PNG: HELPING CREATE HEALTHY PEOPLE

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Abstract

The New Zealand Pedestrian Network Guidance (PNG) sets out ways to improve New Zealand's walking environment. Walking is an active mode that contributes to health outcomes. Physical health is improved by moving the body. Mental and emotional health is improved due to increased blood flow and blood circulation to the brain and body helping boost your mood. Social well-being is improved if the walking environment is inclusive for all of the community and provides opportunity for social interaction. If a walking environment is well designed, it can portray a connection for people, be it to the past or from a spiritual perspective. Planning and designing for walking in all our projects is therefore vital to the Te Whare Tapa Whā model.

The recently launched PNG outlines a process for deciding on the type of provision that should be made for pedestrians – including those with a wide range of disabilities – and provides design advice and standards. It provides a 'one-stop-shop' of best-practice guidance, specifically suited to New Zealand's regulatory and operating environment. It promotes pedestrian friendly environments as places where it's easy and safe to walk, where there are plenty of places to cross the street, enough space for everyone and people can generally feel relaxed. Providing such environments is key to the vibrancy and social connectivity of our communities.

This paper will examine a typical project process and how the PNG provides ongoing guidance throughout the planning and design journey and the connection to health and well-being. The intention of the paper is to educate and inspire our industry to contribute to all four dimensions of the Te Whare Tapa Whā model.

INTRODUCTION TO THE PNG

The New Zealand Pedestrian Network Guidance (PNG) sets out ways to improve New Zealand's walking environment. It outlines a process for deciding on the type of provision that should be made for pedestrians – including those with a wide range of disabilities – and provides design advice and standards. It provides a 'one-stop-shop' of best-practice guidance, specifically suited to New Zealand's regulatory and operating environment and promotes a consistent approach to planning, designing, managing and maintaining walking infrastructure and networks. The PNG applies to all places used by pedestrians, including streets, shared spaces, plazas, paths through parks and recreational areas, or on private land where public presence might reasonably be expected. It applies to new developments, facility upgrades and existing environments.

The guidance is an update of the Pedestrian Planning and Design Guide (PPDG) (Waka Kotahi, 2009). Research and an industry survey in 2018 (Abley, 2018) helped inform what guidance needed updating and what new guidance was needed. The PPDG will remain available online until the PNG is completed and ratified (formally approved by Waka Kotahi).

The PNG exists within a Waka Kotahi multimodal guidance ecosystem and wider guidance ecosystem as shown in **Figure 1**. The Aotearoa Street Planning and Design Guide (Waka Kotahi, 2021) is at the centre offering guidance to create multimodal streets, this document has recently been released as draft and when finalised will be moved to an online framework. It references the PNG, the Cycle Network Guidance (CNG) and the Public Transport Design Guide (PTDG). These three mode specific guides are online frameworks and reference each other throughout. For example, when planning and designing shared paths consideration of both pedestrians and cyclists is required and therefore the PNG and CNG reference each other. Other Waka Kotahi guidance is also linked throughout, such as RTS14, and where relevant there is reference to Austroads guidance. This ecosystem approach is important so that people are directed to the relevant information rather than it being repeated.

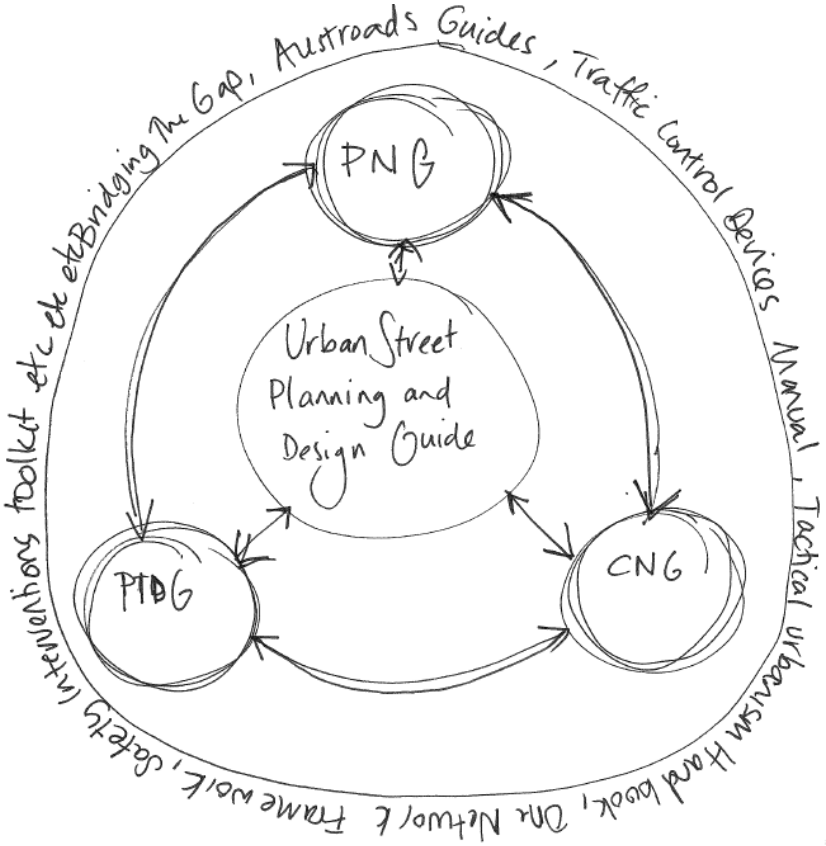

Figure 1 – Waka Kotahi multi-modal guidance eco-system

STRUCTURE OF THE PNG

The PNG comprises nine topic areas as shown in Figure 2. Each topic area has sub-topics. For the purposes of this paper the navigation path to the referenced guidance will be communicated with back slashes, for example: Planning/Walkability/Urban form. The website hyperlinks are also added for those reading this paper as a PDF.

As per the multi-modal guidance eco-system where guidance is linked, users of the PNG are directed to relevant PNG information to help them work through the decision-making processes but also making sure they have the right background information to make those decisions. For example, in the Design/Crossings topic users are directed to further information about safe systems design principles (Design/Pedestrian design principles/Safe System design) as this is a critical part of the design thinking for crossings.

The Walking in NZ topic sets the scene of why planning and designing for walking is important. Although users may not go to this topic in the first instance the content is linked throughout so that the useful information in Walking in NZ is referred to.

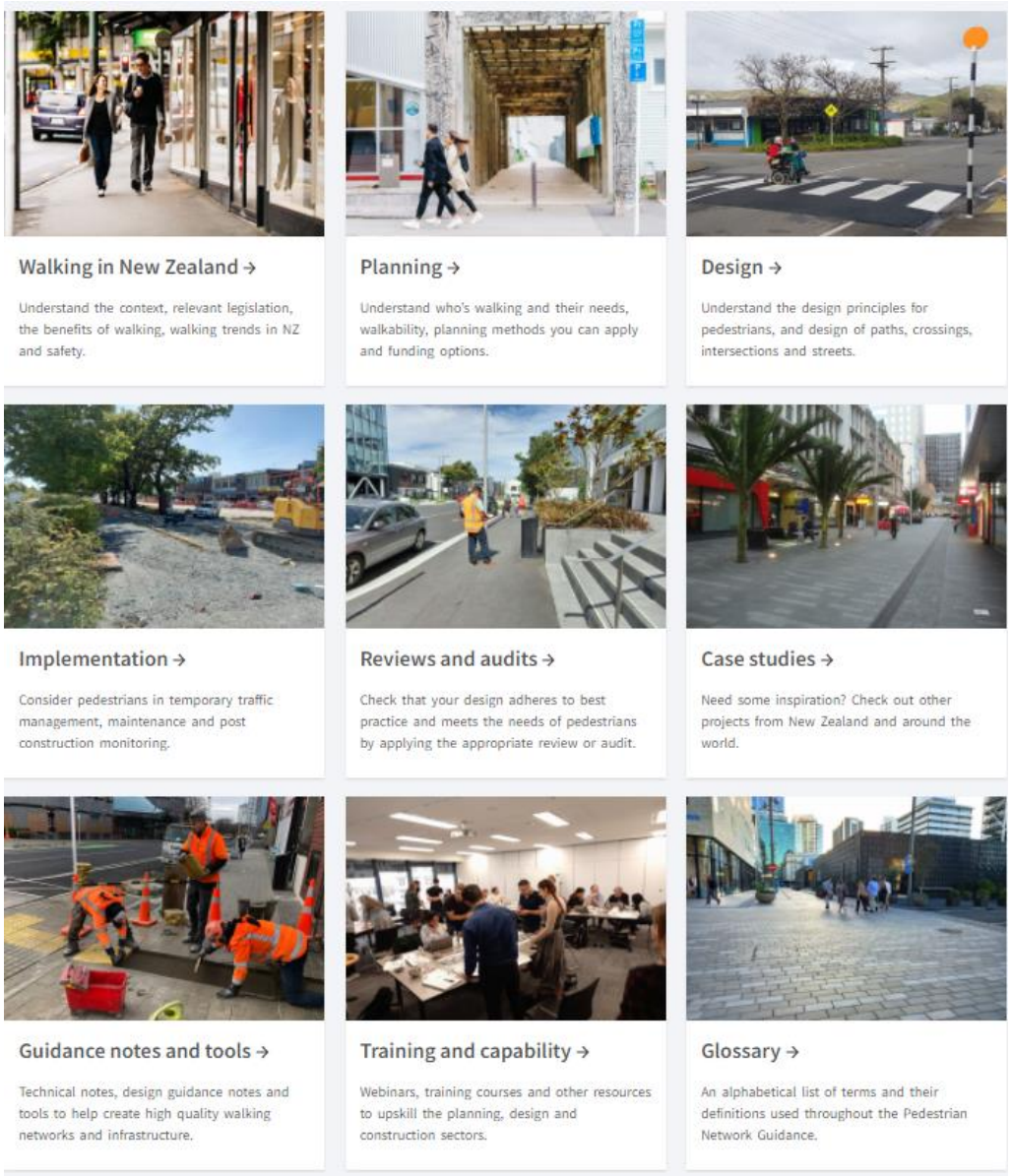

Figure 2 – PNG website landing page

HEALTHY PEOPLE

One model for understanding health is the concept/model of 'Te Whare Tapa Whā' – the four cornerstones of Māori health. The model provides an interconnected perspective for us to think about holistic health (Hauora) and can be visualised as a whare with four walls, and each wall represents a different dimension of health (the cornerstones). All four walls are needed for the house to be strong, these are:

- Taha tinana (physical health)
- Taha hinengaro (mental and emotional well-being)
- Taha whānau (social well-being)
- Taha wairua (spiritual well-being – personal beliefs)

Walking is an active mode that contributes to health outcomes. Physical health is improved by moving the body. Mental and emotional health is improved due to increased blood flow and blood circulation to the brain and body helping boost your mood. Social well-being is improved if the walking environment is inclusive for all of the community and provides opportunity for social interaction. If a walking environment is well designed, it can portray a connection for people, be it to the past or from a spiritual perspective.

Planning and designing for walking in all our projects is therefore vital to the Te Whare Tapa Whā model. The Walking in NZ/Benefits of walking/Health and wellbeing section provides information to support this throughout, including the use of personas to make the guidance real.

The application of principles are also key to the PNG guidance, in particular the principles of Safe, Obvious and Step-free (SOS). These principles incorporate human variation, so that planners and designers can incorporate universal access into their projects. It is important that safe, obvious, step-free routes are provided as a priority on the most important pedestrian routes in towns and cities. This SOS approach essentially mean we are catering for everyone in some form and this also links back to the health model.

APPLICATION OF THE GUIDANCE

To illustrate the application of the PNG guidance this paper examines a typical project process applied to a hypothetical project scenario. It shows how the PNG provides ongoing guidance throughout the planning and design journey and the connection to health and well-being. The intention of the paper is to educate and inspire our industry to contribute to all four dimensions of the Te Whare Tapa Whā model.

The Aotearoa Street Planning and Design Guide recognises that creating good urban streets is an iterative process. The guide organises this process into 4 main phases of development: Discover, Create, Implement and Maintain and Improve (see Figure 3).

The discover and create phases of the process are most closely tied to the planning and design of urban streets and spaces. When working through the application of the guidance to the hypothetical project it will be described within the Discover and Create phases.

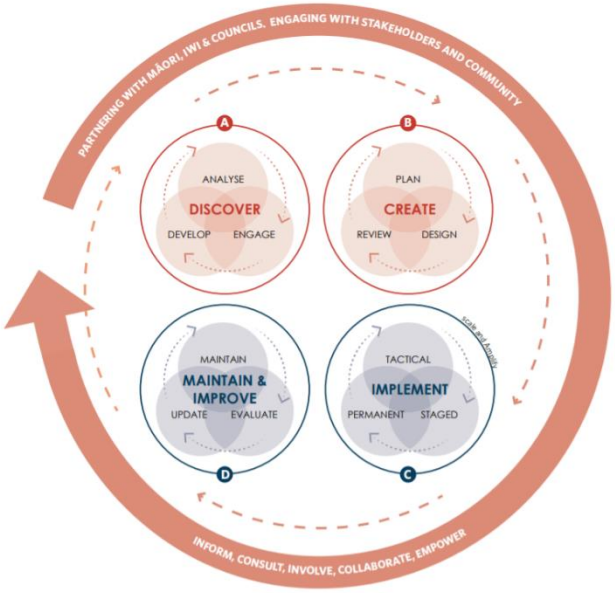

Figure 3: Design process

PROJECT EXAMPLE –OPAWA ROAD CROSSING IMPROVEMENT

The scenario

To demonstrate the application of the PNG guidance the hypothetical Opawa Road Crossing Improvement project has been developed. Let's assume this project arose due to a community concern at the lack of a safe crossing in a location which links busy riverside walking routes, where people cross despite there being no defined crossing place. Figure 4 shows the informal crossing location and the worn grass where people wait to cross the road. A scope for the project was further refined based on the likely approach that would be taken by the road controlling authority, that being to look at a section of Opawa Road not just the location of concern.

Figure 4: Crossing location of concern (west side of bridge)

Figure 5 shows the scope of the investigation. A flush zebra crossing exists 80m to the north and a pedestrian refuge island 190m to the south, there is a bend between them and a bridge over the Heathcote River. Both of these existing crossings are well used particularly by school children travelling to and from Opawa School and a Rudolph Steiner School. Not many children attempt to cross at the location of concern, most likely due to instruction from their parents. The location of concern is predominantly used by adults as part of a river walk/run where detouring to one of the existing crossing locations is unattractive to these people. The key issue with the location of concern is the sight distance to the east (see Figure 6) due to the road geometry but also the presence of vegetation, and the speed of vehicles coming from each direction (approximately 55km/hour[1]).

Children and less mobile pedestrians appear to favour the zebra crossing however there are also concerns about the safety of this crossing, noting a fatality occurred there in 2006. This zebra crossing links the community each side of Opawa Road, with schools and shops to the west. Drivers are often distracted in this location and the visibility of the zebra can be poor, particularly when the sun is low.

Opawa Road is classified as a collector in the Christchurch District Plan and carries approximately 7,100[1] vehicles per day. It is a bus route for the No.28 service. From a One Network Framework (Waka Kotahi, 2021) perspective Opawa Road for its length, comprises several street family types. For this section it would be an Activity street. Activity streets provide access to shops and services by all modes. There is significant demand for movement as well as place with a need to manage competing demands within the available road space. Activity streets aim to ensure a high-quality public realm with a strong focus on supporting businesses, traders and neighbourhood life. Activity streets are where people spend a significant amount of time, working, shopping, eating, residing, and undertaking recreation.

The road width in this section varies between 10 and 13.5m. The width at the crossing location is 13.5m (on the bridge). There are no cycle facilities on this section of Opawa Road.

[1] CCC traffic counts website (data from 2019)

Figure 5: The scope of the investigation

View from the south side looking east (57m)

View from the north side looking east(71m)

Figure 6: Views to the east

Discovery phase

In the Design/ Crossings topic there is guidance on the location of crossings (Design/Crossings/Crossing selection/Location and spacing of crossings). This topic suggests considering the pedestrian activity and the pedestrian network characteristics.

The Planning topic offers advice on measuring pedestrian activity (Planning/Pedestrian planning principles/Measuring pedestrian activity), this is a good starting point when considering crossing locations and there is also guidance to help better understand the needs of particular types of pedestrians. Once the types of pedestrians crossing at this location are understood then this guidance can be referred to.

Measuring pedestrian activity guidance covers the why, when, what, where and how of measuring. In this scenario the use of manual observation surveys is considered appropriate to better understand the following metrics: number of people and types of people choosing to cross at the location and any difficulties doing so. User interviews may also be useful for this location. For the purposes of the application of guidance, let us assume that the manual survey was undertaken at several times and it was found there is high demand for crossing at this location.

Another useful tool is the assessment of the area using the seven pedestrian network characteristics which are outlined under the topic Planning/Walkability/Pedestrian characteristics. Table 1 below shows an assessment against the characteristics which provides a better understanding of the context.

Table 1 - Assessing the walking environment

Pedestrian network characteristic	Assessment
Safe *- Public areas and walking facilities should be safe to use at all times of day and for people to feel safe to spend time in.*	This informal crossing location is not particularly safe due to the lack of appropriate sight distance. However, it is noted that there have been no recorded crashes involving pedestrians at this location in the last 10 years.
Inclusive - *All walking environments should adhere to the principles of inclusive design by ensuring that they are accessible to, and usable by, as many people as reasonably possible.*	In the general proximity there is a priority crossing in the form of a zebra which caters for people who require a priority crossing. There are no kerb cut downs at the informal crossing location meaning that wheeled mobility devices would not be able to cross at this location.
Comfortable *- Walking areas should allow unhindered movement for pedestrians by providing sufficient space, even surfaces and gentle gradients.*	The crossing location is not comfortable due to the pressure to cross quickly due to the speed of oncoming traffic and the limited sight distance to these vehicles.
Direct *- Facilities should be positioned to provide convenient links between major walking trip attractors, without impediments from obstacles or other road users.*	This crossing location is very direct as it links two walking routes.
Legible *- Features should be consistent and easy to understand for all pedestrians to know intuitively how to navigate a space.*	When people walking or biking along the river arrive at this location the way they should cross the road is not legible.
Connected *- Walking networks should have a high density of route options to connect pedestrians to the places they wish to reach including public transport and surrounding networks.*	A crossing at this location would provide a more connected walking network.
Attractive *- Walking environments should be inviting for pedestrians to pass through or spend time in. This can mean low levels of noise and pollution, places to shelter, play, or rest, as well as a clean and visually appealing environment.*	This route is highly attractive as it traverses the Heathcote River where resting places are provided and shade is offered by large trees.

In the Design topic there is guidance on Crossings. In PNG/Design/Crossings/Crossing selection/Crossing selection process the first piece of advice is to consider the context of the location in helping further support an investigation into a crossing location. Table 2 lists questions and aspects to consider (in italics) as inputs to the decision-making process to select an appropriate crossing type for a particular location. The answers for this location are included in Table 2.

Table 2 – Crossing context questions

Question	Considerations
What is the street function?	*What is the current or desired movement and place function of the street and to what extent should pedestrians be prioritised? The One Network Framework classification may assist.* This section of Opawa Road is considered to be an Activity Street in the ONF, this means the place function is reasonably high and therefore pedestrians should be well considered.
What are the traffic volumes and composition?	*Traffic volume affects the delays experienced by pedestrians. Facilities that give priority to pedestrians result in delays to other road users. Should the traffic volumes be reduced? Should the traffic composition be modified or restricted? The composition of traffic includes how many heavy vehicles, buses and cyclists use the road which influences facility choice and design.* Reducing traffic volumes at this location is not feasible given the function of the road connecting communities. Giving priority to pedestrians at this location is problematic due to the limited site distances and the safety implications for vehicles not expecting a priority crossing in this location.
What are the vehicle operating speeds?	*Vehicle operating speeds over 30km/h increase the severity of injury or likelihood of death in crashes involving pedestrians. Higher speeds make it more difficult for pedestrians to judge safe gaps and require longer sight distances. Should traffic calming and speed management be used along the route/area?* The current speed limit is 50km/h and the operating speed is 55km/h. Reducing the speed at this location is critical to providing a safe crossing location. This could be achieved through speed reduction devices however noting this is also a public transport route and therefore ramp gradients of any vertical devices would need to be considered. Reducing the speed limit to 30 km/hour means that required sight distances are less.
Who is expected to use the crossing?	*Who wants to cross? How many people want to cross? Who is the most vulnerable person likely to cross here? Is there suppressed demand to cross here? Are there crossing safety issues for existing or future pedestrians?* The people wanting to cross the road at this location are predominantly pedestrians and cyclists who are traversing the Heathcote River route. Children and less mobile pedestrians are likely to choose the adjacent zebra crossing.
What is the road layout?	*How many traffic lanes are there in each direction? Can road space be reallocated to reduce the number of lanes?* There are two traffic lanes one in each direction they are 7.75m wide so there is potential to reduce the traffic lane width to allocate space to other uses.
What are the surrounding land uses / place value?	*What is the surrounding land use and how might it affect the types, times, and volumes of pedestrian? What would pedestrians expect in this area?* The land use that may affect the types and times in volumes of pedestrians are the schools.
What is the best location of the crossing to match pedestrian desire lines?	*Where do pedestrians cross now and where do they want to go or come from? Do they cross in one place or are they spread out along a link, or at an intersection. What other crossing opportunities are nearby and what type are they?* This location is a desire line, detouring is not attractive to many pedestrians.

This context analysis leads to a conclusion that the only safe and feasible way to create a more formalised crossing at this location is to reduce the operating speed to 30 km/hour from 50km/h. On that basis it is proposed that a local neighbourhood speed zone is created, this would commence just before the bend to the south and extend past the Opawa shopping area to the north, as shown in Figure 7. This recognises the Activity Street status of this section of Opawa Road, supports better safety outcomes and encourages walking in this area to help create healthy people. Mega Maps (Waka Kotahi speed management map) is in the process of being updated to reflect the ONF, so currently it is does not show this section of road as a 30km/hr safe and appropriate speed limit.

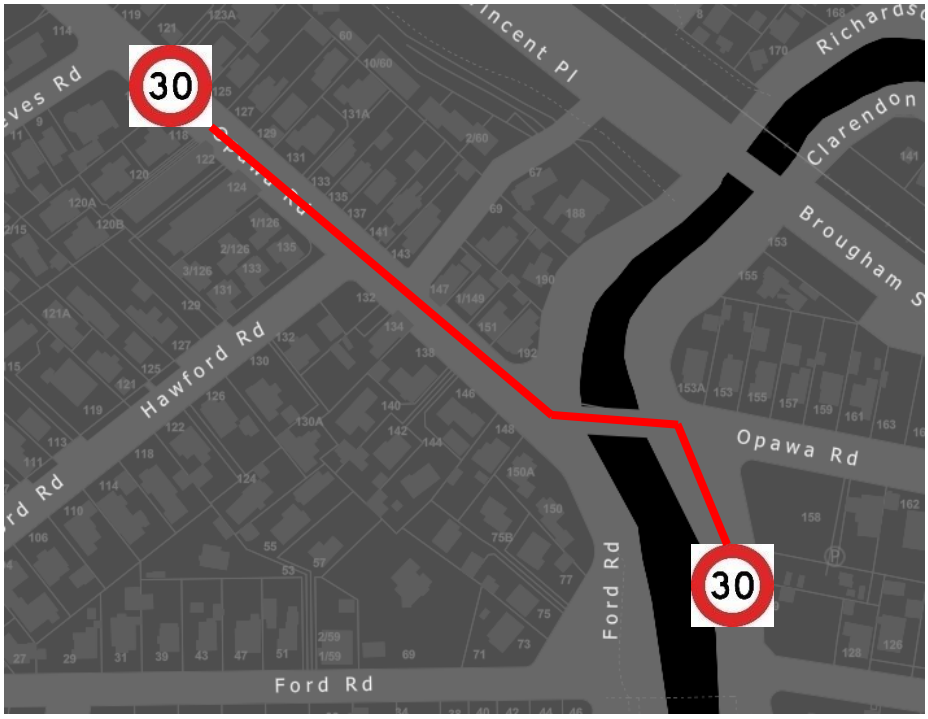

Figure 7: The proposed 30km/hour speed zone

Sight distance to the east is a key issue for this location. This is important if a non-priority crossing is provided where pedestrians must choose gaps in the traffic stream to cross safely. This means pedestrians must be able to see the approaching traffic in good time and be able to cross the road clear of approaching traffic. The Design/Crossing/Crossing design principles/Sight distances topic provides crossing sight distance calculations to establish the distance needed, Table 3 shows the comparison of existing provision, and the requirement under different operating speeds.

Table 3: Sight distance

Location	Existing available sight distance	Sight distance for existing operating speed 55km/hour	Sight distance for proposed operating speed 30km/hour
From south side looking east	57m	98m	53m
From north side looking east	71m	98m	53m

Create phase

After considering the background information a decision is needed on whether a crossing facility is required. In this hypothetical scenario we will assume that the road controlling authority made a decision to progress development of a crossing facility as it supports a better walking neighbourhood. With the context information in mind a crossing selection flowchart (see Figure 8) can be used to establish what options might be appropriate at the given location. In the scenario of a road with traffic in both directions, operating speeds around 30 km/hour and volumes greater than 7,500 a day (allowing for some growth since the 2019 count) there are three options recommended for a further investigation. These are a signalised crossing, a raised zebra crossing or a median refuge crossing.

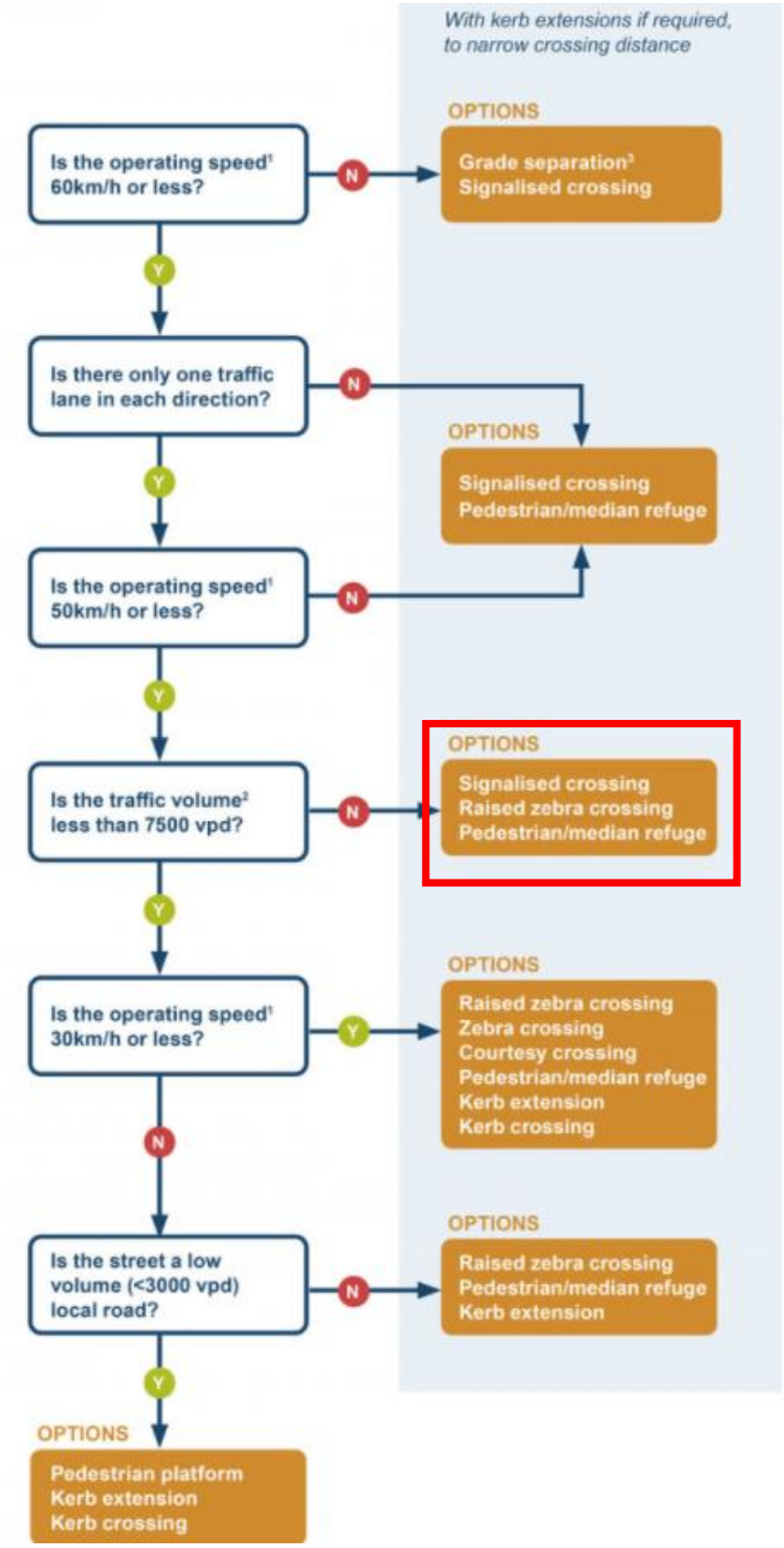

Figure 8: Crossings selection flowchart

The next step in the process is to examine the **Crossing context table** and the various advantages, disadvantages and parameters that apply to each crossing type. This helps practitioners balance aspects such as road geometry and identify a preferred option.

In this scenario a signalised crossing would not be appropriate given the out-of-context nature, essentially drivers will not be expecting them. A raised zebra crossing would also not be expected so close to a bend, even if low operating speeds can be achieved. A median refuge would not give priority but would simplify the task of crossing the road and help reduce traffic speeds, particularly if it was extended for the length of bridge. This would also create a gateway treatment to the small shopping centre where the zebra crossing is located. Given the bridge is 13.5m wide there is still space to provide wide kerbside lanes to cater for cyclists (not squeezing them) as per the guidance in the context table. Figure 9 illustrates the concept design for the crossing and associated work (raising the zebra and installing a raised safety platform to the south), noting there will also be 30km/hour thresholds as per Figure 7. Road marking would be adjusted to provide centreline transitions to the median refuge. Noting of course that there would be further aspects to investigate such as the additional weight to the bridge from the median island.

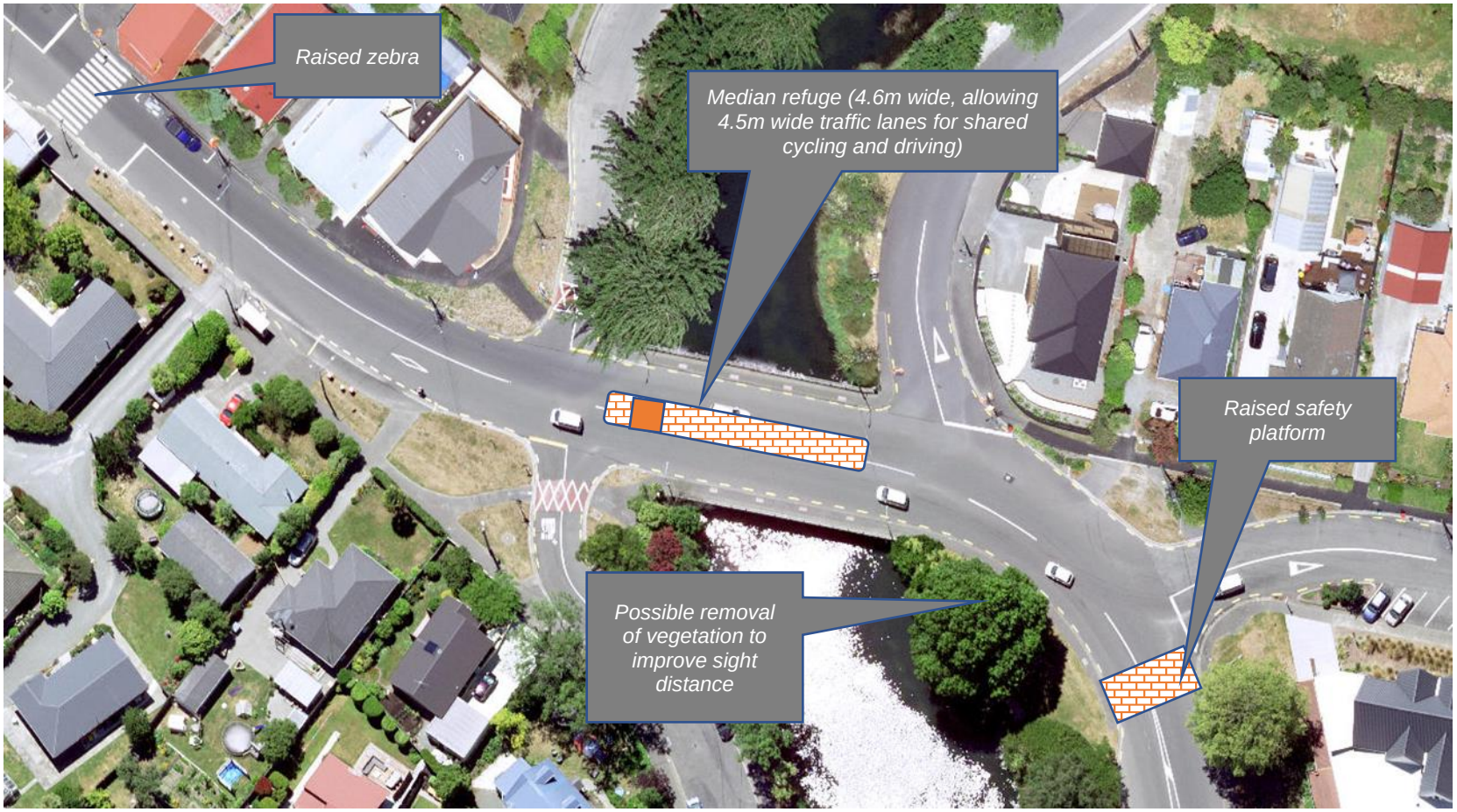

Figure 9: The concept design

The Design/Pedestrian design principles topic can be referred to throughout but also allows a principles based check of the concept design, for example have safe system and SOS principles been applied. Table 4 shows an SOS principles assessment for this project.

Table 4: SOS principles assessment

Principle	Existing situation	Concept design
Safe	Lack of safe crossing sight distance at the location of concern and speeds that would increase the likelihood of death or serious injury in a collision between a motor vehicle and a pedestrian.	The 30km/hr speed environment and removal of vegetation improves the crossing sight distance, and a median island makes a two-stage crossing
Obvious	It is somewhat obvious that there is no formal crossing at the location of concern and the zebra crossing is visible allowing people to make a decision on where to cross.	The zebra crossing will be more visible due to being on a raised platform allowing people to make a decision on where to cross.
Step free	There are no kerb cutdowns at the location of concern, so is not step free.	There will be kerb cut downs at the median crossing.

When progressing the concept design the PNG provides guidance on the review of the concept in the Reviews and Audits topic, including design reviews, safety reviews and audits, CPTED audits.

When moving beyond concept design the PNG offers guidance on the following design and delivery aspects:

- Median/refuge island design guidance
- Other Design details (kerb ramps, sight distance, landscaping, streetlighting
- Construction (content under development)
- Maintenance (content under development)
- Monitoring (content under development)

CONCLUSION

The PNG exists within a Waka Kotahi multimodal guidance ecosystem and wider guidance ecosystem. A hypothetical project was developed to demonstrate the application of the PNG guidance, the Opawa Road Crossing Improvement project. This project arose due to a community concern at the lack of a safe crossing in a location which links busy riverside walking routes, and the manual survey found there was a high demand for this crossing location.

Following through the PNG guidance in a logical manner and with prompts for considering the context of the area, rather than just the crossing site, a crossing was found to be needed at the location of concern but within a wider improvement area. The key area improvement needed was a lower operating speed to be achieved through a 30km/hour speed limit and supporting treatments such as raised platforms and the wide median that contains the crossing.

This outcome would support wider benefits and contribute to making the area more walkable. More walkability equals healthier people. This is only one example of how the application of the PNG can help to create healthier people, there will be many more, so get out there and use the guidance!

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