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Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

23 September 2022

Reference: 220643.01FA

Capital Building Solutions
PO BOX 3351
Victoria Point West
Queensland 4165
Attention: Nathan Winter

TRAFFIC ADVICE FOR THE APPROVED CHILD CARE CENTRE AT 49 NORTH ROCKS ROAD, NORTH ROCKS

Dear Nathan,

Reference is made to your request to provide preliminary traffic advice for the proposed Child Care Centre at 49 North Rocks Road, North Rocks. This letter addresses the traffic impacts of the proposed child care centre with a reduced scale of 80 children until the end of 2024.

The proposed child care centre is approved to accommodate 99 children (under DA/158/2017), with the construction of the proposed roundabout at Speers Road & Jean Street expected to be completed.

It is understood that the roundabout may not be completed until the end of 2023 and as such a reduced intensity of development is proposed which does not necessitate the upgrade. Sensitivity testing of the intersection of Speers Road and North Rocks Road has been undertaken demonstrating that a reduced scale of 80 places would have no unacceptable impact on the intersection before the roundabout is constructed and operational. This traffic assessment is outlined below and has been undertaken consistent with the methodology underpinning the consent noting that this is required as the preferred treatment by condition 39 of the notice of determination.

1 TRAFFIC ASSESSMENT

The impact of the expected traffic generation levels associated with the subject proposal is discussed in the following sub-sections.

1.1 Existing Traffic Environment

Seven (7) day tube count surveys were conducted along North Rocks Road and Speers Street between Monday 13 November 2017 and Monday 20 November 2017. These volumes have been used for the purpose of this traffic impact assessment.

1.2 Traffic Generation

Traffic generation rates applicable to child care centre developments are provided in the *RTA Guide to Traffic Generating Developments (2002)* and recent supplements as adopted by Transport for NSW (TfNSW) and are as follows:

3.11.3 Child care centres

Long-day care

7.00-9.00am 0.8 peak vehicle trips per child

2.30-4.00pm 0.3 peak vehicle trips per child

4.00-6.00pm 0.7 peak vehicle trips per child

The resulting AM and PM peak hourly traffic generation is summarised in **Table 1**.

TABLE 1: ESTIMATED TRAFFIC GENERATION

Use	Scale	Peak	Generation Rate	Trips ⁽¹⁾
<i>Traffic Generation – Pre 2024</i>				
Child Care Centre	80 Children	AM	0.8 per child	64 (32 in, 32 out)
		PM	0.7 per child	56 (28 in, 28 out)

Note:

(1) 50% inbound and 50% outbound split assumed for the AM and PM peak periods.

As shown above, the proposed 80-place child care centre will generate **64** vehicle trips (32 inbound, 32 outbound) in the AM peak period and **56** vehicle trips (28 in, 28 out) in the PM peak period.

1.3 Traffic Assignment

The road network, traffic surveys and locations of residential areas surrounding the site have been assessed and the following traffic assignment has been assumed for all traffic to and from the site:

- AM peak period:
 - 50% from North Rocks Road (east);
 - 50% from North Rocks Road (west);
 - 30% to North Rocks Road (east);
 - 70% to North Rocks Road (west).
- PM peak period:
 - 30% from North Rocks Road (east);
 - 70% from North Rocks Road (west);
 - 50% to North Rocks Road (east);
 - 50% to North Rocks Road (west).

1.4 Traffic Impact

A traffic assessment of the above scenario has been undertaken using SIDRA INTERSECTION 9.0 to assess the intersections performance. The traffic assessment considers the year-to-year background growth of traffic (compounding at a rate of 2.0% p.a.) from 2017 to 2024 in addition to the traffic generated by the future development. The results of this assessment are shown in **Table 2**. The complete SIDRA INTERSECTION 9.0 results are reproduced in **Annexure A**.

TABLE 2: INTERSECTION PERFORMANCE (SIDRA INTERSECTION 9.0)

Intersection	Peak Hour	Degree of Saturation ⁽¹⁾	Average Delay ⁽²⁾ (sec/veh)	Level of Service ⁽³⁾⁽⁴⁾	Control Type	Worst Movement	95th Percentile Queue
EXISTING PERFORMANCE							
Speers Road / North Rocks Road	AM	0.42	0.8 (Worst: 25)	NA (Worst: B)	Give Way	RT from Speers Road	0.5 veh (3.7m) Speers Road
	PM	0.34	0.6 (Worst: 21.3)	NA (Worst: B)		RT from Speers Road	0.3 veh (2.5m) North Rocks Road
FUTURE PERFORMANCE							
Speers Road / North Rocks Road	AM	0.58	2.8 (Worst: 53.2)	NA (Worst: D)	Give Way	RT from Speers Road	2 veh (14.1m) Speers Road
	PM	0.49	2.2 (Worst: 48.5)	NA (Worst: D)		RT from Speers Road	1.7 veh (11.7m) Speers Road

Notes:

- (1) The Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
- (2) The average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
- (3) The Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.
- (4) No overall Level of Service is provided for Give Way and Stop controlled intersections as the low delays associated with the dominant movements skew the average delay of the intersection. The Level of Service of the worst approach is an indicator of the operation of the intersection, with a worse Level of Service corresponding to long delays and reduced safety outcomes for that approach.

As shown, under the proposed scenario, the intersection of Speers Road / North Rocks Road performs at a Level of Service “D”. *RTA Guide to Traffic Generating Developments – Table 4.2: Level of Service Criteria for Intersections* states that a Level of Service “D” represents an intersection operating at near capacity and that an accident study is required.

Further reference is made to *TfNSW Crash and Casualty Statistics* which indicates that there has only been one (1) accident at the intersection of Speers Road / North Rocks Road in the past five (5) years which is very infrequent, suggesting that the intersection does not have a high risk of accidents.

From the above, the intersection of Speers Road / North Rocks Road operates at a satisfactory Level of Service "D", with a very unlikely risk of accident, particularly given that the intersection is proposed to operate under these conditions for a short time only. It is further noted that the reduced traffic volumes observed on the road network post COVID-19 have not been accounted for and that the growth volumes assumed result in a conservative assessment. As such, an 80-place child care centre is fully supportable in terms of traffic impacts.

Please contact the undersigned on 9521 7199 should you require further information or assistance.

Yours faithfully,
McLaren Traffic Engineering



Tom Steal
Senior Traffic Engineer
B.E (Civil) MIEAust
Accredited Level 2 Road Safety Auditor



**ANNEXURE A: SIDRA INTERSECTION 9.0 RESULTS
(4 SHEETS)**

MOVEMENT SUMMARY

Site: 101 [EX PM Peak North Rocks Road / Speers Road - 2022 (Site Folder: Existing)]

Existing Traffic Flows

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV] veh/h	[Total veh/h]	[HV] %				[Veh. veh]	[Dist] m				
South: North Rocks Road (S)														
1	L2	22	0	23	0.0	0.343	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	58.0
2	T1	601	16	633	2.7	0.343	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	59.6
Approach		623	16	656	2.6	0.343	0.3	NA	0.0	0.0	0.00	0.02	0.00	59.5
North: North Rocks Road (N)														
8	T1	553	31	582	5.6	0.329	0.3	LOS A	0.3	2.5	0.06	0.02	0.07	59.4
9	R2	16	0	17	0.0	0.329	10.1	LOS A	0.3	2.5	0.06	0.02	0.07	53.0
Approach		569	31	599	5.4	0.329	0.6	NA	0.3	2.5	0.06	0.02	0.07	59.2
West: Speers Road (W)														
10	L2	8	0	8	0.0	0.059	9.4	LOS A	0.2	1.3	0.74	0.87	0.74	43.4
12	R2	8	0	8	0.0	0.059	21.3	LOS B	0.2	1.3	0.74	0.87	0.74	43.1
Approach		16	0	17	0.0	0.059	15.4	LOS B	0.2	1.3	0.74	0.87	0.74	43.2
All Vehicles		1208	47	1272	3.9	0.343	0.6	NA	0.3	2.5	0.04	0.03	0.05	59.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▼ Site: 101 [EX AM Peak North Rocks Road / Speers Road - 2022 (Site Folder: Existing)]

Existing Traffic Flows
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: North Rocks Road (S)														
1	L2	7	0	7	0.0	0.415	5.7	LOS A	0.0	0.0	0.00	0.01	0.00	58.0
2	T1	713	74	751	10.4	0.415	0.2	LOS A	0.0	0.0	0.00	0.01	0.00	59.6
Approach		720	74	758	10.3	0.415	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
North: North Rocks Road (N)														
8	T1	718	41	756	5.7	0.413	0.2	LOS A	0.2	1.7	0.03	0.01	0.04	59.7
9	R2	7	0	7	0.0	0.413	13.0	LOS A	0.2	1.7	0.03	0.01	0.04	53.2
Approach		725	41	763	5.7	0.413	0.3	NA	0.2	1.7	0.03	0.01	0.04	59.6
West: Speers Road (W)														
10	L2	23	0	24	0.0	0.175	8.9	LOS A	0.5	3.7	0.81	0.92	0.82	42.7
12	R2	22	0	23	0.0	0.175	25.0	LOS B	0.5	3.7	0.81	0.92	0.82	42.4
Approach		45	0	47	0.0	0.175	16.8	LOS B	0.5	3.7	0.81	0.92	0.82	42.5
All Vehicles		1490	115	1568	7.7	0.415	0.8	NA	0.5	3.7	0.04	0.03	0.05	58.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
 Delay Model: SIDRA Standard (Geometric Delay is included).
 Queue Model: SIDRA Standard.
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [FU AM Peak North Rocks Road / Speers Road - 2022 - Yield Test (Site Folder: Existing + Dev + Growth (7Y to end of 2024))]

Existing Traffic Flows
 Site Category: (None)
 Give-Way (Two-Way)
 Design Life Analysis: Constant Number of Years = 7

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV] veh/h	[Total veh/h]	[HV] %				[Veh. veh]	[Dist] m				
South: North Rocks Road (S)														
1	L2	23	0	25	0.0	0.482	5.7	LOS A	0.0	0.0	0.00	0.02	0.00	57.9
2	T1	713	74	856	10.4	0.482	0.2	LOS A	0.0	0.0	0.00	0.02	0.00	59.4
Approach		736	74	881	10.1	0.482	0.4	NA	0.0	0.0	0.00	0.02	0.00	59.4
North: North Rocks Road (N)														
8	T1	718	41	862	5.7	0.504	1.0	LOS A	1.2	8.9	0.13	0.02	0.19	58.6
9	R2	23	0	25	0.0	0.504	17.5	LOS B	1.2	8.9	0.13	0.02	0.19	55.2
Approach		741	41	887	5.5	0.504	1.4	NA	1.2	8.9	0.13	0.02	0.19	58.5
West: Speers Road (W)														
10	L2	33	0	38	0.0	0.578	22.3	LOS B	2.0	14.1	0.93	1.08	1.35	34.4
12	R2	44	0	50	0.0	0.578	53.2	LOS D	2.0	14.1	0.93	1.08	1.35	34.2
Approach		77	0	88	0.0	0.578	39.9	LOS C	2.0	14.1	0.93	1.08	1.35	34.3
All Vehicles		1554	115	1855	7.4	0.578	2.8	NA	2.0	14.1	0.11	0.07	0.16	57.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
 Delay Model: SIDRA Standard (Geometric Delay is included).
 Queue Model: SIDRA Standard.
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [FU PM Peak North Rocks Road / Speers Road - 2022 - Yield Test (Site Folder: Existing + Dev + Growth (7Y to end of 2024))]

Existing Traffic Flows
 Site Category: (None)
 Give-Way (Two-Way)
 Design Life Analysis: Constant Number of Years = 7

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV] veh/h	[Total veh/h]	[HV] %				[Veh. veh]	[Dist] m				
South: North Rocks Road (S)														
1	L2	27	0	29	0.0	0.484	5.7	LOS A	0.0	0.0	0.00	0.02	0.00	57.8
2	T1	713	74	856	10.4	0.484	0.2	LOS A	0.0	0.0	0.00	0.02	0.00	59.4
Approach		740	74	885	10.0	0.484	0.4	NA	0.0	0.0	0.00	0.02	0.00	59.4
North: North Rocks Road (N)														
8	T1	718	41	862	5.7	0.490	0.7	LOS A	0.8	6.1	0.09	0.01	0.13	59.0
9	R2	15	0	17	0.0	0.490	17.4	LOS B	0.8	6.1	0.09	0.01	0.13	54.9
Approach		733	41	879	5.6	0.490	1.0	NA	0.8	6.1	0.09	0.01	0.13	58.9
West: Speers Road (W)														
10	L2	37	0	42	0.0	0.493	18.3	LOS B	1.7	11.7	0.91	1.05	1.23	36.7
12	R2	36	0	41	0.0	0.493	48.5	LOS D	1.7	11.7	0.91	1.05	1.23	36.5
Approach		73	0	83	0.0	0.493	33.2	LOS C	1.7	11.7	0.91	1.05	1.23	36.6
All Vehicles		1546	115	1847	7.5	0.493	2.2	NA	1.7	11.7	0.08	0.06	0.12	57.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
 Delay Model: SIDRA Standard (Geometric Delay is included).
 Queue Model: SIDRA Standard.
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.