Hon John Mickel MP
Member for Logan

Queensland Government

Minister for Transport, Trade, Employment and Industrial Relations

Our ref: MC34726

12 FEB 2008

Mr Jim Pearce MP
Chair
Select Committee on Travelsafe
Parliament House
George Street
Brisbane Qld 4000

Dear Mr Pearce

I refer to the Parliamentary Select Committee on Travelsafe Issues Paper No. 12 entitled *Inquiry into Automatic Number Plate Recognition Technology* which was tabled in the Legislative Assembly on 31 October 2007.

I attach a copy of the government's submission.

Yours sincerely

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Minister for Transport, Trade,
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Parliamentary Travelsafe Committee

Inquiry into Automatic Number Plate Technology

WHOLE OF GOVERNMENT SUBMISSION

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Executive Summary

Automatic Number Plate Recognition (ANPR) technology has a number of applications in the enforcement, monitoring and surveillance of vehicles in Australia and worldwide. Fixed ANPR cameras are used to monitor and support enforcement of heavy vehicle speed and fatigue regulations and route restrictions. Mobile systems are used internationally and in other Australian jurisdictions to detect unregistered vehicles, unlicensed drivers and for traffic survey purposes.

Despite the widespread application of ANPR technology in vehicle monitoring and enforcement programs, there have been few evaluation studies that identify the road safety benefits from its application. This makes it extremely difficult to determine whether the application of ANPR technology in Queensland will deliver a reduction in crash rates, injuries and fatalities.

In Queensland, ANPR technology is used to manage and restrict heavy vehicle use of the Brisbane Urban Corridor (BUC). In 2007, regulations were introduced to restrict heavy vehicle use of the corridor and divert these vehicles to other appropriate road corridors – such as the Logan Motorway. ANPR cameras are used to detect vehicles illegally using the BUC and generate infringement notices.

ANPR technology has been successfully employed to detect fatigue and speed related driving infringements by heavy vehicles in NSW and South Australia through the Safe-T-Cam program. Fixed cameras are located at regular intervals along major transport corridors to detect heavy vehicles that are speeding over extended distances and who breach fatigue driving restrictions. The cameras have been effective in identifying vehicles and issuing warning and infringement notices.

Trials suggest that mobile ANPR units combined with police enforcement units can detect and intercept unregistered vehicles. By integrating a 'blacklist' of unregistered vehicles, enforcement units are able to detect additional illegal activity such as unlicensed driving or existing driving violations. The removal of unregistered vehicles from public roads and reducing unlicensed driving could lead to broader road safety benefits.

ANPR has applications in monitoring time-over-distance speed violations and in supporting current enforcement of red light and speed camera systems by assisting the identification of vehicles and back-end processing. ANPR could also be used in a range of traffic surveys to assist in traffic management planning and infrastructure design. Other potential applications include transport security, dangerous goods monitoring and surveillance of criminal activity.

ANPR technology has a number of associated costs related to the acquisition, installation and maintenance of the equipment and related software and data processing costs. However, the detection and removal of unregistered vehicles from Queensland's roads may have financial benefits, such as reducing the claims against the Nominal Defendants Fund by persons involved in crashes with unregistered and uninsured vehicles.

Lastly, ANPR technology raises a number of privacy issues, related to the collection, storage, use and disclosure of personal information. The further application of ANPR technology will have to ensure that any personal information is used and managed in accordance with the Queensland Government's Information Privacy Standard (IS42).

Introduction

Applications

ANPR technology can be used to support existing road safety measures, vehicle management and enforcement processes. This includes fatigue/speed monitoring and enforcement, identification of unregistered vehicles, heavy vehicle mass management (in combination weight in motion (WiM)) monitoring, heavy vehicle route enforcement and traffic surveillance and management. In addition ANPR technology has applications monitoring 'foreign' vehicles in dedicated busways, e-tolling, and access control for restricted areas such as car parks.

A number of jurisdictions worldwide use ANPR technology to achieve a broad range of objectives. Transport and policing agencies in Germany, Italy, and Switzerland have collaboratively applied the technology to identify persons and vehicles of interest, while United Kingdom (UK) police have added ANPR technology to their available counter-terrorism resources. As well, UK police use ANPR technology to monitor time-over-distance for speed enforcement.

In Australia, ACT and Tasmanian authorities use ANPR technology to detect unregistered vehicles and persons of interest, while SA and NSW police use fixed ANPR systems for time-over-distance enforcement of heavy vehicles. ANPR technology is also used for real-time identification of electronic toll violators.

Queensland Government agencies currently use ANPR technology to monitor heavy vehicle traffic on the Brisbane Urban Corridor (BUC), for traffic survey purposes and to support mass management schemes at the Port of Brisbane.

ANPR technology

ANPR is based on images taken of vehicle number plates and processed through recognition software to identify the vehicle. Some systems can use front and/or rear located cameras to capture the images and so improve identification rates (Land Transport, New Zealand, Research Report 320). ANPR cameras and associated software may be used independently of one another in order to maximise the benefits of existing infrastructure, or together in new applications.

The company producing the ANPR system used in Queensland has over 8000 cameras deployed worldwide in a variety of parking, travel time, access control, toll violation and traffic enforcement applications, including the London congestion pricing scheme. Other systems that "bolt on" to standard CCTV cameras have been developed but are not in use by Queensland Government agencies.

The ANPR system essentially consists of two basic elements:

1. A monochrome infra-red high sensitivity camera module fitted with a fixed focus lens, together with a pulsed LED illuminator; and
2. Optical Character Recognition (OCR) software to convert the captured image to the number plate characters.

The camera can be externally triggered by some form of vehicle detector, such as inductive loops or internally triggered by the camera continually scanning the field of view for images with number plate characteristics. The camera captures multiple images of a number plate, identifies the best prospect and processes the plate image through OCR software to provide the number plate characters. Most ANPR systems incorporate an additional camera to capture a scene image of the vehicle from which the make, model and colour of the vehicle may also be determined.

The camera is capable of capturing licence plate images in the most difficult environmental conditions, including headlight glare, low sunlight, partial plate shading, extreme sunlight glare and poor weather. The camera has an effective range of about 25m and will successfully read plates (reflective and non-reflective) from vehicles travelling at up to 180kph. ANPR cameras can be mounted on overhead structures such as purpose built gantries, bridge overpasses, street lighting poles or for temporary installations, on tripods or vehicles.

Capture rates of better than 95% are possible with careful positioning of the cameras. Typical capture rates for portable units, given the temporary nature of these installations, range between 80 and 95%. To achieve this rate, number plates must be clean and clearly visible. The technology can be deployed in two modes of operation, either manned portable units or fixed installations where the ANPR camera operates remotely.

Terms of Reference

1. The efficacy of ANPR technology for road safety applications;
2. Potential costs and benefits;
3. Whether ANPR-enabled intercept teams should be used for traffic enforcements in Queensland, including examination of existing applications; and
4. Other opportunities and considerations for its use by Queensland Government agencies to promote road safety.

1. The efficacy of ANPR technology for road safety applications

Road Safety Evaluations of ANPR

Queensland Transport (QT), the Department of Main Roads (MR), the Queensland Police Service (QPS) and the Department of Justice and Attorney-General (JAG) were unable to locate any specific evaluations of the road safety benefits of ANPR technology. A recent report by the Australian Transport Safety Bureau (Young and Regan, April 2007) also indicated that no evaluation studies have examined whether the application of ANPR systems affect driver behaviour by reducing violations or crashes. The evaluation studies that do exist (e.g. PA Consulting Group, 2004) focus on the wider implications of ANPR, particularly fighting serious and organised crime, intelligence gathering and counter terrorism. However, this evaluation does indicate some auxiliary road safety benefits such as policing of unregistered vehicles.

The lack of evaluative studies focussing solely on the road safety implications of ANPR makes it extremely difficult to determine the road safety benefits from the use of this technology in Queensland. Further evaluations of the technology in specified applications are required before any definitive conclusions can be drawn about the benefits of using ANPR for reducing the road toll.

Unregistered Vehicles

The *Transport Operations (Road Use Management – Vehicle Registration) Regulation 1999* requires that a person must not use a vehicle on a road that is not registered, unless satisfying certain conditions or exemptions. To register a vehicle in Queensland, it is compulsory to have an insurance certificate under the *Motor Accident Insurance Act 1994* for the vehicle for the proposed registration term. The owner is also required to possess a current certificate of inspection and a safety certificate for the vehicle, unless exempt or satisfying certain conditions. The owner of a registered vehicle is required to display a registration label on the vehicle. The registration of a vehicle attracts registration fees and penalties apply for driving a vehicle that is not registered in Queensland.

In 1999, the Select Committee on Travelsafe released Report No. 27: *Unlicensed, Unregistered and on the Road.* In line with recommendation 11 of the Report (that QT funds road-side surveys of unlicensed driving and the driving unregistered vehicles in Queensland, to determine the number of unregistered vehicles in Queensland), QT commissioned ACNeilsen to undertake an observational survey of 50,000 vehicles. This study was conducted in 2000, 2003 and 2005.

The major findings of this observational survey in 2005 were:

- Overall, 1.81% of Queensland vehicles were identified as unregistered following data verification, down significantly from 5.19% in 2003 and 4.05% in 2000;
- As found in previous years, the majority of unregistered vehicles continue to be long-term offenders, with close to one third identified as lapsed for two years or more; and

- Reflecting the findings in 2003, vehicles over 20 years old were significantly more likely to be unregistered than newer vehicles.

Table 1
Number of vehicles registered and number of infringements for unregistered vehicles in Queensland from 1 January 2002 to 31 December 2006

	2002	**2003**	**2004**	**2005**	**2006**
No. of vehicles registered	3,067,566	3,195,635	3,356,887	3,527,182	3,694,129
No. of infringements	23,006	25,962	29,710	35,393	36,906
% of vehicle fleet	0.75	0.81	0.88	1.0	0.99

Table 1 shows the number of unregistered vehicle infringements on Queensland roads for the past five years and the percentage of the registered vehicle fleet that this represents. The increase in the number of infringements could be as a result of increased enforcement undertaken by QT and QPS.

During 2006, there were 15 fatalities as a result of crashes involving unregistered motor vehicles within Queensland, representing 4.5% of the Queensland road toll. During July 2005 to June 2006, there were 202 injuries as a result of crashes involving unregistered motor vehicles. This represents 1.2% of all the road injuries within Queensland. There was a small upward trend in the number of fatalities as a result of crashes involving unregistered motor vehicles during 2003 to 2006, whereas injuries remained fairly steady from 1995 to 2005.

Travelsafe Report No. 27 indicates that unregistered vehicles pose a number of road safety problems such as inferior vehicle safety standards, owner identification and enforcement. Unregistered vehicles also affect government revenue through the forfeiture of vehicle registration charges and loss of revenue for compulsory third party (CTP) payments.

ANPR technology requires that a registration number that is identified and recorded from the number plate is able to link the vehicle to an individual or body that is responsible for that vehicle. In Queensland, the link between vehicle registration number and responsible individual is achieved through the maintenance of a registered vehicles register, including vehicles either currently registered or within the previous two year period. The register contains a series of particulars for a vehicle including the registered operators name, vehicle registration number and other identification details, the Gross Vehicle Mass (GVM) or Gross Combination Mass (GCM), garage and registered operators address, and commencement and expiry dates for registration.

An assessment commissioned by the UK Home Office (PA Consulting Group 2004) showed that deployment of ANPR technology can significantly increase the number of unregistered and uninsured vehicles intercepted by police and issued with infringement notices. A trial of ANPR technology across a number of police jurisdictions in the UK showed that over a 12 month period, police officers were able to issue 4,150 tickets for uninsured vehicles, 1,235 tickets for not possessing the UK equivalent to the QT Safety Certificate, and 19,563 for driving an unregistered vehicle (PA Consulting Group, 2004).

A trial of ANPR by police in West Yorkshire, UK, also extended to seizure of uninsured vehicles. If drivers were found to be uninsured during an intercept by police, they were not permitted to continue the journey and informed that the vehicle would be removed from public roads, either by the driver or the police at the driver's expense. During a seven month trial period, over 700 uninsured vehicles were removed from the road by ANPR equipped traffic enforcement (PA Consulting Group, 2004).

The application of ANPR technology has the potential to improve the enforcement of unregistered vehicle use on Queensland roads. This has several road safety benefits, such as the removal of vehicles that don't meet current safety standards and broader agency and community benefits from reducing the public burden from lost registration fees. Removing unregistered vehicles also ensures that government agencies can retain current databases on the vehicle ownership, registration status and vehicle type through the registered vehicles register.

Heavy Vehicle Driver Fatigue Monitoring

From 2002 to 2006, there were 243 fatalities as a result of crashes involving heavy freight vehicles within Queensland. This represents 15.1% of the Queensland road toll, however, heavy freight vehicles made up 2.6% of motor vehicles on register. Heavy freight vehicles were also overrepresented in the road toll when considered in terms of vehicle kilometres travelled (VKTs), representing only 8.25% of all VKTs in Queensland for the 12 month period to 31 October 2006.

ANPR technology can be used to monitor and enforce heavy vehicle fatigue regulations with the aim of reducing heavy vehicle fatigue related crashes. ANPR cameras can record the vehicle at strategic locations on the road network and the technology can determine if the time taken to traverse the distance between those points has provided the driver with ample time to take the appropriate rest breaks.

QT and MR conducted a trial of portable ANPR cameras at three sites along the Bruce Highway in March 2006. The purpose of the trial was to test portable ANPR technology in the field, evaluate the concept of detecting fatigue management non-compliance and to analyse ANPR collected data to determine potential enforcement and crash risk reduction benefits. Potential fatigue breaches occur when heavy vehicles are detected travelling between sites in less than the expected travel time, taking into account compulsory rest periods and an industry average speed of 85 km/h.

The Bruce Highway is a major freight route within Queensland, servicing major cities such as Cairns, Townsville and Brisbane. The test sites were located in Gympie, Greenacre/ Giru and Cardwell and estimated as taking 26 hours travel time (Gympie-Greenacre/Giru) and 29 hours travel time (Gympie-Cardwell). Key results of the trial include:

- 7,094 heavy vehicle number plate captures;
- 409 (5.8%) heavy vehicles potentially operating in violation of fatigue management guidelines; and
- 1,162 heavy and light vehicles detected as unregistered at the time of the trial.

Between November 2000 and April 2006, traditional enforcement resulted in an average of 625 heavy vehicle fatigue infringements per year. The week long trial of portable ANPR technology in March 2006 captured two-thirds of the yearly average, potentially increasing the likelihood of detection. The results from the week long trial in March 2006 support the concept of using portable ANPR technology for detecting heavy vehicle offences, in particular, enforcement of heavy vehicle fatigue along major freight routes.

The application of ANPR technology in this way will only prove successful in catching those drivers that use ANPR covered routes. The issue could arise where drivers use alternative routes to avoid fatigue detection monitoring, leading to an increase in heavy vehicles traffic along routes that are unable to safely manage the additional load. This could lower the safety for all users on such routes. The possibility exists of having to greatly expand any future implementation of ANPR cameras to cover secondary or alternative routes.

Monitoring and Enforcement of Speed

Speed has been identified as a contributing factor in 82 fatalities in the year to date within Queensland (as at 29 October 2007), which is 12 fatalities (or 17.1%) greater than for the same period in the previous year, and 32 fatalities (or 65.3%) greater than the 2002 to 2006 average for the same period.

Research has shown that speed enforcement programs backed by extensive public education campaigns are a major factor in substantial reduction in road fatalities. Speed enforcement is based on the principle of general deterrence which operates on the basis that drivers should expect to see speed detection devices (such as cameras and hand held RADAR devices) "anywhere, anytime". For enforcement to be effective, drivers must perceive the risk of being detected is high, and the level and nature of sanction which will result acts as a deterrent.

Evaluations of mobile, fixed position and time over distance speed cameras indicate that they are effective at reducing fatal and injury crashes (Pilkington and Kinra, 2006). A study commissioned by the UK Department of Transport indicates that time-over-distance cameras have been particularly effective at reducing speeds considered excessive – 15 km/h over the signed limit (PA Consulting Group & UCL, 2005).

ANPR has the potential to provide automated information on average vehicle speeds on parts of the road network and to support other speed enforcement measures. The ANPR cameras record the vehicle at two or more locations and the system determines if the time taken to traverse the distance between those points indicates a breach of speed limits.

The main benefit with time-over-distance enforcement is that vehicle speeds are monitored over a complete length of road, causing drivers to maintain even, safe speeds for longer periods. The use of ANPR cameras in this manner is not vulnerable to problems of drivers speeding between fixed speed camera installations, and the subsequent hard braking prior to, and then speeding up, beyond such installations.

The successful enforcement of heavy vehicle speed and fatigue restrictions using ANPR technology is a complex and resource intensive process. ANPR equipment needs to be calibrated and camera images verified to ensure that the correct number plate is captured. The number plate then needs to be linked with the correct vehicle operator or owner using information contained in heavy vehicle registration and operator databases. Once the numberplate and vehicle operators/owners are identified adjudication is required to substantiiate whether the operator or vehicle owner have infringed speed or fatigue restrictions.

NSW Safe-T-Cam Program

NSW Road Traffic Authority (RTA) established the Safe-T-Cam program in 1995 to monitor heavy vehicles and to reduce crash rates. Safe-T-Cam uses ANPR technology to identify vehicles that have travelled excessive speed, infringed fatigue regulations and to identify unregistered vehicles (RTA, 2007). Safe-T-Cam is part of an overall heavy vehicle enforcement program and includes a fixed network and portable units fitted to RTA enforcement vehicles.

The fixed network consists of 24 cameras mounted on overhead gantries and bridges across major transport routes in NSW. The network monitors the travel times of heavy vehicles to compare route times recorded by ANPR technology against driver entries in logbooks. The fixed equipment is also used in seven heavy vehicle checking stations to check logbooks and identify vehicles that fail to enter the station (RTA, 2007)

The mobile enforcement component of the Safe-T-Cam program includes 42 enforcement vehicles fitted with ANPR technology. This enables RTA enforcement officers to stop heavy vehicles and

check licence and registration details through the RTA database and interstate licences through the National Exchange of Vehicle and Driver Information System (NEVDIS) database. According to the RTA, the Safe-T-Cam program has improved the driving behaviour of heavy vehicle operators and contributed to a reduction in heavy vehicle crashes (RTA, 2007)

2. Potential costs and benefits

Installation, Maintenance and Data Processing.

The main issues concerning current ANPR resourcing are the high costs of project establishment and the recurrent expenditure for backend processing. Costs include the purchase of cameras and accompanying software, installation and infrastructure costs and the efficient processing of captured information.

An outline of these costs is at Appendix 2.

The financial implications of ANPR would need to be fully explored if ANPR is to be introduced on a wide scale within Queensland. In addition, all benefits and costs would need to be fully investigated by Government prior to a decision being made regarding implementation on a wide scale.

Nominal Defendant Fund

The Motor Accident Insurance Commission (MAIC) (the Commission) is responsible for the regulation and ongoing management of Queensland's Compulsory Third Party (CTP) Insurance Scheme and the Nominal Defendant Fund. Under the *Motor Accident Insurance Act 1994* the Nominal Defendant acts as an insurer where damages are claimed for personal injury arising from the negligent driving of uninsured or unidentified motor vehicles. Funds for the payment of Nominal Defendant claims are derived from a Nominal Defendant levy, which is included in the compulsory third party premium paid as part of vehicle registration. The current Nominal Defendant levy is $12.85 excluding the $5 surcharge for the HIH levy.

The introduction of ANPR technology could provide a positive cost benefit to both the Queensland Government and the community through the detection and consequential reduction of unregistered vehicles on the road. This benefit may offset the initial establishment costs of the ANPR technology.

Since the establishment of the CTP scheme in Queensland in September 1994, the total cost of unregistered and unidentified claims to the Nominal Defendant has been approximately $163.8 million. Claims for crashes caused by unregistered vehicles represent approximately 40 per cent of these claims and have resulted in claim payments to date (30 September 2007) totalling approximately $64.3 million.

In addition, ANPR may be of assistance in the identification of previously unidentified vehicles via the establishment and utilisation of a vehicle location database. Unidentified vehicles account for a considerable portion of the Nominal Defendant claims with a total of approximately $99.5 million being expended since September 1994. Despite the existence of a statutory provision for cost recovery, the Nominal Defendant encounters a high level of difficulty in recouping costs paid in unregistered vehicle claims.

3. Whether ANPR-enabled intercept teams should be used for traffic enforcement in Queensland, including examination of existing applications

Portable Units

International research has shown significant increases in the arrest rates for officers using mobile ANPR units, where the detection of unregistered vehicles is used to bring the specific vehicles to police attention. In the UK, police agencies have trialled ANPR technology together with intercept teams since 2002. An evaluation of the program (PA Consulting Group, 2004) indicates that the teams have contributed to increased enforcement of road offences such as unregistered driving, driving unlicensed or whilst disqualified, not wearing seatbelts and mobile phone violations. However, the success of the ANPR intercept teams to enforce the latter offences has been attributed to the additional on-road deployment of police officers and the increased observation of driver behaviour.

Unlicensed Driving and Criminality

Another application for ANPR technology is the detection of unlicensed drivers and drivers with outstanding infringement notices, which can be achieved using similar processes to those required for the detection of unregistered vehicles (PA Consulting Group, 2004). ANPR detected numberplates are compared to a blacklist of "vehicles of interest" for detection of unregistered vehicles, detection of unlicensed drivers, or drivers with outstanding infringements and then compared ANPR data with a blacklist of "people of interest". This information is derived from the registration and vehicle insurance databases (PACTS 2005).

Unlicensed driving, while not playing a direct causative role in road crashes, undermines the integrity of the driver licensing system and is associated with a range of high-risk behaviours.

Unlicensed drivers represent over 6% of the drivers involved in fatal crashes and 5% of those in serious injury crashes. Unlicensed drivers have been found to be almost three times as likely to be involved in a crash as licensed drivers. In the event of a crash, those involving unlicensed drivers were twice as likely to result in a fatality or serious injury (Watson 2005)

While ANPR technology is not currently used by the QPS and no ANPR cameras are owned by the QPS, in 2004, the QPS conducted a number of trials at selected sites throughout southeast Queensland to determine the effectiveness of ANPR technology in an operational setting. The primary trial of the technology involved the use of the QPS Vehicle of Interest (VOI) database in conjunction with a QT supplied 'blacklist' of unregistered vehicles.

The ANPR camera was deployed on 23 occasions for a total period of about 49 hours. A total of 23,000 vehicles were checked by the camera against the VOI/QT database. This trial resulted in the identification and interception of 123 vehicles. A total of 326 Traffic Infringement Notices or Notices to Appear were issued, mainly for traffic offences such as unregistered vehicles and unlicensed or disqualified driving.

The trials showed the technology to be reliable, transportable, effective and easy to use. No technical problems were encountered and the accuracy rate in terms of number plate recognition was about 84%.

The inherent advantage of using ANPR technology in this way is its capacity to process vast amounts of information against defined filters to serve specific policy objectives. However, this application of ANPR assumes that the person responsible for the vehicle is controlling the vehicle at the time of detection. This will not always be the case, making the linkage between numberplate and offence more tenuous than that for the detection of unregistered vehicles application.

It should be noted that the broad scale introduction of ANPR technology for criminality and intelligence applications requires further investigation of state regulations regarding privacy and the retention of information.

4. Other opportunities and considerations for its use by Queensland Government agencies to promote road safety

Heavy Vehicle Route Enforcement – Brisbane Urban Corridor (BUC)

ANPR technology has a role in the management of heavy vehicle access to the road network and current applications in Queensland include the Brisbane Urban Corridor (BUC).

In response to community concerns, ANPR technology is used for curfew or route management enforcement of heavy vehicles along the BUC. In this application, the ANPR cameras record the vehicle registration details of heavy vehicles travelling along the BUC.

The BUC forms part of the current national highway system that links the Ipswich Motorway to the Gateway Motorway. A number of truck drivers using this corridor are making through trips, from western areas such as Ipswich, Toowoomba, or Warwick, to the Port of Brisbane or to locations north of Brisbane. An alternative parallel corridor exists further south (specifically the Logan Motorway toll road) which, if better utilised, could reduce truck volumes on the BUC.

On 30 July 2007, ANPR technology was introduced on the BUC to ensue compliance with the truck restrictions. Non-compliance with the restriction will result in the issue of a penalty infringement notice.

Amendments were made to the *Transport Operations (Road Use Management) Act 1995* and the *State Penalties Enforcement Act 1999* to introduce provisions to capture ANPR images as a photographic detection device and to prescribe offences for non-compliance with BUC heavy vehicle restrictions.

Three ANPR stations are located along the BUC and connecting roads. At each station, there are a series of cameras, which capture images of all vehicles that pass the ANPR station. This information is then transferred via a secure communication network to a secure server, which undertakes a number of checks to determine whether an infringement notice should be issued. These checks include:

- the vehicle's registration number is matched to NEVDIS to see whether the vehicle is registered as a truck over 4.5 tonne;
- the registration number between all ANPR sites is matched, to identify when a truck has used the BUC as a route and the time that the truck passed the first "No Truck" sign and passed the last ANPR camera; and
- the time is matched when the truck passed the first "No Truck" sign and when it passed the last ANPR camera to determine if a truck has travelled along the BUC within a pre-defined timeframe, thus defining it as a "through-route" vehicle.

BUC Enforcement Issues

A number of implementation issues have arisen as a result of the BUC Heavy Vehicle Through-route Restriction.

The positioning of the ANPR cameras is critical to maximise the accuracy of the system. Although capture rates of 95% are possible, the incorrect positioning of a camera in relation to the road could result in very low collection rates. Furthermore, environmental factors such as sunlight and shadows and issues such as pavement colour, geometric constraints and poor number plate quality can also affect the performance of the system. In addition, consideration should be taken into the positioning of cameras over the traffic lane (i.e. gantry or bridge mounted) rather than on the side of the road to reduce vehicle shadowing.

As with all optical systems, regular maintenance is necessary to maintain a high level of performance. Maintaining a clean camera is directly dependant upon the accuracy of the system and the frequency of maintenance depends upon the local environment. Due to the requirements on positioning an ANPR camera, as well as security, access must be made available with walk on gantries or easily accessible pole mounted arrangements. Security of the system must also be considered as the equipment is expensive and sensitive, and if used for enforcement, is a target for vandalism.

Processing of the data is not inconsequential. The five ANPR stations in the BUC project collect approximately 300,000 vehicle records per day. This equates to several gigabytes of data per day which creates storage issues if all images are retained. Furthermore the transfer of this data from the field devices to a central storage/processing server is also a significant consideration.

Data security and privacy are also concerns that need addressing. The BUC project utilises high security encryption and digital signatures to ensure that the data is not tampered with. In addition access to the images is restricted to the point that only QPS can view the images.

Weigh in Motion Sites (WiM)

ANPR cameras are used in conjunction with certain Weigh in Motion sites (WiM) sites to identify overloaded vehicles. MR is currently considering a wider application of this approach.

ANPR technology was first trialled in Queensland by MR at a WiM site at Brendale on the north side of Brisbane in 2002. The objective of the trial was to detect and identify overloaded heavy vehicles and with the assistance of QT's compliance officers pursue offenders through Chain of Responsibility (COR) legislation.

A second site was established at the Port of Brisbane in 2003 at an existing WiM site at the entrance to the Port. All vehicles entering or exiting the Port must pass over this site and be weighed. The Port of Brisbane is a major freight hub and the combination of WiM and ANPR at this site provides a unique opportunity to keep overloaded heavy vehicles off Queensland's roads. A number of COR investigations have been launched as a result of the extra information gathered by the technology.

MR intends rolling out ANPR technology to key WiM sites to provide a greater deterrent to heavy vehicle overloading.

There are, however, concerns with the inability of WiM sites to counter secondary behaviours, such as heavy vehicle operators taking different routes to avoid detection. ANPR cameras could be employed to identify potential non-compliant vehicles that leave and then return to their original route having bypassed a WiM site.

Illegal overloading is estimated to be costing the state more than $60 million a year in accelerated wear and damage to the road network. Identifying heavy vehicle operators via the coupling of ANPR technology to WiM sites provides benefits including:

- Information to support COR investigations;
- Efficient selection of overloaded heavy vehicles from the traffic stream without inconveniencing responsible operators;
- Reduced incidence and overload heavy vehicles entering the traffic stream; and
- Material to develop a targeted education campaign about heavy vehicle overloading to peak industry groups.

Traffic Surveys and Management

Vehicle movements are currently measured by various traffic count surveys. These surveys are often manual surveys that are time consuming and labour intensive in terms of both data collection and data analysis.

QT and MR have a joint interest in the use of ANPR technology for traffic management – both for intelligent traffic management systems (e.g. adaptive road signage) and for road utilisation and origin-destination studies. These applications require fixed installations and will provide details from every vehicle passing within range of the ANPR camera to provide information on vehicle movement.

Origin Destination (OD) Surveys: Cameras are positioned at identified entry and exit roads of the area of interest. The cameras at the various nodes record date and time of individual vehicle movements and analysis of the aggregated data provides details of vehicle movements within the capture area. Survey periods range from short duration of 12 hours to full week surveys. The sample size is significantly larger, and more accurate, than historical methods of obtaining OD data. The survey provides data on the route and time taken to traverse various points on the road network.

Travel Time Surveys: These surveys are very similar to OD surveys. Cameras are positioned on routes of interest at identified journey start and end points. The cameras at these points capture date and time of individual vehicle movements and the analysed data provides statistics on journey time on a route of interest.

Roundabout Surveys: This type of survey could be described as a small scale OD survey. Cameras are positioned on the approach and departure side of each leg of the roundabout and the analysed data provides statistics on entry and exit leg movements through the roundabout.

Intersection Surveys: This survey is very similar to a roundabout survey. Cameras are positioned on the approach and departure side of each leg of the intersection and the analysed data provides statistics on turning movements from each leg of an intersection. That is, the proportion of vehicles making left, right turn or through movements at each leg of an intersection.

The information gained from traffic surveys using ANPR technology have many uses, including:

- providing a basis for planning and designing traffic facilities, including the selection of geometric standards, economic analysis, impact assessment, and the determination of priorities;

- assisting traffic operation by indicating the needs for traffic control devices such as signs, traffic signals, pavement markings, and school and pedestrian crossings;
- evaluating the effects of road safety measures and other changes made for traffic by conducting 'before and after' studies;
- improving the understanding of traffic behaviour, and
- providing heavy vehicle and freight data to improve pavement analysis and design capability, bridge management capability, and the monitoring of road network performance.

Dangerous Goods

Vehicles licensed to carry dangerous goods (such as explosives or chemicals) are prohibited from using specific routes and tunnels. The registration numbers of these vehicles can be loaded into the ANPR camera and the system is capable of generating an immediate alarm if a vehicle is detected. Alternatively stored data is electronically downloaded from the camera for processing and investigation of any infringements.

Transport Security

ANPR has potential applications in Transport Security related to vehicle monitoring and security incident investigation by Queensland and Federal agencies. This includes;

- monitoring specific vehicle of interest movements along approach corridors to at-risk infrastructure and events;
- the identification of vehicles entering/leaving security identified surface transport operational precincts; and
- monitoring vehicle lay-over times within precincts.

Variable Speed Limits

A Variable Speed Limit (VSL) is a designated speed limit along a particular road or highway that may change depending upon conditions, events, or time of day. The purpose of varying the speed limit is to provide a safer environment to those in the vicinity of the roadway, and for motorists, by providing warnings of potential dangers such as road construction projects, inclement weather, changed traffic conditions, or school zones.

The issue of road project worker safety is a significant issue, but speed enforcement in such an instance is effectively unenforceable without the use of ANPR cameras. Due to limited, safe off-road areas on road construction projects, it is not practicable to employ traditional speed enforcement sites.

To improve compliance with variable speed limits around schools and major road construction projects, such as the Gateway Upgrade Project, ANPR cameras could be positioned within VSL zones to improve compliance with the VSL and to catch speeding drivers.

5. Additional issues

System Interoperability

An important aspect when considering the appropriateness of ANPR technology for a specific application is the ability to pair ANPR software to existing infrastructure. This application is far preferable to installing new ANPR camera infrastructure. When ANPR technology is used in conjunction with existing infrastructure, the aim is to expedite the post-event business processes. For example, the potential exists in red light and speed camera enforcement for ANPR software to scan offence images from existing cameras to expedite the post-event administrative process for issuing infringement notices. The need for system interoperability is paramount if ANPR technology is to be fully effective.

The use of ANPR technology also has the potential to reduce traffic infringement processing time by allowing automatic identification of vehicle details from the image generated by speed, a red light, or other related enforcement camera. This removes the need to manually verify vehicle details and shortens the time for details to be forwarded to police or a processing authority.

Privacy

While ANPR technology can provide important information for security, criminality, and road safety applications, it is important that government agencies use ANPR technology responsibly. This includes ensuring that ANPR information is collected and retained in compliance with government policies and procedures.

The ANPR project raises several privacy issues related to the collection, storage, and access to personal information. These issues can be addressed through a variety of means, including the encryption of data, secure network connections, use of activity logs, user passwords, and limiting access of information to authorised officers. The implementation of these technologies and internal procedures will ensure adequate protection is in place to meet Information Privacy (IS42).

An ANPR Privacy Impact Assessment has been drafted by Queensland Transport. This assessment will form the basis for ensuring that personally identifying information is handled consistently across the Queensland public sector and treated in a manner that respects an individual's privacy and complies with IS42.

A further outline of privacy issues is at appendix 1

CrimTrac

On 19 September 2007, the Parliamentary Joint Committee on the Australian Crime Commission released *Inquiry into the future impact of serious and organised crime on Australian society*, which recommends the development of a national automatic number plate recognition system (ANPR). (Recommendation 19: The committee recommends that the Commonwealth, state and territory governments implement a national number plate recognition system). Currently, CrimTrac are identifying a scoping study to identify a strategic national approach to the use of the ANPR technology. Road safety was identified as forming one strand of potential valuable outcomes from ANPR, in addition to, for example, fighting serious crime and organised crime, application for intelligence gathering and counterterrorism.

As a member of the CrimTrac Board, the Commissioner of Queensland Police recently supported CrimTrac undertaking a scoping study in relation to ANPR. In that context, the Commissioner indicated to CrimTrac that any decision to adopt this technology on a large scale by the QPS would likely require Queensland Government support and funding. As a result, no firm commitment could be made that Queensland will take up ANPR technology, regardless of the outcomes of the scoping study.

Appendix 1

ANPR technology privacy implications

Queensland's Privacy Scheme

The management of personal information by Queensland government agencies is governed by two Information Standards - Information Standard 42 (IS42) and Information Standard 42A (IS42A). IS42A applies only to Queensland Health, and is based on the ten National Privacy Principles (NPPs) contained in the *Privacy Act 1988* (Cth). IS42 is based on the eleven Information Privacy Principles (IPPs) in that Act and applies to the remaining government agencies, with some exemptions.

Organisations exempted from the operation of IS42 are:

- Royal commissions of Inquiry;
- Parents and Citizens Associations;
- Queensland Department of Health; and
- Courts and tribunals with respect to their judicial and quasi-judicial functions.

Law enforcement agencies (defined as the Queensland Police Service and the Crime and Misconduct Tribunal), are exempt from IPPs 2, 3, 9, 10, and 11.

Information exempted from the operation of IS42 is *personal information*:

- arising from or connected with specified covert activities or controlled operations;
- about a witness included in the witness protection program under the *Witness Protection Act 2000*, or person who is subject to witness protection arrangements under another Act;
- contained in a public interest disclosure under the *Whistleblowers Protection Act 1994*, or collected in the course of an investigation into the same;
- contained in Cabinet and Executive Council documents; and
- arising out of a Royal Commission or commission of inquiry.

IS42 impacts on any proposed use of ANPR technology on Queensland's roads because it prescribes how agencies are to collect, store, use and disclose personal information they hold, and sets out how this personal information may be accessed and amended by the individual concerned.

Personal information

The information which will be collected using ANPR technology is personal information within the meaning of IS42. Personal information is defined in IS42 as *information or an opinion (including information or an opinion forming part of a database), whether true or not, and whether recorded in a material form or not, about an individual whose identity is apparent, or can reasonably be ascertained, from the information or opinion.*

In order for the information to be *apparent* one must be able to look at the information collected and know or perceive plainly and clearly that it is information about a particular individual[1]. This will include situations where a photograph was included with the information, a person's name was

[1] WL v La Trobe University (General) [2005] VCAT 2592

mentioned, or where because of the singular nature of the information it could be no one else but a particular person.

Determining when an individual's identity is *reasonably ascertainable* from the information is not limited solely to a consideration of the information itself. Reference can be made to extraneous material, but resort to these sources is limited by the concept of reasonableness - the identity of the individual must be reasonably ascertainable. What is reasonable will also depend on the circumstances of each case.

Given that there will be the capacity to link a licence plate photograph with an identifiable individual, using databases of information maintained by government agencies, the deployment of ANPR technology in this way would attract the obligations in IS42.

Further, the moment that information is identified and stored, an entirely new set of personal information is created thus attracting privacy obligations.

Collection of Personal Information

ANPR technology will involve a collection of personal information within the meaning of IS42. Collection is governed by IPPs 1-3 which means that:

The collection of the information must be for a recognisable purpose that is directly related to a function or activity of the collector. Additionally, the collection of that particular information must be necessary for or directly related to that purpose and reasonable steps must be taken to ensure the information is relevant to the purpose and up to date and complete. Finally, the fact that the information has been collected must not intrude to an unreasonable extent upon the personal affairs of the individual.

IS42 requires that, when an agency is collecting personal information, it takes such steps as are reasonable (if any) to inform people that their information is being collected and why, unless that information is provided voluntarily to the agency (see IPP2). As the personal information collected using ANPR technology is not given voluntarily, reasonable steps will have to be taken to inform people about ANPR, for example by way of road side signage.

At the very least, the community would expect to be informed that cameras are in use and their location. Queensland Transport has installed signs at all camera locations where it uses ANPR for heavy vehicle monitoring,

Issues

Collection or personal information by unfair means

IS42 requires that personal information must be collected by fair means and in a way that does not intrude unreasonably on the affairs of the individual (see IPPs 1 and 3).

Drivers and those who travel in vehicles cannot consent to the collection of their personal information, because they have no way of preventing their information from being collected if they wish to use the roads. Widespread ANPR use does not discriminate in its collection of personal information, and may be perceived by the community as intruding to an unreasonable extent on their affairs.

Use and disclosure of personal information

IS42 places limitations on what an agency can do with personal information it collect and holds. For example, personal information may only be used for the purpose it was collected or for a directly related purpose. Similarly, IS42 prohibits the disclosure of personal information outside the agency that holds it, subject to a small number of exceptions (see IPPs 10 and 11), therefore the deployment of ANPR and the management of the personal information collected must comply with these principles.

Function creep

Function creep is where technology can be used for multiple purposes, or is used to collect large volumes of personal information about numerous people. It occurs when the technology, or the personal information it collects, is used for an additional purpose beyond that for which the technology was introduced, or the information collected.

The examples cited in the discussion paper of the successful use of ANPR in the United Kingdom relate to law enforcement activities much broader than those that would achieve traffic safety objectives. Any proposals to use personal information collected with ANPR technology for traffic safety purposes to be used for additional or unrelated purposes, including broader law enforcement activities, would be unlikely to comply with IS42 as it now stands.. One approach that can be used to resolve the privacy issues arising introducing new technologies is to provide for the privacy issues within a legislative framework. This allows the management of the technology and the personal information it collects to be clear, open and transparent.

Appendix 2

Approximate cost of a single installation

Permanent installations

Indicative Initial Costs

ANPR Equipment:

Fixed ANPR cameras per lane of detection (including installation) - $40,000

Supporting Infrastructure:
Over lane gantry (30m span suitable for 4 lanes) - $700,000
Pole installation - $100,000 (suitable for 1 lane only)

Back Office System Development for Routine Surveys:
System Development - $150,000
Hardware - $80,000

Back Office System Development (for the BUC Enforcement):
Processing - $500,000 to $1.5M depending on system size (does not include adjudication systems)
Hardware - $100,000
Recurrent Costs

ANPR Equipment:
Routine Camera Maintenance - $5,000 p.a. (per camera station)
Power and Communications - $2,000 p.a. (per station)

Supporting Infrastructure
Inspections - $4,000 p.a. (per station for gantry installation)
$1,000 p.a. (per station for pole mounted installation)

Processing and Data management - $25,000 pa

Portable systems

Mobile ANPR camera - $30,000

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