From: Kathryn Saunders
Sent: Mon, 24 Aug 2020 15:02:52 +1000
To: svc_t1connectp
Subject: Incoming TfNSW Response to Additional Information - DA20/0148 - Penrith City Council
Attachments: ptc. Response to TfNSW RFI - 29 06 20.pdf, 20200824 - TfNSW Response SYD20_00453_03.pdf

#ECMBODY

From: Laura Van putten <Laura.VAN.PUTTEN@transport.nsw.gov.au>
Sent: Monday, 24 August 2020 2:22 PM
To: Kathryn Saunders <kathryn.saunders@penrith.city>
Cc: Pahee Rathan <Pahee.RATHAN@transport.nsw.gov.au>
Subject: FW: Applicant response to requested TfNSW Information - DA20/0148 - Penrith City Council

---

Hi Kathy

Please find attached TfNSW response to the subject modelling response provided by PTC.

Any questions please let me know.

Kind regards,

Laura van Putten

Land Use Planner
Planning and Programs
Greater Sydney
Transport for NSW

T 02 8849 2480 | **M** 0429 505 961
Level 5 27 Argyle Street Parramatta NSW 2150

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I acknowledge the traditional owners and custodians of the land in which I work and pay my respects to Elders past, present and future.

From: Kathryn Saunders [mailto:kathryn.saunders@penrith.city]
Sent: Monday, 13 July 2020 10:17 AM
To: development <development@transport.nsw.gov.au>
Cc: Laura Van putten <Laura.VAN.PUTTEN@transport.nsw.gov.au>
Subject: Applicant response to requested TfNSW Information - DA20/0148 - Penrith City Council

To Whom it may concern,

Please see attached applicant response to the requested further information, including Sidra files.

I have also attached a copy of the internal referral response from Council's Traffic Engineer and the original TfNSW RFI. If deemed necessary, Council may undertake its own warrant assessment and traffic analysis for the precinct/development proposal.

Please be aware there are submissions to the DA, please let me know if/how you would like a copy.

Happy to discuss or arrange for a meeting if required. Thank you.

Kind regards,

Kathryn Saunders
Senior Development Assessment Planner

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T +612 4732 8567
PO Box 60, PENRITH NSW 2751
www.visitpenrith.com.au
www.penrithcity.nsw.gov.au

Good Morning Kathy,

I hope you are well.

Further to the email below, please find attached a response to the matters raised by TfNSW from their consideration of the proposed development. Please let me know if you require anything further to forward this onto TfNSW.

All the best,
Ashleigh

ASHLEIGH RYAN
ASSOCIATE DIRECTOR

M +61 402 344 023
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URBIS

ANGEL PLACE, LEVEL 8, 123 PITT STREET
SYDNEY, NSW 2000, AUSTRALIA

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From: Kathryn Saunders <kathryn.saunders@penrith.city>
Sent: Monday, 1 June 2020 9:05 AM
To: Ashleigh Ryan <aryan@urbis.com.au>
Subject: DA20/0148 - TfNSW Request for Further Information

Good morning Ashleigh,

Please see the attached correspondence from TfNSW with regard to DA20/0148 for your information. If you will be submitting additional information for the consideration of TfNSW in response to the attached, please ensure that this is submitted to Penrith Council initially, so that I may forward on as a formal response.

Regards,

Kathryn Saunders
Senior Development Assessment Planner

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29 June 2020

Bernardo Reiter Landa
Toga
Level 5, 45 Jones Street
Ultimo
NSW 2007

Dear Bernardo

1. DA20/0148 – Response to TfNSW RFI dated 27 May 2020 (Ref. SYD20/00453/01)

This letter has been prepared to present our response to the comments / queries raised by TfNSW relating to the traffic assessment and modelling associated with the subject Development Application.

It should be noted that the modelling accompanies a Development Application, which represents an amendment to the approved development scheme and that the same model formed the basis of the approved development, which was endorsed by Council and RMS.

The modelling was prepared to satisfy the requirements of Council through the preparation of the original development application. In this regard, while we have included the requested changes within the modelling, it is important to highlight that this application is to increase the number of dwellings within the approved development and therefore the fundamental parts of the modelling have been retained as per the previously approved model.

The following section provides a summary of our findings following the incorporation of the TfNSW changes to the model.

2. Executive Summary

In summary, in response to the comments provided by TfNSW, we have prepared the following modelling scenarios:

Scenario 1A	2020 Existing AM Peak
Scenario 1B	2020 Existing PM Peak
Scenario 2A	2026 Future Base AM Peak (includes Urban Apts)
Scenario 2B	2026 Future Base PM Peak (includes Urban Apts)
Scenario 3A	2026 Future Base plus Development AM Peak
Scenario 3B	2026 Future Base plus Development PM Peak

The modelling results are summarised in Attachment 1 and indicate that following the changes recommended by TfNSW, the post development 2026 scenario operates within capacity during the morning and evening peak periods. Key capacity constraints are noted at the intersection of High Street and Worth Street, which currently operates at Level of Service E and continues to do so within the 2026 pre and post-development scenarios.

The post-development scenario indicates slight changes to some of the key indicators (degree of Saturation and Average Delay) however all of the Levels of Service remain unchanged by the development.

A detailed response to each point raised is presented on the following pages.

The electronic SIDRA files have also been provided.

We trust that this information facilitates the completion of the assessment, however, should any clarification be required, please do not hesitate to contact me.

Your faithfully

Andrew Morse

Partner

3. Detailed Response

1	*Generally, this section needs more detail as the following information is not clear:* • *Which intersections use data from TfNSW (including RMS) or Council?* • *Whether existing SCATS data from the signalised intersections was obtained from TfNSW to form the basis of the 2020 design year models?* • *Broadly explain how and why Council had to project data to 2020?* • *What are the adopted peak periods?* • *Which movements have been increased by 10% to represent the 2026 design year?* *Some of these may have been provided in another document, and they need to be included in this report. As these have not been provided, they could not be reviewed.*
Response	The following intersections were based on Council / RMS data: High Street / Worth Street = Council - Adopted from Council's Town Centre model Worth Street / Union Lane = Council Worth Street / Union Road = Council Mulgoa Road / Union Road = RMS - Adopted from the RMS Jane Street model Mulgoa Road / High Street = RMS High Street / Civic Centre = ptc. survey (was not included in the Council or RMS model) SCATS data was used in the original version of the modelling in 2017. To provide some context, when the original model was established in 2017, we were assessing a development with a new road link, a potential major upgrade to Mulgoa Road, signalisation of the High Street roundabout in the context that Council were also developing a Town Centre model to project growth on the network and the need for upgrades. In terms of matching the data, it was agreed with Council that we would adopt the data from the Town Centre strategic model, which was being developed at the time of the original DA. In 2017 we agreed that 2020 would form the base year as it was anticipated that parts of the development would be complete and potentially the RMS Jane Street project. 2026 was agreed as the post development year, given that there are further stages of the Toga project on the western site, which could be completed by 2026. The RMS model was already set up for 2026, therefore the Council data was increased to match the RMS data (the growth was applied equally to all movements except those associated with the Westfield car park at Worth Street. The peak periods were established as 8:00-9:00am and 4:00-5:00pm.
2.	*It is recommended that more detail about existing conditions such as survey counts and survey dates, queue lengths or any other data such as signal timings etc. used for model development and calibration be included in Section 3 or as an appendix of the report.*
Response	The difficulty in providing validation based on existing conditions relates to the changes to the road network that are occurring in the vicinity of the site and the fact that the modelling base year was 3 years in the future. The current DA was prepared during COVID-19 restrictions, so updated traffic surveys have not been possible. Given that the current DA is an amendment to an approved DA (and accepted modelling assessment) it was not considered necessary to undertake a new model, but to apply the increased traffic projection to the current modelling.
3.	*Generally, pre and post development impacts are compared for the same future year, i.e. how does the network operate in 2026 with and without the development. The approach*

	taken (page 13) is different, and it is recommended that the report and modelling consider the following scenarios: • *2020 – Existing Conditions: Existing Road Network, no development* • *2026 – Future Base: Future Road Network, growth, no development* • *2026 – Future Base plus development and Link Road*
Response	This is a valid recommendation and these models have now been prepared to demonstrate the difference between the 2026 with/without development scenarios
4.	*Figure 11 and 12 are labelled "Existing Road Network, Post Development". The description on page 13 suggests that it should be "Pre-Development".*
Response	Noted, these should have read 'pre-development'
5.	*The volume of eastbound and westbound traffic along Union Road in the AM and PM peaks changes by at least 100vph between Worth Street and Mulgoa Road. It is not clear if this is a result of traffic generating developments, or a function of the 2020 volume development process. It is recommended that the volumes are reviewed, update if required and an explanation provided.*
Response	We note that there is some loss/gain between intersections as a result of using the Council and RMS traffic volumes on the east and west side of the model. We chose not to make manual adjustments in order to maintain the datasets provided by RMS and Council. The example identified shows a decrease in westbound traffic in the morning, but an increase in the afternoon, therefore a simple increase to make up the difference is not appropriate. Some traffic would have been lost / gained by the former use of the site as a car sales yard and an unofficial car park.
6.	*The report identifies that model "calibration" has been applied to the intersection of Mulgoa Road / Union Road and gap acceptance parameters changed for the south approach right turn to ensure that the 95th percentile back of queue length is contained within the existing right turn lane.* *Given that Mulgoa Road is under construction to be upgraded to three lanes in each direction, and the right turn volumes at Mulgoa Road/ Union Road are projected volumes, the calibration will not result in replicating the typical traffic condition.* *Any default parameters should only be changed to replicate existing behaviour and adequate justification should be included in the report.*
Response	Observations on site at the time of the modelling indicate that the gap acceptance for the right turn movement is less that the default setting in SIDRA. When running the model we observe queuing that does not occur on site and calibrated the model to reflect the on-site observations (this was prior to the construction work). The change to the default setting is made exactly for this reason, to ensure that the model reflects actual performance.
7.	*Section 3.3 discusses future road network amendments, including intersection upgrades to Mulgoa Road and the Mulgoa Road / High Street intersection. These changes have already been included in the model results presented in Section 3.2.3 and therefore should already be described earlier in the report or the models updated to show the existing conditions road network.*
Response	At the time of preparing the original model in 2017, the 2020 scenario anticipated that the Mulgoa Road upgrade would be completed. As of June 2020, the works are still underway, therefore we have rerun the 2020 model with the current (not upgraded) road network to reflect the current conditions.

8.	*It is recommended that development traffic distribution assumptions be included in the report. To provide a clear understanding of the development impacts, it is prudent to understand how the development traffic was distributed on the network.*
Response	The traffic associated with the development was distributed according to the current distribution patterns at each intersection and the directional split on each road. The traffic flow diagrams are presented in Section 3.2 of the Traffic Impact Assessment.
9.	*The report mentions that the traffic generated by the Urban Apartments development has been included within the Post-Development modelling scenario. This should be described clearly in the modelling scenarios discussed in Item 3, and could be included at the future base scenario, or as a further post development scenario, depending on which development is likely to be constructed first.*
Response	We have included the Urban Apartments development within the 2026 base model (noting that we were requested by Council to include this development within the post-development model, which was accepted in the context of the approved DA).
10.	*The report comments that some delays experienced in the network at the intersections will increase from the existing conditions but "the proposal will result in marginal increases to those delays".* *A significant change in operation is expected at the intersections of Mulgoa Road / Union Road, Worth Street / Union Road and High Street / Worth Street, and therefore the comment is currently considered inaccurate. It may be clarified or justified if the build-up of design year scenarios is improved.*
Response	The new 2026 'without development' scenario enables a clear comparison of the pre and post development situations. Generally, while the development results in some increases to the average delays on those movements where additional traffic is applied, none of the intersections result in a high LoS and none of the intersections have an overall LoS of D or less, other than Worth Street / High Street, which operates at LoS E during the PM peak in both pre and post development scenarios (this intersection operates at LoS E at present).
11.	*The report describes the future operation of the Mulgoa Road / Union Road intersection, summarising that the unsignalised right turn exceeds the capacity of the movement in the peak periods. The report comments that this "is likely due to the random arrival of vehicles from the north within the two southbound lanes", yet both the existing and future year models include the three-lane southbound layout.* *This section also mentions that "The operation of the High Street intersection likely creates gaps between the signal phases that are not being replicated in SIDRA".* *This statement is also considered inaccurate as this is one of the main purposes of developing SIDRA Network models. It is noted that providing correct phasing in a logical sequence may improve the anticipated operation of this movement* *It is recommended that this section of the report is reviewed as it is not accurate and revised.*
Response	It is noted that the report should have referred to three southbound lanes, but the comment relating to random arrivals is still valid. While the southbound lanes of Mulgoa Road are free flowing, there are little opportunities for the right turn movement, however, we observed on site that the changes to the phases at the High Street intersection produced gaps of sufficient length to enable the lead vehicle and some follow-up vehicles to make the turn. The initial modelling did not reflect this outcome. Hence, we calibrated with the gap acceptance adjustment to result in more realistic queue lengths. The intersection operates similarly when run within the network or in isolation.

12.	*The report concludes that : "In summary, the model indicates that the proposal will be accommodated within the road network and will result in some manageable increase to the delays at some intersections"* *As per the results presented in Table 17 and 18 of the report, delays at some intersections increase in the order of 500 seconds and LOS drops from C/D to F with the proposed development. Furthermore, three intersections are anticipated to operate with a DOS over 1. This indicates that the intersections are operating above capacity.* *As highlighted in Item 3, it is recommended that new 2026 future base models are developed with background growth but without the development to understand which aspect of traffic is likely to causes the poor operation. If development traffic causes the poor operation of the intersections, then mitigation options will need to be developed and assessed for the intersections which are operating over capacity.*
Response	Noted: The increase in poor results is related to a comparison between the 2020 and 2026 post development scenarios. A comparison between the 2026 base case and 2026 post development scenarios presents a more appropriate basis for the assessment. Many of the poor results noted by TfNSW in the post development model are also identified in the 2026 base case, indicating that the background traffic growth that has been applied to the model causes the performance of the intersections to decrease. The proposed revised development results in very little change to the results, for example, all of the overall intersection LoS results are the same in both the pre and post development scenarios (AM and PM). In this regard, there are no mitigation works are required as a result of the development. The right turn movement from Mulgoa Road into Union Road operates with a high degree of saturation under both scenarios and this results in a sizable increase in the average delay and queue lengths in the post development scenario, however only a small number of development-generated vehicles are added to this movement. This disproportionate result is the effect of adding traffic to a highly saturated movement.
13.	*It does not appear that pedestrian surveys have been undertaken. It is recommended that pedestrian information is collected for the signalised intersections on Worth Street as the intersection operation will be affected by vehicles giving way to pedestrians.*
Response	The data for pedestrians was not included within either the Council or RMS dataset, therefore the default values of 50 pedestrians per hour was retained on each crossing. This is sufficient to call up a crossing movement on each cycle and was therefore considered a suitable assumption.
14.	*Approach cruise speeds and exit cruise speeds should match the posted speed limits at Union Road, Worth Street and Union Lane.*
Response	Noted. This has been checked and changed where necessary.
15.	*Gap acceptance parameters have been adjusted from their default values at the intersection of Mulgoa Road / Union Road.* *As discussed in Item 6, this is not considered appropriate given that both the layout and volumes represent future conditions.*
Response	See response to Item 6
16.	*All lane widths for all intersections are the default 3.3m. Throughout the intersection network, there are lane widths ranging from 2.5m to 3.3m. It is recommended that these are updated.*
Response	Noted. This has been checked and changed where necessary.
17.	*Intersection geometry is incorrect at the Worth Street / Union Lane intersection as follows:*

	East approach – right turn lane should be a short lane with parking *South approach- should have two exit lanes and two approach lanes.*
Response	Noted. This has been checked and changed where necessary.
18.	*Intersection geometry is incorrect at the Worth Street / Union Road intersection as follows:* *North approach – kerb side lane should be a left turn only lane, without parking.* *East approach – kerb side lane should be a short lane with parking.*
Response	Noted. This has been checked and changed where necessary.
19.	*On the north approach at High Street / Worth Street the left turn slip lane has been modelled as a separate lane. SIDRA recommends that slip lanes with a length less than 30m are modelled as a slip lane off the through lane and Free Queue distances added in the Lane Disciplines to inform how queue lengths for through and left turn vehicles interact. It is recommenced that this is updated.*
Response	Noted. This has been checked and changed and we note for future reference.
20.	*The intersection control needs to be updated at the Worth Street / Union Lane intersection to be a Give-Way rather than a Stop.*
Response	Noted. This has been checked and changed.
21.	*It is noted that pedestrian protection is not included for any of the pedestrian movements. It is likely pedestrian protection will be included from left turn vehicles and some right turn movements at the signalised intersections on Worth Street.* *The model should include pedestrian protection for all conflicting movements in line with TfNSW's Traffic Signal Design Manual and specific advice from the TfNSW Network Operations teams.* *If pedestrian protection is provided at the sites, pedestrian movements must be included within the priorities, and where required the length of late start for vehicles added under Gap Acceptance, Opposing Peds (signals).*
Response	Pedestrian protection was not operating at the modelled intersections at the time of the modelling. It is unknown whether it is operating now or if not when it will be introduced to these intersections. Regardless, it is relevant to apply the same setting to the post and pre-development scenarios to provide an accurate comparison.
22.	*At High Street and Mulgoa Road, the adopted traffic signal phase sequence of A, C, F2 would be unconventional and must be reviewed.* *Phasing for all signalised intersections requires review and should be set up as per SCATS data. Further detail is required in the report on how the phasing sequence and the phases were identified.*
Response	The phasing has been adjusted based on the TCS drawing phase diagram.
23.	*At High Street / Worth Street, the adopted phasing should be obtained from SCATS.*
	The phasing has been established based on the TCS drawing phase diagram.
24.	*Phasing and timing at Worth Street / Union Road needs to be the same as SCATS. Any changes to this phasing also should be consulted with network operations in TfNSW.*
	The 2026 model deals with future traffic growth and changes to the intersection geometry, therefore the SCATS data is not applicable to the future scenarios.

25.	*It is recommended that using 'Undetected' movements be considered and phase transitions for related signalised left turn movements be considered and reviewed for the signalised intersections along Worth Street.*
	'Undetected movements' has been applied to the slip lane at the intersection of High Street / Worth Street.
26.	*All changes recommended above should be undertaken on the 2026 post development models.*
	Noted and included
27.	*Approach and exit cruise speeds have been kept as the default 60km/h for new roads. It is recommended that this is reviewed to ensure that this is correct.*
	Noted. This has been checked and changed where necessary.
28.	*The intersection phasing adopted at High Street / Mulgoa Road needs to be completely reviewed as described in the above sections. Furthermore, it is noted that the addition of a user class for the Urban Apartments has affected the phasing for the left turn slip lane from the east approach and there are now major vehicle conflicts. Refer to Figure 1 for an example.*
	The phasing issue has been corrected and the Urban Apartments traffic volume has been run within the 2026 base case.

Document Control: Prepared by *AM* on *29 June 2020*. Reviewed by *HL* on *29 June 2020*.

Attachment 1 - Sidra Intersection Summaries

MOVEMENT SUMMARY

Site: 1 [1. High St and Mulgoa Rd - No Upgrade]

Network: N101 [Network Model - 2020 Existing AM Peak]

High Street and Mulgoa Road
2020 Existing
Existing Road Network, No Dev
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mulgoa Road														
1	L2	140	2.0	140	2.0	0.194	25.2	LOS B	4.9	34.7	0.69	0.73	0.69	36.4
2	T1	1023	2.0	1023	2.0	1.129	194.2	LOS F	34.4	244.8	1.00	1.68	2.04	10.0
3	R2	119	2.0	119	2.0	0.919	91.9	LOS F	9.5	67.3	1.00	1.00	1.48	5.9
Approach		1282	2.0	1282	2.0	1.129	166.3	LOS F	34.4	244.8	0.97	1.51	1.84	10.8
East: High Street														
4	L2	59	2.0	58	2.0	0.205	41.0	LOS C	5.8	41.3	0.76	0.75	1.01	10.7
5	T1	175	2.0	171	2.0	0.205	39.5	LOS C	5.8	41.3	0.79	0.69	0.89	29.2
6	R2	105	2.0	103	2.0	0.376	64.1	LOS E	6.4	45.8	0.95	0.78	0.95	22.1
Approach		339	2.0	332 N1	2.0	0.376	47.4	LOS D	6.4	45.8	0.84	0.73	0.93	24.5
North: Castlereagh Road														
7	L2	148	2.0	148	2.0	0.991	100.4	LOS F	59.2	421.2	1.00	1.20	1.42	14.7
8	T1	1058	2.0	1058	2.0	0.991	94.5	LOS F	59.2	421.2	1.00	1.22	1.43	14.9
9	R2	498	2.0	498	2.0	1.126	172.3	LOS F	25.4	180.8	1.00	1.30	2.11	13.5
Approach		1704	2.0	1704	2.0	1.126	117.7	LOS F	59.2	421.2	1.00	1.24	1.63	14.2
West: High Street														
10	L2	895	2.0	895	2.0	0.562	31.0	LOS C	16.5	117.4	0.80	0.88	0.97	39.5
11	T1	501	2.0	501	2.0	1.129	194.7	LOS F	66.1	470.9	1.00	1.68	2.04	8.1
12	R2	294	2.0	294	2.0	1.081	166.2	LOS F	33.9	241.3	1.00	1.26	1.91	9.3
Approach		1689	2.0	1689	2.0	1.129	103.1	LOS F	66.1	470.9	0.89	1.18	1.45	18.5
All Vehicles		5015	2.0	5008 N1	2.0	1.129	120.5	LOS F	66.1	470.9	0.94	1.26	1.58	14.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	48.2	LOS E	0.2	0.2	0.83	0.83
P1S	South Slip/Bypass Lane Crossing	53	30.2	LOS D	0.1	0.1	0.90	0.90
P2	East Full Crossing	53	41.7	LOS E	0.2	0.2	0.77	0.77

P3	North Full Crossing	53	50.7	LOS E	0.2	0.2	0.85	0.85
P4S	West Slip/Bypass Lane Crossing	53	43.3	LOS E	0.2	0.2	0.79	0.79
All Pedestrians		263	42.8	LOS E			0.83	0.83

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: 2 [2. Mulgoa Rd and Union Rd - No Upgrade]

Network: N101 [Network Model - 2020 Existing AM Peak]

Mulgoa Rd and Union Rd
2020 Existing
Existing Road Network, No Dev
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Mulgoa Road														
2	T1	1309	2.0	1309	2.0	0.498	2.4	LOS A	34.6	246.4	0.21	0.00	0.27	55.7
3	R2	302	2.0	302	2.0	1.217	236.6	LOS F	42.3	301.4	1.00	3.51	10.49	6.8
Approach		1612	2.0	1612	2.0	1.217	46.3	NA	42.3	301.4	0.36	0.66	2.19	23.7
East: Union Road														
4	L2	60	2.0	60	2.0	0.074	8.4	LOS A	0.3	2.1	0.45	0.66	0.45	49.7
Approach		60	2.0	60	2.0	0.074	8.4	LOS A	0.3	2.1	0.45	0.66	0.45	49.7
North: Mulgoa Road														
7	L2	334	2.0	329	2.0	0.179	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	38.5
8	T1	1084	2.0	1067	2.0	0.277	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1418	2.0	1396[N1]	2.0	0.277	1.3	NA	0.0	0.0	0.00	0.14	0.00	57.6
All Vehicles		3089	2.0	3067[N1]	2.0	1.217	25.1	NA	42.3	301.4	0.20	0.42	1.16	33.4

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 3 [3. High St and Civic Roundabout]

Network: N101 [Network Model - 2020 Existing AM Peak]

High and Civic Roundabout
2020 Existing
Existing Road Network, No Dev
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: High St (E)														
5	T1	313	2.0	310	2.0	0.112	2.1	LOS A	0.5	3.2	0.08	0.27	0.08	41.8
6	R2	28	2.0	28	2.0	0.112	7.5	LOS A	0.4	3.2	0.08	0.32	0.08	50.6
Approach		341	2.0	339[N1]	2.0	0.112	2.6	LOS A	0.5	3.2	0.08	0.27	0.08	43.6
North: Civic Pl (N)														
7	L2	17	2.0	17	2.0	0.042	4.0	LOS A	0.2	1.4	0.45	0.57	0.45	42.2
9	R2	26	2.0	26	2.0	0.042	9.2	LOS A	0.2	1.4	0.45	0.57	0.45	42.2
Approach		43	2.0	43	2.0	0.042	7.1	LOS A	0.2	1.4	0.45	0.57	0.45	42.2
West: High St (W)														
10	L2	74	2.0	68	2.0	0.230	2.6	LOS A	1.1	7.9	0.07	0.25	0.07	48.1
11	T1	695	2.0	643	2.0	0.230	2.1	LOS A	1.1	7.9	0.07	0.24	0.07	41.0
Approach		768	2.0	711[N1]	2.0	0.230	2.2	LOS A	1.1	7.9	0.07	0.25	0.07	42.9
All Vehicles		1153	2.0	1093[N1]	2.1	0.230	2.5	LOS A	1.1	7.9	0.09	0.27	0.09	43.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Roundabout Capacity Model: SIDRA Standard.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 4 [4. High St and Worth St]

Network: N101 [Network Model - 2020 Existing AM Peak]

High and Worth
2020 Existing
Existing Road Network, No Dev
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Worth St (S)														
1	L2	344	2.0	340	2.0	0.506	29.6	LOS C	13.8	97.9	0.75	0.78	0.75	7.8
2	T1	127	2.0	126	2.0	0.286	21.6	LOS B	7.8	55.3	0.66	0.64	0.66	32.1
3	R2	91	2.0	89	2.0	0.286	25.9	LOS B	7.8	55.3	0.66	0.64	0.66	31.8
Approach		562	2.0	554 N1	2.0	0.506	27.2	LOS B	13.8	97.9	0.71	0.72	0.71	20.9
East: High St (E)														
4	L2	28	2.0	28	2.0	0.240	34.8	LOS C	6.4	45.4	0.76	0.65	0.76	27.2
5	T1	282	2.0	282	2.0	0.240	30.2	LOS C	6.5	46.6	0.76	0.64	0.76	27.4
6	R2	31	2.0	31	2.0	0.110	40.9	LOS C	1.4	9.8	0.79	0.71	0.79	31.8
Approach		341	2.0	341	2.0	0.240	31.6	LOS C	6.5	46.6	0.76	0.64	0.76	28.0
North: Worth St (N)														
7	L2	1	2.0	1	2.0	0.014	17.9	LOS B	0.4	2.9	0.47	0.34	0.47	42.2
8	T1	14	2.0	14	2.0	0.014	13.4	LOS A	0.4	2.9	0.47	0.34	0.47	36.6
9	R2	16	2.0	16	2.0	0.041	20.7	LOS B	0.4	3.1	0.67	0.64	0.67	32.2
Approach		31	2.0	31	2.0	0.041	17.3	LOS B	0.4	3.1	0.57	0.49	0.57	34.5
West: High St (W)														
10	L2	118	2.0	110	2.0	0.209	36.0	LOS C	4.6	33.1	0.76	0.74	0.76	28.9
11	T1	451	2.0	420	2.0	0.321	31.2	LOS C	9.0	64.3	0.78	0.66	0.78	30.5
12	R2	199	2.0	186	2.0	0.569	45.0	LOS D	9.5	67.6	0.91	0.82	0.91	10.9
Approach		767	2.0	716 N1	2.0	0.569	35.5	LOS C	9.5	67.6	0.81	0.71	0.81	26.3
All Vehicles		1701	2.0	1642 N1	2.1	0.569	31.6	LOS C	13.8	97.9	0.76	0.70	0.76	25.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	32.3	LOS D	0.1	0.1	0.73	0.73
P2	East Full Crossing	53	18.7	LOS B	0.1	0.1	0.56	0.56
P3	North Full Crossing	53	33.8	LOS D	0.1	0.1	0.75	0.75

P3S	North Slip/Bypass Lane Crossing	53	27.4	LOS C	0.1	0.1	0.68	0.68
P4	West Full Crossing	53	26.1	LOS C	0.1	0.1	0.66	0.66
P4S	West Slip/Bypass Lane Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		316	32.1	LOS D			0.72	0.72

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: 5 [5. Worth St and Union Ln]

Network: N101 [Network Model - 2020 Existing AM Peak]

Worth St and Union Ln
2020 Existing
Existing Road Network, No Dev
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Worth St (S)														
1	L2	74	2.0	72	2.0	0.040	3.9	LOS A	0.0	0.0	0.00	0.52	0.00	29.7
2	T1	442	2.0	434	2.0	0.226	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		516	2.0	507[N1]	2.0	0.226	0.6	NA	0.0	0.0	0.00	0.07	0.00	42.8
East: Union Ln (E)														
4	L2	18	2.0	18	2.0	0.059	3.9	LOS A	0.2	1.7	0.34	0.50	0.34	35.0
5	T1	20	2.0	20	2.0	0.059	9.1	LOS A	0.2	1.7	0.34	0.50	0.34	35.1
6	R2	25	2.0	25	2.0	0.130	10.9	LOS A	0.2	1.7	0.61	0.80	0.61	32.3
Approach		63	2.0	63	2.0	0.130	8.4	LOS A	0.2	1.7	0.45	0.62	0.45	34.0
North: Worth St (N)														
8	T1	143	2.0	135	2.0	0.071	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
9	R2	97	2.0	91	2.0	0.103	6.8	LOS A	0.4	2.6	0.41	0.64	0.41	25.2
Approach		240	2.0	227[N1]	2.0	0.103	2.7	NA	0.4	2.6	0.17	0.26	0.17	32.6
West: Union Ln (W)														
10	L2	36	2.0	36	2.0	0.081	6.0	LOS A	0.3	2.2	0.52	0.70	0.52	20.0
12	R2	15	2.0	15	2.0	0.081	12.2	LOS A	0.3	2.2	0.52	0.70	0.52	20.0
Approach		51	2.0	51	2.0	0.081	7.8	LOS A	0.3	2.2	0.52	0.70	0.52	20.0
All Vehicles		869	2.0	847[N1]	2.1	0.226	2.1	NA	0.4	2.6	0.11	0.20	0.11	35.5

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 6 [6. Worth St and Union Rd]

Network: N101 [Network Model - 2020 Existing AM Peak]

Worth St and Union Rd
2020 Existing
Existing Road Network, No Dev
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Worth St (S)														
1	L2	22	2.0	22	2.0	0.390	68.8	LOS E	3.5	24.6	0.99	0.75	0.99	17.8
2	T1	20	2.0	20	2.0	0.390	64.2	LOS E	3.5	24.6	0.99	0.75	0.99	17.8
3	R2	13	2.0	13	2.0	0.390	68.8	LOS E	3.5	24.6	0.99	0.75	0.99	25.8
Approach		55	2.0	55	2.0	0.390	67.2	LOS E	3.5	24.6	0.99	0.75	0.99	20.1
East: Union Rd (E)														
4	L2	4	2.0	4	2.0	0.129	13.1	LOS A	3.6	26.0	0.39	0.34	0.39	44.3
5	T1	156	2.0	156	2.0	0.129	8.5	LOS A	3.6	26.0	0.39	0.34	0.39	40.6
6	R2	398	2.0	398	2.0	0.678	21.3	LOS B	15.7	111.7	0.67	0.78	0.67	31.7
Approach		558	2.0	558	2.0	0.678	17.7	LOS B	15.7	111.7	0.59	0.65	0.59	33.9
North: Worth St (N)														
7	L2	109	2.0	105	2.0	0.615	67.8	LOS E	6.7	47.5	1.00	0.80	1.03	18.6
8	T1	7	2.0	7	2.0	0.061	55.7	LOS D	0.7	5.3	0.92	0.66	0.92	20.7
9	R2	6	2.0	6	2.0	0.061	59.6	LOS E	0.7	5.3	0.92	0.66	0.92	3.7
Approach		123	2.0	118 N1	2.0	0.615	66.6	LOS E	6.7	47.5	0.99	0.78	1.02	18.3
West: Union Rd (W)														
10	L2	96	2.0	87	2.0	0.069	8.6	LOS A	1.4	10.2	0.27	0.58	0.27	36.6
11	T1	266	2.0	242	2.0	0.211	8.9	LOS A	5.8	41.2	0.41	0.37	0.41	43.3
12	R2	5	2.0	5	2.0	0.211	13.6	LOS A	5.8	41.2	0.42	0.36	0.42	42.5
Approach		367	2.0	333 N1	2.0	0.211	8.9	LOS A	5.8	41.2	0.37	0.42	0.37	42.4
All Vehicles		1103	2.0	1063 N1	2.1	0.678	22.9	LOS B	15.7	111.7	0.59	0.60	0.59	32.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	9.3	LOS A	0.1	0.1	0.38	0.38
P2	East Full Crossing	53	58.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	11.2	LOS B	0.1	0.1	0.42	0.42

P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	34.5	LOS D			0.67	0.67

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [1. High St and Mulgoa Rd - No Upgrade]

Network: N101 [Network Model - 2020 Existing PM Peak]

High Street and Mulgoa Road
2020 Existing
Existing Road Network, No Dev
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Mulgoa Road														
1	L2	238	2.0	238	2.0	0.317	23.0	LOS B	7.6	54.2	0.72	0.76	0.72	37.7
2	T1	825	2.0	825	2.0	0.902	69.0	LOS E	32.2	229.4	1.00	1.05	1.23	22.1
3	R2	62	2.0	62	2.0	0.400	73.2	LOS F	4.2	29.7	0.99	0.76	0.99	7.3
Approach		1125	2.0	1125	2.0	0.902	59.5	LOS E	32.2	229.4	0.94	0.97	1.11	23.6
East: High Street														
4	L2	96	2.0	96	2.0	0.923	88.7	LOS F	26.4	187.7	1.00	1.17	1.81	5.4
5	T1	609	2.0	609	2.0	0.923	80.2	LOS F	26.4	187.7	1.00	1.12	1.54	19.3
6	R2	285	2.0	285	2.0	0.948	93.4	LOS F	24.0	170.8	1.00	1.04	1.42	17.3
Approach		991	2.0	991	2.0	0.948	84.8	LOS F	26.4	187.7	1.00	1.10	1.53	17.6
North: Castlereagh Road														
7	L2	106	2.0	106	2.0	0.960	80.4	LOS F	60.7	432.5	1.00	1.12	1.29	17.6
8	T1	1213	2.0	1213	2.0	0.960	74.8	LOS F	60.7	432.5	0.99	1.13	1.29	17.6
9	R2	633	2.0	633	2.0	0.935	64.6	LOS E	17.5	124.4	1.00	1.04	1.44	28.9
Approach		1952	2.0	1952	2.0	0.960	71.8	LOS F	60.7	432.5	0.99	1.10	1.34	21.7
West: High Street														
10	L2	584	2.0	584	2.0	0.380	21.3	LOS B	8.2	58.2	0.73	0.77	0.73	44.0
11	T1	249	2.0	249	2.0	0.679	57.0	LOS E	16.0	113.7	0.99	0.83	0.99	21.3
12	R2	157	2.0	157	2.0	0.527	64.1	LOS E	9.9	70.8	0.97	0.81	0.97	19.7
Approach		991	2.0	991	2.0	0.679	37.1	LOS C	16.0	113.7	0.83	0.79	0.83	34.0
All Vehicles		5058	2.0	5058	2.0	0.960	64.8	LOS E	60.7	432.5	0.95	1.01	1.23	23.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	57.7	LOS E	0.2	0.2	0.91	0.91
P1S	South Slip/Bypass Lane Crossing	53	25.8	LOS C	0.1	0.1	0.84	0.84
P2	East Full Crossing	53	36.5	LOS D	0.2	0.2	0.72	0.72

P3	North Full Crossing	53	60.5	LOS F	0.2	0.2	0.93	0.93
P4S	West Slip/Bypass Lane Crossing	53	43.3	LOS E	0.2	0.2	0.79	0.79
All Pedestrians		263	44.8	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.

MOVEMENT SUMMARY

Site: 2 [2. Mulgoa Rd and Union Rd - No Upgrade]

Network: N101 [Network Model - 2020 Existing PM Peak]

Mulgoa Rd and Union Rd
2020 Existing
Existing Road Network, No Dev
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Mulgoa Road														
2	T1	1121	2.0	1121	2.0	0.503	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
3	R2	163	2.0	163	2.0	0.776	43.1	LOS D	4.6	32.7	0.95	1.27	2.10	25.0
Approach		1284	2.0	1284	2.0	0.776	5.6	NA	4.6	32.7	0.12	0.16	0.27	50.7
East: Union Road														
4	L2	258	2.0	258	2.0	0.380	11.4	LOS A	2.1	15.0	0.60	0.89	0.77	47.2
Approach		258	2.0	258	2.0	0.380	11.4	LOS A	2.1	15.0	0.60	0.89	0.77	47.2
North: Mulgoa Road														
7	L2	109	2.0	109	2.0	0.060	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	38.5
8	T1	1359	2.0	1359	2.0	0.353	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1468	2.0	1468	2.0	0.353	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.3
All Vehicles		3011	2.0	3011	2.0	0.776	3.6	NA	4.6	32.7	0.10	0.17	0.18	54.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
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 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 SUMMARY

Site: 3 [3. High St and Civic Roundabout]

Network: N101 [Network Model - 2020 Existing PM Peak]

High and Civic Roundabout
2020 Existing
Existing Road Network, No Dev
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: High St (E)														
5	T1	891	2.0	891	2.0	0.637	2.4	LOS A	1.6	11.7	0.20	0.29	0.20	40.7
6	R2	27	2.0	27	2.0	0.637	7.9	LOS A	1.6	11.7	0.20	0.31	0.20	50.4
Approach		918	2.0	918	2.0	0.637	2.6	LOS A	1.6	11.7	0.20	0.29	0.20	41.4
North: Civic Pl (N)														
7	L2	52	2.0	52	2.0	0.228	3.4	LOS A	0.7	4.7	0.37	0.58	0.37	42.3
9	R2	100	2.0	100	2.0	0.228	8.6	LOS A	0.7	4.7	0.37	0.58	0.37	42.3
Approach		152	2.0	152	2.0	0.228	6.8	LOS A	0.7	4.7	0.37	0.58	0.37	42.3
West: High St (W)														
10	L2	58	2.0	58	2.0	0.137	2.6	LOS A	0.6	4.4	0.07	0.26	0.07	48.1
11	T1	360	2.0	360	2.0	0.137	2.1	LOS A	0.6	4.4	0.07	0.25	0.07	41.0
Approach		418	2.0	418	2.0	0.137	2.2	LOS A	0.6	4.4	0.07	0.25	0.07	43.5
All Vehicles		1487	2.0	1487	2.0	0.637	2.9	LOS A	1.6	11.7	0.18	0.31	0.18	42.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Roundabout Capacity Model: SIDRA Standard.
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 SUMMARY

Site: 4 [4. High St and Worth St]

Network: N101 [Network Model - 2020 Existing PM Peak]

High and Worth
2020 Existing
Existing Road Network, No Dev
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Worth St (S)														
1	L2	198	2.0	198	2.0	0.659	56.1	LOS D	11.2	79.4	0.99	0.83	1.01	4.4
2	T1	111	2.0	111	2.0	0.429	46.8	LOS D	7.3	51.9	0.93	0.76	0.93	23.4
3	R2	28	2.0	28	2.0	0.429	51.0	LOS D	7.3	51.9	0.93	0.76	0.93	23.2
Approach		337	2.0	337	2.0	0.659	52.6	LOS D	11.2	79.4	0.96	0.80	0.97	14.0
East: High St (E)														
4	L2	77	2.0	77	2.0	0.469	33.1	LOS C	13.3	94.8	0.79	0.71	0.79	27.8
5	T1	592	2.0	592	2.0	0.469	28.4	LOS B	15.4	109.7	0.79	0.70	0.79	28.1
6	R2	181	2.0	181	2.0	0.417	35.5	LOS C	8.0	57.0	0.79	0.78	0.79	33.4
Approach		849	2.0	849	2.0	0.469	30.3	LOS C	15.4	109.7	0.79	0.72	0.79	29.7
North: Worth St (N)														
7	L2	1	2.0	1	2.0	0.298	23.8	LOS B	6.5	46.2	0.63	0.52	0.63	39.6
8	T1	184	2.0	184	2.0	0.298	19.3	LOS B	6.5	46.2	0.63	0.52	0.63	33.0
9	R2	309	2.0	309	2.0	0.538	26.9	LOS B	11.0	78.3	0.87	0.81	0.87	29.1
Approach		495	2.0	495	2.0	0.538	24.0	LOS B	11.0	78.3	0.78	0.70	0.78	30.5
West: High St (W)														
10	L2	203	2.0	203	2.0	0.481	42.6	LOS D	9.9	70.5	0.87	0.80	0.87	26.9
11	T1	232	2.0	232	2.0	0.151	24.4	LOS B	4.3	30.4	0.67	0.55	0.67	33.3
12	R2	212	2.0	212	2.0	0.955	93.9	LOS F	17.7	126.2	1.00	1.15	1.62	5.9
Approach		646	2.0	646	2.0	0.955	52.8	LOS D	17.7	126.2	0.84	0.82	1.05	20.6
All Vehicles		2327	2.0	2327	2.0	0.955	38.5	LOS C	17.7	126.2	0.83	0.76	0.89	24.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	27.4	LOS C	0.1	0.1	0.68	0.68
P2	East Full Crossing	53	22.9	LOS C	0.1	0.1	0.62	0.62
P3	North Full Crossing	53	28.8	LOS C	0.1	0.1	0.69	0.69
P3S	North Slip/Bypass Lane	53	22.9	LOS C	0.1	0.1	0.62	0.62

	Crossing							
P4	West Full Crossing	53	51.5	LOS E	0.2	0.2	0.93	0.93
P4S	West Slip/Bypass Lane Crossing	53	34.6	LOS D	0.1	0.1	0.76	0.76
All Pedestrians		316	31.3	LOS D			0.72	0.72

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: 5 [5. Worth St and Union Ln]

Network: N101 [Network Model - 2020 Existing PM Peak]

Worth St and Union Ln
2020 Existing
Existing Road Network, No Dev
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Worth St (S)														
1	L2	58	2.0	58	2.0	0.032	3.9	LOS A	0.0	0.0	0.00	0.52	0.00	29.7
2	T1	311	2.0	311	2.0	0.161	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		368	2.0	368	2.0	0.161	0.6	NA	0.0	0.0	0.00	0.08	0.00	42.3
East: Union Ln (E)														
4	L2	18	2.0	18	2.0	0.092	4.5	LOS A	0.3	1.8	0.48	0.59	0.48	34.7
5	T1	20	2.0	20	2.0	0.092	9.4	LOS A	0.3	1.8	0.48	0.59	0.48	34.8
6	R2	25	2.0	25	2.0	0.094	11.0	LOS A	0.2	1.7	0.61	0.79	0.61	32.3
Approach		63	2.0	63	2.0	0.094	8.7	LOS A	0.3	1.8	0.53	0.67	0.53	33.8
North: Worth St (N)														
8	T1	382	2.0	382	2.0	0.141	0.4	LOS A	11.6	82.4	0.08	0.08	0.08	41.9
9	R2	89	2.0	89	2.0	0.141	6.0	LOS A	0.7	4.8	0.28	0.26	0.28	24.7
Approach		472	2.0	472	2.0	0.141	1.4	NA	11.6	82.4	0.12	0.11	0.12	34.9
West: Union Ln (W)														
10	L2	1	2.0	1	2.0	0.058	5.2	LOS A	0.2	1.5	0.63	0.80	0.63	14.3
12	R2	20	2.0	20	2.0	0.058	12.5	LOS A	0.2	1.5	0.63	0.80	0.63	14.3
Approach		21	2.0	21	2.0	0.058	12.1	LOS A	0.2	1.5	0.63	0.80	0.63	14.3
All Vehicles		924	2.0	924	2.0	0.161	1.8	NA	11.6	82.4	0.11	0.15	0.11	35.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
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 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 SUMMARY

Site: 6 [6. Worth St and Union Rd]

Network: N101 [Network Model - 2020 Existing PM Peak]

Worth St and Union Rd
2020 Existing
Existing Road Network, No Dev
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Worth St (S)														
1	L2	16	2.0	16	2.0	0.333	68.3	LOS E	3.0	21.6	0.98	0.74	0.98	18.0
2	T1	28	2.0	28	2.0	0.333	63.7	LOS E	3.0	21.6	0.98	0.74	0.98	18.0
3	R2	4	2.0	4	2.0	0.333	68.3	LOS E	3.0	21.6	0.98	0.74	0.98	26.1
Approach		48	2.0	48	2.0	0.333	65.6	LOS E	3.0	21.6	0.98	0.74	0.98	19.0
East: Union Rd (E)														
4	L2	33	2.0	33	2.0	0.183	25.1	LOS B	5.8	41.0	0.61	0.55	0.61	38.4
5	T1	129	2.0	129	2.0	0.183	20.5	LOS B	5.8	41.0	0.61	0.55	0.61	31.7
6	R2	315	2.0	315	2.0	0.914	72.2	LOS F	24.1	171.7	0.95	1.03	1.32	17.0
Approach		477	2.0	477	2.0	0.914	54.9	LOS D	24.1	171.7	0.83	0.87	1.08	20.9
North: Worth St (N)														
7	L2	395	2.0	395	2.0	0.774	52.5	LOS D	11.5	81.6	0.98	0.89	1.03	21.7
8	T1	32	2.0	32	2.0	0.063	34.4	LOS C	1.6	11.4	0.74	0.58	0.74	26.9
9	R2	4	2.0	4	2.0	0.063	38.3	LOS C	1.6	11.4	0.74	0.58	0.74	5.9
Approach		431	2.0	431	2.0	0.774	51.0	LOS D	11.5	81.6	0.96	0.86	1.01	21.9
West: Union Rd (W)														
10	L2	131	2.0	131	2.0	0.134	16.0	LOS B	3.8	26.9	0.45	0.64	0.45	29.7
11	T1	277	2.0	277	2.0	0.411	21.7	LOS B	10.6	75.2	0.65	0.57	0.65	36.4
12	R2	11	2.0	11	2.0	0.411	26.8	LOS B	10.6	75.2	0.66	0.57	0.66	35.7
Approach		418	2.0	418	2.0	0.411	20.0	LOS B	10.6	75.2	0.59	0.59	0.59	35.1
All Vehicles		1374	2.0	1374	2.0	0.914	43.5	LOS D	24.1	171.7	0.81	0.78	0.90	24.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	20.5	LOS C	0.1	0.1	0.56	0.56
P2	East Full Crossing	53	37.8	LOS D	0.1	0.1	0.76	0.76
P3	North Full Crossing	53	23.5	LOS C	0.1	0.1	0.60	0.60
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96

All Pedestrians	211	35.3	LOS D	0.72	0.72

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [1. High St and Mulgoa Rd]

Network: N101 [Network Model - 2026 Future Base AM Peak (No Link Rd, With Urban Apt)]

High Street and Mulgoa Road
2026 Future Base
No Link Road, With Urban Apartments
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Mulgoa Road (S)														
1	L2	158	2.0	158	2.0	0.224	23.4	LOS B	5.0	35.2	0.71	0.74	0.71	37.5
2	T1	1131	2.0	1131	2.0	0.707	49.4	LOS D	23.2	165.0	0.96	0.83	0.96	27.2
3	R2	105	2.0	105	2.0	0.473	68.8	LOS E	6.9	48.9	0.98	0.79	0.98	8.1
Approach		1394	2.0	1394	2.0	0.707	47.9	LOS D	23.2	165.0	0.94	0.82	0.94	26.7
East: High Street (E)														
4	L2	33	3.2	32	3.3	0.053	38.8	LOS C	1.5	10.5	0.71	0.69	0.71	10.6
5	T1	183	1.7	181	1.7	0.271	54.5	LOS D	5.4	38.3	0.91	0.72	0.91	25.0
6	R2	121	1.7	120	1.8	0.285	68.0	LOS E	3.8	27.1	0.96	0.75	0.96	21.7
Approach		337	1.9	333 N1	1.9	0.285	57.9	LOS E	5.4	38.3	0.91	0.73	0.91	22.9
North: Castlereagh Road (N)														
7	L2	278	2.0	278	2.0	0.220	10.2	LOS A	5.0	35.4	0.36	0.66	0.36	45.4
8	T1	1200	2.0	1200	2.0	0.483	31.2	LOS C	19.6	139.2	0.78	0.68	0.78	30.3
9	R2	593	2.0	593	2.0	0.708	33.7	LOS C	10.4	74.1	0.98	0.84	0.98	38.7
Approach		2071	2.0	2071	2.0	0.708	29.1	LOS C	19.6	139.2	0.78	0.72	0.78	34.8
West: High Street (W)														
10	L2	887	2.0	887	2.0	0.547	23.7	LOS B	14.7	104.8	0.79	0.81	0.81	42.8
11	T1	478	2.0	478	2.0	0.717	61.9	LOS E	15.8	112.5	1.00	0.86	1.03	20.5
12	R2	293	2.0	293	2.0	0.699	72.9	LOS F	10.1	71.6	1.00	0.84	1.07	18.1
Approach		1658	2.0	1658	2.0	0.717	43.4	LOS D	15.8	112.5	0.88	0.83	0.92	31.2
All Vehicles		5459	2.0	5455 N1	2.0	0.717	40.0	LOS C	23.2	165.0	0.86	0.78	0.87	30.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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
P11	South Stage 1	53	56.8	LOS E	0.2	0.2	0.90	0.90

P12	South Stage 2	53	61.4	LOS F	0.2	0.2	0.94	0.94
P1S	South Slip/Bypass Lane Crossing	53	12.9	LOS B	0.1	0.1	0.59	0.59
P2	East Full Crossing	53	35.1	LOS D	0.1	0.1	0.71	0.71
P2S	East Slip/Bypass Lane Crossing	53	13.3	LOS B	0.1	0.1	0.44	0.44
P31	North Stage 1	53	59.6	LOS E	0.2	0.2	0.92	0.92
P32	North Stage 2	53	26.8	LOS C	0.1	0.1	0.87	0.87
P3S	North Slip/Bypass Lane Crossing	53	0.5	LOS A	0.0	0.0	0.11	0.11
P4	West Full Crossing	53	51.5	LOS E	0.2	0.2	0.86	0.86
P4S	West Slip/Bypass Lane Crossing	53	17.6	LOS B	0.1	0.1	0.67	0.67
All Pedestrians		526	33.6	LOS D			0.70	0.70

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 2 [2. Mulgoa Rd and Union Rd]

Network: N101 [Network Model - 2026 Future Base AM Peak (No Link Rd, With Urban Apt)]

Mulgoa Rd and Union Rd
2026 Future Base
No Link Road, With Urban Apartments
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Mulgoa Road (S)														
2	T1	1399	2.0	1399	2.0	0.651	5.4	LOS A	6.8	48.4	0.23	0.00	0.38	51.0
3	R2	368	2.0	368	2.0	1.532	508.4	LOS F	87.7	624.3	1.00	5.27	17.43	3.4
Approach		1767	2.0	1767	2.0	1.532	110.3	NA	87.7	624.3	0.39	1.10	3.93	12.9
East: Union Road (E)														
4	L2	204	2.6	204	2.6	0.228	6.2	LOS A	0.9	6.5	0.41	0.64	0.41	47.6
Approach		204	2.6	204	2.6	0.228	6.2	LOS A	0.9	6.5	0.41	0.64	0.41	47.6
North: Mulgoa Road (N)														
7	L2	327	1.9	327	1.9	0.179	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	38.5
8	T1	1245	2.0	1245	2.0	0.216	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		1573	2.0	1572 N1	2.0	0.216	1.2	NA	0.0	0.0	0.00	0.12	0.00	58.0
All Vehicles		3544	2.0	3544	2.0	1.532	55.9	NA	87.7	624.3	0.22	0.64	1.98	21.7

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 3 [3. High St and Civic Roundabout]

Network: N101 [Network Model - 2026 Future Base AM Peak (No Link Rd, With Urban Apt)]

High and Civic Roundabout
2026 Future Base
No Link Road, With Urban Apartments
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: High St (E)														
5	T1	318	0.0	314	0.0	0.111	2.1	LOS A	0.5	3.2	0.07	0.27	0.07	42.0
6	R2	31	0.0	30	0.0	0.111	7.5	LOS A	0.5	3.2	0.07	0.32	0.07	50.6
Approach		348	0.0	344[N1]	0.0	0.111	2.5	LOS A	0.5	3.2	0.07	0.28	0.07	43.8
North: Civic Pl (N)														
7	L2	12	0.0	12	0.0	0.033	4.2	LOS A	0.1	1.0	0.49	0.61	0.49	41.9
9	R2	21	0.0	21	0.0	0.033	9.4	LOS A	0.1	1.0	0.49	0.61	0.49	41.9
Approach		33	0.0	33	0.0	0.033	7.6	LOS A	0.1	1.0	0.49	0.61	0.49	41.9
West: High St (W)														
10	L2	74	0.0	74	0.0	0.275	2.6	LOS A	1.4	9.9	0.08	0.25	0.08	48.0
11	T1	787	0.0	787	0.0	0.275	2.1	LOS A	1.4	9.9	0.09	0.25	0.09	40.7
Approach		861	0.0	861	0.0	0.275	2.2	LOS A	1.4	9.9	0.09	0.25	0.09	42.5
All Vehicles		1242	0.0	1237[N1]	0.0	0.275	2.4	LOS A	1.4	9.9	0.09	0.26	0.09	42.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Roundabout Capacity Model: SIDRA Standard.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 4 [4. High St and Worth St]

Network: N101 [Network Model - 2026 Future Base AM Peak (No Link Rd, With Urban Apt)]

High and Worth
2026 Future Base
No Link Road, With Urban Apartments
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Worth St (S)														
1	L2	404	1.8	394	1.8	0.632	30.6	LOS C	13.8	97.9	0.78	0.79	0.78	7.6
2	T1	136	1.6	132	1.5	0.314	21.9	LOS B	8.6	61.2	0.67	0.65	0.67	31.9
3	R2	105	2.0	103	2.0	0.314	26.2	LOS B	8.6	61.2	0.67	0.65	0.67	31.6
Approach		645	1.8	629 N1	1.8	0.632	28.1	LOS B	13.8	97.9	0.74	0.74	0.74	20.2
East: High St (E)														
4	L2	35	1.8	35	1.8	0.268	35.2	LOS C	7.2	51.2	0.77	0.66	0.77	27.0
5	T1	312	2.0	312	2.0	0.268	30.6	LOS C	7.4	52.6	0.77	0.65	0.77	27.3
6	R2	31	2.0	31	2.0	0.124	42.9	LOS D	1.4	10.1	0.81	0.72	0.81	31.3
Approach		377	2.0	377	2.0	0.268	32.0	LOS C	7.4	52.6	0.77	0.65	0.77	27.8
North: Worth St (N)														
7	L2	1	2.0	1	2.0	0.014	17.9	LOS B	0.4	2.9	0.47	0.34	0.47	42.2
8	T1	14	2.0	14	2.0	0.014	13.4	LOS A	0.4	2.9	0.47	0.34	0.47	36.6
9	R2	16	2.0	16	2.0	0.045	21.4	LOS B	0.4	3.1	0.70	0.65	0.70	31.8
Approach		31	2.0	31	2.0	0.045	17.7	LOS B	0.4	3.1	0.59	0.50	0.59	34.3
West: High St (W)														
10	L2	118	2.0	118	2.0	0.223	36.1	LOS C	5.0	35.7	0.77	0.74	0.77	28.9
11	T1	495	2.0	495	2.0	0.378	31.9	LOS C	10.9	77.5	0.80	0.68	0.80	30.2
12	R2	221	2.0	221	2.0	0.716	49.4	LOS D	12.4	88.0	0.96	0.87	1.02	10.2
Approach		834	2.0	834	2.0	0.716	37.2	LOS C	12.4	88.0	0.84	0.74	0.86	25.7
All Vehicles		1886	1.9	1870 N1	1.9	0.716	32.7	LOS C	13.8	97.9	0.79	0.72	0.80	24.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	32.3	LOS D	0.1	0.1	0.73	0.73

P2	East Full Crossing	53	18.7	LOS B	0.1	0.1	0.56	0.56
P3	North Full Crossing	53	33.8	LOS D	0.1	0.1	0.75	0.75
P3S	North Slip/Bypass Lane Crossing	53	27.4	LOS C	0.1	0.1	0.68	0.68
P4	West Full Crossing	53	26.1	LOS C	0.1	0.1	0.66	0.66
P4S	West Slip/Bypass Lane Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		316	32.1	LOS D			0.72	0.72

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: 5 [5. Worth St and Union Ln]

Network: N101 [Network Model - 2026 Future Base AM Peak (No Link Rd, With Urban Apt)]

Worth St and Union Ln
2026 Future Base
No Link Road, With Urban Apartments
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Worth St (S)														
1	L2	76	2.8	73	2.8	0.040	3.9	LOS A	0.0	0.0	0.00	0.52	0.00	27.5
2	T1	442	2.1	426	2.1	0.221	0.0	LOS A	2.3	16.1	0.00	0.00	0.00	50.0
Approach		518	2.2	499[N1]	2.2	0.221	0.6	NA	2.3	16.1	0.00	0.08	0.00	44.3
East: Union Ln (E)														
4	L2	18	2.0	18	2.0	0.068	4.0	LOS A	0.3	1.8	0.35	0.51	0.35	35.0
5	T1	21	1.9	21	1.9	0.068	9.0	LOS A	0.3	1.8	0.35	0.51	0.35	35.0
6	R2	25	2.0	25	2.0	0.138	11.7	LOS A	0.3	1.8	0.64	0.81	0.64	31.9
Approach		64	2.0	64	2.0	0.138	8.7	LOS A	0.3	1.8	0.46	0.63	0.46	33.7
North: Worth St (N)														
8	T1	143	2.0	143	2.0	0.093	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
9	R2	100	1.9	100	1.9	0.111	6.7	LOS A	0.4	2.9	0.40	0.64	0.40	22.0
Approach		243	2.0	243	2.0	0.111	2.8	NA	0.4	2.9	0.17	0.26	0.17	32.5
West: Union Ln (W)														
10	L2	76	0.0	76	0.0	0.169	6.1	LOS A	0.7	4.8	0.54	0.72	0.54	19.7
12	R2	32	0.0	32	0.0	0.169	12.6	LOS A	0.7	4.8	0.54	0.72	0.54	19.7
Approach		107	0.0	107	0.0	0.169	8.0	LOS A	0.7	4.8	0.54	0.72	0.54	19.7
All Vehicles		933	1.9	913[N1]	1.9	0.221	2.6	NA	2.3	16.1	0.14	0.24	0.14	34.3

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 6 [6. Worth St and Union Rd]

Network: N101 [Network Model - 2026 Future Base AM Peak (No Link Rd, With Urban Apt)]

Worth St and Union Rd
2026 Future Base
No Link Road, With Urban Apartments
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Worth St (S)														
1	L2	22	2.0	22	2.0	0.390	68.8	LOS E	3.5	24.6	0.99	0.75	0.99	17.8
2	T1	20	2.0	20	2.0	0.390	64.2	LOS E	3.5	24.6	0.99	0.75	0.99	17.8
3	R2	13	2.0	13	2.0	0.390	68.8	LOS E	3.5	24.6	0.99	0.75	0.99	25.8
Approach		55	2.0	55	2.0	0.390	67.2	LOS E	3.5	24.6	0.99	0.75	0.99	20.1
East: Union Rd (E)														
4	L2	4	2.0	4	2.0	0.145	13.6	LOS A	4.2	29.9	0.41	0.35	0.41	44.1
5	T1	174	2.0	174	2.0	0.145	9.0	LOS A	4.2	29.9	0.41	0.35	0.41	40.2
6	R2	423	2.0	423	2.0	0.743	23.3	LOS B	18.0	127.9	0.71	0.80	0.72	30.7
Approach		601	2.0	601	2.0	0.743	19.1	LOS B	18.0	127.9	0.62	0.67	0.63	33.1
North: Worth St (N)														
7	L2	131	0.0	131	0.0	0.699	68.3	LOS E	8.5	59.2	1.00	0.84	1.09	18.6
8	T1	8	0.0	8	0.0	0.068	54.7	LOS D	0.9	6.3	0.91	0.67	0.91	20.9
9	R2	7	0.0	7	0.0	0.068	58.6	LOS E	0.9	6.3	0.91	0.67	0.91	3.8
Approach		146	0.0	146	0.0	0.699	67.0	LOS E	8.5	59.2	0.99	0.82	1.07	18.3
West: Union Rd (W)														
10	L2	111	1.9	90	1.9	0.068	7.4	LOS A	1.4	9.6	0.25	0.58	0.25	19.7
11	T1	289	2.2	236	2.2	0.210	9.3	LOS A	5.8	41.3	0.42	0.37	0.42	40.6
12	R2	5	0.0	4	0.0	0.210	13.2	LOS A	5.8	41.3	0.42	0.37	0.42	39.6
Approach		405	2.1	330[N1]	2.1	0.210	8.8	LOS A	5.8	41.3	0.37	0.43	0.37	38.9
All Vehicles		1207	1.8	1132[N1]	1.9	0.743	24.6	LOS B	18.0	127.9	0.61	0.62	0.63	29.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	9.6	LOS A	0.1	0.1	0.39	0.39

P2	East Full Crossing	53	57.4	LOS E	0.2	0.2	0.94	0.94
P3	North Full Crossing	53	11.7	LOS B	0.1	0.1	0.42	0.42
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	34.5	LOS D			0.68	0.68

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: UrbApart [Urban Apartments]

Network: N101 [Network Model - 2026 Future Base AM Peak (No Link Rd, With Urban Apt)]

Urban Apartments
2026 Future Base
No Link Road, With Urban Apartments
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Union Lane (E)														
6	R2	6	0.0	6	0.0	0.003	5.9	LOS A	0.0	0.0	0.00	0.74	0.00	41.5
Approach		6	0.0	6	0.0	0.003	5.9	NA	0.0	0.0	0.00	0.74	0.00	41.5
North: Urban Apartment Access														
7	L2	56	0.0	56	0.0	0.030	8.0	LOS A	0.0	0.0	0.00	1.00	0.00	47.7
Approach		56	0.0	56	0.0	0.030	8.0	LOS A	0.0	0.0	0.00	1.00	0.00	47.7
All Vehicles		62	0.0	62	0.0	0.030	7.8	NA	0.0	0.0	0.00	0.97	0.00	46.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
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 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 SUMMARY

Site: 1 [1. High St and Mulgoa Rd]

Network: N101 [Network Model - 2026 Future Base PM Peak (No Link Rd, With Urban Apt)]

High Street and Mulgoa Road
2026 Future Base
No Link Road, With Urban Apartments
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Mulgoa Road (S)														
1	L2	246	2.0	246	2.0	0.384	27.9	LOS B	9.2	65.6	0.80	0.78	0.80	35.0
2	T1	1014	2.0	1014	2.0	0.777	57.5	LOS E	22.4	159.7	1.00	0.90	1.06	24.9
3	R2	73	2.0	73	2.0	0.278	64.1	LOS E	4.5	32.0	0.93	0.76	0.93	8.6
Approach		1333	2.0	1333	2.0	0.777	52.4	LOS D	22.4	159.7	0.96	0.87	1.00	25.6
East: High Street (E)														
4	L2	127	2.5	127	2.5	0.180	35.7	LOS C	5.6	40.2	0.70	0.74	0.70	11.3
5	T1	566	2.0	563	2.0	0.769	59.2	LOS E	20.0	142.5	0.99	0.89	1.06	23.8
6	R2	365	2.0	363	2.0	0.772	73.7	LOS F	12.7	90.7	1.00	0.88	1.12	20.6
Approach		1059	2.1	1053 N1	2.1	0.772	61.3	LOS E	20.0	142.5	0.96	0.87	1.04	21.8
North: Castlereagh Road (N)														
7	L2	167	2.0	167	2.0	0.125	7.6	LOS A	1.8	12.6	0.25	0.62	0.25	48.3
8	T1	1403	2.0	1403	2.0	0.666	40.5	LOS C	26.7	190.1	0.91	0.80	0.91	26.4
9	R2	667	2.0	667	2.0	0.773	36.7	LOS C	13.7	97.7	0.99	0.87	1.05	37.6
Approach		2238	2.0	2238	2.0	0.773	36.9	LOS C	26.7	190.1	0.88	0.81	0.90	31.5
West: High Street (W)														
10	L2	654	2.0	654	2.0	0.373	18.9	LOS B	8.8	62.4	0.68	0.75	0.68	45.4
11	T1	269	2.0	269	2.0	0.346	53.3	LOS D	7.9	56.5	0.91	0.75	0.91	22.5
12	R2	162	2.0	162	2.0	0.344	66.6	LOS E	5.1	36.6	0.95	0.77	0.95	19.3
Approach		1085	2.0	1085	2.0	0.373	34.6	LOS C	8.8	62.4	0.77	0.76	0.77	35.2
All Vehicles		5715	2.0	5709 N1	2.0	0.777	44.6	LOS D	26.7	190.1	0.89	0.82	0.92	28.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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
P11	South Stage 1	53	53.3	LOS E	0.2	0.2	0.87	0.87

P12	South Stage 2	53	58.6	LOS E	0.2	0.2	0.92	0.92
P1S	South Slip/Bypass Lane Crossing	53	10.9	LOS B	0.1	0.1	0.55	0.55
P2	East Full Crossing	53	41.7	LOS E	0.2	0.2	0.77	0.77
P2S	East Slip/Bypass Lane Crossing	53	16.6	LOS B	0.1	0.1	0.49	0.49
P31	North Stage 1	53	55.9	LOS E	0.2	0.2	0.89	0.89
P32	North Stage 2	53	27.0	LOS C	0.1	0.1	0.87	0.87
P3S	North Slip/Bypass Lane Crossing	53	0.5	LOS A	0.0	0.0	0.11	0.11
P4	West Full Crossing	53	57.7	LOS E	0.2	0.2	0.91	0.91
P4S	West Slip/Bypass Lane Crossing	53	20.5	LOS C	0.1	0.1	0.71	0.71
All Pedestrians		526	34.3	LOS D			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 2 [2. Mulgoa Rd and Union Rd]

Network: N101 [Network Model - 2026 Future Base PM Peak (No Link Rd, With Urban Apt)]

Mulgoa Rd and Union Rd
2026 Future Base
No Link Road, With Urban Apartments
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Mulgoa Road (S)														
2	T1	1324	2.0	1324	2.0	0.388	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	159	2.0	159	2.0	0.729	39.2	LOS C	3.9	27.8	0.94	1.21	1.86	26.5
Approach		1483	2.0	1483	2.0	0.729	4.3	NA	3.9	27.8	0.10	0.13	0.20	52.7
East: Union Road (E)														
4	L2	167	2.5	167	2.5	0.210	7.0	LOS A	0.8	5.7	0.45	0.68	0.45	46.8
Approach		167	2.5	167	2.5	0.210	7.0	LOS A	0.8	5.7	0.45	0.68	0.45	46.8
North: Mulgoa Road (N)														
7	L2	116	2.0	116	2.0	0.063	5.6	LOS A	0.1	0.4	0.00	0.58	0.00	38.5
8	T1	1591	2.0	1590	2.0	0.275	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1706	2.0	1706	2.0	0.275	0.4	NA	0.1	0.4	0.00	0.04	0.00	59.3
All Vehicles		3357	2.0	3356[N1]	2.0	0.729	2.4	NA	3.9	27.8	0.07	0.11	0.11	55.8

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 3 [3. High St and Civic Roundabout]

Network: N101 [Network Model - 2026 Future Base PM Peak (No Link Rd, With Urban Apt)]

High and Civic Roundabout
2026 Future Base
No Link Road, With Urban Apartments
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: High St (E)														
5	T1	959	2.0	953	2.0	0.420	2.4	LOS A	1.9	13.5	0.20	0.29	0.20	40.6
6	R2	28	0.0	28	0.0	0.420	7.8	LOS A	1.9	13.5	0.20	0.30	0.20	50.5
Approach		987	1.9	982 [N1]	1.9	0.420	2.6	LOS A	1.9	13.5	0.20	0.29	0.20	41.3
North: Civic Pl (N)														
7	L2	52	2.0	52	2.0	0.158	3.7	LOS A	0.6	4.5	0.42	0.62	0.42	42.1
9	R2	100	2.0	100	2.0	0.158	8.9	LOS A	0.6	4.5	0.42	0.62	0.42	42.1
Approach		152	2.0	152	2.0	0.158	7.1	LOS A	0.6	4.5	0.42	0.62	0.42	42.1
West: High St (W)														
10	L2	74	2.0	74	2.0	0.193	2.6	LOS A	0.9	6.7	0.09	0.26	0.09	48.0
11	T1	452	2.0	452	2.0	0.193	2.1	LOS A	0.9	6.7	0.09	0.25	0.09	40.7
Approach		525	2.0	525	2.0	0.193	2.2	LOS A	0.9	6.7	0.09	0.25	0.09	43.3
All Vehicles		1664	2.0	1658 [N1]	2.0	0.420	2.9	LOS A	1.9	13.5	0.19	0.31	0.19	42.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Roundabout Capacity Model: SIDRA Standard.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 4 [4. High St and Worth St]

Network: N101 [Network Model - 2026 Future Base PM Peak (No Link Rd, With Urban Apt)]

High and Worth
2026 Future Base
No Link Road, With Urban Apartments
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Worth St (S)														
1	L2	211	2.0	204	2.0	0.726	58.8	LOS E	11.9	84.7	1.00	0.86	1.08	4.2
2	T1	111	1.9	107	1.9	0.450	47.9	LOS D	7.4	52.2	0.94	0.77	0.94	23.1
3	R2	33	0.0	32	0.0	0.450	52.1	LOS D	7.4	52.2	0.94	0.77	0.94	22.9
Approach		354	1.8	342 N1	1.8	0.726	54.8	LOS D	11.9	84.7	0.97	0.82	1.02	13.5
East: High St (E)														
4	L2	103	2.0	103	2.0	0.526	32.1	LOS C	13.7	97.5	0.79	0.73	0.79	28.1
5	T1	632	2.0	632	2.0	0.526	26.7	LOS B	17.6	125.5	0.78	0.70	0.78	28.9
6	R2	211	2.0	211	2.0	0.458	33.3	LOS C	9.1	65.1	0.78	0.79	0.78	34.1
Approach		945	2.0	945	2.0	0.526	28.8	LOS C	17.6	125.5	0.78	0.72	0.78	30.5
North: Worth St (N)														
7	L2	1	0.0	1	0.0	0.421	28.3	LOS B	7.5	53.3	0.71	0.60	0.71	37.8
8	T1	184	2.0	184	2.0	0.421	23.8	LOS B	7.5	53.3	0.71	0.60	0.71	30.6
9	R2	309	2.0	309	2.0	0.599	29.7	LOS C	11.8	83.9	0.91	0.82	0.91	27.9
Approach		495	2.0	495	2.0	0.599	27.5	LOS B	11.8	83.9	0.84	0.74	0.84	28.9
West: High St (W)														
10	L2	203	2.0	203	2.0	0.471	41.7	LOS C	9.8	69.7	0.87	0.80	0.87	27.1
11	T1	255	2.0	255	2.0	0.153	21.8	LOS B	4.4	31.7	0.64	0.52	0.64	34.5
12	R2	232	2.0	232	2.0	1.117	194.3	LOS F	28.9	205.4	1.00	1.48	2.31	3.0
Approach		689	2.0	689	2.0	1.117	85.6	LOS F	28.9	205.4	0.83	0.92	1.27	14.8
All Vehicles		2483	2.0	2472 N1	2.0	1.117	48.0	LOS D	28.9	205.4	0.83	0.80	0.96	21.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	24.8	LOS C	0.1	0.1	0.64	0.64

P2	East Full Crossing	53	25.4	LOS C	0.1	0.1	0.65	0.65
P3	North Full Crossing	53	26.1	LOS C	0.1	0.1	0.66	0.66
P3S	North Slip/Bypass Lane Crossing	53	20.5	LOS C	0.1	0.1	0.58	0.58
P4	West Full Crossing	53	52.4	LOS E	0.2	0.2	0.94	0.94
P4S	West Slip/Bypass Lane Crossing	53	36.9	LOS D	0.1	0.1	0.79	0.79
All Pedestrians		316	31.0	LOS D			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 5 [5. Worth St and Union Ln]

Network: N101 [Network Model - 2026 Future Base PM Peak (No Link Rd, With Urban Apt)]

Worth St and Union Ln
2026 Future Base
No Link Road, With Urban Apartments
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Worth St (S)														
1	L2	75	1.5	72	1.5	0.039	3.9	LOS A	0.0	0.0	0.00	0.52	0.00	27.5
2	T1	311	2.0	299	2.0	0.156	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		385	1.9	371 N1	1.9	0.156	0.7	NA	0.0	0.0	0.00	0.10	0.00	42.7
East: Union Ln (E)														
4	L2	18	0.0	18	0.0	0.106	4.6	LOS A	0.3	2.1	0.51	0.62	0.51	34.5
5	T1	26	0.0	26	0.0	0.106	9.4	LOS A	0.3	2.1	0.51	0.62	0.51	34.5
6	R2	25	0.0	25	0.0	0.100	10.7	LOS A	0.2	1.6	0.61	0.79	0.61	32.5
Approach		69	0.0	69	0.0	0.106	8.6	LOS A	0.3	2.1	0.54	0.68	0.54	33.7
North: Worth St (N)														
8	T1	382	2.0	368	2.0	0.149	0.3	LOS A	13.8	97.9	0.07	0.08	0.07	42.4
9	R2	116	1.5	112	1.5	0.149	6.0	LOS A	0.7	5.1	0.30	0.34	0.30	27.9
Approach		498	1.9	481 N1	1.9	0.149	1.7	NA	13.8	97.9	0.12	0.14	0.12	37.7
West: Union Ln (W)														
10	L2	2	0.0	2	0.0	0.091	5.2	LOS A	0.3	2.4	0.63	0.82	0.63	14.4
12	R2	32	0.0	32	0.0	0.091	12.6	LOS A	0.3	2.4	0.63	0.82	0.63	14.4
Approach		34	0.0	34	0.0	0.091	12.1	LOS A	0.3	2.4	0.63	0.82	0.63	14.4
All Vehicles		986	1.7	955 N1	1.8	0.156	2.2	NA	13.8	97.9	0.12	0.19	0.12	35.8

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: PARKING AND TRAFFIC CONSULTANTS | Processed: Tuesday, 23 June 2020 4:00:42 PM
Project: Z:\PCI - PROJECT WORK FILES\NSW\TOGA - PENRITH\SIDRA Model\S4.55 East Scheme - Response to TfNSW RFIs\2026 Future Base PM Peak - TBC\200623 - East DA Scheme - 2026 Future Base (No Link Rd, With Urban Apt) - PM Peak.sip8

MOVEMENT SUMMARY

Site: 6 [6. Worth St and Union Rd]

Network: N101 [Network Model - 2026 Future Base PM Peak (No Link Rd, With Urban Apt)]

Worth St and Union Rd
2026 Future Base
No Link Road, With Urban Apartments
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Worth St (S)														
1	L2	16	0.0	16	0.0	0.329	68.2	LOS E	3.0	21.2	0.98	0.74	0.98	18.1
2	T1	28	0.0	28	0.0	0.329	63.6	LOS E	3.0	21.2	0.98	0.74	0.98	18.1
3	R2	4	0.0	4	0.0	0.329	68.2	LOS E	3.0	21.2	0.98	0.74	0.98	26.1
Approach		48	0.0	48	0.0	0.329	65.5	LOS E	3.0	21.2	0.98	0.74	0.98	19.0
East: Union Rd (E)														
4	L2	33	0.0	33	0.0	0.190	22.9	LOS B	6.1	43.2	0.58	0.53	0.58	39.3
5	T1	147	2.1	147	2.1	0.190	18.3	LOS B	6.1	43.2	0.58	0.53	0.58	33.0
6	R2	360	2.0	360	2.0	1.058	151.5	LOS F	42.2	300.8	1.00	1.30	1.89	9.7
Approach		540	1.9	540	1.9	1.058	107.4	LOS F	42.2	300.8	0.86	1.04	1.45	13.2
North: Worth St (N)														
7	L2	421	2.0	409	2.0	0.903	69.6	LOS E	11.5	81.6	1.00	0.99	1.25	18.3
8	T1	32	0.0	31	0.0	0.068	37.6	LOS C	1.6	11.3	0.78	0.60	0.78	25.8
9	R2	4	0.0	4	0.0	0.068	41.4	LOS C	1.6	11.3	0.78	0.60	0.78	5.4
Approach		457	1.8	444 N1	1.8	0.903	67.1	LOS E	11.5	81.6	0.98	0.96	1.21	18.7
West: Union Rd (W)														
10	L2	153	2.1	153	2.1	0.146	13.3	LOS A	4.0	28.5	0.42	0.63	0.42	13.4
11	T1	316	2.0	316	2.0	0.450	19.7	LOS B	11.5	81.6	0.63	0.56	0.63	33.6
12	R2	11	0.0	11	0.0	0.450	24.0	LOS B	11.5	81.6	0.64	0.56	0.64	32.8
Approach		479	2.0	479	2.0	0.450	17.7	LOS B	11.5	81.6	0.56	0.58	0.56	31.1
All Vehicles		1524	1.9	1511 N1	1.9	1.058	65.8	LOS E	42.2	300.8	0.80	0.86	1.08	17.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	18.4	LOS B	0.1	0.1	0.53	0.53

P2	East Full Crossing	53	40.9	LOS E	0.2	0.2	0.79	0.79
P3	North Full Crossing	53	21.1	LOS C	0.1	0.1	0.57	0.57
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	34.9	LOS D			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: UrbApart [Urban Apartments]

Network: N101 [Network Model - 2026 Future Base PM Peak (No Link Rd, With Urban Apt)]

Urban Apartments
2026 Future Base
No Link Road, With Urban Apartments
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Union Lane (E)														
6	R2	49	0.0	49	0.0	0.026	5.9	LOS A	0.0	0.0	0.00	0.74	0.00	41.5
Approach		49	0.0	49	0.0	0.026	5.9	NA	0.0	0.0	0.00	0.74	0.00	41.5
North: Urban Apartment Access														
7	L2	13	0.0	13	0.0	0.007	8.0	LOS A	0.0	0.0	0.00	1.00	0.00	47.7
Approach		13	0.0	13	0.0	0.007	8.0	LOS A	0.0	0.0	0.00	1.00	0.00	47.7
All Vehicles		62	0.0	61 N1	0.0	0.026	6.4	NA	0.0	0.0	0.00	0.80	0.00	42.5

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 1 [1. High St and Mulgoa Rd]

Network: N101 [Network Model - 2026 Development AM Peak]

High Street and Mulgoa Road
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Mulgoa Road (S)														
1	L2	158	2.0	158	2.0	0.224	23.4	LOS B	5.0	35.2	0.71	0.74	0.71	37.5
2	T1	1131	2.0	1131	2.0	0.707	49.4	LOS D	23.2	165.0	0.96	0.83	0.96	27.2
3	R2	111	1.9	111	1.9	0.497	69.0	LOS E	7.2	51.4	0.98	0.79	0.98	8.0
Approach		1399	2.0	1399	2.0	0.707	48.0	LOS D	23.2	165.0	0.94	0.82	0.94	26.6
East: High Street (E)														
4	L2	49	2.1	49	2.1	0.080	39.2	LOS C	2.2	16.0	0.71	0.71	0.71	10.5
5	T1	222	1.4	219	1.4	0.328	55.2	LOS D	6.6	46.9	0.92	0.74	0.92	24.8
6	R2	148	1.4	147	1.4	0.349	68.6	LOS E	4.7	33.5	0.96	0.77	0.96	21.6
Approach		420	1.5	415 N1	1.5	0.349	58.0	LOS E	6.6	46.9	0.91	0.74	0.91	22.6
North: Castlereagh Road (N)														
7	L2	288	1.9	288	1.9	0.229	10.5	LOS A	5.4	38.2	0.37	0.66	0.37	45.0
8	T1	1200	2.0	1200	2.0	0.483	31.2	LOS C	19.6	139.2	0.78	0.68	0.78	30.3
9	R2	593	2.0	593	2.0	0.708	33.7	LOS C	10.4	74.1	0.98	0.84	0.98	38.7
Approach		2081	2.0	2081	2.0	0.708	29.0	LOS C	19.6	139.2	0.78	0.72	0.78	34.8
West: High Street (W)														
10	L2	887	2.0	887	2.0	0.547	23.7	LOS B	14.7	104.8	0.79	0.81	0.81	42.8
11	T1	478	2.0	478	2.0	0.717	61.9	LOS E	15.8	112.5	1.00	0.86	1.03	20.5
12	R2	303	1.9	303	1.9	0.724	73.6	LOS F	10.5	74.8	1.00	0.85	1.09	18.0
Approach		1668	2.0	1668	2.0	0.724	43.7	LOS D	15.8	112.5	0.89	0.83	0.92	31.1
All Vehicles		5568	2.0	5563 N1	2.0	0.724	40.4	LOS C	23.2	165.0	0.86	0.78	0.87	30.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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
P11	South Stage 1	53	56.8	LOS E	0.2	0.2	0.90	0.90
P12	South Stage 2	53	61.4	LOS F	0.2	0.2	0.94	0.94

P1S	South Slip/Bypass Lane Crossing	53	12.9	LOS B	0.1	0.1	0.59	0.59
P2	East Full Crossing	53	35.1	LOS D	0.1	0.1	0.71	0.71
P2S	East Slip/Bypass Lane Crossing	53	13.3	LOS B	0.1	0.1	0.44	0.44
P31	North Stage 1	53	59.6	LOS E	0.2	0.2	0.92	0.92
P32	North Stage 2	53	26.8	LOS C	0.1	0.1	0.87	0.87
P3S	North Slip/Bypass Lane Crossing	53	0.5	LOS A	0.0	0.0	0.11	0.11
P4	West Full Crossing	53	51.5	LOS E	0.2	0.2	0.86	0.86
P4S	West Slip/Bypass Lane Crossing	53	17.6	LOS B	0.1	0.1	0.67	0.67
All Pedestrians		526	33.6	LOS D			0.70	0.70

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 2 [2. Mulgoa Rd and Union Rd]

Network: N101 [Network Model - 2026 Development AM Peak]

Mulgoa Rd and Union Rd
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Mulgoa Road (S)														
2	T1	1404	2.0	1404	2.0	0.660	5.5	LOS A	6.7	47.7	0.22	0.00	0.36	50.9
3	R2	374	2.0	374	2.0	1.613	580.2	LOS F	96.5	686.6	1.00	5.50	18.42	3.0
Approach		1778	2.0	1778	2.0	1.613	126.3	NA	96.5	686.6	0.38	1.16	4.16	11.6
East: Union Road (E)														
4	L2	348	1.5	348	1.5	0.387	7.0	LOS A	2.4	16.8	0.55	0.74	0.64	46.8
Approach		348	1.5	348	1.5	0.387	7.0	LOS A	2.4	16.8	0.55	0.74	0.64	46.8
North: Mulgoa Road (N)														
7	L2	351	1.8	350	1.8	0.191	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	38.5
8	T1	1252	2.0	1251	2.0	0.217	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		1602	2.0	1602	2.0	0.217	1.2	NA	0.0	0.0	0.00	0.13	0.00	57.8
All Vehicles		3728	1.9	3728	1.9	1.613	61.4	NA	96.5	686.6	0.23	0.67	2.04	20.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
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 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 SUMMARY

Site: 3 [3. High St and Civic Roundabout]

Network: N101 [Network Model - 2026 Development AM Peak]

High and Civic Roundabout
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Link Rd (S)														
1	L2	94	0.0	93	0.0	0.173	2.9	LOS A	0.8	5.3	0.38	0.57	0.38	27.8
2	T1	4	0.0	4	0.0	0.173	2.8	LOS A	0.8	5.3	0.38	0.57	0.38	47.3
3	R2	94	0.0	93	0.0	0.173	7.9	LOS A	0.8	5.3	0.38	0.57	0.38	27.8
Approach		192	0.0	190[N1]	0.0	0.173	5.4	LOS A	0.8	5.3	0.38	0.57	0.38	29.2
East: High St (E)														
5	T1	309	0.0	305	0.0	0.109	2.1	LOS A	0.5	3.2	0.07	0.27	0.07	41.9
6	R2	29	0.0	29	0.0	0.109	7.5	LOS A	0.4	3.1	0.07	0.32	0.07	50.6
Approach		339	0.0	334[N1]	0.0	0.109	2.5	LOS A	0.5	3.2	0.07	0.27	0.07	43.8
North: Civic Pl (N)														
7	L2	12	0.0	12	0.0	0.036	4.6	LOS A	0.2	1.2	0.54	0.64	0.54	41.6
9	R2	21	0.0	21	0.0	0.036	9.8	LOS A	0.2	1.2	0.54	0.64	0.54	41.6
Approach		33	0.0	33	0.0	0.036	8.0	LOS A	0.2	1.2	0.54	0.64	0.54	41.6
West: High St (W)														
10	L2	74	0.0	74	0.0	0.309	3.0	LOS A	1.5	10.8	0.21	0.30	0.21	47.3
11	T1	787	0.0	787	0.0	0.309	2.5	LOS A	1.5	10.8	0.22	0.30	0.22	38.5
Approach		861	0.0	861	0.0	0.309	2.6	LOS A	1.5	10.8	0.22	0.30	0.22	40.6
All Vehicles		1424	0.0	1418[N1]	0.0	0.309	3.1	LOS A	1.5	10.8	0.21	0.34	0.21	40.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Roundabout Capacity Model: SIDRA Standard.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 4 [4. High St and Worth St]

Network: N101 [Network Model - 2026 Development AM Peak]

High and Worth
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Worth St (S)														
1	L2	384	2.0	374	2.0	0.636	32.6	LOS C	13.7	97.9	0.80	0.80	0.80	7.2
2	T1	134	1.9	130	2.0	0.328	24.0	LOS B	8.9	63.2	0.70	0.67	0.70	30.9
3	R2	104	2.0	101	2.1	0.328	28.3	LOS B	8.9	63.2	0.70	0.67	0.70	30.6
Approach		622	2.0	605 N1	2.0	0.636	30.0	LOS C	13.7	97.9	0.76	0.75	0.76	19.6
East: High St (E)														
4	L2	35	1.8	35	1.8	0.257	32.9	LOS C	7.1	50.8	0.74	0.64	0.74	28.0
5	T1	322	1.9	322	1.9	0.257	28.3	LOS B	7.3	52.1	0.74	0.63	0.74	28.2
6	R2	31	2.0	31	2.0	0.122	41.2	LOS C	1.4	9.8	0.79	0.72	0.79	31.7
Approach		387	1.9	387	1.9	0.257	29.7	LOS C	7.3	52.1	0.75	0.64	0.75	28.6
North: Worth St (N)														
7	L2	1	2.0	1	2.0	0.015	19.5	LOS B	0.4	3.1	0.49	0.35	0.49	41.5
8	T1	14	2.0	14	2.0	0.015	15.0	LOS B	0.4	3.1	0.49	0.35	0.49	35.5
9	R2	16	2.0	16	2.0	0.047	23.0	LOS B	0.5	3.3	0.72	0.65	0.72	31.0
Approach		31	2.0	31	2.0	0.047	19.3	LOS B	0.5	3.3	0.61	0.51	0.61	33.4
West: High St (W)														
10	L2	118	2.0	118	2.0	0.208	33.8	LOS C	4.8	34.2	0.74	0.73	0.74	29.7
11	T1	541	1.8	541	1.8	0.385	29.9	LOS C	11.6	82.3	0.79	0.67	0.79	31.0
12	R2	237	1.9	237	1.9	0.716	47.2	LOS D	13.0	92.6	0.95	0.87	1.00	10.5
Approach		896	1.9	895 N1	1.9	0.716	35.0	LOS C	13.0	92.6	0.82	0.73	0.84	26.4
All Vehicles		1936	1.9	1918 N1	1.9	0.716	32.1	LOS C	13.7	97.9	0.78	0.71	0.79	25.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	30.2	LOS D	0.1	0.1	0.71	0.71
P2	East Full Crossing	53	20.5	LOS C	0.1	0.1	0.58	0.58

P3	North Full Crossing	53	31.6	LOS D	0.1	0.1	0.73	0.73
P3S	North Slip/Bypass Lane Crossing	53	25.4	LOS C	0.1	0.1	0.65	0.65
P4	West Full Crossing	53	28.1	LOS C	0.1	0.1	0.68	0.68
P4S	West Slip/Bypass Lane Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		316	31.7	LOS D			0.72	0.72

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: 5 [5. Worth St and Union Ln]

Network: N101 [Network Model - 2026 Development AM Peak]

Worth St and Union Ln
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Worth St (S)														
1	L2	76	1.9	73	2.0	0.040	3.9	LOS A	0.0	0.0	0.00	0.52	0.00	27.5
2	T1	458	1.9	441	2.0	0.229	0.0	LOS A	2.3	16.6	0.00	0.00	0.00	50.0
Approach		534	1.9	514[N1]	2.0	0.229	0.6	NA	2.3	16.6	0.00	0.07	0.00	44.4
East: Union Ln (E)														
4	L2	18	2.0	18	2.0	0.067	4.0	LOS A	0.3	1.8	0.38	0.52	0.38	34.8
5	T1	21	1.9	21	1.9	0.067	9.5	LOS A	0.3	1.8	0.38	0.52	0.38	34.8
6	R2	25	2.0	25	2.0	0.126	10.6	LOS A	0.2	1.7	0.60	0.79	0.60	32.5
Approach		64	2.0	64	2.0	0.126	8.4	LOS A	0.3	1.8	0.47	0.63	0.47	33.9
North: Worth St (N)														
8	T1	159	1.8	159	1.8	0.093	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
9	R2	100	1.9	100	1.9	0.113	6.8	LOS A	0.4	2.9	0.41	0.65	0.41	21.5
Approach		259	1.9	259	1.9	0.113	2.6	NA	0.4	2.9	0.16	0.25	0.16	32.9
All Vehicles		857	1.9	837[N1]	2.0	0.229	1.8	NA	2.3	16.6	0.09	0.17	0.09	37.0

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 6 [6. Worth St and Union Rd]

Network: N101 [Network Model - 2026 Development AM Peak]

Worth St and Union Rd
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Worth St (S)														
1	L2	22	2.0	22	2.0	0.390	68.8	LOS E	3.5	24.6	0.99	0.75	0.99	17.8
2	T1	20	2.0	20	2.0	0.390	64.2	LOS E	3.5	24.6	0.99	0.75	0.99	17.8
3	R2	13	2.0	13	2.0	0.390	68.8	LOS E	3.5	24.6	0.99	0.75	0.99	25.8
Approach		55	2.0	55	2.0	0.390	67.2	LOS E	3.5	24.6	0.99	0.75	0.99	20.1
East: Union Rd (E)														
4	L2	4	2.0	4	2.0	0.142	12.8	LOS A	4.0	28.5	0.39	0.34	0.39	44.5
5	T1	174	2.0	174	2.0	0.142	8.2	LOS A	4.0	28.5	0.39	0.34	0.39	40.9
6	R2	423	2.0	423	2.0	0.772	25.8	LOS B	19.2	137.0	0.72	0.82	0.76	29.5
Approach		601	2.0	601	2.0	0.772	20.6	LOS B	19.2	137.0	0.63	0.68	0.65	32.2
North: Worth St (N)														
7	L2	116	0.0	116	0.0	0.733	71.1	LOS F	7.7	53.7	1.00	0.85	1.14	18.1
8	T1	7	0.0	7	0.0	0.148	57.8	LOS E	1.7	12.1	0.94	0.71	0.94	20.1
9	R2	22	0.0	22	0.0	0.148	61.6	LOS E	1.7	12.1	0.94	0.71	0.94	3.6
Approach		145	0.0	145	0.0	0.733	69.0	LOS E	7.7	53.7	0.99	0.82	1.10	16.8
West: Union Rd (W)														
10	L2	121	1.7	100	2.1	0.081	8.0	LOS A	1.7	12.0	0.27	0.57	0.27	19.1
11	T1	336	1.9	278	2.3	0.248	8.6	LOS A	6.6	47.0	0.41	0.37	0.41	41.1
12	R2	6	0.0	5	0.0	0.248	12.6	LOS A	6.6	47.0	0.42	0.37	0.42	40.1
Approach		463	1.8	383[N1]	2.2	0.248	8.5	LOS A	6.6	47.0	0.37	0.42	0.37	39.3
All Vehicles		1264	1.7	1184[N1]	1.8	0.772	24.8	LOS B	19.2	137.0	0.61	0.62	0.63	29.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	8.9	LOS A	0.1	0.1	0.37	0.37
P2	East Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96

P3	North Full Crossing	53	10.8	LOS B	0.1	0.1	0.41	0.41
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	34.6	LOS D			0.67	0.67

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: 7 [7. Union Rd and Link Rd]

Network: N101 [Network Model - 2026 Development AM Peak]

Union Rd and Link Rd
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Union Rd (E)														
5	T1	206	0.0	206	0.0	0.119	0.3	LOS A	0.1	0.9	0.08	0.03	0.08	43.4
6	R2	13	0.0	13	0.0	0.119	6.6	LOS A	0.1	0.9	0.08	0.03	0.08	43.4
Approach		219	0.0	219	0.0	0.119	0.7	NA	0.1	0.9	0.08	0.03	0.08	43.4
North: Link Rd (N)														
7	L2	58	0.0	57	0.0	0.362	11.3	LOS A	1.6	11.0	0.67	1.07	0.86	13.7
9	R2	134	0.0	133	0.0	0.362	13.9	LOS A	1.6	11.0	0.67	1.07	0.86	13.7
Approach		192	0.0	190 N1	0.0	0.362	13.1	LOS A	1.6	11.0	0.67	1.07	0.86	13.7
West: Union Rd (W)														
10	L2	20	0.0	19	0.0	0.300	3.9	LOS A	0.0	0.0	0.00	0.02	0.00	48.6
11	T1	702	0.0	564	0.0	0.300	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	48.6
Approach		722	0.0	583 N1	0.0	0.300	0.1	NA	0.0	0.0	0.00	0.02	0.00	48.6
All Vehicles		1133	0.0	992 N1	0.0	0.362	2.7	NA	1.6	11.0	0.15	0.22	0.18	31.8

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 8 [8. Union Ln and Link Rd]

Network: N101 [Network Model - 2026 Development AM Peak]

Union Ln and Link Rd
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Link Road (S)														
2	T1	65	0.0	65	0.0	0.033	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		65	0.0	65	0.0	0.033	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
East: Union Ln (E)														
4	L2	124	0.0	123	0.0	0.156	3.9	LOS A	0.6	4.4	0.14	0.50	0.14	25.2
6	R2	124	0.0	123	0.0	0.156	4.6	LOS A	0.6	4.4	0.14	0.50	0.14	25.2
Approach		248	0.0	246[N1]	0.0	0.156	4.2	LOS A	0.6	4.4	0.14	0.50	0.14	25.2
All Vehicles		314	0.0	311[N1]	0.0	0.156	3.3	NA	0.6	4.4	0.11	0.40	0.11	26.6

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: Drwy1 [Driveway 1]

Network: N101 [Network Model - 2026 Development AM Peak]

Driveway 1
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Link Rd (S)														
1	L2	33	0.0	31	0.0	0.017	7.5	LOS A	0.0	0.0	0.00	0.79	0.00	20.9
2	T1	1	0.0	1	0.0	0.017	0.0	LOS A	0.0	0.0	0.00	0.79	0.00	19.8
Approach		34	0.0	33[N1]	0.0	0.017	7.2	NA	0.0	0.0	0.00	0.79	0.00	20.9
North: Link Rd (N)														
8	T1	124	0.0	123	0.0	0.064	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.1
9	R2	1	0.0	1	0.0	0.064	4.1	LOS A	0.0	0.0	0.00	0.01	0.00	14.0
Approach		125	0.0	124[N1]	0.0	0.064	0.0	NA	0.0	0.0	0.00	0.01	0.00	46.4
West: Driveway 1														
10	L2	65	0.0	65	0.0	0.110	2.3	LOS A	0.4	2.9	0.01	1.00	0.01	9.0
12	R2	65	0.0	65	0.0	0.110	2.9	LOS A	0.4	2.9	0.01	1.00	0.01	9.0
Approach		131	0.0	131	0.0	0.110	2.6	LOS A	0.4	2.9	0.01	1.00	0.01	9.0
All Vehicles		289	0.0	287[N1]	0.0	0.110	2.0	NA	0.4	2.9	0.00	0.55	0.00	13.2

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: Drwy2 [Driveway 2]

Network: N101 [Network Model - 2026 Development AM Peak]

Driveway 2
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Union Rd (E)														
5	T1	269	0.0	268	0.0	0.141	0.1	LOS A	0.0	0.3	0.02	0.01	0.02	48.2
6	R2	3	0.0	3	0.0	0.141	8.8	LOS A	0.0	0.3	0.02	0.01	0.02	17.6
Approach		273	0.0	271 N1	0.0	0.141	0.2	NA	0.0	0.3	0.02	0.01	0.02	46.5
North: Driveway 2														
7	L2	5	0.0	5	0.0	0.040	5.4	LOS A	0.1	0.9	0.62	0.97	0.62	7.6
9	R2	14	0.0	14	0.0	0.040	8.8	LOS A	0.1	0.9	0.62	0.97	0.62	7.6
Approach		19	0.0	19	0.0	0.040	7.8	LOS A	0.1	0.9	0.62	0.97	0.62	7.6
West: Union Rd (W)														
10	L2	7	0.0	7	0.0	0.300	7.5	LOS A	0.0	0.0	0.00	0.01	0.00	26.8
11	T1	717	0.0	578	0.0	0.300	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	48.5
Approach		724	0.0	585 N1	0.0	0.300	0.1	NA	0.0	0.0	0.00	0.01	0.00	47.7
All Vehicles		1016	0.0	875 N1	0.0	0.300	0.3	NA	0.1	0.9	0.02	0.03	0.02	42.4

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: UrbApart [Urban Apartments]

Network: N101 [Network Model - 2026 Development AM Peak]

Urban Apartments
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Union Lane (E)														
5	T1	191	0.0	188	0.0	0.100	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	47.6
6	R2	7	0.0	7	0.0	0.100	5.8	LOS A	0.0	0.0	0.00	0.04	0.00	47.0
Approach		198	0.0	195[N1]	0.0	0.100	0.2	NA	0.0	0.0	0.00	0.04	0.00	47.4
North: Urban Apartment Access														
9	R2	57	0.0	57	0.0	0.052	2.9	LOS A	0.2	1.2	0.26	0.89	0.26	9.9
Approach		57	0.0	57	0.0	0.052	2.9	LOS A	0.2	1.2	0.26	0.89	0.26	9.9
All Vehicles		255	0.0	252[N1]	0.0	0.100	0.8	NA	0.2	1.2	0.06	0.23	0.06	13.6

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 1 [1. High St and Mulgoa Rd]

Network: N101 [Network Model - 2026 Development PM Peak]

High Street and Mulgoa Road
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mulgoa Road (S)														
1	L2	246	2.0	246	2.0	0.384	27.9	LOS B	9.2	65.6	0.80	0.78	0.80	35.0
2	T1	1014	2.0	1014	2.0	0.777	57.5	LOS E	22.4	159.7	1.00	0.90	1.06	24.9
3	R2	91	1.6	91	1.6	0.363	65.9	LOS E	5.7	40.6	0.95	0.77	0.95	8.4
Approach		1351	2.0	1351	2.0	0.777	52.7	LOS D	22.4	159.7	0.96	0.87	1.00	25.4
East: High Street (E)														
4	L2	172	1.6	170	1.6	0.240	36.5	LOS C	7.8	55.0	0.72	0.75	0.72	11.1
5	T1	597	2.0	591	2.0	0.789	59.4	LOS E	21.5	153.0	0.99	0.91	1.08	23.8
6	R2	384	2.0	380	2.0	0.808	75.5	LOS F	13.6	96.9	1.00	0.91	1.17	20.3
Approach		1153	1.9	1142 N1	1.9	0.808	61.4	LOS E	21.5	153.0	0.95	0.88	1.05	21.5
North: Castlereagh Road (N)														
7	L2	208	1.6	208	1.6	0.158	7.9	LOS A	2.4	17.1	0.26	0.63	0.26	48.0
8	T1	1405	2.0	1405	2.0	0.667	40.5	LOS C	26.8	190.5	0.91	0.80	0.91	26.4
9	R2	667	2.0	667	2.0	0.797	38.6	LOS C	14.3	101.7	1.00	0.89	1.08	36.9
Approach		2281	2.0	2281	2.0	0.797	37.0	LOS C	26.8	190.5	0.87	0.81	0.90	31.4
West: High Street (W)														
10	L2	654	2.0	654	2.0	0.373	18.9	LOS B	8.8	62.4	0.68	0.75	0.68	45.4
11	T1	277	1.9	277	1.9	0.343	52.4	LOS D	8.1	57.5	0.90	0.75	0.90	22.8
12	R2	199	1.6	199	1.6	0.421	67.4	LOS E	6.4	45.4	0.97	0.78	0.97	19.2
Approach		1129	1.9	1129	1.9	0.421	35.6	LOS C	8.8	62.4	0.78	0.76	0.78	34.5
All Vehicles		5914	1.9	5903 N1	2.0	0.808	45.0	LOS D	26.8	190.5	0.89	0.83	0.93	28.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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
P11	South Stage 1	53	52.4	LOS E	0.2	0.2	0.87	0.87
P12	South Stage 2	53	59.6	LOS E	0.2	0.2	0.92	0.92

P1S	South Slip/Bypass Lane Crossing	53	10.9	LOS B	0.1	0.1	0.55	0.55
P2	East Full Crossing	53	41.7	LOS E	0.2	0.2	0.77	0.77
P2S	East Slip/Bypass Lane Crossing	53	16.6	LOS B	0.1	0.1	0.49	0.49
P31	North Stage 1	53	55.0	LOS E	0.2	0.2	0.89	0.89
P32	North Stage 2	53	27.5	LOS C	0.1	0.1	0.87	0.87
P3S	North Slip/Bypass Lane Crossing	53	0.5	LOS A	0.0	0.0	0.11	0.11
P4	West Full Crossing	53	57.7	LOS E	0.2	0.2	0.91	0.91
P4S	West Slip/Bypass Lane Crossing	53	20.5	LOS C	0.1	0.1	0.71	0.71
All Pedestrians		526	34.2	LOS D			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 2 [2. Mulgoa Rd and Union Rd]

Network: N101 [Network Model - 2026 Development PM Peak]

Mulgoa Rd and Union Rd
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Mulgoa Road (S)														
2	T1	1342	2.0	1342	2.0	0.394	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	181	1.8	181	1.8	0.915	70.1	LOS E	7.4	52.8	0.98	1.55	3.19	18.4
Approach		1523	1.9	1523	1.9	0.915	8.4	NA	7.4	52.8	0.12	0.18	0.38	47.1
East: Union Road (E)														
4	L2	249	1.8	247	1.8	0.309	7.5	LOS A	1.6	11.3	0.58	0.76	0.62	46.3
Approach		249	1.8	247[N1]	1.8	0.309	7.5	LOS A	1.6	11.3	0.58	0.76	0.62	46.3
North: Mulgoa Road (N)														
7	L2	192	1.2	191	1.2	0.104	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	38.5
8	T1	1597	2.0	1596	2.0	0.276	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1788	1.9	1787[N1]	1.9	0.276	0.6	NA	0.0	0.0	0.00	0.06	0.00	59.0
All Vehicles		3561	1.9	3557[N1]	1.9	0.915	4.4	NA	7.4	52.8	0.09	0.16	0.21	52.8

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 3 [3. High St and Civic Roundabout]

Network: N101 [Network Model - 2026 Development PM Peak]

High and Civic Roundabout
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Link Rd (S)														
1	L2	52	0.0	50	0.0	0.204	5.7	LOS A	0.7	5.1	0.67	0.74	0.67	23.1
2	T1	2	0.0	2	0.0	0.204	5.6	LOS A	0.7	5.1	0.67	0.74	0.67	44.7
3	R2	52	0.0	50	0.0	0.204	10.7	LOS A	0.7	5.1	0.67	0.74	0.67	23.1
Approach		105	0.0	101 N1	0.0	0.204	8.2	LOS A	0.7	5.1	0.67	0.74	0.67	24.4
East: High St (E)														
5	T1	1000	1.9	991	1.9	0.472	2.5	LOS A	2.3	16.3	0.21	0.30	0.21	40.4
6	R2	29	0.0	29	0.0	0.472	7.8	LOS A	2.3	16.3	0.22	0.30	0.22	50.4
Approach		1029	1.9	1020 N1	1.9	0.472	2.6	LOS A	2.3	16.3	0.21	0.30	0.21	41.1
North: Civic Pl (N)														
7	L2	53	2.0	53	2.0	0.171	3.9	LOS A	0.7	4.9	0.46	0.65	0.46	42.0
9	R2	100	2.0	100	2.0	0.171	9.1	LOS A	0.7	4.9	0.46	0.65	0.46	42.0
Approach		153	2.0	153	2.0	0.171	7.3	LOS A	0.7	4.9	0.46	0.65	0.46	42.0
West: High St (W)														
10	L2	74	2.0	74	2.0	0.253	2.8	LOS A	1.3	9.0	0.18	0.28	0.18	47.5
11	T1	463	2.0	463	2.0	0.253	2.3	LOS A	1.3	9.0	0.18	0.28	0.18	39.1
Approach		537	2.0	537	2.0	0.253	2.4	LOS A	1.3	9.0	0.18	0.28	0.18	42.0
All Vehicles		1824	1.8	1811 N1	1.8	0.472	3.3	LOS A	2.3	16.3	0.25	0.35	0.25	40.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Roundabout Capacity Model: SIDRA Standard.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 4 [4. High St and Worth St]

Network: N101 [Network Model - 2026 Development PM Peak]

High and Worth
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Worth St (S)														
1	L2	215	2.0	205	2.0	0.837	65.9	LOS E	13.0	92.2	1.00	0.94	1.24	3.8
2	T1	114	2.0	109	2.0	0.505	50.2	LOS D	7.7	54.6	0.96	0.78	0.96	22.5
3	R2	34	0.0	32	0.0	0.505	54.4	LOS D	7.7	54.6	0.96	0.78	0.96	22.4
Approach		362	1.8	346 N1	1.8	0.837	59.9	LOS E	13.0	92.2	0.98	0.88	1.13	12.6
East: High St (E)														
4	L2	81	1.9	81	1.9	0.455	26.5	LOS B	12.7	90.0	0.71	0.66	0.71	30.8
5	T1	668	1.9	668	1.9	0.455	21.9	LOS B	16.1	114.6	0.71	0.64	0.71	31.3
6	R2	211	2.0	211	2.0	0.419	28.8	LOS C	8.4	59.8	0.72	0.77	0.72	35.6
Approach		960	1.9	960	1.9	0.455	23.8	LOS B	16.1	114.6	0.71	0.67	0.71	32.6
North: Worth St (N)														
7	L2	1	0.0	1	0.0	0.497	33.6	LOS C	8.8	62.6	0.79	0.66	0.79	35.9
8	T1	194	1.9	194	1.9	0.497	29.1	LOS C	8.8	62.6	0.79	0.66	0.79	28.2
9	R2	309	2.0	309	2.0	0.710	34.9	LOS C	13.1	93.4	0.97	0.84	0.99	25.9
Approach		504	2.0	504	2.0	0.710	32.6	LOS C	13.1	93.4	0.90	0.77	0.91	26.8
West: High St (W)														
10	L2	203	2.0	203	2.0	0.404	35.7	LOS C	8.9	63.7	0.80	0.78	0.80	29.0
11	T1	279	1.8	278	1.8	0.150	18.2	LOS B	4.5	31.6	0.59	0.49	0.59	36.4
12	R2	286	1.6	286	1.6	1.139	211.4	LOS F	36.8	261.1	1.00	1.53	2.38	2.7
Approach		768	1.8	767 N1	1.8	1.139	94.8	LOS F	36.8	261.1	0.80	0.95	1.31	13.4
All Vehicles		2595	1.9	2577 N1	1.9	1.139	51.5	LOS D	36.8	261.1	0.81	0.80	0.99	20.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	21.1	LOS C	0.1	0.1	0.59	0.59
P2	East Full Crossing	53	29.5	LOS C	0.1	0.1	0.70	0.70

P3	North Full Crossing	53	22.3	LOS C	0.1	0.1	0.61	0.61
P3S	North Slip/Bypass Lane Crossing	53	17.1	LOS B	0.1	0.1	0.53	0.53
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4S	West Slip/Bypass Lane Crossing	53	40.1	LOS E	0.1	0.1	0.82	0.82
All Pedestrians		316	30.7	LOS D			0.70	0.70

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 5 [5. Worth St and Union Ln]

Network: N101 [Network Model - 2026 Development PM Peak]

Worth St and Union Ln
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Worth St (S)														
1	L2	75	1.5	71	1.5	0.039	3.9	LOS A	0.0	0.0	0.00	0.52	0.00	27.5
2	T1	321	2.0	305	2.0	0.159	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		396	1.9	376[N1]	1.9	0.159	0.7	NA	0.0	0.0	0.00	0.10	0.00	42.9
East: Union Ln (E)														
4	L2	18	0.0	18	0.0	0.111	4.7	LOS A	0.3	2.2	0.52	0.63	0.52	34.2
5	T1	26	0.0	26	0.0	0.111	9.9	LOS A	0.3	2.2	0.52	0.63	0.52	34.2
6	R2	25	0.0	25	0.0	0.120	11.3	LOS A	0.2	1.7	0.63	0.81	0.63	32.1
Approach		69	0.0	69	0.0	0.120	9.1	LOS A	0.3	2.2	0.56	0.70	0.56	33.4
North: Worth St (N)														
8	T1	437	1.7	415	1.8	0.160	0.4	LOS A	13.8	97.9	0.07	0.08	0.07	41.9
9	R2	116	1.5	112	1.5	0.160	6.1	LOS A	0.8	5.6	0.29	0.31	0.29	28.6
Approach		553	1.7	527[N1]	1.7	0.160	1.6	NA	13.8	97.9	0.12	0.13	0.12	38.1
All Vehicles		1018	1.7	973[N1]	1.7	0.160	1.8	NA	13.8	97.9	0.11	0.16	0.11	37.2

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 6 [6. Worth St and Union Rd]

Network: N101 [Network Model - 2026 Development PM Peak]

Worth St and Union Rd
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Worth St (S)														
1	L2	16	0.0	16	0.0	0.329	68.2	LOS E	3.0	21.2	0.98	0.74	0.98	18.1
2	T1	28	0.0	28	0.0	0.329	63.6	LOS E	3.0	21.2	0.98	0.74	0.98	18.1
3	R2	4	0.0	4	0.0	0.329	68.2	LOS E	3.0	21.2	0.98	0.74	0.98	26.1
Approach		48	0.0	48	0.0	0.329	65.5	LOS E	3.0	21.2	0.98	0.74	0.98	19.0
East: Union Rd (E)														
4	L2	33	0.0	33	0.0	0.188	22.3	LOS B	6.0	42.5	0.57	0.52	0.57	39.6
5	T1	147	2.0	147	2.0	0.188	17.8	LOS B	6.0	42.5	0.57	0.52	0.57	33.3
6	R2	359	1.9	359	1.9	1.080	168.1	LOS F	44.4	315.6	1.00	1.35	1.99	8.9
Approach		539	1.8	539	1.8	1.080	118.1	LOS F	44.4	315.6	0.86	1.07	1.52	12.3
North: Worth St (N)														
7	L2	421	2.0	406	2.0	0.925	75.2	LOS F	11.5	81.6	1.00	1.02	1.31	17.4
8	T1	32	0.0	30	0.0	0.173	39.7	LOS C	4.1	28.8	0.81	0.71	0.81	24.5
9	R2	59	0.0	54	0.0	0.173	43.6	LOS D	4.1	28.8	0.81	0.71	0.81	5.0
Approach		512	1.6	490[N1]	1.7	0.925	69.5	LOS E	11.5	81.6	0.97	0.96	1.23	17.2
West: Union Rd (W)														
10	L2	163	1.9	163	1.9	0.156	13.4	LOS A	4.3	30.7	0.42	0.63	0.42	13.3
11	T1	339	2.0	338	2.0	0.479	19.3	LOS B	11.5	81.6	0.63	0.56	0.63	33.8
12	R2	12	0.0	12	0.0	0.479	23.6	LOS B	11.5	81.6	0.64	0.56	0.64	32.9
Approach		514	1.9	513[N1]	1.9	0.479	17.5	LOS B	11.5	81.6	0.56	0.58	0.56	31.3
All Vehicles		1613	1.7	1590[N1]	1.8	1.080	69.1	LOS E	44.4	315.6	0.80	0.87	1.10	16.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	17.8	LOS B	0.1	0.1	0.52	0.52
P2	East Full Crossing	53	41.7	LOS E	0.2	0.2	0.80	0.80

P3	North Full Crossing	53	20.5	LOS C	0.1	0.1	0.56	0.56
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	34.8	LOS D			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 7 [7. Union Rd and Link Rd]

Network: N101 [Network Model - 2026 Development PM Peak]

Union Rd and Link Rd
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Union Rd (E)														
5	T1	183	1.8	182	1.8	0.122	0.4	LOS A	0.3	1.8	0.13	0.09	0.13	39.3
6	R2	38	0.0	35	0.0	0.122	5.3	LOS A	0.3	1.8	0.13	0.09	0.13	39.3
Approach		221	1.5	216[N1]	1.5	0.122	1.2	NA	0.3	1.8	0.13	0.09	0.13	39.3
North: Link Rd (N)														
7	L2	33	0.0	32	0.0	0.181	8.0	LOS A	0.5	3.5	0.46	0.95	0.46	17.7
9	R2	75	1.6	72	1.6	0.181	9.5	LOS A	0.5	3.5	0.46	0.95	0.46	17.7
Approach		107	1.1	104[N1]	1.1	0.181	9.0	LOS A	0.5	3.5	0.46	0.95	0.46	17.7
West: Union Rd (W)														
10	L2	79	0.0	79	0.0	0.192	3.9	LOS A	0.8	5.9	0.00	0.12	0.00	42.0
11	T1	288	1.9	288	1.9	0.192	0.0	LOS A	0.8	5.9	0.00	0.12	0.00	42.0
Approach		367	1.5	367	1.5	0.192	0.8	NA	0.8	5.9	0.00	0.12	0.00	42.0
All Vehicles		696	1.5	687[N1]	1.5	0.192	2.2	NA	0.8	5.9	0.11	0.23	0.11	34.1

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 8 [8. Union Ln and Link Rd]

Network: N101 [Network Model - 2026 Development PM Peak]

Union Ln and Link Rd
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Link Road (S)														
2	T1	16	0.0	16	0.0	0.008	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		16	0.0	16	0.0	0.008	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
East: Union Ln (E)														
4	L2	91	1.9	87	1.9	0.109	3.9	LOS A	0.4	2.9	0.06	0.53	0.06	25.9
6	R2	91	1.9	87	1.9	0.109	4.3	LOS A	0.4	2.9	0.06	0.53	0.06	25.9
Approach		181	1.9	174[N1]	1.9	0.109	4.1	LOS A	0.4	2.9	0.06	0.53	0.06	25.9
All Vehicles		197	1.7	190[N1]	1.8	0.109	3.7	NA	0.4	2.9	0.05	0.48	0.05	26.4

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: Drwy1 [Driveway 1]

Network: N101 [Network Model - 2026 Development PM Peak]

Driveway 1
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Link Rd (S)														
1	L2	128	0.0	125	0.0	0.068	7.5	LOS A	0.0	0.0	0.00	0.79	0.00	20.7
2	T1	1	0.0	1	0.0	0.068	0.0	LOS A	0.0	0.0	0.00	0.79	0.00	19.5
Approach		129	0.0	126 N1	0.0	0.068	7.4	NA	0.0	0.0	0.00	0.79	0.00	20.7
North: Link Rd (N)														
8	T1	84	2.0	80	2.0	0.042	0.0	LOS A	0.0	0.0	0.01	0.01	0.01	48.5
9	R2	1	0.0	1	0.0	0.042	4.4	LOS A	0.0	0.0	0.01	0.01	0.01	14.0
Approach		85	2.0	81 N1	2.0	0.042	0.1	NA	0.0	0.0	0.01	0.01	0.01	44.8
West: Driveway 1														
10	L2	16	0.0	16	0.0	0.027	2.3	LOS A	0.1	0.7	0.00	1.00	0.00	9.0
12	R2	16	0.0	16	0.0	0.027	2.8	LOS A	0.1	0.7	0.00	1.00	0.00	9.0
Approach		32	0.0	32	0.0	0.027	2.5	LOS A	0.1	0.7	0.00	1.00	0.00	9.0
All Vehicles		246	0.7	239 N1	0.7	0.068	4.3	NA	0.1	0.7	0.00	0.55	0.00	19.3

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: Drwy2 [Driveway 2]

Network: N101 [Network Model - 2026 Development PM Peak]

Driveway 2
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Union Rd (E)														
5	T1	226	2.0	224	2.0	0.120	0.0	LOS A	0.0	0.3	0.02	0.02	0.02	47.7
6	R2	5	0.0	5	0.0	0.120	7.0	LOS A	0.0	0.3	0.02	0.02	0.02	17.6
Approach		232	2.0	229 N1	2.0	0.120	0.2	NA	0.0	0.3	0.02	0.02	0.02	44.7
North: Driveway 2														
7	L2	3	0.0	3	0.0	0.014	3.3	LOS A	0.0	0.3	0.42	0.87	0.42	8.5
9	R2	7	0.0	7	0.0	0.014	4.9	LOS A	0.0	0.3	0.42	0.87	0.42	8.5
Approach		11	0.0	11	0.0	0.014	4.5	LOS A	0.0	0.3	0.42	0.87	0.42	8.5
West: Union Rd (W)														
10	L2	14	0.0	14	0.0	0.150	7.5	LOS A	0.0	0.0	0.00	0.06	0.00	25.9
11	T1	275	2.0	275	2.0	0.150	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	44.5
Approach		288	1.9	288	1.9	0.150	0.4	NA	0.0	0.0	0.00	0.06	0.00	42.0
All Vehicles		531	1.9	528 N1	1.9	0.150	0.4	NA	0.0	0.3	0.02	0.06	0.02	39.9

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: UrbApart [Urban Apartments]

Network: N101 [Network Model - 2026 Development PM Peak]

Urban Apartments
East DA Scheme (FSR 6:1)
One-Way Link Northbound to High/ Civic Roundabout
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Union Lane (E)														
5	T1	167	2.0	161	2.0	0.110	0.0	LOS A	0.0	0.0	0.00	0.22	0.00	37.8
6	R2	51	0.0	50	0.0	0.110	5.8	LOS A	0.0	0.0	0.00	0.22	0.00	45.7
Approach		218	1.5	210[N1]	1.5	0.110	1.4	NA	0.0	0.0	0.00	0.22	0.00	43.4
North: Urban Apartment Access														
9	R2	14	0.0	14	0.0	0.013	3.0	LOS A	0.0	0.3	0.26	0.87	0.26	9.9
Approach		14	0.0	14	0.0	0.013	3.0	LOS A	0.0	0.3	0.26	0.87	0.26	9.9
All Vehicles		232	1.4	224[N1]	1.5	0.110	1.5	NA	0.0	0.3	0.02	0.26	0.02	28.3

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

24 August 2020

Our Reference: SYD20/00453/03
Council Reference: DA20/0148
Planning Portal Reference: CNR-6306

Kathryn Saunders
Penrith City Council
PO Box 60
PENRITH NSW 2751

Dear Ms Saunders,

MODELLING RESPONSE - CONSTRUCT MIXED USE COMMERCIAL AND RESIDENTIAL COMPLEX - 87-93 UNION ROAD, PENRITH

Reference is made to Council's referral dated 13 July 2020 with regard to the abovementioned Development Application, which was referred to Transport for NSW (TfNSW) in accordance with Clause 104 and Schedule 3 of *State Environmental Planning Policy (Infrastructure) 2007*.

TfNSW has reviewed the documentation including the Electronic SIDRA files and *Parking and Traffic Consultants Pty Ltd (PTC)* response dated 29 June 2020 and provides detailed comments to Council in **Attachment A – TfNSW Modelling Response.**

Based on the comments provided in Attachment A, TfNSW raises concerns with Council that it is unclear at this stage what the proposed development impacts to the surrounding local and state road network will be. The response provided by the proponent regarding TfNSW modelling concerns requires further refinement in order to understand the implications of the additional traffic expected to be generated by this development.

Notwithstanding the above and noting the scale of this development, as the consent authority for this development, Council is to determine if the development risks raised by TfNSW are satisfactorily addressed by the applicant. Should Council determine that additional information is required to address the modelling concerns, TfNSW will be happy to review any additional information provided.

If you have any further questions, Ms Laura van Putten would be pleased to take your call on (02) 8849 2480 or please email development.sydney@rms.nsw.gov.au. I hope this has been of assistance.

Yours sincerely

Pahee Rathan
Senior Land Use Assessment Coordinator

Transport for NSW
27 Argyle Street, Parramatta NSW 2150 | Locked Bag 5085, Parramatta NSW 2124
P (02) 8849 2666 | W transport.nsw.gov.au | ABN 18 804 239 602

Attachment A – TfNSW Modelling Response

Traffic input data:

1. For developing the existing base case models, the data was mainly extracted from two old models. Those models had the assumption that in 2020, some future changes including Jane Street and Mulgoa Road infrastructure upgrade already happened; In other words the 2020 traffic in that model was estimated traffic volumes for an upgraded network with additional lanes, while these upgrades do not exist in the current road network.

   Considering that the response provided to comments 1 and 2 shows that the models were not directly based on consistent traffic survey data at specific survey date(s), and given that over three years have been passed since the base model was developed, the traffic condition of the study area may have been changed.

   The recommendation for existing traffic volumes is using a nearest available historical turning movement counts reflecting pre-COVID 19 typical traffic conditions. In the absence of that data in 2019, older available traffic survey records from 2017 or 2018 can be used and scaled up based on SCATS historical traffic volumes.

2. Traffic input data for future models - the adopted traffic growth needs to be presented and discussed in the report, which is expected to be different for local and major roads. In addition, it is recommended that the number of pedestrians in future and the potential changes in the share of heavy vehicles be discussed.

3. Considering the models and the responses to comment 1, 2 and 5 to 7, some other concerns about the adopted approach are as follows:

   a. The proportion of heavy vehicles were kept as 2 percent for all roads/streets in both existing and future conditions, while at least for Mulgoa Roads percentage of heavy vehicles should be different;
   b. In the absence of existing surveys, all pedestrian volumes were coded as software default, and with the same values for future cases;
   c. When the traffic data comes from different sources and different dates, they also needed to be adjusted to reflect the seasonality of traffic as well as achieving a reasonable mid-block balance of trips for each peak; and
   d. The 2020 traffic volumes in the previous model for Mulgoa road and High street were based on estimated traffic for an upgraded road network.

It is therefore recommended that the models be supported by appropriate traffic survey data, be calibrated for existing base case condition, and then the future models be updated accordingly.

Distribution of trips generated by the development:

4. The response to comment 8 shows that a pre-development diagram was prepared; however, to provide a clear presentation of how the future traffic demand is developed for AM and PM peaks, it is suggested that the traffic volumes in these diagrams be according to:
   a. existing base case;
   b. background growth;
   c. the subject development application; and
   d. other development applications required by Council.

It is recommended that traffic diagrams showing the distribution of additional vehicles generated by the development be included in the report.

Providing the above separation of turning movement will enable the reader to understand how many vehicles are added to the critical movements, and give a better understanding of the responses provided to comments 8 to 12.

Model Development:

5. The majority of the comments related to the road network coding and geometry have been addressed.

   The TCS layouts however may not show the current operation of the site, and adopted signal phasing and timing should be supported by SCATS data or survey videos/ site observations. As an example, right turn from High Street to Worth Street during peak hours is expected to happen during F phase and without conflict with straight opposing movements. For pedestrian protection also, phase A and E at this intersection (TCS 2622) have a late start of 5 Seconds, which should be included in the model.

6. It is noted that in the updated models we received 5 scenarios out of 6, and the 2026 future base plus development scenario for AM peak was missed and not reviewed. It is therefore assumed that the changes made in this scenario are similar to the 2026 AM scenario without development.