

Traffic Impact Assessment Report

Planning Proposal
400-404 Cabramatta Road West, Cabramatta

Ref: 0123r01v3
29/02/16

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1 Introduction

Ason Group has been engaged by Tcon Constructions Pty Ltd to prepare a Traffic Impact Assessment (**TIA**) report to support a Planning Proposal (the **Proposal**) that seeks to initiate the preparation of a Local Environmental Plan amendment for the land at 400-404 Cabramatta Road West, Cabramatta (the **Site**). The Site is located within the local government area of Fairfield City Council (**Council**).

In this regard, JBA Urban Planning Consultants has prepared a Planning Proposal report to assist Council in preparing a Planning Proposal for the rezoning of the Site in accordance with Section 55 of the *Environmental Planning and Assessment Act 1979*.

The current principal planning instrument for the subject site is the *Fairfield Local Environmental Plan 2013 (FLEP 2013)*, which zones the land R2 Low Density Residential. The FLEP 2013 prescribes a height standard of 9 metres (3 storeys) and a floor space ratio (**FSR**) standard of 0.45:1.

The intended outcome of this Planning Proposal is to amend the FLEP 2013 as follows:

- Amendment to the permitted use of the site for residential flat buildings and non-residential uses.
- Amendment to the height limit to facilitate a maximum building height of 27 metres.
- Amendment to the FSR standard to a maximum 2.1:1.
- For the purpose of assessing the implications of the Proposal – including a high-level assessment of traffic impacts – a conceptual medium-high density residential and commercial scheme (the **Concept Plan**) has been developed. In summary, the Concept Plan consists of 6 residential flat buildings providing a total of approximately 340 units and 1,200m² of commercial floor space.
- Internal access road running generally north-south through the site and connecting with Links Avenue at its southern end.
- Two levels of basement car parking to satisfy Council's minimum parking requirements.

This TIA report has been prepared to determine the potential access, traffic and parking implications of the Proposal, and to specifically identify any potential impacts to the local traffic and transport environment arising from the Proposal, and means by which any such impacts can be appropriately mitigated.

As part of this TIA study, Ason Group has:

- Visited the Site to observe the operation of the local traffic network.
- Commissioned and reviewed traffic surveys to quantify flows on the adjacent road network.
- Assessed Site connectivity with regard to local and sub-regional facilities and services, and specifically public transport and pedestrian accessibility.
- Determined the traffic generating potential of the Proposal, and assessed potential impacts arising from that traffic generation distributed to the adjacent road network.
- Examined the design of on-site parking and service vehicle facilities.
- Reviewed the key development controls, and traffic and transport guidelines and assessment criteria, pertinent to the Site and the Proposal, including:
 - Fairfield City Wide Development Control Plan 2013 (**DCP 2013**),
 - RMS (formerly RTA) Guide to Traffic Generating Developments (**RMS Guide**),
 - RMS Technical Direction 2013/04a – Guide to Traffic Generating Developments; Updated traffic surveys (**RMS Guide Update**),
 - Austroads Guide to Road Design Part 4A Unsignalised and Signalised Intersections (**Austroads GRD4A**),
 - Australian Standard 4299: Adaptable housing (**AS4299**),
 - Australian Standard 2890.1: Parking Facilities – Off Street Car Parking (**AS2890.1**),
 - Australian Standard 2890.2: Parking Facilities – Off Street Commercial Vehicle Facilities (**AS2890.2**),
 - Australian Standard 2890.6: Parking Facilities – Off Street Parking for People with Disabilities (**AS2890.6**).

2 The Existing Site

2.1 Location

The Site is located at 400-404 Cabramatta Road West, Cabramatta and enjoys a corner block with frontage to both Cabramatta Road West to the north and Orange Grove Road (Cumberland Highway) to the west. The Site has a total area of 15,349m² and is currently vacant with no recent development history.

The Site in its sub-regional and local context is shown on the Location Plan & Site Plan at **Figure 1**.

2.2 Road Network

With reference to Figure 1, the key local roads influenced by the proposal include:

Cabramatta Road West – an RMS classified sub-arterial road that generally runs in an east-west direction between Elizabeth Drive to the west and Cabramatta Road East to the east. The road generally carries 2 lanes of traffic in each direction and is subject to a 60 km/h speed zoning. Cabramatta Road West intersects the Cumberland Highway adjacent to the northwest corner of the site, in the form of a major signalised intersection. Parking along Cabramatta Road west is generally restricted within proximity of the site. The road provides a key access route to Cabramatta Railway Station, which has parking facilities for commuters using the rail network. The Cabramatta Road West – Elizabeth Drive corridor connects the Site to the proposed Western Sydney Airport, which is to be located at Badgerys Creek approximately 20 kilometres to the west of the Site. It is anticipated that 30,000 jobs could be generated directly by the airport's operation by 2060, and indirect employment around the airport site could contribute an additional 30,000 jobs.

Cumberland Highway (Orange Grove Road / Joseph Street) – an RMS classified arterial road that runs in a north-south direction, providing a key road link between Parramatta to the north and Liverpool to the south. The road generally carries 2 lanes of traffic in each direction along a divided carriageway and is subject to a 70 km/h speed zoning. The Cumberland Highway intersects with Links Avenue to the southwest of the site, in the form of a signalised intersection. It is expected that the majority of traffic generated by the Proposal would use this intersection and Cumberland Highway to access the wider road network.

Links Avenue – a local road linking to the Cumberland Highway that provides access to the wider road network for residents fronting Links Avenue, Stafford Street, Panorama Street and View Street. The road generally carries 2 lanes in both directions and is subject to a 50 km/h speed zoning. Parking is generally unrestricted along Links Avenue with “No Stopping” restrictions in operation adjacent to the intersection with the Cumberland Highway.



Figure 1: Location & Site Plan

2.3 Public & Active Transport

2.3.1 Overview

The following summarises the facilities – including public transport services – within proximity of the Site. Reference should be made to the Public Transport and Cycling routes plan shown in **Figure 2**.

2.3.2 Bus services

With regard to bus travel, the *Integrated Public Transport Service Planning Guidelines, Sydney Metropolitan Area* (Transport for NSW, December 2013) state that bus services influence the travel mode choices of areas within 400 metres walk (approximately 5 minutes) of a bus stop. In this regard – and with reference to Figure 2 – it can be seen that there are a number of bus stops within 400 metres of the site, which provide access to local, sub-regional and regional (T-Way and Metrobus) bus services running on the Cumberland Highway and/or Cabramatta Road West. Of note are the 815 and 816 services, which provide direct access to Cabramatta railway station with weekday services every 15 minutes during the commuter peak hours. In addition, the 801 and 819 services provide access to Liverpool town centre and railway station to the south of the site also with weekday services every 15 minutes during the commuter peak hours.

2.3.3 Rail services

With reference to Figure 2, the Cabramatta Station & Transport Interchange is located approximately 1.8 kilometres to the northwest of the Site and provides access to the metropolitan rail system as well as connections to other sub-regional and regional bus services. It is noted that the interchange can be accessed via a bus trip of about 7-8 minutes using the 815 / 816 services on Cabramatta Road.

Cabramatta Station is serviced by the T2 Inner West & South Line, T3 Bankstown Line and T5 Cumberland Line and provides direct services to key Sydney metropolitan centres including Fairfield, Bankstown, Liverpool, Campbelltown, Parramatta and Sydney CBD. Train frequencies are high across the weekday, with significant services available in commuter peak periods. In addition, interchanges at Granville, Lidcombe and Redfern provide access to the T1 Northern & Western Line, T4 Eastern Suburbs and Illawarra Line, T7 Olympic Park Line.

2.3.4 Walking and Cycling

With regard to cycling, Figure 2 shows the site has access to on-street bicycle routes to the north east of the site, with routes to the Cabramatta Town Centre and railway station. An off-road trail is provided along the Cabramatta Creek, which provide connections to recreational and sporting facilities near the Cabramatta Rugby Leagues Club.

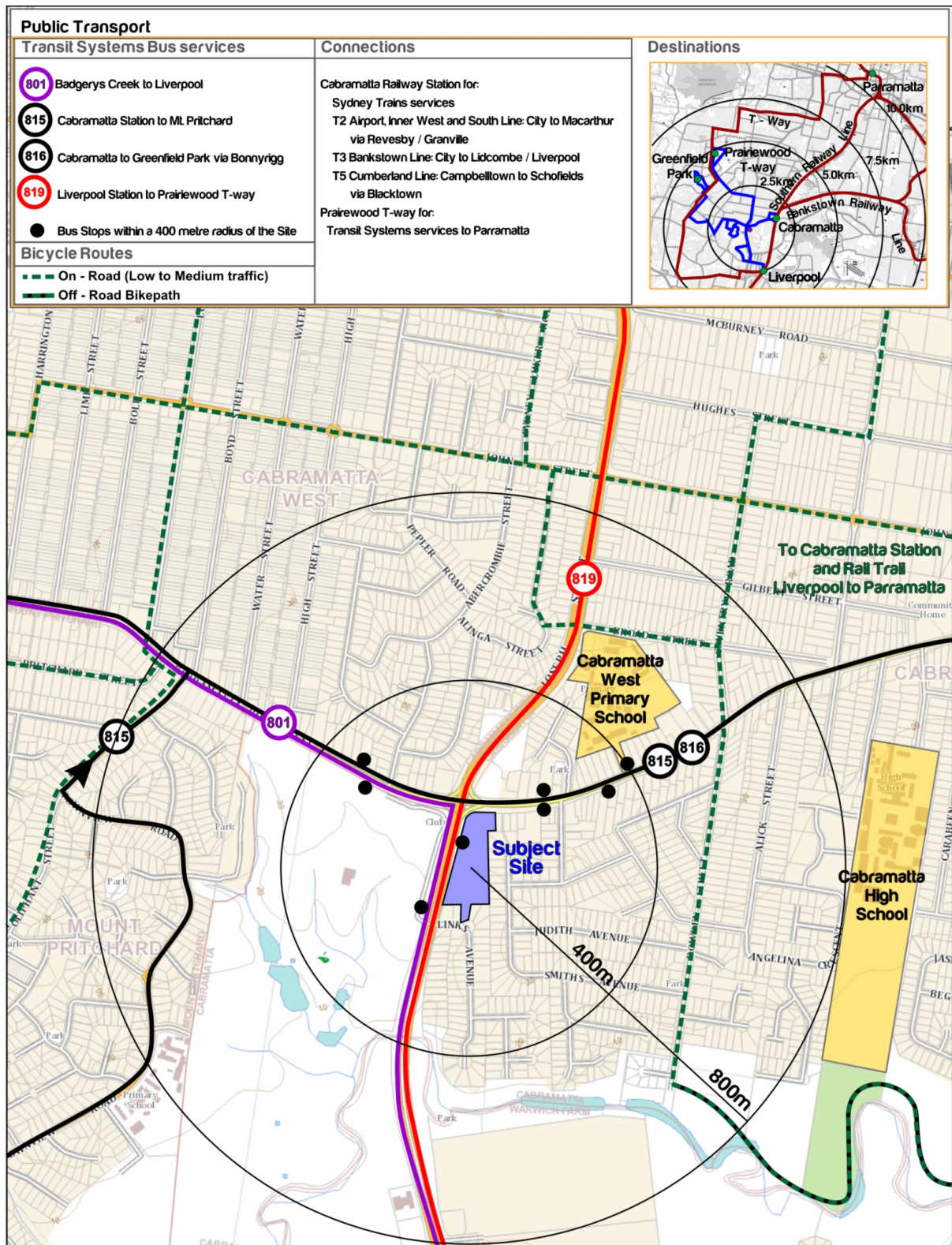


Figure 2: Public Transport and Cycling Routes

With regard to walking, all the streets in the area have footpaths and there are pedestrian crossings on all approaches to the signalised intersection of Cabramatta Road West with the Cumberland Highway, which – importantly – provides a safe pedestrian connection between the site and bus stops for all the services operating in the area. It is noteworthy that the site is well located with regard to the local schools of Cabramatta West Public School to the northeast and Cabramatta High School to the east.

In summary, the site is well served by a number of bus routes that provide direct access to the town centres of Cabramatta and Liverpool. The Cabramatta services provide onward connections at Cabramatta railway station to key Sydney metropolitan centres such as Campbelltown, Liverpool, Fairfield, Bankstown, Parramatta and the Sydney CBD. These bus routes are easily accessible with stops (in both directions) generally adjacent to the site on Cabramatta Road West and the Cumberland Highway and well within the target walk distance of 400 metres. Cycling routes are situated near the Site with on-street routes to the railway station for commuters and off-street routes along the Cabramatta Creek for recreational and leisure activities.

2.4 Local Traffic

2.4.1 Existing Traffic Flows

In order to determine local traffic flows, surveys were undertaken in August 2015 at the following key intersections:

- Cumberland Highway with Cabramatta Road West, and
- Cumberland Highway with Links Avenue.

Importantly, these intersections have been selected as they represent the locations that have significant potential to be impacted by the Proposal, as they provide the primary access paths between the Site and the broader arterial road network.

The survey data is provided in full in **Appendix A** and the peak hour volumes are summarised in **Figure 3**.

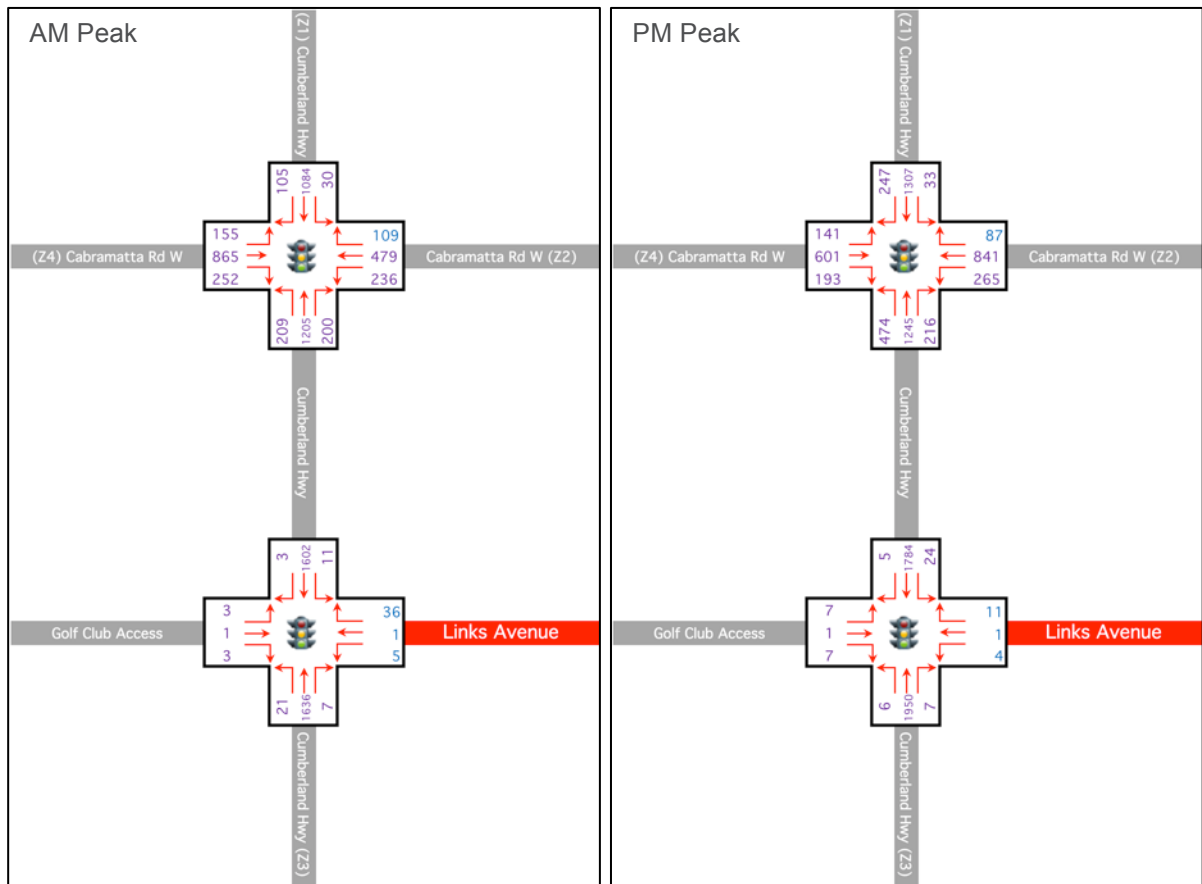


Figure 3: 2015 Peak Hour Traffic Flows

2.5 Network Performance

The performance of the key intersections have been analysed using the SIDRA Intersection modelling program. SIDRA modelling outputs a range of performance measures, in particular:

- **Degree of Saturation (DOS)** – The DOS is defined as the ratio of demand (arrival) flow to capacity. The DOS is used to measure the performance of intersections where a value of 1.0 represents an intersection at theoretical capacity, above 1.0 represent over-saturated conditions (demand flows exceed capacity) and degrees of saturation below 1.0 represent under-saturated conditions (demand flows are below capacity). As the performance of an intersection approaches DOS of 1.0, queue lengths and delays increase rapidly. It is usual to attempt to keep DOS to less than 0.9, with satisfactory intersection operation generally achieved with a DOS below 0.8.
- **Average Vehicle Delay (AVD)** – Delay represents the difference between interrupted and uninterrupted travel times through an intersection and is measured in seconds per vehicle. Delays include queued vehicles accelerating and decelerating from/to the intersection stop lines,

as well as general delays to all vehicles travelling through the intersection. The AVD (or average delay per vehicle in seconds) for intersections also provides a measure of the operational performance of an intersection and is used to determine an intersection's Level of Service (see below). For signalised intersections, the AVD reported relates to the average of all vehicle movements through the intersection. For priority (Give Way, Stop & Roundabout controlled) intersections, the AVD reported is that for the movement with the highest AVD.

- *Level of Service (LOS)* – This is a comparative measure that provides an indication of the operating performance, based on AVD. For signalised and roundabout intersections, LOS is based on the average delay to all vehicles, while at priority controlled intersections LOS is based on the worst approach delay. The following table provides a recommended baseline for assessment as per the RMS Guide:

Level of Service	Average Delay per Vehicle (sec/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

- *Queue Length* – Queue length is the number of vehicles waiting at the stop line, and in this assessment is based on the 95th percentile back of queue length in metres, that is the queue length that is exceeded only 5% of the time. It is measured as the number of queued vehicles per traffic lane at the start of the green period (signals) or queued vehicles in each 'gap acceptance cycle' for roundabouts and priority intersections (i.e. the longest period in which no vehicles from the minor movement can enter the opposing primary flow).

The results of the 'Existing Scenario' SIDRA analysis are summarised in **Table 1**; relevant SIDRA outputs and intersection layouts are attached to this report at **Appendix B**.

Table 1: Existing Intersection Performance

Intersection	Scenario	Period	Degree of Saturation (DOS)	Average Vehicle Delay (AVD)	Level of Service (LOS)
Cumberland Hwy / Cabramatta Rd West	Existing	AM	0.925	41.9	C
		PM	1.107	71.9	F
Cumberland Hwy / Links Avenue	Existing	AM	0.659	2.6	A
		PM	0.701	1.4	A

The results demonstrate that the operation of the intersection at Cumberland Highway / Cabramatta Road West is operating at a satisfactory LOS of C during the morning peak hour; however, it is noteworthy that with an average delay of 41.9 seconds per vehicle, this is a 'High' C, with LOS changing D when average delays exceed 42 seconds. The results also show that the intersection is operating above its theoretical capacity with a LOS of F during the evening peak hour. The intersection of Cumberland Highway and Links Avenue currently performs satisfactorily with minimal average delays and operating at a LOS of A during both peak hours.

3 Proposed RMS Upgrades

3.1 Summary of Upgrades

With reference to **Figure 4**, as part of the RMS Pinch Point Program, a proposal is currently underway to improve safety and ease congestion at the intersection of Cumberland Highway with Cabramatta Road West and Cumberland Highway with Links Avenue – key intersections affecting access to/from the Site.

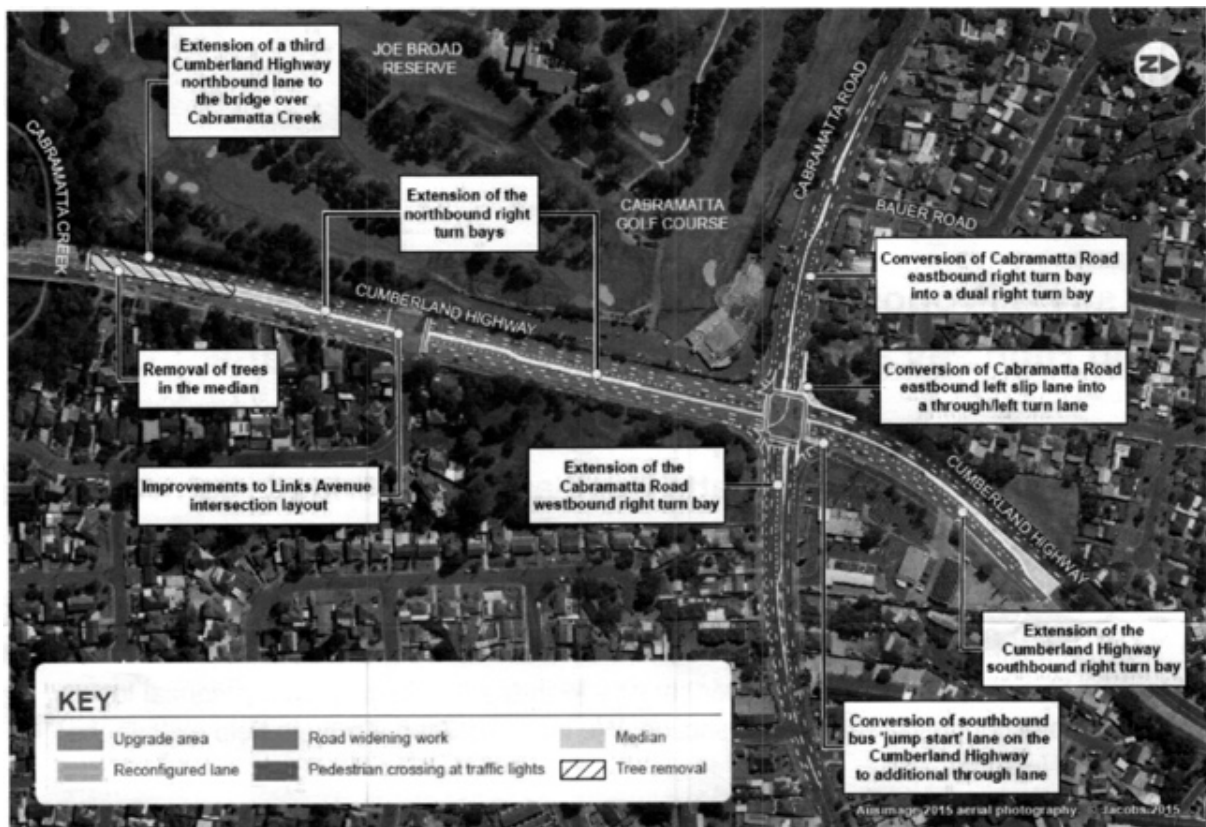


Figure 4: Proposed RMS Upgrades

The following summarises the proposed upgrade works:

- Extension of the third northbound lane on the Cumberland Highway from Cabramatta Road West intersection to the bridge over Cabramatta Creek. This would include widening in the Links Avenue intersection.
- Extension of the Cumberland Highway southbound and northbound right-turn bays.
- Conversion the southbound bus lane on the Cumberland Highway to an additional through lane.

- Extension of the Cabramatta Road West westbound right-turn bay.
- Conversion of the Cabramatta Road West eastbound right-turn bay into a dual right-turn bay.
- Conversion of the Cabramatta Road West eastbound left-slip lane into a through and left-turn lane.
- Improvements to traffic light phasing on the Cumberland Highway at the intersections of Cabramatta Road West and Links Avenue.
- Removal of shrubs in the median and replacement of the grass median with a concrete median.

From informal consultation with DownerMouchel – the delivery contractor – it is understood that based on submissions, the proposed works (as exhibited) are generally supported by key stakeholders and the public. Therefore, it is likely that the upgrades would be implemented as per the summary of works above. Furthermore, it is understood that construction is scheduled to commence mid-2016, the current program has a 6-month duration and accordingly the upgrades are expected to be completed by early 2017.

Recognising that the program for the subject Proposal estimates that (subject to approvals) the Site would be constructed and occupied by early to mid 2019 – some 2.0-2.5 years following the estimated completion of the upgrades, the 'Baseline' analysis in this report assumes completion of the upgrade works and accordingly the traffic impacts of the Proposal are assessed against this baseline scenario, which adopts the improved intersection layouts.

3.2 Baseline Network Performance

With reference to the above, the performance of the upgraded Cumberland Highway intersections with Cabramatta Road West and Links Avenue has been reassessed using SIDRA. The results of the 'Baseline Scenario' (including the RMS upgrades) SIDRA analysis is summarised in **Table 2** and compared alongside the 'Existing Scenario'; relevant SIDRA outputs and intersection layouts are attached at Appendix B.

Table 2: Comparison of Existing and Baseline Intersection Performance

Intersection	Scenario	Period	Degree of Saturation (DOS)	Average Vehicle Delay (AVD)	Level of Service (LOS)
Cumberland Hwy / Cabramatta Rd West	Existing	AM	0.925	41.9	C
		PM	1.107	71.9	F
	Baseline	AM	0.900	45.8	D
		PM	0.900	47.7	D
Cumberland Hwy / Links Avenue	Existing	AM	0.659	2.6	A
		PM	0.701	1.4	A
	Baseline	AM	0.602	1.5	A
		PM	0.664	1.1	A

The results above demonstrate a significant improvement to operating performance at the Cumberland Highway intersection with Cabramatta Road West during the critical evening peak hour, which improves from LOS F to LOS D with the average delay reducing by 24.2 seconds from 71.9 seconds to 47.7 seconds. With regard to the intersection of Cumberland Highway with Links Avenue, the SIDRA intersection analysis demonstrates that the intersection would improve and maintain a 'good' level of performance with LOS A under the 'Baseline Scenario'.

In summary, the proposed RMS upgrades would improve safety and ease congestion in accordance with the objectives of the Pinch Point Program.

4 Indicative Concept Plan

A detailed description of the Proposal is provided in the Planning Proposal report prepared separately by JBA. As mentioned, the key aspects of the Proposal can be summarised as follows:

- Permit the use of the site for residential flat buildings and non-residential uses.
- Increase the height limit to facilitate a maximum building height of 27 metres.
- Increase the FSR control to a maximum of 2.1:1.

An indicative Concept Plan for the residential development of the Site has been developed by Aleksandar Design Group (**ADG**) to inform this Planning Proposal process and provide an indicative development yield against which potential impacts of the Proposal can be assessed, including traffic and parking impacts. On this basis, the following summarises characteristics of the indicative Concept Plan that are of relevance to traffic and parking:

- 340 residential units.
- 1,200m² of commercial floor area (assumed small business premises).
- Car parking across 2 basement levels.
- Vehicle access provided via a two-way road connecting to Links Avenue through the vacant lot at No.6 Links Avenue.

The potential traffic and parking implications of the Proposal are covered in the following sections. Reference should also be made to the plans submitted separately, of which, traffic and parking relevant plans are attached to this report at **Appendix C**.

5 Development Control Plan Requirements

5.1 Parking Provisions

DCP 2013, Chapter 12 – Car Parking, Vehicle and Access Management (Amendment 10) prescribes the following minimum parking spaces for residential flat buildings and commercial (office or business) premises:

- 1 space per dwelling, plus
- 1 visitor space per 4 dwellings where a development has more than 2 proposed dwellings.
- 1 space per 40m² of gross leasable area.

It is noteworthy that the residential flat building parking rates are consistent with the rates presented in Chapter 7 – Residential Flat Buildings of DCP 2013.

Application of the above rates to the proposed indicative yield of the Concept Plan returns a minimum parking requirement of 455 parking spaces to comply with DCP 2013. This is inclusive of residential parking spaces, residential visitor spaces and commercial spaces.

The indicative Concept Plan demonstrates a typical basement level of car parking can provide for approximately 300 parking spaces. Accordingly, the 455 parking spaces required to comply with Council's DCP could be readily provided across 2 basement levels. Adaptable parking (for residents) and accessible parking (for visitors) would also be provided. Adaptable parking spaces would be provided either in accordance with the requirements of AS4299 (3.8 metre wide spaces) or AS2890.6 (2.4 metre wide space with adjacent 2.4 metre shared space). All accessible parking spaces for visitors would be provided in accordance with AS2890.6.

With regards to bicycle parking, DCP 2013 at Chapter 12 has no minimum requirements for bicycle parking. However, the provision of bicycle parking spaces should be adopted to encourage the use of cycling as an alternative mode of transport to private vehicles.

5.2 Car Parking, Servicing and Vehicle Access Arrangements

All general and service vehicle access will be provided via a two-way road connecting to Links Avenue through the vacant lot at No.6 Links Avenue, a location which would comply with the design requirements of AS2890.1 and Austroads GRD4A. In particular, the location ensures adequately visibility (and inter-visibility) is provided between vehicles exiting the access road and vehicles on Links Avenue.

The proposed vehicular basement access point would be from the internal road via a single access point. The proposed driveway would provide access to all parking and servicing areas, and all vehicles will enter and depart the Site in a forward direction. The access driveway and ramps to basement parking and service levels/areas will necessarily be designed to provide full compliance with AS2890.1, AS2890.2 and DCP 2013, Chapter 7, Section 7.5.2.

It is envisaged that waste servicing of the site would be provided at the street level on the internal access road connecting from Links Avenue. A cul-de-sac would be designed to ensure Council's waste collection vehicle could turn around and egress the site in a forward direction.

6 Traffic Analysis

6.1 Trip Generation

The RMS Guide Update provides trip generation rates for residential flat building developments, including trip rates per unit for a number of sites in the Sydney Metropolitan Region. In this regard, the average peak hour trips rates derived from all 8 Sydney Metropolitan site surveys are 0.19 trips per unit during the morning peak hour and 0.15 trips per unit during the evening peak hour.

However, it is noteworthy that 6 of the 8 sites are in locations that significantly better access to public transport – in particular rail transport – than the subject site. Accordingly, the following trip generation analysis is based only on the 2 survey sites that do not benefit from direct access to a train station, namely the Rockdale site and the Liberty Grove site. Interrogation of the raw RMS Guide Update data indicates that these 2 sites – on average – generate 0.3 trips per unit during the morning and evening peak hours.

With regards to the commercial uses, RMS Guide data indicates that 2 trips per 100m² GFA is an appropriate trip rate to adopt to assess the traffic impacts.

With reference to Section 4, the Concept Plan proposes 340 residential units and 1,200m² of commercial floor space, and as a result the trip generation is estimated to be:

- 126 trips during the morning peak hour (87 departure trips, 39 arrival trips); and
- 126 trips during the evening peak hour (39 departure trips, 87 arrival trips).

6.2 Trip Distribution & Assignment

Based on the 2011 Journey to Work data provided by the Bureau of Transport Statistics, the following presents the adopted vehicle-trip distribution of residents to their place of work from the broader Cabramatta West area:

- 25% of development traffic would arrive/depart to the north via the Cumberland Highway. This is associated with trips to/from Fairfield (parts of), Merrylands, Guildford, Parramatta and Auburn.
- 45% of development traffic would arrive/depart to the east via Cabramatta Road West. This is associated with trips to/from Fairfield, Sydney CBD, Bankstown and Auburn.
- 20% of development traffic would arrive/depart to the south via Cumberland Highway. This is associated with trips to/from Campbelltown, Liverpool and the general greater south-west Sydney region.

- 10% of vehicle trips traffic would arrive/depart to the west via Cabramatta Road West. This is associated with trips to/from Blacktown, Penrith and greater western Sydney.

For the purpose of this assessment, it is assumed that the distribution of commercial trips would be similar to that above adopted for the residential component.

With reference to the sections above and adopting an 20;80 (arrival:departure) split for residential trips and 80:20 split for commercial trips during the morning peak hour (and vice versa during the evening peak hour), the resulting trip assignment to the local road network is shown in **Figure 5**.

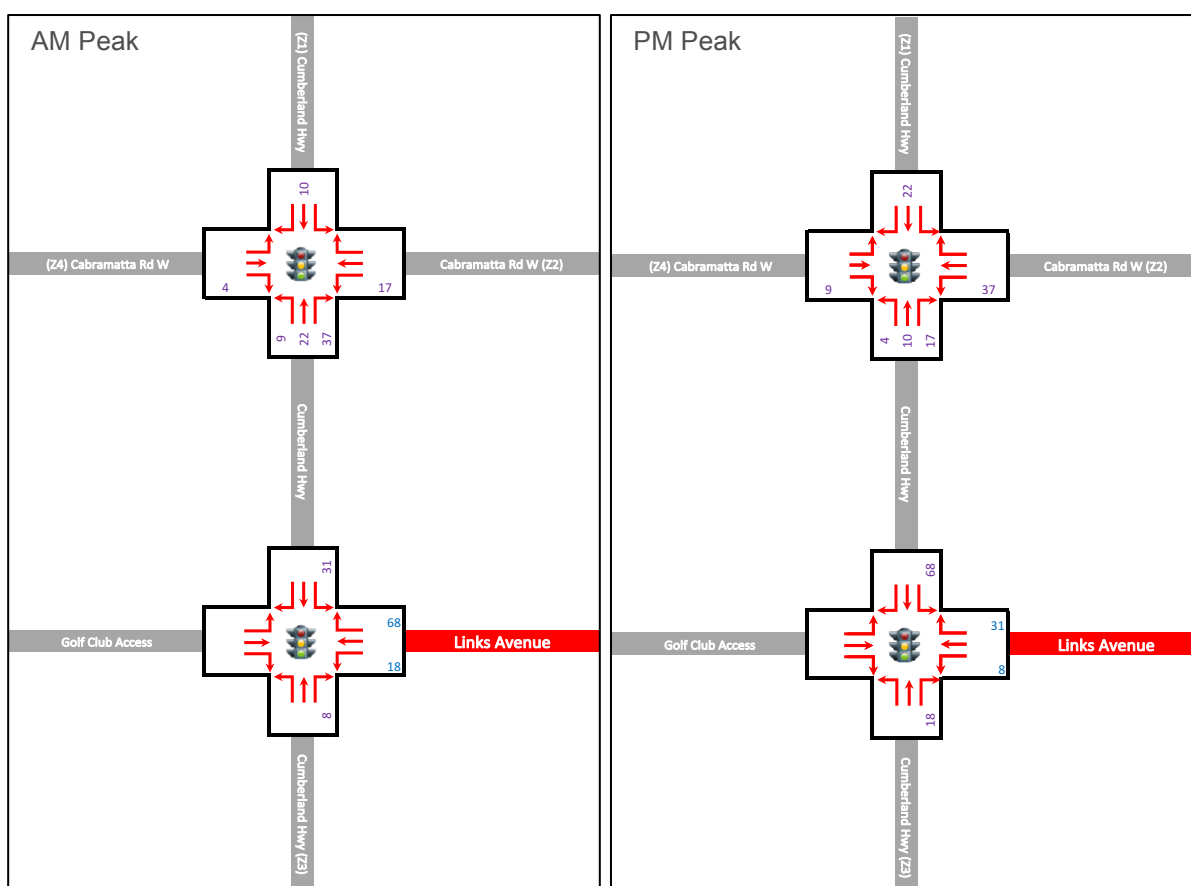


Figure 5: Trip Assignment of Future Development Traffic

6.3 Future Intersection Operation

Table 3 presents a summary of the results of the SIDRA analysis of the key intersections under the 'Future Scenario' (baseline plus development) and for comparison, also presents to Baseline Scenario results from Table 2. The detailed SIDRA outputs are attached at Appendix B.

Table 3: Comparison of Baseline and Future Local Intersection Performance

Intersection	Scenario	Period	Degree of Saturation (DOS)	Average Vehicle Delay (AVD)	Level of Service (LOS)
Cumberland Hwy / Cabramatta Rd West	Baseline	AM	0.900	45.8	D
		PM	0.900	47.7	D
	Future	AM	0.922	46.9	D
		PM	0.939	48.1	D
Cumberland Hwy / Links Avenue	Baseline	AM	0.602	1.5	A
		PM	0.664	1.1	A
	Future	AM	0.614	3.0	A
		PM	0.689	1.9	A

With regard to the intersection of Cumberland Highway with Links Avenue, the SIDRA intersection analysis demonstrates that the intersection would maintain a 'good' level of performance by maintaining a LOS A under the Future Scenario.

With regard to the intersection of Cumberland Highway with Cabramatta Road West, the SIDRA analysis of the morning and evening peak hour indicates that the traffic generation arising from the Proposal would be accommodated at the intersection as it is expected to continue to operate at LOS D during the morning and evening peak hours with only minimal increases in AVD (0.4 – 1.1 seconds).

In summary, the forecast traffic demand arising from the Proposal would be adequately accommodated on the local road network with no material increases in delays at the key intersections. The SIDRA analysis, which considered the proposed RMS upgrades, demonstrates that both of the key intersections would operate satisfactorily with a LOS of D or better during the morning and evening peak periods.

7 Conclusion

The key findings of this Traffic Impact Assessment are:

- Ason Group has been engaged by Tcon Constructions Pty Ltd to prepare a Traffic Impact Assessment report to support a Planning Proposal that seeks to initiate the preparation of a Local Environmental Plan amendment for the land at 400-404 Cabramatta Road West, Cabramatta, which would permit residential flat building development and non-residential uses.
- The Site is well served by a number of bus routes that provide direct access to the town centres of Cabramatta and Liverpool. The Cabramatta services provide onward connections at Cabramatta railway station to key Sydney metropolitan centres such as Campbelltown, Liverpool, Fairfield, Bankstown, Parramatta and the Sydney CBD. These bus routes are easily accessible with stops (in both directions) generally adjacent to the site on Cabramatta Road West and the Cumberland Highway and well within the target walk distance of 400 metres.
- Preliminary analysis of the site indicates that it would satisfactorily accommodate the requirements of Council's DCP 2013 and relevant Australian Standards, including car parking provisions, vehicular access and servicing including garbage collection by Council's waste collection vehicle.
- As part of the RMS Pinch Point Program, a proposal is currently underway to improve safety and ease congestion at the intersection of Cumberland Highway with Cabramatta Road West and Cumberland Highway with Links Avenue. SIDRA analysis demonstrates that the upgrades significantly improve the operation of the local road network during the critical evening peak hour.
- The analysis demonstrates that the forecast traffic demand arising from the Proposal would be adequately accommodated on the local road network with no material increases in delays at the key intersections. The SIDRA analysis, which considered the proposed RMS upgrades, demonstrates that both of the key intersections would operate satisfactorily with a LOS of D or better during the morning and evening peak periods.

It is therefore concluded that the Planning Proposal for 400-404 Cabramatta Road West is supportable on traffic planning grounds.

Appendix A

TTM Data



TTM Reference: 15SYD201
Location: Cabramatta Rd & Orange Grove Rd
Suburb: Cabramatta

Date: Thursday, 6 August 15
Survey Duration: 0700-0900 & 1600-1800
Weather: Fine

AM Peak: 0800-0900
PM Peak: 1700-1800

Notes:

Time	Northern Approach: Joseph St										Southern Approach: Orange Grove Rd										Eastern Approach: Cabramatta Rd										Western Approach: Cabramatta Rd																					
	Left			Straight			Right			Peds	TOTAL			U-turns	TOTAL			Left			Straight			Right			Peds	TOTAL			U-turns	TOTAL			Left			Straight			Right			Peds								
15 min	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total													
time start																																																				
7:00	4	1	5	189	10	199	21	3	24	0	228	0	228	0	24	0	24	250	18	268	24	3	27	0	322	0	32	1	33	73	5	78	7	1	8	0	119	0	40	3	43	158	3	161	62	1	63	0	267	0		
7:15	4	3	7	291	29	320	16	2	18	0	345	0	345	0	20	4	24	269	20	279	17	0	17	0	320	0	34	0	34	0	34	79	5	84	18	2	20	0	138	0	40	4	44	163	7	170	61	4	85	0	299	0
7:30	8	2	10	337	23	360	13	2	15	0	385	0	385	0	30	3	33	283	24	307	35	1	36	0	376	0	36	3	39	76	4	80	8	2	10	0	129	0	56	3	59	165	7	172	76	3	79	0	310	0		
7:45	5	2	7	316	31	347	18	4	22	0	376	0	376	0	40	2	42	234	18	252	39	2	41	0	335	0	38	3	41	118	9	127	19	1	20	0	188	0	45	2	47	238	5	243	66	0	66	0	356	0		
8:00	9	0	9	249	13	262	14	4	18	0	289	0	289	0	50	4	54	348	24	372	51	1	52	0	478	0	45	0	45	111	0	111	21	0	21	0	177	0	41	4	45	200	2	202	53	1	54	0	301	0		
8:15	6	1	7	295	25	320	25	1	26	0	353	0	353	0	39	2	41	269	27	296	64	2	66	0	403	0	72	1	73	109	6	115	30	1	31	0	219	0	31	1	32	164	4	168	40	3	43	0	243	0		
8:30	8	1	9	183	18	201	20	1	21	0	231	0	231	0	50	1	51	271	21	292	36	1	37	0	380	0	46	3	49	141	6	147	23	0	23	0	219	0	35	0	35	242	6	248	85	0	85	0	368	0		
8:45	5	0	5	286	15	301	37	3	40	0	346	0	346	0	58	5	63	213	178	231	41	4	45	0	353	0	64	5	69	102	4	106	33	1	34	0	209	0	40	3	43	239	8	247	67	3	70	0	360	0		
TOTAL	49	10	59	2146	164	2310	164	20	184	0	2553	0	312	23	335	2133	178	2311	307	14	321	0	2967	0	367	16	383	809	39	848	159	8	167	0	1398	0	328	20	348	1569	42	1611	530	15	545	0	2504	0				
AM Peak	28	2	30	1013	71	1084	96	9	105	0	1219	0	197	12	209	1107	98	1205	192	8	200	0	1614	0	227	9	236	463	16	479	107	2	109	0	624	0	147	8	155	845	20	865	245	7	252	0	1272	0				
16:00	11	1	12	287	12	299	52	0	52	0	363	0	363	0	101	2	103	258	19	277	62	1	63	0	443	0	65	0	65	217	7	224	19	2	21	0	310	0	45	1	46	156	5	161	68	0	68	0	275	0		
16:15	7	3	10	396	13	409	63	2	65	0	484	0	484	0	120	5	125	312	19	331	56	0	56	0	512	0	71	0	71	184	2	186	31	1	32	0	289	0	30	1	31	156	4	160	36	0	36	0	227	0		
16:30	7	1	8	330	15	345	45	1	46	0	399	0	399	0	100	4	104	266	17	283	55	0	55	0	442	0	62	0	62	197	3	200	28	1	29	0	291	0	33	1	34	134	8	142	41	1	42	0	218	0		
16:45	9	1	10	334	5	339	60	0	60	0	409	0	409	0	97	4	101	301	16	317	41	0	41	0	459	0	46	1	47	165	5	170	15	1	16	0	233	0	32	1	33	169	5	174	57	1	58	0	265	0		
17:00	7	1	8	304	9	313	61	1	62	0	383	0	383	0	107	2	109	302	19	321	65	2	67	0	497	0	58	0	58	203	6	209	20	1	21	0	288	0	43	2	45	133	5	138	41	1	42	0	225	0		
17:15	4	0	4	317	16	333	59	2	61	0	398	0	398	0	93	1	94	304	11	315	45	0	45	0	454	0	74	0	74	219	2	221	25	0	25	0	320	0	28	2	30	137	6	143	57	1	58	0	231	0		
17:30	8	1	9	309	10	319	54	0	54	0	382	0	382	0	123	4	127	288	14	302	56	1	57	0	486	0	81	0	81	211	10	221	20	0	20	0	322	0	24	0	24	161	4	165	41	0	41	0	230	0		
17:45	12	0	12	328	14	342	69	1	70	0	424	0	424	0	143	1	144	291	16	307	47	0	47	0	498	0	52	0	52	189	1	190	20	1	21	0	263	0	42	0	42	150	5	155	52	0	52	0	249	0		
TOTAL	65	8	73	2605	94	2699	463	7	470	0	3242	0	3912	23	397	2322	131	2453	427	4	431	0	3791	0	509	1	510	1585	36	1621	178	7	185	0	2316	0	277	8	285	1196	42	1238	393	4	397	0	1920	0				
PM Peak	31	2	33	1258	49	1307	243	4	247	0	1567	0	1935	8	974	1185	60	1245	213	3	216	0	1935	0	265	0	265	822	19	841	85	2	87	0	1193	0	137	4	141	581	20	601	191	2	193	0	935	0				

TTM Data



TTM Reference: 15SYD201

Location: Orange Grove Rd & Links Rd

Suburb: Cabramatta

Date: Thursday, 6 August 15

Survey Duration: 0700-0900 & 1600-1800

Weather: Fine

Notes:

AM Peak: 0730-0830

PM Peak: 1700-1800

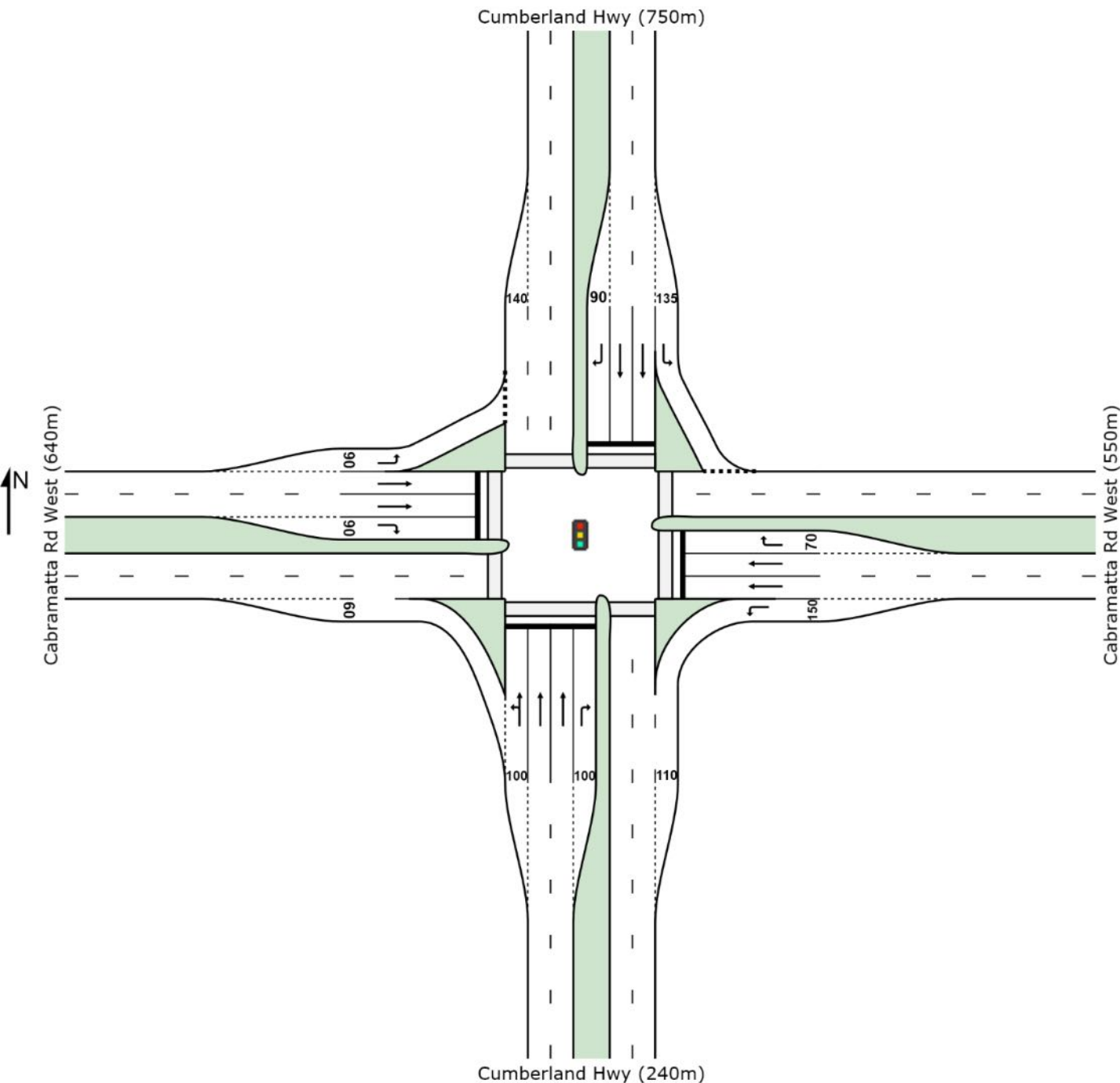
Time	Northern Approach: Orange Grove Rd										Southern Approach: Orange Grove Rd										Eastern Approach: Links Rd										Western Approach: Golf Course Access																													
	Left					Straight					Right					Left					Straight					Right					Left					Straight					Right					Left					Straight					Right				
	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	U-turns	TOTAL	Peds																		
15 min time start	1	0	1	275	19	294	3	0	3	0	298	0	1	0	1	347	21	368	0	1	0	1	359	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0												
7:00	3	0	3	351	29	380	0	0	0	0	383	0	2	0	2	330	27	357	1	0	1	1	359	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0												
7:15	3	0	3	351	29	380	0	0	0	0	383	0	2	0	2	330	27	357	1	0	1	1	359	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0												
7:30	2	0	2	397	22	409	0	0	0	0	411	0	2	0	2	412	31	443	1	0	1	0	446	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
7:45	4	0	4	391	28	419	2	0	2	0	425	0	3	0	3	409	35	444	1	0	1	0	448	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
8:00	0	0	0	374	12	386	0	0	0	0	386	0	8	0	8	425	25	450	3	0	3	0	461	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
8:15	3	1	4	398	33	431	1	0	1	0	436	0	6	0	6	376	31	407	2	0	2	0	415	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
8:30	3	0	3	356	28	384	0	0	0	0	387	0	6	0	6	378	25	403	1	0	1	0	410	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
8:45	4	0	4	383	18	401	1	1	2	0	407	0	1	0	1	341	35	376	1	0	1	0	378	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
TOTAL	20	1	21	2915	189	3104	7	1	8	0	3133	0	27	0	27	3018	230	3248	10	0	10	0	3286	0	10	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
AM Peak	9	1	10	1550	95	1645	3	0	3	0	1658	0	19	0	19	1622	122	1744	7	0	7	0	1770	0	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
16:00	4	0	4	430	17	447	0	0	0	0	451	0	1	0	1	470	18	488	0	0	0	0	489	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
16:15	5	0	5	443	12	455	0	0	0	0	460	0	2	0	2	509	19	528	2	0	2	0	532	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
16:30	7	0	7	477	19	496	1	0	1	1	504	0	1	0	1	420	22	442	1	0	1	0	445	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
16:45	2	0	2	389	6	395	2	0	2	0	399	0	1	0	1	474	20	494	1	0	1	0	496	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
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17:00	3	0	3	436	14	450	1	0	1	0	454	0	1	0	1	469	21	490	0	0	0	0	491	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
17:15	6	0	6	416	14	430	0	0	0	0	436	0	2	0	2	461	11	472	2	0	2	0	476	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
17:30	9	0	9	449	14	463	0	0	0	0	472	0	1	0	1	477	21	498	3	0	3	0	502	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
17:45	6	0	6	429	12	441	4	0	4	4	454	0	2	0	2	474	16	490	2	0	2	0	494	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
TOTAL	42	0	42	3469	108	3577	8	0	8	3	3630	0	11	1	12	3751	148	3902	11	0	11	0	3925	0	12	0	12	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
PM Peak	24	0	24	1730	54	1784	5	0	5	3	1816	0	6	0	6	1881	69	1950	7	0	7	0	1963	0	4	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											

Appendix B

SITE LAYOUT

 **Site: EX AM**

Cabramatta Rd West x Cumberland Hwy
Existing Scenario
AM Peak
Signals - Fixed Time Coordinated



LANE SUMMARY



Site: EX AM

Cabramatta Rd West x Cumberland Hwy

Existing Scenario

AM Peak

Signals - Fixed Time Coordinated Cycle Time = 107 seconds (Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Hwy (240m)													
Lane 1	417	6.9	747	0.558	81 ⁶	27.0	LOS B	15.2	112.5	Short	100	0.0	NA
Lane 2	498	8.1	727	0.686	100	26.2	LOS B	19.3	144.8	Full	500	0.0	0.0
Lane 3	498	8.1	727	0.686	100	26.2	LOS B	19.3	144.8	Full	500	0.0	0.0
Lane 4	200	4.0	219	0.912	100	72.0	LOS F	12.4	90.1	Short	100	0.0	NA
Approach	1614	7.3		0.912		32.1	LOS C	19.3	144.8				
East: Cabramatta Rd West (550m)													
Lane 1	236	3.8	1808	0.131	100	5.7	LOS A	0.0	0.0	Short	150	0.0	NA
Lane 2	240	3.3	321	0.746	100	48.7	LOS D	12.6	90.8	Full	550	0.0	0.0
Lane 3	240	3.3	321	0.746	100	48.7	LOS D	12.6	90.8	Full	550	0.0	0.0
Lane 4	109	1.8	120	0.909	100	73.0	LOS F	6.7	47.8	Short	70	0.0	NA
Approach	824	3.3		0.909		39.6	LOS C	12.6	90.8				
North: Cumberland Hwy (750m)													
Lane 1	30	6.7	990	0.030	100	12.2	LOS A	0.3	2.6	Short	135	0.0	NA
Lane 2	559	6.5	629	0.889	100	43.7	LOS D	30.7	226.9	Full	750	0.0	0.0
Lane 3	525	6.5	591 ¹	0.889	100	43.3	LOS D	28.0	207.0	Full	750	0.0	0.0
Lane 4	105	8.6	114	0.917	100	75.6	LOS F	6.6	49.4	Short	90	0.0	NA
Approach	1219	6.7		0.917		45.5	LOS D	30.7	226.9				
West: Cabramatta Rd West (640m)													
Lane 1	155	5.2	961	0.161	100	12.4	LOS A	3.0	21.9	Short	90	0.0	NA
Lane 2	433	2.3	485	0.892	100	53.9	LOS D	25.8	184.1	Full	640	0.0	0.0
Lane 3	433	2.3	485	0.892	100	53.9	LOS D	25.8	184.1	Full	640	0.0	0.0
Lane 4	252	2.8	272	0.925	100	72.2	LOS F	16.1	115.3	Short	90	0.0	NA
Approach	1272	2.8		0.925		52.5	LOS D	25.8	184.1				
Intersection	4929	5.3		0.925		41.9	LOS C	30.7	226.9				

Level of Service (LOS) Method: Delay (RTA NSW).

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 adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.

⁶ Lane under-utilisation due to downstream effects

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Organisation: ASON PTY LTD | Processed: Sunday, September 20, 2015 11:19:53 PM

Project: \\psf\Home\Google Drive\ASON SL1 (Director)\Ason_SL2\Projects\0123\Projects\Modelling\AG0123m01 Cabramatta Road West x Cumberland Highway.sip6

LANE SUMMARY



Site: EX PM

Cabramatta Rd West x Cumberland Hwy

Existing Scenario

PM Peak

Signals - Fixed Time Coordinated Cycle Time = 148 seconds (Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Hwy (240m)													
Lane 1	474	1.7	633 ¹	0.748	88 ⁵	7.3	LOS A	0.0	0.0	Short	100	0.0	NA
Lane 2	622	4.8	728	0.855	100	44.2	LOS D	40.6	296.1	Full	500	0.0	0.0
Lane 3	622	4.8	728	0.855	100	44.2	LOS D	40.6	296.1	Full	500	0.0	0.0
Lane 4	216	1.4	199	1.086	100	181.7	LOS F	25.9	183.4	Short	100	0.0	NA
Approach	1935	3.7		1.086		50.5	LOS D	40.6	296.1				
East: Cabramatta Rd West (550m)													
Lane 1	265	0.0	1857	0.143	100	5.6	LOS A	0.0	0.0	Short	150	0.0	NA
Lane 2	437	2.3	403	1.085	100	170.1	LOS F	53.3	380.3	Full	550	0.0	0.0
Lane 3	404	2.3	372 ¹	1.085	100	176.3	LOS F	49.5	352.9	Full	550	0.0	0.0
Lane 4	87	2.3	123	0.705	100	83.3	LOS F	6.6	46.8	Short	70	0.0	NA
Approach	1193	1.8		1.085		129.3	LOS F	53.3	380.3				
North: Cumberland Hwy (750m)													
Lane 1	33	6.1	1123	0.029	100	9.4	LOS A	0.2	1.8	Short	135	0.0	NA
Lane 2	712	3.7	787 ¹	0.904	100	45.4	LOS D	49.2	355.1	Full	750	0.0	0.0
Lane 3	595	3.7	658 ¹	0.904	100	44.9	LOS D	37.1	267.8	Full	750	0.0	0.0
Lane 4	247	0.8	274	0.900	100	87.5	LOS F	20.1	141.6	Short	90	0.0	NA
Approach	1587	3.3		0.904		51.0	LOS D	49.2	355.1				
West: Cabramatta Rd West (640m)													
Lane 1	141	2.8	1031	0.137	100	13.4	LOS A	3.4	24.6	Short	90	0.0	NA
Lane 2	301	3.3	451	0.666	100	55.2	LOS D	19.7	141.7	Full	640	0.0	0.0
Lane 3	301	3.3	451	0.666	100	55.2	LOS D	19.7	141.7	Full	640	0.0	0.0
Lane 4	193	1.0	174	1.107	100	197.2	LOS F	24.2	170.6	Short	90	0.0	NA
Approach	935	2.8		1.107		78.2	LOS F	24.2	170.6				
Intersection	5650	3.0		1.107		71.9	LOS F	53.3	380.3				

Level of Service (LOS) Method: Delay (RTA NSW).

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 adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.

⁵ Lane under-utilisation found by the program

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Organisation: ASON PTY LTD | Processed: Sunday, September 20, 2015 11:19:57 PM

Project: \\psf\Home\Google Drive_ASON SL1 (Director)_Ason_SL2\Projects\0123\Projects\Modelling\AG0123m01 Cabramatta Road West x Cumberland Highway.sip6

SITE LAYOUT

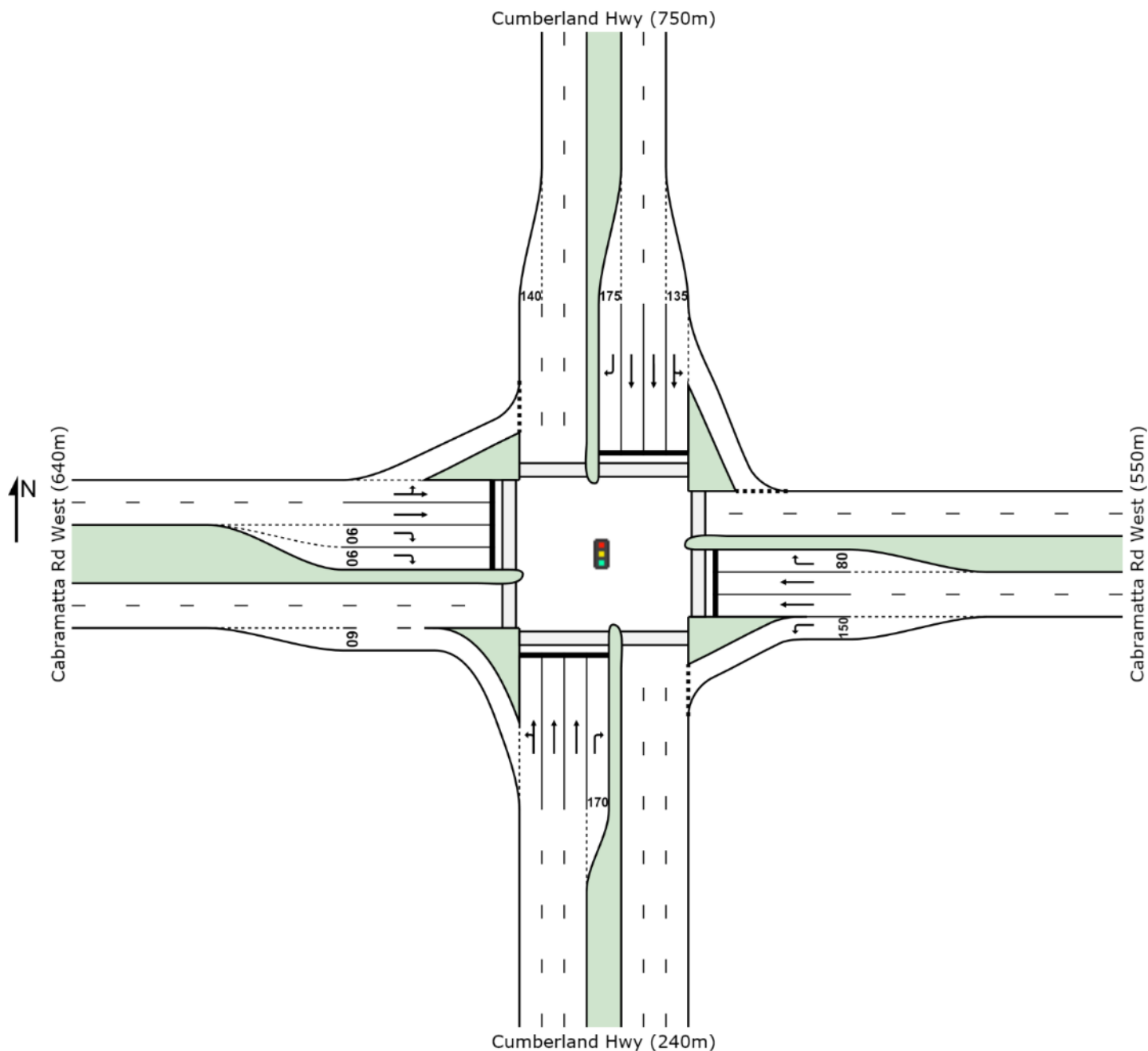
 **Site: BASE AM**

Cabramatta Rd West x Cumberland Hwy

Baseline Scenario

AM Peak - Post RMS Improvement

Signals - Fixed Time Coordinated



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Organisation: ASON PTY LTD | Created: Wednesday, February 10, 2016 12:15:51 PM

Project: Z:\Google Drive\Ason_SL2\Projects\0123\Projects\Modelling\AG0123m01v1 Cumberland Hwy x Cabramatta Rd West (Revised Yield).sip6

LANE SUMMARY



Site: BASE AM

Cabramatta Rd West x Cumberland Hwy

Baseline Scenario

AM Peak - Post RMS Improvement

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Hwy (240m)													
Lane 1	417	6.9	681	0.612	81 ⁶	33.9	LOS C	18.4	136.8	Full	500	0.0	0.0
Lane 2	499	8.1	664	0.751	100	34.2	LOS C	23.8	178.5	Full	500	0.0	0.0
Lane 3	499	8.1	664	0.751	100	34.2	LOS C	23.8	178.5	Full	500	0.0	0.0
Lane 4	200	4.0	226	0.886	100	74.5	LOS F	13.3	96.5	Short	170	0.0	NA
Approach	1614	7.3		0.886		39.1	LOS C	23.8	178.5				
East: Cabramatta Rd West (550m)													
Lane 1	236	3.8	1077	0.219	100	11.5	LOS A	4.5	32.7	Short	150	0.0	NA
Lane 2	240	3.3	334	0.717	100	52.4	LOS D	13.7	98.8	Full	550	0.0	0.0
Lane 3	240	3.3	334	0.717	100	52.4	LOS D	13.7	98.8	Full	550	0.0	0.0
Lane 4	109	1.8	122	0.892	100	78.0	LOS F	7.3	52.2	Short	80	0.0	NA
Approach	824	3.3		0.892		44.0	LOS D	13.7	98.8				
North: Cumberland Hwy (750m)													
Lane 1	373	6.6	564	0.661	100	50.3	LOS D	18.1	133.7	Short	135	0.0	NA
Lane 2	371	6.5	561	0.661	100	39.0	LOS C	17.7	131.2	Full	750	0.0	0.0
Lane 3	371	6.5	561	0.661	100	39.0	LOS C	17.7	131.2	Full	750	0.0	0.0
Lane 4	105	8.6	117	0.900	100	80.3	LOS F	7.1	53.7	Short	175	0.0	NA
Approach	1219	6.7		0.900		46.0	LOS D	18.1	133.7				
West: Cabramatta Rd West (640m)													
Lane 1	534	3.1	605	0.883	100	59.7	LOS E	33.4	240.2	Full	640	0.0	0.0
Lane 2	486	2.3	551 ¹	0.883	100	52.6	LOS D	30.5	218.0	Full	640	0.0	0.0
Lane 3	126	2.8	364	0.346	100	50.5	LOS D	6.4	45.9	Short	90	0.0	NA
Lane 4	126	2.8	364	0.346	100	50.5	LOS D	6.4	45.9	Short	90	0.0	NA
Approach	1272	2.8		0.883		55.1	LOS D	33.4	240.2				
Intersection	4929	5.3		0.900		45.8	LOS D	33.4	240.2				

Level of Service (LOS) Method: Delay (RTA NSW).

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 adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.

⁶ Lane under-utilisation due to downstream effects

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Project: Z:\Google Drive\Ason_SL2\Projects\0123\Projects\Modelling\AG0123m01v1 Cumberland Hwy x Cabramatta Rd West (Revised Yield).sip6

LANE SUMMARY



Site: BASE PM

Cabramatta Rd West x Cumberland Hwy

Baseline Scenario

PM Peak - Post RMS Improvement

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Hwy (240m)													
Lane 1	567	2.2	782	0.726	81 ⁶	35.6	LOS C	26.9	192.1	Full	500	0.0	0.0
Lane 2	576	4.8	646	0.891	100	47.3	LOS D	34.9	254.5	Full	500	0.0	0.0
Lane 3	576	4.8	646	0.891	100	47.3	LOS D	34.9	254.5	Full	500	0.0	0.0
Lane 4	216	1.4	276	0.783	100	64.2	LOS E	13.1	92.7	Short	170	0.0	NA
Approach	1935	3.7		0.891		45.7	LOS D	34.9	254.5				
East: Cabramatta Rd West (550m)													
Lane 1	265	0.0	1134	0.234	100	12.4	LOS A	5.6	39.2	Short	150	0.0	NA
Lane 2	432	2.3	480	0.900	100	60.5	LOS E	28.8	205.8	Full	550	0.0	0.0
Lane 3	409	2.3	454 ¹	0.900	100	60.3	LOS E	27.0	192.8	Full	550	0.0	0.0
Lane 4	87	2.3	107	0.816	100	73.9	LOS F	5.6	40.2	Short	80	0.0	NA
Approach	1193	1.8		0.900		50.7	LOS D	28.8	205.8				
North: Cumberland Hwy (750m)													
Lane 1	447	3.9	652	0.686	100	42.8	LOS D	20.3	146.8	Short	135	0.0	NA
Lane 2	446	3.7	650	0.686	100	34.7	LOS C	20.7	149.3	Full	750	0.0	0.0
Lane 3	446	3.7	650	0.686	100	34.7	LOS C	20.7	149.3	Full	750	0.0	0.0
Lane 4	247	0.8	277	0.892	100	73.2	LOS F	16.5	116.3	Short	175	0.0	NA
Approach	1587	3.3		0.892		43.0	LOS D	20.7	149.3				
West: Cabramatta Rd West (640m)													
Lane 1	381	3.1	504	0.756	100	52.3	LOS D	20.1	144.2	Full	640	0.0	0.0
Lane 2	361	3.3	477	0.756	100	46.7	LOS D	20.2	145.4	Full	640	0.0	0.0
Lane 3	97	1.0	108	0.897	100	79.1	LOS F	6.5	46.1	Short	90	0.0	NA
Lane 4	96	1.0	108	0.897	100	79.1	LOS F	6.5	46.1	Short	90	0.0	NA
Approach	935	2.8		0.897		55.7	LOS D	20.2	145.4				
Intersection	5650	3.0		0.900		47.7	LOS D	34.9	254.5				

Level of Service (LOS) Method: Delay (RTA NSW).

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 adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.

⁶ Lane under-utilisation due to downstream effects

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Project: Z:\Google Drive\Ason_SL2\Projects\0123\Projects\Modelling\AG0123m01v1 Cumberland Hwy x Cabramatta Rd West (Revised Yield).sip6

LANE SUMMARY



Site: FU(R4) AM

Cabramatta Rd West x Cumberland Hwy

Future Scenario (High Density Resi. & Office)

AM Peak - Post RMS Improvement

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance													
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Hwy (240m)													
Lane 1	426	6.7	683	0.624	81 ⁶	34.2	LOS C	19.0	141.0	Full	500	0.0	0.0
Lane 2	509	8.0	664	0.767	100	34.9	LOS C	24.8	185.8	Full	500	0.0	0.0
Lane 3	509	8.0	664	0.767	100	34.9	LOS C	24.8	185.8	Full	500	0.0	0.0
Lane 4	237	3.4	257	0.922	100	79.4	LOS F	16.6	119.7	Short	170	0.0	NA
Approach	1682	7.0		0.922		41.0	LOS C	24.8	185.8				
East: Cabramatta Rd West (550m)													
Lane 1	253	3.6	1081	0.234	100	11.9	LOS A	5.1	36.6	Short	150	0.0	NA
Lane 2	240	3.3	334	0.717	100	52.4	LOS D	13.7	98.8	Full	550	0.0	0.0
Lane 3	240	3.3	334	0.717	100	52.4	LOS D	13.7	98.8	Full	550	0.0	0.0
Lane 4	109	1.8	122	0.892	100	78.0	LOS F	7.3	52.2	Short	80	0.0	NA
Approach	841	3.2		0.892		43.5	LOS D	13.7	98.8				
North: Cumberland Hwy (750m)													
Lane 1	376	6.5	533	0.705	100	53.9	LOS D	19.1	141.4	Short	135	0.0	NA
Lane 2	374	6.5	530	0.705	100	41.6	LOS C	18.7	137.9	Full	750	0.0	0.0
Lane 3	374	6.5	530	0.705	100	41.6	LOS C	18.7	137.9	Full	750	0.0	0.0
Lane 4	105	8.6	117	0.900	100	80.3	LOS F	7.1	53.7	Short	175	0.0	NA
Approach	1229	6.7		0.900		48.7	LOS D	19.1	141.4				
West: Cabramatta Rd West (640m)													
Lane 1	534	3.1	605	0.883	100	60.0	LOS E	33.5	240.5	Full	640	0.0	0.0
Lane 2	486	2.3	551 ¹	0.883	100	52.7	LOS D	30.5	218.0	Full	640	0.0	0.0
Lane 3	128	2.7	364	0.351	100	50.6	LOS D	6.5	46.7	Short	90	0.0	NA
Lane 4	128	2.7	364	0.351	100	50.6	LOS D	6.5	46.7	Short	90	0.0	NA
Approach	1276	2.7		0.883		55.3	LOS D	33.5	240.5				
Intersection	5028	5.2		0.922		46.9	LOS D	33.5	240.5				

Level of Service (LOS) Method: Delay (RTA NSW).

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 adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.

⁶ Lane under-utilisation due to downstream effects

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Project: Z:\Google Drive\Ason_SL2\Projects\0123\Projects\Modelling\AG0123m01v2 Cumberland Hwy x Cabramatta Rd West (Revised Yield & Commercial).sip6

LANE SUMMARY

Site: FU(R4) PM

Cabramatta Rd West x Cumberland Hwy

Future Scenario (High Density Resi. & Office)

PM Peak - Post RMS Improvement

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance													
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Hwy (240m)													
Lane 1	572	2.2	782	0.732	81 ⁶	35.7	LOS C	27.3	194.4	Full	500	0.0	0.0
Lane 2	581	4.8	646	0.898	100	48.4	LOS D	35.7	260.5	Full	500	0.0	0.0
Lane 3	581	4.8	646	0.898	100	48.4	LOS D	35.7	260.5	Full	500	0.0	0.0
Lane 4	233	1.3	261	0.894	100	74.1	LOS F	15.6	110.6	Short	170	0.0	NA
Approach	1966	3.6		0.898		47.8	LOS D	35.7	260.5				
East: Cabramatta Rd West (550m)													
Lane 1	302	0.0	1123	0.269	100	12.7	LOS A	6.7	46.6	Short	150	0.0	NA
Lane 2	432	2.3	480	0.900	100	60.5	LOS E	28.8	205.8	Full	550	0.0	0.0
Lane 3	409	2.3	454 ¹	0.900	100	60.3	LOS E	27.0	192.8	Full	550	0.0	0.0
Lane 4	87	2.3	107	0.816	100	73.9	LOS F	5.6	40.2	Short	80	0.0	NA
Approach	1230	1.7		0.900		49.6	LOS D	28.8	205.8				
North: Cumberland Hwy (750m)													
Lane 1	455	3.9	668	0.681	100	42.1	LOS C	20.3	146.9	Short	135	0.0	NA
Lane 2	454	3.7	667	0.681	100	33.7	LOS C	20.7	149.6	Full	750	0.0	0.0
Lane 3	454	3.7	667	0.681	100	33.7	LOS C	20.7	149.6	Full	750	0.0	0.0
Lane 4	247	0.8	277	0.892	100	73.2	LOS F	16.5	116.3	Short	175	0.0	NA
Approach	1609	3.3		0.892		42.1	LOS C	20.7	149.6				
West: Cabramatta Rd West (640m)													
Lane 1	381	3.1	504	0.756	100	52.3	LOS D	20.1	144.2	Full	640	0.0	0.0
Lane 2	361	3.3	477	0.756	100	46.7	LOS D	20.2	145.4	Full	640	0.0	0.0
Lane 3	101	1.0	108	0.939	100	85.2	LOS F	7.2	50.5	Short	90	0.0	NA
Lane 4	101	1.0	108	0.939	100	85.2	LOS F	7.2	50.5	Short	90	0.0	NA
Approach	944	2.8		0.939		57.2	LOS E	20.2	145.4				
Intersection	5749	3.0		0.939		48.1	LOS D	35.7	260.5				

Level of Service (LOS) Method: Delay (RTA NSW).

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 adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.

⁶ Lane under-utilisation due to downstream effects

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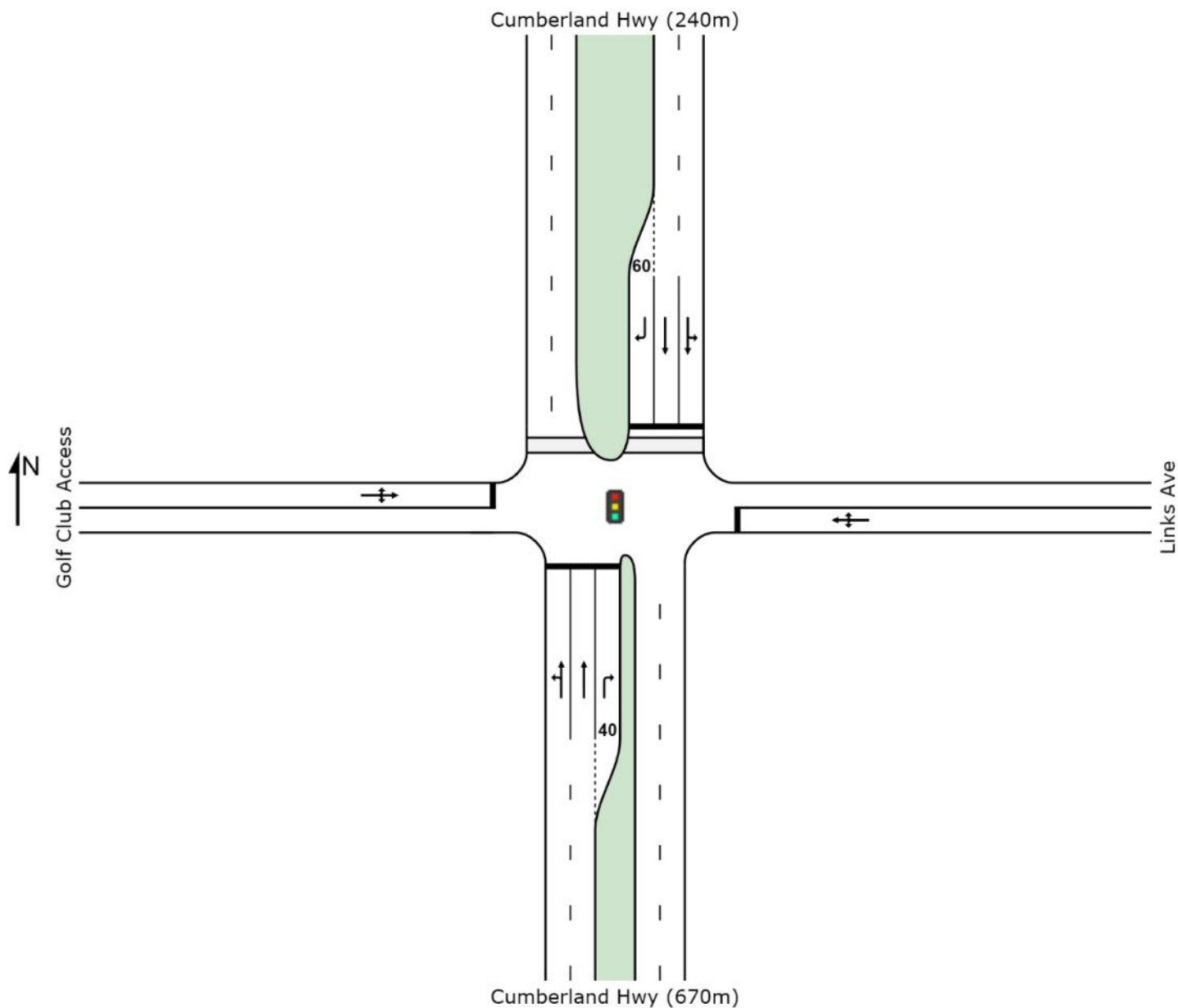
Organisation: ASON PTY LTD | Processed: Monday, February 29, 2016 10:29:58 AM

Project: Z:\Google Drive\Ason_SL2\Projects\0123\Projects\Modelling\AG0123m01v2 Cumberland Hwy x Cabramatta Rd West (Revised Yield & Commercial).sip6

SITE LAYOUT

 **Site: EX AM**

Cumberland Hwy x Links Ave
Existing Scenario
AM Peak
Signals - Fixed Time Coordinated



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Project: \\psf\Google Drive\ASON SL1 (Director)_Ason_SL2\Projects\0123\Projects\Modelling\AG0123m01 Cumberland Hwy x Links Ave.sip6

LANE SUMMARY



Site: EX AM

Cumberland Hwy x Links Ave

Existing Scenario

AM Peak

Signals - Fixed Time Coordinated Cycle Time = 107 seconds (User-Given Cycle Time)

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Hwy (670m)													
Lane 1	872	6.9	1324	0.659	100	2.0	LOS A	6.3	47.0	Full	670	0.0	0.0
Lane 2	872	7.1	1324	0.659	100	1.9	LOS A	6.3	47.0	Full	670	0.0	0.0
Lane 3	7	0.0	139	0.053	100	13.8	LOS A	0.1	1.0	Short	40	0.0	NA
Approach	1752	7.0		0.659		2.0	LOS A	6.3	47.0				
East: Links Ave													
Lane 1	44	2.4	276	0.160	100	45.4	LOS D	2.0	14.2	Full	500	0.0	0.0
Approach	44	2.4		0.160		45.4	LOS D	2.0	14.2				
North: Cumberland Hwy (240m)													
Lane 1	848	5.7	1334	0.636	100	1.9	LOS A	5.8	42.8	Full	240	0.0	0.0
Lane 2	849	5.7	1336	0.636	100	1.8	LOS A	5.8	42.8	Full	240	0.0	0.0
Lane 3	3	33.3	96	0.033	100	14.8	LOS B	0.1	0.6	Short	60	0.0	NA
Approach	1701	5.8		0.636		1.9	LOS A	5.8	42.8				
West: Golf Club Access													
Lane 1	7	0.0	294	0.025	100	43.1	LOS D	0.3	2.2	Full	500	0.0	0.0
Approach	7	0.0		0.025		43.1	LOS D	0.3	2.2				
Intersection	3504	6.3		0.659		2.6	LOS A	6.3	47.0				

Level of Service (LOS) Method: Delay (RTA NSW).

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.

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LANE SUMMARY



Site: EX PM

Cumberland Hwy x Links Ave

Existing Scenario

PM Peak

Signals - Fixed Time Coordinated Cycle Time = 148 seconds (User-Given Cycle Time)

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Hwy (670m)													
Lane 1	1029	3.5	1468	0.701	100	0.9	LOS A	4.6	33.4	Full	670	0.0	0.0
Lane 2	1030	3.5	1468	0.701	100	0.9	LOS A	4.6	33.4	Full	670	0.0	0.0
Lane 3	7	0.0	101	0.073	100	12.2	LOS A	0.2	1.1	Short	40	0.0	NA
Approach	2066	3.5		0.701		1.0	LOS A	4.6	33.4				
East: Links Ave													
Lane 1	17	6.3	225	0.075	100	63.1	LOS E	1.1	7.8	Full	500	0.0	0.0
Approach	17	6.3		0.075		63.1	LOS E	1.1	7.8				
North: Cumberland Hwy (240m)													
Lane 1	951	2.9	1472	0.646	100	1.0	LOS A	3.6	26.2	Full	240	0.0	0.0
Lane 2	952	3.0	1473	0.646	100	0.8	LOS A	3.7	26.2	Full	240	0.0	0.0
Lane 3	5	0.0	83	0.063	100	12.5	LOS A	0.1	0.8	Short	60	0.0	NA
Approach	1908	3.0		0.646		0.9	LOS A	3.7	26.2				
West: Golf Club Access													
Lane 1	16	6.7	233	0.068	100	62.9	LOS E	1.0	7.3	Full	500	0.0	0.0
Approach	16	6.7		0.068		62.9	LOS E	1.0	7.3				
Intersection	4007	3.3		0.701		1.4	LOS A	4.6	33.4				

Level of Service (LOS) Method: Delay (RTA NSW).

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.

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Project: \\psf\Google Drive_ASON SL1 (Director)_Ason_SL2\Projects\0123\Projects\Modelling\AG0123m01 Cumberland Hwy x Links Ave.sip6

SITE LAYOUT

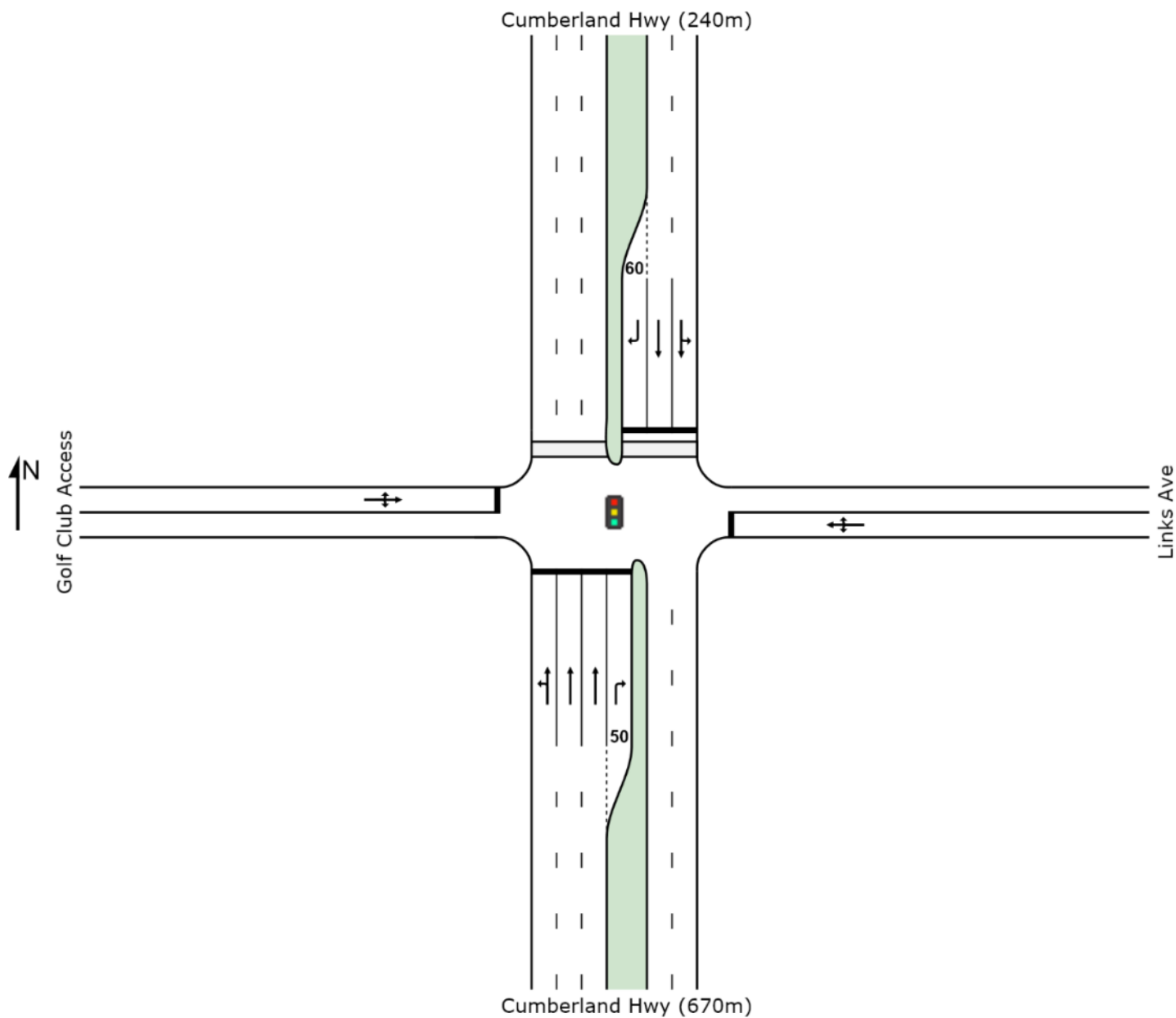
 **Site: BASE AM**

Cumberland Hwy x Links Ave

Baseline Scenario

AM Peak - Post RMS Improvements

Signals - Fixed Time Coordinated



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Organisation: ASON PTY LTD | Created: Wednesday, February 10, 2016 12:26:40 PM

Project: Z:\Google Drive_Ason_SL2\Projects\0123\Projects\Modelling\AG0123m01v1 Cumberland Hwy x Links Ave (Revised Yield).sip6

LANE SUMMARY



Site: **BASE AM**

Cumberland Hwy x Links Ave

Baseline Scenario

AM Peak - Post RMS Improvements

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Hwy (670m)													
Lane 1	581	6.8	1398	0.416	100	0.8	LOS A	1.1	8.3	Full	670	0.0	0.0
Lane 2	581	7.1	1398	0.416	100	0.5	LOS A	1.1	8.3	Full	670	0.0	0.0
Lane 3	581	7.1	1398	0.416	100	0.5	LOS A	1.1	8.3	Full	670	0.0	0.0
Lane 4	7	0.0	140	0.053	100	11.3	LOS A	0.1	0.9	Short	50	0.0	NA
Approach	1752	7.0		0.416		0.7	LOS A	1.1	8.3				
East: Links Ave													
Lane 1	44	2.4	234	0.189	100	53.6	LOS D	2.3	16.5	Full	500	0.0	0.0
Approach	44	2.4		0.189		53.6	LOS D	2.3	16.5				
North: Cumberland Hwy (240m)													
Lane 1	848	5.7	1409	0.602	100	0.8	LOS A	2.4	17.4	Full	240	0.0	0.0
Lane 2	849	5.7	1410	0.602	100	0.7	LOS A	2.4	17.4	Full	240	0.0	0.0
Lane 3	3	33.3	120	0.026	100	11.5	LOS A	0.1	0.5	Short	60	0.0	NA
Approach	1701	5.8		0.602		0.7	LOS A	2.4	17.4				
West: Golf Club Access													
Lane 1	7	0.0	248	0.030	100	51.0	LOS D	0.4	2.6	Full	500	0.0	0.0
Approach	7	0.0		0.030		51.0	LOS D	0.4	2.6				
Intersection	3504	6.3		0.602		1.5	LOS A	2.4	17.4				

Level of Service (LOS) Method: Delay (RTA NSW).

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.

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Project: Z:\Google Drive_Ason_SL2\Projects\0123\Projects\Modelling\AG0123m01v1 Cumberland Hwy x Links Ave (Revised Yield).sip6

LANE SUMMARY



Site: BASE PM

Cumberland Hwy x Links Ave

Baseline Scenario

PM Peak - Post RMS Improvements

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Hwy (670m)													
Lane 1	686	3.5	1429	0.480	100	0.6	LOS A	1.5	10.7	Full	670	0.0	0.0
Lane 2	686	3.5	1430	0.480	100	0.6	LOS A	1.5	10.7	Full	670	0.0	0.0
Lane 3	686	3.5	1430	0.480	100	0.6	LOS A	1.5	10.7	Full	670	0.0	0.0
Lane 4	7	0.0	112	0.066	100	11.7	LOS A	0.1	0.9	Short	50	0.0	NA
Approach	2066	3.5		0.480		0.6	LOS A	1.5	10.7				
East: Links Ave													
Lane 1	17	6.3	230	0.073	100	52.2	LOS D	0.9	6.3	Full	500	0.0	0.0
Approach	17	6.3		0.073		52.2	LOS D	0.9	6.3				
North: Cumberland Hwy (240m)													
Lane 1	951	2.9	1433	0.664	100	0.9	LOS A	3.1	22.4	Full	240	0.0	0.0
Lane 2	952	3.0	1434	0.664	100	0.7	LOS A	3.1	22.4	Full	240	0.0	0.0
Lane 3	5	0.0	130	0.041	100	11.1	LOS A	0.1	0.6	Short	60	0.0	NA
Approach	1908	3.0		0.664		0.8	LOS A	3.1	22.4				
West: Golf Club Access													
Lane 1	16	6.7	236	0.067	100	52.0	LOS D	0.8	5.9	Full	500	0.0	0.0
Approach	16	6.7		0.067		52.0	LOS D	0.8	5.9				
Intersection	4007	3.3		0.664		1.1	LOS A	3.1	22.4				

Level of Service (LOS) Method: Delay (RTA NSW).

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.

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Project: Z:\Google Drive_Ason_SL2\Projects\0123\Projects\Modelling\AG0123m01v1 Cumberland Hwy x Links Ave (Revised Yield).sip6

LANE SUMMARY

 **Site: FU(R4) AM**

Cumberland Hwy x Links Ave

Future Scenario (High Density Resi. and Office)

AM Peak - Post RMS Improvements

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Hwy (670m)													
Lane 1	581	6.8	1398	0.416	100	0.8	LOS A	1.1	8.3	Full	670	0.0	0.0
Lane 2	581	7.1	1398	0.416	100	0.5	LOS A	1.1	8.3	Full	670	0.0	0.0
Lane 3	581	7.1	1398	0.416	100	0.5	LOS A	1.1	8.3	Full	670	0.0	0.0
Lane 4	16	0.0	134	0.118	100	11.6	LOS A	0.3	2.0	Short	50	0.0	NA
Approach	1760	6.9		0.416		0.7	LOS A	1.1	8.3				
East: Links Ave													
Lane 1	135	0.8	236	0.571	100	57.2	LOS E	7.6	53.4	Full	500	0.0	0.0
Approach	135	0.8		0.571		57.2	LOS E	7.6	53.4				
North: Cumberland Hwy (240m)													
Lane 1	865	5.5	1408	0.614	100	1.0	LOS A	2.5	18.2	Full	240	0.0	0.0
Lane 2	866	5.7	1410	0.614	100	0.7	LOS A	2.5	18.3	Full	240	0.0	0.0
Lane 3	3	33.3	120	0.026	100	11.5	LOS A	0.1	0.5	Short	60	0.0	NA
Approach	1734	5.6		0.614		0.9	LOS A	2.5	18.3				
West: Golf Club Access													
Lane 1	7	0.0	242	0.030	100	51.0	LOS D	0.4	2.6	Full	500	0.0	0.0
Approach	7	0.0		0.030		51.0	LOS D	0.4	2.6				
Intersection	3636	6.1		0.614		3.0	LOS A	7.6	53.4				

Level of Service (LOS) Method: Delay (RTA NSW).

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.

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Project: Z:\Google Drive_Ason_SL2\Projects\0123\Projects\Modelling\AG0123m01v2 Cumberland Hwy x Links Ave (Revised Yield & Commercial).sip6

LANE SUMMARY

 **Site: FU(R4) PM**

Cumberland Hwy x Links Ave

Future Scenario (High Density Resi. & Office)

PM Peak - Post RMS Improvements

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Hwy (670m)													
Lane 1	686	3.5	1429	0.480	100	0.6	LOS A	1.5	10.7	Full	670	0.0	0.0
Lane 2	686	3.5	1430	0.480	100	0.6	LOS A	1.5	10.7	Full	670	0.0	0.0
Lane 3	686	3.5	1430	0.480	100	0.6	LOS A	1.5	10.7	Full	670	0.0	0.0
Lane 4	26	0.0	103	0.255	100	12.8	LOS A	0.6	4.0	Short	50	0.0	NA
Approach	2085	3.5		0.480		0.7	LOS A	1.5	10.7				
East: Links Ave													
Lane 1	58	1.8	233	0.249	100	54.2	LOS D	3.1	21.8	Full	500	0.0	0.0
Approach	58	1.8		0.249		54.2	LOS D	3.1	21.8				
North: Cumberland Hwy (240m)													
Lane 1	986	2.7	1430	0.689	100	1.4	LOS A	3.5	25.0	Full	240	0.0	0.0
Lane 2	989	3.0	1434	0.689	100	0.8	LOS A	3.5	25.1	Full	240	0.0	0.0
Lane 3	5	0.0	130	0.041	100	11.1	LOS A	0.1	0.6	Short	60	0.0	NA
Approach	1980	2.9		0.689		1.1	LOS A	3.5	25.1				
West: Golf Club Access													
Lane 1	16	6.7	232	0.068	100	52.1	LOS D	0.8	6.0	Full	500	0.0	0.0
Approach	16	6.7		0.068		52.1	LOS D	0.8	6.0				
Intersection	4139	3.2		0.689		1.9	LOS A	3.5	25.1				

Level of Service (LOS) Method: Delay (RTA NSW).

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.

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Project: Z:\Google Drive_Ason_SL2\Projects\0123\Projects\Modelling\AG0123m01v2 Cumberland Hwy x Links Ave (Revised Yield & Commercial).sip6

Appendix C

7 TYPICAL FLOOR PLANS



GROUND FLOOR PLAN

7 TYPICAL FLOOR PLANS



■ TYPICAL BASEMENT LEVEL