Lindfield Learning Village Stage 2 and 3 - Car and Bus Access Option 4

Road Safety Audit

Concept Design Stage

6th April 2020

JN20045_Report01 Rev02 - Savills LLV Bus Loop Option 4

On Behalf of

Savills Australia

604, 11 Chandos St
St Leonards
NSW, 2065

0405 345 124
admin@amwc-rsa.com
www.amwc-rsa.com
ABN 13 619 698 985

NSW RSA Register Details

Final Signoff Date	06/04/2020
Title of Audit	Lindfield Learning Village Stage 2 and 3 - Car and Bus Access Option 4
Location of Audit	Lindfield
Project Description	The aim of this project is to upgrade and expand the Lindfield Learning Village at the former University of Technology Sydney Ku-ring-gai campus.
Purpose of Audit	The aim of this Road Safety Audit (RSA) is to assess the Option 4 Bus Loop concept design plans in the context of the existing conditions, and the interface between existing and proposed works.
State of Audit	NSW
Stage of Audit	Concept Design Stage
Client Company	Savills Australia
Client Contact	Taha Qureshi
Client Phone	02 8215 8898
Client Email	tqureshi@savills.com.au
Audit Team Lead	Aaron Walton
Audit Team Member	Asith Nagodavithane

Table of Contents

NSW RSA Register Details ii

1 **Project Description** 1

2 **Study Area** 1

3 **Auditable Data** 1

4 **Audit Stage** 1

5 **Exclusions** 2

6 **Audit Team** 2

7 **Audit Program** 2

8 **Audit Risk Assessment Technique** 3

9 **Audit Findings** 4

10 **Formal Statement** 13

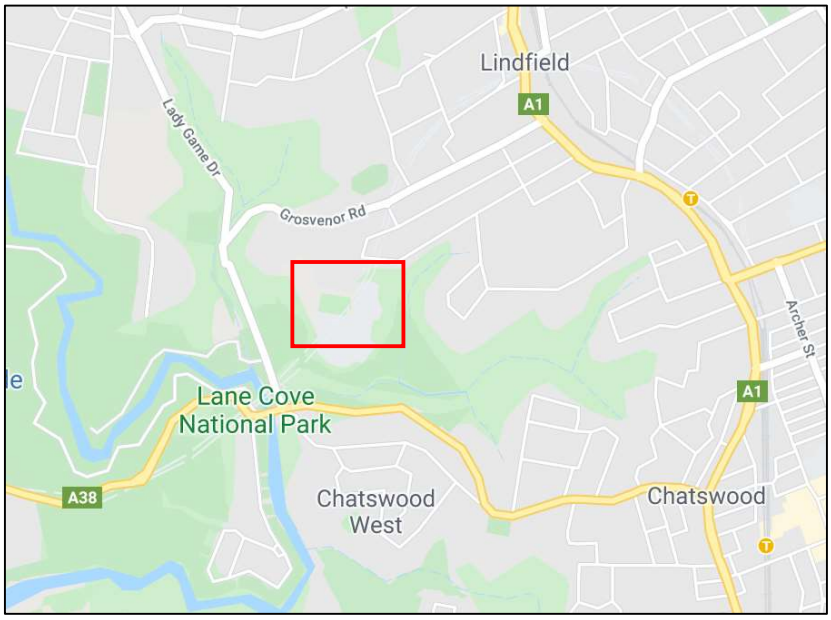
1 Project Description

The aim of this project is to upgrade and expand the Lindfield Learning Village at the former University of Technology Sydney Ku-ring-gai campus. Stage 2 and Stage 3 include works to accommodate 700 additional students, re-purposing of the Stage 1 area, and construction of a loop road around the southern portion of the site for emergency vehicles, buses and drop off and pick up vehicles.

The aim of this Road Safety Audit (RSA) is to assess the Option 4 Bus Loop concept design plans in the context of the existing conditions, and the interface between existing and proposed works.

2 Study Area

The general audit location is shown below.



Source – Google Maps

3 Auditable Data

The following data was referenced during the audit:

> PDF Sketch – SKT204 – 3 sheets – Dated 19/03/2020 – provided via email on 25/03/2020.

4 Audit Stage

A Concept Design Stage Audit was carried out during a desktop assessment of detail design plans and subsequent site visit of proposed works on 26th March 2020. At the time of the site visit weather was clear and traffic was light.

The audit was generally undertaken in accordance with 'TNSW Guidelines for Road Safety Audit Practices (2011)' and 'Austroads: Guide to Road Safety Part 6 and Part 6a (2019)'.

5 Exclusions

At the time of the audit there were no exclusions presented to the audit team.

6 Audit Team

The audit team and client details are shown below.

Table 6-1 Audit Team & Client Details

Role	Name	
Client (Sponsor)	Savills Australia	
Client Contact	Taha Qureshi	Graduate Project Management
Client Email	tqureshi@savills.com.au	
Lead Auditor	Aaron Walton	RSA-02-0501 - Level 3 Auditor
Lead Auditor Email	admin@amwc-rsa.com	
Team member	Asith Nagodavithane	RSA-02-1034 - Level 2 Auditor

7 Audit Program

The audit program details are shown below.

Table 7-1 Audit Program

Activity	Date	Attendees
Opening Meeting	16/03/2020	Aaron Walton, Taha Qureshi
Site Inspection	26/03/2020	Aaron Walton, Asith Nagodavithane
Draft Report	30/03/2020	RSA Report (DRAFT for comment)
Completion Meeting	06/04/2020	Aaron Walton, Taha Qureshi
Final Report	06/04/2020	RSA Report (Final for issue)

8 Audit Risk Assessment Technique

For each of the safety issues identified, the level of risk with each has been determined. The tables below are extracted from Austroads: Guide to Road Safety Part 6 and Part 6a (2019) and have been used in the assessment of risk for this audit.

Table 8-1 Incident Frequency

Frequency	Description
Frequent	Once or more per week
Probable	Once or more per year
Occasional	Once every five or ten years
Improbable	Less often than once every ten years

Table 8-2 Incident Severity

Severity	Description	Examples
Catastrophic	Likely multiple deaths	> High-speed, multi-vehicle crash on freeway. > Car runs into crowded bus stop. > Bus and petrol tanker collide. > Collapse of bridge or tunnel.
Serious	Likely death or serious injury	> High or medium-speed vehicle/vehicle collision. > High or medium-speed collision with a fixed roadside object. > Pedestrian or cyclist 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.

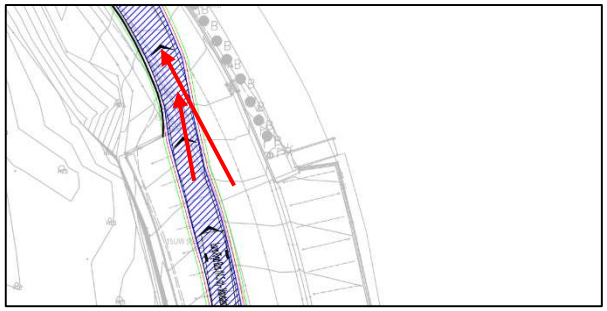
Table 8-3 Resulting Level of Risk Matrix

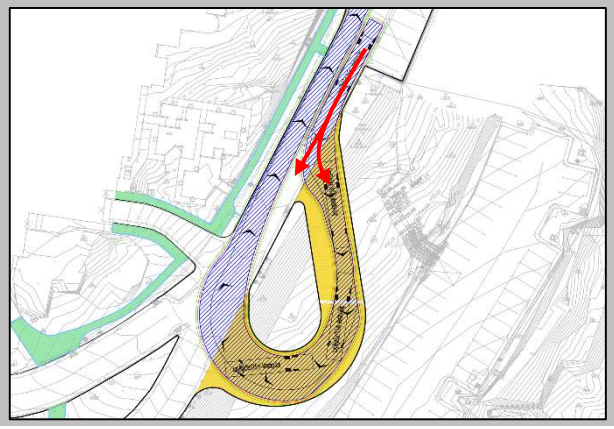
	Frequent	Probable	Occasional	Improbable
Catastrophic	Intolerable	Intolerable	Intolerable	High
Serious	Intolerable	Intolerable	High	Medium
Minor	Intolerable	High	Medium	Low
Limited	High	Medium	Low	Low

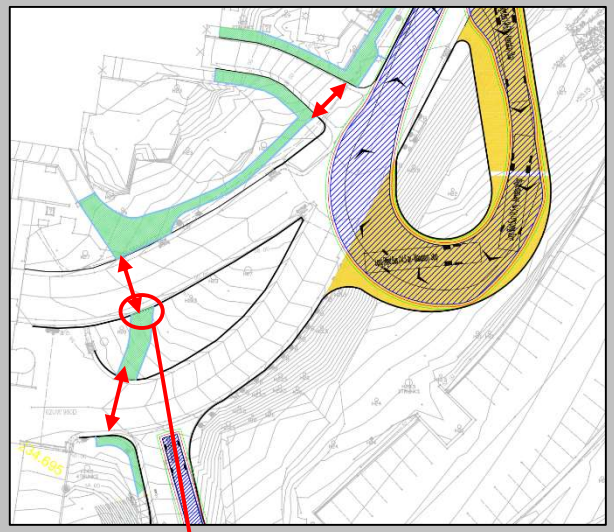
9 Audit Findings

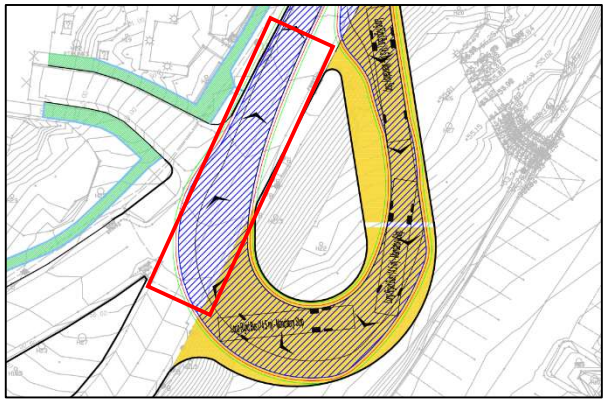
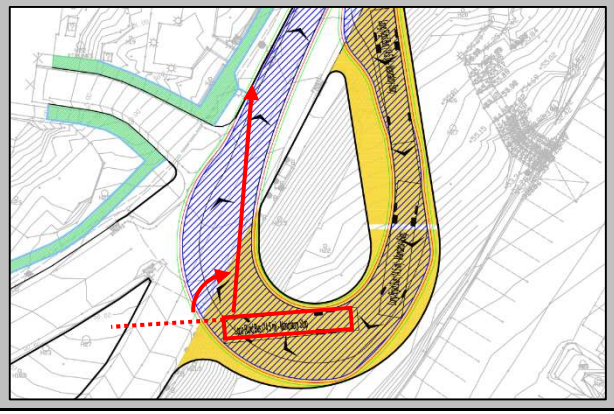
Table 9-1 Audit Findings

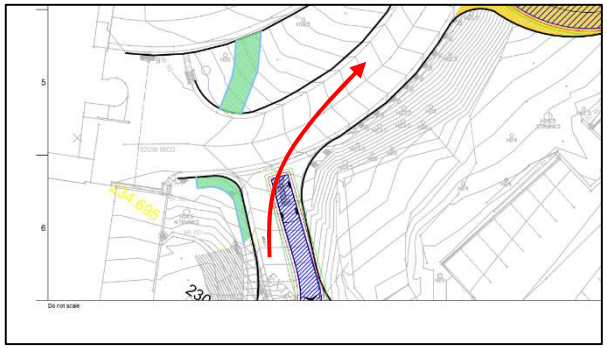
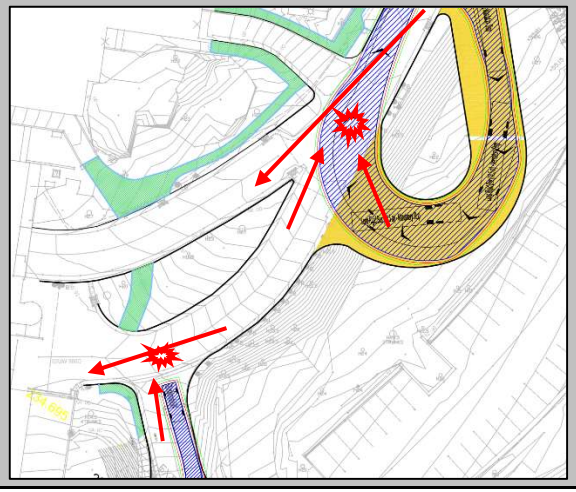
Item Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
1. Turn Paths Bus Stopping Area	The turning path is shown to overhang approaching traffic. There is a risk that an exiting bus may impact oncoming traffic. 	Probable	Minor	High	In the updated design, the roadway is 8m wide in this section which allows the bus to keep to their lane and reduce the risk of collision.
2. Access to Bus Bus Stopping Area	The proposed bus stopping area is at road level. There is a significant height difference from the road level to the bus door. There is a risk that a passenger may trip/fall at significant height differences, in particular mobility impaired passengers. 	Occasional	Limited	Low	Noted. Mobility impaired students are required to make special arrangements for direct access to the school as part of the Department of Education's policies and therefore are unlikely to be taking the bus.

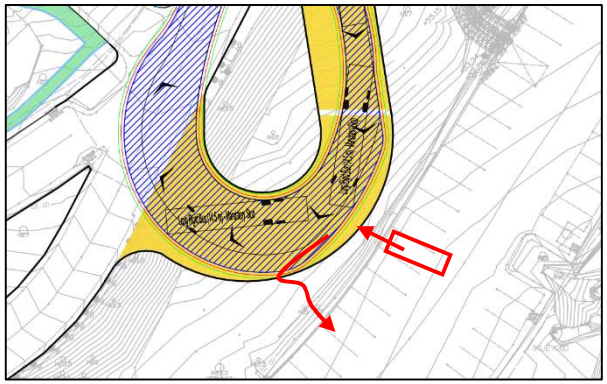
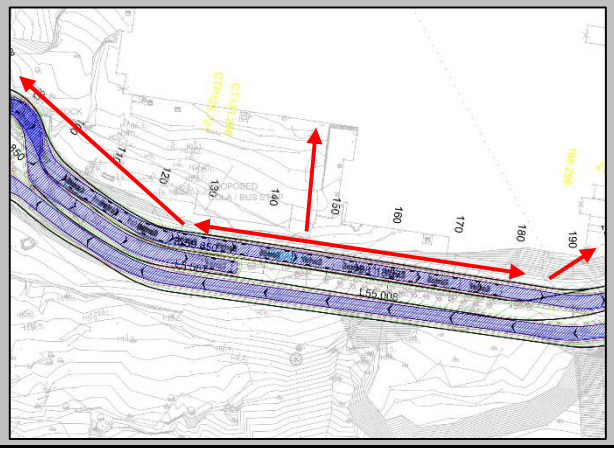
Item Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
3. Pedestrian Conflict Point Bus Stopping Area	There is a pedestrian crossing at the point where bus stopping vehicles merge back in with through vehicles. There is a risk that a bus may block sight to a pedestrian using the pedestrian crossing resulting in pedestrian-vehicle collisions. 	Occasional	Serious	High	Noted, this northern crossing would be removed in the updated design.
4. Merge-Diverge Bus Stopping Area	It is unclear to the audit team to how vehicle diverge and merge is to be conveyed/managed for vehicles using the stopping area and for vehicles continuing through. There is a risk that a through vehicle may not anticipate a vehicle entering or exiting the stopping area resulting in sideswipe collisions. 	Occasional	Limited	Low	The design of this area is proposed to match the design of on-road bus bays and therefore buses would have to merge back with through traffic. When buses are indicating, other vehicles must give way to them.

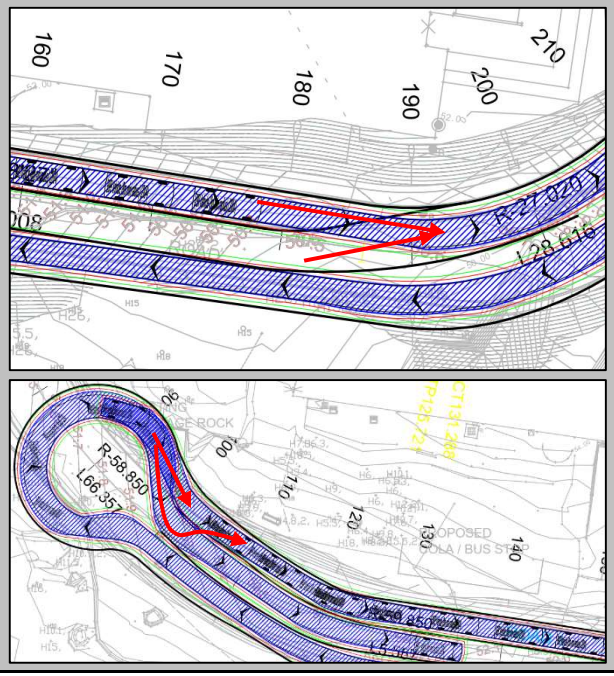
Item Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
5. Turning Area Turnaround Turning Path	It is unclear to the audit team to what vehicles are allowed to use the turning area and how this information is to be conveyed. No further assessment has been carried out. 	Note			The turning area has been redesigned to send all vehicles through, as per a roundabout which should clear up potential confusion with the previous iteration of the design.
6. Roundabout Turnaround Turning Path	It is unclear to the audit team if the existing roundabout is to remain, if vehicles can turn at this point, if vehicles are required to turn at the turning head DOPU area, if vehicles may attempt to U-turn in the parking area. There is a risk that motorists may undertake unsafe turn around movements, such as U-turns, 3 point turns, mounting kerbs/footpaths etc. resulting in side swipe collisions, property damage to roadside objects or vehicle-pedestrian collisions. 	Occasional	Serious	High	The existing roundabout is to be expanded upon with the section of road to be one way north as part of the roundabout.

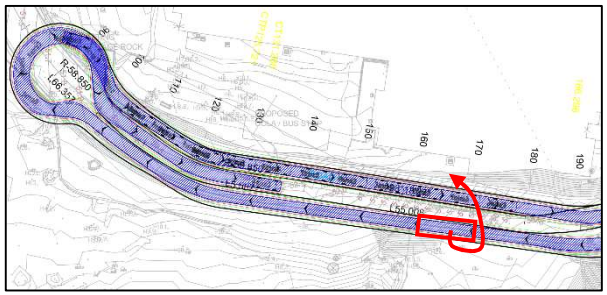
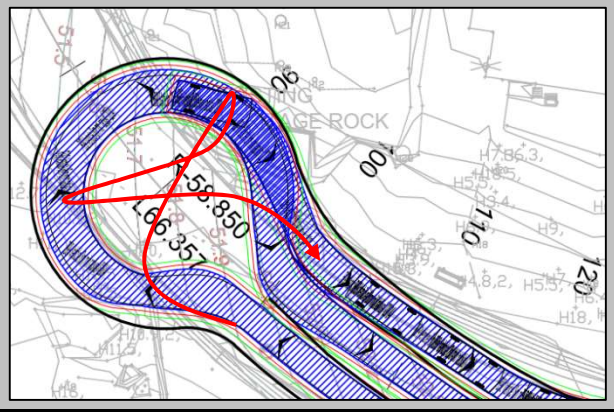
Item Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
7. Pedestrian Paths Turnaround Turning Path	It is unclear to the audit team of the grades of proposed pedestrian paths, requirements for demolition of retaining structures, and vehicle priority or pedestrian crossings, required infrastructure such as steps or handrails, etc. No further assessment has been carried out.  	Note			Noted, this is still being determined as the design is progressing.

Item Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
8. Bus Turn Path Turnaround Turning Path	The bus turn path requires a significant amount of both travel lanes. There is a risk that through vehicles may block the turning path resulting in sideswipe collisions. 	Probable	Minor	High	In the roundabout scenario, this area is one way which removes the conflict.
9. Bus Sightlines Turnaround Turning Path	The position of the bus as it is about to turn into the through travel lane is angled. There is a risk that a driver may not have sufficient sight distances to approaching vehicles resulting in side impact collisions. 	Occasional	Minor	Medium	In the roundabout scenario, this area is one way which removes the conflict.

Item Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
10. Vehicle turn paths Turnaround Turning Path	There are no turning paths provided for vehicles traveling to the rear of the complex. There is a risk that opposing vehicles may not be about to undertake concurrent turns resulting in sideswipe collisions. 	Probable	Minor	High	In the roundabout design, this intersection has been widened to allow two cars to make this turn simultaneously.
11. Intersection Controls Turnaround Turning Path	There are no intersection controls provided for most conflict points. There is a risk that vehicles may not give way to other traffic or may cut across intersections resulting in sideswipe or head on collisions. 	Probable	Minor	High	The roundabout design would implement roundabout style conflict points at the upper point, and the lower point, the through movement is more obvious for cars coming up the hill past the driveway.

Item Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
12. Structure Design Turnaround Turning Path	There is no information provided regarding the turning structure construction, or any upper barriers, handrails, batters, or pier protection from lower levels required. No further assessment has been carried out. 	Note			The turnaround is about 8m above the car park and will include crash barriers along the upper level. The piers will be designed to withstand some impact as per the Building Code of Australia.
13. Pedestrian Routes DOPU Area	It is unclear to the audit team of the proposed pedestrian routes/waiting areas/footpath width/etc. No further assessment has been carried out. 	Note			The pedestrian area is being developed as part of the landscape design and will include fencing along this area that defines entry points to the school when the DOPU area is in operation. 1.5m has been provided between the kerb and the fence.

Item Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
14. Vehicle Restriction DOPU Area	There are no vehicle restrictions proposed for the DOPU area. There is a risk that a vehicle larger than 5.2m may attempt to access the DOPU area and may undertake unsafe turn around movements, such as U-turns, 3 point turns, mounting kerbs/footpaths etc. resulting in side swipe collisions, property damage to roadside objects or vehicle-pedestrian collisions.	Occasional	Serious	High	Signage will be placed limiting vehicles over 5.2m from entering this area at the roundabout. Fire vehicles will be excepted.
15. Merge-Diverge DOPU Area	It is unclear to the audit team to how vehicle diverge and merge is to be conveyed/managed for vehicles using the stopping area and for vehicles continuing through. There is a risk that a through vehicle may not anticipate a vehicle entering or exiting the stopping area resulting in sideswipe collisions. 	Occasional	Limited	Low	The turnaround has been redesigned to add the DOPU lane more clearly after the turnaround point to ease this decision point. The DOPU exit will be signed as a parking lane ending requiring drivers to give way to through traffic.

Item Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
16. Drop off Location DOPU Area	There is a considerable distance for a parent to drive and turn around before being able to DOPU. There is a risk that parents, while stopped in a long queue, may encourage children to exit the vehicle and walk in between traffic resulting in pedestrian-vehicle collisions. 	Occasional	Minor	Medium	This behaviour is unlikely to occur as the parent would not be able to turn around within only two lanes and our queueing estimates suggest that the queue would be between 6-10 vehicles and clear relatively quickly. Additionally, parents will be instructed in how to safely drop their kids off at the school as part of the School Travel Plan.
17. Turn area DOPU Area	There is limited delineation provided for motorists to turn at the turning head in one movement and enter the correct lane. There is a risk that a motorist may undertake unsafe turn around movements, 3 point turns, mounting kerbs/footpaths etc. resulting in side swipe collisions, property damage to roadside objects or vehicle-pedestrian collisions. 	Occasional	Minor	Medium	Pavement markings will be included in the final design that explain that this a turnaround and that vehicles are expected to drive forward through this turnaround.

10 Formal Statement

We, the undersigned, declare that we have reviewed the site and data listed in this report and identified the safety and operational deficiencies above.

It should be noted that while every effort has been made to identify potential safety hazards, no guarantee could be made that every deficiency has been identified.

A project sponsor is under no obligation to accept the findings outlined in this audit report. This report simply provides the opportunity to review potential safety issues highlighted by the auditors.

This audit will be recorded on the NSW Register of Road Safety Auditors and the project sponsor should expect email notification from the register to confirm the audit has been carried out.

We recommend that points of concern be investigated and necessary corrective actions undertaken.

Aaron Walton
Level 3 Road Safety Auditor
Team Leader

Asith Nagodavithane
Level 2 Road Safety Auditor
Team Member