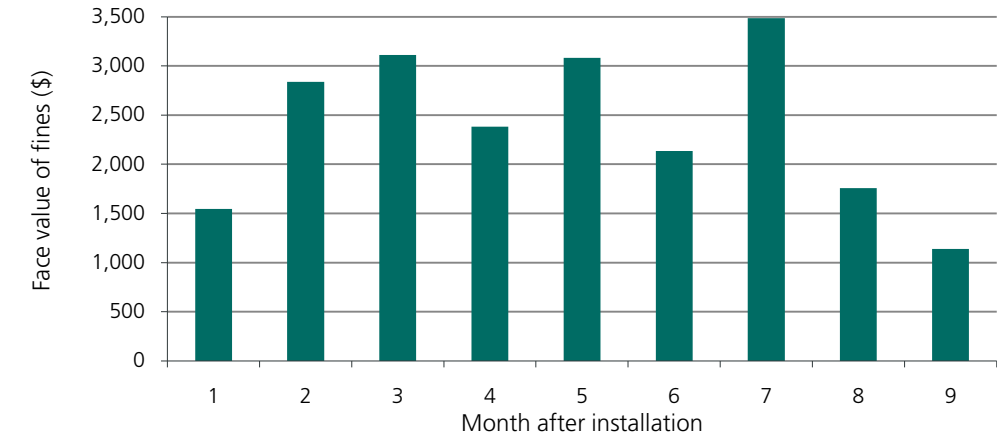
Fixed speed cameras



Safety cameras



Mobile speed cameras



Source: Audit Office analysis of fine data from the State Debt Recovery Office.
 Note: Data has been normalised to factor in the different number of cameras issuing fines each month. Data does not include months where cameras did not issue infringements.

Appendix 6: Fixed speed cameras RTA proposes to review and relocate

Cameras RTA proposes to relocate:

Newcastle Road, Lambton
 Bangalow Road, Clunes
 New England Highway, Murrurundi
 New England Highway, Tilbuster
 New England Highway, Quirindi
 M4 Motorway, Wentworthville/Greystanes
 Brunswick Valley Way, Ocean Shores
 Delhi Road, Macquarie Park
 Eastern Arterial Road, Gordon

Cameras RTA proposes to relocate pending review:

Princes Highway, Broughton
 New England Highway, Scone
 Princes Highway, Nowra
 New England Highway, Llangothlin
 Princes Highway, Angledale
 Pacific Highway, Kundabung
 Pacific Highway, Urunga
 Woy Woy Road, Kariong
 Eastern Valley Way, North Willoughby
 Hume Highway, Burwood
 Bolong Road, Shoalhaven Heads
 Warringah Road, Frenchs Forest
 Manns Road, West Gosford
 General Holmes Drive, Botany
 Spit Rd, Beauty Point/The Spit

Deactivated cameras RTA proposes to relocate:

Bruxner Highway, Alstonville
 Hume Highway, Coolac
 Hume Highway, Tarcutta
 Pacific Highway, Banora Point
 Pacific Highway, Herons Creek
 Pacific Highway, Bundagen

School zone cameras RTA proposes to relocate pending review and consultation:

President Avenue, Gympie
 Carlingford Road, Epping
 Blackwall Road, Woy Woy North
 Ocean Beach Road, Woy Woy
 Balgownie Road, Fairy Meadow
 Sherwood Road, Merrylands West
 Central Coast Highway, Bateau Bay
 Great Western Highway, Parramatta

Source: Crash Analysis of the NSW Fixed Speed Camera Program, RTA, 17 May 2011

Appendix 7: Crash results for fixed speed cameras: public survey cameras

Location		Type of Location	Current Crash Analysis										Current Casualty Analysis											
			3 Years Before			Subsequent Years							3 Years Before			Subsequent Years								
			3	2	1	1	2	3	4	5	6	7	8	3	2	1	1	2	3	4	5	6	7	8
Top 10 cameras 'of concern' in NSW																								
M2 Motorway, North Epping		Non-SZ	13	13	5	13	11	6						1	1	2	5	4	2					
Sydney Harbour Tunnel		Non-SZ																						
Lane Cove Tunnel, Lane Cove		Non-SZ																						
F3, Ourimbah		Non-SZ	11	2	6	4	2	0	3	1	4	4	5	3	0	2	0	1	0	0	1	9	0	0
Spit Rd, Beauty Point/The Spit		Non-SZ	46	39	40	27	22	27	24	22	15	19		32	17	14	14	12	26	13	11	8	8	
Cleveland Street, Moore Park		SZ	6	5	5	1	0							6	4	2	1	0						
F3 Freeway, Bar Point		Non-SZ	8	1	0	2	4	5	8					2	1	0	2	3	2	9				
General Holmes Drive, Botany		Non-SZ	13	17	27	22	17	27	24	43	18	17	33	9	12	15	7	7	9	17	4	10	14	
M4 Wentworthville/Greystanes		Non-SZ	26	28	18	16	32	36	28	18	24	28	25	6	15	9	6	17	24	11	9	11	17	14
Parramatta Road, Auburn		Non-SZ	27	43	29	22	27	16	28	20	25	18	19	14	29	14	20	18	4	13	11	15	9	11
Top camera of concern in each RTA region																								
New England Highway, Murrumbidgee		Non-SZ	0	1	0	1	1	1	0	0	0	0		0	0	0	1	0	0	0	0	0		
Pacific Highway, Macksville		Non-SZ	1	2	2	3	0	0	2	0	4	0		4	3	4	4	0	0	3	0	0		
Princes Highway, Berry		Non-SZ	3	1	2	2	0	2	2	0	0	0		3	0	1	1	0	2	2	0	0		
Hume Highway, Tarcutta		Non-SZ	2	2	4	2	4	1	0	0	0	0		0	3	0	2	1	0	0	0	0		

Source: Roads and Traffic Authority Crash Data, June 2011

Notes: Crashes refers to fatal crashes, crashes causing injury, and non-fatal/non-injury crashes. Casualty refers to the number of deaths and people injured. SZ refers to school zone. These cameras are the cameras of most concern to the public identified through our online survey. RTA did not analyse crash data for the Sydney Harbour and Lane Cove tunnel cameras.

Appendix 8: Wider road safety issues raised during the audit

Over 1,700 people responded to my public request for information on the speed cameras that most concern them, some with detailed comments, both for and against cameras.

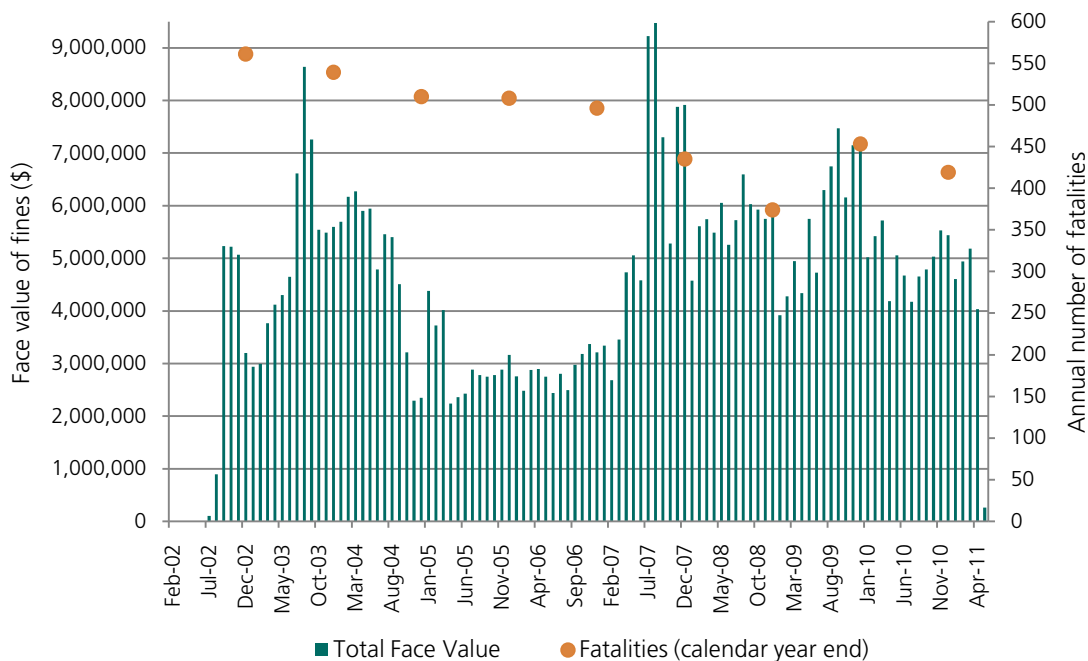
The submissions and our own research in other jurisdictions have given me insights into wider road safety issues not just those causing concern at specific camera locations. I have summarised those I found of particular interest. I will consider them in future audits that I undertake in relation to road safety. I have labelled the suggestions by the public and other stakeholders in the square brackets eg [s1].

I acknowledge that the people who took the trouble to respond do not form a random sample and so the results should not be considered as representative of all public opinion.

Revenue-raising versus road safety

The chart below shows the trend in the total face value of fines notices issued by RTA speed cameras in the last 10 years, and also the trend in deaths on NSW roads. The total face value in 2003 is no different than that in 2010, despite some increases in fines. So the overall revenue raised has not been going up. The number of deaths has declined despite the continued increase in traffic.

Total face value of fines for all speed cameras and total fatalities



Source: Audit Office analysis of fine data from the State Debt Recovery Office, Fatality data from RTA

Note: Data includes fines from RTA fixed, safety and mobile speed cameras.

Most school zone fixed cameras were introduced mid-2007. Safety and mobile cameras introduced mid-2011.

Nevertheless, there is a perception in some parts of the community that speed cameras are primarily for revenue-raising rather than for road safety. Some cameras have generated substantial revenue but there is no evidence that revenue-raising is a factor in decisions on where cameras are located. The selection criteria focus on road-safety. And the evidence also shows, in the months after cameras are installed, there is a decline in fine revenue as driver behaviour changes.

There seems less public concern about the revenue raised by police speed enforcement, yet as the table below indicates, they raise nearly the same amount. The higher average value of fines issued by police suggests they focus on more excessive speeding breaches than do cameras. This may help to explain some of the negative perception many people have of RTA's speed cameras.

Revenue from speeding fines in 2010 is similar to 2003 levels

Public suggestions included speed camera lottery tickets for safe drivers

Number and value of speeding fines issued in 2010-11

Agency	Number of speeding fines	Value of speeding fines (\$)	Average value of fines issued (\$)
RTA cameras			
Fixed	321,312	51,349,763	160
Mobile	10,425	1,581,952	152
Safety	39,278	5,185,323	132
Total	371,015	58,117,038	157
Police	214,344	58,509,347	273
TOTAL	585,359	116,626,385	199

Source: State Debt Recovery Office, statistics webpage accessed 18-07-11
Notes: Police data excludes school zones. RTA fixed cameras includes school zones.

How to change that perception is one of the challenges now facing RTA. The people who wrote to me made a number of suggestions and I have gleaned more from our advisers and other sources.

Some sought to break the nexus between speeding and revenue-raising by suggesting abolishing monetary fines for speeding and replacing them with non-monetary sanctions. This could include community service obligations [s1] (such as requiring speeding offenders to undertake gardening at their local school on weekends) or relying solely on the sanction of demerit points alone with, ultimately, the loss of a driving licence [s2]. Another suggestion would have the 'fine' paid as a donation to a local charity, instead of to Government [s3].

All of these suggestions would impact on the revenue to government and therefore on the level of services that government could fund. They would therefore have an adverse effect on law abiding citizens who do not speed.

Some preferred dedicating the fine revenue to road safety improvements [s4]. Others felt that some sort of rewards were needed for safe driving within the speed limit rather than just sanctions for bad road behaviour. In effect a carrot as well as a stick. A speed camera lottery could be used where 100 motorists each year, who are randomly photographed travelling within the speed limit at particular speed cameras, could be sent a thank you letter and a \$5 lottery ticket [s5].

Some felt that the only way to restore public trust in speed cameras was to have an independent organisation, not RTA, decide how many speed cameras there should be and where they should be located [s6].

Speed zones and signage

Many citizens complained to me about the confusion caused by rapid and frequent changes in speed limits around speed cameras, and poor signage. They called for better signage [s7], including more opportunities for members of the public or community groups to voice concerns directly with RTA about confusing or obscured signs [s8]. I understand the RTA is already considering how it can receive such feedback.

One suggestion is that, for certain speed cameras where offenders might be speeding inadvertently, first time offenders who exceeded the speed limit by less than 10 km/hr, could be issued with a warning letter rather than a fine [s9]. The table below shows the proportion of all offenders, not just first time offenders, who were fined for exceeding the speed limit by less than 10 km/hr at cameras that were frequently mentioned in our public survey.

Fines issued from selected fixed speed cameras highlighted in our public survey

Selected cameras 'of highest concern' in responses to our survey	RTA crash result evaluation	Total no. fines 2010-2011	% fines <=10 km/hr over limit
M2 Tunnel-M2 Motorway, Terry Creek & Norfolk Road	Effective	4,542	54%
Sydney Harbour Tunnel, Cahill Expressway and Warringah Freeway	Effective	2,880	42%
Lane Cove Tunnel, Mowbray Rd and the Pacific Highway	Effective	8,422	45%
Moore Park, Cleveland St, Anzac Parade and South Dowling Street (school zone)	Effective – more data needed	27,564 (all) 1,876 (sz)	72% (all) 55% (sz)
Mascot, General Holmes Drive, Foreshore Road and M5 East Motorway	Relocate pending review	11,848	65%
M4 Motorway, Wentworthville/Greystanes, between Coleman Street and Cumberland Overpasses	Relocate	3,211	25%
Auburn, Parramatta Rd, Harbord Street and Duck Street	Effective	4,444	75%
Princes Highway, Berry, Kangaroo Valley Road and Victoria Street	Effective	4,865	75%
New England Highway, Murrurundi, Bernard and Adelaide Streets	Relocate	2,192	61%

Source: Crash Analysis of the NSW Fixed Speed Camera Program, RTA, May 2011; Audit Office analysis of SDRO fine data

Notes: Review timeframe is 2010-11 except for Mascot (July 2009-April 2010), M2 Tunnel (July 2010-February 2011) and Moore Park (July 2010-May 2011).

More crash data is needed to confirm effectiveness of Moore Park camera as data reviewed for a two year period only. The proportion of fines issued for travelling 10 km/hr or less above the speed limit for all fixed speed cameras since installation is 20%.

Some citizens went further and suggested they should not be fined at speed cameras where it was usually safe to travel at higher speeds than the speed limit [s10]. One suggested that at such locations the camera should only be turned on when driving conditions were hazardous, in a similar way to roads with variable speed limit signs [s11].

Others complained about the speed limits in tunnels and on freeways and felt that the combination of low speed limits and speed cameras was more about revenue-raising. But as you will see from Appendix 1, these cameras also appear at the top of some people's list of cameras that contribute most to road safety, so there is no unanimity on this.

I recognise that the number of crashes on freeways and in tunnels is relatively low but when they occur they risk being severe and disruptive to traffic over a wide area. This risk merits careful consideration before any changes are made. I note the Minister for Roads has recently announced that the RTA has commenced an audit of speed zones. I look forward to seeing the results.

Time taken to receive fines

Many noted that the deterrent effect of a fine from a speed camera is often reduced if there is a large time lapse between the speeding incident and the motorist receiving an infringement notice.

I asked the State Debt Recovery Office (SDRO) to provide data on the time taken to issue speeding fines. The data since January 2009 shows that the median time taken for SDRO to issue infringement notices from fixed, mobile and safety cameras is 6 days or less after the infringement occurred. If this is not fast enough to provide the deterrent effect, then the Government could consider ways of providing more immediate feedback. One suggestion was for the service level agreement between the Government, RTA and the SDRO to require faster turn-round [s12]. I understand that a number of SLAs are already in place between SDRO and RTA, and they are developing one on fine processing and enforcement.

Some of our correspondents suggested there should be greater emphasis on the police issuing infringement notices in person; others that speed enforcement officers be used as a cheaper alternative, in a similar way that Transit Officers are now used on our rail system [s13]. Others looked to new technology for solutions, such as illuminated signs after speed cameras to inform speeders that they have been booked, or using GPS technology in cars to inform speeders likewise [s14]. One idea goes further and suggests that speeders booked twice should have their licence restricted so they can only drive a car with a GPS fitted which alerts them when they speed or approach an accident hot spot, and which may also limit their speed [s15].

Building on previous audit work

I have looked at road safety for heavy goods vehicles and in school safety zones in recent performance audits. My 2009 report *Improving road safety – heavy vehicles* recommended that the RTA focus on improving the detection and enforcement of speeding offences by heavy vehicle drivers by using point-to-point speed enforcement. Twenty-one lengths of road throughout NSW will use this technology by the end of this year.

If it proves effective in controlling speeds of heavy vehicles, the same technology could be used for any driver caught speeding, especially in rural areas. This technology is widely used for all vehicles overseas and in Victoria, with the ACT and Queensland now also adopting the technology.

Advice from our road safety experts

Our road safety consultants have stressed the importance of considering RTA speed cameras as only one component of a wider road safety program that includes both police and RTA speed enforcement, road engineering improvements, setting of speed limits and speed zones, along with public information and advertising campaigns. They argue that a focus on speed cameras, particularly fixed speed cameras, leads to only very localised road safety benefits. A much broader framework is needed.

Appendix 9: About the audit

Audit objective

This performance audit assessed whether the Road and Traffic Authority's (RTA) speed cameras are located in places that reduce speeding and make our roads safer.

Lines of inquiry

We sought to answer the following questions:

- were speed cameras located in areas identified as having greatest road safety risk?
- do speed cameras reduce speeding and the number and severity of road crashes in these locations?

Audit scope

This audit examined fixed, safety and mobile cameras.

The activities audited included RTA's processes:

- to assess and select the location of cameras based on crashes and speeds on NSW roads, and, cameras being an appropriate road safety measure for the high risk areas
- for reviewing the effectiveness of its existing speed cameras.

Audit criteria

In answering the lines of inquiry, we used the following audit criteria (the 'what should be') to judge performance. We based these standards on our research of current thinking and guidance on better practice. They have been discussed, and wherever possible, agreed with those we are auditing.

For line of inquiry 1, we assessed the extent to which RTA:

- has appropriate criteria to determine the location of speed cameras
- conducts thorough and robust analysis of speeding and crash data to determine road lengths with a high road safety risk
- deploys speed cameras at locations consistent with the above criteria
- documents the reasons for any speed camera decisions that do not meet the criteria
- reviews existing camera sites and other high risk sites to determine if changes in the operation or location of cameras need to be made to improve road safety.

For line of inquiry 2, we assessed the extent to which RTA:

- has established an appropriate evaluation framework to assess the effectiveness of its speed cameras
- collects, monitors and analyses relevant information for each camera location to evaluate the effectiveness of the camera in line with the framework
- makes information on the revenue and road safety impact of each speed camera publicly available
- speed cameras are effective in reducing speeding and road crashes.

Audit exclusions

The audit did not specifically examine:

- the accuracy of speed cameras
- speed enforcement by police
- the future roll-out of speed cameras
- other road safety measures.

Audit approach

We acquired subject matter expertise by:

- interviewing staff from the Roads and Traffic Authority responsible for:
 - determining the location of speed cameras
 - reviewing the effectiveness of speed cameras
- interviewing other stakeholders who have a role in speed camera programs
 - NSW Police Force, State Debt Recovery Office
- reviewing policies and procedures for determining camera location and effectiveness
- reviewing speed camera contracts
- analysing data trends on:
 - speeding and crashes for each camera location before installation
 - speeding and crashes for each camera location post installation
 - penalties and revenue for each camera post installation.

We engaged a consultant to provide expert guidance throughout the audit. This included advice on best practice examples and approaches in other jurisdictions. We also engaged a second consultant to undertake a quality assurance role to help manage perceived conflicts of interest, given that most road safety experts have undertaken some work for RTA.

Audit sample

We conducted an online survey through our website that allowed the public to nominate which fixed speed cameras they believe improve road safety and those which do not (ie are seen as revenue-raisers).

We then selected the top ten of each category, as well as the top in each region, to conduct a more detailed examination of speeding and accident trends before and after installation.

Audit selection

We use a strategic approach to selecting performance audits which balances our performance audit program to reflect issues of interest to Parliament and the community. Details of our approach to selecting topics and our forward program are available on our website.

Audit methodology

Our performance audit methodology is designed to satisfy Australian Audit Standards ASAE 3500 on performance auditing, and to reflect current thinking on performance auditing practices. We produce our audits under a quality management system certified to International Standard ISO 9001. Our processes have also been designed to comply with the auditing requirements specified in the *Public Finance and Audit Act 1983*.

Acknowledgements

We gratefully acknowledge the co-operation and assistance provided by the NSW Roads and Traffic Authority Centre for Road Safety, the State Debt Recovery Office, and NSW Police Force, whose staff participated in interviews and provided information relevant to the audit.

Audit team

Our team for the performance audit was Tiffany Blackett and Sandra Tomasi. Rob Mathie and Giulia Vitetta provided direction and quality assurance. We were assisted by Ed Shestovsky, Peter Auld, Brett Chaiyawat, Karen Yee and Melody Shekede. Our road safety expert, Max Cameron from Camcomp, provided expert advice and assistance throughout the audit.

Audit cost

Including staff costs, printing costs and overheads, the estimated cost of the audit is \$241,500.

What are performance audits?

Performance audits determine whether an agency is carrying out its activities effectively, and doing so economically and efficiently and in compliance with all relevant laws.

The activities examined by a performance audit may include a government program, all or part of a government agency or consider particular issues which affect the whole public sector. They cannot question the merits of Government policy objectives.

The Auditor-General's mandate to undertake performance audits is set out in the *Public Finance and Audit Act 1983*.

Why do we conduct performance audits?

Performance audits provide independent assurance to Parliament and the public that government funds are being spent efficiently, economically or effectively and in accordance with the law.

Through their recommendations, performance audits seek to improve the efficiency and effectiveness of government agencies so that the community receives value for money from government services.

Performance audits also focus on assisting accountability processes by holding managers to account for agency performance.

Performance audits are selected at the discretion of the Auditor-General who seeks input from Parliamentarians, the public, agencies and Audit Office research.

What happens during the phases of a performance audit?

Performance audits have three key phases: planning, fieldwork and report writing. They can take up to nine months to complete, depending on the audit's scope.

During the planning phase the audit team develops an understanding of agency activities and defines the objective and scope of the audit.

The planning phase also identifies the audit criteria. These are standards of performance against which the agency or program activities are assessed. Criteria may be based on best practice, government targets, benchmarks or published guidelines.

At the completion of fieldwork the audit team meets with agency management to discuss all significant matters arising out of the audit. Following this, a draft performance audit report is prepared.

The audit team then meets with agency management to check that facts presented in the draft report are accurate and that recommendations are practical and appropriate.

A final report is then provided to the CEO for comment. The relevant Minister and the Treasurer are also provided with a copy of the final report. The report tabled in Parliament includes a response from the CEO on the report's conclusion and recommendations. In multiple agency performance audits there may be responses from more than one agency or from a nominated coordinating agency.

Do we check to see if recommendations have been implemented?

Following the tabling of the report in Parliament, agencies are requested to advise the Audit Office on action taken, or proposed, against each of the report's recommendations. It is usual for agency audit committees to monitor progress with the implementation of recommendations.

In addition, it is the practice of Parliament's Public Accounts Committee (PAC) to conduct reviews or hold inquiries into matters raised in performance audit reports. The reviews and inquiries are usually held 12 months after the report is tabled. These reports are available on the Parliamentary website.

Who audits the auditors?

Our performance audits are subject to internal and external quality reviews against relevant Australian and international standards.

Internal quality control review of each audit ensures compliance with Australian assurance standards. Periodic review by other Audit Offices tests our activities against best practice. We are also subject to independent audits of our quality management system to maintain certification under ISO 9001.

The PAC is also responsible for overseeing the performance of the Audit Office and conducts a review of our operations every three years. The review's report is tabled in Parliament and available on its website.

Who pays for performance audits?

No fee is charged for performance audits. Our performance audit services are funded by the NSW Parliament.

Further information and copies of reports

For further information, including copies of performance audit reports and a list of audits currently in-progress, please see our website www.audit.nsw.gov.au or contact us on 9275 7100.

Performance audit reports

No	Agency or Issues Examined	Title of Performance Audit Report or Publication	Date Tabled in Parliament or Published
215	Roads and Traffic Authority	<i>Improving Road Safety: Speed Cameras</i>	July 2011
214	Barangaroo Delivery Authority Department of Transport NSW Treasury	<i>Government Expenditure and Transport Planning in relation to implementing Barangaroo</i>	15 June 2011
213	Aboriginal Affairs NSW Department of Premier and Cabinet	<i>Two Ways Together - NSW Aboriginal Affairs Plan</i>	18 May 2011
212	Office of Environment & Heritage WorkCover NSW	<i>Transport of Dangerous Goods</i>	10 May 2011
211	NSW Police Force NSW Health	<i>The Effectiveness of Cautioning for Minor Cannabis Offences</i>	7 April 2011
210	NSW Health	<i>Mental Health Workforce</i>	16 December 2010
209	Department of Premier and Cabinet	<i>Sick leave</i>	8 December 2010
208	Department of Industry and Investment	<i>Coal Mining Royalties</i>	30 November 2010
207	Whole of Government electronic information security	<i>Electronic Information Security</i>	20 October 2010
206	NSW Health NSW Ambulance Service	<i>Helicopter Emergency Medical Service Contract</i>	22 September 2010
205	Department of Environment, Climate Change and Water	<i>Protecting the Environment: Pollution Incidents</i>	15 September 2010
204	Corrective Services NSW	<i>Home Detention</i>	8 September 2010
203	Australian Museum	<i>Knowing the Collections</i>	1 September 2010
202	Industry & Investment NSW Homebush Motor Racing Authority Events NSW	<i>Government Investment in V8 Supercar Races at Sydney Olympic Park</i>	23 June 2010
201	Department of Premier and Cabinet	<i>Severance Payments to Special Temporary Employees</i>	16 June 2010
200	Department of Human Services - Ageing, Disability and Home Care	<i>Access to Overnight Centre-Based Disability Respite</i>	5 May 2010
199	Department of Premier and Cabinet NSW Treasury WorkCover NSW	<i>Injury Management in the NSW Public Sector</i>	31 March 2010
198	NSW Transport and Infrastructure	<i>Improving the Performance of Metropolitan Bus Services</i>	10 March 2010
197	Roads and Traffic Authority of NSW	<i>Improving Road Safety: School Zones</i>	25 February 2010
196	NSW Commission for Children and Young People	<i>Working with Children Check</i>	24 February 2010
195	NSW Police Force NSW Department of Health	<i>Managing Forensic Analysis – Fingerprints and DNA</i>	10 February 2010
194	Department of Premier and Cabinet Department of Services, Technology and Administration NSW Treasury	<i>Government Advertising</i>	10 December 2009
193	Roads and Traffic Authority of NSW	<i>Handback of the M4 Tollway</i>	27 October 2009

No	Agency or Issues Examined	Title of Performance Audit Report or Publication	Date Tabled in Parliament or Published
192	Department of Services, Technology and Administration	<i>Government Licensing Project</i>	7 October 2009
191	Land and Property Management Authority Maritime Authority of NSW	<i>Administering Domestic Waterfront Tenancies</i>	23 September 2009
190	Department of Environment, Climate Change and Water NSW Environmental Trust	<i>Environmental Grants Administration</i>	26 August 2009
189	NSW Attorney General's Department NSW Department of Health NSW Police Force	<i>Helping Aboriginal Defendants through MERIT</i>	5 August 2009
187	Roads and Traffic Authority of NSW	<i>Improving Road Safety – Heavy Vehicles</i>	13 May 2009
186	Grants	<i>Grants Administration</i>	6 May 2009
185	Forests NSW	<i>Sustaining Native Forest Operations</i>	29 April 2009
184	NSW Police Force	<i>Managing Injured Police</i>	10 December 2008
183	Department of Education and Training	<i>Improving Literacy and Numeracy in NSW Public Schools</i>	22 October 2008
182	Department of Health	<i>Delivering Health Care out of Hospitals</i>	24 September 2008
181	Department of Environment and Climate Change	<i>Recycling and Reuse of Waste in the NSW Public Sector</i>	11 June 2008
180	Follow-up of 2003 Performance Audit	<i>Protecting Our Rivers</i>	21 May 2008
179	NSW Office of Liquor, Gaming and Racing; NSW Police Force	<i>Working with Hotels and Clubs to reduce alcohol-related crime</i>	23 April 2008
178	Greyhound and Harness Racing Regulatory Authority	<i>Managing the Amalgamation of the Greyhound and Harness Racing Regulatory Authority</i>	3 April 2008
177	Office of the Director of Public Prosecutions	<i>Efficiency of the Office of the Director of Public Prosecutions</i>	26 March 2008

Performance audits on our website

A list of performance audits tabled or published since March 1997, as well as those currently in progress, can be found on our website www.audit.nsw.gov.au.