Traffic control devices manual

Part 1

General requirements for traffic signs

December 2008


ISBN
Preface

Introduction

The *Traffic control devices manual* will provide guidance on industry good practice, including, where necessary, practice mandated by law. The planned structure of the *Traffic control devices manual* comprises 22 parts and is shown in table A.

Each part will be developed under the guidance of a working group of practitioners experienced in, and having specific knowledge about, the subject. The practitioners will also be representative of the intended users of the documents. Interested practitioners and affected organisations will be given the opportunity to comment on drafts and have their input incorporated appropriately in the final document.

The *Traffic control devices manual* will be published electronically only and will be available on the Land Transport NZ website.

Relationships with other documents

The *Traffic control devices manual* will support and reference:

- New Zealand legislation and, in particular, the Land Transport Act 1998 and rules made pursuant to that act, including the Land Transport (Road User) Rule, the Land Transport Rule: Traffic Control Devices and the Land Transport Rule: Setting of Speed Limits
- general polices contained in Austroads Guides (in particular, the Guides to Traffic Management, Traffic Design and Road Safety) by providing detailed guidance to meet specific requirements of New Zealand law and practices
- New Zealand and, as appropriate, Australian standards
- codes of practice, guidelines and published standards of various authorities.

Each part will attempt to provide a broad coverage of the subject but avoid duplicating major elements of referenced documents, preferring to direct readers to the source.

The *Traffic control devices manual* will, on completion, replace the joint Transit New Zealand and Land Transport NZ publication *Manual of traffic signs and markings* (MOTSAM).

Part 1 General requirements for traffic signs

*General requirements for traffic signs* was developed with guidance from a working group representing local government (2 members), New Zealand Road Safety Manufacturers Association (2) and the New Zealand Transport Agency (3 – Highway Network Operations [2] and Network Standards [1]). They were assisted by the contracted authors (Cherie Urlich, Tim Selby and others of Opus International Consultants).
Table A Planned structure of *Traffic control devices manual*

<table>
<thead>
<tr>
<th>Part</th>
<th>Title</th>
<th>Outline of content – may vary as the manual develops</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sign specifications</td>
<td>Detailed descriptions of traffic signs including dimensions, colour and layout</td>
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<tr>
<td></td>
<td>Signal specification</td>
<td>Detailed descriptions of permitted traffic signal displays and dimensions and colours of signal aspects</td>
</tr>
<tr>
<td></td>
<td>Marking specification</td>
<td>Detailed description of road markings, including dimensions, colours and layout</td>
</tr>
<tr>
<td>1</td>
<td>General requirements for signs</td>
<td>Purposes of traffic signs and their legal foundation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Materials and construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General design principles – size, lettering, legends</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Installation – location, mounting heights, etc</td>
</tr>
<tr>
<td>2</td>
<td>Direction, service and general guidance signs</td>
<td>Route signing, including state highways, regional roads, bypasses, detours, scenic routes, etc</td>
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<tr>
<td></td>
<td></td>
<td>Street name signing, including design and location</td>
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<td></td>
<td></td>
<td>Motorist services signing policy, application and design</td>
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<tr>
<td></td>
<td></td>
<td>Tourist signing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General information signs, eg public amenities, features</td>
</tr>
<tr>
<td>3</td>
<td>Advertising signs</td>
<td>Design and location principles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Policies for billboards and other forms of roadside advertising</td>
</tr>
<tr>
<td>4</td>
<td>General requirements for markings</td>
<td>Purposes of markings and their legal foundation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Materials and some general application issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General design principles – size, lettering, legends</td>
</tr>
<tr>
<td>5</td>
<td>Traffic signals</td>
<td>Application of New Zealand legal requirements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Specific applications, eg ramp signals, roundabout signals</td>
</tr>
<tr>
<td>6</td>
<td>Traffic control devices for general use – at intersections</td>
<td>Treatments at intersections, including options for traffic control, advance warning, etc</td>
</tr>
<tr>
<td>7</td>
<td>Traffic control devices for general use – sections of road</td>
<td>Treatments between intersections, including delineation, curves, passing facilities, steep grades, etc</td>
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<tr>
<td>8</td>
<td>Temporary traffic management</td>
<td>Included for completeness – will link to the <em>Code of practice for temporary traffic management</em> and local body supplement</td>
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<tr>
<td>Part</td>
<td>Title</td>
<td>Outline of content – may vary as the manual develops</td>
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<tr>
<td>------</td>
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<tr>
<td>9</td>
<td>Level crossings</td>
<td>Risk assessment (ALCAM)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Design considerations, eg facility types, traffic movements, stacking distance, sight distances</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Types of control – passive or active</td>
</tr>
<tr>
<td>10</td>
<td>Motorways and expressways</td>
<td>Specific signing and marking requirements for motorways and expressways</td>
</tr>
<tr>
<td>11</td>
<td>Local area traffic management</td>
<td>Design principles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LATM devices in New Zealand legal and environmental context</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Applications of LATM – reference examples</td>
</tr>
<tr>
<td>12</td>
<td>Speed</td>
<td>Signs and markings for speed limits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Temporary and variable speed limits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advisory speeds</td>
</tr>
<tr>
<td>13</td>
<td>Parking controls</td>
<td>Legal framework – implications and responsibilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Design considerations and elements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Linear and zone parking treatments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parking furniture, eg meters, vending machines</td>
</tr>
<tr>
<td>14</td>
<td>Special vehicle lanes</td>
<td>Signs, markings and surface treatments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Specific applications – bus, transit, truck, cycle and other classes of lanes</td>
</tr>
<tr>
<td>15</td>
<td>Cycles</td>
<td>The extent to which issues relating to these specific classes of road user will be covered within other relevant sections of the manual is still to be determined. It is possible none of these parts will be developed.</td>
</tr>
<tr>
<td>16</td>
<td>Pedestrians</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Heavy motor vehicles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Definitions</td>
<td>Definitions of terms used throughout the <em>TCD Manual</em></td>
</tr>
<tr>
<td></td>
<td>References</td>
<td>All documents referenced throughout the <em>TCD Manual</em></td>
</tr>
</tbody>
</table>
Contents

Preface................................................................................................................................... i
1 Introduction ..................................................................................................................................... 1-1
  1.1 Purpose ........................................................................................................................... 1-1
  1.2 Scope .......................................................................................................................... 1-1
  1.3 Engineering judgement ............................................................................................... 1-1
2 Responsibilities ................................................................................................................ 2-1
  2.1 Public roads ................................................................................................................... 2-1
  2.2 Private landowners ....................................................................................................... 2-1
  2.3 Road users ................................................................................................................... 2-2
3 Legal framework and implications ..................................................................................... 3-1
  3.1 Legislation .................................................................................................................... 3-1
  3.2 Obligations to install signs ............................................................................................ 3-3
  3.3 Enforcement ................................................................................................................ 3-3
4 General use .......................................................................................................................... 4-1
  4.1 Principles ...................................................................................................................... 4-1
  4.2 Types of signs .............................................................................................................. 4-9
5 General design principles ................................................................................................. 5-1
  5.1 Panel details ................................................................................................................ 5-1
  5.3 Lettering ...................................................................................................................... 5-5
  5.4 Legends ....................................................................................................................... 5-6
  5.5 Dual name signs ......................................................................................................... 5-7
6 Variable traffic signs .......................................................................................................... 6-1
  6.1 Active warning signs ................................................................................................... 6-2
  6.2 Variable message signs ............................................................................................... 6-2
  6.3 Changeable message signs .......................................................................................... 6-6
7 Installation ........................................................................................................................... 7-1
  7.1 General principles ....................................................................................................... 7-1
  7.2 Sign supports ............................................................................................................. 7-2
  7.3 Location ..................................................................................................................... 7-4
  7.4 Orientation ................................................................................................................ 7-11
  7.5 Construction ............................................................................................................. 7-12
  7.6 Inspection and maintenance ....................................................................................... 7-12
8 Reflectivity and illumination ............................................................................................. 8-1
  8.1 Reflectivity .................................................................................................................. 8-1
  8.2 Use of materials ......................................................................................................... 8-2
  8.3 Illumination ................................................................................................................ 8-7

Appendix A: Trials of traffic control devices ............................................................................. A1
1 Introduction

1.1 Purpose

This document entitled Part 1 General requirements for traffic signs is part of a suite of guidelines within the Traffic control devices manual (TCD Manual) prepared by the NZ Transport Agency (the NZTA or the Agency). The document is intended to help provide guidance and indicate best practice on the use of traffic signs to the transport industry and practitioners. In particular, it builds on the specifications for traffic signs, approved or mandated for use in New Zealand, as set down in the Traffic control devices specifications (TCD Specifications).

It sets out the legal framework and responsibilities for the design and installation of traffic signs, including the general principles behind their use. The following terminology is used in the document to describe whether an aspect or statement is a requirement or good practice:

- **must**: indicates something that is mandatory or required by law
- **should**: indicates a recommendation
- **may**: indicates something that is optional and may be considered for use.

In the Land Transport Rule: Traffic Control Devices 2004 (TCD Rule), a traffic sign is defined as:

*a board, plate, screen or other device, whether or not illuminated, displaying words, figures, symbols or other material intended to instruct, advise, inform or guide traffic on a road; and includes a ‘children crossing’ flag, hand held stop sign, a parking control sign and variable message sign; but does not include a traffic signal.*

1.2 Scope

This document seeks to incorporate links to a number of appropriate policies, standards and guidelines and forms a logical link between New Zealand practice and the Austroads Guide to Traffic Management (GTM). It should be read in conjunction with:

- legislative requirements, particularly the TCD Rule and the Land Transport (Road User) Rule 2004 (Road User Rule)
- New Zealand and Australian standards, particularly AS1744 Standard alphabets for traffic signs, AS/NZS 1906.1 Retroreflective materials and devices for traffic control purposes and AS1742.2 Manual of uniform traffic control devices, Part 2: Traffic control devices for general use
- guidelines, particularly the Austroads GTM, in particular Part 10: Traffic control and communication devices.

1.3 Engineering judgement

This manual provides rules, standards and guidance on the use of traffic signs. However, practitioners should always apply sound engineering judgement in the use and installation of traffic signs to ensure they will be effective at any particular site. For instance, the geometry at a site may require some
modification to the sign face to clearly convey an important message, such as the shape of the road, or the sign may have to be installed at a more appropriate location. In such instances, engineering judgement must be applied and any departures from recommended practice documented.
2 Responsibilities

The provision and maintenance of traffic signs is the responsibility of road controlling authorities (RCAs). In relation to a road, the TCD Rule defines an RCA as:

- the authority, body or person having control of the road
- a person acting under and within the terms of a delegation or authorisation given by the controlling authority.

RCAs therefore include:

- territorial authorities (TAs) and regional councils
- the NZTA and other Crown entities that manage and maintain roads (e.g., the Department of Conservation)
- private landowners managing roads used by the public, including car parks, shopping centre car parks, hospitals, universities and airports
- other private landowners.

2.1 Public roads

In relation to public roads, an RCA has a responsibility to provide approved traffic signs to inform road users of any prevailing legislative rules and bylaws, and warn of any hazards. As stated in section 2 of the TCD Rule, an RCA:

- must authorise and, as appropriate, install or operate traffic control devices:
  - if required by or under the TCD Rule or other enactment; or
  - to instruct road users of a prohibition or requirement that it has made concerning traffic on a road under its control; or
  - to warn road users of a hazard
- must remove a traffic control device if required by or under the TCD Rule or other enactment
- may authorise and, as appropriate, install, operate or remove traffic control devices:
  - if desirable for the guidance of traffic or to draw attention to a requirement that controls traffic; or
  - to provide information to road users.

2.2 Private landowners

Owners of private land, such as universities, hospitals, airports, shopping centre car parks, etc., may be considered RCAs with respect to the TCD Rule. They may establish and provide appropriate traffic controls on land under their direct control for use by general members of the public and are therefore governed by the requirements described in section 2.1 above.
There is a legal obligation on property owners to conform to the TCD Rule, particularly in relation to the general requirements in relation to traffic signs described in section 4.1. Property owners of land where access of the general public by vehicle (eg large car parks at malls and shopping centres) have a greater need to consider the guidance contained in this document.

Inconsistent use of traffic signs may lead to a misinterpretation by road users and create a potential for risk, conflict or injury. On entering a ‘private’ site, users should reasonably expect a continuation of the same road rules and a similar standard of signs and markings as those found on public roads.

### 2.3 Road users

The legal obligations of road users are defined in the Road User Rule. Mandatory requirements and guidance on traffic signs are defined in the TCD Rule.
3 Legal framework and implications

3.1 Legislation

The following outlines some legislation relevant to RCAs in New Zealand in relation to traffic signs, their enforcement and road user responsibility.

3.1.1 Statutes

Land Transport Act 1998

This Act is intended to:

- promote safe road user behaviour and vehicle safety
- provide for a system of Rules governing road user behaviour, the licensing of drivers and technical aspects of land transport, and to recognise the reciprocal obligations of persons involved
- consolidate and amend various enactments relating to road safety and land transport
- enable New Zealand to implement international agreements relating to road safety and land transport.

Section 152 of the Act relates to traffic control devices, and describes the power of the Minister to make ordinary Rules – in this case, the TCD Rule and Road User Rule, as described in section 3.1.2 below.

Transport Act 1962

This Act, once the principal Act for general land transport matters, has largely been repealed and most of its provisions included in the Land Transport Act 1998. The Transport Act still includes a number of relevant sections, particularly those relating to traffic bylaws.

Land Transport Management Act 2003

This Act sets out the requirements and processes for local authorities to obtain funding for road construction and maintenance, and for the funding of Police on-road enforcement.

The Act was amended in 2008. This amendment, among other things, created the NZTA, formed by the merger of Transit New Zealand and Land Transport New Zealand. The NZTA is tasked with promoting safe and functional transport by land, and includes responsibilities such as driver and vehicle licensing.

Local Government Act 1974 and 2002

The Local Government Act (LGA) provides the general framework and powers under which New Zealand TAs operate, and is designed to provide a democratic and effective local government that recognises the diversity of New Zealand communities. The legislation promotes local accountability and defines a clear purpose for local government.

In relation to the provision and maintenance of traffic signs, the LGA sets out the general powers of TAs, including the setting of bylaws.
Resource Management Act 1991

The Resource Management Act 1991 (RMA) is the statute (law) that requires the preparation of district, city and regional plans. Some activities can affect the environment. Whether you’ll need a resource consent and what type of consent you will need will depend on what type of activity you are proposing and how the activity is classified in the council plan. For the purposes of this document, this will specifically relate to the placement and type of signs located within the road environment and whether the requirements of the district, city or regional plans are met.

Government Roading Powers Act 1989 (formerly Transit New Zealand Act)

With the establishment of the NZTA on 1 August 2008, Land Transport New Zealand and Transit New Zealand were dissolved and the Transit New Zealand Act 1989 was renamed the Government Roading Powers Act 1989.

Railways Act 2005

This Act sets out the requirements for the licensing of persons wishing to operate a railway in New Zealand. It covers monorails, and both light and heavy railways on track with a gauge of 550 mm or greater. It also includes basic safety obligations of operators and on the general public when near a railway, and the powers the railway operators have to protect and manage the railway corridor. All level crossings, as defined in the Railways Act 2005, should be protected through the use of appropriate traffic control devices. These devices range from passive through to active types and depend on the crossing type, the density of rail and road traffic, and the physical attributes of the crossing and its surrounds.

Building Act 2004

Where a large sign (such as advertising/billboards, etc) may be installed on a public road, additional information should be sought from the local council or other RCA on the size of the structure, as a building consent may be required. A TA may have a signs bylaw or traffic bylaw that will outline the requirements and conditions for the use of signs.

3.1.2 Land transport Rules

Land Transport Rule: Traffic Control Devices 2004

The Land Transport Rule: Traffic Control Devices 2004 (TCD Rule) describes the requirements for the design, construction, installation, operation and maintenance of traffic control devices. It sets out and details the responsibilities of RCAs in the provision of traffic control devices.

RCAs must follow the requirements set down in the TCD Rule. In particular, subclause 13.1(1) states ‘a road controlling authority must comply with this rule when providing, installing, modifying or maintaining a traffic control device’, such as a traffic sign.

Land Transport (Road User) Rule 2004

The Land Transport (Road User) Rule 2004 (Road User Rule) stipulates how traffic must legally operate on the road and applies to all road users. In particular, ‘if traffic at any place is controlled by a traffic control device, a person (including a pedestrian) using the road at that place must comply with the instructions given by that traffic control device that apply to them’ (Road User Rule 3.1(1)).
3.2 Obligations to install signs

The decision to install a traffic sign is determined by an RCA. Where an RCA has exercised its powers under statutory authority (e.g., under the Land Transport Act or Local Government Act) either directly or through the making of a bylaw or resolution or by some other means, the RCA is required under the TCD Rule to notify road users of their obligations. Specifically, subclause 4.2(2) states:

A RCA must install regulatory signs in accordance with [the TCD Rule] to draw attention to a requirement, restriction or prohibition on road users when:

(a) the RCA has made the requirement, restriction or prohibition by bylaw (or other instrument) on a road under its control; or

(b) [the TCD Rule] or any other enactment requires the installation of a regulatory sign to draw attention to the requirement, restriction or prohibition; or

(c) [the TCD Rule] or any other enactment does not require the installation of a regulatory sign, but the RCA consider it desirable that a sign be installed.

In addition, under subclause 4.2(1), an RCA must provide a regulatory sign to instruct road users of the speed at which they may travel where a speed limit changes and at intervals within the speed limit area, as specified in section 8 of Land Transport Rule: Setting of Speed Limits 2003.

Private landowners such as airports and universities are considered to be RCAs and therefore have the responsibility to manage traffic signs under the TCD Rule. This will ensure consistency of interpretation and hopefully therefore better compliance from road users on both public and private roads.

3.3 Enforcement

There are many different forms of enforcement for compliance with traffic signs, in particular those regulatory signs that require, restrict or prohibit specific actions by road users. The primary aim of enforcement of any type of control is to effectively manage use of the road and provide a safer environment for road users.

The New Zealand Police may enforce compliance with regulatory traffic signs on public and private roads as part of their general enforcement powers under the Transport Act 1962.

TAs and regional councils have the right to set bylaws under the Transport Act and the LGA. They may, for example, in relation to parking controls, appoint parking wardens or special vehicle lanes enforcement officers.

Private RCAs have more limited mechanisms available to enforce compliance with regulatory signs but do have powers under their common law rights to control the activities of the public on their land.
4 General use

4.1 Principles

Traffic signs are an essential element of the road system. They are provided to aid the safe and orderly movement of traffic. When using traffic signs, RCAs must abide by the general requirements for all traffic control devices set down in clause 3.1 of the TCD Rule, which states:

Traffic Control devices, whether used singly or in combination, must contribute to the safe and effective control of traffic and must:

(a) be safe and appropriate for the road, its environment or the use of the road; and

(b) not dazzle, distract or mislead road users; and

(c) convey a clear and consistent message to road users; and

(d) be placed so as to:
   (i) be visible to road users; and
   (ii) be legible to road users, if of a type that includes written words or symbols; and
   (iii) allow adequate time for the intended response from road users; and

(e) comply with the relevant requirements in Schedules 1, 2 and 3 [of the TCD Rule], and

(f) be maintained in good repair

In addition to the requirements of the TCD Rule, some general principles for using signs are described in GTM Part 10. Traffic signs should:

- be coordinated with geometric road layout so they are conspicuous in both day and night-time conditions, and not used to ‘solve problems caused by poor and confusing road geometry’

- be installed according to design guides and warrants (however, a device should not necessarily be installed simply because a guide or warrant is met – engineering judgement must still be applied when deciding the most appropriate traffic sign, or alternative measure)

- be of adequate size and properly located so that drivers can read and act on the message

- provide adequate advance warning of hazard or decision points, notwithstanding that the hazard or decision point itself should be adequately delineated.

4.1.1 Route consistency and signing schemes

It is important road users travelling through different RCA areas receive a consistent set of messages about the road environment. This consistency is assisted by the application of legislation, policies and guidelines that dictate the safe and efficient use of traffic signs, markings and other traffic control devices.

Sign schemes can be a beneficial element in maintaining a safe, consistent and manageable road network. Signs and markings are often installed individually for a specific purpose, but they are also installed, or should be considered, as part of an overall signing and marking or traffic management scheme. Designers not only have to ensure the correct devices are used for particular purposes but
also that the devices relate logically to each other and do not provide contradictory information that may confuse drivers.

Further detailed information and general advice on the need for whole-of-route signing schemes is provided in GTM Part 10.

### 4.1.2 Overuse of signs or self-explaining roads

In some instances, an excessive number of signs may have been installed in an attempt to address deficiencies in road geometry, environmental conditions and road safety concerns. Although they may be used to address such deficiencies, traffic signs are unlikely to be an effective solution for problems caused by poor and confusing road geometry.

It is important signs are easily understood and sufficiently spaced to allow enough time for the message to be interpreted and acted on. Where there are too many signs, the most important message may be lost among the clutter. In instances where an excessive number of signs are installed, their use should be reviewed and rationalised or preferably geometric improvements undertaken.

Self-explaining roads are those where their nature can be readily understood through features such as buildings, structures, terrain or vegetation. These provide visual cues to road users that enable them to assess risks and anticipate events. As a result, the need for signs is reduced. Where possible, transport practitioners should focus on providing a self-explaining road rather than relying on excessive use of signs and other traffic control devices to reduce risk.

### 4.1.3 Basic legal requirements

The basic legal requirements for traffic signs are described in subclauses 4.4(1)–(5) of the TCD Rule, which state:

(a) ... a traffic sign, and the details on the sign, must comply with the minimum dimensions specified in Schedule 1 [of the Rule]; however

(b) the dimensions of a traffic sign may be increased provided that the dimension of each letter, numeral, symbol or other detail on the sign are kept in approximate proportion to the dimensions of the other details on the sign; and

(c) a traffic sign may display only words or symbols that are allowed by [the TCD Rule] except;

(i) where the Agency has authorised the installation or maintenance of a non-conforming sign;

(ii) for other than regulatory signs, the display of one monogram or logo of a specified maximum size on a traffic sign.

### 4.1.4 Sign shape and symbol comprehension

**Shape**

Sign shape indicates the type of sign that is being used. Normally, this is identified in conjunction with the colour used. Table 4.1 identifies some examples of basic sign shapes and colours.
Table 4.1 Examples of common shapes and colours of signs

<table>
<thead>
<tr>
<th>Type of sign</th>
<th>Common sign shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warning signs</td>
<td><img src="image" alt="Warning Signs" /></td>
</tr>
<tr>
<td>Regulatory signs</td>
<td><img src="image" alt="Regulatory Signs" /></td>
</tr>
<tr>
<td>Guide signs</td>
<td><img src="image" alt="Guide Signs" /></td>
</tr>
<tr>
<td>Tourist signs</td>
<td><img src="image" alt="Tourist Signs" /></td>
</tr>
<tr>
<td>Motorist service</td>
<td><img src="image" alt="Motorist Service" /></td>
</tr>
</tbody>
</table>

Symbols

Symbols on signs can usually be seen, ‘read’ and interpreted at a greater distance ahead of the decision-making point than a similar message conveyed by words. In addition, when they conform to internationally accepted formats, symbols can convey messages more clearly and quickly to drivers whose English may be limited.

It is important only standard symbols are used. Experience has shown it is necessary to properly assess road users’ understanding of symbols. Approved symbols are detailed in Schedule 1 of the TCD Rule and specifications are detailed on the web at www.landtransport.govt.nz/rules/traffic-control-devices-2004.

4.1.5 Trials and use of non-standard signs

There are a significant number of traffic signs covering a multitude of road and environment situations. In some relatively rare cases, there may be no existing approved sign adequately relating to an identified hazard on the network. The use of a non-standard sign (ie one not identified by the TCD Rule) to warn road users about a specific hazard may need to be considered.
Where the use of a non-standard or non-conforming sign is necessary, the NZTA’s approval is required. Depending on the nature of the proposed sign:

- the sign may be approved by the NZTA under subclause 4.4(4) of the TCD Rule; or
- a trial of the sign, in terms of clause 3.4 of the TCD Rule, may be required.

As part of a trial process, the RCA must submit an application to the NZTA that would provide sufficient information to allow an informed decision to be made. The required information should include:

- the types of issues (objectives of trial)
- background (existing situation)
- technical analysis (description of trial)
- impacts and risks assessment
- expected safety and efficiency gains
- types of consultation
- assessment method.

An outline of the process is illustrated in figure 4.1. A full description is included in appendix A.

**Figure 4.1** Trial process
4.1.6 Inappropriate use of signs

The selection of the most appropriate sign for traffic control and provision of information is important to provide a safe environment for road users. The inappropriate use of signs can occur when:

- standard traffic signs are used to convey the wrong message or provide inconsistent information, eg sign symbols that don’t reflect the road geometry (photo 4.1).
- non-standard traffic signs (such as advertising signs) are made to look like a standard sign (photo 4.2).

**Photo 4.1** Signs showing two different road layout symbols  
**Photo 4.2** Advertising sign resembling a traffic sign

Subclause 3.2(5) of the TCD Rule states:

A person must not install on a road, or in or on a place visible from a road, a sign, device, or object that is not a traffic control device, but that:

(a) may be mistaken for a traffic control device; or
(b) may prevent the traffic control device from complying with the general safety requirements for traffic control devices as described within the TCD Rule Clause 3.1

4.1.7 Multiple and combination signs

Subclause 4.5(1) of the TCD Rule states that, except in specific circumstances (defined in the bulleted list below):

a traffic sign must not be installed with another sign on the same pole or in the same location on the same building, wall or fence, except

(i) each sign is installed so that its message is seen only by the traffic for which the message is intended; and
(ii) the shape, size or orientation of any sign does not obscure the sign, or mislead or distract road users for the sign intended to be seen by traffic moving in another direction.’

There are certain circumstances where a combination of signs is permitted. These are:

- at level crossings, where signs may include assemblies such as:
  - ‘Stop’ or ‘Give Way’, ‘crossbuck’, ‘Look For Trains’ signs; and
– where traffic signals are installed, combinations of a ‘crossbuck’, ‘Stop On Red Signal’; and
– where appropriate, a ‘[number of] Tracks’ sign (TCD Rule subclauses 9.4(7) and (8))

• where an intersection is controlled by traffic signals, combinations of the following:
  – ‘Keep left’
  – ‘Turning traffic give way to pedestrians’
  – ‘Turn left at any time with care’
  – a sign either prohibiting road users from moving in a specific direction or requiring road users to move in a specific direction
  – a specific pedestrian sign not visible to an approaching vehicle
  – a street name sign (TCD Rule subclause 10.5(2))

• a combination of signs that relate to cyclists and pedestrians (TCD Rule subclause 11.4(3))

• not more than two parking signs, or three parking signs, provided one of them is a ‘Clearway’ or special vehicle lane sign (see Part 13 of the TCD Manual)

• a combination of one parking sign and one pedestrian sign, which may be installed on the same pole or in the same location on the same building, wall or fence (TCD Rule subclause 12.6(4))

• where motorist service, tourist and guide/route or general information signs are used and the following principles apply:
  – tourist and motorist service information may, under certain conditions, be combined with guide signing
  – general information signs should not be used to sign motorist services and tourist features and facilities.

Specific details on the provision and location of these types of combinations of signs can be found in Part 2 of the TCD Manual (under development).

4.1.8 Backing boards

A backing board is a larger surrounding panel or board on which a standard traffic sign (or combination of traffic signs) is placed, creating a larger visual target that enhances its conspicuity. In general, increasing the size of the standard sign is the preferred, and often necessary, option. However, it is recognised in some locations that the environment (often low or high levels of light), background contrast and competing or distracting roadside features may justify the use of backing boards.

Backing boards are typically used:

• on temporary traffic signs for level 2 and 3 roads (figure 4.2)

• on urban or rural speed threshold sites (figure 4.3) where the backing board also contributes significantly to the ‘gating’ effect being sought

• when all other normal treatments have been tried (eg larger signs and upgraded delineation) and when a higher-than-expected crash rate is still experienced (figure 4.4).
Colours

The following colours may be used for backing boards:

- white (non-retroreflective sheeting)
- grey (non-reflective sheeting) (‘Aircraft Grey’ No 693 (PMS 431) of the British Standard BS381C Specification for colours for identification, coding and special purposes or similar) – this colour is primarily used for the panel reverse and a smaller sign mounted on the reverse, eg a standard ‘100 km/h speed limit’ sign
- black – matt
- green – dark, matt
- green retroreflective (only for use on a speed threshold sign – normally state highways) (figure 4.3)
- blue retroreflective (only for use on a speed threshold sign)

The following colours should not be used on backing boards:

- red – this colour is reserved for specific signs, such as ‘Wrong Way’ and ‘crossbuck’ level crossing signs and should not be used elsewhere
- yellow or yellow-green, whether reflectorised or fluorescent (especially where a permanent warning sign is being used) – some use has been made of fluorescent yellow as a backing board for ‘Give Way’ signs at roundabouts immediately beyond roundabout metering signals but general use as a backing board is not recommended.

The following principles should be considered when using backing boards:

- The backing board colour should provide a contrast between the sign and the environment (eg it would not be desirable to use a green backing board where there is a significant area of similarly coloured vegetation located behind the traffic sign).
- Bright, conspicuous backing boards should be used sparingly to indicate high crash risk sites.
- Backing boards should not be fully retroreflective or fluorescent unless otherwise specified in the appropriate part of the TCD Manual.

There has been some interest expressed in developing further and more useful guidance on the use of backing boards. We welcome comments on this issue, as well as the views of practitioners who may have gained some experience with the use of backing boards.
Shape

It is recommended that backing boards are rectangular or square. A single rectangular or square backing board makes it much easier to install combinations of traffic signs, such as a speed limit and locality name.

As stated in section 4.1.7 (multiple and combination signs), a backing board can be used for a combination of signs if each sign is installed so the message is seen only by the traffic for which the message is intended. Consideration should also be given to whether the driver approaching from the opposite direction to the sign face needs to distinguish the shape of the traffic sign. This may, for example, have particular relevance for ‘Give Way’ and ‘Stop’ signs at intersections where drivers need to know who should give way. In this instance, rectangular backing boards should not be used. Where there is risk to road users at these sites, consideration may be given to providing an advance warning sign for the intersection with, if necessary, a rectangular backing board (figure 4.5).

Figure 4.5 Advance warning of traffic control at intersection with backing board

4.1.9 Vehicle-mounted signs

Subclause 4.4(13) of the TCD Rule states that a traffic sign must not be displayed on a vehicle unless:

- it is a motor vehicle being used as a school bus
- it is a motor vehicle required by the Land Transport Rule:Vehicle Dimensions and Mass 2002 to display a vehicle-mounted sign complying with the relevant provisions of that Rule
- it is a variable traffic sign displaying a range of information to motorists that complies with Rule requirements on variable traffic signs, provided the vehicle remains stationary in a safe position on the roadside
- the display complies with Schedule 1 of the TCD Rule, including signs covered by Temporary Traffic Management requirements, eg ‘mowing’, ‘surveying’.

4.1.10 Use of logos and monograms

General

Logos and monograms are defined as being graphic symbols or designs that are used to represent a company, organisation or concept. This can also include a ‘punched’ monogram.

Subclause 4.4(5) of the TCD Rule states that a traffic sign, other than a regulatory sign, may display one monogram or one logo, including:

- a street name sign that identifies the RCA or locality within an RCA’s area, provided the monogram or logo does not detract from the legibility of the street name sign
• a sign other than a street name sign, provided that:
  – on a sign less than 1 m² in area, the monogram or logo is not larger than 30 cm²
  – on a sign 1 m² or greater in area, the monogram or logo is not larger than 100 cm².

A monogram must not be displayed on the reverse side of a traffic sign nor on a pole on which an RCA has installed a traffic sign. However, a non-reflective sticker, label or other device may be used if it is no more than 100 cm² and displays ownership details, information that uniquely identifies the sign manufacturer, or installation or maintenance information. See section 5.1.2.

**Posts or poles**

In general, written material (other than a supplementary notice relating to a passenger service) or a monogram must not be displayed on a pole on which an RCA has installed a traffic sign.

### 4.1.11 Temporary masking of signs

Some situations (such as road works, the presence of temporary hazards or special events) require the temporary masking of traffic signs. The type or quality of some masking techniques (particularly systems applied directly to the sign face) may affect:

- the traffic sign's retroreflective material, therefore voiding the manufacturer's warranty
- the night-time reflectivity of the sign
- driver behaviour, where inferior or incomplete masking has enabled the underlying traffic sign message to be seen and therefore created uncertainty and associated risky driver behaviour, eg travelling at the masked speed restriction may be unsafe for the driver or any workers in the affected area.

RCAs should ensure that any temporary masking is effective. This means:

- any masking applied to the face will not affect any product warranties
- while masked, the sign cannot be read or, if only partial covering of the sign is required, the remaining message is not open to misinterpretation
- the covering material is fixed securely and preferably without using any form of adhesion or other means likely to damage the retroreflective sheeting on the sign
- when removed, there is no detrimental effect on the performance of the sign.

### 4.2 Types of signs

Traffic signs have been classified by function into six main groups:

1. regulatory (including general, parking and heavy vehicle)
2. warning (including temporary and permanent)
3. guide or route (including street name and community facilities)
4. motorist service
5. tourist
6. general information.
Specific information can be sourced at www.ltsa.govt.nz/roads/tcd/index.html.

4.2.1 Regulatory

Regulatory signs are those covered by legislation (including speed limit and parking signs) that instruct road users by requiring or prohibiting specific actions (TCD Rule clause 4.1). The TCD Rule makes RCAs responsible for ensuring every regulatory sign fully complies with the legal requirements regarding minimum dimension, shape, colour, reflectorisation, location and authority for installation.

To facilitate traffic law enforcement, it is necessary for RCAs to institute formal authorisation procedures for regulatory and parking signs. For these types of signs, the RCA must record when and where the signs are installed and the authority (Rule, bylaw or other legal instrument) for their installation.

Regulatory signs have legal significance and must be readily distinguishable from all other signs. It is not practical to standardise by shape alone and distinction is made by using specific combinations of shape and colour. Where standard signs do not adequately describe the specific legal provision, a general regulatory sign with a red border may be required.

There are two types of regulatory signs:

- **prohibitory**: those indicating an action a road user must not take, eg 'No right turn'

- **mandatory**: those indicating an action a road user must take, eg 'Turn left'.

It is difficult to give guidance on which form of sign to use in any particular circumstance. Indeed, it is possible the two signs depicted above might be erected at different locations at the same intersection.

Practitioners tend to view the prohibitory sign as the more compelling, although there is no legal basis for such a view. Thus, as an example, on the approach to a T-intersection where the head of the ‘T’ is a one-way road, the prohibitory sign would be preferred.

4.2.2 Warning

Warning signs inform road users of unusual or hazardous conditions on the road ahead.

**Permanent warning**

These signs generally have a black legend on a reflectorised or fluorescent reflectorised, diamond-shaped yellow background. Some permanent warning signs do not conform to this general shape, eg 'truck advisory speed' and the 'Look For Trains' sign.

Further detailed information on the types of permanent warning signs can be found in the appropriate parts of the TCD Manual. Detailed specifications can be found at www.ltsa.govt.nz/roads/tcd/index.html.

**Temporary warning**

These signs generally have a black legend on a reflectorised fluorescent, diamond-shaped orange background. Some temporary signs may have a non-fluorescent, reflectorised orange background,
while many on high-volume roads will be mounted on a white rectangular backing board. In addition, some temporary signs are rectangular.

Further detailed information on the use of these temporary warning signs can be found in CoPTTM and at www.ltsa.govt.nz/roads/tcd/index.html.

4.2.3 Guide or route

Guide signs inform road users of the direction and distances to places on the road ahead or on intersecting roads. These include advance direction signs (ADS), intersection direction signs (IDS) and confirmation direction signs (CDS). These guide or route signs should give road users a clear direction message at the correct location. Further detailed information on the use of these signs can be found in Part 2 of the TCD Manual (under development) and online at www.ltsa.govt.nz/roads/tcd/index.html.

Route signs inform road users of the types of routes by using logos. Routes include the Pacific Coast Highway, the Thermal Highway and wine trails etc. Photo 4.3 shows an example of one of these symbols.

**Photo 4.3** Example of wine trail route using symbol

These types of signs may also include route markers to help road users identify routes and to supplement directional text information. Route markers can also be freestanding signs located at regular intervals along a road to reassure drivers that they are following the correct route (figure 4.6).

**Figure 4.6** Route symbols incorporated onto guide sign and freestanding

Further detailed information on the use of these signs can be found in Part 2 of the TCD Manual (under development) and online at www.ltsa.govt.nz/roads/tcd/index.html.

**Street name**

Street name signs are generally used to provide information to road users at intersections. They may be used in combination with guide or route signs on arterial or collector routes or alone.

Further detailed information on the use of these signs can be found in Part 2 of the TCD Manual (under development) and online at www.ltsa.govt.nz/roads/tcd/index.html.
4.2.4 Motorist service

Motorist service signs may be used to identify locations or facilities that are commonly provided for travellers. They can identify various forms of service areas, from simple rest areas in rural locations to larger service centres with a variety of facilities. The signs generally contain internationally recognised symbols, such as fuel pumps and information signs.

Further detailed information on the use of these signs can be found in Part 2 of the TCD Manual (under development) and online at www.ltsa.govt.nz/roads/tcd/index.html.

These signs are not intended to guide motorists through the road system and should only be used to indicate services that are not obvious to travellers.

4.2.5 Tourist

Tourist signs are used, if appropriate, to indicate tourist facilities that are not obvious to the passing motorist. Theses signs are used on the basic assumption that tourists have prepared themselves for their journey.

Further detailed information on the use of these signs can be found in Part 2 of the TCD Manual (under development) and online at www.ltsa.govt.nz/roads/tcd/index.html.

4.2.6 General information

These types of signs are used to provide road users with information of general interest, such as the names of rivers and streams, local authority boundaries, advice on road conditions, land features and other areas of interest. They can be differentiated from tourist signs (section 4.2.5), which direct motorists to a geographical feature, enterprise or scenic route that is mainly of interest to tourists.

Further detailed information on the use of these signs can be found in Part 2 of the TCD Manual (under development) and online at www.ltsa.govt.nz/roads/tcd/index.html.
5  General design principles

5.1  Panel details

5.1.1  Sign or panel face

The details on the sign face must comply with descriptions in the TCD Rule, which are shown in the TCD Specifications.

Subclause 4.4(7) of the TCD Rule requires a traffic sign that must be reflectorised (in part or whole) to:

- use reflectorised material approved by the NZTA by notice in the New Zealand Gazette; or
- be internally or externally illuminated so as to be visible when illuminated.

Further information relating to reflectorised sign material and illumination is included in section 8 of this document.

5.1.2  Panel reverse

Traffic signs

Figure 5.1 shows an example panel reverse sticker.

Figure 5.1 Example panel reverse sticker

The colour of the panel reverse should normally be ‘Aircraft Grey’ No 693 (PMS 431) of the British Standard BS381C Specification for colours for identification, coding and special purposes or similar. The finish should be semi-gloss or matte to reduce specular glare. Other colours may be used, depending on the environment or other factors, eg any sign that could interfere with any pedestrian or cycle movement may be better coloured white, while a matt dark green or black may be more appropriate in a scenic reserve (providing the sign does not then constitute a hazard for road users).

The panel reverse should only be used for specific items. This may include another traffic sign, remembering that subparagraph 4.5(1)(b)(ii) of the TCD Rule requires ‘the shape, size or orientation of any sign [not to] obscure another sign, or mislead or distract road user from the sign intended to be seen by traffic moving in another direction’. See also sections 4.1.7 and 4.1.8 of this document.

The panel reverse is also the most common location for production, installation or other information relating to the sign. Paragraph 4.4(6)(b) of the TCD Rule states that a non-reflective sticker, label or other device no more than 100 cm² may be installed on the reverse side of a traffic sign. This label may provide details about the sign’s:

- ownership
- unique identification
- manufacture, installation or maintenance.
In some circumstances, generally where the panel reverse is not readily seen (ie because of back-to-back signs or the sign is mounted against a structure such as a wall), the label may be installed on the pole or adjacent to the sign. It must not be placed on the panel face.

Mounting the label on the pole is strictly not permitted in terms of subclause 4.4(11) of the TCD Rule. However, because of its size and the fact it is non-reflective, it is unlikely the label would detract from the value of the sign. The NZTA would be interested in comment on this issue.

Other signs – billboards and advertising signs

Where signs are used for advertising purposes, the panel reverse can either be blank or show another advertising sign, a logo or a message, such as the reverse panel for a sign at a construction site (see figure 5.2).

![Figure 5.2 Example reverse panel for a sign at a construction site](CONTRACTOR: Building Roads Ltd Ph: 0800 123 456)

It is important to note clause 4.2 of the TCD Rule – the panel face or panel reverse must not contain:

- reflective material, if it is likely to reflect the light from the lamps of any vehicle on the road
- fluorescent or phosphorescent material, if it is likely to mislead or distract drivers from traffic signs installed in the vicinity or mask those signs.

Further information on the use of advertising signs, including billboards, can be found in Part 3 of the TCD Manual (under development).

5.2 Sign specification

Specifications relating to the dimensions, colour and layout requirements of all traffic signs are contained in Schedule 1 of the TCD Rule (available at www.landtransport.govt.nz/rules/traffic-control-devices-2004).

In addition, the NZTA is collating the specifications into ‘format enabling images’ that can be integrated directly into sign manufacturing software or as images that can be used when preparing sign schemes or other documents. These sign specifications can be viewed at www.landtransport.govt.nz/roads/tcd/index.

5.2.1 Size selection

Generally, the size of the sign and its symbols and text and other elements must conform to minima defined in the TCD Rule. Site-specific ‘one-off’ signs, such as guide, route or motorist service signs, must meet such minima as are defined in the Rule but clearly it is not possible or appropriate to specify the content of all such signs. In these situations, design principles described in sections 6 and 7 of the Rule and relevant parts of the TCD Manual should be adhered to.
The sign size used in individual circumstances should be determined by a range of factors, including:

- the speed environment
- the type of sign
- whether it is an urban or rural situation
- whether it is a two-lane or multi-lane road
- the lateral offset from a driver’s position to the sign
- the crash history of the site
- competing visual stimuli.

Consideration should be given to a staged process of increasing the size of the sign rather than installing a maximum-sized sign as a first step. For example, if a standard-sized sign is installed but a problem persists, an option might be to increase the sign size. The next stage, after a period of monitoring, might be to consider an even larger sign, the use of backing boards (see section 4.1.8) or an active sign, if this is appropriate (see section 6.1).

It is important to consider sign size consistency along a route. For example, a series of permanent warning signs of varying sizes along a route may impact on a driver’s perception of relative risk between sites.

5.2.2 Reduced sign sizes

In some situations, a legal minimum-sized sign may not fit (eg where there is only a narrow central median) without encroaching into the minimum lateral clearance space and thus creating a hazard to road users. In some cases, a smaller sign has been installed, particularly where it duplicates an existing legal-sized sign on the opposite side of the roadway.

In other situations, the environment (eg speed) or the target audience (eg pedestrians or cyclists) might mean that a smaller than legal-minimum sign would suffice. Such signs are not currently legally permitted nor would they be a desirable size for more typical locations. This suggests some mechanism for reducing sign sizes in certain circumstances could be desirable.

The NZTA would welcome feedback on ways the issue of providing for smaller signs in certain circumstances might be achieved.

5.2.3 Specific sign size

The appropriate size for the following signs should be determined in the manner described below.

‘Stop’, ‘Give Way’ and ‘Give Way at Roundabout’ signs

Sizes are defined in the detailed specifications for each sign.

Circular disc regulatory signs, including ‘No stopping’ sign

In urban areas:

- the minimum allowable size is 400 mm in diameter, which can only be used where:
– the sign is not primarily intended for motorists, eg ‘no pedestrians’
– the sign is illuminated and used in conjunction with a traffic signal
– the physical restrictions of a site do not allow the use of a larger sign

• the normal sign size where operating speeds are 50 km/h or less is 600 mm in diameter (the only exception is when the ‘Keep Left’ sign is used as part of vertically stacked 300 mm discs)

• where signs are used on a median-divided road and where vehicle operating speeds are very high, signs 750 mm in diameter or larger should be used.

In rural areas, the normal size is 750 mm in diameter. However, where signs can be used on median-divided roads and where operating speeds are very high, signs 900 mm in diameter or larger should be used.

Large signs 1200 mm in diameter or larger should be considered for motorways, other high-speed roads, critical locations where there is a speed limit change and the leading ends of median islands.

**Permanent warning signs** (except curve warning and curve advisory speed signs)

In urban areas:

• the normal sign size is 600 mm × 600 mm

• where signs can be used on a median-divided road and where 85% operating speeds exceed 50 km/h, 750 mm × 750 mm or larger signs should be used.

In rural areas:

• the normal sign size is 750 mm × 750 mm, but, where the 85% approach speed is less than 65 km/h, 600 mm × 600 mm size signs may be considered

• where signs can be used on a median-divided road, on motorways and where operating speeds are high (generally >90 km/h), 900 mm × 900 mm signs or larger should be used.

**Permanent curve warning and curve advisory speed signs**

The size of permanent curve warning and curve advisory signs is determined generally by the degree of the hazard, ie they would generally be increased as the differential between the operating speed of the curve and the approach roads increases or the roadside hazard increases.

**Guide, motorist service, tourist and general interest signs**

Sign size is determined by the content and design rules for each type of sign. These include:

• the number of lines of text permitted

• the symbols required or permitted

• clearances between the legend and edges of the sign

• border widths.

Design size and layout requirements for these signs are covered in Part 2 of the TCD Manual (under development).
5.3 Lettering

Any lettering and numerals used on traffic signs must conform to the TCD Rule, in particular those specifications listed in Schedule 1 (available at www.landtransport.govt.nz/roads/tcd/index).

5.3.1 Letter size and style

Two alphabet styles are used for letters on signs:

- Standard alphabets initially based on US standards are sourced from AS1744: 1975 *Forms of letters and numeral for road signs* (known as Standard Alphabets for Road Signs). The standard describes eight different forms and sizes of letters and numerals, ranging from Series A (narrow letters) to Series F (broader letters) and includes modified series E and lower-case forms. In New Zealand, series A, B, C, D, E and modified E lower case are the fonts of this style used on signs other than described in the bullet point below.

- Transport medium NZ font should only be used for:
  - text on parking signs
  - abbreviations for metric symbols, including kilometres (km), metres (m), kilometres per hour (km/h) and kilograms (kg).

Details about the transport medium NZ font can be found at www.landtransport.govt.nz/roads/tcd/transport-medium-nz.html.

Currently, MOTSAM appendix A details dimensions and other aspects of both fonts. It is proposed that AS1744 be modified to take account of changes arising from the adoption of computer software and new characters not envisaged at the time. The NZTA would appreciate comment on the degree to which the level of detail contained in MOTSAM needs to be reflected in the TCD Manual.

The legibility of signs is significantly affected by the type of lettering and the retroreflectivity of the material used. The stroke width needs to increase (by moving from the Series A font through to the Series E font) as the background material increases in retroreflective performance. It is also important to recognise that a larger letter size is likely to improve legibility for older drivers. GTM Part 10 recommends that:

> at locations where the background and surroundings to the sign have a large amount of material that would make the sign difficult to see (eg urban areas with illuminated advertising signs, shop fronts or other lights), a larger legend and sign may be used at the discretion of the designer.

Further information on legibility principles and formulae to determine legibility distances are provided in GTM Part 10.

5.3.2 Specific letter size and style requirements

**Regulatory and warning signs**

Letter size and style is defined in the TCD Rule by letter height and stroke width, while the TCD Specifications website describes letter heights and fonts for each sign.
Guide and route signs

The minimum letter size is specified for each road class in Part 2 of the TCD Manual (under development). The actual letter size required may vary, depending on the size of the sign.

Guide signs use modified Series E for lower case and Series D or E for upper case.

The modified Series E lower case alphabet is only used for destination or stage names (ie those that have been identified as being required between two routes in Part 2 of TCD Manual). Series D or E upper case are used for all additional information shown on guide signs, eg directional or driver information, street names.

The letter size for a guide sign is determined by the following factors:

- the speed of vehicles approaching the sign
- the number of lines of text on the sign
- the type of font to be used on the sign
- the lateral and vertical position of the sign in relation to approaching drivers.

The requirements for guide sign lettering, alphabet style, legend, layout and typical sign examples are given in Part 2 of the TCD Manual and specified on the traffic sign specifications website for each sign.

Motorist service and tourist signs

Part 2 of the TCD Manual gives the general layout requirement for the lettering on motorist service signs and tourist signs, as well as typical examples.

Letter size is determined by sign type and road classification. Letter style should be Series D upper case with medium spacing.

The NZTA welcomes comments on whether tourist signs should use both upper and lower case letters.

General information signs

The general layout requirement for general information sign lettering, as well as typical examples, are given in Part 2 of the TCD Manual and specified on the traffic sign specifications website for each sign.

5.4 Legends

A legend is defined as the text and symbols used on traffic signs. As previously stated, any text, numbers or symbols used on traffic signs must conform to the TCD Rule, particularly the specifications listed in Schedule 2 (located on www.landtransport.govt.nz/roads/tcd/index).

Regulatory and warnings signs

The legends for these signs are fully defined in the individual sign details on the NZTA sign specification website (www.landtransport.govt.nz/roads/tcd/index).
Guide and route signs

The detailed design rules specify what text and which symbols may be shown on each particular type of guide sign. Further information on guide and route signs is provided in Part 2 of the TCD Manual (under development).

Stage and destination names adopted for use on guide signs on state highways have been chosen on the basis that the places are likely to be known to many drivers and are shown prominently on most road maps. Only names approved by the New Zealand Geographical Board (NZGB) can be used on state highways. These names can be found in Part 2 of the TCD Manual. The names must feature on all guide signs between the first placement and the destination.

Guide signs must be approved by the RCA. Design rules for guide signs limit the number of lines of text on each type of sign. Including minor or intermediate place names in addition to the approved stage or destination name could create too many words and lines on a sign. Therefore, place names should be introduced on a ‘sequential, distance from sign basis’, up to the maximum allowed, ie when the first minor or intermediate place is reached, it is replaced with the next place name in the sequence, and so on.

Distances

Table 5.1 illustrates how distances should be shown on sign legends.

Table 5.1 Distances shown on sign legends

<table>
<thead>
<tr>
<th>Distance</th>
<th>Increment</th>
<th>Shown as</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 999 metres</td>
<td>Nearest 100 metre</td>
<td>‘xxx m’</td>
</tr>
<tr>
<td>1000 metres or more</td>
<td>Nearest kilometre</td>
<td>‘xx km’</td>
</tr>
</tbody>
</table>

5.5 Dual name signs

Dual name places and features are those where two official names (a primary and secondary) are used. Only those dual names recognised by the NZGB may be shown on guide, route, tourist and general information signs. Typical dual name signs are illustrated in figures 5.3, 5.4 and 5.5.

5.5.1 Dual name conventions

The NZGB convention for dual names is to separate the primary name from the secondary name with a ‘/’ character, ie Primary name/Secondary name.

This sequence of primary and secondary is set by the NZGB and cannot be changed to accommodate a traffic sign’s layout. However, it is also generally not possible to use a single line format to show dual names on traffic signs, even for two short names. The method adopted for state highways is to:

- show the primary name in the standard manner and lettering style generally used for the type of sign
- show the secondary name in italic capital lettering three-quarters the size of the initial capitals used for the primary name
- centre the secondary name immediately beneath the primary name.
Figure 5.3 Example dual name (CDS) sign

Additional information on dual name signs on guide, route, tourist and general interest signs can be found in Part 2 of the TCD Manual (under development).

5.5.2 Māori names

Māori names can be either the primary (figure 5.3) or secondary (figures 5.4 and 5.5) names and may use macrons to indicate long vowels in Māori (figure 5.5).

It is advisable to check the correct wording with:

- the Māori organisation that has mana whenua status in the area; and
- the NZGB for correct presentation.

Figure 5.4 Example dual name sign

Figure 5.5 Example dual name sign with macron

Additional information on Māori names on guide, route, tourist and general interest signs can be found in Part 2 of the TCD Manual (under development).

It is considered desirable that dual name layouts adopted for any local roads follow the principles described here. The NZTA would appreciate input on this issue.
6 Variable traffic signs

A variable traffic sign is defined in subclause 4.3(2) of the TCD Rule as a sign capable of displaying a different message to meet traffic management needs at different times. It may be either a permanent sign or a temporary sign.

Variable traffic signs may:

- display two or more different fixed messages
- display an infinite range of messages, restricted only by the size of the sign and the capability of the technology
- combine elements of both of the above forms.

The responsibility for approval of a variable traffic sign rests with the RCA.

Clause 4.6 of the TCD Rule states:

A variable traffic sign must:

(a) in changing from one traffic sign to another, conform to a protocol approved by the road controlling authority; and

(b) display only traffic signs that comply with Schedule 1 [of the Rule] and that are approved by the road controlling authority.

Variable traffic signs can contribute to a safer driving environment and better distribution of traffic flows and provide en-route opportunities to advise travellers of road conditions, hazard delays, parking guidance, incidents and detours.

Variable traffic signs should be considered on the basis of both strategic and local needs:

- Their strategic use relates primarily to an overall network impact involving a systematic approach as part of an advanced traffic management system (ATMS). These types of signs are generally used on main arterial roads to provide information to road users at critical decision points, such as major intersections.
- Local variable traffic signs (relating to local issues such as hazardous conditions at local sites) can be used to provide specific route information where there are no alternatives for the motorists to make route changes.

The US Manual of uniform traffic control devices (MUTCD) suggests that effective variable traffic signs need to meet the following basic requirements:

- **Fulfil a need.** Messages must only be posted on signs when there is a real need. If messages are perceived to be unnecessary, drivers may disregard other messages.

- **Command attention and respect.** This can be achieved through the size of the sign or the content of the message, and by the displayed information being accurate and timely.

- **Convey a clear, simple meaning.** At typical speeds, drivers have only a few seconds to notice, read and interpret messages. Composition, formatting and consistency of signage is important for drivers’ quick comprehension.

- **Give adequate time for a proper response.** Messages that are poorly composed and contain too much information may be difficult for drivers to read in the time they have while passing.
Further detailed information on the use of variable traffic signs with ATMS, local, urban and rural applications, and design principles can be found in Austroads GTM Part 10.

The types of variable signs in use are:

- active warnings signs
- variable message signs
- changeable message signs.

### 6.1 Active warning signs

Active warning signs (those that incorporate flashing lights and/or LED components) display messages only when relevant. These types of signs enhance driver awareness of the specific risk applicable when the signs are operating.

The use of flashing lights on signs is currently formally restricted to the following types of signs:

- 40 km/h speed limit school zone signs
- school zone signs
- speed indicator devices
- traffic signals/roundabout queue warning signs
- livestock, curve, truck, pedestrian, cyclist and equestrian hazards
- temporary traffic signs, such as ‘person working’, ‘exclamation mark’, ‘car skidding’, ‘person holding flag’ and ‘lane change ahead’.

Research has concluded that the use of these types of signs is effective in situations of high risk, such as the beginning and end of the school day, the movement of stock and during road works.

Further information on the use and selection criteria of specific types of active warning signs (such as ‘school zones’) can be found in Traffic Notes 37, 56 and 57 (online at www.ltsa.govt.nz/roads/traffic-notes/index.html).

### 6.2 Variable message signs

A variable message sign (VMS) is an electronic sign in which the message can be changed in form, shape, layout, colour and any other manner (photo 6.1). Such signs may be illuminated or otherwise. VMS can be either permanently located or portable, such as those used with temporary traffic management trucks, or on trailers where the message is not always required to be in a set location.

Photo 6.1 Variable message sign
A VMS can be used to:

- actively manage traffic flows
- complement changeable message signs (CMS) to enhance travel information measures
- warn road users of unusual conditions that may affect traffic operations on the roading network
- provide real-time travel information to road users
- complement the fixed warning signs for temporary traffic control.

Information and guidance relating to VMS consistency across regional boundaries can be found in the NZTA’s *VMS sign guidelines and reference manual* (under development) and in GTM Part 10.

### 6.2.1 VMS matrix types

Message options are limited by the type of VMS used and its display space configuration or matrix. There are three typical types of matrix displays: character, line and full.

- **Character matrix.** A separate display space is made available for each letter of the text message. A character matrix of 12 horizontal by 3 vertical has only 36 display spaces available.

- **Line matrix.** There is no physical separation between the characters in a single line of text, but there is a separation between different lines of text.

- **Full matrix.** No physical separation exists between individual characters or lines in the message. A message can be shown at any size and location as long as it is within the display space. This is the preferred option for state highways.

### 6.2.2 Location

As stated in subclause 4.4(9) of the TCD Rule, a traffic sign, including a VMS, must be positioned above or to the left of the approaching road user. In almost all situations, it is considered unwise to position a VMS on the right-hand side of approaching traffic. However, the sign may be placed in a different position where it would be safer, eg a traffic sign may be placed on the right-hand side where geometry restricts the line of sight for drivers on the left-hand side of the road, or in temporary traffic management situations.

If the VMS is intended to advise a route diversion, the sign should be located sufficiently in advance of the alternate route intersection to allow motorists to assimilate the message and respond accordingly, including lane changes if necessary. Table 6.1 shows suggested distances for the placement of VMS from key intersections.
### Table 6.1 Suggested distance for placement of VMS from key intersections

<table>
<thead>
<tr>
<th>Road environment</th>
<th>Placement of VMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motorway</td>
<td>Minimum distance of 1500 m prior to an access/diversion point.</td>
</tr>
<tr>
<td>Urban and arterial</td>
<td>The distance may vary, depending on issues such as speed limits, local factors and right-of-way constraints.</td>
</tr>
<tr>
<td>Rural single lane</td>
<td>With no need to change lanes, but acknowledging the complexity of some decisions and the route choices, a distance equating to at least 1000 m in a 100 km/h zone, or a proportionally reduced distance in a lower-speed zone.</td>
</tr>
<tr>
<td>Rural (AADT &lt;2000)</td>
<td>May display a message advising motorists to turn back. Consideration should be given to choosing a site that has a suitable pull-over/turning area just after and within view of the sign for map reading/turning around.</td>
</tr>
<tr>
<td>Rural (AADT &gt;2000)</td>
<td>With higher volumes and a high-speed environment, a level is reached where pulling over or turning around is unsafe. Professional judgement should be used to determining where pull-over/turning areas are appropriate.</td>
</tr>
</tbody>
</table>

### Clear sight distance

Visibility and impact, and sign size in proportion to the environmental context, are particularly important when selecting a site. High-volume urban roads and high-speed rural roads (>100 km/h) require sites that allow a motorist clear sight distance to the sign of at least 375 m for a 300 mm character height, and at least 250 m for a 200 mm character height. In lower-speed environments, the distances can be reduced proportionally.

Further information on these types of requirements is included in the NZTA’s VMS Sign guideline and reference manual (under development).

### 6.2.3 The message

#### Priority of incidents

Where more than one VMS is used on high-volume strategic routes, consideration will need to be given to prioritising the VMS message, depending on the incident.

#### Message content

VMS messages should consist of the elements or statements shown in table 6.2.

### Table 6.2 Elements of VMS signs

<table>
<thead>
<tr>
<th>Element</th>
<th>Purpose</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem statement</td>
<td>Conveys the type and location of the incident</td>
<td>Mandatory</td>
</tr>
<tr>
<td>Effect statement</td>
<td>Conveys the consequence of the incident</td>
<td>Desirable</td>
</tr>
<tr>
<td>Attention statement</td>
<td>Conveys the group of drivers for whom the message is intended</td>
<td>Desirable where applicable</td>
</tr>
<tr>
<td>Action statement</td>
<td>Conveys the course of action to be taken by drivers</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
When signs are used on higher-volume roads, it may be necessary to provide more elements and therefore more information to drivers than is mandatory.

The content of a VMS message must provide clear and concise guidance to motorists. Further information on message content can be found in the NZTA’s VMS Sign guidelines and reference manual (under development) and Austroads GTM Part 10.

6.2.4 Message display

Display size

The minimum display size is dictated by the maximum message size that needs to be shown on the VMS. This, in turn, is dictated by the intended ITS application. Table 6.3 shows the recommended VMS display sizes and types.

Table 6.3 Recommended VMS display sizes and types

<table>
<thead>
<tr>
<th>Application</th>
<th>Number of lines</th>
<th>Number of pixels across</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Ideal</td>
<td>Minimum</td>
</tr>
<tr>
<td>ATMS motorway</td>
<td>3</td>
<td>4</td>
<td>98</td>
</tr>
<tr>
<td>High-volume urban</td>
<td>2</td>
<td>4</td>
<td>72</td>
</tr>
<tr>
<td>Rural</td>
<td>2</td>
<td>2 or 4</td>
<td>72</td>
</tr>
</tbody>
</table>

Once the display height (the total height of sign) has been determined, the appropriate character height must be considered. The minimum character height is determined by visibility and the ability of the motorist to read and comprehend the message. This is a function of:

- total message size
- local speed environment
- lateral position of the VMS
- sign role.

The NZTA’s VMS Sign guidelines and reference manual (under development) provides more detailed information on display size.

Display colour and font

For message/text display, the pixels must be an amber/yellow colour and the following specifications must apply to display fonts and text layout:

- character height: 7 pixels
- character width: 5 pixels (other variations are included in the NZTA’s VMS Sign guidelines and reference manual – under development)
- character spacing: equal to or greater than the width of the down stroke (pitch)
- word spacing: 5 pixels
- line spacing: 4 pixels.
Where applicable, the VMS must also be able to generate the following fonts:

- double stroke (pitch)
- double height (14 pixels)
- triple height (21 pixels).

The VMS must be capable of displaying any combination of text and numerals, including standard punctuation and arrow display.

### 6.3 Changeable message signs

Changeable message signs (CMS) combine elements of static and variable (real time) or alternate specific information mechanically and electronically. They are used for special or targeted purposes for simple, repetitive messages, such as available parking (photo 6.3). CMS are particularly suitable for situations where the more extensive functions and flexibility offered by VMS are not required on a regular basis.

**Photo 6.3** Changeable message sign

It has been suggested that this chapter is an area where more guidance is needed. The NZTA would appreciate comments on this and what, if any, additional guidance is most required.
7 Installation

7.1 General principles

Subclause 4.4(9) of the TCD Rule states that signs must be installed on the left-hand side from the point of view of a road user approaching the sign, except if a different position would be safer and more effective in the circumstances or it is specified in any enactment.

An example where it may be inappropriate to install a sign on the left-hand side could include a time-restricted bus lane not adjacent to the kerb (ie in the central lane). In this instance, an overhead sign may be used or a sign conveying the message may be installed on the right-hand side of the road, on a traffic island or on a median.

In addition:

- signs should always be positioned so they do not obscure other signs or restrict a driver’s vision (particularly at intersections) and so they do not compromise accessibility
- signs should not normally be installed in medians unless they refer specifically to traffic travelling in the median lane (ie the lane adjacent to median)
- at channelised intersections, some signs may need to be placed on traffic signals or the right side of some roadways (such as ‘Keep Left’ signs)
- in general, only one type of sign should be mounted on each post, except where:
  - another of the same size and shape is mounted on the reverse side and is intended to be seen by opposing traffic
  - one sign supplements the other
  - they are route, direction, motorist service or tourist signs that can be combined in certain situations (see section 4.1.7)
- where a sign is located in an exposed position (ie within the clear zone), consideration should be given to the use of frangible support posts or, where no other option is available, the installation of some form of protection for road users (eg guardrail or barrier) (further information on these types of sign supports and guidance on their use in both urban and rural environments is given section 7.2.2)
- environmental and aesthetic requirements, site layouts and sign size should be considered, especially regarding the location; departures from standard sign positioning rules should be formally justified when determining the placement of a sign.

Specific requirements relating to the design, manufacture, installation, maintenance and compliance for traffic signs are included in the Road Safety Manufacturers Association’s (RSMA) Compliance standard for traffic signs.
7.2 Sign supports

7.2.1 Legislative requirements

The TCD Rule has a number of requirements for the types of support structures for signs.

The colour and form of the support post or pole used for a sign are described in subclauses 6.3(4), 6.3(5), 8.2(9) and 9.4(3) and may be used only for the purpose specified in those provisions. These specific provisions cover the following situations.

Pedestrian crossings

An RCA must install, within 2 m from each end of a pedestrian crossing and on a traffic island that separates two pedestrian crossings, a pole that is:

- 75 mm or more in width and 2 m or more in height; and
- marked with alternating parallel bands of black and white, which may be reflectorised, each of which is approximately 300 mm wide.

Level crossings

A rail access provider may install, at a level crossing, poles that have reflectorised red and white alternate bands that are at least 225 mm wide.

General

Where the specific sign support is not mentioned in the TCD Rule, then all other supports (unless not a specific sign support) should be white, but if made of aluminium or galvanised steel may be left unpainted. Note that a traffic signal post must be painted yellow.

Notwithstanding the option not to paint provided by the TCD Rule, it should be noted that poles used in New Zealand should comply with the minimum wall thickness detailed in the RSMA’s *Compliance standard for frangibility reasons*. These thin wall poles would normally have an electrically deposited zinc coating that will not stand up to the New Zealand coastal environment. They are powder coated to protect the zinc coating and such poles should be painted.

Specific information for support and post types and installation can be found in the RSMA’s *Compliance standard*.

7.2.2 Sign support methods

Signs can be mounted on poles or posts, including telecommunication and power poles, and other existing structures, such as buildings, bridges, walls or fences.

Where a sign is to be installed on anything other than a specific sign post support, approval of the owner of the structure should be sought.

The frangibility of a sign support is important and consideration should be given to providing frangible sign supports where these are located close to the road and the risk of an errant vehicle colliding with the post or pole is a factor. Further information on the frangibility of signs is included in section 7.2.3.

Specific dimensions and requirements for these types of installations are outlined in section 7.3 and illustrated in figures 7.1–7.10.
**Posts**

Posts used to support either small or larger roadside traffic signs can be made of steel, aluminium, timber and other fit-for-purpose materials, including UV-stabilised plastics. Information on the types and appropriate standards for post materials can be found in the RSMA’s *Compliance standard*.

**Small signs**

A small sign has a panel area that is less than or equal to 4.7 m². Where the sign is less than 1.3 m wide, only one support post is needed; where the width is greater than 1.3 m wide, the sign should have two support posts.

**Large signs**

A large sign has two or more posts, a panel size exceeding 4.7 m² or sign supports located more than 2.1 m apart.

Dimensions and the number of posts required for specific signs and locations can be found in the appropriate parts of the TCD Manual and the RSMA’s *Compliance standard*.

**Gantries**

Gantries are large sign support structures that sit over traffic lanes and are typically used where one or more of the following apply:

- on high-volume roads
- on multi-lane roads
- where there are high operating speeds
- where sight visibility for approaching traffic may be restricted
- at locations where space is not available at the roadside
- where the sign needs to refer to a specific traffic lane.

Figures 7.9 and 7.10 show some typical examples of gantry supports.

**Existing structures**

The use of existing structures may help provide a safer environment, as this removes the number of structures on the side of the road. Traffic signs may be placed on existing structures, such as telecommunication poles, buildings, bridges, walls or fences. Note, however, placement of a sign on an existing pole (eg telecommunication pole) might compromise the wind loading of the pole.

**7.2.3 Frangibility and impact performance**

Where signs are placed within the clear zone (ie located close to the edge of the road), they can present a hazard and therefore increase the risk of serious injury to road users. Consideration should be given to providing a frangible support post in the clear zone area, or protecting the post. Further information on specific site requirements is detailed below.
State highways

Where signs are located in the clear zone on state highways, they must be designed, manufactured, installed and maintained to comply with National Cooperative Highway Research Program (NCHRP) Report 350, *Recommended procedures for the safety performance evaluation of highway features for test level 3.*

If they do not comply with NCHRP 350, then signs must not be used in the clear zone unless they are protected by a barrier system or fixed-impact attenuator.

Where there are overhead signs (including cantilevered signs), they generally require significant support systems that are unable to be frangible. All overhead sign supports located within the clear zone must be specifically designed to AS/NZ1170 *Structural design action 2002* and be shielded behind a compliant safety barrier system.

Local roads

Where signs are located within the clear zone on local, high-speed roads, adoption of the state highway requirements should be considered. On other roads, particularly those in urban areas and low-speed environments, the RCA should decide on appropriate measures, including whether sign support posts should be frangible. Such decisions would consider the type of environment and associated level of risk, including the possibility that the risk of injury to pedestrians from breakaway sign posts exceeds that of the vehicle occupants. Examples of sites where breakaway supports may be undesirable are adjacent to bus shelters or in areas with high concentrations of pedestrians.

Information relating to impact performance, frangibility and breakaway designs can be found in the NZTA’s *P/24: Performance-based specification for traffic signs*, the RSMA’s *Compliance standard*, GTM Part 10 and the NZTA’s *State highway geometric design manual*.

7.3 Location

In addition to the general design principles outlined in section 7.1 and the good practice considerations described in sections 7.2.1 and 7.2.2, there are specific requirements for the placement of signs.

7.3.1 General placement

**Regulatory signs**

Subclause 4.2(2) of the TCD Rule specifies when regulatory signs must be provided. In particular:

- regulatory signs must be installed where the RCA has identified a need, including the type of restriction or a prohibition (this is normally by a bylaw process, or other instrument, on a road under its control); or
- regulatory signs must be installed to draw attention to the requirement, restriction or prohibition; or
- regulatory signs are only to be installed where an RCA considers it desirable that a sign is installed.
Permanent warning signs

An RCA must install a permanent warning sign at any place where it considers special care or reduced speed is appropriate. In particular, the RCA must consider its appropriateness near the entrance to a school, kindergarten, pre-school centre or hospital.

Temporary warning signs

Subclause 4.2(5) of the TCD Rule requires an RCA to install temporary warning signs if it considers there is, or is likely to arise at any place on a road, a temporary risk of:

- damage to the public or to road workers; or
- damage to the road.

In addition, subclause 4.2(6) of the TCD Rule states that, where there is a temporary hazard, such as an abandoned vehicle, accident, a washout, etc, an appropriate temporary warning sign may be erected by either emergency services personnel or a worker who has been involved in removing the temporary hazard.

Additional information on the use of temporary traffic signs can be found in CoPTTM.

Advisory signs (guide, route, street name, motorist service, tourist, general interest)

Subclause 4.2(10) of the TCD Rule requires an RCA to install and maintain an advisory sign (which includes a sign that gives information about destinations, routes, amenities, distances, street names or place names) if it considers it necessary or desirable to inform road users.

7.3.2 Longitudinal position

The longitudinal position refers to a sign's position along the length of the side of the road, ie the distance from a specific point or hazard.

Regulatory signs

Subclause 4.2(3) of the TCD Rule states that regulatory signs must be installed to instruct road users of a requirement, restriction or prohibition:

- at each point where the requirement, restriction or prohibition applies; or
- where the requirement, restriction or prohibition applies to a length of road:
  - at the start; and
  - after each intersection along its length; and
  - at the end; and
  - at intervals along its length, as specified in the Rule or other enactments (ie clearway)
- where the requirement, restriction or prohibition applies to a zone restriction at:
  - each entry point to the zone; and
  - intervals within the zone, as specified in the Rule; and
  - each exit point from the zone.
Forward visibility for these signs will vary from 30 m in urban areas for pedestrians and cyclists to 60–120 m in both urban and rural areas, depending on the type of sign. Further information should be obtained from that part of the TCD Manual that relates to the specific signs.

Specific legal distance requirements for longitudinal position relate only to the use of speed limit signs, which must comply with the requirements as listed in Land Transport Rule: Setting of Speed Limits 2003. In summary, it states that a speed limit sign must be placed on the left-hand side (and, in many cases, duplicated on the right-hand side) within 20 m of its legally defined position.

**Warning signs**

Warning signs should be located sufficiently in advance of an unusual or hazardous situation for a driver to react in the appropriate manner. Longitudinal distances are the same for both permanent and temporary warning signs. The distance between the warning sign and the hazardous situation should be either of the following:

- the distance required to reduce (decelerate) the vehicle operating speed from the 85th percentile vehicle speed at the location of the sign to the speed required at the situation or hazard
- the distance required to reduce (decelerate) the vehicle operating speed from the 85th percentile vehicle speed at the location of the sign to a complete stop, ie when the sign is an advance warning of the Stop or Give Way control at the next intersection.

The values given in table 7.1 show the deceleration distances for general light vehicles, such as cars and utilities. For information relating to the deceleration distances required for heavy vehicles, refer to *Austroads Guide to road design Part 4A: Unsignalised and signalised intersections*.

**Table 7.1** Deceleration distances for light vehicles (cars or utilities)

<table>
<thead>
<tr>
<th>85th percentile speed at sign location (km/h)</th>
<th>0</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>60</td>
<td>55</td>
<td>45</td>
<td>30</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>60</td>
<td>80</td>
<td>75</td>
<td>65</td>
<td>50</td>
<td>30</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>70</td>
<td>100</td>
<td>95</td>
<td>80</td>
<td>70</td>
<td>55</td>
<td>35</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>80</td>
<td>120</td>
<td>110</td>
<td>105</td>
<td>95</td>
<td>80</td>
<td>65</td>
<td>40</td>
<td>–</td>
</tr>
<tr>
<td>90</td>
<td>140</td>
<td>135</td>
<td>125</td>
<td>115</td>
<td>100</td>
<td>90</td>
<td>70</td>
<td>45</td>
</tr>
<tr>
<td>100</td>
<td>170</td>
<td>160</td>
<td>155</td>
<td>145</td>
<td>130</td>
<td>120</td>
<td>100</td>
<td>80</td>
</tr>
</tbody>
</table>

Designers should be aware of the different braking capabilities of heavy vehicles and this should be taken into account when setting out sign locations.

Warning signs should also be located where approaching drivers have an uninterrupted view of it over a distance of at least 120 m in rural areas and at least 60 m in urban areas.
Guide, motorist service, tourist and general interest signs

These signs are positioned according to their function, but generally they can also be located where approaching drivers have an uninterrupted view of the sign over a distance of at least 120 m in rural areas and at least 60 m in urban areas. Specific location details are given in Part 2 of the TCD Manual (under development).

7.3.3 Lateral clearance

Signs should be positioned away from the edge of the roadway, as shown in figures 7.1–7.10 and noted in table 7.2, subject to:

- any maximum and minimum dimensions specified; and
- any constraints on visibility due to roadside obstructions.

Lateral clearances must be measured from the edge of the sign nearest to the road to:

- the kerb line; or
- the outer edge of the road shoulder or the nearest lane line, whichever is the critical dimension; or
- the face of the guardrail or the nearest lane line, whichever is the critical dimension.

Table 7.2 Lateral clearances for traffic signs

<table>
<thead>
<tr>
<th>Road and environment type</th>
<th>Min (mm)</th>
<th>Max (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban Kerbed Mountable</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(where minimum lateral clearance cannot be achieved, the sign mounting height must be increased to at least 4.6 m to ensure adequate clearance height for most vehicles)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Urban Kerbed Non-mountable</td>
<td>600</td>
<td>5000</td>
</tr>
<tr>
<td>Un-kerbed (including urban arterial expressways)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural Kerbed (channelised intersections)</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Urban Kerbed Un-kerbed (channelised intersections)</td>
<td>600</td>
<td>5000</td>
</tr>
<tr>
<td>Rural Un-kerbed</td>
<td>600</td>
<td>5000</td>
</tr>
</tbody>
</table>

For typical sign lateral clearances and mounting heights for regulatory, warning, guide, motorist service and tourist signs, see figures 7.1–7.10.
Regulatory and permanent warning signs

**Kerbed roadways (urban and rural)**

Where lateral clearances for kerbed roadways in table 7.2 cannot be provided, the mounting height above the roadway should be increased to at least 4.6 m to avoid damage from trucks and vans.

**Figure 7.1** Lateral and height clearances for regulatory and warning signs in kerbed roadways

![Diagram of lateral and height clearances for kerbed roadways](image)

**Un-kerbed roadways**

**Figure 7.2** Lateral and height clearances for regulatory and warning signs in un-kerbed roadways

![Diagram of lateral and height clearances for un-kerbed roadways](image)

7.3.4 Mounting heights

Signs should be located clear of roadside vegetation and be visible to approaching drivers in all conditions. To achieve this, the sign mounting height may need to be varied to suit local site conditions.

Minimum mounting heights to the bottom of the sign panel and typical details are given in table 7.3 and figures 7.1–7.10.
Table 7.3 Minimum desirable mounting heights for traffic signs

<table>
<thead>
<tr>
<th>Mounting situation</th>
<th>Minimum desirable mounting height (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General minimum</strong></td>
<td>1.5</td>
</tr>
<tr>
<td>This is the height the sign must be mounted as a basic minimum requirement. In some situations, heights may be lower, such as chevron boards on roundabouts, curves, etc.</td>
<td>Mounting height must be measured from the underside of the sign, or the lowest sign in an assembly of signs, to the surface of the adjacent road, trafficable shoulder or top of kerb, whichever is the critical dimension.</td>
</tr>
<tr>
<td><strong>Rural areas (no footpath)</strong></td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Urban areas (not on a footpath)</strong></td>
<td>2.1</td>
</tr>
<tr>
<td>Mounting heights need to be increased in urban areas to help prevent sign visibility problems caused by parked vehicles.</td>
<td></td>
</tr>
<tr>
<td><strong>Over or near a footpath if likely to obstruct</strong></td>
<td>2.5</td>
</tr>
<tr>
<td>Mounting height must be measured to the ground surface or footpath immediately beneath the sign.</td>
<td></td>
</tr>
<tr>
<td><strong>Overhead signs</strong></td>
<td>6.0</td>
</tr>
<tr>
<td>Mounting height is important when there is no alternative route for over-dimension loads. An absolute minimum of 5.3 m can be used where the sign is located over an emergency shoulder or parking lane.</td>
<td>Mounting height must be measured to the road surface immediately below the sign.</td>
</tr>
</tbody>
</table>

Figure 7.3 Urban location single pole support

Figure 7.4 Urban location single pole support over a footpath

* 2.5 m is desirable if in close proximity to a footpath
7.3.5 Spacing between posts

Detailed information on post spacing on specific signs can be found in Part 2 of the TCD Manual (under development). However, as a rule:

- for signs with two posts, the spacing should be approximately 60% of the sign width
- for signs with three posts, the spacing should be approximately 30% of the sign width
- where signs are located on a footpath, consideration needs to be given to pedestrian accessibility around the post and to providing sufficient width to avoid the risk of an errant vehicle striking one or more post (further information can be found in the NZTA’s State highway geometric design manual and the RSMA’s Compliance standard).

**Figure 7.5** Height clearances for regulatory and warning signs

**Figure 7.6** Urban location two-pole support

**Figure 7.7** Rural location standard two-pole support

**Figure 7.8** Rural location behind a guardrail

**Note 1**: The offset from the barrier will depend on the type of barrier system, eg rigid, semi-rigid, non-rigid systems such as New Jersey, guardrail and wire rope barriers.

**Note 2**: Distance between posts is determined by the width of the sign. Refer to section 7.3.4.
Figure 7.9 Cantilever support

Figure 7.10 Gantry support

Note 1: The offset from the barrier will depend on the type of barrier system, eg rigid, semi-rigid, non-rigid systems such as New Jersey, guardrail and wire rope barriers.

Note 2: Refer also to the NZTA’s Bridge manual, appendix A3 for further information regarding vertical and horizontal clearances and offsets from different barrier types to signs.

Photo 7.1 Examples of gantry supports

7.4 Orientation

For optimum results, the orientation of a traffic sign to face oncoming traffic is extremely important. Generally, signs should face the driver’s line of sight. When using reflectorised sheeting, the sign should be facing 5 degrees away from the driver’s line of sight to reduce possible and undesirable reflection from sign surfaces. Figure 7.11 depicts how to correctly orient reflectorised signs at the side of the road. For gantry signs, the orientation is directed at the road users for whom the message is intended.

Orientation of a sign must also consider the traffic environment. A sign placed at a certain angle where it can be seen by the target users must not mislead or distract other roads users for whom it is not intended. For example, a traffic sign located adjacent to a slip lane might be seen by motorists
travelling parallel on the main road. Further specific information on sign sheeting and reflectorisation is included in section 8.

**Figure 7.11** Methods of avoiding specular reflection on a traffic sign

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### 7.5 Construction

Signs specified in all parts of the TCD Manual (excluding advertising signs) for the use on all roads should conform to the RSMA’s *Compliance standard*, in respect of:

- materials
- erection of signs
- methods of construction
- serviceability
- design life.

Further information on these general construction requirements can be found in the NZTA’s *P/24: Performance-based specification for traffic signs* and the RSMA’s *Compliance standard*.

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### 7.6 Inspection and maintenance

Regular inspection and maintenance of traffic signs should be undertaken during both day and night to ensure all traffic signs are visible and effective.

#### 7.6.1 Inspection

Inspections should be made under both day and night conditions to ensure:

- signs remain fully effective for the purposes for which they were installed
- maintenance and replacement requirements are regularly assessed.

During inspections, particular attention should be given to the following points:
• Does the need for the sign still exist? For example, where there has been a reduction in the posted speed limit, a review should be completed on the need for curve advisory speed signs.

• Is the visibility of the sign obscured by vegetation, other signs or other features?

• Has the sign and its posts or supports been vandalised or otherwise damaged?

• Is the sign still legible and correctly orientated?

• Are the retroreflective materials still effective? (Refer to GTM Part 10 for further information.)

7.6.2 Maintenance

Clause 3.1 of the TCD Rule clearly states the general requirements for traffic signs, including that they be safe, display clear and consistent messages and be maintained in good repair.

Regular maintenance, including keeping traffic signs clean, legible and with adequate retroreflectivity, is considered necessary for them to effectively provide messages and visual clues to road users. Where materials such as anti-graffiti and anti-dew sheeting are used, consideration needs to be given to the effects these materials may have on the performance of the signs (see section 8.2.6).

Detailed information on performance degradation and minimum coefficients of luminous intensity of traffic signs can be found in GTM Part 10. Reference should also be made to the RSMA’s Compliance standard for traffic signs for detailed information on maintenance of signs, especially with regards to cleaning and repairs.
8 Reflectivity and illumination

Traffic signs should be provided to aid the safe and orderly movement of traffic, including being clear and conspicuous in both day and night-time conditions. The level of sign conspicuity can be largely determined through the sign reflectivity (section 8.1), sheeting type (section 8.2) and levels of illumination (section 8.3).

The TCD Rule states that, if the traffic sign needs to be reflectorised (either partly or wholly, as set down in the TCD Rule), then it must:

- use reflectorised material approved by the NZTA by notice in the New Zealand Gazette (see section 8.1.1 Approval process for reflective material); or
- be internally or externally illuminated so as to be visible when illuminated (further guidance on illumination is included in section 8.3).

There are two types of retroreflective material used on signs: retroreflective and fluorescent retroreflective. Fluorescent retroreflective material should be used sparingly and only where:

- a site has been determined as a high safety risk
- a site has challenging environmental conditions, such as areas that receive little or no natural light
- the sign is listed in the TCD Rule as approved for use with fluorescent retroreflective sheeting.

Further information on the use of fluorescent retroreflective sheeting is given in section 8.2.

8.1 Reflectivity

Reflective material is defined in the TCD Rule as being 'any material that is designed to reflect incident light back towards the light source, or in a specific direction, but does not include a reflector'. This compares with reflective material but does not reflect light back towards the light source. The principles of reflective and retroreflective materials are illustrated in figure 8.1.

Figure 8.1 Definitions of retroreflective and reflective surfacing

The level of reflectivity is not normally specified for signs described in this document, and therefore an RCA should determine an appropriate level for signs on their roads, taking into consideration the:

- conspicuity requirements
- extent of issues or problem the sign is used for
- cost-effective service life of different sign face materials
• possible degradation of effectiveness over the life of the sign, due to any specific environmental aspects of the site.

It has been suggested that more guidance is desirable in choosing specific reflective materials. This includes defining specific minimum or maximum standards for the various signs used. An example of such specification is contained in VicRoads Traffic Engineering Manual. The NZTA would welcome comment on this issue.

8.1.1 Approval process for reflective material

In New Zealand, any retroreflective material used on traffic signs must be approved by the NZTA. In deciding which materials should be used, the NZTA considers AS/NZS 1906.1: 2007 Retroreflective materials and devices for road traffic control purposes Part 1: Retroreflective sheeting and AS/NZS 1906.2: 2007 Retroreflective materials and devices for road traffic control purposes. The requirements described in the standards include:

• photometric qualities
• colour (defined by CIE chromaticity coordinates)
• rainfall performance
• physical properties, including tensile strength and elongation, bending, impact, scratch resistance, shrinkage, wrinkling, solvent resistance and maintenance
• adhesion, including application, stability and bonding
• durability of the material, including outdoor and indoor accelerated weathering, and resistance to sea salt.

Reflective material approved for use on traffic signs in New Zealand is listed in the New Zealand Gazette. The current notice can be found at www.landtransport.govt.nz/roads/traffic-notes/docs/tn12-gaz-notice-200606022.doc. Approval has been given on the basis of evidence the materials comply with the photometric requirements (i.e. relating to the measurement of various aspects of light, especially its intensity) and colour performance standard of AS/NZS 1906.1 and 1906.2.

8.2 Use of materials

8.2.1 Retroreflective materials

Sheeting types

The characteristics and use of the various classes of retroreflective sheeting are defined in AS/NZS 1906.1: 2007 and AS/NZS 1906.2: 2007. The choice of sheeting material can be one of the following types:

• Class 1 sheeting – often the most appropriate for general use on permanent urban and rural highway signs that are side mounted and close to the roadway, with the required reading distance (by approaching motorists) not exceeding approximately 175 m.

• Class 1A sheeting – primarily for use on delineators and specified for railway level crossing poles.
• **Class 1W sheeting** – may be considered for fully retroreflective signs with lighter-coloured legends where long-distance viewing is necessary or for signs that are substantially offset from the driver’s path (ie overhead signs) or both.

• **Class 2 sheeting** – has a shorter life span than those above, but is acceptable for side-mounted signs close to the roadway, where its moderate photometric performance will not be a problem. It is also suitable sheeting for white background signs where specular reflection (ie light from material with smooth or glossy surfaces) is hard to avoid.

Class 1, 1A and 1W sheeting normally carries a warrantee of 10 years or more, but Class 2 sheeting has a more limited life expectancy. Additional information on classes of sheeting (including warrantee periods and luminous intensity) is included in AS/NZS 1906.1, AS/NZS 1906.2 and GTM Part 10.

### 8.2.2 Use of fluorescent retroreflective materials

Fluorescent material has a unique property that converts the incident ultraviolet (UV) light into reflected longer light waves visible to the human eye. The natural light occurring during dusk, overcast conditions or inclement weather contains a higher proportion of UV energy than normal daylight. Therefore, in these conditions, fluorescent sign sheeting material appears brighter to drivers than normal sign sheeting.

When assessing visibility requirements for traffic signs, the use of fluorescent retroreflective sheeting may be considered where there is:

• poor visibility, particularly during daylight twilight hours, when heavily overcast or shaded conditions are common and data indicates an overrepresentation of relevant crash types

• a need for an enhanced level of conspicuity due to contrast issues, such as snow, vegetation or commercial lighting, or where there are high levels of competing demand on drivers’ attention, such as heavy traffic and commercial activity

• a significant proportion of older drivers and road users using the network (however, in this instance, consideration needs to be given to appropriate forms of reflective sheeting – see section 8.2.8).

In addition to the above, specific signs have been approved for use by the NZTA featuring fluorescent retroreflective sheeting. Retroreflective fluorescent yellow-green has been approved for use on permanent warning signs for vulnerable road users, over-dimension vehicles and school bus signs.

### 8.2.3 Uses of retroreflective fluorescent materials on signs

The following signs are approved to use retroreflective fluorescent sheeting.

**Temporary traffic control**

CoPTTM incorporates guidance on the use of temporary traffic control, including the requirements for the use of fluorescent retroreflective orange on a number of critical signs. With the exception of pedestrian belisha discs, fluorescent retroreflective orange will be reserved solely for signs used in terms of CoPTTM. Further information should be sourced to determine whether the responsible RCA in which the works are undertaken uses CoPTTM or has a locally developed traffic management sign document.
**Pedestrian crossing belisha beacon discs**

Fluorescent retroreflective orange has been approved for use on belisha beacon discs at marked pedestrian crossings.

**Permanent roadside warning signs**

Retroreflective fluorescent yellow-green has been approved for use on vulnerable road user signs (namely, all pedestrian, cyclist and equestrian permanent warning signage, and excluding motorcyclists). Note that, when using these signs, a consistent approach is needed.

**Over-dimension vehicles**

Some vehicles operating with over-dimension permits approved by the NZTA are required to mount one or more appropriate signs on their vehicles. Since 1998, these signs have been required to have at least fluorescent yellow-green backgrounds if only used in daylight and to have retroreflective fluorescent yellow-green backgrounds if used at night.

**School buses**

School bus signs mounted on vehicles must have a fluorescent background. They may, however, have a retroreflective fluorescent yellow-green background. It is recommended the background material for new school bus signs should be retroreflective fluorescent yellow-green. This is considered good practice and is consistent with both the over-dimension vehicle sign and the vulnerable road user warning sign regime.

A school bus sign with a pair of flashing lights is approved as an optional device for operators. This is classed as an active sign (see section 6.1), with the ‘children’ symbol retroreflective fluorescent yellow-green on a black background.

**Permanent warning signs**

There are circumstances where the use of a retroreflective fluorescent yellow background may be justified for permanent warning signs other than those described above. RCAs should consider the criteria outlined in section 8.2.2 in deciding whether to use a fluorescent background. The impact and enhanced conspicuity a fluorescent sign may have compared with a standard yellow sign in the area must be considered. A more rigorous review than normal of the relative need or significance of signs along a section of road is needed to ensure road users are not overloaded by information or distracted from other crucial information.

8.2.4 **Fluorescent (non-retroreflective)**

Some signs can be fluorescent, but not retroreflective. Such signs are therefore more suited to daytime rather than night-time conditions.

**School patrol signs**

The circular ‘school patrol – STOP’ sign used at pedestrian crossing and school crossing points (kea crossings) by authorised and trained school patrols may be fluorescent red.
Kea crossing flags

A key component of kea crossings is the non-retroreflective fluorescent flag mounted when the school patrol is operating. The flag may be red or range fluorescent material.

‘Children Crossing’ sign

In the past, many RCAs installed folding signs with the words ‘Children Crossing’. These signs have never been officially approved. With the advent of kea crossings and concerns about the misuse of these signs, they have largely fallen out of favour. These signs generally have a non-retroreflective fluorescent red background.

8.2.5 Fluorescent material as backing boards

It is recommended that fluorescent material should not be used on backing boards until further research has been undertaken to determine an appropriate material and colour. Additional information on backing boards is given in section 4.1.8.

8.2.6 Graffiti and dew on signs

Graffiti clearly affects the performance of traffic signs, while, in some situations, dew can significantly degrade the retroreflective performance. Overlay materials have been developed that aim at minimise the impact of graffiti and dew.

Overlay ‘anti-graffiti’ sheeting for use on traffic signs makes it more difficult for graffiti to adhere to the sign surface, and therefore makes it easier to remove.

The overlay provided for the reduction of dew on traffic signs creates a uniform water layer on the sign surface, rather than droplets.

When applied, the material generally will not change the day or night-time colour.

Some of the disbenefits of using these overlays on traffic signs are:

- the additional initial cost and a possible reduction in the effective design life of the sign (however, this would be counterbalanced by the likelihood that such signs would not otherwise last due to the impact of graffiti and possible degradation from dew retention on the sign face)
- the reduction by both materials, to some extent, of the retroreflectivity of the sign sheeting
- the ability to apply only one of these products to a sign, not both – the RCA must consider the most likely risk – dew or graffiti – in determining which sheet, if any, should be applied.

Further specific information on the protective qualities of the products should be sourced from the suppliers of the products.

8.2.7 Cleaning of sign faces

Materials that meet AS/NSZ 1906.1 and AS/NZS 1906.2 have been tested to withstand a reasonable range of cleaning techniques. However, it is important to note that use of some cleaning products and methods of cleaning could degrade the performance of the sign. In many cases, such degradation may not be evident during the daytime (generally when the cleaning takes place) but appears at night.
Where signs have anti-graffiti and anti-dew overlay materials, even greater care is necessary.

Where non-approved solvent-based cleaning products are used on sheeting, it can destroy the clear coating and therefore reduce the retroreflectivity properties of the sign sheeting. Use of approved cleaning products and methods is recommended.

8.2.8 Older drivers

As drivers age, they experience loss of visual acuity (i.e., the sharpness or acuteness of eyesight) and therefore the ability to read sign messages can become difficult. They are also more likely to become more sensitive to glare or dazzle.

Research has indicated the need to consider the design of traffic signs when catering for older drivers. Austroads' Road environment and design for older drivers: Stage II Volume 2 – Handbook of suggestions for road design change states 'Currently, the design, legibility and placement of signs is determined by the average driver with normal vision and quick reactions. However, most older drivers have declining eyesight and slow decision making capabilities'.

Where there is a large proportion of older drivers on the network, signs need to be more conspicuous, and larger traffic signs, with proportionally increased letter heights and symbol sizes, may be required. The type of sign materials must also be considered, as some may provide excessive brightness or glare to the driver and reduce the legibility of the signs.

8.2.9 Performance degradation

Performance degradation of signs occurs with normal ageing but varies considerably due to environmental factors. GTM Part 10 states:

Proper maintenance is essential if signs are to remain effective and command the attention and respect of motorists and other road users for the full warranted life of the sign. However, all material will degrade with time and there will come a point at which the external (between the sign and its background environment) and internal (between the legend and sign background material) contrasts of the sign will no longer be sufficient to enable the information to be read. The sign will then be ineffective.

Some examples of where sign reflectivity is acceptable, marginal or unacceptable and requiring replacement are illustrated in figure 8.2.
Where signs are upgraded along a route, consideration should be given to providing a consistent sign regime regarding retroreflectivity. For example, when the reflectivity of one sign on a pole has been improved, the reflectivity of other signs on that pole (e.g., a supplementary plate) should look similar and replacement could be justified.

Maintenance programmes should be developed to remedy the effects of ageing on traffic sign performance.

### 8.3 Illumination

Illumination, for the purposes of this document, relates to a situation when a traffic sign may be made more visible to road users through the use of an artificial light source (not including street or highway lighting).

GTM Part 10 describes the following situations where illumination of traffic signs should be considered:

- Ambient light or background clutter detracts from sign prominence or legibility.
- There are other illuminated signs (traffic and other signs) in proximity or within the field of view.
- There is a strong background light level behind the sign (e.g., emerging from a tunnel and a sign is located at the portal facing into the tunnel).
- Class 1W reflective sheeting is inadequate.
Traffic signs may be illuminated either internally or externally.

There is a need to control the illuminated sign’s brightness, as this may create difficulties in a driver’s perception of the message. The tendency of the human eye to fixate on bright points in the field of view may also lead to driver distraction.

To avoid excessive brightness, traffic and advertising signs that are internally or externally illuminated should:

- comply with the maximum luminance outlined in table 8.1
- have all floodlights or concealed lighting directed solely on the traffic sign and its surrounds
- have any light source shielded so that glare does not extend beyond the sign.

Table 8.1 Maximum luminance of illuminated signs

<table>
<thead>
<tr>
<th>Illuminated area (m²)</th>
<th>Maximum luminance (cd/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Areas with street lighting</td>
</tr>
<tr>
<td>Up to 0.5</td>
<td>2000</td>
</tr>
<tr>
<td>0.5–2.0</td>
<td>1600</td>
</tr>
<tr>
<td>2.0–5.0</td>
<td>1200</td>
</tr>
<tr>
<td>5.0–10.0</td>
<td>1000</td>
</tr>
<tr>
<td>Over 10.0</td>
<td>800</td>
</tr>
</tbody>
</table>

(Source: Institution of Lighting Engineers (1991) Brightness of illuminated advertisements)

The maximum luminance described in table 8.1 specifically relates to advertising signs. In the apparent absence of information for traffic sign illumination, these values may be used for that purpose.

8.3.1 Externally lit

Externally illuminated signs are usually lit by means of a light source directed at the traffic sign. This type of lighting is generally attached directly to the sign or its post or support (eg wall) and designed to direct adequate illumination over the entire face of the sign.

Further information on the practical installation of this type of lighting can be found in GTM Part 10.

8.3.2 Internally lit

Internally lit signs have a light source (usually fluorescent light or neon tubes) located within the sign structure or placed behind the sign to illuminate the message through a translucent face (photo 8.1). Internally illuminated signs can appear in the form of direction signs in tunnels, street name signs (not widely used in New Zealand) and various advertising signs. They are used in some circumstances as ‘active signs’ where, for example, a part-time ban on a turn at signals is activated.

Internally illuminated signs are likely to be used instead of externally lit signs where there is limited room for external lighting to be installed.
Photo 8.1 Internally illuminated sign

(Source: www.signalcontrol.com)

8.3.3 LED and other directly lit systems

LED signs are generally reserved for high-risk/high-profile sites where the message needs additional visibility to road users. Typically, LED signs tend to be used intermittently, eg as part of a temporary sign indicating a traffic incident has occurred or for a speed indicator device. Some examples of signs that use LEDs are shown in photos 8.2–8.4.

LED signs can also be used for advertising purposes. However, their use in some situations may confuse road users and will need to be assessed. Further information on the use of advertising signs is included in Part 3 of the TCD Manual (under development).

There is limited experience in New Zealand in using these types of signs. However, it is acknowledged that more guidance is desirable and the NZTA is currently working to develop standards for their use.

Photo 8.2 40 km/h LED display with standard school speed zone supplementary sign

Photo 8.3 Speed indicator device with LED display

Photo 8.4 Variable message sign with LED display
Appendix A: Trials of traffic control devices

A1 Introduction

This note sets out the information required for an application to the NZ Transport Agency (the NZTA) for the trial of traffic control devices differing from those provided for under current rules.

In considering an application for a trial of the non-conforming device, the NZTA must assume it will eventually result in a change to rules or policy. The NZTA does not change policies and cannot recommend variations to rules without undertaking appropriate analysis and consultation. Costs, benefits, safety effects, resource consumption and implication for all road users and road providers must be fully understood.

A2 Background

It is important road users travelling through various road controlling authority (RCA) areas receive a consistent set of messages about the environment. This consistency is provided by the application of legislation, policies and guidelines that dictate the safe and efficient use of traffic control devices.

The Land Transport Rule: Traffic Control Devices 2004 (the Rule) sets out rules for the installation of traffic control devices by RCAs. Section 3 of the Rule describes general requirements for traffic control devices and requires RCAs to install only those devices described in the Rule. Clause 3.4, however, provides for the NZTA to approve alternative traffic control devices for trial purposes.

A3 Application

An application for a trial must provide sufficient information to allow an informed decision to be made. The level of detail required will vary, depending on the nature of the device. The scope of the trial, the likely impact of the proposal on safety or efficiency and the significance of any change to existing policy or legislation should be included in the proposal.

The application should contain at least the following sections:

- outline of issues
- development background
- technical analysis
- impacts and risks assessment
- expected safety and efficiency gains
- consultation (undertaken and proposed)
- proposed assessment method.

The type of information provided in these sections is detailed at appendix AA. The appendix is a guide only. It may not be necessary to complete each category if it is not relevant to the device being
proposed, but more information may also be required. Relevant, additional information supporting the application should also be provided.

A4 Consideration of application

To ensure the application is given a complete and fair assessment, the NZTA will seek comment and support for the proposal from the Traffic Control Devices Steering Group. This group represents the NZTA, RCAs, professional engineers, and the traffic sign and road marking industry. It has been convened to oversee the development and maintenance of the Traffic control devices manual and Traffic control devices specifications to ensure these documents reflect industry needs and expectations and should, therefore, be well placed to consider any application for a trial.

The Traffic Control Devices Steering Group meets every three months and, under normal circumstances, any application for a trial would be forwarded for their consideration at one of these meetings. However, if circumstances warrant, earlier consideration by the group could be arranged, as could any subsequent application amended as a result of an earlier submission to the group. The group would forward their recommendation, including any conditions they believe appropriate, to the NZTA for its consideration.

A5 Approval

The NZTA, in reaching a decision on an application for a traffic control device trial, will study the details provided by the applicant and in addition will consider:

- the recommendations made by the Traffic Control Devices Steering Group
- the policy, regulatory and legislative effects of implementing the proposal (including any effect on existing policy and whether there is a reasonable possibility of the Rule being amended to include and implement the outcomes of a successful trial)
- any communication, education, publicity and enforcement requirements at a local and, if appropriate, national level
- resource requirements for implementation and evaluation and ensure they have been identified and are available to both the applicant and within the NZTA
- the project’s priority against other initiatives and opportunities.

It is recommended that the applicant discusses the issue with the NZTA at an early stage in the development of a proposal. This could, for example, help identify sources of information, the level and type of information likely to be needed for the application and any timing issues in relation to meetings of the Traffic Control Devices Steering Group, and will facilitate the progress of any application.

A6 Conditions

Where a trial is proposed, the applicant is required to comply with the conditions described in clause 3.4 of the Rule. This clause also allows the NZTA to impose any terms and conditions it considers necessary.

A7 Funding/assistance

Funding of any trial is the responsibility of the proposing authority. The NZTA may be able and willing to help design, implement and evaluate a trial and might be able to help identify possible funding.
sources. However, unless prior agreement has been reached, approval of the trial does not impose any obligation on the NZTA to provide such assistance.

A8 Publication of approval

If the application has been approved and satisfactory agreement reached on conditions relating to the use of the device, appropriate legal documentation, including the required notice in the New Zealand Gazette, will be prepared and promulgated. An outline of the trial, contact details of those involved in the trial and a copy of the Gazette notice will be published as an appendix to Traffic Note 14 and be available on the NZTA website.

A9 Declining approval

If the application is declined, the NZTA is required (subclause 3.4(2) of the Rule) to advise the applicant of the grounds for doing so.

A10 Termination of trial

If the NZTA considers it unsafe to continue the trial, the trial may be terminated by formal notice and the RCA must remove the device immediately (subclause 3.4(7) and subclause 3.4(8) of the Rule).

A11 Outcome of trials

If the trial is successful and the NZTA is satisfied that the results justify a change to policy, appropriate steps will be taken to allow all RCAs to use the device.

This may, however, require a change to the Rule. If this is required, the device may continue to be used only at the trial site or sites until the change is made.

If the device can be adopted without a Rule change, the NZTA will take the necessary steps to formalise the use of the device (eg notification in the New Zealand Gazette).

In either case, notification of the outcome will be made by publishing an amendment to Traffic Note 14 and other appropriate mechanisms.
# Appendix AA

Appendix AA contains information that could be provided to support an application to the NZTA for a trial of a traffic control device in terms of clause 3.4 of the Land Transport Rule: Traffic Control Devices 2004. Necessary information is denoted by an asterisk (*).

## 1 Outline of the issues

| 1.1 | The traffic control device being proposed | * |
| 1.2 | The nature of the problem that the proposal seeks to overcome | * |
| 1.3 | Where the proposed trial will be located | * |
| 1.4 | The timeframes involved | * |
| 1.5 | How the problem can be addressed only by non-standard treatment, rather than existing practice |
| 1.6 | A list of those who need the change |
| 1.7 | Whether the proposal is a one-off local solution or will lead to a national policy |

## 2 Development background

| 2.1 | The stage of development that the proposal has reached and details of any outcomes, including options considered and reasons why any have been discarded or preferred | * |
| 2.2 | Literature or investigation summaries from New Zealand or overseas |
| 2.3 | Outcomes of any previous trials or investigations |
| 2.4 | Any relevant overseas legislation, policies or guidelines investigated or referenced |

## 3 Technical analysis

| 3.1 | Detailed drawings of the proposed device | * |
| 3.2 | Details of any materials of components used |
| 3.3 | Theoretical analyses and considerations supporting the proposal |
| 3.4 | Any computer or other technical analyses used in deriving the proposal |
| 3.5 | Details of any back-up safety systems, where these might be required |
## 4 Impacts and risks

The assessment should demonstrate that the proposal:

4.1 does not create any new safety or other problems  
4.2 is a potential solution to the identified problem  
4.3 addresses the relevant issues  
4.4 will be easily understood by road users

It may also include:

4.5 information regarding the likely level of up-take of the proposal  
4.6 details of any impact on the uniformity or consistency of standards for such devices if the proposed change is implemented  
4.7 effects on harmonisation of standards and international agreements (e.g. Australian standards)

## 5 Safety and efficiency gains

5.1 How the proposal affects each class of road user  
5.2 What the benefits and costs of implementing the proposal are likely to be, with appropriate levels of detail supporting their derivation.

## 6 Consultation

6.1 A list of all interested parties  
6.2 Any consultation undertaken and/or proposed  
6.3 How the views of interested parties have been, or will be, considered

## 7 Proposed assessment

The application should detail how the performance of the device will be assessed. The methodology proposed for the assessment should:

7.1 ensure information sought is well defined and appropriate  
7.2 address all relevant issues, including the suitability of any site suggested for the evaluation  
7.3 provide all information necessary to support any analysis required to determine whether benefits at reasonable cost will be achieved if the proposal is implemented nationally  
7.4 ensure that appropriate levels of understanding of the proposed device and its use have been obtained from road users through observation, interview or questionnaire  
7.5 include a detailed research or evaluation plan that must have a realistic time period for the assessment and provide for close monitoring of any trial, especially in the early stages of field implementation