



Kent Road and Northumberland Road Protected Bike Lanes, Pascoe Vale



Road Safety Audit

Audit Stage: Concept Design

Report for Moreland City Council



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Information Page

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Executive Summary

Safe System Solutions Pty Ltd has been engaged by Moreland City Council to undertake a Concept Design Road Safety Audit of the proposed Protected Bike Lanes along Kent Road between Cornwall Road and Cumberland Road, Pascoe Vale and Northumberland Road between Rhodes Parade and to the north of Snell Grove, Pascoe Vale.

A number of issues have been identified associated with the following areas which require further consideration:

- a) Bike Lane Layout
- b) Driveways
- c) Pavement Markings
- d) Kerb ramps
- e) Parking
- f) Waste management

These issues are detailed in Section 3 Audit Findings and Recommendations of the Road Safety Audit report.

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List of Abbreviations

AADT – Annual Average Daily Traffic

RSA – Road Safety Audit

vpd – Vehicles per day

1. Background

1.1 Road Safety Audit Procedure

Road safety audit is a term used internationally to describe an independent review of a road project or existing road to identify any safety or performance concerns. The audit team considers the safety of all road users and qualitatively reports on road safety issues or opportunities for safety improvement. The team also considers other factors that are relevant to the existing site.

A road safety audit is therefore a formal examination of a road project, or any type of project which affects road users (including cyclists, pedestrians, mobility impaired etc.) or an existing road, carried out by an independent qualified team who identify and document road safety concerns. The objective of a road safety audit is to provide reasonable (but not absolute) assurance that potential, foreseeable hazards for all road users when a road is operational which may result in injury (in particular fatal and serious injury) are identified.

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

1.2 The Safe System

The Austroads Guide to Road Safety Part 6 (2019): Managing Road Safety Audits states that: *"for any project, there is a responsibility on the road authority to maximise alignment with Safe System principles"*. The Guide continues to offer two methods for achieving this:

1. Undertake a Safe System Assessment in the early stages of the project.
2. Integrate Safe System principles into the Road Safety Audit process.

VicRoads Safe System Assessment Guidelines (2018) states that a Safe System Assessment *must* be undertaken for any Victorian Government project greater than \$5M in value, is *desirable* for where the project value is greater than \$2M and *optional* for projects under \$2M. Where A Safe System Assessment is not undertaken, the project team should document how the project has considered Safe System alignment. Safe System Assessments are most valuable when conducted during the early stages of a project.

Table 1: Safe System Kinetic Energy

	Crash Type	Tolerable (10%) Speed (passenger vehicle)
	Head-On	~70km/h
	Side Impact (90°) Side Impact (45°)	~50km/h ~60km/h
	Side Impact into Point Source Hazard (eg. Tree, Power Pole)	30 – 40km/h
	Pedestrian, Cyclist, Motorcyclist	~30km/h

Source: Austroads (2018).

This RSA has been undertaken to conform with AGRS Part 6: Managing Road Safety Audits (2019). As such, an assessment has been undertaken for each RSA finding to determine if the kinetic energy associated with the possible crash is above tolerable levels (as set out above). Also, each recommendation has been categorised into one of the Austroads Safe System treatment categories described in Table 2 below.

Table 2: Safe System Treatment Categories

Primary	Road planning, design and management considerations that practically eliminate the potential of fatal and serious injuries occurring in association with the foreseeable crash types.
Supporting (step towards)	Road planning, design and management considerations that improve the overall level of safety associated with foreseeable crash types, but not expected to virtually eliminate the potential of fatal and serious injury occurring. Improves the ability for a Primary Treatment to be implemented in the future.
Supporting	Road planning, design and management considerations that improve the overall level of safety associated with foreseeable crash types, but not expected to virtually eliminate the potential of fatal and serious injury occurring. Does not change the ability for a Primary Treatment to be implemented in the future.
Non-Safe System Other Elements	Road planning, design and management considerations that are not expected to achieve an overall improvement in the level of safety associated with foreseeable crash types occurring. Reduces the ability for a primary treatment to be implemented in the future.

Source: Austroads (2018a).

1.3 The Safety Audit Team

It is a requirement in Victoria that road safety audits are undertaken in teams of two or more, with at least one Senior Road Safety Auditor. Each auditor must be accredited and registered on VicRoads Register of Road Safety Auditors (www.vrsa.com.au). The team consisted of:

Table 3: Road Safety Audit Team

Senior Road Safety Auditors	Road Safety Auditor
██████████ Safe System Solutions Pty Ltd	
██████████ Safe System Solutions Pty Ltd	

1.4 Site inspections and meetings

A list of site inspections and meetings associated with this road safety audit is provided in the table below:

Table 4: Inspection and meetings

Activity	Location	Date	Time
PRE-AUDIT DISCUSSION	Telephone call with Kris Kasmawan (Transport Projects Engineer Moreland City Council)	08.01.21	1300
DAYTIME SITE INSPECTION	Kent Road and Northumberland Road, Pascoe Vale	12.01.21	1030
NIGHTTIME SITE INSPECTION	Kent Road and Northumberland Road, Pascoe Vale	11.01.21	2130

1.5 Audit process

This road safety audit has been conducted in accordance with the procedures set out in the *Austroads Guide to Road Safety Part 6: Managing Road Safety Audits (2019)* and *Austroads Guide to Road Safety Part 6A: Implementing Road Safety Audits (2019)*. A review of the site has been completed and the details contained within the supporting documentation examined to identify issues that affect road user safety and other relevant issues. The auditors cannot guarantee that every issue that affects road user safety has been identified. Although the adoption of the audit recommendations will improve the level of safety of the site it will not, however, eliminate all the road user safety risks.

Road safety audit is a formal process and the audit findings and recommendations should be documented by the client in writing. If recommendations are not accepted by the client then reasons should be included within the written response. A client is under no obligation to accept all the audit findings and recommendations and should consider these in conjunction with all other project considerations. It is not the role of the auditor to approve the client's response to an audit.

1.6 Risk assessment

The potential road safety problems identified have been assigned a risk rating based on the likelihood of a crash occurring as a result of the deficiency together with the potential consequence of that crash.

The risk ratings adopted are:

- ⇒ Intolerable
- ⇒ High
- ⇒ Medium
- ⇒ Low

Tables 6 to 8 below show the risk rating process.

Table 5: Likelihood of a crash (Austroads, 2019)

Frequency	Description
Frequent	Once or more per week
Probable	Once or more per year (but less than once a week)
Occasional	Once every five to ten years
Improbable	Less often than once every ten years

Table 6: Likely severity of a crash (Austroads, 2019)

Severity	Description	Examples
Catastrophic	Likely multiple deaths	- High speed, multi-vehicle crash on a freeway - Car runs into crowded bus stop - Bus and petrol tanker collide - Collapse of a bridge or tunnel
Serious	Likely deaths or serious injury	- High or medium speed vehicle/vehicle collision - High or medium speed collision with a fixed roadside object - Pedestrian or cyclists struck by a car
Minor	Likely minor injury	- Some low speed vehicle collisions - Cyclist falls from bicycle at low speed - Left-turn rear-end crash in a slip lane
Limited	Likely trivial injury or property damage only	- Some low speed vehicle collisions - Pedestrian walks into object (no head injury) - Car reverses into post

Table 7: Resulting level of risk (Austroads, 2019)

	Frequent	Probable	Occasional	Improbable
Catastrophic	Intolerable	Intolerable	Intolerable	High
Serious	Intolerable	Intolerable	High	Medium
Minor	Intolerable	High	Medium	Low
Limited	High	Medium	Low	Low

2. Scope of Audit

Kent Road is an east-west oriented two-lane, two-way road in Pascoe Vale. On-street parking is present along the entire section. The urban default speed limit (50km/h) applies for this section. The predominant land use in the area is residential, however, there is also a park (Cole Reserve) on the south side. Local Area Traffic Management treatments (speed humps) are installed along with bicycle sharrows. The carriageway is wide and the horizontal and vertical geometry are straight and consistent, enabling good sight lines. According to Moreland City Council Transport data, the AADT along this section is 1617 vpd.

Northumberland Road is a north-south oriented two-lane, two-way road in Pascoe Vale. On-street parking is present in the northern section but is restricted closer to the secondary school. The predominant land use in this area is residential, however, there is also a secondary school (Pascoe Vale Girls College) on the eastern side. Local Area Traffic Management treatments (speed humps and wombat crossing) are installed as well as a school crossing point. A school speed zone (40km/h) is present, outside of school hours the urban default speed limit (50km/h) applies. The horizontal geometry is straight, however there is a rising, steep gradient on approach to Snell Grove.

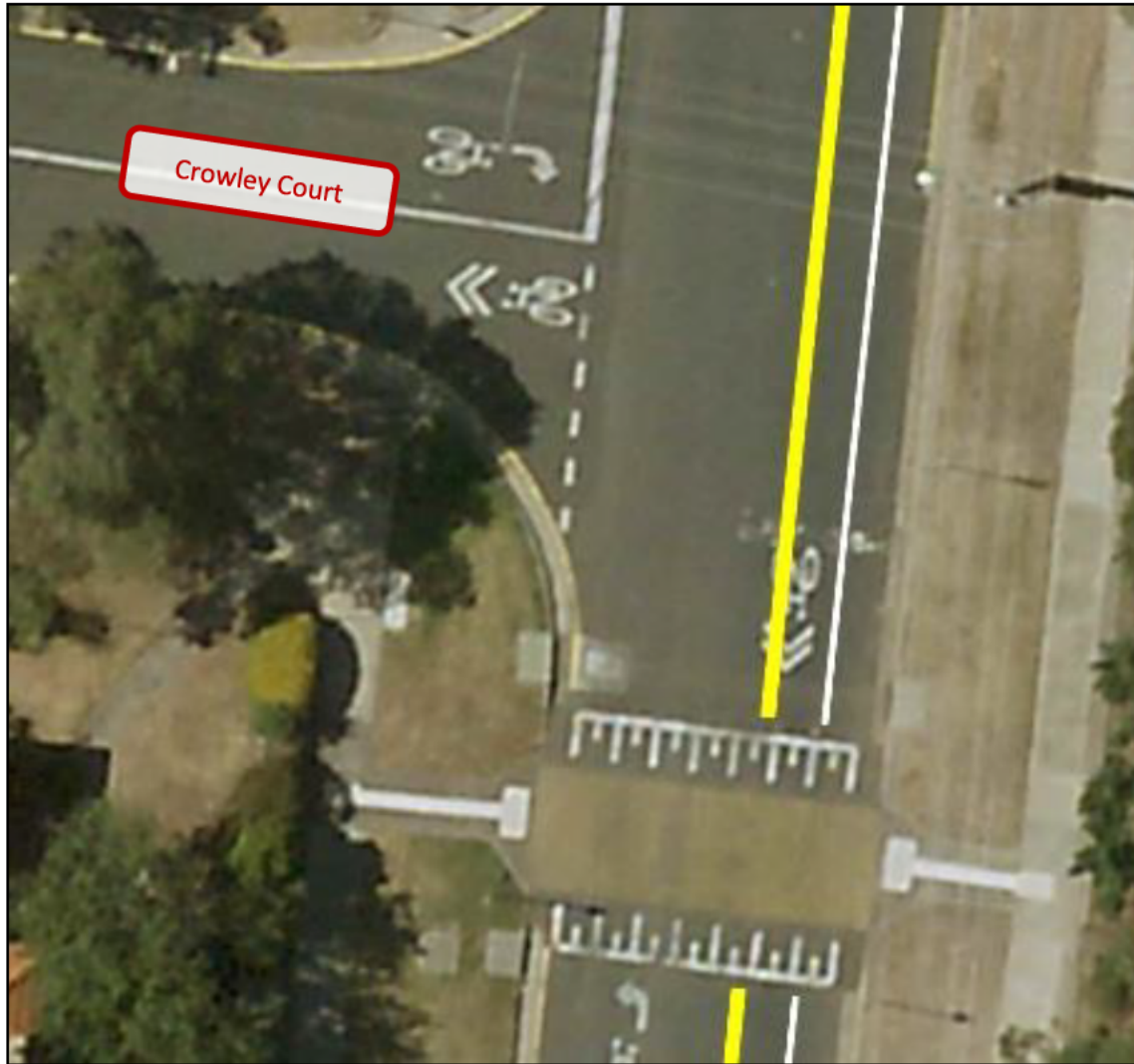
During the 5-year period ending 24/1/2019, there has been 1 police recorded crash in Kent Road. It involved a vehicle colliding with a bicycle while entering the Kent Road/ Cumberland Road roundabout resulting in minor injury.

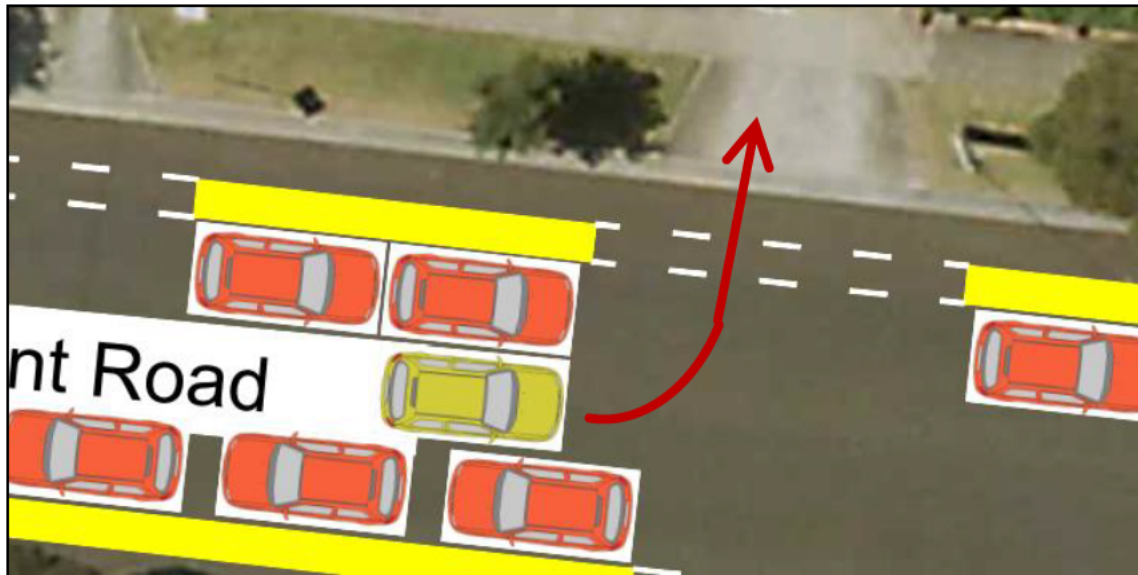
Figure 1: Map of audit location (source: OpenStreetMap)

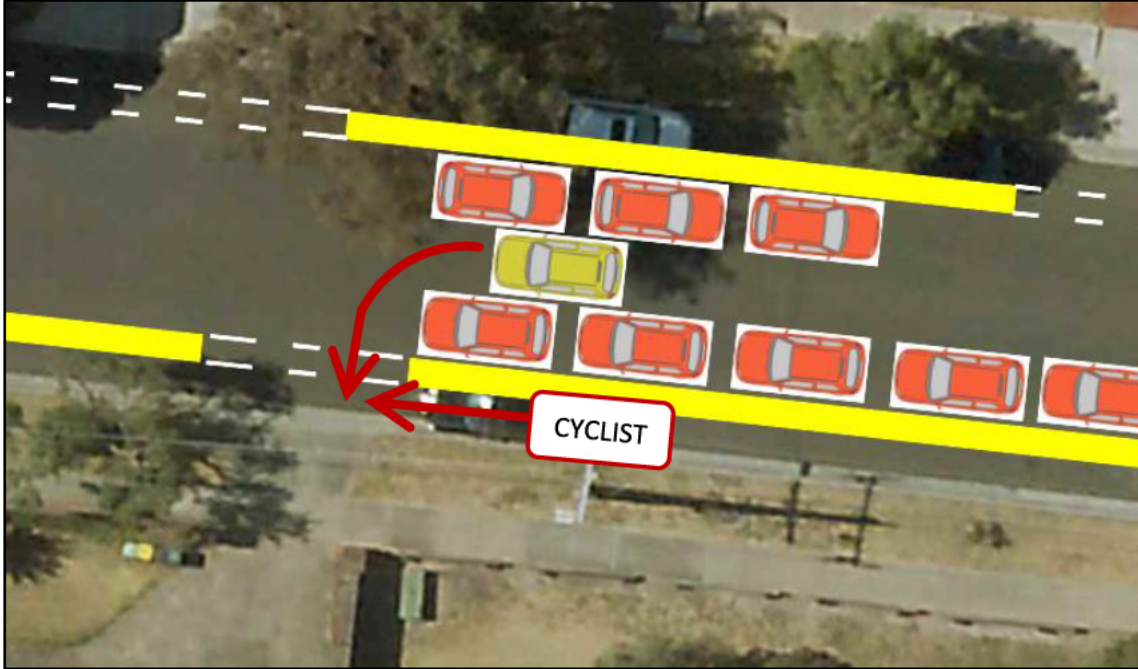


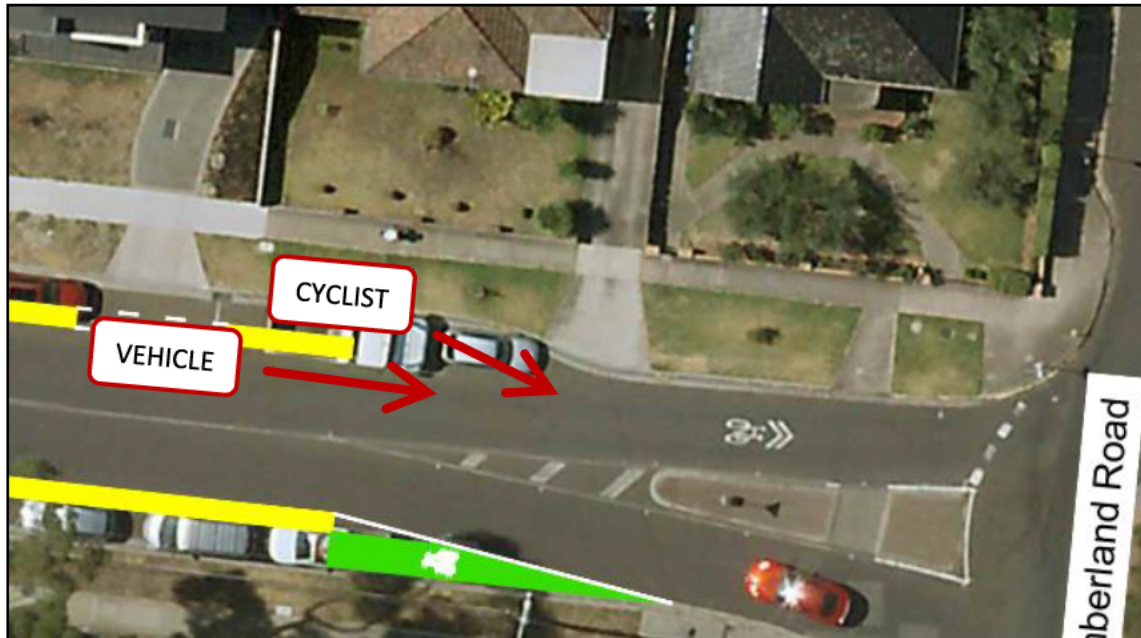
3. Audit Findings and Recommendations

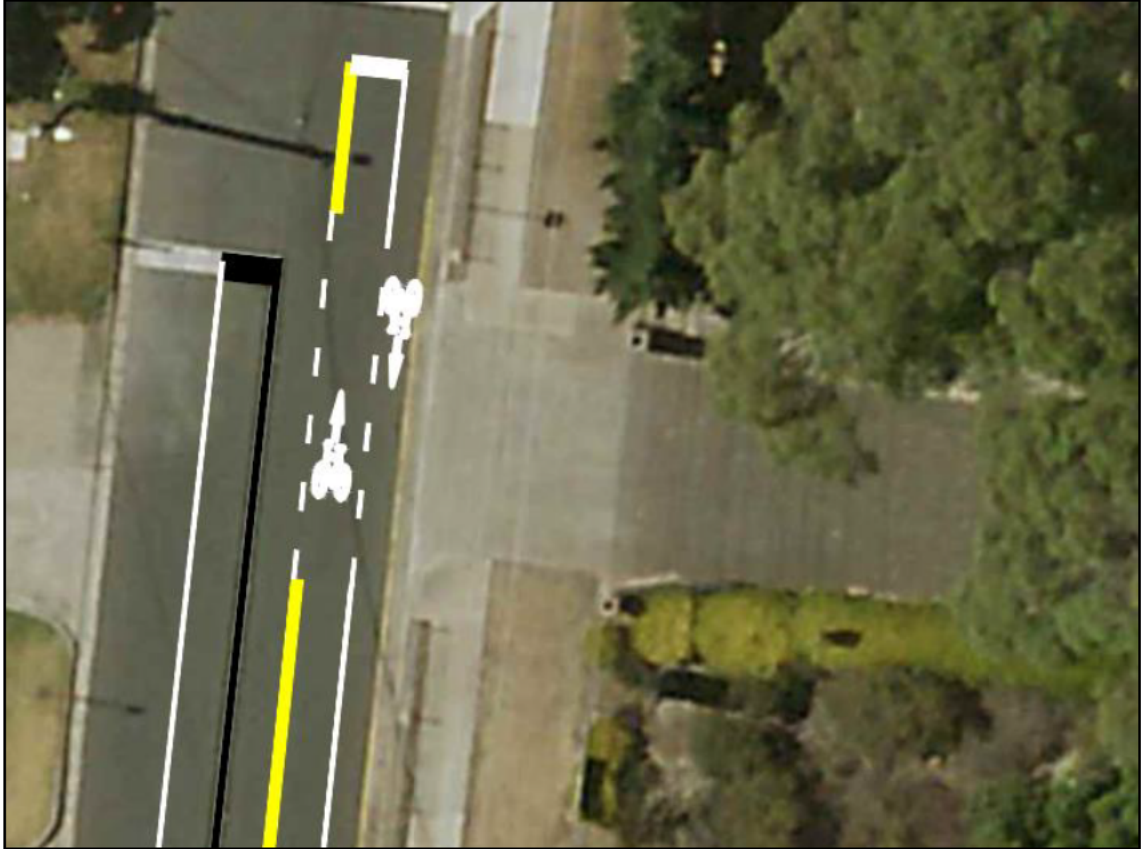
The findings and recommendations of the Road Safety Audit can be found in the table below.

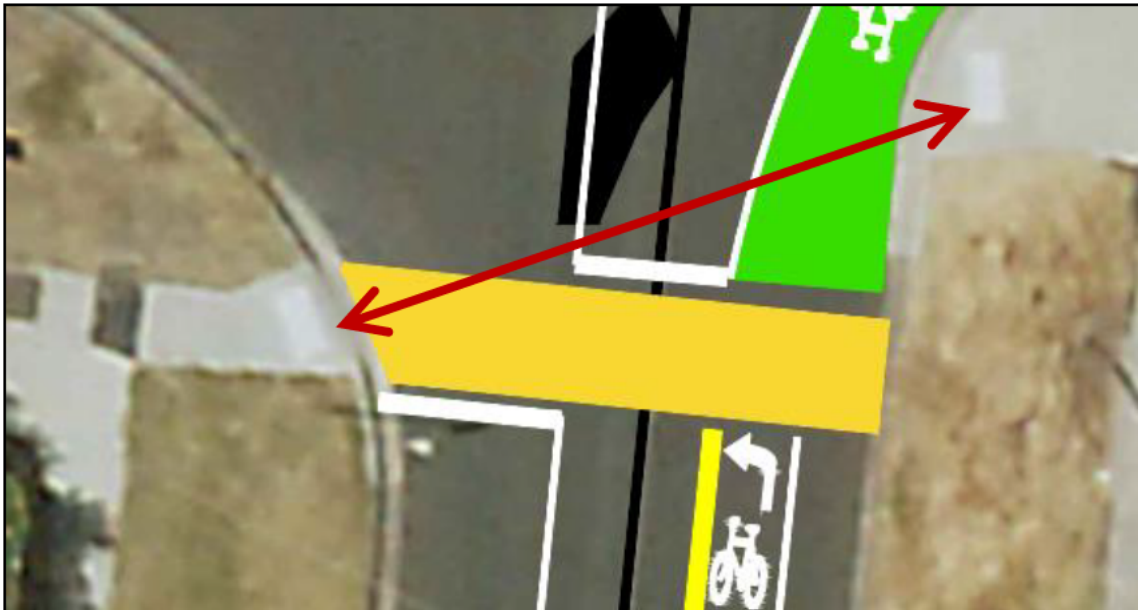
Audit Findings	Level of Risk	Safe System Energy	Recommendations P – Primary ST – Step Towards S – Supporting N – Non-Safe System	Responsible Officer	
				Accept Yes/No	Comments
a) Bike Lane Layout					
i. Sharrows and bicycle wayfinding pavement marking exists on Crowley Court on approach to Northumberland Road – indicating this is a local bicycle route. Yet cyclists turning from Crowley Court cannot access the protected bike lane on Northumberland Road as there is no break* at this location. Similarly, cyclists using the protected bike lane are unable to turn into Crowley Court. This could encourage cyclists to perform unsafe manoeuvres. 	Occasional Minor MEDIUM	Within tolerable levels	*This finding has been developed with the assumption that the protected bike lane will be separated by a continuous kerb / physical barrier. Consider providing a break in the protected bike lane to enable a cyclist exiting from Crowley Court to access the protected bike lane. (S) Consider encouraging cyclists wanting to access Crowley Court to use the wombat crossing. (S)		

Audit Findings	Level of Risk	Safe System Energy	Recommendations P – Primary S – Supporting ST – Step Towards N – Non-Safe System	Responsible Officer	
				Accept Yes/No	Comments
b) Driveways					
i. The design proposes to maintain on-street parking on Kent Street, adjacent the proposed protected bike line. This will create tighter turning movements to enter / leave driveways and may result in minor side-swipe crashes with parked vehicles. 	Occasional Limited LOW	Within tolerable levels	Consider conducting swept path analysis to verify vehicles are able to access / leave driveways with parked vehicles in the proposed locations and modifying the parking layout as necessary (S).		

Audit Findings	Level of Risk	Safe System Energy	Recommendations P – Primary ST – Step Towards S – Supporting N – Non-Safe System	Responsible Officer	
				Accept Yes/No	Comments
ii. The design proposes to maintain on-street parking on Kent Street, adjacent the proposed protected bike lane. Parked vehicles will impact on sight lines between the through traffic lane and the bicycle lane. As such, there is a risk that vehicles pulling into driveways will not be able to see cyclists in the bicycle lane resulting in collisions with cyclists. 	Occasional Minor MEDIUM	Within tolerable levels	Consider demarcating the parking bays and setting the edge of the parking bays further back from the edge of the driveway to improve sight lines (S). Consider providing regular breaks in the parking bays to open up sight lines between the traffic lane and the bicycle lane. (S)		

Audit Findings	Level of Risk	Safe System Energy	Recommendations P – Primary S – Supporting ST – Step Towards N – Non-Safe System	Responsible Officer	
				Accept Yes/No	Comments
c) Pavement Markings					
i. Eastbound cyclists on approach to the Cumberland Road roundabout are forced to merge from the protected bike lane into the traffic lane. This creates a conflict point between vehicles and cyclists. The proposed layout may confuse road users as it is not clear who gives way to who (do cyclists have priority when merging or do vehicles in the traffic lane have priority?)  This finding also applies where the protected bike lane terminates on approach to Cornwall Road.	Improbable Minor LOW	Within tolerable limits*	Consider installing a sharrow pavement marking at this location to raise motorists' awareness that cyclists are merging. (S)  *The Safe System Energy has been recorded as "within tolerable limits" as vehicles would likely be slowing as they approach the roundabout. It is expected that vehicle speeds would be at or below 30km/h (the Safe System speed for vulnerable road user crash types).		

Audit Findings	Level of Risk	Safe System Energy	Recommendations P – Primary ST – Step Towards S – Supporting N – Non-Safe System	Responsible Officer	
				Accept Yes/No	Comments
ii. The entrance to Pascoe Vale Girls College crosses the proposed protected bike lane. This creates a conflict point between vehicles and cyclists. 	Improbable Minor LOW	Within tolerable limits	As this access leads to the school car park, it is expected there are a relatively large number of vehicles turning into and exiting this driveway. As such, it is recommended to install green conflict paint across the bike lanes to raise motorists' awareness of cyclists in the area. (S)		

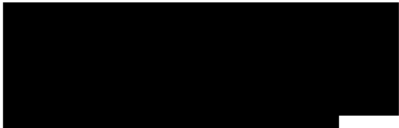
Audit Findings	Level of Risk	Safe System Energy	Recommendations P – Primary S – Supporting ST – Step Towards N – Non-Safe System	Responsible Officer	
				Accept Yes/No	Comments
d) Kerb ramps					
i. The kerb ramps on Northumberland Road near the Rhodes Parade intersection are staggered. Pedestrians would be required to cross at an angle (shown with arrows). This is not the most direct (shortest) path for pedestrians to take and increases their time on the carriageway, thus increasing the risk of pedestrian and vehicle collisions. 	Improbable Minor LOW	Within tolerable limits	Consider shifting the kerb ramp further south to match up with the proposed coloured pavement. (S) It is noted that there is a utility pole support cable installed in this area, which may affect the relocation of the kerb ramp. 		

Audit Findings	Level of Risk	Safe System Energy	Recommendations P – Primary ST – Step Towards S – Supporting N – Non-Safe System	Responsible Officer	
				Accept Yes/No	Comments
e) Parking					
i. Parking adjacent the protected bike lane on Northumberland Road is proposed to be removed. Without appropriate signage, motorists may be unaware parking is not allowed.	TO NOTE	N/A	Currently, “NO STANDING” signage is installed at some locations, but only applies during school hours. Consider installing ‘NO STANDING’ signage on the eastern side of Northumberland Road to cover the length of the proposed protected bike lane. (S)		
f) Waste management					
i. Waste vehicles (garbage trucks) will still service both Kent Road and Northumberland Road. It is likely that garbage trucks would need to prop and wait in the traffic lane and have a team member roll bins from the edge of the nature strip to the truck (across the protected bike lane). This increases the risk of a worker being struck by a cyclist and could lead to increased driver frustration (for motorists stuck behind the garbage truck), increasing the risk of motorists performing unsafe overtaking manoeuvres. Nonetheless, given the metro environment, traffic calming measures and narrowing road environment this risk may not be a significant risk.	TO NOTE	N/A	It is recommended to discuss with waste management crews the operational impact the protected bike lanes may have on their duties.		

4. Conclusion

This road safety audit has been conducted in accordance with the procedures set out in the *Austrroads Guide to Road Safety Part 6: Managing Road Safety Audits (2019)* and *Austrroads Guide to Road Safety Part 6A: Implementing Road Safety Audits (2019)*. The site has been inspected and the supporting documentation has been examined. The findings, recommendations and Safe System elements are provided for consideration by the client and any other interested parties.

Auditors:

 18.01.2021

Senior Road Safety Auditor

 18.01.2021

Senior Road Safety Auditor

Appendix A: Photos

Photo 1 Kent Road midblock, looking west



Photo 2 Northumberland Road midblock, looking south



Photo 3 Kent Road at Cornwall Road intersection, looking east



Photo 4 Northumberland Road at Crowley Court, looking south-west



Photo 5 Kent Road midblock, looking west (night)



Photo 6 Northumberland Road midblock, looking south (night)

