State Highway 45 Post Construction Safe System Audit

Transport Choices – Barrett Road to Morley Street

Prepared for New Plymouth District Council
Prepared by Beca Limited

23 July 2025

Contents

Appendices

Revision History

Revision N°	Prepared By	Description	Date
1	Corrigan Millar and Courtney Devlin	For client review	21.07.2025
2	Corrigan Millar and Courtney Devlin	Amended typos and crash details	24.07.2025

Document Acceptance

Action	Name	Signed	Date
Prepared by	Corrigan Millar		21.07.2025
Reviewed by	Courtney Devlin, Alex Lumsden, Megan Taylor		23.07.2025
Approved by	Marcus Brown		23.07.2025
on behalf of	Beca Limited		

1 Introduction

1.1 Project Background

In 2022 NZ Transport Agency Waka Kotahi (NZTA) provided funding under the Climate Emergency Response Fund (CERF) programme to support Local Authorities to achieve the goals set out in the government's Emissions Reduction Plan. Budget 2023 provided additional funding for Public Transport initiatives. The delivery programmes within CERF included the Transport Choices programme which aimed to fast-track active transport projects working in a partnership model with local authorities around New Zealand.

New Plymouth District Council (NPDC) was successful in obtaining funding for walking and cycling facilities on Devon Street West (State Highway 45) including raised crossings and an off-road cycleway. Since the original design approved by NPDC in 2023, there has been a change in government direction, notably no longer allowing in-lane bus stops and raised safety platforms on the State Highway network. Following this, to best fit the available funding, NPDC modified the design to fit available funding and prioritise safety improvements outside the schools, side road intersection crossing facilities and a connected on-road cycle lane with physical protection at pinch points.

As part of this original Transport Choices project, Beca was commissioned by NPDC to undertake Safe System Audits at 30% design and 90% design for the five corridor scheme designs. One of which was Devon Street West/ South Road (SH45) between Barrett Road and Dawson Street. The original design included approximately 3.7 km of separated cycle facilities, 17 intersection changes and three raised safety platforms. Beca did not do a Detailed Design stage audit for this project stage. For this corridor Beca delivered the following design stage audits outlined in **Table 1-1**.

Table 1-1: Design Stage Safe System Audits completed by Beca throughout the Transport Choices Project on the SH45 corridor

Date issued	Corridor location	Audit Type & Design stage	Key design features	Not included
26 May 2023	Three raised safety platforms – quick construction programme	Preliminary - 30% design stage	• 3x Raised Safety platform's (RSP's) at Spotswood Primary School, Spotswood College and near Belt Road intersection	• Dimensions and cross section of the RSP's not in scope
20 June 2023	SH45 – Barrett Road to 160 Devon Street West	Preliminary – 50% design stage	• Separated cycleway upgrades throughout the corridor • Shared path and on road cycle lanes • Raised Safety Platform upgrades at 183 South Road, Spotswood Primary School, Spotswood College and Belt Road intersection • Parking space reallocation	• The location of the separated cycle lane buffer • Pedestrian routes across intersections • Vehicle tracking paths • Spotswood College frontage • Lorna Street intersection signal phasing • Dimensions and construction of concrete cycleway separators
27 July 2023	SH45 – Barrett Road to 160 Devon Street West	Detailed – 90% design stage	• Separated cycleway upgrades throughout the corridor • Shared path and on road cycle lanes • Raised Safety Platform upgrades at 183 South Road, Spotswood Primary School, Spotswood College and Belt Road intersection • Parking space reallocation • Belt Road one-way traffic lane between SH45 and 58 belt Road. One south bound traffic lane adjacent to a two-way cycle lane.	• Dimensions and construction of concrete cycleway separators • Physical locations of the concrete cycleway separators
14 November 2023	SH45 – Barrett Road to 160 Devon Street West	Preliminary design stage	• One-way separated cycleway through to Belt Road intersection • Two-way bi-directional separated cycleway between Mt Edgecumbe Street and Belt Road • Shared path and on road cycle lanes	• Dimensions and construction of concrete cycleway separators • Physical locations of the concrete cycleway separators

Date issued	Corridor location	Audit Type & Design stage	Key design features	Not included
			• Raised safety platform upgrades at 183 South Road, Spotswood Primary School, Spotswood College and Belt Road intersection • Parking space reallocation • Belt Road one way traffic lane between SH45 and 58 Belt Road. One south bound traffic land adjacent to a two-way cycle lane • Indented bus stops • Mt Edgecumbe Street is closed off to become a cul-de sac.	
24 January 2024	SH45 – Belair Avenue to Bayly Road	Preliminary design stage	• Separated cycleway (not physically protected) • Kerb build outs • Pedestrian zebra crossing Raised Safety Platforms • Shared paths	• Only a small portion of the design was audited. The interaction between the new Belair Avenue and Bayly Road corridor design, with the overall corridor design • Physical concrete cycleway separators were not included in this design

1.2 Project Objectives

This post construction safe system audit (SSA) has been undertaken by Beca Ltd (Beca) at the request of New Plymouth District Council (NPDC). The SSA details the findings from the assessment of the newly constructed walking and cycling infrastructure facilities along State Highway 45 Devon Street West / South Road, New Plymouth. The corridor under investigation spans between Morley Street (eastern end) to Barrett Road (western end). The full extent of the corridor is shown below in **Figure 1-1**.

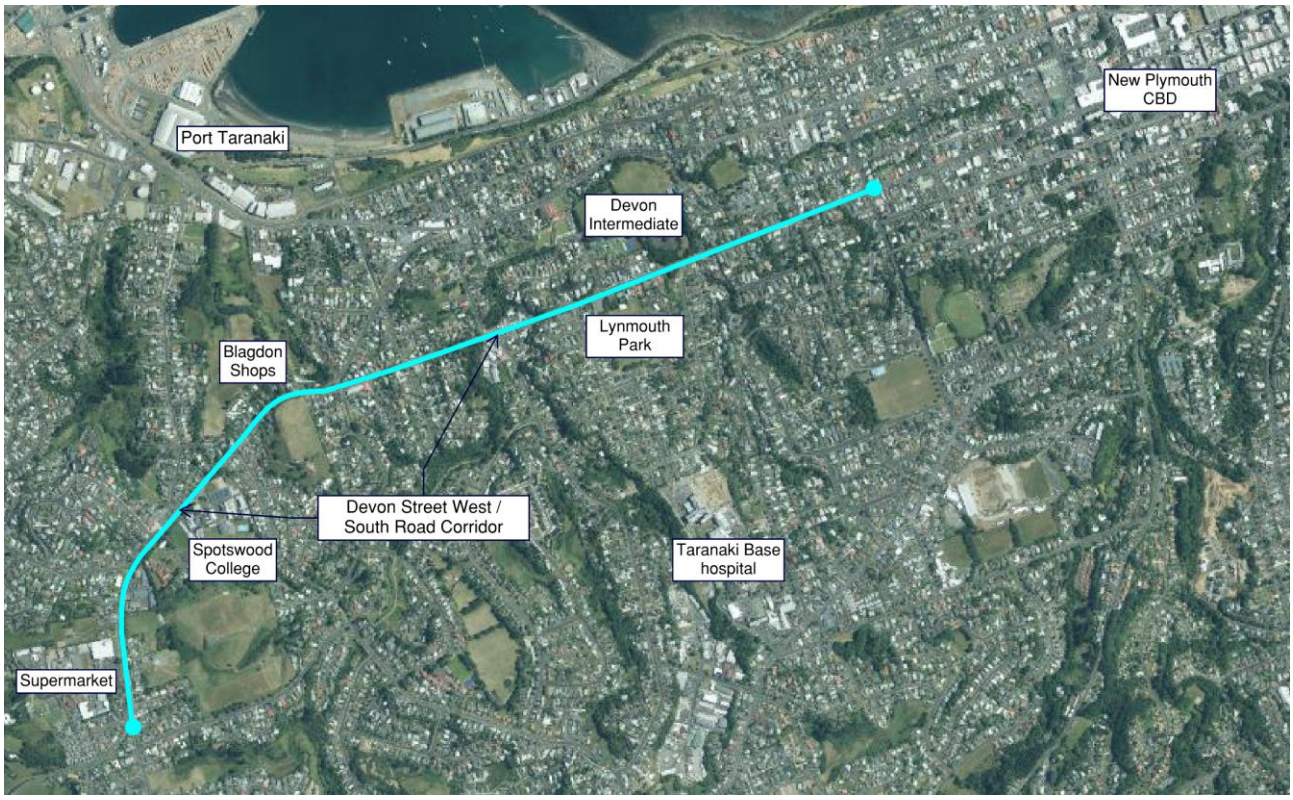


Figure 1-1: Extent of the Devon Street West and South Road corridor

1.3 Existing road Environment and Context

1.3.1 CAS Analysis

A search of the New Zealand Transport Agency Waka Kotahi (NZTA) crash analysis system (CAS) has been undertaken for a period between June 1st 2020 and June 1st 2025. **Figure 1-2** below outlines the extent of the CAS search along State Highway 45 - Devon Street West and South Road, and the locations of the reported crashes. In the above time period, there were 97 recorded crashes, described below.

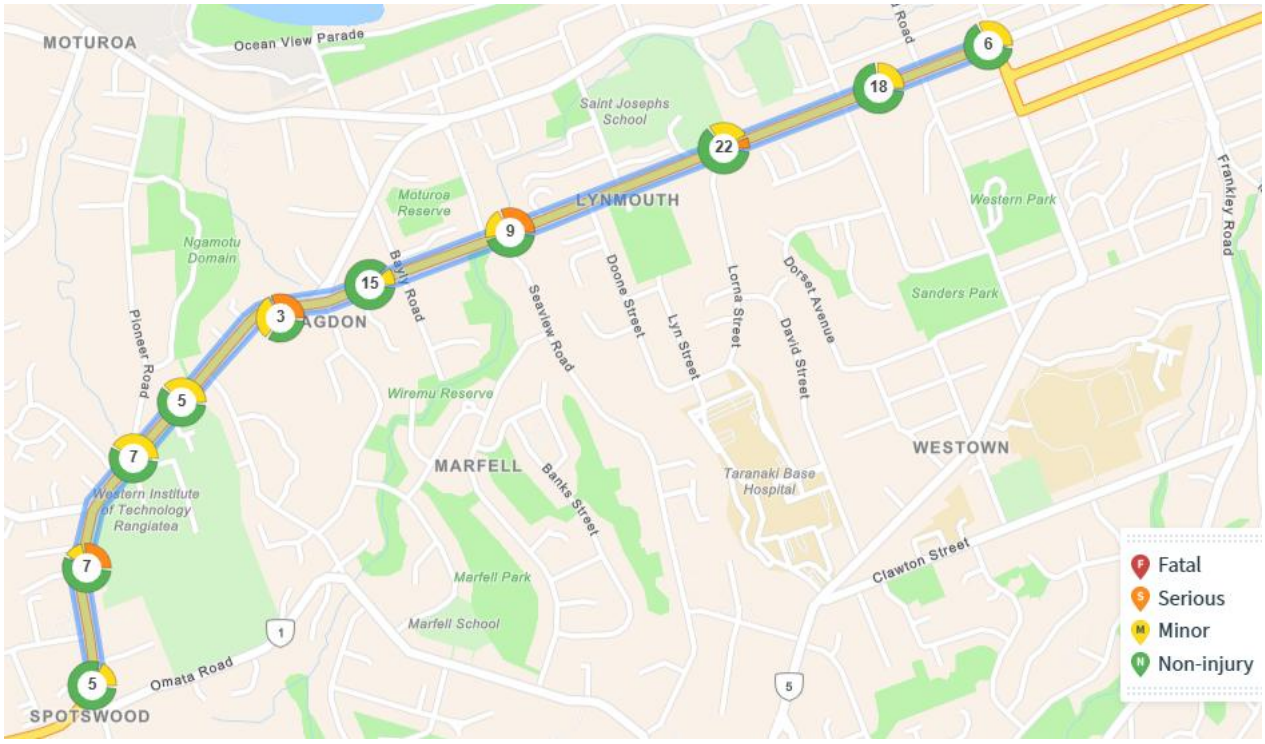


Figure 1-2: CAS Analysis Map of the State Highway 45 Corridor

The crashes highlighted above in **Figure 1-2** have been grouped based on the severity of injuries sustained by those involved. Provided below is a detailed summary of the serious crashes, followed by a high-level overview of minor and non-injury crashes, particularly regarding their location (Mid-block or Intersection) and whether or not active users were involved.

The serious crashes are listed geographically, from east to west along the corridor, starting with the crash at the intersection with Lorna Street. No fatal crashes have occurred within the corridor over the past five years.

Eight Serious Injury Crashes

- A driver, travelling eastbound on Devon Street West (towards New Plymouth CBD) near the Lorna Street intersection, has collided with a parked vehicle resulting in a rear end crash.
- A vehicle travelling eastbound on Devon Street West (towards the New Plymouth CBD) approached the Lorna Street intersection, where vehicles had stopped for a red light. The driver of the approaching vehicle was distracted by their mobile phone and looked up too late to stop in time. As a result, the vehicle collided with the rear of the westernmost stationary car. The impact resulted in the trailing vehicle flipped onto its side and slid into the westbound lane, resulting in a rear-end crash.
- A cyclist traveling eastbound on Devon Street West (towards New Plymouth CBD), north of Seaview Road, has attempted to cross the road and has failed to see a trailing vehicle. The cyclist has collided with the front left side of the vehicles and has fallen on to the road, resulting in a rear-end / changing lane crash.
- A vehicle has been waiting to turn right into Seaview Road from Devon Street West, once a gap has cleared in traffic the vehicle has made the turn. A pedestrian has started to cross the road at the same time and has been hit by the front left edge of the vehicle. Resulting in a right turn left side pedestrian crash.
- A vehicle waiting to turn right onto Lawry Street from Devon Street West has noticed a cyclist travelling eastbound on Devon Street West, the driver has assumed that they would have enough time to make the right turn before the cyclist passed through the intersection. The vehicle has begun the right turn and the cyclist collided with the right side of the vehicle, flipping over the vehicle and landing on the other side. Resulting in a right-angle cyclist crash.

- A vehicle traveling south on Devon Street West (away from New Plymouth CBD) attempted to make a U-turn and failed to notice the trailing motorcycle. The motorcycle has collided with the vehicle and was knocked off onto the road, resulting in a manoeuvre / rear-end crash occurring.
- A vehicle turned right onto South Road (SH45) from Manadon Street in Spotswood, veered left into the footpath and hit a parked work van. The driver then reversed quickly across the road, narrowly missing another parked vehicle and a wheelie bin on the opposite footpath. Resulting in a rear-end with a parked vehicle crash.

Minor injury and non-injury crashes

- From the crashes resulting in minor or no injuries 49 occurred within or adjacent to intersections throughout the Devon Street West corridor, and another 40 crashes occurred within the mid-block sections of the corridor.
- From the minor or non-injury crashes, 16 of these involved active mode road users (6 being cyclists). Notably, ten of these crashes occurred at intersections located throughout the Devon Street West corridor.

Most of the crashes identified in the above CAS search have occurred near key locations such as the Blagdon shops, Devon Intermediate, Westown School, St Joseph's block, and adjacent to Spotswood College. This pattern reflects the urban setting, where a mix of vehicle movements and vulnerable road users frequently interact with the road environment.

Following the installation of the cycle way separators there is no evidence within the CAS database that suggests that there has been an increase in crashes throughout the corridor. It is noted by the SAT that there have been some incidents anecdotally on the corridor since the project was constructed, however, the minor and non-injury crashes are unlikely to have been uploaded to the CAS database at the time of preparing this SSA.

1.3.2 Existing Road Environment Information

Table 1-2 below presents the key road information for the SH45 road corridor which transitions from Devon Street West to South Road. State Highway 45, also known as Surf Highway serves as a key regional connector along the coast, connecting central New Plymouth to the north and Hāwera to the south. Between these centres there are dozens notable places to stop, including the coastal villages of Ōakura, Ōkato, and Ōpunake.

Table 1-2: Key road environment information

	Devon Street West	South Road
Road Function (ONF – MegaMaps)	Urban Connector	Urban Connectors / Activity Street
Speed Environment (MegaMaps)	50km/h Speed Limit 44-51km/h Mean Operating Speed	50km/h Speed Limit 49-51km/h Mean Operating Speed
Land use and expected road users (NPDC District Plan)	The surrounding area features a mix of Medium and General Residential properties, complemented by sports and recreation grounds, along with a few small sections designated as local centre zones. The corridor is primarily used by private vehicles, with occasional heavy vehicle traffic. Active mode users are common along the	

	Devon Street West	South Road
	corridor, particularly around school zones during the busy morning and afternoon peak times. As the road is State Highway 45, it serves as the main route west along the coast towards Ōmata, Ōakura and Ōkato.	
Vehicle volumes and composition (Mobile Roads)	15,374 to 16,429 vpd (1.7% HV)	13,837 to 15,374 vpd (1.7% HV)
Pedestrian and Cyclists (estimated volumes)	Motorcyclists volumes assumed to be 1% of the corridors vpd 50 – 100 pedestrians per day 50 – 100 cyclists per day	Motorcyclists volumes assumed to be 1% of the corridors vpd 50 – 100 pedestrians per day 50 – 100 cyclists per day

1.3.3 Surrounding context

The corridor serves as vehicle access for six educational institutions catering to students from primary school year one through to year 13 at Spotswood College. Considering this, it is highly anticipated that there will be significant volumes of pedestrians and cyclists during morning and afternoon traffic peaks as students arrive and exit school premises. These schools span across the western half of the corridor, with high volumes of student activity expected from the Belt Road pedestrian crossing to Spotswood Primary, located opposite the Woolworths supermarket on South Road, and they will slowly disperse through the wider corridor extents into the surrounding suburbs.

The corridor is serviced by 15 school bus routes, which operate during the morning and afternoon peak periods. These buses run twice daily. In addition, regular commuter bus routes are operational throughout the day, though only four of these cover the Devon Street West/South Road corridor. These routes service the corridor approximately every 40-50 minutes from 7:06am through to 6:20pm until the last passenger disembarks.

The corridor encompasses a diverse range of land uses, from general residential areas to local centre zones. Key destinations within these zones include the Blagdon Shopping Area, the Woolworths supermarket at the western end of the corridor, as well as the café and Devon Medical Centre located near the Morley Street intersection. Therefore, these areas are likely to have a higher level of active mode users who are accessing these locations.

1.4 Work to be assessed

Major upgrades have been completed throughout the corridor to improve the connectivity for active mode users. These facilities aim to provide safer travel options along the corridor, with key east-to-west connections, as well as better intersection and crossing links connecting the north and south suburbs adjacent to the corridor. The assessment will include the audit of the following:

- Pedestrian crossing facilities
- Separated Cycleways (Including buffered separators)
- Shared walking and cycling pathways
- New line marking
- Reallocation of on-street parking facilities
- Kerb build outs
- Footpath connections

2 Safe System Audit

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 who identify and document 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 performance standards.

2.1 Safe Systems 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:

> *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 the road safety or operational problems identified should also be considered.

In accordance with the procedures set down in the “NZ Transport Agency Waka Kotahi Safe System Audit Guidelines” the audit report should be submitted to the client who will 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 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 with 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 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 will disseminate this to team members.

2.2 Report Format

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

The expected crash frequency 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 speeds, type of collision, and type of vehicle involved.

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

The frequency and severity ratings are used together to develop a combined qualitative risk ranking for each safety issue using the 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		Serious	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 2-1: Safety concern risk rating matrix

2.3 Safe System Audit Details

2.3.1 Type of Audit

This Safe System Audit is being carried out at the Post Construction stage of the project.

2.3.2 Audit Team

The Safe System Audit Team (SAT) for the safe system audit is shown in **Table 2-1**.

Table 2-1: Safe System Audit Team

Name	Audit Role	Position
Megan Taylor	Team Lead	Technical Director - Transportation
Courtney Devlin	Team Member	Senior Transportation Engineer
Corrigan Millar	Team Member	Transportation Planner
Alex Lumsden	Audit Reviewer (Traffic Signals)	Associate – Transportation Engineering
Marcus Brown	Audit Reviewer	Principal – Transportation

2.3.3 Meetings and Site Inspections

Daytime and night-time site visits were carried out on 15th and 17th of July 2025. The weather was wet and raining.

The site inspections included both walk-overs, drive-overs, and cycling the route.

2.3.4 Documents Reviewed

The documents supplied by NPDC and reviewed in the Safe System Audit, shown in **Appendix A**, are summarised in **Table 2-2** below.

Table 2-2: Reviewed documents supplied by NPDC

Drawing Title / Document Title	Drawing No.	Sheet No.	Revision (Date Issued)
New Plymouth District Council Barrett Road to Belair Avenue Devon Street West (SH45)	C30 – C32	1 - 3	Not dated
New Plymouth District Council Belair Avenue to Bayly Road Devon Street West (SH45)	C43 – C45	1 - 3	Not Dated
New Plymouth District Council Bayly Road to Morley Street Devon Street West (SH45)	C34 – C40	1 - 6	Not Dated

Along with the design drawings, the SAT were provided with copies of safety concerns that had been formally raised to NPDC by members of the public and users of the corridor.

3 Safe System Alignment

3.1 Project design safe system assessment summary

A safe system assessment has been undertaken by comparing the transport corridor before and after construction. Overall, the project results in a reduction of the Safe System score, suggesting an improvement in safety on the corridor. The summary of the Safe System Assessment is shown below in **Figure 3-1**. Motorcyclists were identified as the most at-risk road users throughout the corridor, this is predominately due to their exposure score, scoring a total of 48, which has not been affected by the project. Pedestrians and cyclists scored second highest equal with a previous layout score of 36, following the installation of the road upgrades pedestrians scores reduced to 24 and cyclists reduced to 15.75.

A summary of the safe system assessment scores per crash type is shown below In **Figure 3-2**.

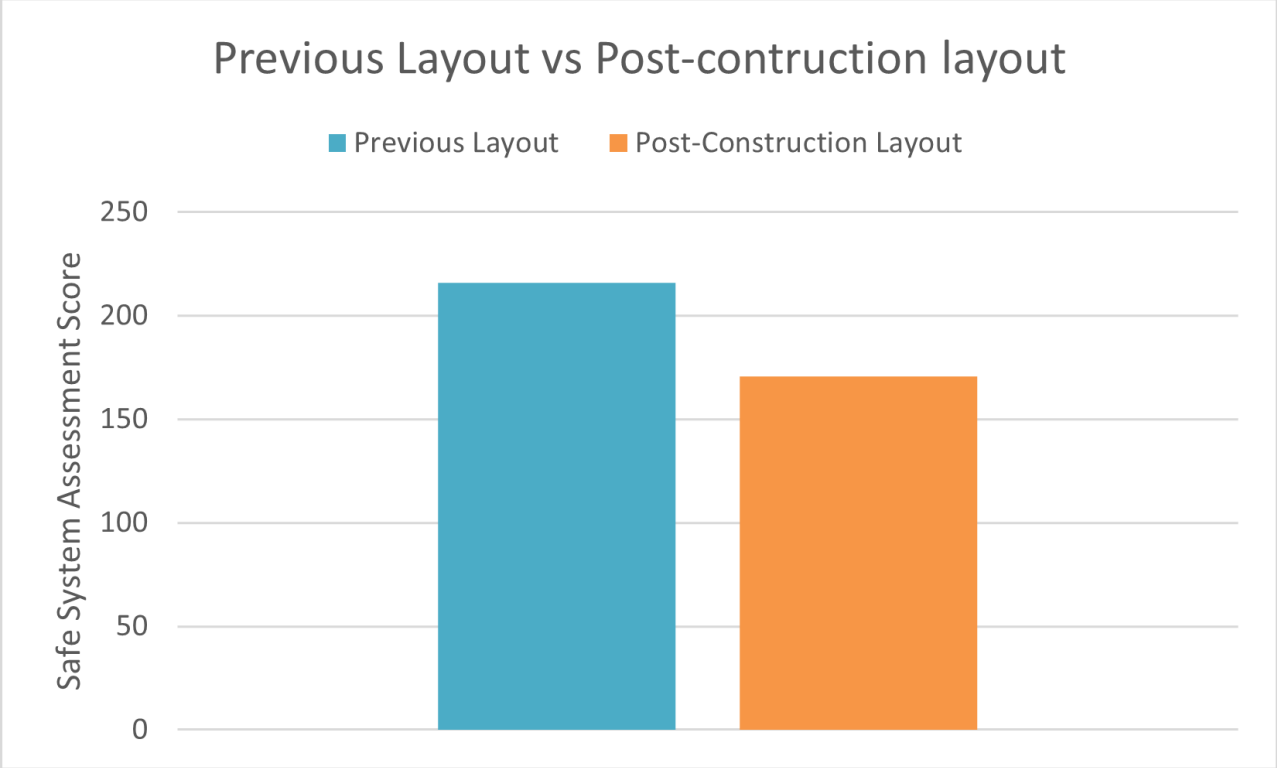


Figure 3-1: Previous layout vs Post-construction layout overall safe system scores

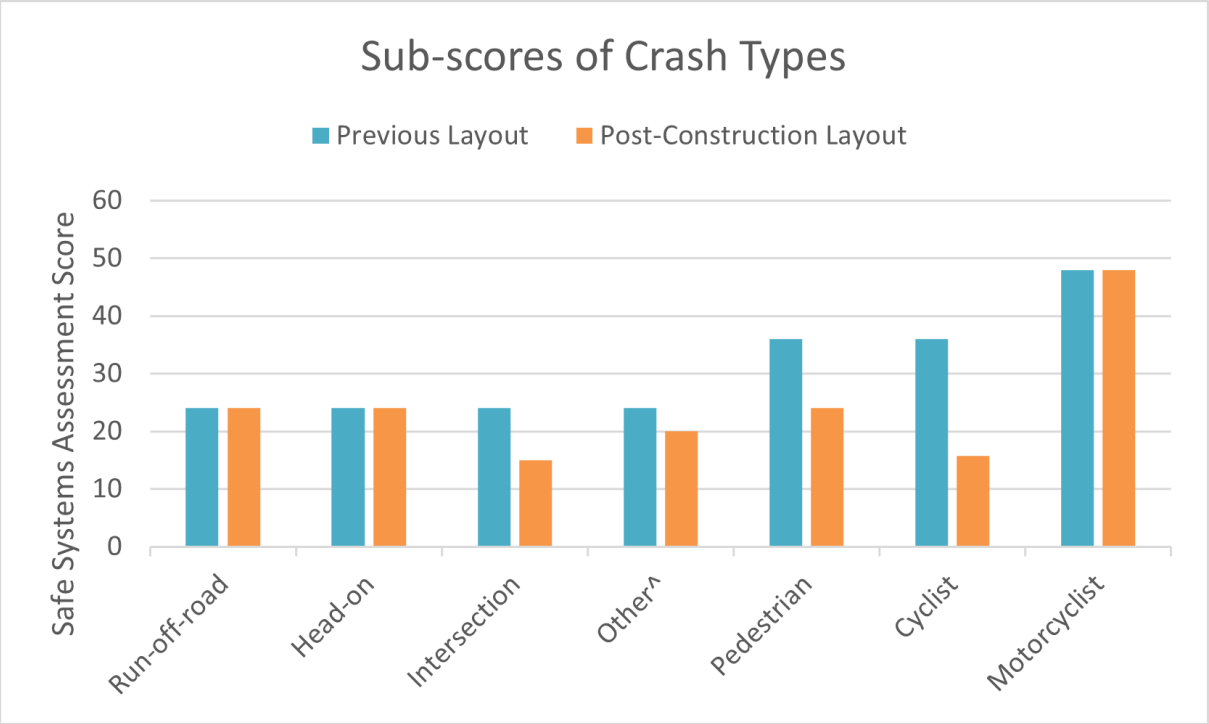


Figure 3-2: Safey system assessment summary by crash type

Prior to the walking and cycling upgrades, the corridor lacked pedestrian crossing infrastructure at many key desire lines, particularly at intersection approaches from minor roads. With the upgrades, several intersections now feature pedestrian refuge islands and kerb build-outs. These additions shorten crossing distances and allow pedestrians to cross in stages, making it safer by reducing their exposure to oncoming vehicles.

The previous corridor layout did not prioritise cyclist safety, exposing them to a higher risk of side-swipe and rear-end crashes. This was largely due to narrow cycle lanes and poor road conditions that reduced the usable space for cyclists. With the recent upgrades, cyclists now have separation from live traffic lanes along most of the corridor. This has significantly improved safety by protecting the rideable space.

The road upgrades have subsequently improved the corridor with respect to other crash types, by limiting the available space for u-turning manoeuvres, up dated line marking, and potentially slowing down entry speeds into many of the intersections. This is evident with the drop in safe system assessment scores for intersection crashes and ‘other’ crash types.

3.2 Safe System Assessment Matrix

The full safe system matrix is shown in **Appendix B**.

4 Safety Concerns

The following safety concerns have been identified as a part of the Safe System Audit.

4.1 Concealed pedestrians at zebra crossing **Serious**

The two car parks located on the eastbound approach towards the new zebra crossing east of the SH45 / Belt Road intersection currently conceal pedestrians waiting to cross at the second stage (after crossing the cycle lane). This is particularly evident if both car parks are utilised, however, when only the westernmost (furthest back from the crossing) park is occupied, pedestrians are still concealed until the approaching vehicle is very close to the intersection. As such, the Approach Sight Distance (ASD) and Safe Stopping Distance (SSD) is reduced. This means that the approaching vehicle will likely not be able to see pedestrians crossing (or other hazards) in time to react safely and stop in time, colliding with the pedestrian. See **Figure 4-1** below.

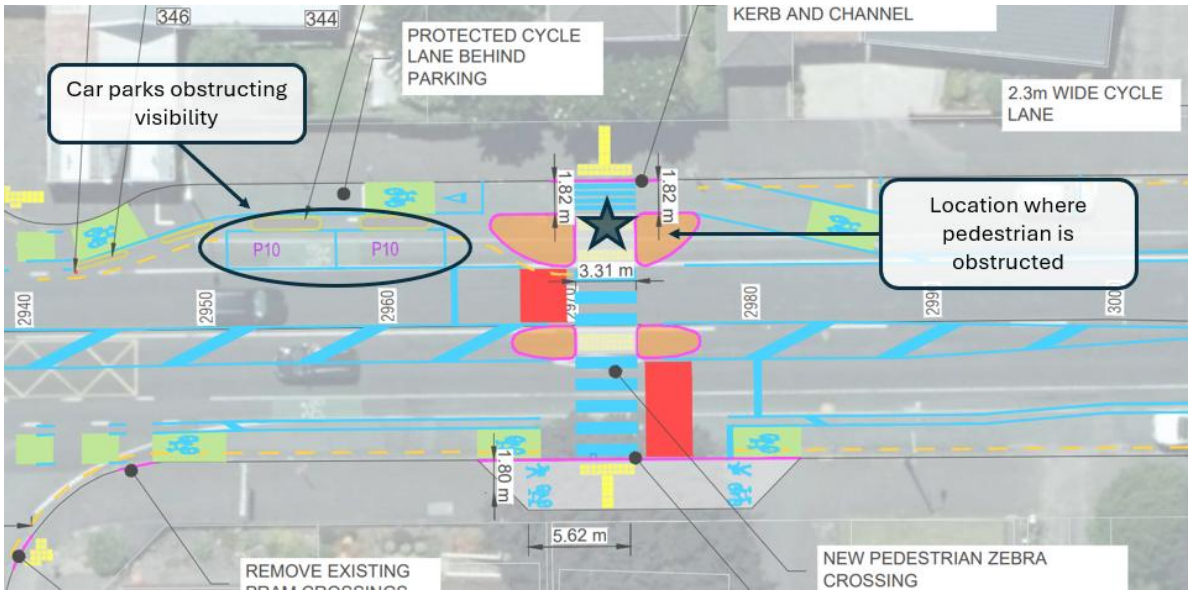


Figure 4-1: Location on the pedestrian zebra crossing where users are concealed by the adjacent car parking

Limited visibility for both pedestrians waiting to cross and oncoming vehicles significantly increases the likelihood of a pedestrian vs vehicle collision. This risk is further heightened by the downhill approach with restricted sightlines, where eastbound vehicles are likely to travel at higher speeds, amplifying the potential severity of a pedestrian vs vehicle collision. During the morning and afternoon peak traffic times the crossing's proximity to various school's increase the volume of vulnerable road users, such as school children. As well as being smaller, children tend to have lower cognitive, sensory, and physical abilities than adults. This means they may not approach the crossing with caution and step out onto the crossing from behind the parked vehicles without establishing visual connection with the oncoming motorist. While pedestrians do have right of way, pedestrian zebra crossings rely on visual connection between users, as opposed to traffic signals where the decision is made for you. This increases the exposure, likelihood, and severity of pedestrian and vehicle type crashes.

Additionally, vehicles using the carparks tend to shy away from the separator, resulting in drivers leaving a significant gap between themselves and separator. This is likely due to concerns around potential wheel damage due to the profile and proximity of the separators, as well as the approach entry angle. This parking behaviour further reduces the available approach sight distance and safe stopping distance. This is shown below in **Figure 4-2**.

Figure 4-2: Large space between the separator and parked vehicle (shown in yellow oval)

Recommendation:

- It is recommended that the two carparks located to the west of the zebra crossing are removed. This will increase the sight distances for both waiting pedestrians and eastbound on-coming traffic. (Primary treatment)

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Likely**	***Death or serious injury is*** **Fatal**

Design Team Response:

The Design Team would firstly like to point out that the design drawings related to the separator layout, which was reviewed by the Safe Systems Audit Team (SSAT) are not Construction drawings, rather they are "For Information Only" drawings which were provided in lieu of the design being finalised (this is noted on the title block & general notes of this drawings set). Additionally, as acknowledged by the SSAT in section 5.1 of the audit, some works are still ongoing on site, which were not completed at the time of the audit.

These points are relevant to any aspects of the audit concerning the concrete separators.

Regarding Safety Concern 4.1, the Design Team partially agree with the auditors.

From the New Zealand Transport Agency's Cycle Network Guidance, there are two recommended sight distance criteria which should be met at a formal pedestrian crossing. These are Approach Sight Distance (ASD) and Crossing Sight Distance (CSD).

Approach Sight Distance (ASD) is numerically equal to Stopping Sight Distance (SSD) (as referred to by the SSAT) and is measured from a driver in the approaching lane to the likely "contact point" between a pedestrian and a vehicle. The contact point is a point mid-way across the crossing, in the carriageway (as shown in the figure below), and thus ASD is currently being achieved at this facility.

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Likely**	***Death or serious injury is*** **Fatal**

CSD however, which is measured from a vehicle to a pedestrian standing 1.6m back from the edge of the carriageway, is currently not achieved (as rightly identified by the SSAT), as a pedestrian could be partially obstructed by a vehicle parked in the P10 (10-minute) parking space.

As noted by the SSAT, this could be resolved by removing the parking bays. An alternative option that could be considered is to recess the existing kerb and channel to the north (i.e. away from the carriageway / into the footpath). This would enable improved sight distance to be achieved, whilst also retaining the parking spaces and the safety improvements for cyclists. This option would reduce the footpath width and require design validation to ensure there are no knock-on / unintended implications (e.g. on surface drainage flows or conflicts with underground services). Another alternative option could be to swap the location of the crossing & parking bays so that the crossing is located immediately adjacent to the shops, and the parking bays further to the east. This however would require reconstruction of the crossing and potentially increase risk to pedestrians due to proximity of the crossing to Belt Road intersection (due to vehicles turning left out).

The Design Team note that the parking spaces at this location have been retained at the request of NPDC following consultation with the adjacent shop owner.

Safety Engineer:

Agree with the concern raised by the Safety Audit Team. The lack of sight lines obscures visibility of pedestrians at the crossing, which should be addressed.

Removing parking will resolve the issue however the it is understood that this is a sensitive issue, particularly given demands for nearby dairy and school. As such to retain parking, the design teams suggestion to recess the existing kerb and channel is considered a good option. This will allow for the current parking to be further indented toward the kerb whilst providing improved clearer views/sight lines of pedestrians on the kerb outstand/pedestrian crossing. It is recommended that this is further explored to address the issue.

Client Decision: *Agree with Designer and Safety Engineer. Kerb and channel to be recessed to achieve visibility requirements for the crossing.*

Action Taken: ***Kerb and channel has been recessed***

4.2 Conflicting Pedestrian and Vehicle phasing **Significant**

At the signalised intersection between Devon Street West / SH45 and Morley Street, in B-phase, pedestrians do not appear to be protected from left hand turning vehicles from Devon Street West / SH45 on to Morley Street. It is unclear if the pedestrian phase (P2) is being overlapped from A-phase to B-phase. This could increases the likelihood of pedestrian vs motor vehicle type crashes. See **Figure 4-3** below.

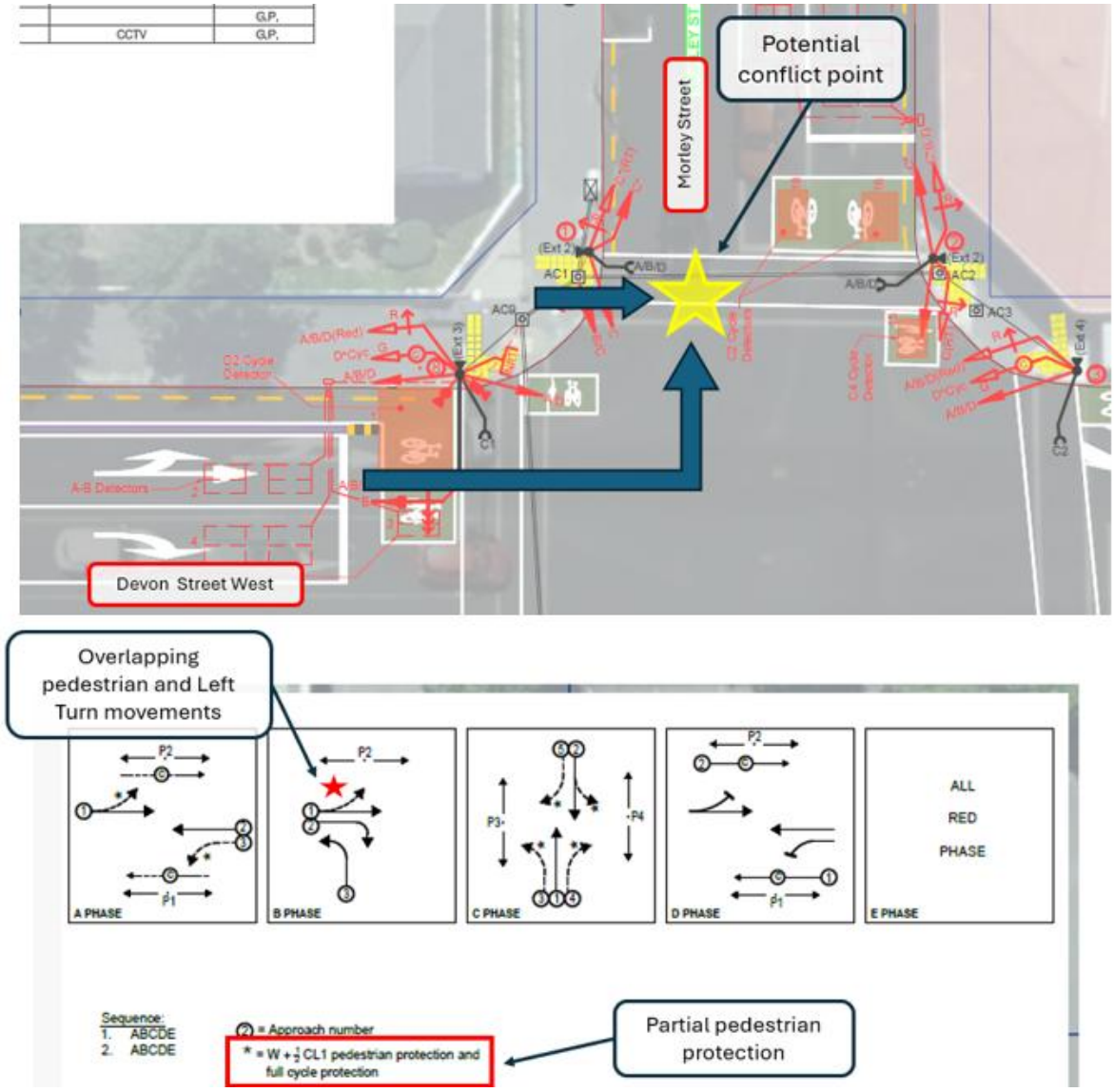


Figure 4-3: Overlapping pedestrian and Left turning driver movements

Vehicles turning left at this location are likely to be travelling less than 30 km/h which reduces the severity of these crash types.

Recommendation:

- Provide red-arrow pedestrian protection at the start of B-phase to avoid the potential for left turn vehicle conflicts with pedestrian crossing movements. This can be done through restricting left turning movements during the full length of the pedestrian crossing phase.
- Consider removing the pedestrian crossing phase (P2) from B-phase

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Unlikely**	***Death or serious injury is*** **Serious**

Design Team Response: *As the phase sequence shows, the A-phase is followed by the B-phase. The protection level is set as "walk plus half clearance", which is the highest level of protection used below full protection. When the controller overlaps to the B-phase, the "walk plus half clearance" still applies. The signal controller must have the ability to overlap from A-phase to B-phase, as the B-phase provides*

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Unlikely**	***Death or serious injury is*** **Serious**

for the highest demand movements at this intersection, supporting the state highway traffic demand. To not provide the Ped2 movement during the B-phase makes no sense, as it would otherwise force the signals to remain in the A-phase needlessly. There is no safety issue here; this is probably just a case of the signal auditor misunderstanding the design drawing. The reason that the star (*) – which signifies the protection level of "walk plus half clearance" – is only shown for the A-phase, and not the B-phase, is that the setting applies from the beginning of the A-phase. When the phase overlaps to B-phase and the protection has not expired yet, it will continue to apply until "walk plus half clearance" has been reached.

Safety Engineer: Click here to enter text.

This has been run past NZTA's Wellington Transport Operations Centre who manages the traffic signal operations. They have explained the following.

"Ped protection is active in D phase, yet the phase can overlap into A and B phases which at that point, ped protection is not required, but vehicles must give way to pedestrians completing their crossing of the road".

To further simplify, the green pedestrian light activates in the D phase, which left turning traffic is stopped and thus pedestrians are protected. Transitioning into the A and B phase, the pedestrian light would have changed to a flashing red, where pedestrians are to finish crossing, but also allow turning left turning traffic to turn if it is clear of pedestrians (i.e. left turning still need to give way if pedestrians are in the progress of crossing, similar to any other traffic signal).

At this time, no changes to the traffic signal phases are required.

Client Decision: *Agree with Designer and Safety Engineer. Pedestrian phase is protected sufficiently so no changes required.*

Action Taken: ***No action required***

4.3 Seaview Road lack of merging room for cyclists **Significant**

It was observed during the cycling site visit that cyclists turning right from Seaview Road onto SH45 / Devon Street West to head eastbound are confronted with a set of separators directly opposite the intersection. These separators are relatively close together leaving insufficient space between the separators to help the cyclists merge with the cycle lane, therefore, cyclists are temporarily 'trapped' in the live traffic lane before they can safely merge into the cycle lane north of the Seaview Road intersection.

The absence of a dedicated merging space for cyclists into the cycleway increases their risk of being struck by oncoming vehicles, potentially leading to side-swipe or right-angle crashes. The severity of such crashes is heightened due to the intersection's location at the bottom of a valley (sag curve), where vehicle speeds are typically higher due to the downhill slope. The lack of merging space for cyclists is shown below in **Figure 4-4**.

Figure 4-4: Lack of merging space at Seaview Road intersection

Recommendation:

- It is recommend removing the separators directly opposite the intersection. This will create a gap that cyclists can use as a merging point, allowing them to safely cross into the cycle lane and exit the live traffic lane.

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Unlikely**	***Death or serious injury is*** **Serious**

Design Team Response:

The Design Team agree with the auditors.

The separators opposite Seaview Road serve an important role in protecting eastbound cyclists at this often-congested intersection. Due to the complex layout of the junction (with back-to-back right turn bays and a high volume of through and turning movement), cyclists are exposed to a higher risk of rear end collisions. As such, it is important to retain as many separators as possible at this location, however, we agree that a gap of sufficient width should be provided to enable cyclists who are crossing from Seaview Road to safely access the protected cycle lane. The gap should not however be so wide as to enable vehicles to enter the cycleway. We recommend that 1 – 2 separators maximum are removed opposite the intersection, approximately in line with the prolongation of the eastern kerb on Seaview Road.

Safety Engineer:

Agree with Safety Audit Teams recommendation. A gap in the separators will assist cyclists turning out of Seaview Road and allow them to enter cycleway more easily, whilst limiting their exposure to traffic on SH45.

Client Decision: *Agree with the Safety Audit Team recommendation. 1 Separator to be removed to allow for cyclists to enter the cycle lane. This should be sufficient to allow cyclists to enter the cycle lane, whilst minimising the risk of vehicles striking the end of the separator after the gap.*

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Unlikely**	***Death or serious injury is*** **Serious**

Action Taken: ***Separator has been removed***

4.4 Concrete Cycleway Separator Design **Moderate**

The profile for the separators suggests that they are non-mountable. While the height of the separators are in line with existing mountable kerb and channel found throughout the district, the gradient of the slope is steeper. The gradient of the slope on the separators is 1:1 as opposed to a standard mountable kerb which has a slope ratio of approximately 1:1.75. The differences between the concrete separators and a typical mountable kerb and channel is shown below in **Figure 4-5**.

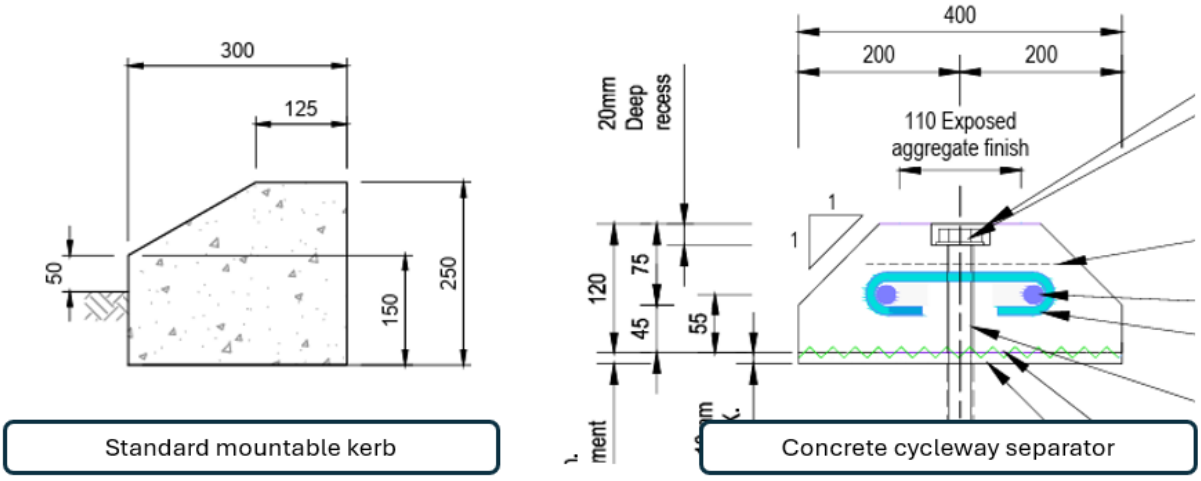


Figure 4-5: Standard mountable kerb detail in comparison to the concrete cycleway separators installed along the corridor

This design has caused considerable concern and discussion by road users and local stakeholders. A particular concern raised involves motorists unable to pull over to let emergency vehicles through in an emergency. The steep sides of the concrete cycleway separators discourage vehicles from pulling into this space as the separators appear to be unmountable and higher than they actually are. Whilst the non-mountable profile helps to discourage encroachment into the cycleways, it is resulting in damage to both vehicles and the separators where there is a collision. It is evident that there have been many collisions with the separators to date, noting the tyre marks and damage caused to the separators along the corridor. A collision resulting in a tyre blowout during our site visit is shown below in **Figure 4-6**.

Figure 4-6: Damage vehicle due to collision with the concrete cycleway separator on SH45 / Devon Street West

In addition to this, most of the cycleway separators currently have only their edges painted white, while the tops remain unpainted. The dull grey exposed aggregate tops of the separators make the kerbs relatively unobtrusive and appear similar to the adjacent road surface in low light conditions. In some instances, the first and occasionally the last separator is painted red on top, but this is not consistent throughout the corridor. See **Figure 4-7** below.

Figure 4-7: Cycleway separators composition matching the surroundings

The absence of red paint on top of the separators makes them harder to spot as the white sides can resemble standard line markings, rather than a raised separator. Additionally, the edge line of the traffic lane is hard up against the base of the separator which somewhat blurs the distinction between the concrete separator and traversable line marking.

These concerns increase the likelihood of the separators being hit by motor vehicles and causing damage to both the vehicles and the separators. Striking a separator can cause issues, such as tyre blowouts (as observed during the site visit). These incidents increase the likelihood of run-off road and rear-end type crashes.

The limited visibility of the separators also can become a trip hazard for people walking and crossing the road mid-block. When pedestrians are crossing the road mid-block, they will be focussing on the road and identifying an appropriate gap in the traffic to cross. The concentration on the traffic may result in a lower level of awareness of the actual ground conditions and level changes.

It is noted by the SAT that the visibility of the separators is increased during dark hours due to the red raised reflective pavement markers (RRPM's) that has been installed on the traffic lane side of the separator. These provide clear delineation between the separators and the edge of the traffic lane. This is shown below in **Figure 4-8**.

Figure 4-8: Red RRPM's effectively delineating the concrete cycleway separators on SH45 / Devon Street West

The SAT have reviewed this operation and note the following:

1. This buffered cycle lane is the first physically separated bicycle facility in New Plymouth. This will require some adaptation by users to the new design; however, the placement of multiple kerbs is not new as there are central median islands and kerb build outs throughout the city.
2. The frequency of the separators being struck by vehicles is high. This requires a change in behaviour by road users and takes a period of time to adjust.

Recommendation:

- The SAT recommend that all separators are painted red on top to increase their visibility during all hours of the day, and differentiating them from the typical edge line marking.
- If space allows, offset the edge line into the lane to provide a small buffer zone between the concrete separator and the traffic lane.
- Investigate the use of alternative, more forgiving separator designs. These could be trialled in targeted areas and when replacing damaged concrete separators
- The operation of the cycleway and the crash statistics should be reviewed again within the next six months once drivers have had a chance to adjust to the new road formation.

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Very Likely**	***Death or serious injury is*** **Minor**

Design Team Response:

The Design Team partially agree with the auditors.

The profile used for the concrete separators as referred to by the SSAT is a variation of the "Safety Kerb B" type profile from Figure 3.7 of the New Plymouth District Council Land Development and Subdivision Infrastructure Standard. This type of kerb profile has been used on similar projects in other parts of New Zealand and can be described as semi-mountable, since it features a chamfered edge rather than vertical face, whereas a non-mountable kerb typically features a vertical face only. The alternative kerb profile identified by the SSAT could be more accurately described as a fully mountable kerb. A fully mountable kerb profile is typically used in urban/lower speed environments, where the kerb is expected to be over-tracked on an intermittent basis (usually by larger vehicles). A key aspect of a protected cycleway design is that it provides protection to vulnerable users (i.e. the cyclist). As such, the Design Team does not advocate use of a fully mountable kerb, particularly where the separation distance between motor vehicles and cyclists is quite limited (as is the case along SH45).

Nonetheless, the Design Team acknowledges the issues identified by the SSAT and the concerns raised by road users.

In relation to the SSAT's recommendations, we do not agree with the recommendation to paint all the separator tops with red paint. Whilst this would provide a visual contrast initially, over time, the effectiveness of the paint will diminish as it accumulates dirt and other contaminants. Additionally, painting all the separator tops red would result in significant additional cost to the road controlling authority, both up front and over the long term, since maintaining their visual effectiveness would require ongoing regular cleaning and maintenance &/or repainting regularly into the future. As such, we believe a more balanced approach is appropriate, whereby the top of the first and last separators only (in each row) are painted red to improve visibility & driver awareness. Installation of vertical delineators (i.e. mounted on top of the separators) could also be considered at select / higher risk locations.

We agree with the SSAT recommendation that a buffer should be provided between the separator edge and the painted edgeline where possible. This may help motorists better differentiate between the edgeline & concrete separator, as well as address the SSATs concerns related to pedestrian trip hazards.

We also agree that continued monitoring should be undertaken to identify any ongoing issues or problematic areas.

Safety Engineer:

Offsetting the separators is considered the most practical solution in reducing accidental strikes as this would provide a greater buffer for traffic.

Painting the top of the separators will help with contrasting the separators from the road, however I agree with the Design Team that the critical separators will be the first and last separator in a series.

Accidental strikes of the separator are likely to be more associated with the first separators, particularly by turning traffic. Potentially these first separators could be more forgiving with being lower or having a more mountable kerb/edge.

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Very Likely**	***Death or serious injury is*** **Minor**

Ongoing monitoring of the separators should be undertaken where adjustments are made where necessary.

Client Decision: *Agree with the Designer recommendations. Making the separators more mountable reduces the safety benefits of the separator, by making it less likely that a vehicle colliding with a separator is kept out of the cycle lane. Painting all of the separators would incur a significant ongoing cost and so given that it is usually the initial separator after a gap that is struck, it is most beneficial and cost effective to highlight the first and last separators in a section. Where possible, a gap should be provided between the edge line and the separator as recommended, as this is the more practical solution for reducing vehicles swiping separators. Ongoing monitoring to be undertaken as recommended by Designer and SE.*

Action Taken: ***Additional separators near beginning and end sections have been painted red on top. We will continue to monitor.***

4.5 Car park locations on SH45 / Devon Street West **Moderate**

Four new car parks on SH45 / Devon Street West, located outside the 299 Motel in the mid-block section between Morley Street and Cutfield Road, extend quite abruptly toward the live traffic lane. This means that drivers need to 'weave' around the parked vehicles as opposed to driving in a straight line. This is exacerbated by inadequate delineation of the travel lane between the car parks and the travel lane meaning drivers are not guided to safely shift towards the centreline and away from these parking spaces. This increases the likelihood of rear end and side swipe type crashes as vehicles may swerve to avoid an unexpected, parked vehicle in their perceived travel lane. The weaving movement is shown below in **Figure 4-9**.

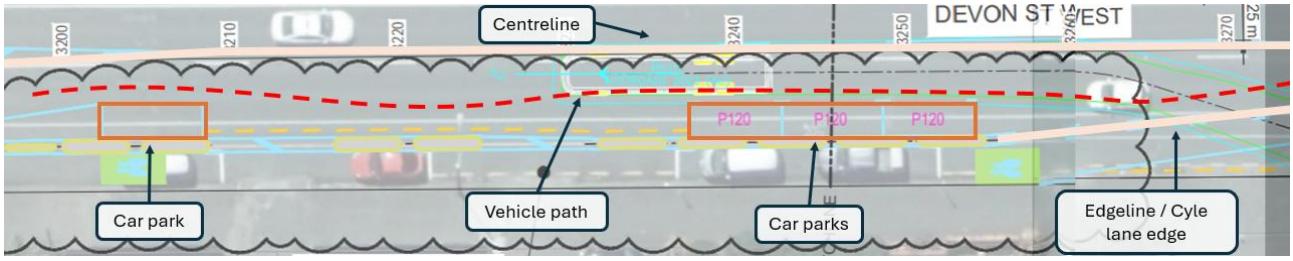


Figure 4-9: Weaving vehicle movement (red dotted line)

An instance where this is particularly apparent is a lone parking space to the west of the first group of three (outside 305 Devon Street West). This space also sits next to a right turn median taper which directs drivers away from the centreline and closer to the parking space. A pinch point or bottleneck is effectively created, further exacerbating the feeling of parking spaces protruding into the live traffic lane.

The parking spaces can be seen below in **Figure 4-10**.

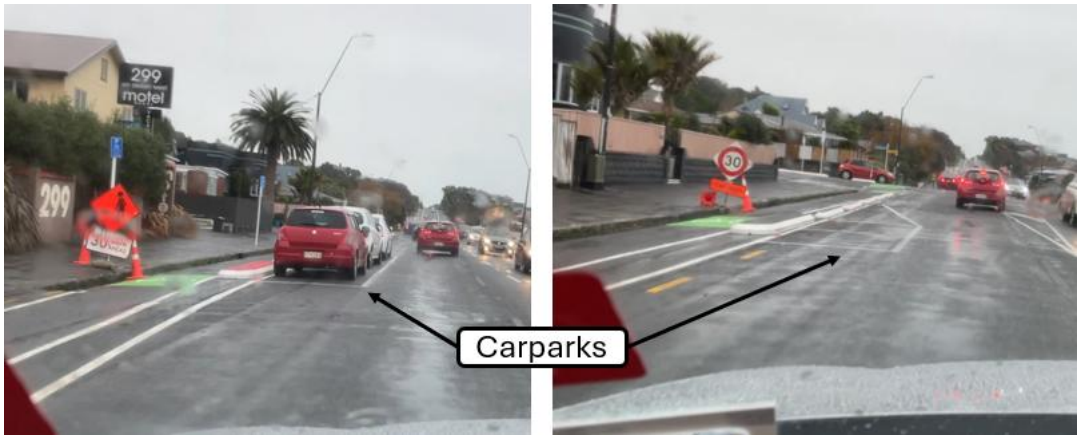


Figure 4-10: Ineffective car park line marking and carparks appearing to protrude into the live traffic lane

Additionally, submissions have been made concerning the risk of opening doors from a car parked next to the live lane, being impacted by through traffic. Generally, if an impact with a door occurs, it would result in vehicle damage only, however, the SAT do acknowledge that if a driver alighting from a parked vehicle took no care in exiting their vehicle, there may be a risk of a side swipe type impact from a through vehicle. It is important to note that this could occur anywhere on the road network and is not necessarily a function of the Devon Street West design only.

The SAT have reviewed this operation and note the following:

1. The driver of a parked vehicle must make sure that the road corridor is safe to open the door.
2. The desired position of through traffic is not well defined this is particularly evident where the existing road surface is flushed, or during times of low light the visibility of these lines is low. Currently the lane is represented as the space between the road centreline and the edge of the parking space.

Recommendations:

- Install an appropriate form of marking or guidance, such as a continuity line and/or edge definition to better position the through traffic to their lane. This will encourage better lane discipline, move the passing traffic away from the parked vehicles and offer an increased margin for door opening. This would also offer a greater margin of safety for pedestrians walking out mid-block between parked vehicles to cross the road.
- Replace the car park line marking with high performance line marking to increase their visibility, particularly in low light conditions.
- The lone parking bay near Cutfield Road intersection could be removed or joined with a continuity line with the three to the east.

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Likely**	***Death or serious injury is*** **Minor**

Design Team Response:

The Design Team partially agree with the auditors.

Due to the relatively flat gradient of Devon Street West, forward visibility of 125m minimum is available to the new parking bays for drivers who are travelling westbound from the intersection of Morley Street. The position of vehicles approaching the parking spaces are also guided to the right-hand side of the lane by the cycle lane buffer markings adjacent to the bus stop opposite No. 293. As such, the Design Team believe it would be unlikely that parked vehicles "appear unexpectantly" to approaching drivers.

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Likely**	***Death or serious injury is*** **Minor**

Additionally, drivers are not required to weave as indicated in Figure 4-9. Rather, once they have manoeuvred to the right of the new parking bays, they can continue to travel in a straight line, following the centreline of the road as is normal practise.

Nonetheless, the Design Team agree that improved delineation could be provided by way of marking a white edgeline, which tapers gradually from the buffer marking adjacent to the bus stop, and continues west adjacent to the parking bays, matching into the end of the newly marked edgeline beyond the final bay. The edgeline would ideally be offset by a minimum of 600mm from the edge of the bays, and would help guide drivers away from the new parking bays and provide separation between parked and through vehicles on SH45. The Design Team understand that changes which are proposed to the existing centreline (i.e. to shift it to the north) have yet to be implemented. To accommodate a 600mm buffer within the existing width available, we estimate that the lanes on SH45 would need to be marked at 3m wide over this short section. Also, the three P120 bays may need to be moved slightly west.

The design team agree with the SSAT that high performance markings could improve delineation during low light conditions and are desirable if funding permits.

Safety Engineer:

Agree with the recommendations for continuity line and use of long-life markings.

The continuity line will help keep traffic within the lane while also providing a buffer to the on-street parking. The realignment of the centreline as described by the Design Team will help redistribute the lane widths to balance out the space.

Client Decision: *Agree with Designer and Safety Engineer recommendations. A continuity line with long-life markings to be installed.*

Action Taken: ***Changes to road marking and a continuity line with long-life markings has been installed***

4.6 Filter turn signals at SH45 / Devon Street West and Morley Street intersection Minor

At the SH45 / Devon Street West / Morley Street intersection, the right hand turn movements from Morley Street onto SH45 / Devon Street West are now controlled by filter turn signals. With the gradient of Morley Street on the northern approach and the further set back hold line, there are visibility constraints for vehicles turning right. Additionally, these vehicles start on an incline, which takes additional time to accelerate and make the turn. This makes it difficult for these drivers to gauge an appropriate gap to make the right turn in between the priority straight through movements. This increases the likelihood of intersection type crashes for right turning vehicles. See the available sight distance in **Figure 4-11** below.

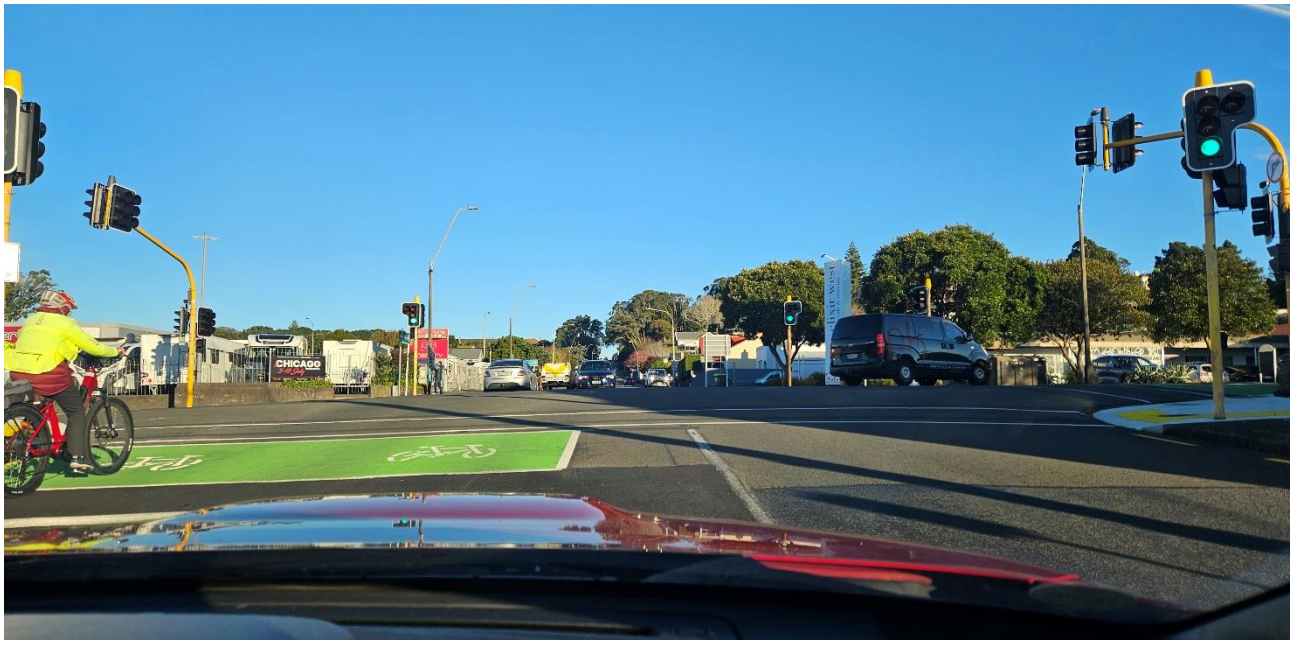


Figure 4-11: Sight distance when waiting to turn right from Morley Street onto SH45 / Devon Street West

The vehicle positioning required for these right hand turns is also unclear. Drivers turning right may not be guided properly at the intersection and encroach into the opposing vehicle lane when making these right turn movements. The lack of position guidance within the intersection before turning further increases the likelihood of intersection type crashes for right turning vehicles. This is shown in **Figure 4-12** below.

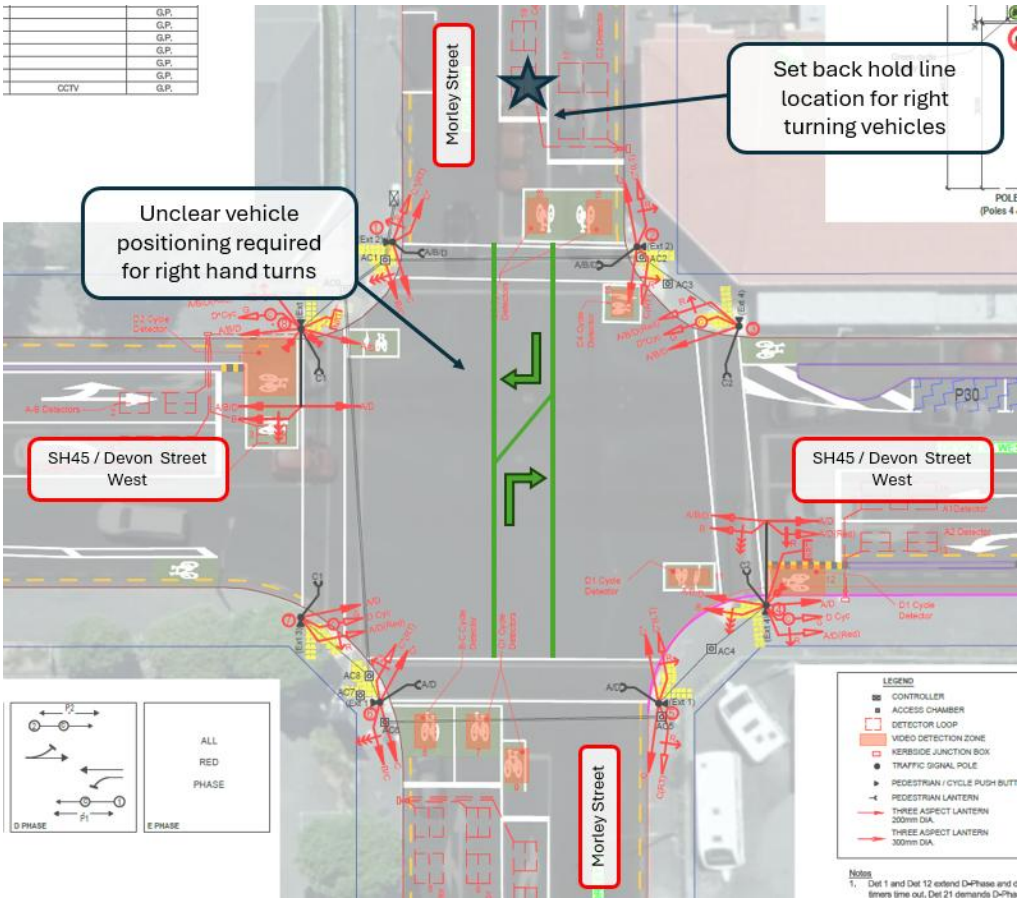


Figure 4-12: Unclear vehicle positioning and lane delineation for right turning vehicles at the SH45 Devon Street West / Morley Street intersection

Recommendation:

- Provide right turn green signal arrows from Morley Street onto SH45 / Devon Street West.
- If filtered turning is deemed to be necessary, consider providing right turn pockets within the intersection in line with the NZ Transport Agency Waka Kotahi Traffic Control Devices manual

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Unlikely**	***Death or serious injury is*** **Minor**

Design Team Response: *SIDRA modelling was undertaken for this intersection as operational changes were to be implemented that affected the capacity of the intersection. At that time, it was determined that for ongoing smooth operation of this state highway intersection, filter turning for the Morley Street approaches would be necessary. This was not seen as a safety risk, as filtering through a single lane of oncoming traffic is regarded as safe, if there are adequate gaps in the traffic flow (which is the case here). However, the design team agrees that vertical alignment provides visibility restrictions, and that these visibility restrictions should be addressed through encouraging drivers to pull into the intersection through guide markings as shown in Figure 4-12. The design team agrees that these guide markings should be retrofitted. This will be considered alongside the next item 4.7.*

Safety Engineer:

The provision of right turn green signal arrows would provide for a safer outcome as it separates conflicting movements, however this change would reduce the efficiency of the intersection (I.e greater delays to every other movement), which a balance between safety and efficiency should be considered.

Based on the crash history of the intersection, there has not been any recorded crashes involving right turns out of Morley into Devon Street West in the last 10 years and as such this movement has not been a concern previously. Thus if the right turn out of Morley can functions similarly to the previous layout, then the right turn signal arrows is not considered to be needed at this time.

Agree with SAT recommendation for right turn pocket markings within the intersection. This will alleviate the issue with the crest of the intersection and help guide right turning traffic into a space to achieve better visibility of oncoming traffic.

Client Decision: *Agree with Designer and Safety Engineer recommendations. Right turn pocket markings to be installed, without right turn green signal arrows.*

Action Taken: ***Right turn pocket markings have been installed***

4.7 Morley Street intersection island **Minor**

Eastbound traffic passing through the Morley Street and SH45 / Devon Street West intersection now encounters a kerb build-out on the eastern side of the intersection. This requires vehicles to deviate from their usual path when travelling towards New Plymouth's CBD. The build-out is partially concealed by the high point at the centre of the intersection, making it difficult for drivers to spot until they are already well into the intersection. This increases the likelihood that motor vehicles will mount the kerb or have to swerve suddenly to avoid the island. The island is marked with two slim-profile edge marker posts, which somewhat enhance its visibility. However, these posts tend to blend into the background created by the cycle lane separators positioned behind the island, reducing their overall effectiveness.

Drivers face the risk of colliding with or driving over the island, which could lead to a run-off-road crash. However, the likelihood of severe crashes at this location is relatively low, as it is expected that vehicles are typically travelling at lower speeds through intersection. The islands concealment is shown below in **Figure 4-13.**

Figure 4-13: Concealed island in the natural path of vehicles heading eastbound through the intersection.

Recommendation:

- The SAT recommend that a reflective directional sign is installed on top to help better guide eastbound drivers to deviate slightly to the right when travelling through the intersection such as ‘keep right arrow’.

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Unlikely**	***Death or serious injury is*** **Minor**

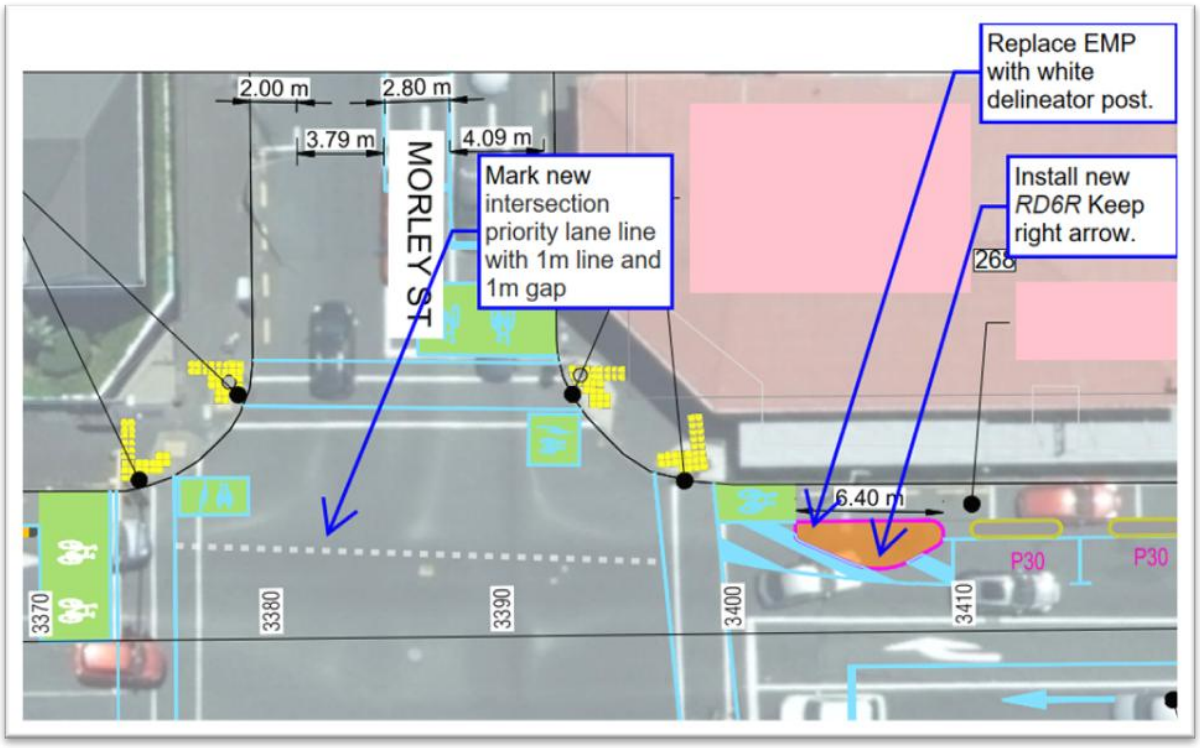
Design Team Response:

The Design Team agree with auditors.

White edge marker posts (EMPs) are not an appropriate form of delineation in the urban area or for this type of application. We agree that an RD6R Keep Right Arrow sign should be used to replace the EMP in the right of the photo. We also recommend that the edge marker post on the left of the photo is replaced with a white delineator post. An intersection priority lane line could also be marked to delineate the edge of the traffic lane through the intersection as shown in the image below.

We note also that orange delineator posts have been used to delineate the road centreline on the east side of the intersection. Preferably, these would be replaced with white delineator posts in keeping with the requirements of Part 4 of the New Zealand Transport Agency Waka Kotahi, Traffic Control Devices manual.

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Unlikely**	***Death or serious injury is*** **Minor**



Safety Engineer:

Agree with Design Team comments and recommendation for RD6R Keep Right Arrow, white delineator post and priority lane line. These improvements should help guide traffic and better highlight the traffic island.

Client Decision: *Agree with recommendations. RD6R Keep Right Arrow, white delineator post, and priority lane line to be installed.*

Action Taken: ***RD6R Keep Right Arrow, white delineator post and priority lane line have been installed.***

4.8 Trap lane on Morley Street intersection approach **Minor**

The eastbound traffic lane approaching the Morley Street intersection is configured as a trap lane. This design directs the travel lane into an exclusive right-turn onto Morley Street. While this is the most common eastbound movement at the intersection, the trap lane increases the risk of side-swipe and rear-end crashes. This occurs when drivers or riders attempt to switch lanes late to continue traveling straight through the intersection.

The trap lane configuration is shown below in **Figure 4-14**.

Figure 4-14: Traffic lane turning into a right turning lane

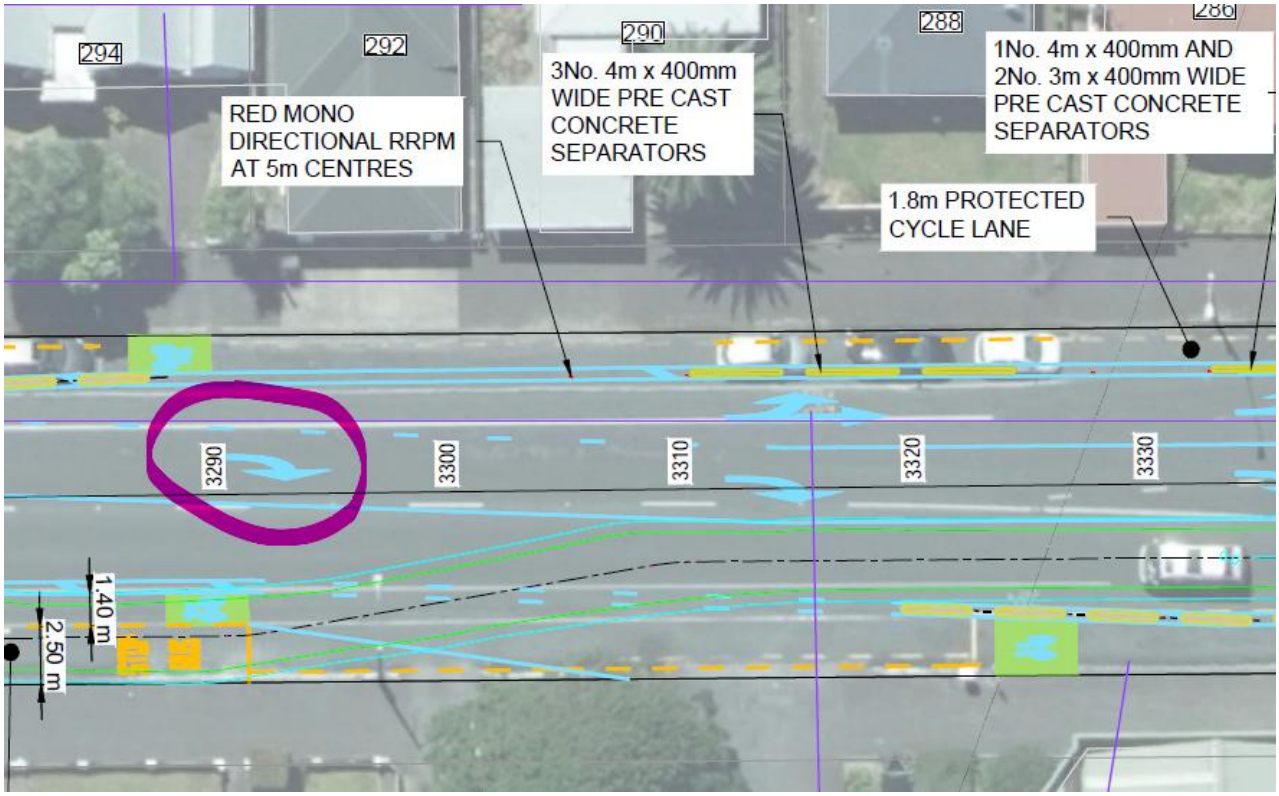
Recommendation:

- The SAT recommends replacing the trap lane with a channelised turn lane where feasible. If this isn't possible the addition of an advance lane arrow on the intersection approach should be implemented.

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Unlikely**	***Death or serious injury is*** **Minor**

Design Team Response: *The design of a captured lane was deliberate and guided by the wishes of the two road controlling authorities involved. The intention was that by default, drivers would follow the alignment of the state highway, rather than being channelled into the central city. That said, it has been noticed that the design has not been fully implemented, as the first right turn arrow that approaching drivers would face is missing. This should be retrofitted, as it avoids trapping drivers inadvertently in the exclusive right turn lane. The missing lane arrow is highlighted on the figure below.*

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Unlikely**	***Death or serious injury is*** **Minor**



Safety Engineer:

Agree with Design Team response. SH45 is the main traffic route, carrying the higher traffic volume. The layout provides for greater queuing and throughput for the right turn movement.

Installing the missing marking should help alleviate drivers from being trapped.

Client Decision: *Agree with Designer and Safety Engineer. No changes from the design required, however the missing marking from the design to be installed.*

Action Taken: ***Missing marking has been installsed.***

4.9 Cycle lane width availability — Minor

Throughout the SH45 / Devon Street West and South Road corridor, the width of available cycle lane differs significantly, with some sections being extremely narrow. The sections of narrow available widths are limited further by uneven surfaces and seal joins, deep stormwater drainage channels, and double line markings. In some sections, such as the section shown below in **Figure 4-15** this narrow width is compounded by the existing steep gradient and drop into the adjacent drainage channel.

Figure 4-15: Narrow cycleway width caused by line marking, surface changes, and drainage channels

These constraints confine cyclists to a reduced portion of the lane, offering them less room to manoeuvre and increasing the risk of cycling into the adjacent live traffic lane. The exposure and likelihood risk for this crash type is increased due to the number of schools along the corridor, which increases the probability of younger and inexperienced cyclists utilising this route.

Recommendation:

- The SAT understand that some of the uneven surfaces are due to various reseals joining and creating a lip. When the road is programmed for its next reseal, these areas with a lip greater than 5mm and uneven seal join, should be repaired to create a smooth and even finished surface.

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Unlikely**	***Death or serious injury is*** **Minor**

Design Team Response:

The Design Team agree with the auditors.

Repairs to the uneven surface should be undertaken as soon as is practicable. We note also that the double line markings referred to by the SSAT provide a width "buffer" between cyclists and passing vehicles in lieu of / where it is not practical to instal physical concrete separators. White hatch markings could be added to the buffer at select locations to enhance driver awareness and increase its effectiveness.

Safety Engineer:

Agree in general with the observations/comments and recommendation of the Safety Auditors. Ideally the cycle lane width would meet the NZTA cycle network guidance as well as included a cycle separator, however due to width constraints of the corridor a balance/compromise in the width of the cycle lane and traffic lane was needed.

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Unlikely**	***Death or serious injury is*** **Minor**

Agree with Design Team comment on the use of double line markings. Idea behind the buffer is to reduce the likelihood of conflicts between cyclists and traffic as it encourages cyclists to be more to the left.

Significant lips and uneven surfaces should be addressed as soon as practicable.

Client Decision: *Agree with recommendations. Uneven surfaces to be highlighted to the maintenance team and fixed as soon as practicable. Agree with the Designer response around the buffer markings. If budget allows, white hatch markings to be added to the buffer to highlight it, however this is not required.*

Action Taken: ***Additional buffer markings have been installed where budget has allowed***

4.10 Ghost markings **Minor**

Following the work being completed, old line markings remain visible in places, which became particularly noticeable during the low light conditions of the night-time site visit. The blackout treatment used on the old markings isn't particularly effective, as the original lines still reflect light and appear to resemble the new line markings. These 'ghost markings' confuse drivers navigating the corridor, increasing the risk of sideswipes, head-on collisions, and increase the likelihood of vehicles colliding with the cycleway separators.

Recommendation:

- A full corridor re-seal, although unlikely, is the most effective way to eliminate the risk of ghost markings. Therefore, should be considered in the future.
    - Nevertheless, further attempts to remove the old line marking should be undertaken through one of the following; high-pressure water jetting, milling, or grinding. These should help to reduce the visibility of the ghost markings.

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Unlikely**	***Death or serious injury is*** **Minor**

Design Team Response:

The Design Team agree with the auditors.

Existing redundant marking should be completely removed in accordance with the project specification. The Design Team understand that NPDC has previously raised this issue with the Contractor, and that further line marking removal is planned.

Safety Engineer:

Agree with SAT recommendation and Design Team Response. Ghost markings should be removed particularly ones that results in confusion for drivers. I note that the removal of only the marking itself may leave an impression of a line, thus consideration of treating an area wider than the width of the marking may achieve a better result.

Probability Rating:	***Severity Outcome Rating:***
Crashes are likely to be **Unlikely**	***Death or serious injury is*** **Minor**

Client Decision: *Agree with the Safey Auditor recommendations. Line markings should be removed in a way that minimises ghost-markings, however it is also noted that the most effective way to do this is to reseal the road, which is impractical for the extents of this project. Other recommended methods to be discussed with the contractors to identify the most suitable one for line marking removal.*

Action Taken: ***Ghost marking to be addressed during reseals of the area***

5 Other comments

5.1 Missing Tactile Ground Surface Indicators (TGSI) and Cycle Lane Raised Reflective Pavement Markers (RRPM)

Certain sections of the corridor are missing Tactile Ground Surface Indicators (TGSI), Raised Reflective Pavement Markers (RRPM), and line markings, which impacts both safety and usability. The absence of TGSI pose a heightened risk for visually impaired road users, as it makes it harder to detect safe crossing points. This increases the chances of conflict with motor vehicles and other road users, as they may unintentionally cross at unsafe locations or step into the roadway without realising their mistake. The RRPM are highly effective in highlighting the extents of cycle lane separators in low light conditions. In areas where they haven't been installed, the visibility of the concrete cycleway separators is limited and vehicles are more likely to collide with the separators.

The SAT is aware of various tasks that are yet to be completed and some of these issues raised above will be covered in these final touch ups.

5.2 Vehicles stopping over hold line at intersections

It was observed on site that vehicles waiting at the side road intersections were stopping over the new hold line and encroaching onto the cycle way. Notably, these hold lines are set back further than the previous hold lines at these locations, which may lead to restricted or the perception of restricted available sight distance. Drivers stopping over the limit line and encroaching onto the cycle lane may result in cyclists riding into the side of the car or manoeuvring type crashes when cyclists deviate out of the cycle lane into the traffic lane. These vehicle behaviours are shown below in **Figure 5-1**.

Figure 5-1: Some examples of vehicles stopping over the holding line and encroaching into the cycle lane

5.3 Cyclist and pedestrian conflict at pedestrian crossing

The newly constructed zebra crossing north of the SH45 / Devon Street West and Belt Road intersection is a unique three-staged pedestrian crossing and is not seen anywhere else in New Plymouth. In most cases, pedestrians only need to cross two stages: one directional traffic lane, pause at the pedestrian refuge island, and then cross the other directional lane. While the design is not tied to any specific safety concerns for pedestrians or cyclists, it's worth noting there may be an increased risk of conflict between pedestrians crossing the road and cyclists. Pedestrians may feel like they are 'out of the danger zone' when they have reached the second stage and step out in front of cyclists.

The performance of this crossing should be monitored over the next three months, while users adjust to the three stages, further treatments may be necessary following the results of that assessment.

5.4 Missing bus platform

At the western end of the SH45 / South Road corridor, a newly constructed bus stop is located on the western side of the road. Adjacent to the bus stop, there is a wide berm between the kerb and footpath; however, no direct connection currently exists between the footpath or bus shelter and the bus stopping location. This presents challenges for users accessing the bus, particularly those mobility-impaired and visually impaired. Such limitations represent a reduced level of service and may hinder these individuals from utilising the bus service effectively.

The issued for construction (IFC) drawings show a connective platform was proposed for this location but that is has not been installed as per the site visit on the 15th July 2025. The berm is shown below in **Figure 5-2.**

Figure 5-2: Bus stop with no footpath to bus connection.

5.5 Separator obstructing vehicle tracking into Devon Medical

A member of the public has raised a concern about the placement of the final separator outside the Devon Medical Centre. They noted that the separator encroaches onto the vehicle tracking path and as a result, vehicles entering the site deviate over the centreline, potentially affecting those exiting the premises. This widened vehicle tracking may increase the likelihood of head-on and side swipes occurring at the access point to the Devon Medical Centre from SH45 / Devon Street West. Vehicle speeds at this location are

expected to be very low, as many vehicles will be manoeuvring in and out of parking spaces before exiting. Additionally, the tighter tracking caused by the separator is likely to slow vehicles as they enter the site, further minimising the potential severity of a crash, should one occur.

This separator could be removed to provide a wider allowance for vehicles entering the site or replaced with a traversable rubber speed hump to reduce the above safety concern.

5.6 Visibility of traffic signals for cyclists

The height of the cycle traffic signals are the same as those for motor vehicles – between 3m and 4m. These may be difficult for cyclists to see. Additionally, on the southwest corner of the SH45 / Devon Street West and Morley Street intersection, there is a lot of vegetation which may obstruct the visibility of the tertiary traffic signal displays.

The limited visibility of cyclist traffic signal displays may increase the likelihood of cyclist and motor vehicle type crashes.

Low-level 200mm – 300mm primary and secondary cycle signals could be installed to improve the visibility of displays for cyclists. Additionally, the adjacent vegetation on SH45 / Devon Street West should be monitored for potential obstruction of the tertiary traffic signal displays.

5.7 Reduced Advanced Stop Boxes on Morley Street

The Advance Stop Boxes (ASB's) for cyclists on Morley Street do not extend to the full width of the turning lanes. The SAT assume this is due to left turn vehicle tracking from SH45 / Devon Street West on to Morley Street encroaching on to the right turn lane.

If not, the reduced width of ASB's limits the awareness of cyclists at the intersection, which could lead to cyclist and motor vehicle type crashes. With this in mind, they should be extended to the full width of the right turn lane to improve awareness of cyclists at the intersection.

6 Conclusion

The corridor features a diverse mix of land uses, ranging from general residential areas to local centre zones. Notable destinations within these zones include the Blagdon Shopping Area, the Woolworths supermarket situated at the western end of the corridor, along with the café and Devon Medical Centre at the eastern most end adjacent to the Morley Street intersection. As a result, these areas are likely to attract a higher number of active mode users accessing these facilities. Additionally, there are multiple schools with access on to the corridor, the schools range from primary school ages through to final year high school students. Resulting in a increase in road users during peak morning and afternoon drop off and pick up times.

As a result of the mixed land uses and the expected volume of vulnerable road users due to the proximity of multiple schools the corridor has historically resulted in a high number of vulnerable road user crashes as demonstrated in the crash history.

The Safe System Assessment scoring shows that the construction of the walking and cycling facilities throughout the SH45 Devon Street West / South Road corridor has improved the safety in regard to pedestrian and cyclist movements. Simultaneously, the safe system scoring shows that the project has managed to help improve the safety for motor vehicles at intersections and ‘other’ crash types alongside the pedestrians and cyclists. Notwithstanding this there some items identified in this report that if addressed would improve overall safety.

The additional safety concerns identified by the SAT are as follows:

- Pedestrians concealed at the three-staged zebra crossing
- Intersection signal phasing
- Lack of cycle lane access from Seaview Road
- Design of separators
- Filter turns at Morley Street signalised intersection
- Concealed traffic island at the Morley Street intersection
- Trap lane on the eastbound approach to the Morley Street intersection
- Cycle lane width availability

Typically, it takes some time for users to become accustomed to the new layout, but it is also noted that there have been some initial issues with vehicles striking the separator islands. Initially it is recommended that the minor delineation improvements identified in this report such as additional direction signage and line marking, installing missing tactiles and RRPM’s are undertaken. Following their installation a monitoring process of a three to six months is recommended to track if any new trends in crashes or community complaints occur as a result of the walking and cycling improvements.

7 Safe System Audit Statement

We certify that we have used the available plans and have examined the specified roads and streets to assess the Safe System alignment and identified any safety concerns that could be changed, removed or modified in order to improve road safety outcomes. The safety concerns identified have been noted in this report.

Signed: ..... Date: 23/07/2025

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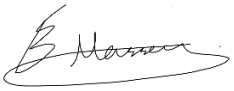
	Signature	*30 July 2025*
Safety Engineer:	*Name Chris Lai (NZTA)*	*Senior Safety Engineer*
	Signature	*7 August 2025*

Project Manager: *Name: Ted Massey (NZTA)* *Principal Walking and Cycling Engineer*

Signature  *Date: 14/08/2025*

Action Completed: *Name Liz Beck (NPDC)* *Position Senior Project Manager*

Signature  *Date: 3/11/2025*

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

Date: 3/11/2025

A

Appendix A – Design Drawings

B

Appendix B – Safe System Assessment Matrix

C

Appendix C – Public Feedback Register