Ref 12.062L02v04

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22 October 2013

Capital Corporation
Suite 705/12 Century Circuit
Baulkham Hills
NSW 2153

Attention: Maria Passafaro

Re: Response to TfNSW & SOPA comments: Stages 1A and 2

Dear Maria,

We refer to the letter from the Department of Planning & Infrastructure dated 13th September 2013 which has as an attachment documenting the combined TfNSW and RMS submission which is itself dated 28th August 2013. In this regard we have reviewed the specific matters raised and our response to these is provided below, under the relevant heading and in the order in which they appear in the submission.

Commercial Office Car Park Generation

The RMS rate of 2.0 trips/100m^2 GFA in the RMS Guideline was previously discounted due to the very outdated nature of the research that underpins it, which is based on surveys undertaken in 1979. Since that time, there has been a significant increase in peak spreading and this is a direct consequence of the increase in part-time and casual workforce participation, as well as behavioural responses to increased traffic congestion on the road network. The RMS trip rate is also premised upon a level of parking that is twice the parking proposed under this development application and this factor alone warrants a commensurate reduction in the trip rate of 2.0/100m^2 GFA of in the order of 50%.

The RMS trip rate also assumes a 62% car mode split across the wider metropolitan area, which, with an average occupancy of 1.19 persons per car, results in a car driver mode split of 52%. Importantly, this does not take any account of the effect of behavioural change in response to public transport targets, as established in the State Government's NSW 2021 ten year plan and the Sydney Metropolitan Transport Plan.

A highly relevant example of the way in which these factors are currently being accounted for in progressive developments, is the State Government's own approach to the redevelopment of the North Ryde Station Precinct (the M2 site) Planning Report dated November 2012. The North Ryde area presently has a mode split for the inbound journey to work of 85% as car driver, yet the TMAP

study prepared by Parsons Brinkerhoff on behalf of the NSW Government adopted a car modal driver split of only 30%, with a substantial commensurate increase in public transport, walking and cycling trips. The NRSPP development similarly proposes a restrictive parking regime, comparable to the restricted parking that is permitted within Olympic Park.

The resultant trip rate for commercial uses as applied by Government for the assessment of the NRSPP was in fact 0.81 trips/100m^2 in the AM Peak (2.7 person trips x 30% car driver); and 0.76 trips/100m^2 in the PM Peak (2.7 person trips x 28% car driver). This is in fact less than the rates adopted in the traffic report, which was 0.97 trips/100m^2 during both peaks (374 veh/hr generated by 38,605m^2 GFA). It should be noted that this was expressed in the original traffic report as 0.8 trips/space/hr (i.e. 374 trips generated by 470 commercial spaces). It is considered that the higher trip rate as adopted, accounts for the fact that the Olympic Park precinct may not achieve the same level of public transport accessibility as the NRSPP in the long term, the latter being a transit oriented development (TOD).

The adopted trip rate of 0.97 trips/100m^2 is also supported by the very recent RMS research as published in the RMS Technical Direction TDT 2013/04a dated August 2013. This Direction includes surveys of an office block in Olympic Park that generated 1.48 trips/100m^2 in the AM peak and 1.41 trips/100m^2 GFA in the PM peak. However, it is emphasised that these rates reflect only current driver behaviour and take no account of behavioural changes over time, in response to initiatives aimed at achieving Government targets for non-car travel modes and reduce car dependency.

In summary, we consider that the commercial trip rates as adopted in the report are valid and indeed, responsible. We do not accept the relevance or application of the RMS rate of 2.0 trips/100m^2 GFA, which takes no account of the reduced parking as proposed, which is 50% of the RMS parking rate that underpins the RMS traffic generation rate. Indeed, this factor alone would reduce the trip rate to 1.0 trip/100m^2 so that in effect, the traffic report as previously submitted does not take advantage of any changes in travel behaviour.

Notwithstanding the above, in an effort to accommodate the RMS (particularly as that this issue has been ongoing), we have undertaken sensitivity testing based on the adoption of a rate of 1.48 trips/100m^2 GFA and 1.41 trips/100m^2 GFA in the AM and PM peaks respectively. These are worst case assumptions that will not occur in practice and it is reiterated that these are not agreed rates and should not be applicable in the circumstances.

The results of this further analysis are shown in **Table 1** and provided in **Attachment 1** (with the intersection layout diagrams requested by SOPA).

Table 1: Intersection Performance: AM and PM Peak Hour

Intersection Description	Control Type	Model	Period	Degree of Saturation	Intersection Delay	Level of Service
Herb Elliott & Australia Avenue	Signals	Without Development	AM	0.472	16.9	B
			PM	0.552	15.7	B
		Original Assessment With Development	AM	0.472	17.3	B
			PM	0.742	17.6	B
		RMS Trip Rates With Development	AM	0.472	17.5	B
			PM	0.819	19.3	B
Herb Elliott & Olympic Blvd	Give-Way	Without Development	AM	0.013	8.8	A
			PM	0.431	11.7	A
		Original Assessment With Development	AM	0.038	9.0	A
			PM	0.576	13.5	A
		RMS Trip Rates With Development	AM	0.061	9.1	A
			PM	0.624	14.1	A
Australia Avenue & Kevin Coombs	Stop (Two-way)	Without Development	AM	0.040	16.0	B
			PM	0.015	14.3	A
		Original Assessment With Development	AM	0.044	16.9	B
			PM	0.016	14.8	B
		RMS Trip Rates With Development	AM	0.047	17.5	B
			PM	0.016	14.8	B
Australia Ave & Sarah Durack	Signals	Without Development	AM	0.643	22.8	B
			PM	0.910	41.0	C
		Original Assessment With Development	AM	0.750	23.1	B
			PM	0.975	50.3	D
		New RMS Trip Rates With Development	AM	0.783	23.8	B
			PM	1.016	54.9	D

It is evident that the RMS trip rates result in a slight deterioration in intersection performances across the network, but with generally acceptable levels of service. The notable exception is the level of service D which is achieved at the intersection of Sarah Durack with Australia Avenue. This indicates that this intersection is 'at capacity' although its performance is considered to be generally satisfactory, particularly in the context of the performance of the four arterial 'gateway' intersections to the precinct, which are located at Holker Street/Silverwater Road, Hill Road/M4 Motorway off-ramp, Bernie Avenue/Parramatta Road and Underwood Street/Australia Avenue/Homebush Bay Drive.

Operation of Herb Elliot Avenue & Road 16

The subject development has been developed in accordance with the SOPA 2030 Masterplan, which includes the geometric design requirements for SOPA approved Road 16 and its intersection with Herb Elliot Avenue. Accordingly, the function, traffic implications and performance of Road 16 and its intersection with Herb Elliot Avenue would have been assessed during the development of the Masterplan.

Notwithstanding, the intersection of Herb Elliot Avenue with Road 16 is minor in nature and based on our understanding of the future road network would operate at a satisfactory level of service and with minimal delays under normal traffic conditions (that is outside major event periods).

Should the Department consider the additional modelling necessary, it is requested that this be made a Condition of Consent and undertaken prior to the issue of a Construction Certificate such that any minor amendments to the future intersection layout can be identified.

SOPA have also requested that modelling of the intersection be undertaken to identify the future operation during major events. This is not considered the responsibility of the applicant and is a traffic management issue that requires a holistic approach/assessment of the entire SOPA precinct. To accurately assess the operation of this intersection under event conditions, appropriate information would be required from SOPA including traffic volumes, road closures, parking restrictions and other management measures that would influence both vehicle route choices within the precinct and traffic flows in the immediate locality.

Survey Data for Retail Uses

The RMS Guideline rates for retail uses during the critical PM peak period are as follows:

	Parking	*Traffic Generation*	*Trips per Space*
*Supermarke*t	4.2/100m^2	15.5/100m^2	3.7 trips/space
Specialty	4.5/100m^2	4.6/100m^2	1.0 trips/space

The original traffic report adopted 3 trips/space and this was applied uniformly to the 36 spaces for the combined retail and supermarket parking for Stages 1 and 2, setting aside the fact that the supermarket under Stage 1 is already approved. This resulted in 108 veh/hr as adopted and we are unclear as to how the 103 veh/hr mentioned in the RMS submission has been derived. Nevertheless, the 108 veh/hr as adopted is clearly a worst case scenario because application of the above RMS rates would reduce trips significantly for Stages 1 and 2 combined, as follows:

Supermarket	16 spaces at 3.7 trips/space	59 veh/hr
Retail	20 spaces at 1.0 trips/space	20 veh/hr

In summary, the RMS submission on this issue in our view fails to take due account of the fact that the parking supply under this application is suppressed as required by SOPA; and an assessment based on trips as a function of floor area alone fails to take account of this critical factor. Specifically, the proposed retail parking (2.0 spaces/100m^2) is only 44% of the RMS parking rate of 4.5 spaces/100m^2 and we are unclear why this critical factor is not recognised by the RMS. In our view, reduced parking must result in lower traffic generation, while promoting alternate travel

modes. In this case, this will involve employees and visitors walking to the modest local neighbourhood retail uses within the development.

Resultant Traffic Generation

Based on the above discussion, we strongly disagree with the suggestion that traffic generation will exceed 800 veh/hr as this conclusion results from the blind application of generic RMS Guideline trip rates with no recognition of the benefits that derive from a suppressed parking supply. It also takes no account of the transport challenge that must be accepted, aimed at altering travel behaviour in accordance with Government policy, rather than simply reflect what is currently occurring. That is, the RMS trip rates represent a car-dependent 'model' that is inappropriate for use without adjustment.

Other Committed Development and the Intersection of Homebush Bay Drive/Australia Avenue and Underwood Road

With regard to the need for a cumulative assessment of other committed development, it is noted that this was not included in the Director General's Requirements for Stage 1a or Stage 2 issued on the 12th December 2012, which formed the framework for these development applications. In this regard, all matters raised by the RMS and the DGR's have been considered previously and were dealt with satisfactorily as part of the Project Application approval.

This current application is generally consistent with the land use concept adopted for the purpose of the Project Application and in these circumstances it is considered unnecessary to now consider the development in a strategic planning context. That is, the need to assess strategic planning issues arising from cumulative development in the locality, while desirable, is properly the responsibility of the RMS, Auburn Council and SOPA in fulfilling their strategic planning functions, in the interests of orderly planning.

With regard to the need to consider the conditions at the intersection of Homebush Bay Drive/Australia Avenue and Underwood Road, we note that this intersection, as well as other critical strategic intersections in the wider locality, will need to be assessed over time in light of all committed and proposed development within SOPA and Wentworth Point, as well as growth generally on these regional arterial corridors. It is understood that Government has committed to establishing a solution to unlocking additional road capacity, noting that there are several stakeholders involved in this process, including local councils, Department of Planning and Infrastructure, Transport for NSW, SOPA and RMS. Nevertheless, these existing capacity constraints should not be considered as reasons to limit development within SOPA; but rather as a challenge to ensure that all opportunities are addressed, solutions found and funding arrangements put in place based on cost apportionment.

Detailed Design Plan of Australia Avenue and New Road (Road 10)

The need to undertake a detailed design for approval prior to construction is accepted and agreed and can be conditioned. With regard to SOPA's request that consideration be given to the performance of this intersection, it is noted that this is assessed in the original traffic impact assessment report.

Car Park Layout

The need to comply with AS 2890.1 Parts 1, 2 and 6 is accepted and agreed and can be conditioned.

Signposting

The need to prepare a signage plan is accepted and agreed and can be conditioned such that it implementation be at no cost to the RMS.

Construction Traffic Management Plan

The need to prepare a Construction Traffic management Plan is accepted and agreed and can be conditioned.

Impacts on Bus Services

Rather than impact adversely on bus services, the proposal, with suppressed parking supply based on SOPA parking rates, is expected to increase the viability of existing bus services over time. Nevertheless, any improvements in services would likely be in response to increased demands over time arising from all committed and future development in the wider locality, including Wentworth Point and SOPA.

The Department is however invited to impose a condition requiring the preparation of a Green Travel and Workplace Travel Plan prior to any occupation, to ensure that use of bus services is maximised.

Performance of Driveways

SOPA has separately raised the issue of the performance of the access driveways onto Road 10 and Road 16. In this regard, during the critical PM peak, the former access generates 156 veh/hr (based on the high RMS trip rates); and the latter access 170 veh/hr, also based on the high RMS trip rates. However, for the reasons discussed above, there are expected to reduce significantly to less than 100 veh/hr.

Under either scenario these are moderate flows that can be readily accommodated and equate generally to 2 or 3 vehicle movements per minute during peak periods, so that delays will be negligible. It is also noted that under Austroads Part 3 – Traffic Studies and Analysis (2009), intersection modelling (capacity analysis) is not required for traffic volumes of this order where access is onto a local road.

Car Parking Summary

It is also noted that a discrepancy in the total number of car parking spaces over the whole site has been found, following lodgement of the State Significant Development (SSD) applications with the Department of Planning and Infrastructure. The SSD applications for Stages 1A and 2 of the proposed developments at 2 Herb Elliott Ave and 6 Australia Ave stated that there would be a total of 504 car parking spaces provided for the whole site. The actual number of car parking spaces to be provided for the whole site is 501. The maximum number of spaces permitted on the site is 525

based on SOPA's controls. The total of 501 car parking spaces therefore continues to comply with the SOPA maximum parking controls for the site and there will be no adverse impacts resulting from this slight reduction from the 504 originally indicated.

The Department of Planning and Infrastructure have retrospectively requested the breakdown of floorspace by use for the Section 75W and for Stage 1A and Stage 2 development applications including car parking numbers. This information is provided in **Table 2** below which also includes the proposed breakdown of the Stage 1 development to provide context.

Table 2: Parking Requirements

Type	Area	SOPA Parking Rates	Maximum Permissible	Spaces Provided
Stage 1				
Commercial	16,425 GFA	1 space per 80m^2	205	205
Supermarket	475 NLA	1 space per 25m^2	19	19
Local Retail	109 NLA	1 space per 50m^2	2	2
Stage 1 Total			**226**	**226**
Stage 1A				
Commercial	6,489 GFA	1 space per 80m^2	81	63
Local Retail	409 NLA	1 space per 50m^2	8	7
Stage 1A Total			**89**	**70**
Stage 2				
Stage 2 Commercial	15,657 GFA	1 space per 80m^2	196	196
Stage 2 Retail	712 NLA	1 space per 50m^2	14	9
Stage 2 Total			**210**	**205**
		Totals	**525**	**501**

It should also be noted that the car parking for the overall development will be delivered in two separate stages. The first development stage will include the construction of the Basement Level 1 which comprises a total of 278 parking spaces. These spaces will service all of the Stage 1 development and 52 of the proposed 70 spaces for Stage 1A. The reaming 18 spaces for Stage 1A will be delivered during the construction of the Stage 2 basement car park.

This is considered supportable in the circumstances particularly given that SOPA's parking requirements are a maximum provision and hence full compliance with these controls is still met.

Based on the above, in our opinion the proposed Stage 1a and Stage 2 developments remain supportable on traffic planning grounds, subject to the imposition of appropriate conditions as discussed. Please contact the undersigned should you have any questions or would like to discuss the matters raised further.

Yours faithfully

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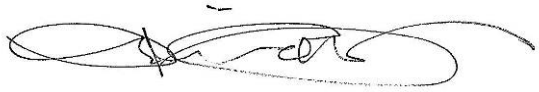
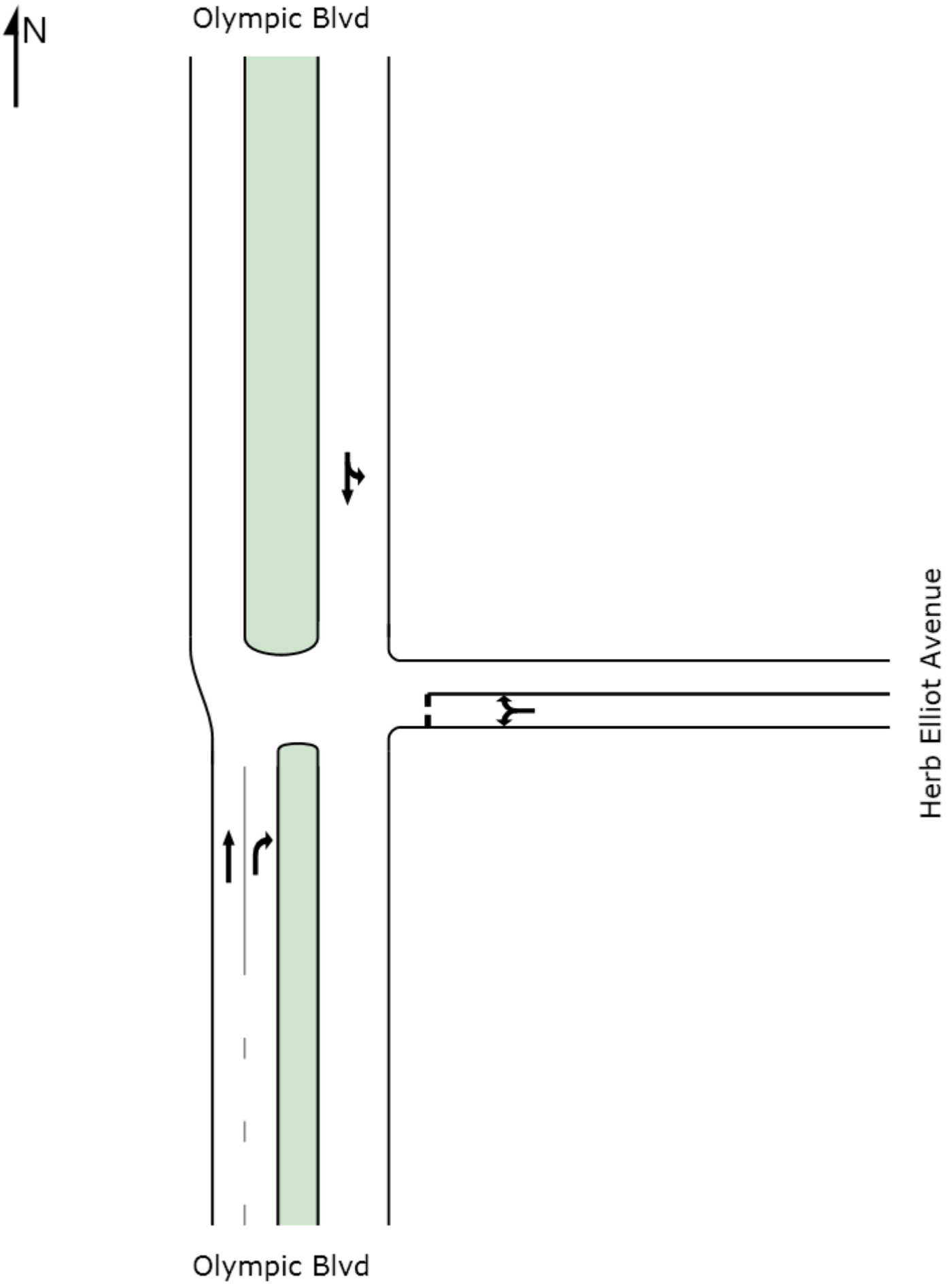


Graham Pindar
Director

Attachment 1


N
Olympic Blvd
Herb Elliot Avenue
Olympic Blvd

MOVEMENT SUMMARY

Site: AM Peak + Development Existing Herb Elliott Ave & Olympic Blvd

AM Peak Existing + Development
Herb Elliott Avenue & Olymkpic Blvd
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Olympic Blvd											
2	T	20	6.0	0.011	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	16	6.0	0.010	8.8	LOS A	0.0	0.3	0.23	0.59	48.1
Approach		36	6.0	0.011	3.9	NA	0.0	0.3	0.10	0.26	54.1
East: Herb Elliot Avenue											
4	L	4	6.0	0.061	9.1	LOS A	0.2	1.5	0.22	0.64	48.0
6	R	59	6.0	0.061	9.0	LOS A	0.2	1.5	0.22	0.62	48.1
Approach		63	6.0	0.061	9.0	LOS A	0.2	1.5	0.22	0.62	48.1
North: Olympic Blvd											
7	L	131	6.0	0.096	8.5	LOS A	0.0	0.0	0.00	0.74	49.0
8	T	42	6.0	0.096	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		173	6.0	0.096	6.4	NA	0.0	0.0	0.00	0.56	51.3
All Vehicles		272	6.0	0.096	6.7	NA	0.2	1.5	0.07	0.53	50.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

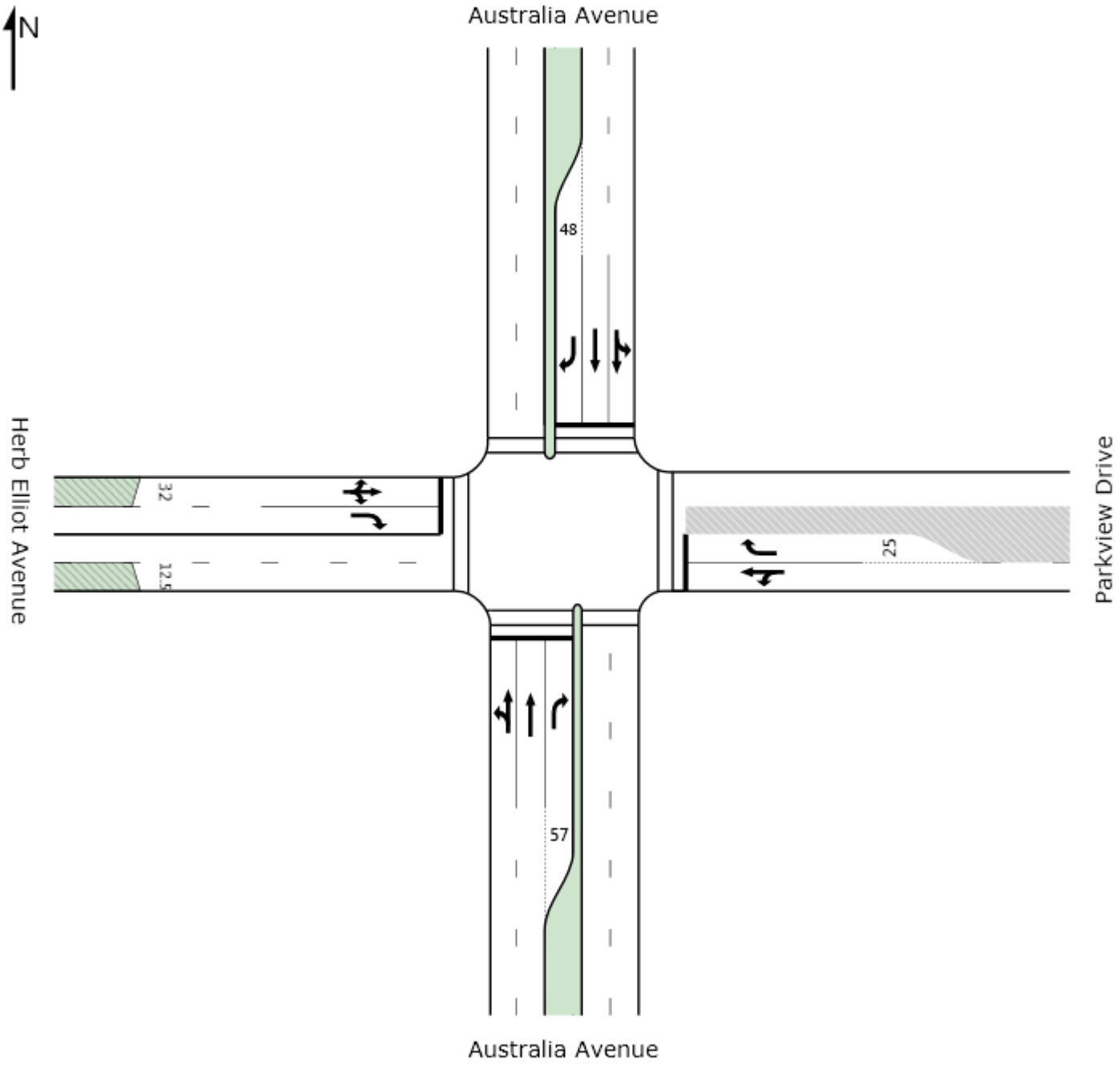
Site: PM Peak + Development ExistingHerb Elliott Ave & Olympic Blvd

PM Peak Existing Development
Herb Elliott Avenue & Olymkpic Blvd
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Olympic Blvd											
2	T	132	6.0	0.070	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	94	6.0	0.067	9.1	LOS A	0.3	1.9	0.30	0.63	47.8
Approach		225	6.0	0.070	3.8	NA	0.3	1.9	0.13	0.26	54.2
East: Herb Elliot Avenue											
4	L	82	6.0	0.624	14.1	LOS A	5.8	42.7	0.63	0.90	43.6
6	R	421	6.0	0.624	13.9	LOS A	5.8	42.7	0.63	1.00	43.6
Approach		503	6.0	0.624	13.9	LOS A	5.8	42.7	0.63	0.98	43.6
North: Olympic Blvd											
7	L	126	6.0	0.139	8.5	LOS A	0.0	0.0	0.00	0.83	49.0
8	T	128	6.0	0.139	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		255	6.0	0.139	4.2	NA	0.0	0.0	0.00	0.41	54.0
All Vehicles		983	6.0	0.624	9.1	NA	5.8	42.7	0.35	0.67	48.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.


N
Australia Avenue
48
Herb Elliot Avenue
32
12.5
25
Parkview Drive
57
Australia Avenue

MOVEMENT SUMMARY

Site: AM Peak Existing +Development Australia Ave, Herb Elliot Ave & Parkview Drive

AM Peak Existing + Development
Australia Avenue, Parkview Drive & Herb Elliot Drive
Signals - Fixed Time Cycle Time = 50 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Australia Avenue											
1	L	315	6.0	0.472	21.5	LOS B	6.0	44.1	0.80	0.81	37.9
2	T	301	6.0	0.422	12.7	LOS A	5.6	41.0	0.78	0.66	42.1
3	R	214	6.0	0.458	22.3	LOS B	4.2	30.9	0.81	0.80	37.4
Approach		829	6.0	0.472	18.5	LOS B	6.0	44.1	0.80	0.76	39.2
East: Parkview Drive											
4	L	27	6.0	0.058	15.3	LOS B	0.6	4.6	0.66	0.69	30.8
5	T	13	6.0	0.058	10.7	LOS A	0.6	4.6	0.66	0.49	31.6
6	R	14	6.0	0.047	15.0	LOS B	0.2	1.6	0.65	0.63	30.8
Approach		54	6.0	0.058	14.1	LOS A	0.6	4.6	0.66	0.63	31.0
North: Australia Avenue											
7	L	29	6.0	0.159	19.7	LOS B	1.8	13.3	0.69	0.84	40.7
8	T	193	6.0	0.159	11.2	LOS A	1.8	13.5	0.69	0.55	43.3
9	R	109	6.0	0.367	25.9	LOS B	2.3	17.3	0.86	0.78	35.2
Approach		332	6.0	0.367	16.8	LOS B	2.3	17.3	0.75	0.65	40.0
West: Herb Elliot Avenue											
10	L	37	6.0	0.282	15.9	LOS B	1.7	12.2	0.69	0.71	30.5
11	T	11	6.0	0.282	11.3	LOS A	1.7	12.2	0.69	0.55	31.1
12	R	211	6.0	0.282	16.2	LOS B	2.8	20.4	0.72	0.72	30.2
Approach		258	6.0	0.282	15.9	LOS B	2.8	20.4	0.72	0.72	30.3
All Vehicles		1473	6.0	0.472	17.5	LOS B	6.0	44.1	0.77	0.72	37.2

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

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	Across S approach	53	19.4	LOS B	0.1	0.1	0.88	0.88
P3	Across E approach	53	15.2	LOS B	0.1	0.1	0.78	0.78
P5	Across N approach	53	19.4	LOS B	0.1	0.1	0.88	0.88
P7	Across W approach	53	16.8	LOS B	0.1	0.1	0.82	0.82
All Pedestrians		212	17.7	LOS B			0.84	0.84

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: PM Peak Existing + Development Australia Ave, Herb Elliot Ave & Parkview Drive

PM Peak Existing + Development
Australia Avenue, Parkview Drive & Herb Elliot Drive
Signals - Fixed Time Cycle Time = 50 seconds (Practical Cycle Time)

Movement Performance - Vehicles

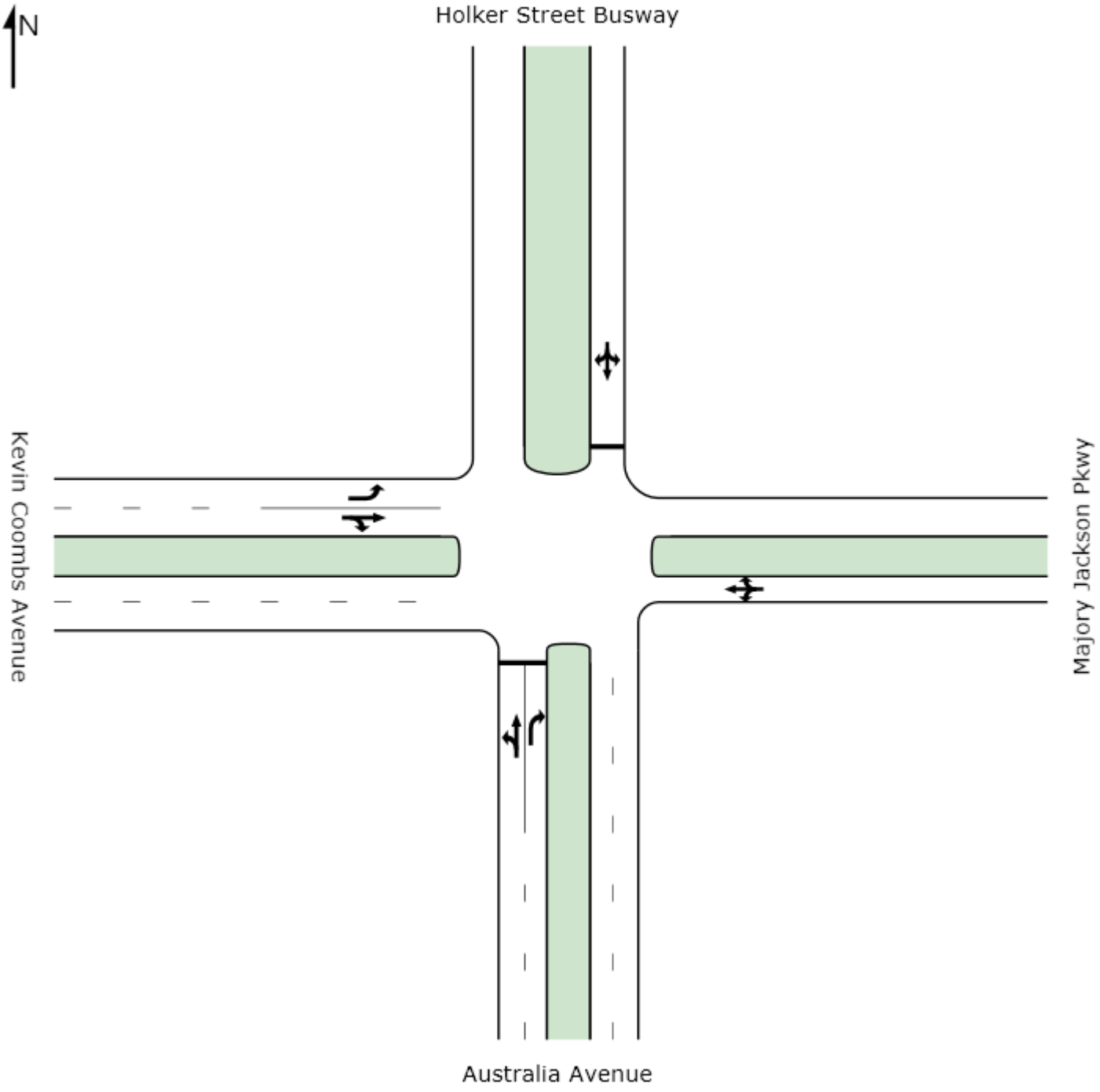
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Australia Avenue											
1	L	91	6.0	0.445	23.5	LOS B	5.2	38.1	0.84	0.84	38.0
2	T	435	6.0	0.445	15.0	LOS B	5.3	39.4	0.84	0.70	39.7
3	R	19	6.0	0.058	24.0	LOS B	0.4	2.7	0.78	0.71	36.3
Approach		544	6.0	0.445	16.7	LOS B	5.3	39.4	0.84	0.73	39.3
East: Parkview Drive											
4	L	152	6.0	0.234	14.2	LOS A	2.9	21.2	0.66	0.73	31.3
5	T	34	6.0	0.234	9.6	LOS A	2.9	21.2	0.66	0.54	32.0
6	R	109	6.0	0.377	15.3	LOS B	1.8	13.2	0.69	0.70	30.6
Approach		295	6.0	0.377	14.1	LOS A	2.9	21.2	0.67	0.70	31.1
North: Australia Avenue											
7	L	11	6.0	0.322	22.8	LOS B	3.6	26.7	0.80	0.87	39.2
8	T	371	6.0	0.322	14.3	LOS A	3.7	26.9	0.80	0.65	40.7
9	R	39	6.0	0.139	26.4	LOS B	0.8	6.0	0.84	0.74	34.9
Approach		420	6.0	0.322	15.6	LOS B	3.7	26.9	0.80	0.67	40.0
West: Herb Elliot Avenue											
10	L	96	6.0	0.819	25.0	LOS B	7.1	52.2	0.76	1.02	26.7
11	T	12	6.0	0.819	20.4	LOS B	7.1	52.2	0.76	0.89	27.1
12	R	605	6.0	0.819	25.9	LOS B	11.7	86.3	0.90	1.03	26.4
Approach		713	6.0	0.819	25.7	LOS B	11.7	86.3	0.88	1.03	26.4
All Vehicles		1972	6.0	0.819	19.3	LOS B	11.7	86.3	0.82	0.82	32.7

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

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	Across S approach	53	16.8	LOS B	0.1	0.1	0.82	0.82
P3	Across E approach	53	17.6	LOS B	0.1	0.1	0.84	0.84
P5	Across N approach	53	16.8	LOS B	0.1	0.1	0.82	0.82
P7	Across W approach	53	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		212	17.7	LOS B			0.84	0.84

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.


N
Holker Street Busway
Kevin Coombs Avenue
Majory Jackson Pkwy
Australia Avenue

MOVEMENT SUMMARY

Site: AM Peak Existing + Development Australia Avenue, Kevin Coomb Ave

AM Peak Existing + Development
Australia Avenue, Kevin Coombs Ave,
Holker St busway & Majory Jackson Pkwy
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Australia Avenue											
10	L	174	6.0	0.159	11.3	LOS A	0.6	4.5	0.12	0.92	46.3
11	T	3	6.0	0.159	11.9	LOS A	0.6	4.5	0.12	1.00	45.8
12	R	21	6.0	0.052	17.4	LOS B	0.2	1.3	0.55	0.94	41.8
Approach		198	6.0	0.159	11.9	LOS A	0.6	4.5	0.17	0.93	45.8
East: Majory Jackson Pkwy											
1	L	47	6.0	0.035	8.5	LOS A	0.2	1.4	0.19	0.59	48.3
2	T	15	6.0	0.035	0.1	LOS A	0.2	1.4	0.19	0.00	55.5
3	R	1	6.0	0.035	8.0	LOS A	0.2	1.4	0.19	0.60	48.5
Approach		63	6.0	0.035	6.5	NA	0.2	1.4	0.19	0.46	49.8
North: Holker Street Busway											
4	L	1	6.0	0.047	16.5	LOS B	0.2	1.2	0.41	0.71	41.9
5	T	16	6.0	0.047	17.5	LOS B	0.2	1.2	0.41	0.95	41.5
6	R	4	6.0	0.047	17.0	LOS B	0.2	1.2	0.41	0.95	41.8
Approach		21	6.0	0.047	17.3	LOS B	0.2	1.2	0.41	0.94	41.6
West: Kevin Coombs Avenue											
7	L	4	6.0	0.002	8.4	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	23	6.0	0.260	0.2	LOS A	1.5	10.8	0.19	0.00	55.4
9	R	417	6.0	0.260	8.3	LOS A	1.5	10.8	0.19	0.60	48.4
Approach		444	6.0	0.260	7.9	NA	1.5	10.8	0.19	0.57	48.7
All Vehicles		726	6.0	0.260	9.2	NA	1.5	10.8	0.19	0.67	47.7

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

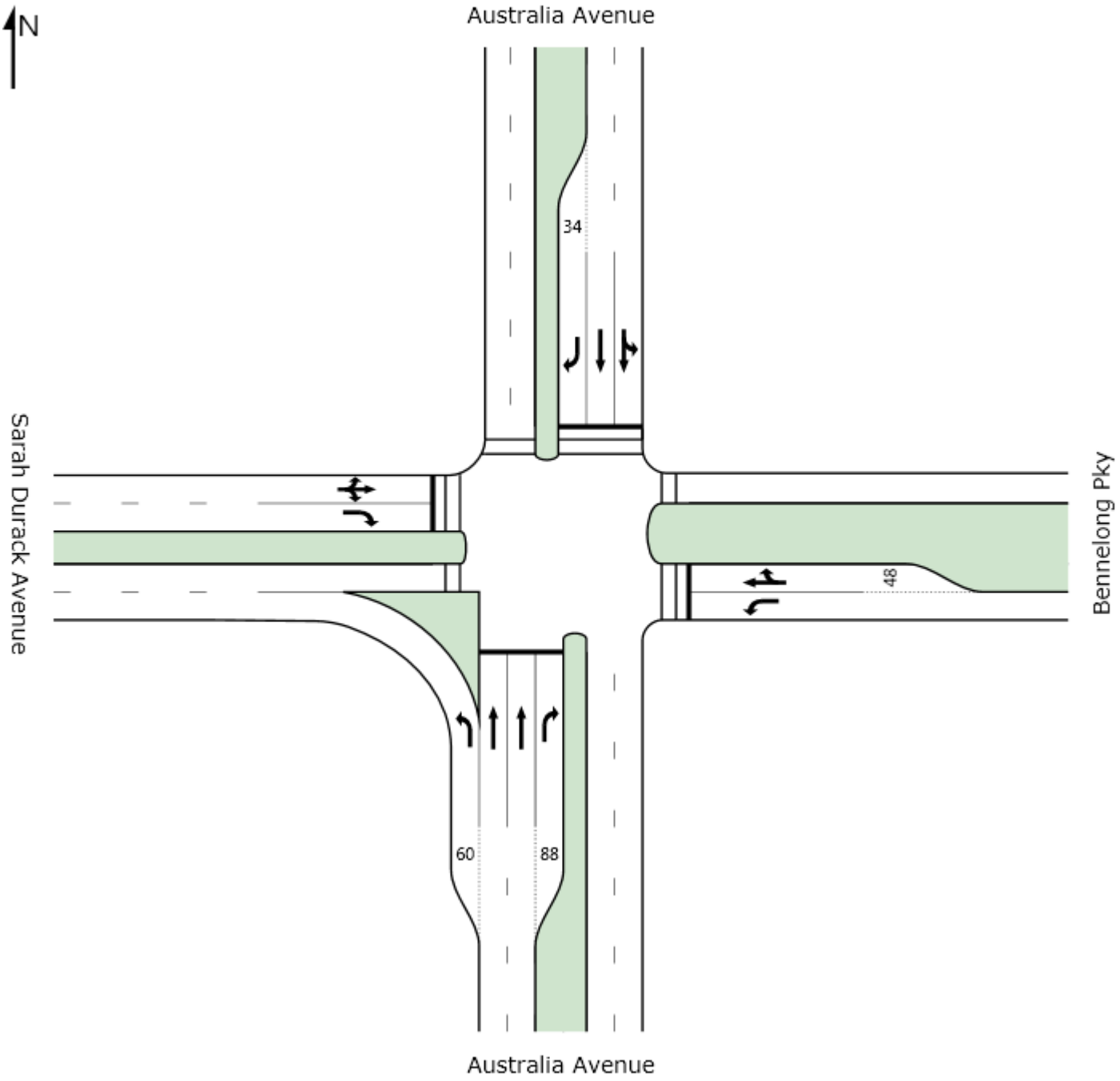
Site: PM Peak Existing + Development Australia Avenue, Kevin Coomb Ave

PM Peak Existing + Development
Australia Avenue, Kevin Coombs Ave,
Holker St busway & Majory Jackson Pkwy
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Australia Avenue											
10	L	469	6.0	0.428	11.3	LOS A	2.3	17.0	0.11	0.92	46.3
11	T	16	6.0	0.428	11.9	LOS A	2.3	17.0	0.11	0.99	45.8
12	R	76	6.0	0.133	14.5	LOS A	0.5	3.7	0.45	0.92	44.1
Approach		561	6.0	0.428	11.7	LOS A	2.3	17.0	0.16	0.92	46.0
East: Majory Jackson Pkwy											
1	L	12	6.0	0.016	8.5	LOS A	0.1	0.6	0.13	0.74	48.7
2	T	16	6.0	0.016	0.1	LOS A	0.1	0.6	0.13	0.00	57.1
3	R	1	6.0	0.016	8.0	LOS A	0.1	0.6	0.13	0.71	49.0
Approach		28	6.0	0.016	3.8	NA	0.1	0.6	0.13	0.33	53.1
North: Holker Street Busway											
4	L	1	6.0	0.016	13.9	LOS A	0.1	0.4	0.25	0.81	43.8
5	T	7	6.0	0.016	14.8	LOS B	0.1	0.4	0.25	0.92	43.4
6	R	1	6.0	0.016	14.1	LOS A	0.1	0.4	0.25	0.93	43.7
Approach		9	6.0	0.016	14.7	LOS B	0.1	0.4	0.25	0.91	43.5
West: Kevin Coombs Avenue											
7	L	3	6.0	0.002	8.4	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	24	6.0	0.150	0.1	LOS A	0.8	5.7	0.10	0.00	57.4
9	R	238	6.0	0.150	8.2	LOS A	0.8	5.7	0.10	0.62	48.8
Approach		265	6.0	0.150	7.5	NA	0.8	5.7	0.10	0.56	49.5
All Vehicles		864	6.0	0.428	10.2	NA	2.3	17.0	0.14	0.79	47.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.


N
Australia Avenue
34
Sarah Durack Avenue
Bennelong Pky
48
60
88
Australia Avenue

MOVEMENT SUMMARY

Site: AM Peak Exist + Development Australia Ave, Bennelong Pky & Sarah Durack Ave

AM Peak Existing + Development
Australia Ave, Bennelong Pky & Sarah Durack Ave
Signals - Fixed Time Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Australia Avenue											
1	L	383	5.0	0.214	7.8	X	X	X	X	0.60	49.8
2	T	1452	5.0	0.783	24.8	LOS B	32.1	234.0	0.89	0.81	33.9
3	R	289	5.0	0.550	22.0	LOS B	7.7	56.4	0.66	0.80	37.5
Approach		2124	5.0	0.783	21.4	LOS B	32.1	234.0	0.70	0.77	36.5
East: Bennelong Pky											
4	L	454	5.0	0.596	14.0	LOS A	11.4	83.6	0.57	0.81	43.4
5	T	33	5.0	0.750	61.6	LOS E	4.4	32.1	1.00	0.85	21.0
6	R	42	5.0	0.750	69.8	LOS E	4.4	32.1	1.00	0.85	20.9
Approach		529	5.0	0.750	21.4	LOS B	11.4	83.6	0.63	0.81	37.7
North: Australia Avenue											
7	L	4	5.0	0.216	29.1	LOS C	6.0	43.7	0.60	0.96	34.8
8	T	396	5.0	0.216	18.8	LOS B	6.0	44.0	0.60	0.51	38.1
9	R	44	5.0	0.200	27.4	LOS B	1.0	7.4	0.83	0.74	34.4
Approach		444	5.0	0.216	19.7	LOS B	6.0	44.0	0.63	0.54	37.6
West: Sarah Durack Avenue											
10	L	31	5.0	0.583	36.3	LOS C	8.7	63.4	0.90	0.82	30.4
11	T	18	5.0	0.583	27.9	LOS B	8.7	63.4	0.90	0.74	30.9
12	R	366	5.0	0.583	44.9	LOS D	8.8	64.5	0.92	0.81	27.1
Approach		415	5.0	0.583	43.5	LOS D	8.8	64.5	0.92	0.81	27.4
All Vehicles		3512	5.0	0.783	23.8	LOS B	32.1	234.0	0.71	0.75	35.4

X: Not applicable for Continuous movement.

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	8.0	LOS A	0.1	0.1	0.38	0.38
P5	Across N approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	21.6	LOS C	0.1	0.1	0.63	0.63
All Pedestrians		159	26.3	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: PM Peak Exist + Development Australia Ave, Bennelong Pky & Sarah Durack Ave

PM Peak Existing + Development
Australia Ave, Bennelong Pky & Sarah Durack Ave
Signals - Fixed Time Cycle Time = 115 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Australia Avenue											
1	L	480	5.0	0.268	7.8	X	X	X	X	0.60	49.7
2	T	427	5.0	0.361	32.9	LOS C	9.3	67.6	0.82	0.69	30.3
3	R	410	5.0	0.921	50.0	LOS D	19.7	143.6	0.97	0.98	25.4
Approach		1317	5.0	0.921	29.1	LOS C	19.7	143.6	0.57	0.75	33.0
East: Bennelong Pky											
4	L	551	5.0	0.849	50.9	LOS D	26.8	195.3	0.99	1.09	25.0
5	T	45	5.0	0.585	62.1	LOS E	3.4	24.7	1.00	0.77	21.2
6	R	12	5.0	0.585	70.3	LOS E	3.4	24.7	1.00	0.77	21.2
Approach		608	5.0	0.849	52.1	LOS D	26.8	195.3	0.99	1.06	24.6
North: Australia Avenue											
7	L	19	5.0	1.016	92.7	LOS F	43.6	318.3	1.00	1.28	17.5
8	T	1182	5.0	1.016	92.8	LOS F	52.8	385.4	1.00	1.34	16.4
9	R	71	5.0	0.235	18.6	LOS B	1.5	11.3	0.56	0.72	39.9
Approach		1272	5.0	1.016	88.6	LOS F	52.8	385.4	0.98	1.30	17.0
West: Sarah Durack Avenue											
10	L	15	5.0	0.693	26.1	LOS B	7.5	54.6	0.67	0.81	35.3
11	T	8	5.0	0.693	17.7	LOS B	7.5	54.6	0.67	0.57	37.1
12	R	448	5.0	0.693	40.7	LOS C	11.0	80.3	0.81	0.80	28.5
Approach		471	5.0	0.693	39.9	LOS C	11.0	80.3	0.80	0.80	28.8
All Vehicles		3668	5.0	1.016	54.9	LOS D	52.8	385.4	0.81	1.00	23.6

X: Not applicable for Continuous movement.

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	35.2	LOS D	0.1	0.1	0.78	0.78
P5	Across N approach	53	51.7	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	36.8	LOS D	0.1	0.1	0.80	0.80
All Pedestrians		159	41.2	LOS E			0.84	0.84

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.