



Junee Subdivision

Recommendations Report

RES2305.40.115-RSA

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Author: Z. Walgers

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Prepared for:

Troy Raulston & Jenna Pollard
TJHRR Pty Ltd
ABN: 98 653 906 300
Wagga Wagga NSW 2650

Prepared by:

Rigore Pty Ltd (Rigore Engineering Services)
ACN: 615 529 854
ABN: 21 615 529 854
Level 1 / 11-15 Baylis Street, Wagga Wagga NSW 2650
PO Box 5666, Wagga Wagga NSW 2650
www.rigore.com.au

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1. Audit Response Statement

Table 1-1 – Audit Details

Project Name:	Junee Subdivision RSA	
Client:	TJHRR Pty Ltd	
Client Representative:	Troy Raulston	Jenna Pollard
Contact Details:	M: 0437 891 147 E: info@trhomeswagga.com.au	M: 0418 421 621 E: jenna.pollard@remax.com.au
Auditors:	James Gorrie (RSA-02-0732 - Level 3) – Lead Road Safety Auditor Zach Walgers (RSA-02-1502 - Level 2) – Road Safety Auditor	
Audits Details:	RES2305.40.115 Junee Subdivision – Road Safety Audit Report	

We, the undersigned, declare that we have reviewed the material and data listed in the Junee Subdivision – Road Safety Audit Report and developed a list of treatments for the identified risks to road safety listed in Section 4. The responses are given to explain the proposed approach to addressing the identified items that have been highlighted.

It should be noted that while every effort has been made to identify appropriate treatments to the potential safety problems, no guarantee can be made that every problem or deficiency has been eliminated, however every effort has been made to significantly reduce the risk of fatal or serious injury (FSI) crashes.

It is recommended that identified treatments be implemented to address the risks to road safety as soon as practicable.



James Gorrie
Lead Road Safety Auditor (RSA-02-0732 - Level 3)

Date: 02/09/2023



Zach Walgers
Road Safety Auditor (RSA-02-1502-Level 2)

Date: 02/09/2023

2. Introduction

Rigore Engineering Services has been engaged by TJHRR Pty Ltd, to undertake a Road Safety Audit on the proposed strategic access options from the proposed subdivision of land at 14 John Potts Drive Junee to the existing Junee Shire Council road network.

2.1. Project Description

The proposed subdivision includes 43 Torrens title residential lots, associated internal road and footpath infrastructure. The proposed site is located within the Junee township between John Potts Drive and Anzac Ave (refer to Figure 2-1 – Site Overview, Junee NSW).

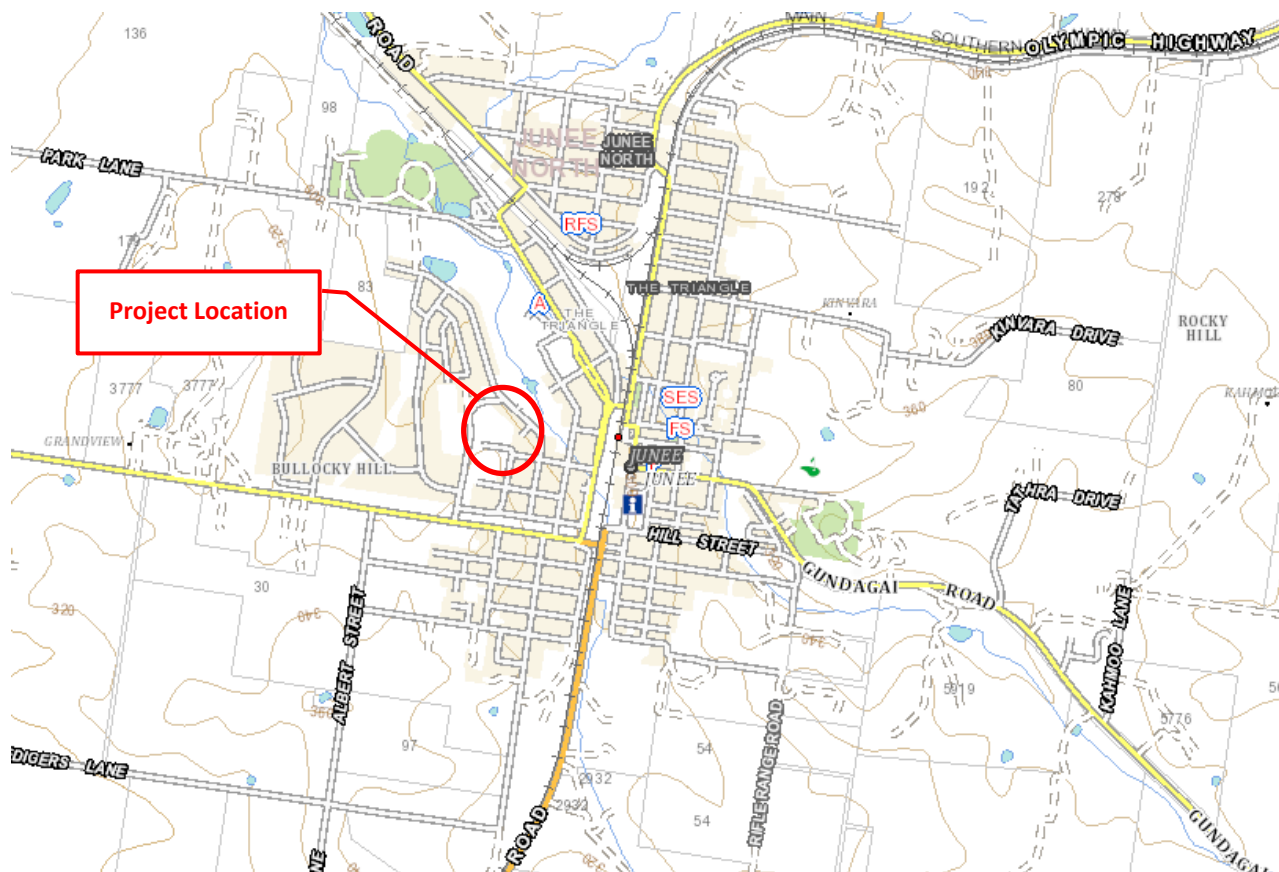


Figure 2-1 – Site Overview, Junee NSW

The proposed strategic access options include the below:

- Option 1 – A single point of network access via Kitchener Street/Anzac Ave



Figure 2-2 – Option 1 Access Location

- Option 2 – A single point of network access via John Potts Drive.



Figure 2-3 – Option 2 Access Location

2.1.1. Project Team

Table 2-1 – Project Team

James Gorrie		
	Position:	Managing Director Project / Design Manager
	Experience:	20+ years
	Education:	Master of Engineering (Civil) Bachelor of Engineering Technology (Civil)
	Qualifications:	CPEng NER MIEAust APEC Engineer
	Accreditations:	Level 3 Lead/Snr Road Safety Auditor NSW VIC QLD SA Treatment of Crash Location Prepare Workzone TMP
Zach Walgers		
	Position:	Lead Civil Designer (Road) Road Safety Auditor
	Experience:	7+ years
	Education:	Master of Engineering / Bachelor of Technology Current Associate Degree of Engineering (Civil)
	Qualifications:	MIEAust
	Accreditations:	Level 2 Road Safety Auditor NSW

2.1.2. Site Inspections

A day and night site inspection was undertaken by James Gorrie (Lead Road Safety Auditor), and Zach Walgers (Road Safety Auditor) on Monday 1st August 2023 between 3:00am and 6:15pm, the weather was clear for the duration of the inspection. During the inspection, the audit team familiarised themselves with the existing road environment, road user make-up and surrounding land use. The site inspection activities involved measuring features, taking photographs, and recording observed road user behaviour.

2.1.3. Client Workshop

The Client Workshop was undertaken immediately following the Completion Meeting held via Microsoft Teams on Monday 14th August 2023 between 4:00pm and 5:00pm. In attendance were James Gorrie (Lead Road Safety Audits), Jenna Pollard and Troy Raulston (TJHRR Pty Ltd representatives). The proposed recommendations were discussed in detail with the attached strategic layouts being produced for assessment using the Safe System Assessment outlined in *AP-R509-16 Austroads Safe System Assessment Framework*.

3. Risk Assessment

3.1. Methodology

The Road Safety Audit will be conducted in accordance with relevant Austroads Guides to Road Safety, inclusive but not limited to *Austroads Guide to Road Safety Part 6: Road Safety Audits 2022* including the application and consideration of Safe System principles.

The Rigore Road Safety Audit team has undertaken the audit by embedding Safe Systems principles. This is achieved by applying our knowledge, experience and understanding of the Safe Systems Framework to document findings in a manner that describes the road user exposure, crash likelihood and crash severity.

The identification and removal or treatment of road elements that may contribute to crash occurrence or crash severity is a key component of the safe system approach to road safety. A safe system acknowledges that human error within the transport system is inevitable and that when it does occur the system makes allowance for these errors to minimise the risk of serious injury or death. In a safe system, therefore, roads (and vehicles) should be designed to reduce the incidence and severity of crashes when they inevitably occur.



Four key principles form the basis of the Safe System philosophy, as outlined in *Guide to Road Safety Part 1: Introduction & The Safe System*:

- People make mistakes that can lead to road crashes
- The human body has a limited physical ability to tolerate crash forces before harm occurs
- A shared responsibility exists amongst those who plan, design, build, manage and use roads and vehicles and those who provide post-crash care to prevent crashes resulting in serious injury or death
- All parts of the system must be strengthened to multiply their effects; so that if one part fails, road users are still protected.

Safer road user behaviour, safer speeds, safer roads and safer vehicles are the four key elements that make up a safe system. In relation to speed, the *Guide to Road Safety Part 3: Safe Speed*, using *Wramborg* curves, outlines the relationships between a motorized vehicle collision speed and the probability of a fatality for different crash configurations:

Often referred to as the Safe System speeds, the following aspirational operating speeds are as follows:

30km/h	where there is the possibility of a collision between a vulnerable road user and a passenger vehicle or where there is the possibility of a side impact with a fixed object e.g. tree/pole
50km/h	where there is the possibility of a right-angle collision between passenger vehicles
70km/h	where there is the possibility of a head-on collision between passenger vehicles
≥100 km/h	where there is no possibility of side or frontal impact between vehicles or impacts with vulnerable road user impacts.

NOTE: presently there is only limited evidence on cyclist and motorcyclist injury thresholds and an assumption is often made that their injury potential is the same as the pedestrian curve. The curves only represent passenger car interactions and do not account for young and elderly people and heavy vehicles. The curves are also limited in that they only provide the probability of fatality and not serious injury and there is little published evidence demonstrating the origins of the curves.

3.2. Risk Assessment Framework

The Austroads system of risk assessment will be applied with the relative characteristics as follows:

Table 3-1 – How often is the problem likely to lead to a crash?

Likelihood	Description
Almost certain	Occurrence once per quarter
Likely	Occurrence once per quarter to once per year
Possible	Occurrence once per year to once every three years
Unlikely	Occurrence once every three years to once every seven years
Rare	Occurrence less than once every seven years.

Table 3-2 – What is the likely severity of the resulting crash type?

Severity	Description	Examples
Insignificant	Property damage	Some low-speed collisions Pedestrian walks into object (no head injury) Car reverses into post
Minor	Minor first aid	Low speed collisions Pedestrian walks into object (minor head injury) Cyclists fall from bicycle at low speed
Moderate	Major first aid and/or presents to hospital (not admitted)	Some low to medium-speed collisions Cyclists fall from bicycle at moderate speed Left turn rear-end crash in a slip lane
Serious	Admitted to hospital	High or medium-speed vehicle / vehicle collision High or medium-speed single vehicle collision with fixed roadside object Pedestrian struck at high speed
Fatal	At scene or within 30 days of the crash.	High speed multi vehicle crash on Freeway. Car runs into crowded bus stop. Bus and petrol tanker collide Collapse of bridge or tunnel

Table 3-3 – The resulting level of risk

			Severity*				
			Insignificant	Minor	Moderate	Serious	Fatal
			Property Damage	Minor first aid	Major first aid and/or presents to hospital (not admitted)	Admitted to hospital	Death within 30 days of the crash
Likelihood (includes exposure)	Almost Certain	One Per Quarter	Medium	High	High	Extreme (FSI)	Extreme (FSI)
	Likely	Quarter to 1-year	Medium	Medium	High	Extreme (FSI)	Extreme (FSI)
	Possible	1 to 3 years	Low	Medium	High	High (FSI)	Extreme (FSI)
	Unlikely	3 to 7 years	Negligible	Low	Medium	High (FSI)	Extreme (FSI)
	Rare	7 years +	Negligible	Negligible	Low	Medium (FSI)	High (FSI)
Safe System Crash Outcome Threshold							

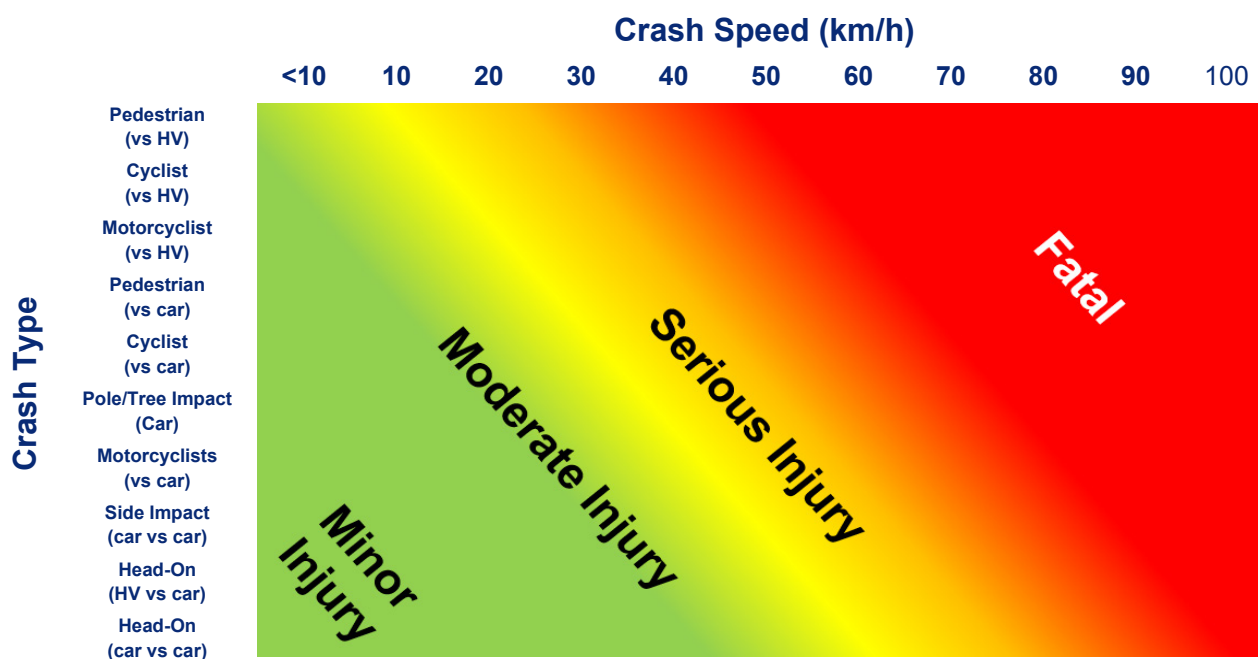
The treatment that Austroads recommend for the above levels of risk is shown in Table 3.4.

Table 3-4 – Treatment approach

Risk	Treatment
Extreme	Must be corrected regardless of cost
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 even if the treatment cost is moderate, but not high
Low	Should be corrected or the risk significantly reduced if the treatment cost is low
Negligible	No action required

The risk matrix above shown in *Table 3.3*, is aligned to Safe System principles and has been designed to be used with consideration of a severity guidance sheet which was developed by the Project Working Group. The PWG comprising of representatives from state and local road agencies was established with the primary objective of consolidating and updating the previously issued Parts 6 and 6A (Austroads 2019).

Table 3-5 – The severity guidance sheet – to be used with the risk matrix



4. Audit Results

The results of the audit observations and findings have been reported in two categories:


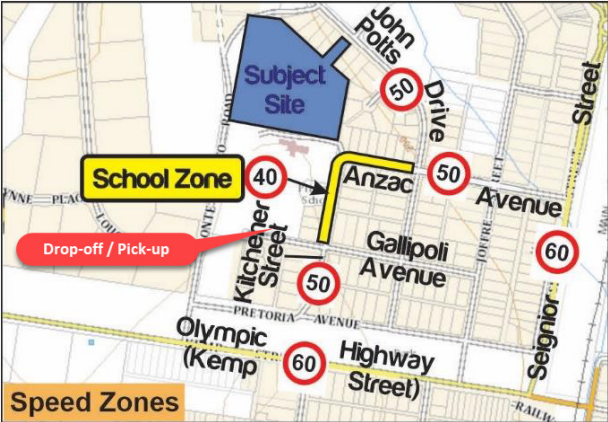
- 4.1 General Observations
- 4.2 Identified Risks



The audit findings, recommended countermeasures and client responses are listed in Table 4.1 and Table 4.2, together with the residual risk ranking, as determined using the risk assessment tables in Section 3.


The project team have provided client response/comments on behalf of the client. In summary, we recommend that Option 1, access via Kitchener St and Anzac Ave be considered the preferred location for network integration as there has been no notable risk identified that may result in a fatal or serious injury should the recommended countermeasure be adopted. Additionally, by adopting Option 1 an opportunity is presented to address outlying issues related to the quality and adequacy of the infrastructure related to the St Josephs School Zone and operations.



4.1 General Observations



Table 4-1 – General Observations

GE	General Observations	Photos / Reference	Recommended Actions
GE-1	<p>The southern extent of the existing school zone is located north of the Vaughan Street/Gallipoli Ave intersection with Kitchener Street. This does not cover the “School Drop-off Pick-up ZONE” located west of this intersection on Vaughan Street.</p> <p>School children were observed walking south along Kitchener Street towards Endeavor Park area (Pretoria Street).</p>	 <p><i>Looking north on Kitchener Street toward the existing school zone.</i></p>	<p>Raise observation with Council representatives to determine if the issue is in hand and/or resolved through other mechanisms.</p> <p>NOTE: Option 1 will require the inclusion of a School Zone threshold treatment if adopted. Refer Attachment A1.</p>
	<p>It is unclear why the extent of the school zone does not include the “School Drop-off Pick-up ZONE” located west of this intersection on Vaughan Street.</p>	 <p><i>Extract: Ason Group Traffic Impact Statement.</i></p>	

GE	General Observations	Photos / Reference	Recommended Actions
GE-2	<p>At the time of the PM site inspection, it was observed that the “School Drop-off Pick-up ZONE” did not appear to be in use by parents or staffed by school monitors.</p> <p>It appeared that the area in front of Saint Jospeh’s Catholic Church (north of the bus zone) or the opposing side of Kitchener Street was instead being used by parents picking up children.</p> <p>Considering the availability of the infrastructure on Vaughan Street, this resulted in an undesirable mix of children pick-up and bus stop operations.</p>	 <p><i>Looking east in the “Drop-off Pick-up ZONE”</i></p>  <p><i>Looking north toward bus stop on Kitchener St.</i></p>	<p>Raise observation with Council representatives to determine if the issue is in hand and/or resolved through other mechanisms.</p>

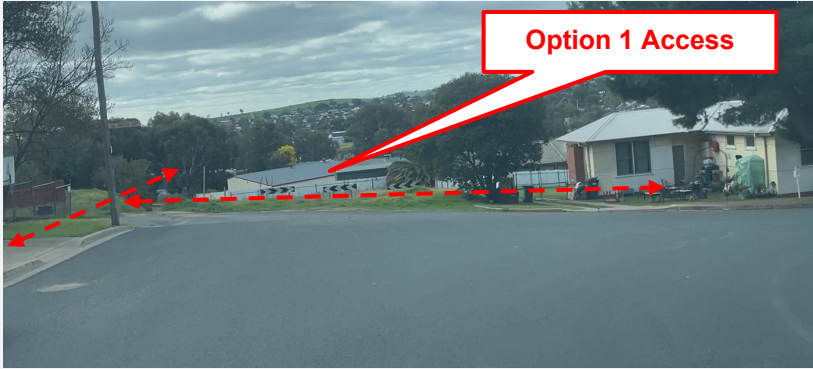

GE	General Observations	Photos / Reference	Recommended Actions
GE-3	<p>At the time of the PM site inspection, a “Walking School Bus” was observed crossing Anzac Ave at the end of Kitchener Street (Option 1 access location), walking children on the northern side of Anzac Ave as far as the northwest corner of Anzac Ave and John Potts Drive intersection (Yellow). Additionally, at the time of the PM site inspection, several children were observed continuing from Anzac Ave at the end of Kitchener Street (Option 1 access location), onto the gravel access track toward the alleyway connecting to Pike Place (Red).</p> <p>It should be noted that Option 2 access (via John Potts Drive) may adversely impact the current access to the Pike Place alleyway, where as Option 1 access (via Anzac Ave/Kitchener Street) presents the opportunity to formalise an all weather access to the Pike Place alleyway.</p>	 <p>Overview of prominent pedestrian movements.</p>	<p>Raise observation with Council representatives for consideration.</p>

GE	General Observations	Photos / Reference	Recommended Actions
GE-5	<p>There is existing lighting and stormwater infrastructure that would require adjustment at the Option 2 access location (14 John Potts Drive).</p> <p>The existing light post is located in the middle of the vacant block where the proposed development access will be located joining John Potts Drive.</p> <p>The existing stormwater pit is located in the middle of the vacant block where the proposed development access will be located joining John Potts Drive.</p>	 <p><i>Looking southwest toward Option 2 access.</i></p>  <p><i>Looking south toward Option 2 access.</i></p>	<p>No action is required for Option 1. Option 2 if adopted will need to consider safe alteration.</p>


GE	General Observations	Photos / Reference	Recommended Actions
GE-6	<p>It is acknowledged that the provision of artificial lighting will form part of the development requirements. Consideration needs to be given to the adequacy of the existing lighting at the development access location adopted.</p>	 <p><i>Looking north down Kitchener Street at the proposed development intersection.</i></p>  <p><i>Looking southwest toward Option 2 access.</i></p>	<p>Consideration needs to be given to the adequacy of the existing lighting at the development access location adopted.</p>


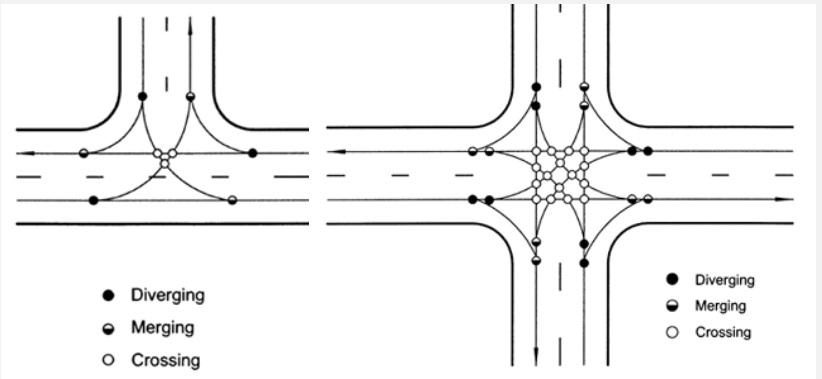
4.2 Identified Risks

Table 4-2 – Identified Risk

ID	Location	Photos / Reference	Description of Deficiency & Likely Consequence	Likelihood	Severity	Risk Level	Recommended Actions	Likelihood	Severity	Residual Risk Level
ID-1	Proposed Option 1 Access Location (Anzac Ave / Kitchener Street)	 <p><i>Looking north on Kitchener St toward Option 1 access location.</i></p>  <p><i>Looking southwest from Pike Place cul-de-sac along alleyway.</i></p>	<p>As indicated by GE-3, children currently walk along the west side of Kitchener Street, either crossing to the northern side of Anzac Ave or continuing from Anzac Ave at the end of Kitchener Street onto the gravel access track toward the alleyway connecting to Pike Place.</p> <p>The proposed Option 1 access will generate additional vehicular movements (approximately 34 vehicles per hour) that will inadvertently interact with the current pedestrian movements.</p> <p>The current conceptual layout for the Option 1 access does not demonstrate an allowance for pedestrian infrastructure connectivity or an extension of the existing school zone.</p> <p>This increases the risk of a vehicle and vulnerable road user collision. The likely travel speeds will be low giving drivers/pedestrians sufficient time to avoid a collision, however, should this occur, this may result in an energy transfer great enough to cause a moderate injury to the pedestrian.</p>	Rare	Moderate	L	<p>Implement the recommended actions as shown by Attachment A1:</p> <ul style="list-style-type: none"> - Provide a raised threshold to provide speed calming and visual prompts to approaching road users; - Provide control through signage and delineation of the intersection of Anzac Ave and Kitchener Street; - Provide an extension of the existing school zone; and - Provide footpath connectivity to the Pike Place cul-de-sac alleyway. 	Rare	Minor	N

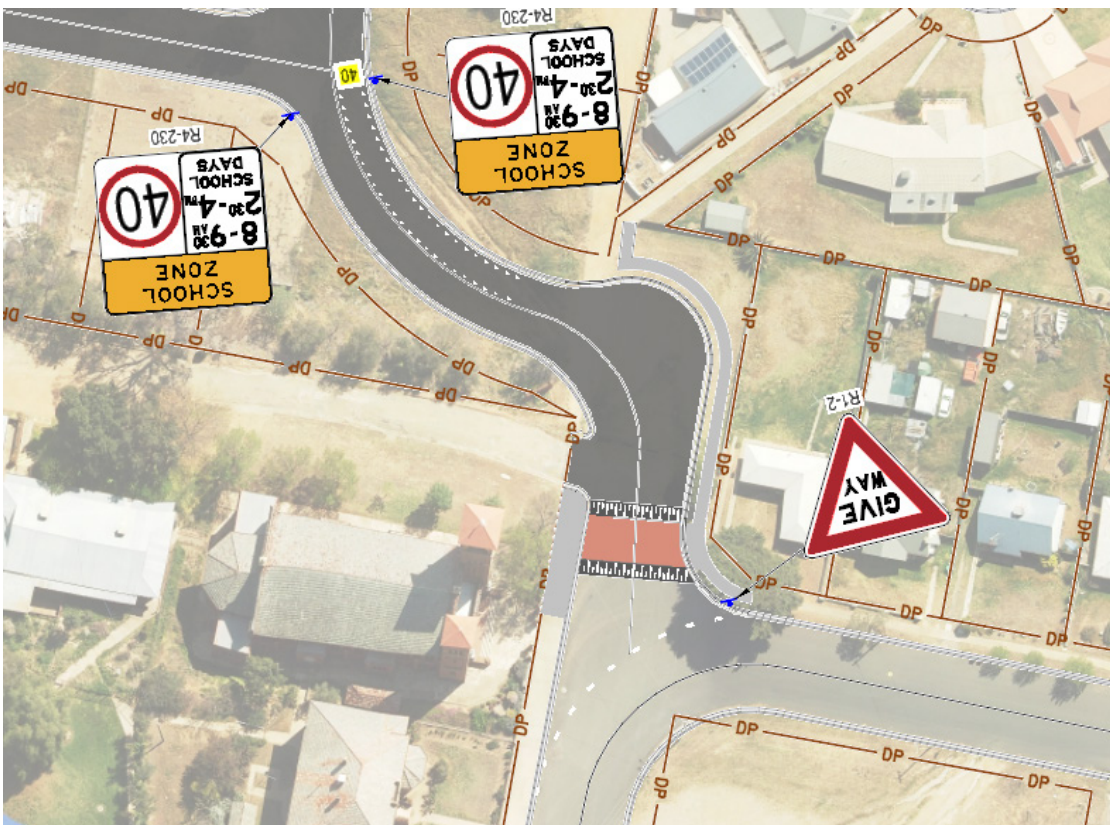
ID	Location	Photos / Reference	Description of Deficiency & Likely Consequence	Likelihood	Severity	Risk Level	Recommended Actions	Likelihood	Severity	Residual Risk Level
ID-2	Proposed Option 1 Access Location (Anzac Ave / Kitchener Street)	 <p><i>Looking west on Anzac Ave at Option 1 access location.</i></p>  <p><i>Overview of Anzac Ave & Kitchener Street intersection where Option 1 access is located.</i></p>	<p>The current conceptual layout for the Option 1 access does not demonstrate the prioritisation of the Anzac Ave/Kitchener Street intersection.</p> <p>This lack of control (yield/stop condition) increases the risk of a driver failing to give way to another road user passing through the intersection. The likely travel speeds will be low giving drivers sufficient time to avoid a collision, however, should this occur, this may result in impact angles with an energy transfer great enough to cause a moderate injury to occupants.</p> <p>NOTES:</p> <ul style="list-style-type: none"> - Noting the T-junction type arrangement, the intuitive approach of most drivers would be to give way to the vehicles travelling north-south, however, consideration should be given to prioritising the current movements due to the no-trough road nature of the proposed development. - Although movements are minimal currently, the current arrangement has no control (yield/stop condition) in place. 	Unlikely	Moderate	M	<p>Implement the recommended actions as shown by Attachment A1:</p> <ul style="list-style-type: none"> - Provide a raised threshold to provide speed calming and visual prompts to approaching road users; - Provide control through signage and delineation of the intersection of Anzac Ave and Kitchener Street; - Provide an extension of the existing school zone; and - Provide footpath connectivity to the Pike Place cul-de-sac alleyway. 	Rare	Minor	N

ID	Location	Photos / Reference	Description of Deficiency & Likely Consequence	Likelihood	Severity	Risk Level	Recommended Actions	Likelihood	Severity	Residual Risk Level
ID-3	Proposed Option 2 Access Location (John Potts Drive)	 <p><i>Looking southwest from John Potts Drive to Option 2 access.</i></p>	<p>The Option 2 access (via John Potts Drive) introduces a long steep downgrade from the development to the connection with John Potts Drive (the through road). There are several inherent risks associated with steep grades in urban environments, particularly where the grade terminates at a T-junction.</p> <p>There is a risk of brake failure of laden vehicles, for example, furniture removalists, delivery vehicles, car-caravans or similar. This may result in several intersection crash types, particularly cross-intersection crashes at a moderate speed. The resultant energy transfer may be great enough to cause serious harm to occupants. There is a risk of children (or inexperienced) cycling, skateboarding or similar losing control on the steep grade and/or within the intersection. This may result in a vehicular strike of a pedestrian or cyclist at a moderate speed. The resultant energy transfer may be great enough to cause a fatal or serious injury to vulnerable road users.</p> <p>NOTES:</p> <ul style="list-style-type: none"> - There is also a risk during construction where trucks loaded with plant, equipment and material may be using this access to the development. 	Rare	Serious	M (FSI)	<p>Implement the recommended actions as shown by Attachment A2:</p> <ul style="list-style-type: none"> - Provide a raised threshold to provide speed calming and visual prompt to approaching road users. 	Rare	Moderate	L

ID	Location	Photos / Reference	Description of Deficiency & Likely Consequence	Likelihood	Severity	Risk Level	Recommended Actions	Likelihood	Severity	Residual Risk Level
ID-4	Proposed Option 2 Access Location (John Potts Drive)	 <p>Overview of John Potts Drive intersection where Option 2 access is located.</p>  <p>Diagrams of conflict point comparison between 3 and 4 leg intersections.</p>	<p>The Option 2 access (via John Potts Drive) introduces a four-leg intersection from the development to the connection with John Potts Drive (the through road) and Crawley Street (providing access to the Junee Urban Wetlands and shared path network). The introduction of an additional leg at this location increases the number of potential conflict points (left).</p> <p>This may result in several intersection crash types, particularly cross-intersection crashes at a moderate speed. The resultant energy transfer may be great enough to cause serious harm to occupants. This may also result in a vehicular strike of a pedestrian or cyclist at a moderate speed. The resultant energy transfer may be great enough to cause a fatal or serious injury to vulnerable road users.</p> <p>NOTES:</p> <ul style="list-style-type: none"> The inclusion of a fourth leg increases the number of conflict points from 6 to 24. Also, note that these diagrams do not directly consider the function of on-road/off-road cyclist use which inherently results in additional conflict points. 	Unlikely	Serious	M (FSI)	<p>Implement the recommended actions as shown by Attachment A2:</p> <ul style="list-style-type: none"> Provide a raised threshold to provide speed calming and visual prompts to approaching road users. 	Unlikely	Moderate	M

Attachment A1 – Strategic Layout

A1 – Option 1



Attachment A2 – Strategic Layout

A2 – Option 2

