

School travel planning an engineer will love: using audits and surveys to identify capital works priorities

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Abstract

School travel plans are a proven successful form of travel demand management in encouraging higher rates of walking and cycling amongst school children. They offer a formal structure within which individual behaviour change interventions, such as walk or ride to school days, can take place.

However, within local government, the development of school travel plans has often taken place separately to more traditional traffic management and engineering. While councils have developed good travel plans for schools, they have often done so in response to activity around a school or available funding. In these instances, schools have been guided through the initial steps of the travel plan process, including surveys and traffic audits, but the responsibility for implementation has fallen upon the school, which is often cash strapped and time poor.

The City of Moonee Valley opted for a different approach, by first conducting assessments of schools throughout the municipality in order to gauge which were more likely to be successful adopters of travel plans and which had the greatest need, in terms of attempting to rectify unsafe local traffic environments. The assessments also allowed the City to prioritise likely capital works expenditure related to school travel issues.

The City of Moonee Valley contracted UrbanTrans to conduct assessments of conditions around 40 schools in the municipality in 2012. Assessments included audits of school traffic conditions and surveys of children and their parents. The results ranked the schools by different criteria, including likely changes to road safety and use of active transport modes by children. The project offers a new way forward for local governments wanting to improve the rates of walking and cycling within schools in their municipalities, in a manner which is integrated with capital works expenditure.

1. Introduction

The percentage of children walking and cycling to school has declined dramatically in many Western nations in the past 40 years. A review of active travel to school programs by the Australian Greenhouse Office, noted that there had been a 75 per cent drop in the number of children walking and cycling to school, since 1970 (UrbanTrans, 2008). This has been accompanied by a steady increase in the number of children driven to school.

This pattern has been repeated worldwide. Mackie (2009) noted a decline in the number of children cycling to school in Auckland from 20 per cent in 1980 to four per cent in 2008. In the UK, the number of children being driven to school doubled from 1990 to the mid-2000s (Cairns et. al., 2006). The United States has recorded a 40 per cent drop in children walking and cycling to school between 1969 and 2001 (McDonald, 2007).

In response, some governments have developed a range of methodologies designed to encourage greater uptake of sustainable travel modes by children travelling to school,

including school travel plans. Travel plans are best viewed as a framework, which support the implementation and integration of individual behavioural interventions as well as policy and infrastructure improvements.

School travel plans typically follow a structured process (Cairns et. al. 2006), which includes:

- engagement with and gaining support of the school community;
- audit of existing school facilities and traffic conditions;
- survey of children and their parents as to current school habits and perceptions of barriers and opportunities;
- development of clear plan of actions;
- implementation of actions over a scheduled time period (usually three years); and
- monitoring and evaluation of changes in modal shift.

School travel plans are an opportunity for self-reflection by the participating school community with the expectation that the community will support actions, which will support behaviour change by children and parents. Plans can incorporate a wide range of activities, such as walking school buses, active travel promotion events (e.g. Walk to School Day) and infrastructure improvements, such as the installation of pedestrian crossings.

When fully implemented, school travel plans have been successful in achieving real behaviour change within the timeline of the plan. The Victorian TravelSmart pilot in six schools on the Bellarine Peninsula in Victoria achieved reductions in the numbers of children being driven to school and increases in sustainable transport use, primarily walking and cycling (Howlett and Watson, 2006). In New South Wales, school travel plans were delivered to 15 schools in inner and western Sydney in 2006 and 2007, with three of the five schools surveyed at the completion of the project recorded increases in active travel (Fry, 2007).

A review of 30 case study schools in the UK found that those schools which had collected data on how children travelled to school recorded an average 23 per cent decrease in the number of children being driven to school (Cairns et. al. 2006). At 20 of the schools, walking had increased with two case study schools recording more than 70 per cent walking to school. Cycling had also grown to an average of 10 per cent across the schools. In Auckland, a study of five schools which had developed and implemented school travel plans found a seven per cent increase in the number of children walking to school, accompanied by a three per cent decrease in those being driven to school (Hinkson 2006).

The downside for school travel plans is that they can be resource intensive. The travel plans delivered for the Victorian TravelSmart program were budgeted at approximately \$20,000 per school, including development and implementation of both the behavioural and infrastructure elements of the plan, which restricts their ability to be rolled out at scale.

School travel plans are often developed with the assistance of the relevant state or local government but responsibility for the implementation of the plan is usually left to the school. Implementation is not usually a high priority within the school, compared to educational outcomes, and with the result that schools often limit their involvement to the adoption of specific behavioural elements which are offered by third parties. These include event-based promotions, such as Walk to School Day and Ride to School Day, which allow children and their parents to try a new mode of transport. These have the advantage of being able to reach a large number of schools at once but without being integrated with other measures, such as infrastructure improvements, any gains achieved in changes in behaviour will be

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temporary and not likely to last. This is supported by Garrard's (2010) assessment of the Victorian Ride2School program in 13 schools which found that parents reported slight increases in the number of children cycling to school, while children reported slight decreases. Attitudes to the program were broadly similar at the end as they were at the beginning. Merom et. al. (2005) reported broadly similar findings in an assessment of the New South Wales Walk Safely to School Day program: slight increases in active travel behaviour but a need for longer term behaviour change support.

Local governments in Victoria have supported schools through the coordination of more structured behaviour change programs, such as walking school buses (and the lesser used cycling school buses). However, these have proved difficult to implement, primarily due to the requirements necessary to recruit and support volunteers (such as background checks for working with children), and the need for parents to commit to a regular schedule of involvement. Walking school bus programs have generally been the subject of initial enthusiasm followed by decline in numbers over time (VicHealth, 2007).

The challenge for local governments has been to develop school travel plans in a more integrated manner, which will provide better support for the schools and coordinate with other local government priorities. Perhaps the greatest of these is the rollout of pedestrian and cyclist supportive infrastructure around schools. This is usually done in response to requests from school communities for improved safety features, rather than the local government making a municipality-wide assessment of the need for infrastructure at different schools.

The City of Moonee Valley is an inner city municipality in Melbourne, serving a population of 113,000 residents. As part of its drive to create safe, active and sustainable communities, the Council has developed a number of key strategies including an Integrated Transport Plan and a specific Walking and Cycling Strategy, designed to increase the number of short trips taken by pedestrians and cyclists. These strategies are also supplemented by a Road Safety Plan, which seeks to promote safe walking to school and the provision of appropriate infrastructure around schools.

The City of Moonee Valley has developed and implemented a program called Better Moves to bring Council and schools together to improve traffic, safety and parking management, and encourage walking, cycling and the use of public transport when travelling to and from school.

Moonee Valley has 24 primary schools, three private schools, 11 secondary schools and three special schools. The Better Moves programs targets between three and five schools a year and Council felt there was a need to have a strategic approach in selecting and approaching schools for its widespread implementation. This was to be achieved through an assessment of the current needs and baseline behaviours of Moonee Valley schools. In addition the Council planned to use the results of the investigation to deliver school travel plans in a manner that complemented other initiatives, including infrastructure improvements.

2. Project Methodology

2.1 Approach

The school surveys and audits were designed to provide the City of Moonee Valley with:

- a list of short term and long term recommendations for infrastructure improvements at each school:
- identification of capital works around schools for future budget allocations;
- background information relating to each school that is vital when approaching schools or when schools approach Council requesting infrastructure improvements;

- data to compare findings and provides Council with a solid and consistent approach with school requests for capital works, school crossings and parking changes; and
- audited safe walking routes for each school and three safe cycling routes across the municipality.

The approach deployed was designed to meet two primary objectives:

- collect information to inform the Council on local school travel patterns, issues and needs; and
- build an understanding within the participating school community of why the survey is being conducted and, in turn, support for the development of a school travel plan.

To achieve this, the project developed a methodology which included:

- age appropriate surveys for children;
- surveys for parents understanding their attitudes and behaviours which influence children's travel choices;
- focus groups with school representatives to delve more deeply into survey responses; and audits of school transport facilities and surrounding traffic conditions

2.3 Age appropriate child surveys

The content of the surveys for children reflected what they were able to answer and what is within their control either to directly make decisions about their travel choices, or to influence those decisions. For example, while all children are subject to the influence of their parents when making choices about their trip to school, children in junior school (Prep to Year Two) are rarely allowed to travel independently. For this reason, the questions asked of children in junior school were restricted to simply how they travelled to school on the day of the survey.

For older children, were asked about:

- year / grade at school;
- current mode of travel;
- whether they had ever considered alternative modes of transport;
- identifiable barriers to change, including after-school activities;
- if they walked to school, how long was the trip (distance, time);
- self-assessment of their cycling ability;
- bicycle ownership; and
- if driven to school, where they were dropped off.

The surveys for children were delivered both in paper form and electronically, depending on the best form of communication within each school. The project did not use hands-up surveys in class, as these can leave children vulnerable to influences such as peer pressure ("I want to do what my friends are doing and I don't want to seem odd") or misunderstanding the question ("I walked some of the way and caught the bus some of the way – which do I say?").

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2.4 Parental surveys

Surveying parents is vital as they play a key role in decision-making about children's travel choices, often acting as the final arbiter in such decisions. Parental surveys covered not only what the parents know about the journey to school but also their attitudes to that journey. Primarily, it is parental fears about issues such as stranger danger, neighbourhood crime and the amount of traffic on roads surrounding the school that influence the choices that they and their children make. Conversely, if these fears can be overcome through initiatives introduced through a school travel plan, then other factors begin to influence parental choices, such as concerns about their children not getting enough exercise, environmental attitudes and stress related to the school run.

Surveys were generally delivered in electronic form to parents, on the advice of the schools and covered the following issues:

- who makes the decision regarding their child's choice of travel;
- known influences upon that decision;
- assessment of distance to walk to school;
- assessment of cycling ability of child; and
- identified traffic problems near school and suggested solutions.

2.5 Focus groups

Each school was offered the opportunity to host a focus group to tease out details from the survey responses to ensure a more accurate picture of the transport situation at the school, and to work with the school community to analyse the survey findings and begin to develop solutions which will be owned by the school.

In practice, this offer of focus groups was only taken up by two schools, limiting its usefulness.

2.6 Transport environment audit

The surveys were supported by an audit designed to deliver a clear picture of the environment immediately surrounding the school during operational hours as well as the facilities, which influence travel choices. This included:

- cycle parking within the school grounds;
- access gates to the school (and hours of access);
- access to public transport (including location of stops and frequency and range of services);
- state of footpaths surrounding the school;
- street widths;
- signalised intersections;
- zebra crossings;
- patrolled crossings;

- level and speed of traffic; and
- pattern of traffic (including headway between vehicles).

3. Results

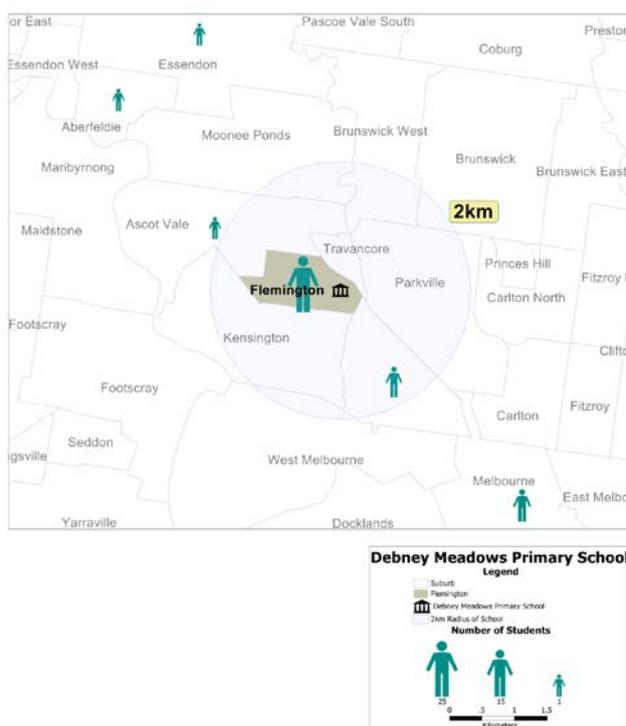
The project engaged 41 schools within the City of Moonee Valley, conducting surveys of children at 25 schools. Those schools that did not consent to either conducting the survey or were unable to run the survey were still subject to a local traffic environment audit.

3.1 Separate reporting for schools and Council

Each school received a report on the state of how its children travelled to school as well as the attitudes of children and their parents towards different forms of travel. It should be noted that parental survey responses were generally very poor, with typically fewer than five per cent responding, which was in line with expectations of schools which reported that getting parents engaged through surveys was difficult.

Each school report included maps both of the distribution of where students lived (according to the survey responses of children identifying them only by postcode) as set out in Figure 1.

Figure 1: Home distribution map by postcode of children at Debney Park Primary School, 2012.



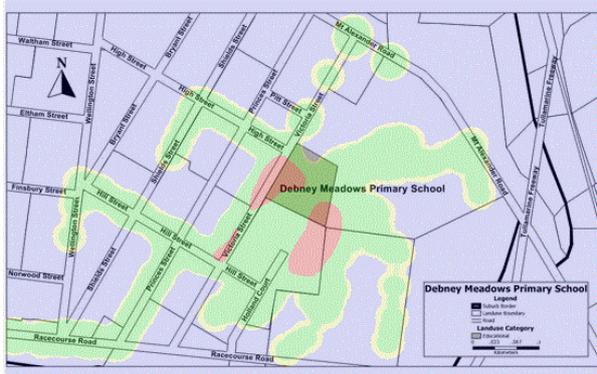
For state schools, the majority of students lived within the immediate postcode area, reflecting the tight catchment areas of most Melbourne schools. Private schools had a wider distribution of student home locations but, again, most of the students at these schools also lived close to their school. In both cases, the maps helped to demonstrate to the school community that distance was not a major barrier to students walking or cycling to school.

The language of the report was presented as findings from the students with titles such as “How We Travel To School” and “How We’ Like To Travel To School”. This was designed to ensure that the adults in the school community had a clear idea of the views of students, rather than the report being a local government document. In response to the latter question, students in primary school generally expressed a desire to use sustainable transport modes more than they currently did.

Each of the school reports also included a map of recommended walking routes, generated from a combination of the most

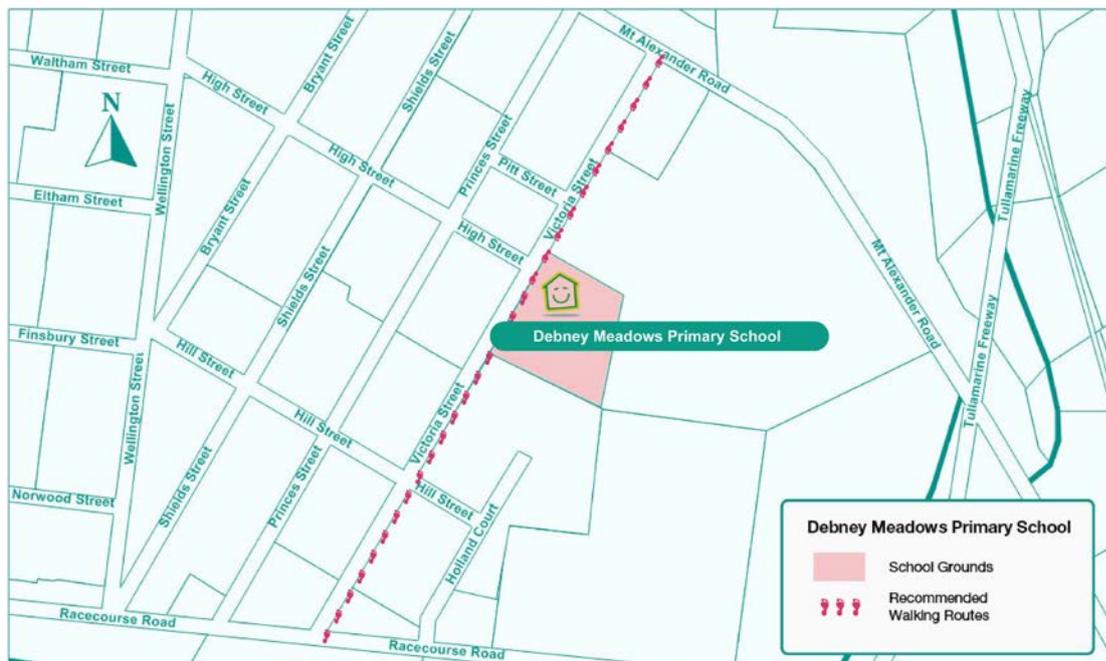
heavily used streets and the audit of surrounding transport facilities. The survey allowed students to mark the route they most commonly used to approach the school. In the electronic form of the survey, this was generated as a heat map, as set out in Figure 2.

Figure 2: Heat map showing most common routes and access points used by students at Debney Park Primary School, 2012.



This was then combined with findings from the team of engineers conducting the local transport environment audit to develop a map showing recommended safe routes for children to walk to school, as set out in Figure 3.

Figure 3: Recommended walking routes for children at Debney Park Primary School, 2012.



The detailed findings of the local transport audit for each school was not presented to the school, but rather was delivered in a separate but related report for the City of Moonee Valley, which combined the findings of the surveys and the audit. This will help the City of Moonee Valley to gauge which schools face the most pressing problems but also have the greatest level of commitment to changing student travel to school behaviour.

3.2 Assessment criteria

The objective of the exercise was to allow the City of Moonee Valley to rank the schools using a range of criteria to assess which schools faced the most pressing transport problems and also displayed the greatest level of commitment to changing student travel to school behaviour.

Ten criteria were developed to assess each school based on the findings of the audit and the surveys. These, and their scoring systems, are set out in the following tables.

The scores in the individual criteria help to gauge which schools are in need of better infrastructure to support active transport. Thus, a school with a generally good transport environment and high levels of active transport will generally be ranked lower in terms of need, than a school with a poor environment and more children being driven to school, as the latter has a greater need for attention.

3.2.1. Percentage of children driven to school

In Table 1, each school receives an even numbered score from 2 to 10, which equates to a percentage of children being driven to school. Those schools with a 0 score either had fewer than 15 per cent of children driven to school, or as was more often the case, did not participate in the survey.

Table 1: Scoring for percentage of children driven to school

| Percentage of children driven to school | Score |
|--|--------------|
| < 15% | 0 |
| 15% - 30% | 2 |
| 30% - 50% | 4 |
| 50% - 60% | 6 |
| 60% - 80% | 8 |
| > 80% | 10 |

3.2.2. Percentage of children catching public transport to school

In Table 2, each school received an even numbered score from 2 to 10, which equated to a percentage of children catching public transport to school. Those schools with a 0 score either had more than 40 per cent of children catching public transport to school, or as was more often the case, did not participate in the survey.

Table 2: Scoring for percentage of children driven to school

| Percentage of children catching public transport to school | Score |
|---|--------------|
| > 40% | 0 |
| 30% - 40% | 2 |
| 20% - 30% | 4 |
| 10% - 20% | 6 |
| 5% - 10% | 8 |
| < 5% | 10 |

3.2.3. Percentage of children walking and cycling to school

In Table 3, each school received an even numbered score from 2 to 10, which equalled a percentage of children walking or cycling to school. Those schools with a 0 score either had more than 75 per cent of children walking or cycling to school or did not participate in the survey.

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Table 3: Scoring for percentage of children walking and cycling to school

| Percentage of children walking and cycling to school | Score |
|---|--------------|
| > 75% | 0 |
| 55% - 75% | 2 |
| 40% - 55% | 4 |
| 25% - 40% | 6 |
| 10% - 25% | 8 |
| < 10% | 10 |

3.2.4. Parking conditions around the school

The parking conditions criteria captured a number of different parking issues commonly faced by schools and gave them an equal score. These scores were then added together to produce a final figure for the school.

Table 4: Scoring for parking conditions around the school

| Parking conditions | Score |
|--------------------------------------|--------------|
| No parking issues | 0 |
| Overstaying pick-up / drop-off times | 2.5 |
| Illegal parking | 2.5 |
| Dangerous manoeuvres | 2.5 |
| Severe lack of parking | 2.5 |

3.2.5. Separation of vehicles and pedestrians at the school

This criteria captured a number of different issues related to the separation of vehicles and pedestrians at the schools, and ranked them according to the severity of the issue.

Table 4: Scoring for separation of vehicles and pedestrians at the school

| Separation of vehicles and pedestrians | Score |
|--|--------------|
| Separated at all times | 0 |
| Shared driveways | 4 |
| Shared pathway over parking lot (not used during school times) | 6 |
| Shared pathway over parking lot | 10 |

3.2.6. Traffic speeds around the school

This criteria ranked the school as to whether there was speeding of vehicles observed.

Table 5: Scoring for traffic speeds around the school

| Speeding | Score |
|-------------------|--------------|
| No speeding | 0 |
| Speeding observed | 10 |

3.2.7. Congestion around the school

Congestion was ranked by the amount of traffic in the immediate surrounds of the school and the time taken for traffic to clear.

Table 6: Scoring for congestion around the school

| Congestion | Score |
|-------------------|--------------|
| No congestion | 0 |
| < 5 minutes | 2 |
| 5 – 10 minutes | 4 |
| 10 – 15 minutes | 6 |
| 15 – 30 minutes | 8 |
| > 30 minutes | 10 |

3.2.8. Condition of footpaths

The condition of the footpaths around each of the schools was assessed according to the criteria set out in Table 7.

Table 7: Scoring for condition of footpaths

| Condition of footpaths | Score |
|--|--------------|
| Footpath and nature strip are wide and in good condition | 0 |
| Some maintenance required | 2 |
| No nature strip in front of school, good footpaths | 4 |
| No nature strip at all, good footpaths | 6 |
| Bad footpaths | 8 |
| No nature strip at all, bad footpaths | 10 |

3.2.9. Traffic calming infrastructure

The audit captured the existence and state of traffic calming infrastructure around each school. This was split into two categories: the first was the provision of infrastructure of which there could be more than one and so received equal scores (e.g. elevated crossings, kerb extensions) and the second related to the provision of signage denoting speeds with different scores for the different types of signage.

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Table 8: Scoring for traffic calming infrastructure

| Traffic calming infrastructure | Score |
|---|--------------|
| Elevated crossing | 2 |
| Chicane / kerb extensions | 2 |
| Speed bumps | 2 |
| 40 km/h signs / painted on ground / LED signs | 6 |
| 40 km/h signs | 8 |
| No traffic calming | 10 |

3.2.10. Provision and condition of school crossings

The provision and condition of crossings around each of the schools was assessed according to the criteria set out in Table 9.

Table 9: Scoring for provision and condition of school crossings

| School crossings | Score |
|---------------------------|-------|
| Supervised with lights | 0 |
| Supervised without lights | 2 |
| Traffic lights | 4 |
| Pelican and/or equivalent | 6 |
| Zebra crossing | 8 |
| No crossing | 10 |

3.2 Ranking the schools

The results for the schools were combined into a spreadsheet which ranked the schools in four main categories, deemed useful for Council:

- Priority Works – brings together a range of criteria including issues identified in the audits and the surveys, to rank schools according to the need for works which will better support use of sustainable transport modes, especially walking and cycling.
- Active Transport – brings together data gathered from the student travel surveys to highlight those schools with higher rates of active transport use by students.
- Safety – assesses safety conditions around the school through the examination of relevant criteria.
- Impact on Road Use – assess the likely impact on roads, depending on their type, of activities to increase active transport through better supportive infrastructure.

3.2.11. Priority works

Assessing which schools were to be prioritised for future works by the City of Moonee Valley combined the aforementioned criteria and also weighted these results by a factor accounting for the population of the school. This is based on an assumption that greater benefit will be gained by works carried out serving a larger number of students, as set out in Table 10.

Table 10: Weighting scores for priority works

| School population | Weighting |
|-------------------|-----------|
| < 150 | 1 |
| 150 - 299 | 2 |
| 300 - 399 | 3 |
| 400 - 499 | 4 |
| 500 - 800 | 5 |

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3.2.12. Active transport

The score for the ranking of the schools by usage of active transport modes for getting to school (walking, cycling and public transport) was also weighted by criteria to be more specific about which schools need treatments in which areas to better support active transport, as set out in Table 11.

Table 11: Criteria for active transport assessments

| Criteria | Weighting |
|---|-----------|
| Percentage of children walking or cycling to school | 2 |
| Separation of vehicles and pedestrians | 2 |
| Observed speeding | 2 |
| Condition of footpaths | 2 |
| Traffic calming | 2 |
| School footpaths | 2 |

3.2.13. Safety

The score for the safety ranking of the schools is also weighted by other criteria to be more specific about which schools need treatments in which areas to better support a safer transport environment around the schools, as set out in Table 12.

Table 12: Criteria for safety assessments

| Criteria | Weighting |
|--|-----------|
| Parking conditions | 2 |
| Separation of vehicles and pedestrians | 2 |
| Observed speeding | 2 |
| Condition of footpaths | 2 |
| Traffic calming | 2 |
| School footpaths | 2 |

3.2.14. Impact on Road Use

The score for this category ranking of the schools is weighted by the types of roads surrounding of the schools. This recognises that some works to encourage active forms of transport may have a negative or no effect on traffic flows on those roads. The weighting scores for the different road types are set out in Table 13.

Table 13: Weighting for road types

| Type of road | Weighting |
|-----------------|-----------|
| Arterial | 0 |
| Major collector | 1 |
| Local collector | 1.5 |

| | |
|---------------------|-----|
| Local street | 2.5 |
|---------------------|-----|

In addition, the following criteria in Table 14 received extra weighting to recognise the impact of these on road conditions:

Table 14: Additional road impact criteria

| Type of road | Weighting |
|--|------------------|
| Percentage of children driven to school | 2 |
| Parking conditions | 2 |
| Congestion | 2 |

5. Discussion

The methodology developed and implemented, was successful in creating a database for the City of Moonee Valley to make assessment of the infrastructure needs of the schools in the municipality, based on audits of transport environment and current school attitudes and behaviours. The Council has been able to rank schools by a range of categories, including safety, road impact, likely impact on active transport uptake and physical works. In each instance, the Council is able to delve into the specific results for each school to make an assessment of the likely degree of cooperation that will be received from the school.

It has also formed a baseline for the measurement of behaviour change in school travel across the municipality, allowing the City of Moonee Valley to develop and deploy its existing Better Moves program in a strategic and efficient manner. The methodology employed in this project also engaged schools by linking the programs to encourage children to walk and cycle to school which would be deployed by the school itself, with its ranking on the database which, depending on its actions, could increase the likelihood that it would receive supportive infrastructure from Council.

The City of Moonee Valley schools project can stand as a model for local government considering dual supportive travel demand management approaches: behaviour change interventions under the umbrella of a school travel plan, and capital works which can support this change and lock it in for future generations of school children and their families.

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