




Prepared in 2013 for
NSW Roads and Maritime Services by
Transport Certification Australia Ltd



Transport
Roads & Maritime
Services

FINAL REPORT

OPERATIONAL PILOT OF ELECTRONIC WORK DIARIES AND SPEED MONITORING SYSTEMS



Final Report - Operational Pilot of Electronic Work Diaries
and Speed Monitoring Systems

Prepared by Transport Certification Australia Limited
in 2013 for NSW Roads and Maritime Services
12/535 Bourke Street
Melbourne VIC 3000
Tel +61 3 8601 4600
Fax +61 3 8601 4611
Email tca@tca.gov.au
www.tca.gov.au

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FOREWORD



The NSW Government is committed to a safer heavy vehicle transport industry and supports the role of emerging vehicle technologies in improving safety.

The National Road Safety Strategy 2011-2020 identifies driver fatigue as a major and potentially growing problem area for road safety. The strategy notes that in some cases, sleep-deprivation can have similar hazardous effects on driving to alcohol consumption.

Heavy trucks were involved in 17 per cent of fatalities on NSW roads between 2009 and 2011 and nearly 30 per cent of these crashes involved interstate heavy vehicle drivers.

To help address these issues the NSW Government, through the NSW Road Toll Response Package, committed more than \$5 million for the Operational Pilot of Electronic Work Diaries and Speed Monitoring Systems. This Pilot was established to examine the feasibility of introducing electronic work diaries on a national basis as a voluntary alternative to the written work diaries currently kept by drivers of fatigue regulated heavy vehicles.

The Pilot found that electronic work diaries are feasible from technical, operational and regulatory perspectives. It also found electronic work diaries may generate safety and productivity benefits as access to reliable work and rest data in electronic form has the potential to assist drivers and operators to more easily and proactively manage fatigue and address some of the inefficiencies with the current paper-based diaries.

The Pilot was led by NSW Roads and Maritime Services for the NSW Centre for Road Safety. Transport Certification Australia was engaged by NSW Roads and Maritime Services to conduct the Pilot.

The governance arrangements for the Pilot ensured that input was received throughout from various stakeholders including industry, the National Heavy Vehicle Regulator, the National Transport Commission, the Commonwealth Government as well as police and road agencies from Queensland, New South Wales, Victoria, South Australia and Western Australia.

The results of the Pilot have come at an exciting time for the heavy vehicle industry with the commencement of the National Heavy Vehicle Regulator during 2013. In May 2013 the Standing Council on Transport and Infrastructure agreed that the next step for electronic work diaries is for a national approach to implementation to be developed by the National Heavy Vehicle Regulator and the National Transport Commission for consideration by the Standing Council later in the year.

The NSW Government is committed to working with the transport industry to address heavy vehicle safety as it continues to strive for a significant reduction in annual fatalities and serious injuries on our roads. It is anticipated that the introduction of electronic work diaries will make a positive contribution to fatigue management, and potentially lead to fewer fatigued heavy vehicle drivers on our roads. If there are fewer fatigued heavy vehicle drivers on our roads, there should be a reduction in casualty crashes involving heavy vehicles. If our community is protected from the trauma of even one heavy vehicle fatal crash then the investment in this project by the NSW Government has been worthwhile.

I congratulate everyone who contributed to the success of the Pilot and the production of this report, and look forward to this important regulatory technology making a contribution to safer drivers and safer roads.

The Honourable Duncan Gay
Minister for Roads and Ports

ACKNOWLEDGEMENT



This report presents the findings and recommendations of the Operational Pilot of Electronic Work Diaries and Speed Monitoring Systems. The objective of the Pilot was to test and provide recommendations to refine the policy and specification developed by the National Transport Commission and Transport Certification Australia respectively, for the approval of electronic systems and their use for enforcement and business purposes while delivering safety and productivity outcomes.

Electronic Work Diaries are about providing alternatives to the written work diaries that support the achievement of a safe and efficient operation of the road freight and logistics industry, demonstrated through improved industry compliance with fatigue and speed laws. Electronic Work Diaries will influence the commercial application of telematics to achieve further safety improvements that complement compliance, enforcement and safety regulatory objectives.

The Pilot found that an Electronic Work Diary is feasible and has identified the optimal technical and operational environment that supports government policies today and in the future.

As the Chief Executive Officer of Transport Certification Australia I would like to thank Mr Peter Wells, Director, Customer and Compliance, NSW Roads and Maritime Services and Chair of the EWD National Steering Committee. I would also like to thank my fellow Steering Committee members, members of the Project Management Committee and the Industry Reference Group, the transport and telematics industry participants, along with the police and enforcement community participants, my project team and the entire Project Team at NSW Roads and Maritime Services and Transport for NSW, for their successful delivery of the Pilot.

A special acknowledgement must go to the NSW Government for funding the Pilot as part of the NSW Road Toll Response Package.

Chris Koniditsiotis
Chief Executive Officer
Transport Certification Australia Limited

PILOT COMMITTEE MEMBERS

STEERING COMMITTEE

ORGANISATION
NSW Roads and Maritime Services
Centre for Road Safety, Transport for New South Wales
Transport Certification Australia
VicRoads
New South Wales Police
Queensland Department of Transport and Main Roads
Queensland Police
Victoria Police
Main Roads, Western Australia
Department of Infrastructure and Transport, Australian Government
South Australia Department of Planning, Transport and Infrastructure
South Australia Police
National Transport Commission
National Heavy Vehicle Regulator Project Office

PROJECT MANAGEMENT COMMITTEE

ORGANISATION
NSW Roads and Maritime Services
Centre for Road Safety, Transport for New South Wales
National Transport Commission
Transport Certification Australia
VicRoads
South Australia Department of Planning, Transport and Infrastructure
Main Roads, Western Australia
Queensland Department of Transport and Main Roads
Department of Infrastructure and Transport, Australian Government
National Heavy Vehicle Regulator Project Office

INDUSTRY REFERENCE GROUP

ORGANISATION
NSW Roads and Maritime Services
National Transport Commission
Australian Trucking Association
Australian Livestock Transporters Association
Victorian Transport Association
South Australian Road Transport Association
NatRoad Limited incorporating Australian Road Train Association
Australian Logistics Council
Livestock and Bulk Carriers Association
Transport Workers' Union of New South Wales
Bus and Coach Association New South Wales
Western Australia Road Transport Association
Road Transport and Road Safety Advocate

EXECUTIVE SUMMARY

BACKGROUND

The Operational Pilot of Electronic Work Diaries and Speed Monitoring Systems (the Pilot) was funded as an initiative of the NSW Government as part of the 2010 NSW Road Toll Response Package, which provided \$170 million for a range of road safety initiatives. Funding of over \$5 million was provided for the Pilot, to determine the technical and operational feasibility of the Electronic Work Diary (EWD) and the extent to which it would contribute to improved fatigue compliance.

The 2008 Heavy Vehicle Driver Fatigue National Model Legislation provided for a range of fatigue related measures including the recording of work and rest times in a Written Work Diary (WWD) or EWD. This model legislation was adopted by Queensland, New South Wales, Victoria and South Australia.

In July 2009, the Council of Australian Governments agreed to establish a single National Heavy Vehicle Regulator (NHVR) to regulate all vehicles over 4.5 tonnes Gross Vehicle Mass. In November 2011, Australia's transport ministers unanimously agreed to the first national heavy vehicle bill at the inaugural Standing Council on Transport and Infrastructure (SCOTI) meeting.

The NHVR commenced operation in January 2013 and is an independent statutory authority based in Queensland. The NHVR reports to the SCOTI and is Australia's first national, independent Regulator for all vehicles over 4.5 tonnes gross vehicle mass.

The Heavy Vehicle National Law (HVNL) has been introduced in Queensland with other participating jurisdictions expected to introduce and pass related legislation in 2013. There were no major changes to legislation in regards to heavy vehicle driver fatigue and in this report all references to the HVNL should also be read as referring to the regulations made under this law and to the model legislation it is replacing.

The HVNL requires that a WWD (or an approved EWD) is used by drivers of fatigue regulated heavy vehicles¹ to record hours of work and rest. Drivers are exempt from this requirement where they are driving locally (less than 100km from their base within their state). Drivers who are participating in fatigue management schemes provided for in the law, or are driving under a work/rest hours exemption or have done so in the last 28 days, are required to keep a diary for all work.

Prior to the Pilot's commencement in 2011, work had been undertaken at the direction of the Australian Transport Council (now SCOTI) to develop:

- A national policy framework and regulatory impact statement for electronic heavy vehicle driver systems (encompassing heavy vehicle speed)
- A performance based specification for electronic heavy vehicle speed and driver fatigue systems enhancing the use of in-vehicle telematics and adding value to the Intelligent Access Program (IAP).

In August 2011 Austroads published the *Performance Based Specification for Electronic Work Diary and Heavy Vehicle Speed Report* (Austroads Report). The Austroads Report included the *Electronic Work Diary (EWD) Specification - Performance Based Specification for EWD and Heavy and Heavy Vehicle Speed Monitoring* (EWD Specification) developed by Transport Certification Australia (TCA) in 2009 and the National Transport Commission's (NTC's) policy position as described within the March 2011 *Electronic Systems for Heavy Vehicle Driver Fatigue and Speed Compliance Policy Paper* (NTC Policy).

The Austroads Report identified a number of issues that would need to be resolved prior to implementation of EWDs to address key differences in the approach taken to the EWD by TCA and NTC. Austroads recommended an operational pilot to resolve these outstanding issues.

An operational pilot was established to resolve these issues and make any necessary revisions to the an EWD Specification. It was also tasked to identify the optimal technical and operational environment under which an EWD would be feasible and deliver improved safety and productivity outcomes.

PILOT OUTCOMES

The EWD was found to be feasible and the optimal technical and operational environment was identified. A number of legislative changes will be required to reflect the proposed EWD. Additionally there are a number of policy issues which have been highlighted in the Pilot which, depending on the resolution of these issues, will impact on industry adoption and overall effectiveness of EWDs.

¹ A fatigue related heavy vehicle is defined as a vehicle with a gross vehicle mass (GVM) of more than 12 tonnes (t), a combination of a GVM of more than 12t or bus over 4.5t with a seating capacity of more than 12 adults including the driver

EWD MODEL

The primary functions of an EWD are to:

- Record work and rest declarations of the Driver
- Provide records for Authorised Officer review
- Provide records for Record Keeper/Transport Operator review.

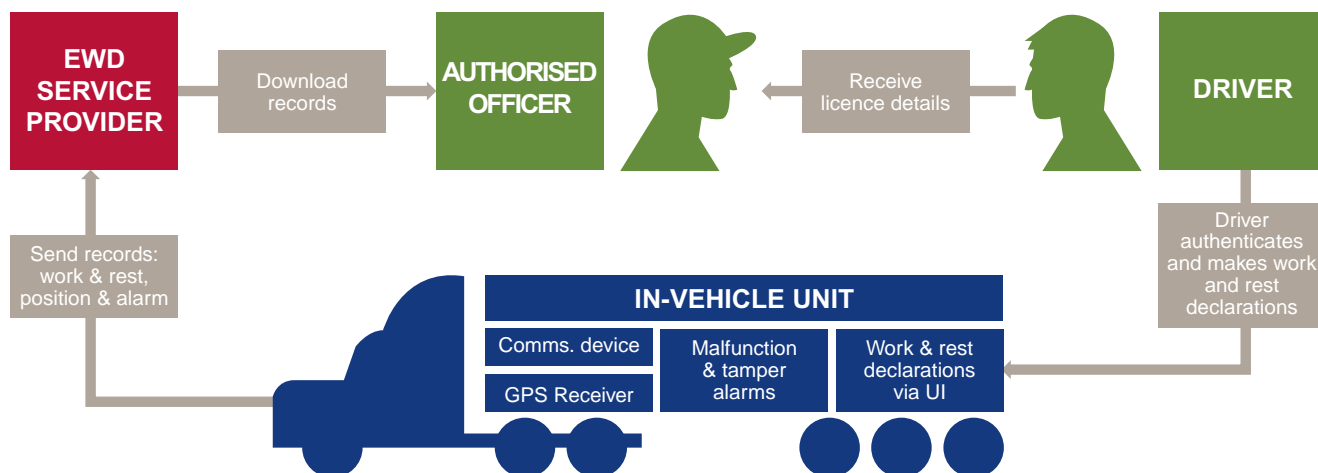
The EWD is comprised of the following broad technical elements:

1. In-Vehicle Unit (IVU) – this is the physical telematics box that is tethered in the heavy vehicle
2. User Interface (UI) – this generally refers to the screen and touchpad/keypad that will be used by Drivers to access and enter information

3. EWD Service Provider (EWD-SP) System – this refers to the EWD-SP's hardware and software (excluding the IVU and UI) used in the collection, processing, testing, storage and communication of EWD data
4. Remote Connection Access Framework (RCAF) – this is a defining feature of the preferred EWD model under which EWD data is continuously captured by the IVU, transmitted to remote storage, from where it is accessed through the internet
5. Compliance Assessment Software (CAS) – this software was developed in the Pilot and allows Authorised Officers to assess compliance with the fatigue rules
6. Interface for data storage and transfer – the EWD Specification provides for an optional interface that enables the transfer of data from the IVU to an approved portable mass storage device.

Figure 1 provides an overview of how the EWD works and how the Driver and Authorised Officers interact with the EWD.

Figure 1: Overview of EWD



EXECUTIVE SUMMARY

The HVNL provides for the use of an EWD as an alternative to a WWD if it is approved by the Regulator.

As part of the approval process the EWD System Manager type-approves and certifies that the IVU, UI and EWD-SP System are compliant with the EWD Specification prior to the EWD's approval for use by the Regulator.

The Driver records their work and rest declarations through the UI. The IVU also continuously records the vehicle's location in the form of Position Records whenever the vehicle is in operation.

In an EWD environment records are automatically downloaded from the IVU to the EWD SP and are then forwarded to the Record Keeper (if the EWD-SP has not been engaged to perform the record keeping task).

Where the Driver operates under more than one EWD, applicable records are transferred between EWD-SP Systems. (and therefore Record Keepers) seamlessly through a central registry.

Drivers have access to their own records through an in-vehicle display when operating the vehicle. The EWD Specification requires that they must also have access to their records when outside the vehicle. The mechanism by which this is provided is not prescribed; it may be, for example, a website or Smartphone application.

Roadside access of Driver records by Authorised Officers can be through one of two mechanisms:

- Remote connection to review Driver records held by the EWD-SP through laptop, in-vehicle electronic equipment, radio, phone or Short Message Service (SMS)
- Review of records through an in-vehicle display.

CAS has been developed by the Pilot to assist Authorised Officers in the review of EWD records. This software assesses Driver records for compliance against the fatigue legislation. For road side review, Driver records are obtained remotely from the EWD-SP and are assessed against fatigue legislation with Authorised Officers presented with a compliance assessment.

CAS may also be used to assist Authorised Officers in back office audits of Driver records held by a Record keeper enabling Authorised Officers to review multiple Driver records at one time.

As such, by enabling accurate and rapid review of large volumes of Driver records a significant efficiency is achieved over the current review process of WWDs.

The EWD was originally based on the utilisation of a regulatory Driver Recording Device (DRD). The DRD was essentially a secure USB mass storage device for insertion in the IVU during the operation of an EWD and would store driver records. The DRD was intended to:

- Allow Authorised Officers to review records at the roadside
- Enable a portable record for the Driver to take between vehicles and Transport Operators.

The Pilot assessed that, while technically feasible, the DRD was not the preferred option due to a range of technical and operational risks, cost and overall technical design. An alternative approach known as the RCAF was developed as a result. This is a process that enables remote access to records for Authorised Officers and provides a technical environment compatible with providing Transport Operators and Drivers with remote access to records.

To support a de-centralised approach to the storage of EWD records, key activities that take place under the RCAF are:

- The central EWD Registry maintains the details of EWDs, Drivers (registered to use EWDs) and EWD-SPs (and other Record Keepers). The EWD Registry contains the address of where records are stored and the currency of those records but does not store Driver records. The EWD Registry acts as a directory to facilitate record access from Drivers, Transport Operators, Authorised Officers and, where required, between EWD-SPs
- Each EWD-SP must update the EWD Registry with the details of the Drivers using their EWD
- Driver work and rest records are held by the EWD-SP and accessed using remote access technology by other EWD-SPs (if required) and Authorised Officers
- When a Driver uses the EWDs of multiple EWD-SPs (eg the Driver works for two companies), the EWD-SPs use the EWD Registry to ensure that they have all of the Driver's EWD records for the last 90 days
- Using the driver licence number and jurisdiction of issue, the Authorised Officer accesses and downloads Driver records at the roadside.

It is acknowledged that the RCAF creates some challenges in remote locations where communications connectivity may be poor or unavailable. A variety of operational options have been devised to address this issue including the use of enhanced equipment, SMS, radio and viewing of records on the IVU display. Provision has also been made in the EWD Specification for an additional technological option of an interface to be approved for specifically defined remote locations, allowing records to be transferred from the IVU and stored.

In evaluating the EWD the Pilot has followed four key areas of enquiry:

1. **Safety** – does the EWD shape safer behaviour?
2. **Acceptance** – will people accept the EWD?
3. **Technology** – does the technology work?
4. **Legislation and Policy** – does the legislation and policy work?

Key findings for each area of enquiry are listed below.

Key findings: safety

- EWDs improve compliance through:
 - Improved data accuracy and transparency to Drivers, Transport Operators and Authorised Officers
 - Provision of real time data which enables Transport Operators to respond immediately to actual breaches and monitor performance over time
 - In-vehicle driver information which enables Drivers to plan their work and rest and take action when alerted to an imminent or actual breach
- Improved compliance with fatigue rules is expected to ultimately contribute to a reduction in heavy vehicle crashes as these rules are based on expert advice regarding minimisation of driver fatigue
- The extent of safety benefits from the adoption of EWDs will be influenced by:
 - Existing use of commercial telematics – The greatest benefit from EWDs will be achieved where telematics have not been previously used by Transport Operators to monitor fatigue compliance. Where these devices have previously been used proactively to manage fatigue and are of a certifiable standard, there are likely to be fewer compliance benefits from introducing an EWD
 - Existing safety culture including management reporting and response to fatigue breaches – The greatest safety benefit will be achieved where the EWD is introduced as part of a culture of fatigue management monitoring, reporting and intervention to improve fatigue compliance.

EXECUTIVE SUMMARY

Key findings: acceptance

- Drivers saw benefit in the use of telematics to monitor compliance with fatigue legislation. They appreciated the provision of information to assist them in planning and viewed the device as reducing the effort required to manage fatigue rule complexity
- Transport Operators saw a range of commercial, safety and customer benefits with the use of telematics. Some Transport Operators are interested in taking up an EWD, provided that cost is not prohibitive and that outstanding enforcement and scrutiny issues are addressed by Authorities and the Regulator. Smaller operators and those in the livestock industry in particular indicated that they would be unlikely to consider an EWD due to the limited perceived benefits and concerns about increased regulatory scrutiny which they believe will result in increased enforcement activity
- Authorised Officers found CAS useful and their feedback has been incorporated into the EWD Specification and development of CAS. Further in-field experience, particularly with the RCAF, is expected to ensure implementation meets the needs of Authorised Officers and improves acceptance
- Evaluation of telematics usability issues have found a number of areas where care in design is needed. Where appropriate these findings have been included in the EWD Specification
- The Pilot has identified a range of benefits that the EWD as an electronic system has over the WWD as a manual system and which go to the acceptance of the EWD:
 - An EWD allows the Driver and Transport Operator to more easily review past work and rest records using data stored in electronic form, to ensure they operate in compliance with fatigue laws
 - The EWD will automatically pre-populate records with default information and reduce the time it takes Drivers to manually record work and rest information
 - The EWD will record time and location to provide greater accuracy for recorded information
 - With CAS the EWD will automate and reduce the time taken for a compliance check for both the Driver and Authorised Officer who must manually calculate compliance with the WWD, especially during on-road intercepts
 - Through the use of CAS, the EWD has the potential to allow more efficient use of Authorised Officer time in assessing fatigue compliance reducing business interruption for Drivers and Transport Operators during an intercept
 - The migration of drivers from WWD to EWD will reduce the quantities of WWDs which jurisdictions are required to print and issue, a significant number of which are reported as lost or stolen.

Key findings: technical feasibility

- The EWD is technically and operationally feasible
- The RCAF is the preferred model
- The amendments to the EWD Specification reflecting the findings of the Pilot include:
 - Development of the RCAF and associated functionality such as the EWD Registry
 - Requirement for GNSS, tethering and tamper monitoring
 - Display resolution of time at one minute
 - Removal of the requirement for a printer as part of the IVU
 - Removal of the DRD as a required component of the EWD while allowing for an interface for data storage and transfer for certain applications
- The technology approach of the RCAF is aligned to that being developed for heavy vehicle monitoring in Europe and the United States of America
- On-road enforcement can be undertaken through a variety of remote access mechanisms including a laptop, smartphone or other in-vehicle electronic equipment. Where communications are unavailable, the review of Driver records can occur through the in-vehicle display
- Based on an analysis of field collected data almost 90 per cent of intercept locations are able to view driver records current to within the last 15 minutes and almost 70 per cent of locations are able to view driver records current to within one minute
- There are a range of security threats and risks in the EWD, as there are in any system. Risk mitigation has been built into the EWD Specification and overall EWD environment.

Key findings – legislation and policy

- There are a number of legislative changes that are required to support the operation of an EWD. These issues will need to be addressed before wide scale deployment occurs
- The EWD Specification outlines a range of measures which will support the evidentiary quality of EWD information and chain of evidence including the certification, auditing and monitoring of EWDs. Acknowledging this approach and to ensure that the veracity of EWD records do not need to be established for each prosecution, consideration should be given to a legislative provision to provide for the acceptance of these records unless there is evidence to the contrary
- From the perspective of the transport industry there remain outstanding issues with respect to enforcement and sanctions under an EWD. This is likely to impact take up of EWDs
- While EWDs may be used to record local work, as with the WWD there is no requirement under the fatigue laws to record local work except for drivers participating in fatigue management schemes (BFM or AFM) or with a fatigue exemption. As such, where local work is not recorded CAS cannot undertake comprehensive assessments of driver work and rest. This provides no compliance improvement over the current WWD arrangements as for most operators (excluding those in AFM and BFM) local records are kept separately. There is an opportunity to explore the policy behind the differences in arrangements for local and long distance work under an EWD
- Alternative compliance models which focus on safety management practices and trends over time, rather than a prescriptive enforcement based approach, could be supported by an EWD which provides for increased resolution, transparency and accuracy of information for both Transport Operators, the Regulator and Authorities.

Key findings: cost benefit analysis

- The cost benefit analysis shows that the net present cost over five years for the preferred EWD model is lower than the net present cost of operating a WWD under all take up assumptions. At the lowest assumed take up level for an EWD (1 per cent) there is a net present cost saving of \$7.5 million over five years compared to a WWD. At the the medium assumed level of take up (41 per cent) there is a net present cost saving of \$1.221 billion over five years compared to a WWD
- Transport Operators will make a cost benefit decision in relation to EWD take up and this decision will include consideration of factors such as regulatory scrutiny. Where Transport Operators have already invested in commercial telematics, take up of EWD would be expected to be considered when existing in-vehicle equipment is upgraded
- The benefits from EWDs are essentially derived from efficiency because of time saved in:
 - Entry and management costs associated with a WWD for Drivers and Transport Operators
 - Roadside enforcement for Authorised Officers.
- While time savings are evident they are small on a per transaction basis and may not translate into reductions in cash outlays as time is redirected to other activities
- There is an up-front cost requiring cash outlay for Transport Operators, Authorities and the Regulator in equipping Authorised Officers and in setting up the EWD Regulatory Framework Owner and EWD System Manager.

Key findings: speed monitoring

- Speed monitoring is feasible under two broad operational environments:
 - By Authorities and the Regulator as conditions applied to Transport Operators
 - By Transport Operators to manage speed compliance.

Authorities and the Regulator can now apply speed monitoring through the use of Intelligent Speed Compliance (ISC) and its associated exception reporting. The policy drivers for ISC vary from independently measuring the speed of vehicles as a stand-alone service, to a secondary line of defence to detect other factors such as speed limiter malfunctions or tampering. Recently TCA released Intelligent Speed Management (ISM), effectively providing the transport and logistic sectors with a way to accurately measure vehicle speed through GPS-enabled telematics systems.

EXECUTIVE SUMMARY

NEXT STEPS

The Pilot has made substantial progress toward the implementation of EWDs, however, there is still further work to be undertaken before full implementation.

At the time of completing the Report, SCOTI agreed that a detailed implementation plan be developed by the NHVR and the NTC for its consideration.

In developing the detailed implementation plan the following constraints and opportunities from the Pilot need to be considered:

Release of the EWD Specification

Industry members consulted through the Industry Reference Group have requested that the EWD be implemented as soon as practicable, and that the early release of the EWD Specification in draft for further public comment will leverage momentum created during the Pilot, provide certainty to industry and help inform future telematics investment decisions.

Legislation

The Pilot identified a number of areas where the HVNL does not align with the EWD Specification and associated certification and operational requirements.

As part of the Pilot, the NTC undertook a review of the national law to identify potential inconsistencies between the national law and Pilot outcomes.

While a number of these issues are relatively administrative in nature, there are a number of areas that will require legislative review prior to the introduction of an EWD.

The NTC will publish for public comment the paper - *Preparing Australia for Electronic Work Diaries: Regulatory Issues paper*.

Regulatory Resources and Capability

The NHVR became operational in January 2013 and will need to consider its resources and work program for any EWD implementation.

Furthermore, the EWD System Manager will need to be appointed to develop the necessary systems, processes and tools required for certification and auditing as part of the EWD approval process.

Initial set up costs to establish the overall EWD environment have been estimated at \$9.9 million, including \$4.9 million estimated for the EWD System Manager to be operationally ready to implement the EWD on behalf of the NHVR.



1 PILOT OVERVIEW

THIS SECTION DETAILS:

- Pilot background
 - Pilot approach and activities.
-

1.1 PILOT BACKGROUND

The Pilot has been driven by three related, but separate factors:

- Heavy vehicle fatigue management legislation and broader telematics industry developments in fatigue and speed management devices
- Amendments to the Electronic Work Diary (EWD) Specification and a policy framework to support the EWD
- The heavy vehicle safety issues discussed during the 2009 NSW Road Safety Roundtable and addressed in the 2010 NSW Road Toll Response Package.

Each of these factors is further detailed opposite.

1.1.1 LEGISLATION AND TELEMATICS

The 2008 Heavy Vehicle Driver Fatigue National Model Legislation provided for a range of fatigue related measures including the recording of work and rest times in a Written Work Diary (WWD) or EWD. The model legislation was adopted by Queensland, NSW, Victoria and South Australia.

In July 2009, the Council of Australian Governments agreed to establish a single National Heavy Vehicle Regulator (NHVR) to regulate all vehicles over 4.5 tonnes Gross Vehicle Mass. In November 2011, Australia's transport ministers unanimously agreed to the first national heavy vehicle bill at the inaugural Standing Council on Transport and Infrastructure (SCOTI) meeting.

The NHVR commenced operation in January 2013 and is an independent statutory authority based in Queensland. The NHVR reports to the SCOTI and is Australia's first national, independent Regulator for all vehicles over 4.5 tonnes gross vehicle mass.

The Heavy Vehicle National Law (HVNL) which has been introduced in Queensland with other participating jurisdictions expected to introduce and pass related legislation in 2013. There were no major changes to legislation in regards to heavy vehicle driver fatigue and in this report all references to the HVNL should also be read as referring to the regulations made under this law and to the model legislation which it is replacing.

The HVNL (Division 7) provides for the use of an EWD as an alternative to a WWD. However, these provisions are based on the model legislation approved in 2008 and for a number of reasons are not aligned with the practical operational requirements for an EWD.

While there is an absence of regulatory approved systems, there are many commercially available electronic fatigue management systems in the market place and a number of Transport Operators have developed in-house systems.

Similarly there are a number of commercial devices and applications that monitor speed of vehicles and provide feedback to Drivers. These devices include Intelligent Speed Adaptation (ISA) devices, navigation devices, and GNSS tracking devices. Speed monitoring is also available as a regulatory application supported under the Intelligent Access Program (IAP) and as a stand-alone application as Intelligent Speed Compliance (ISC).

1.1.2 POLICY AND SPECIFICATION DEVELOPMENT

In November 2008, the then Australian Transport Council (now SCOTI) agreed to:

- Bring forward the immediate development of an Australian performance-based specification for electronic heavy vehicle speed and driver fatigue systems, enhancing the use of in-vehicle telematics and adding value to the Intelligent Access Program (IAP)
- Extend the work of the National Transport Commission (NTC) to develop a national policy framework and regulatory impact statement for electronic heavy vehicle driver systems, by requiring this work to now encompass heavy vehicle speed.

In August 2011 Austroads published the *Performance Based Specification for Electronic Work Diary and Heavy Vehicle Speed Report* (Austroads Report). The Austroads Report included the *Electronic Work Diary (EWD) Specification – Performance Based Specification for EWD and Heavy and Heavy Vehicle Speed Monitoring* (EWD Specification) developed by Transport Certification Australia (TCA) in 2009 and the NTC's policy position as described within the March 2011 *Electronic Systems for Heavy Vehicle Driver Fatigue and Speed Compliance Policy Paper* (NTC Policy).

The Austroads Report identified a number of issues that would need to be resolved prior to implementation to address key differences in the approach taken to the EWD by TCA and NTC. Austroads recommended an operational pilot to resolve these outstanding issues.

1.1.3 NEW SOUTH WALES ROAD TOLL RESPONSE PACKAGE

In order to address a rise in road fatalities in 2009, the NSW Government announced a \$170 million NSW Road Toll Response Package. This package of measures comprised several road safety programs with the broad objective of improving road safety in NSW by achieving a reduction in road casualty crashes and resultant road trauma. The NSW Road Toll Response Package builds upon the recommendations from a Road Safety Roundtable held in July 2009, which was established to engage road safety experts and community representatives to examine road safety issues in response to a rising road toll. The NSW Road Toll Response Package included several distinct programs which included road safety engineering projects, road safety strategies and research projects, enforcement initiatives and specific initiatives to improve heavy vehicle safety.

As part of the NSW Road Toll Response Package the NSW Government announced the Operational Pilot of Electronic Work Diaries and Speed Monitoring Systems (the Pilot) and \$5 million in funding was provided over three years (2010-2013).

TCA was engaged by NSW Roads and Maritime Services in December 2010 to undertake the Pilot.

1 PILOT OVERVIEW

1.2 PILOT APPROACH AND ACTIVITIES

1.2.1 PILOT SCOPE

The NTC Policy and Austroads Report identified a number of issues needing resolution before an EWD could be deployed. These issues revolve around who will perform roles, a number of technical issues and the eventual use of data. Each of these issues make up the Unresolved Issues and Questions which comprise the Pilot scope:

Unresolved Issues

1. Is a heavy vehicle on-board printer required?
2. Is a Global Navigation Satellite System (GNSS) required for the automatic capture and population of records as well as to continuously capture position records?
3. Does the In-Vehicle Unit (IVU) need to be tethered to vehicle? (A question of system security and therefore the level of evidentiary provision in EWD and heavy vehicle speed monitoring systems)
4. Is tamper monitoring required?
5. What is the time resolution for display to Drivers and subsequent reporting, one minute or one second?

Questions

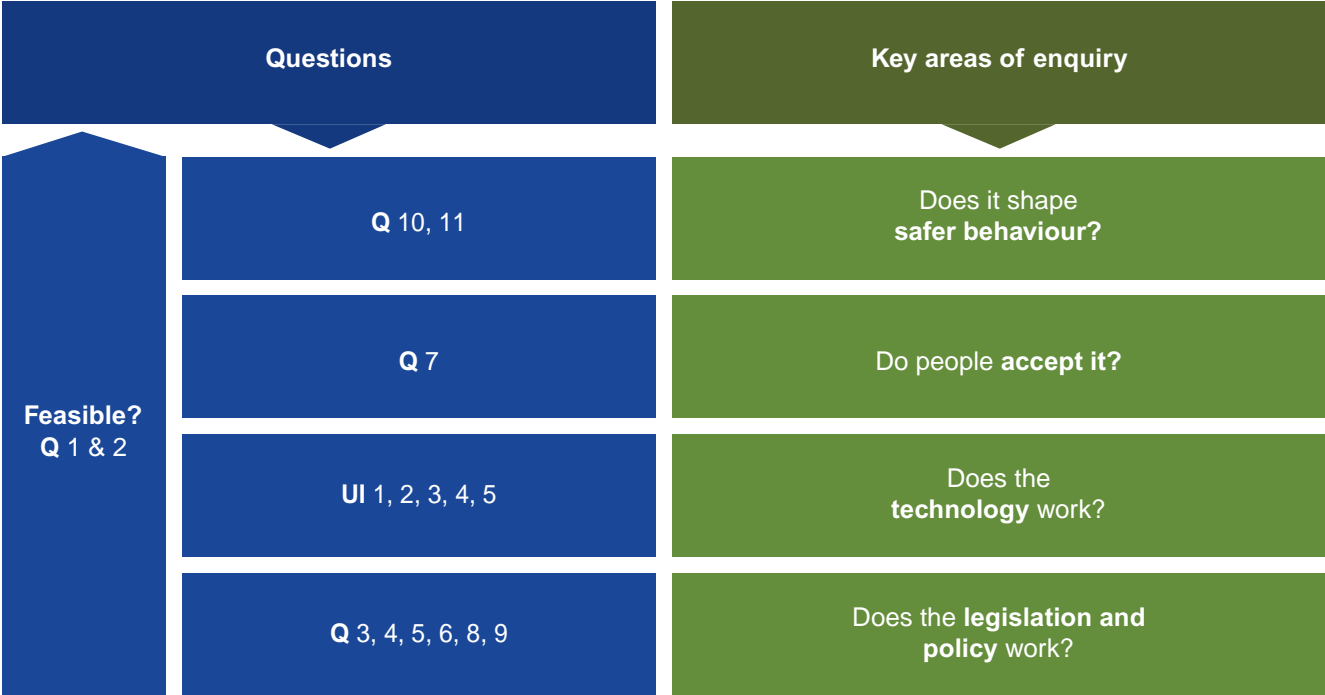
1. Is an EWD feasible and, if so, under what operational environment?
2. Is heavy vehicle speed monitoring feasible and, if so, under what operational environment?
3. How will jurisdictions apply EWDs and heavy vehicle speed monitoring systems?
4. How effective are EWDs and heavy vehicle speed monitoring systems in reporting operator and Driver compliance with regulations?
5. How effective are EWDs and heavy vehicle speed monitoring systems in improving operator and Driver compliant operation?
6. How will a back office audit of the Record Keeper's records be conducted?
7. What are the experiences of all the stakeholders of the human-machine interface and institutional arrangements?
8. Who can perform the roles of EWD/Speed Monitoring Provider, and who should perform the role of the EWD System Manager and Driver Recording Device (DRD) Issuer?
9. What further refinement is required for the EWD Specification and the Heavy Vehicle Driver Fatigue Legislation to accommodate the electronic environment?
10. To what extent do EWDs decrease fatigue incidents in the freight industry?
11. To what extent do heavy speed monitoring devices decrease the incidence of speeding?

To effectively address the Unresolved Issues and Questions, the Pilot established the following four key areas of enquiry or outcomes sought from the EWD:

1. **Safety** – does the EWD model shape safer behaviour?
2. **Acceptance** – will people accept the EWD model?
3. **Technology** – does the technology work?
4. **Process** – does the legislation and policy work?

The following diagram sets out how the Unresolved Issues and Questions are grouped by the areas of enquiry or outcomes.

Figure 2: Pilot framework



1 PILOT OVERVIEW

1.2.2 PROJECT TIMELINE AND DESIGN

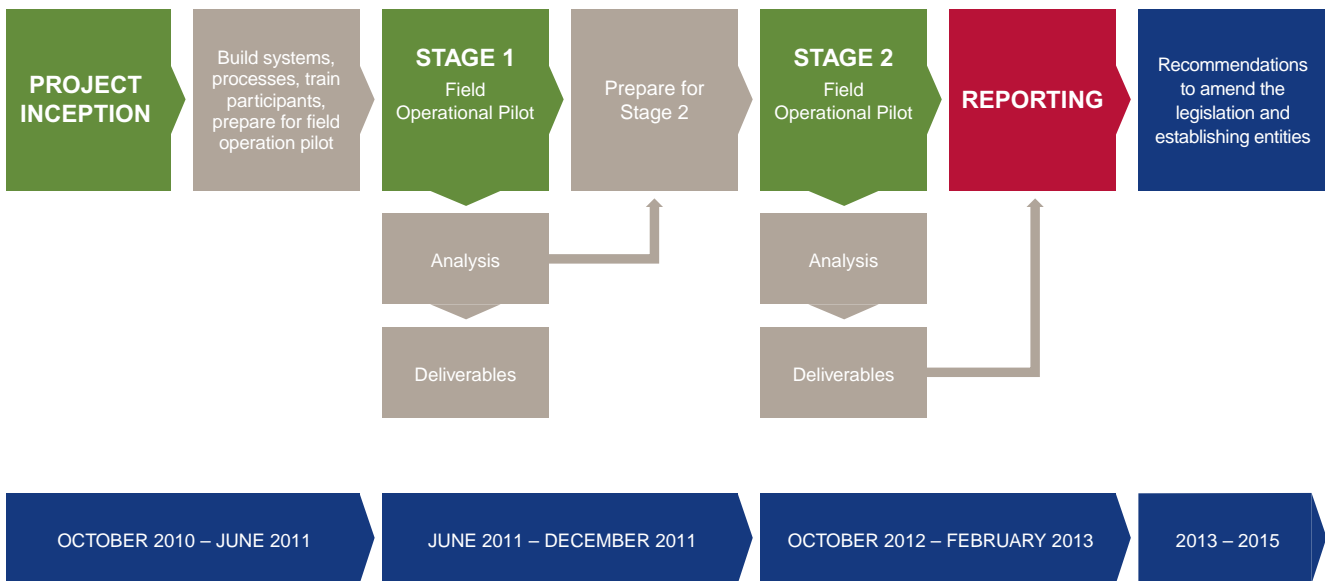
The Pilot was divided into four key phases.

1. Preparation for Stage 1
2. Stage 1
3. Stage 2
4. Analysis and Review

The first two phases were undertaken in 2011. The remaining two phases were completed in 2012 and the first quarter of 2013. The findings from Stage 1 were presented in an interim report which shaped the direction and approach for the remaining phases of work.

The project timeline is outlined in the following figure.

Figure 3: Project timeline



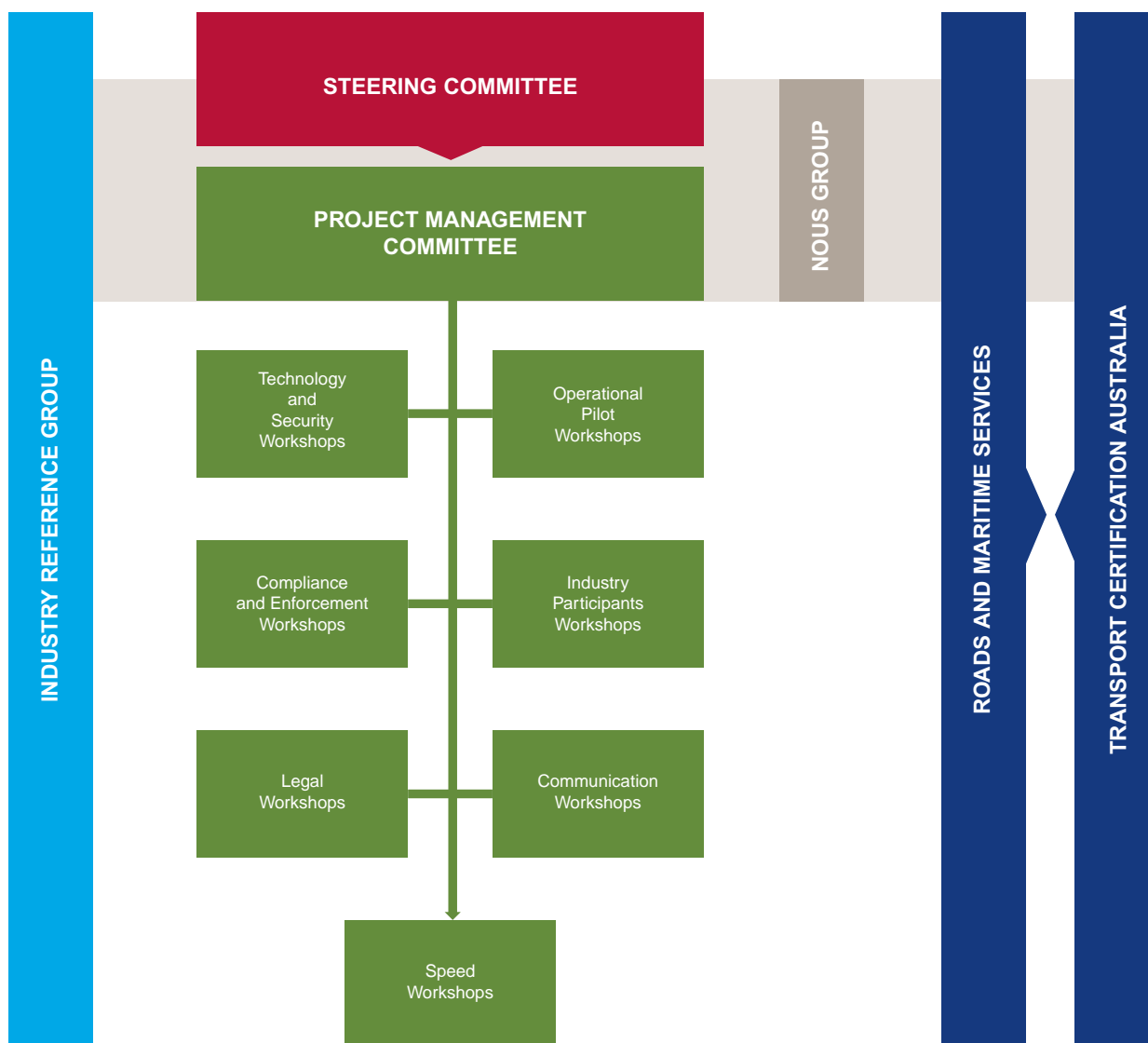
1.2.3 PILOT GOVERNANCE

The Pilot was managed through a range of committees and working groups (as shown in Figure 4):

Membership of these committees included representatives from industry, the NHVR, the NTC, the Commonwealth Government as well as police and road agencies from Queensland, New South Wales, Victoria, South Australia and Western Australia.

Nous Group was engaged by NSW Roads and Maritime Services (RMS) to provide an independent review and assessment of the Pilot.

Figure 4: Pilot governance



1 PILOT OVERVIEW

1.2.4 STAKEHOLDER ENGAGEMENT

Stakeholder consultation has been an integral part of each stage of the Pilot and included face-to-face interaction, telephone engagement, surveys, reference groups and training sessions.

Stakeholder consultation has been conducted with the transport industry (from a Driver and Transport Operator perspective), Authorities, the telematics industry, NHVR and NTC. Over 200 stakeholders were engaged by TCA across a variety of one-on-one and group interviews and small workshops.

1.2.5 SYSTEM FIELD TESTING

The Pilot involved Transport Operators in the testing and review of a range of telematics systems. Systems included commercial (non-regulatory) systems already in use by Transport Operators as well as ten systems built to be compliant with key areas of the developing EWD Specification.

1.2.6 BUSINESS PROCESSES

The overall business system of the Remote Connection Access Framework (RCAF) and the broader EWD architecture rely on individual business system processes. Draft EWD business systems processes were developed as an output of the Pilot.

These processes range from the point of certification of the EWD to use of the EWD by the Driver in the vehicle.

A range of policy decisions remain to be finalised and TCA has compiled a set of draft business processes to support those decisions by detailing the practical processes that will be necessary to support and operationalise the EWD architecture.

1.2.7 DEVELOPMENT OF THE EWD SPECIFICATION

There have been significant amendments to the EWD Specification resulting from the findings of the Pilot which is provided in Section 5 of the report.

1.2.8 LEGISLATION AND PRIVACY RELATED WORK PROGRAM

The NTC is the lead organisation for national transport legislative reform. Working collaboratively with TCA, all jurisdictions, the Pilot Steering Committee, and other groups, the NTC examined the legislative impacts and issues raised by transition to an electronic record keeping environment.

The NTC also undertook a review of the privacy and surveillance legislation within each Australian jurisdiction and potential implications for EWDs which culminated in the *Preparing Australia for Electronic Work Diaries: Regulatory Issues Paper* (NTC Regulatory Issues Paper) which will be separately published for public comment.

The proposed legislative amendments to facilitate the implementation and operation of the EWD are detailed in Section 6 of the report.

1.2.9 THREAT AND RISK ANALYSIS OF THE EWD

An Information Security Threat and Risk Analysis (Threat and Risk Analysis) of the EWD was conducted. The Threat and Risk Analysis was undertaken to ensure the most appropriate technology design for the EWD and allow it to meet the necessary security and data integrity requirements for a system that will record information to be used as evidence in a court.

The Threat and Risk Analysis is discussed in Section 5 of the report.

1.2.10 LITERATURE REVIEWS

Melbourne University Accident Research Centre (MUARC) undertook two literature reviews to inform the Pilot outcomes.

1. Review of the usability, acceptability and effectiveness of technology similar to an EWD and speed monitoring devices. This review was undertaken to inform the development of the interviews and surveys
2. Review of the compliance and safety impacts of technology similar to an EWD and speed monitoring systems.

1.2.11 COST BENEFIT ANALYSIS

A cost benefit analysis was developed in the Pilot to identify the indicative operational costs (including costs for implementation) and benefits associated with the implementation of the EWD compared to the current WWD.

1.2.12 ROLES AND RESPONSIBILITIES

Sinclair Knight Merz (SKM) were engaged by RMS to undertake an independent review of roles and entities which TCA may have a future interest in undertaking, and consequently a possible conflict of interest.

1.2.13 INDEPENDENT REVIEW

Nous Group was engaged by RMS to provide an independent review and assessment of the Pilot.

2 OVERVIEW OF THE EWD

THIS SECTION DETAILS:

- Overview of the EWD
 - Technical elements of the EWD
 - Entities and their roles in the EWD environment.
-

2.1 OVERVIEW OF THE EWD

The primary functions of an EWD are to:

- Record work and rest declarations of the Driver
- Provide records for Authorised Officer review
- Provide records for Record Keeper/Transport Operator review.

Driver's work and rest declarations are recorded on the IVU. The IVU also continuously records the vehicle's location in the form of Position Records while the vehicle is in operation

In an EWD environment, records are automatically downloaded from the IVU to the EWD Service Provider (EWD-SP). Where a Transport Operator is using an independent EWD-SP but has not engaged them as Record Keeper, Driver records are transferred to the Record Keeper. Where the Driver operates under more than one EWD, and therefore works for two or more Transport Operators, records are automatically transferred between EWD-SPs using the EWD Registry.

Drivers have access to their own records through an in-vehicle display when operating the vehicle. The EWD Specification requires that they must also have access to their records when outside the vehicle. The mechanism by which this is provided is not prescribed; it may be, for example, a website or smartphone application.

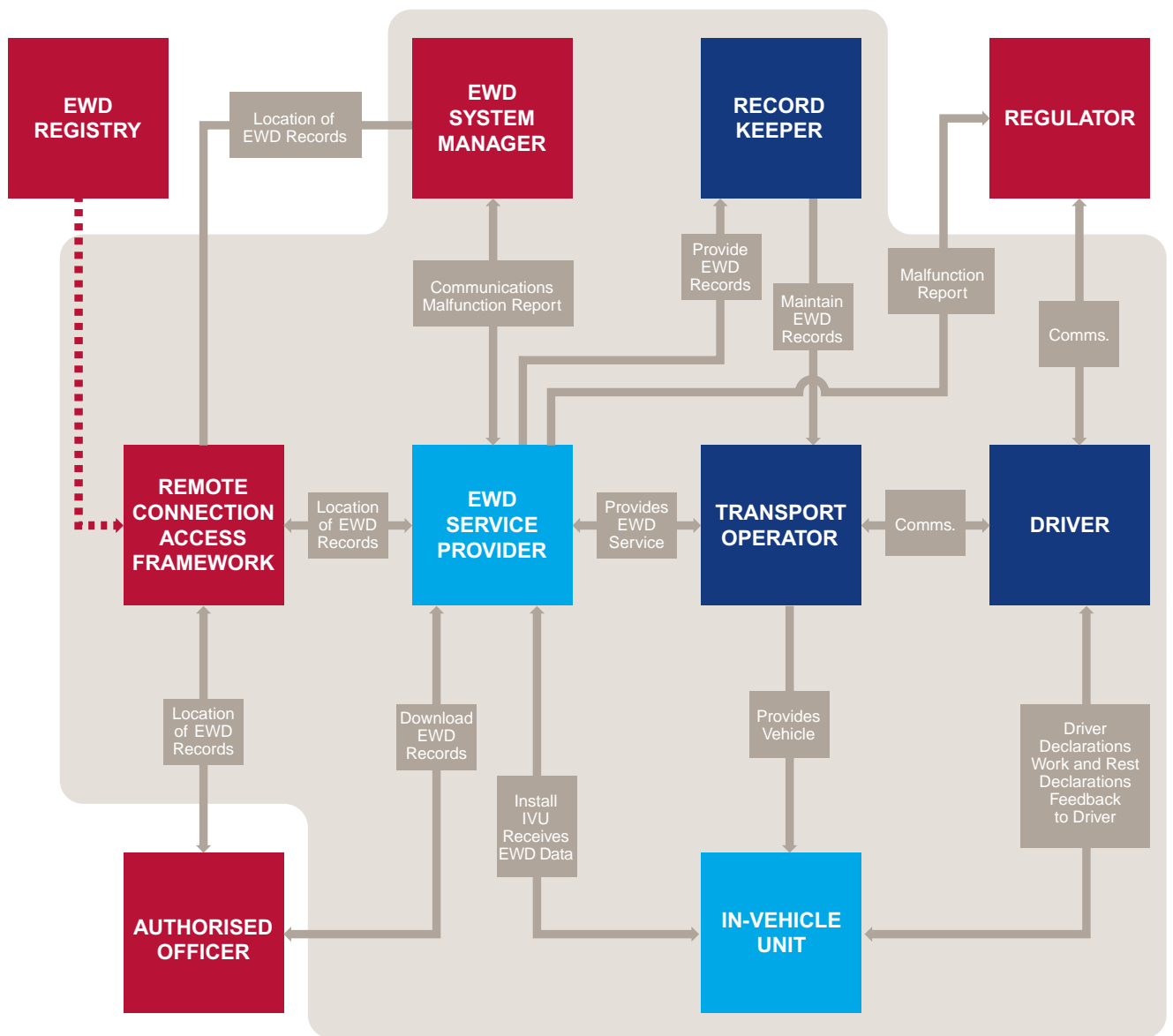
Authorised Officers will access Driver records at the roadside or through a back office audit (ie audit of the records held by the Record Keeper). Roadside access can be through one of two mechanisms:

- Remote connection to review Driver records held by the EWD-SP through laptop, in-vehicle electronic equipment, radio, phone or Short Message Service (SMS)
- Review of records through an in-vehicle display.

To aid in the review of EWD records a software package known as the Compliance Assessment Software (CAS) has been developed. This software assesses Driver records for compliance against the fatigue law.

Figure 5 provides an overview of the EWD environment.

Figure 5: EWD environment



2 OVERVIEW OF THE EWD

2.2 TECHNICAL ELEMENTS OF THE EWD

The EWD is comprised of the following technical elements:

1. In-Vehicle Unit (IVU)
2. User Interface (UI)
3. EWD Service Provider (EWD-SP) System.
4. Remote Connection Access Framework (RCAF)
5. Compliance Assessment Software (CAS)
6. Provision for an interface between the IVU and external devices.

2.2.1 IN-VEHICLE UNIT AND USER INTERFACE

An approved IVU is installed in a heavy vehicle. The IVU is used by the Driver to make their declarations of work and rest. The IVU incorporates the UI (for example, screen and buttons or touch screen), a GNSS Receiver, communication capabilities and other sensors. The IVU may comprise a single device or many, depending on the EWD-SP's system design.

The IVU continuously sends the records to the EWD-SP. These records are then sent to the Record Keeper (in the situation where the EWD-SP has not been engaged by the Record Keeper to assist with the record keeping task).

Malfunctions of the IVU must be reported by the Driver and Transport Operator to the EWD-SP and there is also a requirement for the EWD-SP to advise the Transport Operator, the EWD System Manager and the Regulator of any malfunction or possible tampering with the IVU.

2.2.2 IN-VEHICLE UNIT EXTERNAL INTERFACE

The EWD Specification provided for an Interface from the IVU to a Driver Recording Device (DRD). The DRD was designed as an external store of the Driver's work and rest declarations entered into the IVU.

The DRD was intended to be available to be handed by the Driver to an Authorised Officer at the roadside who can then connect the device to their own equipment to view the Driver's work and rest records and assess compliance.

As a portable device the DRD was also intended to enable a Driver to carry their work and rest declarations between vehicles and IVUs.

As a result of the Pilot findings, the DRD approach is no longer preferred. While the DRD is potentially feasible for use in an EWD, the Pilot found that the model had a number of operational and cost issues which would make it unsuitable as the primary mechanism for recording and access of records by Authorised Officers. The key issues identified were:

- The eight national policy principles identified in the NTC paper *National in-vehicle telematics strategy: The road freight sector*, are founded on the adoption of a performance based approach which promotes private sector development of new technologies. The DRD is a proprietary hardware technology that is difficult to evolve as technology changes
- The DRD functionality is not currently supported by the majority of telematics providers or Transport Operators and would require new hardware development to support the DRD
- Utilising a near-ubiquitous interface (USB) the user is able to connect the DRD to a wide range of computers outside of the EWD environment, enabling either a concentrated attack on the data held by the DRD or the intentional insertion of a virus or malware to attack enforcement systems
- While the number of DRDs will be dependent on how many Drivers adopt the EWD, over time, there is the possibility of many thousands being in circulation, resulting in a very complex operational environment to monitor, proactively manage and resolve technology issues

- Of critical importance, interviewed enforcement agencies identified that the use of an unauthorised USB with departmental equipment was a major security risk and was contrary to existing information security policies. This is because of the potential threat of viruses and malware
- While convenient as a physical device the Driver can carry, accessing EWD Records on the DRD will be restrictive as tablets and other devices are increasingly not incorporating USB interfaces
- It is likely EWD-SPs, through innovation and competition, will provide Drivers with mechanisms (ie a web portal) to access their work and rest records as well as providing fatigue reporting for them as a commercial service. This would render the DRD largely irrelevant to the Driver as a means for accessing their EWD Records
- The DRD poses the largest source of high systemic risks in the EWD environment. It is highly portable and therefore easy to transfer, steal, lose, damage, and is more vulnerable to hacking.

The RCAF (described below) was developed to provide the functionality envisaged under the DRD approach without its inherent risks.

While the DRD is not specifically included in the EWD Specification, provision has been made for an Interoperable Interface from the IVU to external storage devices. This standardised format will enable ready access and use of records where an external recording device is used.

Potential use of an external storage mechanism will be a matter for policy and commercial decision making, such as in circumstances where the Transport Operator chooses this mechanism to provide Drivers with access to their records when outside the vehicle.

2.2.3 REMOTE CONNECTION ACCESS FRAMEWORK

The Pilot, through extensive stakeholder consultation and research, developed the RCAF as an alternative to the DRD based model originally set out in the EWD Specification. The model comprises the following technical components:

- Web services
- Communication over the Internet using HTTPS (ie HTTP running over TLS 1.x or SSL 3.0)
- EWD Registry containing a record of Drivers registered to use an EWD and the address of where their current records reside
- Authentication service between entities (ie authentication for access by Authorised Officers, EWD-SPs and the EWD System Manager).

The RCAF describes the processes and systems which allow for the exchange of Driver records between EWD-SPs, and for Authorised Officers to both obtain Driver records and lodge Officer Annotation Records (similar to the annotations made in a WWD) at a roadside intercept.

Key activities to be performed under the RCAF include:

- Each EWD-SP must update the EWD Registry with the details of the Drivers using their EWD
- The EWD Registry contains the address of where records are stored and the currency of those records
- EWD-SPs use the EWD Registry to identify if a Driver who is using their EWD has used another EWD-SPs EWD in the last 28 days. Where new records are available they are downloaded with up to 90 days of records available
- While the EWD Registry holds details about the Drivers registered to use each EWD-SPs system and when their records were last updated, the EWD Registry never has a copy of the Driver's actual work records and never acts as a central repository. This minimalist approach to data storage in the EWD Registry addresses potential privacy issues and industry concerns about access to commercial in confidence data
- Driver work and rest records are held by the EWD-SP and accessed using remote access technology by other EWD-SPs and Authorised Officers
- Using the driver licence number and jurisdiction of issue, the Authorised Officer accesses and downloads Driver records at the roadside.

2 OVERVIEW OF THE EWD

The overall framework has been designed to provide:

- **Simplicity** – the architecture is based on commonly used technologies. It should be feasible for EWD-SPs to implement the architecture with minimal cost and risk
- **Scalability** – the architecture has the capability to scale up as the number of fatigue related heavy vehicles taking up the EWD increases
- **Privacy** – the architecture does not store Driver records in the EWD Registry, does not provide commercially sensitive information to competitors and minimises the visibility of Driver records to EWD-SPs where the Driver is not actively operating vehicles fitted with their equipment.

The Pilot has found that the RCAF is feasible and preferred as it mitigates problems associated with the DRD as identified above, in particular:

- Reduced security risk compared to a DRD
- Increased stakeholder acceptance over the DRD model because of reduced cost and alignment with existing commercial in-vehicle equipment
- Removal of proprietary aspects associated with DRDs
- Aligning the EWD with a performance based approach to regulatory technology
- Future proofing the technology trends by utilising web based interfaces
- Lower cost than the DRD model as no DRD Issuer function is required and there is a reduced need for standalone equipment for Authorised Officers
- It is not restricted to specific hardware unlike the DRD which requires a USB interface.

However, the RCAF being internet based may not allow Driver access to records when traversing some remote locations where there is limited internet coverage. The Pilot examined connectivity across Australia and has concluded that connectivity issues are expected to arise relatively infrequently and where they do a variety of mechanisms for access, including viewing of records on the in-vehicle display, are available. This issue is discussed further in Section 5.

2.2.4 COMPLIANCE ASSESSMENT SOFTWARE

The Pilot developed CAS as the software tool for analysis of Driver work and rest records against legislative fatigue requirements. CAS draws Driver records from the EWD-SP for a nominated period and compares them to the fatigue legislation. Authorised Officers are provided with information that the Driver records are compliant, or where this is not the case, advises of breaches. Breach information identifies the type of breach (eg minor, substantial) and the rule that was breached (eg 14 day rule). In addition, the Authorised Officer is able to examine data spatially enabling them to view vehicle movements on a map. Driver declarations can be analysed in relation to vehicle movements and potential anomalies identified eg vehicle moving while the Driver has made a rest declaration.

Two forms of the CAS have been developed:

- CAS – On Road (CAS-OR)
- CAS – Record Keeper (CAS-RK).

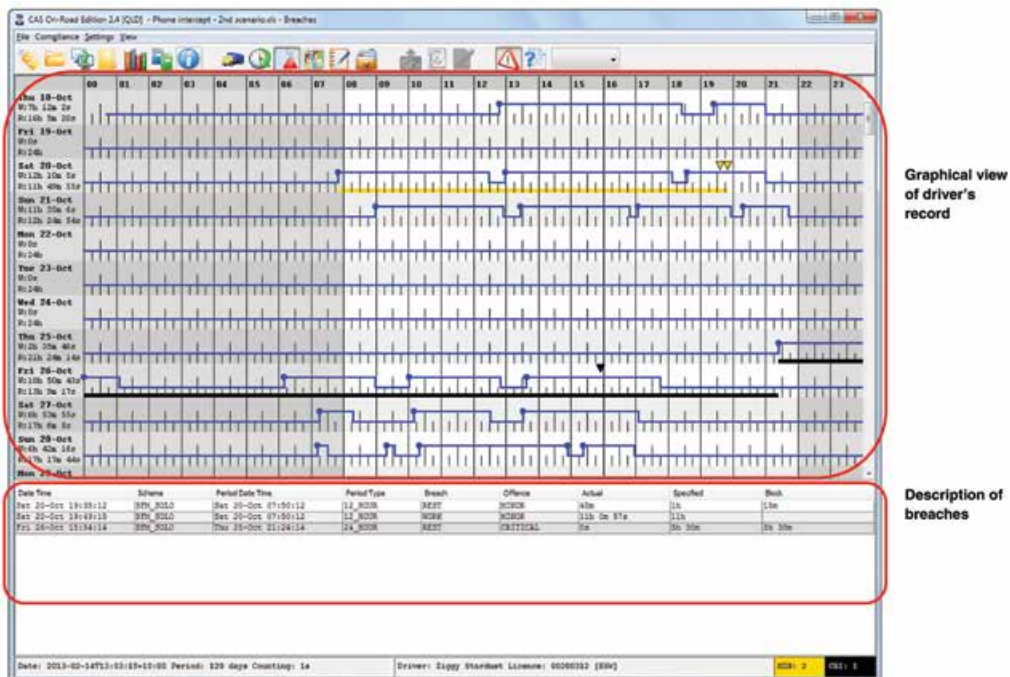
2.2.4.1 CAS-OR

CAS-OR reviews a single Driver's records for compliance which is suitable for a roadside interception. Authorised Officers who regularly review WWDs can develop considerable skill and expertise in this task. However, a significant proportion of Authorised Officers do not regularly conduct roadside interceptions and will not have a high skill level. Furthermore, the complexity of the law and the volume of records required to undertake a review of more than a small volume of records means that usually only more recent records are reviewed at the roadside.

CAS-OR automates the assessment of compliance allowing an Authorised Officer to more efficiently review EWD records at the roadside. This will also assist those Authorised Officers who do not regularly review Driver records.

Examples of CAS information display which would be available at the roadside are provided in Figures 6 and 7.

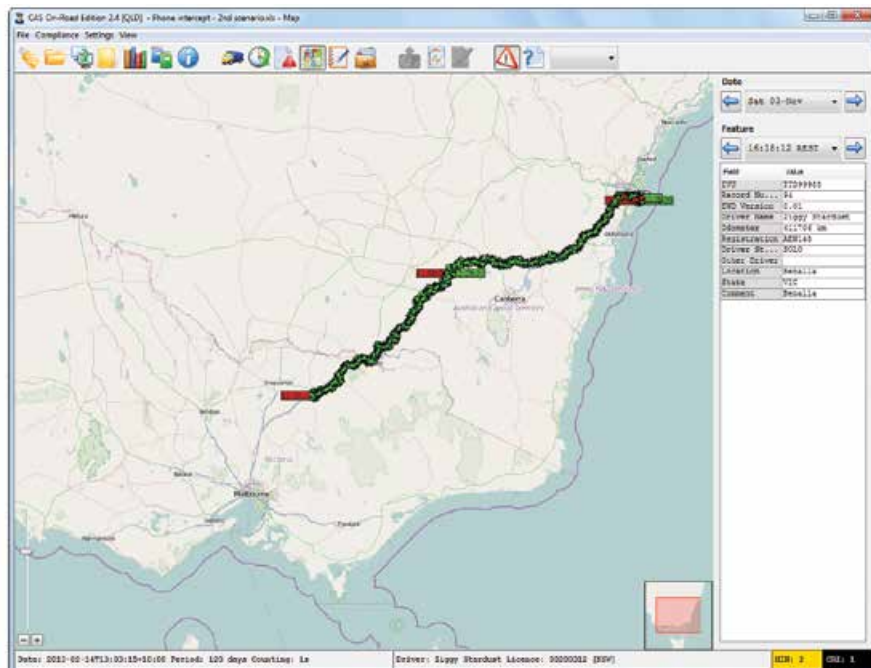
Figure 6: Example of driver records



Graphical view of driver's record

Description of breaches

Figure 7: Example of a route taken



2 OVERVIEW OF THE EWD

2.2.4.2

CAS-RK

CAS-RK facilitates Transport Operator audits allowing review of multiple Driver records. Report templates have been developed for use with CAS-RK and provide information such as:

- Trend of compliance over a prolonged period of operation. The system sorts breaches by month and calculates a total for each month. The result is graphed against time to show changes to the level of compliance over time
- Comparison results. The system sorts breaches by Driver and calculates a total for each Driver.

Review of WWDs during an audit is labour intensive and time consuming as it will usually involve the manual entry of data into an electronic system to assist in review.

Electronic records available from an EWD provide the opportunity for relatively fast and reliable assessment of fatigue compliance, both at the roadside and back office, with consistent results.

2.2.5 EWD-SP SYSTEM

The EWD-SP System provides the overall management and quality control of the in-vehicle equipment, interaction with the EWD Registry, record collection and storage and transfer to the Record Keeper. Technical components will include server systems, software, data centre and security systems. It is this integrated suite of systems and processes that are type approved and certified for use as an EWD.

2.3 ENTITIES AND THEIR ROLES IN THE EWD ENVIRONMENT

The EWD Specification details the roles and responsibilities of the EWD entities but does not define who can perform EWD specific roles. An entity may perform multiple roles, for example, in the case of an owner-operator, the Driver, Transport Operator and Record Keeper may be the same person.

There are up to seven entities that will interact in the operation of the EWD regulatory environment:

Four entities are identified in the legislation:

1. Driver
2. Transport Operator
3. Record Keeper
4. Authorised Officer

A further three entities have been identified in the Pilot:

5. EWD-SP
6. EWD System Manager
7. EWD Regulatory Framework Owner.

Figure 5 provides an overview of how the first six of these entities interact with each other.

SKM were engaged by RMS to undertake an independent review of roles and entities which TCA may have a future interest in undertaking, and consequently a possible conflict of interest.

2.3.1 DRIVER

2.3.1.1 GENERAL

Drivers must provide documentation to the EWD-SP which verifies their identity, licence number and licence issuing jurisdiction. On this basis the EWD-SP issues the Driver with an Identification and Authentication (IDA) method for authentication to the IVU. The IDA is a performance based two-factor identification and authentication method – something you know, such as a password, and something you have, such as a token. The IDA must comply with at least Identity Assurance Level 3 of the Commonwealth Government's National e-Authentication Framework. The Driver must confirm their identification each time they make a declaration.

The EWD is able to be used in a two-up driving arrangement. The second Driver is required to use their IDA to verify their participation in the two-up driving arrangement.

Information within a Driver's records falls into three broad categories:

- System information
- Driver identifying details
- Work and rest records.

System information is always populated by the EWD and cannot be changed by the Driver.

Driver identifying details are automatically populated when the Driver uses their IDA with the IVU. These details include information such as the Driver's name, driver licence number and licence issuing jurisdiction. This information cannot be readily changed by the Driver as it must link directly to the IDA for identification and authentication purposes. Changes to this information would be managed by the EWD-SP.

Work and rest records are created using a combination of pre-populated data and Driver entered data. Automatically populated information is derived from pre-declared information or the IVUs sensors including time, location and potential details about the Driver's work hours option, Record Keeper, base, vehicle registration and time zone. Driver entered data includes the declaration of work and rest which must always be done by the Driver. As with the WWD, each time a Driver changes from work to rest or vice versa they must make a declaration. A declaration is also required when the Driver discontinues using a vehicle or changes to or from local work (work within 100 kilometres of base). Most of the information requires the Driver's confirmation before it is saved as their record. The Driver has the ability to alter this information with the original information kept within an alternative record.

The Driver is able to review their own records on the in-vehicle display. The EWD Specification also requires functionality to enable the Driver to access their records when outside the vehicle. The mechanism by which this is provided is not prescribed by the EWD Specification with the EWD-SP able to determine an appropriate performance based approach – this may include options such as a website or mobile phone application.

2.3.1.2 PRE-POPULATED INFORMATION

Where the Driver believes pre-populated information is incorrect, they can manually enter the details they believe to be correct. The Driver is restricted from changing information that they cannot reasonably know, such as position coordinates, or that which does not change in day to day operations, such as Driver name. Details of all changes, and original data, will be recorded by the IVU.

Automatically pre-populated information such as position is designed to make the process of declaring work and rest as efficient as possible for the Driver. Current legislation requires the Driver to make a declaration as to their hours of work and rest and the EWD reflects this requirement by requiring the Driver to confirm the pre-populated position information. However, when the HVNL is reviewed for EWD implementation this requirement may be reconsidered to improve the efficiency of EWD use by Drivers.

2.3.2 TRANSPORT OPERATOR

A Transport Operator is a person who operates a vehicle or vehicle combination or is responsible for directing a person who operates a vehicle or vehicle combination.

Under a voluntary take up environment it is the Transport Operator who determines whether to use an EWD (or WWD). The Transport Operator is responsible for engaging the EWD-SP to install, maintain and operate their EWD. The Transport Operator may also engage the EWD-SP to supply additional commercial services.

2 OVERVIEW OF THE EWD

2.3.3 RECORD KEEPER

The Record Keeper is responsible for maintaining the Driver's EWD records as specified in the HVNL.

The Record Keeper can be a Transport Operator, including an owner Driver, and the Record Keeper may delegate elements of its record keeping task to the EWD-SP.

In an EWD environment the Record Keeper is required to interact with the EWD-SP to receive and make available EWD records in the format defined in the EWD Specification.

Under the HVNL the role of the Record Keeper is allocated to:

- The employer if the Driver is employed and working under Standard Hours
- The Driver if the Driver is self-employed and working under Standard Hours
- The Transport Operator if the Driver is working under a Basic Fatigue Management (BFM) or Advanced Fatigue Management (AFM) or a work and rest hours exemption (permit) that was granted in combination with the Operator's AFM or BFM accreditation.

2.3.4 AUTHORISED OFFICER

The Authorised Officer is responsible for inspecting the Driver's EWD records and assessing them for compliance.

Records may be viewed at the roadside or during an audit or investigation.

On-road, the Authorised Officer checks the Driver's records using CAS, and annotates the EWD records with their own identification details as a record of access. Where the Authorised Officer does not have remote access they can review records on the in-vehicle display.

2.3.5 EWD SERVICE PROVIDER

The EWD Specification anticipates that EWDs supplied and operated by the commercial sector will harness private sector innovation and technological solutions in meeting regulatory requirements. This is in line with the eight National Policy Principles identified in the NTC July 2011 paper *National in-vehicle telematics strategy: The road freight sector*.

An EWD-SP must be:

- Certified by the EWD System Manager as meeting the requirements of the EWD Specification and associated probity and due diligence issues
- Approved by the the Regulator.

It is the responsibility of the EWD-SP to ensure that the EWD is correctly installed and performs during day-to-day operation in accordance with the EWD Specification. The EWD-SP needs to have the operational knowledge of the system to determine its operational state, perform any necessary enhancements and most efficiently deal with malfunctions if they occur. The EWD-SP also provides EWD Records to the Record Keeper and may be engaged by the Record Keeper to perform some or the entire record-keeping task.

The EWD Specification and the NTC Policy does not limit the number of EWD-SPs which can be approved.

EWD-SPs can offer multiple regulatory and commercial applications supported from the IVU. The EWD-SP is responsible to ensure that the multiple applications operate properly, and do not adversely impact each other. It is envisaged that the EWD will require updating from time to time to improve functionality, fix software 'bugs' or update the protection from electronic threats such as software viruses.

The EWD-SP must be able to identify the Record Keeper for each Driver using their EWD and must have a documented process for updating Record Keeper details and distributing the appropriate records to the Record Keeper.

There are currently a small number of Transport Operators who develop and operate in-house telematics systems. The potential for a Transport Operator to also be the EWD-SP has been considered in the Pilot. There are a number of risks associated with this approach, primarily around ensuring the integrity of data in an environment where there is a potential conflict between the Transport Operator's interests and those required by the EWD System Manager and the the Regulator. The EWD Specification does not prohibit a Transport Operator from undertaking the EWD-SP role, however, for them to do so would require that they demonstrate sufficient controls and processes to meet the role's requirements.

2.3.6 EWD REGULATORY FRAMEWORK OWNER

The SKM review of roles and responsibilities identified that an additional function of EWD Regulatory Framework Owner was required. The EWD Regulatory Framework Owner was described by SKM as responsible for managing legislation and policy implementation governing the EWD. They would also have accountability for approval of fatigue schemes.

SKMs recommendations were made under the assumption that the NHVR will be the EWD Regulatory Framework Owner.

2.3.7 EWD SYSTEM MANAGER

The EWD System Manager is responsible for the certification, re-certification and audit of EWD-SPs. The EWD System Manager is also responsible for the maintenance and continuing development of the EWD Specification, ensuring it is maintained and developed based on input, advances and requirements of all stakeholders including very importantly the EWD Regulatory Framework Owner.

The EWD System Manager is also responsible for ensuring any operational and technical issues are managed and resolved by the parties. The EWD System Manager also fulfils the following functions:

- Managing and maintaining the RCAF for its use by Authorised Officers
- Assisting entities as an expert where required
- Managing the development and maintenance of CAS.

The SKM review of the entities which could undertake the various roles in the EWD environment considered whether the functions of the EWD System Manager should be performed by one entity or whether they could be shared across multiple parties. Specifically they examined the three following possible approaches:

- Collective/Centralised (all four roles performed by one party)
- Shared (one or more roles assigned to two parties)
- Decentralised/Self-Regulation (four roles assigned to many parties within a self-certification arrangement).

The Collective/Centralised approach was recommended on the basis that:

- This was aligned with the IAP approach (ensuring one administrator across multiple uses by the IVU and service provider) and understood by the heavy vehicle industry and other stakeholders
- An organisation exists that already has extensive experience in providing the range of functions to manage telematics applications in the heavy vehicle industry and the functions here fit within its current mandate
- Given the voluntary and possible low take up environment expected for EWDs, there was no basis for introducing additional complexity at this stage.

SKM recommended TCA as the entity best placed to perform this role in view of its mandate, operational skills, knowledge and experience with other telematics applications such as the IAP, Intelligent Speed Compliance and On-Board Mass Monitoring.

TCA is a government owned public company with existing governance and oversight arrangements established specifically for telematics and intelligent technologies that could be used or modified to incorporate EWDs. However the NHVR currently has no legal (ie commercial or contractual) relationship with TCA except where it is specified in the HVNL in relation to the IAP.

As identified by SKM, it is important that the operations of the EWD are managed within a policy context and as such, the establishment of formal accountability arrangements and refinement of roles between the NHVR and TCA will be an essential feature of any implementation plan.

3 KEY AREA OF ENQUIRY ONE: SAFETY BENEFITS

THIS SECTION DETAILS:

- Road safety outcomes
 - Quantification of safety benefits
 - Key findings – safety
-

3.1 ROAD SAFETY OUTCOMES

Figure 8 sets out the Safety Logic Model developed for the Pilot, which identifies how the components of the Pilot interact to produce positive safety outcomes. The model identifies the key features, safety factors and benefits sought from EWD to contribute to the primary outcome:

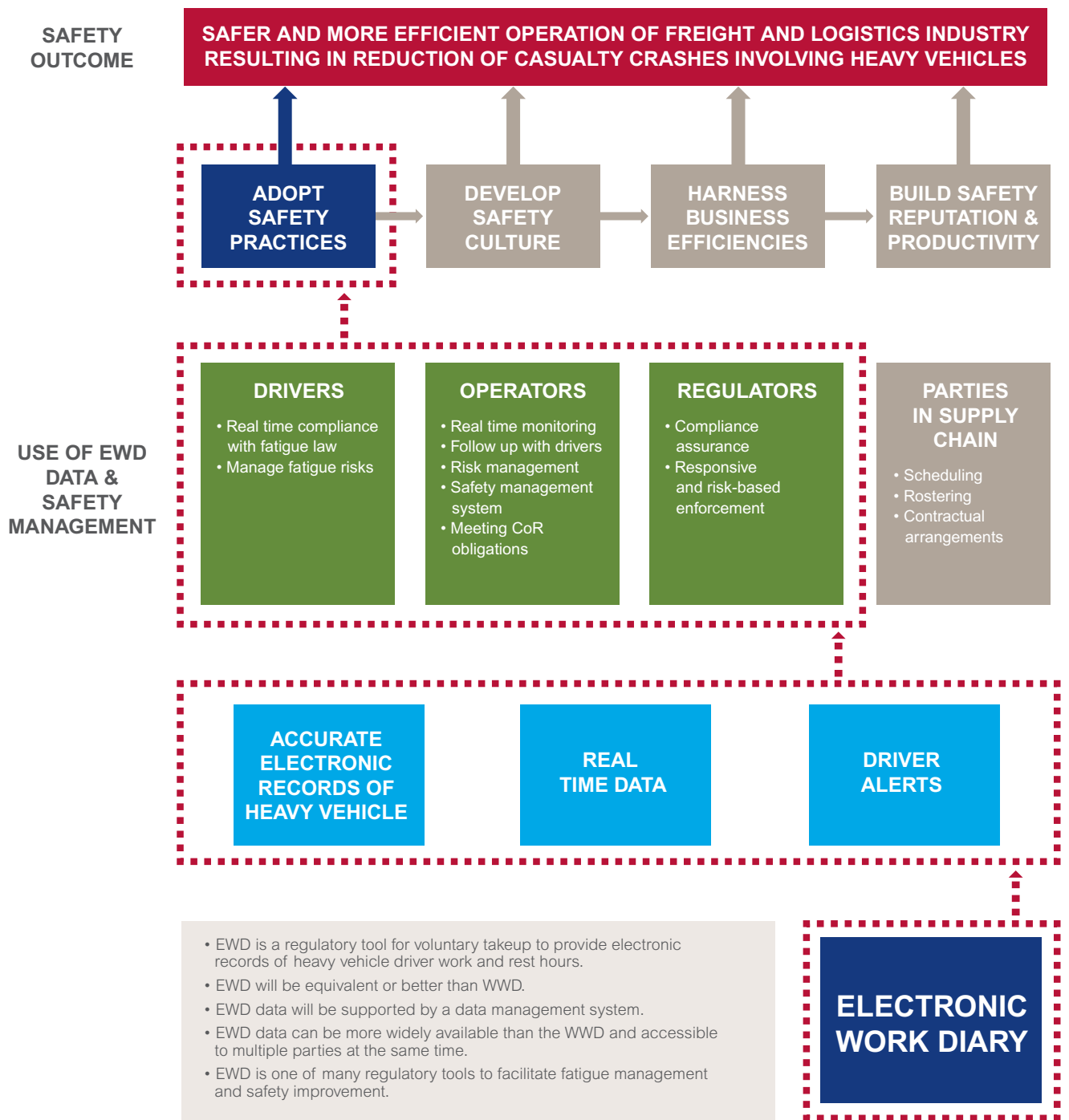
“Safer and more efficient operation of freight and logistics industry resulting in reduction of casualty crashes involving heavy vehicles.”

The model is consistent with the Safe System approach – the global standard framework for understanding and improving road safety. This approach has been adopted in the National Road Safety Strategy 2011-2020.

The Safe System approach provides a guiding set of principles for road safety and is designed to identify the way different elements of the road transport system combine and interact with human behaviour to produce an overall effect on road trauma.

The Safe System approach accepts that unexpected events and human error on our roads are inevitable. However, their incidence and consequence can be reduced and/or prevented through responsible driver behaviour, improved road and vehicle design which is more forgiving of human error and reduces harm in the event of a crash.

Figure 8: Safety Logic Model



3 KEY AREA OF ENQUIRY ONE: SAFETY BENEFITS

The EWD Safety Logic Model explains how the key features of EWDs can be used by Drivers, Transport Operators and the the Regulator to manage the risks of fatigue, which can then contribute to the adoption of safety practices by all parties more broadly.

As outlined in the model, EWDs can provide accurate records of work and rest that are available, in real time, to multiple parties in the road freight chain. In doing so, Drivers, Transport Operators, Authorities and the Regulator can better use EWD data to further improve safety management. For example, Drivers can use EWDs to manage their compliance with fatigue laws in real time while driving, while Transport Operators can monitor the fatigue risks of their Drivers in real time from a back office environment, and communicate with Drivers to manage risks and meet chain of responsibility obligations as an event occurs.

Compared to the WWD, EWDs allow more extensive use of work and rest data to manage fatigue compliance. This may contribute to the adoption of more extensive and robust safety practices by drivers, operators and others in the chain of responsibility. In this sense, EWDs can contribute to the development of safety-focused cultures among industry and regulators and support parties to build a reputation for safety over time. These interactions would contribute to a safer and more efficient operation of the freight and logistics industry, ultimately resulting in reduction of crashes involving heavy vehicles.

The model makes several fundamental assumptions; for example, that take up of EWD is voluntary, and the EWD is equivalent or better than WWD and will be supported by data management systems. In addition, the model indicates that implementation of EWDs will produce safety benefits where it is adopted as part of a safety culture and the data is proactively used to manage fatigue compliance.

Given the potential contribution of the EWD to road safety as outlined in the model, the Pilot examined the following four issues:

1. The extent to which Drivers comply with work and rest hours, and manage their fatigue.
2. How data obtained from EWDs is used by Transport Operators to alert Drivers regarding their compliance or lack of compliance with fatigue laws.
3. How Drivers respond to receiving alerts (in real time) or Transport Operator action taken as a result of detecting breaches in the data.
4. The extent to which Transport Operators (and supply chain parties, if possible) use fatigue data trends to influence their business practices such as scheduling, rostering, and negotiation of contracts.

Multiple data gathering processes were used to investigate the four key road safety issues:

- Field trials which enabled Drivers and Transport Operators to experience in-vehicle telematics and provide data which could be assessed for compliance with fatigue regulations
- TCA led stakeholder interviews with Transport Operators and industry associations to understand how fatigue compliance is managed using a WWD and how telematics information, where available, is currently used
- Surveys and interviews by Monash University Accident Research Centre (MUARC) of Drivers and Transport Operators
- Case studies utilising data from Transport Operators who currently use in-vehicle telematics to consider potential compliance improvements achievable from an EWD
- Literature reviews in the area of electronic data collection and monitoring.

The following sub-sections present key findings separately for each of the four key road safety issues addressed in the Pilot.

3.1.1 THE EXTENT TO WHICH DRIVERS COMPLY WITH WORK AND REST HOURS AND MANAGE THEIR FATIGUE

The Pilot investigated the potential effect of the EWD on Driver compliance compared to the current WWD.

A WWD relies on the Driver to accurately record work and rest times, although gross misrepresentation will be apparent. Stakeholder engagement in the Pilot has highlighted that the following issues are particularly relevant to WWD accuracy:

- Non-disclosure of delays in trip times such as from an accident or congestion. Where a planned trip exceeds the scheduled time resulting in a breach, the time shown in the WWD is adjusted to show a compliant trip
- Continued driving to a location where there is a desired rest stop, even if this will exceed driving hours. The WWD is adjusted so that no breach is shown
- Non-compliance with the legislative rounding rules (ie rounding down work to the nearest 15 minute increment or rounding up rest).

EWDs are expected to provide improvements in data accuracy and integrity in regard to driving time. This data integrity will come from automatic GNSS based recordings of all truck movements including date, time and location. EWDs do not provide any specific information to improve data integrity in relation to non-driving work time, however it will help identify a lack of appropriate entries in regard to this work, eg no time shown for loading and unloading would be evident to Transport Operators and Authorised Officers. Increased integrity of data is expected to provide an improved picture of driver work and rest, promoting enhanced adherence to fatigue laws and improved enforcement effectiveness.

As part of the Pilot, a comparison of telematics and WWD records of work and rest was undertaken. In considering the results of this analysis it is important to recognise that the sample was from:

- Transport Operators and Drivers who willingly participated in the Pilot
- Drivers who were aware that their records (WWD and EWD) were to be analysed and compared as part of the Pilot. It should be noted that participating Drivers were not exempt from completing a WWD.

It is therefore likely that the results show a more compliant picture than would be evident in the broader transport community.

The following two graphs (Figures 9 and 10) show the breaches by EWD and WWD broken down by rule type. The graphs highlight:

- The higher number of minor breaches with an EWD than with a WWD
- The majority of critical breaches found in both EWD and WWD records relate to the 14 day rules.

3 KEY AREA OF ENQUIRY ONE: SAFETY BENEFITS

Figure 9: EWD breaches by rule after filtering to remove apparent anomalies

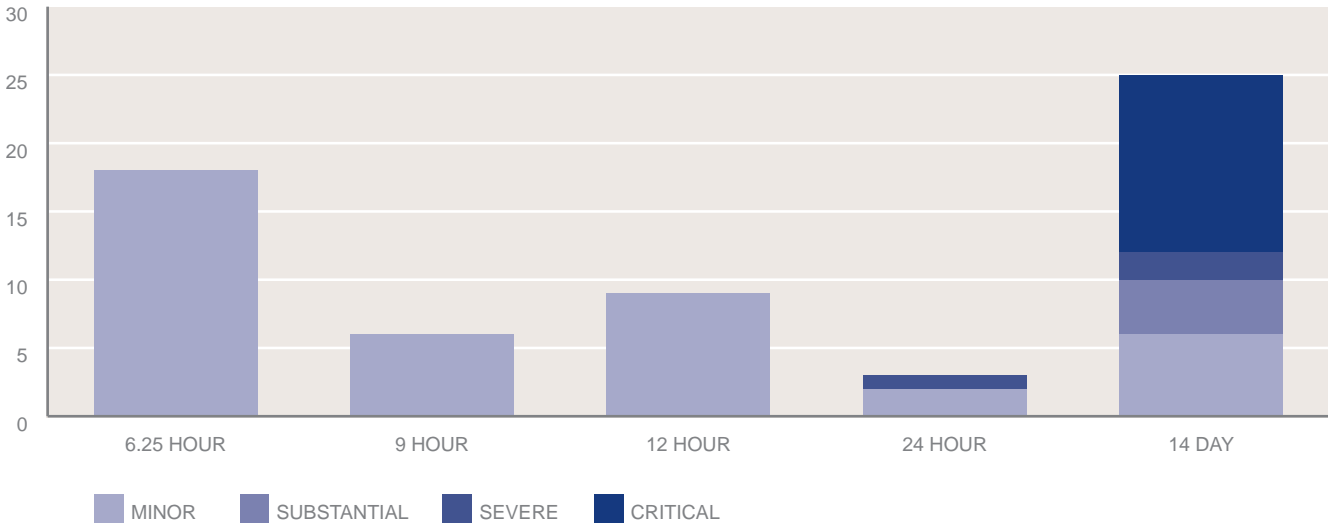
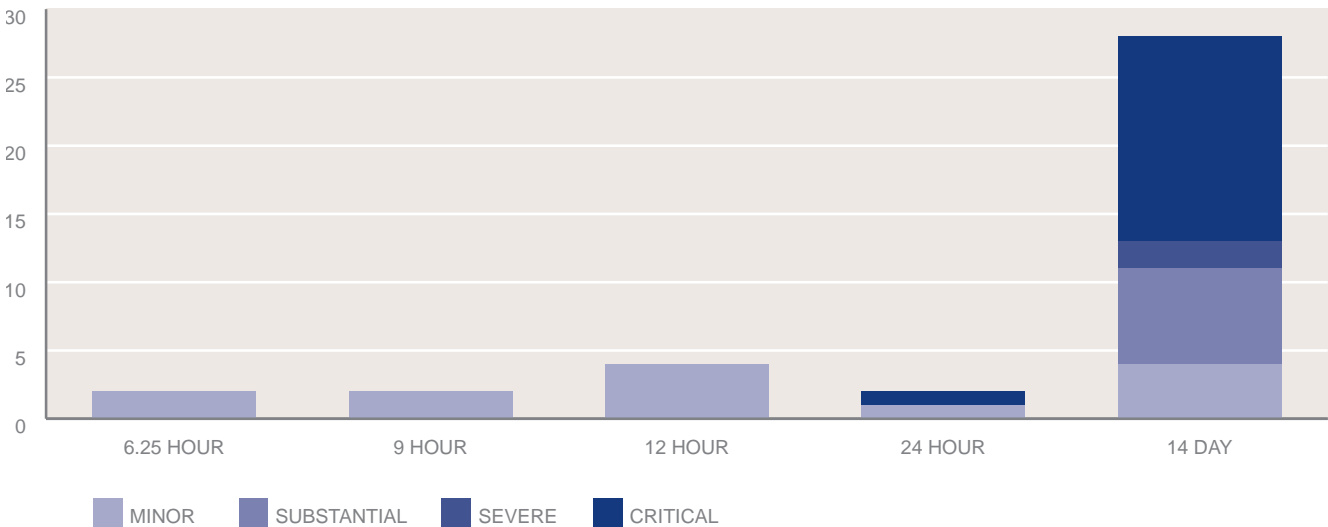
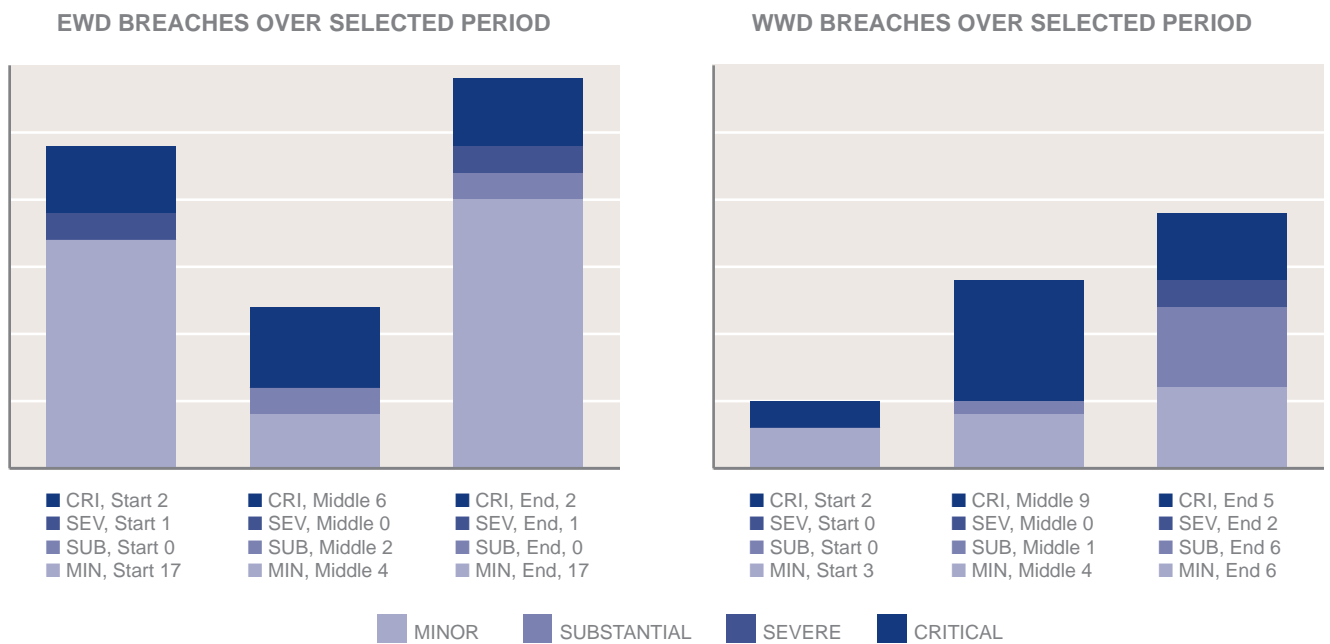


Figure 10: WWD breaches by rule



As outlined in the following graph (Figure 11), over the Pilot period there is a trend increase in breach levels in later Pilot periods, although this is more pronounced for WWD records than EWD records. It could be hypothesised that later results are more indicative of normal, as opposed to Pilot conditions, however, a more longitudinal study would be required to explore this.

Figure 11: EWD and WWD breaches over selected three time periods



The comparison of Pilot EWD and WWD records provided by participating Transport Operators and Drivers found that almost 90 per cent of EWD and WWD records were aligned within 15 minutes, indicating that the data provided has integrity for the purposes of analysis in the Pilot. Further analysis of records shows that during the Pilot the majority of WWD records were rounded in accordance with the legislation – therefore rounded up to the nearest 15 minutes for work and down to the nearest 15 minutes for rest. However all drivers at some stage incorrectly applied the rounding rules; 27 per cent of work records and 12 per cent of rest records were incorrectly rounded. Comparing EWD and WWD records, the average difference was 20 minutes for work records and 10 minutes for rest records.

The data analysis provides some initial findings indicating that WWDs may mask some breaches, in particular minor breaches. However, no specific conclusions can be drawn from the analysis of participant Driver records about whether EWDs result in improved compliance.

Over the course of the Pilot MUARC undertook 112 surveys with 75 Drivers. Over 80 per cent of participating Drivers surveyed have reported that the telematics device had made it easier for them to comply with fatigue law. The majority (over 70 per cent) reported that the device also made it easier for them to plan future work and rest breaks, however despite this the majority of Drivers (75 per cent) did not believe that the device had resulted in them driving when fatigued less often. This could be for a variety of reasons, including that Drivers are already taking responsibility for not driving when fatigued, regardless of maximum legislated

driving hours. One interviewed Driver said “I rest when I am tired anyway,” although acknowledged that the telematics helped with regulatory compliance.

A quarter of drivers surveyed believed that they had driven fatigued less often since they began using the device. Interviewed Drivers who perceived safety benefits from telematics said these came from increased ability to plan their work, and less pressure. The reduced pressure was identified as coming from the automated calculation of break times and knowledge that their break requirement was visible to management and did not need to be justified. One Driver said “I am not pushing myself too hard anymore” and reported feeling more alert because of the reduced pressure.

The extent to which Drivers comply with work and rest hours and manage their fatigue was not able to be completely answered by the Pilot. Drivers indicated that during the Pilot they used their EWD to provide the information to inform completion of their WWDs. As such results would be expected to be reasonably aligned, which may not be the case for Drivers using a WWD without the informational support of a telematics device. To determine the relative level of compliance under WWDs and EWDs would require a larger study involving Drivers using only a WWD or an EWD.

3

KEY AREA OF ENQUIRY ONE: SAFETY BENEFITS

3.1.2 HOW DATA OBTAINED FROM EWDS IS USED BY TRANSPORT OPERATORS TO ALERT DRIVERS REGARDING THEIR COMPLIANCE OR LACK OF COMPLIANCE WITH FATIGUE

EWDS will transfer data on the vehicle's movements and Driver declarations in relation to work and rest in almost 'real time' dependent on communications connectivity. This capability compares to the time delay inevitable in the case of a WWD, which in some cases may not be collected and reviewed until several weeks after a trip has occurred.

It was apparent from stakeholder engagement in the Pilot that optimal improvements in behaviour and compliance levels will come through Transport Operator use of fatigue data rather than mere collection of data. Simply having a more accurate tool to record work and rest hours will have a limited effect on compliance compared to the proactive use of this data as part of a safety culture which strives to enhance and improve safety and compliance as part of company policy and practice (eg Driver follow up, training, documentation and where appropriate performance and disciplinary action).

Many Transport Operators interviewed provided evidence of a proactive use of data to manage and improve compliance with fatigue regulation. A number had invested significant resources in the development of reporting capabilities and the business processes that surround the monitoring of records and management response to breaches. Larger Transport Operators who undertake more formalised reporting of fatigue and speed compliance all reported that it took some considerable time to develop and bed in reporting and management practices, typically three to six months.

Fatigue academic Professor Drew Dawson, in a report to the NTC, provided weighted examples of the way in which these EWD features and practices can mitigate the fatigue risk:¹

- Low weighting – Drivers use the EWD to record work/rest times and to ensure compliance with work/rest rules
- Medium weighting – as above, plus the operator is alerted, in real time, to potential infringements and/or fatigue issues that must be managed
- High weighting – as above, plus Drivers' work/rest records and compliance rates are collected by the operator, aggregated with all other Drivers' records, and regularly reported against targets or benchmarks to support the development, implementation and assessment of fatigue risk management strategies.

This assessment of the potential contribution that EWDS may make to increased compliance and safety was supported by Pilot findings that it is the use of data, not just its collection, which delivers safety improvements.

Transport Operators have implemented a range of processes to utilise information they receive from telematics systems to improve compliance and safety. These include:

- Text and/or emails to the Transport Operator (ie supervisor) of the Driver, advising of the breach
- Procedures to be followed by Transport Operator (ie supervisors on receiving advice of a breach which may involve an escalating response such as phoning or texting the Driver and counselling)
- Regular management reporting of trends.

The following sections present two separate Transport Operator case studies. The first covers a Transport Operator who uses telematics to address Driver compliance with fatigue laws, while the second is for a Transport Operator who relies solely on WWDs to address Driver compliance with fatigue laws.

¹ Professor Drew Dawson, Electronic Work Diaries (EWDS): Enforcement and Fatigue Issues, unpublished advice to the NTC, CQUniversity (2012), p.8.

Case study one - Transport Operator who uses telematics to address Driver compliance with fatigue laws

One Transport Operator participating in the Pilot provided a copy of their procedures for dealing with fatigue breaches identified through their in-vehicle telematics system. Key elements of their process are:

1. If a Driver does not take the required rest break an email is sent to their supervisor
2. An exception report is generated by the in-vehicle telematics reporting system
3. The exception report is reviewed by the Transport Operator's compliance officer and the supervisor to determine whether it is a 'reportable' breach. A 'reportable' breach is one which exceeds the internal tolerance applied by the Transport Operator.² Other data such as WWD records and weighbridge reports may also be used to assess whether the breach is substantiated
4. Reportable breaches are then subject to disciplinary policy which involves:
 - a. A discussion with the Driver about the incident
 - b. Where there are repeated small breaches or a more significant breach, a file note is made
 - c. Where there is a major breach or there is a second breach within a time frame not long after a previous file note, a warning letter will be issued
 - d. If there are numerous offences within a period and the Driver has not changed their behaviour they will be asked to show cause as to why their employment should not be terminated. Termination action can be taken if the response is inadequate.
5. Where the review of breaches highlights a pattern of misunderstanding by Drivers this will be the topic at one of the regular Driver training sessions.

This process of breach management is followed in all instances and case management systems are used to record and monitor the status of actions taken by supervisors. Reports, which are produced monthly, in both tabular and graphic form, cover the following variables:

- Breach type
- Driver
- Supervisor
- Line of business
- Show both monthly results as well as trends over time.

Examples of reports produced are shown in Figures 12, 13,14 and 15.

² Breaches which are below the Transport Operator breach tolerance are still recorded. Drivers who consistently have this type of breach are counselled.

3 KEY AREA OF ENQUIRY ONE: SAFETY BENEFITS

Figure 12: Sample fatigue breach report (commercial system)

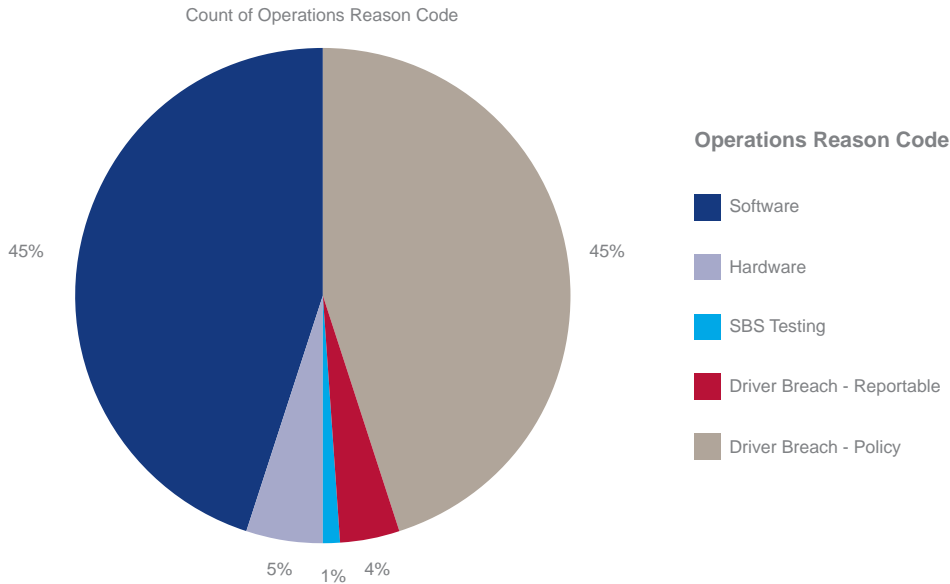


Figure 13: Sample fatigue breach report (commercial system)

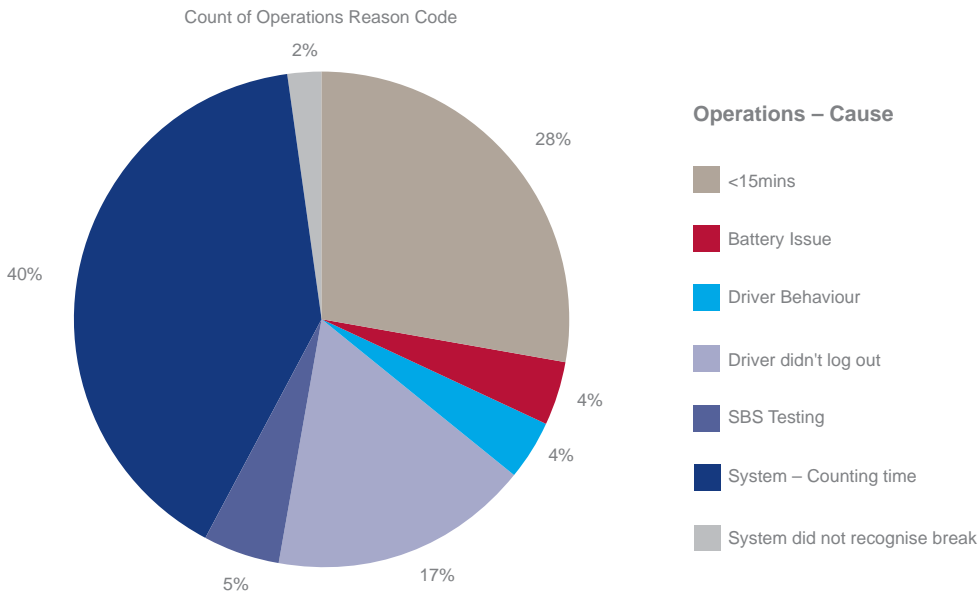


Figure 14: Sample fatigue breach report (commercial system)

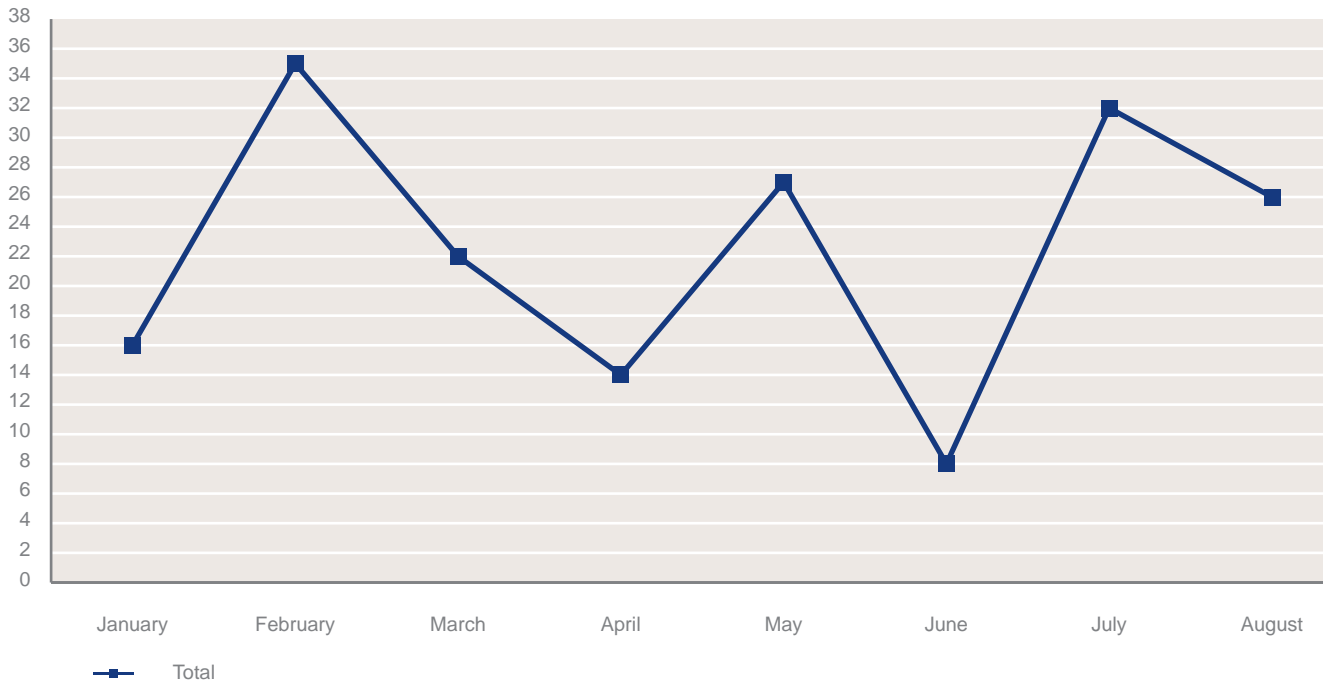
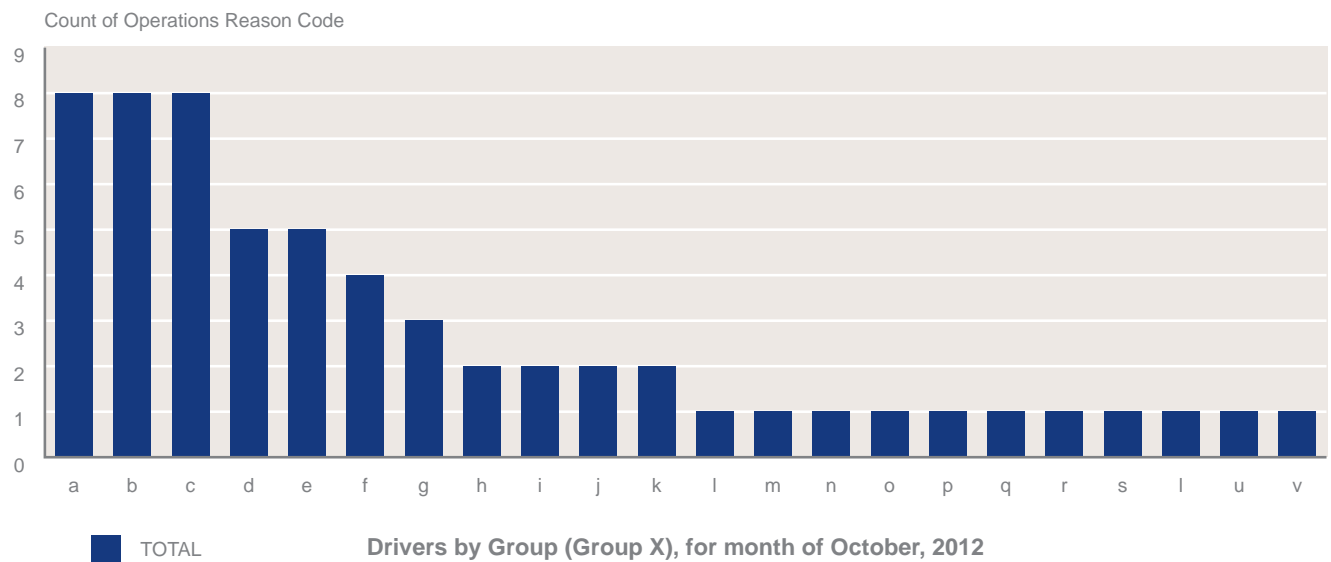


Figure 15: Sample fatigue breach report (commercial system)



3 KEY AREA OF ENQUIRY ONE: SAFETY BENEFITS

Using data obtained from these reports, the Transport Operator is able to proactively manage individuals and systemic issues and take remedial action where warranted based on:

- Review of all system reported breaches
- Follow up action with Drivers
- Regular reporting.

This approach is in line with the 'high weighting' best practice defined by Professor Dawson.

The trend results for fatigue compliance for this Transport Operator are shown in Table 1.

These results show that high levels of compliance are able to be achieved by a proactive Transport Operator, however, some breaches still do occur. It should be noted that breaches below the Transport Operator's internal tolerance level are not shown in these results, meaning that actual compliance levels based on legislation may be lower.

As discussed further in Section 6, in considering the enforcement approach to small and/or infrequent breaches, it is important to note that the precision of the EWD means that a small number of rule infringements were detected even where operators achieve high overall compliance rates. If infringement notices were issued for each, or even some, of the breaches shown above, the cost impact on Drivers, and Transport Operators if they were also breached, would be significant.

Table 1: Fatigue compliance results using commercial telematics

Period	Driver Shifts Worked	Paid Km ('000)	Fatigue Breaches	% Breaches per Shift	% Compliance per Shift	% Breaches per km	% Compliance per km
Sep-11	13,455	3,454	8	0.06%	99.94%	0.23%	99.77%
Oct-11	13,362	3,128	11	0.08%	99.92%	0.34%	99.65%
Nov-11	12,274	3,275	24	0.20%	99.80%	0.96%	99.27%
Dec-11	10,532	2,496	19	0.18%	99.82%	0.70%	99.24%
Jan-12	12,095	2,699	13	0.11%	99.89%	0.37%	99.52%
Feb-12	14,474	3,529	38	0.26%	99.74%	1.08%	98.92%
Mar-12	13,783	3,703	22	0.16%	99.84%	0.59%	99.41%
Apr-12	12,839	2,912	14	0.11%	99.89%	0.48%	99.52%
May-12	6,623	3,916	27	0.41%	99.59%	0.69%	99.31%
Jun-12	14,578	3,074	8	0.05%	99.95%	0.26%	99.74%
Jul-12	15,474	3,166	32	0.21%	99.79%	1.01%	98.99%
Aug-12	15,043	3,697	26	0.17%	99.83%	0.70%	99.30%

Case study two - Transport Operator who relies solely on the WWD to address Driver compliance with fatigue laws

The example provided above related to a Transport Operator participating in the Pilot who had been using in-vehicle telematics for fatigue purposes for some time. Another Pilot Transport Operator who had not been using their telematics devices for fatigue monitoring purposes due to deficiencies in their commercial system’s reporting capability was also analysed in terms of their processes and procedures and overall fatigue compliance. This second Transport Operator had in place very similar processes and procedures for managing breaches and monitoring performance, however utilised WWDs. A total of around 95 per cent of all WWDs are reviewed by the Transport Operator, with a further four Drivers’ records investigated in depth each week to check diary entries against records such as fuel receipts and delivery dockets. The Transport Operator uses a spreadsheet tool which assesses compliance and assists in WWD review. The Transport Operator undertakes regular management reporting similar in style and format to that shown in the previous example. Compliance rates for the Transport Operator in case study two are shown in Table 2.

These results based on WWD data review are comparable to those found in the Transport Operator using in-vehicle telematics. It should be noted that it is unknown whether the internal tolerance level for small breaches which are not reported are comparable between the two Transport Operators and therefore some variation in results may be attributable to the tolerance applied. Differences in the transport industry and nature of work undertaken by the two Transport Operators may also provide some difference in base compliance risk. However, while noting that the results need to be interpreted with some caution, it is clear that sound fatigue compliance rates can be achieved by companies regardless of the tool used.

The existing culture and practice of Transport Operators will impact on the safety benefits that are able to be achieved through use of EWDs. For Transport Operators already using commercial in-vehicle telematics, or where comprehensive fatigue management processes utilising WWDs are already in place, safety improvements will vary. While the implementation of EWDs is one aspect, ensuring it is operating correctly and the information being provided can be relied upon is critical to deriving safety benefits.

Table 2: Fatigue compliance results for a pilot company monitoring through WWD

	Kilometres Travelled	Breaches Detected	Breach Rate	Compliance Rate
Jul-11	2,913	127	4.36%	95.64%
Aug-11	3,041	150	4.93%	95.07%
Sep-11	3,038	122	4.02%	95.98%
Oct-11	3,256	116	3.56%	96.44%
Nov-11	3,109	91	2.93%	97.07%
Dec-11	2,838	80	2.82%	97.18%
Jan-12	2,803	48	1.71%	98.29%
Feb-12	2,957	37	1.25%	98.75%
Mar-12	2,952	34	1.15%	98.85%
Apr-12	2,688	61	2.27%	97.73%
May-12	2,879	58	2.01%	97.99%
Jun-12	2,647	53	2.00%	98.00%

3 KEY AREA OF ENQUIRY ONE: SAFETY BENEFITS

3.1.3 HOW DRIVERS RESPOND TO RECEIVING ALERTS (IN REAL TIME) OR TRANSPORT OPERATOR ACTION TAKEN AS A RESULT OF DETECTING BREACHES IN DATA

The best compliance and safety outcome is for Drivers to work within regulatory provisions with no breach occurrences. The provision of readily understood information and alerts would be expected to assist Drivers to avoid inadvertent breaches.

Stakeholder engagement undertaken during the Pilot and Driver surveys by MUARC found that Drivers find fatigue laws complex, particularly the rules relating to long hours and/or night hours and they appreciate the reduction in stress that comes from having the EWD calculate when they must take rests. Transport Operators advised that in many instances employees rely on the Transport Operator to understand the law and schedule their work in a manner that ensured they remained compliant. One Transport Operator said that the complexity of fatigue rules and the fear of financial penalties from breaches was a factor in the difficulty of recruiting Drivers to undertake non-routine long haul work. Therefore, EWD functionality which provides information and alerts to assist Drivers would be expected to improve compliance and reduce Driver stress.

A US study into the use of electronic logbooks cited one Transport Operator who said that there had been a 10 per cent reduction in violations as a result of the auditory and visual information available to the Driver.³

One Pilot Transport Operator utilising commercial in-vehicle telematics reported the following:

“We have seen a reduction in breaches over the past 3 months as the majority of drivers are now using telematics as a proactive device rather than a reactive device. They had a habit of ignoring the alerts at first as they did not have faith in the system and felt that they knew best and the system was incorrect. We are seeing about a 10 per cent reduction month on month in system generated and actual breaches, but a 15 per cent increase in drivers pulling up to prevent a breach based on the advice he/she is getting from the in-vehicle device.”

The devices used by Transport Operators who participated in the Pilot provided the following types of information and alerts to assist Drivers:

- Text based information on when the next break is due. In some cases future breaks are also noted
- Text based advice when a rest is imminent or has been exceeded
- Auditory alerts when a breach has occurred
- Visual indicators (green/red light) of fatigue compliance status.

Drivers provided the following comments about the usefulness of the information provided by the IVU:

- “Takes the effort out of managing driving times”
- “It has a countdown feature of usable driving hours”
- “That you can visually see how many hours and minutes you have driven so far – easy to read”.

Pilot results have found that Drivers respond positively to the provision of information and use it to proactively manage their compliance.

Around half of all Drivers reported some issues with visual information due to poor contrast or the size of the text, although the majority (over 70 per cent) found the information useful in alerting them to hours of work and rest. Auditory warnings were reported as more useful with almost 90 per cent reporting that they were effective in alerting them to hours of work and rest. Drivers identified that in-vehicle devices could be improved through features such as bigger and more readable screens and more proactive information, such as when they could legally start their next shift, greater lead time in advice on when a break is due and more periodic warnings of when breaks are due (eg not just once one hour before). As such the effectiveness of alerts will be impacted by the design and usability of the in-vehicle device. Usability issues are discussed further in Section 4.

³ Cantor, Corsi and Grimm (2009) ‘Do Electronic Log Books Contribute to Motor Carrier Safety Performance’ Journal of Business Logistics Vol 30 Number 1 p 216

Transport Operators advise that being provided with 'real time' telematics data provides an improvement over a WWD, where there can be substantial time delays in data availability in terms of:

- Reducing non-compliance by intervening and stopping its continuance
- Ensuring that the Drivers can relate to the incident that is being brought to their attention
- Driver realisation that breaches will result in a response from management and therefore a motivation to not breach.

Some fatigue systems in the Pilot had loud auditory alerts which advise the Driver when they have exceeded driving hours. These alerts, by their nature, are intended to ensure the Driver takes the required break, however, care has to be taken to ensure that such alerts do not distract or annoy drivers and therefore create a potential safety issue. This is discussed further in Section 4.

One Transport Operator participating in the Pilot provided a note of caution in regard to in-vehicle information and its potential to result in Drivers working to the rules rather than monitoring their fatigue.

'We are definitely being more proactive on fatigue from a driver's hours regulatory perspective due to the in-vehicle telematics, but as you know you can be working within the regulated hours and still be exposed to fatigue....I would say overall the EWD does not make our workplace safer from a personal driver fatigue perspective, and in fact we are finding in some cases that a driver will go that little bit longer as he can see the green light on his device telling him that he has another 2 hours to go before his next break is due'

In considering the implementation of EWDs, the Regulator and Authorities may wish to give attention to ensuring that Drivers and Transport Operators are aware that there is an overarching responsibility to not drive when fatigued and that simply driving to the regulated hours does not on its own result in safe practice.

3.1.4 THE EXTENT TO WHICH TRANSPORT OPERATORS (AND SUPPLY CHAIN PARTIES, IF POSSIBLE) USE FATIGUE DATA TRENDS TO INFLUENCE THEIR BUSINESS PRACTICES SUCH AS SCHEDULING, ROSTERING, AND NEGOTIATION OF CONTRACTS

In-vehicle telematics is commercially available from multiple suppliers. EWDs would be a regulatory use of this technology. Data from commercial in-vehicle telematics is currently used by Transport Operators for a variety of business purposes including:

- Fatigue compliance
- Driver training
- Vehicle maintenance
- Customer response.

3.1.4.1 FATIGUE COMPLIANCE

Operators reported that data from telematics was useful in scheduling in a way that was most likely to minimise fatigue breaches.

Some Transport Operators reported a 'spike' in breaches when electronic systems were introduced. This reflected the discovery of issues that had previously been masked because of the sheer complexity of fatigue law and the effort involved in the review of WWDs, highlighting the value of telematics data and the analysis it supports. One Transport Operator advised that their whole scheduling arrangements had to be changed because they had inadvertently been breaching more complex rest provisions and this has resulted in loss of shifts for Drivers.

These findings support the value of telematics data in assisting operators in managing their business to achieve fatigue compliance.

3

KEY AREA OF ENQUIRY ONE: SAFETY BENEFITS

3.1.4.2 DRIVER TRAINING

Information provided by the engine management system can highlight areas where Drivers are managing the vehicle in a manner that may lead to on road incidents such as rollovers. One Transport Operator reported a reduction in rollover incidents and general improvement in-vehicle handling following simulator based Driver training programs which focused attention on areas highlighted from in-vehicle telematics.

3.1.4.3 VEHICLE MAINTENANCE

Interviews with Transport Operators found that the information provided by the telematics unit is used to:

- Provide alerts as to when routine kilometre based maintenance is required
- Highlight engine performance issues that may require intervention.

A well maintained vehicle has reduced likelihood of experiencing a failure which may result in an accident or incident. Therefore the use of broader information from in-vehicle telematics, not just the data related to fatigue compliance, may assist in providing safer vehicles.

3.1.4.4 CUSTOMER RESPONSE

Transport Operators reported varying responses from customers to the use of in-vehicle telematics as a mechanism for aiding in meeting their Chain of Responsibility requirements. Responses indicated a broad range of views between the following two positions:

- Customers expect us to manage our responsibilities and have processes in place – they are not concerned with how we do this, nor are they interested in paying more to have the assurance of systems such as telematics
- Customers are looking for demonstrated policies, processes and practices including the use of in-vehicle telematics which provides them with active knowledge of the operator’s compliance with regulation, and will not engage with companies who cannot provide this assurance.

The latter is reported as becoming more common, particularly with large mining companies who have strong safety and compliance requirements themselves and actively consider suppliers and contractors as part of their overall safety system.

The inclusion of telematics use as part of delivering a commercial advantage or as part of contract negotiation in providing chain of responsibility assurance is occurring, however it is not clear that it is widespread.

Increased pressure or expectation from customers that demanded or favoured proactive management of fatigue through the use of telematics would be expected to positively influence adoption and therefore safety outcomes.

3.2 QUANTIFICATION OF SAFETY BENEFITS

Literature reviews reveal that little research into the potential quantifiable safety benefits of EWD type devices has been undertaken. A USA study into the use of electronic logbooks cited an operator who found there had been a 10 per cent reduction in violations as a result of the auditory and visual information available to the Driver.⁴ A further 2009 USA based study examined the safety benefits of onboard recorders. This study found that:

“If a carrier moves from zero per cent electronic logbook adoption to 100 per cent electronic logbook adoption, the average firm can reduce its hours of service violations by 1.38 annually, on average. Given that the average HOS violations in our sample are 11.12 on annualized basis this represents a 12.41 per cent reduction in hours of service violations, on average. Similarly, if a carrier moves from zero per cent electronic logbook adoption to 100 per cent electronic logbook adoption, the carrier can reduce its involvement in motor carrier crashes by 1.27 annually. Given that the average number of crashes in our sample is 8.124, this represents a 15.63 per cent reduction in crashes, on average.”⁵

The results of this study need to be tempered however as the authors acknowledge that:

- Regression analysis cannot be used to determine causation
- The finding that a relationship exists between electronic recording and safety does not necessarily mean that the electronic method caused safety to improve. Rather, it may be other characteristics of the Transport Operators that use electronic recording that were the cause of the improved safety (eg greater commitment to safety than other business practices such as driver training or wellness programs to improve safety performance)
- Safety improvements were more pronounced for Transport Operators with below average safety records prior to the introduction of electronic recording.

Data from the Pilot was examined to determine whether these literature findings, combined with available crash data, could be used to estimate quantifiable safety benefits. It was determined that the Pilot data sets were insufficient to undertake this analysis and further longitudinal research, including a review of compliance levels achieved by Operators using only and EWD or a WWD, would be required to estimate achievable safety benefits from an EWD.

3.3 KEY FINDINGS – SAFETY

The Pilot found that:

- EWDs improve compliance through:
 - Improved data accuracy and transparency to Drivers, Transport Operators and Authorised Officers
 - Provision of real time data which enables Transport Operators to respond immediately to actual breaches and monitor performance over time
 - In-vehicle driver information which enables Drivers to plan their work and rest and take action when alerted to an imminent or actual breach.
- Improved compliance with fatigue rules is expected to ultimately contribute to a reduction in heavy vehicle crashes as these rules are based on expert advice regarding minimisation of driver fatigue.
- The extent of safety benefits from the adoption of approved EWDs will be influenced by:
 - Existing use of commercial telematics – The greatest benefit from EWDs will be achieved where telematics had not been previously used by Transport Operators to monitor fatigue compliance. Where these devices have previously been used proactively to manage fatigue and are of a certifiable standard, there are likely to be fewer compliance benefits from utilising an EWD
 - Existing safety culture including management reporting and response to fatigue breaches – The greatest benefit will be achieved where the EWD is introduced as part of a culture of fatigue management monitoring, reporting and intervention to improve fatigue compliance.

⁴ 'Do Electronic Log Books Contribute to Motor Carrier Safety Performance' Cantor, Corsi and Grimm Journal of business Logistics Vol 30 Number 1 2009 p 216

⁵ 'Do Electronic Log Books Contribute to Motor Carrier Safety Performance' Cantor, Corsi and Grimm Journal of business Logistics Vol 30 Number 1 2009 p 216

4

KEY AREA OF ENQUIRY TWO: ACCEPTANCE

THIS SECTION DETAILS:

- Overview
 - Drivers
 - Transport operators
 - Authorities and authorised officers
 - Expert experiential evaluation
 - Human machine interface guidelines
 - Key findings acceptance
-

4.1 OVERVIEW

The introduction of EWDs is intended to be voluntary except in situations where they may be mandated as part of a Supervisory Intervention Order.

In this voluntary environment the successful introduction of the EWD will depend on acceptance by key stakeholders.

To evaluate the acceptability of EWDs to key stakeholders the following research was undertaken:

- Literature review
- Surveys and interviews by MUARC with the transport industry and Authorised Officers
- Stakeholder engagement conducted by TCA
- An experiential (heuristic) evaluation of telematics device
- Human machine interface guidelines.

4.2 DRIVERS

The literature review into electronic recording devices found that electronic systems are preferred by Drivers to paper based approaches where systems are:

- Easy to use
- Perceived as useful in undertaking a job or task (usefulness)¹.

The second of these two factors was found to be the most important in determining adoption². Usefulness was influenced by whether the electronic device provided:

- Time savings over the paper alternative
- Direct feedback to the Driver as opposed to simply feeding information to a centralised or back office location.

A strong factor affecting whether an electronic recording device will save a Driver time is the level of the Driver's 'technology readiness'. For example, a Driver must have openness towards technology and some basic skill in using electronic recording devices, particularly to the extent that a device requires the Driver to enter data.³ These factors were taken into account in the development of surveys and interview questions utilised in the Pilot. MUARC undertook a range of surveys and interviews with Drivers during Stage 1 and 2 of the Pilot.

All Transport Operators reported initial Driver resistance to telematics. This resistance stemmed from concerns about being monitored rather than the ability to use and understand the technology, although some Drivers do have these practical difficulties. Drivers in the USA have also reported fears about their privacy and loss of control over their private lives from the use of electronic onboard recorders.⁴ Despite initial reluctance, Transport Operators interviewed advised that Drivers' concerns do not generally persist. However, all Transport Operators reported some level of Driver sabotage of equipment. Most reported that interference decreased over time although they acknowledged some residual deliberate interference was ongoing, suggesting Drivers do not unanimously accept monitoring in-vehicle equipment.

1 Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

2 Cheng, Y. W., Y. (2009). User acceptance of automated vehicle location system technology: a study of motor carriers in Taiwan. *World review of intermodal transportation research*, 2, 12.

3 Cantor, D. E., & Terle, M. (2010). Applying a voluntary compliance model to a proposed transportation safety regulation. *International Journal of Physical Distribution & Logistics Management*, 40(10), 822-846.

4 Cantor, D. E., & Terle, M. (2010). Applying a voluntary compliance model to a proposed transportation safety regulation. *International Journal of Physical Distribution & Logistics Management*, 40(10), 822-846.

Driver responses to a question on whether they would use an EWD on a regular basis if it was available, but not mandatory, found that almost all (over 95 per cent) of Drivers who had experience with telematics would voluntarily do so. Drivers who did not have experience with telematics were more mixed on whether they would use the device, indicating that acceptance of an EWD might be something that develops over a longer period of time as Drivers become more familiar and comfortable with the technology.

The majority of Drivers (over 70 per cent) felt confident in using their in-vehicle devices after less than five uses, indicating that devices are generally easy to use and understand. Almost all (over 95 per cent) Drivers reported being able to use their telematics device to record their hours of work and rest and to manage their compliance with fatigue laws. However, Drivers identified the precision of the telematics device as a concern and suggested that building in a few minutes tolerance would improve the system from their perspective.

In the Driver interviews undertaken by MUARC only one Driver was concerned that they would not have a paper copy of their work and rest records under an EWD. Most Drivers said that they rarely or only periodically accessed past records (although some did so daily), and were of the view that the ability to review records on the EWD in-vehicle display was sufficient. One Driver indicated a preference for the ability to review his EWD records on his home PC which would be possible under the RCAF.

Stakeholder engagement and Driver surveys found that Drivers find fatigue laws complex and note a reduction in stress from using an EWD as it automatically calculates when they must take rest breaks.

4.3 TRANSPORT OPERATORS

Stakeholder engagement was conducted with Transport Operators drawn from Pilot participants, nominated by industry associations or identified in the Pilot. In considering the input provided it should be understood that Transport Operators consulted will tend to be those motivated to comply with regulations. Industry associations were also engaged, including the Pilot governance structure to capture the broader views of the industry.

As outlined in Section 3, the transport industry generally welcomed the prospect of a voluntary electronic alternative which is equivalent to the WWD.

Consultation with Transport Operators raised the following matters that would be relevant to their take up of EWDs:

- Existing use of commercial telematics
- Cost of equipment and fees in using a regulatory as opposed a commercial system
- Enforcement approach to small breaches and the perception of exposure to excess scrutiny by regulators because information is available and transparent
- The higher administrative burden of WWDs when compared to an EWD.

4

KEY AREA OF ENQUIRY TWO: ACCEPTANCE

4.3.1 CURRENT USE OF COMMERCIAL TELEMATICS

Analysis of Transport Operator use of existing commercial telematics was undertaken in the Pilot to provide an understanding of the potential for EWD take up.

Transport Operators who have taken up voluntary telematics have done so for a variety of reasons including:

- Safety (this issue has been discussed in Section 3 of the report)
- Commercial efficiencies
- Customer management and satisfaction
- Regulatory compliance including transport and workplace health and safety regulation.

Transport Operators have used telematics to achieve commercial efficiencies through:

- Communication with Drivers
- Assignment of work to the Drivers
- Integration with other systems (manual and computerised) including:
 - Payroll
 - Invoicing
 - Scheduling and rostering.
- Prestart checks and fault reporting
- Maintenance and fleet management
- Customer service (eg advice on where vehicle is and will arrive – in some cases customers can monitor live).

Stakeholder engagement (Transport Operators, service providers, insurance industry) undertaken as part of the Pilot found that:

- Vehicle fleets under five do not routinely use in-vehicle telematics, however may use simple hand held devices such as a GNSS navigator
- Some vehicle fleets between 5 – 29 vehicles will utilise in-vehicle telematics although this is most likely to be a device with no Driver input required (such devices would not meet requirements for an EWD)
- Fleets over 30 vehicles are more likely to invest in in-vehicle telematics as part of overall fleet and business management.

Figures provided by the NTC indicate around 33.5 per cent of operators have some form of GNSS based device for monitoring purposes.⁵ This finding is consistent with previous COAG Road Reform Plan (CRRP) work which estimated that 30 per cent of the Australian heavy vehicle fleet had taken up in-vehicle telematics of some type and is similar to the take up rate reported in 2011 in New Zealand.⁶

A report undertaken by Hyder in 2011 for CRRP found that for Transport Operators who had some form of in-vehicle telematics within their fleet⁷:

- 54 per cent of fleet vehicles were fitted with IVUs
- 45 per cent of devices had the capacity for Driver input
- 23 per cent used the devices to assist with regulatory compliance.

While current take up of commercial telematics is probably a strong indicator of potential interest in regulatory telematics:

- Current reported usage to support regulatory functions is low, indicating the limited availability of such technology and that this is not currently a strong indicator of potential operator take up
- Many of the existing devices would be unsuitable for regulatory use (ie have no Driver input capability and in addition may have limited tamper monitoring and be untethered to the vehicle)
- Even where telematics are used it is not applied to all vehicles in the fleet, supporting stakeholder comments that units are installed on a case by case basis where there is a demonstrable business benefit based on the nature of the work undertaken.

In-vehicle telematics systems also provide Transport Operators with information to assist in the management of complaints and incidents such as:

- Customer claims load arrived late
- Customer queries time charged for being on site
- Members of public complain the vehicle was speeding or that the company has a pattern of speeding
- Providing proactive information ahead of work in a particular location to concerned locals about the impact of vehicles on safety in the area
- Incidents or crashes involving a vehicle.

5 Figures provided by the NTC

6 CAOG Road Reform Business Systems to Support Heavy Vehicle Charging August 2011; p 20

7 COAG Road Reform Plan ITS Telematics Survey

Transport Operators employed varied decision making processes to assess investment in commercial telematics. Some Transport Operators invested in commercial telematics because they inherently believe in the value of the technology and what it could add to their business. In other cases, formal business cases and cost benefit analyses were prepared to inform their decision on investment in commercial telematics.

Many Transport Operators with in-vehicle telematics have, or intend to install, equipment in all vehicles. In some cases there was no positive business case for parts of the operation and therefore not all vehicles are equipped with in-vehicle telematics.

Larger Transport Operators who employ regular/fulltime contract owner Drivers will typically require the installation of a specific in-vehicle telematics device in contractor vehicles.

Equipment and the use of data from the commercial telematics systems fall into two major groupings:

- Standalone systems – Data is analysed periodically as management time allows, and is not integrated into other business systems. Standardised reports developed by their equipment supplier are utilised. This was the approach typically used by Transport Operators with 5 to 30 vehicle fleets
- Integrated systems – There are formalised processes for the review, management and reporting of data from in-vehicle telematics device and data is sometimes automatically integrated with other systems such as payroll and customer accounts. Internal company specific reports have been developed. This approach was found in Transport Operators of 100 vehicles or more.

Based on current commercial use of in-vehicle telematics, take up of an EWD is most likely to occur with larger Transport Operators. Given penetration of commercial systems is currently at around 30 per cent this would reasonably represent the maximum ceiling for voluntary take up of EWDs in the short to medium term with other factors such as cost, scrutiny and sanctions most likely to result in take up below this level. As the take up of commercial telematics grows the scope for EWD adoption is expected to also expand.

4.3.2 REGULATORY EWD TELEMATICS

The transport industry generally welcomed the prospect of the availability of an option to replace the WWD with an electronic equivalent. The potential benefits from a regulatory EWD were cited as:

- Driver benefit – reduced:
 - paperwork
 - stress of remembering and applying fatigue rules
 - infringements for minor WWD administrative errors or unwitting breach of fatigue law.
- Reduction in administrative effort - minimising work involved in collecting, storing and analysing WWDs
- Customer marketing – some operators saw potential benefit in being able to say that their in-vehicle telematics system had a 'government tick of approval' and therefore had a higher level of quality assurance than a non-approved telematics system.

Transport Operators were generally accepting of the RCAF approach where data would be drawn from back office systems when an enforcement review was being undertaken. Some emphasised that only the information currently made available in a WWD should be made available to the Authorised Officer and there was concern that information should not be able to be accessed by competitors.

While larger Transport Operators expressed a desire to at least explore the take up of a voluntary EWD option they raised a number of issues:

- Increased scrutiny and the enforcement approach which would be taken to small breaches
- Cost of equipment and fees from using a regulatory as opposed to a commercial system
- That conditions or access which are currently available may be restricted in the future to Drivers with an EWD.

4

KEY AREA OF ENQUIRY TWO: ACCEPTANCE

4.3.2.1 ENFORCEMENT AND SCRUTINY

The transport industry expressed concern that by using EWDs they would leave themselves open to increased review and scrutiny. The transparency and ease of electronic data analysis compared to the WWD is well understood. While the EWD provides benefits it is also seen as a potential risk if not managed.

The livestock industry, as well as smaller Transport Operators, expressed the strongest reluctance to consider take up of an EWD primarily because of limited perceived benefits as well as concerns about increased regulatory scrutiny.

The resolution of issues relating to enforcement and scrutiny in an electronic environment were consistently cited as a major factor that will influence take up. The belief that raising your profile and exposure with the Regulator and Authorities has negative consequences was the reason that at least two Transport Operators refused to participate in the Pilot, highlighting the importance of perception and assurance around this issue in terms of future take up.

4.3.2.2 PURCHASING CONSIDERATION

Ultimately each Transport Operator's decision as to whether or not to take up an EWD will be based on their assessment of the costs and benefits. The general view expressed in the Pilot was that additional cost would need to be offset by identifiable savings in administration.

Broadly there are four possible starting points for operators who consider voluntary take up of an EWD:

1. Never previously had in-vehicle telematics and decide to invest in an EWD
2. Previously had in-vehicle telematics that are now approved for EWD use. The equipment would require a firmware update to accommodate EWD functionality
3. Previously had in-vehicle telematics that are not approved as an EWD. Equipment is modified to enable it to comply with the EWD Specification
4. Previously had in-vehicle telematics that are not approved as an EWD. When equipment is next due for replacement, EWD compliant technology is installed.

Each of these scenarios will have different costs for the Transport Operator.

The differential cost of a regulatory telematics device compared to a commercial product is not just the cost of the unit itself. Monitoring by the EWD-SP is required for an EWD and this recurrent charge can be greater than is levied for normal commercial services because of the increased evidentiary quality requirements placed on regulatory products.

The cost to telematics providers to enhance their existing products to meet the EWD Specification will depend on the features of their existing product and alignment with requirements. Advice to TCA from existing accredited IAP telematics providers is that the development required and resulting cost will vary from relatively minor to substantial.

The telematics market is currently mature in Australia to the extent that there are a wide variety of products with varying capabilities available from a range of suppliers. IVUs can range in price from a few hundred dollars to around \$1,500 or more. While the price differential is to some extent a reflection of the different functionality, TCA experience with IAP indicates that IVUs which align to the requirements of regulatory applications can be equivalent to the cost of devices which do not have core elements required to meet the IAP Functional and Technical Specification.

The equipment costs of an EWD for a Transport Operator will comprise two main elements and the following values were used in the cost benefit analysis (refer to section 7):

- In-vehicle units – \$1,200 plus \$500 installation
- Monthly monitoring – \$20 per month per unit.

In addition there will be costs to Transport Operators for establishing management reporting systems to enable the review of data from IVUs.

The cost of IAP was consistently cited as too high with Transport Operators indicating that if the cost of an EWD was equivalent to participation in IAP they would not purchase an EWD.

A survey of Transport Operators found that:

- Of a total of seven Transport Operators without existing telematics, three said they would not pay for an EWD and four stated they would pay up to \$500 for an EWD
- Of seven Transport Operators with existing telematics, one said they would not pay to upgrade their existing equipment, two would pay up to \$100 and three would pay up to \$500 per IVU.

The incremental cost of adding EWDs to an existing telematics system is a decision factor and given three of the seven Transport Operators would be willing to pay up to \$500 to upgrade their existing telematics, it is likely to result in their adoption of EWDs at this price point.

While this sample is too small to make a conclusion other than for those operators, we can conclude that where there are existing in-vehicle units that are being used or ready to be used for regulatory telematics, the costs are likely to be acceptable, noting that there is no additional hardware required (except driver authentication in some cases). There are more than 15,000 in-vehicle units currently deployed in heavy vehicles which fit this scenario.

Transport Operators indicated that they expect equipment to last for at least five years, although in some cases, equipment over ten years old is still in service throughout Australia. Transport Operators indicated that they would not abandon their investment in current telematics which still served their business needs if the only benefit was the ability to use an EWD. The EWD Specification has established the minimum standards and if an existing system meets these requirements it could be considered for approval as an EWD. Even if Transport Operators were interested in an EWD, relatively long replacement cycles means that transition times are likely to be long in the absence of any incentive.

Where Transport Operators choose to wait until the end of the useful life of their existing equipment, transition times could be anywhere up to 5-10 years. Transport Operators spoken to during the Pilot were in many instances about to upgrade or purchase equipment within 12 months or had only recently installed new equipment. In some instances Transport Operators have already moved to their second generation of in-vehicle telematics.

Cost and benefit issues are further explored in Section 7 of the report.

4

KEY AREA OF ENQUIRY TWO: ACCEPTANCE

4.4 AUTHORITIES AND AUTHORISED OFFICERS

Authorities have emphasised that the growing freight task and limited resources will almost inevitably require a paradigm shift in the way that compliance with fatigue and other regulations is achieved. The increased use of technology and data to analyse operator behaviour and target resources where they are most effective was universally supported.

In this context the implementation of EWD was seen not as the translation of a written document into an electronic form, but rather as a tool that is part of an emerging alternative compliance and enforcement approach.

MUARC surveys of Authorised Officers found that the majority (around 80 per cent) would voluntarily use electronic mechanisms to monitor Driver fatigue compliance if this was available but not mandatory. The results of the survey assessing experiences using CAS by Authorised Officers was also positive, with the majority agreeing or strongly agreeing with most questions of usability and functionality. For 'perceived usefulness', authorised officers rated the CAS 72.4 per cent, while for 'ease of use', the average score was 70.8 per cent.

Some Authorised Officers expressed concerns about the practical operation of the RCAF in locations where internet connectivity was poor. Testing of EWD for compliance assessment did not take place at the roadside, however, workshops tested methods for conducting roadside compliance assessment where connectivity was poor, such as through SMS and on screen, and data was gathered on the level of connectivity available in typical intercept locations (see Section 5).

The workshop approach was adopted because of the logistical difficulties in organising real life, on road intercepts with the limited number of purpose built EWDs installed in participating vehicles. In addition, the workshop approach provided the opportunity for officers to test multiple scenarios using real data collected over the Pilot from participating Transport Operators. Workshops also allowed Authorised Officers to discuss the effectiveness of CAS and scenarios with each other and query and provide feedback to TCA staff. These learning opportunities would not have been possible in a road-side intercept. The workshop approach was independently reviewed by Nous Group and deemed most appropriate for the Pilot.

During workshops, Authorised Officers were able to detect breaches using CAS that they would have taken increased effort and time to detect when reviewing the WWD. In addition, Authorised Officers utilised functionality to show vehicle location and movements which allowed non-compliances, such as a vehicle moving while the Driver had declared a rest, to be identified.

Overall the survey indicated that while CAS performed as expected, Authorised Officers were concerned about the operational impacts of the RCAF and CAS and how it can provide them with the necessary access and integrity required for the presentation of evidence in court to support prosecutions. These concerns are further examined in Section 5.

Feedback from consultation with Authorised Officers has been incorporated into the development of the EWD architecture and CAS which is detailed in Section 5 of this Report.

4.5 EXPERT EXPERIENTIAL EVALUATION

Three experts in the evaluation of the usability of technology examined eight telematics devices tested in Stage 1 of the Pilot as well as CAS.

The evaluation was effective in identifying a number of specific usability problems that has assisted in the development of the EWD Specification. The following list provides a summary of the recommendations from the expert evaluation which were included in the EWD Specification:

- Make the provision of Driver Information readily accessible to the Driver
- Make (historical) EWD records easily accessible to the Driver to review their history
- Provide a clear method to logout (and by inference login) to the EWD
- Ensure EWD records are presented in an easy to read format
- Specify IVU reliability (ie malfunction resolution should be clearly defined).

Other identified usability features were considered more appropriately left to commercial performance based development.

4.6 HUMAN MACHINE INTERFACE GUIDELINES

A set of Human Machine Interface Guidelines was developed based on the experiential evaluation, surveys and interviews.

The guidelines may be used by the EWD System Manager in assessing EWD IVUs presented for certification and could be considered for other uses in the future, such as an aid for use by the commercial telematics providers in system design and by Transport Operators in making purchase decisions.

The following key principles were identified:

General design principles

- Controls and displays should look and function the way users expect them to be, based on experience with common systems
- The EWD should be consistent across its sub-systems in terms of layout, controls, sequencing of actions and inputs and outputs
- The amount of information the user has to remember when using the system should be minimised
- Controls that are similar in function or that are used together should be located near each other and use common design elements (eg. colour, size, shape)
- Controls or information that are used most often should be located as close as possible to the Driver and their forward line of sight as possible.

User Interface

- The UI should be mounted securely to the vehicle
- The UI should not obstruct the Driver's forward field of view
- The UI should not obstruct the Driver's view of, or access to, vehicle controls
- The UI should be located so that it does not require the Driver to fully extend their arms, lean or reach excessively from their normal driving posture to interact with the system
- The UI should be placed as close as practicable to the Driver's normal line of sight
- The UI should be installed in accordance with Australian Design Rules and vehicle manufacturer instructions.

4

KEY AREA OF ENQUIRY TWO: ACCEPTANCE

Interaction methods

- EWD functions that are available when the vehicle is in motion should be able to be operated manually by Drivers while keeping one hand on the steering wheel at all times
- Control types, appearance and movement should be appropriate for the task/function that they execute
- Controls should provide appropriate visual, auditory and/or tactile feedback to the user, indicating that a response has been successfully selected/executed.

Visual display

- The in-vehicle display should provide adequate luminance and contrast to be easily seen under different lighting conditions
- The in-vehicle display should contain clearly distinguishable colours
- All text and symbols should be of adequate size and font to be easily readable while the vehicle is in motion
- Any information the user has to read should be minimised while the vehicle is in motion.

Auditory display

- Different audio tones, signals and messages should be easily distinguishable from each other
- A maximum of three or four different tones should be used across the system
- Auditory alerts should be able to be interrupted or silenced (muted) with the touch of one button
- The volume of auditory alerts and messages should be loud enough to be heard under all driving conditions, but should not startle the Driver or mask other vehicle warnings.

System navigation

- System design and menu design should be consistent throughout
- In the menu, the most commonly used functions should be the easiest/first to reach
- It should be easy for users to move back and forth across menu levels, return to the start or escape a dead end.

Alert design and scheduling

- EWD should provide multiple break alerts that increase in intensity
- Break alerts should be provided early enough to allow Drivers to plan their break location
- For higher priority alerts or those requiring immediate action, auditory presentation should be used
- Auditory alerts should be supplemented with visual alerts/information.

4.7 KEY FINDINGS – ACCEPTANCE

The Pilot found that:

- Drivers saw benefit in the use of telematics to monitor compliance with fatigue legislation. They appreciated the provision of information to assist them in planning and viewed the device as reducing stress in managing complex fatigue laws
 - Transport Operators saw a range of commercial, safety and customer benefits to the use of telematics and some were willing to take up an EWD provided that cost was not prohibitive and that outstanding enforcement and scrutiny issues are addressed by Authorities and the Regulator. Smaller operators and those in the livestock industry in particular indicated that they would be unlikely to consider an EWD due to the limited perceived benefits which they believe will result in increased regulatory scrutiny
 - Authorised Officers found CAS useful and their feedback has been incorporated into the EWD Specification and CAS development. Further in-field experience, particularly with the remote download of data, will be expected to improve acceptance
 - Evaluation of telematics usability issues have found a number of areas where care in design is needed. Where appropriate these findings have been included in the EWD Specification
- The Pilot has identified a range of benefits that the EWD as an electronic system has over the WWD as a manual system and which go to the acceptance of the EWD:
 - An EWD allows the Driver and Transport Operator to more easily review past work and rest records using data stored in electronic form, to ensure they operate in compliance with fatigue laws
 - The EWD will automatically pre-populate records with default information and reduce the time it takes Drivers to manually record work and rest information
 - The EWD will record time and location to provide greater accuracy for recorded information
 - With CAS the EWD will automate and reduce the time taken for a compliance check for both the Driver and Authorised Officer who must manually calculate compliance with the WWD, especially during on-road intercepts
 - Through the use of CAS, the EWD has the potential to allow more efficient use of Authorised Officer time in assessing fatigue compliance reducing business interruption for Drivers and Transport Operators during an intercept
 - The migration of drivers from WWD to EWD will reduce the quantities of WWDs which jurisdictions are required to print and issue, a significant number of which are reported as lost or stolen.

5 KEY AREA OF ENQUIRY THREE: TECHNICAL FEASIBILITY

THIS SECTION DETAILS:

- The EWD Functional and Technical Specification
- Information security threat and risk analysis
- Remote connection access framework
- Key findings – technical feasibility

The Pilot has demonstrated that telematics service providers are able to deliver an EWD that meets the EWD Specification because during the Pilot commercial providers were commissioned to develop systems in compliance with key components of the EWD Specification which were then tested during the Pilot.

The commercial and regulatory use of EWDs is facilitated by an approach that incorporates a platform for both uses. This is consistent with many of the technical standards being developed in Europe for the next generation of digital tachographs and the United States of America for electronic on-board recorders.

The development of the EWD has been consistent with the national policy principles contained in the *Policy Framework for Intelligent Transport Systems in Australia* published by the Standing Council on Transport and Infrastructure (ITS Policy Framework) in 2012. Additionally the table below sets out the alignment between the approach to the EWD which was taken in Pilot and the national policy principles identified in the *National in-vehicle telematics strategy: the road freight sector* published by the NTC.

Table 3: National Policy Principals

National Policy Principles	EWD alignment with National Policy Principles
<p>The role of business is to develop innovative technological solutions – the private sector has the ability to drive the development of new technologies, and the incentive and resources to innovate in-vehicle telematics.</p>	<p>The EWD Specification is performance based allowing industry to innovate in meeting/exceeding the standards set by government and incorporating additional commercial user features.</p>
<p>The role of governments is to provide policy certainty by setting the regulatory framework, creating an environment for business to invest with confidence.</p>	<p>A key aim of the Pilot is to provide policy certainty in relation to EWD as a key telematics technology. For example, the EWD Specification provides certainty as to the standards an EWD must meet for regulatory approval.</p> <p>NTC through the Pilot has liaised extensively with industry, transport agencies and Police in exploring enforcement issues. These issues are beyond the scope of the Pilot to resolve and they will continue to be addressed following the completion of the Pilot.</p> <p>An EWD is fit for purpose by ensuring it is part of a complete operational environment that includes an appropriate certification and audit program.</p>

National Policy Principles	EWD alignment with National Policy Principles
<p>Technology is a tool to enable policy; policy should not be designed to fit a technology.</p>	<p>The EWD is a regulatory tool which will contribute to government policy objectives of improving heavy vehicle compliance with fatigue law.</p> <p>Since 2008 the HVNL has provided for an approved EWD, however none have been approved due to a lack of technical guidance. The EWD Specification being developed as an outcome of the Pilot will ensure the technology meets the regulatory and policy needs.</p> <p>Having a single in-vehicle unit that is able to meet multiple and changing policy objectives is important to ensuring technology does not set policy. The EWD Specification has been developed to co-exist with other regulatory telematics programs and commercial requirements allowing (public and private) policy to evolve as necessary.</p>
<p>Interoperability standards and platforms must be public, transparent and performance based. They should encourage innovation and facilitate multiple uses. Governments should provide standards and policy directions to help facilitate supply chain interoperability and in-vehicle telematics uptake.</p>	<p>The EWD Specification is performance based to encourage innovation and allow for interoperability. The EWD will appropriately be made available to prospective Applicants wishing to become an EWD Service Provider.</p> <p>The EWD environment supports the principle of “one box, many uses” and, through the RCAF, ensures interoperability and supply chain flexibility by enabling the regulatory and non-regulatory use of telematics to co-exist</p> <p>The EWD provides a high level of interoperability by ensuring the data can be used by regulators and for commercial operations without the need to duplicate.</p> <p>It is performance based to ensure technology does not become a limiting factor in the future – innovation is driven and in fact encouraged.</p>
<p>Telematics-based compliance monitoring should be voluntary wherever practical.</p>	<p>The Pilot has proceeded on the basis that the EWD will be voluntary (apart from where it may be required under a supervisory intervention order).</p>
<p>Uptake by industry should be encouraged rather than compelled.</p>	<p>The Pilot has investigated factors influencing EWD take up including through a cost benefit analysis. The development of the EWD in consultation with the transport industry has been an important engagement to identify and manage issues and concerns such as privacy, which industry has raised, and to appropriately address them to encourage adoption of EWDs.</p>

5 KEY AREA OF ENQUIRY THREE: TECHNICAL FEASIBILITY

5.1 THE EWD FUNCTIONAL AND TECHNICAL SPECIFICATION

The Pilot findings have resulted in significant changes to the EWD Specification. These changes reflect:

- Resolution of the five Unresolved Issues identified in the Pilot scope
- Functionality deemed necessary or desirable from a policy perspective
- Provision for remote access to Driver records (RCAF)
- Removal of the DRD as a mandatory feature of the EWD
- Inclusion of features to contribute to improved compliance and safety outcomes.

A summary of the high level changes made in the EWD Specification are provided in the table below.

Table 4: Summary of amendments to the EWD Specification

High Level Requirement	EWD Specification	Amendments
Tethering	Protected from unauthorised removal or opening of the IVU.	Change to allow for electronic or physical tethering of the IVU. Security seals for protection of the IVU from unauthorised opening.
Type-approved IVU with DRD capability	An IVU which incorporates the DRD which is used by Authorised Officers to view records.	Not included. An IVU that does not incorporate the DRD used by Authorised Officers to view records.
Speed	Requirement to collect speed.	No requirement to collect speed which is available as a separate application – either under the IAP or under a separate regulatory application (Intelligent Speed Compliance) or commercial application (Intelligent Speed Management).
Records	Records are grouped into: Location Speed Alarm Self-Declaration Detail and Self-Declaration Work	Records are grouped into: Position Manifest (ie Data integrity records) Self-Declaration Work (different to previous) and Self-Declaration Driver Commentary Officer Annotation Alarms (multiple)

High Level Requirement	EWD Specification	Amendments
Distance travelled	No GNSS derived value of distance travelled between Driver declarations.	Accommodates: <ul style="list-style-type: none"> - 100km work at a technical level (and can accommodate other policy decisions in this regard) - Switch between WWD and EWD - leaving the vehicle while either working or resting
Data transfer from the IVU to the EWD-SP System (back office)	Records transferred to the EWD-SP at least once every 24 hours.	Change to accommodate the RCAF.
EWD Data available on the IVU	Approximately 5 days of EWD Self-Declarations shall be stored on the IVU.	A minimum of 28 days of EWD Self-Declarations and Officer Annotations shall be stored in the IVU.
Remote Connection Access Framework	Not included.	Included as the primary access method to Driver declarations.
Tier 1 Communication	B2B interface.	Not included – however the ability to assess and report non-compliances is possible under the RCAF.
Tier 2 Communications - communication between the EWD-SP and the EWD System Manager and EWD-SP and the Regulator	Secure FTP Services, Registered Post and S/MIME digitally signed email communications.	Changed to include web based reporting services to allow the incorporation of malfunction (and other) reporting in a secure and reliable manner.
Tier 3 Communication	Not included.	Tier 3 Communication between the EWD-SP and Record Keeper is included.
User Interface and display of information	Not included.	Includes requirements for the installation, use and maintenance of a user interface. Includes requirements for EWD Data that must be displayed to the Driver for different circumstances. For example, when a Driver switches to the WWD, the user interface must display a record number which the Driver can then record in their WWD.
Driver Fatigue Information	Not included.	Requirement to provide the Driver with rest break information, information to help manage fatigue obligations and accompanied by appropriate disclaimers. Rules regarding Driver fatigue Information are included to allow for the modification of requirements as necessary and identified to potentially drive additional road safety benefits. This will allow for the periodic update without the need to complete a major revision of the EWD Specification.

5 KEY AREA OF ENQUIRY THREE: TECHNICAL FEASIBILITY

5.2 INFORMATION SECURITY THREAT AND RISK ANALYSIS

An Information Security Threat and Risk Analysis (Threat and Risk Analysis) was conducted and identified the following 18 Information Security Goals to be considered for the EWD:

1. Driver records of work and rest are complete and free from alteration
2. The EWD provides very high availability to Drivers for recording work and rest
3. The EWD provides high availability for access to Driver records of work and rest in the context of reviewing Driver compliance with fatigue legislation
4. Only authenticated users are able to access information and processing capabilities of the EWD and such access is restricted to only those system functions and information necessary for the user to perform these roles
5. Driver records of work and rest are linked to the Driver, creating the record in such a way that subsequent attempts to repudiate the role of the Driver will be detected and rejected
6. Driver records of work and rest are acceptable as evidence for prosecution of breaches of fatigue legislation and are unable to be successfully challenged in defence of such prosecutions
7. The user authenticated by the system is who they claim to be
8. The activities of users and components of the EWD are monitored so that any misuse or erroneous use of functions are identified and corrective action is taken to contain damage in a timely manner
9. A user and/or administrator of the EWD will be trained and qualified to use the components of the system necessary for performing their role before being authorised to access those components
10. Each component of the EWD can be trusted to reliably perform its intended functions in compliance with the EWD Specification and not to perform any other functions
11. Access between components of the EWD, especially where such access crosses organisational and security boundaries, is restricted to the minimum extent necessary to comply with the requirements for the EWD and not for any other purpose
12. Access between the EWD and external systems is restricted to authorised and trustworthy systems and is to the minimum extent necessary to comply with the requirement for the EWD and not for any other purpose
13. The EWD is unable to be used as a mechanism for the realisation of a threat to the information security of a connected system
14. All components of the EWD are protected from malware at all times
15. All components of the EWD are protected from unintentional adverse impacts from other systems and functionality
16. Anything which is not a component of the EWD is unable to be represented as being a component of the EWD and by so doing frustrate or compromise the achievement of the EWD's objectives
17. Information security threats and risks confronting the EWD will be continually reviewed and information security treatments will be effectively managed to meet changing threats and risks
18. Information security incidents involving the EWD will be detected in a timely manner, and appropriate responses taken to minimise adverse consequences.

Thirteen information security threats were identified for analysis. The following table summarises the results of the analysis for each of the potential systemic threats (Table 5).

Table 5: Threat and risk analysis – Extent of impact

Threat	Key Functional Area				
	Core (including System-Wide)	DRD	Authorised Officer – EWD-SP	Interoperability Back-Office (RCAF)	The Regulator and Authorities
Systemic Extent of Impact					
1. Malicious Damage to Non-physical Assets	Medium	High			
2. Malicious Damage to Physical Assets	Medium				
3. Accidental Damage to Non-physical Assets	Medium				
4. Accidental Damage to Physical Assets	Medium				
5. Denial of Access to Resources	High				
6. Fraudulent Authentication	Medium	High	Medium	High	High
7. Intentional Unauthorised Disclosure	Medium		Medium	Medium	Medium
8. Unintentional Unauthorised Disclosure	Medium		Medium	Medium	Medium
9. Theft or Loss of Physical Assets	Medium				
10. Misuse/Abuse of Resources	Medium				
11. Intentional Attack on Connected Systems	Medium	High	High	Medium	High
12. Unintentional Attack on Connected Systems	Medium	High	Medium	Medium	Medium
13. Challenge to Evidence from the EWD	High	High	Medium	High	Medium

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KEY AREA OF ENQUIRY THREE: TECHNICAL FEASIBILITY

Based on the analysis of the 18 information security goals and 13 potential systemic security threats (as outlined in Table 5) seven key risks were identified:

1. The DRD poses a high systemic risk generally derived from the following factors:
 - Highly-portable and therefore easy to transfer, steal, lose or damage
 - Utilising a USB interface which enables the user to connect the DRD to any of a wide range of computers outside of the control of the EWD, making the DRD a high risk for the transmission of malware to connected devices (whether intentionally or unintentionally)
 - Being managed and operated by entities with potential conflicts of interest
 - Being vulnerable to tampering through the introduction of Trojans, filling up the DRD with data to render it unusable, placing illicit material on the DRD or rendering the DRD unusable with little way of proving it was a tamper instead of a malfunction.
2. Confidentiality risks associated with roadside enforcement access to back office repositories of Driver records
3. Deliberate misidentification of the Driver who is making the work and rest declarations
4. Intentional or unintentional corruption of an EWD from the interface with a non-EWD system hosted on the same platform
5. Threat to completeness and accuracy of records
6. Security of system design, implementation and operation which could be compromised by the wide range of entities involved in the EWD
7. Threat to mobile platforms through the introduction of malware.

The following table outlines how these seven risks are addressed within the EWD environment (Table 6).

Table 6: Summary of key security risks and mitigation

High Level Requirement	EWD Specification	Amendments
1	DRD	The RCAF adopted as an alternative to the DRD
2	Roadside enforcement	<p>Implement Authorised Officer access through a hub-and-spoke architecture that ensures Driver records are not centrally stored by the Regulator but are securely stored by the EWD Service Provider and audited by the EWD System Manager. The hub-and-spoke architecture also limits the size of the network and number of connections required by agencies and EWD-SPs.</p> <p>Maintain an audit trail of access transparent to the Driver.</p> <p>Specify network and security features in the access architecture including the authentication of Authorised Officers.</p>
3	Driver authentication	Specification of a performance based standard for electronic identification and authentication which requires as a minimum two factor authentication and is compliant with the National E-Authentication Framework Identity Assurance to Level 3.
4	Non-EWD applications on EWD platforms	<p>EWD System Manager who conducts certification, re-certification and auditing to ensure the EWD-SP System continues to function as required.</p> <p>All changes to an EWD after certification require the approval and appropriate recertification by the EWD System Manager.</p>
5	Record integrity	Generation, communication, management and storage of EWD Data in a manner which ensure the integrity of the data together with tamper evidence through continuous monitoring.
6	Security of system, design implementation and operation	Multiple EWD Service Providers and an EWD System Manager to continuously audit EWDs independent of its use.
7	Mobile platforms	<p>The RCAF provides a secure infrastructure to access EWD Data.</p> <p>EWDs utilising mobile platforms must consider the security issues associated with the platform within their application for certification and ongoing security lifecycle.</p>

5

KEY AREA OF ENQUIRY THREE: TECHNICAL FEASIBILITY

5.2.1 ANALYSIS OF SPECIFIC INTERFACE RISKS FOR REGULATORY SYSTEMS

The potential interfaces between the EWD and systems operated by Authorities have been identified as key areas of concern, especially with respect to the constraints that may be placed on these interfaces arising from both information security and systems architecture. Key findings can be summarised:

- Concern with the attachment of uncontrolled USB storage devices to official devices primarily because of potential introduction of malware and the potential for sensitive information to be copied from the enforcement agency network to the USB device
- Limitations of existing in-vehicle capability primarily for police, some of whom have no capability and others who have limited capability, including no internet connectivity
- All enforcement agencies expressed a preference that a remote roadside enforcement model should provide a single point of access to Authorised Officers and a single secure network connection from the enforcement agency to this point of access rather than requiring separate access to each source of EWD Records
- Concern over what classification should be applied to records of Driver work and rest and Authorised Officer annotations. The classification of this information impacts on the information security police would need to put in place with respect to these records.

While some of these issues have been addressed with the RCAF, further planning with enforcement agencies will be required as part of the implementation.

5.3 REMOTE CONNECTION ACCESS FRAMEWORK

One of the strengths of the RCAF is the ability for most Authorised Officers to review EWD records of a Driver in a systematic, repeatable and ubiquitous manner using the CAS. Authorised Officers can review Driver records for compliance with the fatigue rules whether they have software installed on an in-vehicle device or if, for example, they can only make a phone call or send a text message (SMS).

5.3.1 ROADSIDE REVIEW

An obvious issue relating to the RCAF is the risk that mobile communications may not be available for a roadside review of EWD records for a number of reasons, including where an area has poor coverage or due to network or equipment failure. These factors may result in records not being able to be accessed at the roadside during an intercept.

Latency (the time difference between when a record is generated to when it is received by the EWD-SP) of mobile communications was considered a key element in assessing the feasibility of the RCAF. The Pilot has found that there is suitable mobile communications coverage in Australia for the implementation of the RCAF.

In the Pilot mobile data communications coverage was estimated using real world records and transmission times collected under the IAP. Data on transmission times from locations nominated by jurisdictions as commonly used for intercepts were analysed.

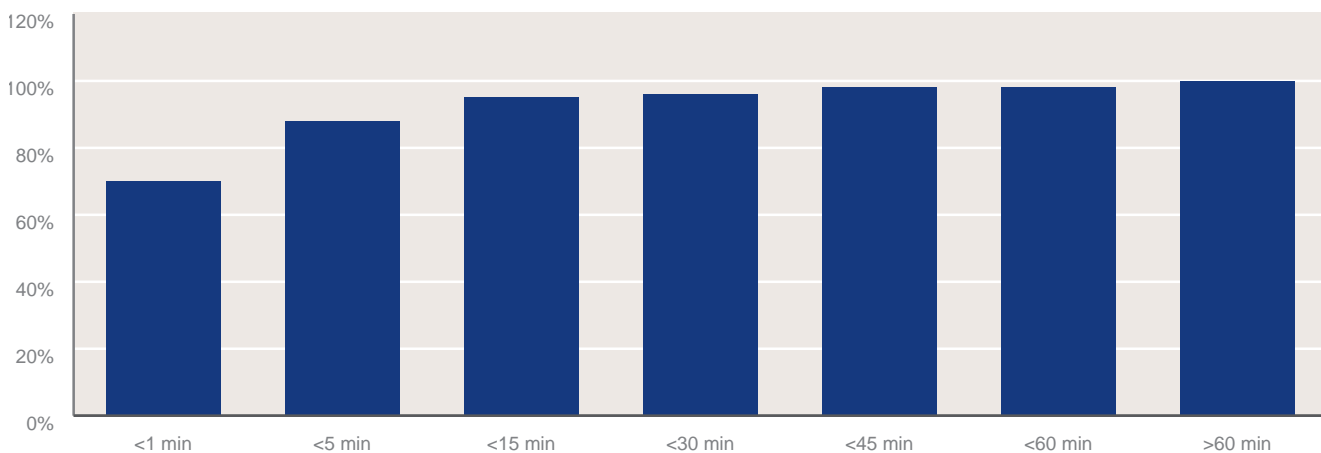
Based on an analysis of operational data from regulatory telematics applications (ie existing deployed applications) and information provided by jurisdictions on intercept sites, it has been determined that 87.6 per cent of provided intercept locations have a communications latency of 5 minutes or less. In most cases, access to data could occur in less than minute and providing suitable communications coverage for conducting a compliance assessment by enforcement officers. Table 6 and Table 7 below outline the Pilot's findings related to communications connectivity.

To help maximise the likelihood of coverage, enforcement vehicles can utilise some simple and cost effective approaches to mobile communications such as high gain antennas which would increase the mobile communications coverage for remote and poorer coverage areas. If internet connectivity in areas of no mobile communications is critical, satellite internet can be used to ensure connectivity.

Table 7: Percentage of intercept locations by period of latency

Time taken to make a record generated in an IVU available in the back office	Percentage of intercept locations where data is available within the nominated time
< 1 min	68.56%
< 5 min	87.60%
< 15 min	94.89%
< 30 min	96.05%
< 45 min	96.57%
< 60 min	96.94%

Table 8: Percentage of intercept locations where data is available within the nominated time

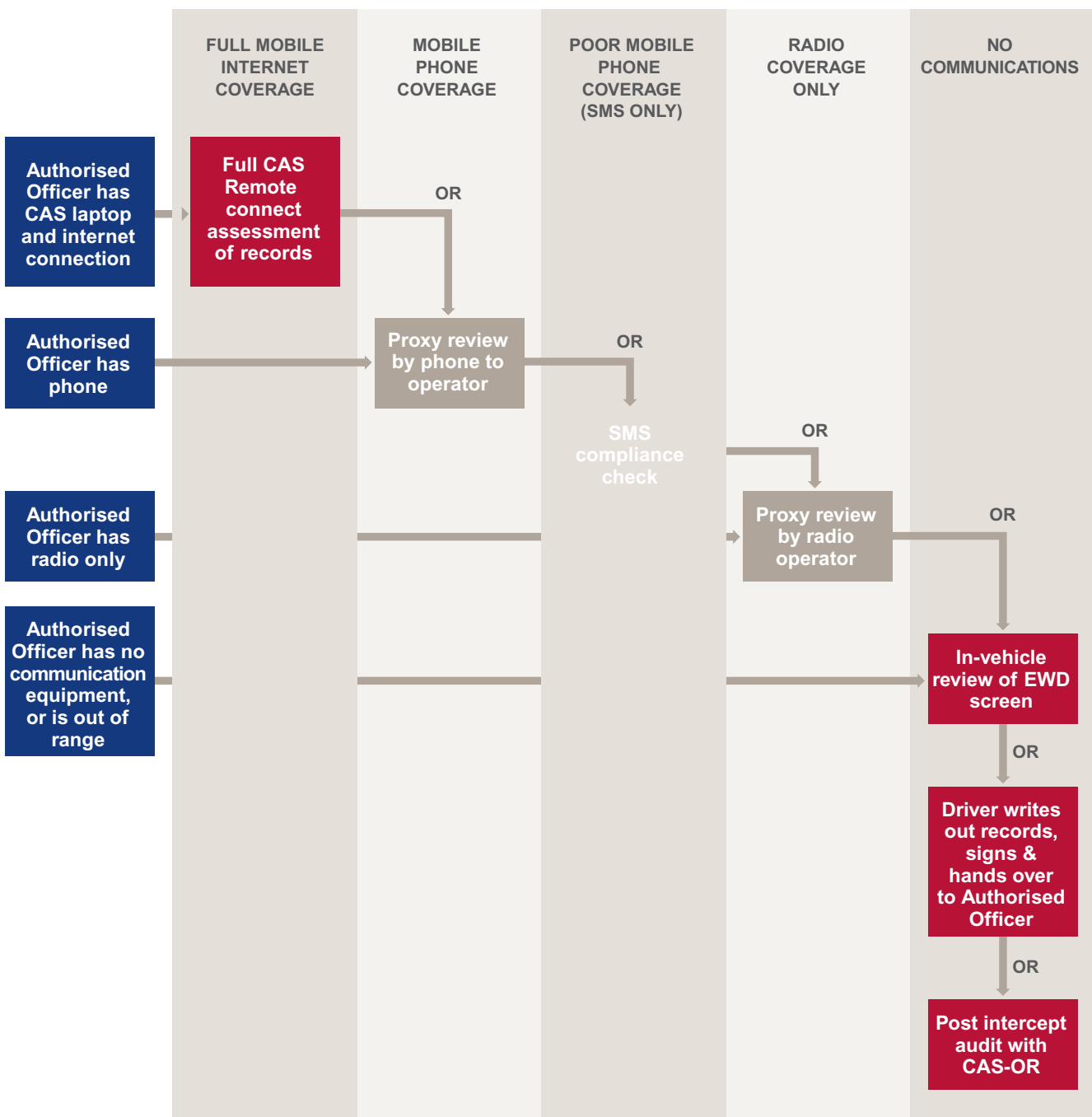


5 KEY AREA OF ENQUIRY THREE: TECHNICAL FEASIBILITY

Figure 16 provides a summary of options for CAS use in different roadside enforcement environments.

An overview of the technologies and approaches available where there is poor connectivity and/or lack of additional equipment such as a laptop are outlined below.

Figure 16: Options for CAS use at the roadside



5.3.1.1 SMARTPHONE AND IN-VEHICLE SYSTEMS

CAS can be deployed to a mobile device such as a smartphone (iPhone or Android as examples).

With the growth in the popularity and capability of smartphones, together with the expansion in mobile communications coverage, this option is no longer out of logistical reach and provides a flexible option for a segment of suitably equipped Authorised Officers that do not have or wish to use laptops. This approach can also be deployed to existing in-vehicle communication systems.

This approach is especially useful for users who may only occasionally conduct roadside enforcement or wish to conduct compliance assessments in the least amount of time.

5.3.1.2 PROXY SUPPORT THROUGH PHONE OR RADIO

An Authorised Officer may contact (by phone or trunk radio) another Authorised Officer who can conduct a compliance check on a Driver remotely. This option requires no additional equipment for roadside Authorised Officers, simply a connection by phone or radio to a base or expert who is equipped with CAS.

The roadside Authorised Officer can relay the Driver's details to the remote Authorised Officer who completes the compliance assessment and advises the roadside Authorised Officer what the results are. This is conceptually similar to a licence or registration check performed over the radio.

5.3.1.3 INTERACTIVE VOICE RESPONSE

An Interactive Voice Response service provides a computer aided phone service where an Authorised Officer can make a telephone call, authenticate themselves and conduct a compliance check by providing the information needed through the telephone keypad or voice. This option is similar to telephone banking, telecommunications provider services or e-toll payment services available in Australia, where you provide your account and pass code through a keypad or using your voice. An automated voice response service provides the results.

This option is human resource efficient, can operate on a 24 x 7 basis and is able to be appropriately secured. This approach is ideal for receiving a summary of compliance in an audio fashion and the full compliance assessment can be electronically emailed as a report for the Authorised Officer to use later if required. It will provide the same accuracy, integrity and certainty of compliance assessment results as obtained from other compliance methods.

5

KEY AREA OF ENQUIRY THREE: TECHNICAL FEASIBILITY

5.3.1.4 SMS SERVICE

A phone SMS can be sent and received when telephone coverage may not permit a phone call as SMS is able to work with intermittent connectivity, making it more available than voice. The SMS compliance check is a system generated response that provides the fatigue compliance results for the Driver.

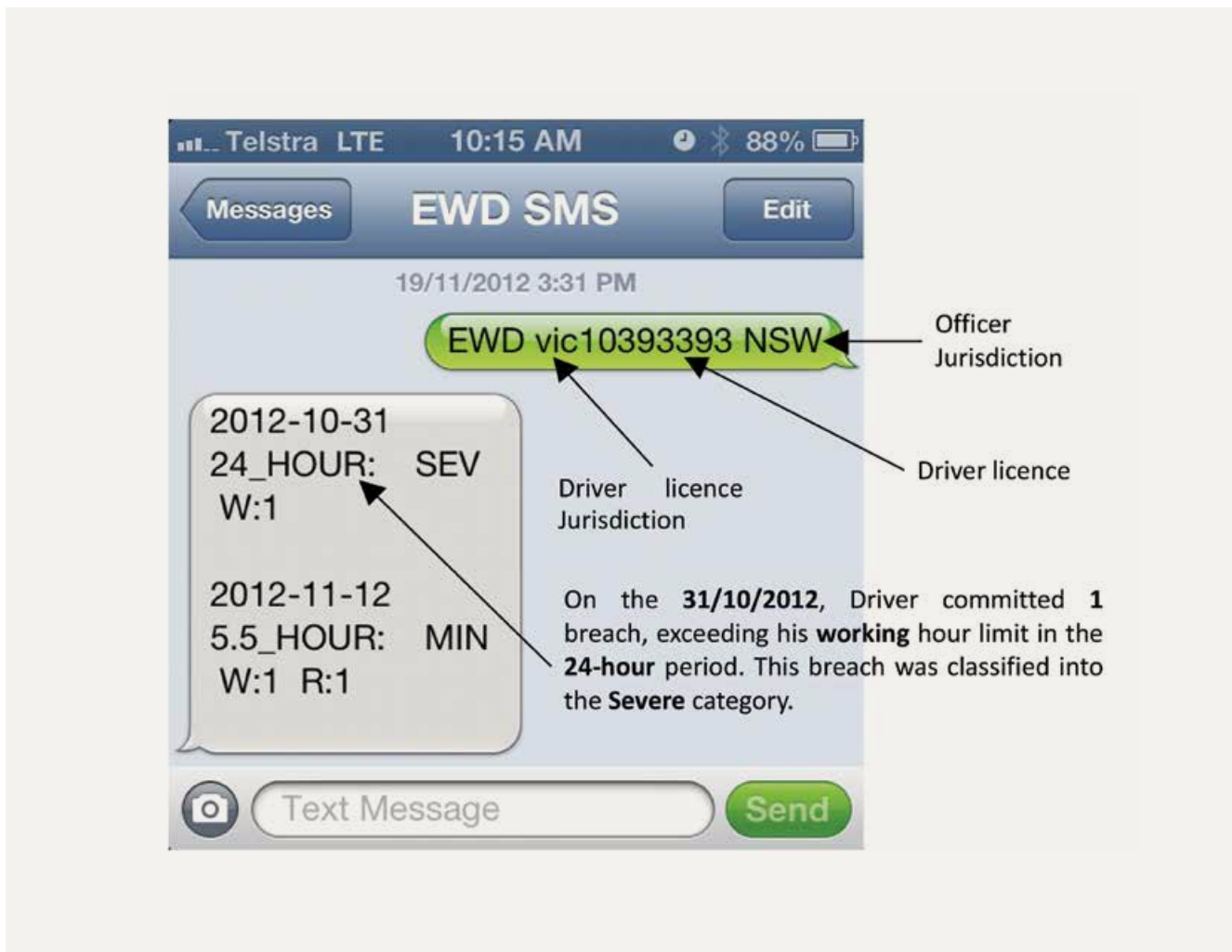
An SMS compliance check may provide access to the EWD Records where other options are not available and will provide the same accuracy and certainty of compliance as other services. A complete report, containing the full assessment check, can be provided to the Authorised Officer via email as a PDF, as a printed report or by other means as needed.

5.3.1.5 ON-SCREEN DISPLAY

As a final option, the Authorised Officer could review EWD records through the on-screen display on the IVU in the cabin of the vehicle.

The information available on the on-screen display will be similar to a WWD. Where an Authorised Officer chooses not to enter the vehicle a further option may be for the Driver to transcribe work and rest declarations from the IVU on a form, sign the form and provide it to the Authorised Officer in support of the compliance assessment. This record could be later correlated with the EWD records and allows an Authorised Officer to provide an annotation in writing. The legislative basis for an Authorised Officer to request access to the cabin to examine the on-screen display or to require the Driver to provide a transcription of records may require consideration if this approach is considered appropriate.

Figure 17: Example of an SMS compliance message



5.4 KEY FINDINGS – TECHNICAL FEASIBILITY

- The EWD is technically and operationally feasible
- The RCAF is the preferred model
- The amendments to the EWD Specification reflecting the findings of the Pilot include:
 - Development of the Remote Connection Access Framework and associated functionality such as the EWD Registry
 - Requirement for GNSS, tethering and tamper monitoring
 - Display resolution of time at one minute
 - Removal of the requirement for a printer as part of the IVU
 - Removal of the DRD as a required component of the EWD while allowing for an interface for data storage and transfer for certain applications
- The technology approach of the Remote Connection Access Framework is aligned to that being developed for heavy vehicle monitoring in Europe and the United States of America
- On-road enforcement can be undertaken through a variety of remote access mechanisms including a laptop, smartphone or other in-vehicle electronic equipment. Where communications are unavailable, the review of Driver records can occur through the on-screen display
- Based on an analysis of field collected data almost 90 per cent of intercept locations are able to view Driver records current to within the last 15 minutes and almost 70 per cent of locations are able to view Driver records current to within one minute.
- There are a range of security threats and risks in the EWD, as there are in any system. Risk mitigation has been built into the EWD Specification and overall EWD environment.

6

KEY AREA OF ENQUIRY FOUR: LEGISLATION AND POLICY

THIS SECTION DETAILS:

- Legislation
 - Integrity of the EWD and evidentiary quality of information
 - Privacy and surveillance
 - Enforcement
 - Sanctions
 - Local Work
 - Links with AFM and BFM
 - Alternative compliance approaches.
-

6.1 LEGISLATION

The 2008 Heavy Vehicle Driver Fatigue National Model Legislation provided for a range of fatigue related measures including the recording of work and rest times in a WWD or EWD. The model legislation was adopted by Queensland, NSW, Victoria and South Australia.

In July 2009, the Council of Australian Governments agreed to establish a single National Heavy Vehicle Regulator (NHVR) to regulate all vehicles over 4.5 tonnes Gross Vehicle Mass. In November 2011, Australia's transport ministers unanimously agreed to the first national heavy vehicle bill at the inaugural Standing Council on Transport and Infrastructure (SCOTI) meeting.

The NHVR commenced operation in January 2013 as an independent statutory authority based in Queensland. The NHVR reports to the SCOTI and is Australia's first national, independent Regulator for all vehicles over 4.5 tonnes gross vehicle mass.

The HVNL which has been introduced in Queensland with other participating jurisdictions expected to introduce and pass related legislation in 2013. There were no major changes to legislation in regards to heavy vehicle driver fatigue and in this report all references to the HVNL should also be read as referring to the regulations made under this law and to the model legislation which it is replacing.

The HVNL (Division 7) provides for the use of an EWD as an alternative to a WWD. However, these provisions are based on the model fatigue law approved in 2008 and for a number of reasons are not aligned with the practical operational requirements for an EWD including:

- The legislative focus was on the issues associated with the introduction of the new three-tier fatigue scheme (Standard, BFM and AFM).
- The technical elements of the EWD (in particular the RCAF) were not known, as the legislation preceded the NTC Policy and EWD Specification and this Pilot. As such the legislation needs to be revised based on the preferred EWD model.

As part of the Pilot the review of legislation has been led by the NTC who have developed the NTC Regulatory Issues Paper which will be separately published for public comment. The paper has identified the following areas for legislative review as a result of the technical or operational learnings from the Pilot.

- Meaning of EWD
- EWD labels
- Counting periods of less than 15 minutes
- Printouts of EWD information
- Meaning of “Driver’s possession” and access to records
- Driver’s defence: malfunction of the EWD
- Meaning of “has been filled up”
- Meaning of “supplementary record”
- Meaning of “diary”
- What the Record Keeper must do if EWD is not in working order
- Records the Record Keeper must have for a Driver undertaking local work
- Duplicate pages the Record Keeper must have
- Requirements of a Driver to give information to the Record Keeper
- Keeping two work diaries simultaneously is prohibited
- Person must not tamper with approved electronic recording system
- Period for which, and way in which, records must be kept
- The regulator functions of EWDs
- Indication to Driver that EWD information has been sent to Record Keeper
- Documents produced by an approved electronic recording system.

A summary of the 19 identified issues is provided below.

6.1.1 EWD DEFINITION

The meaning of an EWD as defined at Section 221 of the HVNL may be construed as limiting the EWD to the physical IVU rather than including the holistic system of communication and storage of information and interaction of various entities and functions.

The NTC position is that it is unclear whether the legislation needs to be altered to address the full EWD roles and responsibilities, suggesting that these issues may be able to be adequately addressed through the EWD governance arrangements, the EWD Specification and contract law.

6.1.2 EWD LABELS

Section 221 of the HVNL requires an EWD to be fitted with a label as a mechanism for establishing authenticity. The EWD Specification provides for a register of Drivers and Transport Operators and this register will enable Authorised Officers to verify that a Driver is using an ‘approved’ EWD, rendering a label obsolete.

6.1.3 COUNTING

Section 246 of the HVNL provides for counting time in 15 minute blocks. However, as increased accuracy and integrity in recording work and rest is seen as a key feature supporting compliance, under an EWD time will be recorded to the second and displayed in one minute increments. This decision reflects the resolution of Unresolved Issue 5. The impact of the removal of rounding rules on assessment of fatigue breaches will also be considered by the NTC as part of their review of this element of the legislation.

6.1.4 PRINT OUTS

The HVNL at Section 262 requires a Driver to carry and produce paper print outs of their work and rest records. Unresolved Issue One related to the requirement for printers. The Pilot resolved that printers were not required and that on-screen display, together with the RCAF, was the approach best suited for the task of providing roadside access to EWD Records in all use cases. Legislative change to reflect this decision is required.

6

KEY AREA OF ENQUIRY FOUR: LEGISLATION AND POLICY

6.1.5 DRIVER'S POSSESSION OF RECORDS

Section 293 of the HVNL requires the Driver to be in possession of their diary. The common interpretation of this requirement would be physical availability and access. While the EWD Specification requires 28 days of EWD records to be available for roadside assessment, for clarity, legislative change to reflect the non-physical nature of records under the RCAF and on-screen display is recommended.

6.1.6 MALFUNCTION OF EWD

Section 293 of the HVNL provides a defence for a Driver who is unable to provide EWD records because of their destruction or loss. There are a variety of situations, including malfunction, that may result in a Driver's records being unavailable. A review of the legislative provisions relating to a malfunction is required to reflect the operating environment of the EWD. It should be noted that supplementary records must be maintained in the case of a malfunction.

6.1.7 EWD WHICH IS 'FILLED UP'

Section 304 provides for a situation where an EWD is 'filled up', lost or destroyed. The concept of 'filled up' is not defined in the legislation and is not relevant to an EWD under the RCAF.

6.1.8 SUPPLEMENTARY RECORDS

As with WWDs there is a provision for the keeping of supplementary records where an EWD is not available. The use of a WWD as a supplementary record is specifically prohibited. However, the use of a WWD may be appropriate as it would be possible for an Authorised Officer to check EWD status through the RCAF, preventing the keeping of 'two sets of books'.

6.1.9 MEANING OF DIARY

Section 313 of HVNL defines certain actions to be taken if a diary is not functioning, however, if as previously outlined the definition of diary could be construed to be restricted to the IVU this will need to be broadened to include the EWD as a whole.

6.1.10 EWD MALFUNCTIONS ACTIONS

Section 313 of the HVNL places an obligation on the Record Keeper to replace a failed EWD. While this obligation is accepted, there are a range of other obligations as outlined in the EWD Specification. A review of legislative obligations in the event of a malfunction or loss of data should be considered in light of the broader EWD and the defined roles and responsibilities.

6.1.11 LOCAL WORK

Paragraph 319(1)(a) of the HVNL requires that where Drivers undertake work which is within 100 kilometres from the Driver's base there is a requirement to keep the totals of Driver work and rest times for each day and each week. This does not require the use of a WWD or EWD.

Including local work in an EWD and streamlining the recording of 100 kilometres and 100 kilometres plus work has clear safety advantages as it would provide a single accurate repository of all work.

Under an EWD, Drivers will be able to record local work or indicate that they are switching to local work and not utilise EWD functionality (ie keep a record of these hours outside of the diary). Local work that is stored within the EWD can be easily assessed by CAS.

The NTC proposes that Drivers and Transport Operators should be encouraged to use an EWD for local work in addition to 100 kilometres plus work, and therefore the legislation should be amended to state that EWD records satisfy the record keeping requirements for local work. This is the subject of further policy consideration beyond the Pilot.

6.1.12 STORAGE OF RECORDS

Section 321 of the HVNL requires a Record Keeper to keep duplicate diary pages – a requirement which, while suitable in a WWD environment, is not relevant to an EWD. However, requirements around the format of stored records to enable access through the RCAF will need to be reflected in legislation.

6.1.13 DRIVER TO PROVIDE RECORDS

Section 322 of the HVNL requires the Driver to provide their EWD records to the Record Keeper. Under the EWD Specification records are automatically transferred from the IVU and therefore the requirement of the Driver to provide records is redundant and under the RCAF not possible. Additionally, the role of EWD-SP in the provision of the data to the Record Keeper could be recognised in legislation.

6.1.14 POSSESSION OF AN EWD AND WWD

Section 326 of HVNL prohibits simultaneous use of an EWD and WWD for recording work and rest. Legislative clarification would ensure that commercial telematics devices with fatigue management capability, but without regulatory approval, are not considered an EWD.

6.1.15 TAMPERING

Sections 335 and 336 of the HVNL prohibit persons from tampering. There are however no obligations on any party to report tampering or suspected tampering. Creation of these legislative obligations, in line with those applicable to IAP, should be considered.

6.1.16 STORAGE AND PROVISION OF RECORDS

Section 341 of the HVNL places an obligation on the Record Keeper to store EWD records in a manner that is readable and enables it to be used as evidence. Strengthening of provisions around storage, especially in relation to authorised access to these records, would be appropriate. Additionally a requirement to provide reasonable Driver access to their records to meet privacy requirements, as well as to enable Drivers to proactively manage their compliance with fatigue laws, particularly when moving between operators, should be required.

6.1.17 REGULATOR FUNCTIONS

Under the section 342 of the HVNL the NHVR is the approver of an EWD with the capacity for delegation provided under section 661. Further review of these sections may be appropriate particularly in light of roles and responsibilities for the EWD System Manager.

6.1.18 DRIVER NOTIFICATION OF DATA TRANSFER

Section 343 requires that an EWD notify a Driver when their EWD records have been transmitted to the EWD-SP. Such a notification is not usual practice in telematics operations. Additionally such functionality may be a distraction for a Driver, particularly with the frequency of record transfer. Removal of this requirement for Driver notification is proposed.

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KEY AREA OF ENQUIRY FOUR: LEGISLATION AND POLICY

6.1.19 PRESUMED DATA ACCURACY

While section 725 of the HVNL provides for the evidentiary admissibility of EWD records, unlike the IAP where data provided from the system is presumed to be accurate unless established otherwise, there is no such legislative provision for EWD. This situation may result in each court case requiring the veracity and integrity of EWD data to be established. In light of the envisaged strength of the certification, audit and monitoring of EWDs, the inclusion of a reverse onus of proof requirement should be considered.

6.1.20 IMPACT OF LEGISLATIVE CHANGE

As at February 2013 HVNL Bill 2 had been passed by the Queensland parliament. The HVNL will then need to be considered by each of the remaining states and territories, with full national adoption not expected until later in 2013.

Six changes to the HVNL have been identified by the NTC as essential for the legal operation of the EWD:

- Clarify the meaning of EWD
- Removal of EWD labels
- Removal of rounding to 15 minutes for EWDs
- Removal of the requirement to carry printouts of EWD information
- Obligation to inform the Regulator if the EWD not in working order or suspected tampering
- Removal of indication to Driver that the information has been sent to the Record Keeper.

The NTC is seeking to involve stakeholders, particularly states and territories participating in the national law, in forums and working groups to consider these issues and progress agreed recommendations to SCOTI. Any changes to the national law and national regulations must have the unanimous approval of all transport ministers.

Timing of the legislative review will be contingent on the NTC's forward work plan, NHVR and jurisdictional support for progressing the required changes and on the timing of the next stages of development of the EWD, post-Pilot.

As some of the legislative changes are essential for the operation of the preferred EWD model identified in the Pilot, it is recommended that these changes be made prior to national adoption of EWDs.

6.2 INTEGRITY OF THE EWD AND EVIDENTIARY QUALITY OF INFORMATION

The following issues have been identified as important in ensuring the integrity of the system and the evidentiary quality of EWD records:

- Legislative provisions in relation to the EWD record
- Establishing the Driver, time, place, vehicle and declaration of the work and rest records
- Chain of evidence which provides assurance that the records have remained unaltered from point of collection to presentation in court.

6.2.1 LEGISLATIVE PROVISIONS

Of particular importance to evidentiary quality of information is the status of the EWD record. As noted above there is an issue as to whether the accuracy of the records needs to be established on each occasion or whether they are presumed, at law, to be accurate unless the contrary is demonstrated. There is precedent for the presumption of accuracy from records produced in relation to other offences against transport legislation, for example, speed camera records, registration records, tolling and IAP records.

Without legislative backing in relation to the veracity of EWD records, each time a matter is taken to court the integrity of the EWD will be open to scrutiny and would be expected to require the provision of expert witnesses. This issue needs further consideration prior to EWD implementation.

6.2.2 ESTABLISHING KEY DATA SETS

EWD data will need to meet evidentiary standards to allow it to be presented in court and the EWD Specification has been designed on this basis.

The EWD Specification has considered a number of standards and published guidelines in ensuring the requirements align to the necessary evidentiary standards required of EWD Data including:

- *HB 171—2003 Guidelines for the Management of IT Evidence*
- *ISO/IEC 27001-2006 Information technology – Security techniques – Information security management systems.*

Driver identification and authentication is required to meet the National E-Authentication Framework (NEAF) Identity Assurance Level 3 (2-factor authentication). The EWD Specification states how strong the identification and authentication should be but not the technology needed.

Data integrity is assisted through the requirements in the EWD Specification of:

- Tamper monitoring – either physical or electronic
- Tethering - supports the integrity of data generated by the EWD by providing an association between a particular heavy vehicle and the location recorded by the GNSS
- EWD-SP Quality System which is aligned to AS/NZ ISO 9001:2000.

6.2.3 CHAIN OF EVIDENCE

The concept of chain of evidence relates to the maintenance of the integrity of the records from their point of capture through to their presentation as evidence in a court.

The requirements of an EWD are consistent with the needs of the Regulator and Authorities in ensuring the integrity of EWD data is maintained throughout:

- Certification, re-certification and audit by the EWD System Manager of an EWD-SP to ensure, among other things, the chain of evidence for EWD Data as required by the EWD Specification is maintained
- Central development and maintenance of CAS to ensure controlled testing and development. This is expected to be performed by the EWD System Manager.
- Under the RCAF, use of data held by the EWD-SP is the single source of truth for Driver records
- Centralised maintenance by the EWD System Manager of the Intelligent Access Map used to determine vehicle location.

In certifying an EWD-SP a whole of system approach is taken that ensures the EWD securely collects, processes, tests, stores and makes available EWD data.

HB 171 – 2003 Guidelines for management of IT evidence is a document developed by the Australian Government to assist in the management of electronic records intended to be used as evidence in a court proceeding. This document provides guidance on Information Communication Technology industry best practice for the creation, storage and protection of information to ensure that challenges to the integrity of the data cannot be sustained. The EWD Specification is aligned with this document.

The Threat and Risk Analysis was conducted to ensure an EWD is suitably robust and reliable. In particular, the minimum requirements for maintaining robustness and reliability in the face of electronic threats have been defined, extending beyond technology and processes to include the roles and responsibilities of various entities in the EWD. Further information on this analysis is in Section 5.

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KEY AREA OF ENQUIRY FOUR: LEGISLATION AND POLICY

6.3 PRIVACY AND SURVEILLANCE

A review of privacy and surveillance law and its relevance to EWD was undertaken by the NTC in conjunction with the Pilot.

Potential issues for the EWD in relation to privacy and surveillance need to be considered in light of various regimes which exist. All jurisdictions, including the Commonwealth but excluding Queensland, have specific legislation covering surveillance and/or listening devices. There are a range of national and jurisdictional privacy principles which apply to various entities as detailed in Table 9.

6.3.1 PRIVACY LEGISLATION AND PRINCIPLES

The Privacy Act 1988 (Cth) regulates the collection, use, disclosure, security and access of personal information. Personal information is defined 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.”¹

Table 9: Summary of privacy legislation by entity

Organisation or Function	Regime Likely to Apply
NHVR	Queensland Information Privacy Principles
TCA, EWD Service Provider, Record Keeper, Transport Operator (other than an employer)	National Privacy Principles
Authorities	State Information Privacy Principles
Employer	Fair Work – best practice guide
Small business	National Privacy Principles (not compulsory)
Owner Driver	National Privacy Principles (not compulsory)

¹ Section 6, Privacy Act 1988.

Personal information is therefore broad in scope. The definition is sufficiently broad to also include location information if the identity of an individual is apparent or can be reasonably ascertained from that information.

Like a WWD, an EWD will record personal information about a Driver, however, unlike a WWD an EWD has the potential to generate more information, more easily and is likely to have a more complex structure of inter-related functions, roles, responsibilities and entities. The risk of infringing privacy legislation is considerably greater under an EWD than is the case for a WWD. The increased risks of breaching privacy legislation under an EWD environment are a result of:

- Increased accuracy of EWD records in relation to time and distance travelled with the capacity to track the geographical location of the vehicle and Driver
- Increased volume of data – eg vehicle location reporting
- Currency of the data – eg the potential to generate real time reports
- Accessibility of the data – eg establishment of a portal of all electronic records that could be accessed remotely by a range of parties.

A range of privacy regimes are currently in force across jurisdictions. While these regimes are broadly consistent, each has some unique features, although all are generally based on the ten National Privacy Principles² which cover:

1. Collection
2. Use and Disclosure
3. Data quality
4. Data security
5. Openness
6. Access and correction
7. Identifier
8. Anonymity
9. Trans-border data flows
10. Sensitive information.

A key feature of these principles is that an organisation must not collect personal information unless the information is necessary for one or more of its functions or activities, and is lawful and reasonable. The privacy principles do not prescribe under what circumstances a collection is “necessary” or “reasonable,” therefore what can be collected, as opposed to how the information is collected or used, is very broad in scope.

While privacy provisions vary somewhat between jurisdictions and their application to private and public sector entities, the following are common key requirements:

- Use of the information only for the purpose for which it was collected unless there is a legislative provision or warrant which requires its use for other purposes
- Knowledge of the collection by the individual concerned and in some cases their agreement to this collection
- Ability for a person to review their own records and correct any errors
- Secure storage of personal information.

In addition to the above, the National Privacy Principles provide that if an organisation such as an Authority collects personal information from another entity such as the Record Keeper, that organisation must take reasonable steps to ensure that the individual is, or has been, made aware of that collection.³

There are more far reaching privacy issues associated with an EWD than a WWD and a Privacy Impact Assessment should be undertaken before wider implementation. The RCAF and contract provisions with EWD-SPs are expected to address a number of these issues, however further protections, including legislative provisions, may be required.

The ability to access and share EWD data does not currently have any specific protections under the HVNL. Consideration should be given to potential legislative protections such as those provided for IAP data.

² Section 6, Privacy Act 1988.

³ NPP 1.5: “If an organisation collects personal information about an individual from someone else, it must take reasonable steps to ensure that the individual is or has been made aware of the matters listed in subclause 1.3 except to the extent that making the individual aware of the matters would pose a serious threat to the life or health of any individual.”

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KEY AREA OF ENQUIRY FOUR: LEGISLATION AND POLICY

6.3.2 HEAVY VEHICLE NATIONAL LAW

The HVNL (Division 7) is the legislative basis for the use of the EWD. There are no specific provisions in relation to EWD related information and therefore general information management and exchange provisions apply. The HVNL provides broad scope for the exchange of information generally between agencies.⁴ A key policy intention of the HVNL is to ensure that there is no information sharing restrictions between police.⁵ The HVNL also provides comprehensive enforcement functions for Authorised Officers⁶ including seizing of evidence including electronically stored data.⁷

By contrast, section 369 of the HVNL limits the use of IAP data, essentially to functions related to the management of the conditions of access or where specifically provided for under another law such as warrant although de-identified data may be released for defined purposes. Additionally there are contractual provisions placed on IAP Service Providers in relation to data protection and use.

A wide range of entities are expected to have legitimate and legally authorised reasons to access EWD data. These include the following:

- Driver
- Record Keeper
- EWD-SP
- EWD System manager
- Transport Operator and/or Employer
- Authorised Officers (police and road agency enforcement staff)
- NHVR
- Regulators (police and road agencies).

Consideration could be given to the provision of legislative protection for the use of EWD data similar to that which applies to IAP. The argument for greater privacy protections under EWD than the IAP is valid as all EWD records identify the Driver. This information is not available from the IAP without reference to other data sources such as Transport Operator schedules. Police have indicated a desire to retain the current broad access powers provided under the HVNL.

6.3.3 SURVEILLANCE

As with privacy, there is a range of commonwealth and state based laws relating to surveillance devices. An EWD that utilises GNSS has the ability to track the location of an individual and is therefore a surveillance tracking device.

All jurisdictions except Queensland have legislation covering surveillance devices. While there are differences in requirements between various state legislation and the commonwealth legislation, express or implied consent of the individual is required unless a warrant is obtained or use is provided for under some other law. In addition New South Wales has specific workplace surveillance legislation that requires employers to obtain written permission from employees to use such devices.

6.3.4 NATIONAL TRANSPORT COMMISSION REVIEW

The NTC review of privacy and surveillance issues associated with EWDs found that, at the broadest level, risks were identified as both:

- The legal risk of non-compliance by organisations that hold or have access to personal information
- The risk that operators will reject EWDs in a voluntary environment because of weak privacy protections, whether real or perceived.

The NTC's assessment was that in relation to privacy, the EWD can be successfully implemented with current privacy protections in place and without significant alteration to the HVNL. However the NTC is seeking feedback from stakeholders on whether the current protections provide sufficient assurance to stakeholders.

6.3.5 PRIVACY IMPACT ASSESSMENT

It is common practice to undertake a Privacy Impact Assessment (PIA) when introducing a business change that involves personal information. While an initial assessment of risks and options was undertaken by the NTC, a detailed PIA was not able to be undertaken until there was clearer direction around a number of implementation issues. A PIA would identify areas where privacy issues are relevant for an EWD and highlight areas where legislative changes or contracts with third parties may require specific protections to deal with the privacy issues associated with EWD data, access and use.

The conduct of a PIA would appropriately be undertaken as part of implementation planning for EWD.

⁴ Subsection 727(2) of the NHVL (Bill 2).

⁵ Subsection 727(2) of the HVNL (Bill 2).

⁶ Chapter 9 of the NHVL (Bill 2).

⁷ Sections 545-548 of the HVNL (Bill 2).

6.4 ENFORCEMENT

There are four major areas of work undertaken by enforcement agencies in relation to fatigue laws:

- Roadside enforcement
- Use of data from Safe-T-Cam (South Australia and New South Wales only)
- Auditing of operators in accreditation schemes
- Chain of Responsibility investigations.

EWDs have the potential to provide efficiencies in relation to these activities as well as changing the approach to how these tasks are carried out. In examining the potential impact on the existing enforcement approaches, the general view is that EWD will provide benefits to Authorised Officers through:

1. Enhanced data accuracy in relation to driving time. This is achieved primarily from the GNSS based population of time in an EWD. In addition the ability to monitor vehicle movements and match them against declared work and rest times and other EWD records provides an additional integrity check
2. Enhanced ability to analyse and review large volumes of data at both roadside and back office audits. This will enable more cost effective use of resources and/or increase the level of compliance review activities as the CAS can analyse large volumes of data quickly
3. Provision of additional data sets for analysis and review and to support investigation of anomalies. For example, if the only work time shown is linked to vehicle movement, queries in relation to non-driving work time that would have been required for loading and unloading can be raised.

The following sub-sections outline the current approaches and the potential impacts of an EWD on these activities.

6.4.1 ROADSIDE ENFORCEMENT

Roadside enforcement is seen as having two major functions:

- Monitoring and enforcing compliance with laws
- Issuing 'stand down and rest' directives where Drivers are detected as fatigued or in significant breach.

In addition there is considered to be a general deterrence benefit from the visible presence of enforcement activity.

Fatigue enforcement at the roadside is almost always undertaken as part of a suite of compliance checks covering a range of areas including load restraint, vehicle safety and mass. Fatigue checks of WWDs range from a relatively simple check of a couple of pages of entries, taking only a minute or two, to more comprehensive reviews of historical data, particularly when initial WWD review indicates an area of concern.

The level of resource devoted to roadside enforcement compared to other enforcement activities varies between jurisdictions. South Australia indicated that a strategic decision had been taken to place emphasis on back office enforcement activities such as monitoring of Safe-T-Cam data reducing roadside effort. Other jurisdictions, in particular New South Wales, placed considerable resources into roadside activity and infrastructure to support this work.

Authorised Officers acknowledge that the effectiveness of fatigue related roadside activities is impacted by factors including:

- Non-recording of local work time in WWDs in most instances (some operators have a policy that requires all work to be recorded)
- 'Lost WWDs' (in NSW 5 per cent of WWD issued in 2011 were reported as lost over the following 12 months), noting that with the increase in related penalties, Authorised Officers report that frequency of this claim has reduced significantly
- Overall integrity of data in a WWD
- Reach of the activity - while there is no definitive data source, work by the NTC and Austroads indicates that a vehicle will be intercepted two to four times per annum on average, although the individual level of intercept will vary considerably based on the route and geographic areas in which the vehicle travels.

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KEY AREA OF ENQUIRY FOUR: LEGISLATION AND POLICY

Two road agencies were able to provide data on the number of directions issued for Drivers to cease driving while fatigued. This indicated an average of 15 to 20 directions per annum per jurisdiction. It is noted that this data does not include directions issued by Police. While this activity is seen as being an important action to take in preventing fatigue related incidents, it would seem that it is taken relatively infrequently.

CAS and its use at the roadside has been supported by regulatory stakeholders because of factors such as its speed of use and the ability to identify all breaches, particularly those relating to more complex rules, regardless of level of experience and training of the Authorised Officer.

The major areas of concern in relation to roadside enforcement under EWD and the RCAF are availability of technology to allow for electronic record review and mobile communications coverage. This issue is discussed in Section 5 of the report.

6.4.2 USE OF DATA FROM SAFE-T-CAM

In New South Wales and South Australia where Safe-T-Cams are used, vehicle travel times are monitored and where the time and distance travelled indicates a potential breach, Transport Operators are asked to provide a copy of relevant WWD pages.

Staff working in these areas use their discretion whether or not to follow up on Transport Operators when a potential breach has been detected. For example, if they are aware that two-up Drivers are regularly used or where past data requests have shown a change in Driver in particular locations, they may not send a 'please explain' notice.

Transport Operators reported concerns with the process of 'please explain' notices in relation to Safe-T-Cam data, particularly where they felt that they were continuing to be asked to provide data when past reviews had demonstrated that activities were compliant. The process of tracking down WWDs particularly where these had not been submitted to the Record Keeper at the time of the enquiry, as well as general administration in answering the request, were considered burdensome.

There is an opportunity for EWD records to be accessed electronically by the Regulator or Authorities, reducing or eliminating the need for records to be requested from a Transport Operator. For this to occur, it would be necessary for records to be able to be searched by vehicle registration number. This functionality does not currently exist but could be developed if there is a need.

6.4.3 AUDITING OF OPERATORS IN ACCREDITATION SCHEMES

Transport Operators working under BFM and AFM are subject to auditing regimes. Some permit schemes are also subject to auditing. All jurisdictions undertake some form of audit, however the level of resources devoted to audit activities vary considerably.

Auditing takes two forms:

- By a third party approved auditor as part of accreditation requirements
- By Authority staff as part of a programmed review (eg every 12 to 18 months), random review (based on an algorithm or similar) or triggered review (based on complaints or intelligence).

The extent to which WWD reviews occur will depend on a variety of factors including resource levels and the focus of the audit.

EWDs provide the opportunity for improved auditing outcomes through:

- Efficiency - reduced time spent on reviewing WWDs
- Completeness – the ability to review 100 per cent of records instead of a sample
- Risk based approaches to fatigue compliance management.

6.4.4 CHAIN OF RESPONSIBILITY INVESTIGATIONS

Chain of Responsibility investigations typically involve the review of substantial volumes of Transport Operator records and focus on examining systemic practices to determine whether Transport Operators and other parties' activity contributes to breaches of fatigue law (eg scheduling trips which cannot be completed while remaining compliant). Investigations are usually triggered by intelligence such as patterns of breaches or information from members of the public or industry.

There are a wide variety of records usually examined as part of a fatigue related Chain of Responsibility investigation, including truck and Driver schedules, fuel, phone and meal records, customer delivery documentation, WWDs and, where kept, commercial in-vehicle telematics records.

The review of WWD records as part of a Chain of Responsibility investigation is very time consuming and will usually involve the use of a spread sheet based tool into which data is manually entered with assessment algorithms run over the entered data. There is often a need to seek out additional information to the WWD when conducting an investigation.

For Transport Operators who already have commercial in-vehicle telematics these records are already available for review as part of a Chain of Responsibility investigation. However, the manner in which data is recorded will typically vary from Transport Operator to Transport Operator, so even though records are stored electronically, the mechanisms and approaches to data review will be Transport Operator specific and rely on available reporting tools or specific data mining approaches which would need to be developed for each Transport Operator. Additionally, as commercial systems are not subject to any regulatory oversight, there is no assurance of the integrity of the data.

CAS-RK which has been developed for the back office review of EWD records, will eliminate the administrative time involved in the collation and assessment of WWDs and enable a comprehensive review of EWD records over a time period which is appropriate to the review objective. This ability to examine EWD Records over an extended period of time enables the identification of any systemic patterns of fatigue law breach.

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KEY AREA OF ENQUIRY FOUR: LEGISLATION AND POLICY

6.5 SANCTIONS

The approach to sanctions under an EWD is an issue which has been highlighted by the Industry Reference Group and Transport Operators as a significant factor in the likely take-up of an EWD.

Some transport industry associations and owner Drivers expressed concern about the current prescribed nature of fatigue laws and stated that an EWD would result in the loss of flexibility in the recording of hours that was inherent in a WWD. Examples given of what many regarded as justifiable 'stretching' included:

- Unexpected events (eg traffic incident resulting in the Driver not being at the planned rest stop on time or needing to keep driving to meet a customer deadline)
- Improved fatigue outcomes that are achieved if, rather than stopping 'by the clock' in the middle of nowhere, but continuing to drive for a relatively short distance to get home and sleep in their own beds and spend time with their family or continue on to a rest stop which had showers and a hot meal.

The identified loss of flexibility was highlighted by concerns of:

- Unsustainable loss of income that would occur if Drivers did not drive beyond the hours allowed under fatigue law
- Artificial nature of fatigue laws that require a Driver to rest when they may not be tired and preventing them from driving when they feel fit to do so
- Increased likelihood that small breaches in fatigue laws will be highlighted and acted upon by Authorised Officers thereby adding to compliance costs of Transport Operators and Drivers.

The review of EWD and WWD records undertaken as part of the Pilot (see Section 5) indicates small breaches fall into two broad categories:

- Breaches of less than five minutes resulting from minor inattention by the Driver to the time
- Breaches of over five minutes and less than 20 minutes which are currently hidden in WWDs by Drivers who choose to continue driving a bit further for reasons such as making a delivery time slot with a client, getting home or to a serviced rest stop.

It is of note that stakeholder engagement found that 15 to 20 minutes is the practical tolerance that occurs in recording of work time in WWDs by Drivers who usually act within the law but on occasion will exceed driving hours. This is the tolerance range that most Transport Operators stated that they were seeking to be applied in an EWD environment.

While the HVNL provides some defences in relation to some fatigue breaches, such as unavailability of a rest stop, this issue of EWD tolerances is independent of the provision of such defences.

The NTC has examined the issue of sanctions and sought the advice of a fatigue expert as to the potential safety risk of relatively small breaches. The expert advice was that breaches of five minutes or less did not pose a safety risk, however breaches of 30 minutes would be a risk when applied to individual work periods or rest periods in between work periods. No advice was provided as to the risk of breaches between 5 to 30 minutes.

It is of note that transport industry stakeholders agree with the NTC and Authorities that when considering small breaches, discrepancies should not arise in relation to rest breaks – therefore once a Driver has stopped there is no reason for them to not take the full required rest break. The issue of small breaches therefore arises in relation to working hours only.

The NTC consideration of this issue brought together enforcement stakeholders including police and road agencies. The general consensus is that Authorised Officers are not interested in non-systemic small breaches, however discretion is a necessary element of the enforcement role. Road agencies proposed a number of options for managing this issue including issuing of guidelines and the introduction of different penalties for EWD versus WWD breaches. Police indicated that they did not agree with approaches involving guidelines, as this would limit police discretion.

Transport Operators are seeking more than an assurance that enforcement agencies will act reasonably. This view is based on a range of factors but primarily past experience. Transport Operators stated that most Authorised Officers act fairly, however without clarity the transport industry has indicated it will likely take a cautious approach when deciding whether or not to adopt the EWD to replace the WWD. The transport industry view is that as the transparency of data under an EWD is likely to lead to detection of many small breaches over a period of time and even if only one or two of these results in the issue of an infringement notice, the financial penalty can be a significant part of a Driver's weekly wage.

6.5.1 AUTHORISED OFFICERS – APPLICATION OF THE HEAVY VEHICLE NATIONAL LAW

The enforcement of fatigue laws under the HVNL will continue to be undertaken by Authorised Officers. The extent to which Police are involved in enforcement varies between jurisdictions.

While no consensus was reached with regard to the treatment of non-systemic small breaches, there was agreement that there needs to be a clear and consistent approach to enforcement. This is further addressed in the NTC EWD Regulatory Issues Paper.

As part of the commencement of the NHVR service level agreements will be established between road authorities and the NHVR and these agreements are expected to cover areas including enforcement priorities and approaches. In addition, national policies and procedures will be in place for enforcement activities.

6.5.2 EQUIVALENCE OF WWD AND EWD

In considering the approach to the management of small breaches the issue of equivalence in approach between EWDs and WWDs was raised by a number of stakeholders.

A number of transport industry stakeholders who were involved in discussions which led to the current national fatigue law have highlighted the commitment that was given by Authorities to consider legislative revision in conjunction with EWD introduction. The inclusion of EWD references in current legislation was seen as more of a 'place holder'. The relative equivalence of WWDs and EWDs is one of the issues industry believes needs to be addressed.

A fundamental premise of the NTC Policy is that users of WWD and EWD should be treated equally with no Transport Operator, Driver or group inherently advantaged or disadvantaged because of their choice of diary option.

Some Authorities and transport industry stakeholders have expressed the view that it is appropriate to have different rules and processes for EWD and WWD users on the basis that their risk profile differs. EWDs provide more transparent and accurate information than a WWD, which enables both the Transport Operator and enforcement agencies to gain assurance as to their compliance with the legislation. Proponents have argued that this lower risk profile would therefore justify a different approach to matters such as enforcement (reduced or no on-road enforcement of fatigue) or sanction action taken relation to detected breaches (eg education and improvement notices rather than infringements).

The concept of differential approaches and responses to a situation based on an assessment of the relative risk is common in any balanced management approach. The different fatigue schemes (Standard, BFM and AFM) offered to heavy vehicle operators based on their relative competency and skill is an example of risk based arrangements in the heavy vehicle transport industry.

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KEY AREA OF ENQUIRY FOUR: LEGISLATION AND POLICY

6.6 LOCAL WORK

Under the HVNL, Drivers working under standard hours are not required to keep WWD or EWD records if all work for a day is undertaken 100 kilometres or less from base. This work is known as local work. This exclusion of local work from diary provisions reflects the 2008 model fatigue national law and is understood to have been a concession developed in response to transport industry concerns with the original proposal that all trips taken by vehicles over 12 tonne would require a diary. While WWD or EWD records are not required, work records for each day and week of a Driver's local work must be maintained by the Transport Operator. These records however, are not available at the roadside and are only available to be examined through the Record Keeper.

Fatigue is not an issue that affects only long distance Drivers, but is an outcome of excess work and insufficient sleep. While Drivers doing only local work are theoretically more likely to have regular sleep patterns, this is not guaranteed. A Driver undertaking a combination of local and long distance work is likely to be a similar fatigue risk to a long distance Driver, however there is reduced capacity for an Authorised Officer to examine compliance and therefore fatigue when only some work and rest records are available at the roadside.

One-on-one industry stakeholder interviews, including commentary from the Industry Reference Group, did not identify the potential requirement to record all work, including local work, as contentious – while there were no advocates strongly arguing that EWDs should require all work to be recorded, no stakeholders expressed concern at the potential prospect, noting that in fact there was administrative savings to allow an EWD to meet obligations for local work and long distance work. Some Transport Operators require a WWD to be used for all work and rest records regardless of whether work is local or not. Further, of those interviewed companies using commercial telematics to manage their business and/or regulatory compliance obligations, the technology was utilised for all trips regardless of distance.

This would suggest that in an EWD environment there may be less industry resistance to a requirement to utilise the technology for all trips than is anticipated by jurisdictions. There are potential enhanced compliance and thus safety benefits from recordings of all work in the EWD rather than continuing with existing arrangements of two sources of work records and differing fatigue rules.

6.7 LINKS WITH AFM AND BFM

Under fatigue law an operator has three potential schemes of operation:

- Standard Hours – the default scheme
- BFM – in exchange for accreditation under the appropriate modules of the National Heavy Vehicle Accreditation Scheme increased hours of work are available
- AFM – provides the opportunity for a Transport Operator to submit a specific set of work arrangements for approval within the overall outer work limits.

The nature of the more flexible and extended hours of work under BFM and AFM may result in a potentially higher level of fatigue risk than that found under Standard Hours. As such even relatively small deviations from work and rest provisions could create a safety risk. WWDs are an imprecise tool and stakeholder feedback, as well as the results of the review of field pilot data, indicates that WWD records are not always accurate, and in some cases there are significant errors. It is open to policy makers to consider if and how EWDs could be used to manage the risk of compliance with BFM and AFM conditions.

Options may include:

- Use of EWDs for some or all BFM and AFM work and rest hour combinations. It should be noted that industry stakeholders have indicated that retrospective mandating of a condition to a currently existing legislative right would be strongly resisted
- Providing increased flexibility of work or rest hour arrangements to BFM and AFM participants in recognition of the use of EWDs
- Regarding use of EWDs as risk mitigation under AFM, increasing the likelihood of approval for more innovative work and rest combinations.

A number of participants recognised that EWDs could potentially be seen as a positive feature in applying for participation, particularly in AFM, with some suggesting that having an EWD should give automatic access to some level of extended hours. The NHVR is currently developing a revised set of arrangements for AFM which assesses the relative risk of various work and rest arrangements including offsetting mitigations. An EWD would be a risk mitigation which could be put forward in an AFM proposal.

6.8 ALTERNATIVE COMPLIANCE APPROACHES

EWDs are designed to be used as an alternative to a WWD. However, like many electronic systems which have replaced manual processes, it is not a case of 'doing everything the same except now using technology'. EWDs create a number of opportunities including:

- Assisting the transport industry with the ability to implement more efficient and effective work practises and remove burdensome administrative requirements
- Streamlining processes for the transport industry and enforcement agencies alike
- Re-thinking how compliance outcomes are achieved over time which can also drive reduced administrative burden on the transport industry.

The EWD provides advantages over a WWD by providing a platform for alternate compliance driven through enhanced accuracy and data integrity. This increased transparency and integrity of data also provides the Regulator or Authorities with the ability to readily assure themselves of overall Transport Operator compliance and therefore safety.

On-road enforcement, auditing and investigations are common tools used across a range of regulatory regimes. In the case of fatigue management their effectiveness is limited by the inherent limitations of a WWD including:

- Requiring Authorised Officer knowledge of the rules and skill in interpreting a WWD to determine compliance
- Time involved in reviewing manual WWD Records
- Location and examination of other records such as trip schedules and delivery dockets to provide verification of WWD Records
- Requirement to seek data from Transport Operators where camera technology detects a potential breach.

The potential for EWDs to be used to support alternative compliance approaches with potentially improved safety and efficiency outcomes was discussed by Authorities and the transport industry during the course of the Pilot. In addition, the approaches used to achieve safety outcomes in other regulatory areas were investigated for potential application in the road transport industry.

6.8.1 TRANSPORT INDUSTRY

The transport industry almost unanimously expressed the view that as an EWD would provide greater transparency and integrity of data that this meant it should not be implemented in the same manner as a WWD. They sought an implementation approach which provided for some flexibility in enforcement with a focus on patterns of behaviour and overall safety management systems rather than a focus on individual breach detection which characterises WWDs. They saw particular alignment with Chain of Responsibility which looks at management systems and processes which are designed to promote regulatory compliance and saw the EWD as a mechanism to support improved safety management.

EWD was viewed as a tool that provided management with timely and accurate information which enabled Transport Operators to proactively manage fatigue compliance. Industry was of the view that Authorities should be looking at how they utilised the technology to plan and monitor compliance as well as respond to any breaches rather than simply reviewing EWD Records for regulatory breaches. This approach has distinct similarities to that adopted for the management of workplace health and safety as well as safety approaches used in the aviation and rail industries. Additionally, this is the compliance approach adopted in the use of regulatory programs such as IAP and Intelligent Speed Compliance.

The transport industry's views about how an accreditation or safety management system approach would operate were not well developed – while the transport industry overall wanted a change to this approach they had not fully considered exactly how such an approach could operate. The following are the types of features most commonly cited as being part of this approach:

- Initial certification of the EWD (to ensure transport industry investment is sound)
- Auditing of EWDs to ensure continuing system integrity
- Accreditation of Transport Operator business practices (similar to that which currently occurs with AFM)
- On-going audit and review of business processes which would focus on patterns of compliance and business processes for the management of Drivers and operations
- An increasing scale of regulatory response to any issues identified at an audit – these would range from issue of improvement notices for relatively minor issues to court action for serious and ongoing non-compliance and ultimately withdrawal of approval to use an EWD

6

KEY AREA OF ENQUIRY FOUR: LEGISLATION AND POLICY

- Reduction or elimination of roadside compliance, and where this did occur, that breaches detected would trigger an audit or 'request for information' to the Transport Operator rather than an infringement notice. Significant breaches would still provide for an enforcement direction for the Driver to rest.
- Mandatory requirement for Transport Operators to:
 - Report immediately, (eg within 48 hours) any breach over an agreed significance level (eg all critical breaches)
 - Provide periodic reporting of trends (eg six monthly) in an agreed format.

Some of the features suggested are already incorporated such as certification and auditing of the EWD, but not the accreditation of the Transport Operator. It is of note that automated reporting was not desired by either Authorities or industry under the current proposed implementation approach.

Transport Operators acknowledged that an accreditation type approach would shift responsibility away from the Driver towards the Transport Operator and were comfortable with this increased level of accountability. Many said that in reality Drivers rely on them to schedule and manage their compliance with fatigue legislation.

The Australian Trucking Association and others saw opportunities for the integration of industry and regulatory accreditation schemes already in operation such as TruckSafe and NHVAS. The view was that an accreditation type approach to EWD could be part of these existing schemes with the addition of new modules. An accreditation style approach to EWD was not supported as appropriate for all Transport Operators. Industry views were that EWDs could be introduced in two different ways:

- As a simple replacement for WWDs where the Transport Operator did not have the systems and approaches to the use of data as part of a holistic safety approach and where a rule driven approach was required to support safety
- As part of an accreditation scheme where Transport Operators had demonstrated a systemic approach to safety and robust use of information in management of the business.

The EWD Specification allows for both approaches using the performance-based approach to aspects such as the depth of integration of an EWD with other business systems used by the Driver or Transport Operator.

Implementation of alternative compliance approaches is a matter for further policy consideration.

6.9

KEY FINDINGS – LEGISLATION AND POLICY

- There are a number of legislative changes that are required to support the operation of EWDs. These issues will need to be addressed before wide scale deployment occurs
- The EWD Specification outlines a range of measures which will support the evidentiary quality of EWD information and chain of evidence. To ensure that the veracity of EWD records do not need to be established for each prosecution, consideration should be given to a legislative provision to provide for the acceptance of these records unless there is evidence to the contrary
- From the perspective of the transport industry there remain outstanding issues with respect to enforcement and sanctions under an EWD. This is likely to impact take up of EWDs
- While EWDs may be used to record local work, CAS does not currently assess compliance for these periods. This provides no compliance improvement over the current WWD arrangements where for most operators, excluding those in AFM and BFM, local records are kept separately. There is an opportunity to explore the policy behind the differences in arrangements for local and long distance work under an EWD
- Alternative compliance models which focus on safety management practices and trends over time, rather than prescriptive enforcement based approaches, could be supported by an EWD which provides for increased resolution, transparency and accuracy of information for Transport Operators, the Regulator and Authorities.



7 COST BENEFIT ANALYSIS

THIS SECTION DETAILS:

- Overview
 - Results
 - Key findings.
-

7.1 OVERVIEW

A cost benefit analysis was developed in the Pilot to identify the indicative operational costs and benefits associated with the implementation of the EWD compared to the current WWD.

7.1.1 SCOPE OF ANALYSIS

The scope of the cost benefit analysis covers a comparison of the time and costs required for operation of the EWD compared to the current WWD.

The potential safety benefits of the EWD in terms of reduced road trauma were not the subject of specific research in the Pilot. To conduct a methodologically acceptable study of EWD driver behaviour and related safety outcomes would have involved a longitudinal study with one Driver group using an approved EWD exclusively (and not in parallel with a WWD) and control groups with the WWD. However, in the absence of a regulatory approved EWD Specification and associated certification arrangements to allow an EWD to be approved, it was not possible for Drivers to use an EWD exclusively.

Broad guidance on the potential benefits that may be achieved from the EWD in terms of reduced crashes has however been obtained from other sources and is set out below.

The value to the community of preventing a single road fatality has been estimated at \$6.3 million¹. This value has been derived using the Willingness to Pay (WTP) methodology which measures the value that road users place on safety or avoidance of a fatality risk as demonstrated through behaviour (eg route preferences), and is preferred to the Human Capital Approach which does not capture the value that individuals place on their own lives and those of others, over and above current and future earnings or costs related to emergency services and property damage. The Human Capital Approach results in costs of around \$2 million for a fatality.

Table 10 uses fatality statistics published by the Bureau of Infrastructure, Transport and Regional Economics (BITRE) as reported in the Australian Road Deaths Database, combined with the WTP values to estimate a range of potential benefits from a reduction in heavy vehicle fatalities.

The table indicates that even a 1 per cent reduction in fatalities could result in a benefit of more than \$15 million per annum, based on fatalities over the last three years. It was estimated that fatigue was a contributing factor in 16 percent of all heavy vehicle fatal crashes in NSW in 2011. As such if there are fewer fatigued heavy vehicle drivers on our roads there should be a reduction in casualty crashes involving heavy vehicles.

There would also be benefits from a reduction in accidents which occasion injury (including permanent impairment and disability) or property damage.

While the Pilot has identified that the EWD can support alternative compliance approaches where there may be increased back office investigation and reduced emphasis on roadside enforcement, the consideration of any benefits associated with such a policy change are beyond the scope of the Pilot and accordingly have not been considered in this analysis.

¹ Transport for NSW, Principles and Guidelines for Economic Appraisal of Transport Investment and Initiatives, March 2013

Table 10: Potential indicative benefits from a reduction in heavy vehicle road fatalities

Year	Number of heavy vehicle fatalities nationally	Indicative value per fatality prevented (\$M)	Potential per cent reduction in fatalities	Potential Reduction in the number of fatalities	Indicative benefit (\$M)
2010	245	\$6.3	1%	2.45	\$15.68
			5%	12.25	\$78.40
			10%	24.50	\$156.80
			15%	36.75	\$235.20
2011	235	\$6.3	1%	2.35	\$15.04
			5%	11.75	\$75.20
			10%	23.50	\$150.40
			15%	35.25	\$225.60
2012	260	\$6.3	1%	2.60	\$16.64
			5%	13.00	\$83.20
			10%	26.00	\$166.40
			15%	39.00	\$249.60

7 COST BENEFIT ANALYSIS

7.1.2 METHODOLOGY

The analysis covered three scenarios or models:

1. WWD (base model) – this is the business as usual case where drivers continue to use the WWD
2. EWD (preferred model) – under this scenario a proportion of operators adopt an EWD which complies with the RCAF under which data is stored remotely and primarily accessed through the internet
3. DRD model – under this scenario the EWD requires a Driver Recording Device or DRD (where the EWD stores data on a portable USB device to facilitate data transfer to enforcement officers at the roadside).

The WWD model represents the base case for the analysis as this is the model currently in operation.

The preferred EWD model is based on the RCAF. This model was preferred to the DRD model for a range of acceptability, technical and policy reasons as detailed in the report. As such the first analysis of the first two models is the focus of this section. However, the DRD model was also subject to the analysis and is addressed in a separate subsection below.

The models were characterised as sets of data processing tasks, each of which incurs a cost such as manpower or equipment.

The cost benefit analysis examines the various activities and data flows involved in the work diary process (EWD or WWD) and classifies activities, which may be undertaken through a variety of entities, in relation to three key processes:

- Task 1: Data Entry – Work and rest data is generated either by the Driver and/or by sensors on the vehicle
- Task 2: Data Management – Transport Operators assemble store and review work and rest data. Remedial action is taken where anomalies are found
- Task 3: Enforcement Data may be reviewed for the purpose of enforcement either on-road or off-road.

Costs incurred in relation to these tasks include:

Time and operating costs

- Driver time and vehicle operating cost in the collection, completion and submission of the WWD
- Operator time in management and review of diaries including follow up action with Drivers
- Authorised Officer and Driver time taken for on-road enforcement
- Authority time taken in audit and investigation activities including camera detected follow up

Equipment and set up costs

- Cost of WWDs and systems required to manage them
- Initial training costs for Drivers and Authorised Officers
- Set up and recurrent costs of EWD System Manager and DRD Issuer (for regulatory DRD approach)
- Equipment costs for Transport Operators and Authorities.

In understanding each of these tasks, data was gathered from a variety of sources:

- Transport Operators
- Industry and Industry Associations
- Authorities
- NTC
- TCA.

In a number of instances information gathered has provided a range of time and costs for the same activity depending on the source of the information. This has been addressed through a Monte Carlo analysis. This is a more complex form of sensitivity analysis that is able to account for a large number and range of uncertain variables. This mathematical analysis results in the generation of possible outcomes taking into account the probability profile of uncertain input values.

7.1.3 ASSUMPTIONS

Costs

The decision to take up a regulatory EWD will be a cost benefit analysis for the Transport Operator.

Broadly there are four possible starting points for Transport Operators who consider take up of an EWD:

1. Do not have in-vehicle telematics
2. Have in-vehicle telematics which will require a firmware update to accommodate EWD functionality
3. Have in-vehicle telematics and the equipment can be modified to enable it to comply with the EWD Specification
4. Have in-vehicle telematics and when this is due for replacement will install EWD compliant technology.

Each of these scenarios will have different costs for the Transport Operator. However, as it cannot be assumed that operators have systems which will be compatible with the EWD this analysis has been developed on the basis that an operator does not currently have in-vehicle telematics. As such this assumption will result in higher costs for this cost benefit analysis.

The equipment costs of an EWD for an operator will comprise two main elements and the following values were used in the cost modelling:

- In-vehicle units – \$1,200 plus \$500 installation
- Monthly monitoring – \$20 per month per unit.

In addition Transport Operators will incur cost in the establishment of reporting and management capability to allow them to review data from the in-vehicle units.

It should be noted that under take up option 2, at the very least, a system will require a firmware upgrade which would cost at least \$200 per unit.

Fleet size and composition

The analysis relies on an understanding of the number of vehicles, fleets and Drivers involved.

Key data sets are summarised below (Table 11).

Table 11: Summary of key data sets and assumptions

Data Set	Volume	Source
Number of Vehicles over 12 tonne	265,316	Jurisdictional registration data as at December 2011
Percentage of 12 tonne fleet undertaking long haul work	31.5%	Survey of Motor Vehicle Use (SMVU)
Vehicles required to keep a diary	83,490	Jurisdictional vehicle numbers by SMVU long haul percentage
Percentage of Operators by Fleet Size	85% - Small 13% - Medium 2% - Large	Assumption based on data sourced from Australia Trucking Association, Australian Livestock Transporters' Association and NatRoad
Percentage of small operators working solely for a medium or large operator	30% in total 20% of those working for medium operators and 80% working for large operators	Assumption based on data from NTC commissioned survey, NatRoad data and stakeholder interviews
Average number of vehicles per fleet	Small operators – 1.7 vehicles Medium operators – 10.6 vehicles Large operators – 258.8 vehicles	Based on analysis of NatRoad vehicle fleet data
Number of Vehicles by operator size, taking into account small operators working solely for larger operators	10,539 vehicles – Small operators 15,312 vehicles – Medium operators 57,640 vehicles – Large operators	Based on the above sources

7 COST BENEFIT ANALYSIS

Expected demand

As noted in section 4, the level of EWD take up will be determined by acceptance of the EWD and assessment of its net costs and benefits.

The analysis has been developed based on the following assumptions of take up (Table 12 and Table 13) with the first and second scenarios seen as realistic in the first few years. Other scenarios have been developed to enable understanding of economies of scale and to allow consideration of any policy positions to encourage take up.

Table 12: Assumptions of EWD take up by fleet size

Fleet Size	Assumption 1	Assumption 2	Assumption 3	Assumption 4	Assumption 5
1 – 4 Vehicles	0%	0%	10%	30%	100%
5 – 29 Vehicles	0.5%	3%	30%	60%	100%
30+ Vehicles	1%	10%	50%	80%	100%
Total Vehicles	1%	9%	41%	70%	100%

Based on these assumptions, the following vehicles would utilise an EWD (Table 13).

Table 13: EWD take up under proposed assumptions

Fleet Size	Assumption 1	Assumption 2	Assumption 3	Assumption 4	Assumption 5
1 – 4 vehicles	0	0	1,054	3,162	10,539
5 – 29 vehicles	77	459	4,594	9,187	15,312
30+ vehicles	576	5,764	28,820	46,112	57,640
Total Vehicles	653	6,223	34,467	58,461	83,490

7.2 RESULTS

The results of the cost benefit analysis as set out in Table 14 shows that at the lowest take up level for an EWD (1 per cent) there is a net present cost savings of \$7.5 million over five years compared to a WWD.

The net present cost over five years for each participant within the EWD environment are also detailed in Table 15.

Table 14: Net present cost over 5 years

	Assumed level of take up				
	1 (Low)	2	3 (Medium)	4	5 (High)
Take up %	1%	9%	41%	70%	100%
Total Costs	\$M	\$M	\$M	\$M	\$M
WWD (Business As Usual)	59.3	373.0	1,958.0	3,304.2	4,711.0
EWD preferred model (Remote Connection Access Framework)	51.8	166.8	736.5	1,222.7	1,730.7
Net benefit of EWD (with RCAF) compared to WWD	7.5	206.2	1,221.5	2,081.5	2,980.9

The costs to each participant within the EWD Environment are detailed in Table 15.

Table 15: Net present cost over 5 years for participants

	Assumed level of take up				
	1 (Low)	2	3 (Medium)	4	5 (High)
WWD					
Transport Operators	36.6	349.6	1,931.4	3,274.7	4,679.2
Authorities	22.7	23.3	26.6	29.5	32.4
Total	59.3	372.9	1,958.0	3,304.2	4,711.6
Remote Connection Access Framework					
Transport Operators	13.8	128.5	696.5	1,181.1	1,678.6
EWD System Manager	22.2	22.2	22.2	22.2	22.2
Authorities	15.8	16.1	17.9	19.4	21.0
Total	51.8	166.8	736.5	1,222.7	1,730.7

7 COST BENEFIT ANALYSIS

The cost benefit analysis indicates that the net present cost over five years for the preferred EWD model is lower than the net present cost of operating a WWD under all take up assumptions.

However, this result needs to be moderated with the understanding that the majority of savings to Transport Operators and Authorities are in time and are largely non-cashable. By contrast there are significant initial costs involved in an EWD for equipment and this will require up-front cash outlay for both Transport Operators and Authorities. Therefore, while there is a net benefit in almost all cases, the decision making process for Transport Operators may be based more on cash outlays rather than small incremental time savings.

7.2.1 INITIAL SET UP COSTS

Initial set up costs range from \$9.9 million at the lowest level of take up to \$56.1 million at the medium level.

Initial costs will be incurred by all parties in the EWD environment and will include costs such as:

- Transport Operators
 - In-vehicle equipment
 - Back office systems for monitoring
 - Training.
- Authorities
 - In-vehicle equipment (where required)
 - Training.
- EWD System Manager
 - Set up of processes for certification, auditing and overall system management.

These costs under different take up scenarios are shown below in Table 16.

Table 16: Initial setup costs

	Level of take up				
	1 \$M	2 \$M	3 \$M	4 \$M	5 \$M
Take up %	1%	9%	41%	70%	100%
Remote Connection Access Framework					
Transport Operators	1.5	11.0	47.7	81.1	116.1
EWD System Manager	4.9	4.9	4.9	4.9	4.9
Authorities	3.5	3.5	3.5	3.5	3.5
Total	9.9	19.5	56.1	89.5	124.5

7.2.2 IMPACTS FOR TRANSPORT OPERATORS

Over 95 per cent of Transport Operator costs for WWDs relate to data capture including:

- Obtaining the WWD
- Making entries (most significant cost)
- Training
- Getting WWD pages to the Record Keeper.

Other Transport Operator costs relate to data management (including cost of diary administration and management) and roadside review.

Data capture costs for Transport Operators reduce by around two-thirds under an EWD. This occurs primarily because of the savings in time inherent in data entry with an EWD. By contrast, data management costs increase by 80 to 500 per cent due to the cost of in-vehicle equipment and operator back office systems and processes required to support an EWD. While Transport Operators will make savings in the processing and analysis of WWDs, some Pilot participants who have been utilising commercial in-vehicle telematics report that there are a significant number of 'false positives' reported by their systems which arise due to Drivers failing to log off (a common and persistent problem) or other system technicalities. It would be expected that some of these issues would not occur under an approved EWD due to the integrity and rigor of the certification process, although those related to driver behaviour would continue.

7.2.3 IMPACTS FOR AUTHORITIES

Around 90 per cent of the time and cost of WWD review incurred by enforcement agencies occurs on the road. The time involved in review of diaries is only a small component of audits and investigations as these activities typically involve review of a range of records, not just WWDs. The time involved in roadside review of work and rest records decreases by around 80 per cent under an EWD.

The RCAF approach allows for existing Police equipment to be used including internet capable devices or mobile phones. All road agencies have equipment suitable for use under both EWD models. Equipment set up costs for Authorised Officers are the same regardless of industry take up.

EWD System Manager costs, auditing and overall management of the operational policy for EWDs, have been estimated based on the recommendation that TCA will undertake these functions. TCA already has existing corporate structures and the benefit of knowledge of the telematics industry resulting in lower initial costs compared to another entity which may have to invest to obtain this capacity. EWD System Manager costs are not significantly driven by the level of Transport Operator take up and will be generally fixed.

The analysis has assumed that the CAS developed as part of the Pilot is sufficient for the needs of enforcement agencies and provision has been made for basic maintenance only.

The costs for Transport Operators as a whole are variable depending on the number taking up the EWD. However, the costs for the establishment of the roles of EWD System Manager as well as equipment costs for Authorised Officers are relatively fixed regardless of the level of take up as capability needs to be available regardless of the number of Drivers.

Recurrent costs for the EWD System Manager are indicated to be approximately \$2.7 million per annum.

7 COST BENEFIT ANALYSIS

7.2.4 COST BENEFITS OF THE DRD MODEL

Prior to the Pilot and the development RCAF the DRD was the primary means for record storage and transfer. On this basis the cost benefit analysis investigated the costs and benefits of adopting the EWD with DRD technology.

The results of the cost benefit analysis set out in Table 17 shows that the net present cost of the DRD model over five years is higher than the EWD preferred model under all take up scenarios. The results also show that the DRD model has a higher net present cost at the lowest take up level (1 per cent) compared to a WWD, costing an extra \$4.5 million over five years. This compares to a net present cost saving of \$7.5 million for the preferred EWD model at the lowest take up level.

The reason for the higher net present costs for the DRD model compared to the preferred EWD model are primarily related to increased costs for:

- The set up and recurrent funding for the DRD issuer
- Additional costs include a DRD compatible interface in the EWD IVU
- Additional DRD enabled equipment required for Police and associated security costs.

Table 17: Net present cost for DRD

	Level of take up				
	1 (Low)	2	3 (Medium)	4	5 (High)
Take up %	1%	9%	41%	70%	100%
Total Costs	\$M	\$M	\$M	\$M	\$M
WWD (Business As Usual)	59.3	373.0	1,958.0	3,304.2	4,711.0
EWD with DRD	63.8	181.3	762.8	1,258.9	1,777.6
Net benefit of EWD (with DRD) compared to WWD	-4.5	191.7	1,195.5	2,045.3	2,934.0

The net present cost over five years for each participant for the EWD model is detailed at Table 18.

Equipment set up costs for Police have been based on an assumption that under the DRD model new in-vehicle equipment will be needed for all officers who regularly review WWDs. This is because Police have advised that due to security risks they will not allow DRDs to be used with any existing equipment.

DRD Issuer costs have been estimated based on a centralised model leveraging from an already existing government or related entity.

The costs for Transport Operators as a whole are variable depending on the number taking up the EWD. However, the costs for the establishment of the roles of EWD System Manager and DRD Issuer as well as equipment costs for Authorised Officers are relatively fixed regardless of the level of take up as capability needs to be available regardless of the number of Drivers.

Recurrent costs for the DRD issuer are approximately \$0.2M per annum.

Table 18: Initial set up costs by participants

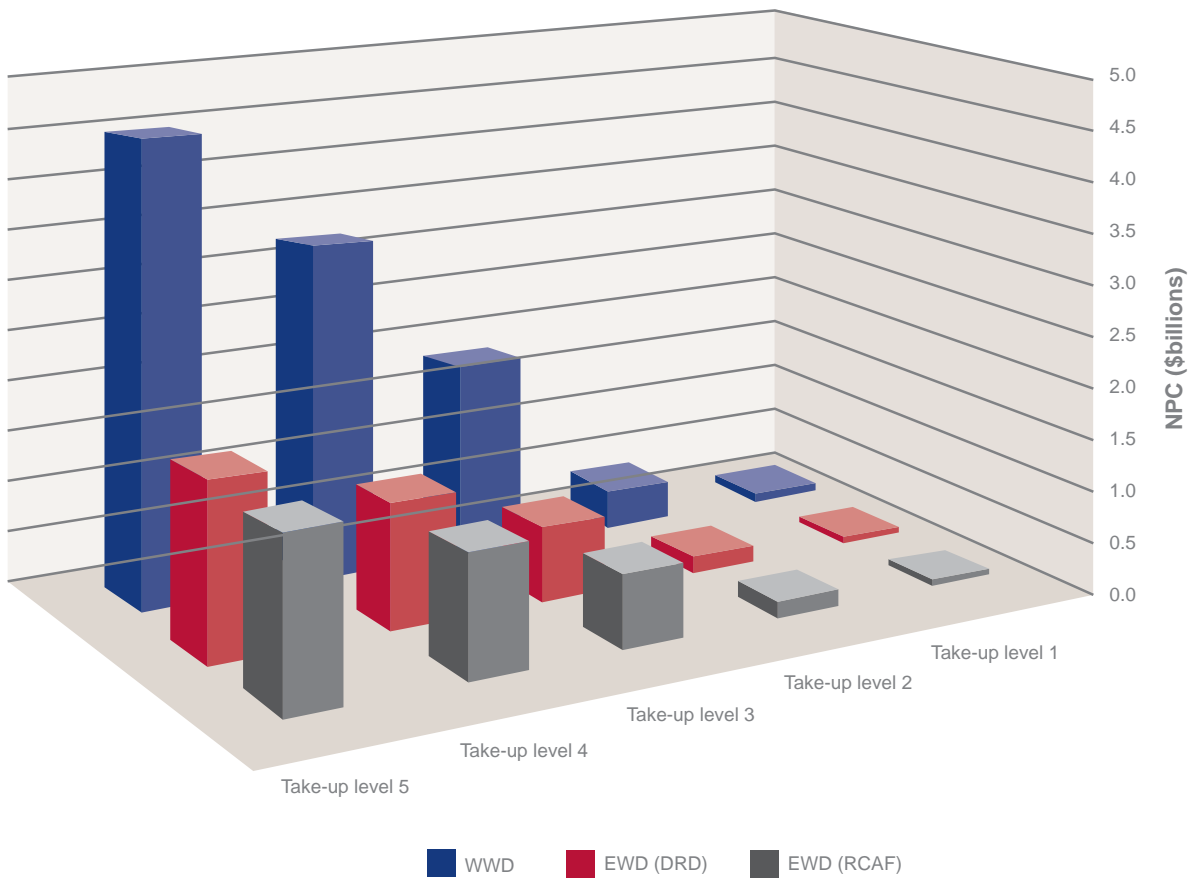
	Level of take up				
	1 \$M	2 \$M	3 \$M	4 \$M	5 \$M
Take up %	1%	9%	41%	70%	100%
DRD					
Transport Operators	1.6	12.3	54.6	92.7	132.7
EWD System Manager	4.9	4.9	4.9	4.9	4.9
DRD issuer	0.2	0.2	0.2	0.2	0.2
Authorities	14.6	14.6	14.6	14.6	14.6
Total	21.3	32.0	74.2	112.4	152.3

7 COST BENEFIT ANALYSIS

7.2.5 CONCLUSION

Figure 18 provides an overview of the results of the analysis and shows that for each level of take up the optimal model from the perspective of the cost benefit analysis is the preferred EWD model.

Figure 18: Net present cost (over 5 years) by model and level of take up



7.3 KEY FINDINGS – COST BENEFIT ANALYSIS

- The cost benefit analysis shows that the net present cost over five years for the preferred EWD model is lower than the net present cost of operating a WWD under all take up assumptions. At the lowest assumed take up level for an EWD (1 per cent) there is a net present cost saving of \$7.5 million over five years compared to a WWD. At the the medium assumed level of take up (41 per cent) there is a net present cost saving of \$1.221 billion over five years compared to a WWD
- The cost benefits from EWDs are essentially derived from time saved in:
 - Entry and management costs associated with a WWD for Drivers and Transport Operators
 - Roadside enforcement for Authorised Officers.
- While time savings are evident they are small on a per transaction basis and may not translate into reductions in cash outlays as time is redirected to other activities
- There is an up-front cost requiring cash outlay for both Transport Operators and Authorities to equip Authorised Officers and set up the EWD Regulatory Framework Owner and EWD System Manager
- Transport Operators will make a cost benefit decision in relation to EWD take up and this decision will include consideration of factors such as regulatory scrutiny. Where Transport Operators have already invested in commercial telematics, take up of EWD would be expected to be considered at point of in-vehicle equipment upgrade
- The cost benefit analysis shows that the net present cost of the DRD model over five years is higher than the EWD preferred model under all take up scenarios. The results also show that the DRD model has a higher net present cost at the lowest take up level (1 per cent) compared to a WWD, costing an extra \$4.5 million over five years.

8 SPEED MONITORING

THIS SECTION DETAILS:

- Legislation and regulatory use
 - Technology
 - A qualitative study of current use of speed data
 - A desktop assessment and closed environment testing
 - Investigation into collecting speed records
 - Key findings – speed
-

8.1 LEGISLATION AND REGULATORY USE

In 2007 the ATC approved the Commonwealth's Model Act on Heavy Vehicle Speeding Compliance Regulations 2008 (Model Speed Act). This national regulation introduced general and specific duties for transport parties for speed. These duties are for transport parties to take reasonable steps to ensure their activities do not cause the Driver to exceed speed limits.

Speed is captured in the chain of responsibility requirements. The Model Speed Act does not require records to be collected, or for electronic equipment to be used in that collection. As there are no current record-keeping requirements of the Driver in relation to speed, speed management is difficult for off-road parties. Unless a noncompliant Driver is detected by on-road enforcement or automatic detection devices, offences cannot be prosecuted.

From a regulatory perspective, speed monitoring has been applied in Queensland for the purpose of determining speed limiter operation. While this has been performed as part of IAP, the speed monitoring function is the same. The results to date have been encouraging and indicate a significant overall reduction in mean heavy vehicle speeds, however, once monitoring and engagement ceases there appears to be a relapse in speeding events.

Based on the confirmation of positive policy outcomes by Queensland, TCA has subsequently released a new regulatory service, known as Intelligent Speed Compliance (ISC). ISC is now available for use by the Regulator and Authorities and is consistent with the objectives of the National Road Safety Strategy 2011 – 2020. ISC has the potential to be used as a stand-alone service, or as a secondary line of defence to detect speed limiter malfunctions or tampering.

The NTC Policy envisaged that speed monitoring systems would only be applied for regulatory purposes under a court ordered Supervisory Intervention Order against a recidivist offender. This approach involves the following:

- Speed monitoring systems utilise in-vehicle telematics to provide heavy vehicle speed records to Transport Operators. Raw speed data is sent from the IVU to the service provider, with no processing and only limited storage within the IVU
- Speed records or exception reports (also known as non-compliance reports) would not be delivered to the Regulator and/or Authorities. Rather, a telematics-based speed recording system would provide raw speed records (in full) to Transport Operators
- Authorities would not receive speed reports or speed data from industry except by auditing an operator to ensure that the operator's business practices do not cause the Driver to exceed speed limits under Chain of Responsibility provisions. The sole exception to this would be in the event of an investigation, where speed records (like all records) would be discoverable
- Roadside analysis or enforcement of telematics-based heavy vehicle speed records would not be possible.

8.2 TECHNOLOGY

The heavy vehicle speed monitoring system centres on the IVU. The IVU's GNSS receiver independently generates vehicle speed periodically while the vehicle is moving. The IVU will be electronically and physically tethered to the heavy vehicle in a secure manner that is consistent with the requirements for an EWD. There are requirements to detect malfunction or access by unauthorised personnel. The electronic records generated and stored by the IVU must be authenticated, have integrity and be secure from interception or corruption to meet evidentiary standards.

The IVU must perform its function within the applicable accuracy standards for GNSS systems and mobile-based communications that is consistent and complementary to the requirements for an EWD. Similarly, the service provider (like the EWD-SP) must have information security and data access controls for the information they receive, store and forward to the Transport Operator.

The functions of stakeholders in the speed monitoring system are similar to those described for the EWD. The service provider (like the EWD-SP) installs and maintains the IVU in a heavy vehicle. This requires the participation of the Transport Operator as controller and/or owner of the heavy vehicle to support the heavy vehicle speed monitoring system.

8 SPEED MONITORING

8.3 A QUALITATIVE STUDY OF CURRENT USE OF SPEED DATA

Transport Operators are required to take reasonable steps to ensure that their activities do not, by act or omission, cause the Driver to exceed the speed limit. Identifying and assessing risks, and acting on identified substantial risks, is one way to take reasonable steps.

In the context of these requirements, the Pilot included interviews with Transport Operators and Drivers to determine the safety initiatives operators have undertaken in order to take reasonable steps to not cause Drivers to speed. These interviews explored generic issues and did not delve into specific cases of speed non-compliance.

Where the transport industry has installed in-vehicle telematics they typically monitor vehicle speed:

- Over 100 km/h
- In some instances in geographical areas of particular sensitivity.

Industry monitoring of speed is undertaken in the following ways:

- Having a tolerance to the speed limit which triggers an alert or investigation (eg 2–3 km/h over) and a time period before it is triggered (eg for more than 15 seconds)
- Generating and reviewing periodical reports
- Generating an alert based on evaluating the speed in 1–5 minute intervals used for a guide only
- Other methods generally decided by the provider of the telematics system. IAP experience indicates that these are often not clearly documented or understood.

The response to incidents of excess speed includes:

- Provision of speed alerts to the Driver
- Post speed-event counselling of Drivers
- Management reporting of speed events
- Disciplinary action and, in some cases, dismissal.

Most stakeholders engaged indicated that monitoring is effective in reducing speeding to a minimal level, with over 95 per cent of Driver's surveyed indicating that in-vehicle alerts were effective in reducing their speeding. One Driver said, "sometimes you don't realise if you over-run" and action can then be taken straight away. The majority of Drivers (over 85 per cent) indicated that the subsequent follow up by the Transport Operator relating to speed was effective in reducing their speeding. Four interviewed Drivers reported that speed monitoring had no effect on speed reduction as the trucks are already speed limited.

Industry use of speed monitoring differs in both technical understanding and private policy use. Operational IAP evidence has shown that correct IVU setup, installation, operation and data analysis is critical to results produced. IAP experience has also shown that operators do not necessarily know when their speed monitoring is producing accurate results.

8.4 A DESKTOP ASSESSMENT AND CLOSED ENVIRONMENT TESTING

The Pilot sourced a sample of five existing speed monitoring systems and assessed these systems by:

- A desktop assessment of the systems' specifications against the EWD Specification
- An evaluation of systems through the use of a test vehicle in a closed environment to compare and determine the accuracy of existing commercial GNSS enabled speed monitoring systems.

This initiative was intended to identify any deficiencies in the systems.

It should be noted that the systems selected are either current commercial systems or derivatives of commercial units that have been modified to suit the EWD requirements of the Pilot. As such, some systems may not currently meet the requirements above but are able to be configured or altered to align. For example, a system may currently measure speed records every 5 seconds rather than the specified 3 seconds. This may simply be a configuration setting.

The Desktop Assessment involved a high level review of each system's capabilities against the requirements within the EWD Specification. The assessment was based upon the tester's knowledge of the system through its use within the Pilot, discussions with the supplier of the system or any

available information contained within data sheets or marketing material. The assessment was not to the level of a certification and as such the findings should be treated in that context.

The desktop assessment was also limited to the functionality of the system rather than the quality systems or practices of the provider supplying the system. It should be noted that the integrity of a regulatory system stems from not only the functionality of the technological components but also the quality systems inherent in the management and processing.

The desktop assessment tested the available systems against the speed accuracy requirements contained within the EWD Specification. The testing was conducted to understand if the performance of the systems are likely to meet the EWD Specification.

8.4.1 RESULTS OF DESKTOP ASSESSMENT

Broadly, systems assessed met or would be able to meet the EWD Specification with a small amount of modification. The architecture of the systems were all consistent with that described in the EWD Specification and had the required data capture, processing and transmission capabilities.

Some systems had limited implemented tamper evidence features which were below the level required. This is not surprising as these systems have been predominantly designed for a commercial rather than regulatory application where there is little motivation for operators to tamper with their own systems. Without intimate knowledge of the system it is impossible to determine the extent of development required to bring these systems up to the standard required of the EWD Specification, however it is estimated that the system could be modified to be compliant.

8.4.2 RESULTS OF CLOSED ENVIRONMENT TESTING

While the systems sampled provided speed records, not all systems were suitable for comparison to the TCA reference system. As such, five units were selected from two manufacturers for testing within the TCA test vehicle and within the TCA laboratory against a GNSS simulator.

Results from all five units demonstrated a high level of speed accuracy (98 per cent – 100 per cent accuracy). It is envisaged that these units would meet the requirements of the EWD Specification within a controlled certification testing environment.

8.5 INVESTIGATION INTO COLLECTING SPEED RECORDS

As part of the Pilot activities, RMS sought legal advice about the implications of Authorities collecting speed records. The advice implied that where there was consent from the Driver for Authorities to collect records, there were no legislative restrictions to collection of records. However, the advice did raise a number of issues relating to the use of this information that would require further policy consideration. It was determined that for the Pilot no further action would be taken, with this issue left for jurisdictional consideration as part of their overall policy and legislative programs.

8.6 KEY FINDINGS – SPEED

- Speed monitoring is feasible under two broad operational environments:
 - By the Regulator or Authorities as conditions applied to Transport Operators
 - By Transport Operators to manage speed compliance.
- Authorities and the Regulator can now apply speed monitoring systems through the use of Intelligent Speed Compliance (ISC) and its associated exception reporting. The policy drivers for ISC vary from independently measuring the speed of vehicles as a stand-alone service, to a secondary line of defence to detect other factors such as speed limiter malfunctions or tampering. Recently TCA released Intelligent Speed Management (ISM), effectively providing the transport and logistic sectors with a way to accurately measure vehicle speed through GPS-enabled telematics systems.

9

FIVE UNRESOLVED ISSUES AND ELEVEN QUESTIONS

THIS SECTION DETAILS:

- Summary of Unresolved Issues
- Unresolved Issue 1 – is a heavy vehicle on-board printer required?
- Unresolved Issue 2 – is GNSS required for the automatic capture and population of records as well as to continuously capture position records?
- Unresolved Issue 3 – does the IVU need to be tethered to the vehicle?
- Unresolved Issue 4 – is tamper monitoring required?
- Unresolved Issue 5 – what is the time resolution for display to Drivers and subsequent reporting, one minute or one second?
- Eleven Questions

Unresolved issues

1. Is a heavy vehicle on-board printer required?
2. Is Global Navigation Satellite System (GNSS)¹ required for the automatic capture and population of records as well as to continuously capture position records?
3. Does the in-vehicle unit (IVU) need to be tethered to the vehicle? (A question of system security and therefore the level of evidentiary provision in Electronic Work Diary (EWD) and heavy vehicle speed monitoring systems)
4. Is tamper monitoring required?
5. What is the time resolution for display to Drivers and subsequent reporting, one minute or one second?

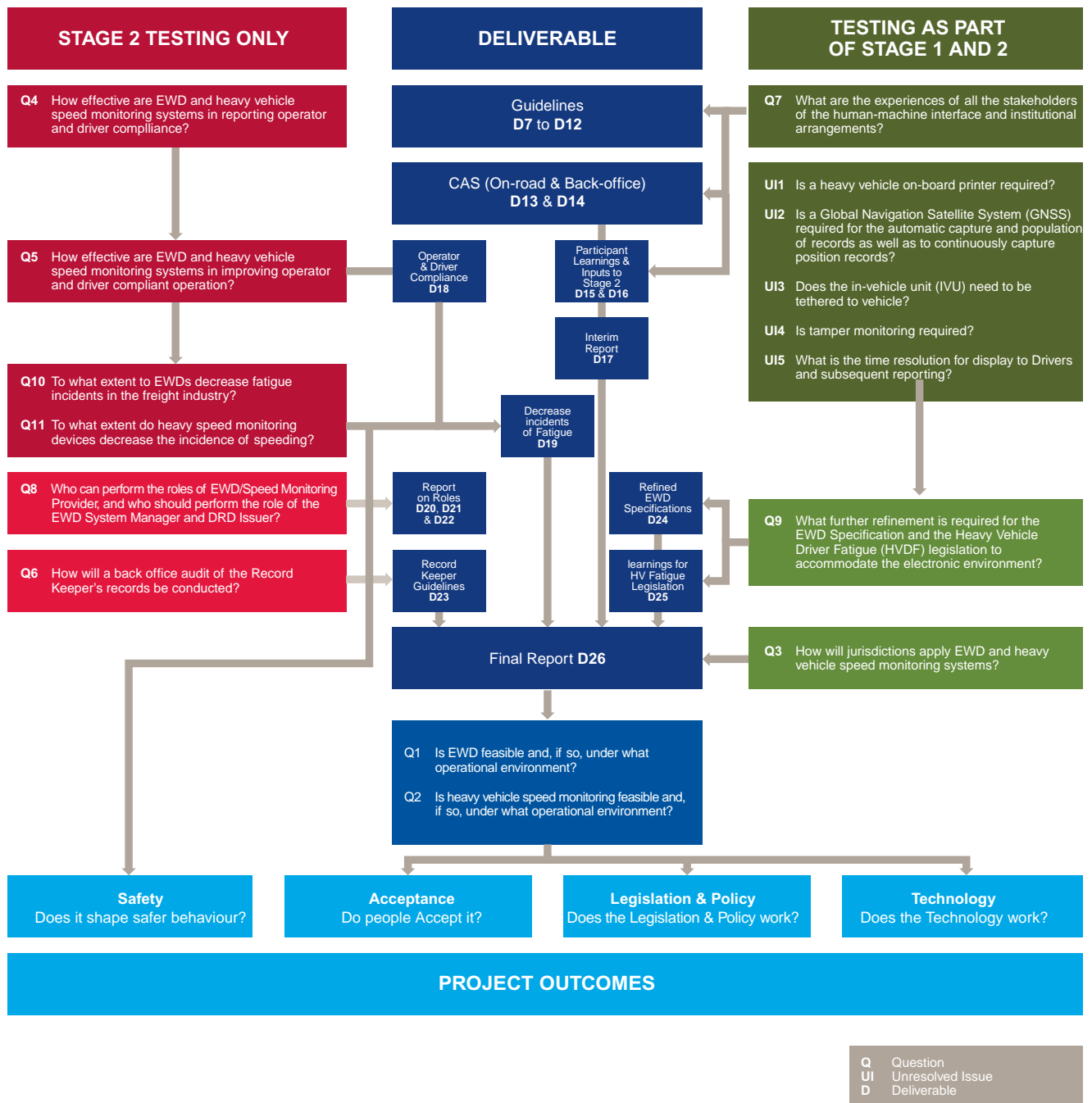
Eleven Questions

1. Is EWD feasible and if so, under what operational environment?
2. Is heavy vehicle speed monitoring feasible and if so, under what operational environment?
3. How will jurisdictions apply EWD and heavy vehicle speed monitoring systems?
4. How effective are EWD and heavy vehicle speed monitoring systems in reporting operator and Driver compliance with regulations?
5. How effective are EWD and heavy vehicle speed monitoring systems in improving operator and Driver compliant operation?
6. How will a back office audit of the Record Keeper's records be conducted?
7. What are the experiences of all the stakeholders of the human-machine interface and institutional arrangements?
8. Who can perform the roles of EWD/Speed Monitoring Provider, and who should perform the role of the EWD System Manager and DRD Issuer?
9. What further refinement is required for the EWD Specification and the Heavy Vehicle Driver Fatigue (HVDF) legislation to accommodate the electronic environment?
10. To what extent do EWDs decrease fatigue incidents in the freight industry?
11. To what extent do heavy speed monitoring devices decrease the incidence of speeding?

Figure 19 sets out how the Unresolved Issues and Questions are grouped by the four key areas of enquiry.

¹ Global Positioning System (GPS) is one form of GNSS

Figure 19: Pilot framework



9 FIVE UNRESOLVED ISSUES AND ELEVEN QUESTIONS

9.1 SUMMARY OF UNRESOLVED ISSUES

The following table provides a summary of the findings relating to the five Unresolved Issues (Table 19).

Table 19: Summary of Unresolved Issues

ID	Unresolved Issues	Finding
UI 1	Is a heavy vehicle on-board printer required?	<p>An EWD does not require an on-board printer and the requirement of on-screen display of EWD records incorporating the necessary information required for roadside enforcement is included in the EWD Specification.</p> <p>In the RCAF, a range of applications and services is provided to meet the varying needs for enforcement by equipped or unequipped officers such as:</p> <ul style="list-style-type: none"> CAS Call centre service SMS Service and/or Smartphone applications IVU display
UI 2	Is GNSS required for the automatic capture and population of records as well as to continuously capture position records?	GNSS will remain a requirement in the EWD Specification.
UI 3	Does the in IVU need to be tethered to the vehicle?	Tethering is a requirement in the EWD Specification. A performance based approach has been adopted to accommodate current commercially available solutions for tethering.
UI 4	Is tamper monitoring required?	Tamper monitoring is a requirement in the EWD Specification. A performance based approach has been adopted to accommodate current commercially available solutions for tamper monitoring.
UI 5	What is the time resolution for display to Drivers and subsequent reporting, one minute or one second?	<p>The display of information to be in one minute increments.</p> <p>The capture of information by an IVU to be in one second increments which is consistent with the current commercial systems.</p>

9.2 UNRESOLVED ISSUE 1 – IS A HEAVY VEHICLE ON-BOARD PRINTER REQUIRED?

9.2.1 HEAVY VEHICLE NATIONAL LAW

The legislation is silent regarding an on-board printer. At the roadside the legislation requires that an EWD “Is capable of readily reproducing, on being accessed by an authorised officer or a police officer while the vehicle to which it is fitted is on the road the information it contains in a form” that is “readily accessible”, “reasonably capable of being understood” and “can be used as evidence”. This provision appears to allow for electronic (including screen or wireless) access to an EWD system and the use of electronic documentation as evidence.

The HVNL also provides that a Driver must carry at least 28 days of EWD records with them and that where a Driver has used more than one EWD in the last 28 days they must carry a print out of the balance of records which are not recorded in their current EWD. It is further noted that the legislation requires Drivers to electronically transfer EWD data to the Record Keeper within 21 days of the data being recorded by the EWD.

These provisions indicate that legislators assumed that an EWD would have the capacity to store possibly 21 or 28 days or more of records.

9.2.2 THE NTC POLICY

The NTC Policy acknowledged arguments by industry that the installation of a printer in the heavy vehicle was outdated, costly, unnecessary and unacceptable. However, comments by enforcement agency representatives during public consultation indicated that without a printed copy that constituted an original record, prosecution of any detected offences under their jurisdictions current court practices and regulations would be difficult or even impossible.

NTC expressed the view that:

“Electronic work diaries should be able to provide roadside access to records in a standardised format for unequipped roadside Authorised Officers. The feasibility of doing so by generating a printout of records, as well as the feasibility of alternative means of providing the information should be established though an on-road pilot”.

9.2.3 AUSTRoadS REPORT

The Austroads Report included an on-board printer as a means by which an EWD could readily reproduce the information it contains on being accessed by unequipped Authorised Officers at the roadside and in an evidentiary form.

There is no suggestion that the printer was the only means of meeting this objective. The Austroads Report also acknowledged that the ultimate decision regarding inclusion of a printer in the EWD was a matter of policy and strongly recommends that a printer not be required for an EWD.

The Austroads Report found that an on-board printer “adds cost, complexity, increased maintenance and a significant opportunity for failure”. It was noted that a printer would add 40 per cent to the cost of an EWD and that this cost would not be justifiable given the infrequency of a roadside inspection for an individual vehicle.

9

FIVE UNRESOLVED ISSUES AND ELEVEN QUESTIONS

9.2.4 THE PILOT

Stage 1 noted Industry and Authorities concerns about the cost, reliability and robustness of printing equipment. It noted that commercial availability of such devices was limited and industry take up of a printer based device was likely to be low.

Further research and consultation was completed in Stage 2 to determine options which do not require a printer for the roadside review of records. In considering alternatives to a printer in Stage 2, there are two main categories of Authorised Officers whose needs in relation to roadside enforcement are to be addressed:

- Authorised Officers who currently do not have electronic equipment but do review Driver work diaries frequently. There are a relatively low number of officers in this category
- Authorised Officers who currently do not have electronic equipment and may review Driver work diaries infrequently. There are a large number of officers in this category including Police.

For Authorised Officers in the first category the most effective alternative to a heavy vehicle on-board printer is to provide them with appropriate internet capable electronic equipment. For Authorised Officers in the second category other approaches were considered, as outlined in section 5.3, including:

- Smartphone and in-vehicle systems
- Proxy support through phone or radio
- Interactive voice response
- SMS
- On-screen viewing of Driver records.

9.2.5 CONCLUSIONS

A heavy vehicle on-board printer is not feasible due to cost, reliability and robustness. The focus in the Pilot was on providing a feasible alternative.

By implementing the RCAF and the analysis of latency at the roadside where enforcement is conducted, it was identified that the need to access Driver records at the roadside where there is no remote access to the Driver records, would be minimal but must still be catered for. On-screen display of Driver records provides this required functionality which is equivalent to the heavy vehicle on-board printer.

The option to view records in the vehicle has received some support from Authorised Officers but concerns were expressed over the possible requirement for officers to enter a vehicle, from privacy and work health safety perspectives.

Roadside officers will be able to access a person in the back office who can conduct the review on their behalf. While this solution may involve some additional time, it was considered appropriate in a number of enforcement workshops where officers identified they review records infrequently.

It has also been identified that where an Authorised Officer may not wish to enter the vehicle cabin, they may seek the transcribing of Driver records from the on-screen display to a WWD form by the Driver so the Authorised Officer can examine the Driver records. This approach has a number of potential variations which would be determined during the implementation phase as it can be customised to specific jurisdiction and enforcement requirements.

9.3 UNRESOLVED ISSUE 2 – IS GNSS REQUIRED FOR THE AUTOMATIC CAPTURE AND POPULATION OF RECORDS AS WELL AS TO CONTINUOUSLY CAPTURE POSITION RECORDS?

GNSS provides an important safeguard to the integrity of an EWD when aggregated with tethering and tamper monitoring. GNSS provides the important element of location, inherent in all Stage 2 telematics systems, which delivers the situational information required to assess work and rest declarations.

9.3.1 HEAVY VEHICLE NATIONAL LAW

While the legislation is silent on GNSS it does not preclude the use of GNSS.

9.3.2 THE NTC POLICY

The NTC Policy allows for automatic capture of time and location information for the EWD. The NTC Policy recommends that GNSS be used for speed monitoring.

9.3.3 AUSTROADS REPORT

The Austroads Report required that the EWD contain the automatic capture of time and location information from a GNSS receiver and use this information as part of a Driver's declarations. It also recommends that, in between Driver declarations, periodic capture of time and location will occur to corroborate the Driver's declaration and the secure operation of the EWD.

9.3.4 THE PILOT

The Pilot has identified the importance of GNSS to the integrity of an EWD.

GNSS provides the automatic population of location for work and rest declarations which can reduce the data entry obligations on a Driver through automatic capture of location rather than requiring the Driver to make location declarations while also ensuring the integrity of work and rest declarations by indicating the status of a vehicle's activity in relation to a Driver declaration.

The Driver is able to review GNSS data and where they consider it incorrect record the correct location or time. Original GNSS and Driver declared records are both stored on the EWD.

GNSS is commonly found in commercially available in-vehicle telematics and is considered a foundation feature of most systems which automatically record time and position/location on a periodic basis.

9.3.5 CONCLUSIONS

GNSS is a required feature of an EWD. GNSS will automatically capture location and time information and populate records for the purposes of Driver declarations and continuously provide validation. It is noted that the Driver will be able to review and make annotations.

9 FIVE UNRESOLVED ISSUES AND ELEVEN QUESTIONS

9.4 UNRESOLVED ISSUE 3 – DOES THE IVU NEED TO BE TETHERED TO THE VEHICLE?

Tethering of the IVU to the vehicle provides an important safeguard to the integrity of an EWD that, when aggregated with GNSS and tamper monitoring, ensures the EWD is at least as good as the WWD.

9.4.1 HEAVY VEHICLE NATIONAL LAW

While the legislation is silent on tethering, the legislative provision relies on evidentiary quality information to support its enforceability.

9.4.2 THE NTC POLICY

While the NTC Policy does not indicate if tethering is required it identifies the following three positions:

1. EWDs should assure the integrity of Driver declarations to at least a standard that is offered by the WWD
2. Electronic work diaries should be designed to maximise the ability for Driver declarations to be used as credible evidence
3. The use of electronic work diaries should provide a highly reliable and robust environment for Driver record keeping.

The NTC Policy states that “requiring an EWD to be tethered – particularly physically tethered – to a vehicle greatly limits the ability of the EWD to record non-driving work, and may lead to the unnecessary and undesirable failure to properly record non-driving activity.”

9.4.3 AUSTROADS REPORT

The Austroads Report required that the recording component of the EWD system is tethered to the vehicle. It also required that equipment must be fitted in accordance with vehicle manufacturer’s requirements and Australian Design Rules. This requirement is not expected to change.

Tethering, along with other elements including GNSS and tamper monitoring, supports a whole-of-system approach for EWD security.

Tethering may be electronic which is important for mobile devices which are an emerging technology for commercial in-vehicle telematics. Innovation is a critical element of the EWD. There are mobile devices in use within IAP such as Self Declaration Input Devices which are electronically tethered to an IVU.

9.4.4 THE PILOT

EWDs should be tethered to the vehicle either physically or electronically. A performance-based approach should be taken to allow the telematics industry to meet the requirement in an innovative and flexible manner.

All except one of the devices tested during Stage 1 of the Pilot incorporated some form of physical or electronic tethering of the IVU to the vehicle. As this system also did not have GNSS and provided little data integrity it was not included in Stage 2 of the Pilot.

It was identified that physical tethering could be achieved for as little as \$15 using tamper evidence screws to attach the IVU to the vehicle. It was also identified that electronic tethering of an IVU was achievable through wireless communications, subject to the telematics industry making a commercial decision to implement in this manner.

9.4.5 CONCLUSIONS

Tethering the IVU supports the integrity of data generated by the EWD by providing an association between a particular heavy vehicle and the location recorded by the GNSS.

This association allows the GNSS data to support the Driver's declarations because the location recorded by the unit should represent the movement of the truck, making false declarations of rest easily identifiable.

Tethering also restricts the places where tampering may occur with the IVU which will increase the overall security of an EWD.

Tethering is a requirement of the IAP and On Board Mass Functional and Technical Specifications, and EWDs commissioned in Stage 2 of the Pilot have tethering (the majority of Stage 1 IVUs also had tethering).

Based on experience to date in the Pilot it is not expected that tethering will significantly increase the cost of an EWD, with physical tethering being a low cost option. Electronic tethering of an EWD can include tethering by interfacing with equipment on a heavy vehicle and this may also provide other data and benefits and is allowed under the EWD Specification to meet current and future policy requirements.

9.5 UNRESOLVED ISSUE 4 – IS TAMPER MONITORING REQUIRED?

Tamper monitoring of the IVU to the vehicle provides an important safeguard to the integrity of an EWD that, when aggregated with GNSS and tethering, ensures the EWD is at least as good as the WWD.

9.5.1 HEAVY VEHICLE NATIONAL LAW

The legislation does not explicitly require tamper monitoring technology, however it contains a number of provisions that support the practical need for tamper monitoring technology to give effect to the law, for example the legislation requires that:

1. An EWD “has a mechanism that readily indicates to the Driver of the vehicle that the system is, or is not, properly functioning.”
2. Tampering with an EWD is prohibited and a Record Keeper must ensure that a Driver does not tamper with an EWD.
3. Tampering which is reasonably suspected must be reported.

9.5.2 THE NTC POLICY

The NTC Policy does not explicitly require tamper monitoring but requires the electronic system to ‘work’ and provide an indication of its operational state to the Driver. The NTC Policy identifies that data integrity is necessary to ensure EWD data is complete and unaltered.

As with tethering, The NTC Policy identifies the following three positions:

1. EWDs should assure the integrity of Driver declarations to at least that as is offered by the WWD
2. EWDs should be designed to maximise the ability for Driver declarations to be used as credible evidence
3. The use of EWDs should provide a highly reliable and robust environment for Driver record keeping.

9

FIVE UNRESOLVED ISSUES AND ELEVEN QUESTIONS

9.5.3 AUSTROADS REPORT

The Austroads Report recommended that tamper monitoring be included in an EWD.

The purpose of tamper monitoring within the EWD Specification is to identify when an EWD is not performing as expected, enabling action to restore data integrity within a reasonable time frame if required.

9.5.4 THE PILOT

With the WWD, tampering is detected through the physical inspection of a WWD for any unauthorised changes (for example, crossing out records with a pen or removing pages). With an EWD, tampering with hardware or software cannot be readily detected to the same level currently available with a WWD in the absence of specific tamper monitoring technology.

Tamper monitoring has been identified as an important commercial element and it has been identified that tamper monitoring include a means of notifying the Driver if the system is malfunctioning.

The Pilot identified the minimum requirements for tamper monitoring.

9.5.5 CONCLUSIONS

Regulatory telematics applications have demonstrated that physical and electronic tamper monitoring is feasible. Tamper monitoring is a feature of the IAP and On Board Mass and of systems commissioned for Stage 2 of the Pilot. While Transport Operators also have an interest in data integrity, the use of the data and the transport industry's level of risk may be different to that of the Regulator and Authorities.

Most commercial telematics systems have some form of tamper monitoring and it is expected that the cost to take that to a regulatory standard will be incremental.

The Threat and Risk Analysis identified two areas of risk requiring tamper monitoring:

- At the point of data collection in the IVU
- After data transmission to the back office.

The Threat and Risk Analysis found that regulators have a tolerance for 'one-off' issues with data integrity but would not accept systemic failures or repeated tampering.

Authorities identified they were prepared to accept a period of time where accurate records may not be available. Seven working days is considered the maximum period acceptable to Authorities for unavailability of records and to achieve this, tamper monitoring is important.

It is also noted that recent widely reported incidents of tampering with heavy vehicle speed limiters highlight the importance of tamper monitoring for the EWD.

As a result, the Pilot has identified the minimum requirements for tamper monitoring.

9.6 UNRESOLVED ISSUE 5 – WHAT IS THE TIME RESOLUTION FOR DISPLAY TO DRIVERS AND SUBSEQUENT REPORTING, ONE MINUTE OR ONE SECOND?

9.6.1 HEAVY VEHICLE NATIONAL LAW

The legislation requires counting of time in 15 minute increments.

9.6.2 THE NTC POLICY

The NTC Policy supports the time resolution for display to Drivers and subsequent reporting to be one minute. The policy recommends that the time of a Driver's declaration be recorded accurately with recording to at least a minute.

With widespread support for the use of accurate time counting and a consistent sanction policy for addressing small breaches, providing improved safety outcomes is important with respect to counting time.

9.6.3 AUSTRROADS REPORT

The Austroads Report recommended that the time of a Driver's declaration be recorded by the IVU to a one second resolution which is consistent with commercial telematics capabilities. This allows policy for time display to be set independently and meets the NTC Policy Paper recommendation of at least a minute.

9.6.4 THE PILOT

IVUs collect information in small increments, usually in at least one second intervals and this is common to telematics systems utilising GNSS. This provides the flexibility for Authorities to determine how they would like to use the data without being restricted by technical limitations.

The capture of information in one second increments also provides the ability to validate time and position data to support Driver declarations.

Industry raised concerns in the Pilot with the implications of minor breaches on sanctions rather than the frequency of data capture. Authorities in the Pilot believe time display increments of a minute are sufficient.

9.6.5 CONCLUSIONS

There are two conclusions which have been determined in the Pilot in relation to the counting of time:

1. The capture of information by an IVU is to be in one second increments
2. The display of information is to be in one minute increments.

9 FIVE UNRESOLVED ISSUES AND ELEVEN QUESTIONS

9.7 ELEVEN QUESTIONS

The Eleven Questions have been answered throughout this report. Table 20 provides a summary of the findings in relation to these Questions.

Table 20: Summary of Questions

ID	UNRESOLVED ISSUES	FINDING
Q 1	Is an EWD feasible and under what operational environment?	An EWD is feasible and this report details the operational environment.
Q 2	Is heavy vehicle speed monitoring feasible and if so under what operational environment?	Heavy vehicle speed monitoring is feasible and deployed as part of existing regulatory applications – the IAP and ISC and proposed commercial programs (ISM).
Q 3	How will jurisdictions apply EWD and heavy vehicle speed monitoring?	The EWD Specification, together with the operating environment and legislation, will enable an EWD to be applied for purposes including: <ul style="list-style-type: none"> • As an alternative to the WWD • Within the terms of a Supervisory Intervention Order • To support other compliance models and concessions such as AFM, BFM or NHVAS.
Q 4	How effective are EWD and heavy vehicle speed monitoring systems in reporting operator and Driver compliance with regulations?	EWDs are effective in reporting Driver compliance with regulations. CAS, developed as part of the Pilot has proven an effective tool in reporting compliance with regulations. Enabled through the RCAF, CAS has also supported a range of applications in the Pilot, including a back office audit application, SMS and iPhone applications that work under a variety of communications conditions.
Q 5	How effective are EWD and heavy vehicle speed monitoring systems in improving operator and Driver compliance with regulations?	Where industry actively uses data from a fatigue management system or heavy vehicle speed monitoring system they have reported improved fatigue and speed compliance in the Pilot. Driver information is required under the EWD Specification and is a key enabler for improving Driver compliance. The Pilot findings indicate that compliance can be improved using an EWD.

ID	UNRESOLVED ISSUES	FINDING
Q 6	How will a back office audit of the Record Keeper's records be conducted?	<p>A version of CAS has been developed to enable the review of multiple Driver records held by an Operator.</p> <p>The Record Keeper is required to hold EWD Records and make them available in a defined format. Back office audits are conducted in the same manner as they are with a WWD, where the audit is conducted at the Record Keeper.</p>
Q 7	What are the experiences of all the stakeholders of the human-machine interface and institutional arrangements?	The Pilot has produced a HMI Guideline. The EWD Specification reflects the HMI Guideline in a performance based manner accommodating the competitive differences of commercial systems without compromising the needs of the Authorised Officer, in particular for roadside enforcement using on-screen display.
Q 8	Who can perform the roles of EWD / Speed Monitoring Provider and who should perform the roles of the EWD System Manager and DRD Issuer?	<p>EWD-SP:</p> <p>EWD-SP can be anyone who meets the two key requirements:</p> <ul style="list-style-type: none"> • The functional and technical requirements to be an EWD-SP defined in the EWD Specification; and • The probity, commercial and regulatory requirements. <p>DRD Issuer</p> <p>DRD Issuer is required should there be a deployment of the optional DRD.</p> <p>There are a variety of new functions that are required for the use of an EWD as a regulatory tool. The allocation of these roles to entities is recommended to occur as follows:</p> <ul style="list-style-type: none"> • EWD Regulatory Framework Owner – NHVR • EWD System Manager – TCA.
Q 9	What further refinement is required for the EWD Functional and Technical Specification and the HVDF legislation to accommodate the electronic environment?	This report contains a summary of the significant amendments to the EWD Specification.
Q 10	To what extent do EWDs decrease fatigue incidents in the freight industry?	EWDs have demonstrated they can decrease fatigue incidents in the freight industry by providing Drivers and Transport Operators with the information they need to reduce fatigue breaches that in turn results in reduced incidents.
Q 11	To what extent do heavy vehicle speed monitoring devices decrease the incidence of speeding?	Heavy vehicle speed monitoring is effective in decreasing the incidence of speeding and heavy vehicle speed monitoring is available under the IAP as part of the access application and now independently under Intelligent Speed Compliance (ISC).

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11 GLOSSARY OF TERMS AND ACRONYMS

TERMS AND ACRONYMS	
AFM	Advanced Fatigue Management
Authority	Police and state road transport authorities
Authorised Officer	A person who holds officer under the law as an authorised officer
Australian Design Rules	National standards for vehicle safety, anti-theft and emissions
BFM	Basic Fatigue Management
CAS	Compliance Assessment Software
COAG	Council of Australian Governments
CRS	Centre for Road Safety
DRD	Driver Recording Device
DRD Issuer	The entity responsible for the issuing process of a DRD to a Driver
Driver	The driver of a heavy vehicle applicable under law to maintain a work diary
EWD	Electronic Work Diary(ies)
EWD Quality System	The EWD-SP's systems and processes detailed within the EWD Specification
EWD Registry	A registry of Drivers using an EWD including identification of the EWD-SP where the Driver's EWD Records are located
EWD Regulatory Framework Owner	The entity responsible for managing legislation and policy implementation governing the EWD
EWD-SP	EWD Service Provider
EWD-SP System	EWD-SP System (ie their back office)
EWD System Manager	The entity responsible for the certification, re-certification and audit of EWD-SPs and type approval of In-Vehicle Units
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HVNL	Heavy Vehicle National Law
IAP	Intelligent Access Program
IDA	Identification and Authentication
Interactive Voice Response	Technology that allows a computer to respond to people through voice recognition
ISC	Intelligent Speed Compliance
ISM	Intelligent Speed Management

11 GLOSSARY OF TERMS AND ACRONYMS

TERMS AND ACRONYMS	
IVU	In-Vehicle Unit
MAC	Message Authentication Code
MUARC	Monash University Accident Research Centre
NeAF	National electronic Authentication Framework
NHVR	National Heavy Vehicle Regulator
NTC	National Transport Commission
PKI	Public Key Infrastructure
Position Record	An EWD Record that includes the GPS coordinates of the heavy vehicle
Questions	The questions which formed part of the Pilot scope as detailed in section 9
RCAF	Remote Connection Access Framework
Record Keeper	As defined in the HVNL
Regulator	The NHVR
RMS	Roads and Maritime Services
SCOTI	Standing Council on Transport and Infrastructure
SIO	Supervisory Intervention Order
SMVU	Survey of Motor Vehicle User
SSL	Secure Sockets Layer
TCA	Transport Certification Australia
TISOC	Transport and Infrastructure Senior Officials Committee
Transport Operator	The person who responsible for controlling or directing the use of a heavy vehicle
UI	User Interface
Unresolved Issues	The unresolved issues described within the Austroads Report and detailed within section 9
WWD	Written Work Diary
XML	Extensible Mark-up Language



