

Concept Design Road Safety Audit

**Hurlstone Agricultural High
School (Hawkesbury)
Londonderry Road, Vines Drive
and Southee Road**

Prepared for NSW Department of Education c/o Mace Australia Pty Ltd / 10 August
2018

161108 TAAE

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Audit Summary

Report Number	161108 TAAE
Audit for	NSW Department of Education c/o Mace Australia Pty Ltd
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Project Representative	Bevan Botha (Mace)
Audit Team	Jason Scoufis (Team Leader) Aaron Walton (Team Member) Grace Carpp (Team Member)
Audit Type	Concept
Commencement Meeting	Wednesday 27 th June, 2018
Audit Date	Thursday 28 th June, 2018
Completion Meeting	Friday 10 th August, 2018
Previous Audit Numbers	No previous audits have been conducted.

1.0 Introduction

1.1 Project Overview

The NSW Department of Education c/o Mace have engaged Taylor Thomson Whitting (TTW) to undertake a Concept Design audit for the access intersections of Southee Road/Londonderry Road and Londonderry Road/Vines Drive to the proposed Hurlstone Agricultural High School (Hawkesbury). The project is proposing to construct a school that will accommodate 1,500 students.

The proposed school will be located within the Western Sydney University Hawkesbury Campus in Richmond. The scope of this audit is limited to the following:

- The paired T-intersections of Vines Drive/Londonderry Road and Londonderry Road/Southee Road and the impact of proposed widening of Vines Drive.
- The additional traffic volumes anticipated when the proposed school is in operation.



Figure 1.1: Audit Site Location

1.2 Supporting Documentation

This RSA reviews the following:

- The site as presented on Thursday 28th June 2018 under day and night conditions
- Civil Engineering plans prepared by Taylor Thomson Whitting
- Transport and Accessibility Impact Assessment prepared by Taylor Thomson Whitting

Appendix A of this report also details the documentation available for review by the audit team.

1.3 Reference Material

This RSA has generally been carried out in accordance with, and with reference to, the following documents:

- Austroads Guide to Road Safety, particularly Part 6: Road Safety Audit
- Austroads Guide to Traffic Management
- RMS Supplements to Austroads
- RMS Delineation Guides
- Relevant Australian Standards
- Relevant RMS Technical Directions

2.0 Audit Process

2.1 Team Members

This RSA was carried out by the following team:

Audit Role	Name	Qualification	Registration
Team Leader	Jason Scoufis	Level 3 Road Safety Auditor	RSA-02-0220
Team Member	Aaron Walton	Level 3 Road Safety Auditor	RSA-02-0501
Team Member	Grace Carpp	Level 1 Road Safety Auditor	RSA-02-1091

Members of this audit team have had no involvement in the design of the surrounding intersections subject to this audit. Audit team members from TTW operate independently of the engineering and design team from TTW responsible for the design of the site.

2.2 Program

The audit included a commencement meeting at TTW offices on 27th June 2018 between the audit team and the following project representatives:

- Bevan Botha (Mace Australia – Project Manager)
- Michael Babbage (TTW – Traffic Engineer)

Commencement discussions involved an overview of key project details and the scope of the audit.

A site inspection was undertaken by the audit team on Thursday 28th June 2018. The site was observed during both daylight hours and after last light under intermittent rainy weather conditions.

A completion meeting was held with the project representatives Bevan Botha and Michael Babbage on the 10th August, 2018. This completion meeting involved discussion of the audit findings and an explanation of the recommended next steps for a Road Safety Audit.

As set out in the Austroads Road Safety Audit Guidelines, responsibility rests with the client organisations for implementing and/or accepting or rejecting the audit findings, comments and recommendations. The client is under no obligation to accept all the audit findings and comments. The role of the audit team is not to respond to the audit findings, nor to agree or approve of the client's response to any audit findings. Rather, the audit provides the opportunity to highlight potential problems and risks, and to have them formally considered by the client in conjunction with all other road management considerations.

3.0 Risk Assessment

The level of risk associated with each audit finding is developed based on a risk matrix approach. This approach considers both the likelihood and consequence of an incident occurring as a result of any particular design component. The tables below are extracted from Austroads Guide to Road Safety Part 6 and have been used in the assessment of risk for this audit.

Table 1: Incident Frequencies

Source: Austroads Guide to Road Safety Part 6, Table 4.1

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

Table 2: Incident Severities

Source: Austroads Guide to Road Safety Part 6, Table 4.2



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 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 3: Level of Risk Matrix



Source: Austroads Guide to Road Safety Part 6, Table 4.3

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

4.0 Audit Findings

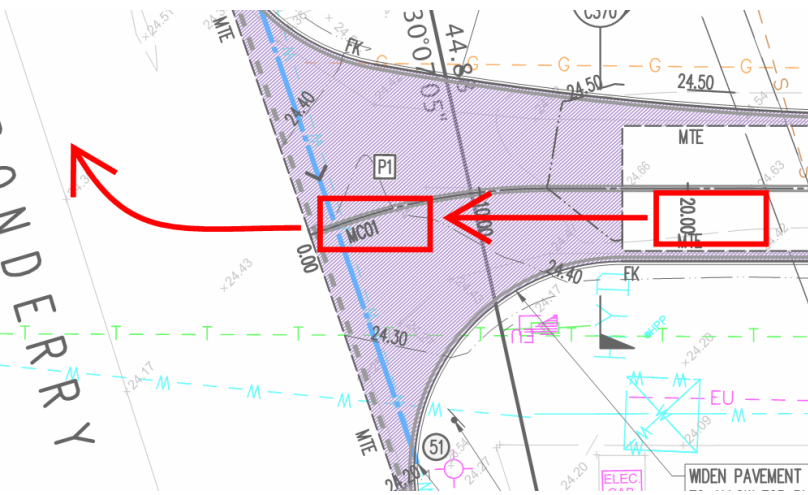

Item	Location	Identified Risks	Photographic Record	Frequency Severity Risk	Accept / Reject	Corrective Actions
INTERSECTIONS OF LONDONDERRY ROAD/VINES DRIVE AND LONDONDERRY ROAD/SOUTHEE ROAD						
1	Londonderry Road/Vines Drive	There is limited drainage located adjacent to Londonderry Road and Vines Drive. There is a risk that ponding water adjacent to the roadway may encroach the travel lane and result in vehicles aquaplaning and losing control. There is also a risk that drivers may swerve to avoid driving through water. These risks could lead to side impact or rear end collisions.		Improbable Minor Low	A	<p>Severe aquaplane risks are not considered to be evident at this location.</p> <p>Vines Drive consists of long straights and wide curves, providing good visibility of oncoming traffic in the event a vehicle is required to avoid water.</p> <p>Existing issue on external road is unlikely to be worsened by additional traffic.</p> <p>Operation is considered satisfactory.</p> <p>No further action.</p>
2	Vines Drive	A pedestrian path is provided on the eastern side of Vines Drive. The path does not continue and finishes approximately 1m from the road carriageway of Londonderry Road. This may result in pedestrians being lead to an uneven surface which may pose a trip hazard.		Improbable Limited Low	R	<p>Standard treatment for end of footpath onto flush and relatively flat grass surface.</p>



Item	Location	Identified Risks	Photographic Record	Frequency Severity Risk	Accept / Reject	Corrective Actions
3	Bus Stop on Londonderry Road	There is no safe pedestrian access provided to the bus stop on Londonderry Road. There is a risk that pedestrians may walk on the pavement to avoid uneven areas and ponding water resulting in collisions with passing vehicles. This risk may be increased once the proposed school is in operation as students may use this bus service.		Improbable Serious Medium	A	As below.
4	Bus Stop on Londonderry Road	The existing bus stop on Londonderry Road is located 40m south of the intersection of Vines Drive and Londonderry Road. There is a risk that buses stopped to pick up passengers may impact sightlines for vehicles exiting Vines Drive and from those travelling northbound on Londonderry Road.		Improbable Serious Medium	A	<p>Vines Drive bus services operate very infrequently (2hrs morning, 1hrs evening). Closest services to school times are currently 8:15am, 10:10am, 2:10pm, 3:50pm which are outside school movement periods.</p> <p>While acknowledging timetables may change, low frequency of services not expected to result in issues.</p> <p>Additional usage of buses by school students is expected to be via dedicated school buses from within HAHS site.</p> <p>Operation is considered satisfactory.</p> <p>No further action.</p>



Item	Location	Identified Risks	Photographic Record	Frequency Severity Risk	Accept / Reject	Corrective Actions
5	Vines Drive	<p>Give-way signage located on Vines Drive at the intersection is faded and may be unclear to drivers. There is a risk that drivers may not be aware of the sign control on the intersection which may lead to side impact collisions.</p> <p>It is noted that the proposed design relocates this existing sign but does not replace it.</p>		<p>Improbable</p> <p>Serious</p> <p>Medium</p>	A	Sign to be replaced. (Action by Civil Engineer)
6	Vines Drive	<p>There is a no chevron board provided adjacent to the intersection on Vines Drive. There is a risk that during night or adverse weather conditions, the driver may not anticipate the terminating leg of the intersection and enter the through carriageway which may result in side impact collisions.</p>		<p>Improbable</p> <p>Serious</p> <p>Medium</p>	A	<p>Good visibility to signage and line marking at intersection, which will alert drivers to intersection and allow users to understand and view the operation.</p> <p>Modified perpendicular alignment of Vines Drive expected to improve vehicle behaviour at this location (including slowing down and awareness of intersection).</p> <p>Operation is considered satisfactory.</p> <p>No further action.</p>

Item	Location	Identified Risks	Photographic Record	Frequency Severity Risk	Accept / Reject	Corrective Actions
7	Vines Drive	40 kilometres per hour speed limit signage is indicated approximately 75 metres south east of the intersection of Vines Drive and Londonderry Road. There is a risk that drivers may not be aware of the reduction in speed from Londonderry Road (60km/h) to Vines Drive (40km/h). This may result in a vehicle braking suddenly and rear end vehicle collisions from following vehicles.		Improbable Minor Low	R	<i>Change in speed is minimal and located sufficiently within the site from Vines Drive.</i>

Item	Location	Identified Risks	Photographic Record	Frequency Severity Risk	Accept / Reject	Corrective Actions
8	Vines Drive	<p>The widening of Vines Drive allows for two exiting vehicles to be adjacent to each other at the intersection of Vines Drive/Londonderry Road.</p> <p>There is a risk that adjacent exiting vehicles on Vines Drive may obstruct sight distance to approaching through vehicles on Londonderry Road which may encourage motorists to enter into traffic resulting in side impact collisions.</p>	<p>Note: Image taken at Campus Drive intersection and is provided as an example.</p>	Occasional Serious High	A	<p>Fairly standard intersection operation. Intersection performs with minimal delay as per intersection modelling, which reduces the likelihood of drivers performing dangerous manoeuvres. Alternative designs such as a slip lane may introduce additional conflicts or poor sight angles.</p> <p>Operation is considered satisfactory.</p> <p>No further action.</p>

Item	Location	Identified Risks	Photographic Record	Frequency Severity Risk	Accept / Reject	Corrective Actions
9	Vines Drive	The proposed centreline of Vines Drive curves approximately 15m prior to the intersection with Londonderry Road. Drivers may tend to drive over the centreline when turning right onto Londonderry Road. This may lead to side swipe or side impact collisions. It is noted that the existing alignment does not have this curve.	<div></div> <div></div> <div>Note: Second image shows the existing arrangement.</div>	Occasional Serious High	R	Proposed centreline of Vines Drive is perpendicular to Londonderry Road to ensure best visibility and act as a traffic calming measure. This alignment is also designed to ensure best turning manoeuvre for buses entering the site and avoid bus-car collisions.

Item	Location	Identified Risks	Photographic Record	Frequency Severity Risk	Accept / Reject	Corrective Actions
10	Londonderry Road	The existing line marking for the centreline appears faded on Londonderry Road near the intersection with Southee Road. There is a risk that drivers may not be aware of the road alignment and may encroach into the oncoming traffic lane. This may lead to head on or side impact collisions.		Improbable Serious Medium	A	<i>Line marking can be renewed as part of line marking works at Vines Drive intersection.</i> <i>To be investigated with RMS during detailed design and approval process. (Action by Civil Engineer)</i>
11	Vines Drive	During night conditions there are no reflectors indicating the alignment of Vines Drive. There is a risk of vehicles not entering Vines Drive on the correct alignment or not travelling within their lane which may lead to head on or side swipe collisions.		Improbable Minor Low	A	<i>Road surface to be renewed as part of Vines Drive works.</i> <i>Provision of reflectors to be considered during detailed design. (Action by Civil Engineer)</i>

Item	Location	Identified Risks	Photographic Record	Frequency Severity Risk	Accept / Reject	Corrective Actions
12	Vines Drive	<p>The street signage of Vines Drive is located approximately 6m away from the Londonderry Road carriageway.</p> <p>There is a risk that the street sign may not be sighted by a passing motorist until late, resulting in sudden deceleration and possible rear end collisions.</p>		Occasional Minor Medium	R	<p><i>Vines Drive is private road to university which is utilised by regular users. New users are also alerted by significant University signage at intersection (visible in site photo).</i></p> <p><i>Additional site traffic for school will also be regular users.</i></p> <p><i>Signage for school to be investigated separately.</i></p>
13	Londonderry Road	<p>On the northern approach along Londonderry Road there is a raised concrete pit lid located adjacent to the southbound travelling lane. There is a risk that vehicles may hit this lid when passing a queued vehicle or swerve to avoid travelling near to this lid. This has the potential to result in side impact collisions.</p>		Improbable Minor Low	A	<p><i>Minimal additional traffic to be created in this area. Passing of queued vehicles unlikely and would occur further south. Pit is approx. 2m from roadway edge and would not require swerving into opposite lane.</i></p> <p><i>Operation is considered satisfactory.</i></p> <p>No further action.</p>

5.0 Conclusion

5.1 Responding to the Audit

The role of the audit team in the Road Safety Audit process is to highlight risks identified within the site or plans as presented to the audit team. Responsibility for addressing these risks and implementing any corrective actions rests with the project team and any other relevant organisations working with the project team.

The project manager is under no obligation to accept all of the findings presented in the audit, nor is the audit team responsible for approving any proposed comments or responses from the project manager and design team.

Note that this audit will be recorded on the NSW Register of Road Safety Auditors and the Project Representative will receive an email notification from the register to confirm the audit has been carried out.

5.2 Concluding Statement

We declare that we have examined the plans and documents listed in Appendix A. We have inspected the site during both day and night conditions. Upon review of the relevant documentation and the site we have identified what we considered to be elements of the proposal which could be altered or removed to improve safety for road users. The identified issues have been detailed in the Table of Audit Findings within this report. We recommend that the issues noted here be investigated, with responses and corrective actions to be considered and implemented as soon as practicable.

The auditable material at the site was restricted to the scope of the audit agreed upon during the commencement meeting.

It is noted that while every effort has been made to identify potential safety hazards, no guarantee can be made that every deficiency has been identified. This Road Safety Audit should not replace standard Safety in Design practices and is not intended to provide full engineering and design judgement relevant to the context of the particular site.

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Appendix A

Reference List

Discipline and Type	Author	Reference Number	Title	Revision	Date
Civil Engineering Drawing	Taylor Thomson Whitting	HASH-00-CD-CE-DR-C340	Vines Drive Site Works Plan Sheet 1 of 5	P8	05.04.18
Traffic Engineering Report	Taylor Thomson Whitting	HASH-00-SD-TR-RP-180111	Transport and Accessibility Impact Assessment	1	11.01.18