Developing technology-neutral road rules for driver distraction

November 2020

Decision regulation impact statement

National Transport Commission

Report outline

Title	Developing technology-neutral road rules for driver distraction
Type of report	Decision regulation impact statement
Purpose	For approval by the ITMM, November 2020
Abstract	The Australian Road Rules relating to driver distraction that regulate the use of specific technology devices are becoming quickly outdated. In this decision RIS, the NTC assessed four options to compare the current technology-based road rules with different technology-neutral approaches for regulating driver distraction, proposing a hybrid option to address the problem. This option is expected to provide the highest road safety benefits in terms of reducing the number of distraction-associated road crashes.
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Foreword

Since 1999 the Australian Road Rules relating to driver distraction have been the basis for regulatory instruments used by states and territories to deter unsafe driver engagement with secondary tasks while driving. The rules relating to driver distraction were drafted at a time when texting and calling were the most common features on a mobile phone.

The widespread adoption of smartphones, as well as wireless communication, entertainment and information systems, has increased the risk of distracted driving. The ambiguity of the current rules regarding modern technology makes it difficult for the public and enforcement agencies to identify the behaviours that could result in distraction, reducing the road rules' safety benefits.

The National Transport Commission (NTC) reviewed the Australian Road Rules relating to driver distraction and found that they are becoming quickly outdated. These rules only regulate distraction from the use of specific technology devices: mobile phones and visual display units. This means that the road rules are unlikely to capture the full range of communication and entertainment functionalities being used by drivers.

The NTC consulted with the public, academia, industry and government stakeholders in identifying the key issues and developing regulatory options that would provide clarity to road users about unsafe driver behaviour and interactions with technology.

The recommendations set out in this decision RIS are designed to provide decision-makers with a new technology-neutral regulatory approach for driver distraction. We expect that this new approach will futureproof the road rules and capture a broader range of unsafe driver interactions.

This document also proposes complementary initiatives to support achieving the overall policy objective of this project and to enhance the effectiveness of the resulting legislative change.

Should Infrastructure and Transport Ministers endorse the proposed policy, the task will be to work closely with all levels of government to implement these recommendations.

We would like to sincerely thank our stakeholders who took part in this project. With their ongoing interest and support we can ensure that the original safety and productivity objectives of the Australian Road Rules continue to be realised for the benefit of all Australians.

Mandi Mees
Executive Leader Safety

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Chief Executive Officer and Commissioner

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Executive summary

Distraction is nationally recognised as a critical road safety risk that needs to be addressed effectively. In May 2018 the Transport and Infrastructure Council endorsed a business case highlighting that the Australian Road Rules relating to driver distraction only regulate the use of particular devices and are quickly becoming outdated.

The National Transport Commission (NTC) has prepared this decision regulation impact statement (RIS) to assess technology-neutral regulatory options for addressing driver distraction. A qualitative assessment of costs and benefits was undertaken, supported by indicative estimates, where appropriate, to inform the proposed policy recommendations to decision-makers. This decision RIS considered status quo, prescriptive, performance-based and hybrid options, and:

- assessed how the different options address the problem
- assessed the impacts of policy options on industry, governments and the community
- arrived at a conclusion on the most effective solution to the identified problem.

Proposed policy

Following the analysis of the four policy options through a qualitative cost-benefit assessment, the NTC recommends option 4: 'hybrid' for developing technology-neutral road rules to regulate driver distraction. This option employs a combined prescriptive and performance-based approach to provide:

- a clear list of permitted and prohibited interactions with four distinct categories of technology based on high-risk interactions and behaviours as identified by research
- a performance-based component to address any source of distraction that could impair a driver's proper control of the vehicle and clear view of the road and traffic.

The recommended hybrid option results in an overall benefit relative to the status quo, with the likely improvement in safety risk reduction significantly exceeding any potential increase in compliance costs. The NTC expects this option to provide the highest road safety benefits in terms of reducing the number of distraction-associated road crashes.

The proposed policy seeks to provide an approach that addresses all sources of distraction and is not limited to interactions with technology. It requires that drivers and riders must ensure safe execution of non-driving-related tasks.

If the Transport and Infrastructure Council endorses the proposed policy, the NTC would work with the Parliamentary Counsel's Office throughout the legislative drafting process. We would also engage with states and territories during the drafting process to ensure the draft legislation reflects the agreed policy.

The NTC notes that there are some differences in existing state and territory legislation closely associated with the proposed policy in this decision RIS. This may affect the adoption of the amendments to the model law resulting from this proposal. This means that some states and territories may be required to consider this in their enactment of such changes.

Prescriptive component

The prescriptive element of the proposed policy aligns with overarching principles seeking to provide a consistent approach across different technologies drivers use, focusing on the specific interactions found by research to result in a high risk of crashing. These principles are:

- Prescriptive rules must encourage safer road use.
- All interactions with technology would be subject to the requirement of the driver having proper control.
- Prescriptive rules need to be easy to understand and avoid unnecessary complexity.
- Prescriptive rules should apply to technology found by research to result in a high road safety risk associated with driver distraction.
- Prescriptive rules should apply to device interactions and functionalities known to result in a high risk of crash.
- Prescriptive rules should be enforceable.

The approach for the prescriptive component of the proposed policy focuses on technology with capabilities that enable drivers to use functionalities that have been found to increase crash risk such as voice phone calls and interactive media (browsing the internet, texting, taking photos and other applications). These functionalities require a device that can support wireless communication, retrieve electronic data and can present such data on some type of display or as a projection.

Under this approach, technology devices are classified into three broad groups or categories. These categories are:

- inbuilt and mounted devices and motorcycle helmet technology
- wearables
- portable devices.

Given the similarities in the way these devices are used and for the purpose of minimising complexity, the proposed policy incorporates two sets of permitted and prohibited interactions and one set of prohibitions under this proposal.

One set applies to inbuilt and mounted devices and motorcycle helmet technology. For these devices, the proposed policy seeks to discourage driver use of technology functions not related to the operation of the vehicle, the professional driving task, navigation, audio-based functionalities and voice-based communications. However, this does not preclude the use of voice commands and the minimal use of a finger to operate a permitted function of the device. It consists of a broad prohibition to use technology (while the vehicle is moving or stationary but not parked), with lower risk interactions permitted by exception. It also prohibits entering text (and/or numbers) and scrolling when using permitted functions.

The second set applies to wearable devices and also imposes a broad prohibition to use devices, with only two lower risk interactions permitted by exception. This approach prohibits touching the device to operate it and only permits audio-based functionalities (voice calls and audio files) to be visible in the screen while the device is operating. However, this does not preclude the use of voice commands to operate the device, provided only permitted functions are visible to the driver. This component of the proposal acknowledges that the risks from using wearables while driving sit somewhere between the risks associated to inbuilt, mounted and motorcycle helmet technology and those from portable devices.

The third, and more stringent approach, applies to portable devices. Research is consistent and conclusive on the high risks from drivers reaching for and using non-mounted electronic devices. In consequence, the proposal prohibits drivers from touching the device and having the display visible to the driver while it is operating. However, this does not preclude the use of voice commands to activate, deactivate, or initiate a function of the device if the display is not visible to the driver while operating.

The proposed permitted and prohibited interactions are a result of adopting a technology-neutral approach – that is, ensuring that those visual and visual–manual interactions found to significantly increase crash risk are not permitted. The permitted and prohibited interactions are provided in Appendix C and section 3.4 of this decision RIS.

Performance-based component

The recommended hybrid option also includes a performance-based approach for addressing sources of driver distraction that are difficult to regulate by prescriptive rules. The performance-based component consists of including the current offences in sub-rules 297(1) and 297(2).

These performance-based rules provide a tool to address both the observable driver and vehicle behaviours that cause and/or indicate the driver's lack of control of a vehicle. In addition, the offences in rules 297(1A) and (3) would be maintained to address circumstances in which animals and passengers can impair a driver's control of the vehicle.

Further detail on road rule 297 is provided in subsection 3.1.2 of this decision RIS.

Restrictions and relaxations

The proposed policy would result, in a few cases, in more restrictive regulation for certain interactions with devices compared with the current road rules. For example, under this proposal, entering text (such as words, sentences and numerical sequences) while the vehicle is moving or stationary (but not parked) with any type of mounted, inbuilt and worn device would be prohibited regardless of the functionality. This would apply to devices currently exempt from this type of restriction, such as inbuilt and mounted dispatch systems (and other devices used as part of the professional driving task), as well as inbuilt and mounted navigation systems. In-vehicle information systems would also be subject to this restriction.

In addition, the current exemption permitting drivers to hold a non-mounted device if they are in the process of giving the body of the device to a passenger would not be maintained. Under this option, drivers would be prohibited from holding a non-mounted device to give it to a passenger.

In contrast, the proposed policy would also introduce a few relaxations. Drivers would be permitted to touch, tap or push a button to operate permitted functionalities in mounted (and inbuilt) devices, including mounted mobile phones. This means that ridesharing and delivery drivers would be able to lawfully accept ride requests and jobs from an app in their mounted smartphones while their vehicle is moving or stationary.

In addition, using wearable and portable devices for a tap-and-go payment in a drive-through would be permitted when the vehicle is stationary. The proposed policy would also permit drivers to use voice controls to perform any permitted function. The NTC considers that prohibitions on using voice controls would be impossible to enforce and the voice-based interactions associated with the highest crash risks would be better addressed through the restriction to what can be visible to the driver on the device's display (i.e. prohibiting to have text messages or emails on a display visible to the driver).

Appendix C sets out the elements of this policy proposal.

Further detail about the hybrid option is also provided in section 3.4 of this decision RIS.

Next steps

Should the Infrastructure and Transport Ministers endorse the regulatory approach proposed in the recommended hybrid option (Recommendation 1) and the complementary initiatives, the NTC would release this decision RIS to the public and start work on drafting the required amendments to the Australian Road Rules.

The proposed policy would frame the drafting of the changes to the Australian Road Rules. The Parliamentary Counsel's Office would be responsible for drafting and publishing the subsequent amendments to the Australian Road Rules. The NTC would work with the Office of Parliamentary Counsel throughout the legislative drafting process. We would also engage with states and territories to ensure the draft legislation accurately reflects the agreed policy.

The NTC has scheduled the drafting of those amendments to be finalised by early-2021. The draft amendments are scheduled to be presented to Infrastructure and Transport Ministers in May 2021 for consideration.

Complementary initiatives

The NTC has also identified five initiatives across the transport system that could support achieving the overall policy objective of this project and enhance the effectiveness of the proposed legislative change. These initiatives address four key issues that the NTC considers essential for supporting implementation of the proposed legislative change.

These issues are:

- evidence base for driver distraction at the national level
- consistent message on driver distraction and legislative reform
- a driver distraction rating system for in-vehicle human–machine interface of new vehicles
- technologies to support enforcement.

Recommendations

1 Context

Key points

- The objective of the project is to investigate if there is a better way to regulate the safe use of technology devices as part of the road rules.
- This decision regulation impact statement assesses technology-neutral regulatory options for addressing driver distraction, analyses their potential impacts, presents an evidence base to decision-makers and recommends a preferred option.

1.1 Background

Distraction is nationally recognised as a critical road safety risk that needs addressing. Each Australian state and territory has undertaken their own programs with a focus on regulating and educating drivers about the rules regarding mobile phone use.

In May 2018 the Transport and Infrastructure Council directed the National Transport Commission (NTC) to review the Australian Road Rules that regulate driver distraction and to determine whether they sufficiently address the key factors that cause it. The NTC's review determined that these rules only regulate the use of particular technology devices and are becoming quickly outdated.

To respond, the NTC has developed a proposed policy to reduce the road crash risk associated with driver distraction to inform amendments to the Australian Road Rules that aim to provide better outcomes for road users regardless of the technology used. The policy is designed to manage the distraction risks posed by technology while encouraging innovation and ensuring technology that has the potential to improve safety is not constrained.

1.1.1 Linkages and related projects

Queensland's Department of Transport and Main Roads project on distraction

Since October 2017 Queensland's Department of Transport and Main Roads (TMR) has led a national driver distraction research project. Stage 1 of the project (now completed) comprised reviewing and analysing international literature and local data, engaging with leading academic researchers and consulting with drivers who admit to illegal mobile phone use to provide further insights about distraction. The project found that driver distraction results from a driver's internal risk and reward assessment, which is then reinforced through a wide range of elements across the transport system.

Stage 2 of the project is ongoing and seeks to generate active involvement and collective responsibility from the stakeholder groups for generating technology-based solutions. TMR brought these stakeholders together at the National Summit on Driver Distraction in July 2019. The summit participants highlighted the role of the Australian Road Rules in defining what is and what is not acceptable regarding the use of technological devices while driving. Participants also agreed that the current road rules have not kept pace with technological developments and can be confusing for road users.

At the summit, participants took part in discussions along five strategic areas (designing for safer interaction, mapping out the adoption of in-vehicle distraction mitigation technology, recognising vehicles as a workplace, encouraging greater compliance through enforcement and changing driver behaviour). Participants identified potential initiatives under these strategic areas and plotted potential timeframes and key milestones.

TMR has also engaged the market by requesting submissions to a request-for-information process to investigate the feasibility of technology-based solutions to address driver distraction. This process confirmed there is a competitive marketplace offering software, sensory and enforcement-based solutions.

The outcomes of the summit discussions and the market engagement process informed the *National Roadmap for Driver Distraction*, a proposal to implement five overarching strategies was presented to the Transport and Infrastructure Council in June 2020. The Council endorsed the roadmap for inclusion on its forward work program.

The National Roadmap outlines a range of solutions to reduce road trauma resulting from mobile phone distraction, including the NTC-led initiative to amend the road rules. TMR and the Office for Road Safety will work with jurisdictions to develop a suitable governance framework to implement initiatives, avoid duplication and facilitate information sharing.

Establishing a fully-fledged driver distraction rating system for the in-vehicle human–machine interface of new vehicles coming onto the Australian market

In 2018 the Victorian Department of Transport commissioned a study to develop and determine how to develop and implement a test protocol for rating the distraction potential of new vehicles entering the Australian market (stage one). A range of methods were employed to assess those attributes of human–machine interface (HMI) design that should be rated, methods of rating distraction and how to develop a distraction rating.

The Department of Transport also undertook a safety rating assessment program review and a cost-benefit analysis of introducing a distraction rating. Eight options for introducing a distraction safety rating as a consumer or Australasian New Car Assessment Program (ANCAP) distraction rating were developed as part of the project. Each option builds on the previous, starting with developing voluntary guidelines for an ANCAP distraction rating to be incorporated in the overall vehicle safety rating. The project estimated that the benefits of introducing a highly effective distraction rating system include road crash savings of approximately $28 per ‘improved/low distraction’ vehicle per year.

A proof-of-concept study (stage two) funded by the Federation Internationale de L’Automobile (International Automobile Federation), the Australian Automobile Association (AAA) and the Victorian Department of Transport is ongoing. It will employ the distraction safety rating system to rate the distraction potential of a small number of new Australian vehicles. This study is required to determine the efficacy of the proposed distraction testing and whether a distraction rating can be computed.

If the proof-of-concept study proves successful, stage three would involve a much larger study to test the proposed distraction testing protocol with a larger range of vehicles available in the Australian market.

NSW Government’s mobile phone detection camera program

The NSW Government successfully conducted a world-first six-month pilot program to test detection camera technology to target illegal use of mobile phones among drivers. The pilot

checked 8.5 million vehicles and found more than 100,000 drivers using their phones illegally (Transport for NSW, 2020).

Independent modelling suggests that this technology could prevent around 100 fatal and serious injury crashes over five years (Transport for NSW, 2020). A survey on community views on the pilot found that 80 per cent of people surveyed support the use of the mobile phone detection cameras (Transport for NSW, 2020).

Following the successful pilot, the NSW Government rolled out the mobile phone detection camera program in late 2019. The program began operating on 1 December 2019, with warning letters being issued for the first three months. Enforcement of illegal phone use detected by the mobile phone detection cameras commenced on 1 March 2020.

The program includes fixed cameras and relocatable trailer-mounted versions of the technology. The mobile phone detection camera program will be supported by a comprehensive road safety campaign including online information and public education.

The program started in late 2019 and will progressively expand to perform 135 million vehicle checks annually by 2023.

1.1.2 International driver distraction regulation

Countries around the world are taking measures to address distracted driving. In some countries, general laws relating to safe driving are applicable to driver distraction. The issues paper published in December 2018 discussed how other countries have adopted specific legislation to address different sources of driver distraction, especially the use of mobile phones.

The NTC found that different countries implement a broad range of approaches. The examples in the issues paper showed a lack of consistency in approaches to regulate driver distraction. This inconsistency was also observed within countries, with states or provinces adopting different approaches.

Of these approaches, only one case could be considered device- or technology-neutral regulation. In 2017 the Washington State Legislature (US) passed the *Driving Under the Influence of Electronics Act* (Washington State Legislature, 2017). This Act outlaws all use of handheld electronic devices behind the wheel (Revised Code of Washington, 2019). Drivers are not allowed call, text, watch video, compose or read any kind of message, social media post, photograph or data, even when stopped at a red light or stop sign. In addition, this law makes smoking, eating, drinking, reading, grooming, or any other activity that causes a driver to be distracted, a secondary offence.

While this law provides an example of modern legislation that seeks to keep pace with technological development, it focuses exclusively on the use of portable or nomadic devices. The Washington State law does not regulate the use of in-vehicle information systems, which allow drivers to use and access information from smartphones through the vehicle's controls.

1.2 Approach

1.2.1 Project approach

The NTC uses a standard project management methodology. A summary of this is contained in NTC's work program for 2017–21 (National Transport Commission, 2017b). The

deliverables are an issues paper for public consultation, a consultation regulation impact statement (RIS) for public consultation, a decision RIS for targeted consultation and a final report with recommendations to the Transport and Infrastructure Council.

The NTC has prepared this decision RIS to assess technology-neutral regulatory options for addressing driver distraction, analyse their potential impacts and present an evidence base for deciding on a preferred option.

A qualitative assessment of costs and benefits, supported by indicative estimates where appropriate, was used to inform recommendations to decision-makers. The rationale for this approach is proved in section 4.1 of this document. The assessment in this decision RIS considered:

- how the different options address the problem of driver distraction
- the feasibility of the technology-neutral regulatory options to mitigate the safety risks associated with distraction
- the impacts of policy options on industry, governments and the community
- the most cost-effective solution to the identified problem.

1.2.2 Project scope

The project scope includes:

- reviewing road rule 297 (the driver to have proper control of the vehicle), road rule 299 (television receivers and visual display units in motor vehicles) and road rule 300 (use of mobile phones)
- researching driver distraction and its road safety implications – this includes a literature review as well as engaging with states, territories and experts to build on existing work on the sources of distraction
- identifying international driver distraction regulations and related guidelines or performance measures, and their potential application in Australia
- identifying potential issues relating to enforcing the proposed regulatory framework and any other limitations, and the regulations that may need to be changed to enforce new rules.

1.2.3 Project inputs

National workshop on driver distraction

In November 2018 the NTC held a national workshop on driver distraction with a broad range of stakeholders across the transport system. Attendees included state and territory governments, police, academics, vehicle manufacturer representatives, motoring clubs, the heavy vehicle industry representatives and technology providers.

The workshop provided stakeholders with the opportunity to provide their views regarding the key issues that should be considered in the review of the current Australian Road Rules and development of potential regulatory options. Those views informed the issues paper released in December 2018 as well as the options considered in this decision RIS.

National Driver Distraction Working Group

The project team established the National Driver Distraction Working Group to share knowledge among government and industry partners working to reduce driver distraction in Australia. The working group also supports the NTC in researching driver distraction and its

road safety implications, providing feedback and testing the proposed regulatory options discussed in this document.

The working group membership includes representatives from:

- road and transport agencies and police from states and territories
- Austroads
- the Federal Chamber of Automotive Industries and vehicle manufacturers
- the heavy vehicle and commercial passenger industry
- the Australian Automotive Association
- the Traffic Accident Commission (Victoria)
- the Royal Automobile Club of Victoria
- academics and experts specialising in driver distraction
- the Australian Road Research Board
- the Australian Government's Office of Road Safety.

Literature review

The NTC commissioned the Australian Road Research Board to undertake an international literature review of the best research available to date on driver distraction. The literature review is available on **the NTC website** and includes research findings on:

- distraction's impacts on driving performance
- crash risks associated to driver distraction
- the physiological symptoms and presentations of driver distraction
- guidelines for in-vehicle technologies developed to reduce negative impacts on driver performance.

Public consultation

The final proposals in this decision RIS were developed through a transparent consultative process. The NTC drew on the knowledge and experience of stakeholders to develop the recommended approach to regulate driver distraction.

Prior to deciding on a recommended approach, the NTC sought stakeholder views through two formal public submission processes. In addition to these processes, we also engaged with a broad range of stakeholders and experts including industry representatives and international academics and government representatives.

1.2.4 Project milestones

1. Issues paper

The first step was publishing an **issues paper**, with an invitation to interested bodies and others to provide their input. This paper provided a definition of the problem and outlined the key issues that required further analysis to establish the appropriate case for action for the project. This paper was released for public consultation on 11 December 2018.

The public consultation period ended on 14 February 2019. The NTC received submissions from road safety agencies, police, industry, academia and community. Their feedback on the

issues identified in the paper informed development of the proposed regulatory options discussed in this document.

2. Consultation RIS

A RIS is required for all government decisions that are likely to have a measurable impact on businesses, community organisations or individuals. The Office of Best Practice Regulation (OBPR) advised the NTC that a Council of Australian Governments (COAG) RIS is required ahead of a Transport and Infrastructure Council's decision on the appropriate form of regulation for driver distraction.

The consultation RIS analysed the potential impacts of new regulatory options and presents an evidence base for deciding on a recommended option. This process gathered evidence and facilitated consultation with stakeholders and the community. Multi-criteria and benefit threshold testing was used in presenting results and informing recommendations to decision-makers. This multi-criteria analysis approach is consistent with the OBPR's cost-benefit analysis guidelines (OBPR, 2007). The OBPR assessed the consultation RIS as compliant on 19 June 2019.

This paper was released for public consultation on 27 June 2019. The consultation period ended on 4 September 2019, resulting in submissions from a broad range of stakeholders. Their feedback allowed us to further develop the proposed regulatory options discussed in this document.

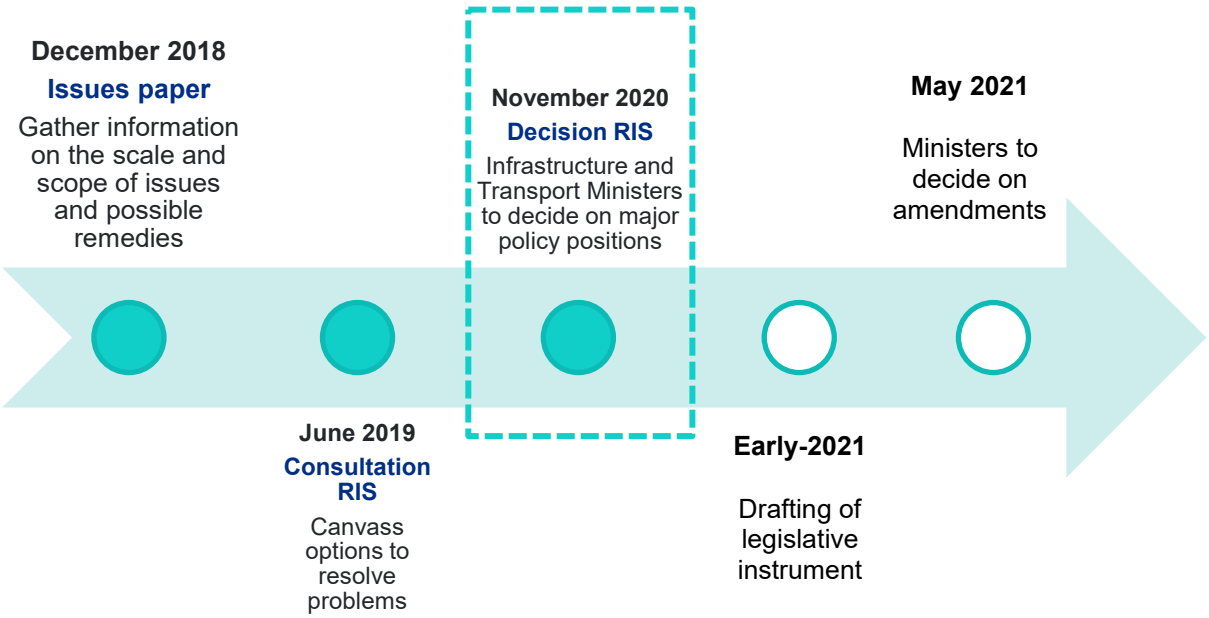
3. Decision RIS

The evidence and views gathered from the public consultation for the consultation RIS informed this decision RIS, together with the final analysis of the options for technology-neutral road rules for driver distraction.

This decision RIS has involved targeted consultation with the states and territories and industry peak bodies. This paper provides draft policy and regulatory recommendations to be presented to the Infrastructure and Transport Ministers in November 2020 for consideration. The OBPR assessed this decision RIS as compliant on 20 October 2020.

The timeline for these activities is presented in Figure 1.

Figure 1. Project milestones and timelines



1.3 Consultation

In June 2019 the NTC released a consultation RIS for public consultation. We asked the community and stakeholders to engage with us on how to best assess technology-neutral regulatory options for addressing driver distraction, analyse potential impacts and present an evidence base for deciding on a preferred option.

The NTC sought community views on:

- how the preferred option addresses the problem
- the feasibility of the technology-neutral regulatory options to mitigate the safety risks associated with distraction
- the impacts of policy options on industry, governments and the community
- approaches to measuring these impacts
- conclusions on the most effective solution to the identified problem.

The NTC received 37 submissions. Of these, 25 were public and are available on **the NTC website**. Twelve submissions were submitted on a confidential basis. Submissions were received from a wide range of stakeholders including the general public, state and territory governments, local governments, police, academics, vehicle manufacturer representatives, motoring clubs, the heavy vehicle industry representatives and technology providers (Figure 2).

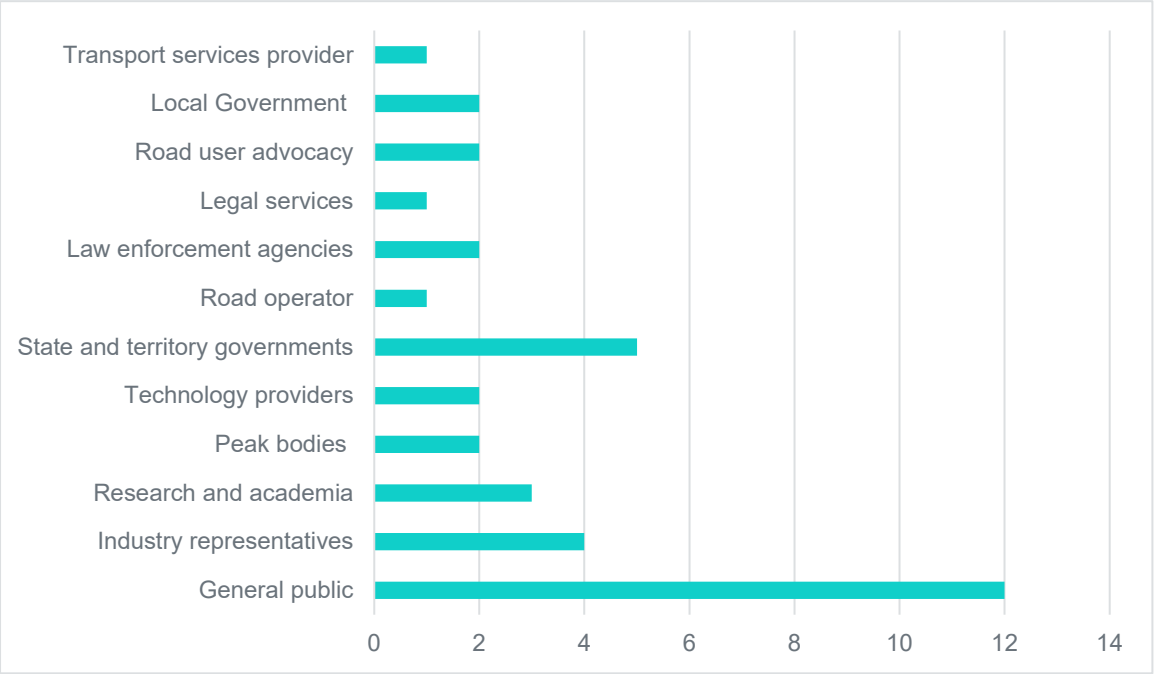
This process resulted in substantial feedback on the issues discussed in the consultation RIS including:

- evidence supporting the case for government intervention
- the merits and limitations of each option
- the analytical method used to assess the impacts of each option
- views on the hybrid option as the best option to address the identified problem.

The feedback has helped the NTC to test or confirm its work, understand the issues that are important to stakeholders and shape the regulatory options proposed in this decision RIS.

The NTC incorporated stakeholder views into its analysis. To provide maximum transparency about the reasoning behind the policy proposal while protecting the rights of stakeholders to make confidential submissions, these views are referred to in the analysis by identifying the sector from which they came.

Figure 2. Submissions by stakeholder type or sector



1.3.1 Key insights from public consultation

Support for the case for government intervention

- There was strong support for the case made by the consultation RIS for government intervention.
- Only two submissions considered that the consultation RIS did not provide enough evidence to make the case for government intervention.

Treatment for cyclist distraction

- Most stakeholders expressed strong support for treating cyclist distraction (and other drivers and riders of vehicles) the same as driver distraction for motor vehicles.

Enforceability of a rule discouraging long eyeglances off the roadway

- About two-thirds of the responses could not propose an approach for discouraging long eyeglances off the roadway that could be enforced.
- One-third proposed alternative strategies to regulation such as vehicle design and technology, enforcing the rule on proper control and education.

Enforceability of a rule discouraging high-risk voice-based interactions

- Over three-quarters of the responses did not propose an approach in the road rules that could be enforced.
- Less than a quarter proposed alternative strategies to regulation such as vehicle design/technology and education.

Ineffectiveness of a full outcomes-based approach for mitigating the safety risks from diverse sources of distraction

- Most stakeholders agreed with our assessment on the limitations of the proposed performance-based option to mitigate the safety risks of driver distraction.

Impact categories and assessment criteria

- There was broad agreement for the proposed impact categories and assessment criteria.
- No new criteria were recommended.

Individuals or groups that may be affected by the proposed options

- Some stakeholders suggested that additional consideration be given to road users in the impact assessment (e.g. taxi drivers, motorcyclists, bicycle riders, heavy vehicle drivers, tech providers and e-scooters riders). However, no evidence was provided to determine the magnitude of such impacts, which would enable quantification.

Method for assessing the benefits and costs of the options

- There was strong agreement for the assessment method used (almost 70 per cent of responses).

Support for the hybrid option as the best regulatory approach for addressing the identified problem

- Stakeholders expressed strong support for the preferred option proposed for addressing the problem identified in the consultation RIS (almost 90 per cent of responses).
- Five responses made suggestions to further strengthen this option such as considering the applicability of this option to drivers of level 3 automated vehicles, making sure drivers of all vehicles are included, reviewing the prescriptive element regularly and noting that not all visual-manual sources of distraction are included.

2 The problem

Key points

- The Australian Road Rules relating to driver distraction do not clearly identify the distracting activities that affect driving performance and have not kept pace with technological development. This means that:
  - some behaviours that can distract drivers and lead to increased crash risk are not explicitly prohibited
  - the road rules treat the sources of distraction and safety risks associated with certain behaviours inconsistently
  - the rules can be confusing for road users and police regarding what technology devices and/or functionalities are legal and illegal to use when driving.
- Stakeholder feedback and scientific research informed the process for addressing the problem:
  - defining driver distraction and formulating common criteria for the options
  - defining technology neutrality
  - developing guiding principles for regulatory options.

2.1 The problem

Driver distraction is a significant road safety risk that is not as well understood as other risk factors. Despite the research limitations, various studies have consistently found that drivers are engaged in distracting activities a significant portion of their driving time. However, the Australian Road Rules relating to driver distraction do not clearly identify the distracting behaviours and have not kept pace with technological development.

Driver distraction consists of diverting attention away from activities that are critical for safe driving towards a competing activity (Regan, Hallett & Gordon, 2011). This occurs the moment the competing activity diminishes a driver's ability to allocate sufficient attention to the driving task resulting in compromised ability to maintain driving performance at a satisfactory level (Regan & Young, 2007). Distraction can occur either because of the compelling nature or complexity of the competing activity, or because the demands of the driving task are so high that they do not allow the performance of a secondary activity at any level (Regan & Young, 2007).

Driver distraction can affect driver performance in different ways. Its effects include degraded speed control, accuracy in peripheral detections, lane-keeping performance and response to unexpected hazards (Cunningham & Regan, 2015). These impacts on driving performance present important road safety risks to road users given the prevalence of this problem among Australian drivers. A naturalistic driving study found that drivers are engaged in a non-driving activity while at the wheel every 96 seconds (Young et al., 2018).

Distraction has been found to be a factor in 16 per cent of crashes where a vehicle occupant was hospitalised for at least 24 hours (Beanland et al., 2013). The 2017 preliminary

summary of fatalities on Western Australian roads found that 28 fatalities (17 per cent) in 2017 were from inattention-related crashes, representing an increase of more than 100 per cent on the previous five-year average (Road Safety Commission, 2018).

A driver's decision to engage in distracting activities can have significant effects on passengers and other road users. These effects include hospital care, emergency services responses and the use of other public resources. A study in Victoria estimated fatality and serious injury costs to the community for in-vehicle technology distraction over a five-year period at about $1.2 billion (Fitzharris, Young & Bowman, 2012). The high cost to society from driver distraction could be reduced significantly if drivers considered those risks before engaging in secondary activities.

2.1.1 Driver-based factors

Distraction can affect different drivers in different ways. For example, age and driving experience have been found to be a factor on the level of potential crash risk resulting from engagement in certain secondary tasks (Goodsell, Cunningham & Chevalier, 2019).

Studies suggest that young and less experienced drivers lack automated driving skills, which does not leave spare attentional capacity to allocate to a secondary non-driving task (Regan et al., 2011, cited in Goodsell, Cunningham & Chevalier, 2019). Research indicates that there is a higher risk of having a near-crash and/or crash when novice drivers engage in certain tasks compared with more experienced drivers (Klauer et al., 2014, cited in Goodsell, Cunningham & Chevalier, 2019).

Other studies have found that older people also find it difficult to share attention between two simultaneous tasks. Their decreased visual and cognitive capacity makes them more susceptible to getting distracted when interacting with devices (Young & Regan, 2007).

Results of a naturalistic driving study indicate that distraction is not only a problem for non-professional drivers. Driver distraction is also prevalent in commercial vehicle operations (Olson et al., 2009). A US study found that the second major contributor to large truck rollover crashes involved lack of alertness issues, including distraction (McKnight & Bahouth, 2008). Secondary activities such as texting can increase crash risk by 23 times for truck drivers (Olson et al., 2009).

2.1.2 Technological factors

In recent years drivers have experienced a rapid emergence of technologies that provide them with enhanced communication, entertainment and safety capabilities while driving. These new devices and functionalities, while sometimes beneficial, have increased the complexity of the driving task and provided additional opportunities for distraction.

The widespread adoption of smartphones presents a great challenge to road safety policymakers. According to a recent survey, 89 per cent of Australians own a smartphone (Deloitte, 2018). This figure could continue growing to up to 95 per cent (Deloitte, 2018). In Victoria, mobile phones and other forms of mobile technology are a growing distraction in cars, contributing to 5 per cent of deaths and 3 per cent of serious injuries in police reports (Transport Accident Commission, 2016).

While drivers may understand the risks associated with mobile and smartphone use, they choose to engage with these types of distracting activities. An Australian Government survey found that a significant number of drivers engage in distracting activities prohibited by road

legislation while knowing that it could increase their risk of crashing. Approximately one in five drivers (21 per cent) admitted that they use their mobile phones for non-driving activities such as browsing the internet, texting, taking photos or using apps (Department of Infrastructure, Regional Development and Cities, 2018).

The findings in this survey align with research that has consistently found a poor causal relationship between drivers' attitudes and behaviour (Elliot, 1992; Tranter & Warn, 2008; Verschuur & Hurts, 2008; Watson, 1997). Extensive road safety research shows that the most powerful influences on crash risk are the behavioural choices that road users make (Ulleberg & Rundmo, 2003).

The mismatch between drivers' attitudes and behaviours can be partly explained by the subjective decisions they make to balance efficiency and safety during daily driving (Fuller, 2005 and Kinnear et al., 2013, cited in Ba et al., 2015). Research has found that those decisions are more influenced by their perceived rewards than by potential risks to themselves and others (Ba et al., 2015).

This mismatch is also observed in young drivers. Their risk taking has less to do with their skills and knowledge and more to do with their motivation, exposure and other psychological factors (Christie & Harrison, 2003; Isler, Starkey & Sheppard, 2011; Johnson & Jones, 2011; Twisk, 2007).

In addition, a large portion of drivers believe that diverting their attention to secondary tasks does not impair their own driving performance while admitting that it is a problem for other drivers (Watson & Strayer, 2010). This belief is against evidence showing that 97.5 per cent of drivers experience a significant reduction in driving performance when executing a secondary task (Watson & Strayer, 2010).

Wearable technology is also becoming increasingly popular. The global market for wearable technology has grown consistently over recent years and is forecast to grow to around $30 billion by 2023 (CCS Insight, 2019). Smartwatches have been estimated to account for more than half of the wearables revenue in 2019. According to estimations, 90 million smartwatches will be sold in 2019, accounting for more than half of the wearables revenue this year, which is predicted to reach 142 million units worldwide (CCS Insight, 2019). It is expected that a greater adoption of smartwatches, smart hearables and smart shoes will lead to sales of 260 million units in 2023 (CCS Insight, 2019).

Studies on the impacts of these devices are still limited. However, a study on the safety of wearing a smartwatch while driving found that drivers glanced more frequently towards their smartwatch compared with their smartphone (Giang et al., 2015). The same study also found that drivers' brake response times were longer when receiving a notification prior to a lead vehicle braking event on the smartwatch compared with the smartphone.

Another technological factor that could result in increased sources of driver distraction is the prevalence of highly complex functionalities available in modern in-vehicle systems. Most vehicle manufacturers allow drivers to automatically pair their smartphones to the vehicle integrated system (FCAI, 2019a). This allows drivers to use and access information from the phone through the vehicle's controls.

In addition, automakers and driving app developers keep adding functions enabling drivers to perform additional non-driving tasks. For example, General Motors is developing a

marketplace platform that will allow in-vehicle online shopping for goods and services (General Motors, 2019).

Tesla has recently introduced a software update that allows drivers to watch movies and shows from Netflix, Hulu and YouTube (Tesla, 2019). Tesla's functionalities also include karaoke and video games. While some of these new functionalities are disabled when the vehicle is moving, it is not clear whether these functions can be enabled when the vehicle is stationary at a red light or in a traffic jam.

While there are global guidelines already available relating to integrated systems that should be adopted within Australia, these are voluntary and can be adopted, fully or partially, based on an individual vehicle manufacturer's determination (OICA, 2015). Decisions can include an analysis of the markets in which a vehicle is driven or other unique attributes of a vehicle (OICA, 2015).

A study on 40 light vehicle models available in the US in 2017 (representative of 30 per cent of the market share in North America) found that many of the features provided in in-vehicle systems are too distracting to be enabled while the vehicle is in motion (Strayer et al., 2019). This study recommended greater consideration to what interactions should be available to the driver when the vehicle is moving.

In 2017 approximately 1.2 million new vehicles were sold in Australia, which is a fraction compared with the over 17 million new vehicles sold in the US that same year (FCAI, 2019b; Lassa, 2018). The size of Australia's new vehicle market means that our country is a 'technology taker' of vehicles and in-vehicle technologies. This means that car manufacturers' decisions regarding their vehicles' alignment to those international guidelines will have a direct effect on the potentially distracting features available to Australian motorists to use while their vehicles are in motion. This leaves the enforcement of the road rules as one of the main regulatory tools to minimise driver distraction.

2.1.3 The problem with current regulation

The NTC's analysis of the Australian Road Rules has found that the rules related to driver distraction:

- have not kept pace with the arrival of the smartphone and modern technology devices (including those built into the vehicle)
- inconsistently treat the sources of distraction and safety risks associated with certain behaviours
- can be confusing for road users and police regarding what technology devices are legal and illegal to use when driving.

Road Rule 297 regulates a broad range of sources of distraction. A driver's ability to maintain proper control of a vehicle (sub-rule 297(1)) can be affected by various causes, technology-based or not. This rule does not define proper control. In its submission to the consultation RIS, the National Road Transport Association (NatRoad) has raised concerns regarding the risk of erroneous enforcement from the ambiguity of sub-rule 297(1) (NatRoad, 2019b).

Road Rules 299 and 300 focus on specific types of technology that cause driver distraction rather than on distracted driving behaviours and interactions that are known to be most risky from a safety perspective. These rules only preclude or limit the use of specific technology

devices – mobile phones, visual display units and television receivers – while permitting their use as driver aids. The current national rules date back to 1999, when texting and calling were the most common features of a mobile phone.

Devices later introduced to the market are not explicitly addressed by the model legislation. States and territories have been required to interpret those rules based on similarities between new devices and mobile phones and visual display units to be able to regulate their use by drivers.

Software installation dictates the functions available in modern devices instead of the hardware. This means that our current prescriptive road rules (rules 299 and 300) cannot keep up with the growing number of functions available to drivers. Also, these rules treat similar functions differently because they are being used in different devices, regardless of their comparable safety risks.

The current offences in the Australian Road Rules can at times be difficult to understand for new or less experienced police officers. This lack of clarity can make it difficult to determine the applicable rule to the observed driver behaviour and therefore reduce enforcement's likelihood to withstand scrutiny if questioned in court.

The lack of clarity in legislation also means drivers do not really know what does and does not conflict with the driving task, with multiple devices being used while operating vehicles (both integrated or mounted and portable). While manufacturers sometimes provide instruction manuals with guidelines on appropriate use, these are often not read or are easily ignored by the end-user, meaning that the incentive to engage with technology is not balanced with knowledge of its distractive and safety consequences (Parnell, Stanton & Plant, 2017).

2.1.4 The need for government intervention

The Safe System approach adopted in the *National Road Safety Strategy 2011–2020* seeks to reduce fatal and serious injury crashes on Australian roads (Commonwealth of Australia, 2018a). The Safe System approach involves taking a holistic view of the road transport system and the interactions among roads and roadsides, travel speeds, vehicles and road users (Commonwealth of Australia, 2018b).

One of the key inputs to the Safe System is developing road rules and enforcement strategies to encourage compliance and manage noncompliance with the road rules. The lack of clear guidance on what compliance looks like for driver distraction could reduce the effectiveness of the Australian Road Rules in achieving the desired road safety outcomes.

As more wireless communication, entertainment and information systems proliferate in the vehicle market, there is a risk that the incidence of distraction-related crashes could increase. The current rules make it difficult for the public and enforcement agencies to identify the behaviours that could result in distraction, reducing the road rules' safety benefits.

Principle 5 of best practice regulation stresses the importance of clearly articulating the policy intent and compliance requirements of regulation to both regulators and regulated parties (COAG, 2007). Good regulation should standardise the exercise of bureaucratic discretion to reduce discrepancies between affected parties, reduce uncertainty and lower compliance costs (COAG, 2007).

A clearer guidance on lawful and unlawful behaviours in the road rules could ensure legislation delivers the greatest net benefit for the community. Improved understanding for police would make enforcement more effective and more likely to withstand scrutiny if questioned in court. In addition, greater understanding for road users could make it less likely that drivers would commit distraction-related offences. This could be particularly beneficial for at-risk groups such as younger and older drivers.

2.2 Objectives

Australia's current road rules relating to driver distraction for technology devices:

- have not kept pace with the convergence of the mobile phone and new technology devices
- inconsistently treat the sources of distraction and safety risks associated with certain behaviours
- can be confusing for road users about what technology devices are legal and illegal to use when driving.

The Australian Road Rules relating to driver distraction focus on specific types of technology being used by drivers, rather than the function of such technologies. They prevent or limit the use of particular technology devices – mobile phones, visual display units and television receivers – while permitting their use as driver's aids. The current national rules date back to 1999, when texting and calling were the most common features of a mobile phone.

Driver distraction is a significant road safety risk that is not as well understood as other risk factors such as drink-driving and speeding. Research in this area is limited and relatively immature in comparison with other road safety risks. However, various studies have consistently found that drivers are engaged in distracting activities a significant portion of their driving time.

In May 2018 the Transport and Infrastructure Council directed the NTC to:

- review the Australian Road Rules that regulate driver distraction to determine whether they sufficiently address the key factors that cause driver distraction
- consider developing a technology-neutral approach for regulating driver distraction.

This project seeks to ensure the road rules achieve better outcomes for road users regardless of the technology used. The project will establish whether the current road rules manage the risks posed by all sources of distraction, including the use of technology devices. If required, we will recommend what changes should be made to the Australian Road Rules.

Any proposed changes will consider their potential to change driver behaviour and enforceability while encouraging innovation and not prohibiting technology with the potential to improve road safety.

The potential benefits from the project include safety and regulatory efficiency.

2.3 Process for addressing the problem

As discussed in Chapter 1, the Transport and Infrastructure Council directed the NTC to develop technology-neutral road rules for driver distraction. Through the public consultation for the issues paper and the consultation RIS, stakeholders provided substantial feedback

that informed the process for preparing the final regulatory options proposed in this decision RIS.

Instead of focusing on the causes of driver distraction, the NTC approached this process by looking into the behaviours associated with distracting activities and the degree to which they may affect driving performance. This process is expected to result in technology-neutral road rules capable of regulating the use of a broad range of devices and therefore making the rules less likely to become outdated when a new device enters the market.

The process consisted of:

1. defining driver distraction and formulating common criteria for the options
2. defining technology neutrality
3. developing guiding principles for options to regulate driver distraction.

The work on developing technology-neutral regulatory options considered the need for rules that:

- are clear and easy to understand
- apply to human drivers
- apply to all drivers or riders of vehicles
- apply to all drivers regardless of their age and the purpose of their trip
- apply to all driving environments
- apply to all vehicles in the driving fleet regardless of their age
- can address diverse causes of distraction
- consider the best evidence available to ensure the outcomes of the project are credible to the community
- maintain restrictions on unsafe interactions with mobile phones and visual display units.

Driver distraction was also defined for this project as the starting point to determine which distracting activities can feasibly be addressed by regulation and how to address them. This helped formulate two common criteria for developing the options proposed in this decision RIS.

The findings from several naturalistic driving studies informed the basis for developing the technology-neutral approach. We produced a table contrasting common causes of distraction and matched them with findings from several naturalistic driving studies (odds ratios,[1] PAR,[2] duration and prevalence); this is provided as Appendix A.

The following subsections explain this process.

[1] The relative risk of a safety-critical event occurring when a driver engages in secondary tasks compared with baseline.

[2] This calculation produces an estimate of the percentage of crashes and near-crashes occurring in the population at large that are attributable to the inattention-related activity. This is a useful metric since odds ratios estimate risk on a per-task (or drowsiness episode) basis while the population-attributable risk percentage accounts for the frequency of occurrence.

2.3.1 Defining driver distraction

For the purpose of this project, driver distraction is defined as:

The diversion of attention away from activities critical for the safe execution of the driving task towards a competing activity, which may diminish the driver's proper control of the vehicle. – Adapted from Regan, Hallett & Gordon (2011)

The benefits of using this definition in developing the options proposed in this decision RIS include:

- Driver engagement in distracting activities can be driving or non-driving-related.
- Activities (especially for a prescriptive approach) associated with distraction are executed by the driver and not caused by external factors.
- It shares common elements with a definition endorsed by international experts (consistency) (Regan, Prabhakharan & Dixit, 2019).

This definition was proposed in the consultation RIS and incorporated feedback from the Research Centre for Integrated Transport Innovation at the University of New South Wales (rCITI). In its submission to the issues paper, rCITI suggested a definition that assumes a driving- or non-driving-related competing activity that distracts as the source of distraction (Regan & Prabhakharan, 2019). The NTC adapted that definition to reflect the logic this project is based on.

This definition for distraction informed the following criteria that guided development of the prescriptive approach included in some of the options proposed in this decision RIS.

1. **Options will focus on behaviour resulting from distracting activities**

The focus on behaviours resulting from competing activities (driving- or non-driving-related) that diminish the driver's control of the vehicle rules out other forms of inattention that are more difficult to observe and, therefore, to enforce. This focus also excludes involuntary and external causes of distraction, which could be difficult to regulate (especially through prescriptive rules).

2. **Options will focus on behaviours performed by drivers**

Only those distracting activities that take place in the vehicle or with the driver can be addressed by the Australian Road Rules. The road rules only apply to vehicles and road users on a road or road-related area (road rule 11). Therefore, the options proposed in this document will only focus on high-risk behaviours performed by drivers.

2.3.2 What technology neutrality means

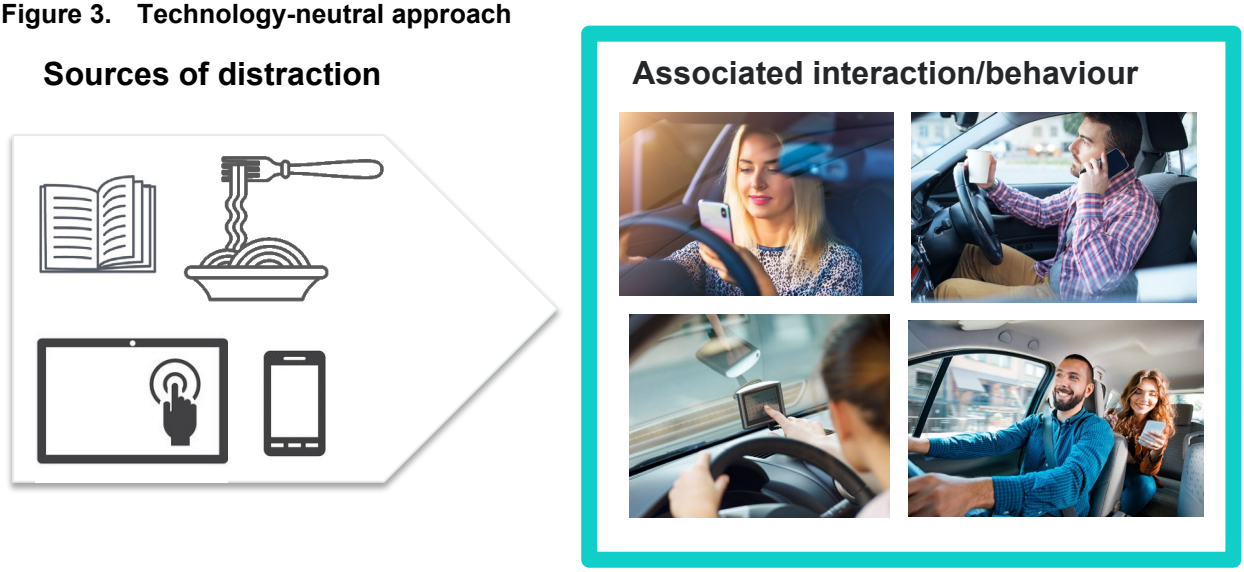
To implement the Transport and Infrastructure Council's direction to develop technology-neutral road rules, the NTC focused its approach on the unsafe behaviours and interactions that result in a demonstrated detriment of driving performance (Figure 3). As the Australian Road Research Board noted in its submission to the issues paper, the behavioural responses to engage with the source of distraction (eyes off road, mind off road, hand(s) off wheel) are most likely the direct cause of driving performance impairment (Chevalier, Cunningham & Roberts, 2019). One submission by a law enforcement agency also supported this view.

Research indicates that visual–manual interactions can significantly impair driving performance (Goodsell, Cunningham & Chevalier, 2019). A number of naturalistic driving studies demonstrate how visual activity away from the road and traffic ahead and hand(s) off

the steering wheel, independent of the source of distraction, can increase the risk of a crash (Goodsell, Cunningham & Chevalier, 2019). For example, a study using data from 3,500 drivers suggests that dialling a handheld phone is associated with a crash risk 12 times greater than undistracted driving (Dingus et al., 2016, cited in Goodsell, Cunningham & Chevalier, 2019). The same study also found that composing a text message on a handheld mobile phone could increase the crash risk sixfold. Research demonstrates that visual–manual interactions that take the driver's eyes off the road are especially dangerous for safe driving, confirming the significant visual component of driving (Goodsell, Cunningham & Chevalier, 2019).

Our approach seeks to target these behaviours and interactions regardless of the distracting activity that triggered them. Under a technology-neutral approach, the road rules would seek to discourage interactions that result in a driver's eyes off the road and/or hands off the wheel. For example, instead of specifically prohibiting drivers from sending text messages on a mobile phone, the proposed approach would rather prevent drivers from entering text-based information on any device capable of wireless communication or electronic data retrieval. This way regulation would consistently target a behaviour that research has been proven to decrease driving performance across all existing and future devices. A technology-neutral approach focuses on unsafe interactions as opposed to restricting the use of specific devices.

Figure 3. Technology-neutral approach



2.3.3 Guiding principles for options to regulate driver distraction

The feedback received during public consultation for the issues paper and consultation RIS and the available evidence on driver distraction gave us useful information for developing the policy proposal. Consideration of all the evidence provided shaped the development of the following principles that framed the regulatory options.

The resulting new or amended rules should be clear and easy to understand

In its submission to the consultation RIS, Transport for New South Wales noted that any proposed changes to the rules need to be clear. The NTC agrees with this statement – it aligns with principles and standards for legislation in jurisdictions across the country.

For example, the Attorney General's Department's principles for clearer laws establish that clearly written laws can be better understood, complied with and administered, and are an

essential for an accessible justice system (Attorney General's Department, 2019). Specifically, two of these principles state that:

- Laws should be no more complex than is necessary to give effect to policy.
- Legislation should enable those affected to understand how the law applies to them.

The intent of these principles is in line with Queensland's fundamental legislative principles (*Legislative Standards Act 1992*). These principles establish that the rights and liberties of individuals rely on legislation that is unambiguous and drafted in a clear and precise way.

In addition, Victoria's best practice regulatory principles also stress the importance of regulation that is clear and easily understood by business and the community (Commissioner for Better Regulation, 2016).

The NTC considers that a policy approach for regulating driver distraction should aim at reducing the levels of ambiguity present in the road rules and avoid unnecessary complexity to ensure effective compliance and enforcement.

The resulting new or amended rules would only apply to human drivers

The current Australian Road Rules do not apply to automated driving systems when performing the dynamic driving task. Only human drivers are subject to the obligations relating to driving and road safety through compliance with traffic laws (National Transport Commission, 2017a).

The NTC's automated vehicle program will work with states, territories and industry to develop dynamic driving obligations for automated driving systems, which will most likely require the system to operate consistently with obligations in the Australian Roads Rules. In May 2018 Australian transport ministers decided that there should be some obligations on the fallback-ready user, including that they: remain sufficiently vigilant to respond to automated driving system requests, mechanical failure or emergency vehicles and regain control of the vehicle without undue delay when required; hold the appropriate licence; and comply with alcohol, drug and fatigue driver obligations. If changes are required to the Australian Road Rules to implement the ministers' decision the NTC's automated vehicle program will progress this.

Therefore, any changes to legislation resulting from this project would be developed under the assumption that drivers are human and will only apply to drivers of vehicles with up to SAE[3] level 2 automation capabilities. This level of automation is commonly referred to as 'partial automation' because the human driver is expected to remain in charge of object and event detection and response and supervise the driving automation system.

Safety issues for levels 3, 4 and 5 will be addressed by the NTC's automated vehicle program. The safety program will ensure the project outcomes do not impede or hinder an approach for managing human-user responsibility for those levels of automation.

Any new or amended rules would apply to all drivers and riders of vehicles

[3] The Society of Automotive Engineers' (SAE) International Standard J3016 has six levels of driving automation from no automation (level 0) to full automation (level 5)

Most of the submissions to the consultation RIS expressed support for applying the amended road rules to drivers of all vehicles without distinction. This includes cyclists and riders of other vehicles.

This is in line with the object of the Australian Road Rules and ensures uniform implementation of any proposed changes or amendments to the road rules. One of the key objects of the Australian Road Rules is to provide uniform rules across Australia for all road users. This object is described in Part 1, section 3 of the Australian Road Rules. The objects of the law declare that the Australian Road Rules should identify uniform rules regardless of road user type.

The NTC considers that the proposed amendments under each option would not result in any material change in safety risks or additional burden if applied to cyclists and other riders. The Australian Road Rules define a 'rider' as the person who is riding a motorbike, bicycle, animal or animal-drawn vehicle. Road rules 297, 299 and 300 refer to drivers of vehicles without expressly exempting riders.

As discussed in the consultation RIS, a suitable approach for regulating driver distraction would not be appropriate for addressing pedestrian distraction. The current road rules relating to driver distraction do not apply to pedestrians and, therefore, are not within the scope of this project.

New or amended rules would apply to all drivers of vehicles regardless of their age/experience and the purpose of their trip

While it is acknowledged that distraction can affect different drivers in different ways, research cited across this decisions RIS shows that activities that result in visual–manual interactions can significantly increase crash risk, regardless of the driver's age or driving experience and the purpose of the trip. Providing a different treatment for drivers based on their age or experience would make any new rules more complex and difficult to understand for road users.

For the purpose of developing simple and clear rules for driver distraction, the options proposed in this decision RIS do not make distinctions based on the type of driver. However, this would not impede states and territories from imposing restrictions or prohibitions on specific licence classes.

The rules resulting from this project should apply to drivers of all vehicles in all driving environments

The NTC recognises that the consequences of distraction can vary depending on the complexity of the driving environment (Strayer & Johnston, 2001, cited in Young & Regan, 2007). However, applying different rules to different road environments would add complexity to road rules, making it more difficult for the public and law enforcement agencies to ensure compliance.

For this reason, the options considered in this decision RIS do not make distinctions based on the type of road environment. Any changes to the road rules should apply to all vehicles moving or stationary (but not parked) regardless of the road environment in which the unlawful behaviour has been observed.

The rules resulting from this project should apply to drivers of all vehicles in the driving fleet regardless of the vehicle's age

By January 2018 the average age of all vehicles registered in Australia was 10.1 years. Tasmania reported the oldest average age at 12.8 years, while the Northern Territory and the Australian Capital Territory had the youngest fleet, with an average age of 9.4 years.

Any changes to the road rules should apply to all vehicles regardless of their age and the level of technology provided by manufacturers. By focusing on high-risk behaviours rather than technology, this project's approach eliminates the challenge of regulating driver interactions with both old and new technologies.

The focus on high-risk behaviours associated with distracting activities means the rules should be able to address diverse causes of distraction

The focus on high-risk behaviours that result from distracting activities leads us to conclude that the proposed approach to regulation should also address non-technological causes of distraction. As noted at the beginning of this subsection, research demonstrates that visual–manual interactions are especially dangerous when driving.

Most submissions to the issues paper and consultation RIS support including non-technological sources of distraction that result in high-risk interactions in our approach. The vast majority of our stakeholders agree that addressing these sources of distraction would ensure a consistent treatment of similar behaviours (and comparable associated risks).

Conventional or non-technological sources of distraction that have been deemed as of high risk in the literature include writing, reading and reaching for an object. Further detail on the risk levels estimated for different sources of distraction is provided at Appendix A.

The regulatory approach should seek to minimise driver distraction while recognising that drivers need to perform certain secondary tasks

This project seeks to discourage unsafe use of technology by drivers, not to ban all use of technology. An absolute ban of all technology is not likely to be supported by the public and businesses. Current in-vehicle technology seeks to balance the public's expectation of being connected with the need to minimise unsafe interactions. While it is recognised that some of the functions available in in-vehicle information systems may be too distracting to be enabled while the vehicle is in motion, there are software platforms that provide more functionality and result in lower levels of cognitive demand (Strayer et al., 2018).

In addition, commercial freight and passenger vehicle drivers are sometimes required to use several devices as part of their usual work. For example, heavy vehicles drivers rely on several technology devices to assist them and to improve their operational efficiency. In-cab fleet tracking and other modern telematics enable drivers to receive jobs, capture proof of delivery, complete pre-trip inspections and receive real-time feedback on their driving performance (NatRoad, 2019b). These functionalities increase both safety and efficiency outcomes.

The significant impacts that visual–manual driver interactions with technology have on driving performance have been consistently demonstrated (Goodsell, Cunningham & Chevalier, 2019). However, impacts of other types such as voice-based interactions are less well known. While some studies consider that having a conversation on a hands-free mobile phone is detrimental to driving performance and of a similar impact to talking on a handheld mobile phone (Caird et al., 2018, cited in Goodsell, Cunningham & Chevalier, 2019), a naturalistic driving study on commercial vehicles found that talking on a hands-free mobile phone carries a low risk (odds ratio lower than 1) and provides a significant protective effect (defined as decreasing the risk of a safety-critical event) for moderately complex tasks (Olson et al. 2009). In addition, an analysis of 43 studies suggests that using voice-

controlled functions may be less detrimental to driving performance than visual–manual interactions with technology (Simmons et al., 2017, cited in Goodsell, Cunningham & Chevalier, 2019).

An outright ban could be perceived as not supported by evidence and affect public perception of the legitimacy of regulation. This perception of legitimacy could be a factor in the public's willingness to comply with any new or amended rules for driver distraction (Tyler, 2001, cited in Yagil, 2005). This factor is highly relevant given that the majority of Australian drivers (57 per cent) would be likely to oppose the introduction of a complete ban (Department of Infrastructure, Regional Development and Cities, 2018).

Existing focus on visual and visual manual unsafe interactions with technology should be maintained

Road rules 299 and 300 regulate the use of mobile phones and visual display units by drivers. While these rules are outdated and their applicability is limited, the NTC considers that the legislator's intent is mostly in line with findings from naturalistic driving studies. These studies confirm that visual and visual–manual interactions with technology devices result in a significant crash risk. In its submission to the issues paper, the rCITI agreed with our assessment that the emphasis in the Australian Road Rules is on visual–manual driver interactions with technology (Regan & Prabhakharan, 2019).

The NTC will ensure that any proposed changes to the road rules maintain a similar treatment to unsafe visual–manual interactions with technology.

3 Options

Key points

Four regulatory options have been developed to compare the current technology-based road rules with different technology-neutral approaches for regulating driver distraction:

1. Status quo: The baseline against which all other options will be compared and consisting of the current road rules 297, 299 and 300.
2. Prescriptive: Proposes prescriptive regulatory responses to all causes of distraction.
3. Performance-based: Proposes a fully outcomes-based regulatory approach to a broad range of causes of distraction, both technology- and non-technology-based.
4. Hybrid: Combines elements from the previous two options and seeks to provide the benefits from both approaches while minimising their disadvantages.

In this decision RIS, the NTC assesses four options to compare the current technology-based road rules with different technology-neutral approaches for regulating driver distraction. These options allow us to assess the merits of performance-based and prescriptive rules for regulating distraction.

The issues paper described the mix of performance and prescriptive-based provisions for regulating driver distraction in the Australian Road Rules. Later, the consultation RIS compared the different approaches of the proposed regulatory options, discussing their advantages and constraints. In submissions to the consultation RIS, most stakeholders agreed with our analysis of these approaches.

The following options have been further developed following feedback from the public consultation process for the consultation RIS. These options are:

1. Status quo: This technology-based option is the baseline against which all other options will be compared. The *Guideline for Ministerial Councils and National Standard Setting Bodies* requires that the 'status quo' and effectiveness of existing regulations should be considered as an option for meeting the objectives (COAG, 2007).
2. Prescriptive: This technology-neutral option proposes a fully prescriptive regulatory response to all causes of distraction that align with the principles discussed at subsection 2.3.3.
3. Performance-based: This technology-neutral option proposes a fully outcomes-based regulatory approach to a broad range of causes of distraction, both technology- and non-technology-based.
4. Hybrid: A technology-neutral option that combines elements from options 2 and 3 and seeks to provide the benefits from both approaches while minimising their disadvantages.

These four options are explained in further detail below. The analysis and assessment on a preferred option are provided in Chapters 4 and 5. Further details on the qualitative assessment framework and the criteria used in the options assessment is provided in Chapter 4. The methodology used provides a range of indicative estimates where possible to support of the qualitative assessment.

3.1 Option 1: Status quo

Key points

- Australian Road Rules 297, 299 and 300 would be maintained in their current form.
- Any amendments to these rules would be the responsibility of the Australian Road Rules Maintenance Group as part of its role in periodically reviewing the Australian Road Rules.
- This option relies on rules dating back to 1999, when texting and calling were the most common features of a mobile phone.
- For this option, the NTC has strictly focused on the letter and intent of the Australian Road Rules. This means that the analysis does not include the variations and interpretations that states and territories have used to apply them to a broader range of interactions with a wider range of devices.

3.1.1 Description of the status quo

Australian Road Rules 297, 299 and 300 would be maintained in their current form. Any amendments to these rules would be undertaken as part of the regular process of maintaining the Australian Road Rules.

No significant changes would be expected under this option, only amendments to provide further clarity regarding the legal use of new technology available in the market (wearables, ridesharing and other driving-related mobile apps, new features in in-vehicle infotainment systems). Changes to states' and territories' associated road rules could be required to reflect any additions resulting from the maintenance process.

Under this option, driver distraction would be primarily addressed by a combined approach consisting of one performance-based rule and a set of prescriptive rules.

These rules (and any proposed changes to legislation) apply to all drivers of vehicles (as defined in the road rules) when their vehicle is moving or stationary but not parked. While there is a definition of 'park' in the Australian Road Rules' Dictionary, it is intended to apply to Part 12 (which deals with restrictions on stopping and parking). The rest of the Australian Road Rules outside of Part 12 rely on the ordinary meaning of the work 'park', which does not provide clarity for motorists or enforcement agencies about whether the key to the vehicle can still be in the ignition and/or the engine can be running.

This has resulted in infringements for drivers using mobile phones while legally parked but still having the engine running. This is creating a problem because there is no direct connection to the rules' policy intent, which is the safe use of technology devices by drivers. The 2019 Australian Road Rules Amendment package (approved in November 2019) addressed this issue by clarifying that, for rules 299 and 300, a vehicle is 'parked' even when the key is in the ignition lock and/or the engine is running.

As explained in the problem statement (section 2.1), this option relies on rules dating back to 1999, when texting and calling were the most common features of a mobile phone. This creates a challenge for law enforcement agencies in deciding how the current rules apply to technology introduced to the market recently. Devices and in-vehicle technologies such as smartwatches and software like Apple CarPlay and Android Auto have presented new challenges, and there seems to be confusion among drivers about the legal use of new technologies.

It is expected that this issue will continue under this option as new technologies appear and existing technology becomes more prevalent and complex. The current ambiguities on what compliance looks like for various types of driver distraction could reduce the effectiveness of the Australian Road Rules in achieving the desired road safety outcomes.

3.1.2 Road rule 297 – the driver to have proper control of a vehicle

Sub-rule 297(1) requires that drivers maintain proper control of their vehicle. A driver's ability to control a vehicle can be affected by various causes, technology-based or not.

The issues paper and consultation RIS discussed how this rule requires that drivers have proper control of their vehicles without providing any further information about what 'proper control' means. The Australian Road Rules do not define proper control or provide any examples about what acceptable compliance looks like under this rule.

This ambiguity can result in different interpretations on whether an offence has been committed. As mentioned in the problem statement, representatives of the road freight industry have raised concerns regarding errors in enforcement due to the lack of clarity of this rule.

Sub-rule 297(2) provides another performance-based rule requiring drivers to have clear view of the road and traffic in all directions. Such an offence can address the use of devices positioned in a way that blocks the clear view of the road and traffic.

Prohibitions in rule 297

Road rule 297 also includes prescriptive sub-rules. The offences in sub-rules 297(1A) and (3) explicitly target circumstances in which animals and passengers can impair the driver's control of the vehicle. Sub-rule 297(1A) explicitly prohibits drivers from having a person or an animal on the driver's lap.

Sub-rule 297(3) prohibits motorbike riders from riding with an animal on the motorbike in any position that interferes with the rider's ability to control the motorbike or to have a clear view of the road. However, sub-rule 297(4) provides an exemption allowing farmers to ride a motorbike on a road with an animal between the rider and the handlebars for a short distance (500 metres or less).

3.1.3 Road rule 299 – television receivers and visual display units in motor vehicles

This prescriptive rule regulates the use of visual display units while driving. It limits the use of devices with screens such as DVD players, tablets and laptop computers.

Rule 299 establishes that a driver must not drive a vehicle with a visual display unit operating if any part of the screen is visible to the driver or likely to distract a driver in another vehicle.

It includes exemptions for:

- bus drivers, if the display shows a destination sign or other bus sign
- motorcyclists, if the device is or is part of a driver's aid and is not handheld
- drivers using devices (mounted or integrated to the vehicle) that are (or are part of) a driver's aid
- emergency and police vehicles.

While the Australian Road Rules do not define 'driver's aids', rule 299 provides examples:

- closed-circuit television security cameras
- dispatch systems
- navigational or intelligent highway and vehicle system equipment
- rear-view screens
- ticket-issuing machines
- vehicle monitoring devices.

The NTC understands that an interpretation of the intent of this rule is to deter drivers from watching a movie or video. However, the NTC notes there is ambiguity around the meaning of 'part of a driver's aid'. This ambiguity could lead road users to believe that they can lawfully watch movies or video, as long as the visual display unit is part of a driver's aid.

The NTC considers that rule 299 is clearly a product of the time and is now outdated. Given the devices available in 1999, it was clear that this rule prohibited drivers from watching movies or video while the vehicle was moving or stationary (but not parked). Therefore, such ambiguity is most likely the result of the proliferation of technologies and functionalities not available at the time.

The NTC also notes that rule 299 does not clarify whether drivers can legally interact with displays that are part of in-vehicle information systems while the vehicle is moving or stationary (but not parked).

Prohibitions in rule 299

Interactions and technology devices not explicitly covered by this rule are not included. States and territories have developed interpretations of the intent of rule 299 to accommodate the use of devices that have entered the market. The NTC identified very minor variations in the enactment of rule 299.

Rule 299 establishes a prohibition for drivers to have a television receiver or a visual display unit operating while the vehicle is moving or stationary (but not parked) if the image on the screen is visible to the driver (from the normal driving position) or the driver of another vehicle. The road rules do not define television receiver or visual display unit, leaving the determination about which devices are subject to this rule to the states' and territories' interpretation.

Given that television receivers and DVD players were the type of devices available at the time the road rules were drafted, the NTC concludes that the intent of rule 299 was to primarily deter drivers from using video capabilities.

3.1.4 Road rule 300 – use of mobile phones

This is another prescriptive rule that regulates the use of mobile phones by drivers. Under this rule, drivers can only use a mobile phone while driving (including when stationary but not parked) to make or receive an audio phone call if the phone:

- is secured in a commercially designed mounting affixed to the vehicle, or

- is not secured in a mounting affixed to the vehicle, is not being held by the driver and does not require the driver to touch or press anything on the body of the phone or to manipulate it.

This rule explicitly differentiates audio phone calls from emails, text messages, video calls, video messages or other similar communication.

Rule 300 exempts the process of giving the body of the device to a passenger in the vehicle from the definition of 'use'. This means that a driver can lawfully hold a non-mounted device if they are giving it to a passenger. Drivers can also use a phone as a driver's aid while driving (including when stationary but not parked) if the phone is secured in a mounting and use of the phone does not require the driver to touch or press any part of the phone. As with rule 299 above, this rule provides examples of the same driver's aids.

CB radios or any other two-way radios are explicitly exempted from this rule.

Police and emergency vehicles are exempted from the prohibition to use handheld mobile phones while driving.

Prohibitions under rule 300

Rule 300 prohibits drivers from physically interacting with mounted mobile phones for any functionality that is not an audio phone call. This means that a driver can only touch, tap or press a button on a mobile phone (while the vehicle is moving or stationary but not parked) if the phone is being used to make or receive an audio call.

While rule 300 permits the use of a mobile phone as a driver's aid, the driver cannot touch or manipulate it while the vehicle is moving or stationary. This includes rideshare and some delivery drivers, who are required to use apps in their mobile phones to accept job requests. In practice, this prohibition can result in these drivers missing opportunities to accept jobs because they are required to do so within a 15-second time limit (Uber Technologies Inc., 2019).

Rule 300 also explicitly prohibits drivers from physically interacting with non-mounted mobile phones while the vehicle is moving or stationary (but not parked), regardless of the functionality. This means that drivers are not permitted hold or manipulate a non-mounted mobile phone in any way. They can, however, use voice controls to make or receive an audio phone call and hold a non-mounted device only in the process of giving it to a passenger.

A wider range of interactions and technology devices not explicitly covered by this rule are not included. Most of those devices did not exist in 1999 and therefore some of their capabilities and functionalities were not considered when the road rules were drafted.

States and territories have amended their associated rules and have developed interpretations of the intent of rule 300 to accommodate the use of devices that have entered the market. The differences identified between jurisdictions' legislation for rule 300 include:

- Music: The road rules in the Australian Capital Territory, New South Wales and Victoria establish that listening to music from a mobile phone is treated similarly to an audio phone call.
- Automatically receiving text messages, emails, video messages or similar: The road rules in the Australian Capital Territory, New South Wales, the Northern Territory, South Australia, Tasmania, Victoria and Western Australia specify that automatic

receival of text messages, emails, video messages or similar communications are exempted if they do not become automatically visible on the screen of the phone.

- Holding a device to give to a passenger: The road rules in Queensland, Tasmania and Western Australia do not exempt the process of giving the body of the device to a passenger in the vehicle from the definition of 'use'.
- Mobile devices: The Australian Capital Territory recently amended section 300 of the Road Transport (Road Rules) Regulation 2017 (equivalent to Australian Road Rule 300), replacing references to mobile phones with mobile devices. The definition of mobile device includes any wireless handheld or wearable device. While these amendments better reflect advances in technology, they are still limited to nomadic devices and remain silent regarding the unsafe use of in-vehicle information systems.

The different enactment and interpretations of this rule by states and territories are not considered in the impact assessment because it would make it impossible to rely on a single baseline to compare all other options against. The focus of this decision RIS is to explore options for regulatory changes to the Australian Road Rules in relation to driver distraction.

3.2 Option 2: Prescriptive

Key points

- This option seeks to provide a higher degree of certainty, clarity and uniformity to regulating driver distraction in the Australian Road Rules by:
  - indicating what interactions with technology are permitted
  - ensuring that interactions found by research to carry a higher risk of crash are not permitted
  - creating four broad categories to classify devices by their common characteristics.
- The high-risk behaviours and interactions not permitted include:
  - text-based interactions
  - video and image-based interactions
  - manual interactions with portable devices
  - long eyeglances off the roadway.
- The device categories are:
  - inbuilt and mounted
  - portable
  - wearable
  - motorcycle helmets.
- The prescriptive option provides a set of permitted behaviours determined by how the interactions known to carry a high crash risk apply to these categories of devices.
- Instead of indicating what drivers can and cannot do with specific devices, this option seeks to provide a list of permitted behaviours and interactions applied as consistently as possible across a broad range of devices.

- The prescriptive option seeks to facilitate enforcement by reducing the level of judgement to be exercised by officers when applying the rules.

3.2.1 Description of the prescriptive option

This option explores the potential of addressing driver distraction with a set of prescriptive rules. NatRoad's submissions to the issues paper and consultation RIS highlighted potential benefits in a more prescriptive and detailed approach for road users (NatRoad, 2019a; 2019b).

This technology-neutral option seeks to provide a higher degree of certainty, clarity and uniformity to regulating driver distraction in the Australian Road Rules. This option also seeks to facilitate enforcement by reducing the level of judgement officers exercise when applying the rules.

The prescriptive option would address technology- and non-technology-based causes of distraction. The key element in this option is that it provides a limited list of permitted interactions with technology, based on those interactions found by research to carry a lower risk of a crash. Those visual and manual interactions found to carry a higher risk are consistently addressed through a broad prohibition to use technology (while the vehicle is moving or stationary but not parked), with lower risk interactions permitted by exception. This approach is applied as consistently as practicable across four device categories. This is a departure from the status quo, which indicates what drivers can and cannot do with specific devices.

This option would adopt the definition of 'park' that is currently in the Australian Road Rules as well as the amendments in the 2019 amendment package to rules 299 and 300. This means that, for this option, parking a vehicle includes stopping and allowing the driver's vehicle to stay (whether or not the driver leaves the vehicle), even though the key is in the ignition or the engine is running.

Appendix B lists high-risks behaviours matched to their corresponding sources of distraction and the associated risk levels estimated by various studies.

3.2.2 Driver behaviours and interactions targeted under this option

As explained in subsection 2.3.2, under a technology-neutral approach, the road rules would seek to discourage high-risk driver behaviours and interactions regardless of the distracting activity that triggered them. Therefore, under this prescriptive option, the road rules would seek to discourage interactions that result in a driver's eyes off the road and/or hands off the wheel for long periods. Research into driver distraction has consistently identified that those visual and visual–manual interactions with technology devices result in a significant crash risk (Goodsell, Cunningham & Chevalier, 2019).

Text-based interactions

Different studies have highlighted the significant level of risk from activities associated with text-based information. For example, text messaging is regarded in the literature as one of the most dangerous secondary tasks drivers can undertake while driving. A comprehensive study demonstrated that texting is associated with a significant reduction in driving performance through different aspects, such as higher reaction time to road hazards, poor lane keeping, missed traffic signals and long glances from the roadway (Caird et al., 2014, cited in Goodsell, Cunningham & Chevalier, 2019). Text messaging is particularly risky

because it takes the driver's eyes and mind off the road and hand(s) off the wheel (Hallett, Regan & Bruyas, 2011, cited in Goodsell, Cunningham & Chevalier, 2019).

Research into the visual and cognitive demands of using in-vehicle systems also found that text-based tasks were associated with a significantly higher level of demand than other task types. Entering a destination for the navigation function was found to be the most demanding of all, with more than twice the level of the high-demand reference point (Strayer et al., 2017).

An on-road study found that manually entering a destination into a navigation system is more likely to involve braking errors (e.g. sudden and erratic braking to hazards and traffic signals) (Dingus et al., 1989, cited in Goodsell, Cunningham & Chevalier, 2019). This finding has been confirmed in simulated driving studies, which showed that manual destination input is associated with increased reaction time to roadway events, greater eyes-off-road time, more frequent glances off the forward roadway and slower speeds (Chiang, Brooks, & Weir, 2001 and Maciej & Vollrath, 2009, cited in Goodsell, Cunningham & Chevalier, 2019).

The common element in all high-risk text-based interactions is the driver's eyes and mind off the road and hand(s) off the wheel for a considerable length of time. This also applies not just to entering text but also to reading large amounts of text and other characters. A naturalistic driving study found that reading can increase the risk of a crash or near-crash event by almost 10 times (Dingus et al., 2016, cited in Goodsell, Cunningham & Chevalier, 2019).

The consultation RIS explained how text-based interactions with printed materials inside the vehicle (books, magazines, newspapers) can result in demands on drivers comparable with technology-based mediums (Dingus et al., 2016, cited in Goodsell, Cunningham & Chevalier, 2019). This led to proposing that the prescriptive option prohibits such interactions explicitly. However, following further considerations, the NTC determined that such interactions would most likely be addressed by a prescriptive approach to discourage drivers to look away from the roadway (also proposed in this option).

From this evidence base, the NTC concludes that a prescriptive approach to regulating driver distraction should seek to ensure that all high-risk text-based interactions with technology are prohibited. This means prohibiting reading and entering any text (and numbers) that could take the driver's eyes and mind off the road and hand(s) off the wheel for a considerable length of time. Text-based distractions include text messages, emails and Word documents, as well as browsing long contact lists and music playlists.

Video and image-based interactions

Video and other image-based sources of driver distraction have also been found to have significant impacts on driving performance. Research found that participants watching and operating a DVD player were less likely to notice outside events (like a vehicle at the front using its brakes), reacted slower to the hazards and were also more likely to use the brakes and take turns at higher lateral accelerations (Funkhouser & Chrysler, 2007).

Engaging with video-based communication apps has significant road safety impacts. Research commissioned by AT&T in the US on mobile phone interactions by drivers aged 16–65 found that 10 per cent use a video chat app (such as Skype or FaceTime) while driving (AT&T, 2015). The results of drivers engaging in this activity can be fatal, as proven by a highway crash caused by a driver using FaceTime that resulted in the death of a five-year-old (The Washington Post, 2017).

From this evidence, the NTC considers that a prescriptive approach to regulating driver distraction should target all video and image-based interactions with technology that are not linked to vehicle information and are not part of a system's visual interface. This means prohibiting drivers from viewing any video and photos and playing games.

However, driver engagement with video-based safety-enhancing functionalities would be exempted from the application of the prescriptive rules under this option. These safety-enhancing functionalities include video feed from rear-view screens, passenger safety cameras for buses and load-monitoring cameras for trucks and trailers.

Manual interactions with portable devices

While the text-based interactions that result from visual–manual distractions are considered the ones with the most severe impact on driving performance, manual interactions with technology can also result in increased risk of crash. A naturalistic driving study found that a driver reaching for a mobile phone is more than four times more likely to crash than a driver not executing a secondary activity (Dingus et al., 2016). A study into commercial vehicles found that reaching for an electronic device can increase the risk of crashing by more than sixfold (Olson et al., 2009).

For these reasons, the NTC considers that a prescriptive approach to regulating driver distraction should propose an approach to non-mounted devices that is highly restrictive regarding physical and visual interactions. This means that all visual and physical interactions with non-mounted devices would be prohibited.

Long eyeglances away from the road

A prescriptive rule seeking to discourage drivers to look away from the roadway for more than two seconds could cover behaviours and interactions associated with other varied sources of distraction. This aligns with evidence that eyeglances away from the road for more than two seconds significantly increases individual near-crash/crash risk (Klauer et al., 2006). The purpose of this threshold is to still allow drivers to perform safety-enhancing activities such as using the rear-view mirrors and scanning the driving environment (Klauer et al., 2006).

In its submission to the issues paper, a state government agency recommended that this project considers a two-second threshold. A paper published by the Monash University Accident Research Centre also recommended including the two-second threshold in the road rules relating to driver distraction (Young & Lenné, 2012).

The NTC considers that a fully prescriptive approach to regulating driver distraction would have to rely on this type of rule to address distractions that are the result of non-technology-based tasks. Such a rule would also address the unsafe use of technology in cases when the driver is executing permitted tasks. Therefore, this option would seek to deter any eyeglances away from the roadway that are longer than two seconds.

Table 1 lists all these targeted interactions, with examples of their associated sources of distraction and high-risk behaviours.

Table 1. Interactions addressed under the prescriptive option and their sources of distraction

Interaction	Observable high-risk behaviour	Source of distraction	Type of distraction
Text-based interactions – entering text such as words, sentences and numerical sequences	Eyes off road; hand off wheel	Dialling on a mobile phone (handheld or mounted)	Visual + manual + cognitive
	Eyes off road; hand off wheel	Texting on a mobile phone (handheld or mounted)	Visual + manual + cognitive
	Eyes off road; hand off wheel	Entering a destination in a navigation device	Visual + manual + cognitive
	Eyes off road; hand off wheel	Entering text and numbers in vehicle-integrated visual display (e.g. touchscreen functions)	Visual + manual + cognitive
	Eyes off road; hand off wheel	Texting on a smartwatch (worn on the wrist or mounted)	Visual + manual + cognitive
	Eyes off road; hand off wheel	Entering text while searching for music on vehicle-integrated music system	Visual + manual + cognitive
	Eyes off road; hand off wheel	Entering an address in a dispatch device	Visual + manual + cognitive
	Eyes off road; hand off wheel	Handwriting on a touchscreen	Visual + manual + cognitive
Text-based interactions – reading text such as words, sentences and numerical sequences	Eyes off road; hand off wheel	Reading ebook (e.g. Kindle or another tablet)	Visual + manual + cognitive
	Eyes off road; hand off wheel	Reading emails from a mobile phone, tablet or another device with internet access	Visual + manual + cognitive
	Eyes off road; hand off wheel	Reading messages from text-based communication apps (e.g. SMS, WhatsApp or similar) on a mobile phone, smartwatch, tablet or another device with internet access	Visual + manual + cognitive
	Eyes off road; hand off wheel	Browsing the internet, (including social media) on a mobile phone, tablet or another device with internet access	Visual + manual + cognitive
Video and image-based interactions	Eyes off road	Video call (e.g. Skype, FaceTime or similar) on any in-vehicle or portable device	Visual + cognitive
	Eyes off road	Looking at a digital photo library	Visual + cognitive
	Eyes off road	Watching a DVD	Visual + cognitive
	Eyes off road	Streaming video from in-vehicle or portable displays	Visual + cognitive
Manual interactions with non-mounted devices	Eyes off road; hand off wheel	Reaching for a phone	Visual + manual
	Hand off wheel	Talking or listening on a handheld phone	Manual + cognitive
	Eyes off road; hand off wheel	Reaching for an electronic device	Visual + manual
	Eyes off road; hand off wheel	Tapping or scrolling on a smartwatch screen (worn on the wrist)	Visual + manual
	Eyes off road; hand off wheel	Using a calculator	Visual + manual + cognitive

Interaction	Observable high-risk behaviour	Source of distraction	Type of distraction
Visual interaction – eyes off the road	Eyes off road; hand off wheel	Reaching for an object distant from driver	Visual + manual
	Eyes off road	Long eyeglances at objects inside or outside the vehicle	Visual
	Eyes off road; hand off wheel	Long and unsafe interactions with in-vehicle visual display (e.g. touchscreen menu) and vehicle controls	Visual + manual
	Eyes off road; hand off wheel	Reading printed materials inside the vehicle	Visual + manual
	Eyes off road; hand off wheel	Eating in a way that could have a negative or dangerous impact on driving performance	Visual + manual
	Eyes off road; hand off wheel	Applying make-up / personal grooming	Visual + manual + cognitive
	Eyes off road	Interacting with or looking at passengers in a way that could have a negative or dangerous impact on driving performance	Visual + cognitive

3.2.3 Treatment of technology devices under this option

This option seeks to treat different driver behaviours and interactions consistently, based on the risk levels estimated by the evidence base outlined in subsection 3.2.2. Given that safe driver interactions with technology can be determined by certain device-specific factors, the different permitted and prohibited behaviours and interactions were grouped by broad device categories based on such factors.

Inbuilt and mounted devices

This refers to technology inbuilt into the vehicle or secured in a mounting affixed to the vehicle that is capable of wireless communication, electronic data retrieval or displaying electronic data by inbuilt display or projection (projection has been included to capture technology such as heads up displays). Examples of inbuilt and mounted technology include:

- mobile phones
- tablets
- laptops
- electronic games
- mp3 players
- heads-up displays
- integrated infotainment system (technology that provides drivers with information such as vehicle diagnostics, road and traffic conditions, navigation information, weather conditions, communication services, entertainment and, in some situations, warning systems and emergency help systems)
- navigational or intelligent highway and vehicle system equipment
- an auxiliary display/projection used to control an electronic device – a smartphone connected to an infotainment system (through a wired or wireless connection)

- dispatch systems and other mounted devices necessary to perform the professional/commercial driving task.

Portable devices

This refers to technology not secured in a mounting affixed to the vehicle that is capable of wireless communication, electronic data retrieval or displaying electronic data by inbuilt display or projection (projection has been included to capture technology such as heads up displays). Examples of portable devices include:

- mobile phones
- tablets
- laptops
- electronic games
- mp3 players
- heads-up displays
- dispatch systems.

Wearables

This refers to technology not secured in a mounting affixed to the vehicle that is worn by the driver and is capable of wireless communication, electronic data retrieval or displaying electronic data by inbuilt display. This applies to devices designed or manufactured to be worn or that are affixed to an accessory commercially designed or manufactured to enable the device to be wearable.

The interactions required for using these types of devices usually resemble those of HMIs for inbuilt devices. That is, minimal manual input. These devices are affixed to the driver's body and do not need to be reached and held by the driver, and their display is usually within the driver's line of sight. However, the reduced size of these devices requires additional restrictions to minimise the potential risks resulting from interactions (visual and manual) that could take the driver's attention off the driving task for longer periods.

For this reason, it is proposed that wearables be subject to a more stringent approach than inbuilt and mounted devices under this option.

Examples of wearable devices include:

- smartwatches
- smart glasses
- heads-up displays for cyclists

Motorcycle helmets

Motorcycle helmet technology has evolved greatly in recent years. There are helmets available now with inbuilt communications technology, safety features such as rear-vision cameras and navigation (Cervantes, 2019). These functionalities seek to provide their users with communication capabilities and access information associated with the operation of the vehicle without taking their eyes off the road and/or their hand of the handlebar. In a submission to the consultation RIS, the Motorcycle Council of New South Wales highlighted the need for clarity to motorcycle riders about the lawful use of helmet devices in any new regulatory approach for distraction (Motorcycle Council of New South Wales, 2019).

Helmets are affixed to the rider's body (head) when in use, and displays are designed to be within their line of sight. As with wearables, the interactions required for using these types of technology usually require minimal manual input and encourage users to keep their eyes on the road. Strict restrictions on visual and physical interactions would be unfeasible for these technologies because drivers could risk being penalised without using them. Under this option, it is proposed that motorcycle helmet technology be treated the same way as inbuilt and mounted devices. This means allowing safer access to communication capabilities and functions associated with the operation of the vehicle while prohibiting any other functions.

3.2.4 Permitted and prohibited behaviours and interactions under this option

For this option, the NTC has developed a list of permitted and prohibited driver behaviours and interactions with technology based on the technology-neutral focused approach discussed in subsection 3.2.2 and the device categories explained in subsection 3.2.3.

This means that this option will focus on deterring long eyeglances off the roadway and text-based, video and imaged-based and manual interactions with technology devices. The technology-related permitted interactions are grouped based on factors common to each broad device category, namely, inbuilt and mounted devices, wearables, motorcycle helmets and portable devices.

The permitted and prohibited behaviours and interactions under this option, which would apply to the driver of a vehicle that is moving or stationary (but not parked), are:

1. **Inbuilt and mounted devices, and motorcycle helmets:**
    a. Drivers would be permitted to touch and have visible the display of the device to perform the following interactions:
        i. accept, reject and initiate an audio call
        ii. stream, play or listen to music or audio files
        iii. use functions associated with safety and the operation of the vehicle (e.g. climate control, vehicle diagnostics, advanced driver-assistance systems, displays and/or monitors associated to blind spot cameras, rear-view cameras, dashboard cameras and CCTV cameras)
        iv. use functions that monitor the driver's behaviour and/or condition
        v. use a dispatch system or device or an app used as part of the professional driving task (only if it can be done without manually entering words, sentences and numerical sequences)
        vi. navigation functions
    b. However, when performing interactions permitted above, drivers would be prohibited to:
        i. manually enter words, sentences and numerical sequences (e.g. phone number, an address for navigation, entering the name of an artists or song)
        ii. scroll (e.g. scroll through contact lists or playlists).
2. **Wearable devices**
    a. Drivers would not be permitted to touch a wearable device
    b. Drivers would not be permitted to have the screen visible while the display operating, unless it is being used for the following functions:
        i. audio calls
        ii. streaming, playing or listening to music or audio files
3. **Portable devices:**

a. Drivers would not be permitted to:
    i. touch a portable device
    ii. have visible the device's inbuilt display while the display is operating

4. **Applicable to all secondary tasks:**
    a. Eyeglances off the roadway longer than two seconds are prohibited

Under this option, drivers would be prohibited to view or interact with technology in any way that is not specifically permitted. However, the NTC notes that any permitted unsafe interactions with technology would still be addressed by the prohibition of eyeglances off the roadway longer than two seconds.

3.2.5 Offences in the current rules maintained under this option

This option would preserve an offence already included in rule 299 (sub-rule 299(1b)) about displays that could distract other drivers. This inclusion would prevent circumstances in which display positioning does not distract the driver of the vehicle the display is in but affects other drivers' focus on the driving task.

The prescriptive option would also maintain the legislature's resolve to ensure drivers have a clear view of the road and traffic in all directions (sub-rule 297(2)). Such an offence would address the use of devices positioned in a way that blocks the clear view of the road and traffic.

Offences in sub-rules 297(1a) and (3) would also be maintained under this option. These rules target circumstances in which animals and passengers can impair the driver's control of the vehicle.

3.2.6 Offences in the current rules not maintained under this option

Offences in rules 297(1), 299 and 300 would no longer be required because their objectives and associated sources of distraction would be addressed by the prohibited behaviours and interactions proposed in the previous subsections.

The offence in rule 297(1) (a driver must have proper control of the vehicle) would be replaced by an offence deterring drivers from looking away from the roadway for more than two seconds at a time. Offences in rules 299 and 300 would duplicate the new offences under this option seeking to regulate interactions with technology devices. Rules 299 and 300 are also incompatible with a technology-neutral approach as directed by the Transport and Infrastructure Council.

3.2.7 Exemptions in the prescriptive option

This option maintains various exceptions from the current road rules because they serve a practical purpose and do not represent a significant safety risk to road users.

Offences resulting from the approach proposed in this option would not apply to:

- Police or emergency vehicles (as currently established in sub-sub-rules 299(2ba) and 300(1b)).
- Displays indicating a destination or functioning as a bus sign (as established in sub-sub-rule 299(2a)).
- Moving and static images linked to vehicle information or as part of the system's visual interface.

- Video-based safety-enhancing functionalities, such as blind spot, rear and side-view screens, dashboard cameras, as well as closed-circuit television security cameras (and their associated monitors).
- Notifications of receiving text messages, emails, video messages or similar communications.
- Information displayed on a device's locked screen (e.g. time, date, battery power)
- The use of devices for tap-and-go payment in a drive-through while the vehicle is stationary.
- CB radios or any other two-way radios.
- Wearable devices without a display or projector, for example, smart clothing (i.e. jackets with tap-based smartphone controls), headphones, earphones and Bluetooth earpieces would not be subject to this policy.

The use of a portable or wearable device for tap-and-go payment in a drive-through would be exempted from restrictions to physical and visual interactions with non-mounted portable devices. The NTC proposes to include the requirement of the vehicle being stationary for the driver to lawfully use a mobile device for tap-and-go payments. The driver would be required to put away or place the portable device in a secured mounting before the vehicle starts moving.

In addition, the offence resulting from addressing driver impairment caused by animals (as discussed in subsection 3.2.5) would not apply to a motorbike rider who rides with an animal between themselves and the handlebars for a distance not further than 500 metres on a road for the purpose of farming (sub-rule 297(4)).

The exemption for police and emergency vehicles is to enable these drivers to receive critical information for operational reasons. These drivers face life-and-death situations as part of their jobs. For example, a single first responder driving into a high-risk situation could experience restricted airtime due to radio traffic and the only access to critical information is through their mobile phone. The NTC recognises the valuable work first responders provide to our community and will ensure that this project does not create additional barriers or challenges.

A number of video-based safety-enhancing devices such as rear-view screens, passenger safety cameras for buses and closed-circuit monitoring cameras are currently being used by professional and non-professional drivers. Drivers also use dashboard cameras to provide video evidence in the event of an accident. The NTC has not found evidence of the use of these devices resulting in an increased risk of a crash.

The general exemption for driving aids in rules 299 would not be maintained under the technology-neutral approach in this option. Addressing high-risk behaviours or interactions regardless of the source of distraction would make this exception inapplicable and inconsistent with the project objectives. However, the NTC acknowledges that professional drivers are required to use dispatch systems as part of their job and that these systems provide information relevant to the safe execution of the professional/commercial task.

As NatRoad noted in its submission to the consultation RIS, there needs to be a distinction between the technology increasingly used to assist drivers (that adds to the efficiency of an operation) and technology used for discretionary personal tasks (NatRoad, 2019b). For these reasons, the NTC does not propose any additional restrictions for dispatch systems, devices using an app as a dispatch system and any other device or function that is part of the professional/commercial driving task, apart from the prohibition to type text or numbers.

CB radios are a valuable tool for commercial drivers. A naturalistic driving study on commercial vehicles found that these devices have a low impact on driving performance (odds ratio lower than 1) and provide a significant protective effect (Olson et al., 2009).

3.2.8 Amendments to the Australian Light Vehicle Standards Rules (ALVSRs) and Australian Heavy Vehicle Standards Rules (AHVSRs)

Rule 41 of the ALVSRs and rule 18 in Schedule 2 - Part 2 of the AHVSRs establish safety requirements regarding the positioning and mounting of visual display units and television receivers. If the approach proposed in this option is adopted by the Australian Road Rules, these rules may require amendments in line with the terminology used to describe in-built and mounted technology.

The NTC would lead the drafting of these amendments as part of the regular maintenance process.

3.2.9 Restrictions and relaxations

The prescriptive option would result, in a few cases, in more restrictive regulation for certain interactions with devices compared with the status quo. In other cases, this option introduces a few relaxations.

Such changes are the result of a technology-neutral focus, which consistently restrict high-risk interactions across different devices and functionalities.

Added restrictions

This option would not permit entering text (words, sentences and numerical sequences) while the vehicle is moving or stationary (but not parked) with any type of mounted, inbuilt and worn device, regardless of the functionality. This would apply to devices currently exempt from this type of restriction such as:

- inbuilt and mounted dispatch systems (and other devices used as part of the professional driving task)
- inbuilt and mounted navigation systems.

This option would also prohibit such text interactions in in-vehicle information systems explicitly, regardless of the function used. This type of technology was not widely adopted by manufacturers at the time the Australian Road Rules were drafted and, therefore, it is considered that such interactions were not targeted. This means that functions that align with the current definition of driver's aids would also be subject to this prohibition.

Finally, the current exemption in rule 300 that allows drivers to hold a non-mounted device if they are in the process of giving the body of the device to a passenger in the vehicle would not be maintained. This means that a driver would not lawfully be able to hold a non-mounted device if they are giving it to a passenger.

Relaxations from the status quo

This option would also result in a relaxation of the current road rules in a few cases.

Drivers would be permitted to touch, tap or push a button to operate permitted functionalities in mounted (and inbuilt) devices. For example, ridesharing and delivery drivers would be allowed to accept jobs when using work-specific apps installed in their mounted devices while their vehicle is moving, provided they are not required to enter text information in the

process. In addition, the use of devices for tap-and-go payment in a drive-through would be permitted provided the vehicle is stationary.

Using voice commands is intended to be legal under this option because hands-free operation of devices is preferable to manual. The NTC is aware of research that indicates that interactions can be cognitively demanding and should not to be performed indiscriminately while driving (Strayer, et al., 2016). However, various studies suggest that using voice-controlled functions may be less detrimental to driving performance than visual–manual interactions with technology (Simmons et al., 2017, cited in Goodsell, Cunningham & Chevalier, 2019).

The banning of voice controls would also represent significant enforcement challenges. Police members are likely to find it difficult to be able to distinguish someone on a hands-free phone call from someone using voice controls to compose a text message or someone singing along to music. Under these circumstances there is a risk that police enforcement would be either overzealous or too lenient.

Under this option, driver engagement in any interactions or behaviours that result in observable impairment of driving performance could be subject to the prohibition addressing long eyeglances off the road or the states' and territories' legislation regarding careless or negligent driving.

3.3 Option 3: Performance-based

Key points

- This option relies primarily on an outcomes-based approach to address driver distraction.
- The two performance-based sub-rules in road rule 297 would address a wider range of sources of distraction:
  - Sub-rule 297(1) requires that drivers maintain proper control of their vehicle.
  - Sub-rule 297(2) requires drivers to have clear view of the road and traffic in all directions, which can address distraction sources such as reaching for objects, talking to passengers in the rear seat and the use of devices positioned in a way that blocks the clear view of the road and traffic.
- This option would maintain the prescriptive sub-rules explicitly targeting circumstances in which animals and passengers can impair the driver's control of the vehicle.

This option seeks to assess the effectiveness and efficiency of a performance-based approach for regulating driver distraction. Seven submissions to the issues paper expressed a preference for a performance-based approach for addressing driver distraction.

One state government road safety agency, the Australian Mobile Telecommunications Association (2019), ANCAP (2019), DriveRisk Australasia (2019), Royal Automobile Association of South Australia (2019), Royal Automobile Club of Victoria (2019) and Insurance Australia Group (2019) considered that a performance-based approach would be better placed for addressing the current and future distractions that can arise from technological and non-technological sources.

3.3.1 Description of the performance-based option

This option proposes a predominantly performance-based approach for addressing most sources of driver distraction. This approach would target the effects of distracting activities, as well as the sources of distraction prior to a crash. This option could mitigate the consequences of a wide range of sources of distraction regardless of whether they are technology-based or not primarily based on two offences included in sub-rules 297(1) and 297(2).

Sub-rule 297(1) – A driver must have proper control of the vehicle

The offence in this sub-rule addresses a broad range of factors that can decrease a driver's ability to safely control a vehicle. Such factors include any type of distraction that causes the driver to drive in a manner determined as failing to have proper control of a vehicle.

The driver's engagement in non-technology-based activities can result in failing to have proper control. The consultation RIS cited evidence indicating that drivers engage in conventional, or non-technology-based, activities more frequently than technology-based ones, which can be just as, or even more, risky than technology-based tasks.

For example, an Australian study found that the secondary tasks more commonly performed by drivers include looking at an object or event outside the vehicle, attending to personal hygiene and adjusting non-critical vehicle devices (e.g. seatbelt) (Young et al., 2018). This aligns with a study that revealed that a larger proportion of drivers involved in accidents are distracted by eating or drinking (1.7 per cent) than by talking on a mobile phone (1.5 per cent) (Stutts et al., 2001, cited in Young & Regan, 2003).

Moreover, lawful and unlawful engagement with technology can also decrease a driver's ability to control a vehicle. This decision RIS has referred to several studies that demonstrate how a driver's use of technology can impair their ability to detect hazards, react to other road users or even maintain consistent direction and speed. In addition to research into the impact of mobile phone use while driving, a naturalistic driving study found that, for example, driver use of other in-vehicle devices (e.g. navigation, vehicle settings) could be a factor in up to 3.8 per cent of crashes (Dingus et al., 2016).

Under this option, unsafe driver engagement in these and other activities (regardless of whether they are lawful) would be addressed by the offence in sub-rule 297(1).

Sub-rule 297(2) – A driver must have a clear view of the road and traffic in all directions

This sub-rule provides another broad offence that outlines the outcome sought by the legislator. This offence can address those sources of distraction that could impair a driver's ability to have a clear view of the road.

For example, naturalistic driving studies estimated that reaching for objects (moving and non-moving) could increase the crash risk by up to nine times (Dingus et al., 2016; Klauer et al., 2006). While these studies do not specify whether that level of risk includes considerations about visibility factors, the NTC considers that it is appropriate to assume that reaching for an object located far from the driver could affect the driver's ability to have a clear view of the road and traffic.

Similarly, driver use of a device that is mounted in a position that obstructs the clear view of road and traffic would be in breach of this sub-rule.

Under this option, driver engagement in any activity (regardless of whether it is lawful) that results in impairment of the driver's view of the road and traffic would be addressed by the offence in sub-rule 297(2).

3.3.2 Clarifying proper control

The consultation RIS initially proposed to include examples of proper control that address key functions of the driving task that have observable or identifiable safety consequences. These examples were:

- having directional control
- having acceleration and speed control
- detecting and safely responding to objects, events and other road users.

Further consultation with road safety agencies and police highlighted a number of challenges and potential unintended consequences from the use of examples in sub-rule 297(1). Such examples could overlap with and narrow other offences in the states' and territories' associated legislation, such as careless and negligent driving.

If vehicle behaviours such as swerving, crossing lanes or uneven speeds were included as examples for the proper control offence, this may indicate a legislative intention that these behaviours are not to be captured by other driving offences. This could have adverse implications for prosecuting careless or negligent driving offences.

From a practical perspective, more information on the rule may also not necessarily lead to better enforcement or public understanding of outcomes. Members of the public may not seek to clarify their driving behaviours from legislation, and driver education and information campaigns could provide more effective strategies.

This engagement has also revealed the challenges of accommodating the different interpretations of proper control and careless or negligent driving across jurisdictions within one set of examples. The object of the Australian Road Rules is to provide uniform rules across Australia and to ensure uniform implementation of any proposed changes or amendments. Developing a set of examples of proper control that could be uniformly adopted by all jurisdictions may not be feasible at this stage.

NatRoad (2019b) has raised the road freight industry's concern regarding the lack of clarity of the offence in rule 297(1). This body's members have noted the risks of erroneous enforcement of this rule from lack of clear and consistent understanding from police and suggest a preference for increasing the level of prescription into this rule.

In contrast, TMR's submission to the consultation RIS noted the need to maintain flexibility in sub-rule 297(1) (Department of Transport and Main Roads (Queensland), 2019). TMR considers that the intent of the rule is that a driver must be able to drive the vehicle in such way that the driver can reasonably respond to expected and unexpected events. By capturing this outcome, it ensures that dangerous outlier behaviours, not yet thought of by regulators, could be covered by enforcement.

Finally, the notion of failing to have proper control involves a broad range of factors beyond driver distraction. Such factors are likely to be out of the scope of this project.

The NTC has considered these and other positions when developing this approach and has concluded that the potential risks of including examples could outweigh any benefit of including them.

For this option, it is proposed that sub-rule 297(1) remains unamended in order to ensure:

- flexibility for capturing dangerous outlier behaviours
- uniform implementation of any proposed changes or amendments resulting from this project
- that there are no adverse implications for the successful prosecution of careless or negligent driving offences.

The NTC considers that the effectiveness of this option would, therefore, rely on education and information strategies that ensure clear and consistent understanding of the requirements for safe driving. States and territory road agencies already provide road users with guidelines explaining many of their requirements and responsibilities, which may require updating to reflect changes to the execution of the driving task from the introduction of new technologies and the impact of increasing vehicle automation.

3.3.3 Other offences in the current road rules maintained in this option

As with the prescriptive option, this option would also preserve the offences in sub-rules 297(1A) and (3). This seeks to prevent circumstances in which animals and passengers can impair a driver's control of a vehicle.

3.3.4 Offences in the current road rules not maintained under this option

Offences in rules 299 and 300 would not be maintained because their associated sources of distraction would be largely addressed by the outcomes-based approach in sub-rules 297(1) and 297(2) – that is, by their impact on the driver's control of the vehicle and visibility of the road and traffic.

3.3.5 Exemptions in the performance-based option

The exemption in sub-rule 297(4) would be part of this option to maintain the ability of farmers to ride a motorbike on a road with an animal between the rider and the handlebars for a short distance (500 metres or less).

None of the exemptions in rules 299 and 300 would be maintained under this option. Focusing on the effects of distraction on driving performance, regardless of the source of distraction, would make these exceptions inapplicable.

3.3.6 Restrictions and relaxations under this option

The performance-based focus of this option would result in a broad relaxation of the road rules because they would not prohibit specific behaviours or interactions with devices. In theory, all activities that do not impair the driver's proper control of the vehicle would be compliant under this option.

However, there are levels of driver engagement in lawful activities that could also deem unsafe and detrimental to the proper control of the vehicle. Furthermore, states and territories could apply their legislation for careless or negligent driving to regulate unsafe driver engagement in some of these activities.

3.4 Option 4: Hybrid

Key points

- The hybrid option consists of a combination of prescriptive and performance-based elements from the two preceding options.
- The prescriptive component explicitly indicates the permitted activities, underneath a broad prohibition to use devices while the vehicle is moving or stationary (but not parked).

- This ensures that only the lower risk interactions with technology that provide benefits to drivers are permitted, and all interactions found by research to carry a higher crash risk are prohibited.
- The prescriptive component indicates the permitted and prohibited interactions with technology determined by the following device categories: inbuilt and mounted; motorcycle helmets; portable; and wearable.
- This provides a binary (yes or no) decision-making framework for determining compliance regarding driver interactions with technology.
- The performance-based component consists of including current offences in rule 297(1) and 297(2).
- These performance-based rules would provide a tool to address both the observable driver and vehicle behaviours that cause and/or indicate the driver's lack of control of a vehicle.
- The performance-based element would still require the judgement of law enforcement officers to determine whether lawful behaviours (e.g. eating or unsafe engagement with driving-related tasks) would be deemed unsafe and therefore noncompliant.

3.4.1 Description of the hybrid option

This technology-neutral option combines elements from the two preceding options. Like the status quo option, this option proposes prescriptive and performance-based elements to address driver distraction.

The vast majority of our stakeholders expressed support for the hybrid option. Almost 90 per cent of responses to the consultation RIS agreed that this option provides the most effective approach for addressing the problem.

The prescriptive component of this option provides a limited list of permitted interactions with technology, based on those interactions found by research to carry a lower risk of crash. Those visual and manual interactions found to carry a higher risk are consistently addressed through a broad prohibition to use technology (while the vehicle is moving or stationary but not parked), with lower risk interactions permitted by exception. This approach is applied as consistently as practicable across four device categories. This is a departure from the status quo, which indicates what drivers can and cannot do with specific devices.

Appendix B lists high-risk interactions matched to their corresponding sources of distraction and the associated risk levels estimated by various studies.

The hybrid option also includes a performance-based approach for addressing sources of driver distraction that are difficult to regulate by prescriptive rules. This component would target both the causes and consequences of driver engagement in distracting activities, regardless of whether such activities are not explicitly prohibited by law. This option could mitigate the consequences of a wide range of sources of distraction regardless of whether they are technology-based or not primarily based on two offences included in sub-rules 297(1) and 297(2).

This option would ensure that all behaviours or interactions with technology associated with activities that have been found to significantly affect driving performance are prohibited, and simultaneously address the observable causes and consequences other behaviours and interactions. This combined approach would provide both a binary (yes or no) decision-

making framework for addressing high-risk behaviours as well as require the judgement of law enforcement officers to determine whether driver engagement in lawful activities (e.g. eating and drinking) would be deemed noncompliant.

The hybrid option recognises that drivers can safely execute non-driving-related tasks if they self-regulate their level of engagement and type of activity in response to the demands of the road environment. For example, activities like interacting with passengers are difficult to regulate because it would be challenging to determine and enforce a safe threshold. However, the consequences of unsafe engagement in this activity can be detected by the evidence of impairment of proper control of the vehicle.

This option would apply the definition of 'park' that is currently in the Australian Road Rules as well as the amendments in the 2019 amendment package to rules 299 and 300. This means that, for this option, parking a vehicle includes 'stop and allow the driver's vehicle to stay (whether or not the driver leaves the vehicle) even though the key is in the ignition and/or the engine is running'.

Appendix C sets out the policy elements of this option.

3.4.2 Prescriptive component under this option

The prescriptive element of this option is framed by a set of principles to ensure its alignment with the objectives of this project.

Key principles framing the prescriptive component

1. **Prescriptive rules must encourage safer road use**

The prescriptive rules should contribute to reducing harm from driver distraction by clearly indicating what unsafe-use technology looks like to road users.

2. **All interactions with technology would be subject to the requirement of the driver having proper control**

This means that unsafe interactions with technology devices not prohibited by prescriptive rules could result in an offence being committed in relation to rule 297(1). The intent is to encourage safe use of technology regardless of whether an interaction is prohibited or not.

Proper control can encompass a range of behaviours and does not limit the application of other provisions (e.g. provisions in relation to driving without due care and attention, and dangerous operation of a motor vehicle).

3. **Resulting prescriptive rules need to be easy to understand and avoid unnecessary complexity**

It is intended that the prescriptive component under this option should aim at reducing the levels of ambiguity present in road rules 299 and 300 and avoid unnecessary complexity to ensure effective compliance and enforcement. This principle is in line with the Attorney General's Department's principles for clearer laws that establish that clearly written laws can be better understood, complied with and administered, and are essential for an accessible justice system (Attorney General's Department, 2019). Specifically, the Attorney General's Department states that:

- Laws should be no more complex than is necessary to give effect to policy.
- Legislation should enable those affected to understand how the law applies to them.

The underlying assumptions from this principle are:

- The number of device categories and associated sets of permitted interactions should be minimised where possible.
- Differentiated treatment for types/classes of vehicles should be avoided.
- Exceptions should be avoided where possible.
- Known safety risks should be the primary reason for breaching this principle.

For example, under this option, simplicity is the reason for:

- proposing to apply the same set of permitted functionalities for similar devices (which effectively results in only three approaches consistently applied across similar devices and functionalities)
- proposing to adopt the existing definition of parking for all types of vehicles.

4. Prescriptive rules should apply to technology found by research to result in a high road safety risk associated with driver distraction

It is intended that the prescriptive rules from this option focus on better outcomes for road users regardless of the technology used. The hybrid option should result in prescriptive rules that manage the distraction risks posed by emerging technology while encouraging innovation and ensuring technology that has the potential to improve safety is not inhibited.

The different functionalities reported as being used by drivers include voice phone calls and interactive media, such as browsing the internet, texting, taking photos or using apps (Department of Infrastructure, Regional Development and Cities, 2018). All these functionalities require a wireless device that can support wireless communication, retrieve electronic data and present such data on some type of display or projection.

The NTC considers it highly unlikely that a future device without any of these capabilities would be able to provide functionalities expected to distract drivers from executing the driving task. That is why the prescriptive rules would focus on driver use of ‘smart’ devices. This refers to devices capable of wireless communication, electronic data retrieval or displaying electronic data by display (inbuilt or separate to the device) or projection.

The problem statement outlines the emerging technology that provides functionalities that have been found by research to result in driver distraction. This option proposes that the types of devices that provide the capabilities and functionalities discussed above be accommodated within the following categories:

- inbuilt and mounted devices
- portable devices
- wearables
- motorcycle helmets.

These devices are described in greater detail in subsection 3.2.3.

The underlying assumptions are:

- The devices categories that would be subject to the proposed prescriptive rules are broad enough to cover all technology that provides functionalities that are known to result in driver distraction.
- A distinction between ‘display’ and ‘projection’ pre-empts new technologies that don’t need a display to be projected on (such as holographic projections).

5. Prescriptive rules should apply to device interactions and functionalities known to result in a high risk of crash

As in the prescriptive option, the prescriptive component of this option would adopt the technology-neutral focus to deter those visual and visual–manual interactions found to result in high crash risk. This component addresses three broad categories of interactions with technology:

- text-based interactions
- video and image-based interactions
- manual interactions with portable devices.

Subsection 3.2.2 explains why these interactions are considered to significantly reduce driver performance. Table 2 lists these interactions with their associated sources of distraction and risky behaviours.

Any unsafe driver behaviour when using technology, including the permitted interactions proposed in this subsection, would be addressed by the performance-based component of this option (as per the first principle).

The underlying assumptions are:

- Text-based interactions should not be permitted where practicable.
- Video and image-based interactions should not be permitted where practicable.
- It is not feasible to prohibit all physical interactions with inbuilt/mounted and motorcycle helmets.
- All visual and physical interactions with portables (regardless of functionality) should be prohibited where practicable.

6. Prescriptive rules should be enforceable

The NTC considers that legislation should be enforceable, not acting as guidelines or educational materials. Following the public consultation process for the consultation RIS and direct engagement with road safety agencies, police and other stakeholders, prescriptive rules targeting long eyeglances off the roadway and voice-based interactions have been determined unenforceable.

Police would find it practically impossible to measure the time drivers take their eyes off the roadway in a dynamic road environment. Likewise, it is unlikely that officers would be able to distinguish someone on a hands-free phone call from someone using voice controls to compose a text message or someone singing along to music. Under such circumstances there is a risk that police enforcement would be either overzealous or too lenient.

Furthermore, NatRoad's submission to the consultation RIS provided scenarios in which drivers may be required to take their eyes from the road for more than two seconds for safety reasons: their need for heightened awareness around overhead bridges in isolated areas, or to detect any signs of human activity (i.e. rock throwers or potential suicide attempts). These safety measures could be in breach of the road rules should an offence prohibiting eyeglances off the roadway be enforced.

For these reasons, the prescriptive component of the hybrid option does not seek to target long eyeglances off the roadway and voice-based interactions. It is proposed that long eyeglances off the roadway and unsafe voice-based interactions are addressed/discouraged through:

- the requirement for drivers to have proper control (as per principle 1)
- deterring all high-risk visual interactions (as per assumptions in the rationale section)
- driver education.

The relevant underlying assumptions are:

- 'Permitted' does not mean 'encouraged'.
- The observable causes and consequences of long eyeglances off the roadway would be captured by the offence in rule 297(1).
- While cognitively distracting, voice-based interactions are usually less detrimental to driver performance than manual interactions.
- The voice-based interactions with the highest associated risks could be better addressed through not permitting higher risk visual interactions (i.e. not permitting to have text messages or emails on a display visible to the driver).
- Voice recognition technology is expected to improve its reliability over time.

This principle differentiates between impossibility to enforce from instances in which certain circumstances may make it difficult for police to detect infringements. The challenges police may sometimes face when enforcing the proposed policy (such as limited visibility of what is occurring inside vehicles and drivers covering their infringing from police) would apply equally to any existing and future rules targeting events taking place within the vehicle. While acknowledging those challenges, the NTC recognises that introducing prescriptive legislation that provides further clarity about what drivers should not do with specific devices could result in road safety benefits (McCartt et al., 2010, cited in Regan & Prabhakharan, 2019).

Table 2. Interactions addressed under the prescriptive option and their sources of distraction

Interaction	Observable risky behaviour	Source of distraction	Type of distraction
Text-based interactions – entering text such as words, sentences and numerical sequences	Eyes off road; hand off wheel	Dialling on a mobile phone (handheld or mounted)	Visual + manual + cognitive
	Eyes off road; hand off wheel	Texting on a mobile phone (handheld or mounted)	Visual + manual + cognitive
	Eyes off road; hand off wheel	Entering a destination in a navigation device	Visual + manual + cognitive
	Eyes off road; hand off wheel	Entering text and numbers in a vehicle-integrated visual display (e.g. touchscreen functions)	Visual + manual + cognitive
	Eyes off road; hand off wheel	Texting on a smartwatch (worn on the wrist or mounted)	Visual + manual + cognitive
	Eyes off road; hand off wheel	Entering text while searching for music on a vehicle-integrated music system	Visual + manual + cognitive
	Eyes off road; hand off wheel	Entering an address in a dispatch system	Visual + manual + cognitive
	Eyes off road; hand off wheel	Handwriting on a touchscreen	Visual + manual + cognitive
Text-based interactions – reading text such as words, sentences and numerical sequences	Eyes off road; hand off wheel	Reading an ebook (e.g. Kindle or another tablet)	Visual + manual + cognitive
	Eyes off road; hand off wheel	Reading emails from a mobile phone, tablet or	Visual + manual + cognitive

Interaction	Observable risky behaviour	Source of distraction	Type of distraction
		another device with internet access	
	Eyes off road; hand off wheel	Reading messages from text-based communication apps (e.g. SMS, WhatsApp or similar) on a mobile phone, smartwatch, tablet or another device with internet access	Visual + manual + cognitive
	Eyes off road; hand off wheel	Browsing the internet, (including social media) on a mobile phone, tablet or another device with internet access	Visual + manual + cognitive
	Eyes off road; hand off wheel	Reading long-format text from a dispatch device	Visual + manual + cognitive
Video and image-based interactions	Eyes off road	Video call (e.g. Skype, FaceTime or similar) on any inbuilt, mounted or portable device	Visual + cognitive
	Eyes off road	Looking at a digital photo album	Visual + cognitive
	Eyes off road	Watching a DVD	Visual + cognitive
	Eyes off road	Streaming video from inbuilt, mounted or portable displays	Visual + cognitive
Manual interactions – portables	Eyes off road; hand off wheel	Reaching for a phone	Visual + manual
	Hand off wheel	Talking or listening on a handheld phone	Manual + cognitive
	Eyes off road; hand off wheel	Reaching for an electronic device	Visual + manual
	Eyes off road; hand off wheel	Entering or reading a text message on a handheld phone	Visual + manual + cognitive

Permitted and prohibited interactions

In principle, driver use of technology will be prohibited while the vehicle is moving or stationary (but not parked). Drivers will only be permitted to use technology in exceptional instances provided below:

2. **Inbuilt and mounted devices, and motorcycle helmets:**
    a. Drivers would be permitted to touch and have visible the display of the device to perform the following interactions:
        i. accept, reject and initiate an audio call
        ii. stream, play or listen to music or audio files
        iii. use functions associated with safety and the operation of the vehicle (e.g. climate control, vehicle diagnostics, advanced driver-assistance systems, displays and/or monitors associated to blind spot cameras, rear-view cameras, dashboard cameras and CCTV cameras)
        iv. use functions that monitor the driver's behaviour and/or condition
        v. use a dispatch system or device or an app used as part of the professional driving task (only if it can be done without manually entering words, sentences and numerical sequences)
        vi. navigation functions

b. However, when performing interactions permitted above, drivers would be prohibited to:
    i. manually enter words, sentences and numerical sequences (e.g. phone number, an address for navigation, entering the name of an artists or song)
    ii. scroll (e.g. scroll through contact lists or playlists).

3. **Wearable devices**
    a. Drivers would not be permitted to touch a wearable device
    b. Drivers would not be permitted to have the screen visible while the display operating, unless it is being used for the following functions:
        iii. audio calls
        iv. streaming, playing or listening to music or audio files
4. **Portable devices:**
    a. Drivers would not be permitted to:
        i. touch a portable device
        ii. have visible (to the driver in the normal driving position) the device's inbuilt display while the display is operating

For all devices, except portables, touching means using hand or finger to operate the device.

For portables, touching means using hand or finger to operate the device, holding a portable device, or the device resting on any part of the driver's body; it does not include keeping the device in a pocket of the driver's clothing or in a pouch worn by the driver.

Portable technology will not be considered to be visible to the driver if it is being used by a passenger and is visible in the driver's peripheral vision (as long as the passenger is not actively trying to obstruct the driver's view of the road). The NTC considers that any passenger behaviour or activity that could impair the driver's ability to control the vehicle is sufficiently addressed by road rule 272.

Under this option, the driver of a vehicle would not be permitted to view or interact with inbuilt, mounted, wearable and motorcycle helmet technology in any way that is not specifically permitted above.

However, the NTC notes that any permitted interaction with technology would still be subject to the requirement of the driver having proper control of the vehicle (performance-based component of this option).

3.4.3 Performance-based component under this option

Just like with the performance-based option, the offence in rule 297(1) (a driver must not drive a vehicle unless the driver has proper control of the vehicle) would address all the sources of distraction, including those not targeted by the approach to regulate driver interactions with technology proposed in subsection 3.4.2 above.

For example, the offence in rule 297(1) would address unsafe driver use of lawful device functionalities. This same offence would also address unsafe driver engagement in non-technological tasks – for example, text-based interactions with printed materials inside the vehicle (books, magazines, newspapers), which can carry an associated crash risk comparable to technology-based mediums (Dingus et al., 2016, cited in Goodsell, Cunningham & Chevalier, 2019).

In addition, the hybrid option would include the offence in sub-rule 297(2), which provides a tool for addressing those sources of distraction that could impair a driver's ability to have a clear view of the road. This means that driver engagement in any activity (regardless of whether it is lawful) that results in impairment of the driver's view of the road and traffic would be addressed by the offence in sub-rule 297(2).

Table 3 provides a non-exhaustive list of driver behaviours that could be addressed by this component of the hybrid option.

Table 3. Behaviours addressed by the performance-based component of the hybrid option

Illegal interaction	Observable high-risk behaviour	Source of distraction	Type of distraction
Any observable behaviour, interaction or indication of impairment of the driver's ability to safely control the vehicle	Eyes off road; hand off wheel	Reaching for an object distant from the driver	Visual + manual
	Eyes off road	Long eyeglances at objects off the roadway	Visual
	Eyes off road	Long eyeglances at objects inside the vehicle	Visual
	Eyes off road; hand off wheel	Long and unsafe interactions with an in-vehicle visual display (e.g. touchscreen menu) and vehicle controls	Visual + manual
	Eyes off road; hand off wheel	Reading printed materials inside the vehicle	Visual + manual
	Eyes off road; hand off wheel	Eating in a way that could have a negative or dangerous impact on driving performance	Visual + manual
	Eyes off road; hand off wheel	Drinking in a way that could have a negative or dangerous impact on driving performance	Visual + manual
	Eyes off road	Interacting with or looking at a front passenger in a way that could have a negative or dangerous impact on driving performance	Visual + cognitive

3.4.4 Offences in the current road rules maintained under this option

This option would also seek to preserve the legislator's intent in relation to some of the offences in rules 297 and 299. The NTC considers that it is largely in line with findings from research regarding visual and visual–manual interactions being associated with a significant crash risk.

As with the prescriptive option, the hybrid option would also preserve the offences in:

- sub-rule 299(1b) about displays that could distract other drivers
- sub-rules 297(1A) and (3), which regulate circumstances in which animals and passengers can impair a driver's control of the vehicle.

3.4.5 Offences in the current rules not maintained under in this option

Just like with the prescriptive option, offences in rules 299 (except 299(1b)) and 300 would duplicate the new offences seeking to regulate interactions with technology devices. Rules

299 and 300 are also incompatible with a technology-neutral approach as directed by the Transport and Infrastructure Council.

3.4.6 Exemptions in the hybrid option

This option proposes the following exemptions from the approach in subsection 3.4.2:

- Police or emergency vehicles (as currently established in sub-sub-rules 299(2ba) and 300(1b)).
- Displays indicating a destination or functioning as a bus sign (as established in sub-sub-rule 299(2a)).
- Moving and static images linked to vehicle information or as part of the system's visual interface.
- Video-based safety-enhancing functionalities, such as blind spot, rear and side-view screens, dashboard cameras, as well as closed-circuit television security cameras (and their associated monitors).
- Notifications of receiving text messages, emails, video messages or similar communications.
- Information displayed on a device's locked screen (e.g. time, date, battery power)
- The use of devices for tap-and-go payment in a drive-through while the vehicle is stationary.
- CB radios or any other two-way radios.
- Wearable devices without a display or projector, for example, smart clothing (i.e. jackets with tap-based smartphone controls), headphones, earphones and Bluetooth earpieces would not be subject to this policy.

The current exemption (sub-rule 297(4)) to the offence resulting from addressing driver impairment caused by animals (as discussed in subsection 3.4.4) would be maintained under this option. This means that the offence in sub-rule 297(3) would not apply to the rider of a motorbike riding with an animal between themselves and the handlebars for a distance not further than 500 metres for the purpose of farming.

The broad exemption for driving aids in rules 299 and 300 (except for video displayed by safety-enhancing functionalities and long-form text related to functionalities as part of the professional/commercial driving task visible to the driver) would not be maintained under the hybrid option. Deterring high-risk behaviours or interactions regardless of the source of distraction would make this exception inapplicable and inconsistent with the project objectives.

3.4.7 Amendments to the ALVSRs and AHVSRs

As with option 2 (prescriptive), if the approach proposed in this option is adopted by the Australian Road Rules, rule 41 of the ALVSRs and rule 18 in Schedule 2 - Part 2 of the AHVSRs may require amendments in line with the terminology used to describe in-built and mounted technology.

The NTC would lead the drafting of these amendments as part of the regular maintenance process.

3.4.8 Restrictions and relaxations under this option

The hybrid option would result in the same new restrictions (in comparison with the status quo) as under the prescriptive option. The same restrictions over entering text and numbers would apply to any type of mounted, inbuilt and helmet technology (regardless of the functionality used) under this option.

This means that inbuilt and mounted dispatch systems (and other devices used as part of the professional driving task) and navigation systems, as well as in-vehicle information systems, would be subject to the prohibition to enter text such as words, sentences and numerical sequences.

In addition, the exemption in rule 300 currently permitting drivers to hold a non-mounted device if they are in the process of giving the body of the device to a passenger would not be maintained. Under this option, drivers would be prohibited from holding a non-mounted device to give it to a passenger.

In addition, the relaxations from the status quo proposed under the prescriptive option associated with interactions with technology other than text and video-based activities and scrolling through lists of contacts and music would also be applicable under this option. Drivers would be permitted to touch, tap or push a button to operate lawful functionalities in mounted (and inbuilt) devices. For example, ridesharing and delivery drivers would be able to lawfully accept ride requests and jobs from an app in their mounted smartphones while their vehicle is moving or stationary. In addition, the use of any device for tap-and-go payment in a drive-through would be permitted when the vehicle is stationary.

These changes are the result of a technology-neutral focus that consistently applies restrictions to high-risk interactions across different devices and functionalities.

Similar to the prescriptive option, the use of voice commands is intended to be legal because hands-free operation of devices is preferable to manual. This is based on:

- studies suggesting that using voice-controlled functions may be less detrimental to driving performance than visual–manual interactions (Simmons et al., 2017, cited in Goodsell, Cunningham & Chevalier, 2019)
- the significant enforcement challenges that police are likely to face with voice-based interactions, which could result in either overzealous or too lenient enforcement.

Consistent with the performance-based option, the outcomes-focused section of this hybrid option would address any evidence of impairment of the driver's proper control of the vehicle, regardless of the cause. This would allow regulating drivers' unsafe engagement in activities with variable effects on driving performance.

This option recognises that drivers can safely execute non-driving-related tasks if they self-regulate their level of engagement and type of activity in response to the demands of the road environment. For example, eating and drinking are difficult to regulate because it would be challenging to determine and enforce a safe threshold. However, the consequences of unsafe engagement in these activities can still be detected by the evidence of impairment (or the risk of impairment) of proper control of the vehicle.

Similarly, driver engagement in lawful interactions with technology does not imply that they are always deemed safe. Under this option, if such engagement results in observable impairment of driving performance it could be subject to the rule on proper control or the states' and territories' legislation regarding careless or negligent driving.

4 Impact assessment

Key points

- The NTC conducted a qualitative cost-benefit analysis of the options to inform recommendations to decision-makers. This qualitative analysis was supported by establishing indicative ranges of specific costs and benefits where possible.
- The criteria developed covers the key identified potential impact areas of the options. These criteria are:
  - Effectiveness: The benefits of laws to mitigate against the risk of driver distraction are essentially the degree that such laws are effective in mitigating those risks.
  - Efficiency: The efficiency with which those laws achieve that risk reduction is determined by the level of social costs (government or non-government, such as regulatory burden) incurred in achieving them.
  - Coherence: Our work needs to align with the Transport and Infrastructure Council Strategic Work Programme. On 6 November 2015, the council released its long-term vision for infrastructure and transport in Australia and agreed to seven themes framing its priorities for national reform. In addition, the council directed the NTC to also consider developing a technology-neutral approach for regulating driver distraction.
  - Our assessment of all the options under these criteria allows us to determine the preferred option as explained in Chapter 5.

4.1 Approach

A **qualitative cost-benefit analysis** has been employed to assess the options being considered in this RIS.

The choice of a qualitative approach is due to the absence of sufficient research and data that would be necessary to develop a credible quantitative cost-benefit analysis. These gaps include the following:

- Research and evidence are limited on the current incidence of road accidents related to driver distraction. While estimates from available research suggest somewhere between 9 and 17 per cent of accidents involving motor vehicles have driver distraction as a contributing cause, there is very limited evidence supporting an understanding of the types of distraction behaviour that make up those estimates. In addition, other research approaches – such as naturalistic driving studies of distraction behaviour – have produced inconsistent findings as to the level of risk associated with particular behaviours.
- Likely behavioural responses to the different options and resulting risk reduction cannot be credibly quantified.
- The existing level of 'regulatory burden' cannot be accurately quantified given the number of different businesses that use the road and the likely behaviour of each if no laws existed that regulated distraction-related behaviour. Likewise, the regulatory burden impact of the performance-based option cannot be credibly estimated given the

wide range of behaviours that may or may not have restrictions removed as a result of adopting that option.

In support of the qualitative assessment, the NTC has developed a range of indicative estimates where possible. These indicative estimates are informed by the best available data and research and plausible assumptions where evidence is limited or unavailable. As such, some of the estimates are based on minimal evidence. Appendix D provides further detail on the assumptions supporting the indicative estimates.

Notwithstanding this, the NTC is satisfied that the indicative estimates credibly capture the relative impacts of each option and therefore provide a useful support to the qualitative assessment. The consultation RIS provided an opportunity to test the plausibility of these indicative estimates and some marginal amendments have been made based on information provided.

The approach taken in carrying out this qualitative assessment is as follows:

- Criteria are developed that cover the key identified potential impact areas of the options being considered. These are assessed against each option.
- For each criterion:
  - any sub-criteria are established and the basis by which each option will be assessed is set out
  - the status quo option is assessed and establishes the baseline
  - each of the other options are assessed against the baseline established under the assessment of the status quo
  - a summary assessment of all the options is provided.
- A final overall assessment is provided, bringing the assessments of each criterion together.

4.1.1 Criteria development

The benefits of laws to mitigate against the risk of driver distraction are essentially the degree such laws are **effective** in mitigating those risks.

The **efficiency** with which those laws achieve that risk reduction is determined by the level of social costs (government or non-government, such as regulatory burden) incurred in achieving them.

The NTC is a national reform agency that develops land transport law reform under direction from the Transport and Infrastructure Council, which requires us to develop consensus among different levels of government and ensure reform has coherence with the existing policies, laws and strategies of state, territory and Australian governments.

In addition to reviewing the Australian Road Rules to determine whether they sufficiently address the key factors that cause driver distraction, the Transport and Infrastructure Council directed the NTC to also consider developing a **technology-neutral** approach for regulating driver distraction.

4.2 Effectiveness

In terms of the effectiveness of the options, the two key considerations in understanding the dynamics are the likely effectiveness in enforcing each option and the behavioural response of road users.

For the purpose of this assessment, driver distraction is separated into two categories:

- technological distraction – distraction caused through interactions with technological devices (these are currently dealt with in rules 299 and 300)
- conventional distraction – distraction caused by factors other than interactions with technological devices (these are currently only indirectly dealt with by rule 297).

To be able to quantify the impact of each option against these risk categories, a more detailed understanding of the existing level of risks associated with specific behaviours than is currently available would be required, as well as a defensible way of estimating the likely effectiveness (enforceability and behavioural response).

Given these limitations, the approach to assessing the likely effectiveness of each option consists of:

- for option 1 (status quo), setting out a conceptual baseline of the prevalence and impact on safety of current levels of driver distraction and the effectiveness of the existing laws in mitigating driver distraction behaviour (referencing all available relevant evidence)
- establishing an indicative baseline of the current level of technological and conventional driver distraction in terms of number of different accident types (fatal, serious injury and property damage only (PDO))
- establishing indicative estimates for the effectiveness of the existing rules in reducing driver distraction-related accidents
- providing a qualitative assessment of each option with reference to this baseline
- establishing an indicative range of risk-impact estimates based on plausible behavioural change scenarios if the option were to be implemented to support the qualitative assessment
- providing a summary assessment of how the options compare against the effectiveness criteria.

4.2.1 Option 1: Status quo

Current level of driver distraction-related accidents in Australia

Driver distraction as a safety issue is not as well understood as other road safety risk factors such as drink-driving and speeding. While the most widely studied cause of distraction in driver distraction literature is mobile phone use, the increasing functionality of smartphones exposes drivers to a growing number of new phone interactions (Goodsell, Cunningham & Chevalier, 2019). Research in new technologies and other sources of distraction has limitations and is relatively immature in comparison with other road safety risks. Accurate data about its real impact on road fatalities and serious injury in Australia is not available.

Many studies about the road safety impacts of driver distraction cite statistics from the National Highway Traffic Safety Administration (NHTSA) in the US. According to NHTSA, 9 per cent of fatal crashes in 2017 were reported as distraction-affected crashes and 14 per cent of these were reported to have involved mobile phone use (NHTSA, 2019).

The Australian National Crash In-Depth Study investigated 340 crashes where a vehicle occupant was admitted to hospital for at least 24 hours. This study found that distraction was present in 16 per cent of these crashes. In-vehicle distractions were present in 9 per cent of these crashes, with interactions with passengers and mobile phones as the most frequent sources of in-vehicle distractions (Beanland, et al., 2013). In Victoria, preliminary figures for the 2015–16 financial year estimated that drivers and riders injured in crashes involving distraction accounted for 8 per cent of deaths and 7 per cent of serious injuries.

However, it is widely accepted that driver distraction is under-reported. The negative implications associated with distracted driving – especially if in connection with a crash – means that self-reporting of negative behaviour is lower than actual occurrence of that behaviour (NHTSA, 2018).

Research undertaken in Europe has found that car drivers spend 25–30 per cent of their total driving time on distracting activities (European Road Safety Observatory, 2015). A recent Australian study found that drivers are engaged in a non-driving task while at the wheel every 96 seconds (Young et al., 2018).

An Australian Government survey found that 79 per cent of drivers agree that talking on a mobile phone while driving increases the risk of being involved in a road crash. However, 21 per cent admit to occasionally or rarely using their mobile phones for activities such as browsing the internet, texting, taking photos or using apps (Department of Infrastructure, Regional Development and Cities, 2018). This disconcerting result could be explained by the large number of drivers who believe that diverting their attention to secondary tasks does not impair their own driving performance (Watson & Strayer, 2010). Such belief is against evidence showing that 97.5 per cent of drivers experience a significant reduction in driving performance when executing a secondary task (Watson & Strayer, 2010).

It is possible that the problem of driver distraction from technology could get worse. Mobile phones are ubiquitous, with 95 per cent of Australians owning one (Department of Infrastructure, Regional Development and Cities, 2018). Most Australians (81 per cent) have smartphones, allowing them to conduct a range of activities in addition to making and receiving calls and sending and receiving text messages (Australian Communications and Media Authority, 2017 cited in Department of Infrastructure, Regional Development and Cities, 2018).

In addition, wearable technology is becoming increasingly popular. The global market for wearables has grown consistently over recent years and is forecast to grow to around $30 billion by 2023 (CCS Insight, 2019). According to estimates, 90 million smartwatches will be sold in 2019, accounting for more than half of wearables sold this year, which is predicted to reach 142 million units worldwide (CCS Insight, 2019). It is expected that a greater adoption of smartwatches, smart hearables and smart shoes will lead to sales of 260 million units in 2023 (CCS Insight, 2019).

Challenges with enforcing existing laws

Road rule 297(1) is expected to address a broad range of sources of distraction by requiring drivers to have proper control of their vehicles. However, as previously established in this paper, this rule does not define proper control. It is not clear what acceptable compliance looks like under this rule.

Road rules 299 and 300 regulate the safe use of visual display units and mobile phones respectively. These rules date back to 1999, when texting and calling were the most common features of a mobile phone.

This means that devices introduced to the market later are not explicitly addressed in current legislation. States and territories have had to interpret those rules based on similarities between new devices and mobile phones and visual display units to be able to regulate their use by drivers.

Effectiveness of the existing laws

For this option, it is assumed that the current level of distraction-affected crashes is 9 per cent for fatal crashes in line with that estimated by the NHTSA (2019) and 16 per cent for non-fatal crashes, using the Australian National Crash In-Depth Study estimate (Beanland, et al., 2013). However, as explained previously, these figures may be higher because the incidence of driver distraction is under-reported.

The existing rules combine performance-based and prescriptive rules to address the road safety risks of driver distraction. In theory, the current rules should maximise the advantages and offset the disadvantages of both approaches. However, this does not appear to be the case.

Rule 297(1) is a performance-based rule with the flexibility to address the safety risks from any sources of distraction that fall outside the scope of rules 299 and 300. Yet, as mentioned in subsection 3.1.1, this rule does not define proper control, specify any requirements for compliance or provide examples of either proper or improper control.

Preliminary data indicates that infringement figures for this rule in different jurisdictions are a small fraction of the number of infringements in relation to rule 300. Direct engagement with road safety and law enforcement agencies has also highlighted that the requirements for compliance for this rule can at times be difficult to understand for new or less experienced police officers. This lack of clarity can make it difficult to determine the applicable rule to the observed driver behaviour and therefore reduce enforcement's likelihood to withstand scrutiny if questioned in court. Considering that a range of studies reveal that drivers engage in conventional, or non-technology-based, activities more frequently than technology-based tasks (Young, Horberry & Charlton, 2019), the NTC considers the level of effectiveness for this rule to be low.

As mentioned in the problem statement (section 2.1), rules 299 and 300 date back to 1999, before the emergence of smartphones, tablets and smartwatches. Texting, calling and watching DVDs were the primary interactions with technology in a vehicle. They only preclude the limit or use of specific technology devices – mobile phones, visual display units and television receivers – while permitting their use as driver aids. Those devices have evolved and changed significantly over time, while new technologies have also entered the market.

Rule 299 does not adequately address the risk of distraction from drivers operating visual displays in in-vehicle systems while the vehicle is moving. Some functions in these devices can sometimes affect the level of attention these systems demand from drivers (Birrell & Young, 2011).

Rule 300 refers to the use of mobile phones as opposed to focusing on the device's functions that could potentially have distracting effects on the driver. Recent functions available in modern smartphones are not adequately regulated by this rule. In addition, new devices that provide similar functionalities are not explicitly covered by rule 300.

While states and territories have made their own amendments and interpreted these two rules to accommodate technological developments, they have reported confusion among

drivers about what is required to comply with these rules. The NTC considers the effectiveness for rules 299 and 300 to be low to medium.

The lack of clarity of rule 297(1) and the inflexibility of rules 299 and 300 reduces the effectiveness of this option. The possibility of future updates of the Australian Road Rules would still result in a high likelihood of any amendments quickly becoming outdated again, requiring further and frequent updates.

However, it is likely that rule 300 still provides a clear message to the public about the risk of using a handheld mobile phone for making audio phone calls while driving. Police also have an instrument for penalising this driver behaviour. The NTC concludes that the level of distraction-affected crashes could be higher without this rule because unsafe mobile phone use among drivers would increase.

Indicative baseline

As presented above, the research and data on distraction as the cause of motor vehicle accidents is sparse and the proportion of technology-related distraction even more so. For the purposes of establishing an indicative baseline, this impact analysis assumes 9 per cent of the existing fatal crashes are caused by driver distraction in line with the NHTSA (2019) study, and 16 per cent of the existing non-fatal (injury or PDO) are caused by driver distraction in line with the Australian National Crash In-Depth Study (Beanland, et al., 2013). Of these, it is assumed that 26 per cent are related to technology use, which is in line with the share of known distraction crashes that were technology-related found in the Australian National Crash In-Depth Study (25.5 per cent) and the prevalence in crashes of driver use of technology estimated from a naturalistic study in the US (26.8 per cent) (Paine & Regan, 2018). This implies that:

- 2.34 per cent of total fatal crashes are due to technological distraction
- 4.16 per cent of total non-fatal crashes are due to technological distraction.

Based on these percentages, and assuming these are evenly distributed across crash types, the indicative cost of technology and non-technology (conventional) distraction-related accidents based on 2018 national data are summarised in Table 4.

Table 4. Distraction-related crashes baseline ($ millions)

Distraction type	Crash type	No. of crashes[a]	Estimated average cost[b]	Indicative total cost
Technological	Fatal (fatalities)	26 (29)	$5.00	$130.9
	Injury	576	$0.35	$201.7
	PDO	18,720	$0.013	$245.2
	Total	19,322		$577.8
Conventional	Fatal (fatalities)	75 (81)	$5.00	$372.6

Distraction type	Crash type	No. of crashes[a]	Estimated average cost[b]	Indicative total cost
	Injury	1,639	$0.35	$574.0
	PDO	53,280	$0.013	$697.9
	Total	54,994		$1,644.5

a) Fatal accident numbers based on five-year average from the Bureau of Infrastructure, Transport and Regional Economic (BITRE). Injury numbers based on an Austroads study estimating 'fatal and serious injury' crashes from 2009 to 2013, subtracting BITRE fatality crash data from that period; PDO data based BITRE data.

b) Fatal crash costs based on average of 1.09 lives lost per fatal crash, OBPR recommended value of statistical life inflated to 2019 dollars and rounded from $4.92 million to $5 million to conservatively reflect that fatal accidents will always involve property damage and often serious injuries of others; injury and PDO costs based on 2009 BITRE estimates inflated to 2019 dollars.

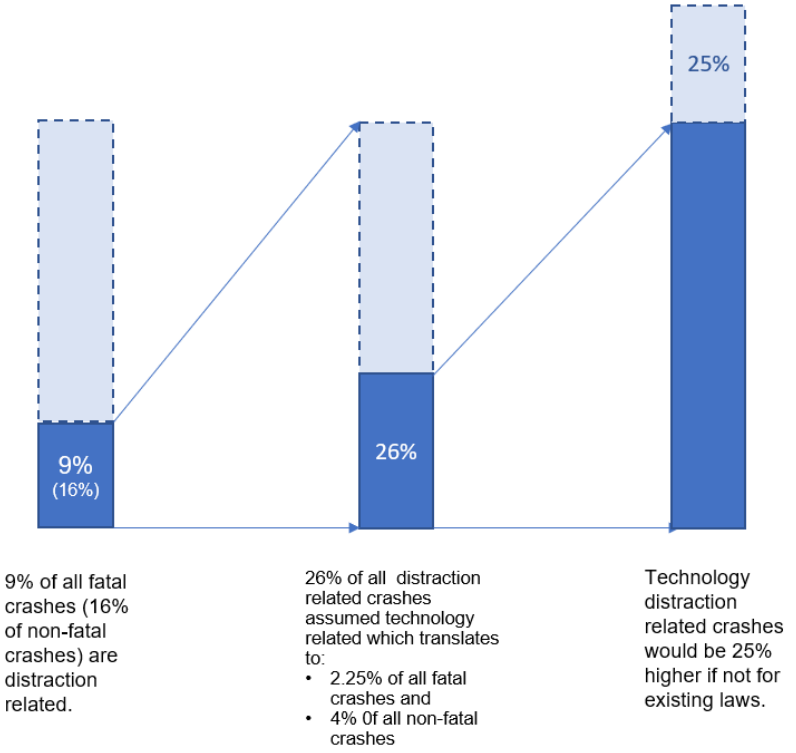
Effectiveness of existing rules

It is challenging to establish the effectiveness of the existing rules in reducing distraction-related crashes given the absence of the counter-factual world where no such regulations exist. Studies in the US, where many states have introduced similar bans on mobile phone use, have produced mixed results varying from finding small negative crash outcomes (Ehsani et al., 2014; Highway Loss Data Institute, 2010; Roper, 2017) to reductions in fatal crashes and hospitalisations (Ferdinand et al., 2014; Ferdinand et al., 2015; Kwon, Yoon & Jang, 2014; Rudisill, Chu & Zhu, 2018), implicitly far larger in percentage than the total numbers presented in Table 4 for technology-related crashes.[4]

For the purposes of establishing an indicative estimate of the reduction of technology-based distraction incidents it is assumed that technology-related crashes would be 25 per cent higher in the absence of the existing laws (as set out in Figure 4).

[4] As an example, Rudisill et al. (2018) found an estimated 10 per cent lower 'non-alcohol-related' fatalities during periods with 'universal hand-held calling bans' in observed US data. This implies a reduction multiple times the 2.34 per cent of fatal crashes being due to technology-related distractions.

Figure 4. Calculation of the range of reductions of technology-based distraction for option 2



This is considerably lower than the higher estimates from the US studies of similar laws and so can be considered a conservative estimate. Table 5 sets out the implied numbers of reduced accidents and associated reduction in costs based on this estimate.

Table 5. Effectiveness of existing laws in reducing technology-related crashes

Crash type	No. of crashes reduced	Estimated average cost of crash ($ million)	Indicative value of risk reduction ($ million)
Fatal (fatalities)	6.5 (7.1)	$5.000	$32.7
Injury	144.0	$0.350	$50.4
PDO	4,680.0	$0.013	$61.3
Total	4,830.5		$144.5

Rule 297(1) is the only measure within the road rules that mitigates the risk of conventional distraction behaviour. Because the number of infringements under this rule is considerably lower than for rule 300 (based on preliminary figures for various jurisdictions over the past three years), it is not clear that this rule currently has a material impact on such behaviours. If, for the purposes of establishing an indicative measure, it was assumed that 1 per cent of conventional distraction-related incidents were mitigated by the presence and enforcement of rule 297(1), this would imply the effectiveness levels provided in Table 6.

Table 6. Effectiveness of existing laws in reducing in conventional distraction-related crashes

Crash type	No. of crashes reduced	Estimated average cost of crash ($ million)	Indicative value of risk reduction ($ million)
Fatal (fatalities)	0.7 (0.8)	$5.000	$3.7
Injury	16.4	$0.350	$5.7
PDO	532.8	$0.013	$7.0
Total	549.9		$16.4

The indicative estimates presented in Tables 5 and 6 will act as a lower limit against which the impact of the options will be considered. The rationale for this is that it is assumed that the options considered in this RIS could produce no worse safety outcomes than if there was no regulation at all.

That is:

- Crashes caused by technology-based distraction can be no worse than 25 per cent higher than the existing level under the status quo if the option is considered completely ineffectual in stopping high-risk technological distraction behaviour.
- Crashes caused by conventional distraction can be no worse than 1 per cent compared with the existing level under the status quo if the option is considered completely ineffectual in stopping high-risk technological distraction behaviour.

On a similar basis, the estimate of the effectiveness of the current laws prescribing illegal technology-related activities (i.e. under rules 299 and 300) will also provide an upper limit on the effectiveness of options considered in this RIS to mitigate the safety risks associated with technology-based driver distraction. The rationale for this is that further reductions in technology-based driver distraction risk in excess of the levels achieved by existing laws is unlikely. As such, crashes caused by technology-based distraction can be reduced by no more than 25 per cent of the current number of technology-based crashes. This upper limit is a conservative estimate to ensure potential benefits of the options are not overestimated. This is not meant to imply that legislation cannot reduce technology-based crashes by a higher level in practice alongside other measures such as enforcement and education of safe driving practices.

4.2.2 Option 2: Prescriptive

The prescriptive option proposes a fully prescriptive approach to address the road safety risks of driver distraction. The main benefit of this approach is that it provides more certainty to police and the community to determine whether certain behaviours and interactions are compliant. Compliance can be determined from an objective observation of driver behaviour, and a binary decision (yes or no) is all that is required. There is no need to subjectively measure the degree to which the driver is engaging in noncompliant behaviour.

Impact on technology-based distractions

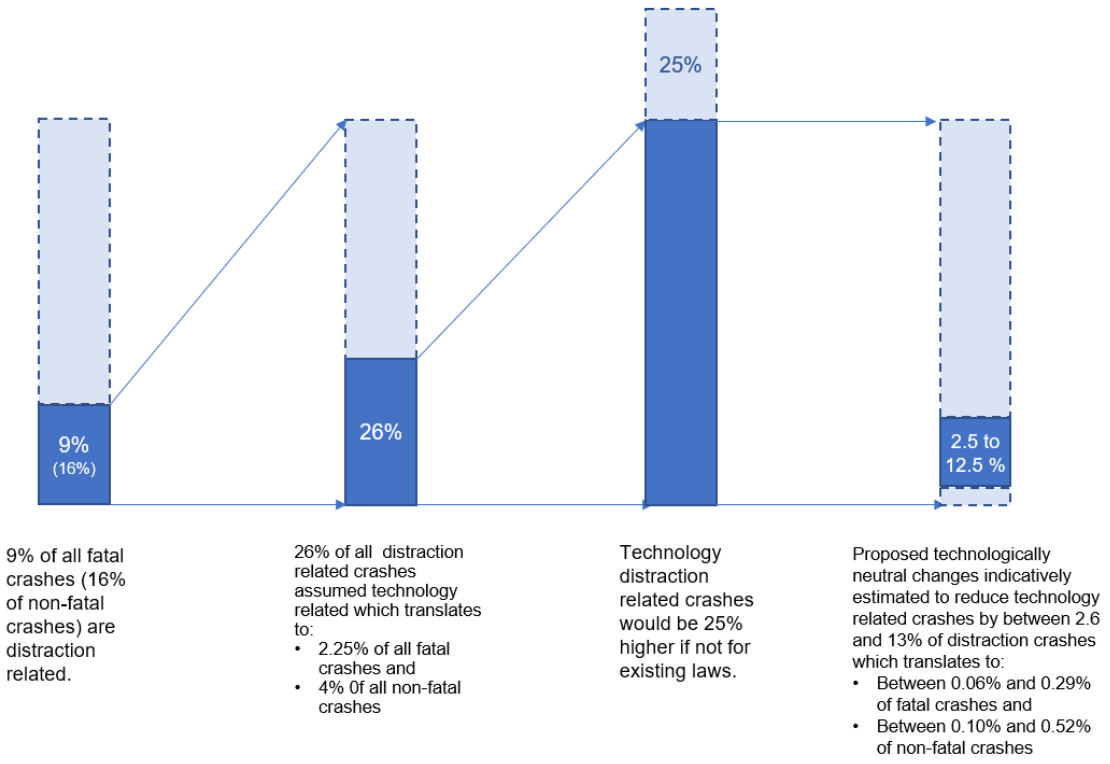
Appendix B shows how this option targets the visual and visual–manual distractions found to significantly increase the risk of a crash or near-crash event. The NTC considers that the new offences under this option deterring text-based, image-based and manual interactions with technology are more effective than rules 299 and 300. The new offences provide a clearer guide for drivers and police about the high-risk interactions with technology that would be illegal under this option. These new offences would remove the current ambiguity regarding the legal use of new devices entering the market.

There are cases in which introducing prescriptive legislation that provides further clarity about what drivers can and cannot do may have resulted in road safety benefits. Studies found that bans on handheld mobile phone use resulted in reductions in use and crash rates immediately after implementation of the laws (Kwon, Chu & Zhu 2014; McCartt et al., 2010, cited in Regan & Prabhakharan, 2019).

The proposed changes under this option are highly likely to have at least some impact in reducing technology-based distraction accidents. At the high end it could have a substantial impact if it is effective in reducing high-risk behaviours. The indicative range is based on the following reductions in technology-based distraction crashes as a result of this option (Figure 5):

- 2.5 per cent – based on achieving a further 10 per cent of the effectiveness of the existing laws
- 12.5 per cent – based on the achieving a further 50 per cent of the effectiveness of the existing laws in mitigating driver distraction crashes.

Figure 5. Calculation of the range of reductions of technology-based distraction for option 2



These are based on the principle that improving the existing laws is only unlikely to achieve as much additional benefit as the existing laws do compared with no laws governing interaction with technology while driving at all.

Table 7 shows the indicative low and high impacts of technology-based distraction under option 2.

Table 7. Indicative low and high impacts of technology-based distraction – option 2

Distraction type	Crash type	No. of crashes	Estimated average cost ($ million)	Indicative total cost ($ million)
Low	Fatal (fatalities)	0.7 (0.7)	$5.000	$3.3
	Injury	14.4	$0.350	$5.0
	PDO	468.0	$0.013	$6.1
	Total	483.1		$14.4
High	Fatal (fatalities)	3.3 (3.6)	$5.000	$16.4
	Injury	72.0	$0.350	$25.2
	PDO	2,340.0	$0.013	$30.7
	Total	2,415.3		$72.2

Impact on conventional distractions

An offence for drivers who take eyeglances off the road for more than two seconds would address conventional sources of distraction. However, such an offence could result in making activities that are intended to be compliant under this option illegal (Young & Lenné, 2012). In addition, law enforcement agencies have noted the significant enforcement challenge of requiring police to detect the eyes-off-road behaviour under various conditions. This could result in overzealous or too lenient enforcement in detecting this offence.

The indicative range of the potential impact on conventional distraction events are:

- 1 per cent increase in conventional distraction crashes, which assumes no effectiveness from making certain conventional distraction behaviours illegal and a decline of 1 per cent due to an ineffectual two second eyes-off-road law replacing the existing ‘proper control’ requirement under rule 297
- 0 per cent net change in conventional distraction crashes, which assumes a small reduction in crashes due to reduced high-risk behaviour in response to prescribing the

'two seconds eyes-off-road' rule having the same effect as rule 297 under the status quo.

The implications of this indicative range are presented in Table 8.

Table 8. Indicative low and high impacts for conventional distraction – option 2

Distraction type	Crash type	No. of crashes	Estimated average cost ($ million)	Indicative total cost ($ million)
Low	Fatal (fatalities)	–0.7 (–0.8)	$5.000	–$3.7
	Injury	–16.4	$0.350	–$5.7
	PDO	–532.8	$0.013	–$7.0
	Total	–549.9		–$16.4
High	Fatal (fatalities)	0.0 (0.0)	$5.000	$–
	Injury	0.0	$0.350	$–
	PDO	0.0	$0.013	$–
	Total	0.0		$–

4.2.3 Option 3: Performance-based

The approach to regulating driver distraction proposed under this option relies on defining a standard or outcome. This results in flexibility for drivers to choose the way to comply with the rules and allows the road rules to accommodate changes in technology and associated behaviours.

The approach proposed in this option is less certain about what acceptable compliance may look like in comparison with a prescriptive approach. The performance-based option requires a higher level of competence from regulators and drivers. Regulators might need to develop supporting guidance material to assist drivers with compliance.

Impact on technology-based distractions

As discussed in the assessment of the status quo option, a significant number of Australian drivers admit to using their mobile phones for non-driving-related activities while at the wheel. Drivers engage in these distracting activities are influenced more by their perceived rewards than by potential risks to themselves and others (Ba et al., 2015). In addition, a large portion of drivers believe that diverting their attention to secondary tasks does not

impair their own driving performance, against evidence showing that such a belief is incorrect for 97.5 per cent of drivers (Watson & Strayer, 2010).

For these reasons, it is likely that unsafe driver interactions with technology would increase due to removing prescriptive rules clearly deterring such interactions. As a result, technology-based distraction-affected crashes would most likely increase under this option.

The indicative ranges are based on the following increases in technology-based distraction crashes as a result of this option:

- 2.5 per cent – based on a 10 per cent deterioration in the effectiveness of the existing laws in mitigating technology-related driver distraction crashes, with deterioration partially mitigated by the effect of the performance-based measure being somewhat effective in reducing technology-related risky behaviours
- 12.5 per cent – based on a 50 per cent deterioration of the effectiveness of the existing laws in mitigating technology-related driver distraction crashes.

Table 9. Indicative low and high impacts of technology-based distraction – option 3

Distraction type	Crash type	No. of crashes	Estimated average cost ($ million)	Indicative total cost ($ million)
Low	Fatal	–3.3 (–3.6)	$5.000	–$16.4
	Injury	–72.0	$0.350	–$25.2
	PDO	–2,340.0	$0.013	–$30.7
	Total	–2,415.3		–$72.2
High	Fatal	–0.7 (–0.7)	$5.000	–$3.3
	Injury	–14.4	$0.350	–$5.0
	PDO	–468.0	$0.013	–$6.1
	Total	–483.1		–$14.4

Impact on conventional distractions

As there would be no change to rule 297 under this option, it is assumed there would be no change to the incidence of conventional distractions compared with the baseline.

4.2.4 Option 4: Hybrid

Under the prescriptive part of this option, compliance can be determined from an objective observation of driver behaviour, and a binary decision (yes or no) is all that is required.

There is no need to subjectively measure the degree to which the driver is engaging in noncompliant behaviour.

By not including an offence for drivers who take eyeglances off the road for more than two seconds, this option removes the risk of unintentionally legislating against some activities that are intended to be compliant.

Instead, the hybrid option maintains the existing offences in rule 297. This preserves flexibility for drivers to choose the way to comply with the rules and for police to determine compliance based on driver and vehicle behaviour.

Impact on technology-based distractions

As with the prescriptive option, the hybrid option deems unlawful the visual and visual–manual distractions found to significantly increase the risk of a crash or near-crash event. The new offences under this option deterring text-based, image-based and manual interactions with technology are assumed to be more effective than rules 299 and 300. The NTC considers that the new offences would improve certainty for drivers and police about the high-risk interactions with technology that would be illegal under this option. This option would remove the current ambiguity regarding the legal use of new devices entering the market.

The proposed changes under this option would most likely have a similar impact on technology-based distraction behaviour to the prescriptive option. In terms of indicative estimates:

- 2.5 per cent – based on achieving a further 10 per cent of the effectiveness of the existing laws
- 12.5 per cent – based on achieving a further 50 per cent of the effectiveness of the existing laws in mitigating driver distraction crashes.

Table 10. Indicative low and high impacts of technology-based distraction – option 4

Distraction type	Crash type	No. of crashes	Estimated average cost ($ million)	Indicative total cost ($ million)
Low	Fatal (fatalities)	0.7 (0.7)	$5.000	$3.3
	Injury	14.4	$0.350	$5.0
	PDO	468.0	$0.013	$6.1
	Total	483.1		$14.4
High	Fatal (fatalities)	3.3 (3.6)	$5.000	$16.4
	Injury	72.0	$0.350	$25.2

Distraction type	Crash type	No. of crashes	Estimated average cost ($ million)	Indicative total cost ($ million)
	PDO	2,340.0	$0.013	$30.7
	Total	2,415.3		$72.2

Impact on conventional distractions

As with the performance-based option, there would be no change to rule 297 under this option, so there would be no change to the incidence of conventional distractions compared with the baseline.

4.2.5 Summary assessment

The assessment of each option against the effectiveness criteria is summarised in Table 11.

Table 11. Summary assessment of each option's effectiveness

	Option 1: Status quo	Option 2: Prescriptive	Option 3: Performance-based	Option 4: Hybrid
Technology-based distraction	N/A	The proposed additional behaviours addressed and better identified under this option are highly likely to have at least some impact in reducing technology-based distraction crashes Indicative impact: Reduction of 0.7 to 3.6 fatalities p/a Reduction of $14.4 million to $72.2 million economic value lost from accidents	It is likely that unsafe driver interactions with technology would increase due to removing prescriptive rules specifically deterring such interactions. As a result, technology-based distraction-affected crashes would likely increase under this option Indicative impact: Increase of 0.7 to 3.6 fatalities p/a Increase of $14.4 million to $72.2 million economic value lost from accidents	The proposed additional behaviours addressed and better identified under this option are highly likely to have at least some impact in reducing technology-based distraction crashes Indicative impact: Reduction of 0.7 to 3.6 fatalities p/a Reduction of $14.4 million to $72.2 million economic value lost from accidents
Conventional distraction	N/A	The two-second eyes-off-road rule will be very hard to enforce and is likely to be less effectual than the current 'proper control' rule	As there would be no change to rule 297 under this option, there would be no change to the incidence of conventional distractions compared with the baseline	As there would be no change to rule 297 under this option, there would be no change to the incidence of conventional distractions compared with the baseline

	Option 1: Status quo	Option 2: Prescriptive	Option 3: Performance-based	Option 4: Hybrid
		Indicative impact: Increase of 0 to 0.8 fatalities p/a Increase of $0 to $16.4 million economic value lost from accidents		

Overall, it is likely that option 4 would be most effective in reducing risks to driver distraction, including being at least as effective as any other option in addressing either technology-based and conventional driver distraction risk. It is likely to be equally as effective as option 2 in reducing technology-based driver distraction while maintaining the modest benefits of retaining rule 297 in addressing conventional distraction risk.

4.3 Efficiency

Efficiency is a measure of the costs associated with achieving a desired outcome. Efficiency increases as the amount of resources required to achieve a specified outcome falls. Costs of regulatory proposals can be borne by both government and non-government sectors.

The primary 'trigger' for a RIS when a new regulatory proposal is being considered is that the options considered are 'likely to have a regulatory impact on businesses, community organisations or individuals'.

The proposed options developed to address the risks on driver distraction in the road rules could prohibit activities that businesses and individuals are currently allowed to undertake while driving or, alternatively, will allow some behaviours that are currently prohibited.

For instance, if someone is required to pull over and park their motor vehicle to carry out a task, they would implicitly have a time cost 'imposed' on them in complying with that requirement. Alternatively, they may need to purchase a particular technology that allows them to legally continue to carry out the function without pulling over.

Options may also vary according to the implications for costs on government agencies such as police and the courts. Though it is possible that there may be some variation in the impact of the different options on government resources (e.g. it is possible that performance-based measures may result in greater legal uncertainty and so increased likelihood of costly appeal proceedings to infringements), this RIS has not sought to measure the impact of these options on police and judicial resources. Assessing the relative impact would be excessively speculative and is very unlikely to alter the choice of the best option.

As discussed in the guiding principles for the options (subsection 2.3.3), these options will also apply by default to cyclists. The NTC has not seen evidence that these options would have an adverse effect on cyclists. Likewise, we have not separately considered heavy vehicles because we do not consider that the options being assessed are likely to affect this class of vehicle any differently from other vehicles.

The approach to assessing the likely efficiency of each option consists of:

- for option 1 (status quo), identifying the possible burdens the existing laws might incur on individuals and businesses as well as specific types of businesses affected by the existing prescriptions in the rules
- establishing indicative estimates of the specific identified burdens
- assessing each option with reference to this baseline set out in the status quo including any indicative estimates established for new restrictions or identified restrictions 'relaxed' from the existing rules
- providing a summary assessment of how the options compare against the efficiency criteria.

4.3.1 Option 1: Status quo

Under the current set of rules under review in this RIS (specifically rules 299 and 300), drivers are not permitted to use a handheld mobile phone or other devices for any tasks or visual display units apart from mounted 'driver's aids' (such as navigational devices). If a mobile phone or navigational device is mounted, drivers are allowed to carry out some functions such as dialling, accepting phone calls and operating navigational devices (including typing in addresses).

It is likely that some individuals and businesses would need to purchase a mount that would allow for them to use navigational devices and mobile phones legally. These mounts can range from $15 to several hundred dollars depending on specifications. Table 12 establishes indicative cost estimates for complying with this existing requirement.

Table 12. Estimated impact on individuals and businesses from the road rules' requirement to use a mobile phone mount affixed to the vehicle

	Individuals	Business	Total
Cars[a]	1,000,000	1,250,000	2,250,000
Mount $	20	20	20
Average life	3 years	3 years	3 years
Compliance cost	$6,666,667	$8,333,333	$15,000,000

a) Based on roughly 5 per cent and 20 per cent of private and business registered light vehicles from the Survey of Motor Vehicle Use (ABS 2019)

The indicative estimate is based on the assumption that about 5 per cent of privately registered vehicles and 20 per cent of business registered vehicles spend at least (i.e. cost to legally comply) $20 (assumed minimum costs) on a complying mount with an average life of three years. The total annual cost would be $15 million a year to individuals ($6.67 million) and business ($8.33 million).

The current rules prohibit the use of an app as a dispatch system or another function as part of the professional/commercial driving task on smartphones, even if they are mounted. This, for instance, prevents driver apps like those used by rideshare companies from being used legally while the vehicle is not parked. Assuming that a complying practice would involve a

rideshare driver or courier pulling over to accept a ride request or a job, this would apply a time-related compliance cost.[5]

After dropping off a customer, rideshare operators may drive to a more advantageous position to pick up the next customer. In Australia, there are an estimated 80,000 rideshare operators making an average of 800 trips a year.[6] Assuming 5 per cent of these trips are accepted by a driver who would need to pull over to legally accept the job for an average of one minute, this would result in an average cost of $22.7 per hour to rideshare businesses/operators, amounting to $1.2 million a year (Table 13).

Table 13. Estimated impact on rideshare operators

Rideshare operators[a]	80,000
Trips per year[a]	800
Affected share	0.05
Average lost time	1 minute
Cost per hour of operator[b]	$22.7
Total annual cost	$1.2 million

a) Based on Houston Kemp analysis of NSW Uber data extrapolated nationally by population (Kemp & Gu, 2017)

b) Based on average of Transport Workers Union (2018) survey and Uber Analysis (Financial Times, 2018)

Rule 297(1), which requires drivers to maintain 'proper control' may restrict other activities that a driver may otherwise engage in if such a rule did not exist.

4.3.2 Option 2: Prescriptive

Under the prescriptive option, a driver will be unable to use mounted devices to, say, type addresses. This may result in some courier-type businesses requiring technological investments such as voice-enabled navigation systems to continue to operate without pulling over to accept jobs or enter addresses into navigational devices or apps.

Voice-activated navigational systems can cost upwards of $150. Assuming 20 per cent of small couriers would be required to purchase such a device (or equivalent solution) to continue to operate, and these devices have a three-year useful life, the total cost to such businesses would be $150,000 (Table 14).

[5] Time-related compliance costs can be measured by multiplying
- the number of agents affected
- the average frequency each agent is required to carry out the additional task in a given time period
- the average time the additional task takes
- the average value of time to the affected agents

[6] Based on an estimated 60,000 Uber drivers with 70.5 per cent market share. Rounded down on assumption that there is some overlap between Uber and other services (IBISWorld, 2019b)

Table 14. Estimated impact on courier businesses

Total couriers[a]	15,000
Affected couriers[a]	0.2
Voice activation	$150
Average life	3 years
Total annual cost	$150,000

a) Based on IBISworld (2019a) estimates of the number of courier businesses with turnover of $50,000 to $200,000 and a share of 'point to point' businesses (considered most likely to be affected)

As established in the status quo option, many rideshare drivers use ride-matching apps that are currently not compliant with existing rules. The prescriptive option would remove the implicit requirement that they pull over to accept client matches, resulting in an indicative burden reduction of about $1.2 million.

More broadly, the prescriptive option would make illegal a number of practices that are not currently explicitly prevented. These include using text-based communication apps and other non-communications-related functions (e.g. social media, video calls, watching videos) across a broad range of modern devices. This RIS has not attempted to measure any burden associated with these restrictions because it is assumed that no economic impacts would result from these prohibitions.

4.3.3 Option 3: Performance-based

The performance-based option potentially allows for a significant number of activities currently prohibited to be conducted as long as they do not impair a driver's control of the vehicle. The complexity and uncertainty in accurately identifying the frequency and verifiability (if they can legitimately be conducted while maintaining proper control of the vehicle) of all of these tasks makes plausible measurement unfeasible.

In terms of the status quo baseline, drivers would no longer be required to purchase a mount to use their phone under existing regulations. This would suggest an indicative burden reduction of $15 million per year.

4.3.4 Option 4: Hybrid

The hybrid option has similar impacts as the prescriptive option as it:

- prohibits the manual entering of addresses into devices, even if they are mounted
- enables the use of apps as part of the professional/commercial driving task such as those used by rideshare operators.

The indicative estimates are therefore the same as option 2 – that is, a reduction of $1.2 million in allowing the use rideshare apps and an increase of $150,000 due to some couriers needing to invest in voice-recognition capabilities.

4.3.5 Summary assessment

Table 15 summarises the analysis of options against the efficiency criteria.

Table 15. Summary assessment of the options' efficiency

	Option 1: Status quo	Option 2: Prescriptive	Option 3: Performance-based	Option 4: Hybrid
Regulatory burden	N/A	Could result in a requirement for couriers to install voice-recognition technology to comply with new requirements Indicative increased burden: $150,000 p/a Would enable rideshare operators to use apps legally without pulling over Indicative reduced burden: $1.2 million p/a	Would mean that drivers would no longer be legally required to buy a phone mount to legally use their phone Indicative reduced burden: $15 million p/a Potential to allow other existing burdens to be removed (not measured)	Could result in a requirement for couriers to install voice-recognition technology to comply with new requirements Indicative estimate: $150,000 p/a increased burden Would enable rideshare operators to use apps legally without pulling over Indicative reduced burden: $1.2 million p/a

Option 3, the performance-based approach, will see the greatest reduction in regulatory burden. The indicative measure of the reduction – which assumes that one million registered personal vehicles and 1.25 million business registered vehicles will no longer need to purchase a mobile phone mount – is estimated at $15 million per year.

Options 2 and 4 also suggest a net reduction in the burden to the extent that the indicative estimates are accurate. Under both options, allowing rideshare operators to legally use apps was assessed to have a larger burden reduction than the increase to couriers in having to purchase voice-recognition technology.

4.4 Coherence

The NTC is a national reform agency that develops land transport law reform under direction from the Transport and Infrastructure Council. The NTC must develop consensus among different levels of government and ensure reform has coherence with the existing policies, laws and strategies of the Australian state, territory and Australian governments.

Our work needs to align with the Transport and Infrastructure Council Strategic Work Programme. On 6 November 2015 the Transport and Infrastructure Council released its long-term vision for infrastructure and transport in Australia and agreed to seven themes framing its priorities for national reform (Transport and Infrastructure Council, 2019). Two of these themes are relevant to the objectives of this project:

- continuing a focus on transport safety while maintaining awareness of technological developments (positive and disruptive) that may impact on safety and security
- removing barriers to innovation and capitalising on new and emerging technologies.

Emerging transport technologies can provide opportunities to improve transport productivity and reduce deaths and injuries. The NTC considers that enabling these technologies to reach their potential is essential for improving our living standards and Australia's competitiveness.

Technological neutrality in the road rules for driver distraction provides an opportunity to encourage innovation and ensure that technology with the potential to improve road safety can be adopted.

More broadly, other existing government policies – such as the Safe Systems framework – are adequately covered by the effectiveness criteria and so are not specifically assessed under the coherence criteria.

The assessment of each option against the coherence criteria focuses on a qualitative assessment of each option regarding how compliant it is with the requirement of technological neutrality and how well it potentially removes barriers to innovation.

4.4.1 Option 1: Status quo

The current laws were established in 1999 to deal with the emergence of mobile phones and to target the two primary functions of mobile phones – texting and dialling (calling).

The impetus for this work was a Transport and Infrastructure Council directive to review the existing rules addressing driver distraction to make them technologically neutral. The current rules are not technologically neutral and may be an impediment to further technological innovation.

4.4.2 Option 2: Prescriptive

This option addresses the high-risk behaviour or interaction rather the technology of the device and, as such, achieves the objective of technological neutrality. The new offences proposed under this option focus on the driver interactions rather than the technology of the device and therefore achieve the objective of technological neutrality.

The prescriptive option may also enable the take-up of new technologies that assist in reducing safety risk, such as voice-recognition devices. This option aligns more closely with the Transport and Infrastructure Council's long-term vision for infrastructure and transport in Australia. Not allowing drivers to manually enter information into a device may encourage the take-up of technologies such as voice-user interfaces. This prescriptive element aligns with the Council's theme about removing barriers to innovation and capitalising on new and emerging technologies.

4.4.3 Option 3: Performance-based

The performance-based option is technologically neutral because it would no longer directly prohibit distraction activities themselves, rather it would see all distraction behaviour captured under the offences in rule 297. This rule includes the requirement for drivers to maintain proper control, have a clear view of the road and traffic and to not have passengers or pets interfering with their driving.

4.4.4 Option 4: Hybrid

Like under option 2, the prescriptive component of option 4 also seeks to address the high-risk behaviour or interaction rather than the technology of the device and, as such, achieves the objective of technological neutrality. The permitted and prohibited interactions with devices apply this interaction-based focus as consistently as possible across a broad range of devices and therefore achieve the objective of technological neutrality.

Like with the prescriptive option, not allowing the manual entering of text or numerical information into a device aligns more closely with the Transport and Infrastructure Council's long-term vision for infrastructure and transport in Australia. This prescriptive element may encourage the take-up of new technologies (such as enhanced voice–user interfaces) in line with the Council's theme about removing barriers to innovation and capitalising on new and emerging technologies.

4.4.5 Summary assessment

The assessment of the options against the coherence criteria is summarised in Table 16.

Table 16. Summary assessment of the options' coherence

	Option 1: Status quo	**Option 2: Prescriptive**	**Option 3: Performance-based**	**Option 4: Hybrid**
Coherence	Not technologically neutral	Technologically neutral and may encourage take-up on new technologies	Technologically neutral	Technologically neutral and may encourage take-up on new technologies

Overall, each of the developed options, by design, achieve the technological neutrality requirement. Options 2 and 4 may enable the take-up of new technologies that assist in reducing safety risk, such as voice–user interfaces.

5 Conclusion and next steps

Key points

- Following the analysis of the four options, the NTC recommends the hybrid option because it would provide:
  - a clear indication of permitted and prohibited interactions with technology based on high-risk interactions and behaviours identified by research
  - a performance-based component that addresses any sources of distraction that could impair a driver's proper control of the vehicle and clear view of the road and traffic.
- The NTC expects this option to provide the highest road safety benefits in terms of reducing the number of fatalities, injuries and economic costs from accidents.
- This option would result in a similar net reduction in burden to businesses as the prescriptive option.
- The hybrid option would meet the Transport and Infrastructure Council's requirement for technological neutrality and enable the take-up of new technologies.
- If the proposed policy is endorsed, the NTC would work with the Parliamentary Counsel's Office throughout the legislative drafting process. The NTC would also engage with states and territories during the drafting process to ensure the draft legislation reflects the agreed policy.
- The NTC has identified a number of non-regulatory initiatives across the transport system that could support achieving the overall policy objective of this project and enhance the effectiveness of the resulting legislative change.

5.1 Recommended option

Option 4: Hybrid is the recommended policy option for developing technology-neutral road rules to regulate driver distraction. The NTC considers that, overall, this option is the most suitable for regulating the risks from driver distraction at an acceptable level of impact on businesses and individuals. This option aligns with the Transport and Infrastructure Council's Strategic Work Programme.

According to our assessment, the hybrid option would:

- be the most effective at mitigating driver distraction safety risks
- equal the prescriptive option as the two next most efficient options (behind the performance-based option)
- be technologically neutral and enable the take-up of new technologies.

While the performance-based option would most likely result in the highest reduction in regulatory burden, it could also result in an increase in unsafe driver interactions with technology. As a result, technology-based distraction-affected crashes would most likely increase under that option.

The impact assessment and resulting conclusions recommending a preferred regulatory approach for the Transport and Infrastructure Council's consideration have been informed by feedback from stakeholders to the consultation RIS as well as ongoing engagement and targeted consultation with transport, road safety and law enforcement agencies across Australia.

The NTC notes that there are some differences in existing state and territory legislation closely associated with the proposed policy in this decision RIS. This may affect the adoption of the amendments to the model law resulting from this proposal. This means that some states and territories may be required to consider this in their enactment of such changes.

Effectiveness

The NTC considers that introducing the new offences under the hybrid option would likely reduce the current level of crashes in relation to the sources of distraction associated with targeted interactions and behaviours. Introducing prescriptive legislation that provides further clarity about what drivers can and cannot do has previously resulted in significant road safety benefits.

The indicative estimates for the effectiveness of the hybrid option suggest that this option would have the highest level of effectiveness of all the options assessed in this decision RIS.

Efficiency

The hybrid option would result in similar impacts as the prescriptive option as it:

- establishes that manually entering long-form text into devices is prohibited, regardless of if they are mounted, inbuilt or are part of a driver's aid
- enables the use of apps that support the professional driving task to be used in mounted smartphones, such as those used by rideshare operators and delivery drivers.

This option suggests a net reduction in the burden to businesses. Allowing professional drivers, such as rideshare operators, to legally use their work-specific apps is likely to have a larger burden reduction than the increase to couriers in having to purchase voice-recognition technology.

While the performance-based option would most likely have the greatest reduction in the regulatory burden (by no longer requiring devices to be mounted), there would be an unacceptable increase in safety risks. These risks would be the result of removing explicit restrictions targeting the unsafe use of devices while driving.

Coherence

This option meets the Transport and Infrastructure Council's requirement for technological neutrality. It also aligns with the Council's long-term vision for infrastructure and transport in Australia because it may encourage the take-up of technologies such as voice–user interfaces.

Recommendation 1: That the Transport and Infrastructure Council approves amending the Australian Road Rules to adopt the policy approach proposed in option 4: hybrid (as set out in Appendix C), which:
1. includes a broad prohibition to use technology (while the vehicle is moving or stationary but not parked), with lower risk

	interactions permitted by exception with inbuilt and mounted devices and motorcycle helmets 2.prohibits all physical interactions and restricts visual interactions with wearable devices 3. prohibits all visual and physical interactions with non-mounted portable devices.

5.2 Complementary initiatives

In its submission, TMR noted that rule changes alone are unlikely to change behaviour or increase compliance. Legislative changes must be supported by broad-based actions across the Safe System to have a substantial impact on compliance and safety.

The road rules are only one of many inputs to the Safe System approach adopted in the *National Road Safety Strategy 2011–2020*. Changing the culture of distracted driving will require a combination of education based on scientific evidence, regulations that target the causes of distraction and effective enforcement of driver distraction laws (Strayer, 2015).

The NTC has identified a number of initiatives across the transport system that could support achieving the overall policy objective of this project and enhance the effectiveness of the proposed legislative change.

5.2.1 Evidence base for driver distraction at the national level

While research shows the links between unsafe driver engagement in secondary tasks and crash events, there is limited data that records driver distraction as a contributory factor. Engagement with the Australian Government and BITRE has highlighted the challenges for developing a national crash data series on driver distraction. Aside from the general challenge for accurately recording the crashes in which distraction was a factor (it relies partly on driver self-reporting), states and territories rely on different legacy recording systems. This results in data that is not comparable, requiring time and resources to process and analyse.

One of the challenges the NTC has faced when trying to assess the benefits and costs of regulatory reform for this decision RIS is the absence of good-quality evidence, and this includes recent and reliable national data. As the UNSW Transport and Road Safety Research Centre (TARS) noted in its submission to the consultation RIS, it is not possible to evaluate the effects of legislative change on driver distraction without good-quality evidence (Williamson, Hatfield & Friswell, 2019).

In May 2020 TMR provided the Transport and Infrastructure Council with a national roadmap on driver distraction that proposes five overarching strategies to progress at the national level. The strategy seeking to encourage greater compliance through enforcement identified the development of a data platform to enable the investigation, tracking and sharing of crash and infringement data resulting from driver distraction as one of the key projects.

The NTC considers that up-to-date national data is essential for quantifying the impacts of driver distraction, identifying trends and evaluating the effectiveness of the different initiatives implemented. This is closely in line with one of the roadmap's overarching strategies.

Recommendation 2: That the Australian Government and states and territories work together to identify opportunities to improve the collection of data on crashes where driver distraction, in particular distraction involving use of devices, is identified as a factor.

5.2.2 Consistent message on driver distraction and legislative reform

The National Summit on Driver Distraction was held in July 2019 as part of TMR's national driver distraction research project. The summit's participants identified potential initiatives under a number of strategic areas and plotted potential timeframes and key milestones. Participants unanimously agreed that a nationally consistent message to ensure safe driver engagement on secondary tasks while driving should be one of these initiatives.

During the public consultation processes for the issues paper and consultation RIS, the vast majority of our stakeholders highlighted the need for non-regulatory measures (i.e. guidelines and public education campaigns) to support drivers' self-regulatory behaviour and decision making. Enforcing the road rules for driver distraction can be difficult in situations in which there is limited visibility of what is occurring inside vehicles. Police often use strategies such as motorcycle units and cameras to detect the use of handheld phones by drivers. However, several jurisdictions have indicated that enforcement alone is unlikely to be effective in managing distracted driving in a safer way (Centre for Accident Research & Road Safety – Queensland, 2017). In addition, there is no feasible way to ensure that a driver's attention remains sufficiently focused on the driving task (Hartley, 2007).

The NTC considers that the effectiveness of the regulatory approach proposed in this decision RIS could be supported by non-regulatory initiatives. Driver education based on robust scientific evidence is required to change the culture of distracted driving (Strayer, 2015). There is strong evidence that carefully planned and well-executed communication campaigns can be effective in reducing crashes for other road safety risks (such as drink-driving) when implemented in conjunction with other activities such as high-visibility enforcement (Elder et al., 2004).

An effective and consistent message on the risks of driver distraction may also be essential for reducing the level of infringements among at-risk groups such as young drivers. According to the Transport Accident Commission, Victorian drivers 18–25 years old are over-represented in road trauma despite the significant decrease in road fatalities since 1989. In 2016 this age bracket represented 19 per cent of drivers who lost their lives in Victorian roads, even though this group represents only around 10 per cent of Victorian licence holders (Transport Accident Commission, 2018).

One of the overarching strategies to be proposed in the national roadmap on driver distraction seeks to change driver behaviour through information campaigns and educational strategies. The roadmap will identify developing a shared national narrative for driver distraction as a key project for driving cultural change and awareness of distracted driving. This proposal consists of reaching a national agreement on the key messages to be used consistently in education strategies implemented by state and territory governments.

On that account, this decision RIS argued that the lack of understanding of the intent of the road rules can reduce the effectiveness of enforcement and the levels of compliance among road users. New or less experienced police officers can find it difficult to determine the applicable rule to the observed driver behaviour, while drivers may not really know which secondary tasks are not safe and may engage in unlawful behaviours while driving.

The NTC considers that a common message on driver distraction and safe engagement would be essential for ensuring consistent compliance and enforcement nationally. Accordingly, we propose that the resulting changes to legislation be supported by initiatives seeking to ensure a shared and clear understanding about the responsibilities of drivers in relation to driver distraction as well as the intent of the relevant legislation. This includes the obligation on the driver to keep a proper lookout by paying due attention to the surrounding road conditions and being able to intervene if required.

Recommendation 3: That the Australian Government and states and territories work together to consider the development of a nationally consistent message to ensure safer driver engagement on secondary tasks. This may include tailoring this message to target different types of road users.

Recommendation 4: That the NTC works with jurisdictions to develop a safe driving guideline where content can be included in information materials to assist the public, road transport industry and law enforcement agencies to clearly and consistently understand drivers' obligations regarding control of a vehicle, as well as the intent and purpose of the legislative changes resulting from the proposed regulatory approach.

5.2.3 A driver distraction rating system for the in-vehicle human–machine interface of new vehicles coming onto the Australian market

The problem statement (Chapter 2) identified the challenges of influencing the development of a safe HMI for in-vehicle systems included in new vehicles available in the Australian market. Our country is a 'technology taker' of vehicles and in-vehicle technologies, given the small size of Australia's new vehicle market. This makes us completely reliant on manufacturers' decisions for adopting different voluntary guidelines available relating to integrated systems.

A study found that a considerable portion of vehicles in North America offer features in in-vehicle systems that are too distracting to be enabled while the vehicle is in motion (Strayer et al., 2019). The car manufacturers' decisions on complying with those international guidelines can have a direct effect on the potentially distracting features available to Australian motorists to use while their vehicles are in motion. Further, if distracting systems are provided, drivers may believe they are safe to use, even though this may not be the case (Parnell, Stanton & Plant, 2018).

In addition, the Australian Automobile Association (AAA) noted the importance of the vehicle HMI for addressing driver distraction in its submission to the consultation RIS. The AAA considers that the design of these interfaces can play a role in minimising unsafe interactions with in-vehicle information systems.

The NTC considers that the Victorian Department of Transport's project to develop a test protocol for rating the distraction potential of new vehicles entering the Australian market (discussed in subsection 1.1.1) could provide an opportunity to address the road safety impact of decisions made by overseas vehicle manufacturers. The now completed stage one allowed determining how to develop and implement a distraction safety rating. Stage two has begun and will consist of a proof-of-concept study that will employ the distraction safety rating system developed in stage one to rate the distraction potential of three new Australian vehicles.

If successful, the proof-of-concept study would be followed by a much larger stage three study with a large range of vehicles available for distraction assessment. Additional funding would allow the project to undertake stage three, and ongoing funding would be required to continue to rate new vehicles coming to market for their distraction potential.

This study could complement work ANCAP is undertaking to assess safety-assist technologies in new vehicles. From 2020, ANCAP will introduce an assessment of driver monitoring systems that aims to detect impaired and distracted driving. Further development of assessment procedures for driver monitoring will be developed and implemented from 2022.

The Victorian Department of Transport's study is in line with the overarching strategies in the national roadmap on driver distraction endorse by the Transport and Infrastructure Council in June 2020. In particular, the study is closely aligned with the strategy on 'designing for a safer interaction', which identifies the evaluation of HMIs and the development of standards as key projects.

Given the potential benefits of this project, the NTC considers that it should be given national priority and that the Australian Government and the Victorian Government should aim to continue this nationally relevant work.

Recommendation 5: That the Victorian and other governments consider opportunities to collaborate in progressing the development and delivery of an ongoing driver distraction rating system for the in-vehicle human–machine interface in new vehicles as they come to market, with the ultimate goal of incorporating the distraction rating system into the Australasian New Car Assessment Program.

5.2.4 Technologies to support enforcement

Road police officers sometimes face circumstances that can reduce the opportunities to observe unlawful behaviour. These circumstances include low light conditions, tinted windows and heavy traffic. Further, roadside enforcement is resource-intensive and relies on probabilistic detection. Such limitations can reduce the effectiveness of any changes to legislation resulting from this project.

The NSW Government's successful pilot program and rollout of detection camera technology to target illegal use of mobile phones provides a useful tool for law enforcement across the nation. As independent modelling suggested, this technology could prevent dozens of fatal and serious injury crashes.

The policy approach recommended in this RIS would prohibit touching a non-mounted device with any part of the driver's body and having the device's display visible to the driver. The NTC considers that this proposed policy approach is in line with the NSW Government's current use of cameras to detect illegal use of non-mounted mobile phones.

A national rollout of these cameras would provide the ability to detect unlawful behaviour among the millions of vehicles circulating on our roads. The NSW Government's experience also demonstrates broad support for using mobile phone detection cameras.

The national roadmap on driver distraction's strategy on encouraging greater compliance through enforcement highlights the development and implementation of initiatives to enhance detection and deterrence as part of the key projects.

The NTC considers that rolling out this technology nationally could have considerable road safety benefits and would improve the effectiveness of the legislative changes proposed in this decision RIS and would closely align with the strategies proposed in the roadmap. Engagement with technology providers has also highlighted opportunities to potentially broaden the use of camera technology in the future, from the current focus on detecting mobile phone use to unsafe use of other devices. Such expansion of camera-detection technology would also be in line with the policy approach proposed in this RIS.

Recommendation 6: That the states and territories work to identify and address legislative barriers to implementing enforcement technologies and consider developing pilot programs to test detection camera and other technologies to target illegal use of mobile phones by drivers.

5.3 Next steps

Should the Infrastructure and Transport Ministers endorse the regulatory approach proposed in the recommended hybrid option (Recommendation 1) and the complementary initiatives, the NTC would release this decision RIS to the public and start work on drafting the required amendments to the Australian Road Rules.

The proposed policy would frame the drafting of the changes to the Australian Road Rules. The Parliamentary Counsel's Office would be responsible for drafting and publishing the subsequent amendments to the Australian Road Rules. The NTC would work with the Office of Parliamentary Counsel throughout the legislative drafting process. The NTC would also engage with states and territories to ensure the draft legislation accurately reflects the agreed policy.

We have scheduled the drafting of those amendments to be finalised by early-2021. The draft amendments are scheduled to be presented to the Transport and Infrastructure Council in May 2021 for consideration.

Appendix A Sources of distraction and their associated risks

	Odds ratios					PAR		Exposure		
								Young et al., 2018		Dingus et al., 2016
Source of distraction	Dingus et al., 2016	Klauer et al., 2006	Olson et al., 2009	Hickman et al., 2010	Fitch et al., 2013	Klauer et al., 2006	Olson et al., 2009	Duration	N	Prevalence
Dialling on a *handheld* phone	12.2	2.79	5.93	3.51	0.99	3.6	2.5			0.14%
Reading a book, newspaper, Kindle or similar	9.9	3.38				2.9				0.09%
Writing	9.9		9							0.09%
Reaching for a *non-moving* object	9.1	1.38	3.09		3.65			6.3	67	1.08%
Looking at an external object	7.1	3.7	0.54					8.3	117	0.93%
Texting	6.1		23.24	163.6	1.73					1.91%
Reaching for a phone	4.8									0.58%
Adjusting an in-vehicle visual display (e.g. touchscreen menu)	4.6							4.3	217	0.83%
Browsing	2.7									0.73%
Adjusting the in-vehicle climate control	2.3							4.3	217	0.56%
Talking on or listening to a *handheld* phone	2.2	1.29	1.04	0.89	0.79	3.6		398.2	5	3.24%
Adjusting the in-vehicle radio	1.9	0.55						4.3	217	2.21%
Eating	1.8	1.57	1.01	1.11				253.2	17	1.90%

Drinking from a container	1.8	1.03	0.97					72.1	14	1.22%
Attending to personal grooming/hygiene	1.4	0.7						9.3	84	1.69%
Interacting with or looking at the *passenger in the adjacent seat*	1.4	0.5	0.35					296.6	82	14.58%
Dancing (in the driver's seat) to music	1					3.1				1.10%
Interacting with or looking at a *child in the rear seat*	0.5	0.33								0.80%
Applying makeup or other personal grooming		3.13	4.48					9.3	84	
Reaching for a *moving* object		8.82						6.3	67	
Reaching for an *electronic* object			6.7			7.6		6.3	67	
Talking on or listening to a *hands-free* phone			0.44	0.65	0.73			273.3	13	
Interacting with or looking at *a passenger in the rear seat*		0.39						281	5	
Using a calculator			8.2							

Inserting/retrieving a CD		2.25								
Smoking (reach, light, extinguish)			0.6							
Smoking (cigarette in mouth or hand)			0.97							
Swatting an insect inside the vehicle		6.37								
Using a dispatch device (truck study)			9.9							
Looking at a map			7							

Appendix B Behaviours and interactions addressed in options and their odds ratios from naturalistic driving studies

Prescriptive option and naturalistic driving studies

		Odds ratios					PAR		Exposure		
									Young et al., 2018		Dingus et al., 2016
Addressed behaviour/interaction	**Source of distraction**	**Dingus et al., 2016**	**Klauer et al., 2006**	**Olson et al., 2009**	**Hickman et al., 2010**	**Fitch et al., 2013**	**Klauer et al., 2006**	**Olson et al., 2009**	**Duration**	**N**	**Prevalence**
Text-based interactions – entering text	Dialling on a *handheld* phone	12.2	2.79	5.93	3.51	0.99	3.6	2.5			0.14%
	Texting	6.1	0	23.24	163.6	1.73					1.91%
	Adjusting an in-vehicle visual display (e.g. touchscreen menu)	4.6							4.3	217	0.83%
	Adjusting the in-vehicle radio	1.9	0.55						4.3	217	2.21%
	Using a dispatch device (truck study)			9.9							
	Writing	9.9		9							0.09%
Text-based interactions – reading	Adjusting an in-vehicle visual display (e.g. touchscreen menu)	4.6							4.3	217	0.83%
	Adjusting the in-vehicle radio	1.9	0.55						4.3	217	2.21%
	Using a dispatch device (truck study)			9.9							
	Browsing the internet	2.7									0.73%
Video and image-based interactions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manual interactions with portables	Reaching for a phone	4.8									0.58%
	Talking on or listening to a *handheld* phone	2.2	1.29	1.04	0.89	0.79	3.6		398.2	5	3.24%
	Reaching for an *electronic* object			6.7			7.6		6.3	67	
	Using a calculator			8.2							
Long eyeglances off the roadway	Reaching for a *non-moving* object	9.1	1.38	3.09		3.65			6.3	67	1.08%

Looking at an external object	7.1	3.7	0.54					8.3	117	0.93%
Adjusting the in-vehicle climate control	2.3							4.3	217	0.56%
Adjusting an in-vehicle visual display (e.g. touchscreen menu)	4.6							4.3	217	0.83%
Adjusting the in-vehicle radio	1.9	0.55						4.3	217	2.21%
Eating	1.8	1.57	1.01	1.11				253.2	17	1.90%
Drinking from a container	1.8	1.03	0.97					72.1	14	1.22%
Interacting with or looking at a *passenger in the adjacent seat*	1.4	0.5	0.35					296.6	82	14.58%
Dancing (in the driver's seat) to music	1					3.1				1.10%
Inserting/retrieving a CD		2.25								
Smoking (reach, light, extinguish)			0.6							
Smoking (cigarette in mouth or hand)			0.97							
Swatting an insect inside the vehicle		6.37								
Attending to personal grooming/hygiene	1.4	0.7						9.3	84	1.69%
Interacting with or looking at a *child in the rear seat*	0.5	0.33								0.80%
Applying makeup/personal grooming		3.13	4.48					9.3	84	
Reaching for a *moving* object		8.82						6.3	67	
Interacting with or looking at *a passenger in the rear seat*		0.39						281	5	

Hybrid option and naturalistic driving studies

			Odds ratios					PAR		Exposure		
										Young et al., 2018		Dingus et al., 2016
	Addressed behaviour/interaction	Source of distraction	Dingus et al., 2016	Klauer et al., 2006	Olson et al., 2009	Hickman et al., 2010	Fitch et al., 2013	Klauer et al., 2006	Olson et al., 2009	Duration	N	Prevalence
Prescriptive	Text-based interactions – entering text	Dialling on a *handheld* phone	12.2	2.79	5.93	3.51	0.99	3.6	2.5			0.14%
		Texting	6.1		23.24	163.6	1.73					1.91%
		Adjusting an in-vehicle visual display (e.g. touchscreen menu)	4.6							4.3	217	0.83%
		Adjusting the in-vehicle radio	1.9	0.55						4.3	217	2.21%
		Using a dispatch device (truck study)			9.9							
		Writing	9.9		9							0.09%
	Text-based interactions – reading	Adjusting an in-vehicle visual display (e.g. touchscreen menu)	4.6							4.3	217	0.83%
		Adjusting the in-vehicle radio	1.9	0.55						4.3	217	2.21%
		Using a dispatch device (truck study)			9.9							
		Browsing the internet	2.7									0.73%
	Video and image-based interactions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Manual interactions with portables	Reaching for a phone	4.8									0.58%
		Talking on or listening to a *handheld* phone	2.2	1.29	1.04	0.89	0.79	3.6		398.2	5	3.24%
		Reaching for an *electronic* object			6.7			7.6		6.3	67	
		Using a calculator			8.2							
Performance	Observable behaviour, interaction or indication of impairment of the driver's ability to safely control the vehicle	Reading a book, newspaper or similar	9.9	3.38				2.9				0.09%
		Writing	9.9		9							0.09%
		Looking at a map			7							
		Reaching for a *non-moving* object	9.1	1.38	3.09		3.65			6.3	67	1.08%

Looking at an external object	7.1	3.7	0.54					8.3	117	0.93%
Adjusting an in-vehicle climate control	2.3							4.3	217	0.56%
Adjusting an in-vehicle visual display (e.g. touchscreen menu)	4.6							4.3	217	0.83%
Adjusting the in-vehicle radio	1.9	0.55						4.3	217	2.21%
Eating	1.8	1.57	1.01	1.11				253.2	17	1.90%
Drinking from a container	1.8	1.03	0.97					72.1	14	1.22%
Interacting with or looking at a *passenger in the adjacent seat*	1.4	0.5	0.35					296.6	82	14.58%
Dancing (in the driver's seat) to music	1					3.1				1.10%
Talking on or listening to a *hands-free* phone			0.44	0.65	0.73			273.3	13	
Inserting/retrieving a CD			2.25							
Smoking (reach, light, extinguish)			0.6							
Smoking (cigarette in mouth or hand)			0.97							
Swatting an insect inside the vehicle		6.37								
Attending to personal grooming/hygiene	1.4	0.7						9.3	84	1.69%
Interacting with or looking at *a child in the rear seat*	0.5	0.33								0.80%
Applying makeup/personal grooming		3.13	4.48					9.3	84	
Reaching for a *moving* object		8.82						6.3	67	
Interacting with or looking at *a passenger in the rear seat*		0.39						281	5	

Appendix C Policy proposal

Table 1: Proper control		
Item	**Proposed policy – proper control**	**Comment**
1.	It is proposed that Australian Road Rule (ARR) 297 be maintained in its entirety, with all its current offences and exemptions Rule 297 would address all the sources of distraction not targeted by the prescriptive element of this policy; this includes non-technology-based distraction as well as unsafe driver engagement with lawful technology-based tasks	The rationale is to maintain the current overarching requirement for drivers to have proper control of the vehicle at all times, regardless of whether they are executing a lawful secondary task.

Table 2: Inbuilt and mounted technology and motorcycle helmets *The elements provided below outline the policy objectives of this proposal. They do not predetermine the final drafting of legislative amendments that would result from the adoption of this proposal*		
Item	**Proposed policy – device categories**	**Comment**

2.	This policy proposal seeks to address driver use of technology capable of wireless communication and/or electronic data retrieval and displaying electronic data by a display built into the device or projection (projection has been included to capture technology such as heads-up displays).
	It is intended that inbuilt and mounted technology, and motorcycle helmets are treated the same under the proposed policy
	Examples of inbuilt and mounted technology:
	• portable devices secured in a mounting affixed to the vehicle, such as:
	  ○ mobile phones
	  ○ tablets
	  ○ laptops
	  ○ electronic games
	  ○ mp3 players
	  ○ navigational or intelligent highway and vehicle system equipment
	  ○ dispatch systems and other mounted devices necessary to perform the professional/commercial driving task
	• heads-up displays
	• integrated infotainment system (technology that provides drivers with information such as vehicle diagnostics, road and traffic conditions, navigation information, weather conditions, communication services, entertainment and, in some situations, warning systems and emergency help systems)
	• integrated dispatch systems and other integrated devices necessary to perform the professional/commercial driving task
	• an auxiliary display/projection used to control an electronic device (e.g. a smartphone connected through a wired or wireless connection to an infotainment system)
	Exemption from classification as inbuilt or mounted technology:
	• CB radio or any other two-way radio
	Motorcycle helmets include: All approved helmets that meet the required standards and are mandatory to wear by riders and passengers as set out by road rule 270.
		The intent is to group a broad range of devices by their common characteristics. However, the final drafting of a definition of this device category in legislation will be required to encompass devices with the capabilities and characteristics identified while avoiding any potential barriers to camera enforcement.
		Inbuilt and mounted technology, and motorcycle helmets would be treated the same regarding what can be visible to the driver of a vehicle and how they may interact with the technology.
		What is meant by 'secured in a mounting affixed to the vehicle':
		• The mounting must be commercially designed and manufactured for the purposes of securely mounting the device in a vehicle.
		• The device must be secured in the mounting, and the mounting must be affixed to the vehicle in the manner intended by the manufacturer.
		• The device must not be mounted in a way that is likely to distract another driver.
		• Affixed to, in relation to a vehicle, includes forming part of the vehicle (i.e. integrated in the dashboard).

Item	**Proposed policy – permitted interactions with inbuilt and mounted technology, and motorcycle helmets**	**Comment**

3.	This policy proposal seeks to discourage driver use of technology functions not related to the operation of the vehicle, the professional driving task, navigation, audio-based functionalities and voice-based communications. However, this does not preclude the use of voice commands and the minimal use of a finger to operate a permitted function of the device.
	The intent of this policy is that the driver of a vehicle that has inbuilt or mounted technology, or is wearing a motorcycle helmet, must not touch the device or have the screen operating while visible to the driver (from the normal driving position) while the vehicle is moving, or is stationary but not parked:
	1. unless the driver is operating the device to:
	  a. accept, reject and initiate an audio call
	  b. stream, play or listen to music or audio files
		The driver of a vehicle would be prohibited to view or interact with inbuilt, mounted technology, or motorcycle helmet technology in any way that is not specifically permitted.
		Examples of interactions that would be deemed illegal under this approach include:
		• Playing videogames
		• Streaming, playing or watching videos
		• Looking at pictures

	c. use functions associated with safety and the operation of the vehicle (e.g. climate control, vehicle diagnostics, advanced driver-assistance systems, displays and/or monitors associated to blind spot cameras, rear-view cameras, dashboard cameras and CCTV cameras) d. use functions that monitor the driver's behaviour and/or condition e. use a dispatch system or device or an app used as part of the professional driving task f. use navigation functions. **2.** the interactions above are permitted as long as the driver: a. does not touch the device to manually enter words, sentences and numerical sequences, for example phone number, an address for navigation, entering the name of an artists or song b. does not scroll, for example scroll through contact lists or playlists. **Touch** refers to using hand or finger to operate the device. It does not include using steering wheel/handle bar buttons or controls or other controls inbuilt into the vehicle. Although it is not intended to permit scrolling, contact lists and play lists are permitted to be visible to the driver of a vehicle if they automatically appear when using voice commands to make a call or play a song. It is also proposed that devices are not mounted (inside or outside the vehicle) in a way that is likely to distract another driver; this means that the prohibition in 299(1)(b) would be maintained. ***Exempted from this policy:*** • moving images from displays indicating a destination or functioning as a bus sign • police or emergency vehicles • the display of the device is not deemed to be operating if the device: ○ automatically receives notifications of receiving text messages, emails, video messages or similar communication ○ has the information provided on the locked screen (e.g. time, date, battery power). ○ has static and motion images linked to vehicle information or as part of the system's visual interface.	• Composing and reading and emails, text messages and other text-based documents • Using the internet and social media • Manually entering (dialling) a phone number • Scrolling through lists of contacts, music and option menus • Typing an address with a navigation device or application • Typing an artist, album or song name While avoiding physical interactions with devices is ideal, the NTC recognises that there are instances in which minimal touch/tap is required. Under this approach, integrated and mounted dispatch systems and other integrated and mounted devices using an app that is displaying information relevant to the professional/commercial driving task would be permitted to be used. The driver would be, however, not permitted to manually enter words, sentences and numerical sequences when using them. The NTC notes that, while the intent is to permit the driver to use the device to display a digital driver licence at request by a police or authorised officer, Australian Road Rule 304 already requires that drivers must obey directions "given by a police officer or authorised person, whether or not the person may contravene another provision of the ARRs by obeying the direction". The intent of ARR 304 is reproduced by rule 304 in the road rules of NSW, Victoria, Queensland, Tasmania, South Australia, Northern Territory and ACT. The intent of ARR 304 is also reproduced in rule 272 of the WA Road Traffic Code 2000.
Item	**Proposed policy – parked vehicle**	**Comment**
4.	It is proposed to apply the definition of 'park' that is currently in the ARRs: 'includes stop and allow the driver's vehicle to stay (whether or not the driver leaves the vehicle)'. As well as the amendments in the 2019 ARRs amendment package to rules 299 and 300 that a vehicle may be parked even though: (a) the key to the vehicle is located in the vehicle's ignition lock, or (b) the engine of the vehicle is running	It is intended that the same definition of 'park' be applied to all vehicles subject to this approach. The NTC considers that different definitions of 'park' for types/classes of vehicles would add complexity without a strong safety rationale. The NTC is not aware of enforcement issues resulting from the definition of 'park' for vehicles other than motor vehicles. It is expected that the issues for motor vehicles have been resolved by the 2019 amendment package.
Item	**Proposed policy – voice control**	**Comment**
5.	It is proposed that the driver of a vehicle be permitted to perform any function that the technology is capable of, provided that the display is not operating, unless it is for a function listed in **Table 2 item 3 section 1** are displayed to the driver of the vehicle	The NTC considers that restrictions to voice-based interactions are impossible to enforce. Voice-based interactions with the highest associated risks would most likely be addressed through resulting restrictions to visual interactions (i.e. not being permitted to have text messages or emails on a display visible to the driver).

Table 3: Wearable technology

The elements provided below outline the policy objectives of this proposal. They do not predetermine the final drafting of legislative amendments that would result from the adoption of this proposal

Item	Proposed policy – wearable devices	Comment
6.	This proposal applies to devices not secured in a mounting affixed to the vehicle that are worn by the driver and capable of: • wireless communication, and/or • electronic data retrieval, and • displaying electronic data by inbuilt display or projection (projection has been included to capture technology such as heads-up displays)	The intent is to address the unsafe use of a range of devices sharing common characteristics. This allows for simplicity in the resulting rules as the focus is on the interactions found by research to carry a higher risk of crash. As with the previous device category, the final drafting of a definition of wearable device in legislation will be required to encompass devices with

	Worn means wearing a device designed or manufactured to be worn or that is affixed to an accessory commercially designed or manufactured to enable the device to be wearable. **Examples of wearable devices include:** • smartwatches • smart glasses • wearable heads-up displays **Wearable devices do not include:** Wearable devices without a display or projector, such as: • smart clothing (i.e. jackets with tap-based smartphone controls) • headphones and earphones • Bluetooth earpieces.	the capabilities and characteristics identified while avoiding any potential barriers to camera enforcement.
Item	**Proposed policy – viewing and using wearable technology**	**Comment**
7.	This policy proposal prohibits driver use of technology functions not related to audio-based functionalities and voice-based communications. However, this does not preclude the use of voice commands. The elements provided below outline the policy objectives of this proposal. They do not constitute the final drafting of legislative amendments that would result from the adoption of this proposal. The driver of a vehicle that is wearing a wearable device while the vehicle is moving, or is stationary but not parked must not: **1.** touch the device **2.** have the screen visible, unless it is being used for: a. audio calls b. streaming, playing or listening to music or audio files. **Touch** for wearables refers to using hand or finger to operate the device. This does not include incidental physical contact not related to the operation of the device or resulting from wearing the device in the way intended by the manufacturer or keeping the device in a pocket of the driver's clothing or in a pouch worn by the driver. Although no physical interaction is permitted, option menus, contact lists and play lists are permitted to be visible to the driver of a vehicle if they automatically appear when using voice commands. As with inbuilt and mounted technology, it is proposed to apply the definition of 'park' that is currently in the ARRs (**Table 2 Item 4**). ***Exempted from this policy:*** • Police or emergency vehicles • the display of the device is not deemed to be operating if the device: ○ automatically receives notifications of receiving text messages, emails, video messages or similar communication ○ has the information provided on the locked screen (e.g. time, date, battery power). ○ has static and motion images linked to vehicle information or as part of the system's visual interface.	The intent is to treat these devices technology with additional restrictions regarding touching and what can be visible while the device is operating. Wearable devices are affixed to the driver's body and do not need to be reached for and held by the driver, and their display is often within the driver's line of sight. However, the reduced size of some of these devices requires restrictions to minimise the potential risks resulting from interactions (visual and manual) that could take the driver's attention off the driving task for longer periods. As with inbuilt and mounted technology, the intent to permit the driver to using the device to display a digital driver licence at request by a police or authorised officer is already enabled by rule 304 in the Australian Road Rules, the road rules of NSW, Victoria, Queensland, Tasmania, South Australia, Northern Territory and ACT, as well as rule 272 of the WA Road Traffic Code 2000. The driver of a vehicle would be prohibited to view or interact with wearable technology in any way that is not specifically permitted. **Examples of interactions that would be deemed illegal under this approach include:** • Playing videogames • Streaming, playing or watching videos • Looking at pictures • Composing and reading and emails, text messages and other text-based documents • Using the internet and social media • Manually entering (dialling) a phone number • Manually selecting or skipping an audio file • Scrolling through lists of contact, music and option menus • Typing an address or any other physical interaction with a navigation device or application • Visually interacting with the device to use navigation functions • Typing an artist, album or song name
Item	**Proposed policy – voice control**	**Comment**
8.	It is proposed that the driver of a vehicle be permitted to perform any function that the technology is capable of, provided that the display is not operating, unless permitted functions listed in **Table 3 item 7 section 2** are displayed.	

Item	Proposed policy – tap-and-go payment	Comment
9.	It is proposed that a driver of a stationary vehicle be permitted to use a wearable device capable of tap-and-go payment in a drive-through.	The NTC proposes including the requirement of the vehicle being stationary for the driver to lawfully use a wearable device for tap-and-go payments.
Item	**Proposed policy – passengers**	**Comment**
10.	As long as the passenger is not actively trying to obstruct the driver's view of the road, wearable technology that has a display or is capable of projection will not be considered to be visible to the driver if it is being used by a passenger and is visible in the driver's peripheral vision.	It is considered that any passenger behaviour or activity that could impair the driver's ability to control the vehicle is sufficiently addressed by road rule 272.

Table 4: Portable technology (not inbuilt or mounted)

The elements provided below outline the policy objectives of this proposal. They do not predetermine the final drafting of legislative amendments that would result from the adoption of this proposal

Item	Proposed policy – portable devices	Comment
11.	This proposal seeks to target portable devices capable of: • wireless communication, and/or • electronic data retrieval, and • displaying electronic data by inbuilt display or projection (projection has been included to capture technology such as heads-up displays) **Examples of portable devices include:** • mobile phones • tablets • laptops • electronic games • mp3 players • heads-up displays • dispatch systems and other portable devices necessary to perform the professional/commercial driving task • cameras **Exemption from the definition of portable technology:** • CB radio or any other two-way radio	The intent is to group a broad range of devices by their common characteristics. This allows for simplicity in the resulting rules as the focus is on the interactions found by research to carry a higher risk of crash. As with the other device categories, the final drafting of a definition of portable device in legislation will be required to encompass devices with the capabilities and characteristics identified while avoiding any potential barriers to camera enforcement.
Item	**Proposed policy – viewing and using portable technology**	**Comment**
12.	This proposal seeks to deter driver use of portable technology. However, this does not preclude the use of voice commands to activate, deactivate, or initiate a function of the device if the display is not visible to the driver. The elements provided below outline the policy objectives of this proposal. They do not constitute the final drafting of legislative amendments that would result from the adoption of this proposal. The driver of a vehicle that is moving, or is stationary but not parked must not: **1.** touch a portable device that is not mounted or affixed to the vehicle **2.** have visible to the driver in the normal driving position the device's inbuilt display while the display is operating. **Touch** for portables includes using hand or finger to touch and operate the device, holding a portable device, or the device resting on any part of the driver's body; it does not include keeping the device in a pocket of the driver's clothing or in a pouch worn by the driver. As with inbuilt, mounted technology, it is proposed to apply the definition of 'park' that is currently in the ARRs (**Table 2 Item 4**). ***Exemptions from this policy:*** • Police or emergency vehicles • The display of the device is not deemed to be operating if the device automatically receives an incoming phone call, notifications of receiving text messages, emails, video messages or similar communication or has the information provided on the locked screen (e.g. time, date, battery power).	Research has found that reaching for a device and interacting with a handheld device can significantly increase the risk of a crash. Therefore, it is proposed that all physical and visual interactions with portable devices are prohibited. Normal driving position would be used in the same manner that it is currently referred to in ARR 299. There is currently no definition of normal driving position in the ARRs. The NTC notes that it is the intent that a portable device could be in a cupholder (or similar) or on a passenger seat, or in an 'oddments tray' that has an inbuilt charging function, as long as the screen is not operating. The NTC also notes that, as with the previous device categories, the intent to permit the driver to using the device to display a digital driver licence at request by a police or authorised officer is already enabled by rule 304 in the Australian Road Rules, the road rules of NSW, Victoria, Queensland, Tasmania, South Australia, Northern Territory and ACT, as well as rule 272 of the WA Road Traffic Code 2000.

Item	Proposed policy – voice control	Comment
13.	It is proposed to allow any function of portable technology to be performed by voice control as long as the display (if the device has one) is not visible to the driver in the normal driving position while the display is operating.	
Item	**Proposed policy – tap-and-go payment**	**Comment**
14.	It is proposed that a driver of a stationary vehicle be permitted to use a portable device capable of tap-and-go payment in a drive-through.	The NTC proposes including the requirement of the vehicle being stationary for the driver to lawfully use a mobile device for tap-and-go payments. It is required that the device would be put away or placed in a secured mounting before the vehicle starts moving.
Item	**Proposed policy – passengers**	**Comment**
15.	As long as the passenger is not actively trying to obstruct the driver's view of the road, portable technology that has a display or is capable of projection will not be considered to be visible to the driver if it is being used by a passenger and is visible in the driver's peripheral vision	It is considered that any passenger behaviour or activity that could impair the driver's ability to control the vehicle is sufficiently addressed by road rule 272.

Appendix D Assumptions for indicative estimates

This regulation impact statement employed a qualitative cost-benefit analysis to assess the options being considered. A qualitative of approach was adopted due to the substantial gaps in evidence that would support relying on a quantitative cost-benefit analysis to choose the preferred option.

Notwithstanding this, the NTC used available evidence in combination with plausible assumptions to establish indicative estimates to support the assessments of the options against the effectiveness and efficiency criteria.

Each assumption, its role in the analysis and the underlying evidence or rationale is set out in the following table.

Assumption	Role in analysis	Evidence/rationale
Effectiveness		
9 per cent of existing fatal crashes are caused by distraction (p. 70)	Baseline/current level of fatal distraction-affected crashes	National Highway Traffic Safety Administration study in the US
16 per cent of existing non-fatal crashes (injury and property only) are caused by distraction (p. 70)	Baseline/current level of non-fatal distraction-affected crashes	Australian National Crash In-Depth Study
26 per cent of distraction-affected crashes relate to technology use (p. 70)	Baseline/current level of crashes caused by distraction due to technology use	Estimate based on the Australian National Crash In-Depth Study and prevalence in crashes of particular distracting activities estimated from a naturalistic driving study in the US (Paine & Regan, 2018)
Technology-related crashes would be 25 per cent higher in the absence of the existing laws (p. 71)	Estimate of the effectiveness of existing laws in preventing baseline technology-related crashes	Informed by estimates from US studies of similar laws
1 per cent of conventional distraction-related incidents are mitigated by the presence and enforcement of rule 297 (p. 72)	Effectiveness of rule 297 relating to the baseline level of conventional distraction	Assumption-based Low number adopted given anecdotally limited use of rule in enforcement
The upper-bound estimate of the effectiveness of options is a 25 per cent reduction in the current number of technology-based crashes (p. 73)	Upper bound of policy effectiveness	Assumption-based Rationale is that further reductions in technology-based driver distraction risk in excess of the levels achieved by existing laws is unlikely
The effectiveness of option 2 in preventing crashes due to technology-related distractions: lower bound is 2.5 per cent and	Lower- and upper-bound estimates of the effectiveness of option 2 for technology-related distractions	Assumption-based Based on achieving 10 per cent and 50 per cent,

Assumption	Role in analysis	Evidence/rationale
upper bound is 12.5 per cent (p. 74)		respectively, of the effectiveness of existing laws
The effectiveness of option 2 in preventing crashes due to conventional distractions: lower bound is –1 per cent and upper bound is 0 per cent (p. 75)	Lower- and upper-bound estimates of the effectiveness of option 2 for conventional distractions	Assumption-based Lower bound assumes that making certain conventional distraction behaviours illegal will have no effect, and the two-second eyes off-road-rule will be less effective than rule 297 that it is replacing Upper bound is that crashes are reduced by the same as the baseline, assuming that the two-second eyes off-road-rule will be equally effective as rule 297 under the status quo
The effectiveness of option 3 in preventing crashes due to technology-related distractions: lower bound is –2.5 per cent and upper bound is –12.5 per cent (p. 77)	Lower- and upper-bound estimates of the effectiveness of option 3 for technology-related distractions	Assumption-based Assumes a 10 per cent and 50 per cent deterioration, respectively, relative to existing laws
The effectiveness of option 4 in preventing crashes due to technology-related distractions: lower bound is 2.5 per cent and upper bound is 12.5 per cent (p. 78)	Lower- and upper-bound estimates of the effectiveness of option 4 for technology-related distractions	Assumption-based Based on achieving 10 per cent and 50 per cent, respectively, of the effectiveness of existing laws
Efficiency		
2.25 million vehicles are affected by the requirement to use a mobile phone mount affixed to the vehicle (p. 81)	Used to estimate how many individuals and businesses are affected under the status quo by the requirement to use a mount	Survey of motor vehicle use and assumption-based Survey of motor vehicle use provides overall vehicle numbers, and it is assumed that 5 per cent of private vehicles and 20 per cent of business vehicles require a mobile phone mount
The cost of a mobile phone mount for vehicles is $20 (p. 81)	Used to estimate cost of compliance with requirement to use a mobile phone mount	Assumption-based Desktop research shows mounts can range from $15 to several hundred dollars
The average life of a mobile phone mount is three years (p. 81)	Used to estimate frequency of replacement for mobile phone mounts	Assumption-based
80,000 rideshare operators are affected by the current requirement for rideshare drivers to pull over to accept a ride request (p. 82)	Input into estimated impact on rideshare operators of needing to pull over to legally accept a job	Based on an estimate of 60,000 Uber drivers with 70.5 per cent market share for Uber Rounded down on the assumption that there is some overlap between Uber and

Assumption	Role in analysis	Evidence/rationale
		other services (IBISWorld, 2019b)
Rideshare operators each take 800 trips per year (p. 82)	Input into estimated impact on rideshare operators of needing to pull over to legally accept a job	Based on Houston Kemp analysis of NSW Uber data extrapolated nationally by population (Kemp & Gu, 2017)
It takes 5 per cent of a rideshare operator's time to pull over to legally accept a job (p. 82)	Input into estimated impact on rideshare operators of needing to pull over to legally accept a job	Assumption-based
Rideshare operators require one minute to accept a job when pulled over (p. 82)	Input into estimated impact on rideshare operators of needing to pull over to legally accept a job	Assumption-based
The cost per hour to a rideshare operator is $22.70 (p. 82)	Input into estimated impact on rideshare operators of needing to pull over to legally accept a job	Based on average of Transport Workers Union (2018) survey and Uber Analysis (Financial Times, 2018)
There are 15,000 total couriers (p. 83)	Input into estimated impact on couriers needing to use voice-activated navigational systems	Based on IBISworld (2019a) estimates of number of courier businesses with turnover of $50,000 to $200,000 and share of 'point to point' businesses (considered most likely to be affected)
20 per cent of couriers would be affected (p. 83)	Input into estimated impact on couriers needing to use voice-activated navigational systems	Assumption-based Implies 80 per cent of couriers that need to communicate and have systems not affected by proposal
Voice-activated navigational systems cost $150 (p. 83)	Input into estimated impact on couriers needing to use voice-activated navigational systems	Assumption-based on market costs of entry-level systems
The average life of a voice-activated navigational system is three years (p. 83)	Input into estimated impact on couriers needing to use voice-activated navigational systems	Assumption-based

Glossary

Include a glossary of terms for complex or technical documents.

Term	Definition
App	A software application developed for use on portable computing devices such as smartphones, smartwatches and tablets.
Australian Road Rules	Model road rules developed by the National Transport Commission and applied in state and territory legislation.
Automated driving system	The hardware and software collectively capable of performing the entire dynamic driving task on a sustained basis. It is a type of driving automation system used in vehicles with SAE levels 3, 4 or 5 of automation as established in standard SAE J3016 by the Society of Automotive Engineers International (SAE).
Automated vehicle	A vehicle with conditional to full automation (SAE levels 3–5). It is a vehicle that has an automated driving system, which means that it is capable of performing the entire dynamic driving task on a sustained basis without human input. It is distinct from vehicles with automated features to assist a driver (SAE levels 1–2), which still require a human driver to perform part of the dynamic driving task.
Council of Australian Governments (COAG)	The peak Australian intergovernmental forum comprising the heads of Commonwealth, state and territory governments and the Australian Local Government Association.
Cognitive demand	The overall mental effort used to perform a task. This includes perception, attention, memory, and decision-making processes.
Cost-benefit analysis	A methodology that involves weighing the costs associated with a decision against the benefits arising from that decision.
Dynamic driving task	All the operational and tactical functions required to operate a vehicle in on-road traffic. This includes steering, acceleration and deceleration, object and event detection and response, manoeuvre planning and enhancing conspicuity through lighting signalling etc. The dynamic driving task excludes strategic functions like trip planning, such as where and when to travel and route selections.
Driver	Defined in the Australian Road Rules as the person who drives a vehicle (except a motorbike, bicycle, animal or animal-drawn vehicle).
Driver's aids	Technologies used by drivers to prevent crashes and make driving more convenient.
Driving performance	The behavior demonstrated by a driver performing the driving task.
Fallback-ready user	A human in a vehicle with conditional automation who can operate the vehicle, who is receptive to requests from the automated

Term	Definition
	driving system to intervene and is receptive to evident dynamic driving task performance-relevant system failures. The fallback-ready user is expected to respond by taking control of the vehicle.
GPS unit	A general term describing any satellite constellation that provides positioning, navigation and timing services on a global or regional basis.
Heavy vehicle	A vehicle with a gross vehicle mass of 4.5 tonnes or more.
Human-machine interface	The user interface that connects a person to a machine, system, or device. The interface consists of hardware and software that allow user inputs to be translated as signals for machines that, in turn, provide the required result to the user.
Indicative cost estimate	An estimate that provides a rough cost projection for measuring changes in qualitative impacts, including both perception-scoring data and observable changes in behaviour.
Impairment	The degraded driving performance associated with secondary-task interactions.
In-vehicle information system	A device that provides drivers with information that is otherwise unavailable to them such as vehicle diagnostics, road and traffic conditions, navigation information, weather conditions, communication services, entertainment and, in some situations, warning systems and emergency help systems.
Levels of driving automation	Society of Automotive Engineers' (SAE) automation level definitions that define the different driving modes for automated vehicles based on the dynamic driving task requirements.
Level 2 automated vehicle	Level of driving automation in which the driving automation system can control both the steering and the speed simultaneously, with the expectation that the human driver remains in charge of object and event detection and response and supervises the driving automation system. This is commonly referred to as partial automation.
National Transport Commission	Independent statutory body that contributes to achieving national transport policy objectives by developing regulatory and operational reform of road, rail and intermodal transport.
Qualitative cost-benefit assessment	A type of cost-benefit analysis that considers qualitative factors as part of the analysis of a decision.
Nomadic device	A portable wireless device capable of wireless communication and/or electronic data retrieval.
Qualitative factors	Decision outcomes that cannot be measured.
Rider	Defined in the Australian Road Rules as the person who is riding a motorbike, bicycle, animal or animal-drawn vehicle.

Term	Definition
Rideshare	An arrangement in which a passenger travels in a private vehicle driven by its owner, usually for a fee, as arranged by using a website or app.
Smartwatch	A mobile device worn on the wrist, typically with a touchscreen interface, with many of the same functionalities as a smartphone.
Tap-and-go payment	A tap-and-go payment is a contactless payment capability incorporated into debit or credit cards and smartphones that allows to make purchases faster, usually without the need to input a PIN.
Transport and Infrastructure Council	Group comprising Commonwealth, state, territory and New Zealand ministers with responsibility for transport and infrastructure issues, as well as the Australian Local Government Association.
Voice–user interface	A computer interface that uses speech recognition to understand spoken commands and questions.
Wearable device	Electronic device that can be worn on the body, either as an accessory or as part of material used in clothing.

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List of tables and figures

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