

Traffic Note 37 – Revision 1

Date June 2005
From Safer Roads
Authorisation Peter Croft, Manager Safer Roads

Signature _____

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40 km/h variable speed limits in school zones – Guidelines

1 Purpose

In January 2000, a number of trial 40 km/h variable speed limits in school zones started operating in Christchurch City. The trial aimed to assess their effectiveness in reducing speeds outside schools and, if the results justified it, assist the Land Transport Safety Authority (now Land Transport New Zealand) in establishing guidelines. Guidelines were first published in 2002 and since then, 40 km/h variable speed limits in school zones have been established throughout New Zealand.

Land Transport Rule: Setting of Speed Limits 2003 requires the Director of Land Transport (the Director) to approve a variable speed limit before a road controlling authority can set such a speed limit by making a bylaw. In accordance with this requirement, the Director has published a notice in the *New Zealand Gazette*¹ (the *Gazette*) approving a variable speed limit of 40 km/h in school zones and setting out conditions for those speed limits. This Traffic Note provides guidelines to comply with the *Gazette* notice, based on the results of the trials in Christchurch and subsequent experience with these speed limits.

2 Background

Roads outside schools are perceived as dangerous for children. At the time when children are crossing there can be high volumes of traffic, manoeuvring vehicles, parked vehicles obscuring visibility and vehicle speeds often appear too high. Research has shown reducing vehicle speeds to 40 km/h or less significantly reduces the level of injury if a child is struck by a vehicle.

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In many jurisdictions, such as the states of Australia and the United States, school zones with special speed limits are applied at schools and indicated by permanently displayed signs. A study of the available literature, and experience with traffic behaviour outside New Zealand schools, suggests the uniform application of permanently displayed speed limits outside schools was unlikely to result in a change to speeds outside most schools.

There are situations where standard traffic control devices and the level of activity outside a school do not result in lower traffic speeds, particularly where the school is on an arterial or other road where there is a high volume of traffic or high speeds. Installation of a 40 km/h variable speed limit in the school zone may, in these circumstances, be desirable to achieve a lower speed environment.

The major drawback of any permanently displayed sign is the manner in which drivers, many of whom would pass the same sign regularly without requiring any action in response to it, tend to ignore or fail to see it. Variable signs, which are displayed only when relevant, offer a way in which this drawback can be minimised and may actually enhance driver acceptance of any restriction imposed.

For this reason a trial of these devices was conducted in Christchurch. The results from the trial are embodied in these guidelines.^{2, 3}

3 Objectives of variable speed limits in school zones

Variable speed limits in school zones are seen as having the following objectives:

- provide a safer road environment outside schools
- reinforce driver expectations of the likely presence of children
- encourage safe and active travel to school.

One of the objectives of the Christchurch trial was to encourage children to walk or ride to school. A major impediment is parents' concerns about child safety. The trial indicated general parent and school belief the signs provided benefits but any shift in mode of travel by children, if it did occur, was not measurable. This reinforces the view no single initiative is likely to bring about changes of the type sought. A 40 km/h variable speed limit in a school zone is unlikely to be effective by itself and must complement other initiatives aimed at enhancing safety for children undertaken at the site by the road controlling authority, the school and other organisations.

4 Warrant

A road controlling authority may only set a 40 km/h variable speed limit in a school zone when:

- (a) there is a high level of school-related activity on the road outside the school, with at least 50 children crossing the road or entering or leaving vehicles at the roadside, and
- (b) the traffic on the road outside the school meets at least one of the following conditions:
 - (i) the mean speed of free-running vehicles is greater than 45 km/h, or
 - (ii) the 85th percentile speed of free-running vehicles is greater than 50 km/h, or

- (iii) there have been speed related crashes in the previous five years, or
- (iv) the school-related activity occurs on a main traffic route.

Evaluations in Christchurch found locations most likely to benefit from a variable speed limit in a school zone are those meeting the above criteria and:

- are on arterial routes or multi-lane roads or high speed environments, and
- have on-road, school-related activity at an obscured school frontage (ie where the presence of the school is not immediately obvious to approaching traffic).

5 Best practice guidelines

Factors required for the successful operation of a 40 km/h variable speed limit in a school zone are:

- having times of operation coinciding with on-road, school-related activity
- approved advisory signs and regulatory displays that alert motorists they are travelling through a school zone
- appropriate levels of enforcement by the Police
- long-term commitment by the principal and Board of Trustees for the correct operation of a 40 km/h variable speed limit at their school.

5.1 Times of operation

Surveys at the trial installations have shown variable speed limits in school zones are effective in reducing speeds, but have the support of drivers only if there are children present when they are operating. Therefore, the times they are activated must be tightly controlled to match, as closely as possible, the times children are crossing the road or are gathered on the roadside. These times may vary from school to school and from time to time. An accurate time clock is therefore a necessary component of a variable speed limit in a school zone.

The 'School Zone variable' signs must be manually activated, by a supervisor approved by the school principal, on each occasion they are to be used and must operate for a maximum period of:

- 35 minutes before the start of school until the start of school
- 20 minutes at the end of school commencing no earlier than five minutes before the end of school
- 10 minutes at any other time of day when at least 50 children cross the road or enter or leave vehicles at the roadside.

Unless the signs are manually turned off earlier, they must turn off automatically when the maximum period has elapsed.

5.2 Length of variable speed limits in school zones

Variable speed limits in school zones should be installed to avoid, as far as possible, side roads with no school frontage. They must be as short as practicable between 300 metres and 500 metres long. There may be shorter lengths on no exit roads or roads with Give Way or Stop control at the

intersection with the school zone, provided the variable speed limit on these roads is adjoining the variable speed limit on the main road outside the school.

5.3 Signs

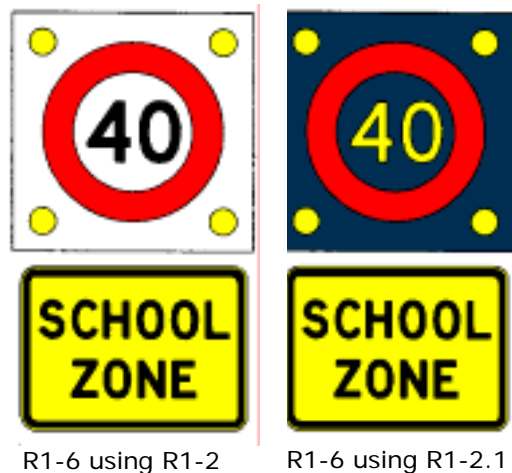
The signs for variable speed limits in school zones must comply with *Land Transport Rule: Traffic Control Devices 2004*. They have been specified by the Director in the *Gazette*¹ as a condition of setting a variable speed limit in a school zone. These specifications may only be varied with the approval of the Director. The signs required are described below.

(a) R1-6 'School Zone variable' sign:

The R1-6 'School Zone variable' sign comprises a variable speed limit sign above a 'School Zone' supplementary sign. The R1-2 or R1-2.1 variable speed limit sign displays the 40 km/h speed limit only during the period when it applies. At all other times the sign is blank or displays the permanent speed limit. These signs must be located on the main road passing the school entrance and on any significant road adjoining the school zone. There must be at least two of these signs facing traffic entering the variable speed limit if the road is median divided, the roadway is more than 15 metres wide or has a permanent speed limit of more than 70 km/h.

The two options permitted for variable speed limit signs use different technology.

- R1-2: the speed limit numerals, roundel and background are displayed in the same colours as permanent speed limit signs, namely black, red and white respectively. Mechanical elements are used to display the speed limit and the message is depicted entirely with retro-reflective material.
- R1-2.1: the speed limit numerals are displayed using yellow or white, lit pixels (eg light emitting diodes, fibre optics). The background is black and unlit. For signs that display only the 40 km/h variable speed limit and are blank for the rest of the time, the roundel is displayed with red, lit pixels. Alternatively, for signs that display the permanent speed limit at times when the variable speed limit does not apply, the roundel may be displayed with either red, lit pixels or with red retro-reflective material.



R1-6 using R1-2

R1-6 using R1-2.1

For each of these two variable speed limit signs:

- when not operating, the underlying message on the speed limit sign must not be discernible to approaching drivers, and
- yellow or white lights, of sufficient brightness to draw attention to, but not distract from, the sign nor dazzle, must be fitted in each corner and operate by flashing diagonally two at a time when the 40 km/h variable speed limit is displayed, and

- the 'School Zone' supplementary sign, fitted below the variable speed limit sign, must be displayed permanently. The 'School Zone' supplementary sign has a black legend and border on a retro-reflective, fluorescent, yellow-green background.

Where the road controlling authority requires an ability to vary the times at which the 40 km/h speed limit operates, all the signs at the beginning of the school zone must be variable because the fixed signs cannot provide accurate times of operation.

(b) R1-6.1 'School Zone fixed' sign

The R1-6.1 'School Zone fixed' sign has a black legend, red roundel and border on a white background. The roundel, border and background are retro-reflective. The legend showing the time should depict the time during which the 40 km/h variable speed limit is in effect and should be specific for each school zone.



Instead of a 'School Zone variable' sign a 'School Zone fixed' sign may be erected on no exit or Stop or Give Way controlled side roads adjoining the school zone. This is based on assumptions that:

- most traffic using such a road will be local and the drivers will be aware of, and responsive to, the school zone operation, or
- the speed of vehicles entering from the side road and passing through the school zone is unlikely to exceed 40 km/h.

If these conditions do not apply, R1-6 'School Zone variable' signs must be installed on the side road.

Likewise 'School Zone variable' signs must be used if the times when the variable speed limit operates are likely to vary because:

- it is not reasonable to expect drivers to read and react to messages longer than those displayed on the 'School Zone fixed' sign; and
- a 'School Zone fixed' sign would not provide flexibility in setting the speed limit.

(c) R1-7 'School Zone Ends' sign

At least one R1-7 'School Zone Ends' sign must be used on each roadway leaving the school zone. There must be at least two of these signs if the road is median divided, the roadway is more than 15 metres wide or has a permanent speed limit of more than 70 km/h.

A 'School Zone Ends' sign comprises a R1-1 speed limit sign above a 'School Zone Ends' supplementary sign. Both signs are mounted on a white retro-reflective backing board. The 'School Zone Ends' sign has a black legend and border on a retro-reflective, fluorescent, yellow-green background. The speed limit sign displays the permanent speed limit for the road.



(d) Sign layout

Appendix 1 has a diagram showing a typical layout of signs for a variable speed limit in a school zone.

5.4 Police enforcement

To be effective the variable speed limit in a school zone must be able to be enforced. The length of the zone, visibility of the signs, proof of display and other issues are all matters the Police must take into account in determining whether they are able to proceed with enforcement and subsequent action. It is therefore imperative any variable speed limit considerations involve the District Road Policing Manager of NZ Police.

The necessary enforcement precedents have been set to enable the Police to enforce the 40 km/h speed limit in school zones.

5.5 School commitment and activity

It is essential there be formal involvement by the school in the decision to introduce a variable speed limit in a school zone. The school is often the prime instigator for consideration of a 40 km/h speed limit but they must understand that once installed there are functions the school must carry out for the speed limit to be effectively managed and for it to achieve the desired outcomes.

For example:

- The 'School Zone variable' signs must be activated by a person authorised by the school Principal.
- Any defined school crossing facility for children must have an adult supervisor when it is operating.
- The signs must be activated and deactivated simultaneously (eg by radio signal or hard-wired) from a single location convenient to the school with a secure system (eg a key or swipe card).
- The principal must agree to keep an accurate log of the occasions and times the 40 km/h speed limit is operating unless these times are stored automatically by the equipment and can be retrieved by the road controlling authority. The log is essential for enforcement purposes (to demonstrate not only that the signs were operating at a particular time but, also to show the conditions of operation set out in the speed limit bylaw are being effectively managed). It can also be useful to determine justifiable changes to time or other aspects of the operation of the speed limit.

6 Application

6.1 Implementation

A 40 km/h variable speed limit in a school zone can only be implemented by a road controlling authority if:

- the conditions approved by the Director in the *Gazette*¹ are complied with

- consultation is undertaken in accordance with *Land Transport Rule: Setting of Speed Limits 2003*, and the people consulted are provided with details of the proposed speed limit including times of operation, placement of signs and method for controlling the variable signs
- written consent is obtained from the principal of the school concerned (agreeing to operate the school zone in accordance with the operating conditions)
- the speed limit is set by bylaw in accordance with *Land Transport Rule: Setting of Speed Limits 2003*.

6.2 Review or removal of a variable speed limit in a school zone

A 40 km/h variable speed limit in a school zone must be reviewed by the road controlling authority if:

- there is a permanent change in the road or school environment resulting in the conditions specified by the Director in the *Gazette*¹ not being met, or
- requested to do so, in writing, by the principal of the school or the District Road Policing Manager of the New Zealand Police, or
- instructed to do so by the Director.

A 40 km/h variable speed limit in a school zone must be removed by the road controlling authority if:

- the variable speed limit is not operated in accordance with the conditions specified by the Director in the *Gazette*¹, or
- instructed to do so by the Director.

Footnote and acknowledgement:

Christchurch City Council has developed additional notes on variable speed limits in school zones providing details of technology used by them, the form of bylaw used and the process they used in involving the schools, the Police and other parties in establishing their school zones. Road controlling authorities are welcome to approach them seeking a copy of this information. Please contact:

City Transport and Streets Manager, Christchurch City Council, PO Box 237, CHRISTCHURCH; telephone 03 941 8666, ask for the Transportation Planner (cycling and pedestrian) or the Schools Co-ordinator; or email schoolzones@ccc.govt.nz

Land Transport NZ acknowledges the valuable input of the Christchurch City Council through the school zone trial and their assistance with the development of these guidelines.

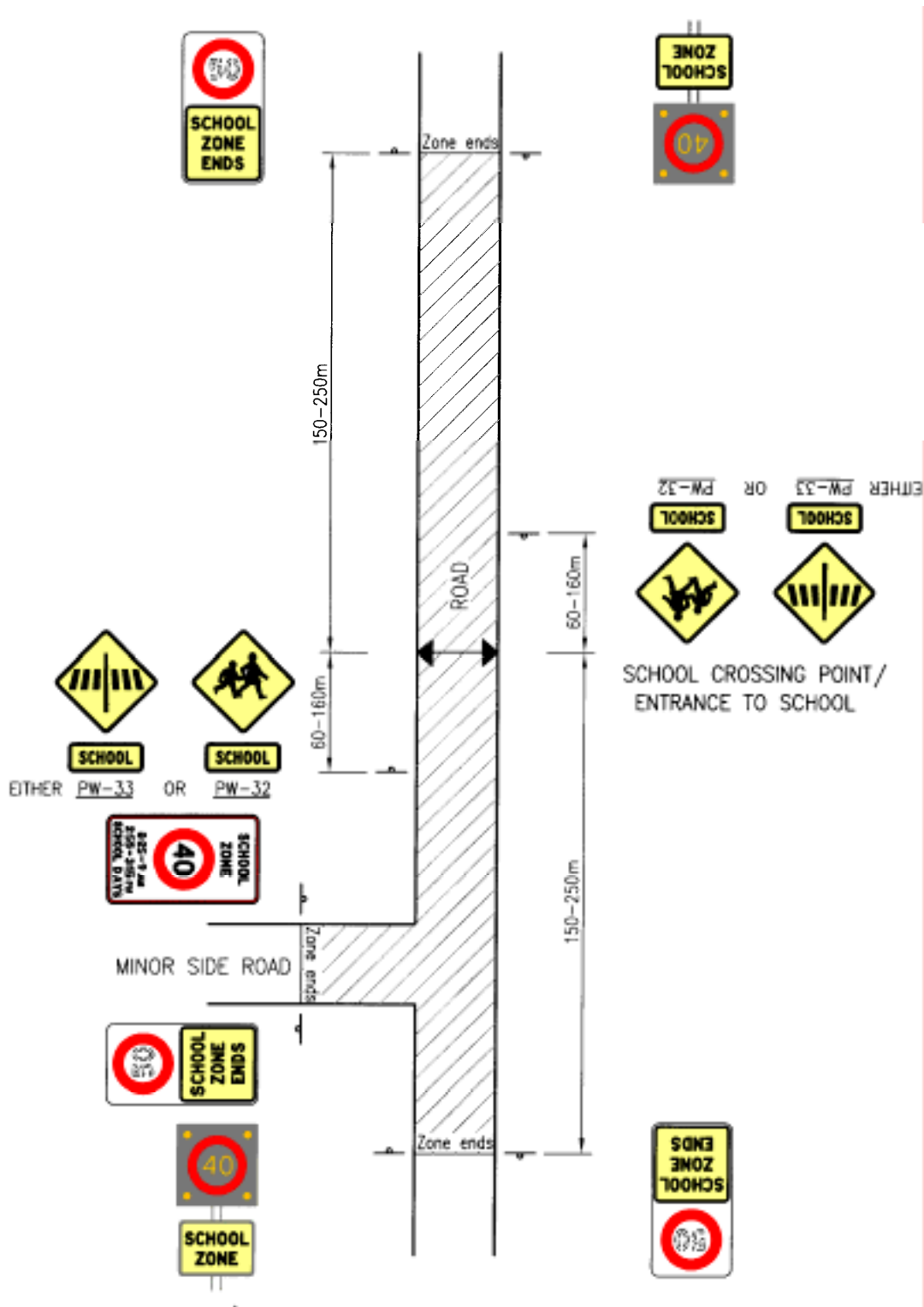
1 *New Zealand Gazette* dated 2 June 2005, No. 86, page 2051 [see Appendix 2].

2 Cottam, Paul. 2001. *Christchurch's 40 km/h Part-Time School Speed Zone Trial: Community Perceptions and Attitudes*, Safe Routes to School Co-ordinator, Christchurch City Council.

3 Osmer, Wayne. 2001. *The Effect on Vehicle Speeds of Electronically-Signed Part-Time Speed Limits Outside Schools*, Regional Engineer, Land Transport Safety Authority, Christchurch.

Both papers were presented at the Road Safety Research, Policing and Education Conference 18–20 November 2001, Melbourne.

Appendix 1: Typical layout – 40 km/h variable speed limit in a school zone



In this diagram the sign numbers quoted are those appearing in MOTSAM. These numbers and descriptions are cross-referenced to signs in *Land Transport Rule: Traffic Control Devices 2004* (the TCD Rule) as follows:

MOTSAM	Description	TCD Rule
PW-32	Symbol of two children with 'School' supplementary	W16-4 with W16-5.1
PW-33	Symbol of pedestrian crossing with 'School' supplementary	W16-2 with W16-5.1

Appendix 2

Extract from *New Zealand Gazette*, 2/6/2005, No. 86, p. 2051

Variable Speed Limit in School Zones

Pursuant to clause 6.1 of Land Transport Rule: Setting of Speed Limits 2003 and a delegation from the Director of Land Transport, I, Peter Graeme Croft, Manager Safer Roads, approve variable speed limits in school zones in accordance with the conditions set out in this notice.

Conditions

1. Variable Speed Limit

A road controlling authority may set a speed limit of 40 km/h that operates in a school zone during the periods specified in condition 2 of this notice. At all other times, the speed limit is the permanent speed limit for the road.

2. Periods of Operation

The 40 km/h speed limit may operate on school days for a maximum period of:

- (a) 35 minutes before the start of school until the start of school;
- (b) 20 minutes at the end of school, beginning no earlier than 5 minutes before the end of school;
- (c) 10 minutes at any other time when at least 50 children cross the road or enter or leave vehicles at the roadside.

3. Signs

Signs that comply with Land Transport Rule: Traffic Control Devices 2004 must be installed to mark the beginning and end of the variable speed limit in the school zone as follows:

- (a) At least one R1-6 “School zone variable” sign at each end of the variable speed limit on the main road outside the school, facing road users travelling towards the variable speed limit; and
- (b) at least one R1-6 “School zone variable” sign or R1-6.1 “School zone fixed” sign facing road users travelling towards the variable speed limit on each side road that intersects with the school zone, where that side road is a no exit road or is controlled by Give-way or Stop signs at the intersection with the school zone; and
- (c) at least one R1-7 “School zone ends” sign at each end of the variable speed limit on every road, facing road users leaving the variable speed limit.

4. Length of Variable Speed Limit

A variable speed limit in a school zone must be a minimum length of 300 metres but should not be longer than 500 metres. The length of variable speed limit on side roads that intersect with the school zone may be shorter than 300 metres.

5. Warrant

A road controlling authority may only set a variable speed limit in a school zone under the following conditions:

- (a) There is a high level of school-related activity on the road outside the school, with at least 50 children crossing the road or entering or leaving vehicles at the roadside; and
- (b) the traffic on the road outside the school meets at least one of the following conditions:
 - (i) The mean speed of free-running vehicles is greater than 45 km/h; or
 - (ii) the 85th percentile speed of free-running vehicles is greater than 50 km/h; or
 - (iii) there have been speed related crashes in the previous five years; or
 - (iv) the school-related activity in condition 5 (a) occurs on a main traffic route.

6. Bylaw

A road controlling authority must set a variable speed limit in a school zone by making a bylaw in accordance with Land Transport Rule: Setting of Speed Limits 2003.

Revocation

The notice dated the 26th day of June 2002, published in the *New Zealand Gazette*, 4 July 2002, No. 76, page 2029, relating to school zone signs is hereby revoked.

Definition

School zone means a length of road outside a pre-school, primary school, intermediate school or secondary school.

Dated at Wellington this 31st day of May 2005.

PETER GRAEME CROFT, Manager Safer Roads.

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