Safety review of NSW decommissioned speed cameras for the development of alternative road safety treatment

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Abstract

Following a performance audit into speed cameras conducted by the Auditor General and the release of the audit final report, 38 fixed speed camera locations where cameras were not found to be effective were switched off with immediate effect. A safety review of the 38 decommissioned fixed speed camera locations was conducted to establish whether alternative road safety treatments are more appropriate and whether the camera should remain. Reviews were led by the NSW Centre for Road Safety in consultation with key stakeholders. A comprehensive methodology was developed and implemented, with locations prioritised according to level of community concerns and road safety risks. For each location, detailed analysis of crash, speed, traffic and other relevant data was undertaken, and the local community was engaged to provide input into road safety issues and concerns. A multi-disciplinary team then inspected each location and recommended alternative road safety treatments where appropriate, taking into consideration the data analysis and feedback from community engagement. Finally, a report detailing location inspection findings, discussion of data analyses, feedback from community engagement, and recommendations for any appropriate alternative road safety treatment was prepared for each location. Implementation of proposed alternative road safety treatments has commenced at all relevant locations, a number of cameras have been removed, and treatments have been completed at around half of the locations, with treatments to be regularly monitored and formally evaluated. This safety review process has been refined and has led to an established methodology to support the annual review of speed cameras, as well as any future decisions about the effectiveness of fixed speed cameras and whether any particular camera should remain in place.

Background

Speeding is consistently identified as a leading factor involved in road crashes throughout Australia and internationally (see Elvik, Christensen & Amundsen, 2004). Speed cameras are commonly employed as a method of speed enforcement in many best practice road safety jurisdictions throughout the world (see Organisation for Economic Co-operation and Development, 2006; World Health Organisation, 2009). Automated camera enforcement supplements enforcement conducted by police officers. Fixed speed cameras are installed to address a specific location with a significant crash history where there is a high level of crash risk or where police are unable to enforce. For fixed speed cameras in school zones, the risk of a pedestrian crash in school times is also considered. In NSW, fixed speed cameras were first introduced in 1997 in the Sydney Harbour Tunnel. Installation of all NSW fixed speed cameras meet specific site selection criteria.

The Auditor General undertook a performance audit into speed cameras and the final report, *'Improving Road Safety: Speed Cameras'* was released by the Audit Office on 27 July 2011 (Audit Office of NSW, 2011). The audit report found that fixed speed cameras were generally located in areas with high road safety risks and that speed cameras change driver behaviour and have a positive road safety impact. However, the report also found that although the number of speeding offences, crashes, injuries and fatalities reduced after the installation of the cameras, these results were varied with the number of crashes decreasing at some locations but not at others.

Concurrent with the performance audit, the NSW Centre for Road Safety (CRS) conducted a detailed crash based review of NSW fixed speed camera locations. At the time of the review there were 172 fixed speed cameras in 141 locations in NSW. Of the 141 fixed speed camera locations, the CRS assessed 96 as effective with clear road safety benefit and proposed to review and/or relocate cameras at 38 locations (Transport for NSW, 2012a).

Following the release of the Auditor General's report, the Minister for Roads and Ports instructed the Roads and Maritime Services (RMS) to switch off cameras at 38 locations with immediate effect. Of those 38 locations, cameras at six were deactivated prior to the release of the audit report. While these cameras were not found to be effective based on crash analysis, follow up action was required to review the road safety risks of these locations and to recommend alternative road safety treatment to address these risks where appropriate.

The aim of the safety review was to develop and evaluate a program of alternative road safety treatment works for the decommissioned fixed speed camera locations to address existing crash risks at each location. The scope of the review covered at least 500 metres either side of the current camera location based on international research evidence demonstrating the likely distance effect of fixed speed cameras (e.g. Christie, Lyon, Dunstan & Jones, 2003; Hess, 2004), and was extended for locations where this distance did not cover the original black length used to select the location when the cameras was first installed.

Review Methodology

The safety review of decommissioned fixed speed cameras applied the Safe System approach to the development of road safety countermeasures that aims to reduce death and injury on NSW roads. The Safe System approach recognises there is a limit to the forces humans can withstand in a crash, while accepting that human error on our roads is inevitable (International Transport Forum, 2008). The approach is also used to promote the importance of travelling at speeds more forgiving of human error, designing roads and vehicles which reduce harm in the event of a crash, and responsible road user behaviour.

The methodology applied for the safety review included the following stages:

Prioritise Locations

Locations for review were prioritised according to level of community concerns and road safety risks. Locations identified as Priority 1 and 2 were targeted for early reviews.

1. <u>Priority One</u> – Locations identified to be the subject of a high level of community concern when they were turned off, and have been reactivated in warning mode[1] following initial reviews by CRS and substantial safety concerns expressed by the community. These locations were inspected as top priority and were supplemented with community engagement activities with key stakeholders, including a community meeting with key invited stakeholders in addition to a site inspection.

2. <u>Priority Two</u> – Locations with known community concerns and generally in school zones. These locations were subject to a community meeting with key invited stakeholders in addition to a site inspection.

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[1] Cameras at warning mode locations operate under a scheme in which vehicles detected speeding more than 30km/h over the speed limit receive a court attendance notice and face significant penalties. Those caught speeding by a lower amount operate under a 'three strike' scheme, in which they receive warning letters for the first two occasions at that camera, and an infringement notice on the third speeding offence.

3. <u>Priority Three</u> – Locations with no known community concerns, and subject to a site inspection only.

4. <u>Priority Four</u> – Six camera locations that were decommissioned prior to the Auditor General's review were ranked as priority four and were subject to a desktop review and site visit to confirm no further action required. Each of these locations had undergone substantial changes in their environment due to the section of road being bypassed or significantly upgraded.

All locations sought community feedback on road safety issues and concerns at these locations, obtained through targeted advertising, letterbox drops and responses received by telephone, post and email.

Community Engagement

Community engagement formed a key component of the safety review of all decommissioned camera locations. The nature of the engagement differed for each priority location. Priority one and two locations included community engagement meetings with invited stakeholders and site inspections. An external community engagement consultant was engaged to provide services regarding community engagement for all review locations.

The purpose of the community engagement meetings was to identify safety issues and concerns from the local community in relation to the decommissioned camera location so that they were considered by the inspection team during inspection and in developing alternative safety treatment for the location. Where the location was on a local or regional road, representatives from the local council were invited to participate in the community engagement meeting. Where the location was in a school zone, the school Principal and the President of the Parents and Citizens/Parents and Friends were invited to participate in the community engagement meeting.

All locations included a letterbox drop for residents immediately impacted by the decommissioned camera location. Residents were invited to raise their road safety issues and concerns via a 1800 number, as well as an RTA mail and email address. In addition, a local media release and local advertisement was planned for each location as the inspection took place.

A community engagement report was prepared for each of the priority one and two locations, which captured community feedback and safety issues for each decommissioned fixed speed camera location. One report was prepared for the priority three and four locations to summarise community feedback received via other communication channels.

An overarching report summarising and analysing feedback received from the community regarding safety issues for all locations was prepared for the Review.

Data Collection

Appropriate collection of data was an important component of the Review to identify evidence-based road safety treatments for each decommissioned location. Data were collected as follows:

1. Crash data collection and analysis – The safety review length to be analysed was identified based on the black length that was originally used to select the location for the camera. For each camera black length, a spatial map was generated and all crashes from the most recent five years were plotted. Detailed analysis of crash data since infringing commenced at the

camera location was undertaken, with a focus on identifying crash trends, crash rates, crash characteristics, and crash clusters along the safety review length.

2. Traffic data collection and analysis – Traffic volume data were identified and collated from the original speed surveys conducted at the location, and supplemented with the most recent data obtained from a number of different sources including speed surveys, RMS Regions, and the local council where available.

3. Infringement history at camera locations - Infringement history was obtained from the Office of State Revenue for each speed camera. A trend analysis of fines issued was undertaken, including a breakdown by speed band to demonstrate the extent of speed compliance, and therefore provided an indicator of road safety risk.

4. Land use changes likely to affect traffic movements were identified based on information supplied by the RMS regions.

5. Road works undertaken since the installation of the fixed speed camera were identified based on information supplied by the RMS regions.

The above data and analysis was used throughout the Review to direct and support the inspection team, and formed an integral component of the final report for all the review locations.

Location Inspections

For priority one and two locations, an inspection team met with community stakeholders prior to the location inspection to gain an understanding of local safety issues, and to consider these community issues during the inspection and assist with the development of alternative safety measures. For priority three locations, a location inspection was carried out without a community engagement meeting. However, the community issues and concerns communicated via other channels were considered by the inspection team in the course of the inspection.

The multi-disciplinary inspection team was responsible for inspecting each decommissioned location and recommending road safety treatments where appropriate, taking into consideration the data analysis provided by the CRS and feedback from the community. Each inspection was led by an external accredited road safety auditor, and members of the inspection team included representatives from the CRS (road safety engineer, behavioural scientist, and project manager), RMS Regions (regional Road Safety and Traffic Manager), NRMA Motoring & Services, and the NSW Police Force. Where the location was on a local or regional road, representatives from the local council were invited to attend. Where the location was in a school zone, the school Principal and the President of the Parents and Citizens/Parents and Friends were invited to attend.

A road safety assessment template was used to note observations of existing road environment features and road safety issues at the location. Key areas of interest during the assessment included:
*   Key road safety issues identified by local community.
*   Behavioural/infrastructure interface issues.
*   Fatality crash locations and crash cluster locations.
*   Hazards in the clear zone and general clear zone issues.
*   Condition of road shoulders.
*   Low radius curves and delineation around curves.
*   Major junction geometry and delineation.
*   Minor intersection treatments.
*   General delineation and line marking.

- Regulatory, warning and advisory sign posting.
- Speed zones.
- Pedestrian and cyclist facilities (usually in town centres).
- Driver rest opportunities.
- Heavy vehicle issues.

Following the team inspection, the lead road safety auditor undertook a separate inspection by car to observe conditions from the driver's perspective.

Development and Implementation of Alternative Treatment

An inspection report was prepared for each of the 38 decommissioned locations in consultation with the inspection team and the CRS describing:
- Existing road and traffic situation.
- Location inspection findings.
- Discussion of data analyses.
- Feedback from community engagement.
- Recommendations for any appropriate alternative road safety treatment/s.

Based on data analysis, inspections, community feedback and review reports for the 38 decommissioned fixed speed camera locations, a program of alternative road safety treatment generally comprised of road engineering and driver behaviour initiatives was developed to address the identified road safety risks.

Broadly across all locations, recommended alternative road safety treatments include:
- Re-activation of some cameras in warning mode based on high level community concerns.
- Mobile speed camera enforcement at three warning mode locations to provide an ongoing enforcement presence to deter speeding.
- Reviewing and upgrading existing road markings and signage.
- Installation of audio-tactile edge and centre line markings, and shoulder widening.
- Consideration of appropriate action for road safety hazards.
- Assessment of safety barrier delineation.
- Investigation of an appropriate speed enforcement strategy and changes to speed zones.
- Possible installation of police enforcement bays at up to five locations.

The CRS Project Manager developed a prioritised program for implementing works across all locations in collaboration with the CRS Safer Roads branch and RMS regions. RMS regions have been engaged at all stages of the review process and are responsible for the development and implementation of road safety treatment projects approved for locations in their regions. Where the projects are on council managed roads, projects will be delivered by the local council.

Following the safety review, cameras at seven locations were placed into warning mode based on high level community concerns, so that drivers detected exceeding the speed limit by more than 30km/h receive a penalty/court summons, and warning letters are issued for other incidences of speeding. These warning letters operate under a 'three strike' scheme where a registered operator is issued with an infringement notice if their vehicle is detected over the speed limit three or more times at the same location. Delivery of alternative road safety treatments has commenced at all 38 decommissioned fixed speed camera locations, and treatments have been completed at around half of these locations. Transport for NSW will work with RMS to remove camera infrastructure and associated signage after completion of alternative road safety treatments at each decommissioned fixed speed camera location. To date, camera infrastructure has been removed from 10 locations.

Evaluation

Alternative road safety treatments implemented at each decommissioned fixed speed camera location will be regularly monitored and formally evaluated. Monitoring and evaluation will be tailored for each location, but will broadly include the following approach:

- Stakeholder interviews.
- Crash data analysis, comparing the five years prior to the camera switch-off with the time elapsed at each site since the road works have been completed.
- Speed data from before commencement of the alternative road safety treatments compared to speed data from after completion of the treatments.
- Analysis of continuous infringement and warning mode data for locations with cameras operating in warning mode.

Discussion

The safety review process applied for these 38 decommissioned fixed speed cameras enabled effective and timely development of alternative road safety treatments at locations where cameras were deemed to be ineffective in addressing existing road safety risks. This safety review process represented an innovative, customer-focussed approach to developing appropriate road safety strategies.

The effectiveness of the safety review process was based on appropriate prioritisation of locations based on risks and concerns identified from community feedback, effective teamwork and inter-agency collaboration, rigorous and comprehensive data collection, community engagement to learn about local road safety issues and concerns, and detailed location inspections by a multidisciplinary team of road safety professionals.

Findings from this safety review have important implications for future policy processes and program decisions, and have led to key actions being incorporated in road safety strategies to address speeding.

The NSW Auditor-General recommended that Transport for NSW monitor the effectiveness of speed cameras annually (Audit Office of NSW, 2011). This recommendation was incorporated in the *NSW Speed Camera Strategy* (Transport for NSW, 2012b), announced by the NSW Government on 1 June 2012, which outlines how sites are selected for the four types of speed cameras used in NSW, how they are monitored and how this information is reported. As part of the Strategy, TfNSW publishes the *Annual NSW Speed Camera Performance Review* to outline speed camera effectiveness and improve transparency of speed cameras in NSW.

The safety review process applied for these 38 decommissioned cameras has been refined and has led to an established methodology for the ongoing assessment of fixed speed cameras to support the *Annual NSW Speed Camera Performance Review*, as well as any future decisions about the effectiveness of fixed speed cameras and whether any particular camera should remain in place.

The first *Annual NSW Speed Camera Performance Review* was completed in July 2012 and found that overall there has been a 38% reduction in crashes, an 87% reduction in fatalities and a 37% reduction in injuries at NSW fixed speed camera locations (Transport for NSW, 2012c). However, six more locations were identified for further field reviews because crashes and/or casualties had increased, or the site had been deactivated for an extended period due to roadwork. The refined safety review process was applied for these further field reviews, which were completed in December 2012.

Outcomes from the safety review process are also consistent with the key focus areas for road safety over the next decade identified in the *NSW Road Safety Strategy 2012-2021* (Transport for NSW, 2012d), recently released by the NSW Government, which includes maximising coordination between traditional and automated speed enforcement methods.

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