

23 May 2018

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Goodman  
Level 17, 60 Castlereagh Street  
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Attn: Guy Smith

**RE: Enfield Intermodal Logistics Centre (ILC), Cosgrove Road, Enfield - Response to Submissions**

Dear Guy,

I refer to your email of 16 May 2018 concerning the Enfield ILC, MOD14 project at the above-mentioned Site. In this regard, we have reviewed the relevant comments provided by the Department of Planning and Environment (DP&E) included in the Response to Submissions (RTS) table and provide our response to relevant traffic matters below.

**1 Response to Submissions**

Ason Group's responses to each relevant comment included in RTS table are summarised in **Table 1** below.

**Table 1: Response to Submissions**

Ref	Matter Raised	Ason Group Response
a	<p><u>Traffic Generation and Access</u></p> <p>The Department notes the documentation does not provide a clear breakdown of access routes for the increase in trucks proposed within modification request and relies on routes (and breakdown of numbers) as presented within the Preferred Project Report prepared in 2006. Given the modification request is for additional truck to truck movements (resulting in increased truck volumes) and reduced train to truck movements, it is requested that a detailed breakdown of truck access routes and volumes be provided, including volumes for any trucks accessing warehouses directly from Cosgrove Road.</p>	<p>Available "routes" are effectively unchanged as a result of the current proposal; which generally retains the overall road network originally proposed in terms of external connections to Cosgrove Road and Roberts Road. The distribution of truck movements onto these routes could change as a result of the change in character. Indeed, minor changes in distribution could reasonably be expected from one specific tenant to the next. In the absence of more specific information (based on data from prospective tenants) being available, the TIA adopted similar 'distribution' of truck movements onto the wider road network. The resultant distribution resulting in the majority of trucks being expected to use Centenary Drive to the north, Roberts Road to the south and, to a lesser extent, Liverpool Road (Hume Highway) to the west. This is consistent with what might be expected of proposed truck-to-truck warehousing having regard for the regional connectivity generally and, as such, deemed suitable for adoption for the high-level traffic analysis undertaken in the absence of known tenants or end-users.</p> <p>Having regard for the above, detailed truck volume projections on respective routes are clearly presented in Section 6.2 of the submitted Traffic Impact Assessment (TIA). It is also noted that the proportion of trucks was refined to account for the change from rail-to-truck to truck-to-truck movements.</p>

Ref	Matter Raised	Ason Group Response
b	The Submissions Report should consider the impacts of the additional truck movements and any redistribution of trucks on the broader traffic network.	As stated above, changes to the proportion (%) of trucks have been accounted for by the modelling included within the TIA.
c	<p><u>Cumulative Traffic Impacts</u></p> <p>Predicted operational traffic generation for the approved garden centre in the Tarpaulin Factory area should be considered in the traffic assessment. See Enfield ILC MOD 13 which includes the details of traffic anticipated to be generated for this development.</p>	<p>The future Garden Centre is not located within the bounds of the current ILC and therefore, like any other development within the wider locality, is deemed separate to the ILC. Hence, the impacts from the Garden Centre were excluded from the scope of the TIA.</p> <p>With reference to Figure 5 of the MOD13 traffic report, prepared by Transport &amp; Urban Planning Pty Ltd (Ref: 1516r, dated May 2016), it is evident that MOD13 will result in a moderate increase in traffic at the Punchbowl Road / Cosgrove Road intersection. Whilst this additional traffic has not specifically been accounted for in the current TIA modelling, it is noted that the MOD14 and MOD13 TIA both identify that intersection as operating satisfactorily, with a Level of Service C or better. Accordingly, there is spare capacity to accommodate further traffic at that intersection.</p> <p>MOD13 identifies minimal increase at the other intersections included as part of the MOD14 TIA, such as the Cosgrove Road / Hume Highway intersection. Accordingly, the addition of MOD13 traffic at these intersections is not expected to have a material impact on the intersection performance or alter the conclusions of the MOD14 report.</p> <p>Notwithstanding the above, additional SIDRA analysis has been undertaken to investigate the performance of intersections impacted by MOD13 traffic and is discussed further in <b>Section 2</b> of this letter.</p>
d	Traffic data used in the assessment of operational noise impacts is inconsistent with that presented in the traffic assessment (e.g. does not include Toll Lease area traffic). Any potential increase in operational traffic noise, both outside of and within the site, must be presented.	This relates to the noise impact assessment report. Accordingly, this matter is deferred to SLR for comment.
e	Also, as residential properties front Cosgrove Road between Punchbowl Road and the proposed warehouses operating 24/7 along Cosgrove Road, predicted traffic noise impacts for these sensitive receivers should be provided based on changes to predicted truck routes and additional truck volumes in relation to existing traffic.	Traffic generation figures for various Precincts are summarised in <b>Table 11</b> of the TIA. This includes separate figures for Precinct A1, noting that cars associated with both Precinct A1 & B will access a consolidated car park on Precinct B, via Cosgrove Road. Trucks will still access Precinct A1 via Mainline Road.
f	Council is concerned that traffic impacts will worsen when the rail-to-truck operation, truck-to-truck operation and warehouse operation at the Enfield Intermodal reach peak capacity. The current consent requires annual traffic audits at various stages of rail-to-truck capacity in clauses 3.6-3.9 of the original consent.	<p>Continuation of the annual audit process is not proposed to change.</p> <p>As outlined in the TIA, the proposal – whilst marginally increasing truck movements – will actually reduce overall traffic movements. Accordingly, the Proposal “ <i>will generally reduce average delays at surrounding intersections..</i>” when compared to conditions that would otherwise arise from the approved ILC.</p>

Ref	Matter Raised	Ason Group Response
g	Council seeks a condition of consent to require traffic impact thresholds based on stages of uptake for both the rail-to-truck operation and truck-to-truck operation. Similarly to the conditions of the original consent, the annual traffic audits of all operations must be undertaken and validated against the traffic model prepared by Ason Group.	As outlined above, no change to the Audit process is sought.
h	A Construction Pedestrian Traffic Management Plan (CPTMP) detailing construction vehicle routes, number of trucks, hours of operation, access arrangements and traffic control should be submitted to Transport for New South Wales and Roads and Maritime for review and approval prior to the issue of a Construction Certificate.	<p>Noted.</p> <p>It is relatively standard process for preparation of any detailed Construction Pedestrian Traffic Management Plans (CPTMPs) to be deferred as a Construction Certificate (CC) requirement.</p> <p>As outlined in Section 8 of the TIA, various CTMPs have already been prepared. Further CTMPs can be prepared, in due course prior to CC, for any works which may not be adequately covered by the existing CTMPs.</p>
i	A construction works zone will not be permitted on Liverpool Road, Punchbowl Road or Roberts Road.	<p>Noted.</p> <p>No Works Zone is proposed on any Classified Roads.</p>
j	A Road Occupancy Licence should be obtained from Transport Management Centre for any works that may impact on traffic flows on Liverpool Road, Punchbowl Road or Roberts Road during construction activities.	<p>Noted.</p> <p>As with any Traffic Control Plans – as part of a detailed CTMP – any request for an ROL would be submitted separately at the relevant time.</p>
k	The introduction of truck-to-truck freight movements may result in a different distribution of traffic to and from the site to that originally envisaged under previous development scenarios for the site.	<p>Noted.</p> <p>However, as provided in the traffic assessment, truck overall traffic movements are anticipated to be reduced from that approved under the original approval.</p> <p>Refer commentary above – in response to DP&amp;E comments - regarding impacts to traffic distribution.</p>
l	<p>The introduction of truck-to-truck movement of freight without any control, could result in the overall percentage of freight moved by truck increasing over time.</p> <p>If this occurs, then the number of road vehicle movements generated by the site could increase, resulting in the saturation of nearby intersections used to access the site.</p>	<p>The TIA has accounted for the increase in truck movements; which are offset by reductions in overall traffic volumes (i.e. trucks increase, however the number of cars during peak periods reduces).</p> <p>Accordingly, the SIDRA modelling indicates that the Proposal will generally improve network performance, albeit only marginally.</p>

Ref	Matter Raised	Ason Group Response
m	As part of the growth plan for the ELC, the Applicant should demonstrate that the long-term commitment to “encourage a modal switch toward intermodal freight transportation in the medium to long term to service Greater Sydney’s 24/7 port supply chain and alleviate road congestion” (Urbis, 2018) is maintained.	<p>This strategic aim is generally supported from a transport perspective.</p> <p>It should be emphasised that intermodal operations have a higher turnover than typical warehouse facilities and – as demonstrated by the analysis included in the TIA – will actually result in (marginally) higher delays to the surrounding road network, than will occur under the current Proposal.</p> <p>Therefore, the strategic ‘benefit’ of rail-to-truck intermodal use of this site is likely to be realised elsewhere within the Metropolitan area and not specifically in the vicinity of the Enfield ILC itself.</p>

## 2 SIDRA Analysis

As discussed the above, additional SIDRA analysis has been undertaken for the following two (2) intersections to assess the impact of the additional traffic volumes as a result of the MOD13 Garden Centre:

- Cosgrove Road / Hume Highway; and,
- Punchbowl Road / Cosgrove Road.

These intersections have been assessed for the following relevant scenarios:

1. Base Case (Surveyed + Balance of Previously Approved Concept Plan)
2. Future Base Case (Base Case + MOD 13 Garden Centre)
3. Project Case (Surveyed + MOD13 Garden Centre + Current MOD14)

Assessment of MOD13 traffic volumes is derived from the TIA report submitted with that application, with relevant extracts included in **Attachment A**.

A summary of the resultant SIDRA analysis is provided in **Table 2**, with relevant SIDRA outputs included in **Attachment B**.

**Table 2: Intersection Performance**

Intersection	Scenario Number	Scenario	Period	Intersection Delay	Level of Service
Cosgrove Rd / Hume Hwy	1	Base Case (Previous Approval)	AM	29.4	C
			PM	71.9	F
	2	Future Base Case (Base Case + MOD13)	AM	32.1	C
			PM	87.1	F
	3	Project Case (Surveyed + MOD13 + MOD14 Changes)	AM	31.3	C
			PM	85.6	F
Punchbowl Rd / Cosgrove Rd	1	Base Case (Previous Approval)	AM	28.7	C
			PM	29.5	C
	2	Future Base Case (Base Case + MOD13)	AM	35.6	C
			PM	34.7	C
	3	Project Case (Surveyed + MOD13 + MOD14 Changes)	AM	34.6	C
			PM	34.5	C

The results of the SIDRA analysis confirm that:

- Overall Level of Service (LoS) will remain the same with NO change under all three (3) scenarios.
- Average intersection delay(s) for the MOD 14 Project Case scenario will be LESS than the Future Base Case scenario.

Accordingly, as concluded in the submitted TIA report, it is evident that the impact of the ILC on the surrounding road network under proposed MOD14 proposal will be LESS than the previously approved schemes.

We trust the above is of assistance and please contact the undersigned or Tim Lewis should you have any queries or require further information in relation to the above.

Yours sincerely,



Ali Rasouli

**Senior Traffic Engineer – Ason Group**

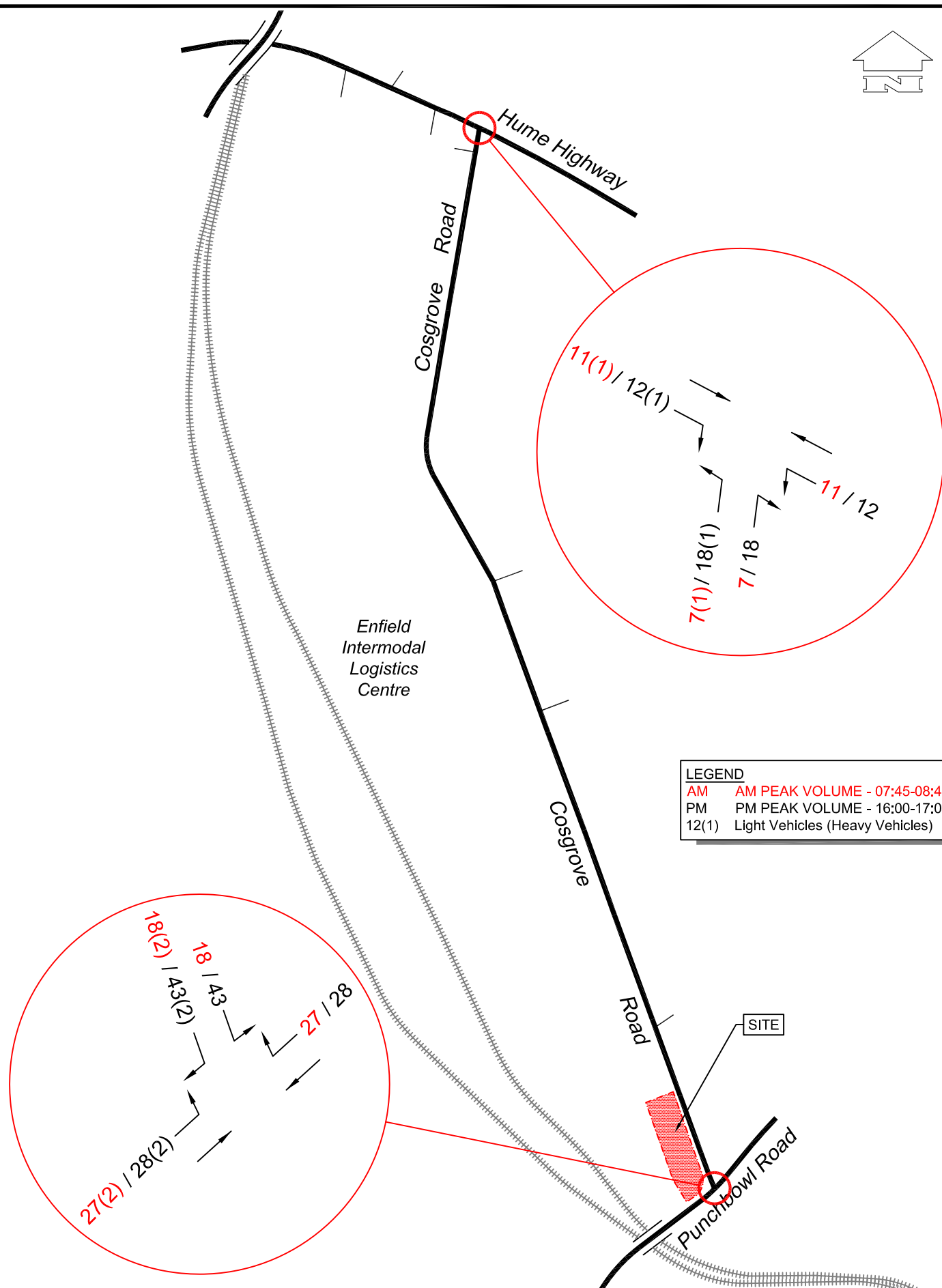
Email: [ali.rasouli@asongroup.com.au](mailto:ali.rasouli@asongroup.com.au)

Attachment(s): 1) Extract of MOD13 Traffic Volumes

2) SIDRA outputs

## Attachment A

### MOD13 Garden Centre Traffic Volumes



## TRANSPORT AND URBAN PLANNING

### TRAFFIC, TRANSPORT & PROJECT MANAGEMENT CONSULTANTS

5/90 Toronto Parade, Sutherland NSW 2232  
Phone 02 9545 1411 Fax 02 9545 1556

admin@transurbanplan.com.au

## FIGURE 5

GARDEN CENTRE, ENFIELD  
CNR COSGROVE ROAD & PUNCHBOWL ROAD

### ADDITIONAL TRIPS

JOB NO.15167



## Attachment B

### SIDRA Outputs

# LANE SUMMARY



**Site: TCS1088 [Liverpool Rd / Cosgrove Rd AM Approved]**

Liverpool Rd / Cosgrove Rd

Signals - Fixed Time Isolated Cycle Time = 140 seconds (User-Given Cycle Time)

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

Lane Use and Performance													
	Demand Flows Total veh/h	HV % veh/h	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: Cosgrove Rd (910m)													
Lane 1	425	17.6	548 <sup>1</sup>	0.776	100	42.2	LOS C	23.5	189.2	Short (P)	60	0.0	NA
Lane 2	173	7.3	214	0.805	100	76.4	LOS F	12.4	92.3	Full	910	0.0	0.0
Approach	598	14.6		0.805		52.1	LOS D	23.5	189.2				
East: Liverpool Rd (1000m)													
Lane 1	570	4.0	649 <sup>1</sup>	0.878	100	41.6	LOS C	33.4	241.6	Short	80	0.0	NA
Lane 2	572	4.9	651 <sup>1</sup>	0.878	100	39.3	LOS C	33.3	243.0	Full	1000	0.0	0.0
Lane 3	830	4.9	945	0.878	100	39.1	LOS C	54.0	394.1	Full	1000	0.0	0.0
Approach	1972	4.6		0.878		39.8	LOS C	54.0	394.1				
West: Liverpool Rd (420m)													
Lane 1	960	5.3	1495	0.642	100	6.4	LOS A	27.0	197.3	Full	500	0.0	0.0
Lane 2	960	5.3	1495	0.642	100	6.4	LOS A	27.0	197.3	Full	500	0.0	0.0
Lane 3	369	17.1	473	0.781	100	56.1	LOS D	20.4	163.4	Short	115	0.0	NA
Approach	2289	7.2		0.781		14.4	LOS A	27.0	197.3				
Intersection	4859	7.1		0.878		29.4	LOS C	54.0	394.1				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

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

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

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

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

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

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# LANE SUMMARY



**Site: TCS1088 [Liverpool Rd / Cosgrove Rd PM Approved]**

Liverpool Rd / Cosgrove Rd

Signals - Fixed Time Isolated Cycle Time = 140 seconds (User-Given Cycle Time)

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

Lane Use and Performance													
	Demand Flows Total veh/h	HV % veh/h	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cosgrove Rd (910m)													
Lane 1	559	6.4	552 <sup>1</sup>	1.013	100	115.9	LOS F	58.2	430.0	Short (P)	60	0.0	NA
Lane 2	271	0.0	264 <sup>1</sup>	1.025	100	132.2	LOS F	27.9	195.2	Full	910	0.0	0.0
Approach	829	4.3		1.025		121.2	LOS F	58.2	430.0				
East: Liverpool Rd (1000m)													
Lane 1	626	5.4	620 <sup>1</sup>	1.010	100	105.6	LOS F	66.2	484.7	Short	80	0.0	NA
Lane 2	638	3.6	632 <sup>1</sup>	1.010	100	103.8	LOS F	67.3	485.6	Full	1000	0.0	0.0
Lane 3	989	3.6	980	1.010	100	91.5	LOS F	98.5	710.8	Full	1000	0.0	0.0
Approach	2253	4.1		1.010		98.9	LOS F	98.5	710.8				
West: Liverpool Rd (420m)													
Lane 1	880	1.9	1390	0.633	100	10.5	LOS A	30.1	213.8	Full	500	0.0	0.0
Lane 2	811	1.9	1281 <sup>1</sup>	0.633	100	9.8	LOS A	26.0	184.8	Full	500	0.0	0.0
Lane 3	307	13.0	333	0.922	100	79.8	LOS F	21.0	163.7	Short	115	0.0	NA
Approach	1998	3.6		0.922		20.9	LOS B	30.1	213.8				
Intersection	5080	3.9		1.025		71.9	LOS F	98.5	710.8				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

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

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

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

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

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

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# LANE SUMMARY



**Site: 101 [Punchbowl Rd / Cosgrove Rd AM Approved]**

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

Lane Use and Performance													
	Demand Flows		Cap.	Deg.	Lane	Average	Level of	95% Back of Queue	Queue	Lane	Lane	Cap.	Prob.
	Total	HV		Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	% veh/h	v/c	%	sec				m		m	%	%
East: Punchbowl Rd (620m)													
Lane 1	471	4.8	1450	0.325	100	4.6	LOS A	8.4	60.9	Full	620	0.0	0.0
Lane 2	471	4.8	1450	0.325	100	4.6	LOS A	8.4	60.9	Full	620	0.0	0.0
Lane 3	285	8.1	322	0.886	100	69.7	LOS E	19.0	142.0	Short	95	0.0	NA
Approach	1227	5.6		0.886		19.7	LOS B	19.0	142.0				
North: Cosgrove Rd (730m)													
Lane 1	169	12.6	216	0.781	100	65.0	LOS E	10.3	80.1	Short (P)	40	0.0	NA
Lane 2	165	15.9	211	0.781	100	65.2	LOS E	10.1	80.2	Full	730	0.0	0.0
Approach	334	14.2		0.781		65.1	LOS E	10.3	80.2				
West: Punchbowl Rd (460m)													
Lane 1	359	8.5	1263	0.284	100	9.6	LOS A	5.8	43.7	Short	90	0.0	NA
Lane 2	724	4.3	828	0.874	100	32.1	LOS C	37.3	270.6	Full	460	0.0	0.0
Lane 3	885	4.3	1012	0.874	100	32.4	LOS C	49.6	359.6	Full	460	0.0	0.0
Approach	1968	5.0		0.874		28.1	LOS B	49.6	359.6				
Intersection	3529	6.1		0.886		28.7	LOS C	49.6	359.6				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

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

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

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

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

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

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# LANE SUMMARY



**Site: 101 [Punchbowl Rd / Cosgrove Rd PM Approved]**

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

Lane Use and Performance													
	Demand	Flows	Cap.	Deg.	Lane	Average	Level of	95% Back of	Queue	Lane	Lane	Cap.	Prob.
	Total	HV		Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	% veh/h	v/c	%	sec				m		m	%	%
East: Punchbowl Rd (620m)													
Lane 1	678	2.7	1214	0.559	100	13.2	LOS A	22.1	158.4	Full	620	0.0	0.0
Lane 2	678	2.7	1214	0.559	100	13.2	LOS A	22.1	158.4	Full	620	0.0	0.0
Lane 3	291	10.1	390	0.746	100	54.7	LOS D	16.5	125.8	Short	95	0.0	NA
Approach	1646	4.0		0.746		20.5	LOS B	22.1	158.4				
North: Cosgrove Rd (730m)													
Lane 1	261	8.3	351	0.745	100	49.3	LOS D	13.9	104.0	Short (P)	40	0.0	NA
Lane 2	270	4.0	362	0.745	100	49.1	LOS D	14.3	103.4	Full	730	0.0	0.0
Approach	532	6.1		0.745		49.1	LOS D	14.3	104.0				
West: Punchbowl Rd (460m)													
Lane 1	166	20.3	1120	0.149	100	8.9	LOS A	2.2	18.2	Short	90	0.0	NA
Lane 2	501	2.3	651	0.770	100	36.9	LOS C	25.9	184.8	Full	460	0.0	0.0
Lane 3	530	2.3	688	0.770	100	37.4	LOS C	27.8	198.5	Full	460	0.0	0.0
Approach	1197	4.8		0.770		33.2	LOS C	27.8	198.5				
Intersection	3375	4.6		0.770		29.5	LOS C	27.8	198.5				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

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

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

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

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

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

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# MOVEMENT SUMMARY



**Site: TCS1088 [Liverpool Rd / Cosgrove Rd AM Approved + Garden Centre Traffic]**

Liverpool Rd / Cosgrove Rd

Signals - Fixed Time Isolated Cycle Time = 140 seconds (User-Given Cycle Time)

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

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Cosgrove Rd (910m)											
1	L2	434	17.5	0.781	41.9	LOS C	23.9	192.6	0.84	0.85	39.5
2	T1	1	0.0	0.838	72.9	LOS F	13.2	98.1	1.00	0.91	25.2
3	R2	179	7.1	0.838	78.6	LOS F	13.2	98.1	1.00	0.91	35.4
Approach		614	14.4	0.838	52.6	LOS D	23.9	192.6	0.89	0.87	37.9
East: Liverpool Rd (1000m)											
4	L2	225	2.3	0.901	51.3	LOS D	35.9	259.8	0.79	0.87	41.9
5	T1	1758	4.9	0.901	45.1	LOS D	58.5	427.0	0.88	0.92	39.9
Approach		1983	4.6	0.901	45.8	LOS D	58.5	427.0	0.87	0.91	40.2
West: Liverpool Rd (420m)											
10	L2	1	0.0	0.642	12.0	LOS A	27.0	197.3	0.46	0.43	19.2
11	T1	1919	5.3	0.642	6.4	LOS A	27.0	197.3	0.46	0.43	56.0
12	R2	382	16.8	0.789	56.4	LOS D	21.4	171.0	0.98	1.03	35.7
Approach		2302	7.2	0.789	14.7	LOS B	27.0	197.3	0.55	0.53	51.4
All Vehicles		4899	7.0	0.901	32.1	LOS C	58.5	427.0	0.72	0.73	44.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	21.8	LOS C	0.1	0.1	0.56	0.56	
P2	East Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96	
All Pedestrians		105	43.0	LOS E			0.76	0.76	

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

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

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

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Approved - RTS Analysis.sip7

# MOVEMENT SUMMARY

 **Site: TCS1088 [Liverpool Rd / Cosgrove Rd PM Approved+ Garden Centre Traffic]**

Liverpool Rd / Cosgrove Rd

Signals - Fixed Time Isolated Cycle Time = 140 seconds (User-Given Cycle Time)

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

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		veh	m		per veh	km/h
South: Cosgrove Rd (910m)											
1	L2	579	6.4	1.008	112.2	LOS F	59.8	441.7	1.00	1.11	25.7
2	T1	1	0.0	1.058	147.8	LOS F	32.5	227.7	1.00	1.19	16.0
3	R2	288	0.0	1.058	153.3	LOS F	32.5	227.7	1.00	1.19	25.3
Approach		868	4.2	1.058	125.9	LOS F	59.8	441.7	1.00	1.14	25.5
East: Liverpool Rd (1000m)											
4	L2	145	10.9	1.054	140.0	LOS F	74.2	542.9	1.00	1.40	27.1
5	T1	2120	3.6	1.054	128.9	LOS F	111.0	801.4	1.00	1.42	24.6
Approach		2265	4.1	1.054	129.6	LOS F	111.0	801.4	1.00	1.42	24.7
West: Liverpool Rd (420m)											
10	L2	1	0.0	0.673	17.6	LOS B	34.2	243.0	0.61	0.57	18.2
11	T1	1689	1.9	0.673	11.4	LOS A	34.2	243.0	0.57	0.53	53.3
12	R2	321	12.8	0.928	80.5	LOS F	22.4	174.1	1.00	1.11	30.6
Approach		2012	3.6	0.928	22.4	LOS B	34.2	243.0	0.64	0.62	47.9
All Vehicles		5145	3.9	1.058	87.1	LOS F	111.0	801.4	0.86	1.06	30.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate	
		ped/h	sec		Pedestrian ped	m		per ped	
P1	South Full Crossing	53	21.8	LOS C	0.1	0.1	0.56	0.56	
P2	East Full Crossing	53	55.9	LOS E	0.2	0.2	0.89	0.89	
All Pedestrians		105	38.9	LOS D			0.73	0.73	

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

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

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

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# MOVEMENT SUMMARY

 **Site: 101 [Punchbowl Rd / Cosgrove Rd AM Approved+ Garden Centre Traffic]**

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

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Punchbowl Rd (620m)											
5	T1	942	4.8	0.328	4.9	LOS A	8.7	63.1	0.35	0.31	55.8
6	R2	314	7.4	0.928	77.1	LOS F	22.4	166.4	1.00	1.01	30.5
Approach		1256	5.4	0.928	22.9	LOS B	22.4	166.4	0.51	0.49	44.9
North: Cosgrove Rd (730m)											
7	L2	174	10.9	0.904	75.5	LOS F	12.8	98.5	1.00	0.99	30.8
9	R2	200	15.3	0.904	75.8	LOS F	12.8	98.5	1.00	1.00	28.9
Approach		374	13.2	0.904	75.6	LOS F	12.8	99.0	1.00	1.00	29.8
West: Punchbowl Rd (460m)											
10	L2	389	8.4	0.315	10.1	LOS A	6.8	51.1	0.38	0.67	51.9
11	T1	1609	4.3	0.913	42.4	LOS C	57.2	414.7	0.92	0.98	36.4
Approach		1999	5.1	0.913	36.1	LOS C	57.2	414.7	0.82	0.92	38.9
All Vehicles		3628	6.0	0.928	35.6	LOS C	57.2	414.7	0.73	0.78	39.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P3	North Full Crossing	53	17.6	LOS B	0.1	0.1	0.54	0.54	
All Pedestrians		105	36.0	LOS D			0.75	0.75	

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

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

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

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Approved - RTS Analysis.sip7



# MOVEMENT SUMMARY

 **Site: 101 [Punchbowl Rd / Cosgrove Rd PM Approved+ Garden Centre Traffic]**

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

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Punchbowl Rd (620m)											
5	T1	1356	2.7	0.590	15.7	LOS B	24.2	173.0	0.67	0.61	48.4
6	R2	320	9.2	0.847	62.4	LOS E	20.1	151.8	1.00	0.93	33.6
Approach		1676	4.0	0.847	24.6	LOS B	24.2	173.0	0.73	0.67	44.0
North: Cosgrove Rd (730m)											
7	L2	262	7.6	0.838	53.3	LOS D	17.5	130.3	0.90	0.90	35.8
9	R2	362	4.1	0.838	53.1	LOS D	17.9	129.7	0.90	0.90	34.1
Approach		624	5.6	0.838	53.2	LOS D	17.9	130.3	0.90	0.90	34.9
West: Punchbowl Rd (460m)											
10	L2	198	18.1	0.179	9.8	LOS A	3.0	24.5	0.34	0.64	51.9
11	T1	1031	2.3	0.836	44.5	LOS D	31.2	222.9	0.98	0.94	35.7
Approach		1228	4.9	0.836	38.9	LOS C	31.2	222.9	0.88	0.89	37.8
All Vehicles		3528	4.6	0.847	34.7	LOS C	31.2	222.9	0.81	0.79	39.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	40.1	LOS E	0.1	0.1	0.82	0.82	
P3	North Full Crossing	53	31.6	LOS D	0.1	0.1	0.73	0.73	
All Pedestrians		105	35.9	LOS D			0.77	0.77	

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

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

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

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Approved - RTS Analysis.sip7

# MOVEMENT SUMMARY



**Site: TCS1088 [Liverpool Rd / Cosgrove Rd AM Proposed]**

Liverpool Rd / Cosgrove Rd

Signals - Fixed Time Isolated Cycle Time = 140 seconds (User-Given Cycle Time)

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

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		veh	m		per veh	km/h
South: Cosgrove Rd (910m)											
1	L2	429	17.6	0.770	41.1	LOS C	23.4	188.2	0.84	0.84	39.8
2	T1	1	0.0	0.805	71.0	LOS F	12.1	93.1	1.00	0.89	25.6
3	R2	166	12.0	0.805	76.7	LOS F	12.1	93.1	1.00	0.89	35.7
Approach		597	16.0	0.805	51.0	LOS D	23.4	188.2	0.89	0.86	38.2
East: Liverpool Rd (1000m)											
4	L2	219	2.4	0.897	50.2	LOS D	35.4	256.3	0.79	0.86	42.2
5	T1	1758	4.9	0.897	44.1	LOS D	57.6	420.2	0.88	0.91	40.2
Approach		1977	4.6	0.897	44.8	LOS D	57.6	420.2	0.87	0.90	40.5
West: Liverpool Rd (420m)											
10	L2	1	0.0	0.642	12.0	LOS A	27.0	197.3	0.46	0.43	19.2
11	T1	1919	5.3	0.642	6.4	LOS A	27.0	197.3	0.46	0.43	56.0
12	R2	380	16.9	0.785	55.9	LOS D	21.1	168.9	0.98	1.02	35.8
Approach		2300	7.2	0.785	14.6	LOS B	27.0	197.3	0.55	0.53	51.4
All Vehicles		4874	7.2	0.897	31.3	LOS C	57.6	420.2	0.72	0.72	44.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Back of Queue Distance	Prop. Queued	Effective Stop Rate	
		ped/h	sec		ped	m		per ped	
P1	South Full Crossing	53	21.8	LOS C	0.1	0.1	0.56	0.56	
P2	East Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96	
All Pedestrians		105	43.0	LOS E			0.76	0.76	

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

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

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

# MOVEMENT SUMMARY

 **Site: TCS1088 [Liverpool Rd / Cosgrove Rd PM Proposed]**

Liverpool Rd / Cosgrove Rd

Signals - Fixed Time Isolated Cycle Time = 140 seconds (User-Given Cycle Time)

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

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Cosgrove Rd (910m)											
1	L2	578	6.4	0.990	94.6	LOS F	51.1	377.1	0.91	1.05	28.2
2	T1	1	0.0	1.032	131.1	LOS F	30.3	212.0	1.00	1.15	17.5
3	R2	285	0.0	1.032	136.6	LOS F	30.3	212.0	1.00	1.15	27.1
Approach		864	4.3	1.032	108.5	LOS F	51.1	377.1	0.94	1.08	27.7
East: Liverpool Rd (1000m)											
4	L2	126	12.5	1.058	143.4	LOS F	74.4	544.7	1.00	1.42	26.8
5	T1	2120	3.6	1.058	132.5	LOS F	111.1	802.1	1.00	1.44	24.1
Approach		2246	4.1	1.058	133.1	LOS F	111.1	802.1	1.00	1.44	24.3
West: Liverpool Rd (420m)											
10	L2	1	0.0	0.679	18.2	LOS B	35.0	248.6	0.62	0.58	18.1
11	T1	1689	1.9	0.679	11.9	LOS A	35.0	248.6	0.59	0.54	53.0
12	R2	319	12.9	0.922	78.8	LOS F	22.0	170.8	1.00	1.10	30.9
Approach		2009	3.6	0.922	22.5	LOS B	35.0	248.6	0.65	0.63	47.8
All Vehicles		5120	3.9	1.058	85.6	LOS F	111.1	802.1	0.85	1.06	30.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	22.3	LOS C	0.1	0.1	0.57	0.57	
P2	East Full Crossing	53	55.0	LOS E	0.2	0.2	0.89	0.89	
All Pedestrians		105	38.7	LOS D			0.73	0.73	

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: 101 [Punchbowl Rd / Cosgrove Rd AM Proposed]**

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

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Punchbowl Rd (620m)											
5	T1	942	4.8	0.328	4.9	LOS A	8.7	63.1	0.35	0.31	55.8
6	R2	311	7.5	0.919	75.0	LOS F	21.8	162.1	1.00	1.00	30.9
Approach		1253	5.5	0.919	22.3	LOS B	21.8	162.1	0.51	0.48	45.2
North: Cosgrove Rd (730m)											
7	L2	169	11.2	0.859	69.5	LOS E	11.8	91.1	1.00	0.95	32.0
9	R2	194	15.8	0.859	69.8	LOS E	11.8	91.1	1.00	0.95	30.1
Approach		363	13.6	0.859	69.6	LOS E	11.8	91.5	1.00	0.95	31.0
West: Punchbowl Rd (460m)											
10	L2	386	8.4	0.312	10.1	LOS A	6.7	50.4	0.38	0.67	51.9
11	T1	1609	4.3	0.913	42.2	LOS C	57.0	413.6	0.92	0.98	36.5
Approach		1996	5.1	0.913	36.0	LOS C	57.0	413.6	0.82	0.92	38.9
All Vehicles		3612	6.1	0.919	34.6	LOS C	57.0	413.6	0.73	0.77	39.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P3	North Full Crossing	53	17.6	LOS B	0.1	0.1	0.54	0.54	
All Pedestrians		105	36.0	LOS D			0.75	0.75	

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

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

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

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# MOVEMENT SUMMARY

 **Site: 101 [Punchbowl Rd / Cosgrove Rd PM Proposed]**

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

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Punchbowl Rd (620m)											
5	T1	1356	2.7	0.590	15.7	LOS B	24.2	173.0	0.67	0.61	48.4
6	R2	318	9.3	0.842	61.9	LOS E	19.8	149.9	1.00	0.93	33.7
Approach		1674	4.0	0.842	24.5	LOS B	24.2	173.0	0.73	0.67	44.0
North: Cosgrove Rd (730m)											
7	L2	263	7.6	0.834	52.8	LOS D	17.4	129.1	0.90	0.90	36.0
9	R2	359	4.1	0.834	52.6	LOS D	17.7	128.5	0.90	0.90	34.3
Approach		622	5.6	0.834	52.6	LOS D	17.7	129.1	0.90	0.90	35.0
West: Punchbowl Rd (460m)											
10	L2	194	18.5	0.175	9.5	LOS A	2.9	23.1	0.33	0.64	52.0
11	T1	1031	2.3	0.836	44.5	LOS D	31.2	222.6	0.98	0.94	35.8
Approach		1224	4.9	0.836	39.0	LOS C	31.2	222.6	0.88	0.89	37.8
All Vehicles		3520	4.6	0.842	34.5	LOS C	31.2	222.6	0.81	0.79	39.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	40.1	LOS E	0.1	0.1	0.82	0.82	
P3	North Full Crossing	53	31.6	LOS D	0.1	0.1	0.73	0.73	
All Pedestrians		105	35.9	LOS D			0.77	0.77	

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

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

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

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