Impact of Roadside Advertising on Road Safety
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Impact of Roadside Advertising on Road Safety

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Impact of Roadside Advertising on Road Safety

Austroads
Sydney 2013
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- promote improved practice and capability by road agencies.
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- Australian Local Government Association
- New Zealand Transport Agency.

The success of Austroads is derived from the collaboration of member organisations and others in the road industry. It aims to be the Australasian leader in providing high quality information, advice and fostering research in the road transport sector.
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SUMMARY

It is now widely recognised that distraction is a significant contributor to crashes. While there has been a focus on in-vehicle distraction, especially from mobile phone use, in recent years there has been a growing recognition that distraction may arise from sources outside the vehicle. In particular, roadside advertising has been suggested to have the potential to create a crash risk in this way. With the emergence of digital technology it is now the case that advertising scenes can change frequently and may even contain motion and it is this potential for movement in the visual scene that is of special concern from a distraction perspective.

Currently, while most road authorities have applicable guidelines to inform the design and placement of roadside advertising, these are quite diverse across jurisdictions and often do not deal appropriately with digital technology. In addition, the actual distraction risk associated with roadside advertising is not incorporated and communicated well in these guidelines.

Therefore, the aims of this project were to; firstly, review the extant literature on the distraction risk associated with roadside advertising and to communicate this. The second aim was to document and review the existing guidelines across road agencies so that inconsistencies and gaps could be identified. Finally, these outputs were to be used to inform guiding principles and make guidance recommendations that can be used to create guidelines and to harmonise guidelines across road agencies.
1 INTRODUCTION

1.1 Background

Australia’s new National Road Safety Strategy notes that, ‘Driving is a complex task and sources of driver distraction, both within the vehicle and in the general road environment, have increased substantially in recent years’ (National Road Safety Strategy 2011–2020, p. 83). While it is recognised that inattentive driving is a contributor to road crashes and that roadside advertising may be one of the contributors to such inattention, criteria for the management of roadside advertising devices vary considerably between jurisdictions. In a number of jurisdictions, responsibility for the criteria resides with the planning agency, while in others it is a road agency function. A number of road agencies have sponsored projects to better inform themselves about the safety implications of outdoor advertising, which also has contributed to variations in jurisdictional practice. Given that the income derived from outdoor advertising can be significant, particularly on high volume corridors, the state practice guidelines are able to be ‘played off’ against each other by the outdoor advertising industry.

In addition, a significant emerging safety issue is the use of digital display technology for outdoor advertising signs. This new technology will enable the advertising industry to display more attention-getting messages that are likely to cause drivers to be less attentive to the driving task. Some recent work in the United States, submitted under NCHRP Project 20-7 (256) by the Veridian Group, reports that

‘the newest digital billboards are also increasingly capable of ‘interacting’ with approaching drivers. In some cases, the Radio Frequency Identification Device (RFID) embedded in a vehicle’s key or on-board computer system, can trigger a personalised message on a digital billboard; in other cases, the billboard can display a message tailored to the radio frequency of passing vehicles. Still other billboards encourage drivers to interact with the sign by ‘texting’ a message or calling a number displayed on the billboard’ (Wachtel 2009).

1.2 Purpose and Outline of the Project

For these reasons there is considerable interest in coming to a definitive understanding of the risks associated with roadside advertising in its various guises so that informed guidelines for the regulation of such advertising can be formulated.

This project is designed to facilitate the harmonisation of agency criteria for the management of roadside advertising devices and promote improved and consistent practice by road agencies. Most importantly, it will assist road agencies to understand and address a significant emerging safety issue – the use of digital display technology for outdoor advertising signs.

There are four major tasks in this project:

- review the human factors elements relevant to understanding the possible safety implications of roadside advertising
- undertake a literature review of existing research investigating the distraction potential of roadside advertising
- document the guidelines, practices (and underpinning rationale) adopted by road and planning agencies for the management of roadside advertising
- develop ‘best practice’ guiding principles and guidelines for the placement of outdoor advertising signs.
2 Method

The research method included extensive desktop research, including internet, library and database searches to locate all relevant material (English language only).

This process was conducted with the aid of the M.G. Lay Library. The M.G. Lay Library contains the most comprehensive and up-to-date collection of international literature on land transport issues (particularly roads) in Australia, and is one of the leading technical libraries in its field in the world. The library is staffed by a team of full time professionally qualified staff. The ARRB Group library has close contact with major libraries both in Australia and overseas, for example the Library at the UK Transport Research Laboratory. Inter-library loans are easily arranged, or document abstracts in other libraries can be accessed via on-line communications. The Australian Transport Index (ATRI), the International Transport Research Documentation database (ITRD), and the Transportation Research Information Services (TRIS) were all searched for relevant information.

ATRI is a database produced by ARRB Group. The Australian Transport Index provides a record of significant material published about roads and land transport in Australia, the United Kingdom, the USA, Europe and Asia. Many of the records include an abstract. The Australian Transport Index is available online and on CD-ROM through Informit, the electronic publishing arm of RMIT University. ATRI contains over 143,000 records. ITRD is managed by the OECD Division of Transport. ITRD covers published technical literature from around the world as well as details of current research projects. The database contains information from 40 major technical institutes from 24 countries and more than 350,000 references including an informative abstract. TRIS is a database prepared by the US Transportation Research Board and covers all modes of transport. It includes publications and descriptions of research projects and contains over 450,000 references.

Following the preparation of the review of the research literature and existing guidelines a workshop was held to disseminate and discuss the outputs of these reviews and to come to some agreement about their implications. Attendees included representatives of state and territory road agencies and academics with expertise in the area. The list of attendees is shown in Appendix A.
3 ROADSIDE ADVERTISING DEVICES

Roadside advertising devices are defined in this report as all advertising signs and devices which are visible to road users (intentionally or otherwise) and are used to display advertising copy that promotes a product, service, event or any other activity for an organisation that would derive a benefit from the display of the advertising. For the purpose of this project, the focus is on advertising devices which are located within or are visible from the boundaries of state-controlled roads.

Definitions and terminology used to describe different types of roadside advertising devices can vary considerably, both internationally and across Australian states. The sections below provide a comprehensive summary of the most commonly used devices in Australia that are likely to impact on road safety, detailing industry standards where appropriate. The categories adopted here reflect common industry classification schemes.

Within the summary, devices have been primarily categorised as non-changeable or changeable. Another important characteristic used to distinguish between devices is luminance. Both non-changeable and changeable devices can be illuminated, as discussed in greater detail in Section 3.3.

3.1 Non-changeable Advertising Devices

Non-changeable devices display a single advertisement copy that can only be changed manually on-site. The content of the advertising copy remains static (i.e. constant) for the duration of the display.

Conventional billboards and posters

These devices refer to large advertising signs, greater than 4 m², with messages that incorporate words, symbols or pictorial displays and are printed on paper or alternative materials such as computer generated woven polyester panels or 'skins'. As illustrated in Figure 3.1, the advertising copy may be mounted on freestanding structures or attached to building walls, roofs and overhead transport infrastructure (e.g. bridges and overpasses). The messages displayed on these conventional devices do not change unless manually replaced on-site.

A variety of sizes are used; the 24 Sheet poster, or traditional ‘Billboard’, is the most frequently used format in outdoor advertising. The messages may be illuminated through external power sources, although this does not usually achieve the same perceived brightness as the digital billboards described in Section 3.2.2. Table 3.1 provides an overview of the different formats of poster used in roadside advertising in Australia.

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1 It should be noted that considerable roadside advertising is situated adjacent to non state-controlled roads.
Source: Department of Planning NSW (2007).

Figure 3.1: Examples of a freestanding billboard (top), wall-mounted billboard (left) and bridge-mounted billboard (right)

Table 3.1: Conventional billboard and poster formats used in outdoor advertising

<table>
<thead>
<tr>
<th>Category</th>
<th>Format</th>
<th>Typical industry dimensions/area</th>
<th>Markets</th>
<th>Illumination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large format</td>
<td>Spectaculars</td>
<td>18.9 m x 4.5 m (＞50 m²)</td>
<td>City and regional – principal arterial roads, highways and freeways</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Supersites</td>
<td>12.66 m x 3.35 m (42.4 m²)</td>
<td>City and regional – principal arterial roads, highways and freeways</td>
<td>Yes</td>
</tr>
<tr>
<td>Poster</td>
<td>24 sheets</td>
<td>6.0 m x 3.0 m (18.0 m²)</td>
<td>City and regional – including highways, primary / secondary arterial roads, railway interchanges, suburban commercial and industrial areas</td>
<td>Often</td>
</tr>
<tr>
<td></td>
<td>6 sheet</td>
<td>3.0 m x 1.5 m (4.5 m²)</td>
<td>City – mainly displayed on building walls in suburban locations</td>
<td>Occasionally</td>
</tr>
</tbody>
</table>

Other contexts in which conventional billboard or poster formats are displayed are described below and illustrated in Figure 3.2.
Mobile/portable billboards

Mobile or portable billboards generally consist of posters mounted on small commercial vehicles or trailers, sometimes illuminated and with two-sided displays. The vehicle remains motionless while the advertisement is displayed.

Public transport shelter and street furniture poster displays

Posters are commonly displayed as an integral part of freestanding structures such as bus stop shelters or on street furniture in business and entertainment areas of city centres. They are usually illuminated and typical dimensions are 1.8 m x 1.2 m or 1.5 m x 1.0 m.

Source: NZTA (2011) (left) and Department of Planning and Community Development (2007) (right).

Figure 3.2: Examples of a mobile billboard (left) and a billboard displayed as part of a bus shelter (right)

Other

There are numerous other miscellaneous formats of non-changeable advertising devices that are commonly used on the road network, although often prohibited on some roads such as freeways and motorways. These include but are not limited to:

- local business, community and event signs
- real estate signs
- tourist information signs
- banners and flags
- paintings or murals on building walls
- building wrap and hoarding
- transit displays (i.e. on moving vehicles such as buses, trams and taxis)
- aerial displays.

3.2 Changeable Advertising Devices

Changeable advertising devices have the capability to mechanically or electronically change the advertising message being displayed automatically or remotely i.e. without the requirement for human intervention on-site. This enables more than one advertisement to be presented, either through the rotation of static images at specified intervals or the use of dynamic displays.
3.2.1 Mechanically-changed

These devices allow the presentation of two or more static messages that are rotated mechanically (i.e. by a motor) through a pre-determined sequence at regular intervals, while the supporting structure remains stationary. There are motionless periods in between the presentation of different messages and the number of messages that can be displayed is restricted. Unlike electronic devices, the change between advertising messages cannot be instantaneous.

Trivision

In trivision devices, messages are printed onto a series of adjacent vertical prisms (usually three-sided), which when aligned display a single advertising image. The prisms are rotated in unison, typically every four to ten seconds, to show one of three messages. They are also referred to as ‘tri-action’, ‘tri-panel’ or ‘changing slat’ signs. These devices are typically 3 m x 6 m or 12 m x 3 m in dimension.

Multi-advertisement scrolling

Also referred to as rolling devices, these devices have multiple advertisements printed onto a looped canvas or connected to form a single scroll. The scroll is usually wound around a vertical axis using a motorised spool, so that the adverts are sequentially presented in the front display panel. These are often smaller signs installed at street level or incorporated into public transport infrastructure such as bus stops. The advertisements are often illuminated or backlit.

3.2.2 Electronically-changed

These devices use digital technology to display bright, high quality electronic images which are uploaded and changed using a computer and modem via a secure network. Digital billboards feature LED (light emitting diode) technology which enables luminance to be controlled and adjusted automatically. Within Australia, Victoria was the first state to permit these types of signs on its road network.

Digital billboards

Similar to conventional billboards, digital billboards are generally large signs with dimensions greater than 4 m² displaying messages which incorporate text, symbols and other pictorial or graphical images. Digital billboards can utilise static electronic displays or non-static electronic displays. They are also known by a large variety of terms including electronic billboards, electronic message displays, dynamic message signs, commercial electronic variable message signs, video billboards and moving or animated electronic signs. The two display types are described below.

- Static electronic displays contain static images only which are presented successively but do not contain or imply motion within the message itself. The device is programmed to alternate the static images at short intervals. Dwell time, transition time and luminance can all be controlled and changed electronically. Different approaches can be taken to the transition between messages e.g. scroll, dissolve, fade or fly-in. In the USA, typical dwell times for digital billboards range between four and ten seconds (with restrictions on proximity to entry and exit ramps), with transition times varying between instantaneous to four seconds (OMA 2010). These times are comparable to standards in other countries such as Canada and the UK. Some Australian states however currently utilise longer dwell times, as detailed in Section 7. It is worth noting that a number of jurisdictions in the USA also depart from these parameters quite substantially, with mandated dwell times of up to many minutes (e.g. Minnetonka, MN; Bloomington, MN) or outright prohibition of digital billboards (e.g. Pennsylvania DOT).
Non-static or dynamic electronic displays present moving images, or images with features that give the impression of motion and change dynamically similar to a video. This includes animation, flashing, scrolling, intermittent or full-motion video and special effects. These displays are not commonly permitted in many countries, including the UK and the majority of jurisdictions in Australia and America.

Figure 3.3: Examples of digital billboards located within the boundaries of (left) or visible from (right) state-controlled roads

Furthermore, rapidly developing technology is enabling more advanced functions which allow digital billboards to interact with road users, for example by the sign displaying a personal message for a specific driver as they approach or by allowing road users to download images and data.

Variable message signs (VMS)

VMS are primarily used by road authorities with the purpose to present messages to motorists to facilitate more effective management of traffic and to promote road safety. VMS have the capability to present text and/or graphical displays.

In Australia, traffic VMS are generally static electronic text-only displays and are most commonly used to display a single message for a significant period of time. Road agencies usually prescribe detailed specifications regarding the format and content of these signs, including size of text, use of colour and permitted words. Messages may be tactical (e.g. incident warnings) or advisory (e.g. safe driving advice or journey time information). Under normal traffic conditions, when there is no need for a safety-critical instruction, the road authority may authorise use of the sign to display other information which may have relevance for both traffic management and advertising; for example, details of upcoming special events.

VMS can also be used solely for commercial advertising purposes. These are often in the form of portable devices located on lower speed roads and adjacent to business premises, as illustrated in Figure 3.4.
Projection on to buildings

It is also possible to project both still and video images directly on to buildings. While this approach is quite common in some parts of North America and Europe, it has been uncommon in Australia until quite recently. It is now becoming more common in Australia for special events such as New Year’s Eve celebrations and the like. However, the advantages of such an approach (reduced infrastructure and installation costs) suggest that there is likely to be increasing interest in deploying this technique in Australia in the future.
3.3 Illumination

It is important that advertising devices are illuminated appropriately for the ambient light conditions to ensure there is no unacceptable glare (making it difficult to read the sign because of excessive external light sources) or reflectance (making the sign itself so bright that it is distracting) that may result in safety issues for road users or that will produce unacceptable light spillage to the local environment. Advertising devices can be classified according to the following definitions:

*Non-illuminated* devices do not have specifically designed internal or external means of illumination, although they may be indirectly illuminated by street lighting or other local light sources. They may be non-reflective, retro-reflective or partially retro-reflective.

*Illuminated* devices have specifically designed internal and/or external means of illumination of the entire advertising copy or a portion of the device. Both changeable and non-changeable devices can be illuminated.

*Externally illuminated* devices have an external light source which is used to illuminate the advertising copy (see Figure 3.6). For example, through the use of fluorescent and/or incandescent bulbs. They may also be referred to as floodlit signs, and most commonly consist of conventional billboards and posters.

*Internally illuminated* devices have internal lighting to illuminate the advertising copy, see Figure 3.6. This includes digital billboards which use LED technology, as well as devices which contain lights or illuminated tubes arranged as an advertisement such as neon signs. The lighting can be adjusted, either automatically using sensors or manually, to match the appropriate luminance for ambient light conditions.

*Static illumination* refers to illuminated advertising devices where the illumination of the entire device is constant in form, intensity and colour; for example, an externally-lit conventional billboard.

*Non-static illumination* refers to an illuminated advertising device where the illumination of the entire device is not constant in form, intensity and colour. For example, animated and video displays or advertisements incorporating flashing, scintillating or blinking lights which emit light intermittently.

![Illustration of illuminated advertising devices](image-url)

**Figure 3.6:** Example of an externally illuminated advertising device (left) and an internally illuminated advertising device (right)

Source: Department of Planning NSW (2007) (right).
4 GENERAL HUMAN FACTORS CONSIDERATIONS

4.1 Introduction

Driving a motor vehicle is a complex task that requires the ability to divide one’s attention between numerous competing tasks. Drivers must simultaneously maintain an appropriate and legal speed, change lanes, navigate traffic and intersections and read and interpret signs of various kinds. Furthermore, drivers are often challenged by conditions that can change almost instantaneously. Some of these changing conditions can be critical to the driving task while others are not. When they are not they are therefore potential distractions from the driving task. Such distractions can result from factors either internal or external to the vehicle.

This review is focussed on distraction from an external source; advertising billboards. The fundamental logic of roadside advertising is to attract attention to something that is not part of the driving task. In order to contribute to the current evaluation of whether this might have an impact on driving safety, the following sections review the nature of attention and some perceptual issues that are likely to be important to the driving task.

4.2 The Nature of Attention

There are two key aspects of attention that are important for understanding the problem of distraction from advertising billboards. One is the automatic capture of attention and the other is the limited capacity of human attention.

4.2.1 Automatic Capture of Attention

One concern with digital billboards in particular is that drivers will deliberately attend to them at the expense of the driving task purely to see what is displayed in the next transition (the Zeigarnik Effect; see e.g. Watchel 2009). Contrary to this concern however, it has been found that drivers typically modulate their off-road glances, not looking away from the forward roadway for more than 1.5 seconds at a time (Dingus et al. 1989). Despite this, there is concern that such self-regulation could be involuntarily disrupted by the attention-grabbing properties of roadside advertising.

While the notion of attention is to some extent synonymous with voluntary, goal-directed activity, nevertheless it appears that attention may sometimes be captured involuntarily by certain events. For example, most people would have had the experience of sudden movement in their peripheral vision resulting in a seemingly automatic orienting in that direction. The question for the current purpose is, when and to what extent this is likely to occur. If one is walking alone on a dark street in a bad neighbourhood then the answer is likely to be; frequently and dramatically. But what about when it is not important, or not desirable, to display such vigilance? What happens when a digital billboard changes or animates in peripheral vision when driving? Can we avoid being distracted by such stimuli?

In recent years researchers have been investigating to what extent this attentional capture is outside of voluntary control and what kinds of stimuli give rise to it. This interest has been driven by purely theoretical considerations, but obviously has important implications for understanding the distraction potential of various kinds of roadside advertising. While there is still debate over some of the theoretical subtleties in this research, there are some clear findings of relevance to the issue of the distraction potential of roadside advertising.

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2 There is good evidence that people have a need to complete a task once initiated and that if the task is not completed there will be some continuing cognitive effort devoted to this, potentially to the detriment of other ongoing cognitive activity such as driving for example (see Greist-Bousquet, S., Schiffman, N. 1992).
While some early research suggested that the appearance of new objects in the visual field was the key to predicting attentional capture (e.g. Yantis & Hillstrom 1994), other research suggested that luminance changes were necessary to capture attention (Theeuwes 1995). More recent research appears to suggest that the presence of unique sensory transients may be the key to predicting attentional capture (Hollingworth, Simons & Franconeri 2010). That is, in order to capture attention there must be a salient change in the environment that creates a new event in the observer's sensory system. This could be luminance changes, which could arise from the appearance of a new object, or motion in a previously immobile object.

With respect to the issue of the extent to which the capture of attention is involuntary; the research is similarly complicated. While some research appears to show that involuntary attentional capture by environmental events does occur, other research suggests that this attentional capture can be suppressed (Yantis & Jonides 1990). The key seems to be that this suppression is more likely if the primary task is very demanding and requires a focussed attentional state, but that such suppression becomes less likely as the primary task becomes less demanding, requiring a less focussed attentional state (Lamy & Tsal 1999; Ruz & Lupianez 2002). The results of Young et al. (2009) showing poorer recall of road signs (suggesting greater attention to roadside advertisements) are consistent with this and are discussed in more detail below.

The typical driving task and driving environment is quite undemanding, with a diffuse focus of attention. Generally drive while talking to a passenger and looking at the scenery and roadside environment generally. Only when, for example, they are on an unfamiliar road, driving at high speed, in heavy traffic, while trying to navigate to an unfamiliar destination is the driving task likely to become demanding. Thus, the fundamental research reviewed above suggests that in typical everyday driving environments attention is likely to be captured involuntarily. In addition, this fundamental research also suggests that motion and luminance changes in digital billboards are likely to be highly effective in capturing attention involuntarily.

4.2.2 Attentional Biases

It is well known that attention may be controlled by the emotionality of information. For example, the sound of someone crying will likely attract our attention. This is not surprising as emotional content is likely to signify that the information is important from a survival perspective. Less well appreciated within road safety is the fact that personality factors appear to dictate how attention to emotional material is controlled. For example, in a seminal study, MacLeod, Matthews and Tata (1986) demonstrated that clinically anxious subjects directed attention towards threatening material, at the cost of attention to other material, while non-anxious subjects directed attention away from threatening material. This processing bias appears to occur automatically and outside of awareness (MacLeod & Rutherford 1992).

Most et al. (2005) provided another demonstration of how the emotionality of material may distract attention away from critical target material. They presented a series of photographs and asked participants to respond to a particular target. When the target was preceded by a photograph with a negative emotional content, participants more often missed the target than when it was preceded by a neutral photograph. This 'blindness' was evident up to 800 msec after the presentation of the emotional photograph. Participants who scored low on harm avoidance were more easily able to modify their cognitive processing to reduce the induced blindness when given appropriate instructions than were participants who scored high on harm avoidance.

These considerations suggest that billboards with emotional content have a greater capacity to attract and hold the attention of individuals for whom that emotional content is significant, and this may result in decrements in driver performance.
4.2.3 Limited Capacity of Attention

Once attention is captured or is strategically focused, the processing of the material within the focus of attention competes with other ongoing for cognitive resources. It is well understood that processing resources may have limited capacity (Wickens 2002). This can be seen very clearly in everyday tasks such as trying to follow a news item on television while having a phone conversation; comprehension of one or the other is likely to suffer.

However, drivers can drive quite successfully most of the time while having a conversation. This is because large chunks of the task of driving are relatively automated and/or do not draw on the same processing resources. When this is not the case driving performance is apt to suffer. For example, because driving relies so heavily on visual information processing, driving and comprehension performance are better when instructions are presented verbally while driving than if they are presented visually (Parkes & Coleman 1990). For the same reason, billboards always have the potential to interfere with driving performance.

Even if billboards do not deflect gaze direction away from the forward roadway, to the extent that they have captured attention they are likely to reduce the processing capacity available for other visual information processing required for driving. Furthermore, as Strayer and Johnston (2001) have shown in the case of mobile phone conversations, some driving-irrelevant stimuli can sometimes be so engaging that essentially all spare capacity is recruited to the secondary task, with serious consequences for driving performance. A billboard that was this engaging would undoubtedly be a serious safety risk for driving.

Concerns about irrelevant processing consuming resources required for optimal driving performance are even more salient for inexperienced drivers. Inexperienced drivers demonstrate significantly greater impairment from secondary tasks while driving (Shinar, Meir & Ben-Shoham 1998). The most likely explanation for this is that many of the tasks involved in driving are not yet as automated as they are for experienced drivers and therefore compete for limited processing resources to a greater extent.

4.3 Perceptual Issues

4.3.1 Eyes Off the Forward Roadway

Thus far consideration has been given to how the capture of attention and the consumption of processing capacity by roadside advertising might impact on driving performance. Another way in which roadside advertising is likely to impact on driving performance is via inappropriate visual fixation, usually away from the forward roadway. That is, even if cognitive capacity is not being consumed to such a degree as to impair driving performance in itself, the fact that a driver is not looking in the correct direction to safely negotiate the road and other traffic may result in an incident, especially if conditions change suddenly.

In a key finding in this area, Klauer et al. (2006), in an analysis of the 100-Car Naturalistic Driving Study, found that glances away from the forward roadway for more than two seconds doubled the near-crash and crash risk compared to baseline. This result is averaged across all road types and traffic conditions. One can imagine that in challenging road environments in heavy traffic this risk would be much greater. At 70 km/h a two second glance away from the forward roadway equates to just under 40 m of travel down the roadway. In certain road environments and in heavy traffic it becomes quite likely that conditions in the forward roadway will have changed over this distance and hence that a driver not looking ahead will not be able to respond appropriately to these changes.
4.3.2 Visual Clutter

It seems intuitively plausible that the presence of driving-irrelevant material in the driving environment will hinder the apprehension of driving relevant information. A key prediction from this hypothesis is that increased visual clutter (defined as driving irrelevant stimuli) will result in decreased ability to locate critical information. Consistent with this, when Ho et al. (2001) asked participants in their experiment to rate driving scenes as either high or low clutter, they found that scenes rated as high clutter resulted in more errors when searching for a target sign. McPhee et al. (2004) found that this kind of impairment was further exacerbated by requiring participants to engage in a listening and comprehension task simultaneously with the search task. In addition they found that older adults performed more poorly than younger adults on the search task.

While these results imply that care should be taken to not clutter the road environment with driving irrelevant items, including roadside advertising, it does not provide an easy-to-use, objective measure of clutter that could be used to make decisions about the installation of additional objects in the road environment. While there has been some recent research aimed at deriving a metric for clutter (Rosenholtz, Li & Nakano 2007) this is not sufficiently developed to allow its application to a road environment. On the other hand, given that subjective estimates of clutter appear to be reliable and predict key aspects of driving performance (Ho et al. 2001; McPhee et al. 2004), it may be sufficient for practical application to use a subjective judgement of clutter until clutter assessment tools are available.

A better approach is currently being developed by Edquist et al. (in prep). They have provided evidence that clutter can usefully be conceptualised as falling into three categories – Built (buildings and other infrastructure), Designed (road markings and traffic control devices) and Situational (vehicles and other road users). Their experiments suggest that multi-storey buildings close to the road (such as typical commercial developments) and a larger number of traffic control devices on view (more than three at any one time) have a negative effect on driving performance. It also seems likely that high traffic volumes (high situational clutter) will also have a negative effect on driving performance although this has not been clearly demonstrated in their research to date.

4.4 Summary

Most drivers, in most driving situations, most of the time, probably possess substantial spare cognitive capacity for the processing of driving-irrelevant information. Given this, and given the exploratory nature of human cognition and the likelihood that drivers attempt to maintain an optimal level of arousal via task difficulty homeostasis (Fuller 2005), it may be very difficult to prevent drivers from directing attention away from the driving task (Trick & Enns 2009). This in itself is not necessarily undesirable as it may serve to maintain an appropriate level of arousal, thus combating the negative effects of monotony (e.g. Oron-Glad, Ronen & Shinar 2008). Indeed, in a recent Austroads (2011) study it was found that roadside signage that was designed to engage drivers in some mental activity, improved driver alertness.

The key question is whether there are situations or individuals where processing is recruited or interfered with by driving-irrelevant material to the detriment of driving performance. The considerations reviewed above suggest that the answer to this is in the affirmative. While attention may be less likely to be captured by irrelevant material in a demanding driving situation, it is clear that in some driving situations it is likely that movement or changes in luminance will involuntarily capture attention and that particularly salient emotional and engaging material will recruit attention to the detriment of driving performance, particularly in inexperienced drivers. Where this happens in a driving situation that is also cognitively demanding, the consequences for driving performance are likely to be significant. Furthermore, if this attentional capture also results in a situation where a driver’s eyes are off the forward roadway for a significant amount of time this will further reduce safety. Additionally, road environments cluttered with driving-irrelevant material may make it difficult to extract the information that is necessary for safe driving, particularly for older drivers.
5 REVIEW OF RESEARCH ON THE SAFETY IMPACT OF ROADSIDE ADVERTISING

The consideration of relevant human factors issues, outlined above, suggests that roadside advertising, especially billboards that exhibit movement and/or luminance changes, that are in an already cluttered road environment and that are especially salient and engaging, could reasonably be expected to have a detrimental effect on driving performance. This is likely to be especially true for inexperienced drivers and older drivers. However, this analysis does not directly answer the question of whether roadside advertising is actually distracting in any real driving environments, to such an extent that it leads to reduced safety and contributes to crashes. In order to evaluate this issue further the review below first discusses the evidence for the involvement of distraction in crashes and then the evidence for the involvement of roadside advertising in distraction and crashes.

5.1 Distraction as a Safety Issue

Studies based on crash reports suggest that perhaps 30% of all crashes involve driver distraction (Wang, Knipling & Goodman 1996) and in around 30% of those the distraction is from outside the vehicle (Stutts et al. 2001). However this source of data is likely to underestimate the contribution of distraction to crashes as drivers are unlikely to admit to such a cause and police may be unwilling to assign distraction as a cause without eyewitness testimony.

In one of the most compelling studies to date, Klauer et al. (2006) analysed the consequences of driver inattention using data from the 100-Car Naturalistic Driving Study. While brief glances away from the forward roadway for the purpose of scanning the driving environment were found to actually decrease the crash risk, glances of two seconds or more doubled the crash risk. In addition, this risk was further increased for certain demanding traffic environments such as intersections and high density traffic.

Some of the riskiest kinds of inattentive driving that contributed to crashes and near crashes in the Klauer et al. (2006) study originated from either drowsiness or in-vehicle distractions. Importantly, looking at an external object exhibited the second highest significant odds ratio of all distractions, (reaching for a moving object produced the highest significant odds ratio) with a driver 3.7 times more likely to have a crash or near crash when looking at an external object. However this kind of distraction accounted for less than 1% of all crashes and near crashes in the study. Thus while looking at an external object appears to be quite risky behaviour when it is engaged in, it is not a frequent cause of crashes overall.

5.2 Roadside Advertising as a Safety Issue

While the Klauer et al. (2006) study does not identify which external objects drivers were looking at when they were so looking, a number of studies have attempted to investigate whether distraction from roadside advertising specifically, might contribute to crashes.

Crundall et al. (2006) showed participants in their study video clips taken from the driver’s perspective and asked them to either scan for hazards only or to look for advertisements also. Advertisements were either at street level or raised 3 m above street level. The core finding from this study was that street level advertisements attracted more attention than raised advertisements when drivers were instructed to look for hazards. Crundall et al. (2006) suggest that this occurs because street level advertisements fall within the normal window within which drivers habitually scan for hazards and that advertisements within this window are inappropriately capturing attention.
Of course this study is somewhat removed from the experience of actually driving, simply requiring, as it does, that drivers passively watch a video (although note that Crundall et al. (2006) discuss why there is good reason to believe that their methodology in this study appropriately taps the key aspects of the driving task).

This concern does not arise in the study by Lee, McElheny and Gibbons (2007). In this naturalistic study drivers drove an instrumented vehicle around a 50 mile loop in Cleveland Ohio. They found that drivers took longer glances at digital billboards than at conventional billboards and baseline sites. While there has been some criticism of their methodology and conclusions (Wachtel 2009) it would be agreed by all parties that Lee, McElheny and Gibbon’s results show that in real world driving, digital billboards can be more distracting than conventional billboards.

Young et al. (2009) conducted a simulator study to investigate the effect of conventional roadside advertising on driver attention and performance. Drivers experienced urban, rural and motorway environments, with and without billboards. The presence of billboards was found to impair lateral control. Similarly, Edquist et al. (2011) found increased delay in the time taken to change lanes in response to signs in a simulator study was delayed by the presence of billboards, although not to a greater extent for changeable digital billboards. The negative impact of roadside advertising on lateral control has also been reported by Bendak and Al-Saleh (2010) in their simulator study. While the frequency of ‘crashes’ in Young et al.’s study was too low for statistical analysis, it is worth noting that there were three times as many crashes in the presence of billboards compared to driving conditions where billboards were absent. Interestingly, they also found that participants displayed significantly poorer recall of traffic control in the motorway and rural driving conditions, compared to urban driving conditions, suggesting that participants were spending more time processing advertisements in these less demanding driving scenarios, at the expense of attending to information that is important for safe driving.

Chattington et al. (2009) conducted a simulator study comparing the effect of static roadside advertising and moving video advertisements. They found that video advertising was significantly more distracting than static advertising, as indicated by more and longer glances towards the advertising. In addition, video advertising was found to reduce the ability to maintain a constant speed and lane position to a greater extent than static advertising.

In recent times, very few studies have attempted to investigate the impact of roadside advertising on actual crash rates. Smiley et al. (2005) investigated the impact of video advertising in Toronto on driving performance in a series of studies, including a before – after installation comparison of crash rates. While Smiley et al. found no statistically significant effect on crash rates overall, they note that sample sizes were not large enough to detect any effect that might accrue from the presence of the billboards. The descriptive statistics in this study however, are consistent with a relative increase in collisions, of all the various types, at the approaches to the video advertising sites.

There are a number of much older studies investigating the effect of roadside advertising on crash rates, but of course these do not deal with modern digital technology. In a review of these older studies, Wallace (2003) concluded that, while many are correlational, thus making it difficult to unambiguously attribute causality, nevertheless, ‘the case for arguing that visual ‘clutter’ at junctions (associated with billboards and signs) can lead to unsafe driving is very strong’ (p. ii).
5.3 Summary

There is compelling evidence that distraction is a major contributor to crashes. However, studies providing direct evidence that roadside advertising plays a significant role in these distraction based crashes are currently not available. The studies that have been conducted show convincingly that roadside advertising is distracting and that it may lead to poorer vehicle control. However, the evidence is presently only suggestive of, although clearly consistent with, the notion that this in turn results in crashes.

It is also worth noting, on the basis of Klauer et al.’s (2006) results, that while looking at an external object increased the crash risk by nearly four times, less than 1% of all crashes and near crashes were from this source of distraction. A substantial proportion of these external objects would not have been advertising signs. Thus, while it is not possible to tell from the reported results, it is reasonable to conclude that far less than 1% of all crashes and near crashes involved distraction from roadside advertising.

While the Klauer et al. (2006) study may not be representative of all driving events, it does suggest that the contribution of roadside advertising to crashes is likely to be relatively minor. On the other hand, from a Safe System perspective it would be difficult to justify adding any infrastructure to the road environment that could result in increased distraction for drivers. The exception to this may be in the case of very monotonous roads where drivers are likely to suffer the effects of passive fatigue.
6 BEST PRACTICE PRINCIPLES

Australian and New Zealand jurisdictions are now firmly committed to the Safe Systems approach to road safety (see Figure 6.1). This approach, which is derived from the Swedish Vision Zero and Dutch, Sustainable Safety approaches to road safety, has at its core the recognition that road users are fallible and will make mistakes, even if alert and intending to comply with the road rules. As a result, vehicles and road infrastructure need to be designed to discourage errors and protect against the consequences of errors when they do occur. Within this philosophical context it is difficult to see how adding roadside infrastructure that has the potential, however minor, to encourage driver error (through distraction) could be justified.

Source: Australian Transport Council (2009).

Figure 6.1: Austroads Safe Systems diagram
However, as noted earlier, the human factors issues are not straightforward when attempting to be definitive about what is and is not desirable from a distraction perspective. Firstly, in some environments, some level of appropriate roadside ‘distraction’ may be desirable. Secondly, it seems very likely that if drivers are not completely engaged by the driving environment they will spontaneously engage in other ‘distracting’ activities. Finally, it appears that in many cases drivers regulate their engagement with potentially distracting stimuli so that its distraction potential is controlled to some extent. This does not mean that roadside advertising is of no concern, but it does mean that there are situations where it is unlikely to compromise the integrity of the Safe System. The key is to specify the principles that are important in determining those situations.

Based on the human factors issues and the specific research outlined above, the following principles should be considered when formulating guidelines for the approval and placement of roadside advertising.

6.1 Potential for Capturing Attention Involuntarily

While the function of roadside advertising is clearly to capture attention, this is undesirable from a safety perspective if it results in attention being diverted involuntarily from the central task of driving. In order to minimise the possibility that such automatic attentional capture occurs, the following principles should be considered.

6.1.1 Movement
The potential for sudden movement and change in the environment to capture attention in a way that is outside volition suggests that digital billboards should not display moving or flashing images (or lighting) or change in a way that produces an impression of movement.

6.1.2 Dwell Time
For similar reasons, the length of time for which an image is displayed should be as long as possible to reduce the frequency of those sudden environmental changes that can capture attention involuntarily.

6.1.3 Transition Time
Again, the transition time between images should be instantaneous in order to reduce the number of sudden environmental changes that could capture attention.

6.1.4 Luminance
Signs that have luminance levels that are high relative to other objects in the environment are likely to gain preferential attention and be particularly good at capturing attention when they change. As a result, digital signs should have luminance levels no greater than any other sign and preferably lower than non-changeable signs.

6.1.5 Content
As some content, particularly emotional content, can capture attention automatically, it is undesirable for such content to be used in roadside advertising. For a similar reason, content that mimics the content of traffic signs would also be undesirable.
6.2 Mental Workload

Because humans have a limited capacity for processing information simultaneously there is the potential for the processing of roadside advertising to interfere with the processing of information critical for safe driving. In order to minimise the possibility that attention is consumed to an unsafe degree the following principles should be considered.

6.2.1 Visual Clutter

A highly cluttered visual field makes it difficult to locate and prioritise processing of driving-critical information. Therefore, roadside advertising should not be placed in locations where there are already a number of existing signs and distracting material visible to a driver. The subjective impression that the driving environment is already cluttered is likely to be a good indication that further signage should be avoided.

6.2.2 Driving Demand

Aspects of the driving environment other than visual clutter are likely to increase mental workload and decrease capacity to process task-irrelevant material such as roadside advertising. In particular, intersections, decision-making points and merge points are likely to be demanding of attention. This suggests that in these and similarly demanding driving environments roadside advertising should not be visible.

6.2.3 Content

The greater the quantity of information in an advertising display, the longer it will take to process and hence the longer a driver’s eyes will be off the road. This suggests that the informational load of the advertising message should be minimised as much as possible so that the content can be processed as rapidly as possible. This will minimise the time during which drivers’ eyes are off the road. Similarly, advertising messages should not be displayed to create a meaningful sequence across transitions as this is likely to create an excessive quantity of information to be processed. In addition it is undesirable for more than one sign to be visible at a time as this will also increase the amount of information to be processed.

6.3 Gaze Direction

Safe driving requires that drivers are looking in the appropriate direction to maximise their information gain about critical aspects of the driving environment. Clearly if they are looking in a direction that is well outside the visual envelope of normal driving-relevant information there is the risk that such relevant information will be missed. As a result it is important that roadside advertising that attracts attention is only located in positions which obviate this possibility.

This consideration suggests that roadside advertising is best located in the line of sight of the forward roadway, provided that it does not obscure or background critical other signage, signals or infrastructure. The following principles are suggested.

6.3.1 Offset

Roadside advertising should not be substantially offset from the travel lane it is desired to be viewed from as this could move gaze direction away from the forward roadway.

6.3.2 Elevation

Roadside advertising should not be elevated to the extent that it draws gaze away from the forward roadway.
6.4 Road Environment

A final consideration is the existing safety profile of the road environment in question. For example, a road with an existing high crash rate would probably be a poor choice for installation of roadside advertising. By the same token, a road rated as risky by any of the road assessment methods (e.g. AusRAP) would also be an environment in which roadside advertising probably should not be introduced. These considerations give rise to the following principles.

6.4.1 Crash Rate Assessment

Black spot locations should not be sites for roadside advertising, especially where crash types are likely to be exacerbated by distraction (e.g. rear end).

6.4.2 Risk Assessment

Rocks assessed as having an unacceptable risk profile should not be sites for roadside advertising.
7 CURRENT GUIDELINES

A review of relevant documentation was undertaken to determine the current guidance provided by each state and territory road and/or planning authority, as well as the main industry representative in Australia, the Outdoor Media Association (OMA). A summary of the review, evaluated against sign design and sign placement criteria derived from the best practice principles outlined above, is provided in Table 7.2 and Table 7.3 with ratings assigned on the following basis:

**Key:**

 ✓ – criterion is given detailed coverage in relevant policy documents and guidelines, with quantitative permission thresholds provided if appropriate.

 ~ – criterion is referred to within relevant policy documents or guidelines, however guidance is highly subjective or non-definitive (i.e. tends to be qualitative).

 X – criterion is not covered within relevant policy documents or guidelines. This may be because it relates to a certain type of advertising device (i.e. changeable) that is not permitted by the jurisdictions.

Table 7.1 outlines the key relevant guidance documents for each jurisdiction; further details of the reference sources for the information included in Table 7.2 and Table 7.3 are provided in the accompanying spreadsheet.

**Table 7.1: Key jurisdiction and/or planning authority and industry guidance documents for roadside advertising**

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Organisation</th>
<th>Document title</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queensland</td>
<td>Department of Transport and Main Roads (TMR)</td>
<td>Roadside Advertising Guide</td>
<td>2009</td>
</tr>
<tr>
<td>South Australia</td>
<td>Department for Transport, Energy and Infrastructure (DTEI)</td>
<td>Roadside Advertising In Unincorporated Areas – Operational Instruction 19.6</td>
<td>2008</td>
</tr>
<tr>
<td></td>
<td>Department for Transport, Energy and Infrastructure (DTEI)</td>
<td>Roadside Advertising In Unincorporated Areas – Operational Instruction 19.7</td>
<td>2008</td>
</tr>
<tr>
<td></td>
<td>Department of Infrastructure, Energy and Resources (DIER)</td>
<td>DIER Policy Statement OPS22 – Electronic billboards on state roads</td>
<td>2007</td>
</tr>
<tr>
<td>Northern Territory</td>
<td>Department of Construction and Infrastructure (DCI)</td>
<td>Guidelines for Permanent Roadside Advertising Signs on Road Reserves</td>
<td>2010</td>
</tr>
<tr>
<td>Australian Capital Territory</td>
<td>Australian Capital Territory Government</td>
<td>Consolidated National Capital Plan</td>
<td>2009</td>
</tr>
<tr>
<td></td>
<td>Australian Capital Territory Government</td>
<td>The Code of Practice for the placement of moveable signs in public places</td>
<td>2005</td>
</tr>
<tr>
<td>Victoria</td>
<td>Department of Planning and Community Development/VicRoads</td>
<td>Victoria Planning Provisions 1999: Advertising Signs Clauses 52.05 (VC49), 36.04 (VC 62) and 73 (VC37), and Amendment VC45</td>
<td>Various</td>
</tr>
<tr>
<td>Jurisdiction</td>
<td>Organisation</td>
<td>Document title</td>
<td>Date</td>
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<tr>
<td>Western Australia</td>
<td>Main Roads Western Australia (MRWA)</td>
<td>Roadside Advertising Standard</td>
<td>2000 (updated 2007)</td>
</tr>
<tr>
<td>New South Wales</td>
<td>Department of Planning(^2) – with input from Roads and Traffic Authority (RTA)(^3)</td>
<td>Transport Corridor Outdoor Advertising and Signage Guidelines Assessing Development Applications Under SEPP 64</td>
<td>2007</td>
</tr>
<tr>
<td></td>
<td>New Zealand Transport Agency (NZTA)</td>
<td>Leaflet – State highways – advertising signs</td>
<td>2011</td>
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<tr>
<td></td>
<td>New Zealand Transport Agency (NZTA)</td>
<td>Advertising – ‘how to’ guide</td>
<td>2011</td>
</tr>
<tr>
<td>N/A</td>
<td>Outdoor Media Association</td>
<td>Discussion Paper - Digital billboards and road safety: An analysis of current policy and research findings</td>
<td>2010</td>
</tr>
</tbody>
</table>

1. Now Department of Planning, Transport and Infrastructure (DPTI).
2. Now Department of Planning and Infrastructure.
DTMR

Refer to Section:

6.1.1

6.1.2

6.2.3

6.2.3

6.2.3

6.1.5

6.1.5

6.1.4

6.1.4

6.1.6 and 6.3

Table 7.2: Overview of jurisdiction and industry guidance for human factors criteria relating to sign design (as at July 2010)

<table>
<thead>
<tr>
<th>Sign design criteria</th>
<th>Movement</th>
<th>Flashing lights</th>
<th>Dwell time</th>
<th>Transition time</th>
<th>Message sequencing</th>
<th>Quantity of information</th>
<th>Information presentation</th>
<th>Colour</th>
<th>Information content meaning</th>
<th>Luminance</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Covers presence of motion in the advertisement, including video and special effects within a single display/message as well as transition, movement and rotation between successive displays.</td>
<td>Covers use of flashing, blinking, revolving, pulsating or intermittent lights.</td>
<td>Also referred to as the message display duration, message on-time or exposure time.</td>
<td>Covers use of a sequence of displays and messages as part of a single advertisement.</td>
<td>Includes message length, quantity of text or number of informational elements.</td>
<td>Covers format of information including font type, text size and spacing, layout and arrangement.</td>
<td>Covers use of colour in general or in relation to a specific area of sign.</td>
<td>Covers the content and meaning of the information contained within the message including textual and graphical elements.</td>
<td>Covers use of luminance (or referred to as illumination) and criteria relevant to retro-reflectivity and glare.</td>
<td>Includes size and shape of advertising device.</td>
<td></td>
</tr>
</tbody>
</table>

<p>| Queensland - DTMR | Devices with changing illumination or variable messages are not permitted within the boundaries of state-controlled roads. These devices are not permitted to be visible from Motorways/Freeways or state-controlled roads with a speed limit of 80 km/h or more. Rotating devices are non-reflective only when movement is about a vertical axis and where the speed limit is less than 80 km/h. | Advertising devices within and outside the boundaries of, but visible from, state-controlled roads shall not contain flashing red, blue or amber point light sources. The maximum flash rate permitted for devices visible from state-controlled roads in Lighting Environments Zones 1 and 2 (central city and suburban areas with high to moderate off-street ambient lighting levels) = 2 flashes/sec. Flashing lights are not permitted when visible from road in Lighting Environment Zone 3 (rural/residential areas with low off-street ambient lighting levels). Large free-standing billboards shall not contain flashing point light sources. | For trivision, VMS and illuminated multi-advertisement scrolling signs, minimum dwell time = 2.5 to 3.5 secs (for a corresponding message length of two to six familiar words). | For VMS, sequential messages not recommended. For large screen VMS or strip type 'text only' VMS, the number and complexity of words used in a message should be consistent with the display duration. | Requirements with regards to legibility are generally advisory – provides guidance based on application of Austroads methodology. | Advertising devices should not be coloured like an official traffic sign. Where a VMS is used as a 'text only' display in a sequential message set, the background colour should be uniform, non-conspicuous in colour, and should not change across the sequential message set. Where background colours do not change between series of message sets, the end of a message should be denoted by a blank time of 1 sec. Where background colours change between series of message sets, the end of a message should be denoted by a blank time of 2 secs. | Any light source shall be shielded so that glare does not extend beyond the device. The supporting structure shall have a non-reflective finish to prevent glare. Devices containing retro-reflective material shall be rotated approximately five degrees away from the devices. | Devices attached to overhead transport infrastructure should be contained within the silhouette or major portion of structure. Signs within the boundaries of state-controlled roads may be limited to accepted industry standards. | Devices should not be shaped like an official traffic sign. Max. area of any face of a Category 1 Advertising Device = 43 m². For Category 2 advertising devices (passenger transport shelters and seats), the max. area of each device = 2.2 m². For Category 2 advertising devices (illuminated advertising panels above illuminated street name plates), the max. area of each face = 2.2 m². Devices attached to overhead transport infrastructure should be contained within the silhouette or major portion of structure. Signs within the boundaries of state-controlled roads may be limited to accepted industry standards. | Devices should not be shaped like an official traffic sign. Max. area of any face of a Category 1 Advertising Device = 43 m². For Category 2 advertising devices (passenger transport shelters and seats), the max. area of each device = 2.2 m². For Category 2 advertising devices (illuminated advertising panels above illuminated street name plates), the max. area of each face = 2.2 m². Devices attached to overhead transport infrastructure should be contained within the silhouette or major portion of structure. Signs within the boundaries of state-controlled roads may be limited to accepted industry standards. |</p>
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<th>Quantity of information</th>
<th>Information presentation</th>
<th>Colour</th>
<th>Information content/meaning</th>
<th>Luminance</th>
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<tr>
<td>Queensland – DTMR (cont.)</td>
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<td>South Australia – DTEI(1)</td>
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<td>No advertising display shall be allowed to be placed or maintained if visible from the road and displaying any red or blinking or intermittent light likely to be mistaken for a warning or danger signal.</td>
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<td>Tasmania – DIER (Note that criteria apply to temporary event advertising only as other sign types prohibited)</td>
<td>✔️</td>
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<td>Electronic billboards are prohibited for advertising purposes.</td>
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<td>Flashing or animated signs, including those employing flashing lights, are prohibited.</td>
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<td>The design and colouring of the sign must be simple and clear.</td>
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<td>The sign should not detract from the message of legitimate signs needed for the purposes of road safety, statutory control and guidance of road users. The message appearing on the signs must be clear and concise to ensure road users can interpret the message.</td>
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<tr>
<td>Illuminated signs, or signs with retro-reflective materials, are prohibited.</td>
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<td>Maximum sign total area = 3.0 m². The sign must not conflict with the shape of traffic signs.</td>
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(Note that criteria generally apply to advertising in incorporated areas only – advertising is not generally permitted in unincorporated areas. Advertising signs are generally not allowed on DTEI arterial roads and highways.)

(Note that criteria generally apply to advertising in incorporated areas only – advertising is not generally permitted in unincorporated areas. Advertising signs are generally not allowed on DTEI arterial roads and highways.)

(1) The design and colouring of the sign must be simple and clear. The sign must not conflict with the shape of traffic signs. No advertising display shall be allowed to be placed or maintained if the illumination from the display is of such brilliance so positioned as to blind or dazzle the vision of travellers on the road. Normal line of vehicle headlight beams in order to minimise specular reflection. No advertising display shall be allowed to be placed or maintained if visible from the road and displaying any red or blinking or intermittent light likely to be mistaken for a warning or danger signal. No advertising display shall be allowed to be placed or maintained if imitating any directional, warning, regulatory or tourist sign, or any sign likely to be mistaken for any such permitted sign, or if likely to be construed as giving warning to traffic, such as by use of the words ‘stop’ or ‘slow down’. Signs must be legible from an appropriate distance and designed and installed so that they may be identified and read by an approaching driver in advance to avoid driver distraction from their primary task of safely controlling the motor vehicle.

<table>
<thead>
<tr>
<th>Dimensions</th>
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<tbody>
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<table>
<thead>
<tr>
<th>Queensland – DTMR (cont.)</th>
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<tbody>
<tr>
<td>Movement</td>
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<td>Flashing lights</td>
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<td>Information content/meaning</td>
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<tr>
<td>Luminance</td>
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<td>Dimensions</td>
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</tbody>
</table>

Queensland – DTMR (cont.)

South Australia – DTEI(1)

Tasmania – DIER

(Note that criteria apply to temporary event advertising only as other sign types prohibited)
### Impact of Roadside Advertising on Road Safety

<table>
<thead>
<tr>
<th>Sign design criteria</th>
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<th>Dwell time</th>
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<th>Information content/meaning</th>
<th>Luminance</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Northern Territory - DCI</strong>&lt;br&gt;(Note that corporate 'product' advertising will not be approved on the road reserves, unless part of a tourist related sign)</td>
<td>✓</td>
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<td>The overall size of the freestanding sign shall not be in excess of 3.6 m wide by 1.8 m high.</td>
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<tr>
<td></td>
<td>Animated signs generally not permitted (except within City Division).</td>
<td>Flashing signs shall generally not be approved (except within City Division).</td>
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<td>✓</td>
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<td>✓</td>
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<td>The Authority shall refuse to approve any sign which it considers offensive.</td>
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<td>Signs illuminated by exposed lamps or neon tubes as distinct from backlighting or floodlighting, shall generally not be approved except where such signs are located on sites within the City Division. Advertising signs on bus shelters may be side illuminated. Illuminated signs attached to buildings must be located on ground storey level only. Advises that other sign types must not be highly reflective.</td>
<td>~</td>
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</tr>
<tr>
<td></td>
<td>Policy that electronic variable message advertising signs should not display animated or moving images, but this can be overridden.</td>
<td>Electronic variable message advertising signs with flashing or intermittent lights are viewed as a safety hazard.</td>
<td>✓</td>
<td>~</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>A sign is a safety hazard if the sign is likely to be mistaken for a traffic control device, because it contains red, green or yellow lighting, or has red circles, octagons, crosses, triangles or arrows.</td>
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<td>The luminance of electronic variable message advertising signs must be such that it does not give a veiling lumiance to the diver of greater than 0.25 cd/m² throughout the driver’s approach to the advertising sign.</td>
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<td>A sign is a safety hazard if the sign could distract drivers due to its size.</td>
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<tr>
<td><strong>Australian Capital Territory Government</strong></td>
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<td>The maximum size of any one display or set of graphics/TextView presented on electronic variable message advertising signs must remain static and unchanged for a minimum period of 50 secs.</td>
<td>~</td>
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</tr>
<tr>
<td></td>
<td>Policy that electronic variable message advertising signs should not display animated or moving images, but this can be overridden.</td>
<td>Electronic variable message advertising signs with flashing or intermittent lights are viewed as a safety hazard.</td>
<td>✓</td>
<td>~</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>A sign is a safety hazard if the sign could mislead drivers or be mistaken as an instruction to drivers.</td>
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<td>The sign shall not be so designed as to bear resemblance to any traffic sign of a regulatory or warning nature. In particular, the colour scheme of black letters on a yellow background, red background with white or black lettering (similar to speed, stop, give way signs, and the like), shall not be used.</td>
<td>✓</td>
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<td>For signs both within or visible from the NT Government road reserve, the sign shall not be so designed as to bear resemblance to any traffic sign of a regulatory or warning nature.</td>
<td>~</td>
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</tr>
<tr>
<td><strong>Victoria – Dept. of Planning and Community Development/ VicRoads</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>The sign shall not be so designed as to bear resemblance to any traffic sign of a regulatory or warning nature. In particular, the colour scheme of black letters on a yellow background, red background with white or black lettering (similar to speed, stop, give way signs, and the like), shall not be used.</td>
<td>✓</td>
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<td></td>
<td>Policy that electronic variable message advertising signs should not display animated or moving images, but this can be overridden.</td>
<td>Electronic variable message advertising signs with flashing or intermittent lights are viewed as a safety hazard.</td>
<td>✓</td>
<td>~</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>A sign is a safety hazard if the sign could mislead drivers or be mistaken as an instruction to drivers.</td>
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<td>The overall size of the freestanding sign shall not be in excess of 3.6 m wide by 1.8 m high.</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Sign Design Criteria**

- **Movement**
  - ✓: Allowed
  - ~: Not allowed

- **Flashlighting**
  - ✓: Allowed
  - ~: Not allowed

- **Dwell Time**
  - ✓: Defined
  - ~: Not defined

- **Transition Time**
  - ✓: Defined
  - ~: Not defined

- **Message Sequencing**
  - ✓: Defined
  - ~: Not defined

- **Quantity of Information**
  - ✓: Defined
  - ~: Not defined

- **Information Presentation**
  - ✓: Defined
  - ~: Not defined

- **Colour**
  - ✓: Defined
  - ~: Not defined

- **Information Content/meaning**
  - ✓: Defined
  - ~: Not defined

- **Luminance**
  - ✓: Defined
  - ~: Not defined

- **Dimensions**
  - ✓: Defined
  - ~: Not defined

**Sign Design Criteria**

- **Movement**
  - ✓: Allowed
  - ~: Not allowed

- **Flashlighting**
  - ✓: Allowed
  - ~: Not allowed

- **Dwell Time**
  - ✓: Defined
  - ~: Not defined

- **Transition Time**
  - ✓: Defined
  - ~: Not defined

- **Message Sequencing**
  - ✓: Defined
  - ~: Not defined

- **Quantity of Information**
  - ✓: Defined
  - ~: Not defined

- **Information Presentation**
  - ✓: Defined
  - ~: Not defined

- **Colour**
  - ✓: Defined
  - ~: Not defined

- **Information Content/meaning**
  - ✓: Defined
  - ~: Not defined

- **Luminance**
  - ✓: Defined
  - ~: Not defined

- **Dimensions**
  - ✓: Defined
  - ~: Not defined
### Sign design criteria

<table>
<thead>
<tr>
<th>Western Australia – MRWA</th>
<th>Sign design criteria</th>
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<tbody>
<tr>
<td>Advertising devices within the boundaries of state-controlled roads shall not include Moving, Rotating or Variable Message Advertising Devices (with the exception of Trivision Signs). Moving Advertising Devices situated in the vicinity of highways and main roads are only permitted when movement within the device is about a vertical axis or axes (i.e. where the Moving Advertising Device is a Rotating Advertising Device) and where the speed environment is 70 km/h or less. Variable Message Advertising Devices are subject to the movement within a Moving-Single Message Display not occurring for continuous periods greater than 1.5 sec.</td>
<td>✓</td>
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</tbody>
</table>

**Variable Message Advertising Devices situated in the vicinity of a highways and main roads are subject to the Single Message Display being fully introduced within 1.5 secs.**

**Variable Message Advertising Devices situated in the vicinity of a highways and main roads are subject to the completion of the message being introduced sequentially within 1.5 secs.**

**MRWA will consider general concepts in relation to legibility, including the relationship between legible height, sign content and speed environment (as discussed in NAASRA 1998 ‘Traffic Control Devices’ document).**

**Lettering used on banners should generally have a minimum height of 300 mm. Lettering less than 200 mm in height is unacceptable.**

**Colour combinations that could potentially result in an Advertising Device being mistaken for a traffic sign or a traffic control signal shall not be permitted.**

**Considers a number of criteria relevant to message content (non-traffic focused):**
- A false representation of, or a condition that could potentially mislead a motorist into thinking the message was a traffic sign or traffic control signal.
- Not being a traffic sign, displays a word or direction ordinarily associated with a traffic sign.

**Max. average luminance for devices on state-controlled roads for different lighting environments:**
- Zone 1 (central city areas) = 500 cd/m²
- Zone 2 (suburban areas) = 350 cd/m²
- Zone 3 (rural/Residential areas) = 300 cd/m²

**External illumination sources shall be shielded to ensure that external ‘spot’ light sources are not directed at approaching motorists.**

**The erection of Non-Static-Illuminated Advertising Devices within the boundaries of highways and main roads is prohibited, with the exception of Chasing Bulb and Scintillating Light Display Advertising Devices on premises adjacent to highways and main roads.**

**Category 3 (local business and community signs) shall be non-illuminated.**

**Election signs should be non-illuminated and not incorporate reflective or fluorescent materials.**

**The size and shape of Advertising Devices erected within highways and main roads is restricted to accepted industry standards (details provided).**

**Device attached to overhead structures shall be contained within the silhouette of the major portion of the overhead structure.**

**The maximum size of individual Advertising Devices attached to bus passenger shelters and roadside seats shall be approximately 1.5 m².**

No part of an Advertising Device attached to a bus passenger shelter shall project beyond the highest part of the roof or the walls of the structure.

**Category 3 devices (local business/Community advertising) must generally be less than 4.5 m² in size.**

**Banners shall not be greater than 10 m or less than 7 m in length, and shall be 1 m in depth.**

**Flags shall not be greater than 1.5 m in height, a maximum length of 2 m with a minimum distance of 1 m to the nearest kerb when the flag is fully extended.**

**Real estate signs must be less than 0.25 m² in size.**
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<tr>
<td>VMS moving signs not face the road reserve and are visible to drivers will only be approved if the display is completely static from its first appearance to the commencement of a change to another display. VMS will only be approved if the sign does not contain any scrolling messages (i.e. displayed text which moves up, down or across the screen so that a line of text or graphics appears at one edge of the screen for each line that moves off the opposite edge). Video and animated electronic signs, including any signs which contain any portion of video and/or animated content will not be approved if facing the road reserve and visible to drivers. According to the Safety Assessment Matrix for advertising on RTA infrastructure, a message is considered low risk (3-2 rating) if it is not animated/ changeable or remains static for at least 5 mins. It is considered medium risk (2 rating) if the message stays static for less than 5 mins. Note: VMS not recommended for advertising in NSW.</td>
<td>✓</td>
<td>✓</td>
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</table>

The proposed advertising message should not spread the message across more than one adjoining sign. The amount of information supplied on a sign should be minimised so that the time required to read and understand the message is minimised. As a guide, each sign should be restricted to 6 units of information. The summation of units is to be calculated as follows: Words of up to 8 letters, inclusive = 1 unit, numbers up to 4 digits, inclusive = 0.5 unit, numbers of 5-8 digits = 1 unit, symbols/ pictures/logo or abbreviation = 0.5 unit.

Advertisements should not contain large areas of red display if they are to be illuminated. According to the Safety Assessment Matrix for advertising on RTA infrastructure (provides a 1-5 risk rating, where 5 is more risk), the grounds for immediate rejection of an advertisement proposal are if the advertisement imitates the colour, shape and legend of a traffic control device (risk rating 4) and the layout as well (risk rating 5).

Advertisements should not contain messages that are distracting or otherwise inconsistent with road safety. According to the Safety Assessment Matrix for advertising on RTA infrastructure (provides a 1-5 risk rating, where 5 is more risk), the grounds for immediate rejection of an advertisement proposal are if the advertisement imitates the colour, shape and legend of a traffic control device (risk rating 4) and the layout as well (risk rating 5).

Advertisements must not initiate a traffic control device such as traffic lights. Advertisements must not instruct drivers to perform an action such as ‘Stop’, ‘Halve or Give Way’. Advertisements must not invite traffic to move contrary to any traffic control device, or turn where there is fast moving traffic. Advertisements should not contain messages that are distracting or otherwise inconsistent with road safety. According to the Safety Assessment Matrix for advertising on RTA infrastructure (provides a 1-5 risk rating, where 5 is more risk), the grounds for immediate rejection of an advertisement proposal are if the advertisement imitates the colour, shape and legend of a traffic control device (risk rating 4) and the layout as well (risk rating 5).

Guidelines include maximum allowable daytime luminance of illuminated advertisements categorised by illuminated area (m²) and zone type (i.e. defined in relation to land use and ambient off-street lighting levels).

- No limit for Zones 1 (city centre areas) and 5 (main corridors).
- Range from 2900 cd/m² for an area up to 0.5 m to 2900 cd/m² for an area over 10 m in Zone 2 (major shopping/commercial centres).
- Range from 2000 cd/m² for an area up to 0.5 m to 800 cd/m² for an area over 10 m in Zone 3 (medium shopping/commercial centres).
- Range from 1000 cd/m² for an area up to 0.5 m to 400 cd/m² for an area over 10 m in Zone 4 (rural/residential).

The maximum night-time luminance of signs must be 1/4 of the daytime prescribed values. For night time use, the lighting is not intended to be used during the daytime. The light sources for illuminated signs must focus solely on the sign and i) be shielded so that glare does not extend beyond the sign and ii) with the exception of advertising on bridges must not exceed 42.4 m² in area. The actual sign dimensions should be determined by the design lines of the bridge and should not be dictated by industry standards (i.e. supersites = 12.66 m x 3.35 m). According to the Safety Assessment Matrix for advertising on RTA infrastructure (provides a 1-5 risk rating, where 5 is more risk), the grounds for immediate rejection of an advertisement proposal are if the advertisement imitates the colour, shape and legend of a traffic control device (risk rating 4) and the layout as well (risk rating 5).
<table>
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<th>Sign design criteria</th>
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</tr>
</thead>
</table>
| **New South Wales – Dept. of Planning RTA**
(cont.) |          |                |            |                |                   |                        |                          |        |                             |           |            |

of back lit neon signs, have no light source visible to passing motorists with a light output greater than that of a 65 W incandescent bulb.

The level of reflectance of an advertisement and its content is not to exceed the Minimum Coefficients of Luminous intensity per unit area for Class 2A Material (Australian Standard AS/NZS 1906.1:2007).

Advertisements must not contain reflectors, which at night could be mistaken for a traffic control device.

According to the Safety Assessment Matrix for advertising on RTA infrastructure (provides a 1–5 risk rating, where 5 is more risk), the grounds for immediate rejection are if the sign does not vary to match the ambient light and may cause discomfort or temporary night blindness.
Sign design criteria | Movement | Flashing lights | Dwelling time | Transition time | Message sequencing | Quantity of information | Information presentation | Colour | Information content/meaning | Luminance | Dimensions
---|---|---|---|---|---|---|---|---|---|---|---
Proposals to erect variable message signs should be carefully assessed where the time to change from one display to the next is greater than 2 secs.

Proposals to erect variable message signs should be carefully assessed where the minimum time for any separate display is less than 5 secs.

Animated or flashing signs should not be used as roadside advertising if they:
- incorporate a revolving light of any colour
- move or vary in intensity
- are unlikely to be considered acceptable.
Flash lighting cannot be used on vehicles to promote vehicle-mounted advertising as stated in clause 8.5 of the Road User Rule 2004.

| Animation or flashing lights should not be used as roadside advertising if they are likely to form the content/meaning of the sign, signal and turn device (including sandwich boards, vehicle-mounted signs, flags, banners and spinner) should not have any form of illumination or reflectorisation. Any advertising signs or devices which are internally or externally illuminated should:
- comply with the maximum luminances stated below
- have all floodlights or concealed lighting directed safely on to the advertisement and its surrounds
- have any light source shielded so that glare does not extend beyond the advertisement
- with the exception of neon signs, have no light source visible to passing motorists with a light output greater than that of a 65 W incandescent bulb.

Maximum luminance of illuminated advertising devices (based on guidance from UK Institution of Lighting Engineers) –
In areas with street lighting, the maximum luminance varies from 2000 cd/m² for illuminated areas up to 0.5 m² to 800 cd/m² for areas over 10.0 m².
In areas without street lighting, the maximum luminance varies from 1000 cd/m² for illuminated areas up to 0.6 m² to 400 cd/m² for areas over 10.0 m².

State highway guidelines state that billboards must not be more than 6 m wide or 3 m high.

| New Zealand – NZTA | | | | | | | | | | | |
### Sign design criteria

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<tr>
<td>✓</td>
<td>X</td>
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<td>✓</td>
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<td>✓</td>
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<td>✓</td>
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#### Both static and animated digital billboards shall be considered for planning permits on their individual merits. Digital billboards shall contain a default design that will freeze the device in one position if a malfunction occurs.

Each message shall remain fixed for a maximum of 8 secs, with 5–7 secs being the recommended dwell time depending on the sign's location (for example, signs with a dwell time of 5 secs would be appropriate in lower speed commercial environments, whereas 7 secs would be more appropriate on freeways and motorways).

The transition time between messages shall be no longer than 1 sec to reduce the likelihood of a driver perceiving any blanking of the display screen.

No message sequencing is permitted between two or more advertising copies on the same digital billboard.

The OMA will develop guidelines for creative agencies to ensure that the amount of information displayed on a digital billboard is kept to a minimum.

To avoid situations where the digital billboard may be mistaken as a traffic signal, the advertisement copy should not be dominated by the colours red, yellow or green in combination if it is to be located near traffic lights.

The light emitted from a digital billboard shall not exceed a certain threshold over ambient light levels. The OMA will consult with local lighting engineers on this matter to determine the most appropriate standard for local conditions.

Digital billboards must have automatic dimming capability.
### SUMMARY

- Now Department of Planning, Transport and Infrastructure (DPTI);  
- Now Roads and Maritime Services (RMS).

<table>
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<tr>
<td>There is considerable variation in the policies of agency towards the approval of advertising devices which contain movement.</td>
<td>All but two jurisdictions will not approve the use of flashing lights on advertising devices on or within visibility of state-controlled roads. In Queensland and Western Australia, flashing lights may be approved provided they meet specific criteria. This may include the colour of the lamps, the rate of flashing, the location of the sign relative to road speed and land use or the type of sign.</td>
<td>This criterion is not always covered in the guidance, presumably because some jurisdictions do not generally approve advertising devices that contain movement or changeable messages. Three jurisdictions indicate required or advisory minimum dwell times, ranging from 2.5 to 30 secs (also depending on sign type). The OAIA recommends that the maximum dwell time for digital billboards should be 9 secs, with reduced times for lower speed environments. Two other jurisdictions require that the driver does not see more than one message in the period of exposure, under normal driving conditions.</td>
<td>This criterion is not always covered in the guidance, presumably because some jurisdictions do not generally approve advertising devices that contain movement or changeable messages. Four jurisdictions provided quantitative guidance on maximum transition times. Required times range from 0.1 to 4 seconds. Times are sometimes dependent on whether the device has an electronic display or is mechanically changed. The OAIA recommends that the transition time for digital billboards should be under 1 second. Queensland advises that for electronic devices, the screen should change instantaneously.</td>
<td>The majority of jurisdictions do not refer to this criterion explicitly. Only New South Wales and New Zealand provide qualitative restrictions on the number of information elements or words/symbols.</td>
<td>Legibility is recognised by over half of the jurisdictions as being significant for road safety. Four jurisdictions provide specific guidance on requirements for the presentation and format of information within the message. This mainly focuses on the minimum letter heights, which ranges from 80 mm to 200 m (also depending on sign type). New Zealand provides further guidance, for example, on appropriate fonts.</td>
<td>The large majority of jurisdictions will not approve advertising devices with a message that imitates a traffic control device, traffic sign or any other advisory or regulatory sign permitted by the road authority. For example, many jurisdictions require that the message does not provide instruction to drivers.</td>
<td>Nearly all jurisdictions will not allow advertising devices with a message that imitates a traffic control device, traffic sign or any other advisory or regulatory sign permitted by the road authority. A few jurisdictions have a ban on illuminated messages for specific types of advertising device. Some jurisdictions will not approve non-static illuminated devices within the boundaries of state roads. Four jurisdictions have provided quantitative guidance on permitted maximum luminance levels for zones with different ambient light conditions; the most stringent of these are in Queensland and Western Australia, where the maximum permitted luminance ranges from 300 to 500 cd/m² depending on the surrounding land use. Some jurisdictions also provide additional guidance on other relevant aspects such as veiling luminance and glare.</td>
<td>All jurisdictions refer to luminance/lumination in their guidance. A few jurisdictions have a ban on illuminated messages for specific types of advertising device. Some jurisdictions will not approve non-static illuminated devices within the boundaries of state roads. Four jurisdictions have provided quantitative guidance on permitted maximum luminance levels for zones with different ambient light conditions; the most stringent of these are in Queensland and Western Australia, where the maximum permitted luminance ranges from 300 to 500 cd/m² depending on the surrounding land use. Some jurisdictions also provide additional guidance on other relevant aspects such as veiling luminance and glare.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Now Department of Planning, Transport and Infrastructure (DPTI);  
2. Now Roads and Maritime Services (RMS).
Queensland – TMR

State guidelines

Table 7.3: Overview of jurisdiction and industry guidance for human factors criteria relating to sign placement (as at July 2010)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Longitudinal placement</th>
<th>Lateral placement</th>
<th>Vertical placement</th>
<th>Orientation/viewing angle</th>
<th>Sight distance/visibility</th>
<th>Speed limit/speed environment</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Covers restriction distances in relation to traffic control devices and driver decision and action points, as well as advertising device density constraints.</td>
<td>Covers location relative to edge of carriageway and offset back from kerb etc.</td>
<td>Covers both maximum height of sign and overhead placement.</td>
<td>Includes requirements for rotation relative to the carriageway geometry and/or passing vehicles.</td>
<td>Covers restrictions in relation to sight distances and visibility of the advertising device as well as for other features of the roadside environment, including official traffic signs and control devices.</td>
<td>Covers restrictions on placement of certain types of advertising signs relative to speed limit or speed environment of road. The speed environment provides an indication of the operating speed of the road and is generally defined as the 85th percentile speed.</td>
<td>Any other relevant criteria, for example, restrictions in relation to surrounding land use and roadway geometry or criteria for vehicle-mounted advertising and double-sided signs.</td>
</tr>
<tr>
<td>Refer to section:</td>
<td>6.2.1 and 6.2.2</td>
<td>6.3.1</td>
<td>6.3.2</td>
<td>6.3.1</td>
<td>6.2 and 6.3</td>
<td>6.4</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Queensland – TMR

An Advertising Device may be considered a traffic hazard if it:
- is in an area where there are several devices and the cumulative effect of those devices may be potentially hazardous
- interferes with the effectiveness of a traffic control device (e.g. traffic light, stop or give way sign)
- restricts a driver at a critical time (e.g. making a decision at an intersection).

Appendix C specifies Advertising Device restriction distances relative to designated traffic situations for devices located on state-controlled roads and devices beyond the boundary of, but visible from, state-controlled roads. This includes minimum distances between the device and traffic conflict points, official traffic signs and other advertising devices. States that further restrictions may apply where traffic conditions require additional driver attention and decision making, such as sections of road that have a vehicle crash history higher than the system average.

Restriction distances for devices located within the boundaries of state-controlled roads (excluding freeways/motorways, only non-rotating, non-illuminated/static illuminated devices permitted) range from 60 m to 140 m depending on the speed environment.

An advertising device may be considered a traffic hazard if it is a dangerous obstruction to road or other infrastructure, traffic, pedestrians, cyclists or other road users. For advertising devices located within the boundaries of state-controlled roads (except where road reserves are very narrow), lateral placement of the device is restricted to locations outside of the Clear Zone (defined in Appendix B of the guidance). The Clear Zone is defined as the total roadside border area, starting at the edge of the travelled way, available for safe use by motorists and for the display of official traffic signs. Queensland has adopted the AASHTO 1996 Roadside Design Guide as the primary reference.

Example calculations:
- Clear Zone for straight roads with flat roadides is 4.5 m for 60 km/h speed environments, 6 m for 80 km/h speed environments and 9 m for 100 km/h speed environments.
- Clear Zone requirements do not apply to devices attached to transport infrastructure including passenger transport shelters and seats and pedestrian overbridges.
- On roads where the overhead transport structure (e.g. road overpass or pedestrian/bicycle bridge) and the road ‘intersect’ at right angles, the advertising

The minimum clearance beneath a device located on an awning within a state-controlled road is 2.5 m. Maximum heights:
- 6 sheet poster = 5 m
- 12 sheet poster = 9 m
- supersite = 10 m

The maximum height of a footway sign is 1 m.

Devices containing retro-reflective material shall be rotated approximately 9° away from the normal line of vehicle headlight beams in order to minimise specular reflection.

An advertising device may be considered a traffic hazard if it obscures a driver’s view of a road hazard (e.g. at corners or bends in the road). Devices should not obstruct or distract a driver’s line of sight of official traffic signs, exit ramps, on-ramps, intersections or other decision-making areas.

Variable message advertising devices shall only be installed where:
- the required sign viewing time does not result in a safety problem for the particular environment;
- there is adequate advance visibility to read the sign.

The approach end of a passenger transport shelter shall be either open or transparent to provide waiting passengers with maximum visibility of the approaching passenger transport vehicle.

Devices with changing illumination, variable messages or rotating/changing movement (‘Trivision’) are not permitted to be located on, or visible from, state-controlled roads with speed limits 80 km/h or above (including motorways/freeways).

Advertising devices that change, move or rotate (including Trivision advertising devices) are only permitted on private property and visible from a state-controlled road with a speed limit of less than 80 km/h. VMS advertising devices are only permitted on public property and visible from a state-controlled road with a speed limit of less than 80 km/h. Rotating devices should be permitted only when movement is about a vertical axis and where the speed environment is 80 km/h or less.

Non-rotating, static illuminated advertising devices shall only be permitted on bus shelters located in built-up areas with speed environments of 80 km/h or lower. Advertising on bus shelters is not permitted on motorways or freeways.

Official road furniture such as official signs and delineator guide posts shall not be used as the supporting structure of an advertising device without prior written permission.

Variable message advertising devices should only be installed where the device is not a moving advertising device.

On-road advertising for roadside vending shall be directed only toward oncoming vehicles on the same side of the road as the vendor. An approval for vehicle-mounted advertising for a roadside vending site does not imply that this advertising would be permitted when the vehicle was driven on any road.

There are certain areas where advertising may be inappropriate due to the nature of the surrounding area. For example, advertising is generally not permitted within the boundaries of state-controlled roads in national parks or other protected areas.
### Queensland – TMR

<table>
<thead>
<tr>
<th>Sign placement criteria</th>
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<th>Lateral placement</th>
<th>Vertical placement</th>
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<th>Sight distance/visibility</th>
<th>Speed limit/speed environment</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restriction distances for devices beyond the boundaries of but visible from state-controlled roads (excluding freeways/motorways) vary between 60 m and 160 m depending on the sign type, characteristics such as size and speed environment. For example, restriction distances for variable message signs are 120 m for signs over 20 m² and 80 m for signs under 20 m² for locations where the speed limit is less than 80 km/h and with a dwell time of greater than or equal to 8 seconds. Advertising device longitudinal exclusion zones are also detailed for motorways/freeways (in some cases based on the methodology outlined in the Austroads Guide to Traffic Engineering). Exclusion zone relative to official traffic signs = $1.2V/2.5V$ (where $V =$ speed). Advance/downstream separation distance from motorway exit ramp = $7.5V/2.5V$. Advance / downstream separation distance from motorway on-ramp = $9V/2.5V$. Longitudinal separation distance from other advertising devices on motorways = $2.5V/10V$. Maximum of two Advertising Devices (faces) are permitted to be attached to, or form part of, a passenger transport shelter.</td>
<td>Device may only be installed directly above the traffic at which the advertising device is directed. In situations where the overhead transport structure of the traversed road is curved or does not 'intersect' at right angles, the position of the installation shall be determined by the Department. Advertising is not permitted in the medians or traffic islands (unless the carriageways diverge significantly as a result of topography or dense vegetation). For Category 4 (miscellaneous including local business / community signs), no portion of an advertising device should project over the carriageway or over any surface used by motor vehicles (taking cross-fall into account).</td>
<td>~</td>
<td>X</td>
<td>X</td>
<td>~</td>
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<td></td>
</tr>
</tbody>
</table>

### South Australia – DTEI

| Note: guidelines generally apply to advertising in incorporated areas only – advertising is not generally permitted in unincorporated areas | No advertising display shall be allowed to be placed or maintained if the displays which are placed interfere with the effectiveness of, or obscure any official traffic control sign, device or signal. Internally illuminated signs should not be immediately behind or alongside traffic signals in such a way as to diminish the target value of the signals for drivers (see Operational Instruction 2.19). The display shall not infringe upon the recommended clear zone for errant vehicles. [Note: no definition or method of determining clear zone is provided in the guidance document] | ~ | ~ | X | ~ | ~ |

No advertising display shall be allowed to be placed or maintained if the display obstructs, or interferes, with the drivers vision in approaching, merging or intersecting traffic. No advertising display shall be allowed to be placed or maintained if the displays which are placed interfere with the effectiveness of, or obscure any official traffic control sign, device or signal. An advertising display can be removed under Section 41 of the Highways Act if the advertising display restricts drivers' sight distance, or completely obscures any DTEI sign. Advertising displays placed within the 100-80-60 km/h buffer zones on the approaches to towns should be actively discouraged as drivers may not notice the lower speed signs due to the large number of signs competing for drivers’ attention. Advertising signs are generally not allowed on DTEI arterial roads and highways. The display shall not be placed on the same post as a DTEI traffic control sign. No advertising display shall be allowed to be placed or maintained if visible from the road and which is placed upon trees, or painted or drawn upon rocks or other natural features.
<table>
<thead>
<tr>
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<th>Vertical placement</th>
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<th>Speed limits/speed environment</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tasmania - DIER (Note criteria apply to temporary event advertising only as other types banned on state roads)</td>
<td>The consenting authority must give consideration to the number of competing signs in the area. The sign should not obstruct or form a confusing background to traffic signs or signals.</td>
<td>Sides for the location of temporary event signs should be chosen so that the sign is no closer than 1 m from the outside edge of the gravel shoulder or 3 m from the sealed road surface, whichever is greater.</td>
<td>The sign shall be erected at right angles to the roadway but angled off the direction of the traffic by approximately 9° to reduce headlight glare reflecting back into the motorist’s vision.</td>
<td>The sign should not obstruct a driver’s or pedestrian’s view of the road or other road users. The sign should not obstruct or form a confusing background to traffic signs or signals.</td>
<td>Advertising signs are not permitted on a State or Local Government Road reserve subject to a speed limit in excess of 60 km/h.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern Territory - DCI (Note that corporate ‘product' advertising will not be approved on state road reserves, unless part of a bus or train related sign)</td>
<td>Signs shall not be erected so as to obscure or interfere with any guide sign, information sign, service sign or regulatory sign.</td>
<td>No signs may be erected within a radius of 150 m of any intersection of public roads, railway crossing or school. Signs shall not be erected on any section of road for which signs have been erected to warn motorists of potential hazards in such locations so as to detract from the effectiveness of the warning signs, e.g. near sharp curves or narrow bridges.</td>
<td>Reduce likelihood of advertising devices creating obstacles by maintaining adequate lateral clearance between the through traffic lanes and the advertising device, other than portable roadside advertising. Adequate lateral clearance can generally be taken to mean: • more than 1.5 m from the vehicle carriageway on roads with operating speeds of 60 km/h or less • more than 3 m from the vehicle carriageway on roads with operating speeds greater than 60 km/h.</td>
<td>Proposed signs shall be oriented at right angles to and facing the oncoming traffic. If the sign face is manufactured partly or wholly with retro-reflective material, a 5° deflection away from the normal is required to eliminate reflection from car headlights.</td>
<td>Signs shall not be erected so as to obscure or interfere with any guide sign, information sign, service sign or regulatory sign.</td>
<td>Private advertising signs will not be permitted on defined urban roads, and only on rural roads in accordance with the conditions established in the guidelines. Defined urban roads includes roads adjoining urban development in minor urban centres, and on approach roads with designated town speed zones.</td>
<td></td>
</tr>
<tr>
<td>Australian Capital Territory Government (Note that only applies to specific sign types advertising local events, real estate or government agency flag-bearers, as other commercial roadside signs are not permitted in road reserves)</td>
<td>Freestanding signs may be approved on business leases and on sites for recreational, institutional, educational or other similar purposes provided that unnecessary repetition or multiplication is avoided - one freestanding sign per site permitted. One advertising sign permitted per bus shelter. Real estate roadside signs and community roadside signs must be located further than 20 m from a road intersection. Moveable signs may be placed on unleased Territory Land subject to them not being placed: • on roundabouts • within 20 m of traffic lights • within 20 m of the apex of the kerb lines at an intersection (real estate directional signs exempt) • traffic lights or street lights.</td>
<td>The placement of moveable signs must be a minimum of 1.2 m back from the street kerb to allow persons free access when alighting from a vehicle. In commercial areas, pedestrians must have access to a minimum of a 2.5 m wide walkway free of moveable signs or other obstructions, in addition to the 1.2 m back from the top of the street kerb. The walkway should allow pedestrians to walk either in a straight line or in a line which follows the street contour. Generally, devices are not permitted in the median of the road reserve. Moveable signs must not encroach on or cause an obstruction on pedestrian or bicycle footpaths.</td>
<td>Freestanding signs may be approved on business leases provided maximum height is 4 m (residential neighbourhoods) and 6 m in other locations. Freestanding signs may be approved on sites for recreational, institutional, educational and other similar purposes provided maximum height is 4 m.</td>
<td></td>
<td>Billboards are not permitted on unleased land in the Designated Areas. Many sign types are banned from Main Avenues and Approach Routes. Advertising signs displayed on bus shelters are not permitted in ANZAC Parade or on bus shelters in Commonwealth, Kings and Constitution Avenues or the area bounded by these Avenues. Moveable business signs must not be placed outside of the boundaries of the commercial or industrial centre in which the business is operating.</td>
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</table>
### Sign placement criteria

<table>
<thead>
<tr>
<th>Sign placement criteria</th>
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<th>Lateral placement</th>
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<th>Speed limit/traffic environment</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>A sign is a safety hazard if the sign is at a location where the minimum concentration is required, such as a high pedestrian volume intersection.</td>
<td>✓</td>
<td>✓</td>
<td></td>
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</tr>
<tr>
<td>A sign is a safety hazard if traffic is within 100 m of a rural railway crossing.</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>A sign is a safety hazard if the sign is where there is fast moving traffic or the sign is so close to the turning point that there is no time to signal and turn safely.</td>
<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td>In business, office and industrial areas (sign Categories 1 and 2) internally illuminated signs are only permitted if the sign is more than 30 m from a residential zone or pedestrian or traffic lights.</td>
<td>✓</td>
<td>✓</td>
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</tbody>
</table>

### Victorian Road Design Guide

- **Longitudinal placement controls** apply to large freestanding advertising devices where the structure overhangs a footway, in residential areas or pedestrian or traffic light locations.
- **Lateral placement** controls apply to large freestanding advertising devices within the boundaries of state-controlled roads and are in the form of a Clear Zone. The Clear Zone is the total roadside border, starting at the edge of the travelled way, available for use byV
- **Vertical placement** controls apply to large freestanding advertising devices on street name posts only:
  - The minimum clearance beneath the device including all attachments shall be 2.5 m.
  - The minimum clearance beneath the device (including the street name part of the sign) shall be 2.5 m.
- **Orientation/viewing angle** controls apply to large freestanding advertising devices on street name posts only:
  - The minimum clearance beneath the device shall be 2.5 m.
- **Sight distance/visibility** controls apply to large freestanding advertising devices on street name posts only:
  - The minimum clearance beneath the device shall be 2.5 m.
- **Speed limit/traffic environment** controls apply to large freestanding advertising devices on street name posts only:
  - The minimum clearance beneath the device shall be 2.5 m.
- **Other** controls apply to large freestanding advertising devices on street name posts only:
  - The minimum clearance beneath the device shall be 2.5 m.

### Western Australia – MRWA

- It is important that drivers are not distracted in the proximity of designated traffic situations, to allow concentration to be focused on the driving task. A designated traffic situation includes areas in which merging, diverging and weaving traffic manoeuvres take place.
- Unsignalised railway level crossings, road intersections and diverging areas in the vicinity of an ‘important’ traffic sign or a traffic control signal.
- Australian Standard AS 1742.2 – 1994 Manual of Uniform Traffic Control Devices has been adopted as the primary reference for the determination of the longitudinal placement of signs located within the vicinity of a highway or main road.
- The minimum spacing of at least 1.2 km shall be applied to the distances from designated traffic situations and a traffic sign or a traffic control signal and to other Advertising Devices, which are specified in this Guide.
- Device restriction distances for devices located on highways and main roads are outlined in Appendix C.
- These distances are the absolute minimum and requirements may be greater at locations where longer traffic queues occur, or where the proposed device obstructs sight lines at an intersection or zebra crossing.
- The minimum distances for devices located on a highway or main road range from 80 m in a 60 km/h speed environment.
<table>
<thead>
<tr>
<th>Sign placement criteria</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Western Australia – MRWA (cont.)</td>
<td>environment to 140 m in &gt;100 km/h speed environment. In a 80km/h speed environment, the restriction distance is 100 m. The device restriction distance for devices located in the vicinity of highways and main roads ranges between 80 m and 140 m depending on the device characteristics and speed environment. Large freestanding billboards and trivision signs shall be longitudinally separated from other Advertising Devices within the boundaries of highways and main roads at Main Roads discretion. Typical controls include limitation of the spacing (density) as follows:</td>
<td></td>
<td></td>
<td>driveway. Case 6 – Exiting side road driveways close to intersections on highways and main roads. In general, the advertising sign is acceptable if it is at or beyond the end of the appropriate extended sightline.</td>
<td></td>
<td></td>
<td>business fronting the sign installation, being obtained in writing.</td>
</tr>
</tbody>
</table>

driveway.

Typical controls include limitation of the spacing (density) as follows:

- Devices > 10 m² shall be located so that only one single device is visible at any one time.
- Devices having an area of 4.5 to 10 m² shall be located no closer than 500 m apart.
- Category 1 signs (large freestanding devices and devices attached to bridges are not permitted within 500 m of the start or finish of a merging zone.
- Overhead bridges under Main Roads control by a distance of not less than 500 m.
- Planned road improvements such as proposed on and off ramps to and from future interchanges.
- All adjacent Category 2, 3 and 4 advertising devices and traffic control devices by a distance of at least 2.5 Vm.
The advertisement must not create a physical obstruction or hazard to road users or vehicles. The location of a sign on footpaths or nature strips must meet the following criteria to ensure adequate clearance for pedestrian and wheelchair access:

**A** sign must be positioned so that an absolute minimum envelope of 0.9 m x 2 m of unobstructed clear path of travel is maintained for the entire length of the advertising structure.

**B** where the sign supports are not frangible (breakable) the sign must be placed outside the clear zone as defined in Section 3.7 of the RTA’s Road Design Guide (2011) or behind an RTA-approved crash barrier. Clear Zone is defined as the total roadside border area, starting at the edge of the travelled way, available for use by errant vehicles and the display of traffic control signs.

**C** where a sign is proposed within the Clear Zone but behind an existing RTA-approved crash barrier, all its structures up to 5.3 m in height (relative to road level) are to comply with lateral clearances as specified by Section 6 of the RTA’s Road Design Guide (2011) with respect to dynamic deflection and working width.

The advertisement must not create a physical obstruction or hazard. Where advertising structures hang over the road, the minimum vertical clearance should be the same as other structures in that road environment (i.e. equal or greater clearance than the overpass, tunnel portal or pedestrian bridge).

However, in cases where these structures exceed the minimum vertical clearance specified for the particular type of road, the sign may protrude below the bridge or other structure. If the minimum vertical clearance for other surrounding structures is not known then a minimum vertical clearance of 5.3 m is to be used for the sign structure. However, on high performance motorways, the minimum clearance may be 5.8 m or more.

Wall advertisement only permitted if, for a building having

**i** an above ground elevation of 200 m² or more the advertisement does not exceed 10% of the above ground elevation, and

**ii** an above ground elevation of more than 200 m² the advertisement does not exceed 20% of the above ground elevation.

A sign should not be located:

- to a road hazard
- to an intersection
- to a traffic control device
- to pedestrian or wheel chair access:

The advertisement should not be placed in a position that has the potential to give incorrect information on the alignment of the road (i.e. locationalignment of sign should not give visual clues to the driver suggesting that the road alignment is different to the actual alignment).

### Table: Sign Placement Criteria

<table>
<thead>
<tr>
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<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

- Multiple advertisement signs in rural or natural areas or along freeways or tollways adversely impacts on visual amenity and road safety. The overall number of signs placed along a transport corridor should be minimised preferably with only one advertising sign visible in a given view.

- In assessing advertising proposals, the consent authority is to have regard to:
  - Multiple advertisements on a single block of land, structure or building should be discouraged as they contribute to visual clutter.
  - Where there is advertising clutter, consideration should be given to reducing the overall number of individual advertisements on a site. Replacement of many small signs with a larger single sign is encouraged if the overall advertising display area is not increased.
  - In rural areas, and along freeways and tollways, no more than one advertising structure should be visible along a given sightline.

- An advertising proposal may be considered a traffic hazard if it interferes with the effectiveness of a traffic control device, or if it distracts the driver at a critical time. According to the Safety Assessment Matrix for signs on RTA infrastructure, (provides a 1-5 risk rating, where 5 is more risk), the grounds for immediate rejection of an advertising proposal are if the sign is located less than 100 m upstream from a decision point (4 risk rating) or if the sign is located at a significant decision/turnpoint (5 risk rating).

- Furthermore, a proposal can be rejected if it may reduce the effectiveness of a class 4 or 5 traffic control device.

- As a guideline, advertising in urban areas should be restricted to rail corridors, freeways, tollways or classified roads:
  - (a) within or adjacent to strategic transport corridors passing through enterprise zones, business development zones, commercial core zones, mixed use zones or industrial zones,
  - (b) within or adjacent to strategic transport corridors passing through entertainment districts or other urban locations identified by the local council in a relevant strategy as being appropriate for such advertising.

- The RTA will not allow advertising on guide signs, regulatory signs, warning signs, variable message signs or on signs that already have guide signs attached.

- In the case of advertising on bridges, no advertising signs will be permitted on bridge approaches that already display RTA guidelines. Only one advertising sign will be permitted on each approach to a bridge.

- The advertisement should not be located:
  - i) less than the safe sight distance from an intersection, merge point, exit ramp, traffic control signal or sharp curves
  - ii) less than the safe stopping sight distance from a marked fest crossing, pedestrian crossing or refuge, cycle crossing or cycle facility or hazard within road environment
  - iii) so that it is visible from the stem of a T intersection.

- The minimum sight distance requirements for the design speed of the road must be met for road hazards (stopping sight distance), emergency vehicle access points and driveways (approach sight distance) and intersections (safe intersection sight distance). See RTA Road Design Guide for sight distances.

- An advertisement must not obstruct a pedestrian or cyclist’s view of the road. Advertisements on bridges should not block significant view for pedestrians or other bridge users (e.g. cyclists) and not create a tunnel effect, impede passive surveillance or in any other way reduce safety for drivers, pedestrians or bridge users.

As a guide, advertising in urban areas should be restricted to rail corridors, freeways, tollways or classified roads:
### Impact of Roadside Advertising on Road Safety

#### New South Wales – Dept. of PlanningRTA(2)

<table>
<thead>
<tr>
<th><strong>Sign placement criteria</strong></th>
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<th><strong>Speed limits/speed environment</strong></th>
<th><strong>Other</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>New South Wales – Dept. of PlanningRTA(2)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Advertising signs should not be located within 100 m and 200 m in urban and rural areas respectively of:
- intersections
- permanent regulatory or warning signs
- curves (with chevron signing)
- pedestrian crossings.

Advertising signs should not, in the case of a sign inviting motorists to turn, be located so close to the turning point that motorists have insufficient time to read the sign, signal and turn safely.

The effectiveness of roadside advertising and also traffic safety will be compromised if there are too many advertising displays on the roadside.

In situations where they are permitted, off-site advertising signs visible from roadways should be erected at the maximum spacings possible to ensure that passing motorists have a chance to assimilate such signs if they so desire.

Appendix 2.7 provides minimum distances between adjacent advertising signs, based on figures taken from HAASPA. These are the recommended minimum distances between successive traffic warning signs with different messages – desirable minimums are based on recommended distances between signs requiring decisions.

Recommended minimum spacing ranges from 50 m on roads with operating speed of 60 km/h to 80 m on roads with an operating speed of 115 km/h.

Desirable spacings range from 80 m on roads with an operating speed of 60 km/h to 250 m on roads with an operating speed of 115 km/h.

Wherever possible, billboards should not be placed at an intersection.

As a general rule, billboards should be placed at least 50 m from an edge of the vehicle carriageway.

Lateral clearance distances are controlled by a number of different factors:
- whether the sign is located within the road reserve
- whether appropriate clear zone requirements are met (refer to Traffic Control Devices Manual Part 1)
- whether the sign can be seen within the driver’s field of vision.

Advertising signs and markings should not be permitted on the vehicle carriageway, on any traffic island or extended kerb line within the vehicle carriageway.

Minimum lateral clearance distance between an advertising sign and the edge of the carriageway for roads with a speed limit of 60 km/h or less should be 1.5 m. This minimum distance increases to 3 m for roads with a speed limit greater than 60 km/h. For state highways, the NTZA requires signs to be located closer than 5 m from the edge of the carriageway.

No advertising sign or device, whether temporary or permanent, should be located on or above a footpath or berm closer than 0.5 m to the birth face or the edge of the vehicle carriageway.

Where footpath-mounted advertising is allowed by local authorities the recommended conditions applicable to their use include the sign should not reduce the width of any footpath or other pedestrian way usable by pedestrians to less than 2 m.

In locations where the signs are installed above an area used by pedestrians such as footpaths, the recommended minimum vertical clearance is 2.5 m with an absolute minimum of 2.1 m.

Signs or banners over the roadway should have a minimum vertical clearance of 0.5 m (this does not apply to signs mounted on bridges where the absolute minimum clearance is 4.9 m).

In general, visibility problems will not be caused by signs or devices which are:
- less than 1 m in height, except where they are likely to obscure children
- the bottom of the sign is more than 3 m above the level of the roadway.

The sign must be at right angles to the state highway and positioned to avoid vehicle head-on collision.

The location, orientation and design of advertising signs in relation to the road should be assessed to ensure advertising signs can be read without a motorist having to slow down or stop their vehicle.

Roadside advertising may create restrictions to sight visibility and create a safety hazard if it obstructs or interferes with:
- road users’ view of a road hazard, person or oncoming vehicle on the roadway
- road users’ view of a person or vehicle about to enter the roadway.

The sign must not obscure driver visibility at access points or intersections.

Signs should be placed as close as possible to drivers’ lines of sight while maintaining the lateral clearances from the roadway.

Safe intersection sight distances are defined, ranging from 96 m for 50 km/h roads to 253 m for 100 km/h roads. For 70 km/h roads, the recommended distance is 149 m.

The distances relate to the absolute and desirable sight distances along the major road from 5 m (3 m minimum) back from the major road. Corrections should be made where grade is greater than 2%.

The sign must be located so that there is an unrestricted view to the motorist for a minimum distance of 180 m where the speed limit is 70 km/h or higher.

Some of the more common situations where there is potential for visibility problems include:
- vehicle-mounted signs
- portable signs placed on footpaths, shoulders or grass berms
- signs adjacent to driveways, particularly of major traffic generators, e.g. service stations
- signs close to intersections or curves in the roadway.

Where applicable, the sign must be located on the site to which the sign relates and must be placed to ensure there is only one advertising sign located on or adjacent to the property to which it relates.

The recommendation of this guideline is that local authorities discourage the use of aerial displays in all forms.

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**Austroads 2013**

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### SUMMARY

**New Zealand – NZTA (cont.)**

- **OMA Recommendations (See digital billboards only)**
  - Digital billboards should be spaced within 150 linear metres of each other if they are located on the same side of the road on a freeway or motorway only. This is based on standards adopted by a majority of states in the USA and is relatively consistent with the sight stopping distances detailed in the 'sight distance/visibility' criterion. In inner city locations where the speed limit is less than 70 km/h, the spacing between billboards should be considered on a merit basis to allow for the consolidation of signs. Only one digital billboard shall be permitted at a single location on a freeway or motorway facing the same direction.

<table>
<thead>
<tr>
<th>Sign placement criteria</th>
<th>Longitudinal placement</th>
<th>Lateral placement</th>
<th>Vertical placement</th>
<th>Orientation/viewing angle</th>
<th>Sight distance/visibility</th>
<th>Speed limit/speed environment</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New Zealand – NZTA</strong></td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
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</tr>
</tbody>
</table>

### Other

- **Longitudinal placement**
  - Digital billboards should be spaced within 150 linear metres of each other if they are located on the same side of the road on a freeway or motorway only.
  - Minimum restriction distances vary from 50 m to 160 m across jurisdictions, and depending on device type and speed limit or speed environment. Some jurisdictions cite lower values for smaller devices such as local community and business signs.
  - Most jurisdictions also restrict the density of advertising devices by limiting the number of devices permitted at a single location.
  - All jurisdictions provide qualitative guidelines in relation to this criterion. A number of jurisdictions also specify minimum restriction distances from other features of the road environment, including other advertising devices, official traffic signs or intersections.
  - Minimum restriction distances vary from 50 m to 160 m across jurisdictions, and depending on device type and speed limit or speed environment. Some jurisdictions cite lower values for smaller devices such as local community and business signs.
  - Most jurisdictions also restrict the density of advertising devices by limiting the number of devices permitted at a single location.

<table>
<thead>
<tr>
<th><strong>OMA Recommendations</strong> (See digital billboards only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital billboards should be spaced within 150 linear metres of each other if they are located on the same side of the road on a freeway or motorway only. This is based on standards adopted by a majority of states in the USA and is relatively consistent with the sight stopping distances detailed in the 'sight distance/visibility' criterion. In inner city locations where the speed limit is less than 70 km/h, the spacing between billboards should be considered on a merit basis to allow for the consolidation of signs. Only one digital billboard shall be permitted at a single location on a freeway or motorway facing the same direction.</td>
</tr>
</tbody>
</table>

- **Lateral placement**
  - Digital billboards should be spaced within 150 linear metres of each other if they are located on the same side of the road on a freeway or motorway only.
  - Minimum restriction distances vary from 50 m to 160 m across jurisdictions, and depending on device type and speed limit or speed environment. Some jurisdictions cite lower values for smaller devices such as local community and business signs.
  - Most jurisdictions also restrict the density of advertising devices by limiting the number of devices permitted at a single location.

- **Vertical placement**
  - Digital billboards should be spaced within 150 linear metres of each other if they are located on the same side of the road on a freeway or motorway only.
  - Minimum restriction distances vary from 50 m to 160 m across jurisdictions, and depending on device type and speed limit or speed environment. Some jurisdictions cite lower values for smaller devices such as local community and business signs.
  - Most jurisdictions also restrict the density of advertising devices by limiting the number of devices permitted at a single location.

- **Orientation/viewing angle**
  - Digital billboards should be spaced within 150 linear metres of each other if they are located on the same side of the road on a freeway or motorway only.
  - Minimum restriction distances vary from 50 m to 160 m across jurisdictions, and depending on device type and speed limit or speed environment. Some jurisdictions cite lower values for smaller devices such as local community and business signs.
  - Most jurisdictions also restrict the density of advertising devices by limiting the number of devices permitted at a single location.

- **Sight distance/visibility**
  - Digital billboards should be spaced within 150 linear metres of each other if they are located on the same side of the road on a freeway or motorway only.
  - Minimum restriction distances vary from 50 m to 160 m across jurisdictions, and depending on device type and speed limit or speed environment. Some jurisdictions cite lower values for smaller devices such as local community and business signs.
  - Most jurisdictions also restrict the density of advertising devices by limiting the number of devices permitted at a single location.

- **Speed limit/speed environment**
  - Digital billboards should be spaced within 150 linear metres of each other if they are located on the same side of the road on a freeway or motorway only.
  - Minimum restriction distances vary from 50 m to 160 m across jurisdictions, and depending on device type and speed limit or speed environment. Some jurisdictions cite lower values for smaller devices such as local community and business signs.
  - Most jurisdictions also restrict the density of advertising devices by limiting the number of devices permitted at a single location.

- **Other**
  - Digital billboards should be spaced within 150 linear metres of each other if they are located on the same side of the road on a freeway or motorway only.
  - Minimum restriction distances vary from 50 m to 160 m across jurisdictions, and depending on device type and speed limit or speed environment. Some jurisdictions cite lower values for smaller devices such as local community and business signs.
  - Most jurisdictions also restrict the density of advertising devices by limiting the number of devices permitted at a single location.

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1. Now Department of Planning, Transport and Infrastructure (DPTI);
2. Now Roads and Maritime Services (RMS).
8 GAP ANALYSIS

While many of the best practice principles identified are covered in at least some of the road authorities’ existing guidelines, a number of issues are not yet considered. In particular, the following issues typically are not covered:

- specification of appropriate dwell and transition times relative to road speed limit or speed environment as well as the sight distance to the device
- restrictions in relation to the use of:
  - special effects for transition between messages e.g. ‘fade’, ‘zoom’ or ‘fly-in’ effects
  - message sequencing e.g. the maximum number of sequential messages permitted and/or the minimum and maximum time duration for the entire sequence
  - emotive content – although this may be covered more comprehensively in general guidelines for advertising content, it is not typically being considered in relation to the impact on road safety
  - audio, interactive or personalised electronic message displays
- specification of maximum and minimum duration times for display of non-static messages i.e. animated or video displays (if permitted)
- restrictions on quantity of information permitted within an advertising message depending on the road speed limit or speed environment as well as the size of the device e.g. the maximum number of informational elements
- additional specifications regarding luminance, particularly in relation to electronic devices:
  - default display luminance or display settings in event of failure
  - requirements for change in luminance in response to changing light conditions
  - luminance contrast and contrast ratio
  - particularly in relation to changeable devices i.e. digital billboards, specification of:
    - maximum dimensions
    - maximum height
    - minimum spacing between changeable devices
    - specification of maximum required viewing times and minimum sight distances of advertising devices relative to road speed limit or speed environment
    - the fundamental safety profile of the road in question, including restrictions on placement of devices on, or visible from, sections of road classified as black spots or high risk locations.
## 9 GUIDANCE MODEL/OUTLINE

Based on the considerations discussed above, the following guidance recommendations are provided. These are divided into sign design guidance (Table 9.1) and sign placement guidance (Table 9.2). The recommendations are specifically targeted at digital billboards and their potential for distraction and should be considered to be an addition to existing guidelines relating to conventional billboards.

### 9.1 Sign Design Guidance

### Table 9.1: Sign design guidance recommendations

<table>
<thead>
<tr>
<th>Sign design criteria</th>
<th>Movement</th>
<th>Flashing lights</th>
<th>Dwell time</th>
<th>Transition time</th>
<th>Message sequencing</th>
<th>Quantity of information</th>
<th>Information presentation</th>
<th>Colour</th>
<th>Information content/meaning</th>
<th>Luminance</th>
<th>Dimensions</th>
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</thead>
<tbody>
<tr>
<td>Roadside advertising devices should not contain motion, changes in luminance or any effects that create the illusion of movement.</td>
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<tr>
<td>Roadside advertising devices should not contain flashing, blinking, revolving, pulsating or intermittent lights.</td>
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<td>This should take account of (1) visibility distance [VD]: the maximum distance from the sign at which the sign face becomes visible to drivers and (2) speed environment [SE].</td>
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<tr>
<td>The goal is to limit the number of message changes that drivers are exposed to. Therefore an advertising device that is visible from 1000 m away on a 60 km/h road needs to have much longer dwell times than an advertising device that is visible only from 100 m away on a 100 km/h road.</td>
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<td>All drivers will see at least one change if: • dwell time (sec) &lt; [VD (m) / (SE (km/h) \times 0.28)].</td>
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<td>Ideally, the proportion of drivers (PD) who see a change should be much less than 1. Therefore: • dwell time (sec) &gt; [VD (m) / (SE (km/h) \times 0.28)].</td>
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<td>For a desired PD: • dwell time = [VD (m) / (SE (km/h) \times 0.28 \times PD)].</td>
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<td>Message should change instantaneously. That is, no ‘fade’, ‘zoom’ or ‘fly-in’ effects and no blank screen between messages.</td>
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<td>Sequencing of messages should be prohibited.</td>
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<td>For text, this should be consistent with the number of words that can be read during the approach interval and also the number of words that can be read in a 2 second interval (the ‘eyes off the road’ interval at which the crash rate doubles). This can be achieved by (1) estimating the legibility distance [LD] the distance at which the text first becomes legible, (2) taking into account approach speed – the speed environment [SE], (3) estimating the comprehension rate [CR], and (4) ensuring that attention of more than 2 seconds is not required to comprehend the message. Therefore: • number of words &lt; [LD (m) / (SE (km/h) \times 0.28) \times CR (sec)]. And: • number of words &lt; [CR (sec) \times 2]. In general, a typical comprehension rate would be approximately three words per second, but this will vary for different text sizes, fonts and formats. As a result the CR may need to be tested and demonstrated in the application process.</td>
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<td>Not applicable to advertising devices.</td>
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<td>Advertising devices should not be coloured like an official traffic sign or traffic signals.</td>
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<td>Advertising devices should not imitate traffic control devices or give instructions to traffic to ‘stop’, ‘halt’ or other (e.g. give way, turn left or merge).</td>
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<td>Advertising devices should not contain extreme emotional material, especially content which could be threatening or anxiety provoking.</td>
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<td>Luminance levels should not exceed those of static signs in typical ambient light conditions.</td>
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<td>Advertising devices should not be shaped like an official traffic control sign/device.</td>
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</table>

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**Guidance recommendation**

- Roadside advertising devices should not contain motion, changes in luminance or any effects that create the illusion of movement.
- Roadside advertising devices should not contain flashing, blinking, revolving, pulsating or intermittent lights.
- The goal is to limit the number of message changes that drivers are exposed to. Therefore an advertising device that is visible from 1000 m away on a 60 km/h road needs to have much longer dwell times than an advertising device that is visible only from 100 m away on a 100 km/h road.
- All drivers will see at least one change if: $$\text{dwell time} \leq \frac{\text{VD} (\text{m})}{\text{SE} \times 0.28}$$.
- Ideally, the proportion of drivers (PD) who see a change should be much less than 1. Therefore: $$\text{dwell time} \geq \frac{\text{VD} (\text{m})}{\text{SE} \times 0.28}$$.
- For a desired PD: $$\text{dwell time} = \frac{\text{VD} (\text{m})}{\text{SE} \times 0.28 \times \text{PD}}$$.
- Message should change instantaneously. That is, no ‘fade’, ‘zoom’ or ‘fly-in’ effects and no blank screen between messages.
- Sequencing of messages should be prohibited.
- For text, this should be consistent with the number of words that can be read during the approach interval and also the number of words that can be read in a 2 second interval (the ‘eyes off the road’ interval at which the crash rate doubles).
- This can be achieved by (1) estimating the legibility distance [LD] the distance at which the text first becomes legible, (2) taking into account approach speed – the speed environment [SE], (3) estimating the comprehension rate [CR], and (4) ensuring that attention of more than 2 seconds is not required to comprehend the message.
- Therefore: $$\text{number of words} \leq \frac{\text{LD} (\text{m})}{\text{SE} \times 0.28} \times \text{CR} (\text{sec})$$.
- In general, a typical comprehension rate would be approximately three words per second, but this will vary for different text sizes, fonts and formats. As a result the CR may need to be tested and demonstrated in the application process.
- Not applicable to advertising devices.
- Advertising devices should not be coloured like an official traffic sign or traffic signals.
### 9.2 Sign Placement Guidance

#### Table 9.2: Sign placement guidance recommendations

<table>
<thead>
<tr>
<th>Sign placement criteria</th>
<th>Longitudinal placement</th>
<th>Lateral placement</th>
<th>Vertical placement</th>
<th>Orientation/viewing angle</th>
<th>Sight distance/visibility</th>
<th>Speed limit/speed environment</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising devices should not be located in such a way that they might interfere with the effectiveness of a traffic control device (e.g. by restricting sightlines or distracting from traffic control devices via proximity or as a background).</td>
<td>Without conflicting with clear zone requirements (e.g. installation of post in a hazardous location), advertising devices should not be placed such that drivers must divert their gaze away from the forward roadway in order to comprehend the sign message.</td>
<td>Advertising devices should not be placed at a height that coincides with the normal ‘hazard viewing window’ that drivers scan. That is, they should be elevated above the height of vehicles, pedestrians and traffic control devices, but not so high that they draw the gaze away from the forward roadway.</td>
<td>Advertising devices should be oriented to facilitate legibility from the maximum legibility distance and across the full approach distance.</td>
<td>Advertising devices should be placed so that enough time is available on approach for drivers to comprehend the message. That is, the sight distance must correspond to the required legibility distance.</td>
<td>The speed environment on its own is likely to be less important than the overall risk profile of the road and driving demand characteristic of the road section which should be carefully reviewed.</td>
<td>All installations should consider the overall risk profile of the road environment in question and the driver demand of the road section (e.g. crash history, AusRAP ratings, traffic volume, speed, complexity, clutter).</td>
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<tr>
<td>Advertising devices should not be located so that they are visible at the approach to, or from, an intersection, pedestrian crossing, tram stop or in any location that is likely to be highly demanding of attention.</td>
<td>Only one advertising device should be visible to drivers at any time.</td>
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<tr>
<td>Advertising devices should not be placed such that drivers must divert their gaze away from the forward roadway in order to comprehend the sign message.</td>
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<tr>
<td>All installation should consider the overall risk profile of the road environment in question and the driver demand of the road section (e.g. crash history, AusRAP ratings, traffic volume, speed, complexity, clutter).</td>
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<td>Black spots and road sections with less than a 3-star rating (AusRAP or equivalent) should be ruled out for advertising device placement.</td>
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<td>Highly cluttered road environments should be ruled out for advertising device placement.</td>
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<td>The installation should be reviewed at regular intervals and audited against the guidance principles (because crash rates, traffic volume, the built environment etc. will change over time).</td>
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<tr>
<td>Advertising signs should not be placed on the same posts as traffic control devices.</td>
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</tbody>
</table>
REFERENCES


Department of Planning NSW 2007, *Transport corridor outdoor advertising and signage guidelines: assessing development applications under SEPP 64*, Department of Planning, Sydney, NSW.


Outdoor Media Association 2010, *Discussion paper: digital billboards and road safety: an analysis of current policy and research findings*, OMA, Sydney, NSW.


**Australian/New Zealand Standards**


APPENDIX A  LIST OF WORKSHOP ATTENDEES

David Jorgensen, Department of Transport and Main Roads, Queensland
Murray Cleaver, Roads and Maritime Services, NSW
Debbie Romp, Roads and Maritime Services, NSW
Dr Jessica Edquist, Monash University, Victoria
Roger Farley, Office of Road Safety, Western Australia
Vin Gerasimenok, Department of Infrastructure, Energy and Resources, Tasmania
Steve Clark, Department of Planning, Transport and Infrastructure, South Australia
Raphael Grzebieta, University of NSW, NSW
Dr Paul Roberts, ARRB GROUP, Western Australia
Noha Elazar, ARRB GROUP, NSW
<table>
<thead>
<tr>
<th>Keywords:</th>
<th>Roadside advertising, digital billboards, driver distraction, roadside advertising guidelines.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract:</td>
<td>This research project aimed to harmonise the criteria road agencies use to manage roadside advertising devices, and promote improved and consistent good practice by road agencies.</td>
</tr>
<tr>
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<td>Physical and psychological human characteristics strongly suggest that in some driving situations it is likely that the movement or changes in luminance created by digital displays will involuntarily capture attention, and that particularly salient emotional and engaging material will divert attention, to the detriment of driving performance. This is particularly the case for inexperienced drivers. Where this happens in a driving situation that is also cognitively demanding, the consequences have the potential to be significant.</td>
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<td>This report provides guidance principles designed to mitigate the potential for roadside advertising to capture attention, reduce the cognitive capacity available for driving and have a negative impact on driving performance. The principles are divided into sign design and sign placement recommendations and cover movement, dwell time, transition time, message sequencing, quantity of information, information content / meaning, luminance, longitudinal placement, lateral placement, vertical placement, orientation/viewing angle, sight distance/visibility, and speed environment.</td>
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