

# AGENDA/KAUPAPA



P O Box 747, Gisborne, Ph 06 867 2049 Fax 06 867 8076  
Email [service@gdc.govt.nz](mailto:service@gdc.govt.nz) Web [www.gdc.govt.nz](http://www.gdc.govt.nz)

MEMBERSHIP: Her Worship the Mayor Rehette Stoltz, Deputy Mayor Josh Wharehinga, Colin Alder, Andy Cranston, Larry Foster, Debbie Gregory, Ani Pahuru-Huriwai, Rawinia Parata, Aubrey Ria, Tony Robinson, Rob Telfer, Teddy Thompson, Rhonda Tibble and Nick Tupara

**EXTRAORDINARY COUNCIL/TE KAUNIHERA**  
DATE: Wednesday 6 November 2024  
TIME: 9:00AM  
AT: Te Ruma Kaunihera (Council Meeting Room), Awarua, Fitzherbert Street, Gisborne

## AGENDA – OPEN SECTION

- 1. Apologies .....3
- 2. Declarations of Interest.....3
- 3. Leave of Absence .....4
- 4. Acknowledgements and Tributes .....4
- 5. Public Input and Petitions .....4
- 6. Extraordinary Business .....4
- 7. Notices of Motion .....4
- 8. Adjourned Business.....4
- 9. Reports of the Chief Executive and Staff for DECISION .....5
  - 9.1. **24-314** Proposed changes to Grey St / Kahutia St Intersection .....5

# Council

---

<b>Chairperson:</b>	Mayor Rehette Stoltz
<b>Deputy Chairperson:</b>	Deputy Mayor Josh Wharehinga
<b>Membership:</b>	Mayor and all Councillors
<b>Quorum:</b>	Half of the members when the number is even and a majority when the number is uneven
<b>Meeting Frequency:</b>	Six weekly (or as required)

## Terms of Reference:

The Council's terms of reference include the following powers which have not been delegated to committees, subcommittees, officers or any other subordinate decision-making body, and any other powers that are not legally able to be delegated:

1. The power to make a rate.
2. The power to make a bylaw.
3. The power to borrow money, or purchase or dispose of assets, other than in accordance with the Long Term Plan.
4. The power to adopt a Long Term Plan, Annual Plan, or Annual Report.
5. The power to appoint a Chief Executive.
6. The power to adopt policies required to be adopted and consulted on under the Local Government Act 2002 in association with the Long Term Plan or developed for the purpose of the Local Governance Statement.
7. The power to adopt a remuneration and employment policy.
8. Committee Terms of Reference and Delegations for the 2019–2022 Triennium.
9. The power to approve or amend the Council's Standing Orders.
10. The power to approve or amend the Code of Conduct for elected members.
11. The power to appoint and discharge members of Committees.
12. The power to establish a joint committee with another local authority or other public body.
13. The power to make the final decision on a recommendation from the Ombudsman where it is proposed that Council not accept the recommendation.

14. The power to make any resolutions that must be made by a local authority under the Local Electoral Act 2001, including the appointment of an electoral officer.
15. Consider any matters referred to it from any of the Committees.
16. Authorise all expenditure not delegated to staff or other Committees.

Council's terms of reference also includes oversight of the organisation's compliance with health and safety obligations under the Health and Safety at Work Act 2015.

Note: For 1-7 see clause 32(1) Schedule 7 Local Government Act 2002 and for 8-13 see clauses 15, 27, 30 Schedule 7 of Local Government Act 2002

## 9. Reports of the Chief Executive and Staff for DECISION



24-314

**Title:** 24-314 Proposed changes to Grey St / Kahutia St Intersection  
**Section:** Chief Executive's Office  
**Prepared by:** Jade Lister-Baty - Principal Advisor to Chief Executive  
**Meeting Date:** Wednesday 6 November 2024

---

Legal: No

Financial: No

Significance: **Medium**

---

### Report to EXTRAORDINARY COUNCIL/TE KAUNIHERA for decision

#### PURPOSE - TE TAKE

The purpose of this report is to recommend a safety enhancement to the Grey Street Streets for People trial, specifically addressing safety concerns at the intersection of Grey and Kahutia Streets.

#### SUMMARY - HE WHAKARĀPOPOTOTANGA

The closure of the Grey Street and Kahutia Street intersection was intended to enhance safety for pedestrians and cyclists by reducing through traffic. However, findings from the post-construction safety audit, analysis of traffic monitoring data and community feedback have highlighted unintended safety issues with the layout. These include illegal U-turns, dangerous vehicle movements across cycle lanes, and increased conflict points.

Council is presented with four options to consider: to take no action and allow the trial to continue as-is, to implement alternative safety measures to prevent illegal U-turns, to install a temporary roundabout or revert to a "T" intersection with Stop yields and enhanced crossings to mitigate safety concerns.

The recommended option is to revert the intersection to a "T" with priority on Grey Street and Stop yields on Kahutia, with raised pedestrian crossings on Kahutia to provide priority to Cyclists and Pedestrians - allowing for continued monitoring and enhanced safety.

This report outlines the recommended course of action, backed by the post-construction safety audit findings.

The decisions or matters in this report are considered to be of **Medium** significance in accordance with the Council's Significance and Engagement Policy.

## RECOMMENDATIONS - NGĀ TŪTOHUNGA

That the Extraordinary Council/Te Kaunihera:

1. Approves the installation of “T” intersection at the Grey and Kahutia Street intersection to address safety issues during the trial.

*Authorised by:*

**Nedine Thatcher Swann - Chief Executive**

---

**Keywords:** grey street enhancement, grey street Gisborne, streets for people trial, streets for people

## BACKGROUND - HE WHAKAMĀRAMA

1. The Grey Street Streets for People trial is part of a larger initiative to promote active transport modes by improving pedestrian and cyclist safety. A modal filter was introduced at the intersection of Grey and Kahutia Streets to eliminate through traffic, thus prioritising pedestrians and cyclists. However, the post-construction safety audit conducted by Urban Connection Limited identified several safety concerns that require immediate attention.
2. The intersection's closure has led to unintended driver behaviours, particularly illegal U-turns across pedestrian and cyclist spaces, creating new safety hazards. In light of these findings, it is essential to consider corrective measures that maintain the goals of the trial while improving safety.

## DISCUSSION and OPTIONS - WHAKAWHITINGA KŌRERO me ngā KŌWHIRINGA

### Findings from the Post-Construction Safety Audit

3. The post-construction safety audit (**Attachment 1**) and road surveying camera data (**Attachment 2**) conducted in September - October 2024 highlighted several key issues at the Grey and Kahutia Street intersection that have contributed to unsafe driving behaviours and raised safety risks for pedestrians and cyclists:
4. **Illegal U-turns and Complex Traffic Movements:** The closure of the intersection has led to drivers performing illegal U-turns across the cycle lanes and pedestrian areas. These manoeuvres were observed during site inspections, where vehicles were seen crossing cycleways and making dangerous movements, particularly at the intersection with Kahutia Street. The lack of physical barriers or deterrents (such as concrete separators) has enabled these illegal movements. Without intervention, these actions will likely continue, posing a significant risk to cyclists and pedestrians.
5. **Pinch Points and Increased Conflict Areas:** The closure has created a pinch point where vehicles must navigate around the modal filter, leading to increased conflict points between vehicles, cyclists, and pedestrians. The complexity of movements has increased due to the restriction of certain turns, leading to confusion and more hazardous behaviours.
6. **Cycle Lane Encroachment and Parking Issues:** Drivers have been observed driving through the cycleway and parking on pedestrian and artwork areas, further contributing to unsafe conditions. This behaviour highlights the inadequacy of the current deterrents in place.
7. **Visibility and Confusing Signage:** The audit noted that some signage at the intersection was overloaded, leading to driver confusion. The complexity of the signs, especially with up to four signs on a single pole, makes it difficult for drivers to process the information in a timely manner, increasing the likelihood of crashes.

## Options for Council Consideration

8. **OPTION 1 - Do Nothing:** Continuing the trial without modifications would not address the safety concerns raised in the audit. This option carries significant risks, as unsafe driving behaviours are likely to persist, increasing the potential for accidents involving pedestrians and cyclists.
9. **OPTION 2 - Install Alternative Safety Measures:** Install measures, such as physical barriers or increased signage to deter illegal U-turns. However, these measures may not fully address the complexity of traffic movements at the intersection and could lead to continued unsafe behaviours.
10. **OPTION 3 - Install Temporary Roundabout:** Installing a temporary roundabout at the Grey and Kahutia Street intersection would provide enhanced safety, reduce conflict points and simplify traffic movements, ensuring that vehicles slow down and navigate the intersection in a safer, more controlled manner. A temporary roundabout could be constructed using bolt-down rubber speed humps and paint, allowing for flexibility in adjusting the design as further data is gathered, with an estimated cost of \$97,000 plus contingency.
11. **OPTION 4 – Reinstatement to a “T” intersection prioritising Grey Street with stop controls on Kahutia Street and raised pedestrian crossings (Preferred Option):** This option is preferred over a roundabout due to its alignment with the specific traffic conditions. Reinstating the former intersection layout will create a more predictable environment for all users—particularly cyclists and pedestrians—while also effectively moderating traffic speeds on Kahutia Street.
12. Stop controls and proposed new raised features will curb excessive speeds and encourage traffic calming along Kahutia, unlike a roundabout that could unintentionally increase speeds and allow vehicles to move through with minimal slowdown. Local driver behaviour which typically shows limited speed reduction at roundabouts, could undermine the intended safety benefits in this context. Reverting to a ‘T’ layout as it was before the trial will be better suited for the moderate traffic flow entering from the side street and provide drivers with straightforward right-of-way rules.
13. While full costs have not been determined, installation of signs, road marking and raised crossing will be more cost-effective than a roundabout.

## ASSESSMENT of SIGNIFICANCE - AROTAKENGA o NGĀ HIRANGA

14. The decisions or matters in this report are considered to be of **Medium** significance in accordance with Council’s Significance and Engagement Policy.

## TREATY COMPASS ANALYSIS

### Kāwanatanga

15. The proposal ensures that the Council upholds its responsibility to provide safe road infrastructure, consistent with the first article of Te Tiriti o Waitangi.

### **Rangatiratanga**

16. The recommendation takes into account community feedback and ensures that the local community has safer access to streets designed for active modes of transport.

### **Oritetanga**

17. This report prioritises equitable access to safe streets for all road users, including pedestrians, cyclists, and vulnerable groups such as children and the elderly.

### **TANGATA WHENUA/MĀORI ENGAGEMENT - TŪTAKITANGA TANGATA WHENUA**

18. Tangata whenua have not been engaged on the proposed recommendation.

### **COMMUNITY ENGAGEMENT - TŪTAKITANGA HAPORI**

19. Community feedback has been considered extensively throughout the trial, with concerns raised about unsafe driver behaviours at the Grey and Kahutia Street intersection. The proposed change of layout directly addresses these community concerns while allowing the trial to continue gathering valuable data.
20. Reports on the safety audit and traffic data analysis have been made available on Council's website 31 October, and an update of the decision paper to Council has been emailed to a stakeholder list of submitters, businesses, and residents.

### **CLIMATE CHANGE – Impacts / Implications - NGĀ REREKĒTANGA ĀHUARANGI – ngā whakaaweawe / ngā ritenga**

21. The recommendation does not address or impact Climate Change aspirations or planning.

### **CONSIDERATIONS - HEI WHAKAARO**

#### **Financial/Budget**

22. The preferred option will be more cost effective than installing a roundabout estimated at \$97,000. The funding is available within the existing Streets for People project budget contingency.

#### **Legal**

23. There are no significant legal implications associated with the re-installation of a "T" intersection. The changes comply with road safety regulations and align with the broader goals of the trial.

### **POLICY and PLANNING IMPLICATIONS - KAUPAPA HERE me ngā RITENGA WHAKAMAHERE**

24. The recommendation does not impact planning, the trial will continue to collect data and analyse effectiveness for future planning.



## RISKS - NGĀ TŪRARU

25. If no action is taken, the ongoing safety risks at the Grey and Kahutia Street intersection may lead to negative public perceptions of the trial and potential safety incidents involving pedestrians or cyclists.
26. With any roundabout / intersections there will always be a level of risk factor of the driver (or pedestrian) to consider. Re-opening the intersection will mean there is more interactions between vehicle traffic and the least protected cyclists/pedestrians. In practice safety will always be dependent on the actual road user/s acting safely and obeying rules.

## NEXT STEPS - NGĀ MAHI E WHAI AKE

Date	Action/Milestone	Comments
November	If Approved. Installation will begin and monitored ongoing.	

## ATTACHMENTS - NGĀ TĀPIRITANGA

1. Attachment 1 - Grey Street Post- Construction Safe System Audit [24-314.1 - 57 pages]
2. Attachment 2 - AIRS Report for Grey Street [24-314.2 - 46 pages]



**Grey Street, Gisborne – Streets For People**  
**Post-Construction Stage Safe System Audit Report**  
**Prepared for Gisborne District Council**

REVISION 0 - OCTOBER 2024

## Table of Contents

<b>1</b>	<b>Safe System Auditing for Transport Projects</b>	<b>3</b>
1.1	Safe System Audit Procedure	3
1.2	The Safe System	4
1.3	Report Format	4
1.4	Disclaimer	6
<b>2</b>	<b>Safe System Audit Details</b>	<b>7</b>
2.1	Type of Audit	7
2.2	The Safety Audit Team	7
2.3	Meetings and Site Inspections	7
<b>3</b>	<b>Project Description</b>	<b>8</b>
3.1	Project Background and Objective	8
3.2	Existing Conditions and Context	8
3.3	Proposed Works	9
<b>4</b>	<b>Safety Concerns</b>	<b>10</b>
4.1	Crash History	10
4.2	Summary of findings	11
4.3	Summary of findings	12
4.4	General Safety Concerns	13
4.4.1	<i>Missing Kerb Separators (Physical Deterrent)</i>	<i>13</i>
4.4.2	<i>Left-turns onto Kahutia Street (W)</i>	<i>18</i>
4.4.3	<i>Signage</i>	<i>21</i>
4.4.4	<i>Guidance to the Visually Impaired</i>	<i>27</i>
4.4.5	<i>Electronic Billboard Distraction</i>	<i>30</i>
4.4.6	<i>Cycle Lane Pinch Points</i>	<i>33</i>
4.4.7	<i>Non-frangible hazards</i>	<i>35</i>
4.4.8	<i>Detritus on the cycleway</i>	<i>37</i>
4.4.9	<i>Ponding</i>	<i>39</i>
4.4.10	<i>Manhole Cover</i>	<i>41</i>
4.4.11	<i>Road Markings</i>	<i>43</i>
4.4.12	<i>Cycle connections</i>	<i>45</i>
4.4.13	<i>Visibility at Childers Road crossing</i>	<i>47</i>
4.4.14	<i>Posted Speed Limit</i>	<i>50</i>
4.4.15	<i>Pavement Conditions</i>	<i>52</i>
4.4.16	<i>Green Surfacing Markings</i>	<i>54</i>
4.4.17	<i>Lighting</i>	<i>55</i>
<b>5</b>	<b>Safe System Audit Statement</b>	<b>56</b>

# 1 Safe System Auditing for Transport Projects

This report has been prepared for the Gisborne District Council to carry out a Post Construction Stage Safe System Audit for Grey Street, Gisborne, Streets for People project.

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

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

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

## 1.1 Safe System Audit Procedure

The primary objective of a Safe System audit is to deliver a project that achieves an outcome consistent with the Safe System approach, that is, minimisation of death and serious injury. The Safe System 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 Safe System audit is summarised as follows:

To deliver completed projects that contribute towards a Safe System by identifying and ranking potential safety concerns for all road users and others affected by a transport project.

A Safe System audit should 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 Safe System 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 design team on the type of improvements that might be appropriate. It is not intended to be prescriptive and other ways of improving road safety or operational problems identified should also be considered.

In accordance with the procedures set down in the "Waka Kotahi NZ Transport Agency Safe System Audit Guidelines," the audit report should be submitted to the client, who is to instruct the design team

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

Decision tracking is an important part of the Safe System 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 design team, safety engineer and client for each issue, documenting the design team's response, client decision and the action taken.

A copy of the report, including the design team's response to the client and the client's decision on each recommendation, shall be given to the Safe System audit team leader as part of the important feedback loop. The Safe System audit team leader is to disseminate this to team members.

## 1.2 The Safe System

A Safe System is a forgiving road system that takes into account human fallibility and vulnerability. Under a Safe System, the whole transport system is designed to protect people from exposure to high crash forces that lead to death and serious injury (DSI).

It is recognised that people are vulnerable, and the key crash types and associated crash forces that people can be exposed to lead to death or serious injuries. A Safe System manages crash forces within these limits to protect people.






The audit team is required to understand the human tolerance to force and identify where these boundary conditions are likely to be exceeded when reviewing the transport project.

## 1.3 Report Format

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

- The expected crash probability is qualitatively assessed on the basis of 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 on the basis of factors such as expected impact speeds, type of collision, angle of collision and type of vehicle involved.

The key crash types and respective impact speed thresholds are shown below in Figure 1.3-1.

Key crash type	Impact speed threshold
Car/pedestrian/cyclist 	20-30 km/h
Car/motorcyclist 	20-30 km/h
Car/tree or pole (non-frangible objects) 	30-40 km/h
Car/car (side-impact, intersections) 	50 km/h
Car/car (head-on, rear-end) 	70 km/h

**Figure 1.3-1 - Key crash types and impact speed thresholds**

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 Safety concern risk rating matrix below. The qualitative assessment requires professional judgement and a wide range of experience in projects of all sizes and locations.

		Severity outcome				
		Non-injury	Minor	Major	Fatal	
		Property damage only (PDO)	Injury which is not 'serious' but requires first aid, or which causes discomfort or pain to the person injured.	Safe System injury threshold	Injury (fracture, concussion, severe cuts or other injury) requiring medical treatment or removal to and retention in hospital.	A death occurring as the result of injuries sustained in a road crash within 30 days of the crash.
Probability of a crash	Very likely	Minor	Moderate		Serious	Serious
	Likely	Minor	Moderate		Serious	Serious
	Unlikely	Minor	Minor		Significant	Serious
	Very unlikely	Minor	Minor		Significant	Significant

Figure 1.3-2 - Safety Concern Risk Rating Matrix

### 1.4 Disclaimer

The findings and recommendations in this report are based on an examination of available relevant plans, the specified road and its environs, and the opinions of the SSA team. 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. Safe system 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 report's accuracy, 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.

## 2 Safe System Audit Details

### 2.1 Type of Audit

This Post-Construction Stage Safe System Audit (SSA) report for the Grey Street, Gisborne – Streets For People project has been prepared for the Gisborne District Council.

A key driver of the SSA is the identification of hazards or deficiencies that can potentially result in serious and fatal crashes.

### 2.2 The Safety Audit Team

The safe system audit was carried out in accordance with the Waka Kotahi NZ Transport Agency Safe System Audit Guidelines, Road to Zero Edition – August 2022 by:

- Matheus Boaretto, Urban Connection Limited, Hawke's Bay – Team leader
- Steve James, Urban Connection Limited, Wellington – Team member

### 2.3 Meetings and Site Inspections

The Safety Audit Team (SAT) undertook a full site inspection during the daytime and nighttime on 30 July 2024.



## 3 Project Description

### 3.1 Project Background and Objective

The Streets for People project seeks to primarily enhance cyclist safety on Grey Street in Gisborne by implementing protected cycling facilities. Safety improvements for pedestrians are also included through additional pedestrian crossings. Associated traffic calming measures on Grey Street and at vehicle accesses, along with the associated road markings and traffic signs, are also introduced. The extent of the works is from Grey Street/Childers Road intersection to 130 m west of Grey Street/Kahutia Street intersection, as shown in Figure 3.1-1.

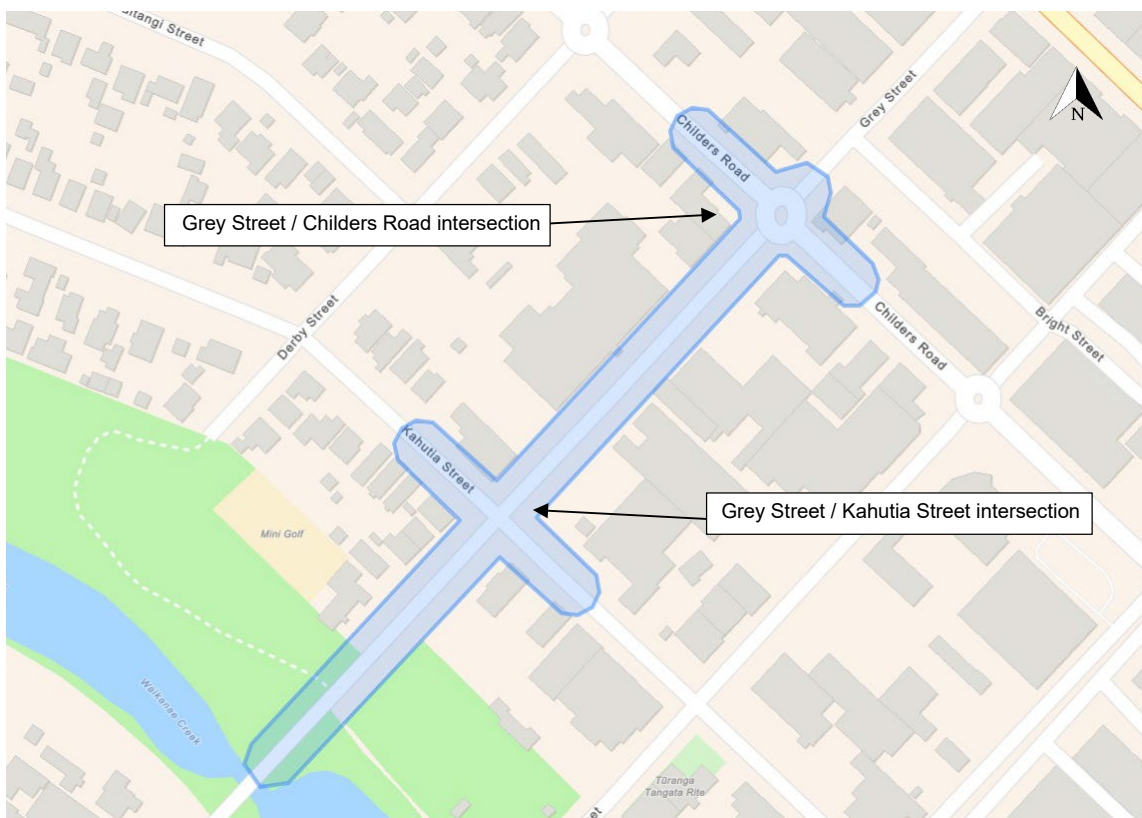


Figure 3.1-1 Locality plan

### 3.2 Existing Conditions and Context

The existing conditions and context of the sections subject to this assessment are as follows:

- Grey Street has a recorded annual average daily traffic (AADT) from 2,899 to 6,000 (Mobile Road 2022), with 3% of heavy vehicles;
- Grey Street provides the connection between Waikanae to the south and Gisborne CBD to the north. Typical road users consist of residents of Gisborne travelling to and from the CBD. The adjoining roads are Arterial, Primary Collectors, or Secondary Collectors;
- The posted speed limit is 50 km/h throughout the site;

- The section throughout the site is urban commercial. The alignment is flat and straight on both ends of the site;
- A high presence of pedestrians and cyclists is expected due to the link to the CBD, the adjacent commercial area and stake and bike parks and tracks;
- A high presence of children is likely, especially on weekends, given that a Stake (and scooter) park is located on the east side of Grey Street and the pump track is located west of the site; and
- The typical cross-section throughout Grey Street is two-lane two-way, with wide sealed shoulders.

### 3.3 Proposed Works

The project consists of the following improvements.

- Pedestrian and cycling improvements on Grey Street, specifically:
  - Installing a new protected bi-directional cycleway (typically 3 m wide) with a 0.7 m wide buffer and 0.6 m wide concrete separators between the cycle lane and parking along Grey Street;
  - Installation of new courtesy crossings on Grey Street East and Kahutia Street South;
  - Installation of a modal filter at Kahutia Street South, which bans the right turn movements at the Grey Street/Kahutia Street intersection;
  - Introducing a new public space and a pick-up/drop-off area near the skate park along Grey Street;
  - Installation of a new flush pedestrian crossing at mid-block on Grey Street between Kahutia Street and Childers Road using concrete traffic islands, rubber speed humps, and markings;
  - Installation of a new raised pedestrian crossing across Childers Road to the south of the Grey Street/Childers Road intersection; and
  - Road markings and signs.

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

- Streets for People – Gisborne Grey Street Linear Park Trial: Detailed Design Set – For Construction – Version 2.1 – Project number: NZ3334 – Dated 29 April 2023

## 4 Safety Concerns

### 4.1 Crash History

The crash history of the site was assessed to assist the SSA team in understanding the safety performance of the site and its immediate surroundings. A 5-year CAS assessment was undertaken from 2019 through 2023, including 2024 to date. The crash location map is shown in Figure 4.1-1, and the summary of the crashes is presented in Table 4-1.

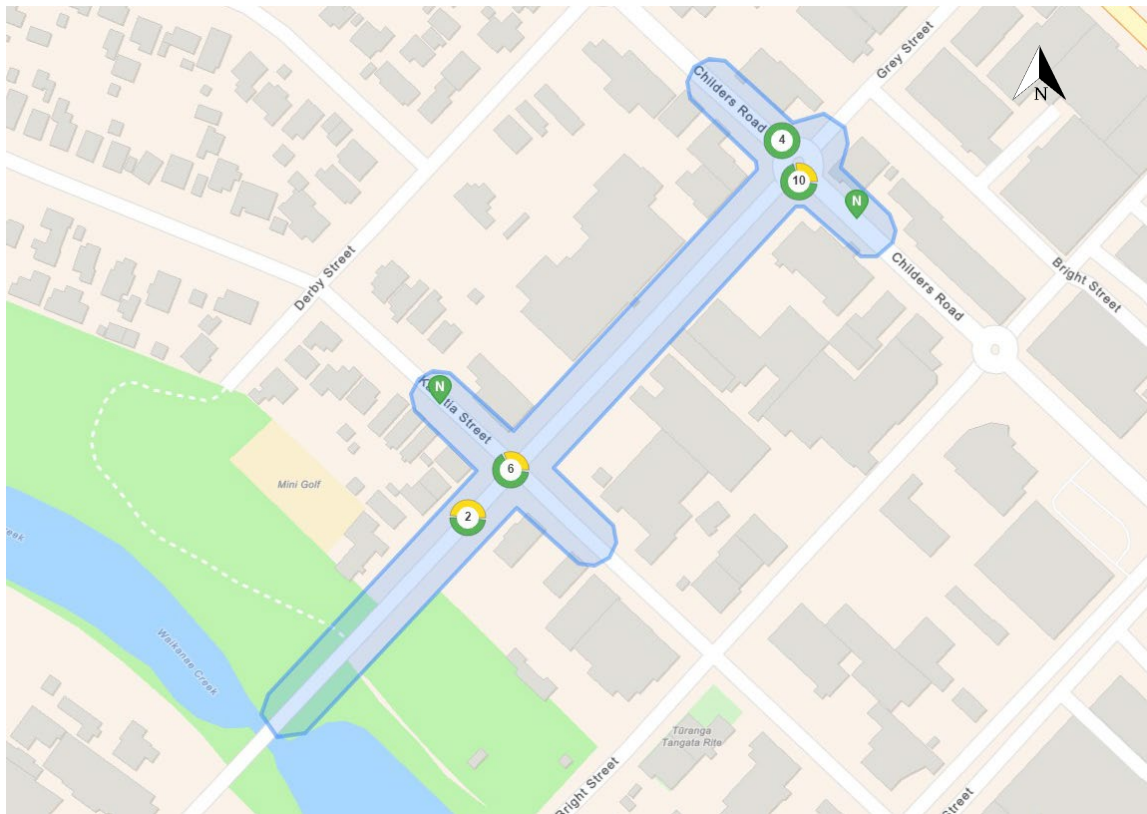


Figure 4.1-1 – Extent of safety assessment and crash locations

Table 4-1: Crash Summary 2018 – 2024 (to date)

Crash Severity	Grey Street (0.530 to 0.880)			
	Frequency		Casualties	
Fatal	0		0	
Serious	0		0	
Minor Injury	6		7	
Non-injury	18		-	
<b>Total</b>	<b>24</b>		<b>7</b>	
Crash Type		Environment		
Overtaking crashes	0%	Natural light conditions	Light/overcast	70.83% (17)
Straight road lost control/head-on	4.17% (1)		Dark/twilight	29.17% (7)
Bend lost control/head-on	4.17% (1)	Road conditions	Dry	89% (24)
Rear end/obstruction	29.17% (7)		Wet	11% (3)
Crossing/turning	62.5% (15)		Ice or Snow	0%
Others	0%	Intersection/midblock		
Involved motorcyclists	4.17% (1)	Intersection		83.3% (20)
Involved pedestrians/cyclists	12.5% (3)	Midblock		16.7% (4)

There have been a total of 24 crashes, including six minor-injury crashes and 18 non-injury crashes, along this section of Grey Street in the last 5 years. None of the crashes were serious injuries or fatal crashes. 83.3% of crashes occurred at intersections. The most common type of crash was crossing or turning at intersections, followed by rear-end crashes.

## 4.2 Summary of findings

The safety concerns from the Concept Design Stage RSA are presented in Table 4-2 below. This summarises the previously identified risks and actions taken in the Detailed Design Stage.

Table 4-2: Concerns from the Concept Design Stage

Safety Concerns	Action
Section 5.3.1 – Tree Planters – Visibility obstruction.	Issue addressed – Low planter boxes were installed. The client's decision states that contractors were to be engaged to maintain the planter boxes for the duration of the trial.
Section 5.3.2 – Cycleway Crossfall and Vehicle Crossing – Steep crossfall, catch pits and vehicle accessways	Issue resolved – The client decided not to level crossfall due to funding, and monitoring will be undertaken.
Section 5.3.3 – Courtesy Crossing – Inconsistent treatment	Issue resolved – The client decided to install a zebra pedestrian crossing on Kahutia Street (E). Monitoring is to be undertaken.
Section 5.3.4 – Existing Raised Pedestrian Crossing – issues related to crossing ramps, line markings and accessibility.	Issue resolved – Client Decision states that this pedestrian crossing is outside of the scope of the project, but feedback has been given to the appropriate team.

Section 5.3.5 – Crossings at the Grey Street/Kahutia Street Intersection – Speed management and layout	Issue addressed – Speed management was installed in the form of speed humps, and a dual crossing has been installed.
Section 5.3.6 – Tactile Pavers – Consider providing TGI's where missing and on all crossing points	<b>Issue not addressed</b> – Tactiles were missing at the time of the audit, being not in line with current standards/guidelines. The client instructed the designer to provide tactiles. This is further discussed in Section 4.4.4.
Section 5.3.7 – Vegetation over the cycleways –low-hanging branches.	Issue addressed – tree branches were trimmed.
Section 5.3.8 – Cycleway Connection to Existing Crossing	Issue resolved – Client decided that this was outside the project's scope.
Section 5.3.9 – Northern Tie-in – Cycleway and Courtesy Crossing Conflict	Issue resolved – The design was to progress according to the designer's recommendation and as per the client's decision.
Section 5.3.10 – Pedestrian refuge – missing or substandard refuges	Issue resolved – Client decided to review changes if there is a permanent stage. The project area is to be monitored with s-tech traffic cameras.
Section 5.3.11 – Proposed Parking Spaces – parking dimensions	Issue resolved – Client's decision states that parking is to be as per design and will be monitored and evaluated.
Section 5.3.12 – Tripping hazards on footpath	Issue resolved – Client states that budget for footpath renewals was not finalised at the time of the report, and the issue is to be monitored with s-tech traffic cameras.
Section 5.3.13 – Plate on the Drain – tripping hazard	Issue resolved – Client states that budget for footpath renewals was not finalised at the time of the report, and the issue is to be monitored.
Section 5.3.14 – Visibility restriction – Childers Road Crossing –	Issue addressed – The sign was moved, and existing trees are under a maintenance schedule.
Section 5.3.15 – Cars Encroaching Footpath	<b>Issue not addressed</b> – The client's decision states that separators have been installed to prevent the issue from occurring. The auditors could not identify any change.
Section 5.3.16 – Speed management measures (speed humps) – Consider providing RSPs at all crossing points	Issue resolved – Client decided that speed is managed through vertical deflection devices (speed humps), and monitoring and evaluation will be continued throughout the trial.
Section 5.3.17 – Connectivity to Side Road	Issue resolved – Changes to be investigated if there is a permanent stage of the project. The project area is to be monitored with s-tech traffic cameras.

### 4.3 Summary of findings

The frequency of risk rankings associated with this Safe System Audit is provided below, with detailed findings to follow. This summary illustrates the degree of consideration that should be given when working through the findings.

**Table 4-3: Summary of Findings**

Serious	Significant	Moderate	Minor	Comment	Total
1	4	-	8	4	17

## 4.4 General Safety Concerns

### 4.4.1 Missing Kerb Separators (Physical Deterrent)

**Serious**


Whilst on-site, the audit team noted a few unusual and unsafe driving behaviours, as follows:

- A car turned left out of the AA centre, drove along the cycle lane, around the tree and turned left into Kahutia Street (E). This movement is shown in orange colour in Figure 4.4-1;
- A car turned left out of Kahutia Street (W) onto Grey Street, performed a U-turn after the central kerbed island, drove through the cycleway and artwork pavement markings and turned into Kahutia Street (E). This movement is shown in red colour in Figure 4.4-1;
- A delivery vehicle drove through the cycleway and parked over the artwork pavement markings on the southern side of the Grey Street/Kahutia Street intersection.

The auditors note that no concrete kerb separators are provided in the vicinity of the Grey Street/Kahutia Street intersection. Therefore, no physical deterrent is present to prevent vehicles from cutting across the cycleway.

The likelihood is assessed as likely, given that three events were witnessed during the site visit (within 60 to 90 minutes). Physical speed management measures (i.e., speed humps) have been installed by the project, which results in low operating speeds throughout the section. Due to the low speeds, a minor injury crash would typically be expected to occur in the event of a crash. However, a high presence of children is likely throughout the site, especially on weekends, given that the stake/scooter park is located on the east side of Grey Street and the pump track west of the site. If the crash involved a child (or elderly), a serious injury could potentially result.

**Table 4-4: Risk analysis – Against a pedestrian**

<b>Prominent crash type</b>		<ul style="list-style-type: none"> <li>▪ Vehicle versus pedestrian</li> </ul>
<b>Probability</b>	Likely	<ul style="list-style-type: none"> <li>▪ Low frequency of motorists driving across the cycleway</li> </ul>
<b>Severity</b>	Serious	<ul style="list-style-type: none"> <li>▪ Impact speeds generally expected to be below 30 km/h; however, serious outcome could be generated if a child is involved.</li> </ul>

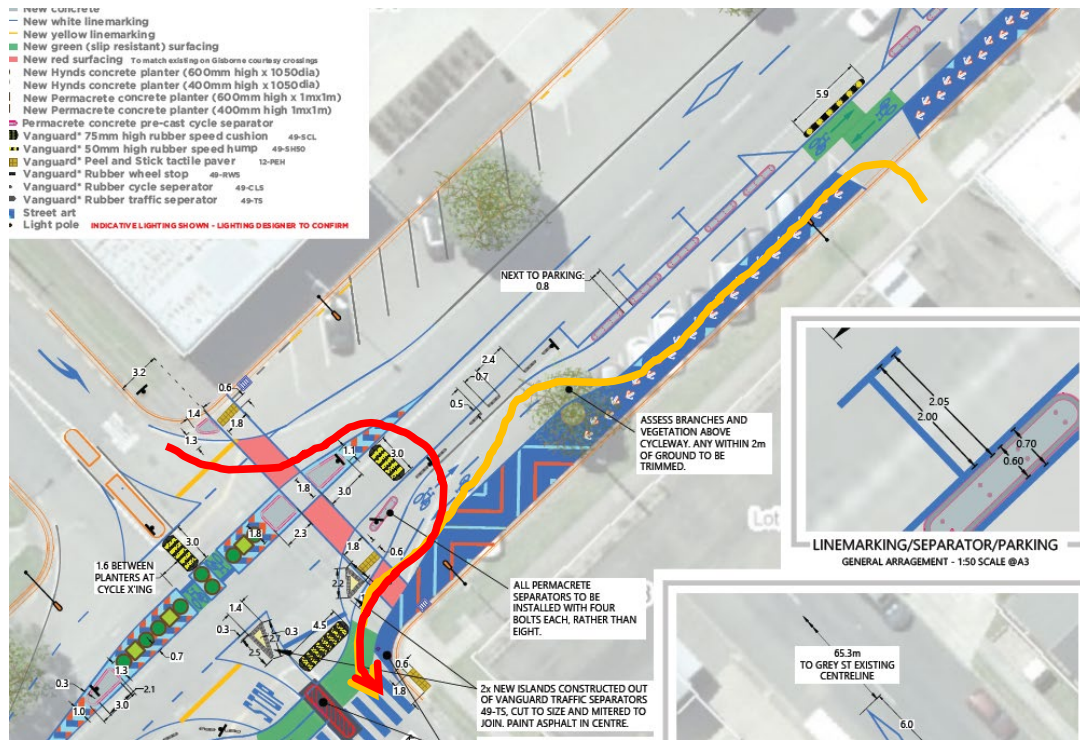




Figure 4.4-3 – Car driving across the cycleway and turning left onto Kahutia Street (2)

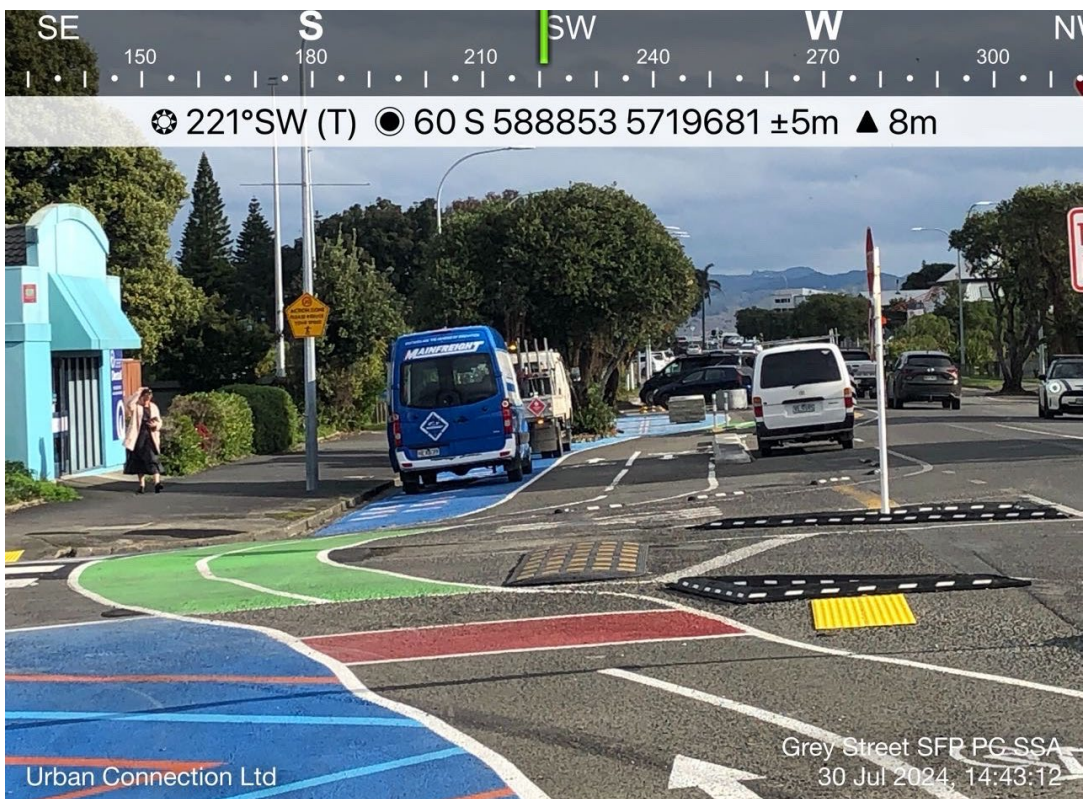


Figure 4.4-4 – Delivery and service vehicle parked on artwork pavement markings





Figure 4.4-5 – Section with no physical deterrent (concrete kerb separators) on the north side of the Grey Street/Kahutia Street intersection

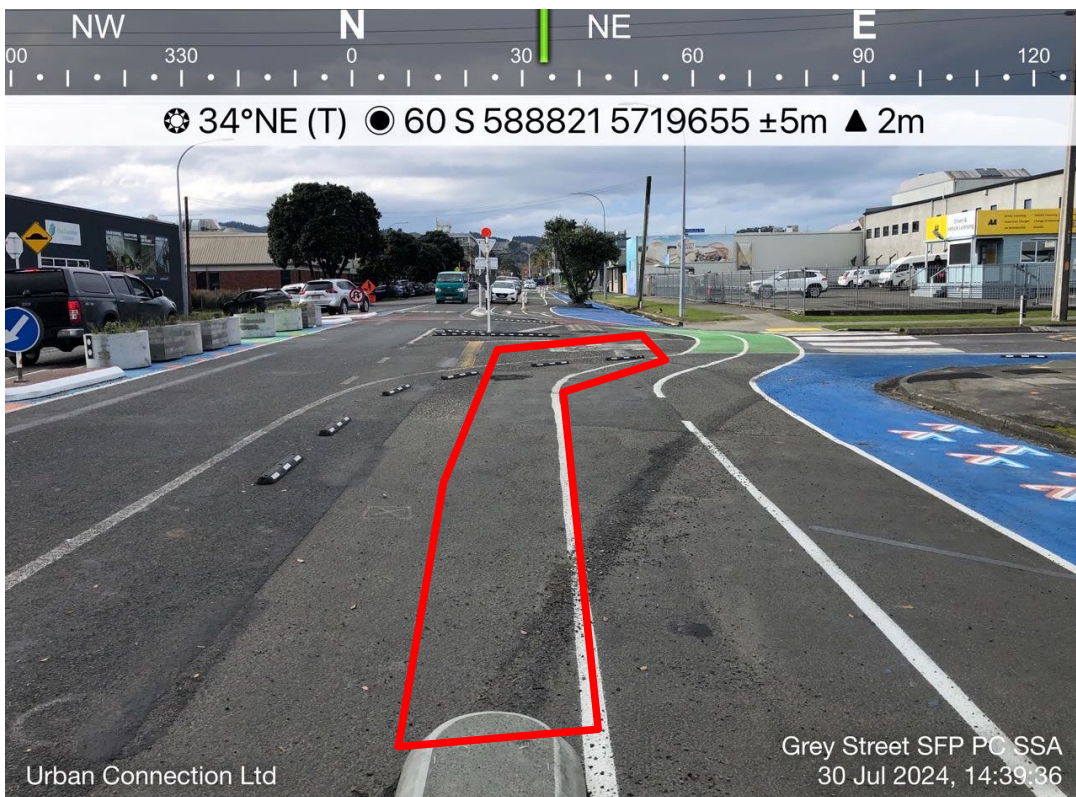


Figure 4.4-6 – Section with no physical deterrent (concrete kerb separators) on the south side of the Grey Street/Kahutia Street intersection

**Recommendation:**

1. Consider installing physical deterrent measures to prevent manoeuvres across the cycleway, including near accessways (such as the AA centre).

<b>Probability Rating:</b>	<b>Severity Outcome Rating:</b>
<b>The probability of a crash is Likely</b>	<b>Crashes are likely to be Serious</b>
<p><b>Design Team Response:</b> <i>The design included a bollard between the cycling and pedestrian spaces on each side of Kahuita Street to try and prevent these sorts of movements. I understand this was not installed due to late changes which enabled some elements to be mountable by trucks. Earlier versions of the design included concrete seperators on Grey Street east of the intersection, which were subsequently cost-cut to the very minimal rubber seperators in the space there now, which clearly don't prevent vehicles crossing. Our suggestion – replace the rubber seperators east of Kahutia on Grey Street with more substantial, preferably concrete.</i></p>	
<p><b>Safety Engineer:</b> <i>Agree. The environment should be managed with infrastructure provided to: protect vulnerable road users and / or prevent unintended vehicle manoeuvres which may compromise safety.</i></p>	
<p><b>Client Decision:</b> <i>During the construction, the intersection was rescoped following truck movement trials as it was found trucks needed to have mountable corners for the left hand turn. The bollards were then removed and replaced with low seperators. Flexi posts can be installed after the seperators to prevent vehicles accessing this area on the other side of the existing seperators. These are low cost and do not interfere with truck movements. We are waiting to see the Corridor Analysis report to under the frequency and risk profile of this action.</i></p>	
<p><b>Action Taken:</b> <i>Recommended installing flexi posts and to be reviewed once the corridor analysis report is received.</i></p>	

#### 4.4.2 Left-turns onto Kahutia Street (W)


**Significant**

The design provides vehicle tracking for a large rigid truck (11.5 m long), indicating that the movements undertaken by these vehicles are appropriately accommodated at the Grey Street/Kahutia Street intersection. However, the auditors observed evidence (wheel tracks) that heavy vehicles were going over the kerb and encroaching on the berm/footpath when undertaking a left turn onto Kahutia Street (W), as shown in Figure 4.4-7.

The auditors cannot determine if this was a single occurrence of a manoeuvring mistake or if there is a turning demand for longer heavy vehicles. It is noted, however, that the area appears constrained to accommodate turning movements of longer heavy vehicles (for instance, semi-trailers).

This condition can result in safety issues involving pedestrians waiting to cross the road and turning heavy vehicles. Due to the low turning speeds and likely low frequency of heavy vehicle movements, the probability of a conflict is assessed as very unlikely. However, a collision between pedestrians and heavy vehicles could be serious, even at low-impact speeds.

**Table 4-5: Risk analysis – Against a pedestrian**

<b>Prominent crash type</b>		<ul style="list-style-type: none"> <li>Heavy vehicle versus pedestrian</li> </ul>
<b>Probability</b>	Very Unlikely	<ul style="list-style-type: none"> <li>Low turning speeds</li> <li>Low frequency of longer HCVs</li> </ul>
<b>Severity</b>	Serious	<ul style="list-style-type: none"> <li>Impact speeds generally expected to be below 30 km/h; however, serious outcome could be generated in the event of a heavy vehicle v. pedestrian</li> </ul>

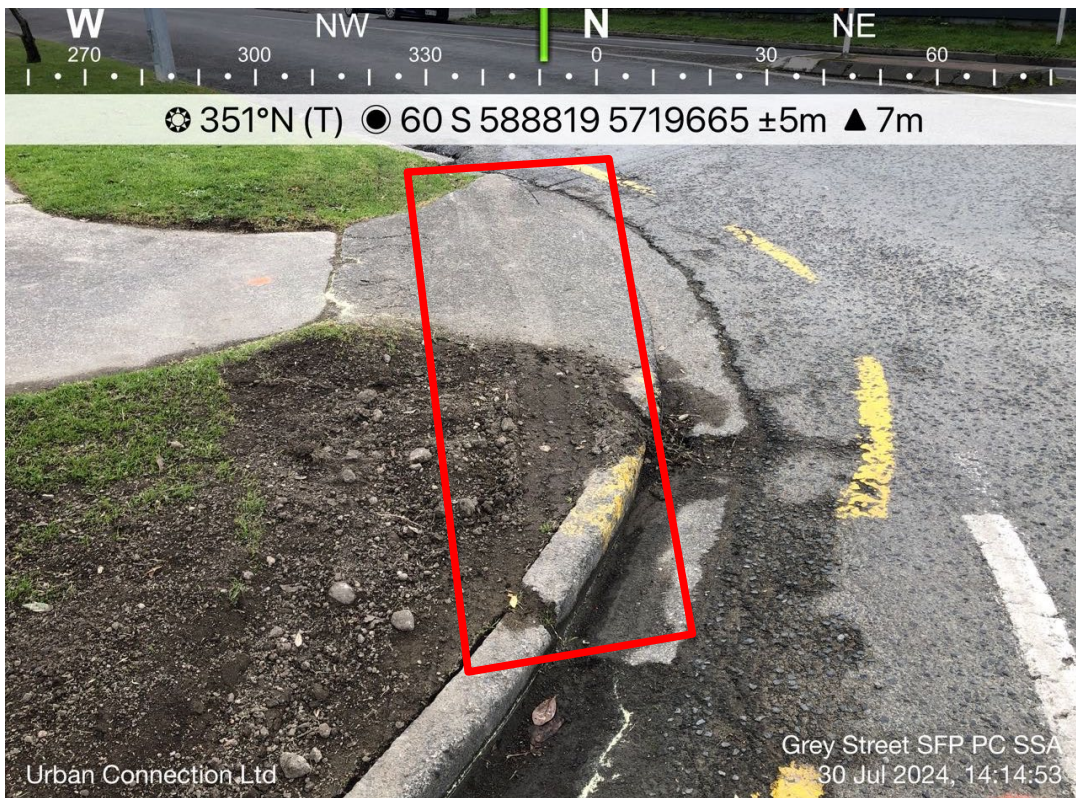


Figure 4.4-7 – Wheel tracks on the berm and footpath

**Recommendation:**

1. Confirm if there is a turning demand for longer heavy vehicles at this intersection;
2. Undertake vehicle tracking for longer heavy vehicles; and
3. Consider layout changes to accommodate the turning of longer heavy vehicles or physical measures to protect pedestrians on the footpath.

<b>Probability Rating:</b>	<b>Severity Outcome Rating:</b>
<b>The probability of a crash is Very Unlikely</b>	<b>Crashes are likely to be Serious</b>
<p><b>Design Team Response:</b> As can be seen in Google Streetview imagery, most that dated July 2019, this is a pre-existing issue, however, potentially the over-run may have become more frequent since the modal filter was installed. This project was designed to accommodate the RTS18 Large Rigid Truck as the design vehicle, however it has become evident that larger vehicles make movements into and out of Kahutia Street semi-regularly. We recommend investigation into what demand there is for larger vehicles, which movements, and whether there are alternative reasonable routes some of these particularly large vehicles can take which do not pass through this key urban area. For remaining movements, we suggest adjustments to the design to accommodate the RTS18 Semi Truck, such as localised changes to kerblines and/or removal/adjustment of some islands. with careful consideration and mitigation of effects on safety and amenity for all other users.</p>	
<p><b>Safety Engineer:</b> Agree. Heavy vehicle movements should be deterred or safely provision made for their manoeuvring.</p>	
<p><b>Client Decision:</b> This has been identified as a pre-existing issue prior to the changes made on Grey Street. The placement of the pre-existing traffic island and the placement of the Pohutukawa Tree made it a tight left hand turn into Kahutia Street for large trucks.</p>	
<p><b>Action Taken:</b> Maintenance have enquired into widening and strengthening the pram crossing as this was a preexisting issue and this will be completed through the footpath maintenance budget.</p>	

### 4.4.3 Signage

### Significant

Some of the signage installed throughout the section has been assessed as confusing for approaching traffic. In some instances, up to four signs have provided on sign poles. This is assessed as a signage overload for drivers, who are unlikely to be able to comprehend all actions required from the signs within the time/space available. This is detailed below.

- Grey Street/Kahutia Street intersection:
  - Northeastern approach: four signs are provided on a single pole, including an orange disk sign, a give-way sign, a supplementary 'to cyclists & pedestrians' sign and a pedestrian crossing sign. Note that the orange disc A hump sign is provided approximately 10 m before (refer to Figure 4.4-8);
  - Southeastern approach: three signs are provided on a single pole, including a give-way sign, a supplementary 'to cyclists & pedestrians' sign and a pedestrian crossing sign (refer to Figure 4.4-9). No orange disc and black & white pole is provided at the pedestrian crossing;
  - Southeastern and northwestern approaches: two signs are provided on a single pole adjacent to the limit line, including a stop sign and a no-right-turn sign (refer to Figure 4.4-9);



**Figure 4.4-8 – Signage at the northeastern approach of the Grey Street/Kahutia Street intersection**



**Figure 4.4-9 – Signage at the northeastern approach of the Grey Street/Kahutia Street intersection**

- Grey Street/Childers Road intersection:
  - Southeastern approach (westbound direction): three signs are provided on a single pole, including a give-way sign, a supplementary 'to cyclists & pedestrians' sign and a pedestrian crossing sign (refer to Figure 4.4-10);
  - Southeastern approach (westbound direction): two signs are provided on a single black & white pole, including an orange disk and a hump sign (refer to Figure 4.4-11);

- Southeastern approach (eastbound direction): four signs are provided on a single black & white pole, including an orange disk sign, a give-way sign, a supplementary 'to cyclists & pedestrians' sign and a pedestrian crossing sign (refer to Figure 4.4-12);



**Figure 4.4-10 – Signage at the southeastern approach of the Grey Street/Childers Road intersection (westbound direction)**



**Figure 4.4-11 – Signage at the southeastern approach of the Grey Street/Childers Road intersection (westbound direction)**



**Figure 4.4-12 – Signage at the southeastern approach of the Grey Street/Childers Road intersection (eastbound direction)**

- Zebra Crossing on Grey Street:
  - Both approaches: two signs are provided on a single pole, including a pedestrian crossing sign and a hump sign (refer to Figure 4.4-13 and Figure 4.4-14);



**Figure 4.4-13 – Signage at the zebra crossing on Grey Street (northbound direction)**



**Figure 4.4-14 – Signage at the zebra crossing on Grey Street (southbound direction)**

As described above, this is a signage overload where too much information is provided, making it difficult for approaching drivers to comprehend and react to the regulation and/or warning. This condition increases the likelihood of conflicts between vehicles, pedestrians and cyclists.

Particular regard is also required concerning the signage at the northeastern approach of the Grey Street/Kahutia Street intersection (as shown in Figure 4.4-8). At this location, a give-way sign is provided along the priority route (Grey Street), confusing motorists as to which road has priority at the intersection; as is, vehicles could be misled that traffic along Kahutia Street has priority, which is not the case. This can lead to rear-end and side-impact crashes. Furthermore, the orange disc and give-way sign may mislead motorists in relation to the courtesy crossing on Grey Street, which does not establish priority for pedestrians.

The signage throughout the site also does not comply with the rules of the Traffic Control Devices (TCD) 2004<sup>1</sup> and/or MOTSAM, as follows:


- A traffic sign must not be installed with another sign on the same pole except if the additional sign is a supplementary sign and some other exceptions not applicable to this situation;
- No other traffic sign other than an orange disc shall be erected on a black and white pole at a pedestrian crossing;
- A pedestrian crossing sign should be erected in advance of the conflict area by at least a distance associated with the operating speed limit (for instance, for a 50 km/h operating speed, the sign should be at least 65 m from the crossing);
- A hump sign should be erected in situations where there is a sharp rise in the profile of the road that is likely to cause considerable discomfort to car passengers, cause shifting a load or a loss of control crash. This may not be applicable to all humps throughout the site;

<sup>1</sup> Land Transport Rule – Traffic Control Devices 2004 – Rule 54002/2004 – Section 4.5



The auditors recognise that it may be difficult to accommodate traffic signs at some locations throughout this section. On the other hand, the signage strategy is considered confusing, which could lead to safety issues. The prominent issue relates to conflicts between vehicles and vulnerable road users (pedestrians and cyclists). Due to the low speeds, lighting and typically good visibility, the probability is assessed as unlikely. Generally, conflicts would be expected to result in minor injuries due to the low impact speeds; however, if the crash involved a child or elderly, serious injuries could be generated.

**Table 4-6: Risk analysis – Against a pedestrian**

<b>Prominent crash type</b>		<ul style="list-style-type: none"> <li>Vehicle versus pedestrian</li> </ul>
<b>Probability</b>	Unlikely	<ul style="list-style-type: none"> <li>Low speeds;</li> <li>Lighting;</li> <li>Good intervisibility.</li> </ul>
<b>Severity</b>	Serious	<ul style="list-style-type: none"> <li>Impact speeds generally expected to be below 30 km/h; however, serious outcome could be generated if an child/elderly is involved.</li> </ul>

**Recommendation:**

1. Consider installing the signage as per TCD rules.
2. At the northeastern approach of the Grey Street/Kahutia Street intersection, consider a combination of the RP63 and RP65 signs (shown below).



**Probability Rating:**

The probability of a crash is Unlikely

**Severity Outcome Rating:**

Crashes are likely to be Serious

**Design Team Response:** Through the design process, there was significant discussion regarding compromises to TCD rules regarding signage combinations, because of conflicts due to the TCD rules being optimised for less complex circumstances than have recently become common around New Zealand, including on this project; notably, the combination of intersections, priority crossings for both walking and cycling, and traffic calming, all in close succession. The design team worked to minimise signage, as well as consider precedents set by other projects around the country.

Below is an explanation for some sign combinations highlighted by the SSA, and recognition of potential changes to signage:

**General notes:**

- (1) W16-2 (zebra crossing) signs:  
TCD mandates these signs, however not including them for priority pedestrian and cycle crossings was considered, given they are advised with 'Give Way' 'To pedestrians and cyclists' signage. However, It was suggested that we include W16-2 signs for all approaches given they are

universally included on all other local priority crossings

(2) 'Give Way' with supplementary 'to pedestrians and cyclists' signage on approaches to priority crossings is a TDC requirement for cycles having right of way across a road-way.

(3) Removal of all hump signs, on the basis of reducing over-saturation of signage, will be discussed between GDC and the design team.

#### **Locations Highlighted by the SSA:**

##### **Figure 4.4-8: Northeastern approach of the Grey Street/Kahutia Street intersection**

The signage closest to the intersection from this approach was originally spread across two islands; one each before and after the courtesy crossing over Grey Street. However, a late design change was implemented to cater for larger trucks, which required the latter island to be fully mountable, and as such the signage was combined onto one pole. There is no location beyond the current pole where signage could be placed prior to the crossing.

Further to this, moving any of the signs currently on the striped pole further east would make it less clear that they apply only to the left movement..We suggest that this could be mitigated by a combination of:

- Replace the Give way + supplementary with a RP63 +RP65, sharing a new pole further to the North east.

- Move the W16-2 sign to a new, separate pole, also North East on Grey St, and roughly 65m in advance of the intersection, and add a supplementary 'ON LEFT' sign.

##### **Figure 4.4-9: Southeastern approach of the Grey Street/Kahutia Street intersection**

We will investigate opportunities to move the W16-2 (zebra crossing) sign further south-east along Kahutia Street, at a position roughly 65m in advance of the crossing, such that the Give way + supplementary no longer shares a pole.

Stop and No right turn sign location changes from design were subject to late changes to accommodate larger trucks. We will investigate opportunities to move the no right turn sign off the Stop pole, moving it onto the new light pole on the left (next to the crossing), or onto a new pole in that vicinity.

##### **Figure 4.4-10 & 11 Southeastern approach of the Grey Street/Childers Road intersection (westbound direction)**

The Give Way + supplementary was combined with the zebra crossing sign at this location given the local context: other positions in advance of this position, but within the vicinity of the crossing, were deemed less visible, as they would be on the far side of on-street parking, and/or obscured by street trees.

The hump and belisha signs could be separated by moving the belisha to instead be on the adjacent new light pole.

**Figure 4.4-12 southeastern approach of the Grey Street/Childers Road intersection (eastbound direction)**

Its agreed that this is a large number of signs to share a pole, which could lead to signs being missed by drivers, plus the striped pole being barely noticeable.

However, the suggested solution of a combination of RP63 and RP65 doesn't account for traffic moving straight across Childers, or turning right out of Grey (Northeast bound) towards the crossing. Further, the combination does not make clear whether it applies to left or right turning traffic, or both.

Aside from the current location of these signs, there is no identified location where any of the existing signs could go where it would be clear what movements and location they apply to.

If requested, an option could be to replace the zebra sign with three zebra signs, one on each approach to the roundabout, leaving only the combination of the Belisha and Give Way + supplemental sharing the pole. Its recognised that TCD does not allow for this combination, however there is precedent for shared striped poles around the country where conditions are constrained.

A further measure to be considered to improve the legibility of zebra crossing associated signage here is the addition of a second belisha and striped pole on this approach, on the centre island

**Safety Engineer:** *Agree. The signs need to be installed to meet legal requirements, be simple / concise, and effective.*

**Client Decision:** *To review the signage as specified above*

**Action Taken:** *Signage is currently being reviewed and any signage being removed will be repurposed elsewhere.*

#### 4.4.4 Guidance to the Visually Impaired

Significant

The guidance for the visually impaired throughout the crossing points along the site is poor. This condition increases the chances of conflicts between these vulnerable road users and vehicles. The following has been observed at the time of the site visit:

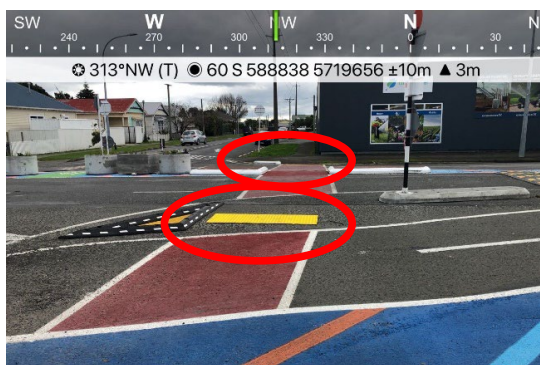
- No directional (leading) tactile indicators are present to lead the vision impaired to the crossing points. These users have no guidance as to where to cross the road;
- Missing or poorly installed warning (hazard) tactile indicators at several locations throughout the section, including:
  - Warning tactiles too close to the traffic lanes or cycleway;
  - No warning tactiles on the pedestrian refuge at the northeastern side of the Grey Street/Kahutia Street intersection;
  - No warning tactiles through Kahutia Street (W) and courtesy crossing adjacent to the Childers Road intersection;



**Figure 4.4-15 – Directional tactiles do not cover the entire footpath**



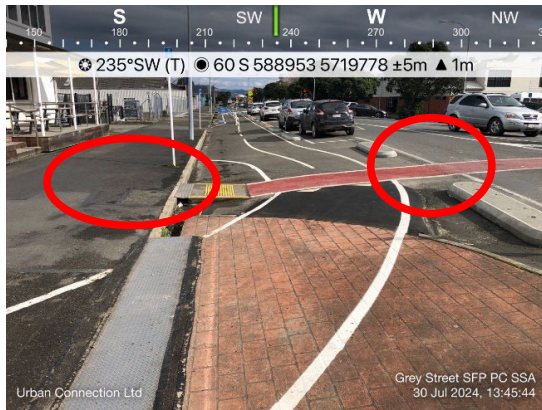
**Figure 4.4-16 – No directional tactiles (Kahutia Street (E))**



**Figure 4.4-17 – Warning tactiles too close to the cycleway and no warning on the refuge**



**Figure 4.4-18 – No directional tactile indicators and poor installation of warning tactiles at the pedestrian crossing on Grey Street**



**Figure 4.4-19 – No warning tactiles past the cycleway and no directional tactiles**



**Figure 4.4-20 – No directional tactile indicators at the pedestrian crossing on Childers Road**




**Figure 4.4-21 – No directional tactile indicators at the pedestrian crossing on Childers Road**



**Figure 4.4-22 – No warning and directional tactiles at the pedestrian crossing on Grey Street**

The above deficiencies could result in conflicts between vehicles/cyclists and visually impaired users. The probability of conflicts between vehicles and visually impaired people as a result of the deficiencies is assessed as very unlikely, given the low vehicle speeds and number of visually impaired. Generally, conflicts would be expected to result in minor injuries due to the low impact speeds; however, if the crash involved a child or elderly, serious injuries could be generated.

**Table 4-7: Risk analysis – Vehicle versus pedestrian/cyclist**

<b>Prominent crash type</b>		<ul style="list-style-type: none"> <li>Vehicle versus pedestrian</li> </ul>
<b>Probability</b>	Very Unlikely	<ul style="list-style-type: none"> <li>Low speeds;</li> <li>Low number of visually impaired.</li> </ul>
<b>Severity</b>	Serious	<ul style="list-style-type: none"> <li>Impact speeds generally expected to be below 30 km/h; however, serious outcome could be generated if an elderly is involved.</li> </ul>

**Recommendation:**

1. Install TGSIs in accordance with current standards/guidelines.

**Probability Rating:***The probability of a crash is Very Unlikely***Severity Outcome Rating:***Crashes are likely to be Serious***Design Team Response:**

The prioritisation of tactile infrastructure for this trial project was developed in collaboration with a disability specialist. The specialist recommended that directional tactiles would be excessive for a project of this nature, however any permanent project resulting from this trail is recommended to include directional tactiles.

*The quick failure of adhesive for the tactiles installed in some locations is recognised as an issue, which is currently being investigated.*

*Some specific responses for situations raised but not covered above:*

*Fig 4.4.15:*

*Changes to the existing raised table crossing are considered generally outside of the scope of this project, however the design team recommends that GDC consider this remediation as part of any future project relevant to the crossing.*

*4.4.16:*

*The tactiles at this location were originally designed to be in the tactical footpath space, however a late design change was made to allow for large trucks to occasionally track over this area, rendering it inappropriate as a safe waiting space. Creating an adjacent row of tactiles in the tactical space a safe distance back from the tracking will be investigated*

*4.4.17:*

*We have received advice from a disability specialist that tactiles should ideally be placed outside of the carriageway/cycleway, but not generally between a cycleway and carriageway, as this can create an overload and lead to confusion. As such, we recommend moving these tactiles back to the outside of the cycleway, so that the arrangement is similar to that in 4.4.19*

**Safety Engineer:** *Agree. Consistent and effective guidance should be installed for visually impaired users. I recommend consultation with a representative organisation such as Blind Low Vision NZ and / or the Orientation & Mobility instructors.*

**Client Decision:** *Tactiles are to be replaced and installed as per the guideline.*

**Action Taken:** *To reinstall temporary tactiles. The new tactiles to be installed on a better surface within the walkway for better durability.*

#### 4.4.5 Electronic Billboard Distraction

**Significant**

A large electronic billboard is installed on the southeastern corner of the Grey Street/Childers Road intersection. This electronic billboard emits rapid-moving, bright, colourful and interchangeable messages that can potentially distract motorists approaching the intersection, particularly the ones approaching from the southeast and northwest.

Note that the billboard is located in close proximity to the recently constructed raised pedestrian and cycle crossing. In this area, it is important that motorists are focused on the interaction with the vulnerable road users using the crossing and that distractions are minimised. The distraction caused by the billboard may increase the likelihood of a driver not stopping/giving way for the vulnerable road users, potentially leading to a crash. It may also lead to rear-end and side-impact crashes at the intersection.

Note that electronic billboards/signs are required to comply with the TCD rules. Some information has been collected from Part 3 (Advertising signs) of the TCD. Animated or flashing signs should not be used as roadside advertising if:


- They incorporate a revolving light of any colour;
- They rotate as a whole about any axis other than a vertical one;
- The message is more complex than a single word, logo or symbol displayed in any direction at one time;

In addition, each installation or proposed installation needs to be reviewed to ensure that possible distractive effects are minimised, being carefully assessed where:

- They are located close to an intersection, merging or diverging traffic sites or other sites where demands on motorists' concentration is high;
- Each separate display is not static from the first appearance to replacement;
- The time to change from one display to the next is greater than two seconds;
- The minimum time for any separate display is less than five seconds.

The pedestrian crossing and intersection are expected to accommodate moderate to high volumes of pedestrians, cyclists and vehicles. However, due to the low turning speeds as a result of the roundabout layout, the probability of crashes is assessed as unlikely. Generally, conflicts would be expected to result in minor injuries due to the low impact speeds; however, if the crash involved a child or elderly, serious injuries could be generated.

Table 4-8: Risk analysis – Against pedestrians

Prominent crash type		<ul style="list-style-type: none"> <li>Vehicle against pedestrians</li> </ul>
Probability	Unlikely	<ul style="list-style-type: none"> <li>Low speeds due to roundabout;</li> </ul>
Severity	Serious	<ul style="list-style-type: none"> <li>Impact speeds generally expected to be below 30 km/h; however, serious outcome could be generated if a child/elderly is involved.</li> </ul>

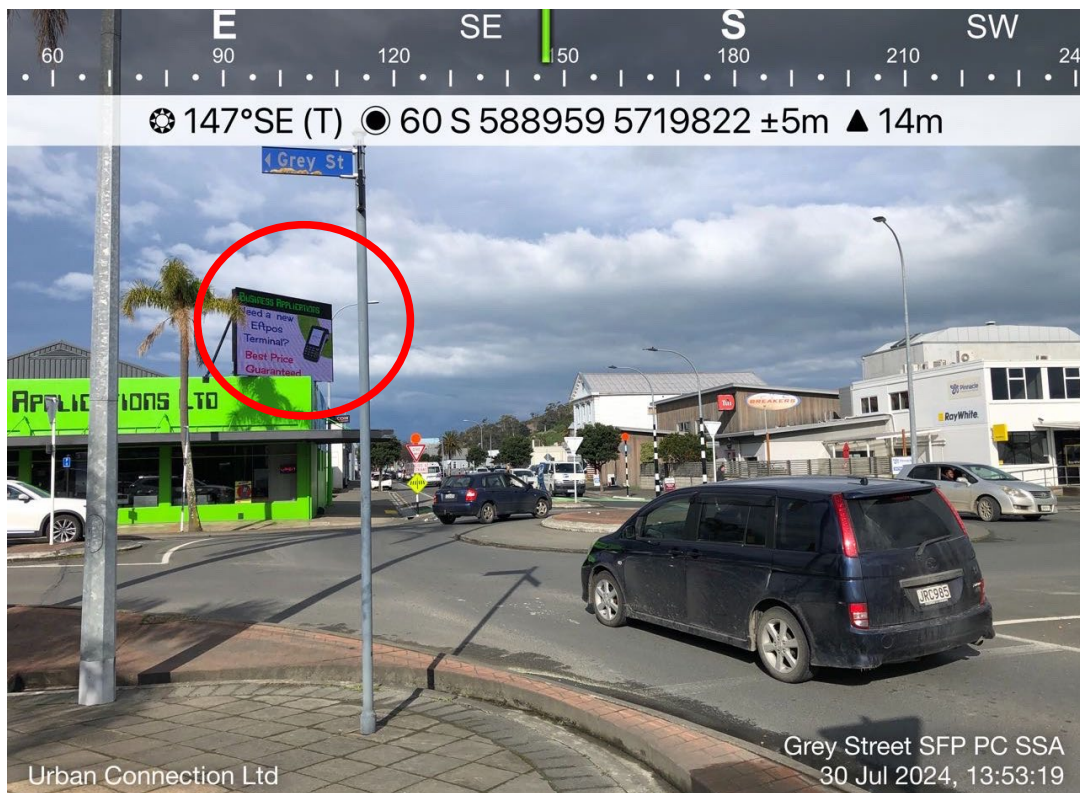


Figure 4.4-23 – Electronic Billboard/Sign

**Recommendation:**

1. Consider relocating the electronic sign away from the zebra crossing or provide an electronic billboard in accordance with TCD rules.



<b>Probability Rating:</b>	<b>Severity Outcome Rating:</b>
<b>The probability of a crash is Unlikely</b>	<b>Crashes are likely to be Serious</b>
<b>Design Team Response:</b> <i>This issue is outside of the scope of this project, and it is recommended for consideration by GDC</i>	
<b>Safety Engineer:</b> <i>Agree. Distractions to drivers should be avoided at key decision points where there is the risk of serious injury; especially vulnerable road users such as pedestrians and cyclists.</i>	
<b>Client Decision:</b> <i>This was an existing crossing point with the obstruction in place without being under the control of a zebra crossing</i>	
<b>Action Taken:</b> <i>No action taken</i>	


**4.4.6 Cycle Lane Pinch Points**

**Minor**

The two-way cycle lane has pinchpoints where the width is narrower than desired, which could lead to conflicts between cyclists. One of these pinch points, in front of the skate park, is only 1.8 m wide – the tolerable minimum width should be 2.5 m<sup>2</sup>. Due to low cyclist speeds, low to moderate cycle volumes and good forward visibility, the probability of a crash has been assessed as very unlikely. The pinch points are also highlighted with red surfacing and 'slow' pavement symbols, further mitigating the risk. Any conflict would be expected to be minor in nature.

It is acknowledged that existing trees may create impediments to a wider cycle lane configuration at those points.

**Table 4-9: Risk analysis – Against vulnerable road users**

<b>Prominent crash type</b>		<ul style="list-style-type: none"> <li>Between vulnerable road users (cyclist v cyclist)</li> </ul>
<b>Probability</b>	Very Unlikely	<ul style="list-style-type: none"> <li>Low cyclist speed;</li> <li>Low-moderate cycle volumes;</li> <li>Good forward visibility;</li> </ul>
<b>Severity</b>	Minor	<ul style="list-style-type: none"> <li>Low impact speeds of less than 30 km/h</li> </ul>



**Figure 4.4-24 – Pinch points in front of the skate park**

<sup>2</sup> NZTA Separated Cycleways guidance ([hyperlink provided](#))

**Recommendation:**

1. Consider widening the cycle lanes to ensure a consistent minimum tolerable width of 2.5m along the site.

<b>Probability Rating:</b>	<b>Severity Outcome Rating:</b>
<i>The probability of a crash is Very Unlikely</i>	<i>Crashes are likely to be Minor</i>
<b>Design Team Response:</b> <i>Significant consideration was given to this issue at design phase, leading to the installed warning markings. Splitting the directions of the cycleway, such that the tree is in the middle, was also considered, but given the good sightlines and low volumes, it was determined users would generally follow the shortest, rather than the left route around the tree, negating any safety benefit however having a significant cost to other street uses. We recommend that this design be reviewed periodically in the future, as usage of the cycleway grows .</i>	
<b>Safety Engineer:</b> <i>Agree that the pinch [point needs to be managed. Ideally wider and consistent cycle lane widths would be provided. If this cannot be done the conflict should be managed to mitigate the risk of a crash occurring and the risk of injury. This could for example making users aware of the paths tow way use, and moderating the speed of users on the cycleway – noting it could be used by electric powered / assisted vehicles.</i>	
<b>Client Decision:</b> <i>The trees are unde regular maintenance to ensure clear visibility for cyclists in both directions. Advance warning has been installed for cyclists. The trees are protected and cannot be removed.</i>	
<b>Action Taken:</b> <i>No action taken</i>	


**4.4.7 Non-frangible hazards**

**Minor**

The wooden and concrete planter boxes installed on the central medians are solid objects that could be hit by an errant vehicle. The purple bollards installed at the pick-up/drop-off area in front of the skate park are also non-frangible and, therefore, a hazard for vehicles.

The probability of a loss of control crash is assessed as very unlikely due to low vehicle speeds. Good forward visibility is also typically provided. Also due to the low operating speeds, a minor injury crash would potentially result.

**Table 4-10: Risk analysis – Vehicle against non-frangible hazard**

<b>Prominent crash type</b>		<ul style="list-style-type: none"> <li>Vehicle against non-frangible hazard</li> </ul>
<b>Probability</b>	Very Unlikely	<ul style="list-style-type: none"> <li>Low vehicle speeds;</li> <li>Good forward visibility;</li> </ul>
<b>Severity</b>	Minor	<ul style="list-style-type: none"> <li>Low impact speeds of less than 30 km/h</li> </ul>



**Figure 4.4-25 – Planter boxes and purple bollards adjacent to traffic lanes**

**Recommendation:**

1. Consider removing non-frangible hazards or replacing them with frangible elements;
2. Consider reflective elements on the purple bollards.

<b>Probability Rating:</b>	<b>Severity Outcome Rating:</b>
<b>The probability of a crash is Very Unlikely</b>	<b>Crashes are likely to be Minor</b>

**Design Team Response:** We agree with the recommendation that reflective elements, such as reflective tape, be installed on each bollard. In terms of their safety as non-frangible elements, these bollards were in a similar position prior to the trial, and the design team is not aware of any safety issues which arose from them at that time. They are designed to keep traffic out of the PUDDO space, frequently used by children getting dropped off, and as such serve an important function in protecting those users in the event a car is not being driving in control. The low speed environment created by this project is seen to minimise the risk of a injury-crash caused by a collision with these bollards.

**Safety Engineer:** Agree. Hazards should be avoided in the road environment as much as practical for all road users. Where they cannot be removed, they should be managed effectively, which would include suitable delineation.

**Client Decision:** Bollards were pre-existing at a higher speed environment, the new design is a low speed environment.


**Action Taken:** No action taken.

**4.4.8 Detritus on the cycleway**

**Minor**

Gravel is tracking onto the cycle lanes on the southwest side of the Grey Street/Kahutia Street intersection. This could cause cyclists to lose stability and may result in a minor injury. The probability of this type of crash is assessed as very unlikely due to the fact that this issue has been identified at a localised point, with low to medium cycle volumes and low travelling speeds.

**Table 4-11: Risk analysis – Cyclist loss of control**

<b>Prominent crash type</b>		<ul style="list-style-type: none"> <li>▪ Cyclist loss of control</li> </ul>
<b>Probability</b>	Very Unlikely	<ul style="list-style-type: none"> <li>▪ Localised issue;</li> <li>▪ Low-moderate cycle volumes;</li> <li>▪ Low travelling speeds.</li> </ul>
<b>Severity</b>	Minor	<ul style="list-style-type: none"> <li>▪ Low impact speeds of less than 30 km/h</li> </ul>



**Figure 4.4-26 – Gravel/detritus on the cycle lanes**

**Recommendation:**

1. Sweep the pavement to provide a smooth riding surface.

<b>Probability Rating:</b>	<b>Severity Outcome Rating:</b>
<i>The probability of a crash is Very Unlikely</i>	<i>Crashes are likely to be Minor</i>
<b>Design Team Response:</b> <i>It is recommended that GDC investigate this and consider street sweeping</i>	
<b>Safety Engineer:</b> <i>Agree. Foreign matter in the cycleways that could result in a loss of traction, or evasive manoeuvres should be avoided. It is expected that regular maintenance will be required on an ongoing basis.</i>	
<b>Client Decision:</b> <i>Cycleway has been added to a sweeping schedule under maintenance</i>	
<b>Action Taken:</b> <i>Will be swept regularly under the sweeping schedule.</i>	


**4.4.9 Ponding**

**Minor**

There was one location (refer to photo) where stormwater was accumulated adjacent to the cycle lane. In wet conditions, it is likely that stormwater can encroach on the cycle lanes since it appears that the superficial drainage system is not appropriately capturing stormwater at this location. This could cause a cyclist to lose control due to slippery surface conditions and may result in a minor injury. The probability of a cycle crash is assessed as very unlikely since it appears to be a localised issue with low to medium cycle volumes and low travelling speeds.

Note that this condition is also likely contributing to pavement damage, as seen in the figure below.

**Table 4-12: Risk analysis – Cyclist loss of control**

<b>Prominent crash type</b>		<ul style="list-style-type: none"> <li>▪ Cyclist loss of control</li> </ul>
<b>Probability</b>	Very Unlikely	<ul style="list-style-type: none"> <li>▪ Localised issue;</li> <li>▪ Low-moderate cycle volumes;</li> <li>▪ Low travelling speeds.</li> </ul>
<b>Severity</b>	Minor	<ul style="list-style-type: none"> <li>▪ Low impact speeds of less than 30 km/h</li> </ul>



**Figure 4.4-27 – Ponding adjacent to the cycle lane**

**Recommendation:**

1. Consider options to ensure water is adequately drained away.



**Probability Rating:***The probability of a crash is Very Unlikely***Severity Outcome Rating:***Crashes are likely to be Minor*

**Design Team Response:** *Permanent changes to the street such as what would be required to remediate this are considered outside of the scope of this trial project. From the image, it appears that the ponding is near the maximum depth that the surrounding pavement undulations could support. It appears to be shallow, and generally outside of the cycleway- we agree it is a minor hazard.*

**Safety Engineer:** *Drainage should be provided so as to avoid compromising safety. This could be by loss of traction, evasive manoeuvres, or aggregation of slippery material (mud or leaves for example).*

**Client Decision:** *This is a pre-existing issue that would need to be reviewed if the project was to become permanent. All driveways are to be constructed as per the GDC engineering code.*


**Action Taken:** *No action taken.*

**4.4.10 Manhole Cover**

**Minor**

There is a large manhole cover located within the cycle lanes adjacent to the new raised zebra crossing on Childers Road. In wet conditions, this manhole lid will likely be slippery, and a cyclist could lose control when travelling across it, especially given this is within the turn manoeuvre. Given the low to medium cycle volumes and low turning speeds, the probability is assessed as very unlikely. A minor injury would be expected also due to low travelling speeds.

**Table 4-13: Risk analysis – Cyclist loss of control**

<b>Prominent crash type</b>		<ul style="list-style-type: none"> <li>▪ Cyclist loss of control</li> </ul>
<b>Probability</b>	Very Unlikely	<ul style="list-style-type: none"> <li>▪ Low-moderate cycle volumes;</li> <li>▪ Low travelling speeds.</li> </ul>
<b>Severity</b>	Minor	<ul style="list-style-type: none"> <li>▪ Low impact speeds of less than 30 km/h</li> </ul>



**Figure 4.4-28 – Manhole cover on the cycleway**

**Recommendation:**

1. Consider installing a non-slip surface to the manhole lid.

<b>Probability Rating:</b> <i>The probability of a crash is Very Unlikely</i>	<b>Severity Outcome Rating:</b> <i>Crashes are likely to be Minor</i>
<b>Design Team Response:</b> <i>We agree this is a hazard, given it's a location where changes in speed and direction are likely. Its recommended that GDC install a non-slip surfacing over this cover</i>	
<b>Safety Engineer:</b> <i>Agree. The manhole cover could be slippery when wet, especially if it has polished with use. Adequate traction should be provided for safe use. The cover should also be designed to avoid the retention of water and / slippery material (such as mud).</i>	
<b>Client Decision:</b> <i>Discussed with utility provider and this is unable to be moved. This is very unlikely and minor in terms of risk.</i>	
<b>Action Taken:</b> <i>No action taken.</i>	

4.4.11 Road Markings

Minor

During the site visit, the auditors observed the following deficiencies associated with road markings:

- The zebra crossing advance warning diamond on the southbound approach to the raised crossing is missing. This is an important marking to ensure drivers are aware of the crossing ahead and can stop/give way in time;
- The hump markings (white painted triangles) on the existing raised crossing ramps have disappeared on both approaches. Hump markings are also missing at the new crossing on Childers Road. These are important delineation devices to assist drivers with knowing there is a raised crossing ahead;
- A number of existing carriageway markings are faded, such as:
  - the centreline and some edge lines on Grey Street south of Kahutia Street;
  - at the zebra pedestrian crossing north on Grey Street;
  - intersection limit lines at the Grey Street/Kahutia Street intersection.

The prominent crash types linked to the above deficiencies are side-impact and/or head-on crashes as a result of the missing limit lines and centrelines. Speed humps and lighting are provided in the vicinity of the pedestrian crossings, expected to generally prevent issues from arising. The probability is assessed as very unlikely due to the low operating speeds and good forward visibility. Crashes would be expected to be minor.

Table 4-14: Risk analysis – Side-impact/head-on


<b>Prominent crash type</b>		<ul style="list-style-type: none"> <li>▪ Side-impact/head-on</li> </ul>
<b>Probability</b>	Very Unlikely	<ul style="list-style-type: none"> <li>▪ Low vehicle speeds;</li> <li>▪ Good forward visibility;</li> </ul>
<b>Severity</b>	Minor	<ul style="list-style-type: none"> <li>▪ Low impact speeds of less than 30 km/h</li> </ul>



Figure 4.4-29 – Faded limit line at the Grey Street/Kahutia Street intersection

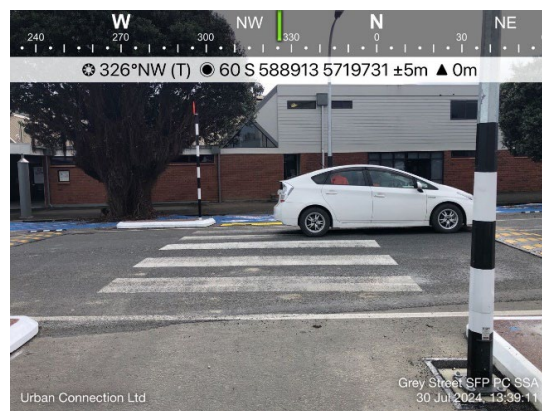


Figure 4.4-30 – Faded zebra markings on Grey Street



**Figure 4.4-31 – Faded centre lines on Grey Street in front of the skate park**



**Figure 4.4-32 – Missing white triangles at raised pedestrian crossing**

**Recommendation:**

1. Install conspicuous road markings throughout the section in accordance with current standards/guidelines.

**Probability Rating:**

The probability of a crash is Very Unlikely

**Severity Outcome Rating:**

Crashes are likely to be Minor

**Design Team Response:** Its recommended that GDC investigate the rapid fading of markings remediate.

**Safety Engineer:** Regulatory markings must be provided. All necessary markings should be maintained to be effective and safe. The environment should be self explaining as much as practical. There may be a case to remove unnecessary markings; to avoid clutter and reduce the amount of paint on the road which can be slippery when wet (especially for two wheeled vehicles).

**Client Decision:** The line marking has been added into the regular maintenance schedule. This was installed during winter and line marking has since been redone. Condition of the pavement impacts the durability of the line marking, however the pavement is outside of the project scope.

**Action Taken:** Line marking to be monitored.

4.4.12 Cycle connections

Minor

No safe cycling connections are provided on Childers Road approaching the bidirectional cycleway (refer to Figure 4.4-33). No ramps/kerb letdowns exist for cyclists to enter the cycle lanes adjacent to the new raised zebra crossing. Note that a kerb buildout blocked an existing ramp.

This condition can result in conflicts between cyclists and vehicles at this point. The probability of a cycle crash is assessed as unlikely, given the low speeds of approaching vehicles and low to moderate volumes of cyclists. Due to the low speeds, a crash would be expected to be minor.

Table 4.4-15: Risk analysis – Against vulnerable road users


Prominent crash type		<ul style="list-style-type: none"> <li>Vehicle v cyclist</li> </ul>
Probability	Unlikely	<ul style="list-style-type: none"> <li>Low vehicle approach speeds;</li> <li>Low to moderate cyclist volumes.</li> </ul>
Severity	Minor	<ul style="list-style-type: none"> <li>Impact speeds unlikely to exceed 30 km/h</li> </ul>



Figure 4.4-33 – Cycle connections on Childers Road

**Recommendation:**

1. Provide safe cycle connections to the side roads.

**Probability Rating:***The probability of a crash is Unlikely***Severity Outcome Rating:***Crashes are likely to be Minor*

**Design Team Response:** *Cycling improvements for travelling along Childers road are generally considered outside of scope of this project. Its important to note that prior to this project, the cycle lane shown ended in the same position as it does now, and cyclists were similarly expected to merge with general traffic through the roundabout. This project has improved conditions for those users, by installing a raised table so that the shared lane has a lower operating speed, as well as through providing priority for cycle users crossing Childers road here. In the interests of their own safety, its recognised that many cyclists may have previously chosen to mount the footpath, using the former pram crossing, rather than merge with traffic. This option would not interact safely with the new zebra crossing nor new lighting. Those users could instead mount the Childers Road footpath 35m prior to this position, at the nearest vehicle crossing. Its recommended that any future project on Childers Road consider separated infrastructure for cyclists on approaches and through this intersection. In the mean-time, as a low-cost interim measure, we suggest a sharrow marking be considered in the centre of the general lane on Childers Road on the final approach to the raised table be considered, to indicate to all road users that cyclists may be merging with general traffic here.*

**Safety Engineer:** *Agree. Effect and safe cycle connections should be provided. These should provide suitable surface traction and avoid hazards for example.*

**Client Decision:** *Recommendation to be investigated however the probability is unlikely and severity is minor.*

**Action Taken:** *To investigate*


**4.4.13 Visibility at Childers Road crossing**

**Minor**

GDC has informed the auditors about a near-miss conflict between a pedestrian and a mobility scooter user at the footpath on the southern quadrant of the Grey Street/Childers Road roundabout. The near-miss conflict is likely to have arisen due to the limited forward visibility, obstructed by a wall, at the intersection's corner (refer to Figure 4.4-34).

This condition can result in conflicts between vulnerable road users (pedestrians, cyclists and other wheeled users) at this point. This area is likely to experience a relatively high demand of cyclists and, particularly, pedestrians. However, the probability of a conflict is assessed as unlikely, given the relatively low walking/riding speeds. Similarly, a conflict would likely result in a minor injury due to the low speeds.

**Table 4-16: Risk analysis – Vulnerable road users conflict**

<b>Prominent crash type</b>		<ul style="list-style-type: none"> <li>Vulnerable road users conflict.</li> </ul>
<b>Probability</b>	Unlikely	<ul style="list-style-type: none"> <li>Low walking/riding speeds.</li> </ul>
<b>Severity</b>	Minor	<ul style="list-style-type: none"> <li>Low impact speeds of less than 30 km/h</li> </ul>



**Figure 4.4-34 – Visibility at the corner (Source: GDC)**



**Recommendation:**

1. Consider the following:
  - a. Engage with the property's manager/owner to try and remove or reduce the height of the visibility obstruction (i.e., wall);
  - b. Consider investigating the demand of vulnerable road users at this point to understand the suitability of the current treatment and, for instance, whether a slow zone shared path treatment would be appropriate;
  - c. Consider other opportunities, such as a convex mirror, to improve the visibility at the corner.

<b>Probability Rating:</b>	<b>Severity Outcome Rating:</b>
<b>The probability of a crash is Unlikely</b>	<b>Crashes are likely to be Minor</b>
<p><b>Design Team Response:</b> We agree that GDC should consider engaging with the property owner as recommended to determine whether changes can be made to the wall. We disagree with the suggestion of a shared path at this corner. Shared paths provide poor outcomes for all users, particularly less-able pedestrians. Further, its important to keep wheeled users, who are often moving faster than footpath users, as far from the obstruction as possible, to maximise sightlines between these users and all other users. Separation should be made as clear and legible as possible to encourage users to stay in their space, an outcome which we recognise is Somewhat compromised here, due to project scope and budget. We believe that speed is managed as much as practicable at this location, through horizontal deflection, narrowing, and vertical deflection in the form of the ramp just to the south-west of the intersection on the cycleway. We agree that a convex mirror be investigated as a good improvement, however a limitation in many areas is that these can be commonly vandalised.</p>	
<p><b>Safety Engineer:</b> Agree that the conflicts need to be managed safely. Ideally the sight lines should be improved and / or balanced in keeping the space available and speeds. A mirror is less effective and has limitations, thus should only be used as a temporary measure and / or if the safety risks cannot be otherwise addressed.</p>	
<p><b>Client Decision:</b> This was an RFS we received and this will continue to be monitored through the 12 month trial.</p>	
<p><b>Action Taken:</b> Continue to monitor</p>	



#### 4.4.14 Posted Speed Limit

#### Comment

The posted speed limit through the section is not clear. At the northeastern approach of the Grey Street/Childers Road intersection, a 30 km/h speed limit is set for traffic travelling towards the CBD, with no speed shown (covered with black tapes) for traffic travelling towards the site (i.e., southwest-bound).

At the southwestern approach, no speed signs are provided other than an advisory action zone sign with a very small 30 km/h roundel (refer to Figure 4.4-35). The sign is also mounted with two more signs (a speed hump and supplementary advisory speed signs), which reduces the likelihood of approaching motorists being able to comprehend the information (i.e., too much information is provided). This condition also does not comply with the rules of the Traffic Control Devices (TCD) 2004<sup>3</sup>. This is further discussed in Section 4.4.3.



Figure 4.4-35 – Action zone sign with 30 km/h advisory speed

The operating speeds throughout the section are considered typically controlled by the installed speed management measures. Therefore, this is presented as a comment. However, a clear posted speed of 30 km/h would be expected to further manage vehicle speeds, resulting in safety benefits throughout the section where a high presence of vulnerable road users is anticipated.

<sup>3</sup> Land Transport Rule – Traffic Control Devices 2004 – Rule 54002/2004 – Section 4.5

**Recommendation:**

1. Consider extending the existing posted speed limit of 30 km/h on Grey Street to the southwest (through the site);
2. Install traffic signs in accordance with TCD rules.

<b>Probability Rating:</b>	<b>Severity Outcome Rating:</b>
The probability of a crash is N/A	Crashes are likely to be N/A
<p><b>Design Team Response:</b> This sign pre-exists the project, and is considered outside of our scope. We agree with the recommendation to extend/formalise a 30km/h speed given the uses on and around this street, and add that it would be consistent with the design speed this project has created on this street.</p>	
<p><b>Safety Engineer:</b> The environment should suitably control and promote moderate speeds as suggested is the case. Ideally the speed limit would be consistent with planned management of the area. Any change in speed limit will need to be cognisant of the speed limit legislation that is under review. The action zone sign lettering appears too small to be read by motorists and is a non-standard shape. Signs appropriately designed to provide a clear and concise information to the target audience should be provided. Compliance with the TCD Manual should achieve this.</p>	
<p><b>Client Decision:</b> Pre-existing advisory sign, the speed limit is to be reviewed under the speed limit review programme. Current speed limit is 50km/h.</p>	
<p><b>Action Taken:</b> No action taken.</p>	

#### 4.4.15 Pavement Conditions

#### Comment

There were a few locations throughout the site where pavement defects have been identified. The pavement defects typically consist of cracking and potholes. These pavement defects are currently assessed as a nuisance; hence, this section is presented as a comment. However, prompt action is considered required so that the pavement defects don't expand and adversely affect safety within the site.



Figure 4.4-36 – Pavement defects



Figure 4.4-37 – Pavement defects



Figure 4.4-38 – Pavement defects



Figure 4.4-39 – Pavement defects

#### Recommendation:

1. Identify and promptly repair the pavement defects within the site;

<b>Probability Rating:</b>	<b>Severity Outcome Rating:</b>
The probability of a crash is N/A	Crashes are likely to be N/A
<b>Design Team Response:</b> Permanent pavement remediations are considered generally outside of the scope of this trial project, however we suggest that GDC consider this recommendation	
<b>Safety Engineer:</b>	Agree. The pavement should be managed to avoid safety issues; loss of traction, loss of stability, or with users attempting to avoid / evade defects.
<b>Client Decision:</b>	Outside of the project scope.
<b>Action Taken:</b>	Pavement will remain as is until further action is required and or considered for renewal

4.4.16 Green Surfacing Markings

Comment

While most of the driveways that cross through the bidirectional cycleway have green surfacing markings, some driveways do not have such provisions. Green surfacing markings are important delineation features that highlight the interaction with the cycleway and the potential presence of cyclists. A consistent treatment throughout the site is assessed to positively affect the safety of all users.



Figure 4.4-40 – No green surfacing through driveway



Figure 4.4-41 – No green surfacing through driveway

**Recommendation:**

1. Consider installing green surfacing through all driveways;

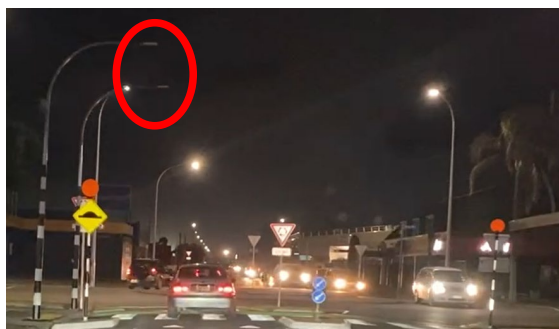
<b>Probability Rating:</b>	<b>Severity Outcome Rating:</b>
The probability of a crash is N/A	Crashes are likely to be N/A
<b>Design Team Response:</b> Green surface markings were included for these locations in the original design, however it was decided to delay their implementation as there was potential for changes to the layout in this area early in the trial. For safety and legibility, we agree that these markings should be added.	
<b>Safety Engineer:</b> Green surfacing helps highlight the presence of cyclists, and should be installed as part of a wider safety and management regime. Additional facilities should be considered if there are locations / vehicle crossings where there is elevated risk of conflict.	
<b>Client Decision:</b> Green line marking was not installed as part of an adaption to the design with the potential of the carparks being moved towards the footpath.	
<b>Action Taken:</b> Line marking remains uninstalled until further action is required	

**4.4.17 Lighting**

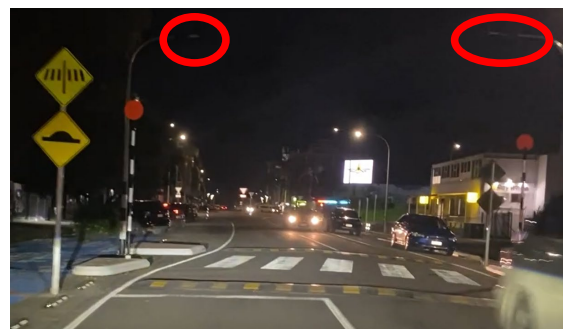
**Comment**

During the nighttime inspection, it was observed that the newly installed low-level lighting poles were not working at the pedestrian crossings on Childers Road (raised crossing) and Grey Street (zebra crossing). However, overall, the site was assessed to have good lighting levels, with other existing lighting poles in the vicinity of the pedestrian crossings being lit.

It is understood that lighting installation was being finalised at the time of the audit. This is, therefore, presented as a comment at this stage. However, it is important to highlight that the low-level lighting poles must be functional to improve lighting levels in the vicinity of the pedestrian crossings.



**Figure 4.4-42 – Low-level light not working on Childers Road**



**Figure 4.4-43 – Low-level light not working on Grey Street**

**Recommendation:**

1. Ensure that the low-level lighting poles are functional;

<b>Probability Rating:</b>		<b>Severity Outcome Rating:</b>	
The probability of a crash is N/A		Crashes are likely to be N/A	
<b>Design Team Response:</b> This is for GDC to investigate.			
<b>Safety Engineer:</b>		Agree that lighting should be installed and operating as intended, especially for pedestrian safety.	
<b>Client Decision:</b>		Eastland Network were still processing the application to turn the new lights on during the safety audit.	
<b>Action Taken:</b>		The lights are now active	



## 5 Safe System 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: (Signed on pdf)

Date: 28 August 2024

**Matheus Boaretto**, BEng (Civil), GradDipEng (Highways)  
Senior Transport Engineer, Urban Connection Limited

Signed: (Signed on pdf)

Date: 28 August 2024

**Steve James**, MET, CMEngNZ (Eng. Technician)  
Principal Safety Engineer, Urban Connection Limited

<b>Designer:</b>	Name: ..... <u>Sam Hood</u> .....	Position: <u>Transport Engineer</u>
	Signature.....  .....	Date <u>20/09/2024</u>
<b>Safety Engineer:</b>	Name: ..... <u>Glenn Connelly</u> .....	Position: <u>Senior Safety Engineer</u>
	Signature.....  .....	Date <u>16/09/2024</u>
<b>Project Manager:</b> <u>Manager</u> .....	Name: ..... <u>Lauriel Edwards</u> .....	Position: <u>Urban Area Network</u>
	Signature.....  .....	Date <u>11/09/2024</u>
<b>Action Completed:</b>	Name: ..... <u>Dave Hadfield</u> .....	Position: <u>Journeys Infrastructure</u>
Manager	Signature.....  .....	Date: <u>11/10/2024</u>

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

**Date:** .....

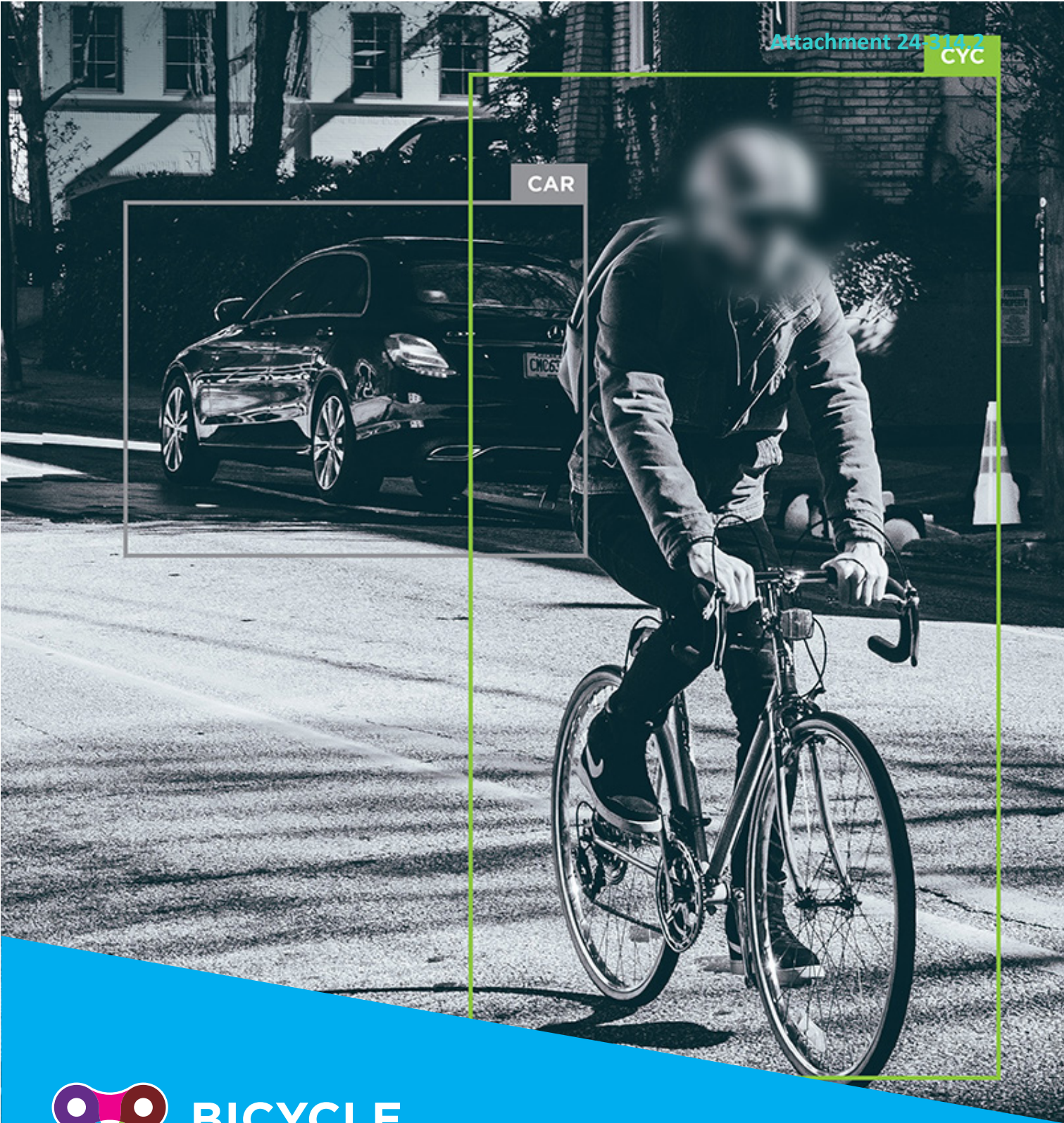
© Urban Connection Limited 2024

This document is and shall remain the property of Urban Connection Limited. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. The unauthorised use of this document in any form whatsoever is prohibited.

Grey Street SFP Post-Construction SSA\_Rev0

Document Status FINAL

Revision	Prepared by:	Reviewed by:		Approved by:		
		Name	Signature	Name	Signature	Date
0	Matheus Boaretto	Aaron Campion	(Signed on pdf)	Aaron Campion	(Signed on pdf)	28/08/2024



**BICYCLE  
NETWORK®**

# Artificial Intelligence Road Surveys (AIRS)

Gisborne District Council

AIRS Study

**Grey St, Gisborne, New Zealand**

# Table of Contents

<b>About AIRS</b>	<b>iv</b>
<b>Background - Gisborne AIRS Study</b>	<b>v</b>
<b>Survey Site 1: Kahutia St &amp; Grey St</b>	<b>1</b>
Active Traveller Movement Tracelines	2
Vehicle Movement Tracelines	4
Rider Volumes and Movements	7
Motor Vehicle Volumes and Movements	10
<b>Survey Site 2: Childers Rd &amp; Grey St</b>	<b>18</b>
Active Traveller Movement Tracelines	19
Vehicle Movement Tracelines	21
Road User Volumes and Movements	24
Car Parking Occupancy	26
<b>Survey Site 3: Grey St Pedestrian Crossing</b>	<b>27</b>
Active Traveller Movement Tracelines	28
Vehicle Movement Tracelines	30
Crossing Volumes and Movements	34

# Glossary

**AIRS** - Artificial Intelligence Road Survey

**Countline** - A line placed across a road or path in the AI software to count user volumes that pass across it.

**Countshapes** - A series of shapes drawn over a road or path in the AI software to count user volumes that pass between them and their movements.

**Traceline** - A line the AI software draws which traces individual road user's path across the field of vision.

**Conflict Event** - An incident detected using the AIRS methodology that has been viewed by Bicycle Network and judged to be a conflict between road or path users.

**Event of Interest** - An incident detected where a conflict didn't occur, but behaviour could cause risk to any user, or provides greater understanding of how the site is used.

## Acknowledgment of Country

Bicycle Network acknowledges that we are tauiwi, undertaking this project on the land of the mana whenua. We acknowledge the iwi (tribal) authorities in Tairāwhiti, Gisborne, their historical and territorial rights over the land, and their special cultural and spiritual relationship with the environment.

Bicycle Network acknowledges the Wurundjeri and Bunurong Peoples as the traditional owners of the land on which this report was written, and pay our respects to their culture and elders, past and present, and their ongoing connection to land, waters and community.

# About AIRS

## Summary

Bicycle Network's Artificial Intelligence Road Survey (AIRS) program uses AI technology to detect and classify moving objects entering the camera's field of vision.

We identify and categorise nine road user categories including pedestrians, bicycles, motorcycles, cars, taxis, van/ute, bus and two types of articulate.

## Aims and purposes

AIRS is designed to inform councils, transport groups and planners of the travel behaviour in urban spaces.

The program aims to answer some critical questions:

- Which user types are occupying the road, how many and at what times?
- What are the directions of movement? And what exact path did they take?

## Methodology

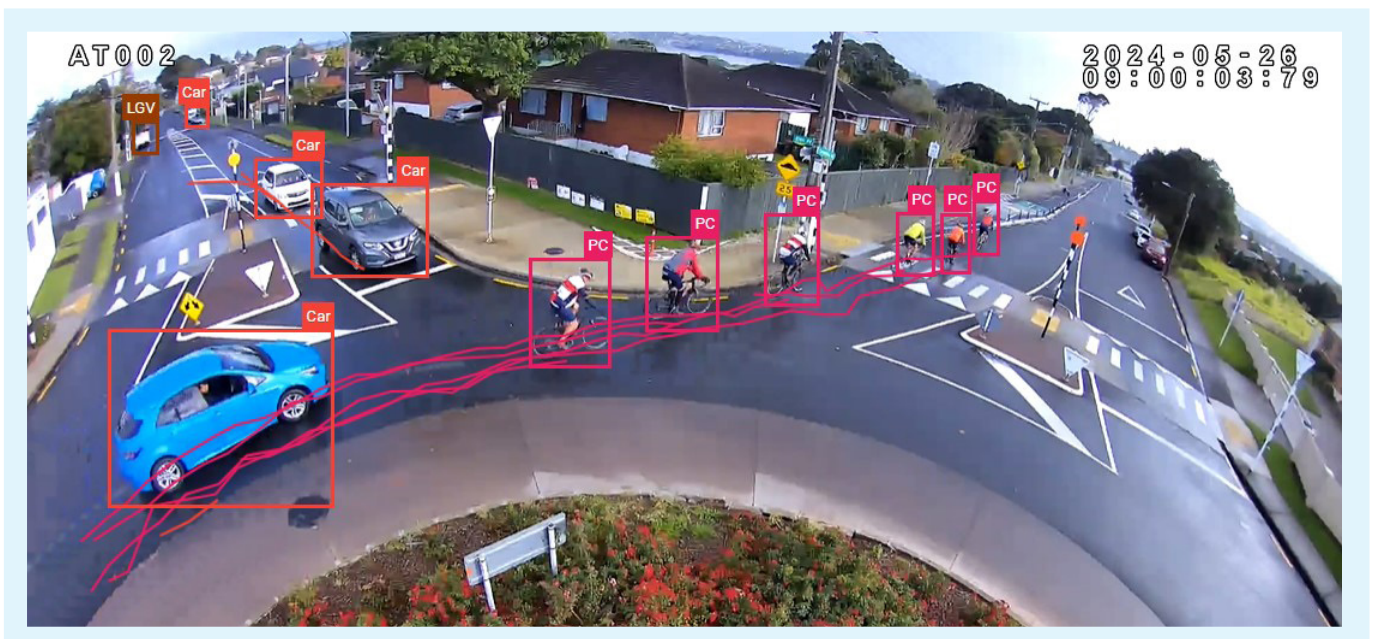


We use high-definition cameras to collect footage from sites of interest (step 1). The footage is then imported into an online portal that applies object detection AI to identify and classify road users (step 2).

Following a series of standard error-checking and quality control measures, we conduct a spatial analysis of the road (step 3).

Road user volumes, flow and directionality are extracted by placing a digital 'countline' or 'count shape' over the footage and the software counts all road user passing through or between those line or shapes.

Road users paths are traced ('tracelines'), which offers a spatial understanding of how road users interact in this space.



# Background - Gisborne AIRS Study

## Background

Bicycle Network was engaged by Gisborne District Council to undertake Artificial Intelligence Road Surveys (AIRS) analysis of Grey Street in Gisborne, (locations pictured in Image 1 below).

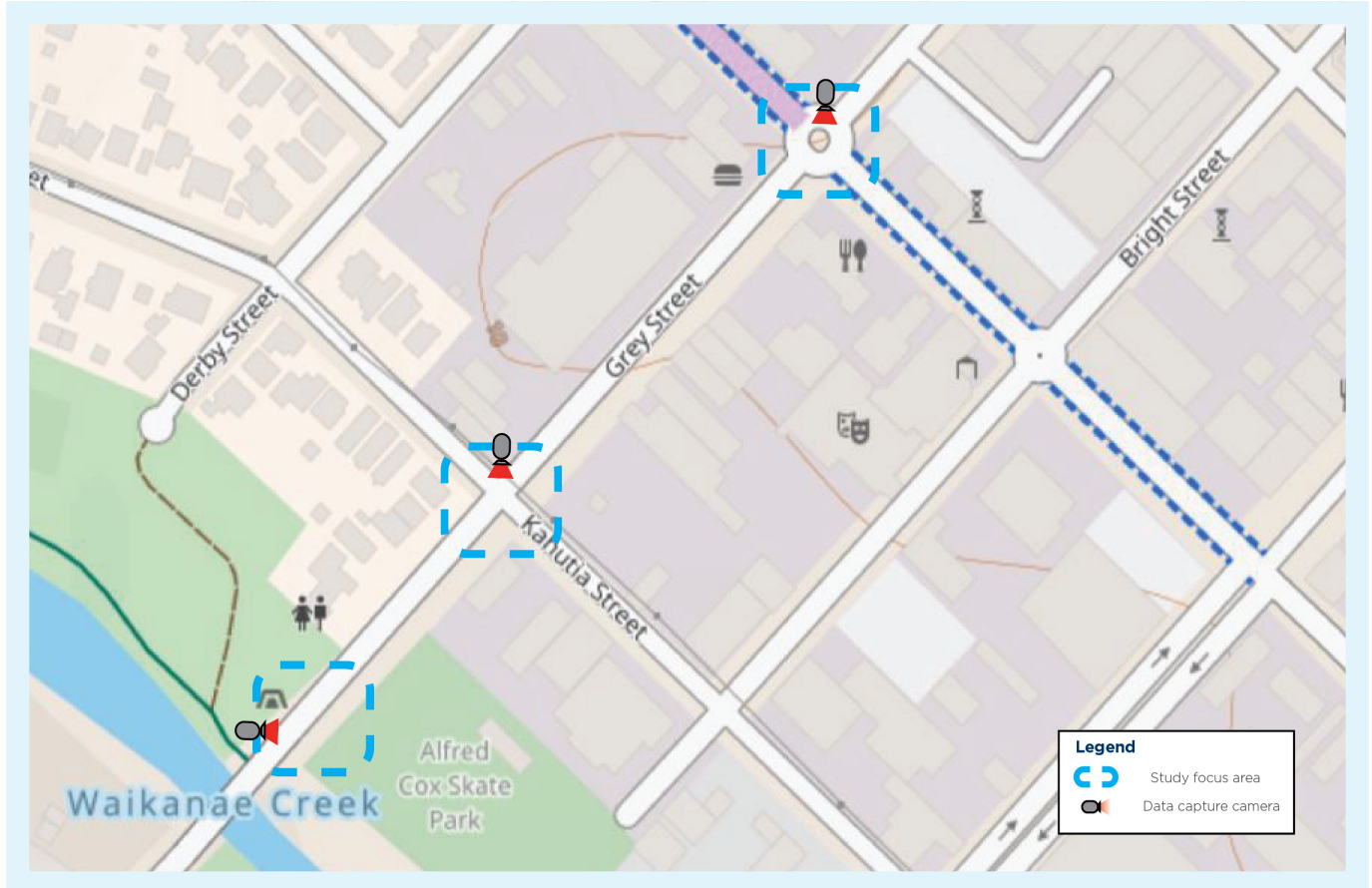


Image 1. Site locations of AIRS study along Grey St, at Kahutia St, Childers Rd and a pedestrian crossing near Alfred Cox skatepark.

## Survey Aims

The survey was conducted across one week in August 2024, to understand travel volumes, patterns, and the use of the cycleway, footpaths and roads along Grey St.

The AIRS analysis was carried out to provide user tracelines, volumes, directionality and path types.

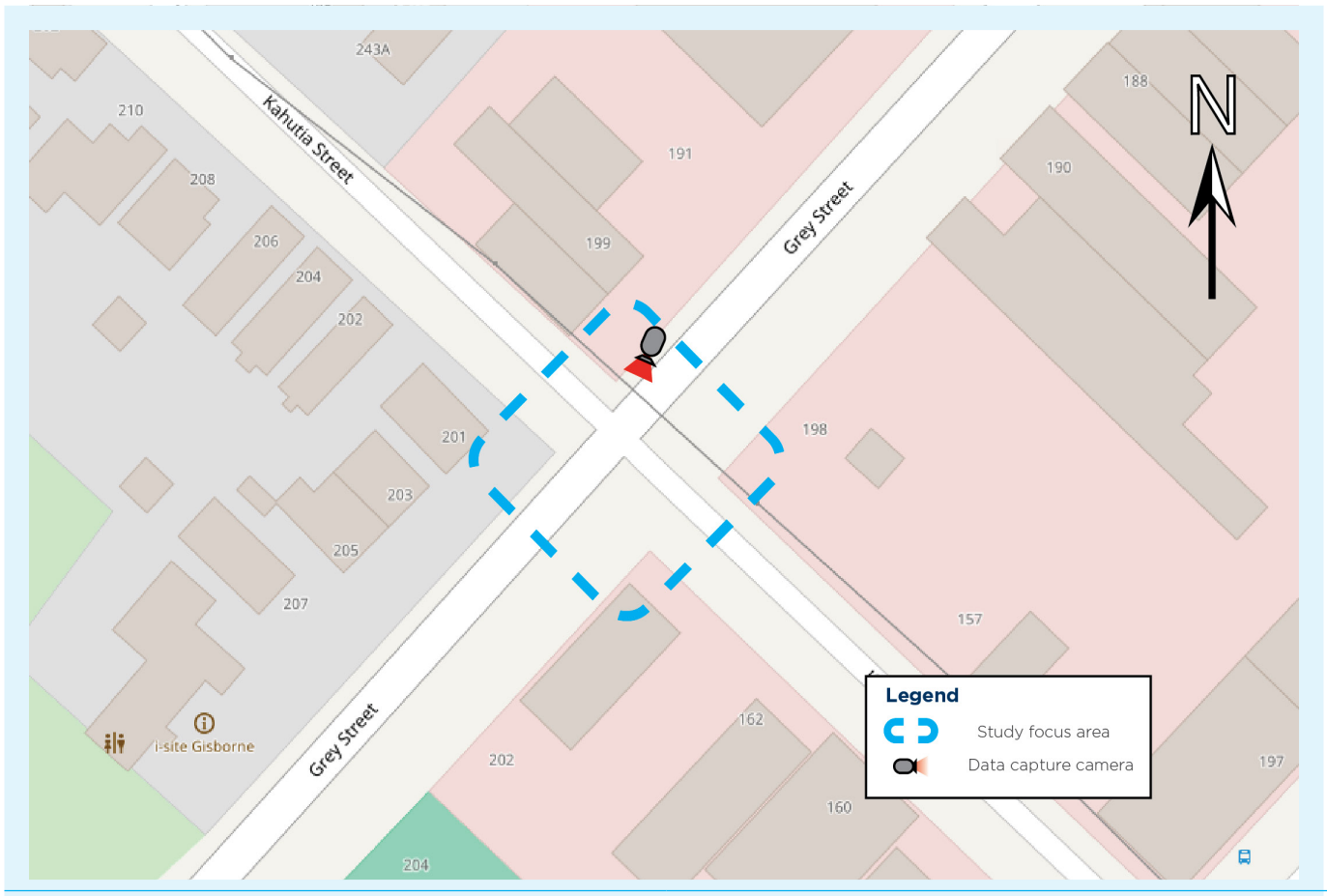
A car park occupancy analysis was carried out at Childers Rd to understand the occupancy percentage and turnover of the realigned car spaces on Grey St.

A conflict analysis of the pedestrian crossing was also conducted to identify any near-miss incidents between users and any other behaviour or patterns that could be risky.

\*Note on supplied footage

The dates and times of the footage supplied to Bicycle Network were incorrect and the data has been adjusted to reflect the correct times.

# Survey Site 1: Kahutia St & Grey St



## Location:

Kahutia Street and Grey Street, Gisborne, New Zealand, 4010

## Coordinates:

-38.667175, 178.021097

## Dates and Time:

Friday 23rd August to Sunday 25th August

7:00am to 6:00pm each day\*

## Weather conditions:

Max temp: 19 °C

Min temp 2.9 °C

Total rainfall: 0 mm (across 3 survey days):

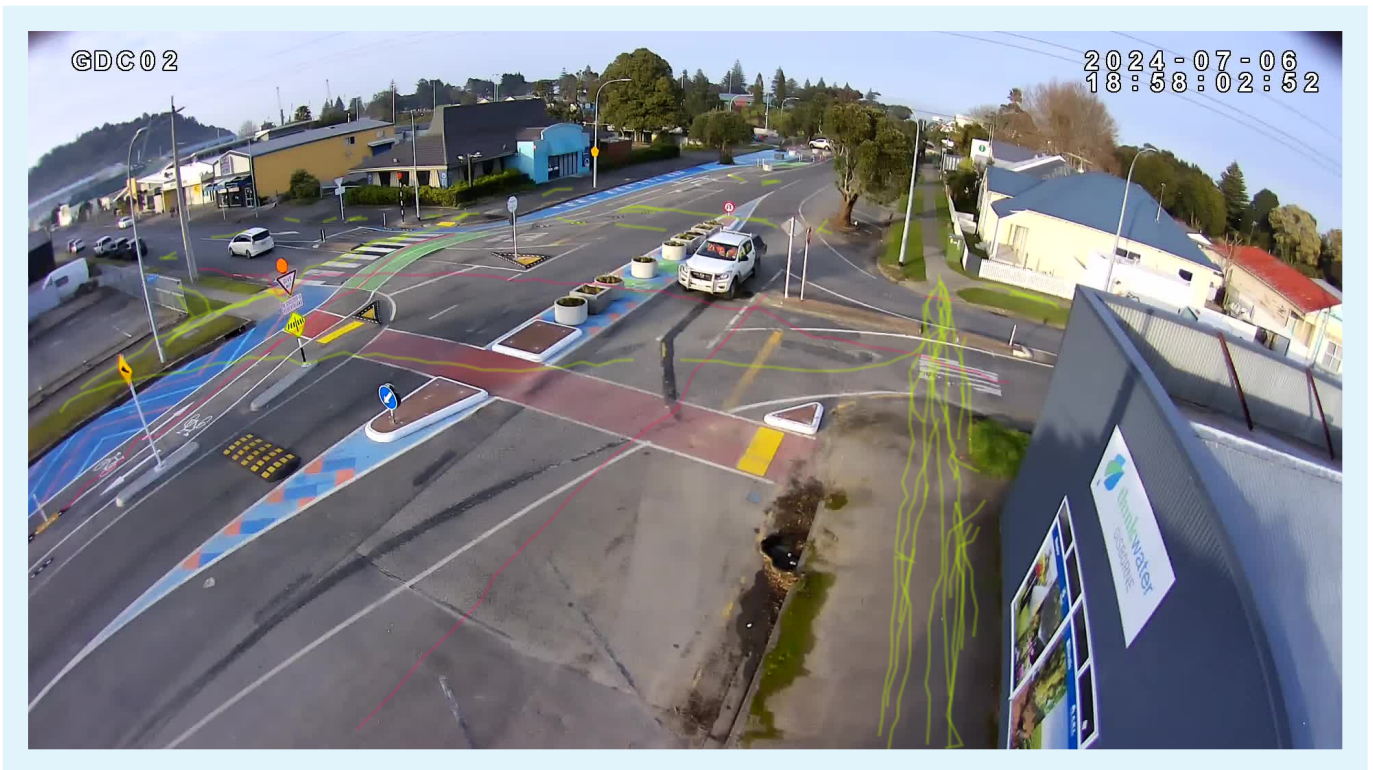
## Survey Site Aims:

- To determine volumes and movements of users (riders, pedestrians and vehicles) and what path type (cycleway, road, footpath) they are travelling on.
- To investigate and analyse potential conflicts between vehicles and vulnerable road users (bike riders and pedestrians), or between riders and pedestrians on paths.



# Active Traveller Movement Tracelines

## Weekday Morning - Active Traveller Movement Traceline Paths



Path tracelines showing the path of pedestrians (yellow lines) and bike riders (pink lines), from 8:00am - 9:00am on Friday 23rd August, 2024.

## Weekday Afternoon - Active Traveller Movement Traceline Paths



Path tracelines showing the path of pedestrians (yellow lines) and bike riders (pink lines), from 3:00pm - 4:00pm on Friday 23rd August, 2024.

# Active Traveller Movement Tracelines

## Weekend Morning - Active Traveller Movement Traceline Paths



Path tracelines showing the path of pedestrians (yellow lines) and bike riders (pink lines), from 10:00am - 11:00am on Saturday 24th August, 2024.

## Weekend Afternoon - Active Traveller Movement Traceline Paths



Path tracelines showing the path of pedestrians (yellow lines) and bike riders (pink lines), from 3:00pm - 4:00pm on Saturday 24th August, 2024.

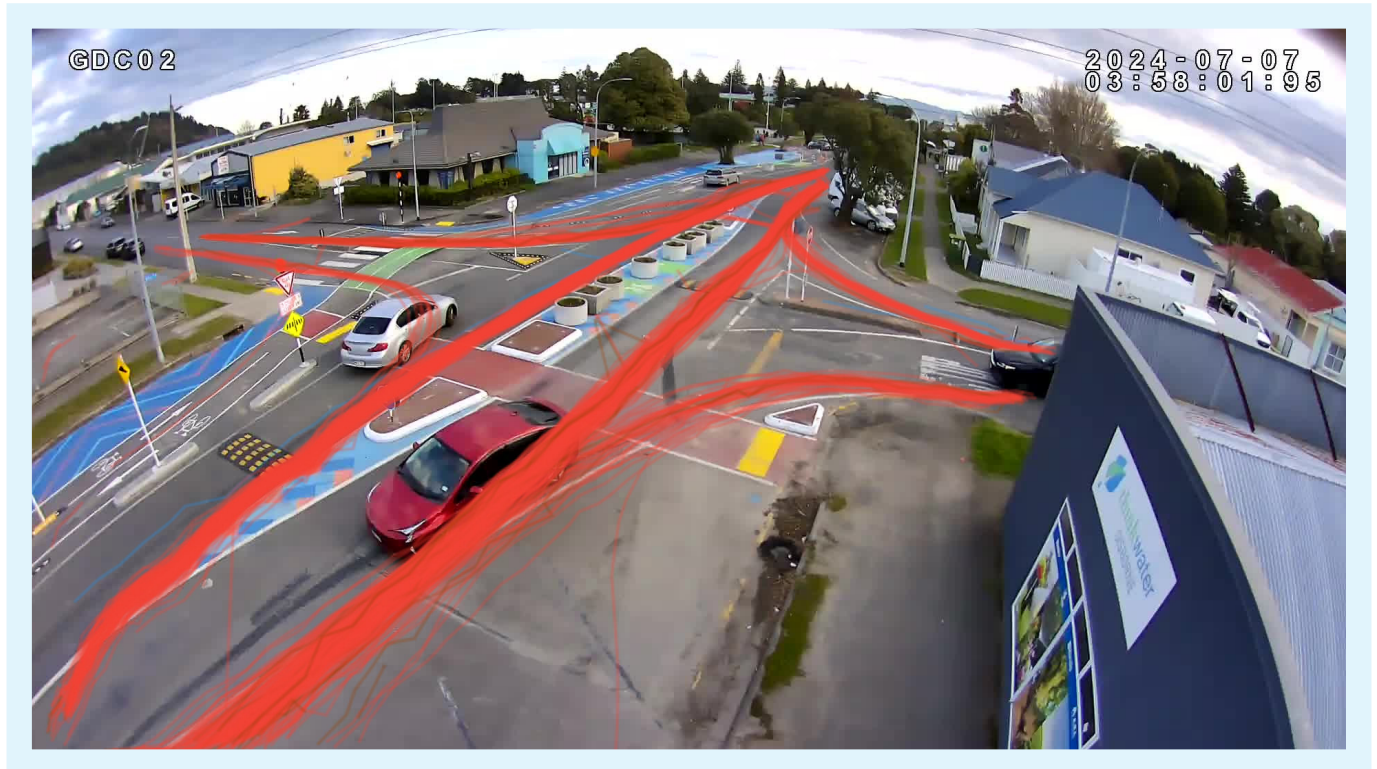
# Vehicle Movement Tracelines

## Weekday Morning - Small Vehicle Movement Traceline Paths



Path tracelines showing the path of motorcycles (blue lines), cars (red lines), and LGVs (brown lines) from 8:00am - 9:00am on Friday 23rd August 2024.

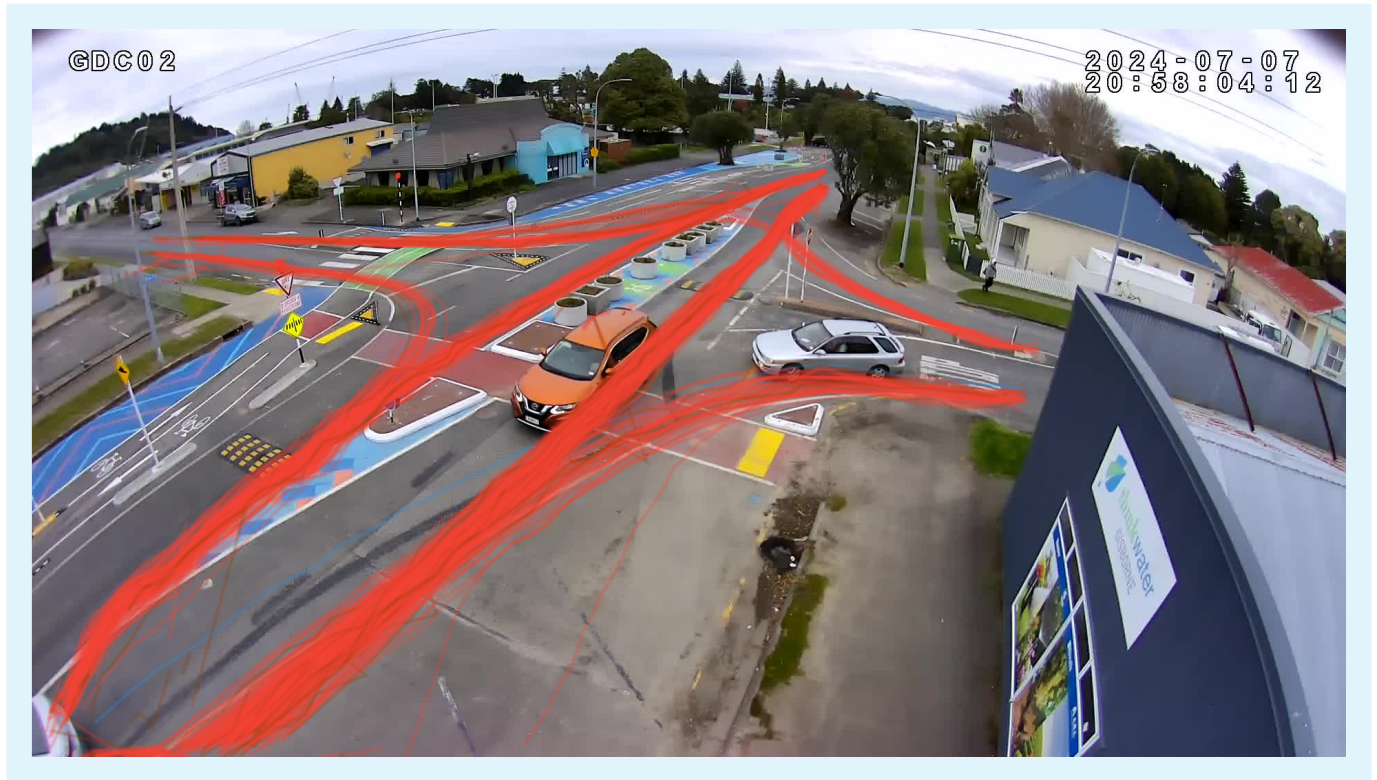
## Weekday Evening - Small Vehicle Movement Traceline Paths



Path tracelines showing the path of motorcycles (blue lines), cars (red lines), and LGVs (brown lines) from 5:00pm - 6:00pm on Friday 23rd August 2024.

# Vehicle Movement Tracelines

## Weekend - Small Vehicle Movement Traceline Paths



Path tracelines showing the path of motorcycles (blue lines), cars (red lines), and LGVs (brown lines) from 10:00am - 11:00am on Saturday 24th August, 2024.

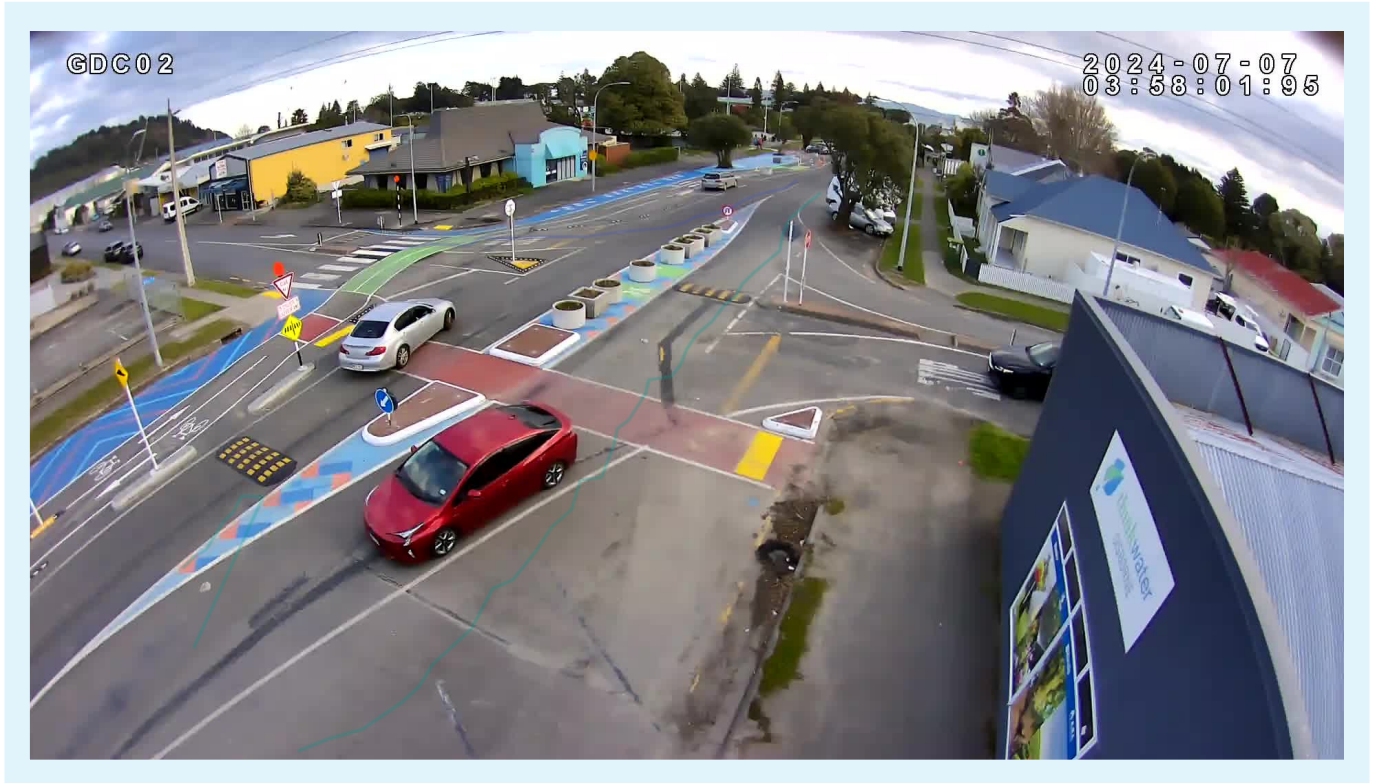
## Weekday Morning - Large Vehicle Movement Traceline Paths



Path tracelines showing the path of buses (blue lines), box trucks (aqua lines), and semi-trailers (purple lines) from 8:00am - 9:00am on Friday 23rd August 2024.

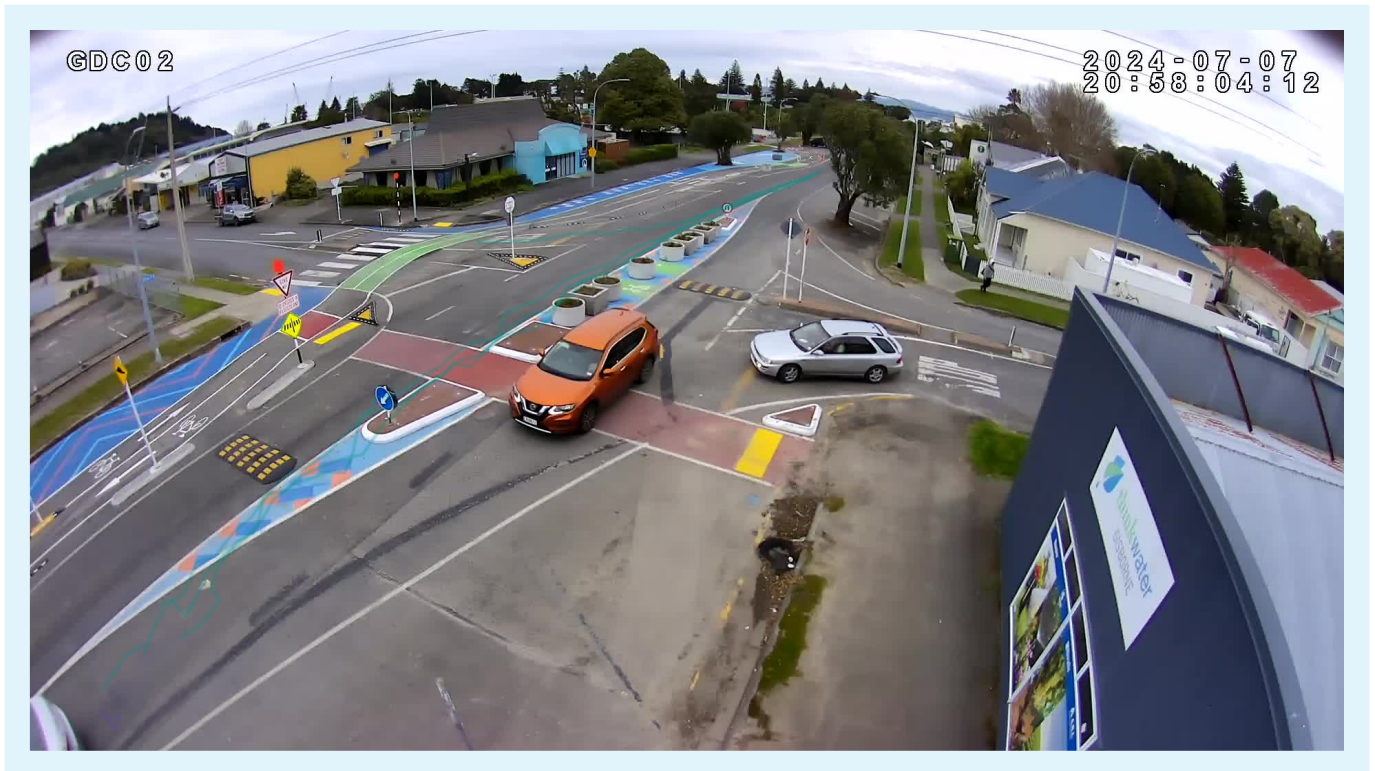
# Vehicle Movement Tracelines

## Weekday Evening - Large Vehicle Movement Traceline Paths



Path tracelines showing the path of buses (blue lines), box trucks (aqua lines), and semi-trailers (purple lines) from 5:00pm - 6:00pm on Friday 23rd August 2024.

## Weekend - Large Vehicle Movements - Traceline Paths



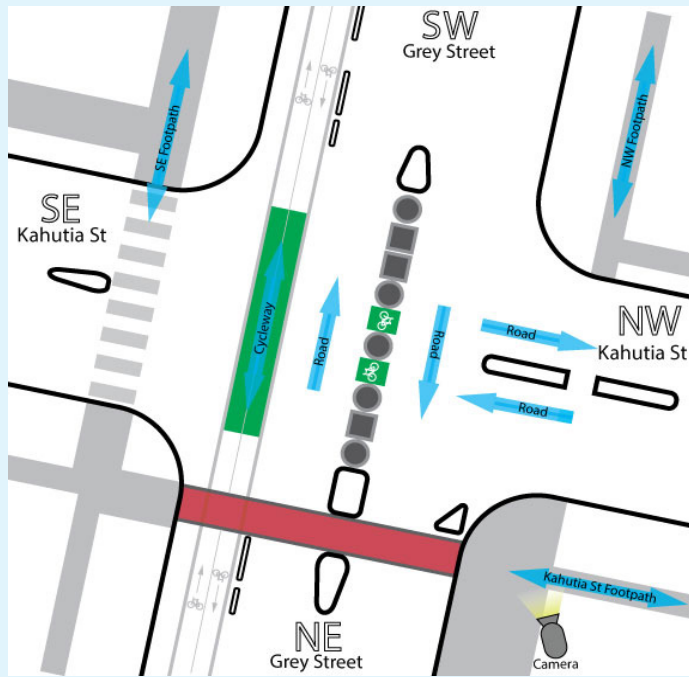
Path tracelines showing the path of buses (blue lines), box trucks (aqua lines), and semi-trailers (purple lines) from 10:00am - 11:00am on Saturday 24th August, 2024.

# Rider Volumes and Movements

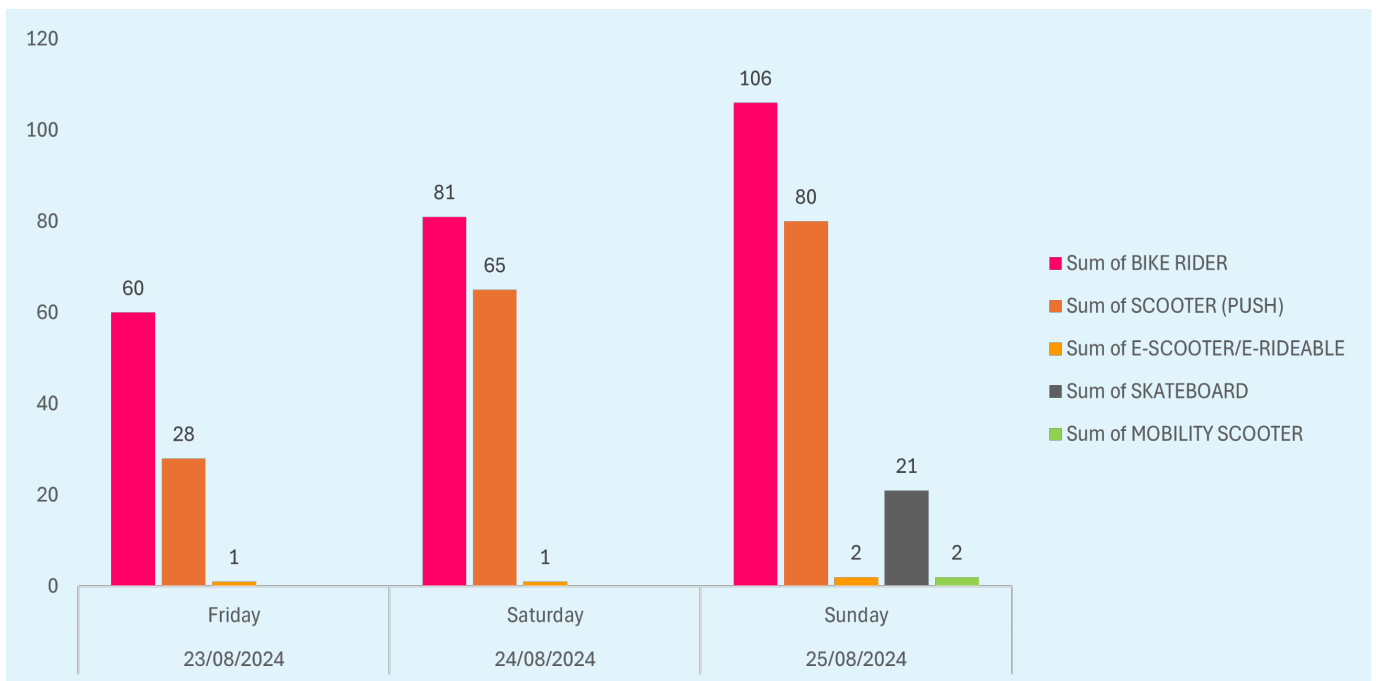
## Rider Data Collection Methodology

To extract data from the AI Software, we have placed digital 'count lines' over the footage. The AI Software automatically detects and classifies the type of user and counts them if they pass over the lines. At times, a manual analysis was required due to the AIRS software not detecting riders accurately.

Each path type is displayed in the graphic below by the blue arrows. Each rider was counted once as they passed through the site. The volumes are contained in the graphs on the following pages.



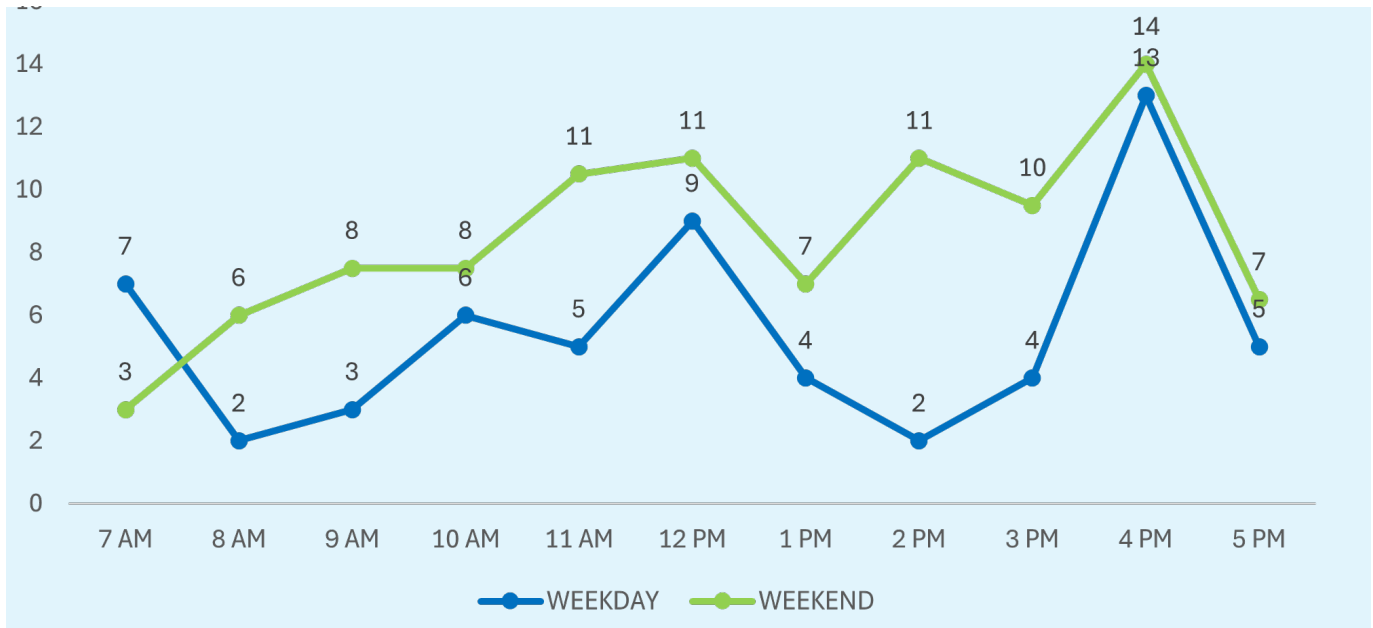
## Total Daily Volumes of Riders - All Movements



Total volume of riders travelling through the Grey St/Kahutia St intersection for each survey day (7:00am - 5:00pm), categorised by user-type.

# Rider Volumes and Movements

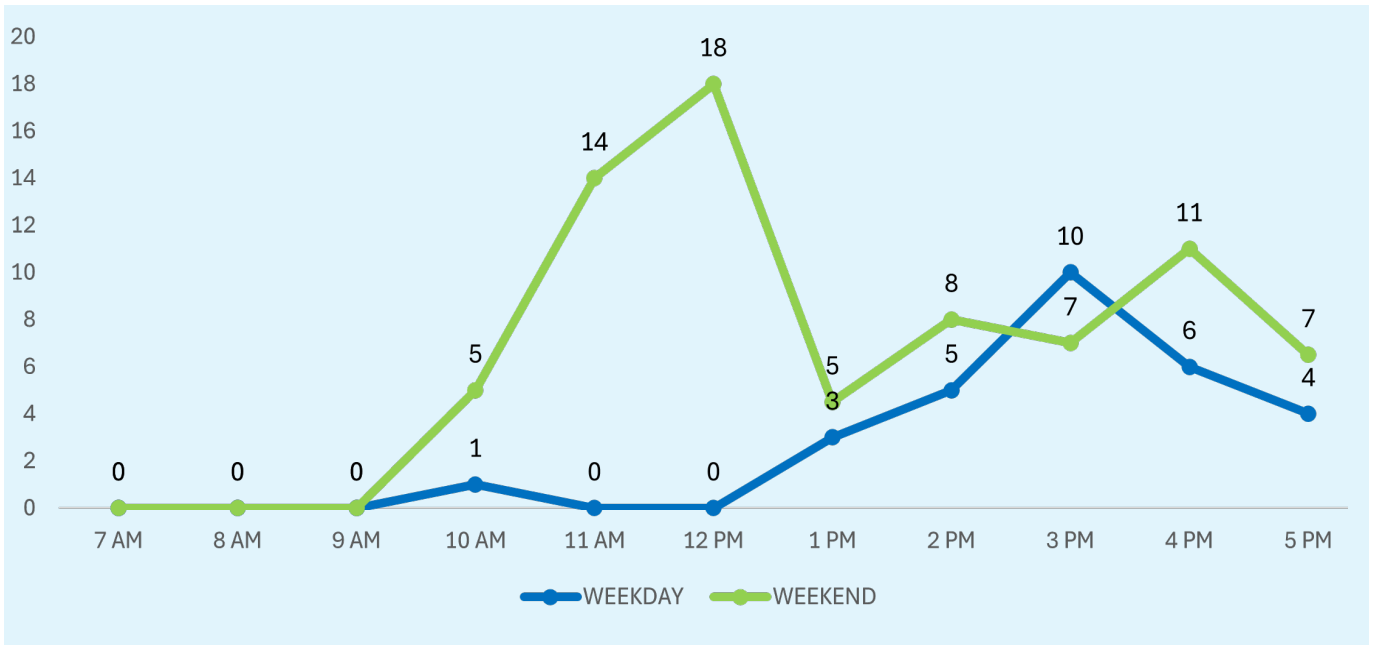
## Hourly Bike Rider Volumes



Hourly volumes of bike riders during the survey period on a weekday (Friday 23rd August), compared to an average weekend day (average of the 2 weekend days studied).

- The weekday has three main peaks of bike riders:
  - The first peak from 7:00am - 8:00am (7 riders an hour).
  - A second peak from 12:00pm - 1:00pm (9 riders an hour).
  - A third (and the largest) peak from 4:00pm - 5:00pm (13 riders an hour).
- On weekend days, bike rider volumes peak from 4:00pm - 5:00pm

## Hourly Scooter (Push and E-Scooter) Volumes

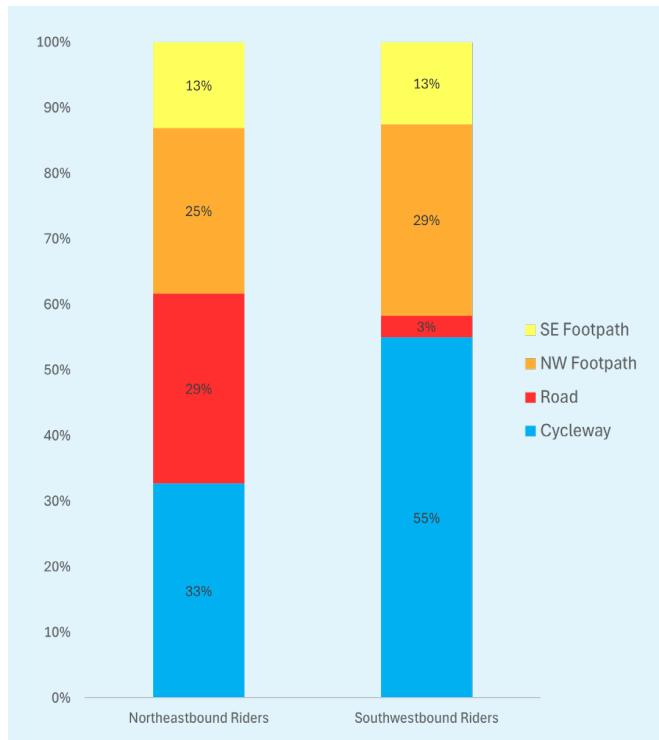


Hourly volumes of scooter (push) riders during the survey period on a weekday (Friday 23rd August), compared to an average weekend day (average of the 2 weekend days studied).

- Weekdays have a uni-modal peak of bike riders from 3:00pm - 4:00pm, which coincides with school finishing.
- On weekend days, scooter rider volumes peak from 12:00pm - 1:00pm (18 riders).

# Rider Volumes and Movements

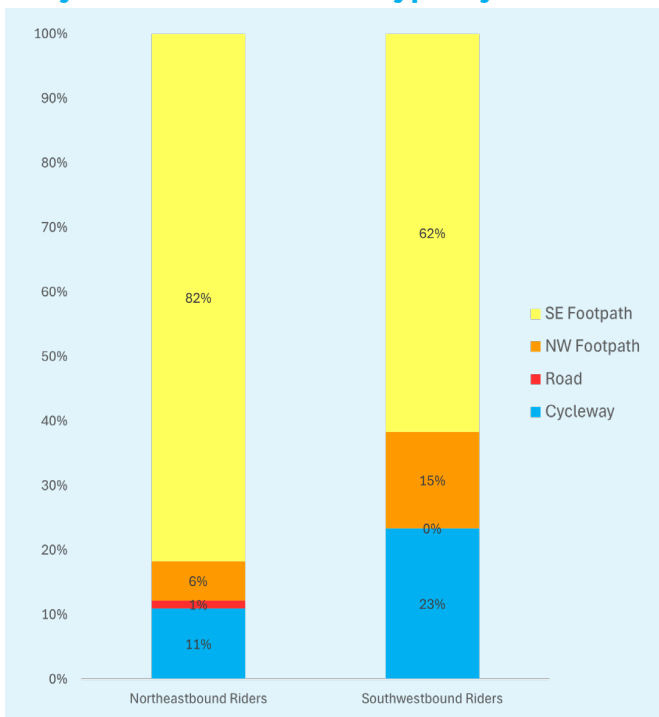
## Grey St Bike Rider Path-Type by Direction



The percentage of northeastbound bike riders using each path type on Grey Street compared to the percentage of southwestbound riders (towards the skatepark) using each path type.

- A significantly greater proportion of southwestbound riders use the cycleway (55%) compared to northeastbound riders (33%).
  - This difference could be reflected by the bidirectional cycleway being on the “correct” (left) side for southwestbound riders, but on the “wrong” (right) side for northeastriders.
- A significantly greater proportion of northeastbound riders use the road (29%) compared to northbound riders (3%).
  - Again, this difference could possibly be attributed to the absence of a cycleway on the left of the road for southbound riders, meaning riders need to cross traffic on the road to get to the bidirectional cycleway.
- The volume of bike riders on the footpath is similar for both directions of travel. This high percentage of riders on the footpath is likely partly due to the nearby skate park and associated high proportion of children.

## Grey St Bike Rider Path-Type by Direction



The percentage of northeastbound bike riders using each path type on Grey Street compared to the percentage of southwestbound riders (towards the skatepark) using each path type.

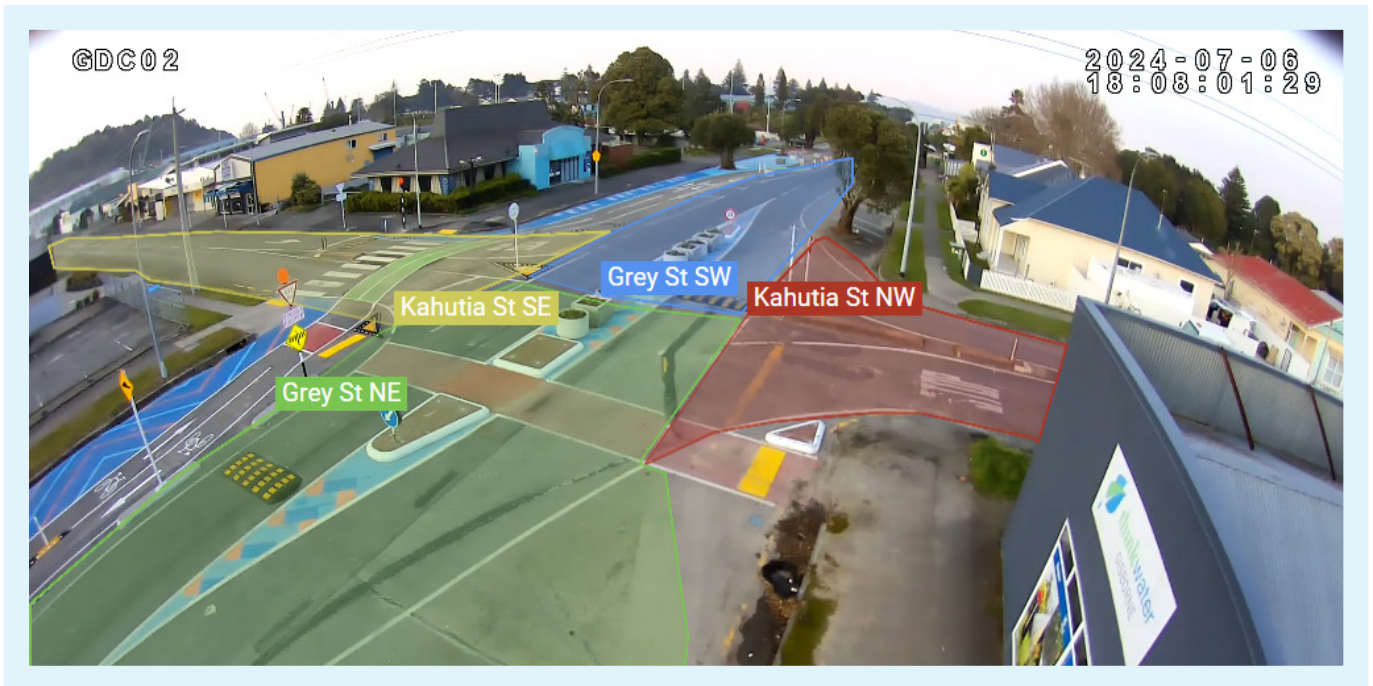
- A greater proportion of southwestbound scooter riders use the cycleway (23%) compared to northeastbound riders (11%).
- The majority of scooters rode on the southeast footpath (71%), which is the footpath on the side of the skate park.
- Only one scooter was recorded riding on the road. This was an e-scooter.



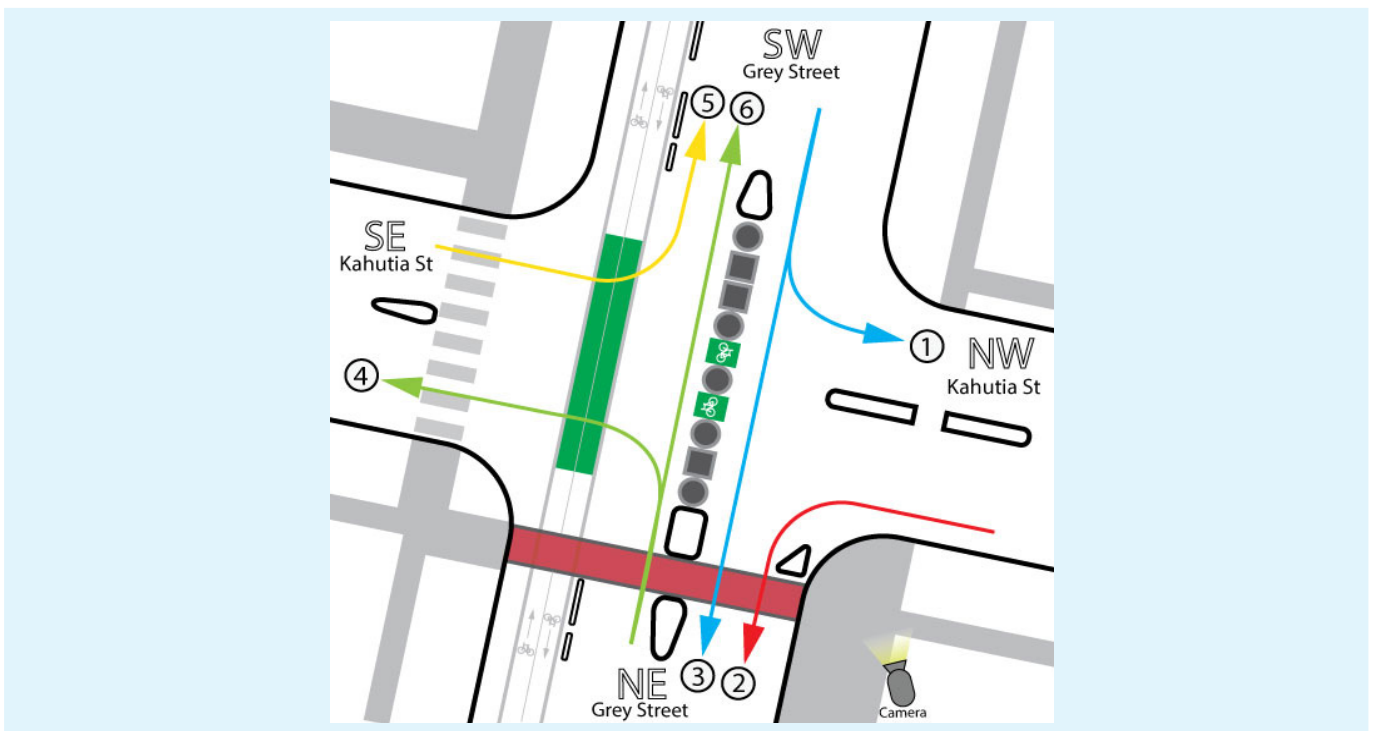
# Motor Vehicle Volumes and Movements

## Motor Vehicle Data Collection Methodology

To extract data from the AI Software, we have placed digital 'count shapes' over the footage. The AI Software automatically detects and classifies the type of user and counts them if they pass between two shapes. This allows us to study all possible movements by all user types.



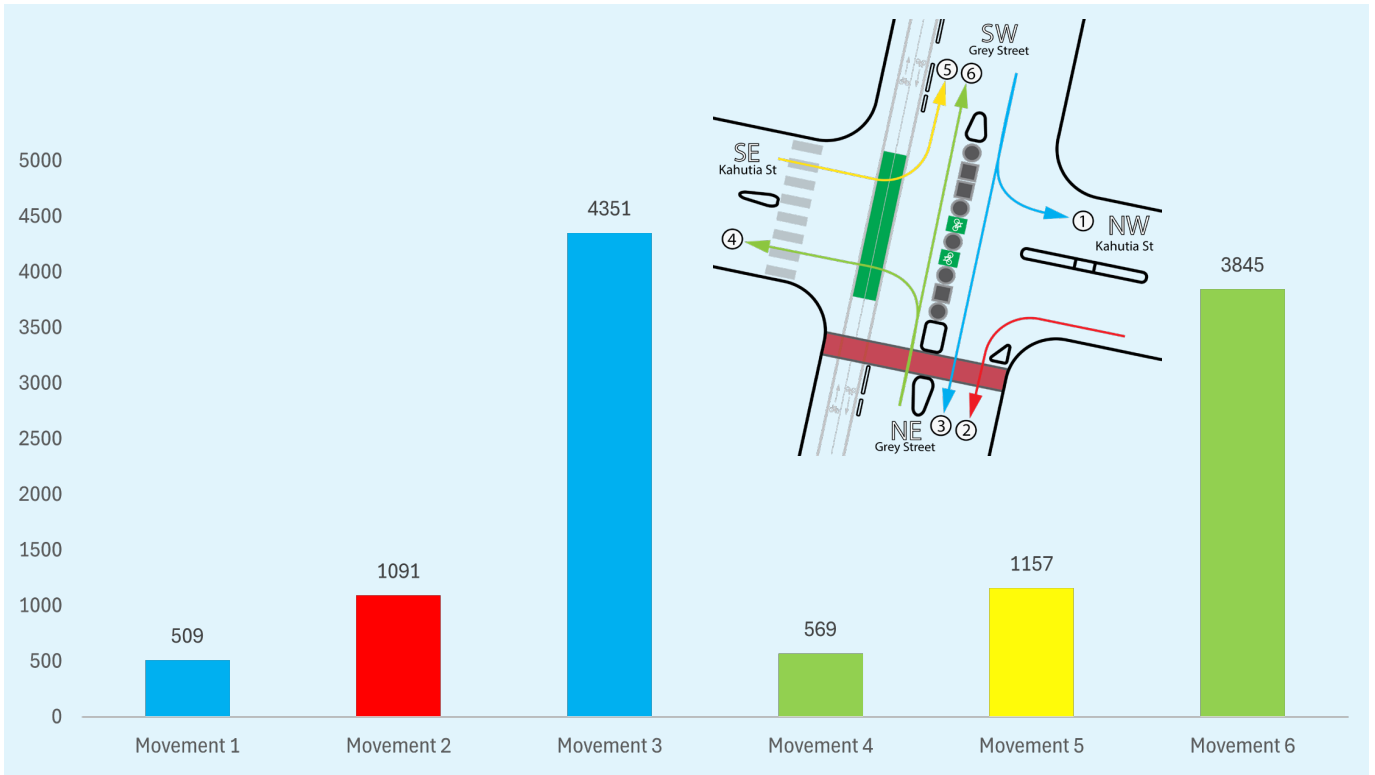
Above is a screenshot of how these count shapes have been created in the AI Software to extract the relevant data. Each movement studied has a Movement Label.



Each possible movement (movements between Movement Labels) has been translated into a 'Movement ID' and is displayed as a number in the graphic above. The Movement IDs relate to the road user volumes contained in the data graphs on the following page.

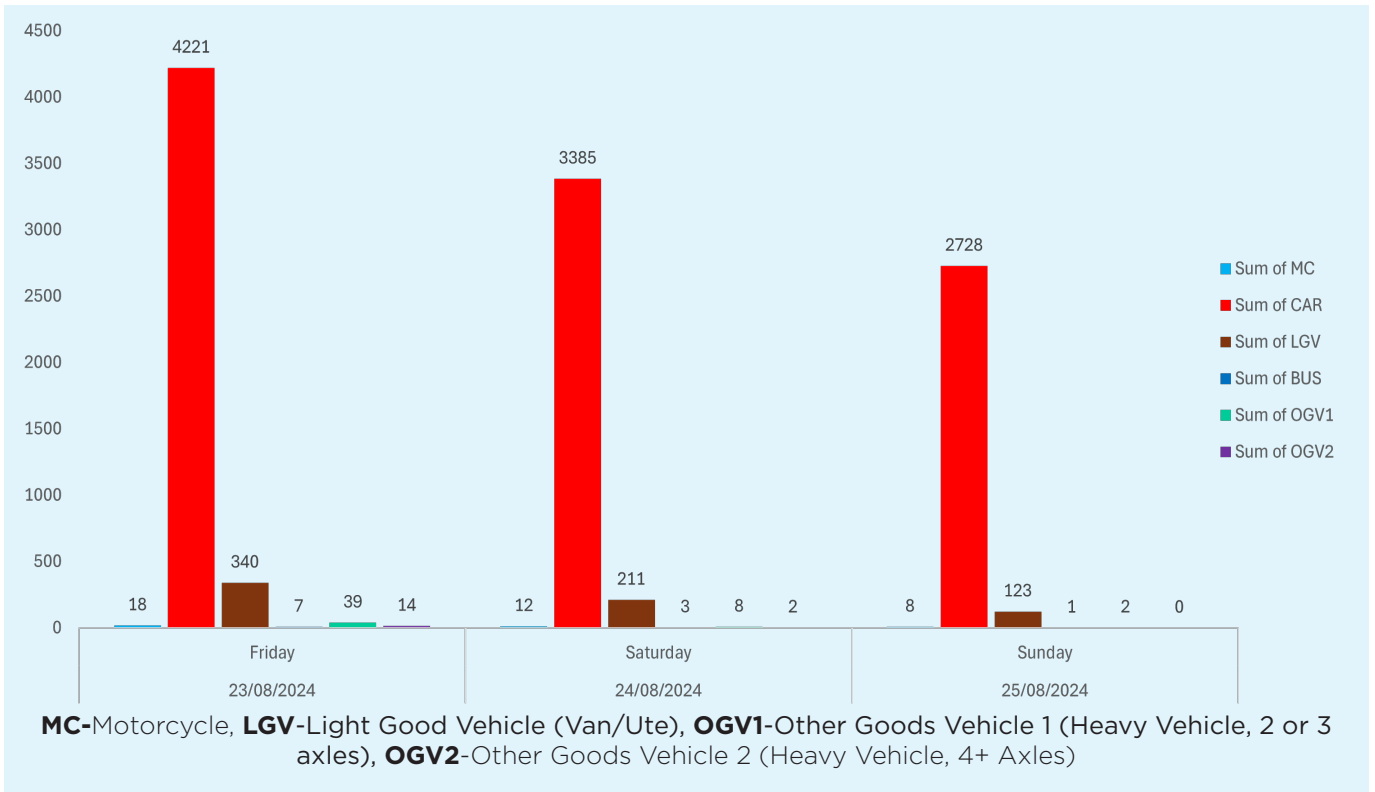
# Motor Vehicle Volumes and Movements

## Total Volumes of Motor Vehicles by Movement ID - Entire Survey Period



Total volume of motor vehicles passing through the Grey St and Kahutia St Intersection for all three survey days (7:00am - 5:00pm), categorised by movement ID.

## Daily Volumes of Motor Vehicles by User Type

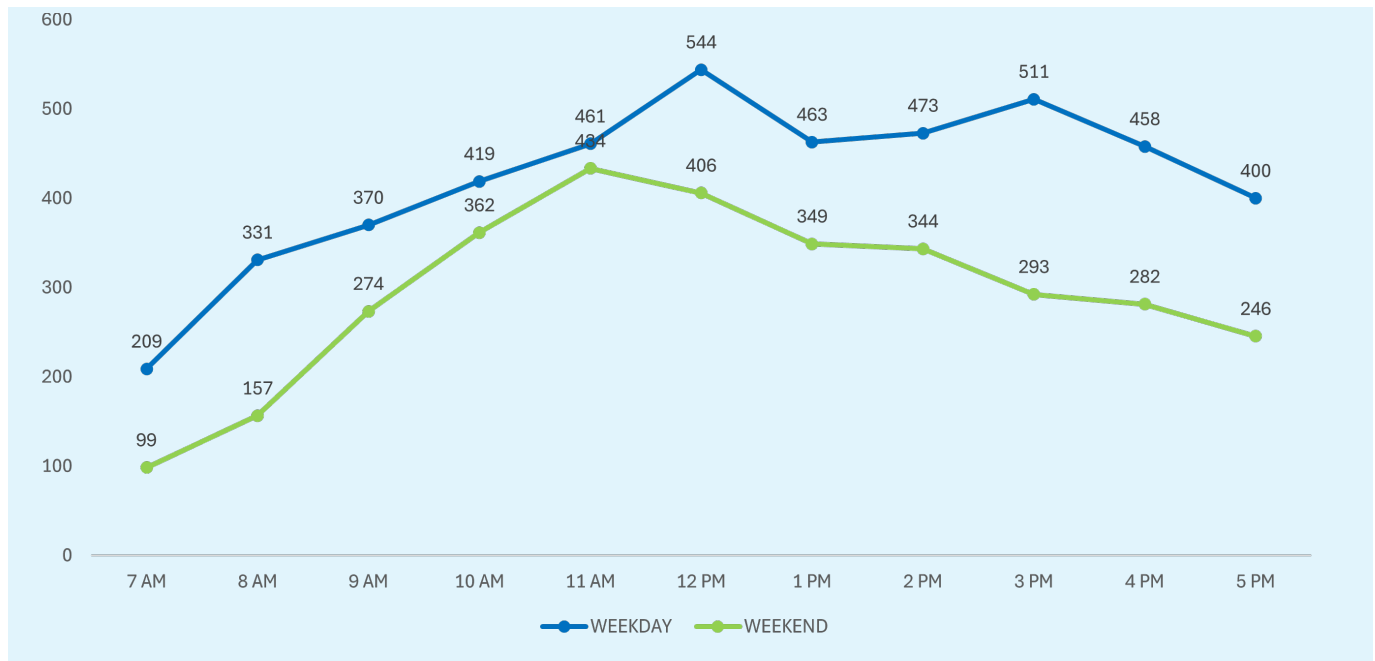


Total volume of motor vehicles passing through the Grey St and Kahutia St Intersection each survey day (7:00am - 5:00pm), categorised by user type.

\*For greater detail of the data table, please open the accompanying Excel Worksheet.

# Motor Vehicle Volumes and Movements

## Hourly Motor Vehicle Volumes



Average hourly volumes of motor vehicles passing through the Grey St and Kahutia St Intersection on a weekday compared to a weekend day. Weekday volumes are from Friday 23rd August and weekend volumes an average of the 2 weekend days studied.

# Illegal Manouevres - Motor Vehicles

## Background

The Kahutia Street/Grey Street intersection is left-hand turn only. Concrete planter boxes have been used to prevent through-traffic on Kahutia Street and right-hand turns. Despite the “no U-turn” and “no right-hand turn” signs, some motor vehicles still complete these movements.

## Methodology

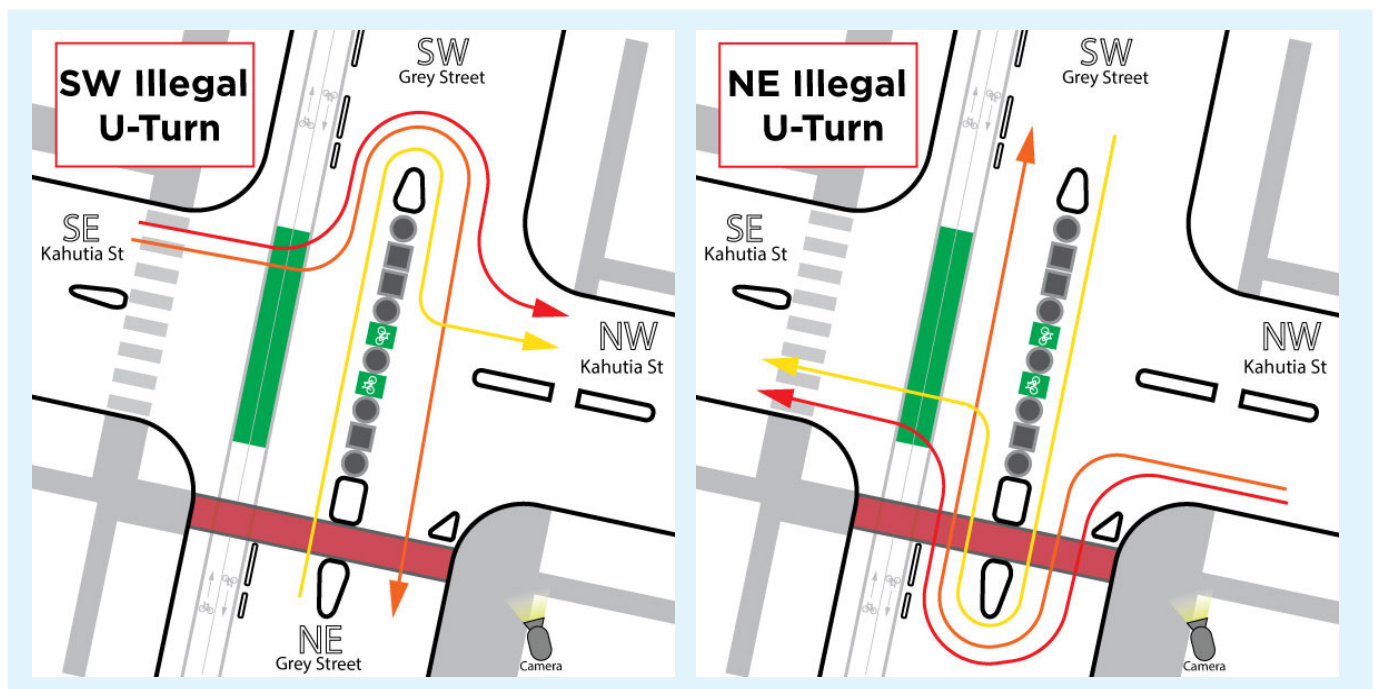
Video footage from each survey day was watched by Bicycle Network and each illegal manouevre manually counted. This data was used to create the graphs on the following pages.

Motor-vehicle “illegal manouevres” were classified into three main categories;

- **U-turns:**
  - Southwest side.
  - Northeast side.
- **Right-hand turns** (which involve the vehicle driving on the wrong (right-hand) side of the road to complete the turn).
- **Motor vehicles in the cycleway.** Some instances of this were due to driver confusion of the new street layout, and others a result of completing a U-turn and not having enough road space to complete the turn (so would enter cycleway).

## U-Turn Movements

The side of the U-turn (either southwest or northeast) was recorded for each occurrence. The graphics below show the movement paths of these two classifications of U-turn.



Illegal U-turn movements.

# Illegal Manouevres - Motor Vehicles

## Right-Turn Movements

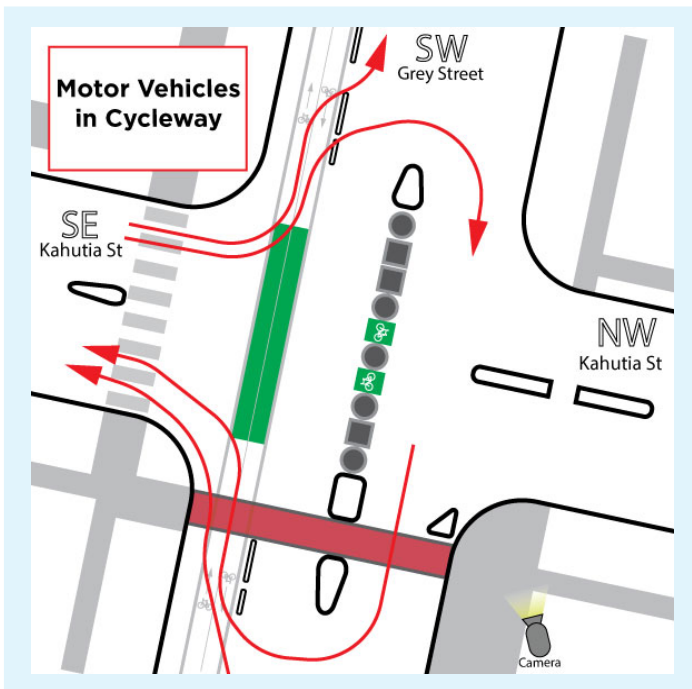
The graphic below shows the movement paths of illegal right-hand turns recorded.



*Illegal right-hand turn movements.*

## Motor Vehicles Travelling in the Cycleway Movements

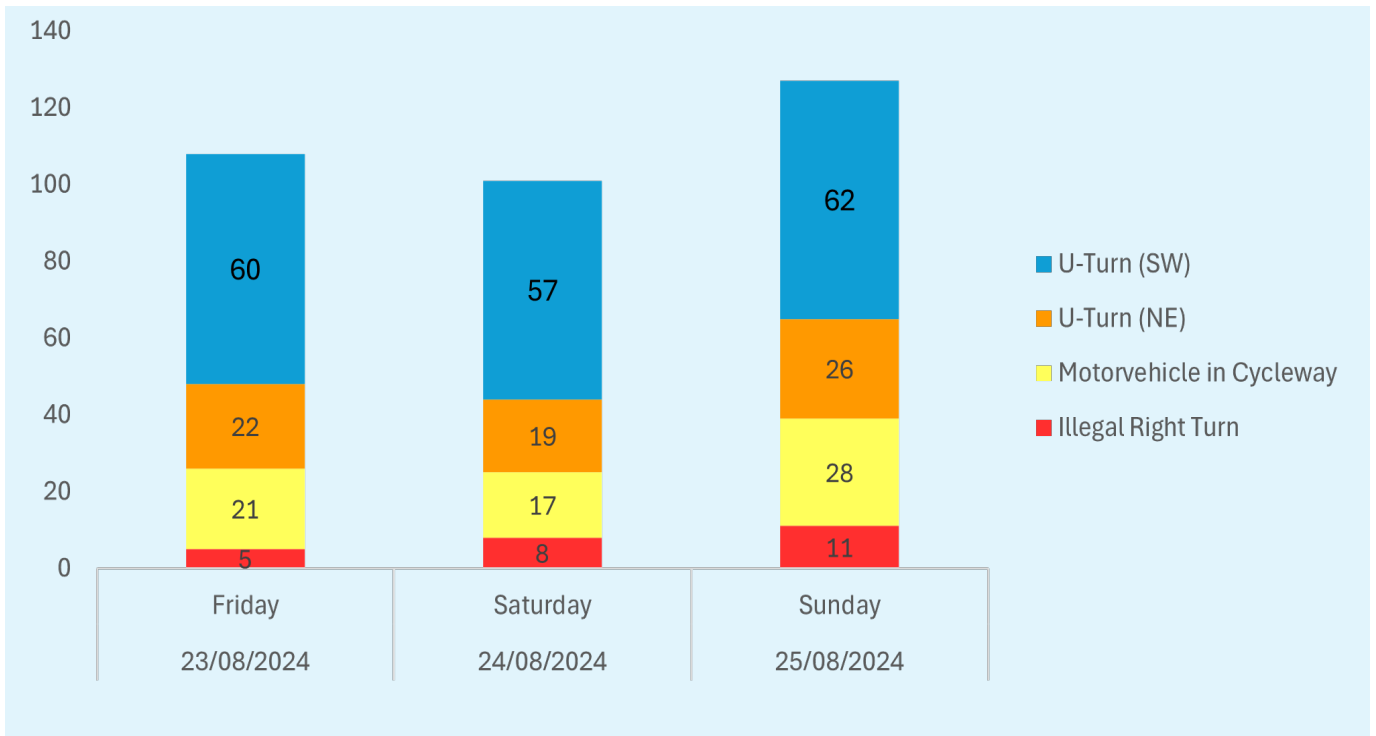
The graphic below shows the movement paths of motor vehicles travelling in the cycleway.



*Example movements of motor vehicles driving in the cycleway.*

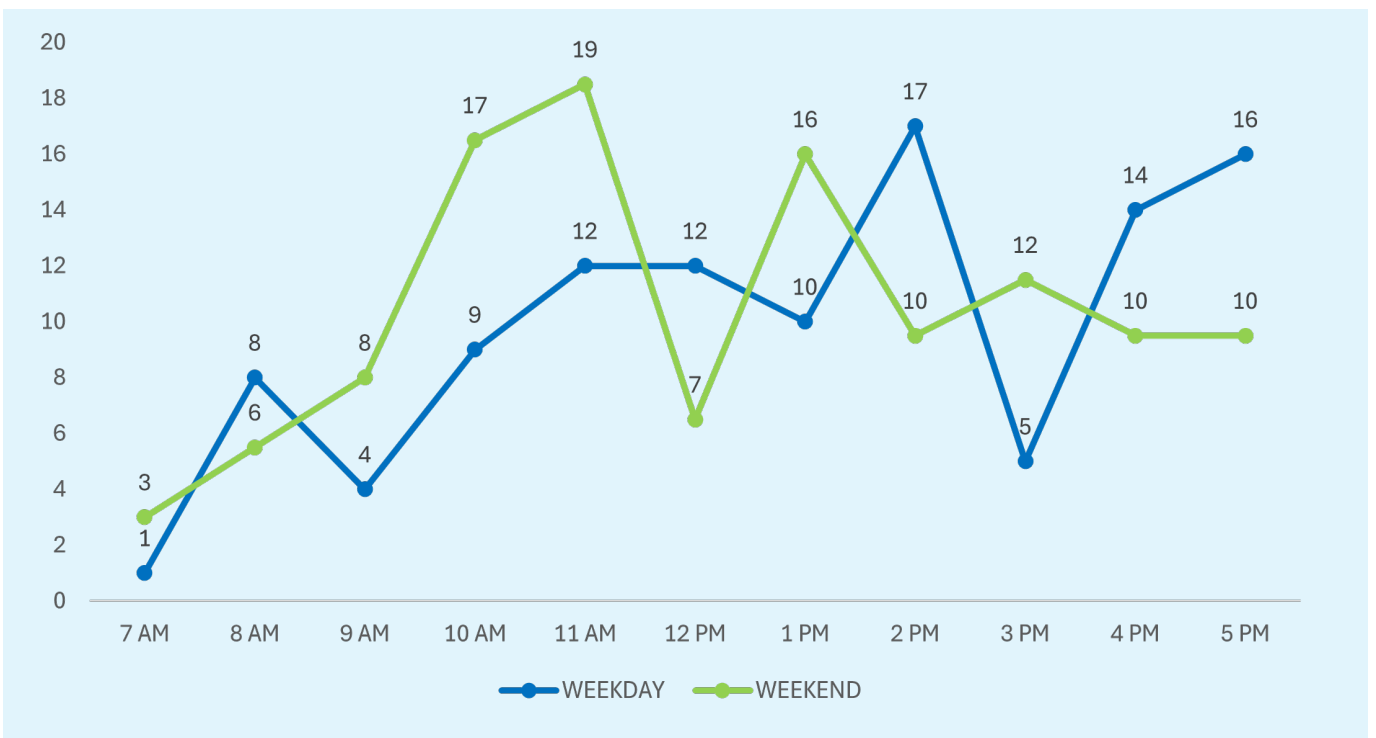
# Illegal Manouevres - Motor Vehicles

## Total Daily Volumes of Illegal Motor Vehicle Movements



Total volume of motor vehicles completing an illegal movement while travelling through the Grey St/Kahutia St intersection for each survey day (7:00am - 5:00pm), categorised by movement type. Note that some vehicles were counted twice, completing a U-turn and travelling in the cycleway.

## Hourly Volume of Illegal Motor Vehicle Movements



Average hourly volumes of motor vehicles completing illegal movements, passing through the Grey St and Kahutia St Intersection on a weekday compared to a weekend day. Weekday volumes are from Friday 23rd August and weekend volumes an average of the 2 weekend days studied.

# Illegal Manouevres and Events of Interest

Examples of illegal manouevres performed by drivers, or other events of interest were clipped as videos and can be found in the “Video Clips” File along with this report. These videos are described in the table below. Note that these video clips are just a sample and do not include each occurrence of an illegal manouevre.

Table 1. Illegal manouevre examples and events of interest.

Date	Time	Description of Event	Video Clip ID
Friday, 23 August 2024	3:46:00 PM	Driver of LGV turns left into cycleway and completes U-turn at southwest end.	1
Friday, 23 August 2024	9:49:30 AM	Driver of LGV completes U-turn at northwest end and enters cycleway.	2
Friday, 23 August 2024	8:32:00 AM	Driver turns right from Kahutia St onto Grey St.	3
Friday, 23 August 2024	10:53:05 AM	Driver turns right from Grey St onto Kahutia St.	4
Friday, 23 August 2024	11:35:35 AM	LGV driver drives in cycleway and parks on blue paint next to the cycleway. LGV then mounts the footpath, drives in the cycleway again and drives on the wrong (right-hand) side of the road.	5&6
Friday, 23 August 2024	12:21:50 PM	Driver completes U-turn at northwest end and enters cycleway.	7
Friday, 23 August 2024	3:05:25 PM	Driver turns right from Kahutia St onto Grey St and meets oncoming traffic. Oncoming car must manouevre around car which completed the illegal right-hand turn.	8
Friday, 23 August 2024	4:19:42 PM	Driver turns right from Grey St onto Kahutia St.	9
Friday, 23 August 2024	4:47:40 AM	Driver fails to give way to two northwestbound children scooter riders in the cycleway.	10
Friday, 23 August 2024	4:50:30 AM	Two LGV drivers consecutively complete a U-turn at the northwest end. One enters the cycleway.	11
Friday, 23 August 2024	1:55:30 PM	Driver of OGV1 turns right from Grey St onto Kahutia St.	12
Saturday, 24 August 2024	8:22:50 AM	Driver turns right from Kahutia St onto Grey St.	13
Saturday, 24 August 2024	8:41:05 AM	Driver turns left from Kahutia St into cycleway, appearing confused before returning to correct road lane.	14
Saturday, 24 August 2024	11:28:30 AM	Driver turns right from Kahutia St onto Grey St before merging into correct lane.	15
Saturday, 24 August 2024	12:09:33 PM	Pair of pedestrians cross Grey St in the middle of the intersection (not using the designated crossing) and hold up a car which gives-way.	16
Saturday, 24 August 2024	1:54:10 PM	Driver turns left from Kahutia St onto blue painted area between the cycleway and footpath. The driver appears confused and reverses out of area before doing U-turn in front of another car (other car slows down to give way). Driver then slows down to incorrectly give-way to another vehicle in the intersection, even though they had right-of-way.	17
Saturday, 24 August 2024	2:15:40 PM	Driver turns right onto Kahutia St from Grey St.	18
Saturday, 24 August 2024	3:05:40 PM	Driver turns right onto cycleway from Kahutia St and drives along cycleway.	19

# Illegal Manouevres and Events of Interest

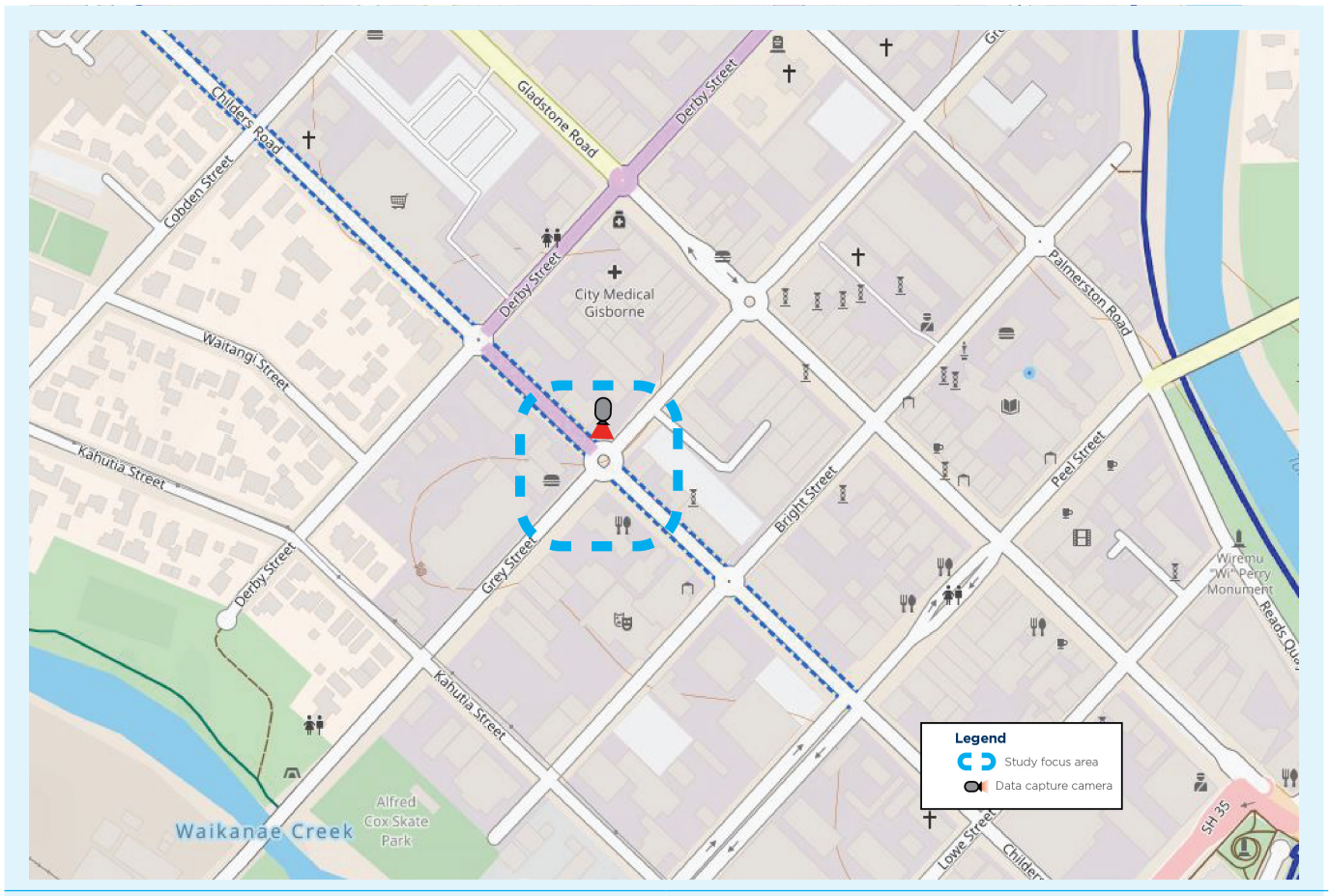
Date	Time	Description of Event	Video Clip ID
Saturday, 24 August 2024	1:13:15 AM	Driver waits on Kahutia S pedestrian crossing blocking pedestrians while waiting for traffic to clear before turning right onto Grey St.	21
Sunday, 25 August 2024	8:23:50 AM	Driver turns right from Grey St onto Kahutia St at speed.	22
Sunday, 25 August 2024	8:56:20 AM	Northwest bound driver proceeds through intersection on wrong (right-hand) side of road.	23
Sunday, 25 August 2024	9:00:53 AM	Driver turns left from Kahutia St into cycleway and drives along cycleway.	24
Sunday, 25 August 2024	10:17:00 AM	Driver mounts pedestrian crossing island to continue straight along Kahutia St.	25
Sunday, 25 August 2024	11:28:00 AM	Northwest bound driver proceeds through intersection on wrong (right-hand) side of road.	26
Sunday, 25 August 2024	1:59:50 PM	Pedestrian crosses at red crossing point and car does not slow to give-way.	27
Sunday, 25 August 2024	3:15:00 PM	Driver starts to turn left into the cycleway from Kahutia st, but then reverses and correctly drives in road lane.	28

## Observations and Findings

- Cars were observed to give-way to pedestrians crossing Grey St at the red-painted crossing more often than not. The only time a car did not stop to give-way was captured in Video Clip 27.
- The intersection did not get congested across the survey period.
- Most vehicles travelled through the intersection slowly, upon observation.
- Some vehicles that performed illegal movements appeared confused by the intersection, however, the majority of illegal movements appeared to be planned and performed with intent.
-



## Survey Site 2: Childers Rd & Grey St



### Location:

Childers Road and Grey Street, Gisborne, New Zealand, 4010

### Coordinates:

-38.665877, 178.022625

### Dates and Time:

Friday 23rd August to Friday 30th August

7:00am to 6:00pm each day\*

### Weather conditions:

Max temp: 19 °C

Min temp 2.9 °C

Total rainfall: 12 mm (across 7 survey days):

### Survey Site Aims:

- To determine volumes and movements of all road users\*
- To analyse car parking occupancy along re-aligned carparking facilities on Grey St.
- \*Pedestrian crossing totals were unable to be accurately recorded, likely due to camera vantage point and distance from each crossing.

# Active Traveller Movement Tracelines

## Weekday Morning - Active Traveller Movement Traceline Paths



Path tracelines showing the path of pedestrians (yellow lines) and bike riders (pink lines), from 8:30am - 9:30am on Friday 23rd August, 2024.

## Weekday Afternoon - Active Traveller Movement Traceline Paths



Path tracelines showing the path of pedestrians (yellow lines) and bike riders (pink lines), from 4:30pm - 5:30pm on Friday 23rd August, 2024.

# Active Traveller Movement Tracelines

## Weekend Morning - Active Traveller Movement Traceline Paths



Path tracelines showing the path of pedestrians (yellow lines) and bike riders (pink lines), from 10:30am - 11:30am on Saturday 24th August, 2024.

## Weekend Afternoon - Active Traveller Movement Traceline Paths



Path tracelines showing the path of pedestrians (yellow lines) and bike riders (pink lines), from 3:30pm - 4:30pm on Saturday 24th August, 2024.

# Vehicle Movement Tracelines

## Weekday Morning - Small Vehicle Movement Traceline Paths



Path tracelines showing the path of motorcycles (blue lines), cars (red lines), and LGVs (brown lines) from 8:30am - 9:30am on Friday 23rd August 2024.

## Weekday Evening - Small Vehicle Movement Traceline Paths



Path tracelines showing the path of motorcycles (blue lines), cars (red lines), and LGVs (brown lines) from 5:30pm - 6:30pm on Friday 23rd August 2024.

# Vehicle Movement Tracelines

## Weekend - Small Vehicle Movement Traceline Paths



Path tracelines showing the path of motorcycles (blue lines), cars (red lines), and LGVs (brown lines) from 10:30am - 11:30am on Saturday 24th August, 2024.

## Weekday Morning - Large Vehicle Movement Traceline Paths



Path tracelines showing the path of buses (blue lines), box trucks (aqua lines), and semi-trailers (purple lines) from 8:30am - 9:30am on Friday 23rd August 2024.

# Vehicle Movement Tracelines

## Weekday Evening - Large Vehicle Movement Traceline Paths



Path tracelines showing the path of buses (blue lines), box trucks (aqua lines), and semi-trailers (purple lines) from 5:30pm - 6:30pm on Friday 23rd August 2024.

## Weekend - Large Vehicle Movements - Traceline Paths

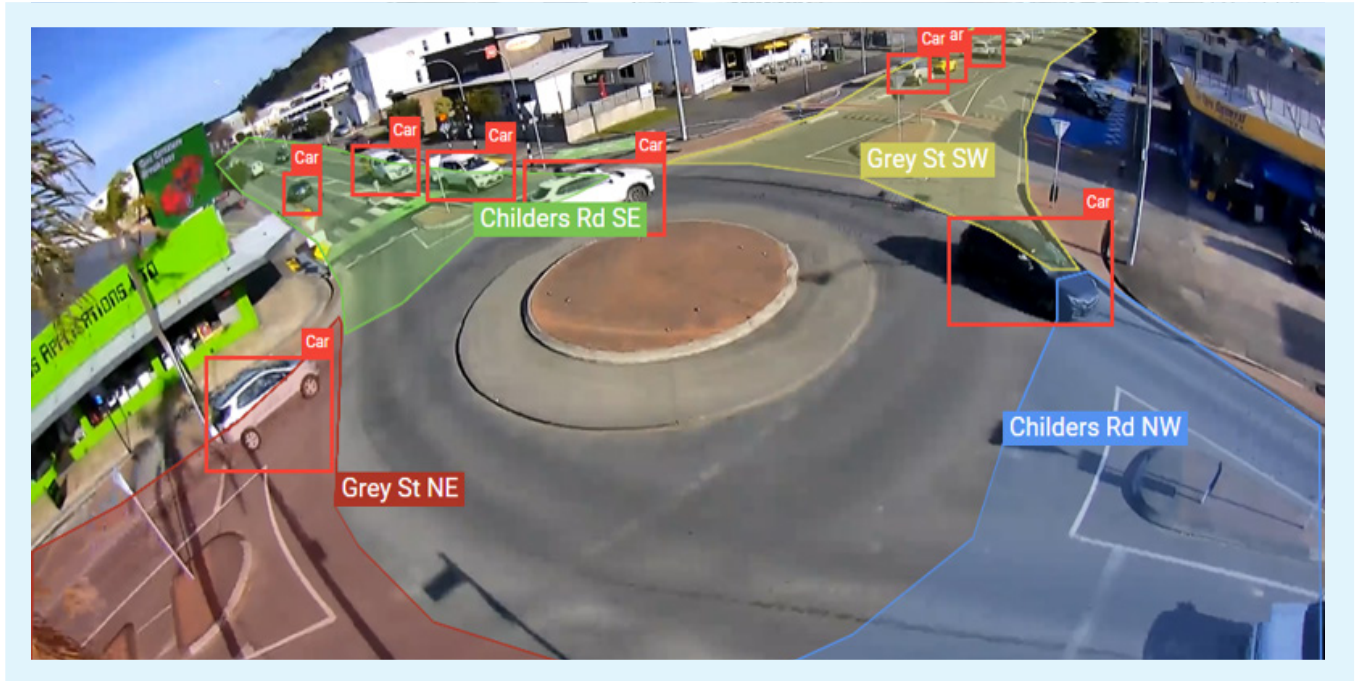


Path tracelines showing the path of buses (blue lines), box trucks (aqua lines), and semi-trailers (purple lines) from 10:00am - 11:00am on Saturday 24th August, 2024.

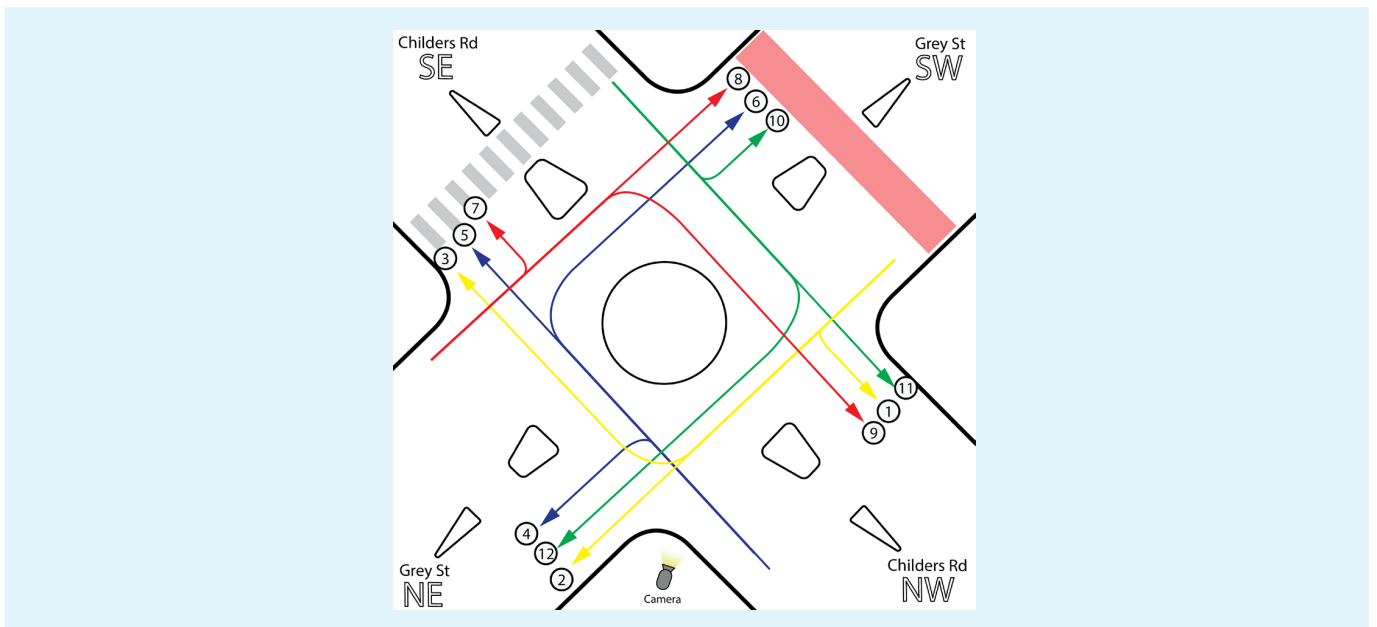
# Road User Volumes and Movements

## Road User Volumes

To extract data from the AI Software, we have placed digital ‘countlines’ over the footage. The AI Software automatically counts any crossing user that passes through those lines. This allows us to study each movement by road user type (e.g car, truck, bus).



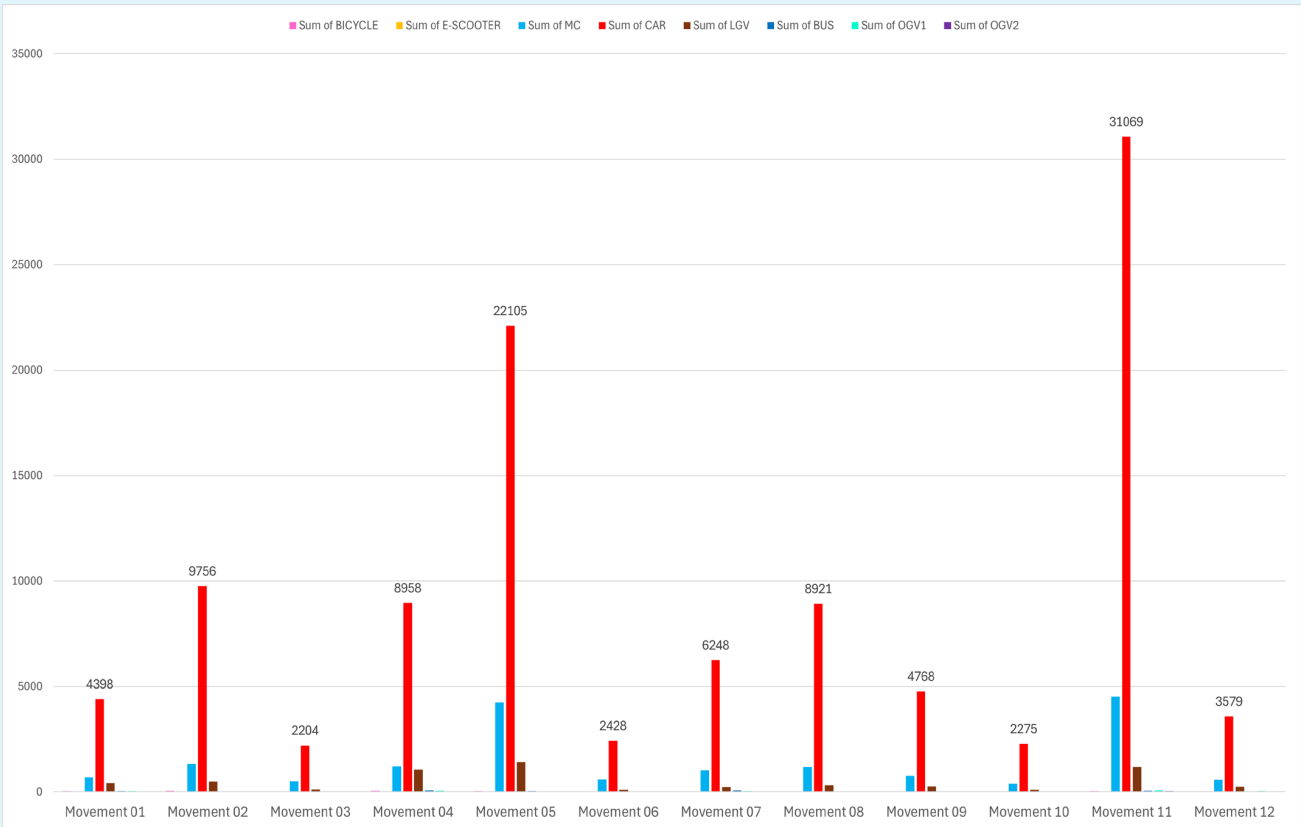
Above is a screenshot of how these count lines have been created in the AI Software to extract the relevant data. Each movement studied has a ‘Movement Label’.



Each possible movement has been translated into a ‘Movement ID’ and is displayed as a number in the graphic above. The Movement IDs relate to the road user volumes contained in the data tables on the following page.

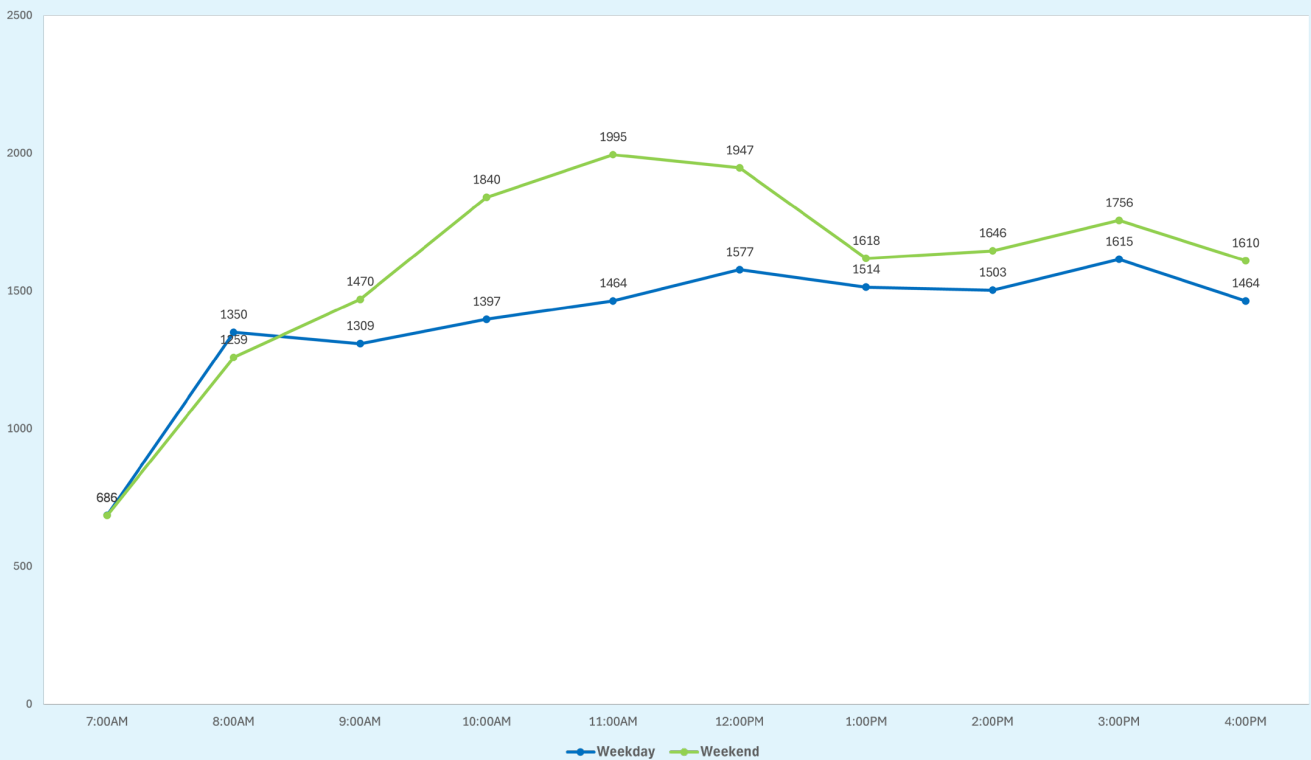
# Road User Volumes and Movements

## Road User Volumes



**MC**-Motorcycle or Motor-scooter, **E-SCOOTER**-E-scooter or other micro-mobility e-rideables, **LGV**-Light Good Vehicle (Van/Ute), **OGV1**-Other Goods Vehicle 1 (Heavy Vehicle, 2 or 3 axles), **OGV2**-Other Goods Vehicle 2 (Heavy Vehicle, 4+ Axles)

## Hourly Road User Volumes (All Users)



Average hourly road user totals (All user types and movements).

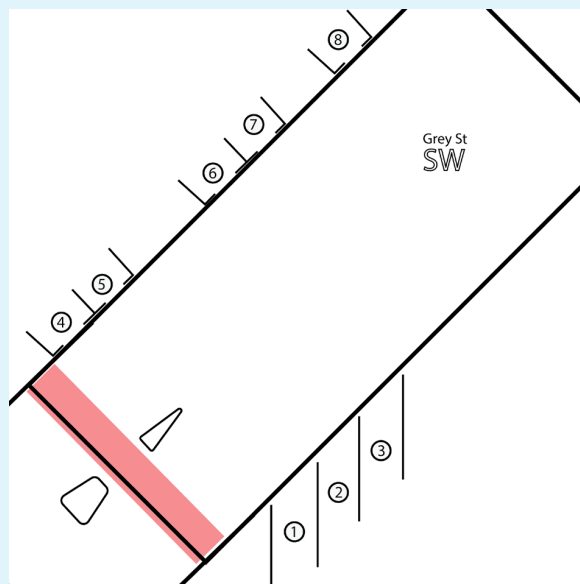
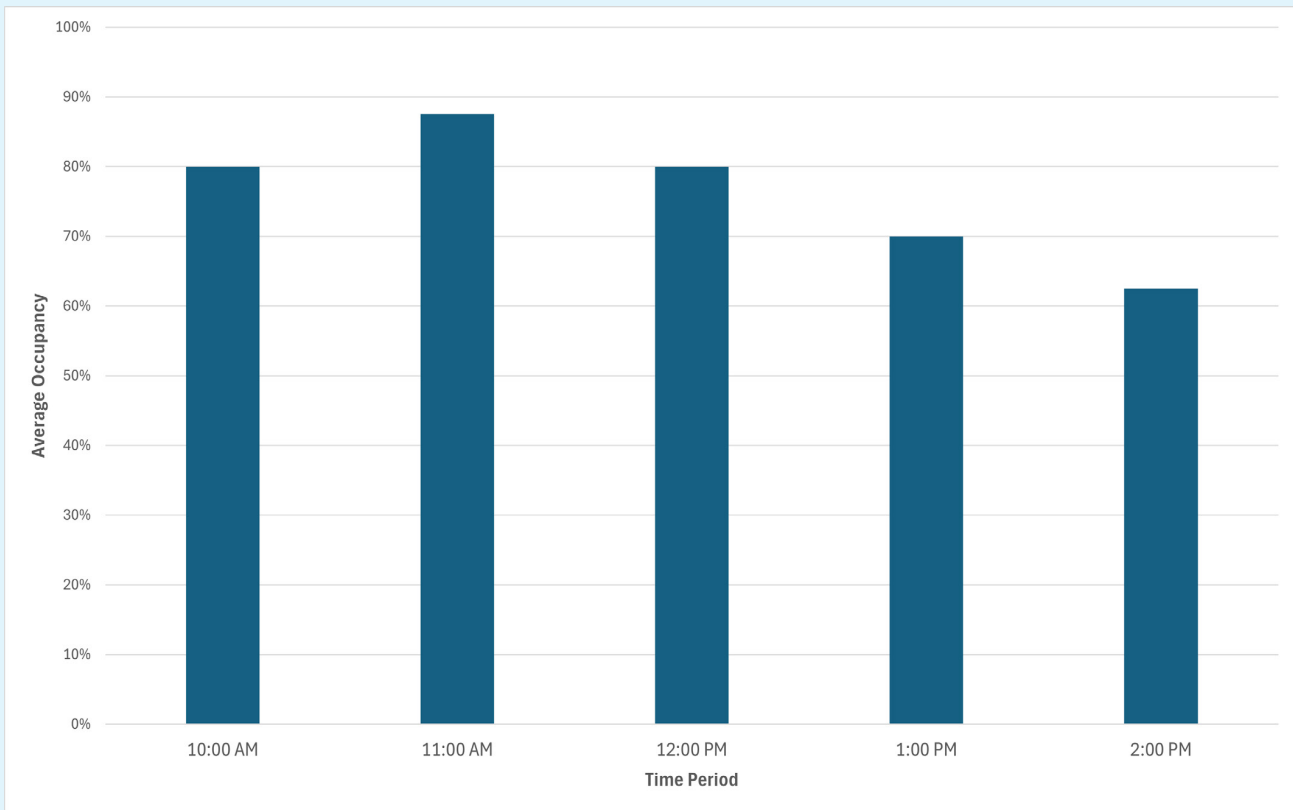
\*For greater detail of the data table, please open the accompanying Excel Worksheet.



# Car Parking Occupancy

## Calculating Occupancy

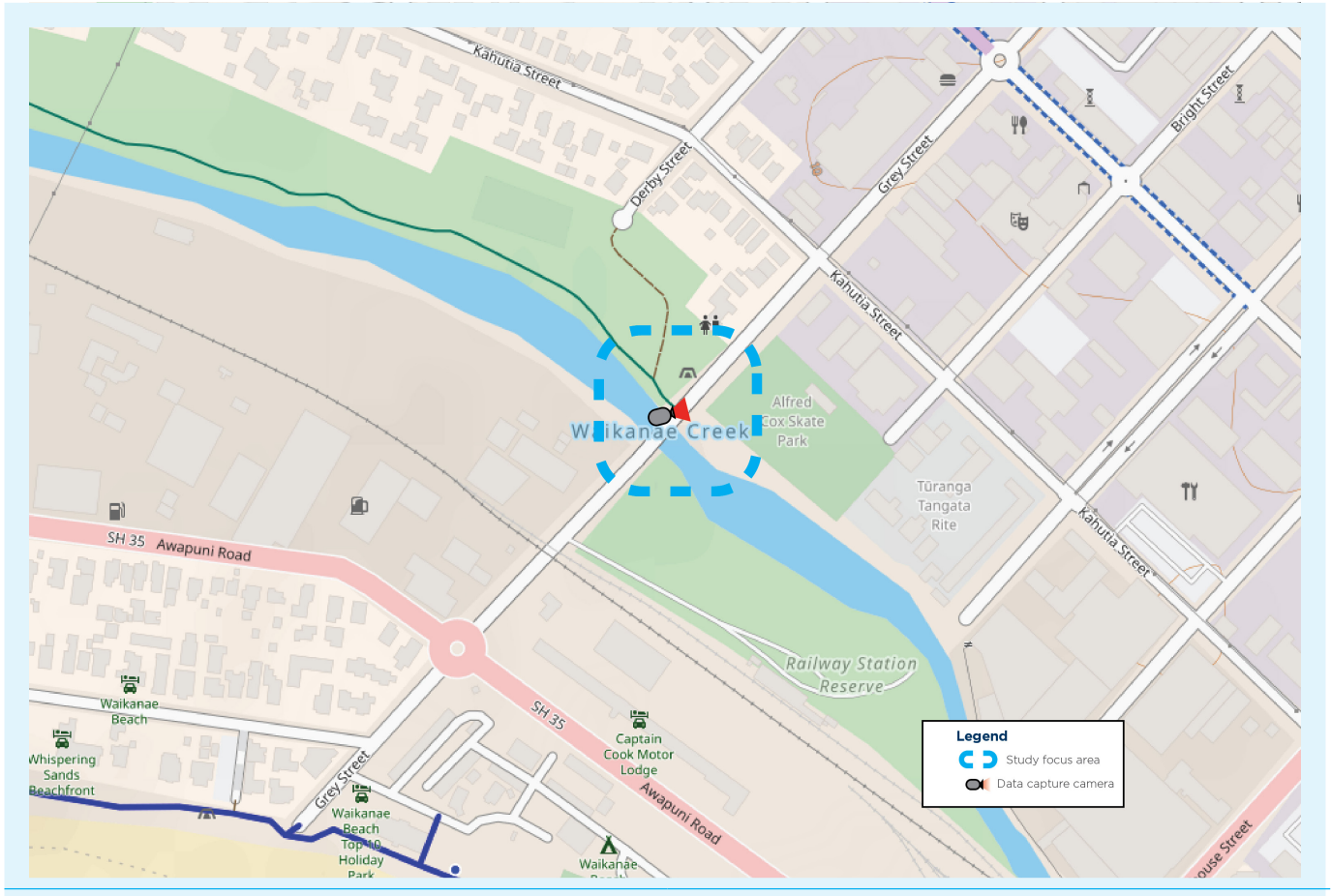
Bicycle Network reviewed the footage between the hours of 10:00am and 3:00pm and logged the occupancy and turnover of vehicles in the 8 provided spaces that were visible to the camera.



The average hourly carpark occupancy percentage includes both weekdays and weekend days from the survey period.

\*For greater detail of the data table, please open the accompanying Excel Worksheet.

# Survey Site 3: Grey St Pedestrian Crossing



## Location:

Pedestrian Crossing, Grey Street, Gisborne, New Zealand, 4010

## Coordinates:

-38.668180, 178.019972

## Dates and Time:

Friday 23rd August to Saturday 31st August

7:00am to 6:00pm each day\*

## Weather conditions:

Max temp: 19 °C

Min temp 2.9 °C

Total rainfall: 12 mm (across 7 survey days):

## Survey Site Aims:

- To determine volumes and movements of all road users\*
- To determine volumes and movements of all crossing users
- Examine crossing behaviours and potential conflicts

# Active Traveller Movement Tracelines

## Weekday Morning - Active Traveller Movement Traceline Paths



Path tracelines showing the path of pedestrians (yellow lines) and bike riders (pink lines), from 7:20am - 8:20am on Friday 23rd August, 2024.

## Weekday Afternoon - Active Traveller Movement Traceline Paths



Path tracelines showing the path of pedestrians (yellow lines) and bike riders (pink lines), from 4:20pm - 5:20pm on Friday 23rd August, 2024.

# Active Traveller Movement Tracelines

## Weekend Morning - Active Traveller Movement Traceline Paths



Path tracelines showing the path of pedestrians (yellow lines) and bike riders (pink lines), from 9:20am - 10:20am on Saturday 24th August, 2024.

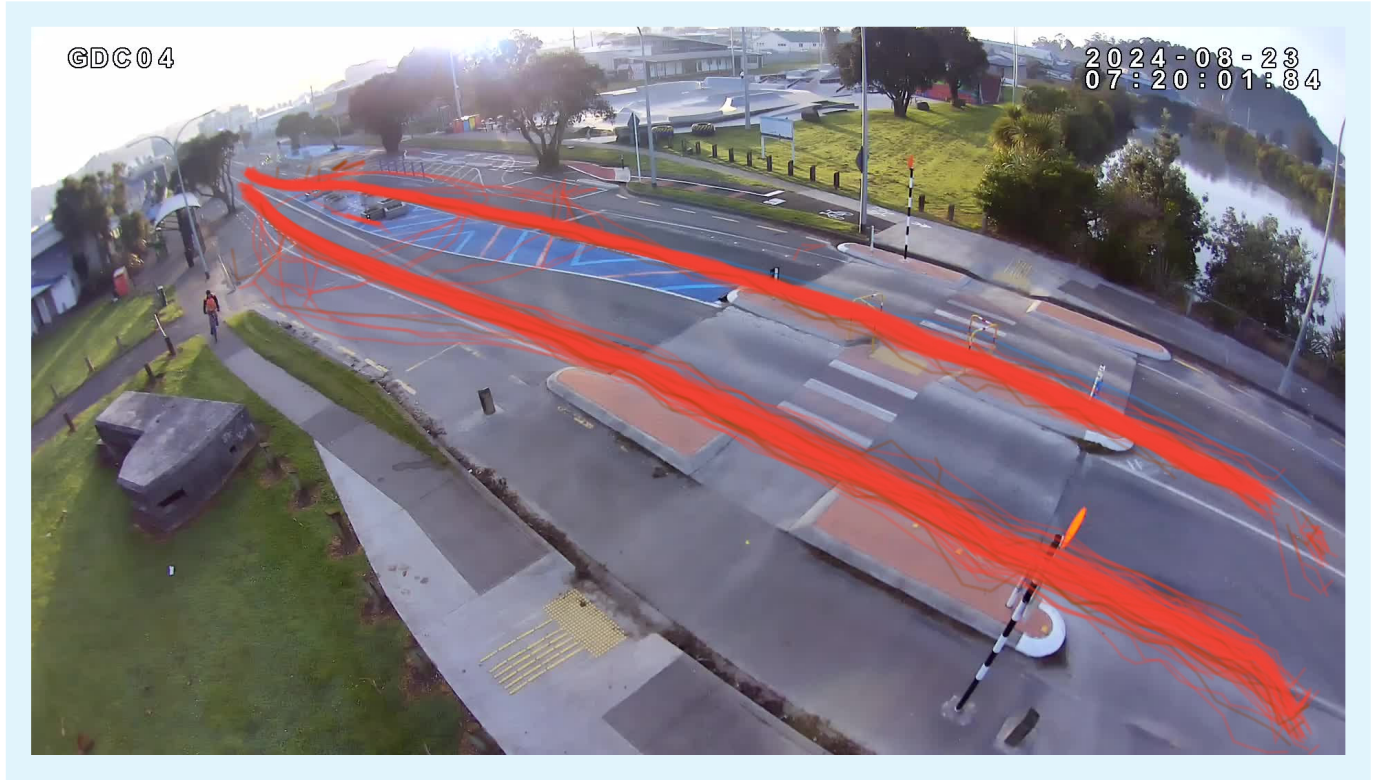
## Weekend Afternoon - Active Traveller Movement Traceline Paths



Path tracelines showing the path of pedestrians (yellow lines) and bike riders (pink lines), from 3:20pm - 4:20pm on Saturday 24th August, 2024.

# Vehicle Movement Tracelines

## Weekday Morning - Small Vehicle Movement Traceline Paths



Path tracelines showing the path of motorcycles (blue lines), cars (red lines), and LGVs (brown lines) from 7:20am - 8:20am on Friday 23rd August 2024.

## Weekday Evening - Small Vehicle Movement Traceline Paths



Path tracelines showing the path of motorcycles (blue lines), cars (red lines), and LGVs (brown lines) from 4:20pm - 5:20pm on Friday 23rd August 2024.

# Vehicle Movement Tracelines

## Weekend - Small Vehicle Movement Traceline Paths



Path tracelines showing the path of motorcycles (blue lines), cars (red lines), and LGVs (brown lines) from 9:20am - 10:20am on Saturday 24th August, 2024.

## Weekday Morning - Large Vehicle Movement Traceline Paths



Path tracelines showing the path of buses (blue lines), box trucks (aqua lines), and semi-trailers (purple lines) from 7:20am - 8:20am on Friday 23rd August 2024.

# Vehicle Movement Tracelines

## Weekday Evening - Large Vehicle Movement Traceline Paths



Path tracelines showing the path of buses (blue lines), box trucks (aqua lines), and semi-trailers (purple lines) from 4:20pm - 5:20pm on Friday 23rd August 2024.

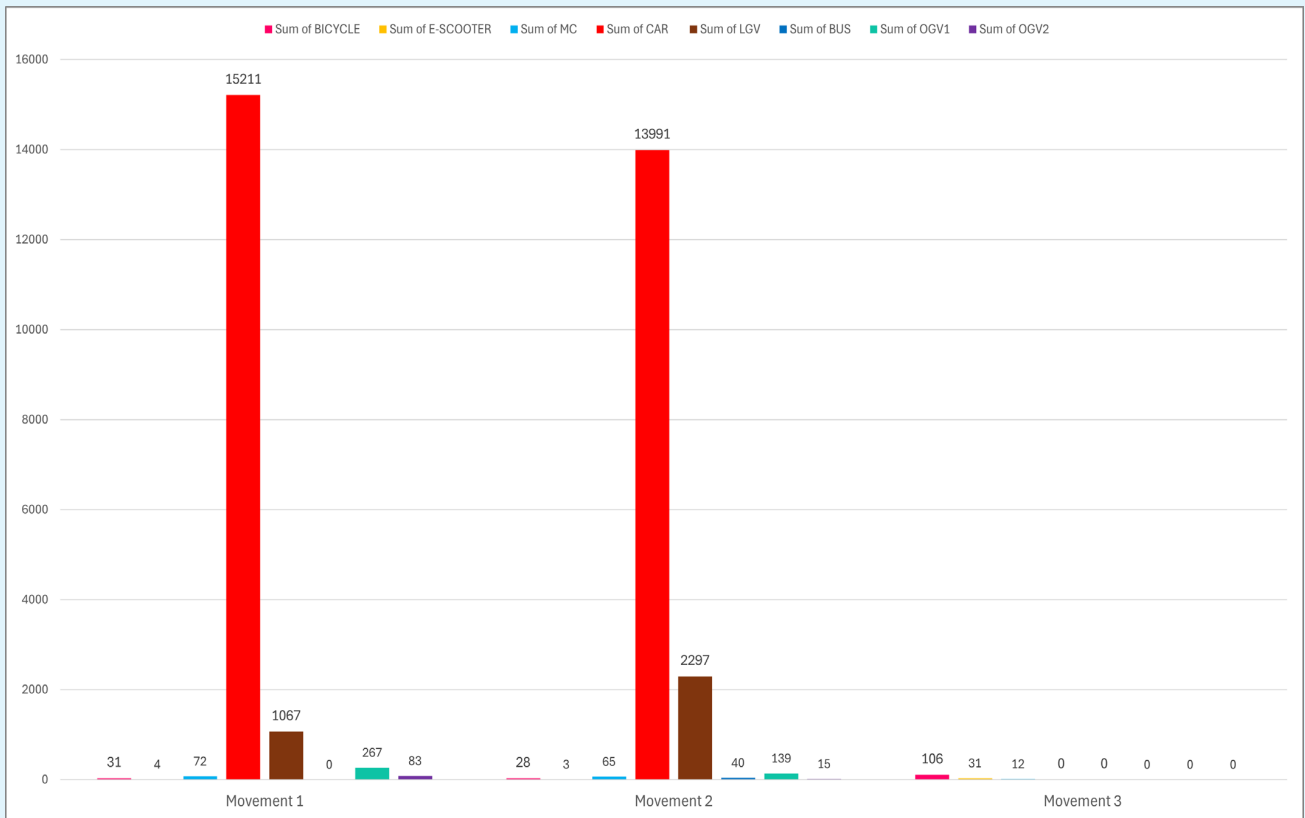
## Weekend - Large Vehicle Movements - Traceline Paths



Path tracelines showing the path of buses (blue lines), box trucks (aqua lines), and semi-trailers (purple lines) from 9:20am - 10:20am on Saturday 24th August, 2024.

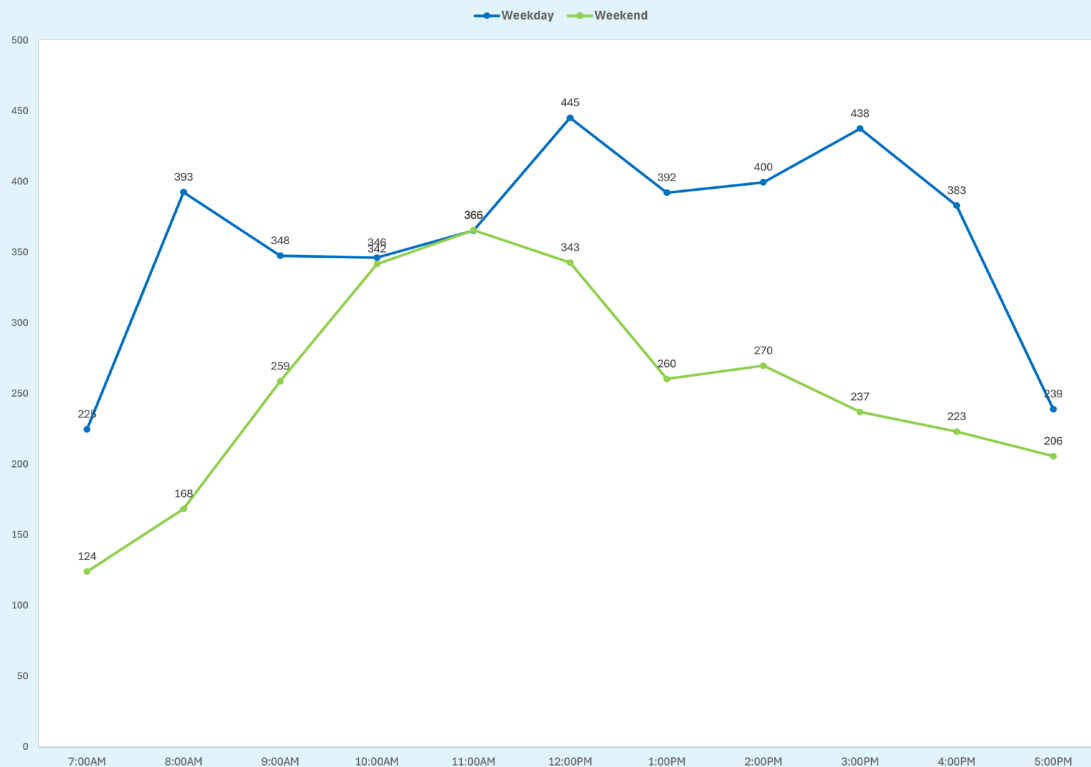
# Road User Volumes and Movements

## Road User Volumes



**MC**-Motorcycle or Motor-scooter, **E-SCOOTER**-E-scooter or other micro-mobility e-rideables, **LGV**-Light Good Vehicle (Van/Ute), **OGV1**-Other Goods Vehicle 1 (Heavy Vehicle, 2 or 3 axles), **OGV2**-Other Goods Vehicle 2 (Heavy Vehicle, 4+ Axles)

## Hourly Road User Volumes



Average hourly road user totals (All user types and movements).

\*For greater detail of the data table, please open the accompanying Excel Worksheet.



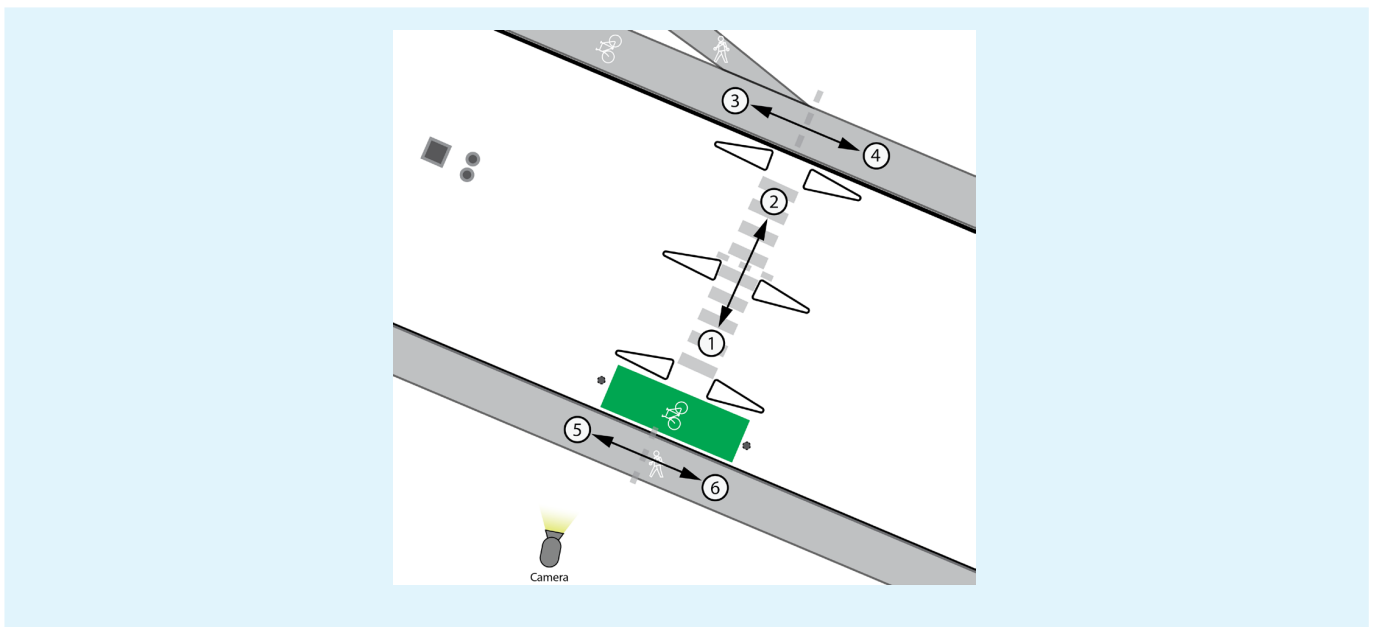
# Crossing Volumes and Movements

## Active Transport Volumes

To extract data from the AI Software, we have placed digital 'countlines' over the footage. The AI Software automatically counts any crossing user that passes through those lines. This allows us to study each crossing movement by road user type (pedestrian or bike rider).



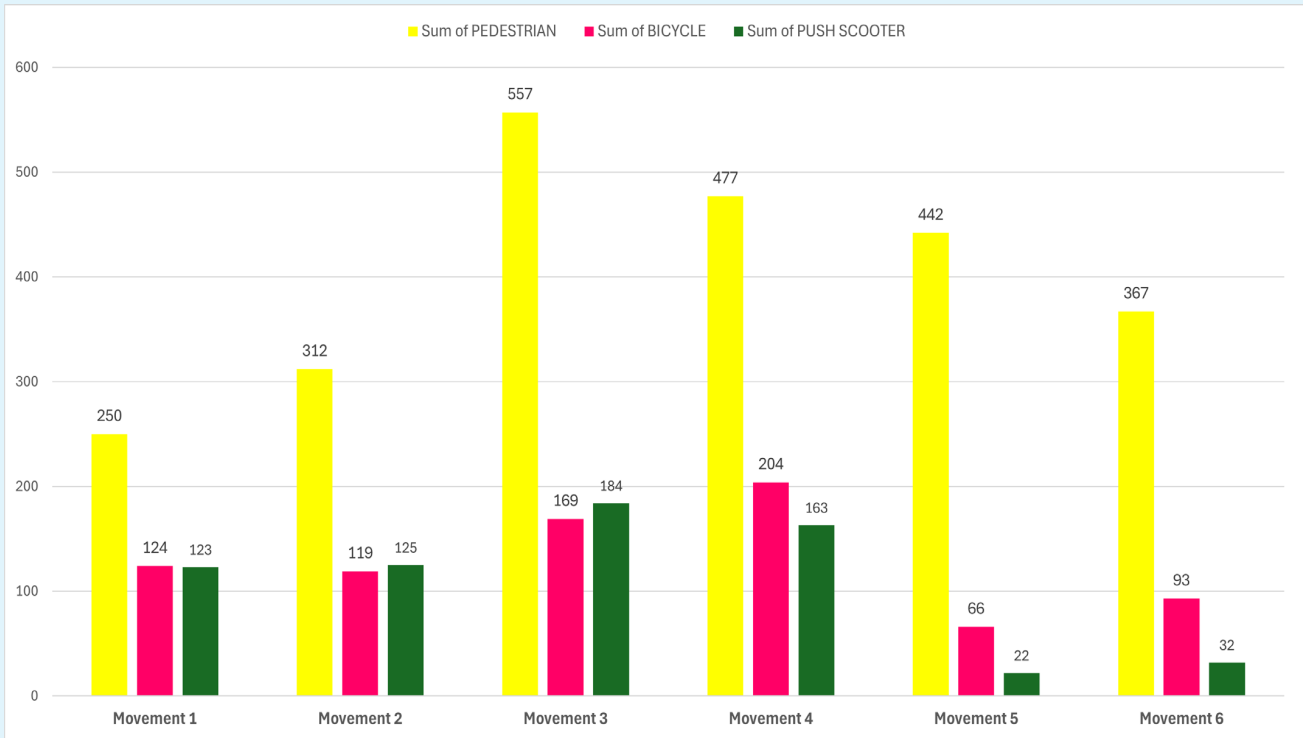
Above is a screenshot of how these count lines have been created in the AI Software to extract the relevant data. Each movement studied has a 'Movement Label'.



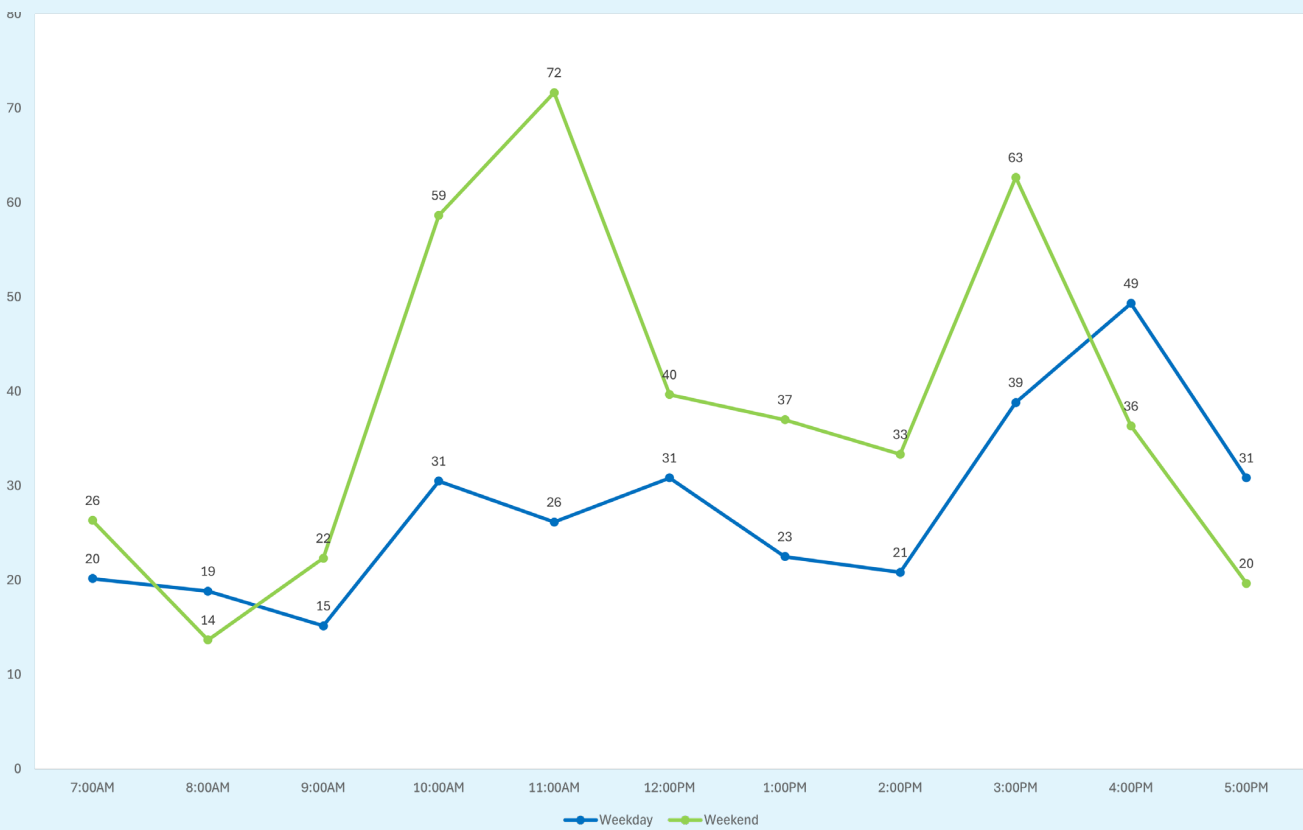
Each possible movement has been translated into a 'Movement ID' and is displayed as a number in the graphic above. The Movement IDs relate to the road user volumes contained in the data tables on the following page.

# Crossing User Volumes and Movements

## Crossing Active Travel Volumes



## Hourly Crossing Volumes (All Users)

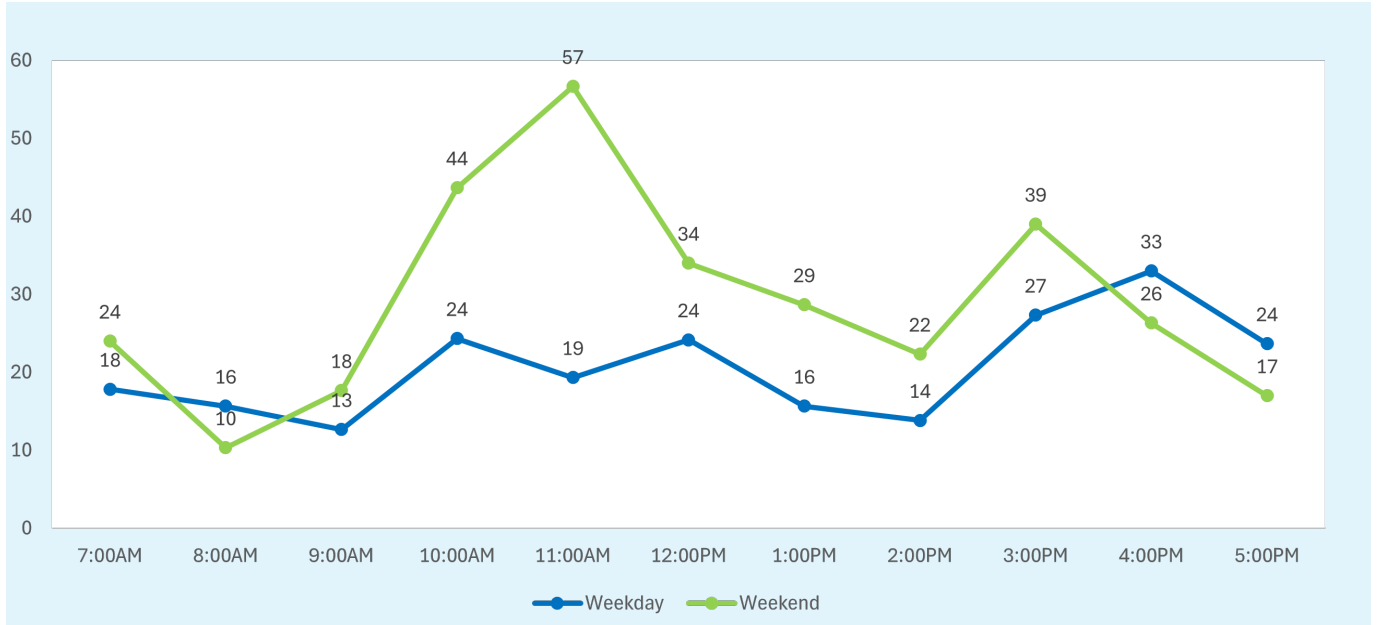


The data is organised by Movement ID, date, time and then volume of each individual crossing user type.

\*For greater detail of the data table, please open the accompanying Excel Worksheet.

# Crossing Volumes and Movements

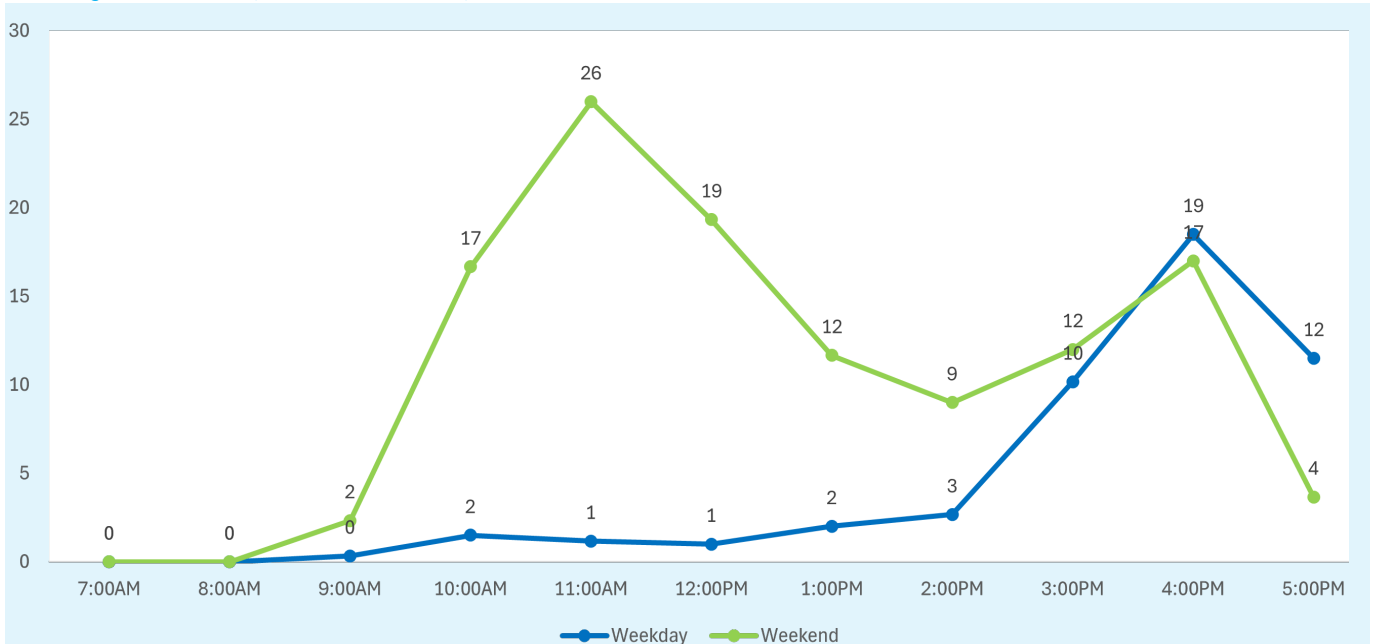
## Hourly Pedestrian Volumes



Average hourly volumes of pedestrians during the survey period.

- The weekend has two main peaks of pedestrians:
  - The first peak from 10:00am - 12:00pm (approx 50 crossings an hour).
  - A second peak from 3:00pm - 4:00pm (39 crossings an hour).
- On weekdays, pedestrian volumes are more consistent across the day, with an afternoon peak at 4:00pm of 33 crossings.

## Hourly Scooter (Push Scooter) Volumes

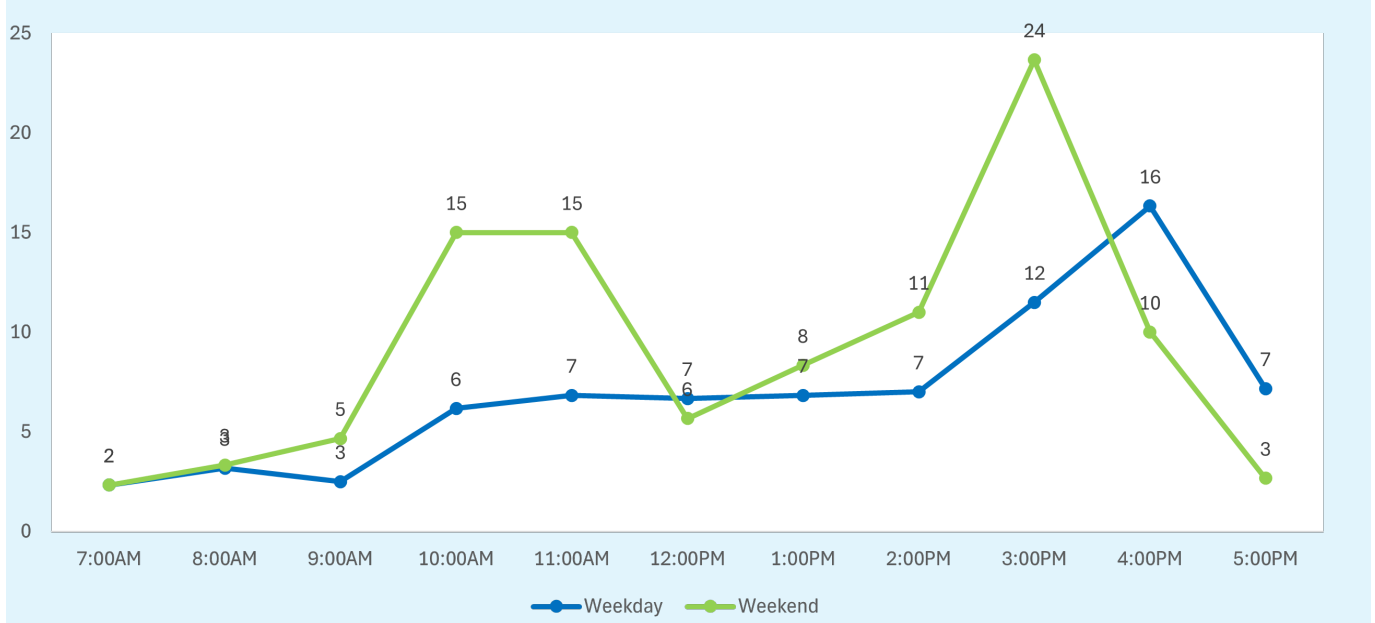


Average hourly volumes of scooter (push) riders during the survey period.

- Weekdays have a uni-modal peak of scooter users from 3:00pm - 5:00pm, which coincides with school finishing.
- On weekend days, scooter rider volumes peak between 10:00pm - 12:00pm (26 crossings).

# Rider Volumes and Movements

## Hourly Bike Rider Volumes



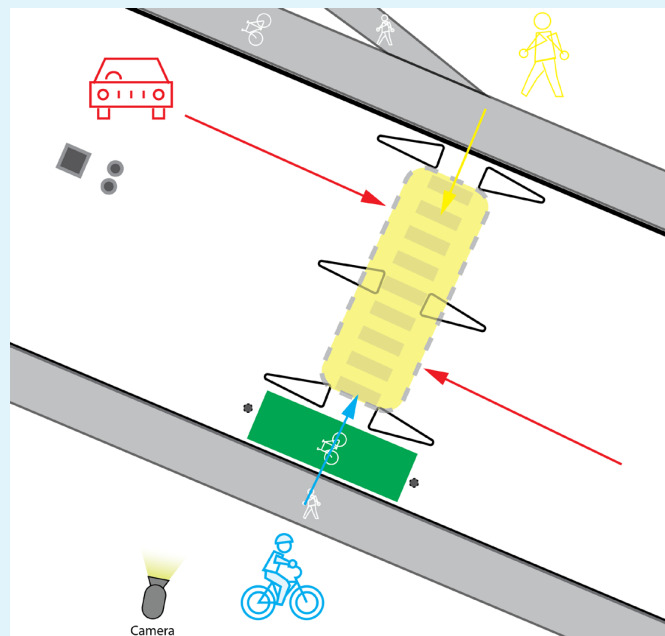
Average hourly volumes of bike riders during the survey period.

- The weekday has one main peaks of bike rider crossings:
  - From 3:00pm - 5:00pm (approx 14 riders an hour).
- On weekend days, bike rider volumes experienced two main peak periods:
  - Between 10:00am - 12:00pm (15 crossings per hour).
  - From 3:00pm to 4:00pm (24 crossings per hour).

# Crossing Behaviour Analysis

## Key Measures

Road user behaviour when pedestrians, bike riders and scooter riders cross the pedestrian crossing on Grey Street.



A set of countlines captures the exact time all crossing users enter the crossing from either side. A second set of count lines captures the exact time a road user enters the described 'conflict zone'.

# Crossing Behaviour Analysis

Bicycle Network reviewed all crossings that occurred during peak hours where the following condition was met: A crossing user entered the crossing within 2 seconds of a road user entering the 'conflict zone' shown on the previous page.

**Rider and Vehicle Interaction - Conflict Severity Scale #**

Table 2#

Score#	Title#	Description & Vehicle/Rider Response #
1#	No adjustment required#	The rider does not need to change course or speed. Vehicle may slow down or stop to allow riders to pass before turning.#
2#	Minor adjustment required#	The rider may need to slightly alter their speed or course to negotiate a turning vehicle. The situation is unlikely to be perceived as unsafe or stressful, but may be perceived as inconvenient.#
3#	Major adjustment required#	The rider may need to significantly alter their speed or course to avoid a collision with a vehicle. There is an expected moderate level of stress from one or both parties. However, this adjustment by the rider avoids a collision.#
4#	Near-Miss#	A rapid change of course or speed is required by either driver or rider to avoid a collision. There is an expected high level of stress from one or both parties. Either party may gesture to one another.#
5#	Collision#	There is physical contact between parties, or the rider may come off their bicycle due to having to make a rapid evasive manoeuvre.#

Bicycle Network uses a severity scale to score each incident detected using the AIRS conflict analysis methodology (See table 2 above).

After reviewing each potential conflict detected, there were zero conflicts that were scored level 2 or above during the survey period.

On two occasions drivers continued through the crossing as a pedestrian enters the road from the other side of the crossing (see screenshot below), however these presented minimal risk and were scored as level 1 on the scale.



Image showing pedestrian using the crossing as a vehicle continues without stopping (See video clip #1).



## BICYCLE NETWORK®

With nearly 50,000 members, Bicycle Network is the largest member-based bike riding organisation in Australia. At Bicycle Network, we campaign for better conditions, infrastructure and policies that make it easier and more accessible for people of all ages and abilities to ride a bike. We work closely with all levels of government to improve conditions for all people who ride.

Did you know that at Bicycle network we also do:

### RIDE2SCHOOL

Our Ride2School team work collaboratively with schools, students and councils to help young people overcome the barriers preventing them from riding to school and getting active. Schools engaged in the year-long program report an active travel rate of 45 per cent, nearly double the national average. Other Ride2School initiatives include:

**MIND.BODY.PEDAL** – a one-day program aimed at empowering and inspiring secondary school aged females. It is designed to address the unique barriers holding teenage females back from being physically active.

**ACTIVE PATHS** – is a collaborative way-finding initiative, designed to make the journey to and from school as safe, fun and easy as possible!

Find out more by visiting [ride2school.com.au](http://ride2school.com.au) or contacting [ride2school@bicyclenetwork.com.au](mailto:ride2school@bicyclenetwork.com.au).

### ADVOCACY AND CAMPAIGNS

We work with government, stakeholders, and the community to improve the bike riding environment across Australia. We provide expert advice on transport planning, and campaign for policies that support people riding bikes.

If you want our help on a bike riding issue or active transport plan in your LGA, reach out to our Public Affairs team at [campaigns@bicyclenetwork.com.au](mailto:campaigns@bicyclenetwork.com.au)

**GET IN TOUCH** - If your council would like to explore opportunities to collaborate with Bicycle Network or our members in the future, please get in touch with via [bikefutures@bicyclenetwork.com.au](mailto:bikefutures@bicyclenetwork.com.au)

### BIKE PARKING

Bicycle Network are the bike parking experts – we design, quote, construct and install a wide range of bike parking and end-of-trip facilities for Council's and private developments.

For more information, visit [bicyclenetwork.com.au/bike-parking-experts](http://bicyclenetwork.com.au/bike-parking-experts) or email [parking@bicyclenetwork.com.au](mailto:parking@bicyclenetwork.com.au) (1300 727 563)

### PARKITEER - BIKE CAGES

We manage a network of 130 secure bike parking cages at public transport hubs across Melbourne and regional Victoria on behalf of the Department of Transport.

Learn more at [parkiteer.com.au](http://parkiteer.com.au) or by contacting [parkiteer@bicyclenetwork.com.au](mailto:parkiteer@bicyclenetwork.com.au)

### RIDES AND EVENTS

We run some of Australia's biggest bike rides, including The Great Vic Bike Ride (3,000+ riders), Around the Bay (10,000+ riders), the Great Outback Escape (NT), the iconic Peaks Challenge Falls Creek (VIC) and many more. We also coordinate regular social bike rides to help encourage riding and discuss the concerns of the riding public.

To organise events and social rides in you LGA, visit [bicyclenetwork.com.au/rides-and-events](http://bicyclenetwork.com.au/rides-and-events)

### CORPORATE MEMBERSHIPS

Sign up as a corporate member and your employees will be able to take advantage of our exclusive corporate membership offer. In addition to helping us improve bike riding conditions across Australia, our members are covered every time they ride with our bike riding insurance. Plus, they'll get access to a range of services and discount offers.

Contact us at [membership@bicyclenetwork.com.au](mailto:membership@bicyclenetwork.com.au)



**BICYCLE  
NETWORK®**