Colston Budd Hunt & Kafes Pty Ltd
as Trustee for C & B Unit Trust
ABN 27 623 918 759

Our Ref: TR/8209/jj

28 March, 2012

Transport Planning
Town Planning
Retail Studies

Roads and Maritime Services
PO Box 973
PARRAMATTA CBD NSW 2124

Attention: Owen Hodgson
Email: Owen.Hodgson@rms.nsw.gov.au

Dear Sir,

RE: PART 3A PROJECT: PROPOSED WINTEN/AUSTRALAND COMMERCIAL DEVELOPMENT, ON SITE AT 396 LANE COVE ROAD AND 1 GIFFNOCK AVENUE, MACQUARIE PARK

1. As requested we have reviewed the RMS letter dated 27 March 2012. In the letter the RMS raised the following matters:

   1) The modelled base flows are consistent between the previous and latest rounds of modelling with the exception of the left turn from Lane Cove Road(S) to Waterloo Road (W) which is 60 vehicles less in the latest modelling;

   2) The previously identified discrepancy between left and right volumes on the Waterloo Road (W) is still present and has not been corrected. A comparison of modelled base flows (mode) and RMS surveys (count) for the intersection are shown below; and

   3) The heavy vehicle percentage is half what was used in the previous modelling (1% as compared with 2%) which is less than originally surveyed at 3.5-4%. There was no explanation provided for this reduction in heavy vehicle volumes.

2. Set out below are our responses.

3. With regard to Point 1, we agree that the left turn from Lane Cove Road (northbound) into Waterloo Road (westbound) had decreased by 60 vehicles per hour in the weekday afternoon peak period (from 480 to 420) in the latest SIDRA modelling. We have reviewed the modelling and found that the 420 vehicles per hour is the correct volume (extracted from the PARAMICS modelling undertaken by PB). Thus the latest modelling has the correct values.

Suite 1801/Tower A, Zenith Centre, 821 Pacific Highway, Chatswood NSW 2067
P.O. Box 5186 West Chatswood NSW 1515 Tel: (02) 9411 2411 Fax: (02) 9411 2422
Directors - Geoff Budd - Lindsay Hunt - Stan Kafes - Tim Rogers - Joshua Hollis ACN 002 334 296
EMAIL: cbhk@cbhk.com.au

4. With regard to Point 2 we confirm that the left and right turning volumes on the Waterloo Road approach in the weekday afternoon peak period are as extracted from the PARAMICS modeling undertaken by PB. To address the RMS concerns we have rerun the SIDRA models with the left and right turn volumes switched. The results are provided in Table 1.

5. With regard to Point 3 we have rerun the SIDRA model with the percentage heavy vehicles increased from 1% to 2% as agreed in our discussion with Angella Malloch on 28 March 2012. The results are provided in Table 1.

Table 1:	**Summary of Revised SIDRA Analysis for intersection of Lane Cove Road/Waterloo Road***					
Option	Average Delay (seconds)		Level of Service (LOS)		95% back of queue on Lane Cove Road (metres)	
	AM	PM	AM	PM	AM	PM
Existing	61	46	E	D	563	341
Existing + Dev	73	47	F	D	615	355
Existing + G - turn	52	43	D	D	534	355
Existing + Dev + G - turn	67	43	E	D	615	364

- left and right turn volumes on Waterloo Road switched and % heavy vehicles increased from 1% to 2%.

6. Examination of Table 1 reveals the following:

- the intersection of Waterloo Road and Lane Cove Road currently operates at or near capacity in the weekday morning and afternoon peak hours (LOS D/E);
- with development traffic added to existing traffic flows the intersection would continue to operate at or near capacity in the weekday morning and afternoon peak hours (LOS D/F);
- the provision of the G-turn provides some benefits in intersection performance in the morning peak hour (performance improving from LOS E/F to LOS D/E). Average delays improved by some 6 to 9 seconds; and
- in the afternoon peak hour there was limited improvement in intersection operation with the LOS remaining at LOS D and an improvement in average delays of some 3 to 4 seconds.

7. Electronic copies of the SIDRA analysis will be forwarded to RMS for review. Copies of the SIDRA movement summaries are attached to this letter.

8. We trust the above provides the information you require. Finally, if you should have any queries, please do not hesitate to contact us.

Yours faithfully,
COLSTON BUDD HUNT & KAFES PTY LTD

T. Rogers
Director

MOVEMENT SUMMARY

Site: Existing AM (modelled)

Lane Cove Road - Waterloo Road
Existing AM (modelled)
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Lane Cove Road (south)											
1	L	535	2.0	0.494	10.1	LOS A	4.9	35.1	0.12	0.69	47.2
2	T	2398	2.0	1.005	87.1	LOS F	79.1	563.3	1.00	1.19	17.2
3	R	178	2.0	0.911	97.3	LOS F	9.0	64.4	1.00	0.94	16.4
Approach		3111	2.0	1.005	74.4	LOS F	79.1	563.3	0.85	1.09	19.3
East: Waterloo Road (east)											
4	L	49	2.0	0.236	74.6	LOS F	4.6	32.9	0.95	0.75	19.6
5	T	210	2.0	0.963	99.7	LOS F	20.0	142.1	1.00	1.11	15.6
6	R	156	2.0	0.752	81.4	LOS F	13.2	94.0	1.00	0.86	18.6
Approach		415	2.0	0.963	89.8	LOS F	20.0	142.1	0.99	0.97	17.1
North: Lane Cove Road (north)											
7	L	241	2.0	0.843	37.0	LOS C	43.7	311.1	0.83	0.96	30.7
8	T	2159	2.0	0.844	28.0	LOS B	44.8	319.3	0.83	0.78	32.3
9	R	481	2.0	0.985	111.1	LOS F	23.0	163.8	1.00	1.05	14.9
Approach		2881	2.0	0.985	42.6	LOS D	44.8	319.3	0.86	0.84	26.9
West: Waterloo Road (west)											
10	L	62	2.0	0.076	29.5	LOS C	3.4	24.5	0.60	0.71	33.3
11	T	163	2.0	0.470	59.6	LOS E	12.3	87.9	0.95	0.77	22.0
12	R	123	2.0	0.187	64.0	LOS E	5.2	37.2	0.89	0.76	21.9
Approach		348	2.0	0.470	55.8	LOS D	12.3	87.9	0.86	0.76	23.4
All Vehicles		6755	2.0	1.005	60.9	LOS E	79.1	563.3	0.86	0.96	21.9

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	26.4	LOS C	0.1	0.1	0.59	0.59
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P7	Across W approach	53	34.0	LOS D	0.2	0.2	0.67	0.67
All Pedestrians		159	43.2				0.74	0.74

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

MOVEMENT SUMMARY

Site: Existing PM (modelled)

Lane Cove Road - Waterloo Road
Existing PM (modelled)
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Lane Cove Road (south)											
1	L	420	2.0	0.364	8.3	LOS A	2.6	18.2	0.08	0.62	49.0
2	T	2189	2.0	0.875	39.8	LOS C	47.9	340.9	0.92	0.88	27.5
3	R	70	2.0	0.478	89.4	LOS F	3.8	27.1	1.00	0.73	17.4
Approach		2679	2.0	0.875	36.2	LOS C	47.9	340.9	0.79	0.84	29.0
East: Waterloo Road (east)											
4	L	300	2.0	0.878	83.1	LOS F	24.5	174.6	1.00	0.94	18.2
5	T	160	2.0	0.654	61.3	LOS E	17.0	121.2	0.98	0.82	21.3
6	R	278	2.0	0.654	68.7	LOS E	17.0	121.2	0.97	0.83	21.0
Approach		738	2.0	0.878	73.0	LOS F	24.5	174.6	0.99	0.87	19.8
North: Lane Cove Road (north)											
7	L	192	2.0	0.870	49.0	LOS D	46.2	329.2	0.91	0.98	26.4
8	T	1983	2.0	0.870	39.6	LOS C	47.1	335.3	0.92	0.88	27.4
9	R	121	2.0	0.826	93.9	LOS F	6.4	45.6	1.00	0.85	16.8
Approach		2296	2.0	0.870	43.3	LOS D	47.1	335.3	0.92	0.89	26.5
West: Waterloo Road (west)											
10	L	370	2.0	0.499	32.0	LOS C	18.7	133.1	0.75	0.81	32.1
11	T	146	2.0	0.421	59.0	LOS E	11.2	79.7	0.94	0.76	22.1
12	R	511	2.0	0.775	74.2	LOS F	19.6	139.5	1.00	0.88	19.9
Approach		1027	2.0	0.775	56.8	LOS E	19.6	139.5	0.90	0.84	23.5
All Vehicles		6740	2.0	0.878	45.8	LOS D	47.9	340.9	0.87	0.86	25.9

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	32.0	LOS D	0.1	0.1	0.65	0.65
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P7	Across W approach	53	32.0	LOS D	0.1	0.1	0.65	0.65
All Pedestrians		159	44.4				0.76	0.76

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

MOVEMENT SUMMARY

Site: Existing AM (modelled) + Dev

Lane Cove Road - Waterloo Road
Existing AM (modelled) + Dev
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Lane Cove Road (south)											
1	L	535	2.0	0.514	11.3	LOS A	6.4	45.9	0.16	0.71	46.0
2	T	2398	2.0	1.038	111.0	LOS F	86.4	615.2	1.00	1.30	14.5
3	R	178	2.0	0.810	90.2	LOS F	8.7	61.6	1.00	0.86	17.3
Approach		3111	2.0	1.038	92.7	LOS F	86.4	615.2	0.86	1.17	16.6
East: Waterloo Road (east)											
4	L	49	2.0	0.251	75.8	LOS F	4.7	33.2	0.96	0.75	19.4
5	T	210	2.0	1.023	129.7	LOS F	22.5	160.0	1.00	1.22	12.9
6	R	156	2.0	0.799	84.3	LOS F	13.5	96.0	1.00	0.89	18.2
Approach		415	2.0	1.023	106.3	LOS F	22.5	160.0	0.99	1.04	15.1
North: Lane Cove Road (north)											
7	L	241	2.0	0.843	37.0	LOS C	43.7	311.1	0.83	0.96	30.7
8	T	2159	2.0	0.844	28.0	LOS B	44.8	319.3	0.83	0.78	32.3
9	R	579	2.0	1.047	136.8	LOS F	32.1	228.4	1.00	1.12	12.7
Approach		2979	2.0	1.047	49.9	LOS D	44.8	319.3	0.86	0.86	24.7
West: Waterloo Road (west)											
10	L	62	2.0	0.073	28.4	LOS B	3.4	23.9	0.59	0.71	33.9
11	T	163	2.0	0.470	59.6	LOS E	12.3	87.9	0.95	0.77	22.0
12	R	123	2.0	0.187	64.0	LOS E	5.2	37.2	0.89	0.76	21.9
Approach		348	2.0	0.470	55.6	LOS D	12.3	87.9	0.86	0.76	23.4
All Vehicles		6853	2.0	1.047	73.0	LOS F	86.4	615.2	0.87	1.01	19.6

Level of Service (Aver. Int. Delay): LOS F. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	26.4	LOS C	0.1	0.1	0.59	0.59
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P7	Across W approach	53	35.4	LOS D	0.2	0.2	0.69	0.69
All Pedestrians		159	43.6				0.75	0.75

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

MOVEMENT SUMMARY

Site: Existing PM (modelled) + dev

Lane Cove Road - Waterloo Road
Existing PM (modelled) + dev
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Lane Cove Road (south)											
1	L	420	2.0	0.372	8.4	LOS A	2.6	18.4	0.08	0.62	48.9
2	T	2189	2.0	0.888	42.8	LOS D	49.8	354.9	0.94	0.91	26.4
3	R	70	2.0	0.478	89.4	LOS F	3.8	27.1	1.00	0.73	17.4
Approach		2679	2.0	0.888	38.6	LOS C	49.8	354.9	0.81	0.86	28.1
East: Waterloo Road (east)											
4	L	300	2.0	0.878	83.1	LOS F	24.5	174.6	1.00	0.94	18.2
5	T	160	2.0	0.654	61.3	LOS E	17.0	121.2	0.98	0.82	21.3
6	R	278	2.0	0.654	68.7	LOS E	17.0	121.2	0.97	0.83	21.0
Approach		738	2.0	0.878	73.0	LOS F	24.5	174.6	0.99	0.87	19.8
North: Lane Cove Road (north)											
7	L	192	2.0	0.870	49.0	LOS D	46.2	329.2	0.91	0.98	26.4
8	T	1983	2.0	0.870	39.6	LOS C	47.1	335.3	0.92	0.88	27.4
9	R	157	2.0	0.919	98.7	LOS F	8.2	58.5	1.00	0.93	16.2
Approach		2332	2.0	0.919	44.4	LOS D	47.1	335.3	0.92	0.89	26.1
West: Waterloo Road (west)											
10	L	370	2.0	0.494	32.3	LOS C	18.7	132.9	0.75	0.81	32.0
11	T	146	2.0	0.421	59.0	LOS E	11.2	79.7	0.94	0.76	22.1
12	R	511	2.0	0.775	74.2	LOS F	19.6	139.5	1.00	0.88	19.9
Approach		1027	2.0	0.775	56.9	LOS E	19.6	139.5	0.90	0.84	23.4
All Vehicles		6776	2.0	0.919	47.1	LOS D	49.8	354.9	0.88	0.87	25.5

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	32.0	LOS D	0.1	0.1	0.65	0.65
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P7	Across W approach	53	32.7	LOS D	0.1	0.1	0.66	0.66
All Pedestrians		159	44.6				0.76	0.76

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

MOVEMENT SUMMARY

Site: Existing AM (modelled) + G-turn

Lane Cove Road - Waterloo Road
Existing AM (modelled) + G-turn
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Lane Cove Road (south)											
1	L	535	2.0	0.484	10.1	LOS A	4.8	34.5	0.12	0.69	47.2
2	T	2398	2.0	0.989	76.9	LOS F	75.0	534.3	1.00	1.14	18.7
Approach		2933	2.0	0.989	64.7	LOS E	75.0	534.3	0.84	1.06	21.0
East: Waterloo Road (east)											
4	L	49	2.0	0.251	75.8	LOS F	4.7	33.2	0.96	0.75	19.4
5	T	210	2.0	1.023	129.7	LOS F	22.5	160.0	1.00	1.22	12.9
6	R	156	2.0	0.799	84.3	LOS F	13.5	96.0	1.00	0.89	18.2
Approach		415	2.0	1.023	106.3	LOS F	22.5	160.0	0.99	1.04	15.1
North: Lane Cove Road (north)											
7	L	241	2.0	0.702	22.3	LOS B	26.1	186.2	0.50	0.96	38.2
8	T	2159	2.0	0.702	13.4	LOS A	27.5	195.6	0.51	0.48	42.1
9	R	481	2.0	0.985	111.1	LOS F	23.0	163.8	1.00	1.05	14.9
Approach		2881	2.0	0.985	30.5	LOS C	27.5	195.6	0.59	0.61	32.0
West: Waterloo Road (west)											
10	L	62	2.0	0.577	64.5	LOS E	14.3	102.1	0.96	0.85	22.2
11	T	341	2.0	0.577	59.0	LOS E	14.9	106.1	0.97	0.81	22.0
12	R	123	2.0	0.187	64.2	LOS E	5.2	37.2	0.89	0.76	21.8
Approach		526	2.0	0.577	60.9	LOS E	14.9	106.1	0.95	0.80	21.9
All Vehicles		6755	2.0	1.023	52.4	LOS D	75.0	534.3	0.75	0.85	24.1

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians							
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	18.3	LOS B	0.1	0.1	0.49	0.49
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P7	Across W approach	53	35.4	LOS D	0.2	0.2	0.69	0.69
All Pedestrians		159	40.9				0.71	0.71

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

MOVEMENT SUMMARY

Site: Existing PM (modelled) + G-turn

Lane Cove Road - Waterloo Road
Existing PM (modelled) + G-turn
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Lane Cove Road (south)											
1	L	420	2.0	0.372	8.4	LOS A	2.6	18.4	0.08	0.62	48.9
2	T	2189	2.0	0.888	42.8	LOS D	49.8	354.9	0.94	0.91	26.4
Approach		2609	2.0	0.888	37.3	LOS C	49.8	354.9	0.80	0.86	28.6
East: Waterloo Road (east)											
4	L	300	2.0	0.878	83.1	LOS F	24.5	174.6	1.00	0.94	18.2
5	T	160	2.0	0.654	61.3	LOS E	17.0	121.2	0.98	0.82	21.3
6	R	278	2.0	0.654	68.7	LOS E	17.0	121.2	0.97	0.83	21.0
Approach		738	2.0	0.878	73.0	LOS F	24.5	174.6	0.99	0.87	19.8
North: Lane Cove Road (north)											
7	L	192	2.0	0.735	32.0	LOS C	32.3	230.3	0.68	0.96	32.9
8	T	1983	2.0	0.735	22.8	LOS B	33.4	237.8	0.69	0.64	35.3
9	R	121	2.0	0.708	90.0	LOS F	6.2	44.4	1.00	0.80	17.3
Approach		2296	2.0	0.735	27.1	LOS B	33.4	237.8	0.70	0.67	33.3
West: Waterloo Road (west)											
10	L	370	2.0	0.892	63.4	LOS E	24.3	173.2	1.00	0.97	21.9
11	T	216	2.0	0.725	63.9	LOS E	18.6	132.8	1.00	0.86	20.9
12	R	511	2.0	0.725	72.1	LOS F	18.6	132.8	1.00	0.86	20.2
Approach		1097	2.0	0.892	67.5	LOS E	24.3	173.2	1.00	0.90	20.9
All Vehicles		6740	2.0	0.892	42.7	LOS D	49.8	354.9	0.82	0.80	27.0

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	24.7	LOS C	0.1	0.1	0.57	0.57
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P7	Across W approach	53	34.7	LOS D	0.2	0.2	0.68	0.68
All Pedestrians		159	42.8				0.74	0.74

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

MOVEMENT SUMMARY

Site: Existing AM (modelled) + G-turn + dev

Lane Cove Road - Waterloo Road
Existing AM (modelled) + G-turn + dev
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Lane Cove Road (south)											
1	L	535	2.0	0.514	11.3	LOS A	6.4	45.9	0.16	0.71	46.0
2	T	2398	2.0	1.038	111.0	LOS F	86.4	615.2	1.00	1.30	14.5
Approach		2933	2.0	1.038	92.8	LOS F	86.4	615.2	0.85	1.19	16.6
East: Waterloo Road (east)											
4	L	49	2.0	0.251	75.8	LOS F	4.7	33.2	0.96	0.75	19.4
5	T	210	2.0	1.023	129.7	LOS F	22.5	160.0	1.00	1.22	12.9
6	R	156	2.0	0.799	84.3	LOS F	13.5	96.0	1.00	0.89	18.2
Approach		415	2.0	1.023	106.3	LOS F	22.5	160.0	0.99	1.04	15.1
North: Lane Cove Road (north)											
7	L	241	2.0	0.702	22.3	LOS B	26.1	186.2	0.50	0.96	38.2
8	T	2159	2.0	0.702	13.4	LOS A	27.5	195.6	0.51	0.48	42.1
9	R	579	2.0	1.047	136.8	LOS F	32.1	228.4	1.00	1.12	12.7
Approach		2979	2.0	1.047	38.1	LOS C	32.1	228.4	0.60	0.64	28.8
West: Waterloo Road (west)											
10	L	62	2.0	0.577	64.5	LOS E	14.3	102.1	0.96	0.85	22.2
11	T	341	2.0	0.577	59.0	LOS E	14.9	106.1	0.97	0.81	22.0
12	R	123	2.0	0.187	64.2	LOS E	5.2	37.2	0.89	0.76	21.8
Approach		526	2.0	0.577	60.9	LOS E	14.9	106.1	0.95	0.80	21.9
All Vehicles		6853	2.0	1.047	67.4	LOS E	86.4	615.2	0.76	0.91	20.6

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	18.3	LOS B	0.1	0.1	0.49	0.49
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P7	Across W approach	53	37.5	LOS D	0.2	0.2	0.71	0.71
All Pedestrians		159	41.6				0.72	0.72

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

MOVEMENT SUMMARY

Site: Existing PM (modelled) + G-turn + dev

Lane Cove Road - Waterloo Road
Existing PM (modelled) + G-turn + dev
Signals - Fixed Time Cycle Time = 140 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Lane Cove Road (south)											
1	L	420	2.0	0.348	8.3	LOS A	2.4	17.2	0.08	0.62	49.0
2	T	2189	2.0	0.915	47.6	LOS D	51.1	363.9	0.98	0.99	25.0
Approach		2609	2.0	0.915	41.3	LOS C	51.1	363.9	0.83	0.93	27.1
East: Waterloo Road (east)											
4	L	300	2.0	0.918	86.7	LOS F	24.5	174.4	1.00	0.98	17.7
5	T	160	2.0	0.658	58.3	LOS E	15.7	111.6	0.99	0.82	22.0
6	R	278	2.0	0.658	66.2	LOS E	15.7	111.6	0.99	0.83	21.5
Approach		738	2.0	0.918	72.8	LOS F	24.5	174.4	0.99	0.89	19.9
North: Lane Cove Road (north)											
7	L	192	2.0	0.744	31.5	LOS C	31.1	221.2	0.70	0.96	33.2
8	T	1983	2.0	0.744	22.2	LOS B	32.1	228.5	0.70	0.65	35.6
9	R	157	2.0	0.857	88.3	LOS F	7.6	53.8	1.00	0.89	17.6
Approach		2332	2.0	0.857	27.4	LOS B	32.1	228.5	0.72	0.69	33.1
West: Waterloo Road (west)											
10	L	370	2.0	0.857	53.7	LOS D	21.4	152.2	1.00	0.94	24.2
11	T	216	2.0	0.702	58.5	LOS E	17.4	124.0	0.99	0.85	22.0
12	R	511	2.0	0.702	66.7	LOS E	17.4	124.0	0.99	0.85	21.3
Approach		1097	2.0	0.857	60.7	LOS E	21.4	152.2	1.00	0.88	22.3
All Vehicles		6776	2.0	0.918	43.1	LOS D	51.1	363.9	0.84	0.83	26.8

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	24.0	LOS C	0.1	0.1	0.59	0.59
P5	Across N approach	53	65.1	LOS F	0.2	0.2	0.96	0.96
P7	Across W approach	53	34.3	LOS D	0.1	0.1	0.70	0.70
All Pedestrians		159	41.1				0.75	0.75

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).