

**ROAD SAFETY ROAD SAFETY AUDIT REPORT**  
**Stage 3 - Detailed Design Stage Road Safety Audit**

**ROAD SAFETY AUDIT FOR**  
**PROPOSED RETIREMENT VILLAS**  
**LOT AND DRAINAGE WORKS**

**JORDAN SPRINGS (STAGE 2)**



Ref. 19028 RSA Stage 3

6 May, 2019

Prepared By



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## 1.0 INTRODUCTION

### 1.1 Auditors and Audit Process

This report details the results of a Detailed Design Stage (Stage 3) Road Safety Audit of the proposed lot and drainage works which form Stage 2 of the Jordan Springs Residential Subdivision. The Stage 2 development is comprised of Retirement Villas.

The civil works plans were prepared by J. Wyndham Prince.

The Detailed Design Stage (Stage 3) Road Safety Audit was requested by Penrith City Council and Transport and Urban Planning were engaged by J.Wyndham Prince to carry out the Audit.

The Audit has examined the plans for the proposed subdivision as outlined in Section 1.3 following.

Road Safety Audit Team:

**Lisa Tulau** Design Manager  
Accredited Level 3 Road Safety Auditor (Audit Leader)  
Auditor ID: RSA-02-0443

**Terry Lawrence** Director  
Accredited Level 3 Road Safety Auditor  
Auditor ID: RSA-02-0002

None of the auditors has had any involvement with the design or development of the project.

The audit commenced with an email briefing from Ahlam Najjar, Assistant Project Manager for J. Wyndham Prince and continued with subsequent requests for additional information.

The Stage 2 road network connects to Road 1 of Stage 1, which connects to the existing road network at Jordan Springs Boulevard. Inspection of the proposed connection point for Stage 1 at Jordan Springs Boulevard was undertaken in February, 2019 as part of the audit process for that stage. As this audit is required for a greenfield site and the connection point to the adjoining Stage 1 has not been constructed, a site inspection was not considered necessary. The plans were audited between 29 April and 3 May with the Audit report prepared concurrently.

The audit has been carried out following the procedures set out in the Roads and Maritime Services Guidelines for Road Safety Audit Practices Part 1: Road Safety Audit. The audit examines the features of the proposal which may affect road user safety and it has sought to identify potential safety hazards. However, the auditors point out that no guarantee is made that every deficiency has been identified. Further, if all the recommendations in this report were to be followed, this would not confirm that the proposed design is 'safe'; rather, adoption of the recommendations should improve the level of safety of the proposal within the existing road network.

## 1.2 Description of the Project

Stage 2 of the Jordan Springs Residential Subdivision is comprised of Retirement Villas and is located on the southern side of Jordan Springs Boulevard between Stage 1 and Lakeside Parade.

The proposal as it currently exists includes;

- Access to Stage 2 subdivision via new Road 3 which forms new T-intersection with Road 1 of Stage 1;
- Road 3 extends throughout Stage 2 for approx. 450m, forming a loop road via a number of 90-degree bends;
- Driveways 1 to 4 connect to the northern part of Road 3 and are approx. 50m in length;
- Road 3 has a longitudinal grade of approx.1%;
- Driveways 1-4 have a longitudinal grade of approx.1%, falling towards Road 3;
- Road 3 has a 6.5m wide carriageway, flush kerb both sides and verges of varying widths;
- Road 3 has 3% crossfalls which fall toward a central drainage channel (formed in the pavement) and pits along the centerline of the carriageway;
- 1.2m wide footpath between residences and carriageway along Road 3;
- Provision of 1.5m footpath adjacent to existing dam along Road 3;
- Bulk earthworks over entire area of Stage 2, primarily in fill;
- Retaining walls along the boundary of individual lots and adjacent to the existing dam mound;
- Stormwater drainage system in carriageway of Road 3 and along the rear of residential lots;
- Maintenance access to Gross Pollutant Trap.

## 1.3 Audited Plans

The following plans were examined as part of the audit.

- Proposed Lot and Drainage Works Plans by J. Wyndham Prince - Plan No.11048702 / CC101-112, CC116-120 (Advance Copy Only - Not for Construction)
- Landscape Works Plans for Lot 3991 Concept DA - Jordan Springs Plan Numbers L-DA 101 to 105
- Lighting and servicing Concept Plan dated 6.3.19

## 1.4 Documents Used During the Audit

The following documents were referenced as part of the audit.

- Austroads Guide to Road Safety - Part 1: Road Safety Overview and Part 6: Road Safety Audit
- Roads and Maritime Services - Guidelines for Road Safety Audit Practice Part 1: Road Safety Audit
- Austroads - Guide to Road Design

- Austroads - Guide to Traffic Management
- RMS - Supplements to Austroads Guide to Road Design and Guide to Traffic Management

## 1.5 Responding to the Audit Report

As set out in the road safety audit guidelines, responsibility for the road design always rests with the designer/project manager and not with the auditor. A project manager is under no obligation to accept any or all the audit recommendations. Also, it is not the role of the auditor to agree to or approve of the project manager's response to the audit. Rather, the audit provides the opportunity to highlight potential problems and have them formally considered by the project manager, in conjunction with all other project considerations.

To assist with this, Table 3.1 (containing this audit's findings) contains a column for any response.

## 2.0 RECOMMENDATIONS FROM PREVIOUS STAGE AUDITS

It is not known whether previous audits were undertaken.

## 3.0 AUDIT FINDINGS AND RECOMMENDATIONS

### 3.1 Risk Ranking

Risks and potential safety issues have been identified and ranked using Austroads Ranking method, based on frequency, severity, overall level of risk and treatment approach presented in Tables 4.1 to 4.4 in Guide to Road Safety Part 6: Road Safety Audit (See Appendix 1)

The risk rankings and Austroads suggested treatment approach are defined as follows:

- Intolerable - Must be corrected
- High - Should be corrected or the risk significantly reduced, even if the treatment cost is high
- Medium - Should be corrected or the risk significantly reduced, if the treatment cost is moderate, but not high
- Low - Should be corrected or the risk reduced, if the treatment cost is low

### 3.2 Audit Findings

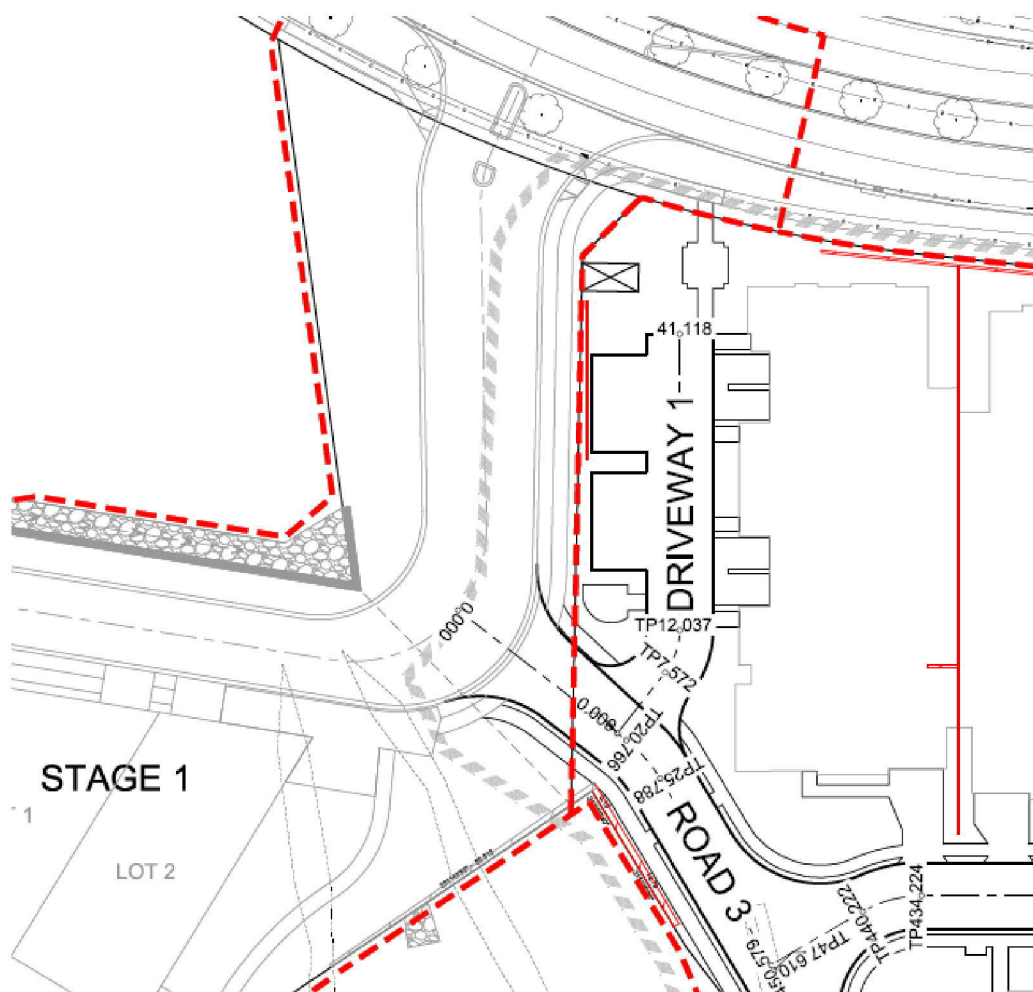
Stage 3 Detailed Design Stage Audit findings were as follows;

Sight lines at intersection of Road 3 and Driveway 1

The proposed T-intersection of Road 3 and Driveway 1 is located within 20m of the intersection of Road 3 / Road 1 (Stage 1). The intersection of Road 1 / Road 3 is the only entry point to the Retirement Villa Development.

Sight lines to southbound vehicles entering Road 3 from Road 1 will be limited for vehicles turning right from Driveway 1 due to the road geometry and close proximity of the intersections, which is a potential safety issue.

Consider options to improve sight distance.



Proposed landscaping at intersection of Road 3 and Road 1

Proposed landscaping on the north eastern corner of the intersection of Road 3 / Road 1 has the potential, when mature, to obscure sightlines for vehicles turning right from Driveway 1. The proposed large shrub has a mature height of up to 5m.

If Driveway 1 remains in the current location, consider replacing proposed plantings on north eastern corner of Road 3 / Road 1 with plant species having mature height less than driver eye height or <1.2m.





Table 3.1 below summarises those matters identified in the audit which require consideration by the design team.

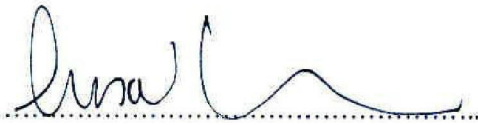
**TABLE 3.1**

Item	Issue	Risk Ranking	Response by audit Manager	Other comments including Council/RMS
1	<p>Sight lines to southbound vehicles entering Road 3 from Road 1 will be limited for vehicles turning right from Driveway 1 due to the road geometry and close proximity of the intersections.</p> <p>Consider options to improve sight distance.</p>	Medium / High	<p>Road geometry is heavily constrained at the intersection, and this is a very low speed environment. Street tree planting will be reviewed to maintain maximum sight distance</p>	
2	<p>Proposed landscaping on the north eastern corner of the intersection of Road 3 / Road 1 has the potential, when mature, to obscure sightlines for vehicles turning right from Driveway 1.</p> <p>If Driveway 1 remains in the current location, consider replacing proposed plantings on north eastern corner of Road 3 / Road 1 with plant species having mature height less than driver eye height or &lt;1.2m.</p>	Medium / High	<p>Driveway 1 needs to remain in its current location. Landscape design to be amended to limit height of plantings in north eastern corner to 1m.</p>	



## 4.0 FORMAL STATEMENT

We have examined the plans detailed in Section 1.3 and we have audited these plans in accordance with the procedures set out in the RMS's Guidelines for Road Safety Audit Practices. The audit has been carried out for the sole purpose of identifying any features of the proposed design that could be altered or reconsidered to improve safety. The identified issues have been noted in this report in Table 3.1 and are put forward for consideration by the Project Manager.



Lisa Tulau  
Lead Road Safety Auditor (Level 3) Audit Leader



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Terry Lawrence  
Road Safety Auditor (Level 3)

6 May, 2019

## APPENDIX 1

### Austroads Risk Assessment Tables 4.1 to 4.4 Extract

**C. Risk ranking of safety issues**

The following tables may be useful to provide an indication of the level of risk and how to respond to it. Determine into which category in Table 4.1 and Table 4.2 the issue best fits. From this select the risk category in Table 4.3 and its suggested treatment approach in Table 4.4. This is not a scientific system and professional judgement should be used. Section 9.3 provides an evidence based approach to prioritising the treatment of works emanating from road safety audits of existing roads.

**Table 4.1: How often is the problem likely to lead to a crash?**

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 4.2: What is the likely severity of the resulting crash type?**

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 4.3: The resulting level of risk**

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

**Table 4.4: Treatment approach**

Risk	Suggested treatment approach
Intolerable	Must be corrected.
High	Should be corrected or the risk significantly reduced, even if the treatment costs is high.
Medium	Should be corrected or the risk significantly reduced, if the treatment cost is moderate, but not high.
Low	Should be corrected or the risk reduced, if the treatment cost is low.

#### D. Implementing the agreed changes

Once the corrective action report has been finalised, the agreed actions need to be implemented. The designer has to develop design changes that address the safety problems. If one is at the pre-opening stage, the actions need to be implemented as soon as possible on site. Temporary warning, delineation or other treatment may be needed until the agreed solution is implemented.

Actions taken should be recorded (for example, description of work, by whom and when). This is to fully close out the road safety audit finding as well as to factual record what works were completed. Reasons for any variations from the proposed action must also be set out in writing.

#### ***Framing responses to audit findings or recommendations***

When an audit finding or recommendation is not accepted, or is accepted only in part, care should be taken about framing the corrective action report, bearing in mind that it may become a public document in the event of a crash occurring.

Consider the following responses to findings or recommendations made during a pre-opening audit of a project to widen the carriageway of a two-lane, two-way road to provide an overtaking lane:

#### *Safety issues:*

‘Fixed objects within the new clear zone. These include a concrete bus shelter and stockpiles of aggregate and box culverts.’ Three sections of guard fence are now nearer the edge line, but do not have safe end treatments.

#### *Findings or recommendations*

Take action to reinstate appropriate clear zones for this road. Pay attention to the guard fence.

#### *Responses:*

‘The bus shelter was constructed before work on the overtaking lane. It is 4 m from the edge line. The expense of moving it is not considered justified. Most of this highway has objects within the clear zone, for example 3 km to the south there are 150 trees within 1.5 m to 6 m from the edge line. The stockpiles cannot be removed as there are few stockpile sites in the area. All the guard fence was constructed before construction of the overtaking lane. Compared with other guard fence in this region, it is not considered a priority and no action is planned to install the correct end treatment.’