

**TRAFFIC, PARKING AND
ROAD SAFETY ASSESSMENT**

FOR

**A PROPOSED INCREASE
IN CHILD NUMBERS AT**

**OXFORD FALLS EARLY LEARNING
CENTRE**

Ref. 17185r2

January 2018

Prepared By



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1.0 INTRODUCTION

Transport and Urban Planning Pty Ltd has been engaged by BBF Town Planners to prepare a traffic impact and parking assessment report for an increase in child numbers at the Oxford Falls Early Learning Centre (ELC), located at 1039 Oxford Falls Road West, Oxford Falls.

The site location is shown on **Figure 1**.

Oxford Falls ELC currently has approval for up to 60 children and operates as a long day care centre, from 6.30am to 6.00pm on all weekdays. The centre is fully patronized and an increase in child numbers of 48 is proposed.

While Oxford Falls Road West is a relatively lightly trafficked local road, Council has raised comments about the impact of the proposed increased patronage of the centre at a pre-DA meeting, including road safety concerns regarding the nearby access intersection of Oxford Falls Road West and Wakehurst Parkway.

This report will analyse the existing traffic and road safety conditions and the expected impacts of the increased child numbers.

The remainder of this report is set out as follows:

- Section 2 details the site location, the development proposal and access roads;
- Section 3 identifies the traffic generation of the proposal, and assesses the impact of that traffic;
- Section 4 provides a crash history analysis of the key access intersection;
- Section 5 identifies the site access and parking requirements of the development;
- Section 6 provides conclusions.



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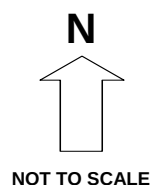


FIGURE 1
 OXFORD FALLS EARLY LEARNING CENTRE
 1039 OXFORD FALLS ROAD, OXFORD FALLS
SUBJECT SITE
 JOB NO. 17185R2 01/02/18

2.0 SITE DETAILS

Oxford Falls ELC is located on the southern side of Oxford Falls Road West, approximately 550 metres west of Wakehurst Parkway. It is located approximately 2km north of Frenchs Forest and 2km east of Belrose, and is bounded by undeveloped bushland to the north. The catchment area of the ELC is mainly to the south along Wakehurst Parkway, with a small percentage of trips to the north and west.

The site has an existing two way 6m wide driveway and off street parking for 24 cars, including 2 spaces for the disabled. The current parking supply exceeds the current demand for parking at the centre.

It currently has approval for up to 60 children and operates as a long day care centre. It operates from 6.30am to 6.00pm on all weekdays. The proposal is to increase the maximum child numbers by 48 to a maximum total of 108 children.

2.1 Access Roads and Intersections

The ELC has a two way driveway with access to Oxford Falls Road West, which is a local Council road carrying low to moderate traffic volumes. Oxford Falls Road West runs generally east/west between Wakehurst Parkway and Morgan Road. Morgan Road continues west a further 2.5km to Forest Way at Belrose. Morgan Road is also a local Council road carrying low traffic volumes. Both Oxford Falls Road West and Morgan Road have a 50km/h speed limit.

It is noted that currently traffic volumes along Oxford Falls Road West are higher than normal due to works associated with a major upgrade of Northern Beaches Hospital (Ref. Northern Beaches Council Meeting dated 28 November 2017, Item 9.3, Executive Summary). This assessment has been carried out during the period of elevated traffic flows, and is therefore a conservative (worst case) assessment. It is expected that by the time this development is operational that traffic volumes along Oxford Falls Road West will have reverted to their former lower levels.

Wakehurst Parkway is a classified State Road (MR397) and is under the control of RMS. It carries high traffic volumes during peak hours and moderate traffic volumes at other times. Its intersection with Oxford Falls Road West is the key access intersection for the Oxford Falls ELC. It is a T-junction with a Stop sign controlling Oxford Falls Road West.

At this intersection, Wakehurst Parkway consists of one lane in each direction, with sealed road shoulders which allow through traffic to pass delayed right turning vehicles into Oxford Falls Road West. An 80km/h speed limit applies.

Forest Way provides the western access to the ELC at a signalised intersection with Morgan Road. Forest Way is also a classified State Road (MR529) and carries high traffic volumes. It is well constructed as a high capacity arterial road, with four traffic lanes divided by a wide median and turning lanes at main intersections. It also has an 80km/h speed limit.

To assess the traffic impact of the proposed additional child care numbers, SIDRA intersection modelling will be undertaken for existing intersection conditions at the site access driveway, and at the intersections of Wakehurst Parkway / Oxford Falls Road West and Forest Way / Morgan Road. Then the additional traffic volumes generated by the proposed increase in child numbers will be included and the SIDRA modelling will be repeated, providing a good before / after comparison of intersection operation.

3.0 TRAFFIC GENERATION AND IMPACT

3.1 Additional Traffic Generation

The RMS Guide to Traffic Generating Developments provides the following peak traffic generation rates for long day child care centres.

- 0.8 trips per child in the 7.00am – 9.00am period
- 0.7 trips per child in the 4.00pm – 6.00pm period

The additional traffic generation of 48 children is calculated as follows:

+48 Children

AM: $48 \times 0.8 = 38$ trips in 2 hours = 19 trips/hour
PM: $48 \times 0.7 = 34$ trips in 2 hours = 17 trips/hour

Note: Each trip is assumed to generate one vehicle movement in and one vehicle movement out. However, in practice it is likely that the increase in vehicle trips will be slightly lower than the above numbers, because some new children will be siblings of existing children attending the centre, and will travel in the same vehicle.

3.2 Existing Traffic Volumes

Traffic surveys were undertaken on Monday 18 September 2017 from 6.30am to 9.30am and from 2.30pm to 5.30pm at the following three locations:

- Oxford Falls Road West at the ELC Driveway
- Oxford Falls Road West / Wakehurst Parkway
- Forest Way / Morgan Road / Wyatt Avenue

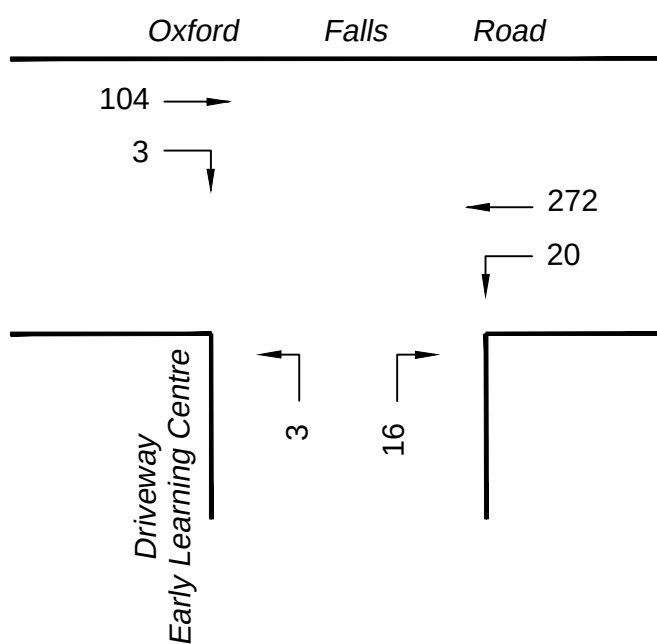
The peak hour volumes were extracted from the survey data and are detailed in **Figures 2 to 4** on the following pages. **Figure 5** shows the distribution of additional trips that were identified in Section 3.1.

Note that the PM peak hour at the ELC driveway is later than the surrounding main road peak hour. The highest use of the ELC driveway occurred between 4.30pm and 5.30pm, so this assessment will be based on these volumes because they will produce the most conservative outcomes.

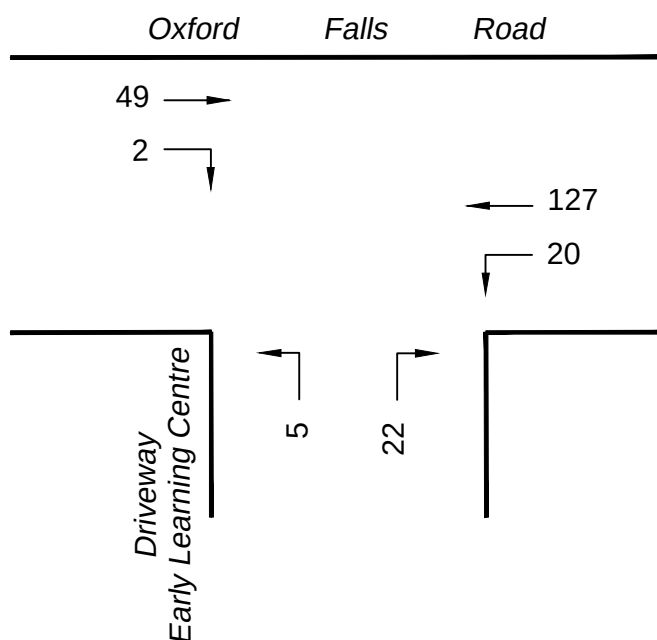
3.3 SIDRA Modelling Information

SIDRA was initially developed by the Australian Road and Research Board during the 1970's. It has continued to be developed and used for traffic analysis throughout Australia and internationally. SIDRA is endorsed in the RMS Guide to Traffic Generating Developments (Section 4.2.2, page 4-3) to determine measures of effectiveness of intersection operation.

SIDRA modelling calculates the intersection's operation and produces outputs to assess intersection capacity and efficiency. The key SIDRA outputs are Degree of Saturation, Average Delay and Level of Service (LoS). Degree of Saturation (DoS) is the ratio of demand flow to capacity, or volume/capacity (v/c). For intersections controlled by signals, satisfactory operation is indicated by a DoS of up to about 0.9. Full saturation is 1.



AM PEAK HOUR
0730 - 0830



PM PEAK HOUR
1630 - 1730

KEY

344 TOTAL VEHICLES

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FIGURE 2

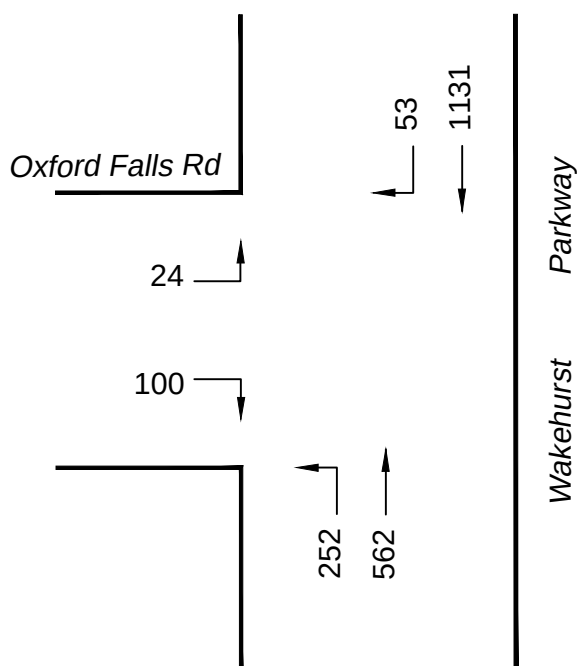
OXFORD FALLS EARLY LEARNING CENTRE
1039 OXFORD FALLS ROAD, OXFORD FALLS

**INTERSECTION OF OXFORD FALLS RD & EARLY
LEARNING CENTRE DRIVEWAY**

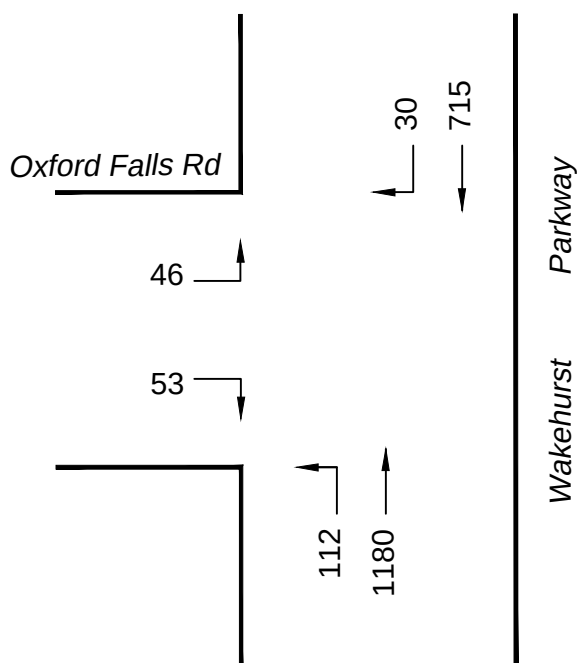
EXISTING TRAFFIC VOLUMES-AM & PM PEAK HOUR

JOB NO.17185R2

01/02/18



AM PEAK HOUR
0730 - 0830



PM PEAK HOUR
1545 - 1645

KEY

344 TOTAL VEHICLES

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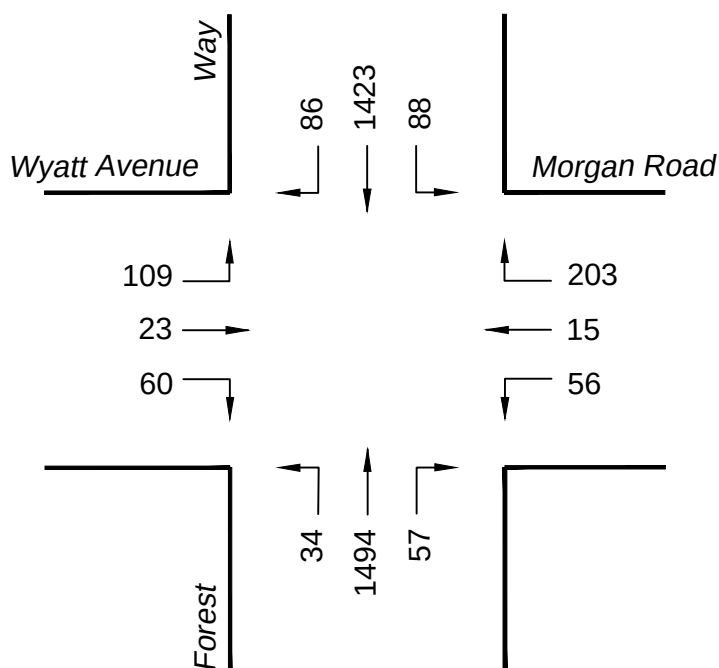
FIGURE 3

OXFORD FALLS EARLY LEARNING CENTRE
1039 OXFORD FALLS ROAD, OXFORD FALLS
**INTERSECTION OF OXFORD FALLS RD &
WAKEHURST PARKWAY**

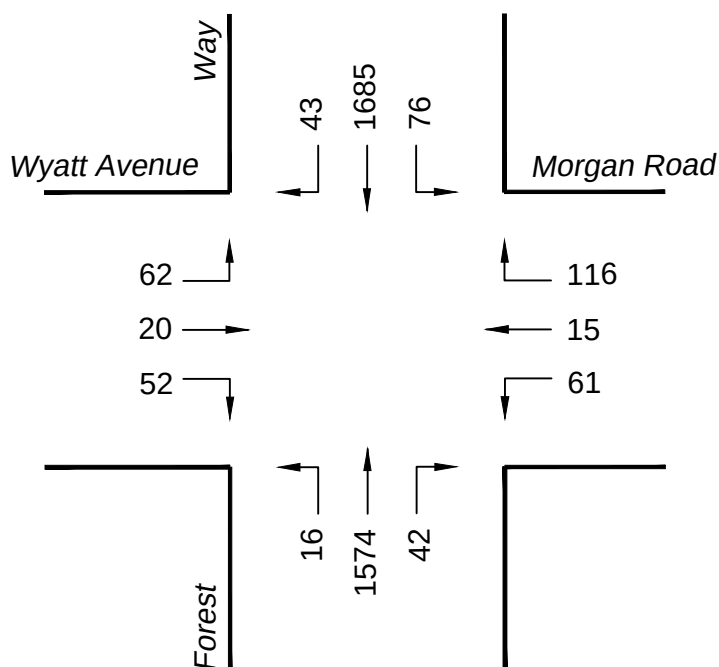
EXISTING TRAFFIC VOLUMES-AM & PM PEAK HOUR

JOB NO.17185R2

01/02/18



AM PEAK HOUR
0745 - 0845



PM PEAK HOUR
1515 - 1615

KEY

344 TOTAL VEHICLES

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FIGURE 4

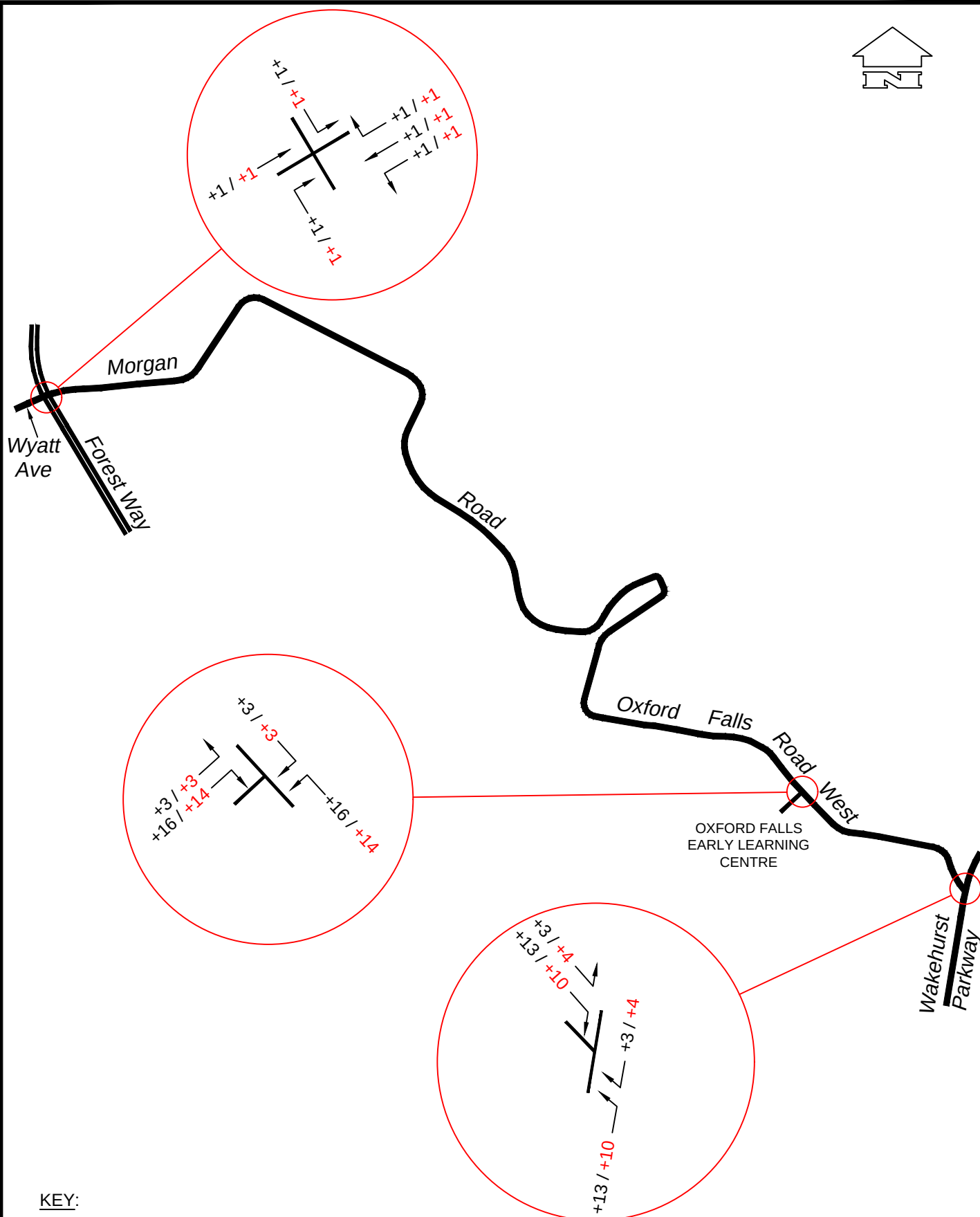
OXFORD FALLS EARLY LEARNING CENTRE
1039 OXFORD FALLS ROAD, OXFORD FALLS

**INTERSECTION OF FOREST WAY, WYATT AVENUE
& MORGAN ROAD**

EXISTING TRAFFIC VOLUMES-AM & PM PEAK HOUR

JOB NO.17185R2

01/02/18



KEY:

+16 / +14 AM / PM Peak Hour

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FIGURE 5

OXFORD FALLS EARLY LEARNING CENTRE
1039 OXFORD FALLS ROAD, OXFORD FALLS

**ADDITIONAL TRAFFIC GENERATION
TRIP DISTRIBUTION**

Table 1 shows for each Level of Service, the range of Average Delay to vehicles using the intersection and a description of operational efficiency. Levels of Service range from “A” (Good Operation) to “E” (at capacity).

TABLE 1**LEVEL OF SERVICE CRITERIA FOR INTERSECTIONS**

Level of Service	Average Delay (seconds/vehicle)	Traffic Signals	Stop/Give Way Signs
A	<14	Good operation	Good Operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity, incidents will cause excessive delays	At capacity, requires other control mode

Source: Table 4.2 RTA Guide to Traffic Generating Developments October 2002

The modelling methodology involves using SIDRA to determine existing operation, including calibrating the model to duplicate current on site traffic queues and delays. Results are summarised for the current AM and PM peak hour at each intersection. Then the additional traffic volumes calculated in Section 3.1 are assigned to the road network on a similar proportion to current flows to and from the ELC, and are added to each intersection. The SIDRA modelling is recalculated and the results are compared to current operation.

Note that in accordance with SIDRA guidelines, operation of unsignalised intersections is assessed by only reviewing the delays on the minor approach and the right turn into the minor approach, because delays for through movements on the major road are negligible. However for the signalized intersection of Forest Way and Morgan Road, the results of all vehicle movements are provided.

3.4 SIDRA Results – Access Driveway**TABLE 2****OXFORD FALLS ROAD WEST / ELC DRIVEWAY
EXISTING OPERATION**

Movement	AM Peak			PM Peak		
	DoS	Avg Delay (sec)	LoS	DoS	Avg Delay (sec)	LoS
Right turn into ELC	0.061	6.6	A	0.029	6.0	A
Exit from ELC	0.022	5.4	A	0.025	4.5	A

The above results show very low levels of saturation and low delays. The driveway access intersection operates at Level of Service A (good operation) at all times.

TABLE 3

**OXFORD FALLS ROAD WEST / ELC DRIVEWAY
WITH ADDITIONAL 48 CHILDREN**

Movement	AM Peak			PM Peak		
	DoS	Avg Delay (sec)	LoS	DoS	Avg Delay (sec)	LoS
Right turn into ELC	0.063	6.7	A	0.031	6.1	A
Exit from ELC	0.044	5.5	A	0.041	4.6	A

The above results show that for an additional 48 children, the degree of saturation remains at very low levels and there is only an increase of 0.1 seconds to average delay. This indicates that the access driveway has a large amount of spare capacity and will experience a negligible traffic impact from the proposed development. The Level of Service will remain at A (good operation).

3.4 SIDRA Results – Wakehurst Parkway Intersection

TABLE 4

**OXFORD FALLS ROAD WEST / WAKEHURST PARKWAY
EXISTING OPERATION**

Movement	AM Peak			PM Peak		
	DoS	Avg Delay (sec)	LoS	DoS	Avg Delay (sec)	LoS
Right turn into Oxford Falls Road West	0.619	18.3	B	0.486	36.7	C
Exit from Oxford Falls Road West	0.348	17.7	B	0.244	24.0	B

The above results show moderate levels of saturation and delays. The intersection operates at Level of Service B (acceptable delays and spare capacity) except for the right turn from Wakehurst Parkway in the PM peak hour, when that movement operates at Level of Service C (satisfactory, but accident study required). The delays for that movement are due to it having to give way to the high volume of northbound traffic on Wakehurst Parkway during the PM peak. (Note that an accident study will be provided in Section 4 of this report)

TABLE 5

**OXFORD FALLS ROAD WEST / WAKEHURST PARKWAY
WITH ADDITIONAL 48 CHILDREN**

Movement	AM Peak			PM Peak		
	DoS	Avg Delay (sec)	LoS	DoS	Avg Delay (sec)	LoS
Right turn into Oxford Falls Road West	0.626	18.7	B	0.511	38.1	C
Exit from Oxford Falls Road West	0.399	18.3	B	0.271	24.5	B

The above results for an additional 48 children show that there is only a small increase in average delays during the AM peak hour of less than 1 second, however the right turn from Wakehurst Parkway experiences an increase in delay of up to 1.4 seconds. Because this movement is already subject to Level of Service C, these increases suggest that this movement is approaching capacity and a moderate increase in traffic volume may cause a decline in intersection performance. However, under the modelled scenario there will be no change to the current Levels of Service, and the intersection would continue to operate satisfactorily, subject to an accident study.

3.6 SIDRA Results – Forest Way / Morgan Road

TABLE 6

**FOREST WAY / MORGAN ROAD / WYATT AVENUE
EXISTING OPERATIOTN**

Movement	AM Peak			PM Peak		
	DoS	Avg Delay (sec)	LoS	DoS	Avg Delay (sec)	LoS
All movements	0.810	25.8	B	0.780	17.0	B

The above results show moderate to high levels of saturation, which are mainly caused by the very high traffic volumes using the intersection (over 3,250 vehicles per hour two way along Forest Way). However average delays are moderate and the intersection operates at Level of Service B (good with acceptable delays and spare capacity) during peak hours.

TABLE 7

**FOREST WAY / MORGAN ROAD / WYATT AVENUE
WITH ADDITIONAL 48 CHILDREN**

Movement	AM Peak			PM Peak		
	DoS	Avg Delay (sec)	LoS	DoS	Avg Delay (sec)	LoS
All movements	0.817	25.9	B	0.789	17.8	B

The above results show that for an additional 48 children, there is only a small increase in saturation and an increase of 0.1 second in the AM and 0.8 seconds in the PM to average delay. This indicates that small amount of additional traffic that will use this intersection will have only a marginal impact on operation. The Level of Service will remain at B (good with acceptable delays and spare capacity).

3.7 Summary of SIDRA Analysis

The above SIDRA results and analysis indicates that:

- a) The site access driveway and its intersection with Oxford Falls Road West has a large amount of spare capacity and will be able to satisfactorily accommodate the additional traffic generated by an increase of 48 children at the Oxford Falls ELC.
- b) The additional traffic at the intersection of Oxford Falls Road West and Wakehurst Parkway will produce a low increase in delays at the intersection, however the right turn from Wakehurst Parkway is showing signs of nearing capacity. The SIDRA results suggest that an accident study is required for that movement, and this will be provided in Section 4. However the traffic operational impact of an additional 48 children is assessed as acceptable, with no change to current Levels of Service.
- c) The additional traffic at the intersection of Forest Way and Morgan Road is expected to be very low in volume and will have a low and acceptable impact on that intersection.

4.0 CRASH ANALYSIS

The previous section identified that the proposed increase in child numbers at the Oxford Falls ELC will produce a low traffic impact at the intersection of Wakehurst Parkway and Oxford Falls Road West, but that an accident study should be carried out for the right turn from Wakehurst Parkway.

The most recent 5 year crash data for the intersection of Wakehurst Parkway and Oxford Falls Road West was obtained from the RMS Sydney Crash Data Centre. The data covers the period between 1 January 2012 and 31 December 2016.

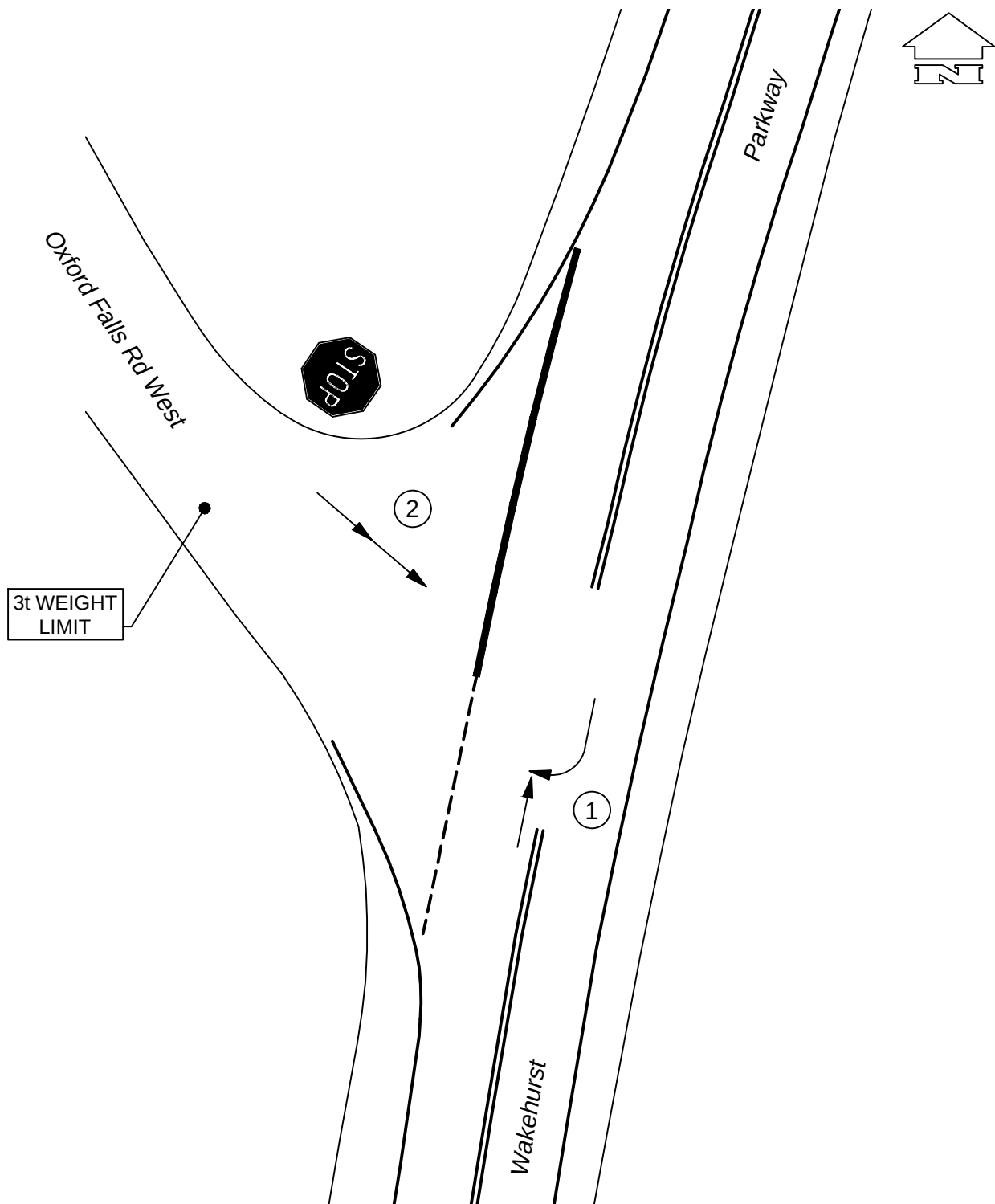
Note regarding crash data accuracy: RMS crash data is obtained from crashes reported to Police with a minimum severity of either personal injury or tow away of a vehicle. There may have been other unreported or minor crashes in the study area.

The crash data shows that there were 2 crashes at the intersection in the 5 year period. These crashes and their details are shown on **Figure 6**.

A crash rate of 2 per 5 years (an average reported crash every 30 months) is a low rate, especially given the high traffic volumes using Wakehurst Parkway. It is also noted that one of the 2 crashes occurred at night when the ELC would be closed.

Council's comments about this intersection being a known black spot are noted, and may apply to crash records from an earlier period. However the crash record for the most recent 5 year period is low and does not warrant any remedial traffic management treatment.

In summary, the most recent 5 year crash rate at the intersection is low, with only 1 crash recorded during hours of operation of the child care centre. The crash rate is very unlikely to be affected by the low volumes of additional traffic that would be generated by the proposed increase in child numbers at the ELC. Therefore there is no justification for any improvements to be made at this intersection, either due to its crash record or because of the proposed development.



CRASH	DATE	DAY	TIME	RUM CODE	INJURIES
1	02/05/12	WED	2053	21, RIGHT TURN/THROUGH	NIL
2	28/05/15	THUR	0900	39, SAME DIRECTION, OTHER	1 MINOR

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FIGURE 6

OXFORD FALLS EARLY LEARNING CENTRE
1039 OXFORD FALLS ROAD, OXFORD FALLS

5 YEAR CRASH HISTORY 2012-2016 WAKEHURST PARKWAY & OXFORD FALLS ROAD

JOB NO.17185R2

01/02/18

5.0 SITE ACCESS AND PARKING

5.1 Site Access

The existing site access consists of a concrete driveway which is suitable for two way traffic movement. The driveway is 6m wide at the property boundary and widens to approximately 8.8m at the road edge. No alteration is proposed to be made to the driveway as part of the subject proposal.

Sight lines to and from the driveway along Oxford Falls Road West satisfy the safe sight distance requirements of AS2890.1-2004 (Figure 3.2) for the prevailing 50km/h speed limit.

5.2 Parking

Warringah DCP 2011 requires a parking supply of 1 space per 4 children attending a child care centre. The proposal involves a maximum of 108 children, so the number of parking spaces required is 27.

The existing car parking provision of 24 spaces is planned to be increased to 29 spaces, including 2 tandem spaces to be used by staff, and 2 spaces for the disabled. Internal circulation is well designed and meets standard requirements for access and manoeuvring.

Therefore the proposed parking provisions and access satisfies the DCP and Australian Standard requirements.

6.0 CONCLUSIONS

Transport and Urban Planning Pty Ltd has prepared this traffic impact, road safety and parking assessment report for a proposed increase of 48 children at the Oxford Falls ELC, from the currently approved maximum of 60 to a new maximum of 108 children.

The report has involved a capacity assessment of the existing site access driveway and key access intersections. The traffic generation of the proposal has been calculated and SIDRA modelling of the future volumes at the site driveway and key access intersections carried out. The results show only very low increases in delays, and all existing Levels of Service will remain unchanged.

The report has also assessed the recent crash record at the intersection of Oxford Falls Road West and Wakehurst Parkway in relation to road safety concerns raised by Council. The most recent RMS crash data showed that the intersection has a low crash rate, that there is no requirement for any remedial action, nor any road safety reason to object to an increase in children at the Oxford Falls ELC.

New parking spaces are proposed which will increase on site supply from 24 to 29 spaces. Warringah DCP2011 requires at least 27 spaces for the proposed development, and so the proposal complies. Also a review of existing internal circulation and the site access driveway confirms that the site is fully in accordance with relevant Australian Standards.

The outcome of this assessment is that the traffic impact of an increase in child numbers of 48 children will be acceptable in terms of traffic impact to road capacity and road safety.

The proposed development will be a moderate traffic generator and will have a low traffic impact on surrounding roads. There are no adverse road safety implications. The site access and provision of on-site parking meets all requirements. The proposal is assessed as an acceptable traffic generating development.



R.O.A.R. DATA

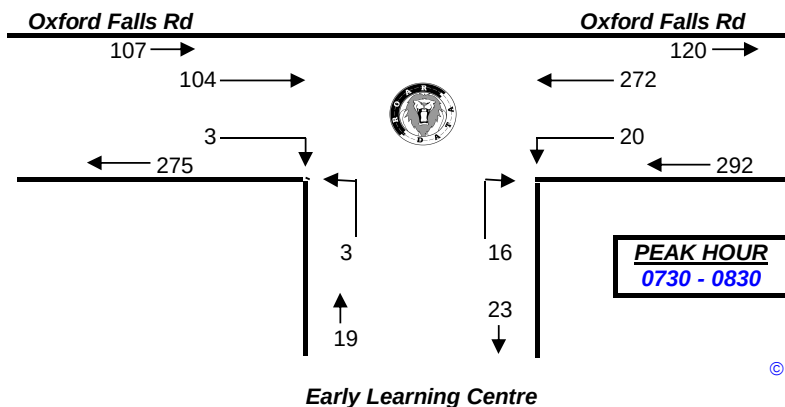
Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

All Vehicles

Time Per	WEST		SOUTH		EAST		TOTAL
	Oxford Falls		Early		Oxford Falls		
	R	I	L	R	I	L	
0630 - 0645	0	2	0	0	50	2	54
0645 - 0700	0	9	1	1	64	0	75
0700 - 0715	0	14	0	1	86	3	104
0715 - 0730	0	14	0	2	77	4	97
0730 - 0745	0	14	1	3	86	2	106
0745 - 0800	1	23	2	2	59	6	93
0800 - 0815	1	28	0	5	68	6	108
0815 - 0830	1	39	0	6	59	6	111
0830 - 0845	0	32	0	3	44	9	88
0845 - 0900	1	28	2	4	46	5	86
0900 - 0915	0	16	1	3	55	3	78
0915 - 0930	0	14	0	0	28	4	46
Period End	4	233	7	30	722	50	1046

Peak Per	WEST		SOUTH		EAST		TOTAL
	Oxford Falls		Early		Oxford Falls		
	R	I	L	R	I	L	
0630 - 0730	0	39	1	4	277	9	330
0645 - 0745	0	51	2	7	313	9	382
0700 - 0800	1	65	3	8	308	15	400
0715 - 0815	2	79	3	12	290	18	404
0730 - 0830	3	104	3	16	272	20	418
0745 - 0845	3	122	2	16	230	27	400
0800 - 0900	3	127	2	18	217	26	393
0815 - 0915	2	115	3	16	204	23	363
0830 - 0930	1	90	3	10	173	21	298
PEAK HR	3	104	3	16	272	20	418



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Client : TUPA

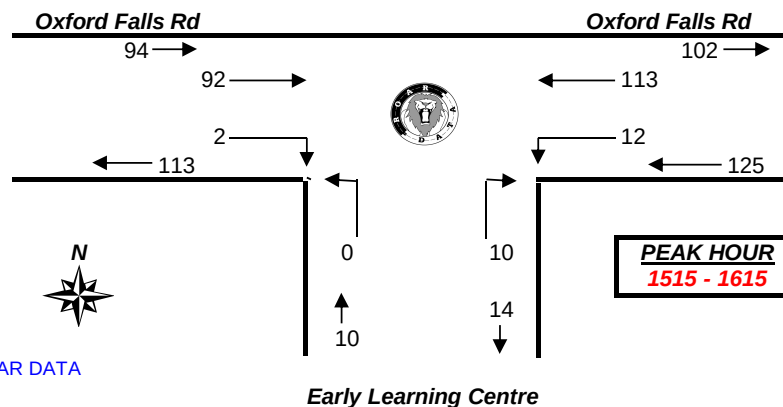
Job No/Name : 6577 OXFORD FALLS Early Learning Centre

Day/Date : Monday 18th September 2017

All Vehicles

Time Per	WEST		SOUTH		EAST		TOTAL
	Oxford Falls		Early		Oxford Falls		
	R	I	L	R	I	L	
1430 - 1445	0	15	0	1	31	1	48
1445 - 1500	0	12	0	2	41	2	57
1500 - 1515	0	12	0	2	28	2	44
1515 - 1530	0	26	0	2	32	3	63
1530 - 1545	1	20	0	2	17	3	43
1545 - 1600	1	25	0	2	32	2	62
1600 - 1615	0	21	0	4	32	4	61
1615 - 1630	1	18	1	3	29	2	54
1630 - 1645	1	14	1	4	23	4	47
1645 - 1700	1	10	2	6	28	5	52
1700 - 1715	0	14	2	5	32	6	59
1715 - 1730	0	11	0	7	44	5	67
Period End	5	198	6	40	369	39	657

Peak Per	WEST		SOUTH		EAST		TOTAL
	Oxford Falls		Early		Oxford Falls		
	R	I	L	R	I	L	
1430 - 1530	0	65	0	7	132	8	212
1445 - 1545	1	70	0	8	118	10	207
1500 - 1600	2	83	0	8	109	10	212
1515 - 1615	2	92	0	10	113	12	229
1530 - 1630	3	84	1	11	110	11	220
1545 - 1645	3	78	2	13	116	12	224
1600 - 1700	3	63	4	17	112	15	214
1615 - 1715	3	56	6	18	112	17	212
1630 - 1730	2	49	5	22	127	20	225
PEAK HR	2	92	0	10	113	12	229





ROAR DATA

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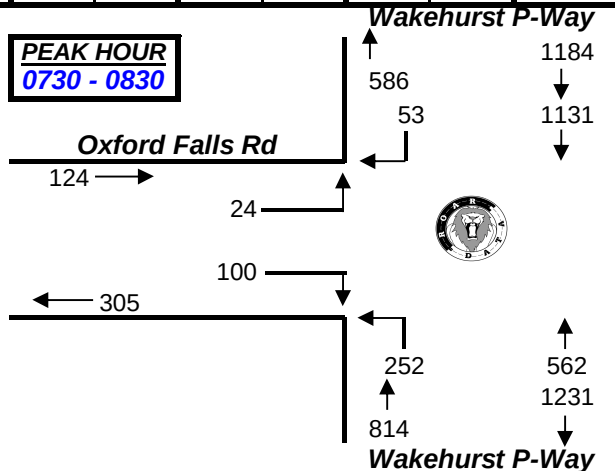
Ph.88196847, Mob.0418-239019

All Vehicles

All Vehicles	NORTH		WEST		SOUTH		
	Wakehurst P-		Oxford Falls		Wakehurst P-		
Time Per	<u>R</u>	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>I</u>	TOTAL
0630 - 0645	15	289	1	3	41	133	482
0645 - 0700	22	287	5	6	46	125	491
0700 - 0715	28	267	5	9	76	120	505
0715 - 0730	18	276	5	13	57	99	468
0730 - 0745	12	251	5	12	75	140	495
0745 - 0800	14	297	4	22	59	129	525
0800 - 0815	15	279	6	33	63	136	532
0815 - 0830	12	304	9	33	55	157	570
0830 - 0845	6	267	11	30	37	120	471
0845 - 0900	6	231	8	25	52	141	463
0900 - 0915	12	269	8	15	39	159	502
0915 - 0930	14	264	2	10	25	174	489
Period End	174	3281	69	211	625	1633	5993

	NORTH		WEST		SOUTH		
	Wakehurst P-		Oxford Falls		Wakehurst P-		
Peak Per	R	I	L	R	L	I	TOTAL
0630 - 0730	83	1119	16	31	220	477	1946
0645 - 0745	80	1081	20	40	254	484	1959
0700 - 0800	72	1091	19	56	267	488	1993
0715 - 0815	59	1103	20	80	254	504	2020
0730 - 0830	53	1131	24	100	252	562	2122
0745 - 0845	47	1147	30	118	214	542	2098
0800 - 0900	39	1081	34	121	207	554	2036
0815 - 0915	36	1071	36	103	183	577	2006
0830 - 0930	38	1031	29	80	153	594	1925

PEAK HR	53	1131	24	100	252	562	2122
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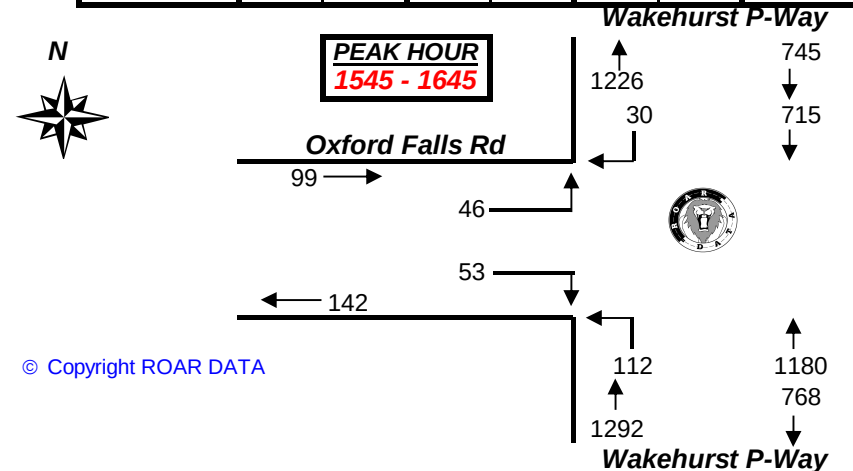
Client : TUPA
 Job No/Name : 6577 OXFORD FALLS Early Learning Centre
 Day/Date : Monday 18th September 2017

All Vehicles

All Vehicles	NORTH		WEST		SOUTH		
	Wakehurst P-		Oxford Falls		Wakehurst P-		
Time Per	<u>R</u>	<u>I</u>	<u>L</u>	<u>R</u>	<u>L</u>	<u>I</u>	TOTAL
1430 - 1445	10	153	6	11	25	174	379
1445 - 1500	9	166	3	6	34	200	418
1500 - 1515	3	143	7	7	26	210	396
1515 - 1530	14	185	7	25	21	229	481
1530 - 1545	4	190	8	15	14	283	514
1545 - 1600	4	179	10	19	33	300	545
1600 - 1615	5	178	14	15	33	283	528
1615 - 1630	8	183	12	9	19	300	531
1630 - 1645	13	175	10	10	27	297	532
1645 - 1700	9	183	7	9	25	308	541
1700 - 1715	9	162	8	9	32	337	557
1715 - 1730	10	194	5	16	33	322	580
Period End	98	2091	97	151	322	3243	6002

	NORTH		WEST		SOUTH		
	Wakehurst P-		Oxford Falls		Wakehurst P-		
Peak Per	R	I	L	R	L	I	TOTAL
1430 - 1530	36	647	23	49	106	813	1674
1445 - 1545	30	684	25	53	95	922	1809
1500 - 1600	25	697	32	66	94	1022	1936
1515 - 1615	27	732	39	74	101	1095	2068
1530 - 1630	21	730	44	58	99	1166	2118
1545 - 1645	30	715	46	53	112	1180	2136
1600 - 1700	35	719	43	43	104	1188	2132
1615 - 1715	39	703	37	37	103	1242	2161
1630 - 1730	41	714	30	44	117	1264	2210

PEAK HR	30	715	46	53	112	1180	2136
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R.O.A.R. DATA
Reliable, Original & Authentic Results
 Ph.88196847, Mob.0418-239019

Client : TUPA
 Job No/Name : 6577 OXFORD FALLS Early Learning Centre
 Day/Date : Monday 18th September 2017

All Vehicles	NORTH Forestway			WEST Wyatt Ave			SOUTH Forestway			EAST Morgan St			TOT
Time Per	L	I	R	L	I	R	L	I	R	L	I	R	
0630 - 0645	13	384	5	5	1	4	2	328	4	9	0	27	782
0645 - 0700	20	368	8	11	1	3	4	279	10	14	2	55	775
0700 - 0715	19	384	9	12	1	9	0	304	9	12	1	70	830
0715 - 0730	12	345	5	8	1	4	3	367	7	14	0	76	842
0730 - 0745	20	360	8	13	1	5	2	362	8	17	5	61	862
0745 - 0800	19	382	22	11	4	3	4	347	15	15	4	58	884
0800 - 0815	17	319	24	27	10	17	15	382	15	13	9	54	902
0815 - 0830	30	329	33	32	3	31	12	389	16	12	1	46	934
0830 - 0845	22	393	7	39	6	9	3	376	11	16	1	45	928
0845 - 0900	22	366	9	21	2	5	2	370	10	15	2	30	854
0900 - 0915	11	331	5	11	5	6	4	380	10	19	7	54	843
0915 - 0930	14	330	3	5	4	2	2	356	10	11	3	15	755
Period End	219	4291	138	195	39	98	53	4240	125	167	35	591	10191

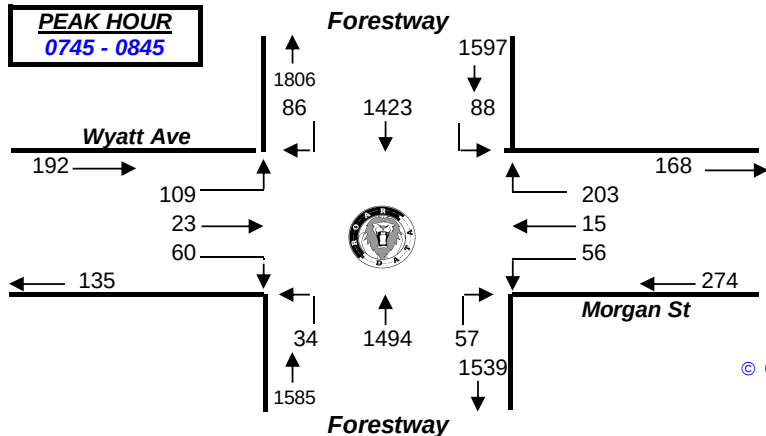
All Vehicles	NORTH Forestway			WEST Wyatt Ave			SOUTH Forestway			EAST Morgan St			TOT
Time Per	L	I	R	L	I	R	L	I	R	L	I	R	
1430 - 1445	12	336	8	10	1	2	3	311	6	8	3	25	725
1445 - 1500	9	389	26	5	0	5	11	373	10	11	8	22	869
1500 - 1515	19	368	24	21	8	13	10	362	9	17	3	37	891
1515 - 1530	20	421	9	29	7	30	3	382	12	14	0	25	952
1530 - 1545	22	408	15	11	4	7	1	403	14	15	4	27	931
1545 - 1600	17	433	7	6	4	4	5	406	9	20	8	31	950
1600 - 1615	17	423	12	16	5	11	7	383	7	12	3	33	929
1615 - 1630	9	423	7	13	3	2	2	357	6	11	3	20	856
1630 - 1645	11	489	7	10	1	7	3	352	6	6	1	19	912
1645 - 1700	7	399	14	11	0	7	2	346	6	15	4	23	834
1700 - 1715	8	454	10	10	1	8	2	355	6	14	5	26	899
1715 - 1730	7	528	21	8	3	5	2	333	2	21	4	30	964
Period End	158	5071	160	150	37	101	51	4363	93	164	46	318	10712

Peak Time	NORTH Forestway			WEST Wyatt Ave			SOUTH Forestway			EAST Morgan St			TOT
Peak Time	L	I	R	L	I	R	L	I	R	L	I	R	
0630 - 0730	64	1481	27	36	4	20	9	1278	30	49	3	228	3229
0645 - 0745	71	1457	30	44	4	21	9	1312	34	57	8	262	3309
0700 - 0800	70	1471	44	44	7	21	9	1380	39	58	10	265	3418
0715 - 0815	68	1406	59	59	16	29	24	1458	45	59	18	249	3490
0730 - 0830	86	1390	87	83	18	56	33	1480	54	57	19	219	3582
0745 - 0845	88	1423	86	109	23	60	34	1494	57	56	15	203	3648
0800 - 0900	91	1407	73	119	21	62	32	1517	52	56	13	175	3618
0815 - 0915	85	1419	54	103	16	51	21	1515	47	62	11	175	3559
0830 - 0930	69	1420	24	76	17	22	11	1482	41	61	13	144	3380

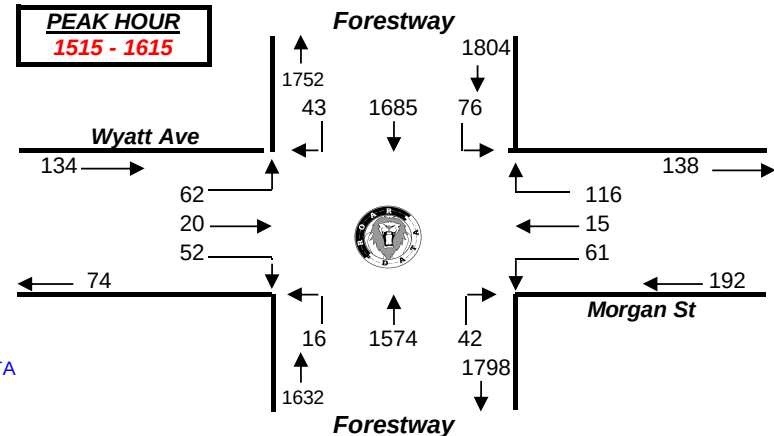
Peak Time	NORTH Forestway			WEST Wyatt Ave			SOUTH Forestway			EAST Morgan St			TOT
Peak Time	L	I	R	L	I	R	L	I	R	L	I	R	
1430 - 1530	60	1514	67	65	16	50	27	1428	37	50	14	109	3437
1445 - 1545	70	1586	74	66	19	55	25	1520	45	57	15	111	3643
1500 - 1600	78	1630	55	67	23	54	19	1553	44	66	15	120	3724
1515 - 1615	76	1685	43	62	20	52	16	1574	42	61	15	116	3762
1530 - 1630	65	1687	41	46	16	24	15	1549	36	58	18	111	3666
1545 - 1645	54	1768	33	45	13	24	17	1498	28	49	15	103	3647
1600 - 1700	44	1734	40	50	9	27	14	1438	25	44	11	95	3531
1615 - 1715	35	1765	38	44	5	24	9	1410	24	46	13	88	3501
1630 - 1730	33	1870	52	39	5	27	9	1386	20	56	14	98	3609

PEAK HOUR	88	1423	86	109	23	60	34	1494	57	56	15	203	3648
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PEAK HOUR	76	1685	43	62	20	52	16	1574	42	61	15	116	3762
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MOVEMENT SUMMARY

 **Site: 101 [ELC Driveway / Oxford Falls Road - Existing AM]**

AM Peak Hour 0730-0830
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: ELC Driveway											
1	L2	3	0.0	0.022	4.8	LOS A	0.1	0.5	0.38	0.62	49.6
3	R2	17	0.0	0.022	5.5	LOS A	0.1	0.5	0.38	0.62	48.6
Approach		20	0.0	0.022	5.4	LOS A	0.1	0.5	0.38	0.62	48.7
East: Oxford Falls Road (east)											
4	L2	21	0.0	0.166	5.6	LOS A	0.0	0.0	0.00	0.04	55.5
5	T1	286	0.0	0.166	0.0	LOS A	0.0	0.0	0.00	0.04	59.6
Approach		307	0.0	0.166	0.4	NA	0.0	0.0	0.00	0.04	59.4
West: Oxford Falls Road (west)											
11	T1	109	0.0	0.061	0.0	LOS A	0.0	0.2	0.03	0.02	59.7
12	R2	3	0.0	0.061	6.6	LOS A	0.0	0.2	0.03	0.02	55.0
Approach		113	0.0	0.061	0.2	NA	0.0	0.2	0.03	0.02	59.6
All Vehicles		440	0.0	0.166	0.6	NA	0.1	0.5	0.02	0.06	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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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 [ELC Driveway / Oxford Falls Road - Existing PM]**

PM Peak Hour 1630-1730
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: ELC Driveway											
1	L2	5	0.0	0.025	4.3	LOS A	0.1	0.6	0.24	0.57	50.6
3	R2	23	0.0	0.025	4.6	LOS A	0.1	0.6	0.24	0.57	49.5
Approach		28	0.0	0.025	4.5	LOS A	0.1	0.6	0.24	0.57	49.7
East: Oxford Falls Road (east)											
4	L2	21	0.0	0.084	5.5	LOS A	0.0	0.0	0.00	0.08	54.9
5	T1	134	0.0	0.084	0.0	LOS A	0.0	0.0	0.00	0.08	59.2
Approach		155	0.0	0.084	0.8	NA	0.0	0.0	0.00	0.08	58.9
West: Oxford Falls Road (west)											
11	T1	52	0.0	0.029	0.0	LOS A	0.0	0.1	0.02	0.03	59.7
12	R2	2	0.0	0.029	6.0	LOS A	0.0	0.1	0.02	0.03	54.9
Approach		54	0.0	0.029	0.3	NA	0.0	0.1	0.02	0.03	59.6
All Vehicles		237	0.0	0.084	1.1	NA	0.1	0.6	0.03	0.13	58.2

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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MOVEMENT SUMMARY

 **Site: 101 [ELC Driveway / Oxford Falls Road +48 Children AM]**

AM Peak Hour 0730-0830
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: ELC Driveway											
1	L2	6	0.0	0.044	4.8	LOS A	0.1	1.0	0.39	0.64	49.4
3	R2	34	0.0	0.044	5.6	LOS A	0.1	1.0	0.39	0.64	48.5
Approach		40	0.0	0.044	5.5	LOS A	0.1	1.0	0.39	0.64	48.6
East: Oxford Falls Road (east)											
4	L2	38	0.0	0.175	5.6	LOS A	0.0	0.0	0.00	0.07	55.0
5	T1	286	0.0	0.175	0.0	LOS A	0.0	0.0	0.00	0.07	59.3
Approach		324	0.0	0.175	0.7	NA	0.0	0.0	0.00	0.07	59.0
West: Oxford Falls Road (west)											
11	T1	109	0.0	0.063	0.1	LOS A	0.1	0.4	0.05	0.04	59.5
12	R2	6	0.0	0.063	6.7	LOS A	0.1	0.4	0.05	0.04	54.6
Approach		116	0.0	0.063	0.5	NA	0.1	0.4	0.05	0.04	59.3
All Vehicles		480	0.0	0.175	1.0	NA	0.1	1.0	0.05	0.11	58.5

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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MOVEMENT SUMMARY

 **Site: 101 [ELC Driveway / Oxford Falls Road +48 Children PM]**

PM Peak Hour 1630-1730
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: ELC Driveway											
1	L2	8	0.0	0.041	4.3	LOS A	0.1	1.0	0.25	0.57	50.5
3	R2	38	0.0	0.041	4.6	LOS A	0.1	1.0	0.25	0.57	49.5
Approach		46	0.0	0.041	4.6	LOS A	0.1	1.0	0.25	0.57	49.7
East: Oxford Falls Road (east)											
4	L2	36	0.0	0.092	5.5	LOS A	0.0	0.0	0.00	0.13	54.3
5	T1	134	0.0	0.092	0.0	LOS A	0.0	0.0	0.00	0.13	58.8
Approach		169	0.0	0.092	1.2	NA	0.0	0.0	0.00	0.13	58.2
West: Oxford Falls Road (west)											
11	T1	52	0.0	0.031	0.1	LOS A	0.0	0.2	0.06	0.06	59.2
12	R2	5	0.0	0.031	6.1	LOS A	0.0	0.2	0.06	0.06	54.2
Approach		57	0.0	0.031	0.6	NA	0.0	0.2	0.06	0.06	59.0
All Vehicles		273	0.0	0.092	1.6	NA	0.1	1.0	0.06	0.19	57.3

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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MOVEMENT SUMMARY



Site: 102 [Wakehurst Parkway & Oxford Falls Road West - Existing AM]

AM Peak Hour 0730-0830
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Wakehurst Parkway (south)											
1	L2	252	0.0	0.423	7.0	LOS A	0.0	0.0	0.00	0.20	71.3
2	T1	562	2.0	0.423	0.1	LOS A	0.0	0.0	0.00	0.20	76.2
Approach		814	1.4	0.423	2.2	NA	0.0	0.0	0.00	0.20	74.6
North: Wakehurst Parkway (north)											
8	T1	1131	2.0	0.619	1.5	LOS A	2.6	18.2	0.21	0.03	76.3
9	R2	53	0.0	0.619	18.3	LOS B	2.6	18.2	0.21	0.03	58.5
Approach		1184	1.9	0.619	2.2	NA	2.6	18.2	0.21	0.03	75.2
West: Oxford Falls Road West											
10	L2	24	0.0	0.032	10.5	LOS A	0.1	0.8	0.53	0.90	50.6
12	R2	100	0.0	0.348	19.4	LOS B	1.0	6.9	0.88	1.04	45.1
Approach		124	0.0	0.348	17.7	LOS B	1.0	6.9	0.81	1.02	46.1
All Vehicles		2122	1.6	0.619	3.1	NA	2.6	18.2	0.17	0.16	72.3

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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MOVEMENT SUMMARY



Site: 102 [Wakehurst Parkway & Oxford Falls Road West - Existing PM]

PM Peak Hour 1545-1645
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Wakehurst Parkway (south)											
1	L2	112	0.0	0.666	7.1	LOS A	0.0	0.0	0.00	0.06	73.3
2	T1	1180	2.0	0.666	0.2	LOS A	0.0	0.0	0.00	0.06	78.4
Approach		1292	1.8	0.666	0.8	NA	0.0	0.0	0.00	0.06	77.9
North: Wakehurst Parkway (north)											
8	T1	715	2.0	0.486	6.8	LOS A	12.2	86.6	1.00	0.04	68.1
9	R2	30	0.0	0.486	36.7	LOS C	12.2	86.6	1.00	0.04	53.5
Approach		745	1.9	0.486	8.0	NA	12.2	86.6	1.00	0.04	67.3
West: Oxford Falls Road West											
10	L2	46	0.0	0.244	27.8	LOS B	0.8	5.4	0.90	1.02	41.2
12	R2	53	0.0	0.224	20.7	LOS B	0.6	4.1	0.89	1.02	44.4
Approach		99	0.0	0.244	24.0	LOS B	0.8	5.4	0.89	1.02	42.8
All Vehicles		2136	1.8	0.666	4.4	NA	12.2	86.6	0.39	0.10	71.3

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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MOVEMENT SUMMARY



Site: 102 [Wakehurst Parkway & Oxford Falls Road West +48 Children AM]

AM Peak Hour 0730-0830

Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Wakehurst Parkway (south)											
1	L2	265	0.0	0.430	7.0	LOS A	0.0	0.0	0.00	0.21	71.2
2	T1	562	2.0	0.430	0.1	LOS A	0.0	0.0	0.00	0.21	76.0
Approach		827	1.4	0.430	2.3	NA	0.0	0.0	0.00	0.21	74.4
North: Wakehurst Parkway (north)											
8	T1	1131	2.0	0.626	1.6	LOS A	2.8	19.9	0.23	0.04	75.9
9	R2	56	0.0	0.626	18.7	LOS B	2.8	19.9	0.23	0.04	58.3
Approach		1187	1.9	0.626	2.4	NA	2.8	19.9	0.23	0.04	74.9
West: Oxford Falls Road West											
10	L2	27	0.0	0.036	10.5	LOS A	0.1	0.9	0.53	0.91	50.6
12	R2	113	0.0	0.399	20.2	LOS B	1.2	8.1	0.89	1.06	44.7
Approach		140	0.0	0.399	18.3	LOS B	1.2	8.1	0.82	1.03	45.7
All Vehicles		2154	1.6	0.626	3.4	NA	2.8	19.9	0.18	0.17	71.7

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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MOVEMENT SUMMARY



Site: 102 [Wakehurst Parkway & Oxford Falls Road West +48 Children PM]

PM Peak Hour 1545-1645

Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Wakehurst Parkway (south)											
1	L2	122	0.0	0.672	7.1	LOS A	0.0	0.0	0.00	0.06	73.2
2	T1	1180	2.0	0.672	0.2	LOS A	0.0	0.0	0.00	0.06	78.3
Approach		1302	1.8	0.672	0.8	NA	0.0	0.0	0.00	0.06	77.8
North: Wakehurst Parkway (north)											
8	T1	715	2.0	0.511	8.1	LOS A	12.7	90.6	1.00	0.05	66.2
9	R2	34	0.0	0.511	38.1	LOS C	12.7	90.6	1.00	0.05	52.4
Approach		749	1.9	0.511	9.5	NA	12.7	90.6	1.00	0.05	65.5
West: Oxford Falls Road West											
10	L2	50	0.0	0.265	28.3	LOS B	0.8	5.9	0.90	1.03	41.0
12	R2	63	0.0	0.271	21.5	LOS B	0.7	5.0	0.90	1.03	44.0
Approach		113	0.0	0.271	24.5	LOS B	0.8	5.9	0.90	1.03	42.6
All Vehicles		2164	1.8	0.672	5.0	NA	12.7	90.6	0.39	0.11	70.2

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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MOVEMENT SUMMARY

 **Site: 103 [Forest Way & Morgan St - Existing AM]**

AM Peak Hour 0745-0845

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Forest Way (south)											
1	L2	34	1.0	0.808	29.1	LOS C	30.2	215.0	0.90	0.85	44.4
2	T1	1494	2.0	0.808	22.0	LOS B	30.2	215.0	0.89	0.84	53.9
3	R2	57	1.0	0.481	54.1	LOS D	2.6	18.4	1.00	0.75	32.0
Approach		1585	1.9	0.808	23.3	LOS B	30.2	215.0	0.89	0.84	52.4
East: Morgan St											
4	L2	56	1.0	0.134	30.1	LOS C	2.3	16.3	0.77	0.70	39.6
5	T1	15	0.0	0.134	25.6	LOS B	2.3	16.3	0.77	0.70	35.8
6	R2	203	1.0	0.810	50.2	LOS D	9.8	69.3	1.00	0.97	32.3
Approach		274	0.9	0.810	44.8	LOS D	9.8	69.3	0.94	0.90	33.7
North: Forest Way (north)											
7	L2	88	1.0	0.809	29.2	LOS C	30.2	215.0	0.90	0.86	44.1
8	T1	1423	2.0	0.809	22.0	LOS B	30.2	215.0	0.88	0.84	53.7
9	R2	86	1.0	0.726	56.7	LOS E	4.1	29.1	1.00	0.84	31.3
Approach		1597	1.9	0.809	24.3	LOS B	30.2	215.0	0.89	0.84	51.1
West: Wyatt Ave											
10	L2	109	1.0	0.242	30.3	LOS C	4.4	31.0	0.80	0.73	39.4
11	T1	23	0.0	0.242	25.8	LOS B	4.4	31.0	0.80	0.73	35.6
12	R2	60	1.0	0.204	37.8	LOS C	2.3	16.0	0.87	0.74	36.3
Approach		192	0.9	0.242	32.1	LOS C	4.4	31.0	0.82	0.74	37.9
All Vehicles		3648	1.8	0.810	25.8	LOS B	30.2	215.0	0.89	0.84	48.8

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.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	20	38.3	LOS D	0.0	0.0	0.92	0.92	
P2	East Full Crossing	20	16.2	LOS B	0.0	0.0	0.60	0.60	
P3	North Full Crossing	20	38.3	LOS D	0.0	0.0	0.92	0.92	
P4	West Full Crossing	20	16.2	LOS B	0.0	0.0	0.60	0.60	
All Pedestrians		80	27.3	LOS C			0.76	0.76	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 103 [Forest Way & Morgan St - Existing PM]**

PM Peak Hour 1515-1615

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Forest Way (south)											
1	L2	16	1.0	0.699	19.7	LOS B	24.0	170.5	0.74	0.68	50.3
2	T1	1574	2.0	0.699	12.5	LOS A	24.0	170.5	0.73	0.66	62.7
3	R2	42	1.0	0.355	53.5	LOS D	1.9	13.4	0.99	0.73	32.2
Approach		1632	2.0	0.699	13.7	LOS A	24.0	170.5	0.73	0.67	61.1
East: Morgan St											
4	L2	61	1.0	0.198	37.4	LOS C	2.7	19.0	0.87	0.73	36.6
5	T1	15	0.0	0.780	36.6	LOS C	5.8	40.8	0.90	0.78	32.2
6	R2	116	1.0	0.780	53.6	LOS D	5.8	40.8	1.00	0.93	31.4
Approach		192	0.9	0.780	47.1	LOS D	5.8	40.8	0.95	0.86	32.9
North: Forest Way (north)											
7	L2	76	1.0	0.775	20.8	LOS B	28.8	204.8	0.80	0.75	49.2
8	T1	1685	2.0	0.775	13.6	LOS A	28.8	204.8	0.79	0.73	61.4
9	R2	43	1.0	0.363	53.5	LOS D	1.9	13.7	0.99	0.73	32.2
Approach		1804	1.9	0.775	14.9	LOS B	28.8	204.8	0.79	0.73	59.5
West: Wyatt Ave											
10	L2	62	1.0	0.248	39.6	LOS C	3.2	22.3	0.90	0.74	36.0
11	T1	20	0.0	0.248	35.1	LOS C	3.2	22.3	0.90	0.74	32.8
12	R2	52	1.0	0.326	47.6	LOS D	2.3	15.9	0.97	0.75	33.0
Approach		134	0.9	0.326	42.1	LOS C	3.2	22.3	0.93	0.74	34.3
All Vehicles		3762	1.9	0.780	17.0	LOS B	28.8	204.8	0.78	0.71	56.3

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.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	20	39.2	LOS D	0.0	0.0	0.93	0.93	
P2	East Full Crossing	20	11.3	LOS B	0.0	0.0	0.50	0.50	
P3	North Full Crossing	20	39.2	LOS D	0.0	0.0	0.93	0.93	
P4	West Full Crossing	20	11.3	LOS B	0.0	0.0	0.50	0.50	
All Pedestrians		80	25.2	LOS C			0.72	0.72	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 103 [Forest Way & Morgan St +48 Children AM]**

AM Peak Hour 0745-0845

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Forest Way (south)											
1	L2	34	1.0	0.808	29.1	LOS C	30.2	215.3	0.90	0.85	44.4
2	T1	1494	2.0	0.808	22.0	LOS B	30.2	215.3	0.89	0.84	53.9
3	R2	58	1.0	0.490	54.1	LOS D	2.7	18.8	1.00	0.75	32.0
Approach		1586	1.9	0.808	23.3	LOS B	30.2	215.3	0.89	0.84	52.3
East: Morgan St											
4	L2	57	1.0	0.139	30.2	LOS C	2.4	16.8	0.78	0.70	39.6
5	T1	16	0.0	0.139	25.6	LOS B	2.4	16.8	0.78	0.70	35.8
6	R2	204	1.0	0.817	51.0	LOS D	9.9	69.9	1.00	0.97	32.1
Approach		277	0.9	0.817	45.3	LOS D	9.9	69.9	0.94	0.90	33.6
North: Forest Way (north)											
7	L2	89	1.0	0.809	29.2	LOS C	30.3	215.4	0.90	0.86	44.1
8	T1	1423	2.0	0.809	22.1	LOS B	30.3	215.4	0.88	0.84	53.7
9	R2	86	1.0	0.726	56.7	LOS E	4.1	29.1	1.00	0.84	31.3
Approach		1598	1.9	0.809	24.3	LOS B	30.3	215.4	0.89	0.84	51.1
West: Wyatt Ave											
10	L2	109	1.0	0.245	30.4	LOS C	4.4	31.3	0.80	0.73	39.4
11	T1	24	0.0	0.245	25.8	LOS B	4.4	31.3	0.80	0.73	35.6
12	R2	60	1.0	0.205	37.8	LOS C	2.3	16.0	0.87	0.74	36.2
Approach		193	0.9	0.245	32.1	LOS C	4.4	31.3	0.82	0.74	37.9
All Vehicles		3654	1.8	0.817	25.9	LOS B	30.3	215.4	0.89	0.84	48.8

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.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	20	38.3	LOS D	0.0	0.0	0.92	0.92	
P2	East Full Crossing	20	16.2	LOS B	0.0	0.0	0.60	0.60	
P3	North Full Crossing	20	38.3	LOS D	0.0	0.0	0.92	0.92	
P4	West Full Crossing	20	16.2	LOS B	0.0	0.0	0.60	0.60	
All Pedestrians		80	27.3	LOS C			0.76	0.76	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 103 [Forest Way & Morgan St +48 Children PM]**

PM Peak Hour 1515-1615

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Forest Way (south)											
1	L2	16	1.0	0.712	20.4	LOS B	24.7	175.6	0.76	0.69	49.7
2	T1	1574	2.0	0.712	13.3	LOS A	24.7	175.6	0.75	0.68	61.9
3	R2	43	1.0	0.363	53.5	LOS D	1.9	13.7	0.99	0.73	32.2
Approach		1633	2.0	0.712	14.4	LOS A	24.7	175.6	0.75	0.68	60.3
East: Morgan St											
4	L2	62	1.0	0.185	35.6	LOS C	2.6	18.6	0.85	0.73	37.3
5	T1	16	0.0	0.731	36.1	LOS C	5.8	40.6	0.90	0.78	32.3
6	R2	117	1.0	0.731	51.2	LOS D	5.8	40.6	1.00	0.89	32.1
Approach		195	0.9	0.731	45.0	LOS D	5.8	40.6	0.94	0.83	33.6
North: Forest Way (north)											
7	L2	77	1.0	0.789	22.0	LOS B	30.0	213.4	0.82	0.77	48.4
8	T1	1685	2.0	0.789	14.9	LOS B	30.0	213.4	0.81	0.76	60.0
9	R2	43	1.0	0.363	53.5	LOS D	1.9	13.7	0.99	0.73	32.2
Approach		1805	1.9	0.789	16.2	LOS B	30.0	213.4	0.82	0.76	58.2
West: Wyatt Ave											
10	L2	62	1.0	0.239	38.7	LOS C	3.2	22.3	0.89	0.74	36.3
11	T1	21	0.0	0.239	34.1	LOS C	3.2	22.3	0.89	0.74	33.1
12	R2	52	1.0	0.301	47.2	LOS D	2.2	15.8	0.97	0.74	33.2
Approach		135	0.8	0.301	41.3	LOS C	3.2	22.3	0.92	0.74	34.5
All Vehicles		3768	1.9	0.789	17.8	LOS B	30.0	213.4	0.80	0.73	55.6

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.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back Pedestrian ped	of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	20	39.2	LOS D	0.0	0.0	0.93	0.93
P2	East Full Crossing	20	11.8	LOS B	0.0	0.0	0.51	0.51
P3	North Full Crossing	20	39.2	LOS D	0.0	0.0	0.93	0.93
P4	West Full Crossing	20	11.8	LOS B	0.0	0.0	0.51	0.51
All Pedestrians		80	25.5	LOS C			0.72	0.72

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.