5. 40 KILOMETRE PER HOUR SPEED LIMITS OUTSIDE SCHOOLS

General Manager responsible:	General Manager, City Environment, DDI 941-7305
Officer responsible:	Road Corridors Manager, Transport & Greenspace
Author:	Paul Burden/Michael Thomson, Traffic Operations

PURPOSE OF REPORT

1. The purpose of this report is to respond to the Council's resolutions of 8 July 2010 regarding variable speed limits (40 kilometre per hour school zones) outside schools.

EXECUTIVE SUMMARY

2. At the Council meeting held on 8 July 2010 it was resolved:

   (a) "That Council staff investigate and report back to Council within three months regarding the installation of standard 40 kilometres per hour speed restriction signs outside every school in Christchurch"; and

   (b) "That the Council advocate to central government through the Minister of Transport for a mandatory 40 kilometre per hour restriction during time of school entry and exit outside every school in New Zealand."

   Note: The delay in reporting back to Council has occurred for several reasons, notably the earthquake events and the extensive research required to comprehensively respond to this request.

3. In the preparation of this report it became apparent that the various terms used for describing signs is potentially confusing. Therefore, the following information is provided to minimise this confusion:

   (a) A "fixed sign" is one that displays a message continuously. Sometimes referred to as a "static" sign (see figures 1, 3 and 7);

   (b) An "electronic sign" is one that is blank at all times that the message is not activated (Sometimes referred to as a "variable" sign). For the purposes of a school zone, this electronic sign also has a fixed sign installed below (see figure 2);

   (c) An "active sign" is one which shows a "fixed" message but has lights attached which flash when the message is most relevant (see figure 9) Not: this sign is not currently used in Christchurch;

   (d) A "permanent speed limit" is one that does not change. Also referred to as a "fixed" speed limit (see figure 1);

   (e) A "variable speed limit" is one that changes at different times and/or days (see figures 2 and 3)

Figure 1 Fixed 40 kilometre per hour Speed Restriction Sign

Figure 2 Electronic 40 kilometre per hour variable speed sign

Figure 3 Fixed 40 kilometre per hour Variable Speed Limit Sign – as used in Christchurch

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4. It has been interpreted that the word 'standard' in the Council resolution relates to a 'fixed' sign which displays the "variable" speed limit and times for the operation of the 40 kilometre per hour limit as shown in figure 3. The rationale for the request stems from a desire to improve road safety outside schools by reducing vehicle speeds through simple, low cost signage.

5. The investigation into the Council's request reveals that the installation of standard 40 kilometres per hour speed restriction signs outside every school in Christchurch is inappropriate due to five primary reasons as follows;

   (a) Current legislation does not provide for the Council to do this.

   (b) It is not considered best practice.

   (c) In some cases such action would be detrimental to road safety.

   (d) In some cases it is not the most appropriate solution.

   (e) It is not supported by the New Zealand Transport Agency and the Ministry of Transport.

6. In terms of legislation, the "Land Transport Rule: Setting of Speed Limits 2003" requires the Director of the New Zealand Transport Agency to approve a variable speed limit before a road controlling authority sets such a speed limit by making a bylaw.

7. The requirements for installing variable speed limits specifies the use of electronic signs in most situations (see figure 2). There are exemptions from this and a "fixed sign may be erected on 'no exit', 'stop' or 'give way' controlled side roads adjoining the school zone." (see figure 3).

8. It follows that the legislation does not allow the Council to install fixed sign variable speed limits, as the only type of sign at a School Speed Zone.

9. In terms of best practise involving road safety, a review of the New Zealand Transport Agency's guidelines and the Council's methodology for selecting sites for implementation of electronic variable speed limit signs has been undertaken (refer **Attachments 1 & 2**).

10. A literature review has also been undertaken to consider the effectiveness of implementing the Council's suggestion.

11. The best practise and literature reviews clearly show that 40 kilometre per hour variable speed limit signs should only be considered where certain conditions are satisfied and where it is not possible to install traffic calming or other treatments to reduce vehicle speeds. (refer **Attachment 3**).

12. The research also shows that some of the safety benefits of the existing treatments outside schools would be lessened if fixed 40 kilometre per hour variable speed limit signs were installed as requested by Council.

13. The 'Background' to this report provides a description of a number of alternative treatments that improve safety for schools. Many existing treatments (like electronic variable speed limits and traffic signals) at schools in Christchurch provide a higher level of safety than "standard 40 kilometre per hour signs". This report therefore recommends that the Council proceed with these alternative treatments to ensure the *greatest possible safety* is provided to all schools in Christchurch.

FINANCIAL IMPLICATIONS

14. If the Council continues with the existing programme of electronic variable speed limit installation outside schools, then this is already programmed in the current LTCCP.

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Do the Recommendations of this Report Align with 2009-19 LTCCP budgets?

15. Yes, if the Council accepts the recommendations of this report.

LEGAL CONSIDERATIONS

16. If this report's recommendations are adopted (i.e. retain status quo), then the proposed programme for the installation of electronic variable speed limits complies with the conditions specified and published by the Director of NZTA in the New Zealand Gazette (21/4/2011, number 55, page 1284 see **Attachment 3**) approving a variable speed limit of 40 kilometres per hour in school zones and setting out conditions for those speed limits. A Council resolution is required to implement the variable speed limit restrictions in accordance with Traffic Note 37 (see **Attachment 3**).

17. Traffic Note 37 also sets the requirement for installing electronic signs which display the 40 kilometre per hour speed limit only during the period when it applies.

18. Any variable speed limit must be in accordance with conditions set out in the New Zealand Gazette, 21/4/2011, No. 55, p. 1284 'Variable Speed Limit in School Zones'. The installation of electronic variable speed limits outside every school in Christchurch would be contrary to this, as would the use of fixed signs only to identify the variable speed limit.

Have you considered the legal implications of the issue under consideration?

19. As above.

ALIGNMENT WITH LTCCP AND ACTIVITY MANAGEMENT PLANS

20. The LTCCP has a specific project relating to the installation of electronic variable speed limits outside schools. The recommendations also support the "Safer Routes to Schools and Road Safety at Schools" projects.

Do the recommendations of this report support a level of service or project in the 2009-19 LTCCP?

21. If this report's recommendations are adopted (i.e. retain status quo) the LTCCP's installation of electronic variable speed limits outside schools project will be supported.

ALIGNMENT WITH STRATEGIES

22. If this report's recommendations are adopted (i.e. status quo) then actions will be in alignment with the following strategies by increasing safety where it is most required:

    (a) Canterbury Regional Land Transport Strategy:

        (i) Assist with achieving Goal Two of the strategy by reducing speeds around schools and therefore encouraging cycling;

        (ii) Assist with achieving Goal Five through assisting with a Christchurch Safe Routes to Schools Programme.

    (b) Canterbury Travel Demand Management Strategy:

        (i) Assist with implementing Policy 3.2 by increasing safety of alternative transport forms to and from schools.

    (c) Christchurch City Council Cycle Strategy July 2004;

    (d) Christchurch City Council Pedestrian Strategy February 2001;

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(e) Christchurch City Council Safer Christchurch Strategy October 2008.

Do the recommendations align with the Council's strategies?

23. As above.

CONSULTATION FULFILMENT

24. The Council staff asked the local NZTA office to comment on the appropriateness of the 8 July 2010 Council resolutions. The response dated 16 August 2010 states *"…A mandatory 40 kilometre per hour speed limit outside all schools is not considered credible and would likely result in non-compliance by motorists at many schools and some disregard for the 40 kilometre per hour limit with the possible flow on effect of lower compliance at the schools where the 40 kilometre per hour limit is appropriate."*

25. Police have not made any comment on the legality of installing fixed sign variable speed limit signs but have indicated that they would enforce them if the Council were to install such signs.

STAFF RECOMMENDATION

It is recommended that the Council:

(a) Receives this report.

(b) Continues to use a range of strategies to ensure the greatest possible safety to schools in Christchurch.

(c) Continues with its existing prioritisation process for the installation of 40 kilometre per hour electronic variable speed limits outside schools in Christchurch.

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BACKGROUND

26. There are 161 schools in Christchurch fronting onto 282 roads. Seven of these roads are administered by NZTA. The following Figure 4 shows the distribution of speed limits on road frontages administered by Christchurch City Council.

Speed Limit	No. of Road Frontages
50	269
60	6
70	3
80	3
100	1
Total	282

Figure 4: Distribution of Speed Limits

27. It can be seen that the majority (95 per cent) of school road frontages are on roads with a 50 kilometre per hour speed limit. There is only one school frontage road administered by the Council with a 100 kilometre per hour speed limit. This is Waitaha School on Kirk Road which is a special education facility for diverse learners. This school is set well back from Kirk Road on its own private access way. Students do not walk or cycle to this facility.

28. This is quite different to other local authorities where many of their schools are on 100 kilometre per hour roads.

29. Christchurch was the first city in New Zealand to trial electronic 40 kilometre per hour variable speed signs/limits, and its installation programme is well advanced with 22 zones being installed in Christchurch. These zones cover 30 schools and 31 road frontages.

30. In addition to this, Christchurch's grid pattern street layout means there are large numbers of traffic signals, many of which service schools.

31. 31 school frontages are already equipped with electronic 40 kilometre per hour variable speed limits with an addition of two school frontages being implemented this financial year. 33 school frontages have traffic signals in close proximity to the school gate (refer to figure 5).

School frontages with electronic 40 kilometre per hour variable speed limit	31
School frontages with traffic signals in close proximity	33

Figure 5: School Frontages

32. A prioritisation process has previously been approved by the Council which determines the next schools to be provided with electronic 40 kilometre per hour variable speed limits.

33. This process looks at the road environment, the kerbside activity, the number of heavy vehicles, cyclists, operating speeds, traffic volume, crossing use, road designation, community interest and existing facilities and rates each criteria to achieve a total score which determines the final ranking of every school in Christchurch.

34. The schools with the highest ranking receive the allocated budget. These schools are then studied in more depth to determine the best possible treatment which will provide the greatest safety benefits.

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35. Currently a simple school speed zone installation with one road frontage requiring only two electronic signs costs approximately $25 - $30,000. A complicated installation which could involve up to five electronic signs would cost around $60,000. Currently the budget allocation of $116,000 will achieve up to three new school speed zones.

36. A list of treatments for improving safety outside schools is provided below and a discussion around the relative benefits.

Fixed School Warning Signs

37. All schools in Christchurch are clearly identifiable by fixed school warning signs (See Figure 7).

Figure 7: Fixed School Warning Sign

38. These signs clearly identify the location of each school in Christchurch. This is particularly relevant when the school cannot be seen from the road because it may be down a drive. The effectiveness of these signs is reinforced by the accumulation of caregivers' vehicles dropping off and picking up the students (sometimes referred to as "chaos at the school gate").

39. Other treatments are added to provide additional safety benefits. These can be found in the form of:

(a) Grade separation (Over bridge or under pass)

(b) Signals

(c) Pedestrian (zebra) crossing with school patrol

(d) Kea crossing (which have school patrols)

(e) Pedestrian (zebra) crossing

(f) Kerb build outs

(g) Pedestrian refuge island

(h) Kerb build outs plus pedestrian refuge island

(i) Active School Signs

(j) Fixed School Signs

(k) Traffic Calming

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NZTA Treatment Selection Criteria

40. NZTA Traffic Note 56 provides a flow chart for the selection of appropriate traffic control devices near schools, as shown in Figure 8.

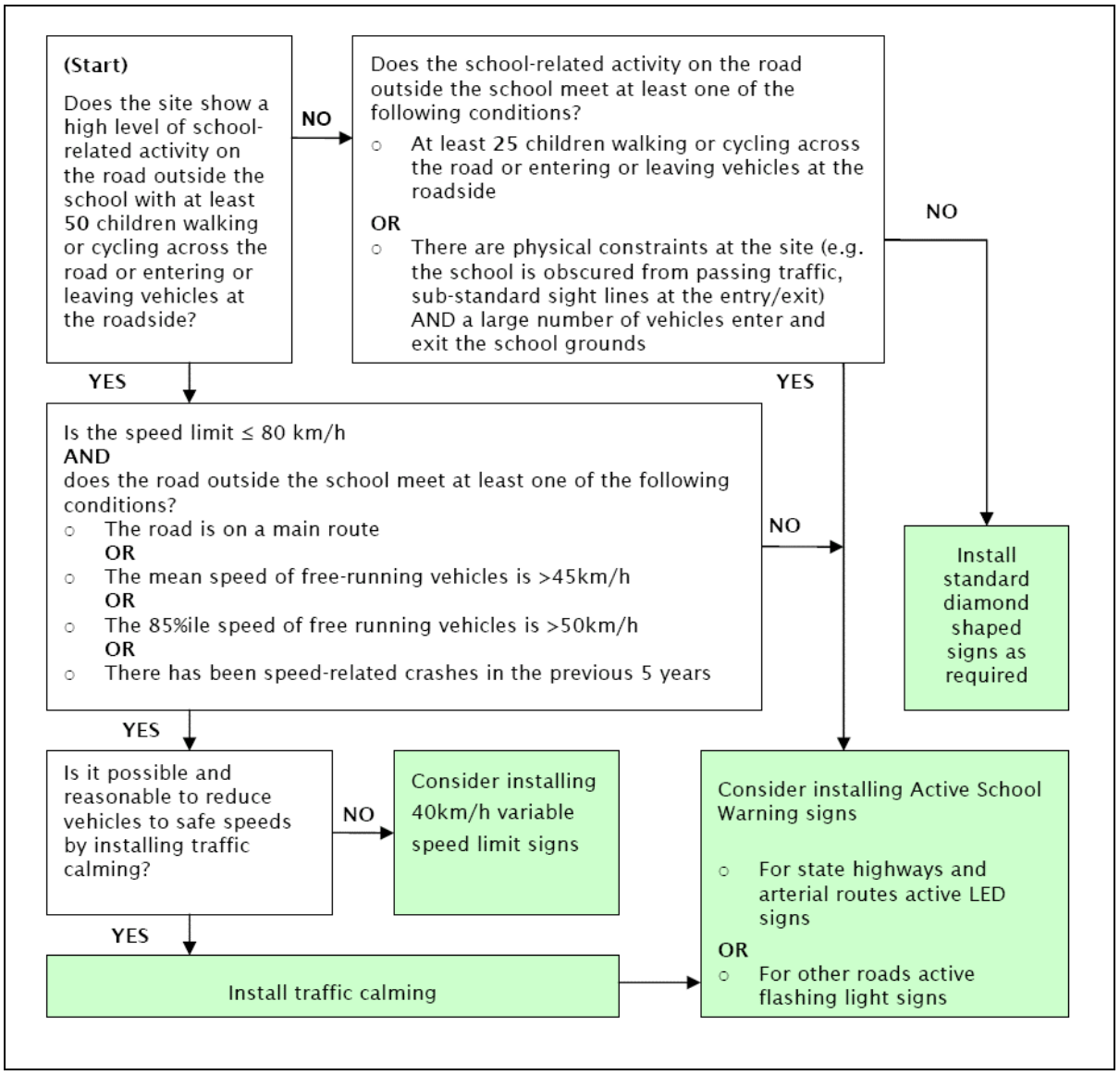

Figure 8: Selection Criteria for Traffic Control Devices near Schools

Electronic Variable Speed Limits

41. Selecting 40 kilometre per hour variable speed limit signs should only be considered where the warrant conditions are satisfied and where it is not possible to install traffic calming or other treatments to reduce vehicle speeds.

42. There are 161 schools in Christchurch. Of these, 31 school frontages are currently provided with electronic variable speed limits with another two being added this financial year. Most of the remaining schools may not benefit from the installation of a 40 kilometre per hour school zone. Traffic signals on very busy roads or traffic calming on lower volume, higher speed roads will achieve a safer environment for school children.

43. Staff have previously presented the Council with a comprehensive spreadsheet process that determines the priority order for subsequent electronic variable speed limit installations. The Council accepted this process at that time.

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44. The following schools are currently provided with 40 kilometre per hour electronic variable speed limits:

Belfast	
Burnside High	
Ilam	
Our Lady of Assumption	
Waimairi	
Chisnallwood	
Hillmorton	
Isleworth	
Bishopdale	
Harewood	
Manning	
Christchurch Boys' High	
Avondale	
Marshland	
Windsor	
Branston	
Christ the King	
Cobham	
Halswell	
Our Lady of Fatima	
South New Brighton	
Hoon Hay	
Mariehau	
Lyttelton Main	
Burwood	
Westburn	
Templeton	
Aranui High	
Kirkwood	
Windsor	
Linwood North	
Cashmere Primary	currently being installed
Fendalton	currently being installed

45. Fixed sign variable speed limits were installed at schools in New South Wales and Victoria. Many of these have been retrofitted with electronic variable speed signs as the fixed signs did not achieve the desired results (see figure 6).

Figure 6: Fixed with electronic variable speed signs added

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Traffic Signals

46. The following are schools which have been provided with pedestrian traffic signals at the school gate:

    (a) Thorrington School on Colombo Street
    (b) Bishopdale School on Greers Street
    (c) Christchurch Boys' High School on Straven Road
    (d) Riccarton High School on Main South Road
    (e) Riccarton High School on Curletts Road
    (f) Linwood College on Aldwins Road
    (g) St Margarets College on Papanui Road
    (h) Villa Maria College on Peer Street
    (i) Shirley Boys' High/Marion College on North Parade

47. There are many other schools that have traffic signals at intersections in close proximity to school entrances that provide a high level of safety. (for example, Christ's College)

48. The installation of a 40 kilometre per hour electronic or fixed variable speed limit in these locations would slow the traffic. This has the effect of bunching up the vehicles. The traffic signals are programmed to detect a gap in the traffic before changing to red. The bunched up traffic provides fewer gaps, therefore the time taken from when a student pushes the button and the "walk now" signal comes up is greater. This encourages students to cross clear of the signals. Accident statistics show that crashes involving pedestrians at schools with traffic signals occur 50 metres or more away from the signals.

49. The introduction of 40 kilometre per hour variable speed limits at schools with signals is likely to reduce the safety and therefore cannot be recommended.

Grade Separation

50. Grade separation can be in the form of an over-bridge or an underpass. Mairehau High School has an underpass under QEII Drive to provide students with safe access from properties north of the expressway. Waimairi School has a footbridge over the railway line from Hawthorne Road/Hartley Avenue. Alternative access from Blighs Road or Wairakei Road means students would have a long walk to school. The Council maintains the footbridge over the railway as this encourages active and sustainable travel to Waimairi School.

51. Grade separation does have disadvantages. Footbridges, unless covered, exposes pedestrians to extremes of weather and objects can be dropped onto vehicles below. Underpasses have a bad reputation for "stranger danger" and tend to attract inappropriate behaviour and graffiti. They can also be unfriendly in terms of ramp gradients – for disabled or persons with pushchairs etc.

Active School Zone Signs

52. Traffic Note 56 (October 2008) introduces 'Active' signs that draw the drivers attention to the likely presence of school children crossing or moving at the side of the road. This reinforces the common road environment message to drivers. The signs comprise either a fixed or electronic sign displaying the 'Children' symbol with the words 'School Zone' below. This sign combination is supplemented with two orange flashing lights at the top of the sign on each side which light alternately when activated (see Figure 9). Christchurch currently have no active school warning signs.

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Figure 9: Active School Warning Signs as recommended in Traffic Note 56

53. Active School Warning Signs do not legally require drivers to reduce their speed but the visual impact of these signs results in speeds being lower even when the lights are not activated. Traffic Note 56 says these signs may be useful in situations where the use of a 40 kilometre per hour variable speed limit is inappropriate or does not satisfy the warrant conditions. For example, in rural areas where the speed limit is greater than 80 kilometre per hour the 40 kilometre per hour variable speed limit is not an appropriate treatment because of the very high differential between motorists speeds.

Traffic Calming

54. Traffic calming provides benefits to all users of the street and enhanced amenity for neighbouring residents and business across the entire day compared to the 40 kilometre per hour variable speed limit that only provides reduced speed benefits for short periods at the start and end of each school day. This is supported by The Scottish Executive Development Department Transport Division 3 Circular No. 6/2001 which notes "Unrealistic and unenforceable speed limits will not bring about the expected road safety benefits and are likely to lead to pressure for the provision of traffic calming measures to ensure their effectiveness."

55. The "Land Transport Rule: - Setting of Speed Limits" matches speed limits to the traffic environment. Traffic calming will achieve the lower speed environment that will permit the installation of a lower speed limit. This was the process undertaken before a fixed 40 kilometre per hour was implemented in Charleston and on the Esplanade.

Do Nothing

56. Speed surveys have been carried out on a number of schools that have access from quiet residential streets. In these locations the traffic is generally caregivers dropping off and picking up students. Any other traffic is usually residents who are well aware of the presence of the school.

School	Road	Mean Speed	85th %ile Speed
Freeville	Sandy Avenue	36	42
Richmond	Pavitt Street	31	39

Figure 10: Speed Survey

57. It can be seen from the two examples above that 85 per cent of vehicles travel at or below 42 kilometre per hour in the worst case. Electronic variable speed limits could not be justified and fixed 40 kilometre per hour speed limits would have no benefit.

58. In schools which front low volume residential roads, static "school" signs (see Figure 7) are adequate. The installation of a 40 kilometre per hour sign would only encourage greater speeds and therefore such signs are not justified.

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Examples where a School Zone is not appropriate.

(a) Greers Road at Bishopdale School:

This site was selected as one of the original five trial sites. The road is an arterial road, forming part of the traffic ring route. It carries approximately 18,000 vehicles per day. A zebra pedestrian crossing, with a school patrol existed at the school gate to assist the school community when crossing this road. Once the school zone was installed, it was reported by the Police Education Officer that the slowing of traffic made the operation of the school patrolled crossing very difficult. It was observed that the slowing of traffic, reduced the headway (gaps) between the vehicles, making selection of a safe gap to swing out the school patrol stop signs by the children patrollers, very difficult. The school's Principal reported ongoing incidents at the zebra crossing, with many "near misses" and minor injuries of school children being struck by vehicles, where the motorists failed to stop.

Following replacement of the school zone with a signalised crossing, road safety and convenience of road crossing has significantly improved at this school's road frontage.

(b) Keighleys Road at Bromley School:

This local road, was experiencing a significant number of speed related crashes. The road has a number of deceptive bends near the school's frontage. These crashes were occurring outside school operation times and mainly late at night. The school community raised concerns about safety and requested a school zone. A school zone would not have operated outside school travel times, and therefore would not have had any effect on the crash rate occurring. Following significant investigation by Council staff, traffic calming devices were installed on Keighleys road. The school patrol crossing point was relocated to optimise approach visibility. This work, as an alternative to a school zone, has improved road safety for the school community, and road safety for all road users at other times of the day.

(c) Pavitt Street at Richmond School:

This local road has a relatively low traffic volume and has a narrow carriageway width (just over 6 metres). At school start /finish times, cars are parked on both sides of the roadway, creating an extremely narrow situation. The effect of this is that motorists travel slowly. (Refer Figure 10 which shows the average speed to be 31 kilometre per hour). The installation of a 40 kilometre per hour zone in this street would give an inappropriate message i.e. advising motorists that they can potentially travel faster than they currently do.

Conclusion

59. Installing variable speed limits in areas where they are not warranted e.g. on local streets where mean speeds are already around 40 kilometre per hour at school times, may detract from the overall effectiveness of the initiative and potentially compromise those areas where speed reduction is required. Therefore widespread installation of 40 kilometre per hour variable speed limits in school zones would be likely to:

(a) Only achieve small speed reductions at some sites; and

(b) Probably result in increased speeds at existing sites due to decreased motorist compliance stemming from a perception of reduced importance of the signs.

60. Such a perception is not atypical of any sign or traffic control device. It is for these reasons that warrants exist to ensure when regulatory or warning signs are erected that their importance is not devalued by use in situations where they are unnecessary.

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61. The resolution to advocate to Government to mandate 40 kilometre per hour school zones in New Zealand has an underlying well meaning objective. However, other than reducing the cost of implementing the currently electronic variable speed signs, there are few other benefits. The Government has already expressed views regarding the effectiveness of the proposal.

62. Staff do not support the resolution to advocate mandatory fixed sign 40 kilometre per hour variable speed limits outside every school in New Zealand. It is recommended that the Council continue with their programme to install 40 kilometre per hour electronic variable speed limits at schools where speed is a measurable issue and other treatments would not work as opposed to putting the programme on hold while waiting for a decision from central government.

63. As an alternative to implementing fixed sign school variable speed zones that are neither warranted nor absolutely necessary, the Council could consider the introduction of other road safety improvement techniques such as:

    (a) Improved signage and delineation.

    (b) Pedestrian facilities such as defined crossing points, including signalised crossings.

    (c) Adjusting the phasing on existing traffic signals.

    (d) Additional school crossing patrol locations.

    (e) Active school warning signs.

    (f) Traffic calming.

    (g) Better enforcement.

    (h) Better student road safety education.

    (i) Better parent road safety education.