

Queensland multi-lane school zone trial

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Abstract:

In Queensland, school zones are not permitted on multilane roads. However, a number of multi-lane roads in the State have school zones installed that do not comply with the current guidelines. There is increasing demand to install school zones on multilane roads.

While some other states permit school zones on multi-lane roads, there is very little information on compliance rates with the reduced speed zones. The Department of Transport and Main Roads in Queensland commenced a year long trial at the start of the 2010 school year of school zones on multilane roads throughout the State to determine driver compliance with the reduced speed limit over a sustained period.

Four types of school zones signs were installed to determine if any particular type of sign was more effective than the others in regulating vehicle speeds during the school zone times. These included static school zone signs, enhanced school zone signs, variable speed limit signs and vehicle activated signs.

This paper outlines experiences in Queensland with the installation of school zones on multilane roads including site selection, before and after speed surveys and signage installation challenges and presents the findings of the trial.

Key words

School zones, multi-lane road, static sign, enhanced sign, variable speed limit sign, vehicle activated sign.

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Background

In Queensland, school zones are not permitted on multi-lane roads. Generally, higher order pedestrian crossing facilities such as pedestrian actuated traffic signals are installed where mid block crossings are necessary. However, due to community requests, a number of school zones have been installed on multi-lane roads.

The Department of Transport and Main Roads has been reluctant to instruct road authorities to remove the existing school zone signs from multi-lane roads. In 2009, the Department undertook to review its existing policy and researched the policy in other jurisdictions within Australia.

An inter-jurisdictional scan of other states found that school zones on multi-lane roads were permitted in New South Wales, Victoria, Western Australia and Tasmania. Each of the states had adopted different signing practices with enhanced school zone signs installed in New South Wales, variable speed limit signs installed in advance of static school zone signs in Victoria, electronic speed limit signs installed with static SCHOOL ZONE and times of operation plate in Western Australia and variable speed limit signs installed in Tasmania.

Purpose of the Trial

In view of the varying signing practices between the states, a decision was made by the Department of Transport and Main Roads in Queensland to conduct a trial of the different types of school zone signs on multi-lane roads.

The purpose of the trial was to evaluate the effectiveness of school zones in reducing speed on multi-lane roads, and to determine the relative effectiveness of different signage types in reducing speed.

Eight schools, four on divided and four on undivided multi-lane roads were identified for the trial. Eight sites were identified as control sites for the trial. The trial commenced at the start of the 2010 school year and continued to the end of the school year. Speed surveys were conducted for two weeks in November 2009, before the start of the trial and two speed surveys were taken during the trial in May/June 2010 and October 2010.

Sign Types and installation

Four types of signs were trialled. These include:

- Static school zone signs

- Enhanced school zone signs. These include twin alternate flashing lights mounted at the top of the school zone sign and four rings of LED annulus with the two inner rings flashing
- Variable speed limit signs supplementing static school zone signs
- Vehicle activated signs supplementing static school zone signs.



Static school zone speed limit sign (also installed in advance of signs shown below)



Enhanced School zone speed limit sign (flashing light school zone sign)



Variable speed limit sign (installed in conjunction with static school zone sign)



Vehicle activated "SLOW DOWN" speed limit sign (installed in conjunction with static school zone sign)

On undivided roads, signs were installed only on the kerbside while on divided roads; signs were duplicated on the median. All school zones were generally 300 metres long. Static and enhanced school zone signs were installed 150 metres in advance of the crossing facility and where variable speed limit signs and vehicle activated signs were also installed, these were 70 m within the school zone.

Trial and control sites

Trial sites were selected based on the following criteria:

- the speed limit outside school zone times does not exceed 80 km/h;
- there is direct pedestrian access to the school from the road on which the school zone is proposed;
- the number of through traffic lanes does not exceed six (three in each direction);
- school children must be walking or cycling within the proposed school zone;
- adequate pedestrian crossing facilities must be provided (pedestrian actuated signals, crosswalks or children's crossing (limited to four lanes)) within the proposed school zone;
- school zone times of operation shall be consistent with other school zones within the local area;
- trial sites shall not be located on the same road as control sites.

Trial sites				Control sites	
School	Location	Type of sign	School zone	School	Location
Carina State School	Creek Rd, Carina	Enhanced	8:00 – 9:00 am and 2:30 – 3:30 pm	Mabel Park State School	Paradise Rd, Slacks Creek
Balaclava State School	McCoombe St, Westcourt, Cairns	Enhanced	7:30 – 9:30 am and 2:00 – 4:00 pm	Cairns West State School	Hoare St, Manunda, Cairns
Mt Maria Junior College (Enoggera)	South Pine Rd, Enoggera	VAS	7:00 – 9:00 am and 2:00 – 4:00 pm	Albany Creek State School	Albany Creek Rd, Albany Creek
Bundamba State School	Brisbane Rd, Bundamba	VAS	7:30 – 9:00 am and 2:30 – 4:00 pm	Camp Hill State Infants and Primary School	Old Cleveland Rd, Camp Hill
St Ita's Regional Primary School	Gladstone Rd, Dutton Park	VSL	8:00 – 9:00 am and 2:30 – 3:30 pm	Clontarf Beach State School	Elizabeth Ave, Clontarf Beach
Mother of Good Counsel School (Cairns North)	Sheridan Street, Cairns North	VSL	7:30 – 9:30 am and 2:00 – 4:00 pm	Parramatta State School	122 Mulgrave Rd, Parramatta Park, Cairns
Taigum State School	Handford Rd, Taigum	Static	8:00 – 9:00 am and 2:30 – 3:30 pm	St Joseph's Primary School (Nambour)	177 Currie St, Nambour
Weir State School	Ross River Rd, Kirwan, Townsville	Static	7:30 – 9:00 am and 2:30 – 3:30 pm	Townsville Central State School	Warburton St, Townsville

Data collection

Vehicle speeds were measured prior to the installation of the school zone signs at all 16 trial and control sites to establish the base data for comparison and were again measured in May/June 2010 and October 2010.

Speed data was collected using tube counters and speeds were measured 70 metres inside the school zone at all sites. Speeds were measured only in one direction of travel with the tube counters being installed on the carriageway on the opposite side to the school.

Data analysis

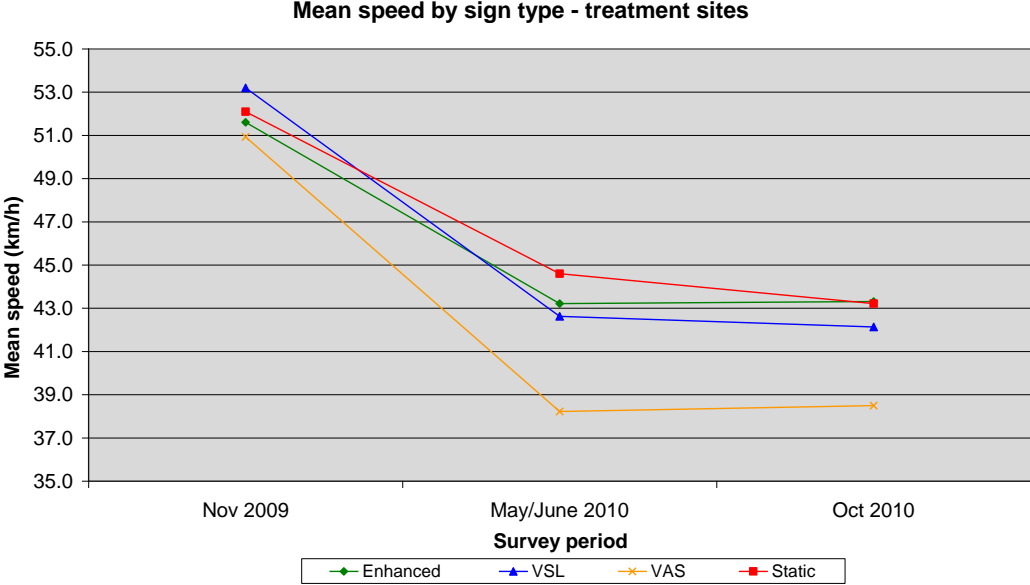


Figure 1: Mean speed by sign types at treatment sites

- Mean speeds at all sites reduced after the installation of school zone
- Sites with vehicle activated signs performed better than sites with other signs
- Reduced mean speeds were sustained at most sites after 10 months

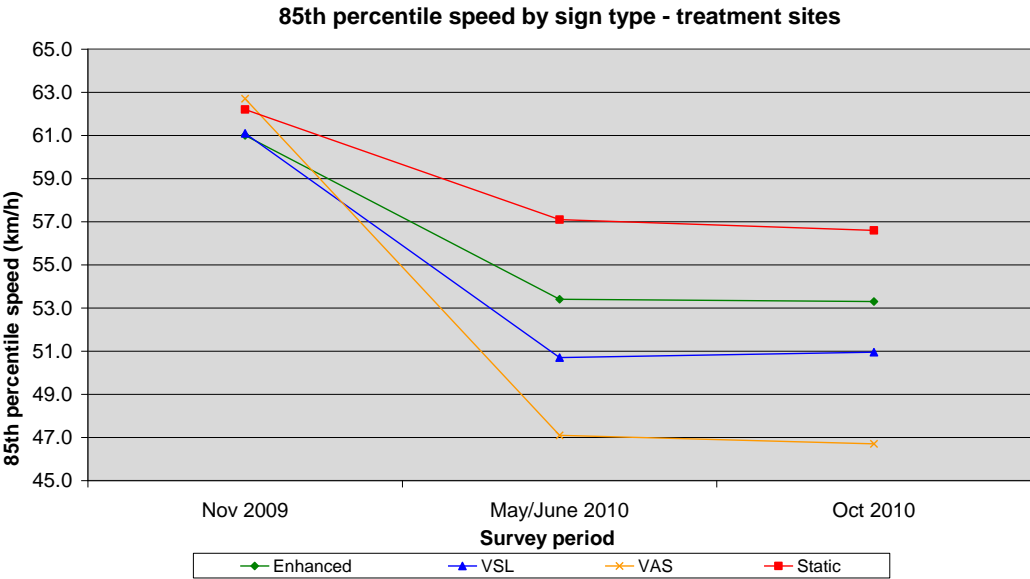


Figure 2: 85th percentile speed by sign type at treatment sites

- 85th percentile speeds at all sites reduced after the installation of school zone
- Sites with vehicle activated signs performed better than sites with other signs
- Reduced 85th percentile speeds were sustained at most sites after 10 months

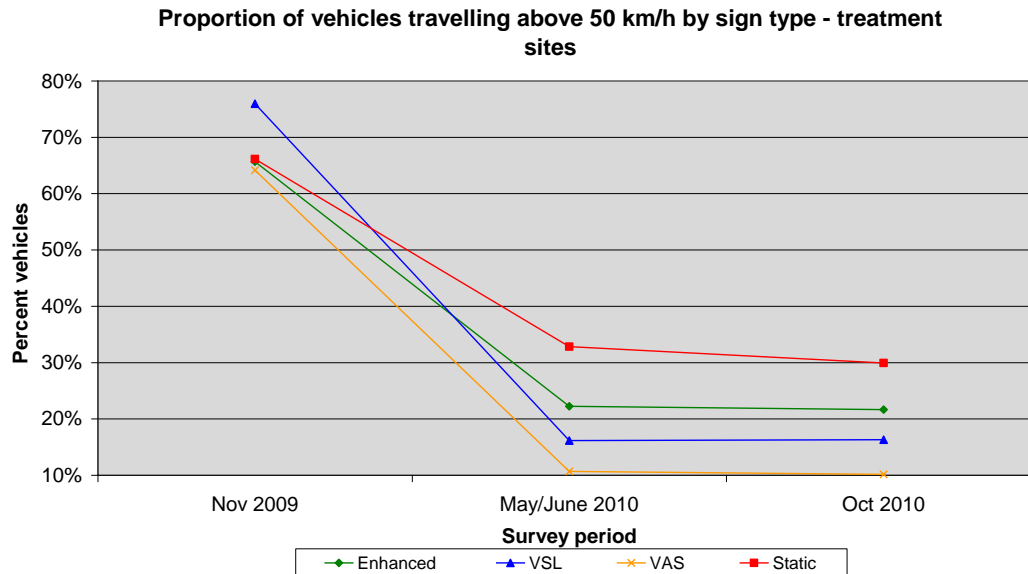


Figure 3: Proportion of vehicles travelling above 50 km/h at treatment sites

- Sites with vehicle activated signs performed best followed by sites with variable speed limit signs, enhanced school zone signs.
- Over 30 % of vehicles travelled at a speed > 50 km/h where static signs were installed.

Mean speed by time at treatment sites

At all the sites, lower mean speeds were recorded during the school zone times. At some sites, the reduced mean speeds were sustained for the duration of the school zone while at other sites, mean speeds reduced for a shorter duration than the school zone time.

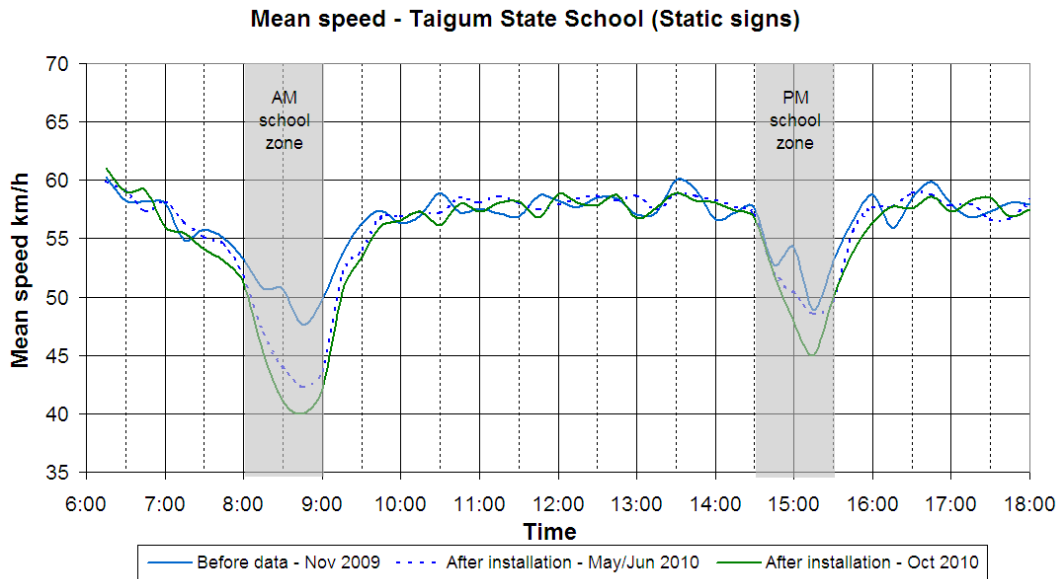


Figure 4: Static sign on undivided road

- School zone operates for 1 hour in the morning and afternoon. However, reduced mean speeds are not sustained for the full duration of the school zone time.

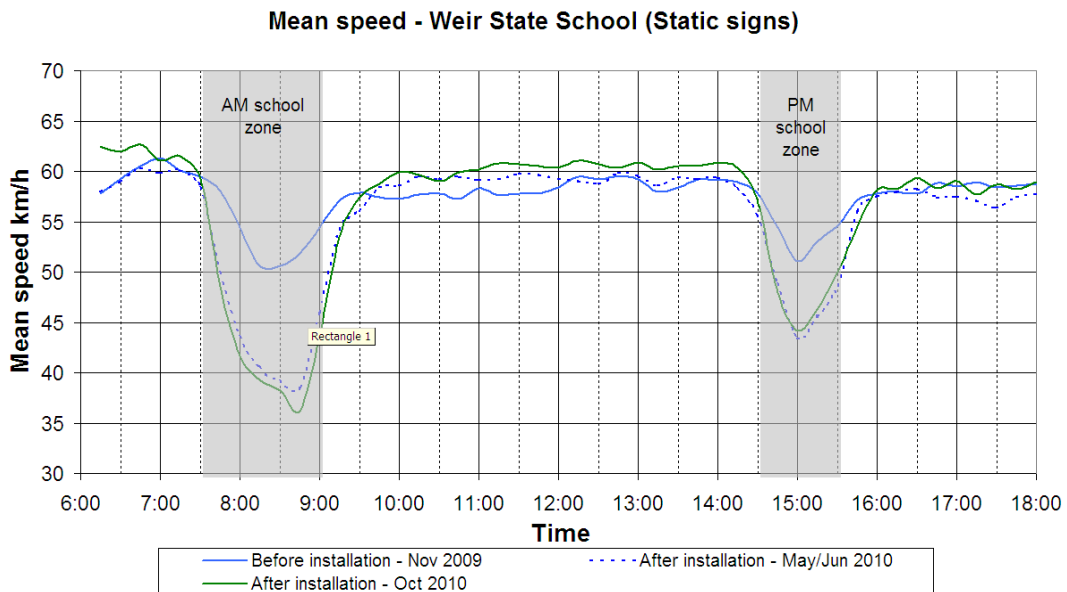


Figure 5: Static sign on divided road

- School zone operates for 1.5 hours in the morning and 1 hour in the afternoon. Reduced mean speeds were recorded after the installation of the school zone but were not sustained for the full duration of the school zone time.

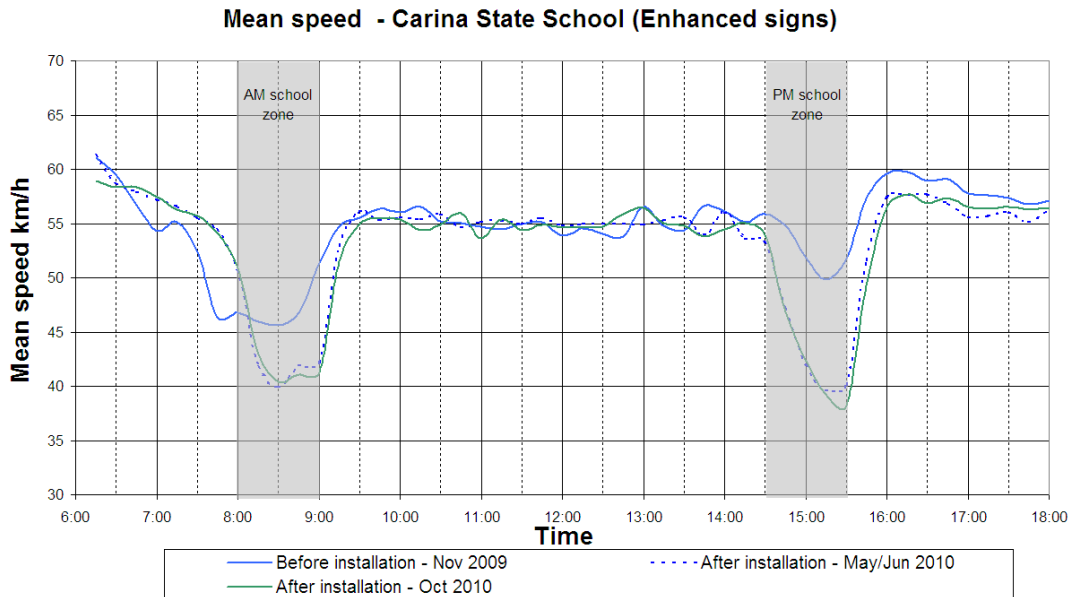


Figure 6: Enhanced signs on undivided road

- School zone operates for 1 hour in the morning and afternoon. Reduced mean speeds were sustained in the morning but not in the afternoon.

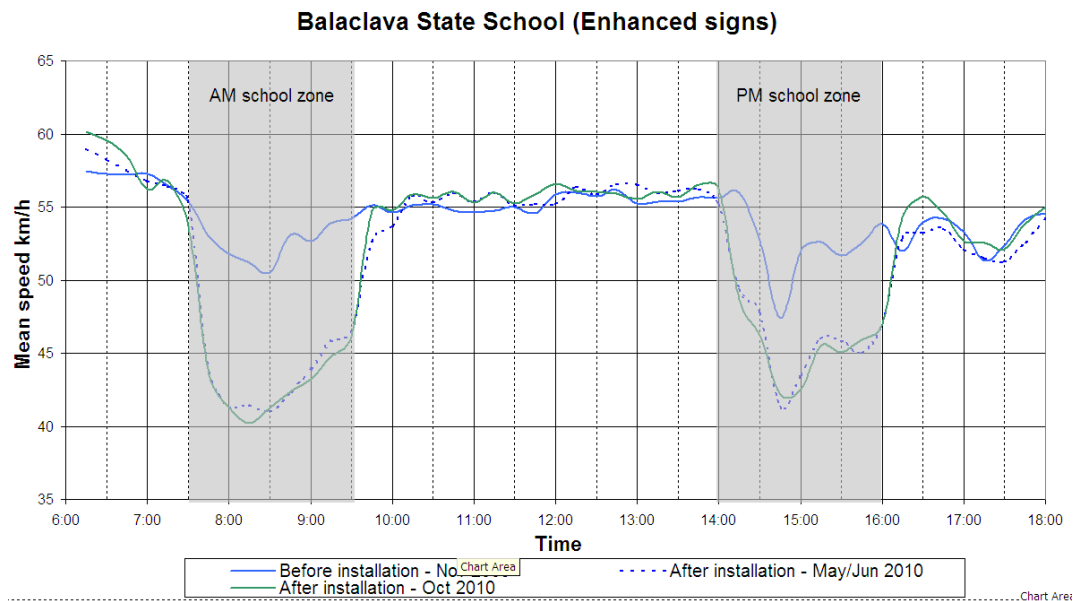


Figure 7: Enhanced signs on divided road

- School zone operates for 2 hours in the morning and 2 hours in the afternoon. Reduced mean speeds were observed in both post survey periods. Reduced speeds were sustained for the full duration of the school zone in the morning while the speeds reduced appreciably closer to the school closing time in the afternoon.

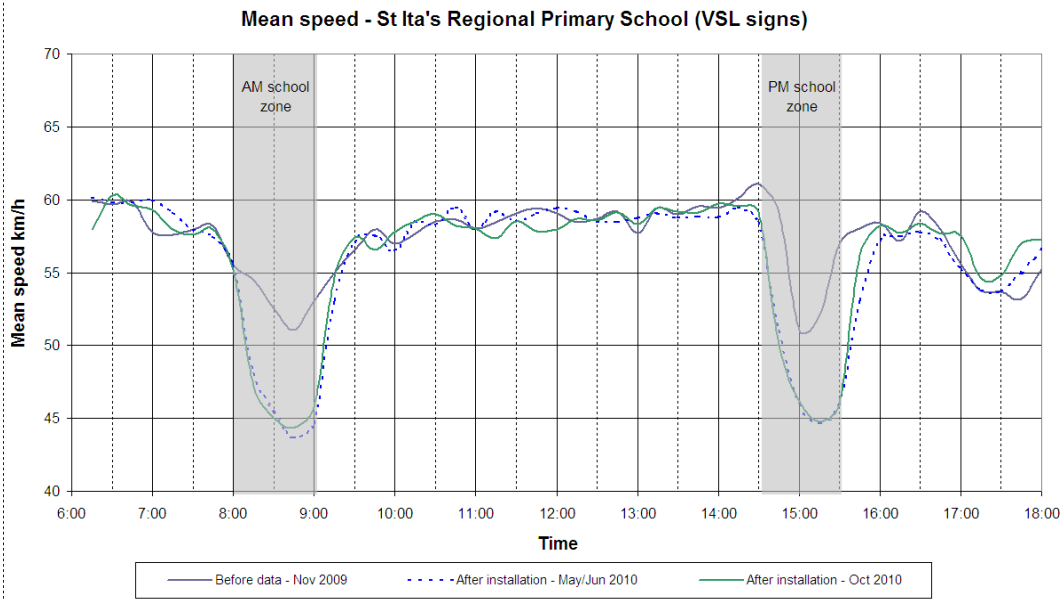


Figure 8: Variable speed limit sign on undivided road

- School zone operates for 1 hour in the morning and afternoon. However, reduced mean speeds are not sustained for the full duration of the school zone, particularly in the afternoon where speeds were observed to reduce closer to the school closing time.

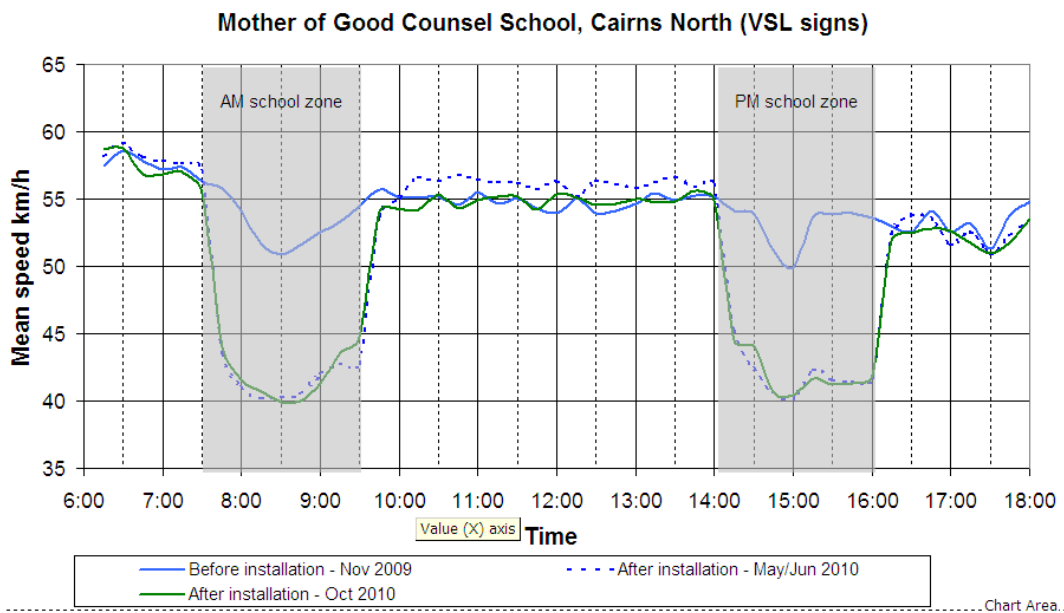


Figure 9: Variable speed limit sign on divided road

- School zone operates for 2 hours in the morning and 2 hours in the afternoon. Reduced mean speeds were observed in both post survey periods. Reduced speeds were sustained for the full duration of the school zone both in the morning and afternoon.

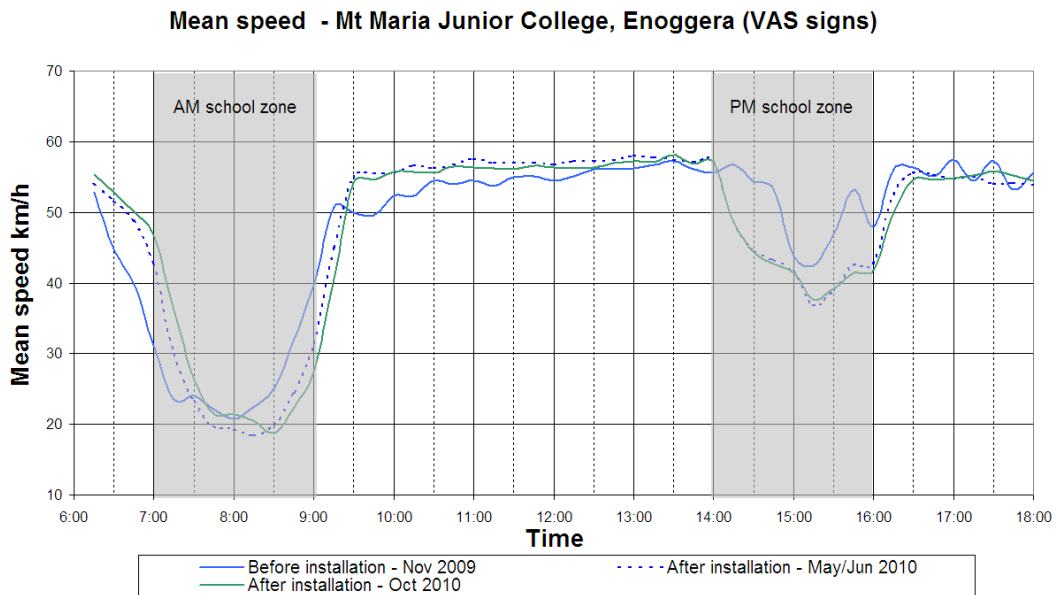


Figure 10: Mean speed by time – Vehicle activated signs on undivided road

- School zone operates for 2 hours in the morning and 2 hours in the afternoon. Mean speeds were already low in the pre trial survey primarily due to congestion at the site. However, the reduced speeds were sustained over a longer period after school zone signs were installed.

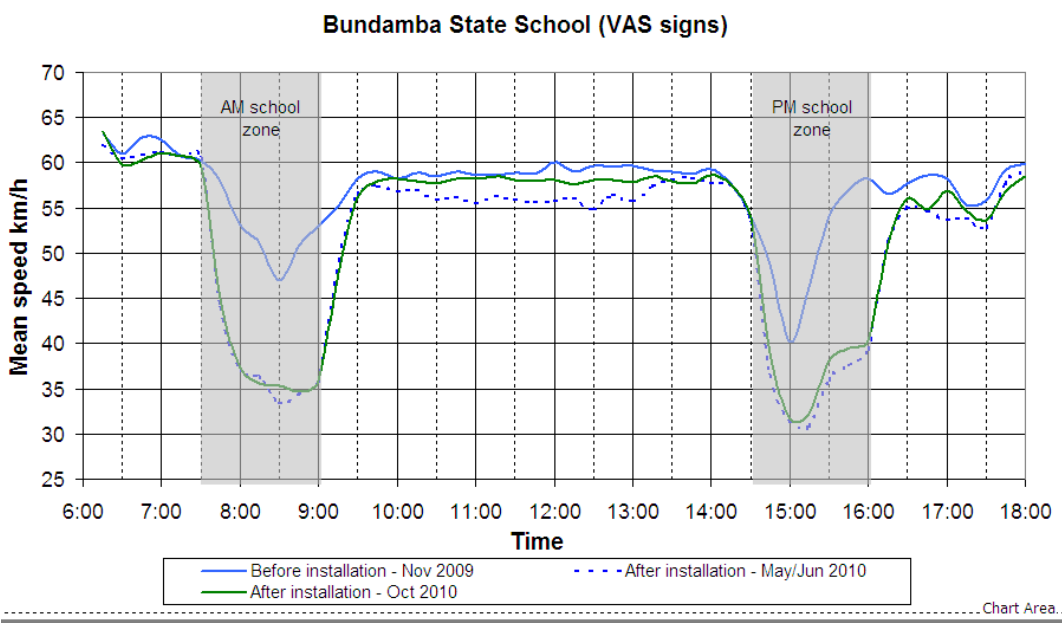


Figure 11: Mean speed by time – Vehicle activated signs on divided road

- School zone operates for 1.5 hours in the morning and 1.5 hours in the afternoon. Reduced mean speeds were observed in both post survey periods. Reduced speeds were sustained for the full duration of the school zone both in the morning and afternoon.

Results

The main findings from the analysis of the survey data collected before and after installation, of the four types of school zone signs are as follows:

- The 85th percentile speeds at all the trial sites reduced from the pre-trial levels. However, with the exception of Bundamba State School where vehicle activated signs were installed, the 85th percentile speeds were still high.
- The sites where vehicle activated signs were installed performed the best, recording the lowest and largest reductions in mean and 85th percentile speeds.
- The sites where static signs only were installed recorded the least reduction in mean and 85th percentile speeds.
- The percentage of vehicles travelling above 50 km/h (10 km/h above the posted speed limit) were considerably lower, but still constitute a large number of traffic - 10% for VAS, 15% for the VSL on the divided road, 22% for enhanced flashing lights and 30% for static signs only.
- The school zone signs installed on divided roads performed better than those on undivided roads.
- The duration of the school zone did not seem to be a factor.