**Stantec**

Memo

To:	Shire of Serpentine Jarrahdale	From:	Stantec Australia
Project	CW1200712 (300304677) – Free Reformed School, Oakford - Transport Impact Assessment	Date:	16 October 2023
Subject	Technical Note	Revision	A
Author	SC/LL	Reviewer	DH

Reference: 300304677

1 INTRODUCTION

Stantec was engaged by Free Reformed School Association to address the Shire of Serpentine Jarrahdale's concern that the current road network does not have capacity to accommodate the traffic generated by the development since there is great uncertainty around the timing and funding of the proposed roundabout at the Abernethy Road/Kargotich Rd intersection for the proposed educational establishment to be located at 575 (Lot 218) Abernethy Road, Oakford as shown in **Figure 1-1**.

Figure 1-1   Site Location

Source: Metromap (2023)

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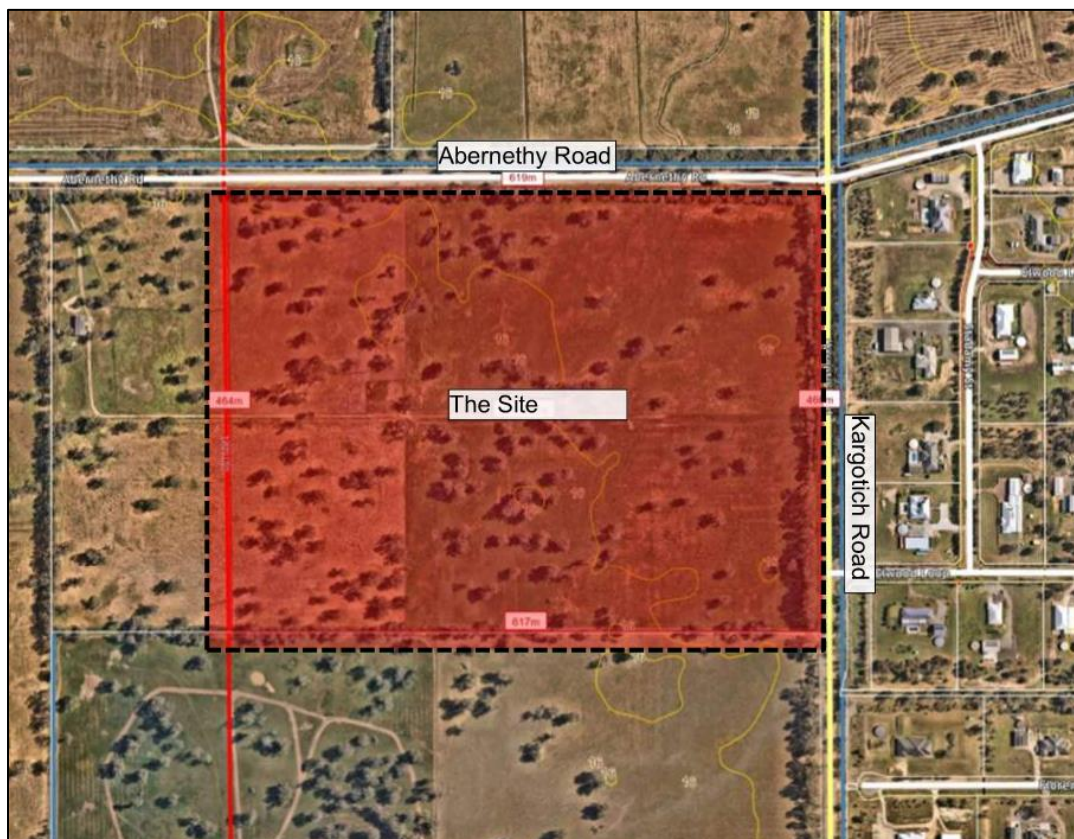
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The Shire has requested that traffic modelling is required for the current scenario and the ultimate school traffic scenario to determine the intersection safety, functionality and level of service based on traffic increases from the proposed school.

The following traffic modelling scenarios were assessed:

- Scenario 1: capacities of the existing intersection in 2028 without the proposed development; and

- Scenario 2: capacities of the existing intersection in 2028 with the proposed development (after Stage 1 Development completion).

1.1   BACKGROUND

The following background information for this technical note has been extracted from the Transport Impact Assessment report submitted by Stantec (dated 25 July 2023 Rev D):

- The proposed development consists of a private school for primary and secondary students which is anticipated to accommodate approximately 1,200 students and are to be implemented in two stages;

- Stage 1 development (*which is considered in this technical note*) sees the influx of **568 Secondary students** for the opening year of the development in 2028; while

- Stage 2 development seeks to accommodate 432 Primary students in 2033;

- The number of trips generated by the proposed development at Stage 1 completion in 2028 is provided in **Table 1-1** summarises the total estimated trips to be generated by the proposed development.

- Table 1-1 (*with Stage 1 trip generation highlighted*).

- Background traffic data was obtained from the traffic count survey undertaken on 9th May 2023;

- Opening year has been assumed to be 2028 for the opening of the secondary school

- The proportion of heavy vehicles was based on the traffic count data;

- The 2028 background traffic has been obtained by interpolating traffic data from existing traffic counts and the ROM data for the "without" Tonkin Highway extension. It is also assumed that the Tonkin Highway Extension would not be operational by 2028 as a worst case scenario;

- The intersection assessment was modelled as a network model using SIDRA 9 software analysis tool in accordance with Main Roads WA Operational Modelling Guidelines; and

- The approach and exit speeds were based on speed limits from Main Roads WA Road Information Mapping System.

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1.2 DEVELOPMENT TRIP GENERATION

The trip generation has been calculated for the proposed development utilising trip generation rates from the *Institute of Transportation Engineers (ITE) "Trip Generation" 10th Ed as* detailed *in Section 6.3* in *Transport Impact Assessment report submitted by Stantec (dated 25 July 2023 Rev D).*

Table 1-1 summarises the total estimated trips to be generated by the proposed development.

Table 1-1   Estimated Total Trip Generation

	AM Peak		PM Peak	
	In	**Out**	**In**	**Out**
Stage 1: School Opening Year (568 Secondary Students)	**284**	**284**	**284**	**284**
Stage 2: School Full Development Buildout (432 Primary Students)	*216*	*216*	*216*	*216*
Total	*500*	*500*	*500*	*500*

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2 SIDRA ANALYIS RESULTS

Results of the existing intersection assessment using the SIDRA software tool are discussed in the following sections. Detailed SIDRA results for both scenarios are also included in **Appendix A**.

2.1 SCENARIO 1 - 2028 WITHOUT THE DEVELOPMENT

In this scenario, the existing intersection layout of Abernethy Road and Kargotich Road is retained without taking into consideration the proposed development. **Figure 2-1** below illustrates the SIDRA layout while **Table 2-1** summarises the SIDRA results for this scenario.

Figure 2-1 **SIDRA Network Layout**

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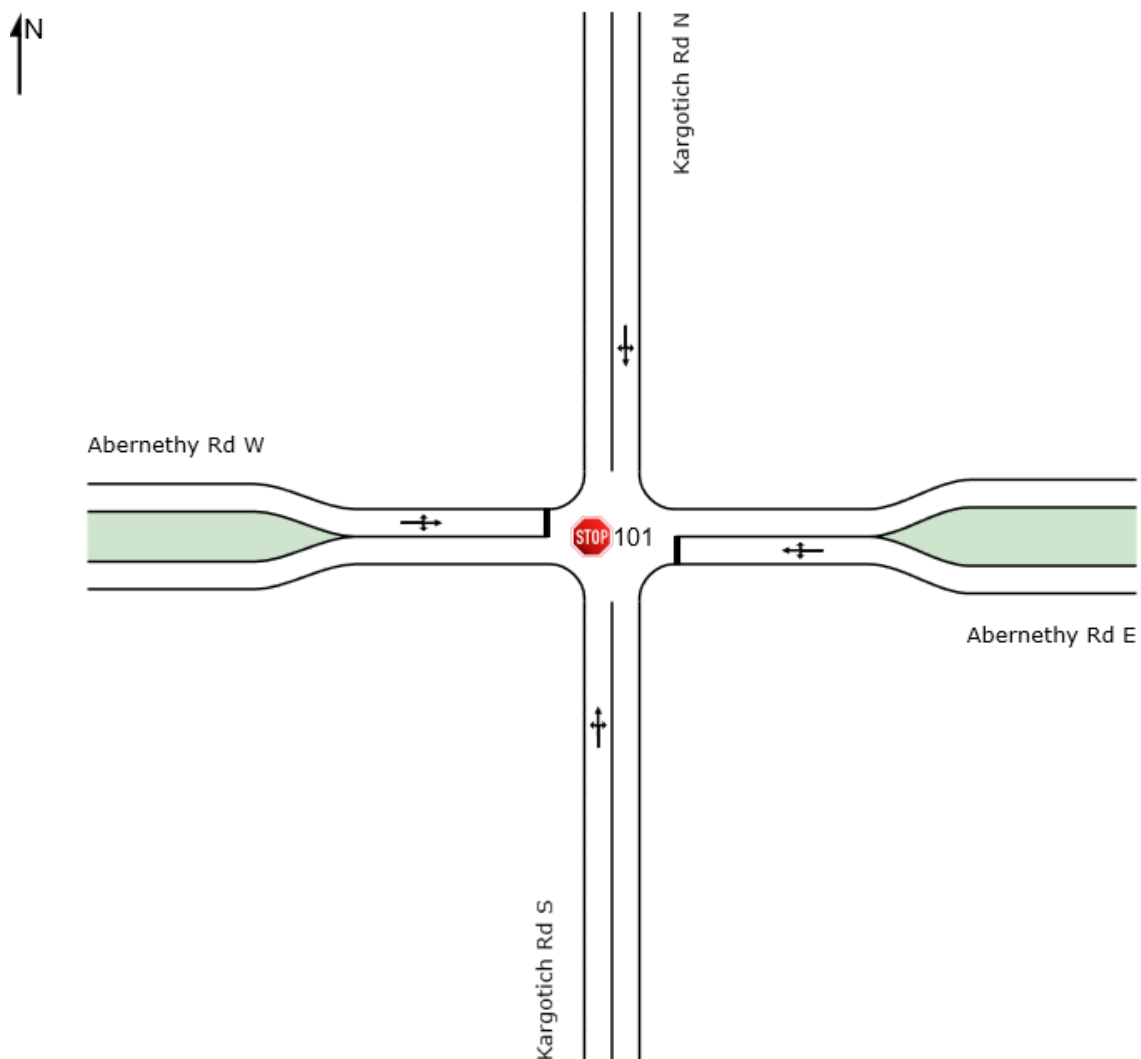
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Table 2-1 **SIDRA Results: Scenario 1 - Kargotich Road / Abernethy Road Intersection**

Intersection Approach		Weekday AM Peak				Weekday PM Peak			
		DOS	Delay (s)	LOS	95% Back of Queue (m)	DOS	Delay (s)	LOS	95% Back of Queue (m)
South: Kargotich Rd S	L	0.329	7.4	A	5.1	0.177	7.4	A	5.2
	T	0.329	0.0	A	5.1	0.177	0.0	A	5.2
	R	0.329	12.3	B	5.1	0.177	12.3	B	5.2
East: Abernethy Rd E	L	0.370	10.9	B	13.1	0.067	10.0	B	1.7
	T	0.370	17.7	C	13.1	0.067	12.7	B	1.7
	R	0.370	19.5	C	13.1	0.067	13.8	B	1.7
North: Kargotich Rd N	L	0.201	7.6	A	0.9	0.257	7.6	A	1.4
	T	0.201	0.5	A	0.9	0.257	0.5	A	1.4
	R	0.201	17.0	C	0.9	0.257	9.8	A	1.4
West: Abernethy Rd W	L	0.057	8.7	A	1.4	0.066	8.0	A	1.7
	T	0.057	14.2	B	1.4	0.066	11.9	B	1.7
	R	0.057	17.3	C	1.4	0.066	12.9	B	1.7
All vehicles		0.370	4.4	NA	13.1	0.257	3.4	NA	5.2

The 2028 "without" development scenario shows that the intersection is expected to operate at satisfactory capacity and a level of service of 'C' or better for both the AM and PM peak hour periods.

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2.2   SCENARIO 2 - 2028 WITH THE DEVELOPMENT

In this scenario, the existing intersection layout is also retained with the additional Stage 1 Development traffic included. The SIDRA Network Layout for this scenario is illustrated in **Figure 2-2** with the results presented in **Table 2-2** to **Table 2-6**.
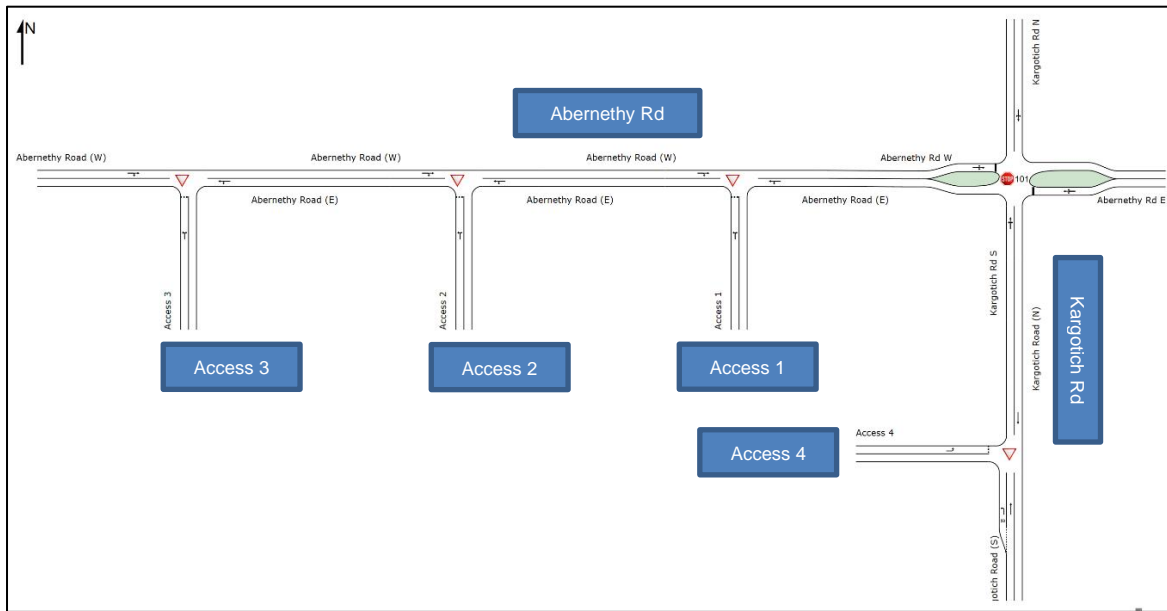
Figure 2-2   SIDRA Network Layout

Table 2-2   SIDRA Results: Scenario 2 - Kargotich Road / Abernethy Road Intersection

Intersection Approach		Weekday AM Peak				Weekday PM Peak			
		DOS	Delay (s)	LOS	95% Back of Queue (m)	DOS	Delay (s)	LOS	95% Back of Queue (m)
South: Kargotich Rd S	L	0.357	7.4	A	2.7	0.207	7.4	A	2.7
	T	0.357	0.0	A	2.7	0.207	0.0	A	2.7
	R	0.357	12.9	B	2.7	0.207	13.0	B	2.7
East: Abernethy Rd E	L	0.846	24.4	C	24.3	0.311	10.8	B	4.1
	T	0.846	35.7	E	24.3	0.311	15.7	C	4.1
	R	0.846	45.4	E	24.3	0.311	21.9	C	4.1
North: Kargotich Rd N	L	0.296	7.6	A	3.9	0.320	7.6	A	3.3
	T	0.296	0.6	A	3.9	0.320	0.6	A	3.3
	R	0.296	15.6	C	3.9	0.320	10.3	B	3.3
West: Abernethy Rd W	L	0.467	10.9	B	7.0	0.381	9.0	A	6.2
	T	0.467	20.5	C	7.0	0.381	16.3	C	6.2
	R	0.467	30.1	D	7.0	0.381	21.2	C	6.2
All vehicles		0.846	11.6	NA	24.3	0.381	7.1	NA	6.2

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Table 2-3 **SIDRA Results: Scenario 2 - Abernethy Road / Access 1 Intersection**

Intersection Approach		Weekday AM Peak				Weekday PM Peak			
		DOS	Delay (s)	LOS	95% Back of Queue (m)	DOS	Delay (s)	LOS	95% Back of Queue (m)
South: Access 1	L	0.096	5.2	A	1.0	0.094	5.1	A	0.9
	R	0.096	6.3	A	1.0	0.094	6.2	A	0.9
East: Abernethy Road (E)	L	0.146	5.5	A	0.0	0.127	5.5	A	0.0
	T	0.146	0.0	A	0.0	0.127	0.0	A	0.0
West: Abernethy Road (W)	T	0.094	0.0	A	0.3	0.103	0.0	A	0.3
	R	0.094	6.9	A	0.3	0.103	6.5	A	0.3
All vehicles		0.146	2.0	NA	1.0	0.127	2.0	NA	0.9

Table 2-4 **SIDRA Results: Scenario 2 - Abernethy Road / Access 2 Intersection**

Intersection Approach		Weekday AM Peak				Weekday PM Peak			
		DOS	Delay (s)	LOS	95% Back of Queue (m)	DOS	Delay (s)	LOS	95% Back of Queue (m)
South: Access 2	L	0.082	5.0	A	0.8	0.080	4.9	A	0.8
	R	0.082	5.7	A	0.8	0.080	5.6	A	0.8
East: Abernethy Road (E)	L	0.115	5.6	A	0.0	0.096	5.5	A	0.0
	T	0.115	0.0	A	0.0	0.096	0.0	A	0.0
West: Abernethy Road (W)	T	0.058	0.0	A	0.2	0.068	0.0	A	0.2
	R	0.058	6.2	A	0.2	0.068	5.9	A	0.2
All vehicles		0.115	2.3	NA	0.8	0.096	2.4	NA	0.8

Table 2-5 **SIDRA Results: Scenario 2 - Abernethy Road / Access 3 Intersection**

Intersection Approach		Weekday AM Peak				Weekday PM Peak			
		DOS	Delay (s)	LOS	95% Back of Queue (m)	DOS	Delay (s)	LOS	95% Back of Queue (m)
South: Access 3	L	0.069	4.8	A	0.7	0.068	4.7	A	0.7
	R	0.069	5.3	A	0.7	0.068	5.2	A	0.7
East: Abernethy Road (E)	L	0.081	5.5	A	0.0	0.062	5.5	A	0.0
	T	0.081	0.0	A	0.0	0.062	0.0	A	0.0
West: Abernethy Road (W)	T	0.040	0.0	A	0.4	0.049	0.0	A	0.4
	R	0.040	5.5	A	0.4	0.049	5.3	A	0.4
All vehicles		0.081	2.8	NA	0.7	0.068	3.0	NA	0.7

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Table 2-6   SIDRA Results: Scenario 2 - Kargotich Road / Access 4 Intersection

Intersection Approach		Weekday AM Peak				Weekday PM Peak			
		DOS	Delay (s)	LOS	95% Back of Queue (m)	DOS	Delay (s)	LOS	95% Back of Queue (m)
South: Kargotich Road (S)	L	0.025	5.5	A	0.0	0.025	5.5	A	0.0
	T	0.295	0.1	A	0.0	0.141	0.0	A	0.0
North: Kargotich Road (N)	T	0.220	0.0	A	0.0	0.243	0.0	A	0.0
West: Access 4	L	0.050	6.9	A	0.5	0.035	5.4	A	0.4
All vehicles		0.295	0.6	NA	0.5	0.243	0.6	NA	0.4

The analysis shows that the delays are expected to increase for the Abernethy Road eastern approach for the "with" development scenario, however, overall the Abernethy Road and Kargotich Road Intersection is expected to operate at acceptable levels of service, average delays, and capacities during both the AM and PM peak hour periods for the 2028 opening year.

3   SUMMARY OF SIDRA RESULTS

The following findings are summarised:

- The SIDRA results for Scenario 1 would indicate that the Abernethy Road/Kargotich Road intersection will operate at satisfactory capacity and acceptable level of service;

- The SIDRA results for Scenario 2 indicates that the existing intersection layout of Abernethy Road and Kargotich Road is expected to operate at acceptable levels of service, average delays, and capacities during both the AM and PM peak hour periods for the 2028 opening year.

- The SIDRA results for Scenario 2 indicates that the intersections on Abernethy Road with the proposed development accesses (Access 1 to Access 4) are expected to operate at a satisfactory capacity with a level of service at 'A'; and

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