TRAFFIC AND PARKING IMPACT ASSESSMENT

PLANNING PROPOSAL (COMMERCIAL)

AT 1-3 LORD STREET, BOTANY NSW

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

18184.01FC - 13 July 2018

Development Type: **Planning Proposal (Commercial)**

Site Address: **1-3 Lord Street, Botany NSW**

Prepared for: **CD Construction**

Document reference: **18184.01FC**

Status	Issue	Prepared By	Checked By	Date
Draft	A	CW/PK	TH	5th June 2018
Final	A	TH		2nd July 2018
Final	B	CW	TH	13th July 2018
Final	C	TH		13th July 2018

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1 INTRODUCTION

McLaren Traffic Engineering (MTE) was commissioned by *CD Construction* to prepare a Traffic and Parking Impact Assessment of the Planning Proposal (Commercial) at 1-3 Lord Street, Botany NSW. The relevant plans are reproduced in **Annexure A** for reference.

1.1 Description and Scale of Development

The planning proposal includes amendments to the LEP regarding height and FSR, up to 16.5m and 1.75:1 FSR. This would permit a 4-storey building comprising permitted uses within the existing B7 zoning. No changes to land uses are proposed. An orderly development for assessment purposes, in relation to traffic and parking and assuming approval of the proposal, would comprise the following:

- Food Premises (Café or the like) – 99sqm GFA;
- Ground Floor Commercial – 522sqm GFA;
- Ground Floor Commercial Lobby – 100sqm GFA
- Upper-Level Office/Commercial – 3750sqm GFA.

1.2 State Environmental Planning Policy (Infrastructure) 2007

If the planning proposal were approved, the subsequent development application would qualify as a traffic generating development with relevant size and/or capacity under Clause 104 of the SEPP (Infrastructure) 2007 due to the proximity to Botany Road. Formal referral to the Roads and Maritime Services (RMS) may be required and this traffic report is considered in that circumstance to be suitable for support to be provided by RMS.

1.3 Site Description

1.3.1 Existing Conditions

The subject site is situated at 1-3 Lord Street, Botany NSW and has a total area of approximately 2555.7m^2. The site is surrounded by general business developments, a varied combination of light industrial and offices, with residential development located outside of the Lord Street Business Park Precinct to the south and Sydney Airport to the west. The site fronts Lord Street on its northern boundary and currently has vehicular access to Lord Street via a two-way driveway.

1.3.2 Zoning

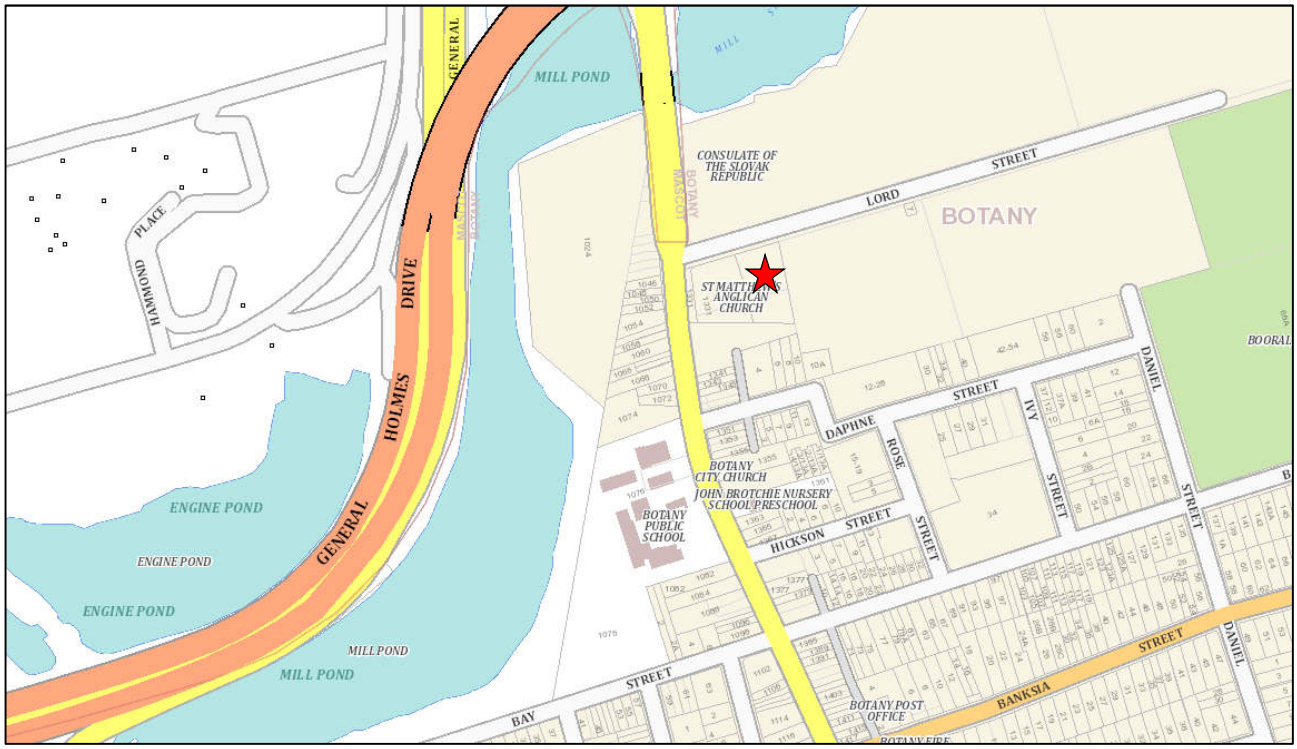
The subject site is currently zoned B7 – Business Park under the *Botany Bay Local Environmental Plan (BBLEP)*. There is no change of zone proposed as part of the proposed development with uses permitted within the B7 zone.

1.4 Site Context

The location of the site is shown on aerial imagery and on a map in **Figure 1** and **Figure 2** respectively.

Site Location

FIGURE 1: SITE CONTEXT – AERIAL PHOTO



Site Location

FIGURE 2: SITE CONTEXT – STREET MAP

2 EXISTING TRAFFIC AND PARKING CONDITIONS

2.1 Road Network

The road network surrounding the site has the following characteristics:

2.1.1 Lord Street

- Unclassified LOCAL street;
- Approximately 12m wide carriageway facilitating two-way passing and kerbside parking;
- Signposted 50km/h speed limit applies;
- Unrestricted parking on both sideways of the street.

2.1.2 Botany Road

- Classified STATE road (No. 170);
- Approximately 17m wide carriageway facilitating four traffic flow lanes (two in each direction) and a 1m wide median;
- Signposted 60km/h speed limit applies;
- "*No Stopping*" signage along the west side of the road, "*No Parking*" signage along the east side of the road.

2.1.3 Intersection Characteristics

- SIGNAL controlled intersection at Botany Road / Lord Street with two phases at peak times and pedestrian crossing movements on the southern and eastern legs

2.2 Existing Traffic and Parking Context

Traffic counts were completed at the intersection of Lord Street and Botany Road on Thursday the 3rd of May 2018 by an independent traffic surveyor during the weekday AM and PM commuter periods. The raw data is attached in **Annexure B** for reference.

Existing intersection performances have been assessed using SIDRA INTERSECTION 8.0, the results of this analysis are summarised in **Table 1.** Detailed movement summaries are provided in **Annexure C.**

TABLE 1: INTERSECTION PERFORMANCE (SIDRA INTERSECTION 8.0)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/veh)	Level of Service[3]	Control Type	Worst Movement
EXISTING PERFORMANCE						
Lord Street / Botany Road	AM	0.65	12.4 (Worst: 56.4)	**A** (Worst: D)	Signals (2 Phase)	RT from Lord ST
	PM	0.74	23.5 (Worst: 56.8)	**B** (Worst: E)		LT from Lord ST

NOTES:
(1) 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.

As shown, the nearby intersection is currently performing at a high level of efficiency, both with a level of service “A” or “B” conditions in both the AM & PM peak hours. The level of service “A” and “B” performance is characterised by low approach delays and spare capacity.

2.3 Public Transport

The nearest bus services run along Botany Road in both directions with the nearest stops located on either side of the road within 250m walking distance of the site. Bus routes M20, 309, 310, L09, X09 and X10 provide services from Matraville or East Gardens to Central Station. The bus routes connect well with the wider public transport network at East Gardens bus interchange, Green Square Railway Station and multiple CBD railway stations. The location of the site relative to the surrounding public transport infrastructure is shown in **Figure 3**.

Site Location

FIGURE 3: CONTEXT MAP – PUBLIC TRANSPORT

3 PARKING ASSESSMENT

The proposal will generate demand for parking by visitors and staff. Estimation of the likely demand for parking at the site should be considered in conjunction with local planning policies, contextual effects such as regional location and individual land uses. For the purpose of the assessment comparison is made between the Botany Bay Development Control Plan 2013 (DCP) and the RMS Guide to Traffic Generating Developments (RMS Guide), as amended. The RMS Guide has been undergoing significant change in the past 5 years as new parking surveys are being completed, subsequently increasing the availability of recent and localised data within the greater Sydney metropolitan area.

3.1 Parking Quantum

3.1.1 Council Parking Requirement

Section 3A and Section 6 of the DCP outline a range of controls that need to be considered in terms of design and implementation of off-street parking facilities to support developments within Bayside Council area. The general objectives of the DCP with regards to parking are reproduced in **Figure 4** and the parking requirements for each relevant land use quoted below.

3A 1.2 General Objectives

Objectives

- **O1** To minimise car parking in areas which have good access to public transport to promote sustainable transport;
- **O2** To ensure adequate car and bicycle parking is provided;
- **O3** To minimise the visual impacts of car parks when viewed from the public domain and adjoining sites;
- **O4** To maximise opportunities for consolidated areas of deep soil planting and landscaping;
- **O5** To minimise traffic congestion and ensure adequate traffic safety and management;
- **O6** To ensure parking facilities are safe, functional and accessible to all through compliance with design standards; and
- **O7** To ensure parking provisions and design are compatible with the particular development proposed.

FIGURE 4: BOTANY BAY COUNCIL DCP CAR PARKING OBJECTIVES

Business Premises – 1 space / 40m^2 GFA

Food and Drink Premises – a) Restaurants and café:

For developments with a gross floor area greater than 100m^2 the parking provision is to be provided as follows:

1 space / 2 employees; plus

1 space / 3 seats (internal and external); or

1 space / 10m^2 GFA, whichever is greater

For developments with a gross floor area less than 100m2, the parking provision recommended above is desirable, however applicants can take into account car parking available in adjacent parking areas, including on-street and its time of usage. Alternatively a parking assessment based on survey of similar sized developments can be utilised.

Office Premises – 1 space / 40m^2 GFA

It is clear then that the applicable parking rates for the development would be:

Office – 1 space per 40sqm

Commercial – 1 space per 40sqm

Café – 1 space 10sqm

For the assumed land uses this would equate to some 130 spaces including 24 for the food premises and 106 for the business uses.

3.1.2 RMS Parking Surveys

The following parking survey information is provided with the RMS Guide for the purpose of traffic and parking demand generation. For the subject site, the following subsections analyse the different land uses and their impact.

3.1.2.1 Food Premises

While restaurants were surveyed by RMS in 1980, and drive through coffee shops more recently, the most applicable land use for food premises at the subject site would be that of an ancillary café or the like. Within large shopping centres, the food premises are surveyed to operate as a secondary attractor, such that they only generate additional staff parking demand since customers are visiting elsewhere in the centre and stop in on the way through. The rate given for such a development is:

Speciality Shops and Secondary Retail – 45 spaces per 1000sqm or 1 per 22.2sqm

An alternate method is examining the stand-alone restaurant rate which states there is one staff per 10 seats and one seat per 2.1sqm GFA. Comparing this to the Journey to Work data for Botany which shows 25% of worked do not drive a car to work, this produces the following RMS equivalent rate for ancillary food premises:

Ancillary Restaurant in Botany – 1 space per 28sqm for staff

This would generate demand for 8.6 spaces.

3.1.2.2 Business Uses

The RMS Guide surveyed business parks and office buildings in the 1980s and again in 2013. The guide provides three sets of rates applicable to the subject site with the 2018 rates forming part of a DRAFT guide which is still subject to public comment:

Current Guide (2002)

Office and Commercial – 1 per 40sqm for unconstrained situation

Business Park Average – 1 per 66.7sqm

Business Park Office – 1 per 55.5sqm

Draft Guide (2018)

Commercial – 1 per 40sqm

Office and Business Park Average – 1 per 66.7sqm

Business Park Office – 1 per 55.5sqm

Comparison between the rates shows that the office component of a business park is likely to be 1 space per 55.5-66.7sqm, with ground floor offices having a slightly higher demand at 1 space per 40sqm. This recognises the potential for ground floors to have some higher generating retail uses combined with lower generating offices.

This would generate demand for 68 to 79 spaces.

3.1.2.3 Combined Parking Demand

Considering the food premises would be drawing patronage generally from the Lord Street Business Park Precinct, it would be generating traffic and parking demand at the same time as the surrounding uses and thus no discount can be given to different overlapping peaks. In that case, the parking demand is the sum of the individual uses or peak demand of 77 to 88 spaces.

3.1.3 Recommended Parking Provision

The site is well located regarding the local and regional traffic networks and has an adjacent high-frequency bus route (5-minute frequency at commuter times) for connectivity to the wider public transport networks. Current journey to work data shows 75% of staff in the Botany area who commute to work do so as a private vehicle driver with the remainder arriving as a passenger or by public transport.

For this planning proposal it is recommended to follow the objectives of the DCP regarding traffic and parking, whereby the development should seek the balance of trying "*To minimise car parking in area which have good access to public transport to promote sustainable transport*" while also trying "*To ensure adequate car and bicycle parking is provided*". The recommend parking rates for future development applications should be:

Food Premises - 1 space per 28sqm

Office/Commercial/Business – 1 space per 40sqm ground floor plus 1 space per 55.5sqm on first floor or higher

Based on the proposed 1.75:1 FSR, 84.1 spaces will be required, this is conservatively rounded up to 85 spaces, as summarised in **Table 2**. Based on the dimensions of the site and proposed structure, approximately 92 spaces can be accommodated and the site will not be limited by its ability to provide for parking.

TABLE 2: SUMMARY OF PARKING DEMAND

Land Use	Scale	Rate	Parking Demand
Commercial (ground floor)	522m^2 GFA	1 space per 40m^2 GFA	13.05
Commercial (first floor or higher)	3750m^2 GFA	1 space per 55.5m^2 GFA	67.57
Commercial Lobby	100m^2 GFA	Ancillary	0
Food Premises	99m^2 GFA	1 space per 28m^2 GFA	3.54
Total	**4471m^2 GFA**		**84.16 (85)**

3.2 Disabled Parking

Council's DCP Part 3C requires disabled parking according to the BCA where applicable. For retail/office/business developments the rate is 2% of parking. The subject planning proposal is likely to provide approximately 50-100 parking spaces and thus 2 spaces must be provided in a convenient location. Design according to AS2890.6 shall be completed at the DA stage.

3.3 Servicing & Loading

Council's DCP Part 3A requires provision for an MRV (8.8m length) for waste collection to service the site including access via forward only movements at the property boundary crossover. It is not anticipated that any vehicle larger than this will be required for the likely uses. Provision for an MRV shall be provided at the DA stage.

3.4 Bicycle Parking

Council's DCP Part 3A designates the following Bicycle Parking Rates:

> *In every new building, where the floor space exceeds 600m² GFA (except for houses and multi-unit housing) bicycle parking equivalent to 10% of the required car spaces or part therefore as required in Table 1 shall be provided.*

The resulting bicycle storage requirements are provided in **Table 3**.

TABLE 3: DCP BICYCLE PARKING REQUIREMENTS

Land Use	Scale	Rate	Bicycle Spaces Required
Food Premises	24	10%	2.4 (3)
Commercial/Office/Business	106		10.6 (11)
Total	**130**	**-**	**14**

As shown above, the site requires the provision of 14 bicycle spaces which shall be provided to promote sustainable transport methods.

3.5 Car Park Design & Compliance

The car parking layout and access thereto, shall be assessed for compliance against the relevant sections of AS2890.1:2004, AS2890.2:2002 and AS2890.6:2009. A preliminary compliance check has been completed and shows ample opportunity to achieve the minimum requirements for design in accordance with the answer.

4 TRAFFIC ASSESSMENT

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

4.1 Traffic Generation

4.1.1 Existing Site Traffic

The existing commercial/industrial/business uses on the site would be expected to generate traffic according to the RMS surveys in 2012 of *Business Parks and Industrial Estates* which provides the following average generation

0.52 trips per 100sqm of GFA in the AM peak hour

0.56 trips per 100sqm of GFA in the PM peak hour

With existing GFA of approximately 2300sqm, this equates to 12/13 trips in AM/PM peak hours. This should be discounted from the proposed traffic generation to estimate the additional trips for the proposal.

4.1.2 Additional Site Traffic

The estimated traffic generation level for the business park use, based upon the RMS' Guide to Traffic Generating Developments 2002 (as amended), is shown below:

Food Premises – Assume acts as restaurant with 50% reduction due to ancillary nature to business park. 5 trips per 100sqm x 50% = 2.5 trips per 100sqm.

Office/Commercial/Business – Assume acts as office block. 1.6 / 1.2 trips per 100sqm for AM / PM.

Ground Floor Commercial – Assume acts as office block with increase according to recommended increase in parking rate, i.e. 1 per 40sqm compared to 1 per 55.5sqm. 2.2 / 1.7 trips per 100sqm for AM / PM.

A summary of the traffic generation is shown in **Table 4** below.

TABLE 4: ESTIMATED TRAFFIC GENERATION

Use	Scale	AM Peak Hour Rate	PM Peak Hour Rate	AM Peak Hour Generation	PM Peak Hour Generation	Peak Hour Split[1]	
						AM	PM
Food Premises[1]	99sqm GFA	2.5 per 100sqm GFA	2.5 per 100sqm GFA	2	2	1 In 1 Out	1 In 1 Out
Office / Commercial / Business[2]	3750sqm GFA	1.6 per 100sqm GFA	1.2 per 100sqm GFA	60	45	54 In 6 Out	5 In 40 Out
Ground Floor Commercial	522sqm[3]	2.2 per 100sqm GFA	1.7 per 100sqm GFA	11	9	9 In 1 Out	1 In 8 Out
Total	**4,371sqm**	**-**	**-**	**73**	**56**	**64 In 7 Out**	**7 In 49 Out**

Notes:
(1) Food Premises assumes 50% inbound and outbound at all times.
(2) Assumes 90% inbound & 10% outbound during AM peak for commercial: Vice versa for PM.

Subtracting the existing estimated site traffic produces the following estimation of new trips, above those surveyed:

- 53/6 trips IN/OUT in the AM peak hour
- 6/37 trips IN/OUT in the PM peak hour

4.2 Traffic Impact

4.2.1 Traffic Distribution

The existing surveys at the Lord Street and Botany Road indicate that traffic accessing the Lord Street Business Park Precinct has the following distribution:

- AM – 15% inbound/outbound south and 85% inbound/outbound north
- PM – 30%/10% inbound/outbound south and 70%/90% inbound/outbound north

It is assumed for the purpose of assessment that new trips will follow the existing distribution.

4.2.2 Intersection Capacity Analysis (Using Sidra Intersection 8.0)

The traffic generation outlined above has been added to the existing traffic volumes recorded. *SIDRA INTERSECTION 8.0* was used to assess the intersection's performance. The purpose of this assessment is to compare the existing intersection operations to the future scenario under the increased traffic load. The results of this assessment are shown in **Table 5**.

As shown in **Table 5**, the nearby intersection remains generally unaltered under the future scenario. The existing LoS has been retained with minimal delays and additional capacity maintained. It is worth noting that average delays of 70 seconds are expected when signal cycle times extend to 120 seconds. Existing surveys show cycle times of 80 to 138 seconds during commuter peak hours and minor road delays to Lord Street should be expected to be near to 70 seconds at peak times as a result.

The routes to and from the site do not utilise any low volume residential precincts and are along local arterial or State roads. Therefore, residential amenity will not be impacted by the traffic generated by the proposed development.

TABLE 5: INTERSECTION PERFORMANCE (SIDRA INTERSECTION 7.0)

Intersection	Peak Hour	Degree of Saturation(1)	Average Delay(2) (sec/veh)	Level of Service(3)	Control Type	Worst Movement
EXISTING PERFORMANCE						
Lord Street / Botany Road	AM	0.65	12.4 (Worst: 56.4)	**A** (Worst: D)	Signals (2 Phase)	RT from Lord ST
	PM	0.74	23.5 (Worst: 56.8)	**B** (Worst: E)		LT from Lord ST
FUTURE PERFORMANCE						
Lord Street / Botany Road	AM	0.67	12.8 (Worst: 56.9)	**A** (Worst: E)	Signals (2 Phase)	RT from Lord ST
	PM	0.76	24.5 (Worst: 56.9)	**B** (Worst: E)		LT from Lord ST

NOTES:
(1) 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.

5 CONCLUSION

In view of the foregoing, the development concept that underpins the planning proposal (as outlined in **Annexure A**) is fully supportable in terms of its traffic and parking impacts. The following outcomes of this traffic impact assessment are relevant to note:

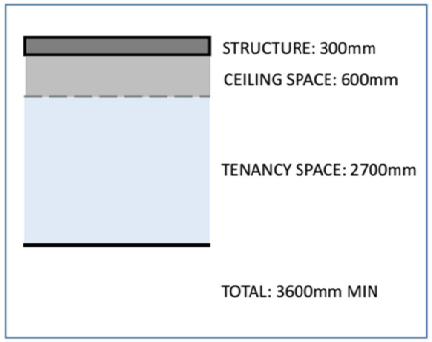
- The proposal is for rezoning of the land regarding existing height and FSR controls. No buildings are proposed in this application.
- A subsequent compliant development application would generate parking demand of approximately 85 car spaces. This should guide future massing and capacity constraints for development applications.
- A subsequent compliant development application would generate a maximum of 64 movements in the AM peak hour and 45 trips in the PM peak hour. Intersection capacity analysis shows there is spare capacity at the intersection of Lord Street and Botany Road to accommodate the change with minimal increase to delays and capacity.

DRAFT

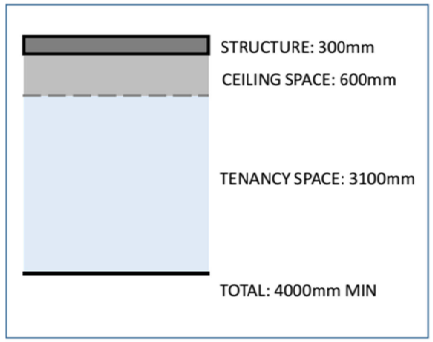
PROPOSED DEVELOPMENT AREAS

Floor	Height	Use	Area
Basement 1	(3m)	Car parking	N/A
Ground	4.0m	Commercial/Warehouse Lobby Retail/Cafe	522sqm 100sqm 99sqm
Level 1	3.6m	Commercial	1250sqm
Level 2	3.6m	Commercial	1250sqm
Level 3	3.6m	Commercial	1250sqm
Roof	1.7m	*Plant/Overrun*	
Total	16.5m		4471sqm

3.6M FLOOR-TO-FLOOR



4.0M FLOOR-TO-FLOOR



KEY DEVELOPMENT CONTROLS

Site Area	2555sqm
Existing FSR (LEP)	1:1
Proposed FSR	1.75:1
Proposed GFA *- Ground Floor Commercial/Warehouse* *- Ground Floor Commercial Lobby* *- Ground Floor Café/Retail* *- Level 1 Commercial* *- Level 2 Commercial* *- Level 3 Commercial*	4471sqm *522sqm* *100sqm* *99sqm* *1250sqm* *1250sqm* *1250sqm*
Height Limit (DCP)	10m
Proposed Height	16.5m
Zone B7 Business Park	No change proposed.
Parking Requirement *- Ground Floor Commercial 1:40* *- Ground Floor Café/Retail 1:28* *- Upper Floor Commercial 1:55*	88 Spaces *16* *4* *68*
Basement 1 Parking	74 spaces
Ground Level Parking	18 spaces
Total Parking	92 Spaces

Note: Refer to Traffic and Parking Impact Assessment for information on parking requirements

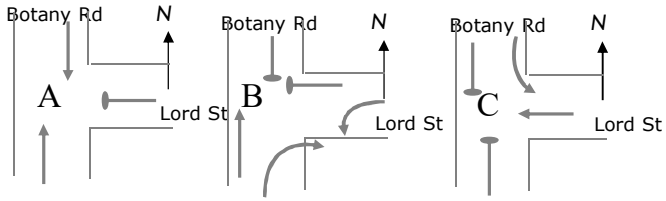
ANNEXURE A

ANNEXURE B: TRAFFIC COUNTS

(4 SHEETS)

Curtis Traffic Surveys **Signal phases**

Job:	180503mcl (18_184)
Day, date	16/05/18
Location:	Botany Rd & Lord St
Weather:	Fine
Client:	McLaren Traffic Engineering

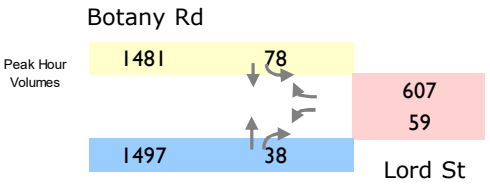


Time lights change to green — Duration of phase — Cycle time

Time Period			A	B	C	A	A	B	C	
14:00	to	14:15	14:13:18	x	14:14:11	14:14:33	00:00:53	x	00:00:22	00:01:15
14:15	to	14:30	14:27:10	x	14:28:50	14:29:03	00:01:40	x	00:00:13	00:01:53
14:30	to	14:45	14:40:09	x	14:41:09	14:41:23	00:01:00	x	00:00:14	00:01:14
14:45	to	15:00	14:51:34	x	14:52:32	14:52:50	00:00:58	x	00:00:18	00:01:16
15:00	to	15:15	15:07:09	x	15:08:19	15:08:39	00:01:10	x	00:00:20	00:01:30
15:15	to	15:30	15:27:00	x	15:28:20	15:28:47	00:01:20	x	00:00:27	00:01:47
15:30	to	15:45	15:37:55	x	15:38:53	15:39:17	00:00:58	x	00:00:24	00:01:22
15:45	to	16:00	15:55:28	x	15:56:29	15:56:50	00:01:01	x	00:00:21	00:01:22
16:00	to	16:15	16:08:05	x	16:09:16	16:09:45	00:01:11	x	00:00:29	00:01:40
16:15	to	16:30	16:21:17	x	16:22:53	16:23:16	00:01:36	x	00:00:23	00:01:59
16:30	to	16:45	16:41:07	x	16:42:23	16:42:39	00:01:16	x	00:00:16	00:01:32
16:45	to	17:00	16:53:29	x	16:55:20	16:55:47	00:01:51	x	00:00:27	00:02:18
17:00	to	17:15	17:06:13	x	17:07:15	17:07:41	00:01:02	x	00:00:26	00:01:28
17:15	to	17:30	17:22:07	x	17:23:40	17:24:22	00:01:33	x	00:00:42	00:02:15
17:30	to	17:45	17:37:07	x	17:38:40	17:39:08	00:01:33	x	00:00:28	00:02:01
17:45	to	18:00	17:47:56	x	17:49:34	17:49:58	00:01:38	x	00:00:24	00:02:02
18:00	to	18:15	18:07:05	x	18:08:12	18:08:22	00:01:07	x	00:00:10	00:01:17
18:15	to	18:30	18:16:45	x	18:17:50	18:18:04	00:01:05	x	00:00:14	00:01:19
18:30	to	18:45	18:35:50	x	18:36:50	18:37:05	00:01:00	x	00:00:15	00:01:15
18:45	to	19:00	18:49:33	x	18:51:22	18:51:30	00:01:49	x	00:00:08	00:01:57

Curtis Traffic Surveys **g movement count**

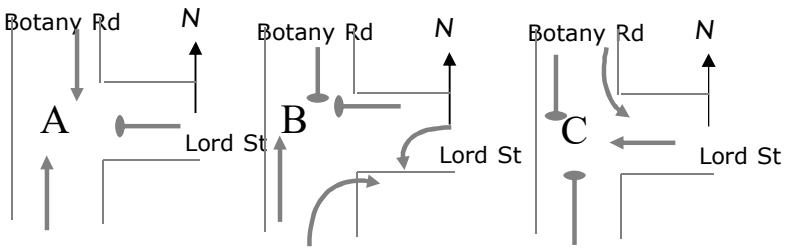
Job: 160503mcl (18_184)
Day, date 16/05/18
Location: Botany Rd & Lord St
Weather: Fine
Client: McLaren Traffic Engineering



Time Period			From Botany Rd south		From Lord St		From Botany Rd north		Total vehicles	Peak
			through	right	left	right	left	through		
14:00	to	14:15	169	7	9	50	17	282	534	
14:15	to	14:30	166	12	11	64	38	263	554	
14:30	to	14:45	102	10	13	30	27	208	390	
14:45	to	15:00	317	15	13	20	25	306	696	
15:00	to	15:15	309	13	13	94	45	333	807	
15:15	to	15:30	326	10	12	92	26	396	862	
15:30	to	15:45	353	7	14	98	36	303	811	
15:45	to	16:00	286	9	11	99	27	257	689	
16:00	to	16:15	307	8	16	120	25	306	782	
16:15	to	16:30	344	7	15	165	22	335	888	
16:30	to	16:45	341	8	12	120	20	391	892	
16:45	to	17:00	349	9	11	112	21	394	896	
17:00	to	17:15	463	14	21	210	15	361	1084	peak
17:15	to	17:30	285	3	8	107	7	402	812	
17:30	to	17:45	284	3	18	135	12	414	866	
17:45	to	18:00	250	5	13	122	10	407	807	
18:00	to	18:15	255	3	4	94	10	412	778	
18:15	to	18:30	190	4	8	77	3	433	715	
18:30	to	18:45	282	1	2	53	2	382	722	
18:45	to	19:00	119	3	0	11	4	249	386	
Total			5497	151	224	1873	392	6834		
›urly summary										
14:00	to	15:00	754	44	46	164	107	1059	2174	
14:15	to	15:15	894	50	50	208	135	1110	2447	
14:30	to	15:30	1054	48	51	236	123	1243	2755	
14:45	to	15:45	1305	45	52	304	132	1338	3176	
15:00	to	16:00	1274	39	50	383	134	1289	3169	
15:15	to	16:15	1272	34	53	409	114	1262	3144	
15:30	to	16:30	1290	31	56	482	110	1201	3170	
15:45	to	16:45	1278	32	54	504	94	1289	3251	
16:00	to	17:00	1341	32	54	517	88	1426	3458	
16:15	to	17:15	1497	38	59	607	78	1481	3760	peak hour
16:30	to	17:30	1438	34	52	549	63	1548	3684	
16:45	to	17:45	1381	29	58	564	55	1571	3658	
17:00	to	18:00	1282	25	60	574	44	1584	3569	
17:15	to	18:15	1074	14	43	458	39	1635	3263	
17:30	to	18:30	979	15	43	428	35	1666	3166	
17:45	to	18:45	977	13	27	346	25	1634	3022	
18:00	to	19:00	846	11	14	235	19	1476	2601	

Curtis Traffic Surveys **Signal phases**

Job:	180503mcl (18_184)
Day, date	16/05/18
Location:	Botany Rd & Lord St
Weather:	Fine
Client:	McLaren Traffic Engineering

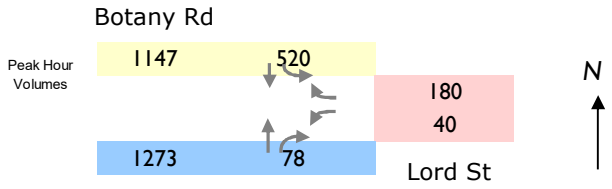


Time lights change to green | Duration of phase | Cycle time

Time Period			A	B	C	A	A	B	C	
07:00	to	07:15	07:11:35	x	07:12:43	07:12:58	00:01:08	x	00:00:15	00:01:23
07:15	to	07:30	07:23:24	x	07:24:41	07:24:59	00:01:17	x	00:00:18	00:01:35
07:30	to	07:45	07:36:25	x	07:37:30	07:37:48	00:01:05	x	00:00:18	00:01:23
07:45	to	08:00	07:51:32	x	07:52:38	07:53:03	00:01:06	x	00:00:25	00:01:31
08:00	to	08:15	08:03:05	x	08:04:23	08:04:46	00:01:18	x	00:00:23	00:01:41
08:15	to	08:30	08:23:10	x	08:25:10	08:25:27	00:02:00	x	00:00:17	00:02:17
08:30	to	08:45	08:33:51	x	08:35:28	08:35:46	00:01:37	x	00:00:18	00:01:55
08:45	to	09:00	08:46:48	x	08:48:57	08:49:09	00:02:09	x	00:00:12	00:02:21

Curtis Traffic Surveys **ıg movement count**

Job: 180503mcl (18_184)
Day, date 16/05/18
Location: Botany Rd & Lord St
Weather: Fine
Client: McLaren Traffic Engineering



Time Period			From Botany Rd south through	From Botany Rd south right	From Lord St left	From Lord St right	From Botany Rd north left	From Botany Rd north through	Total vehicles	Peak
07:00	to	07:15	224	3	5	21	32	156	441	
07:15	to	07:30	251	5	3	30	41	143	473	
07:30	to	07:45	285	10	3	32	65	162	557	
07:45	to	08:00	326	11	6	29	75	230	677	
08:00	to	08:15	347	7	8	49	96	247	754	
08:15	to	08:30	325	25	14	48	166	330	908	peak
08:30	to	08:45	326	20	11	39	119	253	768	
08:45	to	09:00	275	26	7	44	139	317	808	
Total			2359	107	57	292	733	1838		
ɔurly summary										
07:00	to	08:00	1086	29	17	112	213	691	2148	
07:15	to	08:15	1209	33	20	140	277	782	2461	
07:30	to	08:30	1283	53	31	158	402	969	2896	
07:45	to	08:45	1324	63	39	165	456	1060	3107	
08:00	to	09:00	1273	78	40	180	520	1147	3238	peak hour

ANNEXURE C: SIDRA INTERSECTION ANALYSES

(4 SHEETS)

MOVEMENT SUMMARY

Site: 1 [Lord St/Botany Road Existing AM]

Lord St/Botany Road Existing
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Botany Road South												
2	T1	1273	3.8	0.571	4.8	LOS A	18.8	135.9	0.38	0.35	0.38	53.5
3	R2	78	1.2	0.386	18.1	LOS B	2.2	15.3	0.69	0.75	0.69	43.0
Approach		1351	3.6	0.571	5.6	LOS A	18.8	135.9	0.40	0.37	0.40	52.6
East: Lord Street												
4	L2	40	0.0	0.505	51.3	LOS D	5.6	39.9	0.98	0.83	1.18	27.0
6	R2	180	4.7	0.505	56.4	LOS D	6.0	43.4	0.98	0.81	1.07	25.6
Approach		220	3.8	0.505	55.5	LOS D	6.0	43.4	0.98	0.81	1.09	25.8
North: Botany Road North												
7	L2	520	0.6	0.648	15.0	LOS B	25.7	183.7	0.58	0.69	0.58	46.4
8	T1	1147	5.4	0.648	10.9	LOS A	26.8	196.3	0.61	0.60	0.61	46.3
Approach		1667	3.9	0.648	12.2	LOS A	26.8	196.3	0.60	0.63	0.60	46.3
All Vehicles		3238	3.8	0.648	12.4	LOS A	26.8	196.3	0.54	0.54	0.55	45.6

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 of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	50	9.6	LOS A	0.1	0.1	0.40	0.40
All Pedestrians		100	31.9	LOS D			0.68	0.68

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: 1 [Lord St/Botany Road Existing AM + Subject Site]

Lord St/Botany Road Existing AM + Subject Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Botany Road South												
2	T1	1273	3.8	0.590	5.0	LOS A	20.0	144.6	0.39	0.36	0.39	53.4
3	R2	86	1.2	0.440	19.4	LOS B	2.6	18.6	0.74	0.77	0.74	42.2
Approach		1359	3.6	0.590	5.9	LOS A	20.0	144.6	0.42	0.39	0.42	52.3
East: Lord Street												
4	L2	41	0.0	0.524	52.3	LOS D	5.8	41.8	0.98	0.84	1.20	26.7
6	R2	187	4.7	0.524	56.9	LOS E	6.2	45.2	0.98	0.81	1.08	25.5
Approach		228	3.9	0.524	56.1	LOS D	6.2	45.2	0.98	0.81	1.10	25.7
North: Botany Road North												
7	L2	566	0.6	0.665	15.3	LOS B	27.2	194.1	0.59	0.70	0.59	46.1
8	T1	1151	5.4	0.665	11.1	LOS A	28.2	206.2	0.62	0.62	0.62	46.0
Approach		1717	3.8	0.665	12.5	LOS A	28.2	206.2	0.61	0.64	0.61	46.1
All Vehicles		3304	3.7	0.665	12.8	LOS A	28.2	206.2	0.56	0.55	0.56	45.3

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
P1	South Full Crossing	50	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	50	9.6	LOS A	0.1	0.1	0.40	0.40
All Pedestrians		100	31.9	LOS D			0.68	0.68

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: 1 [Lord St/Botany Road Existing PM]

Lord St/Botany Road Existing PM
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Botany Road South												
2	T1	1497	2.7	0.669	12.4	LOS A	29.1	208.8	0.62	0.57	0.62	45.7
3	R2	38	0.0	0.199	23.8	LOS B	1.0	6.7	0.78	0.73	0.78	39.9
Approach		1535	2.6	0.669	12.7	LOS A	29.1	208.8	0.63	0.57	0.63	45.5
East: Lord Street												
4	L2	59	0.0	0.741	56.8	LOS E	18.4	128.8	0.98	0.92	1.38	25.7
6	R2	607	0.0	0.741	53.9	LOS D	18.4	128.8	0.98	0.89	1.19	26.1
Approach		666	0.0	0.741	54.2	LOS D	18.4	128.8	0.98	0.89	1.20	26.1
North: Botany Road North												
7	L2	78	0.0	0.737	26.1	LOS B	33.6	239.7	0.81	0.75	0.81	41.2
8	T1	1481	2.5	0.737	20.8	LOS B	33.7	241.0	0.81	0.75	0.81	39.3
Approach		1559	2.4	0.737	21.1	LOS B	33.7	241.0	0.81	0.75	0.81	39.4
All Vehicles		3760	2.1	0.741	23.5	LOS B	33.7	241.0	0.77	0.70	0.80	37.3

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
P1	South Full Crossing	50	45.2	LOS E	0.1	0.1	0.87	0.87
P2	East Full Crossing	50	16.6	LOS B	0.1	0.1	0.53	0.53
All Pedestrians		100	30.9	LOS D			0.70	0.70

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: 1 [Lord St/Botany Road Existing PM + Subject Site]

Lord St/Botany Road Existing PM + Subject Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Botany Road South												
2	T1	1497	2.7	0.678	13.1	LOS A	29.9	214.2	0.64	0.58	0.64	45.2
3	R2	40	0.0	0.212	24.7	LOS B	1.0	7.3	0.80	0.73	0.80	39.4
Approach		1537	2.6	0.678	13.4	LOS A	29.9	214.2	0.64	0.59	0.64	45.0
East: Lord Street												
4	L2	63	0.0	0.758	56.9	LOS E	19.7	137.8	0.99	0.93	1.39	25.7
6	R2	642	0.0	0.758	54.0	LOS D	19.7	137.8	0.99	0.90	1.20	26.1
Approach		705	0.0	0.758	54.3	LOS D	19.7	137.8	0.99	0.90	1.22	26.1
North: Botany Road North												
7	L2	82	0.0	0.750	26.9	LOS B	34.4	245.5	0.82	0.77	0.82	40.8
8	T1	1481	2.5	0.750	21.7	LOS B	34.5	246.7	0.83	0.76	0.83	38.7
Approach		1563	2.4	0.750	22.0	LOS B	34.5	246.7	0.83	0.76	0.83	38.8
All Vehicles		3805	2.0	0.758	24.5	LOS B	34.5	246.7	0.78	0.72	0.82	36.8

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
P1	South Full Crossing	50	44.3	LOS E	0.1	0.1	0.86	0.86
P2	East Full Crossing	50	17.1	LOS B	0.1	0.1	0.53	0.53
All Pedestrians		100	30.7	LOS D			0.70	0.70

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.

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Division of RAMTRANS Australia ABN: 45067491678 RPEQ: 19457

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

s10 October 2018 Reference: 18591.01FA

CD Construction
Unit 2, Level 2
8 Lord Street
Botany NSW 2019
Attention: Nathan Fuz

**RESPONSE TO PEER REVIEW OF
INDUSTRIAL AND WAREHOUSE DEVELOPMENT
AT 1-3 LORD STREET, BOTANY**

Dear Nathan,

Reference is made to your request to provide a Response to Peer Review by Cardno for the proposed Industrial and Warehouse Development at 1-3 Lord Street, Botany. The relevant plans are provided in **Annexure A** for reference. Each of the comments made is reproduced in italics in the sections below and responded to thereafter.

1 Existing Traffic & Parking Context

1.1 Heavy Vehicle Percentage

> *Cardno Comment: Section 2.2 does not specify what peak hours have been identified from the surveys, however based on Appendix B, the surveys identify an AM peak hour of 8:00-9:00am and a PM peak hour of 4:15-5:15pm. The SIDRA files appear to be set-up for these peak hours however it is unclear how the heavy vehicle percentage was derived.*
>
> *Clarification is requested in regards to the applicable heavy vehicle percentage adopted in the intersection modelling as the survey, nor the report, differentiate between light and heavy vehicles.*

The proportion of heavy vehicles has been adapted from the Traffic Impact Assessment completed by Traffix of a proposed Mixed-Use Development at 11-13 Lord Street, Botany. The relevant pages from this report are provided in **Annexure B**.

1.2 Intersection Operation – Phasing

Cardno Comment: The TCS plan (0565) for the intersection of Lord Street and Botany Road identifies four phases. The survey information provided in Appendix B of the traffic report identifies that only two phases operated during the survey time (Phase A & C). However, the SIDRA modelling has been set-up such that phase A, C & D were activated which does not correspond to Table 1 information of Appendix B survey results.

Clarification is requested in regards to the intersection phasing and cycle times and sequencing. The introduction of an additional phase could modify the performance results reported within the report.

Revised SIDRA modelling using a two-phase arrangement (and all other amendments requested) has been completed, with the detailed results provided in **Annexure C**. There remains negligible change in the operation of the intersection in the existing and future scenarios.

It should be noted that phases B and D are likely to be called if they would result in a higher level of efficiency of operation of the intersection and that their inclusion in the SIDRA Model is generally best practice.

1.3 Length of Northbound Lane

Cardno Comment: There are kerbside parking restrictions along Botany Road (northbound) which appear to be in effect during the afternoon peak hour (3:00pm-6:00pm). This indicates that during the morning peak hour, the northbound kerbside lane is reduced to an effective length of approximately 60m). This is not reflected in the SIDRA geometry.

It is requested that the traffic and transport assessment be updated to reflect current lane arrangements and identify the intersection performance.

Revised SIDRA modelling including the short northbound kerbside lane (and all other amendments requested) has been completed, with the detailed results provided in **Annexure C**. There remains negligible change in the operation of the intersection in the existing and future scenarios.

It should be noted that it is unlikely that vehicles will commonly park along Botany Road, a major thoroughfare, and that the use of a 60m short lane is, therefore, a worst case.

1.4 Pedestrian Priorities

Cardno Comment: The pedestrian priorities within SIDRA have not been set to identify conflict between pedestrians and turning movements. This is required to induce delay on vehicle movements as a result of an activated pedestrian phase. With regard to the Lord Street "Left turn on red", they too are required to giveway to pedestrians crossing Lord Street. This potentially results in increased delay for turning movements.

It is requested that that the traffic and transport assessment be updated to reflect current lane arrangements and identify the intersection performance.

Revised SIDRA modelling including the update to the priorities (and all other amendments requested) has been completed, with the detailed results provided in **Annexure C**. There remains negligible change in the operation of the intersection in the existing and future scenarios.

It should be noted that the SIDRA default setting of 50 pedestrians per hour likely overestimates the volume of pedestrians that will use the intersection at peak hours and that consequently the performance of the turns that conflict with these movements will be slightly better than that reflected by the SIDRA model.

2 Parking Quantum

2.1 Calculation of Parking Provision

> *Cardno Comment: It is unclear how the total of 130 car parking spaces was identified. For example, the number of spaces stated for the food premises is 24, however based on the size of the food and drink premises (99m2), the number of staff (assumed to be 5 based on the alternate RMS methodology identified further within the report) and the number of seats (assumed to be 47 based on the alternate RMS methodology identified further within the report) would result in 18 spaces. Or, adopting the floor space requirement (1 space per 10m2) results in 10 car spaces on top of the staff requirement of 3. Both of which would be less than the 24 identified by the report.*
>
> *It is requested that the traffic report be amended to show calculations on how the 130 spaces has been determined.*

The calculation of 130 referred to a previous scheme which has been superseded, the latest calculation is summarised in **Table 1**, indicating that 119.2 spaces are required for the latest scheme under a strict application of the Council DCP.

TABLE 1: DCP PARKING REQUIREMENT

Land Use	Scale	Rate	Parking Requirement
Food/Drink Premises	99sqm GFA	1/10sqm GFA	9.9 spaces
Commercial/Office	4372sqm GFA	1/40 sqm GFA	109.3 spaces
Total			**119.2 spaces**

2.2 The Validity of Use of Draft Government Agency Documents

> *Cardno Comment: The traffic report makes reference to the Draft 2018 RMS Guide, however clarification has been sought from the RMS, who have advised no such document exists, and the new guideline yet to be release will be a TfNSW document.*
>
> *Clarification is requested in regards to the contents and validity of the draft 2018 RMS Guide as identified in the traffic report.*

The title of the document in question was mistaken in the McLaren Traffic and Parking Impact Assessment. The correct document is titled *Draft Guide to Transport Impact Assessments* by Transport for NSW. The document has been provided to the authors of the Cardno report for consideration.

In terms of the validity of the use of the draft document, the use of the latest survey data is a best practice approach to traffic engineering. The transport characteristics of workers throughout metropolitan Sydney has changed noticeably in the 33 years between the 1980 and 2013 surveys and the use of the most recent data is an appropriate approach to the assessment of development.

2.3 Justification of Parking Demand

> *Cardno Comment: The traffic report appears to justify the use of 1 space per 55.5m2 for upper floors on the basis that they will be a lower generating land use in comparison to the potential ground floor uses, which are recommended to achieve a parking rate of 1 space per 40m2.*
>
> *Based on Appendix A, the ground floor spaces are identified as commercial / warehouse whilst the upper three floors are identified as commercial. The potential ground floor use of warehouse would be a lower parking generator whilst the above three levels appear to present themselves akin to an office block, which would require 1 space per 40m2.*
>
> *Further justification is required on the recommended parking rates identified in the traffic report.*

Two of the office sites surveyed to inform the RMS Technical Direction 2013/04a that have similar public transport access to the subject site and are likely to be similar in terms of on-site parking demand. The accessibility scores and recorded on-site peak parking demands of the two sites are compared to the subject sites' in **Table 2**.

TABLE 2: ACCESSIBILITY SCORE AND ON-SITE PARKING DEMAND

Site Location	Accessibility Score	Peak On-Site Parking Demand per 100m^2 GFA	Equivalent Floor Area Per Space
Olympic Park, Homebush	140	1.19	84m^2
Norwest/Bella Vista	164	2.08	48m^2
Lord Street, Botany	146	-	-

Further, the journey to work data for each of these locations is provided in **Table 3**. As shown, workers in Botany:

- Have a similar rate of private car use as Homebush and a lower rate than Bella Vista;
- Are more likely to use bus services than workers in either Homebush or Bella Vista;
- Are more likely to walk to work than workers in either Homebush or Bella Vista;
- Are more likely to ride a bike or motorbike to work than workers in either Homebush or Bella Vista.

It is, therefore, reasonable to assume that the on-site parking demand for the commercial areas of the site will be similar to or in the range of one space per 48m^2 to one space per 84m^2. The applied rate of 1 space per 55m^2 for the upper floors of the development is therefore appropriate and commensurate with the context. The use of a higher rate of parking demand for the ground floor commercial floor area provides some flexibility for future development applications on the site and, if it were confined purely to office area, would have a similar 1 space per 55m^2 parking demand.

TABLE 3: JOURNEY TO WORK TRAVEL MODE SUMMARY

Travel Mode	Baulkham Hills (West) Bella Vista	Botany	Homebush
Bicycle	0.27%	0.87%	0.34%
Bus	2.06%	3.52%	0.76%
Car as driver	79.31%	71.48%	71.10%
Car as passenger	4.35%	3.89%	4.24%
Did not go to work	6.78%	5.48%	6.99%
Ferry	0.00%	0.09%	0.00%
Mode not stated	1.23%	1.36%	1.89%
Motorbike	0.38%	0.88%	0.37%
Other mode	0.16%	0.57%	0.34%
Taxi	0.16%	0.33%	0.22%
Train	1.53%	5.58%	8.85%
Tram	0.02%	0.04%	0.00%
Truck	0.31%	1.96%	1.65%
Walked only	0.82%	2.25%	1.77%
Worked at home	2.62%	1.71%	1.48%

3 Bicycle Parking

Cardno Comment: As per previous comments, a review of the Council DCP parking requirement should be undertaken by the applicant. This may result in a change to the bicycle parking requirement.

The bicycle storage requirement has been recalculated as summarised in **Table 4**.

TABLE 4: DCP BICYCLE PARKING REQUIREMENT

Land Use	Car Parking Requirement	Rate	Bicycle Parking Requirement
Food/Drink Premises	9.9 spaces	10%	1 space
Commercial/Office	109.3 spaces		11 spaces
Total			**12 spaces**

4 Traffic Generation

4.1 Generation of Existing Site

> *Cardno Comment: Whilst a reduction in forecast trips is warranted to account for the existing site generation, there is opportunity to establish the actual site generation rather than rely on a generic trip rate.*

The scale of the existing development is not sufficient to justify surveys and it is expected there would be negligible difference between the results of traffic modelling based on a generically calculated discount and a discount determined by surveys.

4.2 Appropriate Traffic Generation Rate

> *Cardno Comment: The survey sites identified in the technical direction are more likely to have better transport accessibility.*
>
> *It is requested that the traffic report either review the transport accessibility available to the Botany site in comparison to the RMS surveyed sites, or adopt the higher 2 trips per 100m2 rate. If the higher trip rate is identified to be more applicable, the traffic assessment would require an update.*

The subject site has been compared to two sites surveyed as part of the report to inform the RMS Technical Direction in **Section 2.3**. Similarly, the sites exhibit traffic generation rates of between 1.48 – 2.75 peak hour trips in the AM and 1.41 – 1.17 peak hour trips in the PM. On this basis, the utilised rates of 1.6 trips in the AM peak and 1.2 trips in the PM peak are appropriate considering the context of the site.

5 Traffic Impact

5.1 Cumulative Impacts

> *Cardno Comment: There is no consideration to the cumulative impact of other developments along Lord Street, including 10-13 Lord Street and 28-40 Lord Street.*

It is not the responsibility of the developer to assess cumulative and traffic impacts of developments that are yet to be either approved or completed.

5.2 Future Year Assessment

> *Similarly, as the application is a planning proposal, a design horizon and future year assessment (e.g. 10 years plus) should be assessed to confirm the intersections can sustain traffic growth and the development.*

The subject proposal has a net traffic generation of approximately 59 trips in the AM peak hour and 43 trips in the PM peak hour. Based on existing traffic conditions, the additional traffic would constitute an additional 1.8% in the AM peak hour and 1.1% in the PM peak hour at the intersection of Lord Street and Botany Road. Considering the extremely low impact of the proposal, it is unclear on what basis future year assessment is necessary.

6 Model Parameters

6.1 Minor Grade Change

> *Cardno Comment: According to the TCS Plan, it is identified as 1%. Therefore the grading should be modified to reflect existing condition.*
>
> *It is however expected that this would result in minimal impact.*

This parameter has been changed to inform the traffic modelling, with the results provided in **Annexure C**.

6.2 Calibration of Queue Lengths

> *Cardno Comment: It is unclear whether the AM queue lengths were validated against the any observed queues. This may result in a differing intersection performance to what has been reported and ultimately,. May result in the need for mitigating measures post development.*

It is unclear how the calibration of queue lengths is of any benefit for the modelling of a signalised intersection when the intersection phasing and general proportion of heavy vehicle traffic is known. As a result, no calibration has been undertaken.

Calibration of queue lengths is typically undertaken for unsignalised intersections to observe the average delay (specifically for right turns out onto high volume two-way roads) and to ensure the SIDRA results accurately reflect the on-site observations, particularly with relation to average delays for turning movements.

6.3 Phasing

> *Cardno Comment: According to the TCS plan, the B and D phase doesn't seem to run at the nominated peak hours. This could have an impact on the results identified in the report.*

See **Section 1.2**.

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

Yours faithfully
McLaren Traffic Engineering

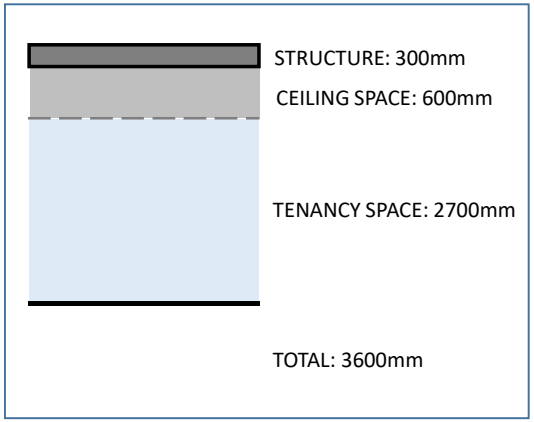
Tom Steal
Senior Traffic Engineer
BE Civil AMAITPM GradIEAust
RMS Accredited Level 1 Road Safety Auditor
RMS Accredited Work Zone Traffic Management Plan Designer and Inspector

ANNEXURE A: SCHEDULE OF AREAS

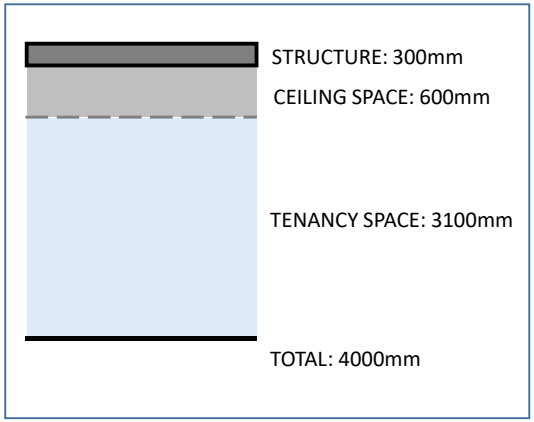
PROPOSED DEVELOPMENT AREAS

Floor	Height	Use	Area
Basement 1	(3m)	Car parking	N/A
Ground	4.0m	Commercial/Warehouse Lobby Retail/Cafe	522sqm 100sqm 99sqm
Level 1	3.6m	Commercial	1350sqm
Level 2	3.6m	Commercial	1250sqm
Level 3	3.6m	Commercial	1150sqm
Roof	1.7m	*Plant/Overrun*	
Total	16.5m		4471sqm

3.6M FLOOR-TO-FLOOR



4.0M FLOOR-TO-FLOOR



KEY DEVELOPMENT CONTROLS

Site Area	2555sqm
Existing FSR (LEP)	1:1
Proposed FSR	1.75:1
Proposed GFA *- Ground Floor Commercial/Warehouse* *- Ground Floor Commercial Lobby* *- Ground Floor Café/Retail/Ancillary* *- Level 1 Commercial* *- Level 2 Commercial* *- Level 3 Commercial*	4471sqm *522sqm* *100sqm* *99sqm* *1350sqm* *1250sqm* *1150sqm*
Existing Height Limit (DCP)	10m
Proposed Height Limit	16.5m
Zone B7 Business Park	No change proposed.
Parking Requirement *- Ground Floor Commercial 1:40* *- Ground Floor Café/Retail 1:28* *- Upper Floor Commercial 1:55*	85 Spaces *13* *4* *68*
Proposed Basement 1 Parking	74 spaces
Proposed Ground Level Parking	18 spaces
Proposed Total Parking	92 Spaces

Note: Refer to Traffic and Parking Impact Assessment for information on parking requirements

ANNEXURE B: EXCERPT FROM TRAFFIX REPORT

MOVEMENT SUMMARY

Site: 1 [Botany Rd x Lord St EX - AM Peak]

Scenario: Existing
Period: AM Peak
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Botany Rd											
2	T1	1028	3.8	0.381	4.7	LOS A	10.5	75.6	0.35	0.31	43.2
3	R2	87	1.2	0.286	12.6	LOS A	1.5	10.3	0.54	0.68	38.9
Approach		1116	3.6	0.381	5.3	LOS A	10.5	75.6	0.36	0.34	42.6
East: Lord St											
4	L2	37	0.0	0.243	32.1	LOS C	2.5	17.6	0.89	0.75	29.3
6	R2	89	4.7	0.243	47.6	LOS D	3.1	22.8	0.92	0.75	26.9
Approach		126	3.3	0.243	43.1	LOS D	3.1	22.8	0.91	0.75	27.5
North: Botany Rd											
7	L2	494	0.6	0.503	12.5	LOS A	16.9	120.2	0.48	0.64	41.2
8	T1	803	5.4	0.503	10.0	LOS A	18.2	133.2	0.53	0.53	36.8
Approach		1297	3.6	0.503	11.0	LOS A	18.2	133.2	0.51	0.57	39.0
All Vehicles		2539	3.6	0.503	10.1	LOS A	18.2	133.2	0.47	0.48	39.1

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.
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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	10.4	LOS B	0.1	0.1	0.42	0.42
All Pedestrians		105	32.4	LOS D			0.68	0.68

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: 1 [Botany Rd x Lord St EX - PM Peak]

Scenario: Existing
Period: PM Peak
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Botany Rd											
2	T1	1006	2.7	0.463	13.8	LOS A	17.0	121.5	0.59	0.52	34.3
3	R2	31	0.0	0.112	24.9	LOS B	1.0	7.3	0.60	0.68	32.2
Approach		1037	2.6	0.463	14.1	LOS A	17.0	121.5	0.59	0.53	34.2
East: Lord St											
4	L2	43	0.0	0.455	41.4	LOS C	11.8	82.3	0.86	0.83	26.2
6	R2	466	0.0	0.455	41.3	LOS C	12.0	84.1	0.86	0.81	28.7
Approach		509	0.0	0.455	41.3	LOS C	12.0	84.1	0.86	0.81	28.5
North: Botany Rd											
7	L2	64	0.0	0.444	18.0	LOS B	15.7	111.8	0.58	0.56	39.6
8	T1	957	2.5	0.444	13.7	LOS A	16.0	114.4	0.59	0.54	34.1
Approach		1021	2.4	0.444	13.9	LOS A	16.0	114.4	0.59	0.54	34.7
All Vehicles		2567	2.0	0.463	19.4	LOS B	17.0	121.5	0.64	0.59	32.4

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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	40.1	LOS E	0.1	0.1	0.82	0.82
P2	East Full Crossing	53	14.0	LOS B	0.1	0.1	0.48	0.48
All Pedestrians		105	27.1	LOS C			0.65	0.65

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: 1 [Botany Rd x Lord St EX - Weekend]

Scenario: Existing
Period: PM Peak
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

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: Botany Rd											
2	T1	698	4.2	0.240	4.2	LOS A	5.7	41.3	0.31	0.27	43.9
3	R2	28	0.0	0.056	9.6	LOS A	0.4	2.9	0.39	0.61	40.9
Approach		726	4.1	0.240	4.4	LOS A	5.7	41.3	0.31	0.28	43.7
East: Lord St											
4	L2	28	0.0	0.282	40.1	LOS C	3.2	23.1	0.92	0.76	26.6
6	R2	114	3.7	0.282	49.7	LOS D	3.7	26.5	0.93	0.76	26.4
Approach		142	3.0	0.282	47.8	LOS D	3.7	26.5	0.93	0.76	26.4
North: Botany Rd											
7	L2	114	5.6	0.317	13.1	LOS A	9.4	68.7	0.44	0.48	42.1
8	T1	679	5.7	0.317	8.7	LOS A	9.6	70.7	0.45	0.43	38.2
Approach		793	5.7	0.317	9.4	LOS A	9.6	70.7	0.45	0.44	39.1
All Vehicles		1661	4.8	0.317	10.5	LOS A	9.6	70.7	0.43	0.40	38.2

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.
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	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	10.4	LOS B	0.1	0.1	0.42	0.42
All Pedestrians		105	32.4	LOS D			0.68	0.68

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: 1 [Botany Rd x Lord St FU - AM Peak]

Scenario: Existing
Period: AM Peak
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Botany Rd											
2	T1	1028	3.8	0.383	4.7	LOS A	10.6	76.4	0.35	0.31	43.2
3	R2	96	1.1	0.323	12.9	LOS A	1.7	11.8	0.56	0.69	39.1
Approach		1124	3.6	0.383	5.4	LOS A	10.6	76.4	0.36	0.34	42.6
East: Lord St											
4	L2	44	0.0	0.316	35.0	LOS C	3.2	23.0	0.94	0.77	28.8
6	R2	117	3.6	0.316	49.2	LOS D	4.1	29.9	0.94	0.77	27.1
Approach		161	2.6	0.316	45.3	LOS D	4.1	29.9	0.94	0.77	27.5
North: Botany Rd											
7	L2	526	0.6	0.514	12.2	LOS A	17.2	122.1	0.47	0.65	41.6
8	T1	803	5.4	0.514	10.1	LOS A	18.8	137.5	0.53	0.53	36.8
Approach		1329	3.5	0.514	11.0	LOS A	18.8	137.5	0.51	0.58	39.3
All Vehicles		2615	3.5	0.514	10.7	LOS A	18.8	137.5	0.47	0.49	38.9

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.
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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	10.4	LOS B	0.1	0.1	0.42	0.42
All Pedestrians		105	32.4	LOS D			0.68	0.68

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: 1 [Botany Rd x Lord St FU - PM Peak]

Scenario: Existing
Period: PM Peak
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Botany Rd											
2	T1	1006	2.7	0.450	13.2	LOS A	16.2	116.3	0.57	0.51	34.7
3	R2	45	0.0	0.158	20.1	LOS B	1.1	8.0	0.69	0.69	35.9
Approach		1052	2.6	0.450	13.5	LOS A	16.2	116.3	0.58	0.52	34.8
East: Lord St											
4	L2	59	0.0	0.543	45.3	LOS D	14.3	100.2	0.89	0.85	25.5
6	R2	532	0.0	0.543	44.2	LOS D	14.5	101.5	0.90	0.83	28.2
Approach		591	0.0	0.543	44.3	LOS D	14.5	101.5	0.89	0.83	28.0
North: Botany Rd											
7	L2	124	0.0	0.554	25.5	LOS B	21.2	150.6	0.73	0.69	37.1
8	T1	957	2.5	0.554	21.2	LOS B	21.3	152.7	0.73	0.67	29.1
Approach		1081	2.2	0.554	21.7	LOS B	21.3	152.7	0.73	0.68	30.4
All Vehicles		2723	1.9	0.554	23.4	LOS B	21.3	152.7	0.71	0.65	30.8

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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	40.9	LOS E	0.1	0.1	0.83	0.83
P2	East Full Crossing	53	19.9	LOS B	0.1	0.1	0.58	0.58
All Pedestrians		105	30.4	LOS D			0.70	0.70

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: 1 [Botany Rd x Lord St FU - Weekend]

Scenario: Existing
Period: PM Peak
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

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: Botany Rd											
2	T1	698	4.2	0.274	6.2	LOS A	7.5	54.5	0.37	0.33	41.4
3	R2	52	0.0	0.119	12.7	LOS A	0.9	6.6	0.49	0.66	41.1
Approach		749	3.9	0.274	6.7	LOS A	7.5	54.5	0.38	0.35	41.4
East: Lord St											
4	L2	52	0.0	0.380	47.4	LOS D	6.3	44.8	0.92	0.80	25.5
6	R2	207	2.0	0.380	50.2	LOS D	6.6	47.3	0.92	0.79	27.4
Approach		259	1.6	0.380	49.7	LOS D	6.6	47.3	0.92	0.79	27.0
North: Botany Rd											
7	L2	207	3.0	0.386	16.6	LOS B	12.6	91.8	0.53	0.61	41.5
8	T1	679	5.7	0.386	12.5	LOS A	13.0	95.4	0.54	0.53	34.9
Approach		886	5.1	0.386	13.4	LOS A	13.0	95.4	0.54	0.55	37.1
All Vehicles		1895	4.2	0.386	15.7	LOS B	13.0	95.4	0.53	0.50	35.6

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 of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	52.4	LOS E	0.2	0.2	0.94	0.94
P2	East Full Crossing	53	13.6	LOS B	0.1	0.1	0.48	0.48
All Pedestrians		105	33.0	LOS D			0.71	0.71

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.

ANNEXURE C: SIDRA INTERSECTION RESULTS

MOVEMENT SUMMARY

Site: 1 [Lord St/Botany Road Existing AM]

Lord St/Botany Road Existing
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 123 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Botany Road South												
2	T1	1273	3.8	0.536	3.6	LOS A	14.7	106.1	0.32	0.29	0.32	55.1
3	R2	78	1.2	0.571	19.5	LOS B	2.8	19.9	0.57	0.76	0.60	42.2
Approach		1351	3.6	0.571	4.5	LOS A	14.7	106.1	0.33	0.32	0.34	53.9
East: Lord Street												
4	L2	40	0.0	0.583	49.9	LOS D	5.6	39.9	1.00	0.81	1.08	27.3
6	R2	180	4.7	0.583	58.1	LOS E	6.5	47.4	1.00	0.80	1.03	25.2
Approach		220	3.8	0.583	56.6	LOS E	6.5	47.4	1.00	0.80	1.04	25.6
North: Botany Road North												
7	L2	520	0.6	0.552	8.5	LOS A	13.2	94.4	0.35	0.57	0.38	51.6
8	T1	1147	5.4	0.552	3.8	LOS A	16.5	121.1	0.36	0.40	0.37	53.6
Approach		1667	3.9	0.552	5.2	LOS A	16.5	121.1	0.36	0.46	0.37	52.9
All Vehicles		3238	3.8	0.583	8.4	LOS A	16.5	121.1	0.39	0.42	0.40	49.0

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.
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
P1	South Full Crossing	50	56.7	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	50	5.3	LOS A	0.1	0.1	0.29	0.29
All Pedestrians		100	31.0	LOS D			0.63	0.63

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.

LANE SUMMARY

Site: 1 [Lord St/Botany Road Existing AM]

Lord St/Botany Road Existing
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 123 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Botany Road South													
Lane 1	781	3.8	1457[1]	0.536	100	3.9	LOS A	14.7	106.1	Short	60	0.0	NA
Lane 2	492	3.8	918[1]	0.536	100	3.1	LOS A	7.3	52.8	Full	330	0.0	0.0
Lane 3	78	1.2	137	0.571	100	19.5	LOS B	2.8	19.9	Short	25	0.0	NA
Approach	1351	3.6		0.571		4.5	LOS A	14.7	106.1				
East: Lord Street													
Lane 1	111	3.0	190	0.583	100	50.0	LOS D	5.6	39.9	Short (P)	40	0.0	NA
Lane 2	109	4.7	188	0.583	100	63.3	LOS E	6.5	47.4	Full	500	0.0	0.0
Approach	220	3.8		0.583		56.6	LOS E	6.5	47.4				
North: Botany Road North													
Lane 1	835	2.4	1514	0.552	100	6.4	LOS A	13.2	94.4	Full	320	0.0	0.0
Lane 2	832	5.4	1508	0.552	100	4.1	LOS A	16.5	121.1	Full	320	0.0	0.0
Approach	1667	3.9		0.552		5.2	LOS A	16.5	121.1				
Intersection	3238	3.8		0.583		8.4	LOS A	16.5	121.1				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

PHASING SUMMARY

Site: 1 [Lord St/Botany Road Existing AM]

Lord St/Botany Road Existing
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 123 seconds (Site User-Given Phase Times)

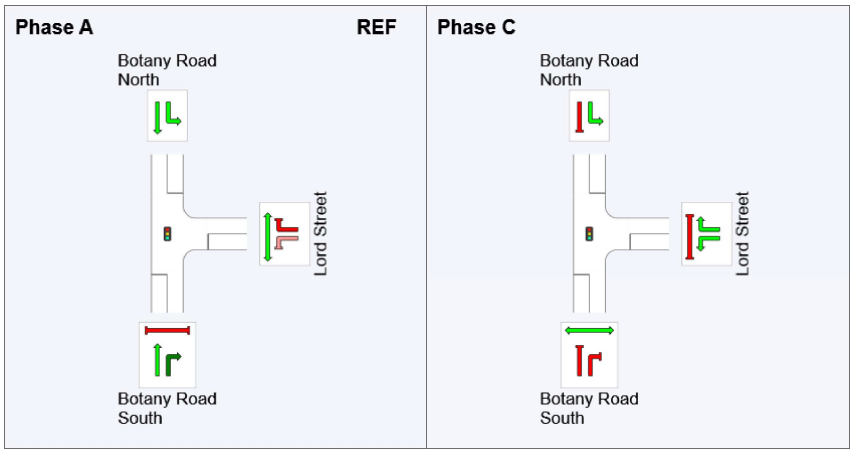
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Reduced Phasing
Reference Phase: Phase A
Input Phase Sequence: A, C
Output Phase Sequence: A, C

Phase Timing Summary

Phase	A	C
Phase Change Time (sec)	0	104
Green Time (sec)	100	13
Phase Time (sec)	106	17
Phase Split	86%	14%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

MOVEMENT SUMMARY

Site: 1 [Lord St/Botany Road Existing AM + Subject Site]

Lord St/Botany Road Existing AM + Subject Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 123 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Botany Road South												
2	T1	1273	3.8	0.568	3.6	LOS A	15.8	113.9	0.33	0.30	0.33	55.0
3	R2	86	1.2	0.673	29.2	LOS C	4.1	28.8	0.66	0.85	0.83	37.2
Approach		1359	3.6	0.673	5.3	LOS A	15.8	113.9	0.35	0.33	0.36	53.0
East: Lord Street												
4	L2	41	0.0	0.607	51.4	LOS D	5.9	42.1	1.00	0.82	1.11	26.9
6	R2	187	4.7	0.607	58.9	LOS E	6.8	49.5	1.00	0.81	1.06	25.1
Approach		228	3.9	0.607	57.5	LOS E	6.8	49.5	1.00	0.81	1.07	25.4
North: Botany Road North												
7	L2	566	0.6	0.567	8.3	LOS A	13.5	96.0	0.36	0.58	0.38	51.6
8	T1	1151	5.4	0.567	3.8	LOS A	17.4	127.6	0.37	0.41	0.38	53.6
Approach		1717	3.8	0.567	5.3	LOS A	17.4	127.6	0.37	0.47	0.38	52.8
All Vehicles		3304	3.7	0.673	8.9	LOS A	17.4	127.6	0.40	0.44	0.42	48.6

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 of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	55.8	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	50	5.3	LOS A	0.1	0.1	0.29	0.29
All Pedestrians		100	30.5	LOS D			0.62	0.62

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.

LANE SUMMARY

Site: 1 [Lord St/Botany Road Existing AM + Subject Site]

Lord St/Botany Road Existing AM + Subject Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 123 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Botany Road South													
Lane 1	813	3.8	1432[1]	0.568	100	4.0	LOS A	15.8	113.9	Short	60	0.0	NA
Lane 2	460	3.8	809[1]	0.568	100	3.0	LOS A	6.7	48.2	Full	330	0.0	0.0
Lane 3	86	1.2	128	0.673	100	29.2	LOS C	4.1	28.8	Short	25	0.0	NA
Approach	1359	3.6		0.673		5.3	LOS A	15.8	113.9				
East: Lord Street													
Lane 1	115	3.0	189	0.607	100	51.4	LOS D	5.9	42.1	Short (P)	40	0.0	NA
Lane 2	113	4.7	187	0.607	100	63.7	LOS E	6.8	49.5	Full	500	0.0	0.0
Approach	228	3.9		0.607		57.5	LOS E	6.8	49.5				
North: Botany Road North													
Lane 1	861	2.2	1518	0.567	100	6.4	LOS A	13.5	96.0	Full	320	0.0	0.0
Lane 2	856	5.4	1508	0.567	100	4.2	LOS A	17.4	127.6	Full	320	0.0	0.0
Approach	1717	3.8		0.567		5.3	LOS A	17.4	127.6				
Intersection	3304	3.7		0.673		8.9	LOS A	17.4	127.6				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

PHASING SUMMARY

Site: 1 [Lord St/Botany Road Existing AM + Subject Site]

Lord St/Botany Road Existing AM + Subject Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 123 seconds (Site User-Given Phase Times)

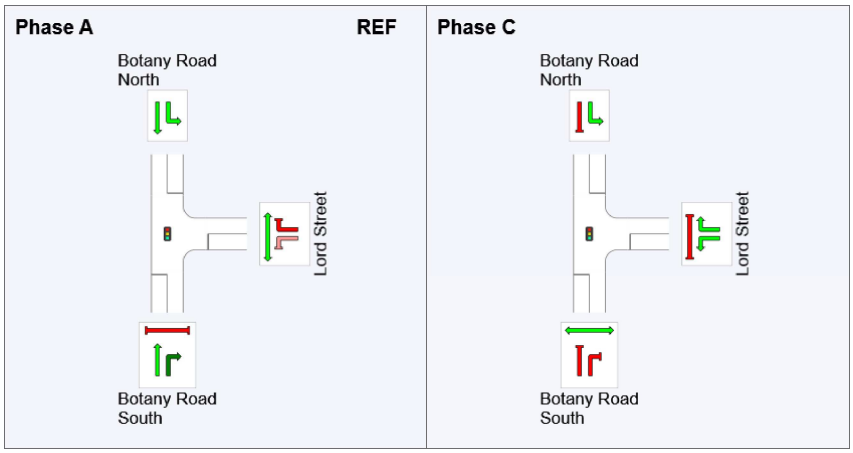
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Reduced Phasing
Reference Phase: Phase A
Input Phase Sequence: A, C
Output Phase Sequence: A, C

Phase Timing Summary

Phase	A	C
Phase Change Time (sec)	0	104
Green Time (sec)	100	13
Phase Time (sec)	106	17
Phase Split	86%	14%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

MOVEMENT SUMMARY

Site: 1 [Lord St/Botany Road Existing PM]

Lord St/Botany Road Existing PM
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Botany Road South												
2	T1	1497	2.7	0.880	24.2	LOS B	27.3	195.9	0.62	0.72	0.82	37.3
3	R2	38	0.0	0.259	25.2	LOS B	1.2	8.2	0.68	0.74	0.68	39.1
Approach		1535	2.6	0.880	24.3	LOS B	27.3	195.9	0.62	0.72	0.81	37.4
East: Lord Street												
4	L2	59	0.0	0.857	53.7	LOS D	16.4	114.9	1.00	1.03	1.61	26.4
6	R2	607	0.0	0.857	51.8	LOS D	16.4	114.9	1.00	1.00	1.44	26.6
Approach		666	0.0	0.857	52.0	LOS D	16.4	114.9	1.00	1.01	1.45	26.6
North: Botany Road North												
7	L2	78	0.0	0.629	15.2	LOS B	19.6	139.9	0.63	0.61	0.70	48.5
8	T1	1481	2.5	0.629	9.7	LOS A	19.8	141.9	0.63	0.59	0.67	48.1
Approach		1559	2.4	0.629	9.9	LOS A	19.8	141.9	0.63	0.59	0.67	48.1
All Vehicles		3760	2.1	0.880	23.2	LOS B	27.3	195.9	0.69	0.72	0.87	37.5

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.
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
P1	South Full Crossing	50	39.3	LOS D	0.1	0.1	0.94	0.94
P2	East Full Crossing	50	10.8	LOS B	0.1	0.1	0.49	0.49
All Pedestrians		100	25.0	LOS C			0.71	0.71

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.

LANE SUMMARY

Site: 1 [Lord St/Botany Road Existing PM]

Lord St/Botany Road Existing PM
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Botany Road South													
Lane 1	749	2.7	852[1]	0.880	100	24.2	LOS B	27.3	195.9	Short	60	0.0	NA
Lane 2	748	2.7	850[1]	0.880	100	24.3	LOS B	27.3	195.8	Full	330	0.0	0.0
Lane 3	38	0.0	147	0.259	100	25.2	LOS B	1.2	8.2	Short	25	0.0	NA
Approach	1535	2.6		0.880		24.3	LOS B	27.3	195.9				
East: Lord Street													
Lane 1	335	0.0	391	0.857	100	53.7	LOS D	16.4	114.9	Short (P)	75	0.0	NA
Lane 2	331	0.0	386	0.857	100	50.3	LOS D	16.3	114.2	Full	500	0.0	0.0
Approach	666	0.0		0.857		52.0	LOS D	16.4	114.9				
North: Botany Road North													
Lane 1	780	2.3	1241	0.629	100	10.2	LOS A	19.6	139.9	Full	320	0.0	0.0
Lane 2	779	2.5	1238	0.629	100	9.7	LOS A	19.8	141.9	Full	320	0.0	0.0
Approach	1559	2.4		0.629		9.9	LOS A	19.8	141.9				
Intersection	3760	2.1		0.880		23.2	LOS B	27.3	195.9				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

PHASING SUMMARY

Site: 1 [Lord St/Botany Road Existing PM]

Lord St/Botany Road Existing PM
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

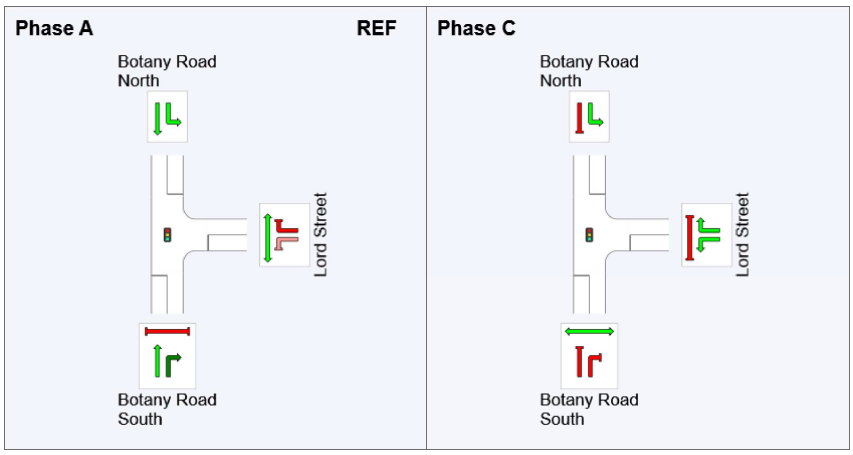
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Reduced Phasing
Reference Phase: Phase A
Input Phase Sequence: A, C
Output Phase Sequence: A, C

Phase Timing Summary

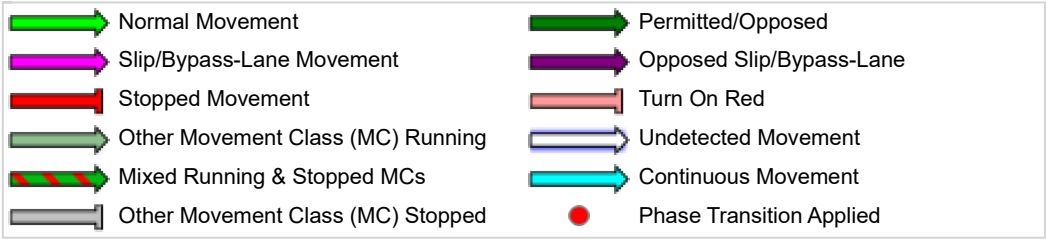
Phase	A	C
Phase Change Time (sec)	0	65
Green Time (sec)	59	19
Phase Time (sec)	65	25
Phase Split	72%	28%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



MOVEMENT SUMMARY

Site: 1 [Lord St/Botany Road Existing PM + Subject Site]

Lord St/Botany Road Existing PM + Subject Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Botany Road South												
2	T1	1497	2.7	0.889	26.6	LOS B	28.6	205.0	0.62	0.74	0.85	36.0
3	R2	40	0.0	0.274	25.4	LOS B	1.2	8.7	0.69	0.74	0.69	39.0
Approach		1537	2.6	0.889	26.6	LOS B	28.6	205.0	0.62	0.74	0.84	36.1
East: Lord Street												
4	L2	63	0.0	0.902	61.0	LOS E	19.1	133.6	1.00	1.10	1.76	24.8
6	R2	642	0.0	0.902	58.7	LOS E	19.1	133.6	1.00	1.08	1.59	25.1
Approach		705	0.0	0.902	58.9	LOS E	19.1	133.6	1.00	1.08	1.60	25.1
North: Botany Road North												
7	L2	82	0.0	0.630	15.2	LOS B	19.7	140.4	0.63	0.61	0.70	48.5
8	T1	1481	2.5	0.630	9.7	LOS A	19.9	142.5	0.63	0.59	0.67	48.0
Approach		1563	2.4	0.630	10.0	LOS A	19.9	142.5	0.63	0.59	0.67	48.1
All Vehicles		3805	2.0	0.902	25.8	LOS B	28.6	205.0	0.70	0.74	0.91	36.1

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.
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
P1	South Full Crossing	50	39.3	LOS D	0.1	0.1	0.94	0.94
P2	East Full Crossing	50	10.8	LOS B	0.1	0.1	0.49	0.49
All Pedestrians		100	25.0	LOS C			0.71	0.71

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.

LANE SUMMARY

Site: 1 [Lord St/Botany Road Existing PM + Subject Site]

Lord St/Botany Road Existing PM + Subject Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Botany Road South													
Lane 1	749	2.7	843[1]	0.889	100	26.6	LOS B	28.6	205.0	Short	60	0.0	NA
Lane 2	748	2.7	841[1]	0.889	100	26.7	LOS B	28.6	204.9	Full	330	0.0	0.0
Lane 3	40	0.0	146	0.274	100	25.4	LOS B	1.2	8.7	Short	25	0.0	NA
Approach	1537	2.6		0.889		26.6	LOS B	28.6	205.0				
East: Lord Street													
Lane 1	355	0.0	393	0.902	100	61.0	LOS E	19.1	133.6	Short (P)	75	0.0	NA
Lane 2	350	0.0	388	0.902	100	56.8	LOS E	18.8	131.4	Full	500	0.0	0.0
Approach	705	0.0		0.902		58.9	LOS E	19.1	133.6				
North: Botany Road North													
Lane 1	782	2.2	1241	0.630	100	10.2	LOS A	19.7	140.4	Full	320	0.0	0.0
Lane 2	781	2.5	1238	0.630	100	9.7	LOS A	19.9	142.5	Full	320	0.0	0.0
Approach	1563	2.4		0.630		10.0	LOS A	19.9	142.5				
Intersection	3805	2.0		0.902		25.8	LOS B	28.6	205.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

PHASING SUMMARY

Site: 1 [Lord St/Botany Road Existing PM + Subject Site]

Lord St/Botany Road Existing PM + Subject Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

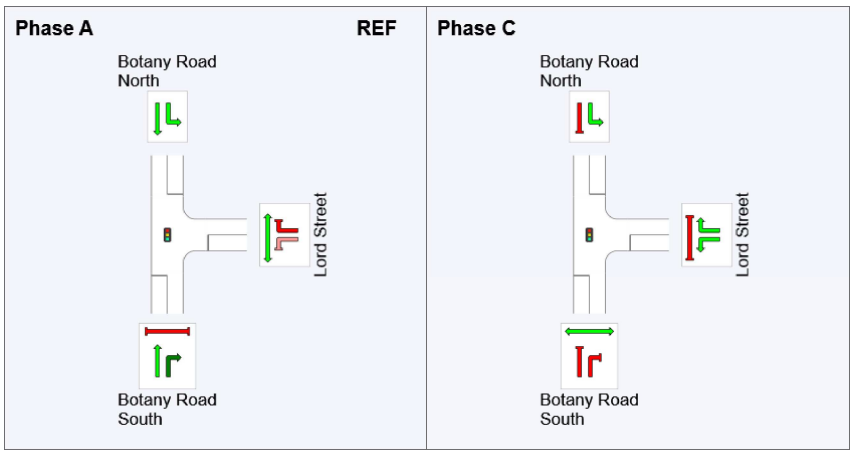
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Reduced Phasing
Reference Phase: Phase A
Input Phase Sequence: A, C
Output Phase Sequence: A, C

Phase Timing Summary

Phase	A	C
Phase Change Time (sec)	0	65
Green Time (sec)	59	19
Phase Time (sec)	65	25
Phase Split	72%	28%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase