

Project Number: 5-C4006.00

# Petone to Melling Cycleway

## Pre-Opening Road Safety Audit

28 May 2024

CONFIDENTIAL



### Contact Details

S(9)(2)(a)

WSP  
L9 Majestic Centre  
100 Willis Street  
Wellington 6011

S(9)(2)(a)

@wsp.com

S(9)(2)(a)

WSP  
L9 Majestic Centre  
100 Willis Street  
Wellington 6011

S(9)(2)(a)

wsp.com

### Document Details:

Date: 13 October 2023  
Reference: 5-C4006.00  
Status: DRAFT

Prepared by

S(9)(2)(a)

Reviewed by

S(9)(2)(a)

Approved for release by

S(9)(2)(a)

### Document History and Status

Revision	Date	Author	Reviewed by	Approved by	Status
A	2023-10-13		S(9)(2)(a)		Draft

### Revision Details

Revision	Details
A	Initial draft release

## Contents

1	Background.....	5
1.1	Safety Audit Procedure.....	5
1.2	The Safety Audit Team .....	6
1.3	Audit Inspection.....	6
1.4	Report Format.....	6
1.5	Scope of Audit.....	7
1.6	Documents Provided.....	8
1.7	Disclaimer .....	9
1.8	Cycle, pedestrian and micromobility user volumes.....	9
2	Approach to Safety Audit Findings .....	11
3	Safety Audit Findings – Marsden Street Crossing .....	11
3.1	Ramp geometry insufficient to manage survivable impact speeds .....	11
	Moderate	11
3.2	Intervisibility between drivers and crossing users.....	13
	Significant	13
3.3	Perception of who has priority .....	16
	Moderate	16
3.4	Visibility of pedestrians and cyclists in dark lighting conditions.....	17
	Moderate	17
3.5	Definition between the footpath and carriageway.....	18
	Moderate	18
3.6	Hutt River Trail approach to crossing.....	19
	Minor	19
4	Safety Audit Findings – Normandale Road Crossing.....	21
4.1	Shared path crossing.....	21
	Significant	21
4.2	Vehicles bypassing speed cushions on Bridge Street.....	25
	Minor	25
5	Safety Audit Findings – Bridge Street Crossing.....	27
5.1	Accessibility of the crossing .....	27
	Moderate	27
5.2	Speed cushions placement ineffective at reducing vehicle speeds .....	28
	Minor	28
5.3	Placement of kerb build outs protecting pedestrians.....	30

RELEASED UNDER THE OFFICIAL INFORMATION ACT 1982

Minor	30
<b>6</b>	<b>Safety Audit Findings - Shared path adjacent to businesses.....31</b>
6.1	Shared path conflict at driveways.....31
Moderate	31
6.2	Dooring risk .....32
Moderate	32
6.3	Warning signage location .....32
Moderate	32
<b>7</b>	<b>Safety Audit Findings – Northern section.....34</b>
7.1	No separation between cycle path and Parliament Street.....34
Moderate	34
7.2	Pharazyn Street crossing.....35
Moderate	35
7.3	Lack of delineation marking around bollards.....36
Minor	36
7.4	Intervisibility at Parliament Street.....37
Minor	37
<b>8</b>	<b>Safety Audit Findings – Underpasses .....39</b>
8.1	Speed management on ramps and underpass visibility.....39
Significant	39
8.2	Lean zone over the centreline.....40
Moderate	40
8.3	Service duct end covers .....42
Moderate	42
8.4	Trip hazards.....42
Minor	42
<b>9</b>	<b>Safety Audit Findings – Cycle path access control.....44</b>
9.1	Vehicle access.....44
Minor	44
9.2	Motorcycle access.....44
Minor	44
<b>10</b>	<b>Safety Audit Findings – Separated path midblocks.....45</b>
10.1	Build-up of debris.....45
Moderate	45
10.2	Stormwater grates .....46
Minor	46

RELEASED UNDER THE OFFICIAL INFORMATION ACT 1982

10.3	Uncovered culverts.....	47
Minor	47	
<b>11</b>	<b>Safety Audit Findings – Dowse Bypass.....</b>	<b>47</b>
11.1	Vehicles on SH2 driving onto shoulder.....	47
Significant	47	
11.2	Bypass delineation.....	48
Minor	48	
11.3	Wrong-way travel.....	50
Minor	50	
11.4	Wayfinding and advisory signage.....	51
Significant	51	
<b>12</b>	<b>Safety Audit Findings – Petone Station.....</b>	<b>52</b>
12.1	Access to cycle path from McKenzie Avenue.....	52
Minor	52	
12.2	Vehicle tracking at Park and Ride exit.....	54
Minor	54	
12.3	Conflict with train passengers.....	55
Minor	55	
12.4	Separation between cycle path and car park.....	57
Minor	57	
<b>13</b>	<b>Safety Audit Findings – Southern connection.....</b>	<b>59</b>
13.1	Path width and condition.....	59
Significant	59	
<b>14</b>	<b>Safety Audit Findings – Comments.....</b>	<b>60</b>
14.1	Wayfinding and signage.....	60
14.2	Inconsistent markings for shared path users.....	62
14.3	Lighting / CPTED.....	63
14.4	Pedestrian access.....	63
14.5	Fence.....	63
14.6	Holes.....	64
<b>15</b>	<b>Audit Statement.....</b>	<b>65</b>

RELEASED UNDER THE OFFICIAL INFORMATION ACT 1982

# 1 Background

## 1.1 Safety Audit Procedure

A road safety audit is a term used internationally to describe an independent review of a future road project to identify any safety concerns that may affect the safety performance. The audit team considers the safety of all road users and qualitatively reports on road safety issues or opportunities for safety improvement.

A road safety audit is therefore a formal examination of a road project, or any type of project which affects road users (including cyclists, pedestrians, mobility impaired etc), carried out by an independent competent team who identify and document road safety concerns.

A road safety audit is intended to help deliver a safe road system and is not a review of compliance with standards.

The primary objective of a road safety audit is to deliver a project that achieves an outcome consistent with Safer Journeys and the Safe System approach, that is, minimisation of death and serious injury. The road safety audit is a safety review used to identify all areas of a project that are inconsistent with a safe system and bring those concerns to the attention of the client in order that the client can make a value judgement as to appropriate action(s) based on the risk guidance provided by the safety audit team.

The key objective of a road safety audit is summarised as:

*“To deliver completed projects that contribute towards a safe road system that is increasingly free of death and serious injury by identifying and ranking potential safety concerns for all road users and others affected by a road project”*

A road safety audit should desirably be undertaken at project milestones such as:

- Concept Stage (part of Business Case);
- Scheme or Preliminary Design Stage (part of Pre-Implementation);
- Detailed Design Stage (Pre-Implementation / Implementation); and
- Pre-Opening / Post-Construction Stage (Implementation / Post-Implementation).

A road safety audit is not intended as a technical or financial audit and does not substitute for a design check on standards or guidelines. Any recommended treatment of an identified safety concern is intended to be indicative only, and to focus the designer on the type of improvements that might be appropriate. It is not intended to be prescriptive and other ways of improving the road safety or operational problems identified should also be considered.

In accordance with the procedures set down in the “NZTA Road Safety Audit Procedures for Projects Guidelines - Interim release May 2013” the audit report should be submitted to the client who will instruct the designer to respond. The designer should consider the report and comment to the client on each of any concerns identified, including their cost implications where appropriate, and make a recommendation to either accept or reject the audit report recommendation.

For each audit team recommendation that is accepted, the client shall make the final decision and brief the designer to make the necessary changes and/or additions. As a result of this instruction the designer shall action the approved amendments. The client may involve a safety engineer to provide commentary to aid with the decision.

Decision tracking is an important part of the road safety audit process. A decision tracking table is embedded into the report format at the end of each set of recommendations to be completed by the designer, safety engineer and client for each issue documenting the designer response, client decision (and asset manager’s comments in the case where the client and asset manager are not one and the same) and action taken.



A copy of the report including the designer's response to the client and the client's decision on each recommendation shall be given to the road safety audit team leader as part of the important feedback loop. The road safety audit team leader will disseminate this to team members.

In October 2022, Waka Kotahi released "Safe System Audit Guidelines for Transport Projects", which supersedes the aforementioned "NZTA Road Safety Audit Procedures for Projects Guidelines - Interim release May 2013". Since earlier audits for the Petone to Melling Cycle Project were undertaken under the older guidance documents, we are undertaking this RSA under the older guidance for consistency. Additionally, one of the main differences between the RSA and the SSA is the SSA requires an assessment of project options using the Safe Systems Assessment Framework, which is not useful for a pre-opening audit as project options should be no longer relevant.

## 1.2 The Safety Audit Team

The road safety audit was carried out in accordance with the NZTA Road Safety Audit Procedure for Projects Guidelines - Interim release May 2013, by:

- Catherine Mills, Senior Transportation Engineer, WSP – Safety Audit Team Leader
- Hilary Fowler, Senior Transportation Planner, WSP – Safety Audit Team Member

## 1.3 Audit Inspection

The Safety Audit Team (SAT) attended a pre-audit briefing on Tuesday 22 August 2023, and identified that the audit inspection would be booked in once the streetlighting was connected and fully operational. After the lighting was confirmed as fully operational, the inspection was booked for the afternoon of Wednesday 27 September; however, there were high wind gusts so for safety reasons the inspection was re-booked to the next fine day on Wednesday 4 October.

Due to changing availability of the SAT in the time between the briefing on 22 August and the earliest we could inspect on 4 October, Hilary was recruited to the SAT as Sam Thornton was no longer available.

The site visit was undertaken by Catherine and Hilary on Wednesday 4 October 2023 from 2:00pm to 6:00pm in fine conditions with light winds and no rain, and a night inspection was undertaken from 7:00pm to 8:30pm on the same day. During the inspection, different areas of the worksite were at varying stages of completeness, and some were open to the public, including:

- Northern section from Hutt River Trail to the intersection of Parliament Street and Bridge Street was complete and open to the public such that we could review operations.
- The cycle-only path from the intersection of Bridge Street and Parliament Street was mostly complete and closed to the public, including the Dowse Bypass.
- The Petone Station area was complete and open to the public such that we could review operations.
- The underpass south of Petone Station was not yet complete and still required surfacing and some other works, such that the SAT were not yet able to ride through this area.

## 1.4 Report Format

The potential road safety problems identified have been ranked as follows:

The expected crash frequency is qualitatively assessed based on expected exposure (how many road users will be exposed to a safety issue) and the likelihood of a crash resulting from the presence of the issue. The severity of a crash outcome is qualitatively assessed based on factors such as expected speeds, type of collision, and type of vehicle involved.

Reference to historic crash rates or other research for similar elements of projects, or projects as a whole, have been drawn on where appropriate to assist in understanding the likely crash types, frequency and likely severity that may result from a particular concern.

The frequency and severity ratings are used together to develop a combined qualitative risk ranking for each safety issue using the Concern Assessment Rating Matrix in Table 2 below. The qualitative assessment requires professional judgement and a wide range of experience in projects of all sizes and locations.

Table 1: Concern Assessment Rating Matrix.

Severity (likelihood of death or serious injury)	Frequency (probability of a crash)			
	Frequent	Common	Occasional	Infrequent
Very likely	Serious	Serious	Significant	Moderate
Likely	Serious	Significant	Moderate	Moderate
Unlikely	Significant	Moderate	Minor	Minor
Very unlikely	Moderate	Minor	Minor	Minor

While all safety concerns should be considered for action, the client or nominated project manager will make the decision as to what course of action will be adopted based on the guidance given in this ranking process with consideration to factors other than safety alone. As a guide a suggested action for each concern category is given in Table 2 below.

Table 2: Concern Categories.

Risk	Suggested Action
Serious	A major safety concern that must be addressed and requires changes to avoid serious safety consequences.
Significant	Significant concern that should be addressed and requires changes to avoid serious safety consequences.
Moderate	Moderate concern that should be addressed to improve safety
Minor	Minor concern that should be addressed where practical to improve safety.

In addition to the ranked safety issues, it is appropriate for the safety audit team to provide additional comments with respect to items that may have a safety implication but lie outside the scope of the safety audit. A comment may include items where the safety implications are not yet clear due to insufficient detail for the stage of project, items outside the scope of the audit such as existing issues not impacted by the project or an opportunity for improved safety but not necessarily linked to the project itself. While typically comments do not require a specific recommendation, in some instances suggestions may be given by the auditors.

## 1.5 Scope of Audit

This Audit is a Pre-Opening Stage Safety Audit of the project site on the day of the inspection. This is shown in Figure 1 below, including the cycleway and shared path sections of Petone to Melling (P2M).





Figure 1: Extents for this RSA.

## 1.6 Documents Provided

The SAT has been provided with the following documents for this audit:

- “P2M public concerns for safety review v2”, a MS Word document detailing concerns raised to the Petone to Melling Team from the public for the sections of the project which are already open and fully operational.
- A drawing set including the following designs:
  - 60306339-SHT-CI-0101-3 Bridge St Crossing Proposal R1
  - 60306339-SHT-CI-0101-4
  - 60306339-SHT-CI-0102-3
  - 60306339-SHT-LS-0001-2
  - 60306339-SHT-LS-0002-3
  - 60306339-SHT-LS-0003-3
  - 60306339-SHT-LS-0004-1
  - 60306339-SHT-LS-0011-2
  - 60306339-SHT-LS-0012-2
  - 60306339-SHT-LS-0013-2
  - 60306339-SHT-LS-0021-6
  - 60306339-SHT-LS-0022-5
  - 60306339-SHT-LS-0023-5
  - 60306339-SHT-LS-0024-4
  - 60306339-SHT-LS-0025-5
  - 60306339-SHT-LS-0026-3
  - 60306339-SHT-LS-0026-3A
  - 60306339-SHT-LS-0027-5

- 60306339-SHT-LS-0028-4
- 60306339-SHT-LS-0029-5
- 60306339-SHT-LS-0030 5 HCC Q Speed Cushion Deferral
- 60306339-SHT-LS-0030-7
- 60306339-SHT-LS-0031-2
- 60306339-SHT-LS-0032-2
- 60306339-SHT-LS-0033-2
- 60306339-SHT-LS-0034-2
- 60306339-SHT-TR-0001-6
- 60306339-SHT-TR-0001-6A
- 60306339-SHT-TR-0002-4
- 60306339-SHT-TR-0002-4A
- 60306339-SHT-TR-0003-4
- 60306339-SHT-TR-0003-4A
- 60306339-SHT-TR-0003-4B
- 60306339-SHT-TR-0004-5
- 60306339-SHT-TR-0004-5A
- 60306339-SHT-TR-0015-2
- 60306339-SHT-TR-0020-1
- 60306339-SHT-TR-0021-2

## 1.7 Disclaimer

The findings and recommendations in this report are based on an examination of available relevant plans, the specified site and its environs, and the opinions of the SAT. However, it must be recognised that eliminating safety concerns cannot be guaranteed since no road can be regarded as absolutely safe and no warranty is implied that all safety issues have been identified in this report. Safety audits do not constitute a design review nor an assessment of standards with respect to engineering or planning documents.

Readers are urged to seek specific technical advice on matters raised and not rely solely on the report.

While every effort has been made to ensure the accuracy of the report, it is made available on the basis that anyone relying on it does so at their own risk without any liability to the safety audit team or their organisations.

## 1.8 Cycle, pedestrian and micromobility user volumes

To understand the likely future use of the walking and cycling link, the SAT has used an excerpt from the demand estimates for the nearby section of Te Ara Tupua planned between Petone and Ngauranga, as shown in Table 3 to Table 5 below.

---

<sup>1</sup> From Waka Kotahi Memorandum *User Demand Assessment for N2P section of Te Ara Tupua* dated 28 April 2020

Table 3: Estimated average weekday use of Te Ara Tupua between Ngauranga and Petone.

Mode	Weekday Both ways, Base use 2024	Users by 2025 after path opening step change	Users by 2030 (based on growth of 10% p.a. (and 6% for peds) for 2025-2030)	Users by 2035 (based on growth of 5% p.a. for 2030-2035)	Users by 2050 (based on 2% p.a. growth after 2035)
Cyclists	715	1,359	2,189	2,794	3,760
Walkers/runners	5	272*	364	465	626
Transport device riders	1	181	292	372	501
<b>Total mean use</b>	<b>721</b>	<b>1812</b>	<b>2,845</b>	<b>3,631</b>	<b>4,887</b>
95 <sup>th</sup> percentile	1,081	2,718	4,268	5,447	7,331

Note \* - We expect that only around 50 of these walkers/runners will travel the full length of the path.

Table 4: Estimated average AM Peak hour use of Te Ara Tupua between Ngauranga and Petone.

Weekday AM Peak Hour Users	2025	2030	2035	2050
Cyclists	271	438	559	752
Walkers/runners	22	29	37	50
Transport device riders	27	44	56	75
<b>Total</b>	<b>320</b>	<b>511</b>	<b>652</b>	<b>877</b>
95 <sup>th</sup> percentile	480	767	978	1,316

Table 5: Estimated average weekend day use of Te Ara Tupua between Ngauranga and Petone.

Weekend-day Both ways	Users by 2025 after path opening step change	Users by 2030 (based on 10% p.a. growth after 2025)	Users by 2035 (based on 5% p.a. growth after 2030)	Users by 2050 (based on 2% p.a. growth after 2035)
Cyclists	1,087	1,751	2,235	3,008
Walkers/runners	490	655	837	1,127
Transport device riders	272	438	558	751
<b>Total</b>	<b>1,849</b>	<b>2,844</b>	<b>3,630</b>	<b>4,886</b>
95 <sup>th</sup> percentile	2,774	4,266	5,445	7,329

These volumes are all higher than what's anticipated on the Petone to Melling section of Te Ara Tupua, given that a proportion of the Petone to Ngauranga volumes are likely to arrive via the Hutt River trails, the Esplanade and Honiana Te Puni reserve rather than from the Petone to Melling section of Te Ara Tupua.

Within the scope of this safety audit, we anticipate that the pedestrians and micromobility volumes would be quite different, as much of the demand for these users would be driven by the Petone Station and associated park and ride within the audit site.

However, these number do indicate that there could be up to 750 cyclists per hour using Te Ara Tupua in the future. Taking a conservative approach, this could equate to 500 cyclists per hour along the Petone to Melling cycleway in the future.

## 2 Approach to Safety Audit Findings

Following the site inspections, the SAT prepared this report to outline the safety concerns. This has been split into the following chapters:

- Marsden Street crossing
- Normandale Road crossing
- Bridge Street crossing
- Shared path adjacent to businesses
- Northern section (not otherwise covered)
- Underpasses
- Access control
- Cycle path midblocks
- Dowse bypass
- Petone Station
- Southern connections
- Comments

The ordering of these chapters is loosely geographical from north to south. Within each chapter, there are sub-chapters which outline each of the safety concerns associated with that location or theme.

## 3 Safety Audit Findings – Marsden Street Crossing

### 3.1 Ramp geometry insufficient to manage survivable impact speeds

Moderate

During our site visit, the SAT noticed the vehicles approaching the crossing didn't slow down as much as anticipated and were still travelling over the crossing at speed, and that the ramp gradient appeared somewhat shallow.

Raised safety platforms are primarily installed as a speed management device, to reduce vehicle speeds so that any impact which may occur is below the survivable impact speed. For the Marsden Street Crossing, we anticipate collisions between pedestrians and cyclists and vehicles with a survivable impact speed of 30km/h. For a raised safety platform to keep pedestrians and cyclists safe while crossing, it's crucial that both the platform height and the ramp gradient are carefully selected to achieve the desired speed reduction to at or below 30km/h.

From the designs, the ramp gradient is shown to be 1:20 and the minimum platform height is shown as 75mm as shown below. From Waka Kotahi's Pedestrian Network Guidance<sup>2</sup>, it is recommended that a 1:15 ramp gradient is selected for a 30km/h speed at the platforms, and that a 1:20 ramp gradient is selected for a 40km/h speed. Additionally, a 100mm high platform is recommended and a 75mm high platform minimum is only to be used if there are a high volume of trucks anticipated. As shown below, the risk of death for a pedestrian/cyclist vs. vehicle collision at 30km/h is around 10%, but at 40km/h is around 45%. The speeds to avoid serious injury are lower again.

Presently the raised platform has hump advisory speed signs of 15km/h, shown below in Figure 4 and Figure 5. Since these are inconsistent with the speed reduction from the ramp and platform geometry, this increases the risk at other raised safety platforms as approaching drivers would be less likely to adhere to the speed shown on the advisory sign.

<sup>2</sup> <https://www.nzta.govt.nz/walking-cycling-and-public-transport/walking/walking-standards-and-guidelines/pedestrian-network-guidance/design/crossings/priority-crossings/raised-zebra-crossings/>

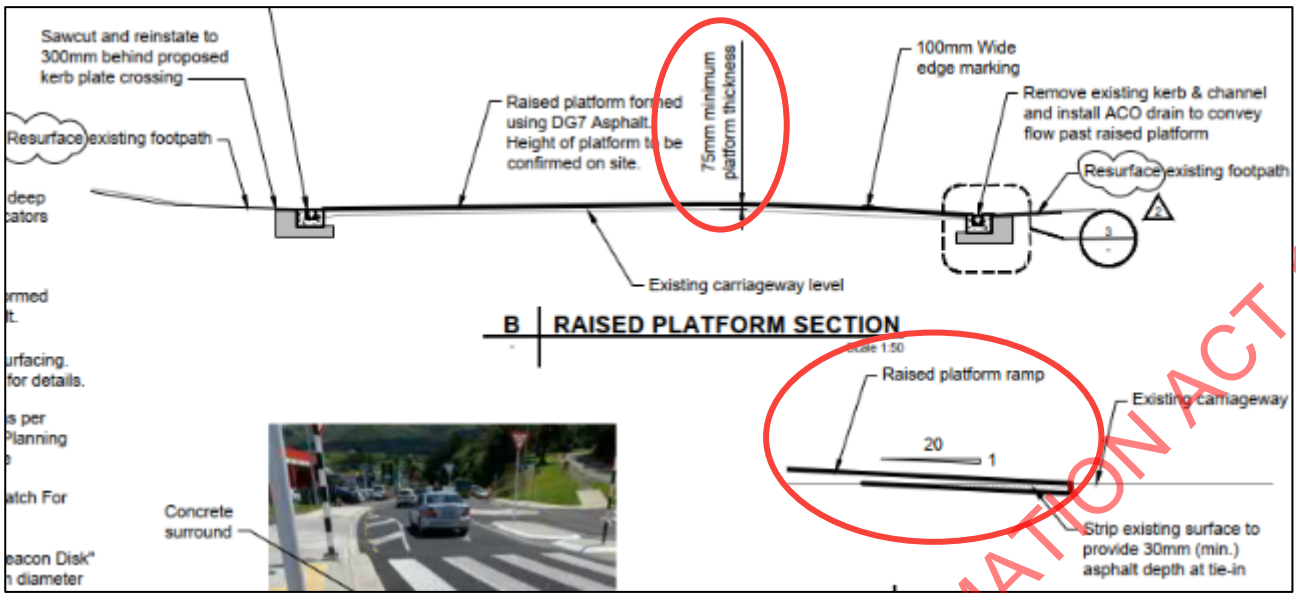


Figure 2: Raised crossing details from detailed designs.

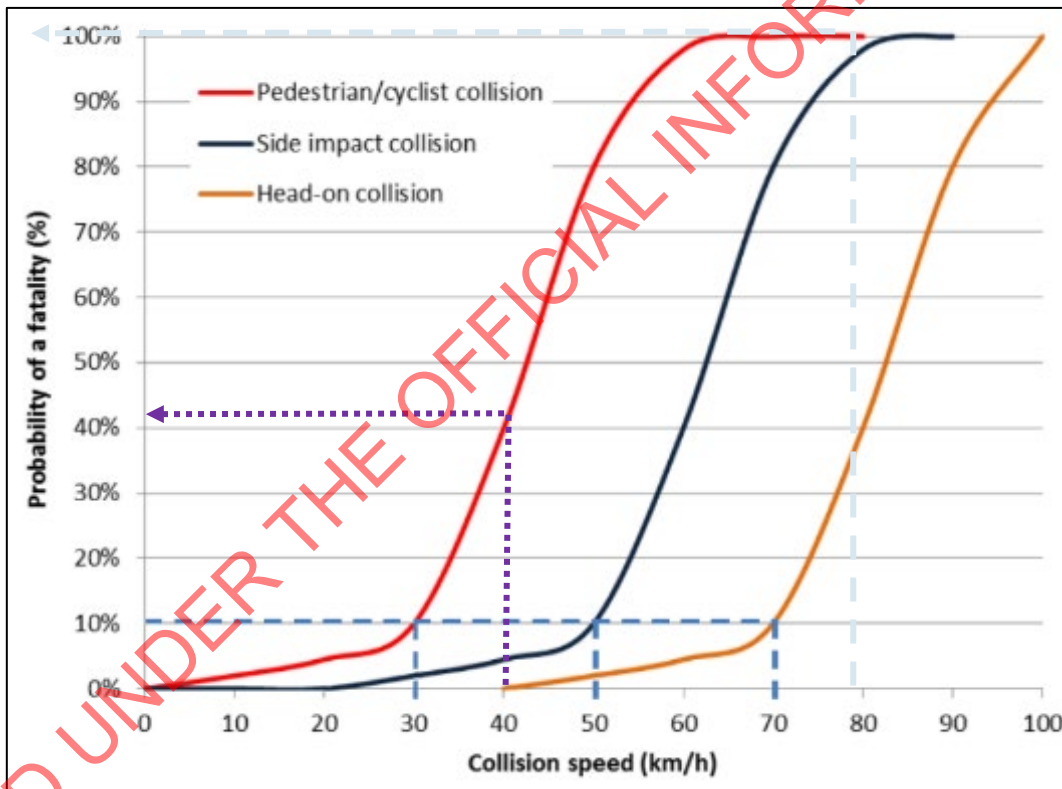


Figure 3: Relationships between a motorised vehicle collision speed and probability of a fatality for different crash configurations, from Austroads Guide to Road Safety Part 3: Safe Speed.

Following safety concerns within this chapter are affected by ramp geometry.

**Recommendation(s):**

- 1 Confirm the in-situ platform height and ramp geometry in comparison to the Pedestrian Network Guidance standards, and survey vehicle speeds at the crossing.
- 2 If required, reconstruct the platform to achieve a speed reduction to at or below 30km/h.
- 3 Consider speed humps/cushions in advance of ramp.
- 4 Replace the '15' hump advisory speed supplementary plates with a more realistic speed closer to the platform geometry, i.e. '35'.



Frequency:	Severity:	Rating:
<i>Crashes are likely to be Occasional</i>	<i>Death or serious injury is Likely</i>	<i>The safety concern is Moderate</i>
<b>Designer Response:</b>	The 1:20 ramp grade was selected to allow for the type of fire trucks from the nearby station to negotiate the crossing. This does result in a faster design speed over the ramp than recommended by the Safety Auditors. The design has been altered over time to reflect changes to the TCD manual and from discussions between Waka Kotahi and the Designers. If changes are to be made to slow vehicles in advance of the crossing, the designer recommends the installation of cushions to the locations as originally designed and shown on Drawing LS-0030 Rev 5.	
<b>Safety Engineer:</b>	<b>Monitoring to assess effectiveness of raised platform could be considered. If speeds are excessive then discuss installation of speed cushions on southern approach with HCC (northern approach, road will be reconfigured by Te Awa Kairangi project). North side has better visibility. Need to consider emergency/heavy vehicles.</b> HCC: support monitoring speeds, acknowledging the signposted reduction, don't support installation of speed cushions	
<b>Client Decision:</b>	<i>No specific action. The crossing is a temporary installation until the road is reconfigured by Te Awa Kairangi project in 12-24 months.</i>	
<b>Action Taken:</b>	Advised HCC to undertake speed monitoring	

### 3.2 Intervisibility between drivers and crossing users

Significant

Pedestrian zebra crossing and cycle priority crossings rely on having good sightlines, so that drivers have sufficient time to see an approaching crossing user, react and apply the brakes, and come to a stop to give way as they are required. When there is insufficient visibility, pedestrian and cyclist priority crossings result in crashes as the pedestrian or cyclist may enter the carriageway with right of way and an approaching driver would not be able to stop in time and would hit them, and the crossing user (particularly cyclists) would not have visibility towards the approaching vehicle to know they shouldn't enter the crossing.

For the Marsden Street Crossing, the presence of vegetation on the Hutt Riverbank obscures southbound driver's sightlines towards approaching cyclists, and the power pole on the west side restricts northbound driver's ability to see pedestrians. This is pictured below.

One other possible way where intervisibility may be obscured between drivers and crossing users is in the morning, when there is a risk of sunstrike due to the north-south alignment of Marsden Street aligning with the sun's position near the horizon at certain times of year. This is likely to be more of an issue in Winter when the sun rises further north and when the morning peak period coincides with sunrise. See Figure 5 below, from Google Street view in June 2021.





Figure 4: Intervisibility issues at Marsden Street raised crossing.

RELEASED UNDER THE OFFICIAL INFORMATION ACT 1982

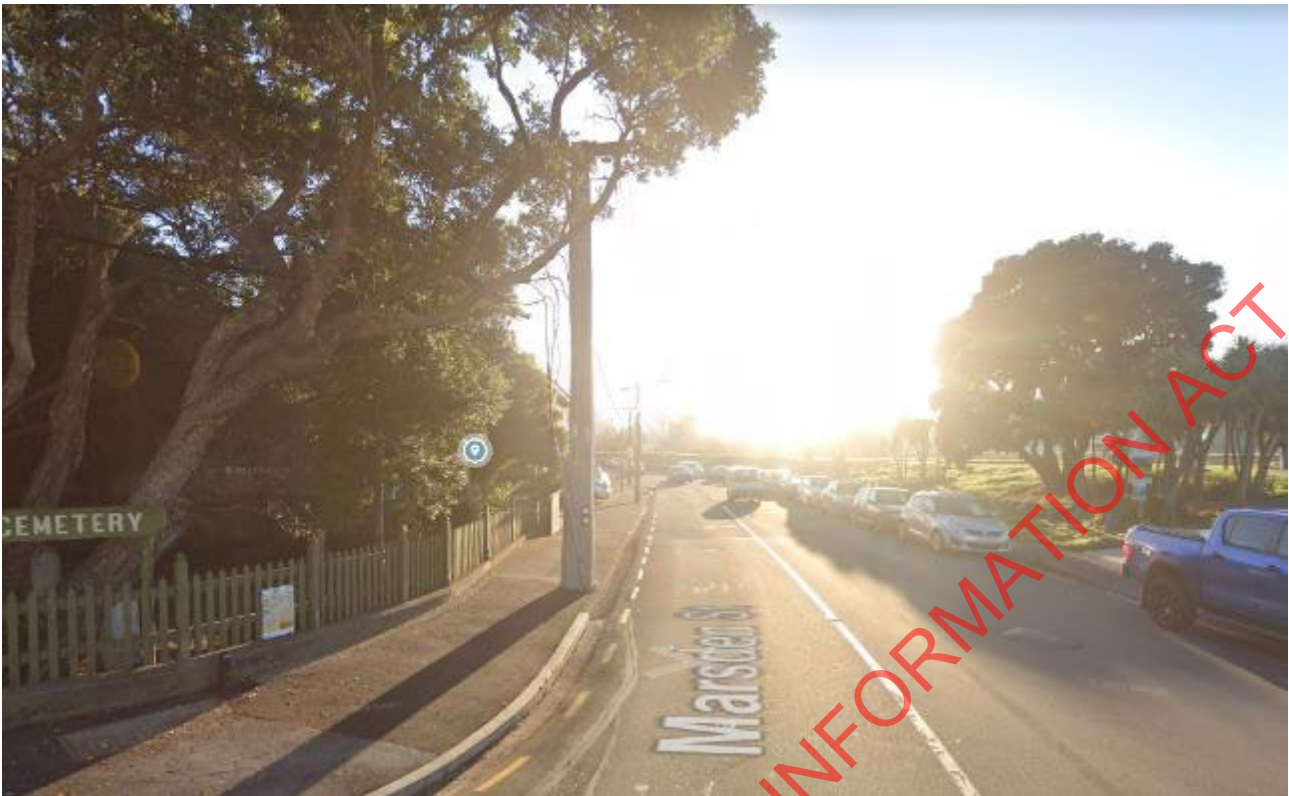


Figure 5: Marsden Street in the vicinity of the crossing, in June 2021 prior to crossing installation.

**Recommendation(s):**

- 5 Remove vegetation on the Hutt River Trails approach such that drivers and cyclists both have intervisibility before entering the crossing. Approach sight distance calculations may be useful to determine how much visibility for pedestrians and cyclists is required.
- 6 Install kerb buildouts on the west side of the crossing so a pedestrian is no longer obscured behind a powerpole before crossing or relocate the power pole.
- 7 Consider local road safety campaigns in Winter advising drivers to clean windscreens and take extra care and use sunglasses or vehicle visors when travelling north during morning peak hour.

Frequency:	Severity:	Rating:
<i>Crashes are likely to be Common</i>	<i>Death or serious injury is Likely</i>	<i>The safety concern is Significant</i>
<i>Designer Response:</i>	WRT the southbound approach, the available visibility length currently meets design standard. This may change over time and is therefore a maintenance issue to be passed onto Greater Wellington Regional Council. WRT the northbound approach, a kerb build-out was not installed after consultation with Waka Kotahi correlated to cost. Originally, a flush nib kerb, together with signage in-between the existing kerb and the flush nib kerb, was designed to be installed as the hold point for pedestrians and cyclists, which gave visibility to approaching drivers that met standard (refer to Dwg TR-0021 Rev 1). The flush nib kerb, or signage in the designed position, has not been installed. The reasons for this should be explored with the site staff. Alternatively installing cushions (to the locations shown on Dwg LS-0030 Rev 5), on the approach to the crossing either in conjunction with or in lieu of, the design as shown on Dwg TR-0021 Rev 1, will help slow speeds and minimise crash severity for the situation of sun strike. In lieu of a flush kerb, bolt down wheel stops should be considered.	



<p><b>Safety Engineer:</b></p>	<p>Discuss vegetation removal with GWRC. Consider a pair of safe hit post or cycle separator to accentuate edge of roadway                  HCC: in principal would support improved kerb delineation.                  Approval subject to reviewing site and final treatment proposal.                  Signage should be reviewed when road realigned.</p>
<p><b>Client Decision:</b></p>	<p><b>Hazard is significant and should be addressed. Undertake early removal of vegetation to improve sightlines (to be removed anyway as part of future stop bank works).</b>                  Improve kerb delineation at northbound approach through installation of cycle separators.                  The crossing and eastern approach will be redesigned by Te Awa Kairangi project in 12-24 months as part of the road reconfiguration.</p>
<p><b>Action Taken:</b></p>	<p>Included in package of works to contractor – confirm cycle separator placement with HCC and approval for tree pruning from GWRC first.</p>

### 3.3 Perception of who has priority

Moderate

Locations where vulnerable road users such as pedestrians and cyclists cross the road rely on both approaching drivers and the vulnerable road user approaching the crossing correctly identifying who has priority, so that drivers stop for pedestrians, or pedestrians wait for a safe gap in traffic to cross, etc. According to *Waka Kotahi Research Report 257 Reducing Conflict Through Improved Design of Pedestrian-Vehicle Spaces*<sup>3</sup>, drivers are much less sensitive to the number of features in the road environment which may signal pedestrian priority, such that both drivers and pedestrians may perceive they have priority if there are 4-5 features in the road environment signalling a crossing, and that zebra crossing bars were the only feature which clearly signalled to both drivers and pedestrians that pedestrians have priority.

At Marsden Street, the length of the zebra crossing portion is shorter, such that some drivers (especially southbound drivers in low vehicles) may not see the zebra crossing bars, and may not be sufficiently familiar with the new cycle crossing facility to realise they need to give way to an approaching cyclist. Zebra crossing bars must be at least 2.0m long, but they can be longer if the crossing needs to be more conspicuous.

Cycle priority crossings are a relatively new feature in New Zealand which some drivers may not be aware of, so particularly for cyclists there is a risk approaching drivers do not recognise they need to yield.



Figure 6: Marsden Street raised crossing.

<sup>3</sup> [257 - Reducing conflict through improved design of pedestrian - vehicle spaces \(nzta.govt.nz\)](https://www.nzta.govt.nz/research-reports/257-reducing-conflict-through-improved-design-of-pedestrian-vehicle-spaces/)

**Recommendation(s):**

- 8 Monitor the crossing and consider installing a median refuge island with an additional Belisha pole and disc to increase the conspicuity of the crossing and add more features to signal pedestrian and cyclist priority.
- 9 Monitor the crossing and consider reconstructing the raised safety platform with a longer length so the zebra crossing bars are more conspicuous to approaching drivers.

Frequency:	Severity:	Rating:
<i>Crashes are likely to be Infrequent</i>	<i>Death or serious injury is Likely</i>	<i>The safety concern is Moderate</i>
<b>Designer Response:</b>	The Designer recommends installing cushions (to the locations shown on Dwg LS-0030 Rev 5) on the approaches to the crossing will help slow speeds for those drivers not aware of recent changes to the TCD manual and minimise crash severity. WRT monitoring the crossing, the Designer is unsure what is to be recorded if monitoring was to occur and suggests the Client seek further clarification from the Safety Auditors.	
<b>Safety Engineer:</b>	This is a standard intervention working well nationwide. No action.	
<b>Client Decision:</b>	No action.	
<b>Action Taken:</b>	nil	

**3.4 Visibility of pedestrians and cyclists in dark lighting conditions** Moderate

The Marsden Street crossing has no specific street lighting at the crossing and relies on existing streetlighting in the area so drivers can see pedestrians and cyclists on the crossing. While zebra crossings are allowed to be unlit in New Zealand if the road controlling authority does not think they require lighting, the SAT is not supportive of this stance as the Petone to Melling Cycle Path would be used by commuters in winter when it's dark, such that there would be many cyclists and possibly pedestrians using this crossing in dark natural lighting conditions.

The SAT had some difficulty seeing pedestrians and cyclists using the crossing in our night inspections as pictured below.

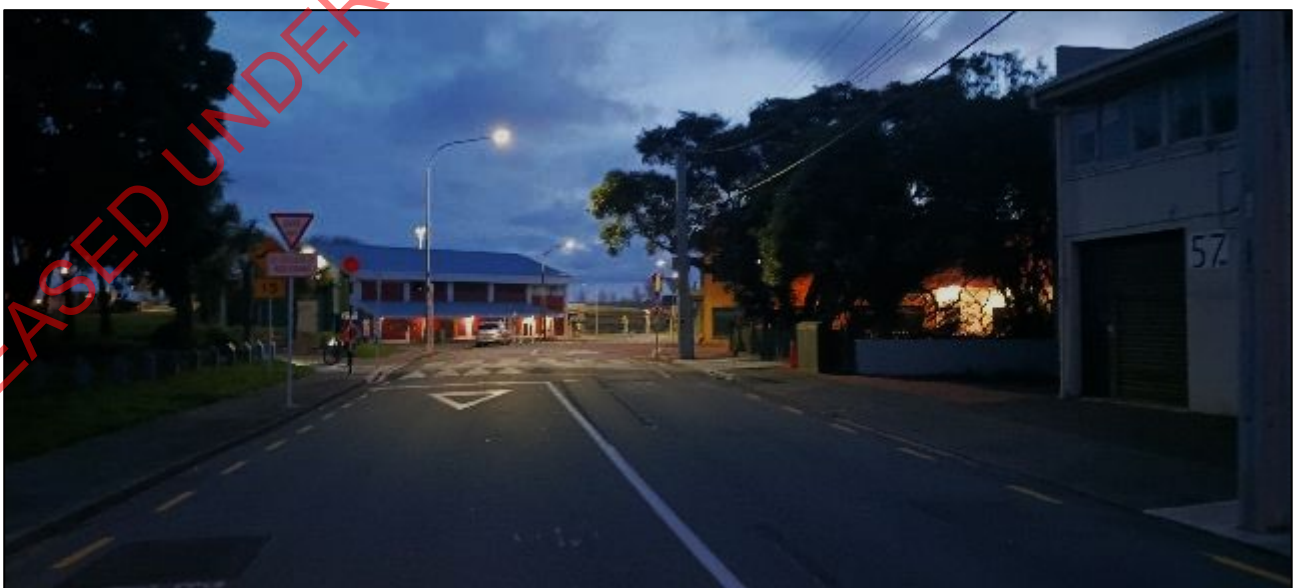


Figure 7: Marsden Street crossing at night.

**Recommendation(s):**

- 10 Use a luxmeter to survey the level of lighting from the existing streetlighting on the crossing. If the minimum lux levels for a zebra crossing aren't met, replace the existing Belisha Poles with combined poles including streetlights and Belisha Discs.

<b>Frequency:</b> <i>Crashes are likely to be Occasional</i>	<b>Severity:</b> <i>Death or serious injury is Likely</i>	<b>Rating:</b> <i>The safety concern is Moderate</i>
<b>Designer Response:</b>	The Designer agrees with the Safety Auditors recommendation	
<b>Safety Engineer:</b>	Agree with the recommendation regarding surveying light levels. Belisha disks should stand out well when viewed by vehicle lights. If a street light is needed, perhaps utilise existing power pole HCC: flashing belisha should be considered. Support surveying lighting level and additional lighting on existing power pole if necessary.	
<b>Client Decision:</b>	Support additional lighting as needed. The crossing is temporary until Marsden St is realigned in 12-24 months, therefore attach temp light to power pole rather than replacing belisha infrastrucutre.	
<b>Action Taken:</b>	Included in package of works to contractor – first confirm existing lighting level against minimum requirements with lux survey.	

### 3.5 Definition between the footpath and carriageway

Moderate

On the western side of the crossing, the crossing length appears to start part way out into the road, and kerb built-out islands have not been provided to protect pedestrians and cyclists waiting to cross on the tactiles. It's likely that some northbound drivers on Marsden Street would perceive the area with tactiles as part of the carriageway, and drive into it.



Figure 8: Western side of Marsden Street crossing without kerb build-outs.

#### Recommendation(s):

- 11 Install kerb buildouts on the western side of the crossing.

<b>Frequency:</b> <i>Crashes are likely to be Occasional</i>	<b>Severity:</b> <i>Death or serious injury is Likely</i>	<b>Rating:</b> <i>The safety concern is Moderate</i>
---	--	---



<i>Designer Response:</i>	WRT the northbound approach, a kerb build-out was not installed after consultation with Waka Kotahi correlated to cost. Originally, a flush kerb, as the hold point for pedestrians and cyclists, together with signage in-between the existing kerb and the flush nib kerb was designed to be installed which gave visibility to approaching drivers (refer to Dwg TR-0021 Rev 1). The flush nib kerb, or signage in the designed position has not been installed and the Designers response to Section 3.2 above is recommended.
<i>Safety Engineer:</i>	Consider a pair of safe hit post or cycle separator to accentuate edge of roadway HCC: don't support hit post (maintenance issue), prefer kerb extension. Consider planter boxes (with reflectors).
<i>Client Decision:</i>	As per 3.2, improve kerb delineation at northbound approach through installation of cycle separators. TR-0021 Rev 2 was the final IFC, with removal of nib kerb and confirmed built as specified
<i>Action Taken:</i>	Included in package of works to contractor – confirm cycle separator placement with HCC.

### 3.6 Hutt River Trail approach to crossing

Minor

The cycle approach to the crossing from the Hutt River Trail is on a steep downgrade and on a curve, with a narrow entry to the crossing partially restricted by a bollard. Given the approaching trail to the crossing is flat wide and straight, it's likely that cyclist speeds into the corner are fast, and that cyclists may have difficulty negotiating the narrow entry to the crossing. This is particularly the case when there may be pedestrians using the zebra portion of the crossing and is pictured below.

One other risk is that given the approach to the path is difficult to negotiate, cyclists will be focused on avoiding the bollard and negotiating the curve on, so may be less likely to carefully check any approaching vehicles on Marsden Street have seen them and will give way, i.e. lazy looking. This is exacerbated by the steep geometry of the path which may encourage faster approach speeds to the crossing for some cyclists.







Figure 9: Views of approach to Marsden Street raised crossing.

**Recommendation(s):**

- 12 Remove vegetation and widen the path approaching the crossing from the Hutt River Trail side so there is more space to avoid the bollard.
- 13 Install pavement markings delineation the bollard so cyclists approaching from the Hutt River Trail are more aware of its presence.
- 14 Install pavement markings on the Hutt River Trail approach to the curve down to the crossing (e.g. red coloured surfacing, slow, '15', etc.) similar to other locations in the Petone to Melling project to manage cyclist approach speeds into the curve.
- 15 On the path immediately before the crossing where cyclist ride out, install linemarkings which say 'look both ways before crossing' or similar.

Frequency:	Severity:	Rating:
Crashes are likely to be Occasional	Death or serious injury is Unlikely	The safety concern is Minor
Designer Response:	The bollard was installed to prevent unauthorised vehicle accessing the stopbank area. The Designer does not recommend making more space as this will lead to unauthorised vehicular access to the stopbank,. The Designer agrees with Recommendations 13 and 14. WRT recommendation 15, a site visit shows that hazard markings have been installed on the approach to the bollard from the stopbank. WRT Recommendation 15, the Designer agrees with installing line markings but the words are too long and suggests that symbols be used instead.	
Safety Engineer:	Noting that recommendation 13 has been completed. Agree with recommendation 14 but a couple of red blocks should be sufficient.	
Client Decision:	<b>The existing approach to the crossing from the stop bank was utilised as an interim measure until the crossing and it's approach are redesigned by Te Awa Kairangi. As the impact rating is minor defer improvements until the Te Awa Kairangi project.</b>	
Action Taken:	nil	

## 4 Safety Audit Findings – Normandale Road Crossing

The shared path intersects with Normandale Road, close to where Normandale Road intersects with Bridge Street. Normandale Road is classed as an Urban Connector in the One Network Framework and has traffic volumes of <2,000 vehicles per day, according to Mobile Roads.

Vehicles have priority over pedestrians and cyclists who have a refuge to use when crossing the road.



Figure 10: Shared path crossing over Normandale Road near intersection with Bridge Street  
(Source: NearMap).

### 4.1 Shared path crossing

Significant

The SAT identified several issues with this configuration which increase the risk of vehicle vs cyclist and vehicle vs pedestrian crashes.

#### 4.1.1 Crossing not perpendicular to the road and angled away from direction of traffic

The shared path crossing point at this location is not perpendicular to the road, increasing the distance that a path user must cross. The angle of the refuge islands is such that path users are facing away from the direction that vehicles are coming from. This is contrary to the Traffic Control Devices (TCD) Manual<sup>4</sup> which recommend refuge are angled in a way that users face towards oncoming traffic.

<sup>4</sup> <https://www.nzta.govt.nz/roads-and-rail/traffic-control-devices-manual/part-5-traffic-control-devices-for-general-use-between-intersections/pedestrian-facilities/pedestrian-crossing-features/>

#### 4.1.2 Refuge not deep enough to accommodate bikes, particularly on the southern side

The refuge allows path users to cross Normandale Road in two movements. However, the depth of the refuge is only just enough for bikes, particularly on the southern side. The depth is insufficient for cargo bikes or other forms of longer bikes. Waka Kotahi's Cycle Network Guidance suggests that median refuges should have a depth of at least 2.5m to accommodate longer bikes. The shallow depth of the refuge means that front and/or back wheels protrude into the traffic lane.



Figure 11: Median refuge depth dimensions shown with dimensions of a cargo box (represented by red box).

#### 4.1.3 Refuge missing resting rails, tactile pavers, or an edge line

The median refuge as constructed is quite basic, missing some of the detail usually included with a refuge. There are no resting rails, no tactile pavers, and no edge markings along the side of the refuge to indicate delineation with the traffic lane. Figure 11 below shows an example of a pedestrian refuge from the TCD Manual. Note that this design is for a pedestrian only refuge. A shared path refuge is expected to be wider and deeper to accommodate bikes.

RELEASED UNDER THE OFFICIAL INFORMATION ACT 1982



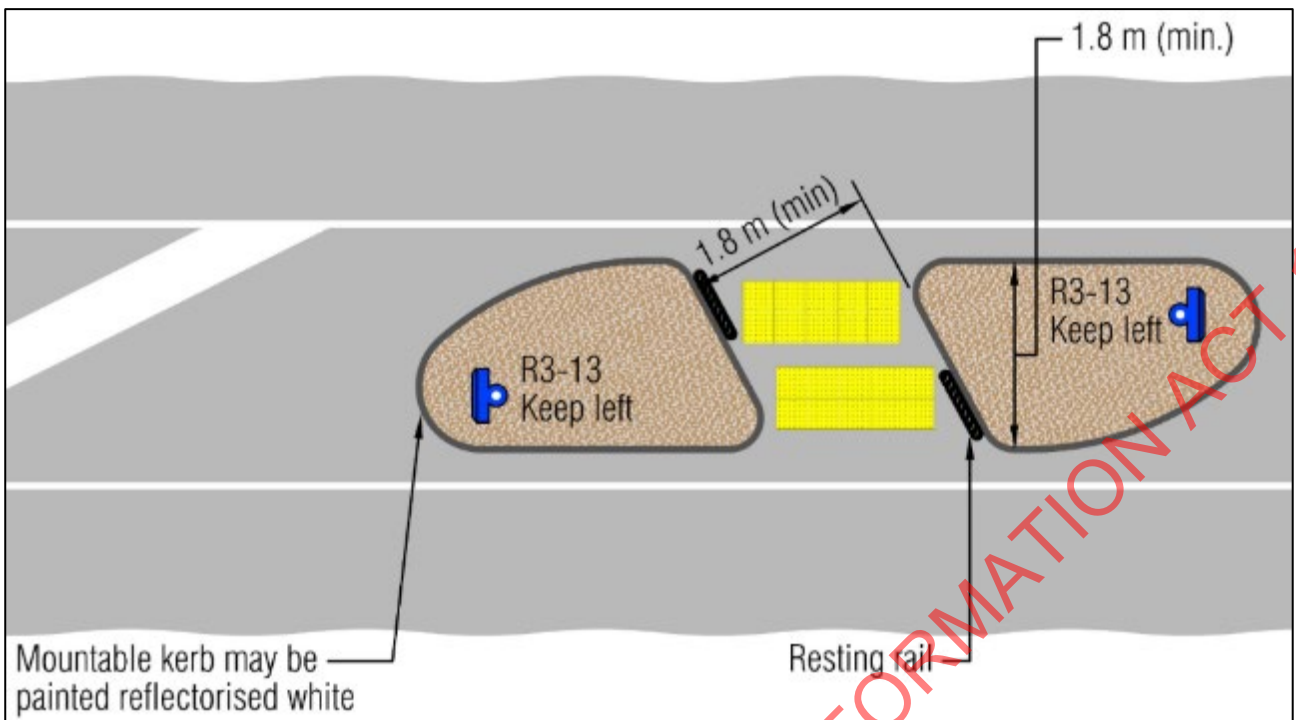


Figure 12: Example of a diagonal pedestrian refuge (Source: TCD Manual).

#### 4.1.4 Limited visibility to north from west side of intersection

The intervisibility between path users on the west side of the intersection and south-bound traffic on Normandale Road is limited, due to the vegetation in The Greenway. The median refuge means that path users can cross in two movements, reducing the risk created by the limited visibility. For pedestrians, Normandale Road is probably safer to cross than it was before the refuge was constructed.

However, due to the limitations of the median refuge described above, many path users, particularly those on bikes, are likely to prefer to cross in one movement. In which case, visibility from each end is much more important. There are numerous conflict points to check (including looking back over shoulder) before crossing. The sight distance between a southbound vehicle on Normandale Road and a path user on the western side of the crossing is about 45m through a gap in the vegetation.

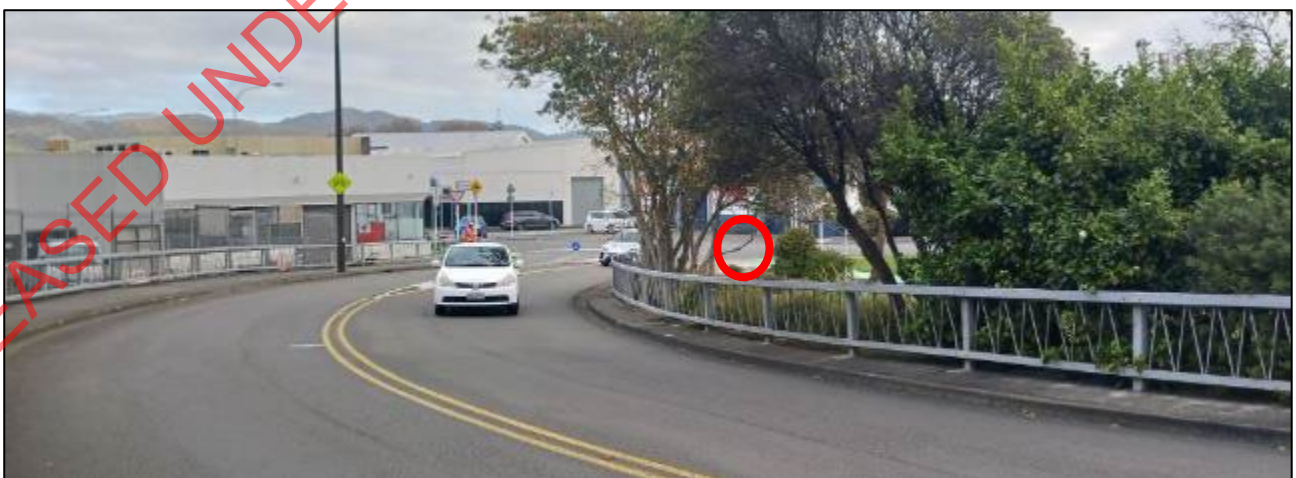


Figure 13: Intervisibility of path between southbound vehicles approaching intersection and shared path on western side of crossing (circled in red).

#### 4.1.5 Presence of driveway on intersection

There is a driveway on the corner of the intersection as pictured in Figure 13. This is an unfortunate location for a driveway, which is beyond the control of the project to change. The driveway is located where path users will stop to give way to traffic.



Figure 14: Driveway onto Normandale Road / Bridge Street intersection.

#### 4.1.6 Path users on east side of intersection waiting to cross block access for pedestrians on Normandale Road

Path users, particularly those on bicycles, waiting to cross on the eastern side of the intersection are likely to block pedestrian access to and from the footpath on Normandale Road. This is due to the pinchpoint in the footpath at the point where it intersects with the shared path.

#### Recommendation(s):

- 16 Many of the issues raised above could be alleviated with a better solution. Reconsider the best solution for this crossing point, considering alternative solutions such as a pedestrian / cycle crossing on a raised safety platform, signalling, or a roundabout at the intersection with Bridge Street.
- 17 In the meantime:
  - (a) Ensure that the median refuge is fit-for-purpose by providing resting rails, tactile pavers, and edge lines as per the TCD Manual.
  - (b) Trim back vegetation to improve intervisibility between southbound vehicles on Normandale Road and path users on western side of intersections.
  - (c) Install speed cushions on Normandale Road to further reduce speeds on approach to crossing. These should be on both sides of the road to stop vehicles crossing the centre line to avoid speed cushions.
  - (d) If vehicle tracking allows, tighten curve on the eastern side to allow more waiting space.

#### Frequency:

Crashes are likely to be Common

#### Severity:

Death or serious injury is Likely

#### Rating:

The safety concern is Significant

<b>Designer Response:</b>	The geometry of the crossing was governed by existing walls, narrow path widths and vehicle swept paths. A raised platform or roundabout was rejected by HCC and GWRC due to bus driver responses during consultation. Traffic volumes and movements did not meet the threshold for signalling the intersection and was not supported by HCC. Resting rails to the median refuges are a hazard to bus/truck turning swept paths and vehicles with load overhang. The Designer agrees that pedestrian tactile pavers and edge markings can be installed to the median refuge area over half the width. Vegetation clearance should be explored with HCC and trimmed to provide visibility that meets current standard. Installing cushions on Normandale would reduce crash severity between cyclists/pedestrians and vehicles and would mitigate most of the concerns raised by the Safety Auditors.
<b>Safety Engineer:</b>	Agree with designer's comments to paint edgelines to improve refuge delineation, however pedestrian tactile pavers could be a slip hazard. Agree with trim vegetation to improve visibility. Agree with recommendation for speed cushions on Normandale Road. HCC: Proceed with the design of a mountable refuge island, with no resting rails as these devices are likely to cause damage to drivers of large vehicles turning at the intersection. HCC is supportive to the installation of edge lines. Tree trimming is supported to improve visibility of the intersection, please progress with this work. The installation of speed cushions is not supportive due to structural and budget constraints. Confirm tracking curves. If vehicle tracking allows, tighten curve on the eastern side to allow more waiting space.
<b>Client Decision:</b>	Trim vegetation to improve sightlines and add this to the Asset Owner's Manual landscaping maintenance schedule. Paint edge lines at the median refuge. Speed cushions and curve changes deferred. To be considered by HCC as part of any future intersection improvements.
<b>Action Taken:</b>	Tree trimming and edge lines included in package of works to contractor

#### 4.2 Vehicles bypassing speed cushions on Bridge Street

Minor

To reduce speeds on approach to the intersection with Normandale Road, speed cushions have been installed close to the intersection. There is another set of speed cushions on other side of the intersection which is addressed in Chapter 5.

Vehicles bypassing the speed cushions and straddling the centre line on Bridge Street was observed by the SAT. This increases the risk of a head-on crash. This is enhanced by the presence of nearby side roads (Aglionby Street and Herbert Street). For example, a left-turning vehicle from Aglionby Street onto Bridge Street may encounter a westbound vehicle who has crossed the centre line to avoid the speed cushions.





Figure 15: Example of vehicle crossing centre line to bypass speed cushions on Bridge Street.

**Recommendation(s):**

- 18 Reconsider the best solution for this intersection, considering alternative solutions such as a raised intersection, signalling, or a roundabout.
- 19 In the meantime, install extra speed cushions over the centre line to reduce the ability for vehicles to avoid the speed cushion.

Frequency:	Severity:	Rating:
<i>Crashes are likely to be Common</i>	<i>Death or serious injury is Very Unlikely</i>	<i>The safety concern is Minor</i>
<b>Designer Response:</b>	A raised platform or roundabout was rejected by HCC and GWRC during consultation. Traffic volumes and movements did not meet the threshold for signalling the intersection and was not supported by HCC. The Designer supports installing extra speed cushions.	
<b>Safety Engineer:</b>	Agree with designer response to install central speed cushion HCC: agree with installing central speed cushion	
<b>Client Decision:</b>	Install central speed cushion	
<b>Action Taken:</b>	Included in package of works to contractor	

RELEASED UNDER THE OFFICIAL INFORMATION ACT 1982

## 5 Safety Audit Findings – Bridge Street Crossing

### 5.1 Accessibility of the crossing

Moderate

As pictured below, the approach to the crossing from the adjacent park does not align with the path in the park. For mobility-impaired pedestrians (e.g. vision-impaired, using a mobility scooter, etc.) this may mean that they cannot negotiate from the path onto the crossing. The northbound approach to the crossing from the park is also on the inside of a bend, and given pedestrians need to choose a gap in traffic, pedestrians need to rotate their head a long way on both directions to see if a vehicle is approaching. People over the age of 60 typically have reduced neck articulation and may have difficulty looking back and forth to choose a safe gap in traffic to cross.

This difficulty of choosing a gap is also exacerbated by the long crossing distance and the ability of pedestrians to accurately judge both a vehicle's approach speed and predict how long it will take them to walk across the full length of the crossing.



Figure 16: Bridge Street crossing, images from site visit and designs.

## Recommendation(s):

- 20 Undertake an inspection at the crossing with representatives from CCS disability action or similar to understand their needs and difficulties in travelling through this area.
- 21 Align path from park to crossing.
- 22 Install a median refuge to reduce crossing distances, and so pedestrians only need to look in one direction at a time to choose a gap rather than articulating their neck through a wide angle to check in both directions.
- 23 Monitor and consider whether a raised platform zebra crossing is more appropriate in the long term, and whether the crossing is suitably located on bridge street.

Frequency:	Severity:	Rating:
<i>Crashes are likely to be Infrequent</i>	<i>Death or serious injury is Likely</i>	<i>The safety concern is Moderate</i>
<b>Designer Response:</b>	Build-outs were placed via a site notice. Designer comments from the Site Engineer are "The intent of this crossing was to reinstate a crossing lost due to the compensation carparks. It was developed to provide a crossing point while managing site constraints e.g. bus stop and service pits etc. A meeting could be held with CCS Disability Action or similar. Aligning path with crossing would require further relocation of a drain that runs from the park to the kerb and channel."	
<b>Safety Engineer:</b>	Agree with designer response to install central speed cushion or median refuge HCC: consider that the crossing ultimately needs to be redesigned and possibly relocated in future. Not supportive of refuge island option. Support edgelines to make road appear narrow as an interim solution, as well as driver feedback signs.	
<b>Client Decision:</b>	Install edge lines and driver feedback signs. HCC to consider a crossing upgrade in future.	
<b>Action Taken:</b>	Included in package of works to contractor.	

## 5.2 Speed cushions placement ineffective at reducing vehicle speeds Minor

The speed cushions placed in the vicinity of the crossing to reduce vehicle speeds are effective when drivers align their vehicle correctly in the traffic lane; however, the cushions are placed far enough apart such that a driver can drive over the centreline between the cushions, so they don't need to slow down. We observed more than 10 drivers doing this in a period of around five minutes during our inspection.

The path vehicles take between the speed cushions increases the risk of a head-on crash rated in this section, and also affects vehicle speed and the severity ratings for the crossing in the previous section. Speed cushion placement close to the Normandale Road intersection is covered in Chapter 4.





Figure 17: Speed cushions near Bridge Street crossing with vehicles driving along centre line to avoid.

**Recommendation(s):**

- 24 Either install a third speed hump in the centre of the road or install a median refuge at the crossing so drivers are no longer able to drive along the centreline and avoid the speed humps.
- 25 Monitor and consider whether a raised platform zebra crossing is more appropriate in the long term, and whether the crossing is suitably located on bridge street.

<b>Frequency:</b> Crashes are likely to be Common	<b>Severity:</b> Death or serious injury is Very Unlikely	<b>Rating:</b> The safety concern is Minor
<b>Designer Response:</b>	The Designer agrees with Recommendation 24. Raised platforms on Bridge Street are not supported by HCC. WRT monitoring, the Designer recommends that the Client discusses with the Safety Auditors the items to be recorded if monitoring is to be undertaken.	
<b>Safety Engineer:</b>	Agree to consider a refuge island, this may negate the need for a central cushion. HCC: consider that the crossing ultimately needs to be redesigned and possibly relocated in future. Not supportive of refuge island option.	

<b>Client Decision:</b>	<b>Install central speed cushion. HCC to consider a crossing upgrade in future.</b>
<b>Action Taken:</b>	<b>Included in package of works to contractor.</b>

### 5.3 Placement of kerb build outs protecting pedestrians

Minor

Similar to the issue at the Marsden Street crossing, the placement of the kerb buildouts in relation to the crossing location on Bridge Street would not prevent drivers from driving into the area of carriageway where pedestrians may be waiting to cross. Pedestrians may also be discouraged from waiting on the carriageway due to the discomfort of not being protected by kerb buildouts, meaning they are further from the driver’s field of vision and approaching drivers may be less likely to see them.



Figure 18: Bridge Street crossing indicating placement of kerb build-outs.

#### Recommendation(s):

- 26 Install kerb buildouts to protect pedestrians and prevent vehicles from entering the area where pedestrians wait on the tactiles.

<b>Frequency:</b> <i>Crashes are likely to be Infrequent</i>	<b>Severity:</b> <i>Death or serious injury is Unlikely</i>	<b>Rating:</b> <i>The safety concern is Minor</i>
<b>Designer Response:</b>	Build-outs were placed via a site notice. Designer comments from the Site Engineer are “The intent of this crossing was to reinstate a crossing lost due to the compensation carparks. It was developed to provide a crossing point while managing site constraints e.g. bus stop and service pits etc. A meeting could be held with CCS Disability Action or similar. Aligning path with crossing would require further relocation of a drain that runs from the park to the kerb and channel.”	
<b>Safety Engineer:</b>	Agree with designer’s response but best solution is a refuge, which breaks the crossing distance into two halves. HCC: The option of a refuge island is not supportive by HCC as this might cause a pinch point to drivers. Review sight distance checks and consider adding more No Stopping At All Times. Do not proceed with the refuge island.	

<b>Client Decision:</b>	Kerb build-out not simple as would require drain relocation. Hazard is minor and can be considered as part of future crossing upgrade/relocation. Do nothing.
<b>Action Taken:</b>	nil

## 6 Safety Audit Findings - Shared path adjacent to businesses

This chapter covers safety concerns with the 125m section of shared path along Bridge Street between the Normandale Road and Marsden Street crossings. The shared path here is directly adjacent to light industrial businesses with six driveways.

### 6.1 Shared path conflict at driveways

Moderate

There are likely to be a reasonable number of vehicle movements in and out of each of the driveways along Bridge Street on weekdays. This increases the risk of a vehicle vs cyclist crash.

Striped, green marking, as per Waka Kotahi's High-Use Driveway Treatment for Cycle Paths and Shared Paths<sup>5</sup> have been implemented at each driveway. This highlights the potential presence of cyclists to vehicles. There is room at each business for vehicles to turn around so that they exit forwards. There is reasonable visibility of users on the path from the driveways.

Due to on-street parking, visibility of path users and the markings are reduced for entering vehicles.

#### Recommendation(s):

- 27 Remove some on-street car parks to provide better visibility for entering vehicles.
- 28 Consider rubber speed humps to reduce driveway entry speeds.

Frequency:	Severity:	Rating:
Crashes are likely to be Occasional	Death or serious injury is Likely	The safety concern is Moderate
<b>Designer Response:</b>	Noting consultation feedback from HCC and businesses during the design process, it is unlikely that removal of carparks would be acceptable to either HCC or business owners. However, the Designer agrees that consultation with HCC and Business Owners should occur to ascertain if some carparks can be removed or rubber humps installed.	
<b>Safety Engineer:</b>	Check placement of parking aligns with tech note 002 in CNG. HCC: support rubber speed humps (may require approval of properties). If not supported could consider cycling humps on the pathway. Or 'slow' markings for cyclists (horizontal lines).	
<b>Client Decision:</b>	Install rubber speedhumps to reduce driveway entry speeds – confirm with individual business owners.	
<b>Action Taken:</b>	Included in package of works to contractor.	

<sup>5</sup> <https://www.nzta.govt.nz/assets/pub-resources/high-use-driveway-treatment-for-cycle-paths-and-shared-paths-design-guidance-note/High-use-driveway-treatment-for-cycle-paths-and-shared-paths-design-guidance.pdf>



## 6.2 Dooring risk

Moderate

A dooring crash risk occurs when a cyclist's line of travel is in the zone of where a car passenger opens their car door. This can lead to cyclist vs door crash, or other cyclists crash type if that cyclist swerves to avoid the car door.

Many of the frontages are surface-level car parks. Some of these car parks are directly adjacent to the shared path, increasing the risk of eastbound cyclists being doored. The buffer between the edge of the path and property boundaries is not wide enough to avoid being doored without changing the line of travel.

There is also a risk of westbound cyclists being doored by vehicles parked on-street, although this is slightly lower due to the cyclist and car-door opener facing each other.

The shared path is already the minimum width of 2.5m, so there is no room to widen the buffer between the path and the property boundary without removing on-street car parks.

### Recommendation(s):

- 29 Remove the on-street car parking so that the path can be widened to provide an wider buffer from vehicles parked off street.
- 30 Educate businesses with parking directly adjacent to the path to practise the 'Dutch reach' technique of opening a car door.

Frequency:	Severity:	Rating:
<i>Crashes are likely to be Common</i>	<i>Death or serious injury is Unlikely</i>	<i>The safety concern is Moderate</i>
<i>Designer Response:</i>	WRT cyclists being doored by parked vehicles on Bridge Street, the edge marking is located in accordance with current standards and guidelines and the Designer believes that if cyclists are using the edge marking as intended, then the risk of dooring is below the threshold for any further treatment. The Designer agrees that attempts are made to educate businesses about the risk of dooring on the northern side of the shared path.	
<i>Safety Engineer:</i>	Consequence of dooring less severe as path not on live lane. Note that marking encourage riders to keep left, which reduces the likelihood and impact in event of dooring. HCC: don't support removal of parking. General education through social media etc is a good idea	
<i>Client Decision:</i>	Refer education piece to comms team. No change to infrastructure.	
<i>Action Taken:</i>	Referred to comms team	

## 6.3 Warning signage location

Moderate

WU61 signs have been placed at the driveways to alert drivers to the presence of cyclists travelling in both directions. The SAT considers these signs could be better placed to better align with the guidance. The recommended layout is shown in Figure 18 below.

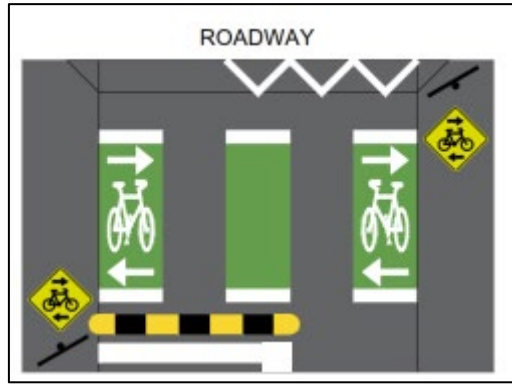


Figure 19: Correct high-use driveway treatment for cycle paths and shared paths.

The WU61 signage poles should be located clear of the cycle path or shared path, and pointing in a direction that faces an oncoming driver. The placement of the poles on Bridge Street are within the shared path which increases the risk of a cyclist crash if they hit the pole with their handlebars.



Figure 20: Example of WU61 sign pole located within shared path.

**Recommendation(s):**

- 31 Relocate WU61 sign poles so that they are not within the shared path and such that they are consistent with Design Guidance.

<b>Frequency:</b> Crashes are likely to be Common	<b>Severity:</b> Death or serious injury is Unlikely	<b>Rating:</b> The safety concern is Moderate
<b>Designer Response:</b>	Signs were placed in accordance with current standards. Considering that the signs face the roadway, the Designer agrees that these signs can be relocated to align with the existing edgeline.	

<b>Safety Engineer:</b>	Check if poles were misplaced, appears further than 300mm from kerbline. Should not be on path side of edge line. Recommend moving poles and/or edge-line. HCC: In general consider pavement markings more effective.
<b>Client Decision:</b>	Possible defect in either placement of edgeline or some of the signs, refer to EtC for inspection against design and correction by contractor.
<b>Action Taken:</b>	Nil (corrective action is through defects process)

## 7 Safety Audit Findings – Northern section

This chapter covers the shared path section between the P2M cycle path and the Hutt River Trail. It covers safety issues not otherwise identified in Chapters 3-6.

### 7.1 No separation between cycle path and Parliament Street

Moderate

At the northern end of the cycle path, there is a short section of cycle path directly adjacent to Parliament Street. Based on what was observed on site and in the detailed design drawings, there does not appear to be any physical separation between the path and the road. This increases the risk of vehicles encroaching into the cycle path and causing a cyclist vs vehicle crash.

The lack of separation also means that there is no physical barrier to stop vehicles from parking on the cycle path, blocking access for cyclists. Cyclists may have to use the road to get around parked vehicles, reducing accessibility.



Figure 21: No permanent physical separation between cycle path and traffic lane.

#### Recommendation(s):

- 32 Provide physical separation between the cycle path and traffic lane at Parliament Street / Bridge Street intersection. Leave a gap wide enough for cyclists to use to

access the road if they wish. There are a range of options to choose from using 'Protected Cycle Lane Barrier Selection Matrix'.<sup>6</sup>

Frequency:	Severity:	Rating:
<i>Crashes are likely to be Occasional</i>	<i>Death or serious injury is Likely</i>	<i>The safety concern is Moderate</i>
<b>Designer Response:</b>	Due to width constraints, correlated to vehicle turning swept paths (particularly buses), high level physical separation is not recommended as vehicles will shy away and likely cross the centreline. The Designer recommends bolt down wheel stops along the white edge line.	
<b>Safety Engineer:</b>	Safe hit posts are also an acceptable solution that would be more conspicuous to drivers. HCC: support hit posts, pending review of specification. Don't support wheel stops.	
<b>Client Decision:</b>	Install yellow safe hit posts	
<b>Action Taken:</b>	Included in package of works to contractor – confirm positioning with HCC prior to installation.	

## 7.2 Pharazyn Street crossing

Moderate

Of the three road crossings that path users must make; (Pharazyn Street, Normandale Road, Marsden Street), Pharazyn Street felt the safest. There were good sightlines in either direction. The speed cushions on either side of the crossing appeared to be reasonably effective at reducing vehicle speeds. While the shared path leads to the crossing on a straight alignment, there are enough visual clues to path users to stop and give way to traffic.

However, there are some deficiencies with the median refuge. It is missing resting rails, tactile pavers, and edge lines separating the refuge from the traffic lane. It is also not quite deep enough to accommodate longer bikes such as cargo bikes. Waka Kotahi's Cycle Network Guidance suggests that median refuges should have a depth of at least 2.5m to accommodate longer bikes. These deficiencies are relatively minor and not expected to increase the frequency of a particular crash type but should be addressed to improve the level of service for people walking and cycling along the path.

Average traffic speeds are unknown. If speeds are greater than 30km/h, then a vehicle vs cyclist, or vehicle vs pedestrian crash is likely to lead to serious injury.

<sup>6</sup> <https://www.nzta.govt.nz/assets/Walking-Cycling-and-Public-Transport/docs/cycling-network-guidance/protected-cycle-lane-barrier-selection-matrix.pdf>





Figure 22: Pharazyn Street shared path crossing with right-hand hold rail on western side circled.

The SAT understands that the right-hand hold rail on the western side (circled in Figure 8) of the intersection is obstructing access for maintenance vehicles to the nearby pump station. Given this hold-rail is on the right-hand side of the path when most path users will be on the left-hand side, it is considered acceptable to remove this hold-rail to allow easier access for maintenance vehicles.

**Recommendation(s):**

- 33 Ensure that the median refuge is fit-for-purpose by providing resting rails, tactile pavers, and edge lines as per the TCD Manual.
- 34 The traffic lanes are quite wide in this location (>4m) so increasing the depth of the median refuge to comfortably accommodate longer bikes should be possible.
- 35 Monitor traffic speeds and consider a raised crossing here in future to improve level of service for path users.

<b>Frequency:</b> <i>Crashes are likely to be Infrequent</i>	<b>Severity:</b> <i>Death or serious injury is Likely</i>	<b>Rating:</b> <i>The safety concern is Moderate</i>
<b>Designer Response:</b>	The Designer agrees with Recommendation 33. Narrowing of the lane widths should be discussed with HCC as the originally designed width was provided in consultation with HCC. A raised crossing was investigated but not supported by HCC due to the height restriction imposed by the Normandale overbridge.	
<b>Safety Engineer:</b>	Agree with recommendation 33 HCC: support edgelines and tactiles. don't support resting rails due to maintenance. If monitoring reveals a strong need for resting rails, can reconsider.	
<b>Client Decision:</b>	Install edgelines and tactile pavers.	
<b>Action Taken:</b>	Included in package of works to contractor.	

**7.3 Lack of delineation marking around bollards**

Minor

About 25m west of the Pharazyn Street crossing, there are two bollards to prevent vehicle access to the path (beyond the pump station). There are no hazard delineation markings around the bollards, which increases the risk of a cyclist crash with the bollards.



Figure 23: Bollards on shared path west of Pharazyn Street.

**Recommendation(s):**

- 36 Implement hazard delineation markings as per Waka Kotahi’s Access Control Devices on Paths Design Guidance Note.<sup>7</sup>

<b>Frequency:</b> <i>Crashes are likely to be Occasional</i>	<b>Severity:</b> <i>Death or serious injury is Unlikely</i>	<b>Rating:</b> <i>The safety concern is Minor</i>
<b>Designer Response:</b>	The Designer agrees with Recommendation 36.	
<b>Safety Engineer:</b>	Agree with SAT and designer. HCC: Agree and check dimensions for wheelchair access.	
<b>Client Decision:</b>	Install hazard delineation markings	
<b>Action Taken:</b>	Included in package of works to contractor	

**7.4 Intervisibility at Parliament Street**

**Minor**

Where the shared path meets Parliament Street, there is a large bamboo plant which limits visibility between southbound path users and northbound traffic on Parliament Street. Traffic volumes are very low, as it largely an access street to a low number of properties. Therefore, the risk of a pedestrian or cyclist crash is low.

<sup>7</sup> <https://www.nzta.govt.nz/assets/resources/access-control-devices-on-paths/Access-control-devices-on-paths-design-guidance-note.pdf>



Figure 24: Where shared path meets Parliament Street.

**Recommendation(s):**

- 37 Consider trimming back the bamboo vegetation to improve intervisibility between southbound path users and northbound traffic. This may require negotiation with adjacent property owners.
- 38 Mark out a centre line, limit line and Give Way markings on the left-hand approach.

Frequency:	Severity:	Rating:
<i>Crashes are likely to be Infrequent</i>	<i>Death or serious injury is Unlikely</i>	<i>The safety concern is Minor</i>
<b>Designer Response:</b>	The Designer agrees with Recommendation 37. Recommendation 38 is not warranted as a fence has been erected and vehicles no longer approach from the right (the right in Figure 24).	
<b>Safety Engineer:</b>	Agree with 37, recommend wayfinding signage northbound to reduce cyclists going off-route to private property HCC: agree with trimming. Noting upcoming Parliament st works to address other concerns.	
<b>Client Decision:</b>	<b>Add bamboo trimming to the asset owner's manual landscaping maintenance schedule. Wayfinding and traffic conflict will be addressed in upcoming Parliament St Greenway project.</b>	
<b>Action Taken:</b>	Added bamboo trimming to asset owner's manual.	

RELEASED UNDER THE OFFICIAL INFORMATION ACT 1982



## 8 Safety Audit Findings – Underpasses

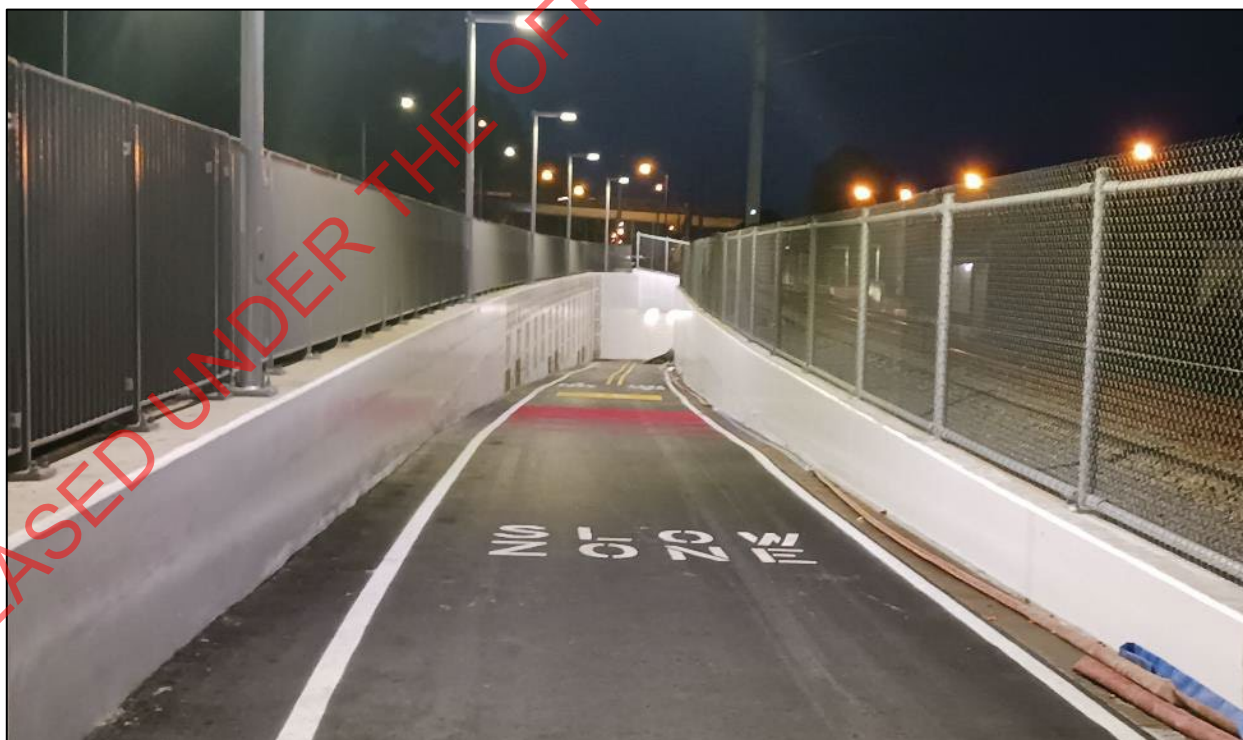
### 8.1 Speed management on ramps and underpass visibility

Significant

Although the SAT was not able to ride through the Petone underpass, we were able to ride through the underpass near Parliament Street. While there are adequate linemarking and delineation on the ramps warning cyclists to reduce their speeds to avoid a collision with an oncoming cyclist or losing control on the corner into the underpass, there are no physical speed reduction measures, as such there is a risk that some cyclists would ignore the linemarking.

In earlier audits, the SAT advised limited visibility into the underpass was a potential issue leading to a collision between oncoming cyclists, and we recommended an electronic warning sign or convex mirror may need to be installed after monitoring. Our stance to monitor this issue remains the same in this audit, as it's possible the lack of visibility or sight distance into the underpass may also act to reduce cyclist approach speeds, and visibility restrictions are an emerging treatment to improve safety in some circumstances (see Austroads Guide to Road Design Part 7: New and Emerging Treatments, section 6.3).

One potential issue which may also lead to inappropriate entry speeds to the underpass is cyclists' ability to judge their speed in the lower sections of the underpass, especially as the grade of the ramps means cyclists roll faster as they ride further into the underpass. In *Austroads Research Report 557-18: Measures to Reduce Crashes Adjacent to and within Tunnels*<sup>8</sup>, tunnels create an enclosed environment where people are less able to judge speed because there is less information from the environment about how fast they're travelling, and that providing stripes along the tunnel wall can assist to both reduce travel speeds and reduce speed differential between tunnel users. This would fulfil a similar role to how edge marker posts function for drivers at night when there is no visual information from the landscape surrounding the road to provide depth perception, which is essential for judging travel speed.



<sup>8</sup> <https://austroads.com.au/publications/tunnels/ap-r557-18>





Figure 25: Entrance to Petone underpass at either end.

**Recommendation(s):**

- 39 Install physical measures to reduce cyclist speeds on the ramps entering the underpass, e.g. similar to the Kent/Cambridge Terrace bumps outside the fire station.
- 40 Undertake monitoring post-opening including speeds and behavioural monitoring to identify near misses or if travel speeds are likely to result in serious injury (impact speed above 30km/h, i.e. cyclists in opposing directions both going above 15km/h or similar). This will provide immediate information to manage risk so that additional measures such as convex mirrors, electronic warning signs and depth perception aids (tunnel wall stripes or similar) can be installed quickly if required.

Frequency:	Severity:	Rating:
<i>Crashes are likely to be Common</i>	<i>Death or serious injury is Likely</i>	<i>The safety concern is Significant</i>
<i>Designer Response:</i>	In consultation with cycle groups during consenting, the provision of physical measures at underpass portals was rejected and the Resource Consent application did not include any physical measures. The Designer agrees with Recommendation 40 and if there is a safety issue, the information gathered can be used as evidence to overturn cycle groups objections and additional measures as recommended by the Safety Auditors considered.	
<i>Safety Engineer:</i>	Existing markings are adequate. Monitor and if there are serious problems then additional measures can be considered.	
<i>Client Decision:</i>	Lane tracking data collected post-opening indicates a good level of compliance >91% at the ramp approach, meaning good behaviours are helping to reduce this risk. No action at this stage.	
<i>Action Taken:</i>	nil	

**8.2 Lean zone over the centreline**

**Moderate**

When cyclists turn corners (especially when turning at speed), they lean their bike into the curve to assist with maintaining traction during the corner while maintaining their speed. This means that there is a 'lean zone' where cyclist may clip objects while negotiating around a curve. Although the SAT did not find fixed objects in the lean zone in the underpasses, one possibility is that the lean zones for cyclists travelling in opposite directions in the underpass overlap, such that head-on

collisions may occur. This is particularly the case if cyclists travelling into the underpass misjudge the corner radii and travel into the bottom of the underpass at a speed too fast to stay left of the centreline, swinging wide around the corner.

The Normandale underpass already has 'keep left' path behaviour markings and a double-yellow no-overtaking centreline to prevent this; however these are again linemarkings rather than physical measures.



Figure 26: Normandale underpass.

**Recommendation(s):**

- 41 Undertake monitoring post-opening including speeds and behavioural monitoring to identify near misses or if travel speeds are likely to result in serious injury (impact speed above 30km/h, i.e. cyclists in opposing directions both going above 15km/h or similar). This will provide immediate information to manage risk so that additional measures such as convex mirrors, electronic warning signs and depth perception aids (tunnel wall stripes or similar) can be installed quickly if required.
- 42 Additional measures could be audio-tactile pavement markings (ATP) on both centrelines to encourage cyclists to keep left, or a flush median buffer space along the centreline.

Frequency:	Severity:	Rating:
<i>Crashes are likely to be Occasional</i>	<i>Death or serious injury is Likely</i>	<i>The safety concern is Moderate</i>
<i>Designer Response:</i>	In consultation with cycle groups during consenting, the provision of physical measures at underpass approaches and at portals was rejected and the Resource Consent application did not include any physical measures. The Designer agrees with Recommendation 41 and if there is a safety issue, the information gathered can be used as evidence to overturn cycle groups objections and additional measures as recommended by the Safety Auditors considered.	
<i>Safety Engineer:</i>	Disagree with additional physical measures, double yellow line is already wider than guidance recommends and allow for some lean. If there are serious problems then reconsider	
<i>Client Decision:</i>	No action	
<i>Action Taken:</i>	nil	

### 8.3 Service duct end covers

Moderate

When the SAT travelled through the underpass, the service duct ends were not covered, and could act as an impaling hazard for cyclists.



Figure 27: Service duct with no cover.

#### Recommendation(s):

- 43 Cover service duct rail ends or install a duct terminal that does not pose an impaling hazard.

Frequency:	Severity:	Rating:
<i>Crashes are likely to be Infrequent</i>	<i>Death or serious injury is Likely</i>	<i>The safety concern is Moderate</i>
<i>Designer Response:</i>	A cover has been installed to the lighting tube. The Designer does not consider this an impalement hazard. Cyclist handlebars will hit the wall/lighting tube first, rather than a cyclist being impaled.	
<i>Safety Engineer:</i>	Railing is on right hand side of path where riders are not expected to be riding	
<i>Client Decision:</i>	Cover has been installed. No further action.	
<i>Action Taken:</i>	nil	

### 8.4 Trip hazards

Minor

There are several areas in the vicinity of the underpasses where minor differences in the height between the footpath, carriageway and underpass ramp could trip pedestrians, as the height difference is not sufficiently large (e.g. a kerb is 100mm high) that pedestrians may notice the difference in levels.

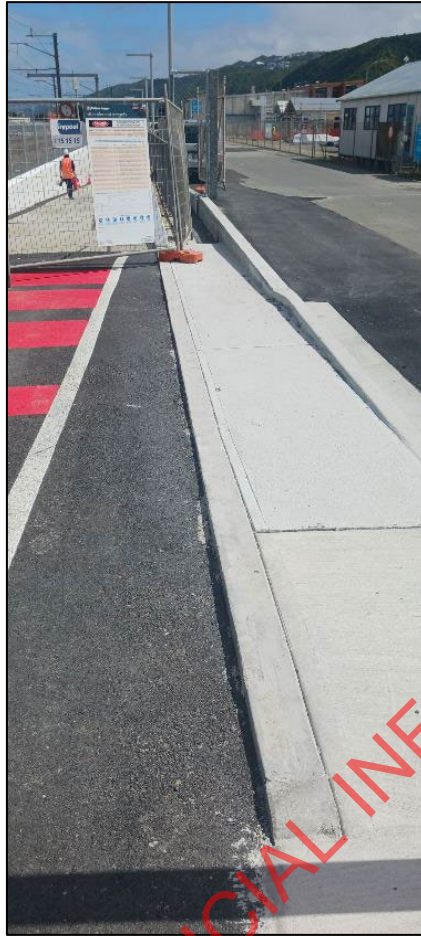


Figure 28: Possible hazard at northern end of Petone underpass.

**Recommendation(s):**

- 44 Remove trip hazard by levelling surface or providing an obvious step-down if necessary. If this is not possible, then consider delineating the step down e.g. with tubular delineators or similar.

<b>Frequency:</b> <i>Crashes are likely to be Occasional</i>	<b>Severity:</b> <i>Death or serious injury is Very Unlikely</i>	<b>Rating:</b> <i>The safety concern is Minor</i>
<b>Designer Response:</b>	The Designer agrees with providing delineation at the locations where there is an obvious step-down.	
<b>Safety Engineer:</b>	<b>Confirm if there is a step-free egress point nearby. Make it more conspicuous, if need be.</b>	
<b>Client Decision:</b>	This step is not an egress point and has no strong desire lines therefore no action for this trip hazard. Confirmed egress point to carpark is conspicuous.	
<b>Action Taken:</b>	nil	



## 9 Safety Audit Findings – Cycle path access control

There are several locations where the cycle path is adjacent to a road. This introduces the risk of unwanted access to the cycle path from vehicles. The locations where the cycle path is adjacent to roads are:

- Petone underpass from Hutt Road
- Petone underpass from McKenzie Avenue
- Cycle path from Petone Station Park and Ride
- Cycle path from SH2 south of Dowse interchange
- Cycle path from SH2 north of Dowse interchange
- Normandale underpass from Parliament Street

### 9.1 Vehicle access

Minor

The cycle path is well marked so it is highly unlikely that vehicles would inadvertently drive along the cycle path. There may however be instances where vehicles deliberately and illegally try to access the path. Bollards were not present during the site visit, but it is understood that they will be installed at the locations listed above (except off SH2 where there are other barrier types).

In some locations, such as the entrance to the Petone underpass, it may be technically possible to drive around bollards, but this requires some determination. The SAT considers that the bollards are a sufficient deterrence.

Access from SH2 is impossible for vehicles without driving through the crash barriers.

#### Recommendation(s):

- 45 Work with Police to ensure enforcement of illegal use of cycle paths by vehicles.
- 46 Ensure adequate markings around bollards to prevent cycle crashes with bollards.
- 47 Only consider more restrictive access control devices if vehicle access proves to be a real problem.

Frequency:	Severity:	Rating:
<i>Crashes are likely to be Infrequent</i>	<i>Death or serious injury is Unlikely</i>	<i>The safety concern is Minor</i>
<b>Designer Response:</b>	The Designer is not able to respond to Recommendation 45. A ground planted pole is to be installed at the north end of Petone station carpark, together with hazard markings. The Designer agrees with Recommendations 46 and 47.	
<b>Safety Engineer:</b>	<b>Agree with 45, Police should be involved if it becomes an ongoing problem. Agree with 46. Note the risk that more restrictive access control devices (effective against motor bikes) could negatively affect access for some riders (e.g. on cargo-trikes).</b>	
<b>Client Decision:</b>	Bollard installation and markings are already within spec therefore no further action required.	
<b>Action Taken:</b>	nil	

### 9.2 Motorcycle access

Minor

Because the cycle path is well marked, it is unlikely that motorcyclists would use the cycle path inadvertently. However, bollards will be insufficient to prevent a motorcyclist from deliberately and illegally accessing the cycle path.

Access control for motorcyclists is not considered in Waka Kotahi's 'Access Control Devices on Paths Design Guidance Note'. This is because preventing motorcycle access also severely restricts cycle access.

**Recommendation(s):**

- 48 Work with Police to ensure enforcement of illegal use of cycle paths by motorcyclists.
- 49 Only consider more restrictive access control devices if motorcycle access proves to be a real problem.

<b>Frequency:</b> <i>Crashes are likely to be Occasional</i>	<b>Severity:</b> <i>Death or serious injury is Unlikely</i>	<b>Rating:</b> <i>The safety concern is Minor</i>
<b>Designer Response:</b>	<b>The Designer is not able to respond to Recommendation 48. The Designer agrees with Recommendation 49.</b>	
<b>Safety Engineer:</b>	Agree with 48 if it's an ongoing problem	
<b>Client Decision:</b>	No action unless it becomes a problem in future	
<b>Action Taken:</b>	nil	

## 10 Safety Audit Findings – Separated path midblocks

This section considers safety issues identified on the midblock sections of the cycle path between Petone Station and the Dowse bypass, and the Dowse bypass and the Normandale underpass.

### 10.1 Build-up of debris

Moderate

The cycle path is between the rail corridor and the state highway. On both sides, there are gravel berms. This gravel is likely to migrate onto the cycle path on a frequent basis due to rainfall events and tracking by maintenance vehicles using the corridor and berm. If left unmaintained, the build-up of debris may lead to cycle loss-of-control crashes.

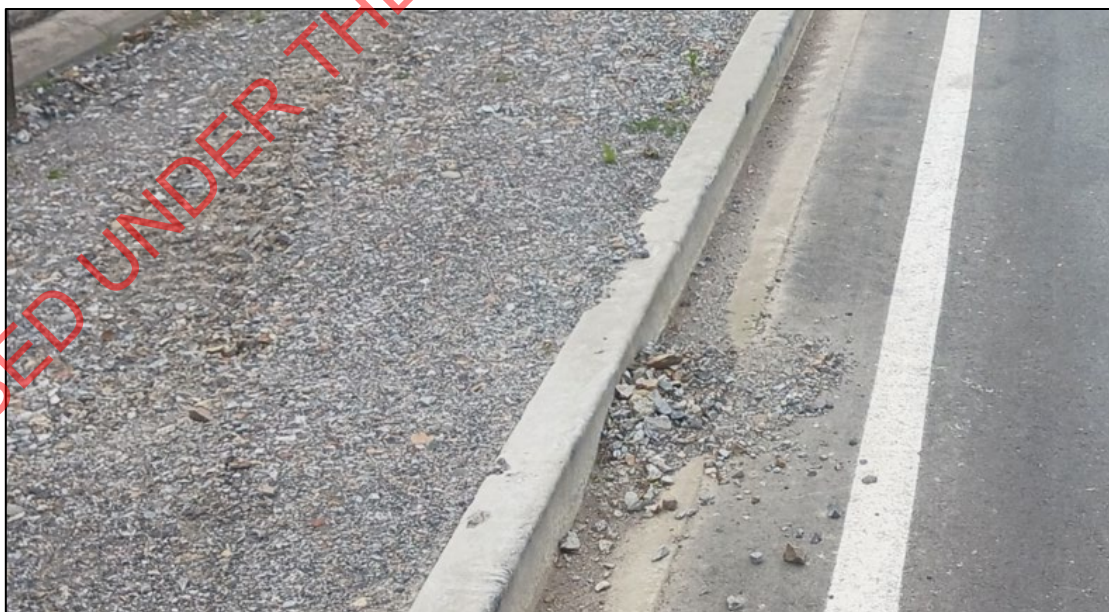


Figure 29: Example of debris build-up on path adjacent to gravel berm

**Recommendation(s):**

- 50 Ensure the cycle path is regularly swept.

51 Consider solutions to prevent gravel and other debris from building up on the cycle path.

<b>Frequency:</b> <i>Crashes are likely to be Common</i>	<b>Severity:</b> <i>Death or serious injury is Unlikely</i>	<b>Rating:</b> <i>The safety concern is Moderate</i>
<b>Designer Response:</b>	The Designer agrees with Recommendations 50 and 51.	
<b>Safety Engineer:</b>	Agree	
<b>Client Decision:</b>	Levels of service for keeping the path well-swept are part of the maintenance agreement with HCC. No further action.	
<b>Action Taken:</b>	nil	

### 10.2 Stormwater grates

Minor

The SAT observed that some stormwater grates were protruding slightly in some locations on the main cycle path. Stormwater grates are beyond the edgelines, and thus out of the main route of travel of cyclists. However, they could cause a loss-of-control crash for some cyclists that adjust their line of travel for some reason.



Figure 30: Example of stormwater grate protruding slightly at edge of path.

#### Recommendation(s):

52 Ensure stormwater are flush with the surface if possible.

<b>Frequency:</b> <i>Crashes are likely to be Infrequent</i>	<b>Severity:</b> <i>Death or serious injury is Unlikely</i>	<b>Rating:</b> <i>The safety concern is Minor</i>
<b>Designer Response:</b>	The Designer agrees with Recommendation 52.	
<b>Safety Engineer:</b>	Agree	
<b>Client Decision:</b>	Completed as part of construction snags list. Further instances outside of tolerance can be referred to the EtC as a construction defect.	
<b>Action Taken:</b>	nil	



### 10.3 Uncovered culverts

Minor

There are several deep and uncovered stormwater culverts adjacent to the cycle path. This increases the severity of a loss-of-control crash, should one occur. This is considered low risk given the kerb between the cycle path and the berm.

If a vehicle on SH2 strikes the barrier, there is also a low risk of the wheel from that vehicle getting caught in the culvert.



Figure 31: Example of deep, uncovered stormwater culvert adjacent to cycle path.

#### Recommendation(s):

- 53 Consider options for avoiding serious injury to someone falling here.

Frequency:	Severity:	Rating:
Crashes are likely to be Infrequent	Death or serious injury is Unlikely	The safety concern is Minor
Designer Response:	Hazard markers have been installed at these drains. A steel grate could be fabricated to cover the drain, however a cyclist falling onto that could result in a serious injury. No further measures are recommended.	
Safety Engineer:	Agree with designer response. The path edge-line will help to keep riders away from the kerb.	
Client Decision:	No further action	
Action Taken:	nil	

## 11 Safety Audit Findings – Dowse Bypass

### 11.1 Vehicles on SH2 driving onto shoulder

Significant

On the SH2 Dowse southbound onramp, there is a risk that drivers on the ramp are not aware that a cyclist using the Dowse Bypass southbound are about to enter the shoulder. Measures to prevent drivers on the ramp from entering the shoulder are required.





Figure 32: SH2 shoulder adjacent to Dowse bypass.

**Recommendation(s):**

- 54 Install 250mm pitch ATP on the Dowse southbound onramp edgeline, a buffer zone at least 300mm wide delineating the edgeline from the shoulder area cyclists will use, and green coloured surfacing on the shoulder where cyclists will exit the Dowse bypass onto the SH2 shoulder.

<b>Frequency:</b> <i>Crashes are likely to be Occasional</i>	<b>Severity:</b> <i>Death or serious injury is Very Likely</i>	<b>Rating:</b> <i>The safety concern is Significant</i>
<b>Designer Response:</b>	The Designer agrees with Recommendation 54 and suggests that green cycle markings also be installed on the shoulder.	
<b>Safety Engineer:</b>	Agree with recommendation and designer comment, consider green colouring on northern entrance to bypass as well	
<b>Client Decision:</b>	Undertake works as detailed in recommendation 54, and green colouring on northern entrance to bypass as well (refer 11.4)	
<b>Action Taken:</b>	Included in package of works to contractor	

**11.2 Bypass delineation**

Minor

The bypass area at night was well lit. However, we anticipate that some additional guidance would be beneficial to assist cyclists in snagging on the edges of fixed objects in the area such as barriers, as these were difficult to see at night. The northern end of the bypass also did not have linemarking when we passed through, which would have facilitated in cyclists positioning their bikes to avoid snagging on the barriers.



Figure 33: Dowse bypass at night.

**Recommendation(s):**

- 55 Install black and white hazard markers on all barrier terminals on both sides of the Dowse Bypass.
- 56 Complete linemarking at northern end of the bypass.

<b>Frequency:</b> <i>Crashes are likely to be infrequent</i>	<b>Severity:</b> <i>Death or serious injury is Unlikely</i>	<b>Rating:</b> <i>The safety concern is Minor</i>
<b>Designer Response:</b>	The Designer agrees with Recommendations 55 and 56.	
<b>Safety Engineer:</b>	Agree with recommendations and designer	
<b>Client Decision:</b>	Install black and white hazard markers on all barrier terminals on both sides of the Dowse Bypass. Confirmed linemarking is complete at northern entrance, ER will confirm if hazard markers were installed.	
<b>Action Taken:</b>	Nil, unless it's found that hazard markers were not installed	



### 11.3 Wrong-way travel

Minor

While riding through the bypass area, the SAT did not immediately comprehend how to use the layout of the bypass, how to get where we wanted to go, etc. While this issue is partly attributed to wayfinding, one other way of managing this is to ensure lane designation/direction arrows are provided at all merge and diverge areas in the bypass, so that riders do not enter a separated area and travel in the inverse direction. This is particularly the case as the lane setout involves southbound riders riding both directly adjacent to the train line and directly adjacent to the interchange if they're bypassing the interchange but intending to continue on SH2, while northbound riders ride between the two southbound lanes. This is not typical of a road layout in NZ where everyone keeps left.

One particular concern is around the route cyclists need to take if they are travelling northbound on the cycle path and want to get to Maungaraki, on the other side of the Dowse interchange. To do this cyclists need to continue heading northbound to the northern end of the bypass, then U-turn and exit the cycle path onto the SH2 shoulder, riding southbound up the shoulder of the Dowse southbound offramp to the roundabout. This path isn't obvious from the southern end of the bypass, so without additional guidance some cyclists may choose to ride up the shoulder of the Dowse southbound onramp in the inverse direction.

The SAT anticipate confusion of how the cycle path layout works in this area would be more of a useability issue than a safety issue, as there are good sightlines for oncoming cyclists so riders would moderate their speeds and behaviour.



Figure 34: Southern end of Dowse bypass.

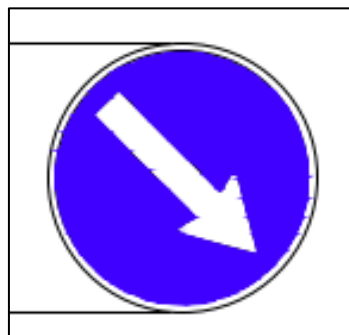


Figure 35: RG-17 sign that could be installed to remind northbound riders to stay right of the southbound bypass lane.

#### Recommendation(s):

- 57 Install directional arrows in all lanes at every merge and diverge in the vicinity to the Dowse Bypass to prevent inverse entry.

- 58 Install RG-17.1 twin disc 'keep left/right' signs on barrier terminals or tubular delineator posts which form the commencement of a merge or diverge as appropriate.

Frequency:	Severity:	Rating:
<i>Crashes are likely to be Infrequent</i>	<i>Death or serious injury is Unlikely</i>	<i>The safety concern is Minor</i>
<b>Designer Response:</b>	The entry point to the cycle bypass has been designed in consultation with Waka Kotahi. The entry point is not a designated location for northbound cycle path users to access Maungaraki via the SH southbound exit slip to Dowse interchange. There is no formal access provided to Maungaraki as part of the P2M project, hence there no guidance was provided for cyclists to undertake this manoeuvre. To guide northbound cycle path users not to enter the southbound entry slip at the cycle bypass exit or the southbound exit slip at the cycle bypass entry, the Designer recommends that the signage as shown on Dwgs LS-0025 and LS-0027 be installed. The Designer agrees with Recommendation 57. The Designer agrees with Recommendation 58 but recommends these signs be installed on the appropriate ends of the guardrail that separates the cycle path from the cycle bypass.	
<b>Safety Engineer:</b>	Suggest adding a white arrow in the southbound lane adjacent to the first post in figure 34. If ongoing problem can resort to RG-17. Prefer markings alone as RG-17 can introduce a snag risk.	
<b>Client Decision:</b>	Install white southbound arrow in the southbound lane adjacent (SH2 side) to the first post in figure 34.	
<b>Action Taken:</b>	Included in package of works to contractor.	

#### 11.4 Wayfinding and advisory signage

Significant

The cycle bypass of the Dowse Interchange is an unusual feature not commonly seen on cycle paths. To the uninitiated, it is unclear what is meant by the path layout, and what behaviour is expected of cyclists. The SAT considers that this could be improved through better wayfinding signage.

According to the designs, the sign shown in 36 is to be installed on approach to the start of the bypass. This sign is intended for people cycling on SH2, advising them of the upcoming bypass. There is too much information to comprehend quickly for someone riding on SH2.

The intention of the bypass is to reduce the risk to cyclists on SH2, by allowing them to bypass the Dowse interchange, rather than merging across the interchange's off-ramp and on-ramp. Cyclists may not understand the signage and thus continue through the interchange, rather than using the bypass as desired. This may contribute to increasing the risk of a cyclist vs vehicle crash as cyclists cross the off-ramp and on-ramp.



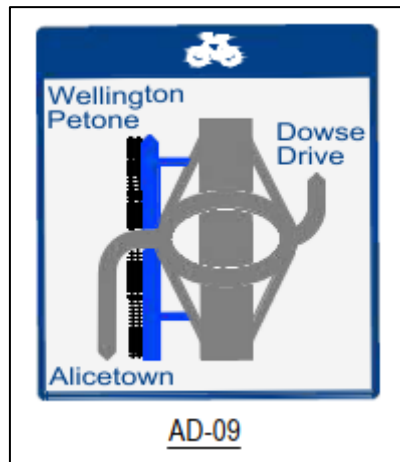


Figure 36: Proposed wayfinding signage for Dowse Interchange bypass.

### Recommendation(s):

- 59 Re-consider how wayfinding signage can be implemented at this location to achieve the desired behaviour and to cyclists to use the bypass rather than staying on SH2 and crossing the Dowse interchange off- and on-ramps.
- (a) Using the phrase 'Dowse interchange cycle bypass' or similar on wayfinding signage is probably enough to explain to path users what the extra, contra-flow lane is for.
  - (b) Provide signage at either end which explains to northbound and southbound cyclists how to access Maungaraki and Alicetown via SH2.

Frequency:	Severity:	Rating:
<i>Crashes are likely to be Infrequent</i>	<i>Death or serious injury is Very Likely</i>	<i>The safety concern is Significant</i>
<b>Designer Response:</b>	The Designer does not agree with the Safety Auditor wrt the ADS being confusing and recommends no change to the current signage. The designer recommends markings on the southbound exit slip shoulder saying "Wellington/Petone" with a left arrow within a green sharrow marking. WRT Recommendation 59(b), refer to the Designers response in Section 11.3 above. -	
<b>Safety Engineer:</b>	<b>Agree with designer except sharrow not appropriate. Left arrow with a cycle marking should be effective.</b>	
<b>Client Decision:</b>	Install markings on the southbound exit slip shoulder saying "Wellington/Petone" with a left arrow with cycle marking, in a position to allow appropriate response time to then utilise the bypass. Install northbound wayfinding for Alicetown/Maungaraki at northern end of bypass (in a position for a u-turn manoeuvre, not a wrong-way entry into bypass lane).	
<b>Action Taken:</b>	Included in package of works to contractor	

## 12 Safety Audit Findings – Petone Station

### 12.1 Access to cycle path from McKenzie Avenue

Minor

An entrance and exit point for cyclists to access P2M has been constructed south of Petone Station near the entrance to the Park and Ride car park off McKenzie Avenue. At the time of the site visit,

there were no markings to highlight this as a cycle access or to advise cyclists to give way to other path users. The access is only 1.6m wide which is not wide enough to allow for an exiting cyclist and an entering cyclist at the same time.



Figure 37: Cycle accessway between McKenzie Avenue and P2M cycle path.

The number of cyclists from McKenzie Avenue using this entrance is probably likely to be low but will include visitors to Belmont Regional Park. However, the narrow width increases the risk of a cyclist vs cyclist crash. The lack of markings to guide cyclists may cause confusion and increase the risk of failing to give way to P2M path users and vehicles on McKenzie Avenue.

**Recommendation(s):**

- 60 Widen the accessway so that there is enough room for cyclists in opposing directions to pass each other.
- 61 Square up the accessway to the path so provide a better line of sight for cyclists coming on to the path.
- 62 Provide Give Way markings for cyclists using the McKenzie Ave accessway to and from the main P2M path. Include some greening and a cycle symbol to highlight that the path is intended for cyclists only.

Frequency:	Severity:	Rating:
<i>Crashes are likely to be Infrequent</i>	<i>Death or serious injury is Unlikely</i>	<i>The safety concern is Minor</i>
<b>Designer Response:</b>	The original design was for southbound cyclists to access McKenzie Ave and beyond via the area on the south side of the McKenzie Ave MSE wall as it was deemed safer for cyclists to not have to cross in front of the Weltec access road bellmouth, which has visibility constraints for drivers exiting WelTec. This is also a route by which cyclists from Pito-one Road could access the shared path to travel south along the cycle path. Northbound access to the cycle path from McKenzie Ave was via the Petone station carpark route. Access to the shared path, as shown in Fig 37, was agreed by site staff and Waka Kotahi. The Designer recommends that signage (eg no entry signage) and guidance markings be installed (similar to the cycle	

	bypass), indicating that when travelling southbound on the shared path, those users wanting to access McKenzie Ave and beyond are guided to the southern side of the McKenzie Ave MSE wall, rather than adopt Recommendations 60 and 62. WRT Recommendation 61, the Designer believes the current markings as shown in Fig 37 are sufficient warning for northbound shared path users approaching the access point.
<b>Safety Engineer:</b>	Recommend limit line for cyclists using this access route in either direction to show that you are not in a merge but a give way situation. Then put a green block with a cycle image (Note: there is no pedestrian access to bridge).
<b>Client Decision:</b>	Install limit line and green block with cycle image
<b>Action Taken:</b>	<b>Included in package of works to contractor</b>

### 12.2 Vehicle tracking at Park and Ride exit

Minor

Another risk for cyclists accessing the P2M path via the entrance south of Petone Station is from Park and Ride car park users. Vehicles traveling the wrong way were observed several times by the SAT, as shown in Figure 37. Vehicles exiting the right way were observed to often cross the centre line. Vehicles exiting the wrong way and right way are likely to be tracking in the path of a cyclist waiting to turn right onto P2M, as shown in Figure 38.

Given that sightlines are reasonable and expected low speeds of exiting vehicles, the risk is low.



Figure 38: Example of vehicle exiting out of Park and Ride car park the wrong way.

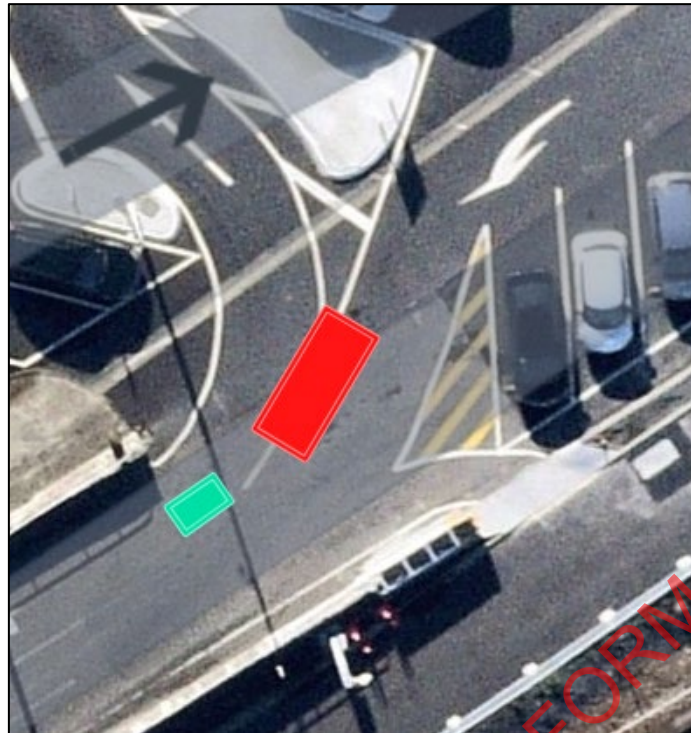


Figure 39: Observed path of vehicles exiting Park and Ride into where a cyclist may be waiting to turn into P2M cycle path.

**Recommendation(s):**

- 63 Install physical barrier between Park and Ride entry and exit to deter vehicles from crossing centre line or exiting the wrong way. Leave a reasonably-sized gap for cyclists to access P2M path.
- 64 If not possible to implement a physical centre line barrier, install other treatments to reduce speed of vehicles coming in and out of the car park.

<b>Frequency:</b> <i>Crashes are likely to be Infrequent</i>	<b>Severity:</b> <i>Death or serious injury is Unlikely</i>	<b>Rating:</b> <i>The safety concern is Minor</i>
<b>Designer Response:</b>	Physical barriers or treatments as stated in Recommendation 63 and 64 cannot be installed as this is KiwiRail's heavy maintenance vehicles (under pilot vehicle) route to be able to access the northern end of the Petone station carpark and the rail corridor. The Designer recommends a give way hold line and associated signage be installed for vehicles exiting the carpark to give priority for any cyclist wanting to turn right into the shared path.	
<b>Safety Engineer:</b>	Additional RD-1R could be installed to direct cars not to exit out of the entrance.	
<b>Client Decision:</b>	Existing markings sufficient, risk is minor. No action.	
<b>Action Taken:</b>	nil	

**12.3 Conflict with train passengers**

**Minor**

The P2M passes adjacent to Petone Station, which is one of the busiest stations on the Wairarapa Line and Melling Branch. Cyclists must stop and give way to train passengers walking between the Park and Ride car park and the platform. This is indicated by zebra crossing markings on the path. This is supported by striped, red markings which is intended to highlight an area of possible conflict, and 15km/h speed advisory markings.





Figure 40: Pedestrian zebra crossing and conflict marking adjacent to Petone Station.

The SAT considers that this is a good start, but that there are some missing elements. For example, there are no give way markings, limit line, or centre line marking on approach to the zebra crossing. This would help to better define the zebra crossing. Keep Left marking and give-way triangles as used in other projects around the region would also help. Because the zebra crossing pictured is on top of a ramp, it is more difficult to see on approach, so these additional elements are important to improve compliance.

The 15km/h speed advisory marking pictured in Figure 40 are ineffective. They are intended to represent advisory signs but are missing the black text and border. They are low-contrast, white text-on-yellow background, which means that they cannot be read until the cyclist is almost on top of them. By this point, a cyclist should be looking ahead rather than down at the ground. The text is also not elongated, which also makes them harder to read on approach.



Figure 41: Advisory speed marking on approach to Petone Station.

There is a risk that cyclists on the path are not aware of the need to stop until they are too close to stop safely. Therefore, there is an increased risk of conflict between cyclists on the path and with train passengers. Peak train passengers are likely to be at the same time as peak cycle path usage.

#### Recommendation(s):

- 65 Implement a limit line, Give Way markings, and centre line on approach to the zebra crossings.
- 66 Implement 'Keep Left' markings similar to those that exist on approach to underpasses.

- 67 Provide signage ahead of the station advising cyclists of the station and to prepare to stop. For example, 'Petone Station ahead – prepare to stop'. This should be on a sign to allow cyclists to read on approach.
- 68 Remove the ineffective speed advisory markings and either replace with higher contrast, elongated speed advisory markings or place advisory speed signs on a pole.
- 69 Monitor interactions between cyclists and train passengers. If problems arise and persist, consider cycle speed calming.

Frequency:	Severity:	Rating:
<i>Crashes are likely to be Occasional</i>	<i>Death or serious injury is Unlikely</i>	<i>The safety concern is Minor</i>
<i>Designer Response:</i>	The Designer agrees with Recommendations 65 and 66. Recommendation 67 is not warranted if Recommendations 65 and 66 are implemented	
<i>Safety Engineer:</i>	Agree with recommendations 65 and 66 – suggest applying more red surfacing first, so there is a single, large red block as a background to these markings (rather than the existing stripes). See standard design for Bus Stop Bypasses - <a href="https://www.nzta.govt.nz/assets/Walking-Cycling-and-Public-Transport/img/public-transport-design-guidance/bus-stop-design/Figure-82-Preferred-design-for-two-way-cycleway-bus-stop.jpg">https://www.nzta.govt.nz/assets/Walking-Cycling-and-Public-Transport/img/public-transport-design-guidance/bus-stop-design/Figure-82-Preferred-design-for-two-way-cycleway-bus-stop.jpg</a> . Speed advisory markings have proven ineffective. To be phased out over time.	
<i>Client Decision:</i>	Modify crossing approach to align with bus stop bypass linked above, i.e. limit line, give way triangle. Remove speed advisory markings.	
<i>Action Taken:</i>	Included in package of works to contractor	

#### 12.4 Separation between cycle path and car park

Minor

At the northern end of Petone Station, the cycle path passes adjacent to the end of the Park and Ride, as pictured in Figure 41. There is a risk of vehicle encroachment to the path as vehicles manoeuvre into car parking spaces. Without a physical barrier, there is also a risk of vehicles illegally parking over the path. This increases the risk of a cyclist vs vehicle crash and reduces the level of service for cyclists.

Figure 42: Northern end of Petone Station



Petone Station Park and Ride.



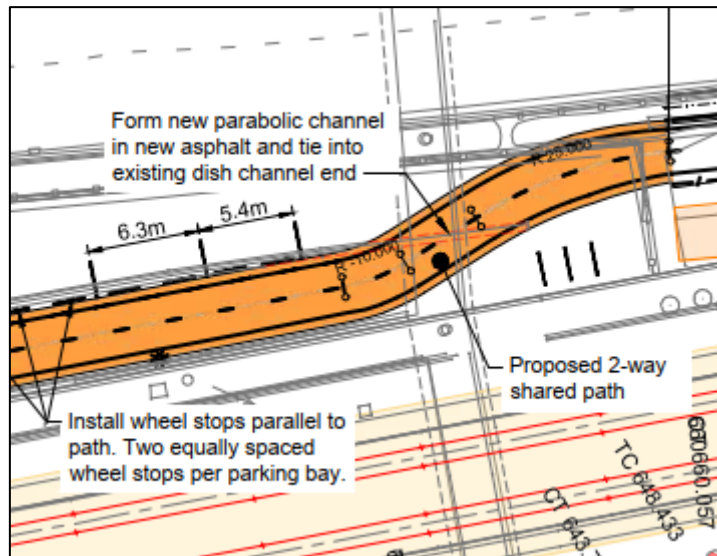


Figure 43: Detailed design drawings at northern end of Park and Ride.

Access beyond the Park and Ride is required for KiwiRail maintenance vehicles to access the track.

**Recommendation(s):**

- 70 Remove any car parks which are not possible to park in without encroaching into the cycle path.
- 71 Provide more physical separation between the path and the space adjacent to prevent vehicle encroachment into the cycle path. There are a range of options to choose from using 'Protected Cycle Lane Barrier Selection Matrix'.<sup>9</sup> Access for KiwiRail maintenance vehicles must be retained.

Frequency:	Severity:	Rating:
Crashes are likely to be Infrequent	Death or serious injury is Unlikely	The safety concern is Minor
Designer Response:	Removing carparks will require the agreement of GWRC. The arrangement as constructed has been designed in conjunction with GWRC. Currently vehicle drivers are not parking on the shared path (a wheel stop will not stop a determined driver to straddle their parked vehicle into the shared path) and the Designer believes the area should be monitored for complaints before implementing any other measures, which must not impede KiwiRail's access to the rail corridor.	
Safety Engineer:	Agree with recommendation 70 if GWRC are amenable to the idea. Otherwise, recommend speed humps on edge of roadway and extra cycling only green block surfacing in cycle path.	
Client Decision:	The accessway must be maintained and the number of car parks preserved. Speed humps are unlikely to deter vehicle encroachment. Due to the constrained environment vehicle speeds will already be low so humps are not required as a speed control. Acknowledging cars will occasionally temporarily enter the cycleway (as they do when accessing driveways on Bridge St), the green block can provide increased awareness to drivers of the potential conflict with cyclists and to have increased awareness. Install cycling only green block on path at conflict point.	
Action Taken:	Included in package of works to contractor.	

<sup>9</sup> <https://www.nzta.govt.nz/assets/Walking-Cycling-and-Public-Transport/docs/cycling-network-guidance/protected-cycle-lane-barrier-selection-matrix.pdf>

## 13 Safety Audit Findings – Southern connection

### 13.1 Path width and condition

Significant

Upon opening of Petone to Melling, the SAT anticipates an increase in the number of cyclists using the existing separated path to the south of the project instead of riding on Hutt Road. While this section of path is outside the project extents, there is a risk of crash migration from the existing path being at a much lower standard than the path to the north. In particular, the existing path is much narrower, has forward visibility restricted by vegetation growth, is poorly delineated at night, covered with debris from adjacent landscaping, and has no lighting. This contributes to the risk of head-on crashes in particular south of the project extents on existing infrastructure.

One other issue is there is a gap in the path at the south end between the Petone to Melling and Te Ara Tupua project extents which is not planned to be upgraded.



Figure 44: Existing shared path south of Petone to Melling path.

Recommendation(s):



- 72 Vegetation trimming to restore forwards visibility and increase useable path width, path sweeping and marking a centreline on the existing shared path south of the project prior to opening Petone to Melling.
- 73 Liaison between Petone to Melling, Hutt City Council and Te Ara Tupua to determine how to upgrade the section of path between projects e.g. with path widening and lighting.

Frequency:	Severity:	Rating:
Crashes are likely to be Common	Death or serious injury is Likely	The safety concern is Significant
<b>Designer Response:</b>	The Designer recommends that the Client considers and responds to Recommendations 72 and 73.	
<b>Safety Engineer:</b>	Agree with 72 and 73	
<b>Client Decision:</b>	There is no gap in infrastructure between Petone to Melling and Te Ara Tupua - they have direct interface and will be equivalent level of service, once Te Ara Tupua is complete. Vegetation trimming has been referred to HCC and for this area will ultimately be managed within the new Te Ara Tupua maintenance corridor.	
<b>Action Taken:</b>	nil	

## 14 Safety Audit Findings – Comments

This section lists all other comments on the path where improvements could be made, but do not lead to specific safety risks.

### 14.1 Wayfinding and signage

#### 14.1.1 Wayfinding requirements at Parliament Street

The shared path begins off Parliament Street. During the site visit, there were no wayfinding signs to indicate which way to go. The designs don't show wayfinding signs being included here. Wayfinding at this intersection, including the pedestrian path up to Normandale Road, would help prevent path users from missing the turn-off, which is partially hidden by a large bamboo plant.



Figure 45: Intersection of Parliament Street and shared path with no wayfinding.

#### 14.1.2 Regulatory / advisory signage confusion at Dowse interchange

Signage on-site (Figure 46) indicated that using the bypass is mandatory for cyclists on SH2. This doesn't allow for cyclists who need to use the interchange to get to Alicetown or Maungaraki.



Figure 46: Regulatory signage on site, indicating cyclists must get off SH2.

According to Sheet 1 of the 'Sign Details' the sign should be advisory (with a black border), rather than regulatory (with a red border).

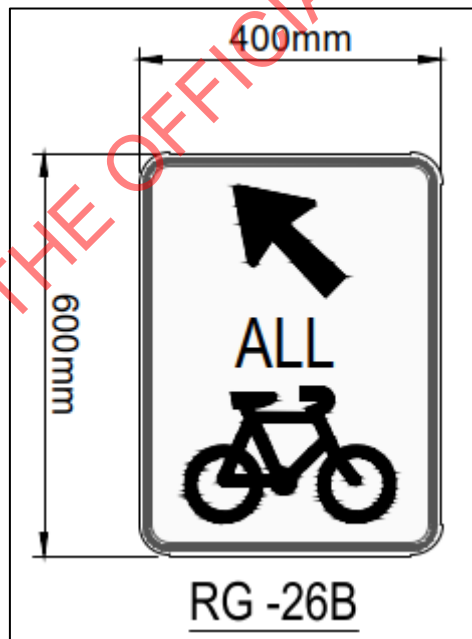


Figure 47: Advisory signage recommended for cyclists on SH2 to use Dowse bypass.

As part of the exercise to ensure good wayfinding at the Dowse interchange (as described in Chapter 11), the regulatory or advisory signage could be reviewed.

#### 14.1.3 Removal of old wayfinding and other signage

The SAT noted existing wayfinding and guide signage adjacent to the project. Once the Petone to Melling path opens, this will need to be removed to be replaced with wayfinding along the shared path connecting P2M to the Hutt River Trail. Having incorrect signage will lead to confusion for cyclists. Ensure redundant signage is removed as the Petone to Melling cycle path is opened.



Figure 48: Example of existing wayfinding signage on Bridge Street that will need to be relocated.



Figure 49: Cross Here With Care signs to be removed and replaced with signage to encourage SH2 riders to use Dowse bypass.

## 14.2 Inconsistent markings for shared path users

There is some inconsistency with the way the shared path is treated at different road crossings. For example, the crossing at Normandale Road includes solid green marking, while the crossing at Pharazyn Street does not include any green marking. The Pharazyn Street crossing includes hold-rails while the Normandale crossing does not.



Figure 50: Shared path approach to Normandale Road intersection.





Figure 51: Shared path approach to Pharazyn Street.

Both crossings include Give Way markings which are laid as if the path is one-way when it is a two-way path. This is potentially confusing for users and could be reviewed, with a change to placing the Give Way sign and limit line on the left-hand side of the approach with a centre line. Solid green marking is not necessary.

### 14.3 Lighting / CPTED

On a path like this with limited access, crime prevention through environmental design (CPTED) is critical. The only natural surveillance for much of the route is from the adjacent state highway where vehicles are driving at about 100 km/h, and limited natural surveillance from trains passing intermittently. Ensuring good lighting at night is a critical component of making the path feel safe from a personal security perspective. The SAT considered the lighting to be of an excellent standard during the night visit. CCTV cameras are present, covering most, if not all, of the route.

The section of shared path underneath the Normandale Road bridge between Parliament Street and Pharazyn Street is not likely to receive much passive surveillance. This could lead to reduced personal security when walking or cycling through this area. While the area is well lit at night, it did not feel as bright during the day. CCTV cameras are present but probably do not detect activity beneath the bridge.

A CPTED specialist could be employed to review the whole route and make further recommendations to improve personal security.

### 14.4 Pedestrian access

Cycle only paths are unusual. Many pedestrians will expect that they are entitled to walk along the cycle path as shared paths are far more common.

There are two points of potential access for pedestrians – at the northern end of the Petone Station Park and Ride, and at the northern end of the Normandale underpass, off Parliament Street. The cycle path does not represent a particular desire line for pedestrians, so high numbers of pedestrians are unlikely.

Pedestrians entering the cycle path are not expected to pose a particular safety risk due to expected low volumes and good sightlines for most of the path's length. Sightlines are not as good at the underpasses – this is covered in Chapter 8.

### 14.5 Fence

The pipe and wire fence between the rail corridor and the cycle path has sharp wires on top of it. The fence is 1.8m in height to meet KiwiRail requirements for deterring trespassers into the rail

corridor. Due to the height of the fence, it is very unlikely that the fence will pose any safety risk to path users.

Cyclists are more likely to touch the sides of the fence. In general, the sides of the fence are smooth with no sharp edges. The only snagging risk is if a handlebar went through one of the openings of the mesh. This snagging risk is mitigated by an edgeline marking the shoulder of the cycle path. The shoulder provides a buffer between the path and the fence.

#### 14.6 Holes

During the site visit, there were some holes in the gravel berm. It is assumed that these will be filled in in advance of the cycleway opening.

##### Client Decision in response to section 14.

The additional comments are appreciated and response as follows:

14.1.1 Improved wayfinding will be implemented as part of Parliament St Greenway project – no action.

14.1.2 Agree, but only requires a border change to black. **Action** – affix black tape to border.

14.1.3 'Cross here with care' sign has been removed. HCC are undertaking a review of all cycling wayfinding signage in the area – no action.

14.2 HCC support rails on one side at a minimum, as per guidelines, but not in the refuge.

**Action** – install grab rail at left side approach to Normandale crossing (this will also encourage cyclists to stop and look prior to crossing).

14.3 CPTED was assessed as part of the original design – no action.

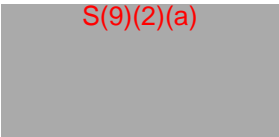

14.4 Agree and there has been feedback of poor compliance by pedestrians. **Action** – install no pedestrian signs at entrances to main alignment.

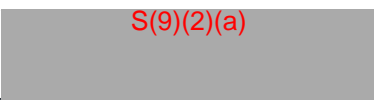
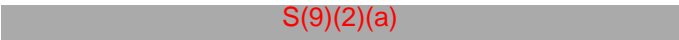
14.5 The maintenance routine is to check the condition of the fence, i.e. that the top edge is directed upwards and not into the path. **Action** – confirm that this is recorded in the AOM.

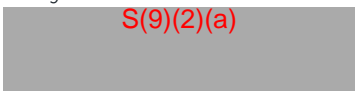
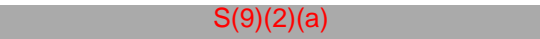
14.6 Completed under construction snags list – no action.

## 15 Audit Statement

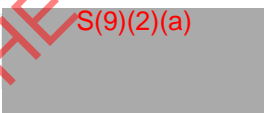
We certify that we have used the available plans, and have examined the specified roads and their environment, to identify features of the project we have been asked to look at that could be changed, removed or modified in order to improve safety. The problems identified have been noted in this report.

Signed: .....  ..... Date: 2023-10-11  
  
Senior Transportation Engineer, WSP

Signed: ...  ..... Date: 2023-10-11  
  
Senior Transportation Planner, WSP

Reviewed by:  
Signed:  ..... Date: 2023-12-12  
  
Technical Principal – Transportation, WSP

**Designer:** Name:  ..... Position: Technical Director, AECOM.

Signature  Date: 7 Nov 2023...

**Safety Engineer:** Name: Simon Kennett Position: Principal Multi-modal Advisor,  
Waka Kotahi

Signature  Date: 20 Nov 2023...

**HCC Traffic Engineer:** Name: Evandro Scherer Position: Transport Engineering  
Manager, HCC

Signature... ..... Date: 16/01/24.

**Project Manager:** Name: Gray Renwick Position: Senior Project Manager – Complex,  
Waka Kotahi.

Signature...  Date: 24/01/24.



*Action Completed:* Name.....

*Position*.....

*Signature*.....

*Date*.....

*Project Manager to distribute audit report incorporating decision to designer, Safety Audit Team Leader, Safety Engineer and project file.*

*Date:* .....

RELEASED UNDER THE OFFICIAL INFORMATION ACT 1982

RELEASED UNDER THE OFFICIAL INFORMATION ACT 1982

RELEASED UNDER THE OFFICIAL INFORMATION ACT 1982



[wsp.com/nz](http://wsp.com/nz)