BRIDGING THE GAP

Helping Pedestrians and Cyclists Cross the Great Divide

Technical Note

Author

Andrew Stevens

BE (Civil)

Associate, Beca Transportation

Traffic Safety Manager for the Auckland Motorway Alliance

Contact Details

DDI 09 539 9118

Email andrew.stevens@ama.nzta.govt.nz

Presenter

Andrew Stevens

ABSTRACT

Dealing with short comings in pedestrian and cyclist networks can become very emotive, especially when the lack of facilities relate to children, the more vulnerable of our road users.

When there are limited statistics to demonstrate the need to upgrade facilities, either from a safety or suppressed demand point of view, it can become difficult to prioritise sites or justify doing any work.

The Auckland Motorway network recognises that while being a key part of the country's infrastructure, it also effectively severs one side of the community from the other with only periodic bridges or underpasses (at the interchanges) providing a route for cross traffic. Several of these interchanges were built several decades ago when they were situated in a rural environment but now find themselves in an urban one, or at a time before alternative modes of transport were a key consideration in design.

These interchanges form a key and high volume interface between the local and state highway network thus providing significant challenges for pedestrians and cyclists.

The Auckland Motorway Alliance (AMA) commissioned and developed a level of service / risk rating tool along the lines of the KiwiRAP star rating tool that is focused around pedestrian, cyclist and shared path facilities through interchanges. The refinement and testing of the tool was completed in conjunction with the then Auckland City Council and representation from the cycling fraternity.

The past 6 months has seen the now Auckland Transport and the AMA rate all the interchanges on the Auckland network. The next tranche of work is to combine this risk rating with a HRIG analysis, CAS data and the AT regional pedestrian and cyclist network maps to come up with a common ranking of improvement priorities. This will lead on to an agreement with stakeholders about the aspirations for each site, and ultimately to development of a programme for improvements.

The rating tool is readily adaptable to local road intersections and could be used to rate / analyse the impacts of different proposed schemes on the safety of vulnerable road users.

THE ISSUE

The Auckland motorway network predominately runs north to south through the middle of urban Auckland. In the context of pedestrians and cyclists this effectively splits the community down the middle. The motorway is a key national and regional strategic corridor, naturally distributing and drawing significant volumes of traffic to and from it, resulting in many of the older interchanges, in particular, being far from pedestrian or cyclist friendly. Thus while pedestrians and cyclists are not permitted on the motorway itself there is still the need to allow them to cross from one side to the other.

We are also faced with an ever expanding Auckland. Thus, some interchanges that were constructed in rural environments with little or no thought to pedestrian or cyclist activity now find themselves in urban Auckland!

This is a time when alternative transport options are being promoted both in terms of promoting individual health and wellbeing and also as a means to manage congestion and optimise the existing road infrastructure.

Thus we have:

- Vulnerable road users in the form of pedestrians and cyclists
- A road infrastructure that does not always meet the needs of those users
- A significant level of suppressed demand due to safety concerns
- Limited crash statistics to base a risk or needs assessment on
- Limited budgets allocated to Cycling and Walking, and hence
- The challenge of how to prioritise investment for what can often be a very subjective or emotive topic.

THE OBJECTIVE

There have been many safety and prioritisation tools developed in recent years, with the likes of the NZTA KiwiRAP 5 Star Rating analysis being notable as a proactive tool for prioritising safety concerns along the State highway network. Taking this tool as the inspiration, a brief was prepared to develop something similar to evaluate the infrastructure provided for pedestrians and cyclists to cross from one side of an interchange to the other.

The aim for this project was to develop a tool and / or methodology that would:

Primarily:

- Assist with the risk assessment and hence prioritisation of the motorway interchanges, and
- Help with identifying a suitable level of service.

Secondly, be a tool that:

- Could be used to assess the relative merits of proposed designs
- Would complement other existing tools (both for effectiveness and understanding),
- Would be a relatively simple field tool to use, and
- Could be adapted for use on local road intersections.

DEVELOPING THE TOOL

The Auckland Motorway Alliance (AMA), which is responsible for the maintenance and management of the Auckland Motorway Network, lead the development of this tool in conjunction with representatives from the then Auckland City Council and local cycle advocacy groups as well as experienced Road Safety Auditors.

Following the development of the initial concept, field tests were undertaken on six sample sites and the tool updated based on this experience.

The final tool has since been used to assess all 62 motorway interchanges on the Auckland Network (not including motorway to motorway connectors or those currently under construction). Reports where then prepared on both the rating tool and the interchange assessments that were undertaken.

THE TOOL

The concept of the assessment tool is relatively simple. It takes a typical motorway interchange and separates it out into its individual components when considered in the context of a pedestrian or cyclist. These components are tagged as midblock (MB), ramp crossing (RC) or midblock crossing (MC) as shown in Figure 1 below

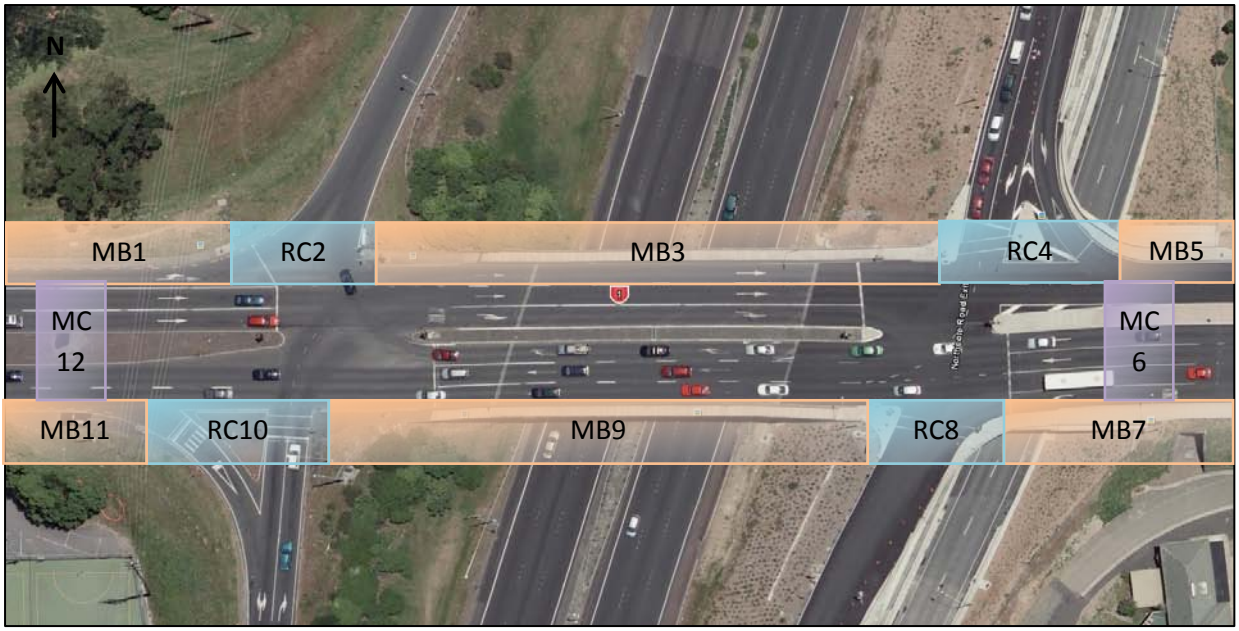

Figure 1 - Interchange Assessment Sections

Once the interchange in question has been separated out into the subsections as indicated in Figure 1, each section is categorised in terms of what facilities it provides:

- Pedestrian (Pedestrian only off road facilities)
- Cyclist, (On road, or shared with vehicles)
- Shared Path (Shared use, off road, and all midblock crossings)

It is possible for any given section to have more than one type of facility.

A ranking exercise then follows based on checklists that have been developed. The checklists note typical facility features (level of service) as indicated in Figure 2 below.

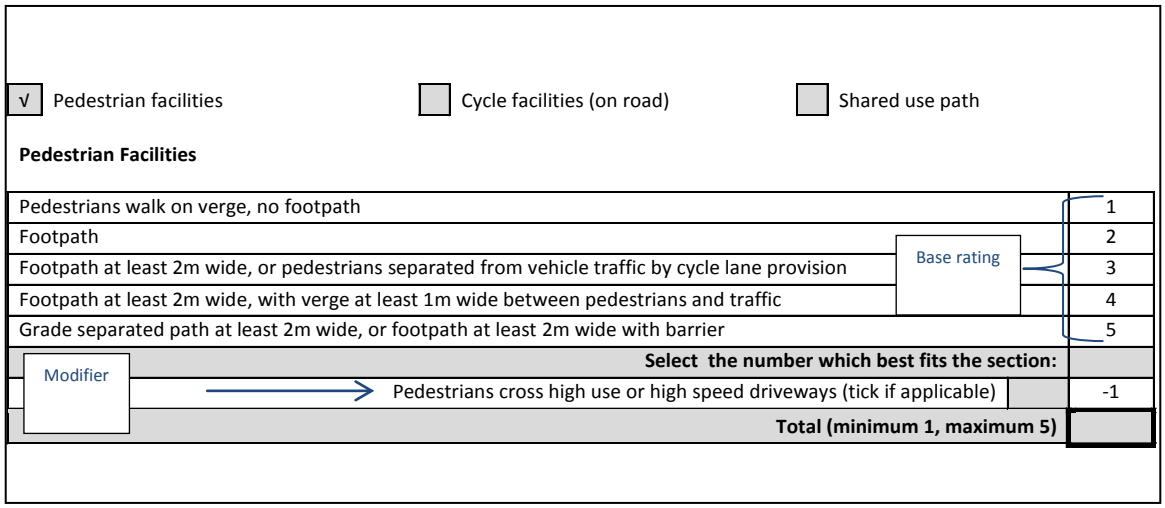

Figure 2 - Typical Assessment Checklist

It is not possible to include every possible design feature in the check lists; hence there is the ability to modify the suggested base rankings to capture poor safety features.

On completion of an audit, all sections are tallied by rating, and the results tabulated as indicated below (Figure 3).

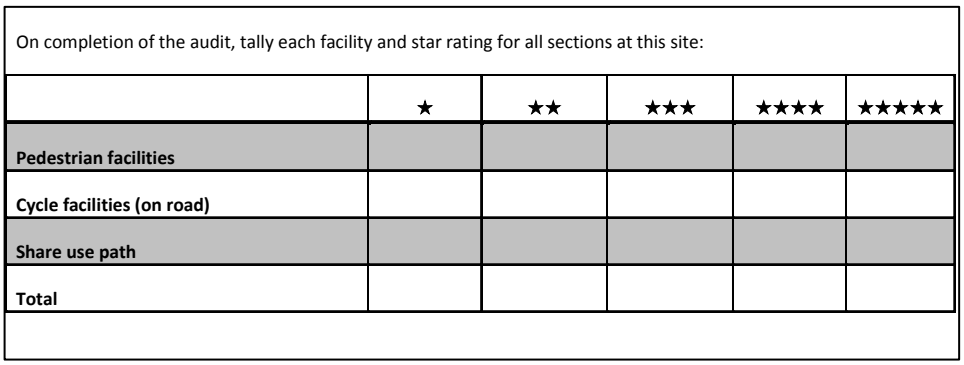

Figure 3 – Summary Sheet

The star ratings are used to give an indicative safety risk rating of the facility as a whole and of the individual components that make up the interchange by way of assessing the level of facility provided. These are summarised below (Figure 4):

Rating	Level of Service	Example
*	No dedicated facilities.	Pedestrian are forced to walk on the verge, no footpath.
**	Minimal facilities.	Cyclist crosses roundabout, nearside lane wider than standard width.
***	Basic facilities provided.	Shared use path, unsegregated with 1m separation from traffic.
****	Facilities to cope with high demand in a controlled manner.	Pedestrian cross at signalised intersections, no slip lane present.
*****	Highest level of facility provided.	Grade separated shared use path, with an adequate width

Figure 4 - Relative Safety Rating Summary

DISCUSSION

While the output of this assessment tool bears some resemblance to the KiwiRAP star rating data, there are some key differences. With KiwiRAP the intention is to work towards getting all highways up to a 3 or 4 star rating based on incremental safety benefits; i.e. maximising the star rating. When it comes to pedestrian and cyclist facilities it is conceivable that we may only want a 1 or 2 star level of service based on the environment. That is to say a 1 or 2 star facility may be all that would be expected and is all that is appropriate at a rural interchange, while a 3 star facility is likely to be adequate for a typical urban interchange and a 4 or 5 star facility may be desirable where there are high volumes of pedestrians and cyclists or are along key routes. That is, the applicable target star rating is largely influenced by the demand volumes and the environmental setting, i.e. a balancing exercise between exposure and risk.

The other area to be aware of when using this tool is that while a particular interchange may rate as a 4 star facility overall, that if there is a 1 star component amongst the mix, then this one component may require careful consideration. A one star component on a key link within a four star facility may result in significant suppressed demand, or heightened risk at that feature based on it being out of character from the rest of the facility. Thus awareness of the individual component ratings is just as important, if not more so than the overall facility rating.

This tool was developed based around the Motorway interchanges as this was seen as a key interface between the NZTA and local authority road networks and where the majority of vulnerable road users are found with respect to the motorway network. It was therefore seen as important that we had the same prioritisation, or understanding of priorities for being able to work together in improving and providing an appropriate level of facility at each interchange.

While this tool has been developed based around motorway interchanges, it is easily adaptable to any local road intersection by dropping out the irrelevant midblock sections from the analysis. It has successfully be modified to accommodate the varied number of configurations of motorway interchanges and local road connections to date.

At present the tool has been used to assess existing facilities, but it is equally adept to being able to evaluate the relative merits of different design concepts.

WHERE WE ARE AT AND OUR NEXT STEPS

During the latter half of 2012, Auckland Transport and the AMA undertook a joint exercise to use this tool to assess every interchange on the Auckland Network.

The output from this exercise has been mapped to aid a visual interpretation:

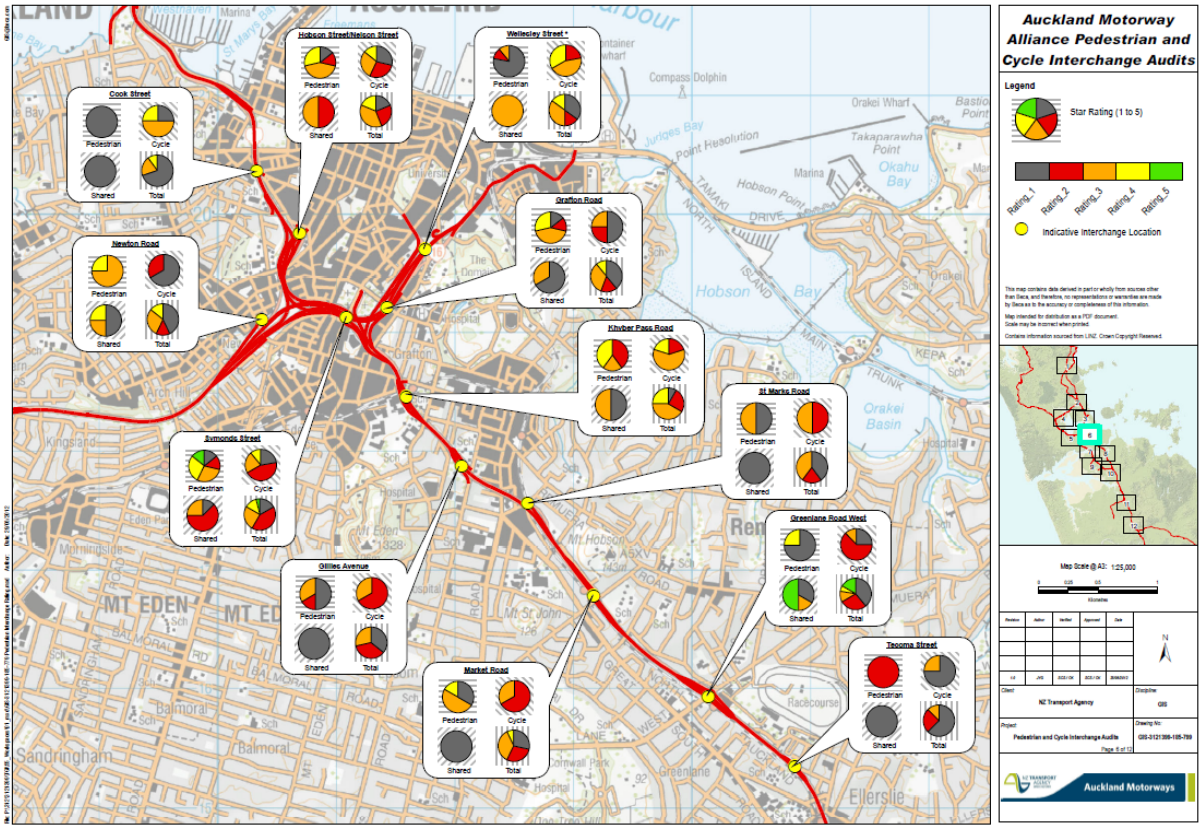

Figure 5 – Mapped Output

To aid the prioritisation of treatment of the interchanges in a proactive manner, the data is now being combined with crash history from the Crash Analysis System database and the AT cycle and walking maps. The High Risk Intersection Guide (HRIG) crash risk models have also been used. However, these models relate to risk for motorised transport and are based on typical T intersections and cross roads, of which motorway interchanges are not, but have been used to give an indication of risk to pedestrians and cyclists based on exposure to traffic. These four datasets will then be combined to assign a target Star Rating and generate a prioritised forward works programme that AT and the AMA can work together on implementing.

ACKNOWLEDGEMENTS

Bevan Woodward (Cycle Action Auckland)

Gary Nates (Beca)

Grant Gordon (Opus)

Irene Tse (AT, formally Ak City)

Shane Turner (Beca)

Stephanie Spedding (Beca)

Steve Patton (Auckland Transport)

Tracy Allatt (Beca)

REFERENCES

High Risk Intersection Guide, 2012, NZTA

Pedestrian and Cyclist Risk Assessment Tool, 2010, AMA

Pedestrian and Cycle Risk Assessment of Interchanges, 2012, AMA