
# SAFE ROADS AT SCHOOLS – SAFE SCHOOL ACCESS ASSESSMENT

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# Safe Roads at Schools – Safe School Access Assessment

## *Document Purpose*

This document has been compiled by the Australian Road Research Board's (ARRB) Transport Safety Team. The intention is to outline a method to proactively identify and address road safety risk for students (and their parents) accessing schools, with a focus is on Vulnerable Road Users as they walk, ride, skate or scoot to school from their homes, bus stops or nearby street parking.

With a growing transition towards more Active Transport especially as more parents work from home, ARRB considers it timely to stimulate a discussion about a systematic approach to proactively identifying vehicle/vulnerable user crash risk around schools.

We believe the focus should be on improvements to the roads used by students for their journey to and from school and the roads which provide immediate school access. A survey conducted in New South Wales [1], identified that of the 3,400 responses:

> *36 % of parents would not let their children walk to school due to unsafe crossings, 12 % indicated a lack of footpaths was a deterrent and 11 % indicated limited parking or poor driving made roads around schools unsafe.*

Encouraging active transport participation by students (and their parents) requires a good connectivity of roads and pathways to and from the school. It is often the case that road authorities, school administrators and P&C Committees are aware of local road safety issues, however it is challenging to quantify the risk, prioritise treatments, and determine which school should receive funding.

ARRB has developed a process to assist in proactively reducing road safety risk at schools, which we have outlined in this information sheet.

1. Chanthivong, A 2020, *Macquarie Fields NSW School Safety Survey*, 2020, Anoulack Chanthivong MP, Member for Macquarie Fields, Ingleburn, NSW

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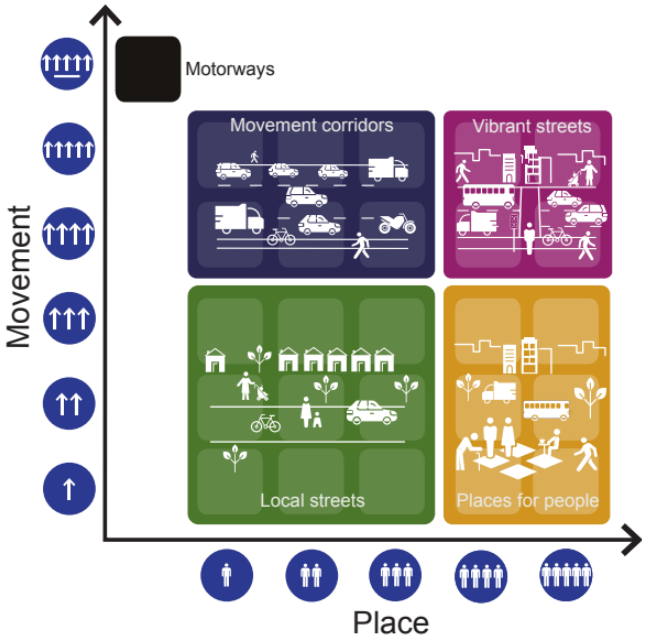
## The Factors that Contribute to Crash Risk around Schools

### *Roads and Vulnerable Road User Facilities at Schools – Are They Fit for Purpose?*

Schools are located on a variety of roads, these roads are often not designed to be 'Places for people' (Figure 1); in some instances, the road function is to move vehicles as quickly and efficiently as possible (movement corridors). In other cases, roads surrounding a school, or roads at the immediate school accesses, tend to become 'places for people' for a concentrated period of the day. This is problematic since both these road functions – movement corridors and places for people, typically coincide with the morning and afternoon peaks times for traffic.

Whilst treatments such as school zone speed reductions are provided at most schools, and pedestrian crossing refuge islands and signalised crossings are present at some schools, additional measures can be provided to further reduce the potential for a crash between traffic and school pedestrians.

Figure 1 - 'Movement and Place' framework




Source [2]

### *Students as Vulnerable Road Users*

There are several factors related to their age and stage of development that make children particularly vulnerable road users and some of these are outlined below.

| Student characteristics compared to adults | Risks contributing to potential crashes | |
|---|---|---|
| | Primary School Students | High School Students |
| Shorter physical stature | Reduced ability to see over objects such as parked vehicles and vegetation which reduces the likelihood of being seen by other road users. | |
| Peripheral limitations | Reduced ability to scan the built environment and identify approaching vehicles or vehicle accesses. | Distraction by electronic devices and inattentive to surroundings. Looking at the ground instead of other road users or surrounds. |
| Attention span and cognitive ability limitations | Unaware of signage, unable to read or understand warning signs and traffic signals. Can process limited visual or audible stimulus at a time. Unpredictable behaviour (e.g. running across rod to parents). | Distracted by electronic devices, the use of headphones, and socialising with peers. |
| Poor judgment of vehicle speed and distance | Unable to select a safe crossing gap in traffic reliably and consistently. Difficulty in judging where traffic is coming from. | May intentionally try to cross the road in an unsuitable gap in traffic. Intentional risk-taking or 'sensation seeking' behaviour. |
| Difficulty in sound recognition | Missing audible clues to traffic and traffic signal crossings. | Same as PS Students plus the use of headphones and socialising with peers. |
| Behavioural risks | Poor selection of routes and crossings to meet parents or friends. Disregarding traffic and running out onto the road to cross or chase an object. | Appearing from or crossing at locations a driver may not expect. Intentional risk-taking or 'sensation seeking' behaviour. Limited adult supervision. |
| Limited understanding of traffic patterns and expectations | Inability to anticipate driver behaviour and vehicle movement. Poor understanding of what is expected of them as pedestrians. | Disregard for signage, intentional risk-taking or 'sensation seeking' behaviour, and peer pressure. |

2. Transport for NSW 2018, Future transport strategy 2056, TfNSW, Sydney, NSW

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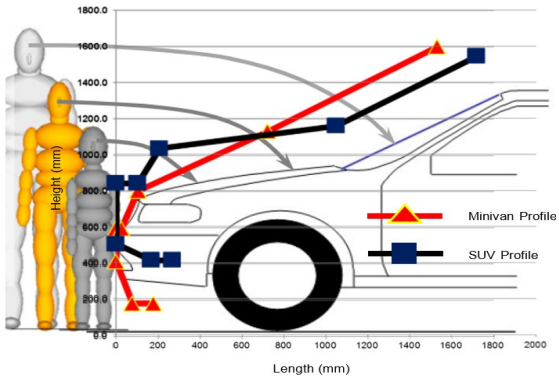
## *Increased Crash Severity Risk for School-Age Students*

During a frontal impact (87 % of vehicle to child pedestrian crashes) [3] school-age students are more likely to strike their head (56 % or crashes compared to 30 % for adult pedestrians) on a part of the vehicle that is not designed to absorb an impact by a head, furthermore if struck by an SUV or minivan the head will not strike an 'impact friendly' zone on the vehicle (Figure 2). Head trauma is the most frequent and severe injury for child pedestrians [3].

Figure 2 – Pedestrian Impact Kinematics




Source [4]

## *Crash History*

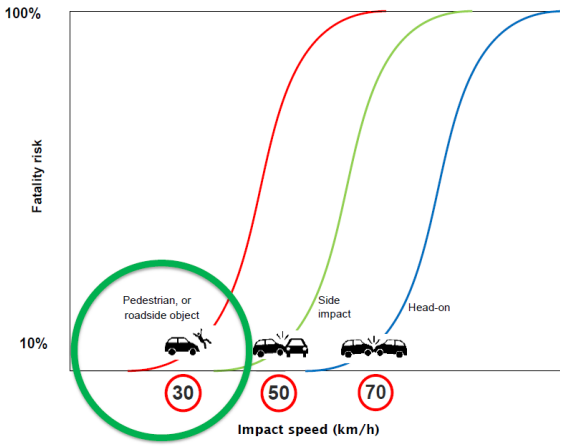
The Australian Institute of Health Welfare report '*Australia's Children*' [5] found, between 2009 and 2018, of the children aged 0 – 14 who died in a road crash, 35% were outside of a vehicle (29% pedestrians and 6% cyclists), this is a stark indicator of the vulnerability of children.

The report goes on to identify a range of relatively low cost, but highly effective road engineering measures that can be considered in mitigation, e.g. pedestrian crossings. Put simply, lives can be saved by improving the roads around all schools, with the priority being those where the highest risks are identified.

## *Impact Speeds*

Crash impact speed can greatly affect the likelihood of fatal and serious injury to the road users involved. The implementation of 40 km/h school speed zones led to a 24% reduction in all pedestrian and cyclist crashes outside schools [5]. Further reductions to school speed zones or the operating speeds within a school zone would further reduce crashes by reducing the crash likelihood (e.g. less stopping distance required) and crash severity (lower impact speeds reduce the risk of a fatality), Figure 3.

Figure 3 – Impact speeds and fatality risk




# Proactively Managing Vulnerable Road User Crash Risk at Schools

## *A Crash Prevention and Active Transport Future*

There needs to be a balance between providing for vulnerable road users at schools and maintaining road function. The first step is, however, identifying and quantifying crash risk and potential crash severity. This proactively identifies safety risk which fulfils a Duty of Care and enables suitable countermeasures to be identified, prioritised, and programmed for implementation.

Improving road safety around schools and on connecting roads and streets as part of the route to and from schools requires collaboration between road managers, schools, enforcement agencies, and school communities. This is reflected in current *Safe Routes to School (SRTS)* programs around Australia. In most cases these programs identify beneficial countermeasures, however, they are only able to provide an indicative (qualitative) measure of their appropriation of use and how they will improve safety. This presents challenges in prioritising if, or where, treatments should be provided and which schools have the highest risk and should be addressed as a priority.

3. Yang, J and Yao, J, *Correlation of different impact conditions to the injury severity of pedestrians in real world accidents*, paper number 05-0352, Hannover Medical University, Germany. 4. Cuerden, R 2016, *The Impact of Higher or Lower Weight and Volume of Cars on Road Safety, Particularly for Vulnerable Users* (presentation based on the report), Directorate-General for internal policies, European Parliament, Brussels. presentation web link. 5. Australian Institute of Health and Welfare 2020, *Australia's children*, webpage, Australian Institute of Health and Welfare, viewed 6 July 2020, < https://www.aihw.gov.au/reports/children-youth/australias-children/contents/health/injuries>. 6. Centre for Accident Research and Road Safety – Queensland 2015, *Pedestrian Safety*, Centre for Accident Research and Road Safety – Queensland, Queensland, Australia.

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## *A Quantitative, Repeatable, Risk-Based Approach*

The Star Rating for Schools (SR4S) Program is designed to be an objective (research and evidence-based) and repeatable package that identifies a Risk Score for vulnerable road user access points and crossing locations. Developed by the International Road Assessment Program (iRAP), SR4S has been applied around the world; ARRB, as the Australian Centre of Excellence, is working to apply SR4S to the Australian road and school environment.

The program considers traffic volume, speed, vehicle parking, road type, existing school-based countermeasures, crossing facilities, speed management measures and existing road engineering features to generate a SR4S Risk Score. Countermeasure options that align with the Australian Standards Manual of Uniform Traffic Control Devices (AS1742)can be applied in the SR4S model to adjust the risk scores. The SR4S model considers treatments such as speed reductions (*which can consider speed camera enforcement*), crossing guards, signalised crossings, priority crossings with speed reduction deflections etc.

A probability of serious or fatal injury crash outcome is calculated for the existing and treated scenarios as part of the output from the SR4S model and is based on the expected vehicle operating speeds for all traffic movements around the school including through and intersection movements. The analysis recognises that students are highly susceptible to head injuries and have a higher head injury fatality rate than adults (when struck by a vehicle). Calculating the probability of the crash outcome will complement and qualify the before and after SR4S Risk Score and assist in identifying the most suitable treatments.

## *Countermeasures to Reduce Crash Risk*

A multitude of countermeasures can be provided around schools to improve safety. One example is reducing vehicle operating speeds, which can decrease both crash likelihood and severity. Experience has shown that the implementation of 40 km/h school speed zones led to a 24% reduction in the number of pedestrian and cyclist crashes outside schools [7].

Engineering treatments can reduce operating speeds and provide a priority crossing for the vulnerable road user, for example, the treatment in Figure 4 can be provided on side roads and surrounding streets to 'force' speed reductions (even lower than the school zone limit) at high-risk locations.

When an engineering treatment that results in permanent speed reduction is not suitable (e.g. roads with a function that requires moving high volumes of traffic at speed outside of school hours) a countermeasure such as speed enforcement of School Zone Speed Limits could be provided to assist in ensuring vehicles are not exceeding the school zone speed limit of 25 or 40 km/h.

Figure 4 – Priority Crossings on side roads

Vertical deflections reduce vehicle speeds

Source [8]

7. Centre for Accident Research and Road Safety – Queensland 2015, *Pedestrian Safety*, Centre for Accident Research and Road Safety – Queensland, Queensland, Australia.

8. TMR 2015, *Technical Note128, Selection and Design of Cycle Tracks* May 2015, Department of Transport and Main Roads, Queensland, Australia.

# Safe School Access Assessment

In an effort to promote active transport for parents and students, whilst also mitigating the potential high severity outcomes from vehicle and pedestrian crashes, ARRB is proposing the ***Safe School Access Assessment*** process to identify student safety risk for schools across the state, identify countermeasures to reduce risk, estimate the reduction in risk possible, and develop an implementation program.

The ***Safe School Access Assessment*** process is a proactive assessment that considers crash risk as identified by the SR4S Risk Score and the probability of a vehicle to pedestrian crash resulting in a Serious or Fatal injury. It can be used to quantify a risk score for each school, prioritise locations for further investigation and the development of countermeasures to reduce the crash likelihood and severity.

As the risk is quantifiable an implementation program can be developed to demonstrate how risk can be reduced over time and within budget limitations, this demonstrates proactive risk management and fulfils an agency's duty of care requirements.

The ***Safe School Access Assessment*** requires the Before and After SR4S Risk Score output and the probability of a vehicle to pedestrian crash resulting in a Serious or Fatal injury.

***To discuss the proposed Safe School Access Assessments process in further detail please contact David Milling (Team Leader, Transport Safety) on 0438 859 779 or david.milling@arrb.com.au .***

## FOR MORE INFORMATION CONTACT


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