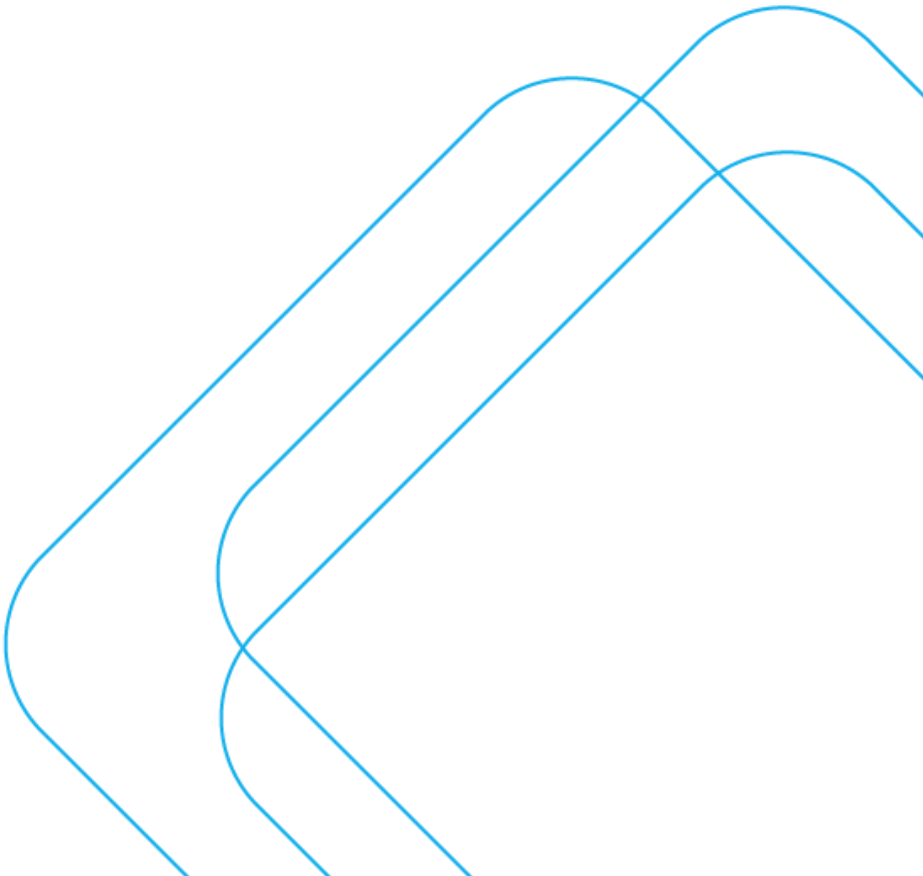
SCT Consulting

MACARTHUR GARDENS NORTH MASTER PLAN

Transport Assessment

22 JANUARY 2025

SCT Consulting acknowledges
the traditional owners of the lands
on which we work.
We pay our respects to Elders
past, present and emerging.



Quality Assurance

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1.0	11 October 2024	Draft Report
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Executive Summary

Introduction

In 2022 Landcom submitted a DA for a proposed master plan for a 'high-density residential and mixed-use development' for Macarthur Gardens North (the site). The DA (3944/2021/DA-SW) was granted consent on 14 December 2022. Landcom is now considering an increase to the approved residential yield from the previous master plan of 1,250 apartments to 1,625 apartments (**Figure ES-1**), including an affordable housing component of 162 dwellings.

Figure ES-1 The proposed updated MGN master plan

Source: Macarthur Gardens North Urban Design Report (September 2024)

To assist the revised application, Landcom has engaged with key stakeholders including the Department of Planning, Housing and Infrastructure (DPHI) and Transport for NSW (TfNSW) to ascertain specific requirements each organisation may have in evaluating the revised application. Following initial discussions with both organisations, a Transport Assessment Scoping Note was developed to outline the transport assessment required and subsequently accepted with additional requests.

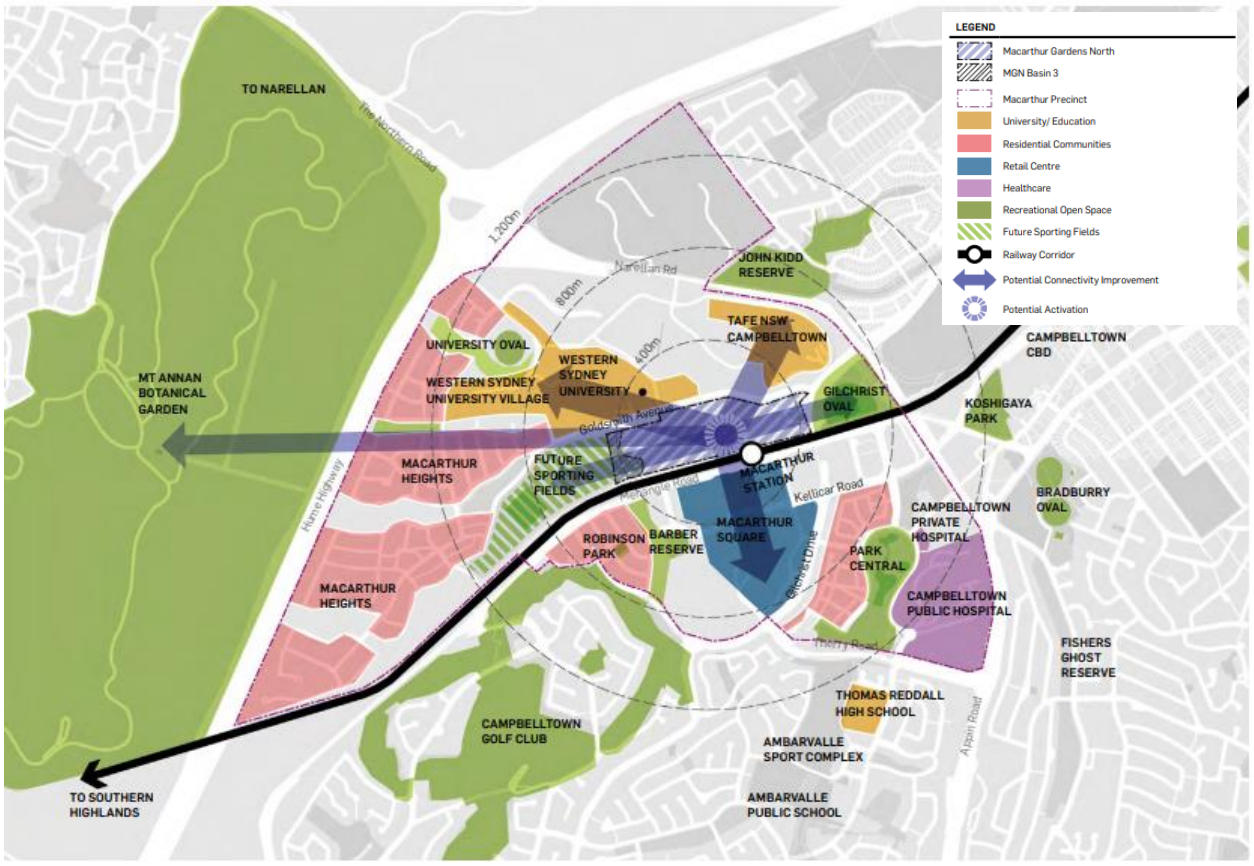
This report has been prepared consistent with the methodology proposed in the scoping note (including the additional requests from DPHI and TfNSW). The report focuses on the revised master plan and its revised impacts due to the proposed uplift. Where appropriate, relevant comparisons have been made to the previous Traffic and Transport Study (referred to throughout this document as 'the 2021 transport report'), which was developed to support the previously approved DA.

Several strategic documents and their relevance to transport for the site were reviewed. Overall, the documents highlight MGN as a site with excellent future access to public and active transport links, and the aim to reduce reliance on private vehicles.

Existing conditions

The site is part of the broader Macarthur region (**Figure ES-2**), which is a rapidly expanding and developing area. It is located on a greenfield site approximately 200m – 400m north of the Macarthur Station and south of the Western Sydney University and TAFE NSW – Campbelltown. The site is also near local services and amenities including the Macarthur Square Shopping Centre, Campbelltown Mall and Hospital and open space and green infrastructure.

Figure ES-2 The site in relation to existing surrounding land uses



Source: Macarthur Gardens North Urban Design Report (September 2024)

Analysis of JTW data showed a higher proportion of car users (63 per cent), in comparison to the 54 per cent of Greater Sydney, showing a higher dependency on car use. Train and bus usage was stated as 18 and one per cent respectively, which is slightly lower than Greater Sydney (with 22 per cent). Active transport usage was three per cent for walking and cycling combined.

There are formal walking and cycling facilities provided in proximity to the site, although several physical barriers limit active transport access from the site to the regional network. These include the Hume Motorway west of the site, Narellan Road | Appin Road east of the site and the railway line south of the site.

An existing bridge and associated footpath currently connect Macarthur Station and Goldsmith Avenue north of the rail corridor. The existing bridge has an internal width of approximately 1.8m and connects to a footpath that runs to Goldsmith Avenue. The bridge forms the northern part of the rail corridor crossing, which also consists of the station concourse and pedestrian bridge across Menangle Road (south of the station).

The nearest train station to the site is the Macarthur Station, within a 5 to 10-minute walk from the site via an existing access path between Goldsmith Avenue and the station. Macarthur Station is served by the T8 Airport & South Line (Macarthur to City via Airport and | or Sydenham) and Southern Highlands train services. A bus interchange with access to bus services is located to the south of the Station and serves the local bus network which primarily connects to Campbelltown and Narellan.

To understand how the traffic volumes have changed between 2019 and 2024, a comparison of traffic flow data was undertaken on the nearby key road corridors, including the nearby intersections on Narellan Road and Gilchrist Drive. The analysis showed that the traffic volumes have decreased across both intersections, in both the AM and PM peak hours, with the most significant reduction being at the Narellan Road | Western Sydney University Access Road

intersection in the PM peak hour. The 2024 peak hour traffic survey has confirmed that the **background traffic volumes have generally reduced over the last five years**, except for the WSU access approach and the Gilchrist Drive approach, which shows that there has been some increase in 'development' traffic associated with Macarthur Heights and WSU.

Given the reduction in traffic volumes noted between 2019 and 2024, the nearby intersections would perform better compared to the 2019 modelling (documented in the 2021 transport report).

The revised master plan (the Planning Proposal)

The proposed revised master plan will facilitate **an additional 375 dwellings, increasing the overall yield from 1,250 to 1,625 dwellings**. The revised master plan will also include an affordable housing component in addition to market housing. Vehicles will access the site from the surrounding road network via William Downes Avenue (through WSU) and Goldsmith Avenue.

Along with an improved pedestrian and cycle network within the precinct, Landcom is also planning to replace the existing pedestrian bridge that connects the site directly to Macarthur Train Station south of the site. The replacement bridge will increase capacity (widened from 1.8m to 3.5m) and improve connectivity and accessibility between the MGN site, and public transport services at Macarthur Station and Macarthur Town Centre. In addition, the bridge and ramp will also provide north-south connectivity for cyclists (though they would be required to dismount whilst using the bridge).

Transport appraisal

The site is in proximity to excellent existing and planned public and active transport, as well as the Western Sydney University and TAFE. Several actions relevant to the site focus on the improvement of public and active transport links, as well as other measures to reduce car dependence, such as constrained residential parking provision (maximum car parking rates) for developments in proximity to train stations. This is in line with the desired transport vision for the site, as outlined in several strategic documents.

The introduction of the affordable housing component will encourage more public and active transport usage, as these residents are more likely to walk, cycle or use public transport, due to restricted parking provision.

The excellent access to public and active transport will encourage a further shift away from private vehicles for residents of the site. In addition, the reduction in background traffic growth has resulted in spare capacity being available on the road network, to accommodate any additional development trips associated with the potential uplift.

Public and active transport

Overall, the site has excellent public and active transport accessibility, which would contribute to increased public transport and active transport mode share compared to the historical mode share for the region, including:

– An overall future mode shift of approximately 20 per cent towards public transport away from cars can be assumed, resulting in a public transport mode split of **33 per cent train trips and six per cent bus trips**.

– All public transport trips would have a linked walking trip, which would result in the same amount of walking trips for every public transport trip, plus the 'walk only' trips of three per cent (as identified in the JTW data).

– The cumulative potential users of the proposed pedestrian bridge is expected to quadruple by 2041, during the AM and PM peak periods. This is likely to result in a mode shift towards active transport.

– Overall, a **future public and active transport mode share of approximately 40 per cent** is assumed, reducing the future private vehicle trips from 63 per cent to 43 per cent.

Parking provisions

The revised master plan introduces an affordable housing component to the development, which results in different parking rates compared to the approved master plan. Applying the site-specific DCP parking rates to the market housing component and the Housing SEPP (2021) parking rates for the affordable housing results in **1**,**501 parking spaces** being required for the site.

Although the 1,501 spaces are more than the approved master plan requirements (of 1,166 parking spaces), the introduction of the affordable housing component has reduced the number of required spaces compared to if these were market housing dwellings.

The parking provision would include a minimum of 10 shared vehicle spaces and also 677 bicycle parking spaces for the apartments and visitors.

Vehicle trip generation

Retaining the trip generation assumptions from the approved master plan and applying these to the revised master plan (a total of **1,625 dwellings**) would result in **488 trips** being generated by the proposal, an **increase of 113 trips** compared to the approved master plan (previously 375 trips).

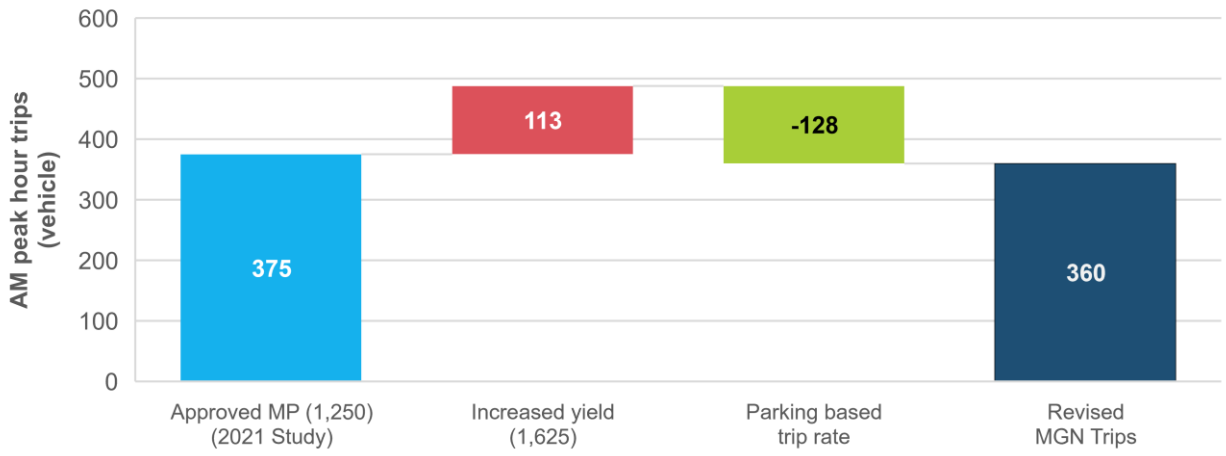
However, since the previous approval an affordable housing component has been introduced to the site. Based on the Housing SEPP (2021) reduces the parking requirements for affordable housing (compared to market housing). The reduced parking would consequently generate fewer private vehicle trips compared to a typical apartment; hence it is appropriate to adopt a trip rate linked to parking provision rather than total apartments.

By extension, this reduction in parking rate would result in a mode shift away from private vehicles, which can be facilitated based on the site's proximity to excellent public and active transport and the introduction of the upgraded pedestrian bridge, improving accessibility to Macarthur Station interchange.

Adopting the reduced parking provision and a parking-based trip rate (which already includes mode-shift) would decrease 128 trips, or a revised trip generation of **360 trips in the AM peak hour** and **338 trips in the PM peak hour**. This is a reduction compared to the approved master plan (and the modelling in the 2021 transport study).

The outcomes of these changes are summarised in **Figure ES-3** and discussed in detail in the relevant sections.

Figure ES-3 Summary of changes to MGN trip generation



Road network performance

To evaluate the impact of the revised masterplan yield, the SIDRA Network models developed for the 2021 study updated to reflect the new trip generation scenarios. The following scenarios (and associated rationale) were modelled in this study:

– **Future year base (revised assumptions)**

- Updated traffic volume data was collected in September 2024, at the Narellan Road | Western Sydney University Access Road and Gilchrist Drive | Goldsmith Avenue. Based on the observed traffic volumes, the growth anticipated (by the previous study) between 2019 and 2024 was not observed. Therefore, the 2029 future year scenario was revised to reflect zero growth between 2019 and 2024.
- The scenario still includes other developments proposed in the surrounding region (consistent with the 2021 transport study) and background growth (at the same rate previously proposed) between 2024 and 2029.

– **Future year with development**

- This scenario quantifies the impact of the MGN development by testing the network performance under the revised background growth assumptions plus the revised MGN trips (360 AM and 338 PM peak hour, consistent with **Figure ES-3**). This is the expected network performance in the future year.

– **Sensitivity analysis A: Original future year base with development using per-unit trip rates**

  - This sensitivity scenario tests the network performance where the original background growth assumptions (from the 2021 transport study) still hold plus the revised MGN trips based on the original 2021 transport study assumptions (i.e. the increase of 113 trips compared to the previously approved master plan as per **Figure ES-3**).

– **Sensitivity analysis B: Revised future year base with development using per-unit trip rates**

  - This sensitivity scenario tests the network performance where the revised background assumptions are valid (i.e. the reduction in background growth), plus the revised MGN trips based on the original 2021 transport study assumptions (i.e. the increase of 113 trips compared to the previously approved master plan as per **Figure ES-3**)

The key outcomes of the modelling undertaken are that:

– The network performance is heavily impacted by the background growth adopted from the 2021 transport study.

– Consistent with the 2021 transport study, the additional trips generated by the MGN site will have minor impacts on the performance of the surrounding intersections, compared to the 2029 scenario without the MGN site development trips.

– Compared to the approved master plan, the network performs better in the future year with development scenario. In contrast to the approved master plan, all intersections are expected to perform at LoS E or lower and within their capacity.

– The sensitivity analysis confirmed that using higher trip rates for the development traffic revealed little to no change in performance compared to using lower rates.

– Overall, the traffic modelling confirmed that the increased in development yield as a result of the revised master plan has negligible impacts on the performance of the surrounding critical intersections.

Green travel initiatives

Sustainable transport and Travel Demand Management (TDM) strategies involve the application of policies, objectives, measures and targets to influence travel behaviour, to encourage the uptake of sustainable forms of transport, i.e. non-car modes, wherever possible.

TDM strategies generally guide all relevant customers (residents, employees and visitors) in changing their travel behaviour in the following ways:

– Reduce travel

– Re-mode (consideration of travel via alternative modes)

– Re-time (consideration of travel at alternative times)

– Re-route.

TDM measures have proven to reduce congestion created by growth within urban areas and unlock urban renewal opportunities. They result in travel behaviour that uses less road space than a single-occupant vehicle commute and takes advantage of spare transport capacity outside the morning and afternoon peaks.

Key initiatives and measures have been identified, such as community applications for awareness or carpooling, real-time information and end-of-trip facilities, or already implemented in the master plan, including parking measures, connectivity to public transport, shared spaces and the mixed-use component of the development.

At the master planning stage, there is no means to enforce the delivery of Green Travel Plan actions. It is recommended that subsequent development applications be given the requirement to develop green travel plans to realise the benefits of the site's excellent access to public and active transport networks and regional services.

1.0 Introduction

1.1 Background

Macarthur Gardens North (MGN), the site, is part of the broader Macarthur region within the Campbelltown City Local Government Area (~45km from the Sydney CBD). The site is bounded by Goldsmith Avenue to the north, Gilchrist Drive to the east and the southern railway line (with Macarthur Station) to the south, as seen in **Figure 1-1**.

In 2022 Landcom submitted a Development Application (DA) for a proposed master plan for a 'high density residential and mixed-use development' for the site. The master plan also included a station arrival plaza and park, a regional east-west cycleway network and a significant amount of open space that retains the existing creek and biodiversity within the area (to be known as Macarthur Gardens North). SCT Consulting was commissioned in 2021 to prepare a Traffic and Transport Study (referred to throughout this document as 'the 2021 transport report') to support the proposed DA. The DA submission was granted consent on 14 December 2022 (3944/2021/DA-SW).

The 2021 transport report concluded that the 375 additional trips generated by the site would have minor impacts on the performance of the surrounding intersections, compared to the 2029 base case scenario (with background traffic growth but without the MGN site development trips).

Based on the previous study, all assessed intersections are expected to perform at the either the same Level of Service (LoS) with and without the site or an acceptable level of performance for an urban context (LoS C or better). The previous assessment has been updated and discussed in more detail in the relevant sections of this study.

Figure 1-1 The MGN site location

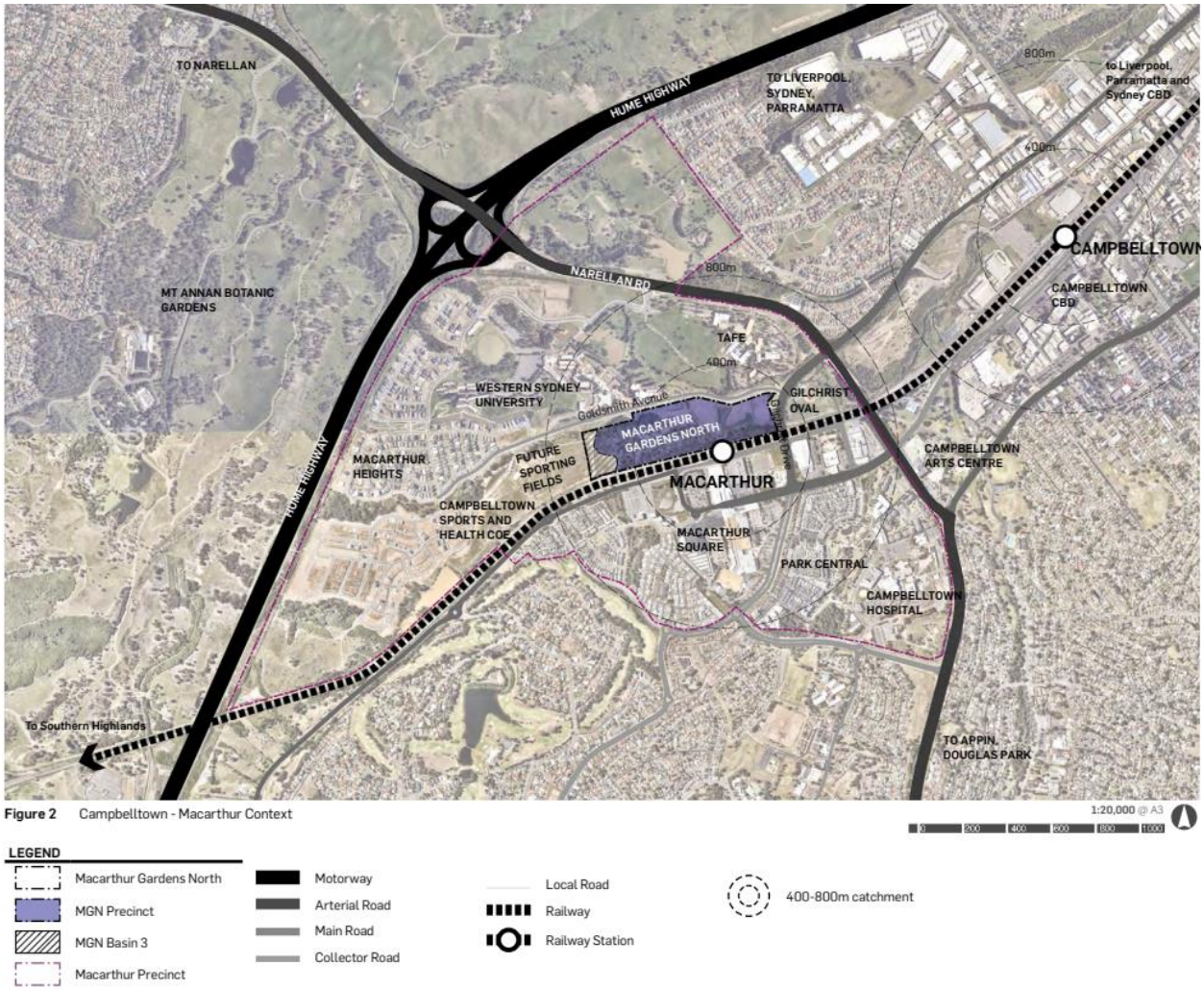


Figure 2 Campbelltown - Macarthur Context

Source: Macarthur Gardens North Urban Design Report (2024)

1.2 The revised master plan

Since the development's approval in December 2022, there has been an increased push for housing supply in response to decreasing housing affordability and shortfalls in housing supply. A key planning reform has been the introduction of the Transit Orientated Development (TOD) Program, which facilitates increased density near transport hubs and increased height limits being permitted if a greater proportion of the development is designated as affordable housing.

Though not formally listed as TOD site, there is in principle support from Campbelltown City Council and the Department of Planning, Housing and Infrastructure (DPHI) for Landcom to pursue a planning pathway to enable the delivery of additional dwellings at MGN due to its proximity to Macarthur Station. Subsequently, Landcom has been investigating where the additional yield can be located on site, and within the existing approved building footprints.

To achieve this, a site specific LEP amendment to increase the current maximum height of buildings in select locations and the preparation of a new concept development application (DA) to capture a new set of maximum building envelopes are proposed to be lodged concurrently over the site (**Figure 1-2**). The proposal can be summarised as follows:

– LEP Amendment: amendment to the maximum Height of Building (HOB) control from 32m to steeped heights ranging from 32m (9 storeys) up to 85m (24 storeys), as required to facilitate an overall total dwelling yield of **1,625 dwellings (+375 dwellings over the previous concept DA)**. The scope of the LEP amendment is isolated to parts of proposed Lots 11, 12, 13 and 17. All remaining lots are proposed to be retained in accordance with the Concept Plan DA 2022 approval.

– Concept DA: establish a new concept DA with new building envelopes across proposed Lots 11, 12, 13 and 17 that will enable the delivery of a high density residential and mixed-use development comprising six (6) mixed use towers, whereby the new concept DA equates to approximately an additional 400 dwellings when compared to the previous approval.

– Along with the increase in number of dwellings, the amended Concept Plan is going to deliver 10% affordable housing across the whole development.

Figure 1-2 The proposed updated MGN master plan

Source: Macarthur Gardens North Urban Design Report (September 2024)

Landcom has engaged SCT Consulting to prepare a transport study to support the Concept DA, focusing on the increase in the proposed yield at the MGN site relative to the approved scheme. This study leverages the findings of the 2021 transport study and focuses on the changes and impacts due to the proposed uplift.

1.3 Purpose of report

The purpose of this transport assessment is to support the revised DA (3944/2021/DA-SW) by assessing the increase in the proposed yield at the MGN site relative to the approved scheme.

In summary, the report has considered the following scope of works:

– Review of relevant background documents

– Review of existing traffic and transport context surrounding the MGN, including updated intersection count data since the 2021 transport report

– Discussion of the 2021 transport report context and outcomes for the approved DA

– Discussion of the proposed development uplift including proposed changes in dwelling mix and reduced parking provision

– Analysis of parking provision based on the Campbelltown City DCP and other relevant guidelines

– Discussion of net traffic generation and increase

– Qualitative assessment of any transport and parking impacts due to the of the revised master plan.

1.4 Stakeholder consultation

To expedite the approval process for the revised application, including LEP Amendment and Concept DA, Landcom has engaged with key stakeholders including Department of Planning, Housing and Infrastructure (DPHI) and Transport for NSW (TfNSW) to ascertain specific requirements each organisation may have in evaluating the revised application.

From a transport perspective, following initial discussions with both organisations, a Transport Assessment Scoping Note (included in **Appendix A**) was developed to outline the transport assessment required.

In summary the Scoping Note recommended the updated transport study (this document) should include:

1. First-principles assessment to determine the trips generated by the development.
    a. If there is a net-zero change in vehicle trips generated (or net reduction), then there is no need for revised traffic modelling. A qualitative traffic assessment and a Green Travel Plan (i.e. Travel Demand would be developed to support the Planning Proposal.
    b. If there is an increase in vehicular trips, update intersection modelling to determine the revised intersection performance.
2. Document the updated analysis, modelling (if required) and outcomes for the study area in a revised Traffic and Transport Assessment Report.

DPHI and TfNSW accepted the proposed approach noting the additional requests:

– Using the SIDRA models from the previous assessment (2021 transport study), assess the increased yield scenario and document outcomes due to the development (any mitigation measures needed to manage potential operational impacts on State road network) and provide model results (including SIDRA summaries).

– Include the status of the proposed pedestrian bridge; and

– Include built form outcomes of additional height and whether this may interact with Sydney Trains operations.

Subsequently, the report includes:

– First-principles assessment, refer to **Sections 5.2** and **5.3**.

– SIDRA modelling of increased yield scenario (including other sensitivity assessment), refer to **Section 5.5**

– Green travel initiatives, which would be further developed in the subsequent DA, in **Section 5.6**.

For further information on the built form outcomes and proposed pedestrian bridge status and, refer to the other documents included in the submission, including the Urban Design Report (Urbis, 2024).

1.5 Report structure

This report has been structured into the following sections:

– **Section 2** provides a summary of the review of all relevant background documents.

– **Section 3** provides an overview of the existing conditions for all transport modes and a description of the existing transport demographics in the area.

– **Section 4** provides an overview of the previously approved master plan and associated transport and traffic impacts, and the now proposed master plan.

– **Section 5** presents the transport appraisal which discusses the site's trip generation compared to the previous approval, the site's public and active transport accessibility, the parking requirements and the background growth for the surrounding road network.

– **Section 6** summarises the study findings and presents the final conclusions of the assessment.

2.0 Relevant documentation review

2.1 Relevant strategic documents

Several strategic documents and their relevance to transport and traffic surrounding the site were reviewed. Overall, the documents highlight MGN as a site with excellent future access to public and active transport links, and the aim to reduce reliance on private vehicles. The key transport outcomes of the documents are summarised below:

– **The future transport links Western Sydney**: The future transport link between the North West, Western Sydney Airport, South West and Greater Macarthur Growth Areas will provide improve transport options and accessibility for future MGN residents to future employment areas along Sydney's expanded Metro network. This will also enable MGN to be designed as a transit-oriented development with 30-minute access to jobs and economic growth across Western Sydney and for the planned Western Sydney Airport.

– **The Glenfield to Macarthur Urban Renewal Corridor (GMURC) Strategy**: The corridor consists of seven precincts surrounding train stations, being Glenfield, Macquarie Fields, Ingleburn, Minto, Leumeah, Campbelltown and Macarthur. The GMURC Strategy identifies that the role of the future Macarthur Precinct is to serve residents predominantly within a walking and cycling catchment of train stations and essential services. In line with the MGN master plan, it focuses on mixed-use urban activation and increased residential density around train stations.

– **Reimagining Campbelltown City Centre Master Plan**: This master plan supports a more liveable future for the Campbelltown City Centre. Based on the Reimagining Campbelltown City master plan, the character and role of the future city is to serve residents predominantly within a walking and cycling catchment of essential services and good public transport. This will be supported by introducing a non-car dependent high-quality sustainable transport network which focuses on people (and not cars), has multiple options, and allows residents to access the Campbelltown City Centre without a car within 30 minutes.

– **The Campbelltown 2040 Local Strategic Planning Statement (LSPS) (Campbelltown City Council, 2020)**: The LSPS highlights the Macarthur Precinct's location in proximity of excellent public transport and good walking and cycling links. Several actions relevant to the MGN focus on the improvement of public and active transport links, as well as other measures to reduce car dependence, such as constrained residential parking provision (maximum car parking rates) for developments in proximity of train stations.

– **The Campbelltown-Macarthur Place Strategy for the Macarthur Precinct**: The Strategy identifies place-specific actions required to ensure that the future Campbelltown City Centre is sustainable and resilient and fulfills its metropolitan role. It identifies that the role of the future Macarthur Precinct is to serve residents predominantly within a walking and cycling catchment of essential services and good public transport. The Precinct is expected to provide a non-car dependent high-quality sustainable transport network which focuses on people (and not cars). Improved access to public and active transport links will help achieve this.

2.2 Campbelltown City Council DCP 2015 Part 16 – Macarthur Gardens North

The site specific DCP for Macarthur Gardens North Precinct apply to the site. Guiding principles for the vision and objectives outlined in the site specific DCP, related to transport include:

– Seamless connections to key destinations:

  - Create an active transport network that is well integrated with the natural amenity of Bow Bowing Creek Reserve and Macarthur Station. This integration will **enhance the pedestrian and cyclist experience**, provide better connectivity to WSU and TAFE and ultimately, **encourage the use of active transport**.

– A new community with access to jobs:

  - Provide a mix of dwelling typologies, close to the amenity of Bow Bowing Creek and with **convenient access to Macarthur Station** to support a diverse community.

To enable the vision, the MGN Precinct will deliver several transport related improvements including:

– An arrival plaza and park on the northern side of Macarthur Station that links to the precinct's key destinations being Western Sydney University, TAFE, MGN and Bow Bowing Creek.

– Active transport via a regional east-west cycle network and walking paths around significant areas of open space that retains the existing creek and biodiversity values.

– Safer and more comfortable connections from the site to the station, WSU, TAFE, Gilchrist Oval and the new Sporting Field complex through a series of high quality new open spaces such as the Bow Bowing Creek Reserve.

Related to Access and Movement, the objectives outlined are:

– Objective 4.1.1: Ensure integration of a variety of transport modes and ensure safety and accessibility for pedestrians and cyclists.

– Objective 4.1.2: Prioritise public and active transport as a mode of transport over private motor vehicles.

The active transport network will be improved by:

– Objective 4.2.2: A shared pedestrian/ cycleway along Bow Bowing Creek connecting Macarthur Station to future sporting fields and Mt. Annan Botanical Gardens to the west and Gilchrist Oval to the east. It is also to link to the main street network within the Precinct and existing cycleway along Goldsmith Avenue.

– Objective 4.2.3: A permeable pedestrian network along streets and public open spaces, that promotes safe pedestrian environment with three main pedestrian priority crossings along Goldsmith Avenue generally.

– Objective 4.2.4: Accessible pedestrian access from Macarthur Station to the Station Arrival Plaza via an appropriate bridge and ramps.

– Objective 4.2.5: Accessible pedestrian access to lift lobbies within the northern and southern part of the residential blocks.

The DCP specifies **maximum** car parking provisions for the MGN Precinct, as summarised in **Table 2-1**.

Table 2-1 Required maximum car and bicycle parking provisions in the MGN Precinct

Land use	Parking requirements
Residential	
1 Bed | studio	0.6 spaces per apartment
2 Bed	0.9 spaces per apartment
3 Bed	1.4 spaces per apartment
Visitor	0.1 spaces per apartment
Bicycle parking	1 space per 3 apartments 1 visitor space per 12 apartments
Car share	
Car share requirements	A minimum of 8 car share spaces are to be provided within the development
Retail	
Retail requirements	1 space per 95m^2 of retail GFA

Source: Campbelltown City Council Macarthur Gardens North Site Specific DCP 2015 Volume 2 Part 16 (Effective: 10/07/2023)

Other requirements for parking are:

– All car parking and access for vehicles, including disabled access spaces, shall be in accordance with AS2890 parts 1 and 2 (as amended), except as otherwise specified in this Plan.

– All required private car parking is to be provided at basement level.

– Pedestrian access to residential flats shall be separated from the commercial/retail uses.

– Development shall provide adequate space for the on-site parking, loading and unloading of all service vehicles.

2.3 Guidance to Transport Oriented Development (2024)

The Transport Oriented Development (TOD) Program, rolled out by the Department of Planning, Housing and Infrastructure, is part of the biggest planning reforms aimed at meeting the growing demand for housing and improving affordability, especially for young people and families. As part of the program, the State Environmental Planning Policy (Housing) 2021 – also known as the Housing SEPP has been amended. A new chapter 5, Transport Oriented Development, will apply new planning controls to specified lots in the mapped area around identified stations to increase housing supply - referred to as the TOD amendment.

Section 157 of the Housing SEPP includes development standards on the number of parking spaces required for each affordable housing dwelling required under Section 156.

As part of the TOD Program, the State Environmental Planning Policy (Housing) 2021 – also known as the Housing SEPP, will be amended. A new Chapter 5, Transport Oriented Development, will apply new planning controls to specified lots in the mapped area around identified stations to increase housing supply.

The aims of Chapter 5 of the SEPP are:

– to increase housing density within 400m of existing and planned public transport,

– to deliver mid-rise residential flat buildings and shop top housing around rail and metro stations that:

  - are well designed
  - are of appropriate bulk and scale
  - provide amenity and liveability, to encourage the development of affordable housing to meet the needs of essential workers and vulnerable members of the community.

– to encourage the development of affordable housing to meet the needs of essential workers and vulnerable members of the community.

The amended SEPP (Chapter 5) outlines parking requirements for affordable housing, as shown in **Table 2-2**.

Table 2-2 Affordable minimum housing parking requirements

Dwelling	Parking requirements
1 Bed	0.4 spaces per apartment
2 Bed	0.5 spaces per apartment
3 Bed	1 parking space per apartment
Visitor	No visitor space required (but if there is spare space they can be allocated as visitor parking)

Source: SEPP (Housing) Amendment (TOD) 2024 (NSW) Schedule 1 - Amendment of State Environmental Planning Policy (Housing) 2021

2.4 Guide to Traffic Generating Developments

The RMS Guide to Traffic Generating Developments (RTA, 2002) sets out traffic generation rates based on survey data collected in New South Wales for a range of land uses. This guide is referred to in the Austroads Guide which is used by Roads and Maritime Services and is generally regarded as the standard for metropolitan development characteristics.

2.4.1 The Technical Direction: TDT 2013/04a – updated surveys

Over the past few years, several surveys have however been undertaken to update trip generation and parking information as part of the Guide. The Technical Direction: TDT 2013/04a provides a summary of the updated information. Typical vehicle trip generation rates for high density residential flat dwellings in Sydney are shown in **Table 2-3**, based on the TDT 2013/04a. The guidance provides advice on the traffic impacts of land use developments, based on traffic surveys in various locations in Sydney.

Table 2-3 Typical vehicle trip generation rates for high density residential flat dwellings

Weekday rates	Trips per dwelling		Trips per car space	
	Sydney average	Sydney range	Sydney average	Sydney range
AM peak (1 hour)	0.19	0.07-0.32	0.15	0.09-0.29
PM peak (1 hour)	0.15	0.06-0.41	0.12	0.05-0.28
Daily vehicle trips	1.52	0.77-3.14	1.13	0.56-2.16

Source: Roads and Maritime Technical Direction TDT 2013/04a: Guide to Traffic Generating Developments: Updated traffic surveys

It should be noted however, that these vehicle trip generation rates are based on surveys in a range of different locations in Sydney. Many of these are much closer to Sydney CBD and have access to more frequent public transport services than the MGN site. A review was therefore undertaken of trip generation rates and mode share across several sites more like MGN as part of the 2021 transport report. These rates are further discussed in **Section 5.3**.

2.4.2 Guide to Transport Impact Assessment (version 1.1, September 2024)

The Guide to Transport Impact Assessment (version 1.1, September 2024) provides trip rates based on updated survey for sites with high-density developments and high public transport accessibility. All surveyed developments were composed of residential buildings of six storeys or more and did not contain significant uses other than residential activity. Eight surveyed developments were within Sydney and two others were in regional cities and were close to public transport nodes providing high levels of transport service.

The average trip rates based on the updated Guide are shown in **Table 2-4**.

Table 2-4 Trip rates at high-density residential sites with high public transport accessibility (Sydney)

Weekday rate	Trip rate (trips | dwelling)	
	AM Peak Hour	PM Peak Hour
Average rate	0.19	0.15

Source: The updated Guide to Transport Impact Assessment (Draft, 2024)

3.0 Existing conditions

3.1 The site

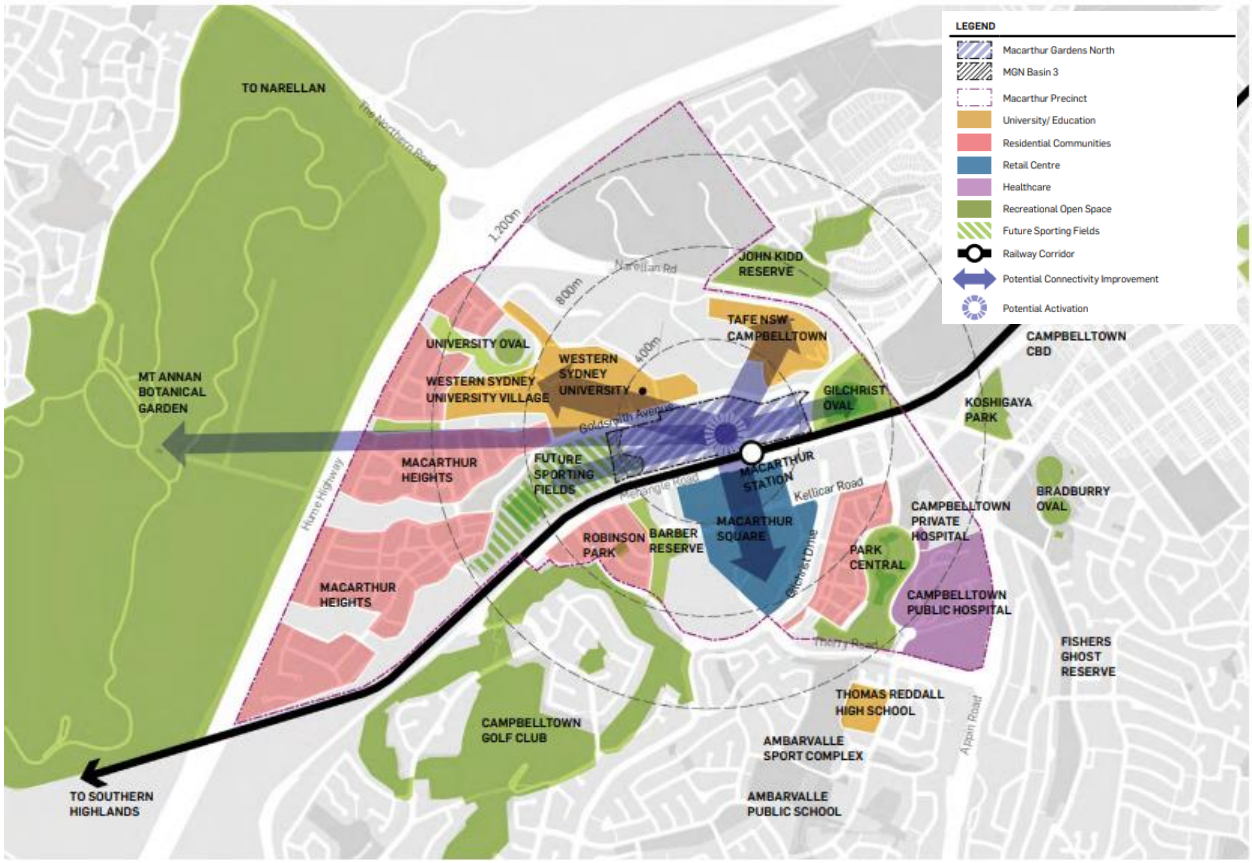
The Macarthur Gardens North (MGN) site is located on a greenfield ~18.5-hectare site, which includes the Bow Bowing Creek Reserve which will be retained and a development area. The site is in the Campbelltown City Local Government Area and situated within the broader Macarthur region, a rapidly expanding and developing area.

The site is located immediately north of the Macarthur Station and south of Western Sydney University and TAFE NSW – Campbelltown. The site is also located near local services and amenities including the Macarthur Square Shopping Centre, Campbelltown Mall, Campbelltown Hospital, as well as open space and green infrastructure. The site in relation to existing surrounding land uses is shown in **Figure 3-1**.

The railway corridor running east to west dissected the precinct and creating an infrastructure barrier between north and south of the railway. Being at the heart of the precinct next to railway station, MGN provides an opportunity stitching these communities, significant centre and facilities into an integrated and well-connected precinct.

There is currently no development located on the existing site that would generate any traffic or transport movements.

Figure 3-1 The site in relation to existing surrounding land uses



Source: Macarthur Gardens North Urban Design Report (September 2024)

3.2 Travel behaviour

2016 Method of travel to work data (journey to work data) from the relevant statistical area of 'Campbelltown' was analysed to determine travel behaviour of employees working in the vicinity of the site. The site area analysed for journey to work data is shown in **Figure 3-2**.

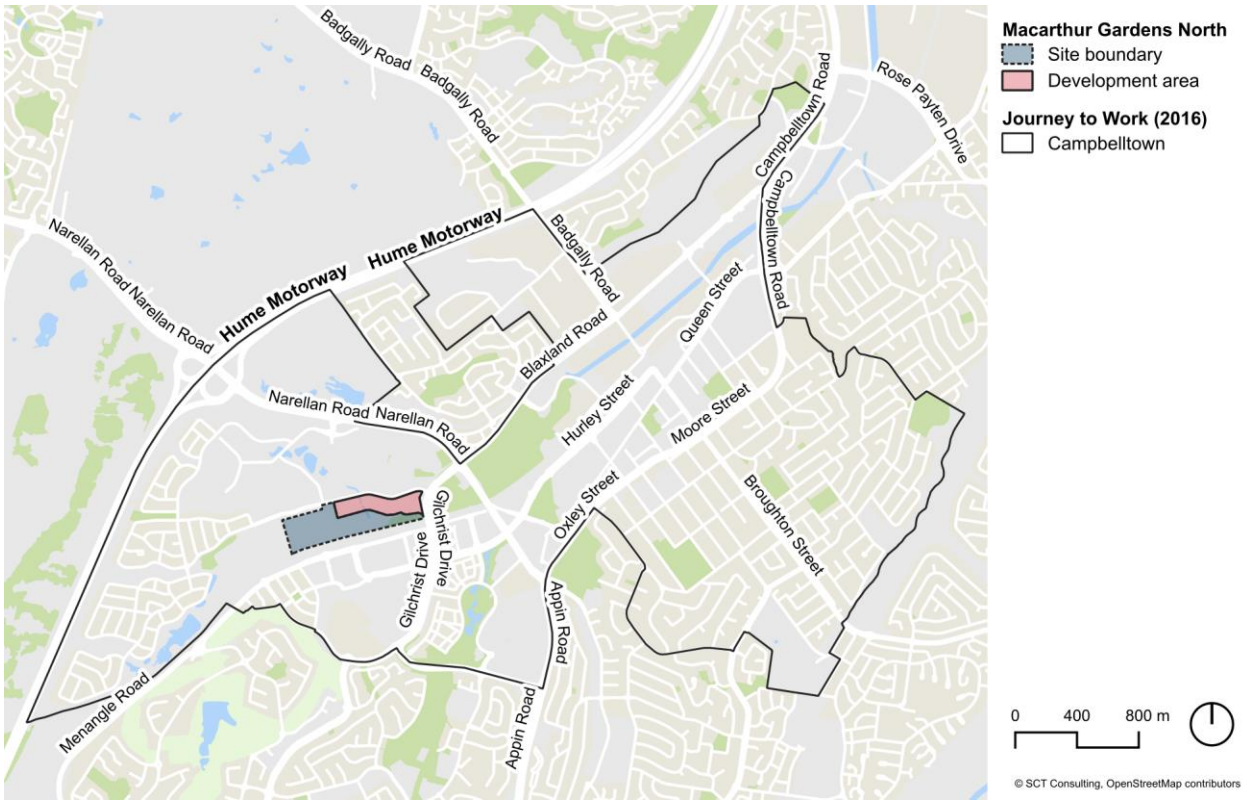
The 2016 JTW data has been used for analysis rather than the 2020 available data, to avoid any influence to travel patterns due to the COVID-19 pandemic.

At the time of the JTW data being collected in 2016, approximately 5,100 trip samples were included in the survey for the area. According to the Australian Bureau of Statistics, persons in employment are those of working age who, during a short reference period, were engaged in any activity to produce goods or provide services for pay or profit.

The analysis showed a higher proportion of car users (58 per cent drivers and five per cent passengers), in comparison to the 54 percent of Greater Sydney, showing a higher dependency of the private car use. Train and bus usage was stated as 18 and 1 per cent respectively, which is slightly lower than Greater Sydney (with a total of 22 per cent public transport usage). Active transport usage was three per cent for walking and cycling combined. It should be noted that 10 per cent of the people surveyed at the time were working at home or did not go to work.

Of the 42,489 people who work in Campbelltown City Council LGA, most workers (62 per cent) travel outside of the LGA to work. The main areas of employment for residents are Campbelltown City LGA (34 per cent), followed by Sydney City LGA and Liverpool LGA (11 per cent respectively), Camden LGA (six per cent) and Canterbury-Bankstown LGA (six per cent). Smaller origins include Parramatta and Fairfield LGAs (four and three per cent), and other origins across the Greater Sydney region each generating three or less than three per cent of work-related trips to the area.

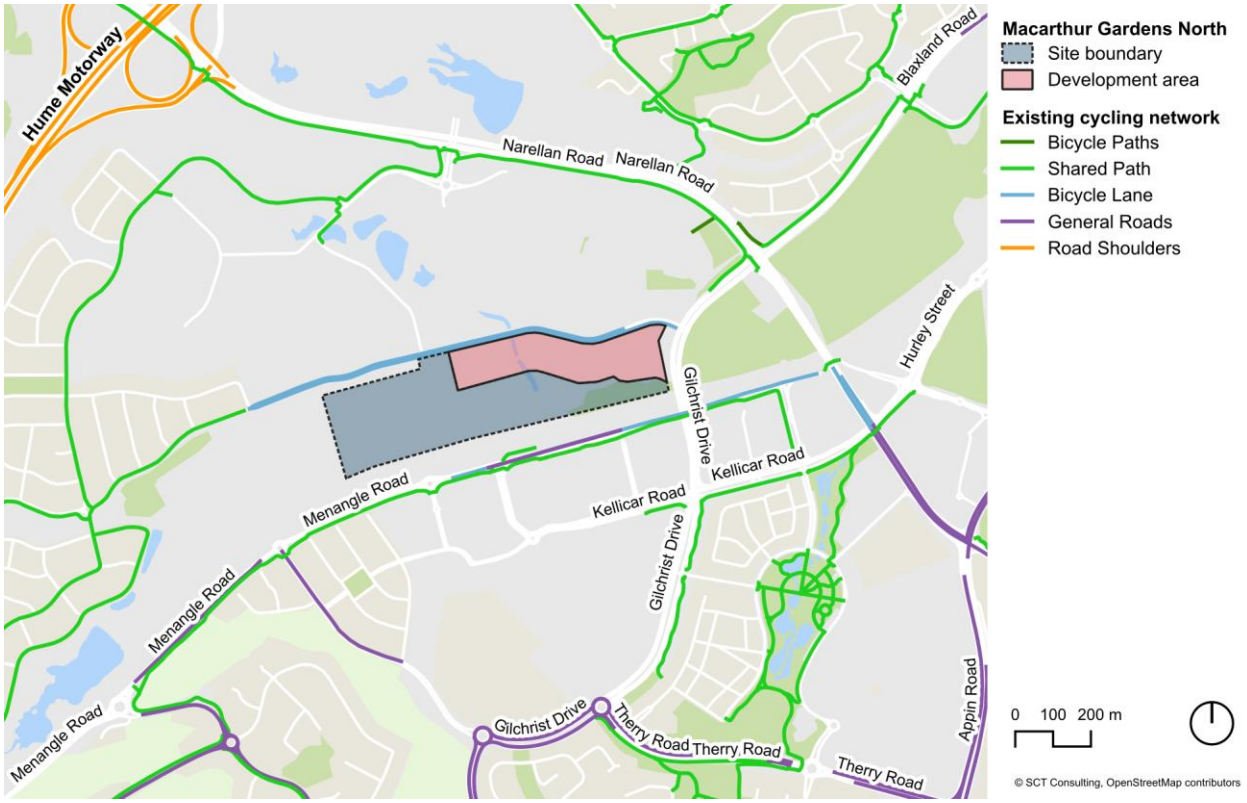
Figure 3-2 Study area for the travel behaviour reference for method of travel to work analysis



3.3 Walking and cycling

There are formal walking and cycling facilities provided in proximity to the site, although several physical barriers limit active transport access from the site to the regional network. These include the Hume Motorway west of the site, Narellan Road | Appin Road east of the site and the railway line south of the site, as seen in **Figure 3-3**.

Figure 3-3 Cycling routes surrounding the site



A dedicated on-road cycle lane is provided on Goldsmith Avenue, immediately north of the site. This leads to an off-road shared path on the western side of Gilchrist Drive and Blaxland Road as well as the southern side of Narellan Road. A cycle network is also provided along Menangle Road to the south of the railway line and Macarthur Station, providing an east-west cycle connection between Campbelltown and Menangle Park.

Footpaths are provided on both sides of Goldsmith Avenue immediate to the north of the site, between Gilchrist Drive and Milky Way (northern side) and between Gilchrist Drive and University Drive (southern side). The footpaths along Goldsmith Avenue are then connected to walking paths within Western Sydney University and TAFE NSW – Campbelltown to the north of the site as well as Macarthur Station to the south of the site. Two pedestrian zebra crossings are provided at Goldsmith Avenue, approximately 210m and 580m respectively west of the intersection with Narellan Road, to provide access to these facilities from the site. Pedestrian access is also provided to Gilchrist Oval located east of the site, through the site and under Gilchrist Drive.

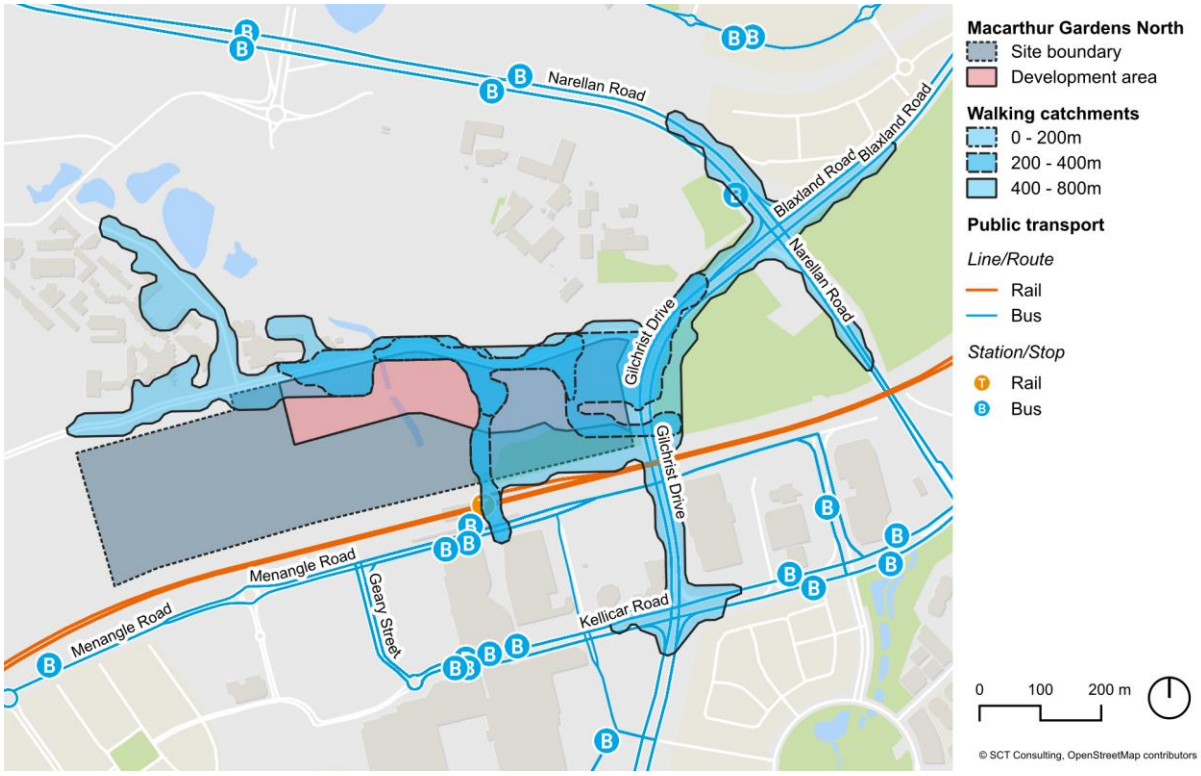
An existing bridge and associated footpath currently connect Macarthur Station and Goldsmith Avenue north of the rail corridor. The existing bridge has an internal width of approximately 1.8m and connects to a footpath that runs to Goldsmith Avenue. The bridge forms the northern part of the rail corridor crossing, which also consists of the station concourse and pedestrian bridge across Menangle Road (south of the station).

This combination of the two bridges and concourse acts as the main north-south connection for pedestrians between the north including Macarthur Heights residential areas and the tertiary education campuses of Western Sydney University and TAFE NSW to the south.

A shared path is provided along the western side of Gilchrist Drive, just to the north of Goldsmith Avenue. The shared path then extends to Narellan Road (on the southern side only). Once you cross the railway line via the station concourse, there are also footpaths along both sides of Menangle Road south of the site.

The walking catchment from the site is shown in **Figure 3-4**, which clearly shows that Macarthur Station, Western Sydney University and TAFE NSW – Campbelltown are all located within a walking distance of 200m to 400m of the site, or within a ten-minute walk to | from the site.

Figure 3-4 Walking catchment of site



3.4 Public transport

3.4.1 Train

The nearest train station to the site is the Macarthur Station, which is located within a 5 to 10-minute walk from the site via an existing access path provided between Goldsmith Avenue and the station. Macarthur Station is served by the T8 (Macarthur to City via Airport and | or Sydenham) and Southern Highlands train services. The Southern Highlands line services Macarthur Station with trains running from Campbelltown to Moss Vale or Goulburn and trains running from Town Hall to Macarthur.

The number of train services for the weekday peak hours (6am to 9am and 3pm to 7pm) and weekend throughout the day (6am to 9pm) is summarised in **Table 3-1**. As seen, the T8 line services the Macarthur Station frequently, with an average of approximately five services per weekday peak hour in each direction and four services per hour throughout the day during weekends.

A lesser number of train services are provided on the Southern Highlands line, with on average approximately one service per hour running between Campbelltown and Moss Vale and between Macarthur and Town Hall respectively in each direction, during both weekday peak hours and per hour throughout the day during weekends.

The proximity of the site to the Macarthur Station along with the frequent number of train services available to the City and Airport, suggests that future residents of the site will be well served by public transport to these key employment and local centres.

Table 3-1 Train service frequency for Macarthur Station

Train line	To	From	Number of services			
			Weekday		Weekend	
			AM (6-9am)	PM (3-7pm)	Sat (6am-9pm)	Sun (6am-9pm)
T8	Macarthur	City (via Airport or Sydenham)	14	17	60	60
	City	Macarthur (via Airport or Sydenham)	15	20	60	60
Southern Highlands	Campbelltown	Moss Vale	5	5	10	10
	Moss Vale	Campbelltown	4^	5	10^	10^
Southern Highlands	Town Hall	Macarthur	3	6	10	9
	Macarthur	Town Hall	4	5	9	9
Total			**41**	**58**	**149**	**148**

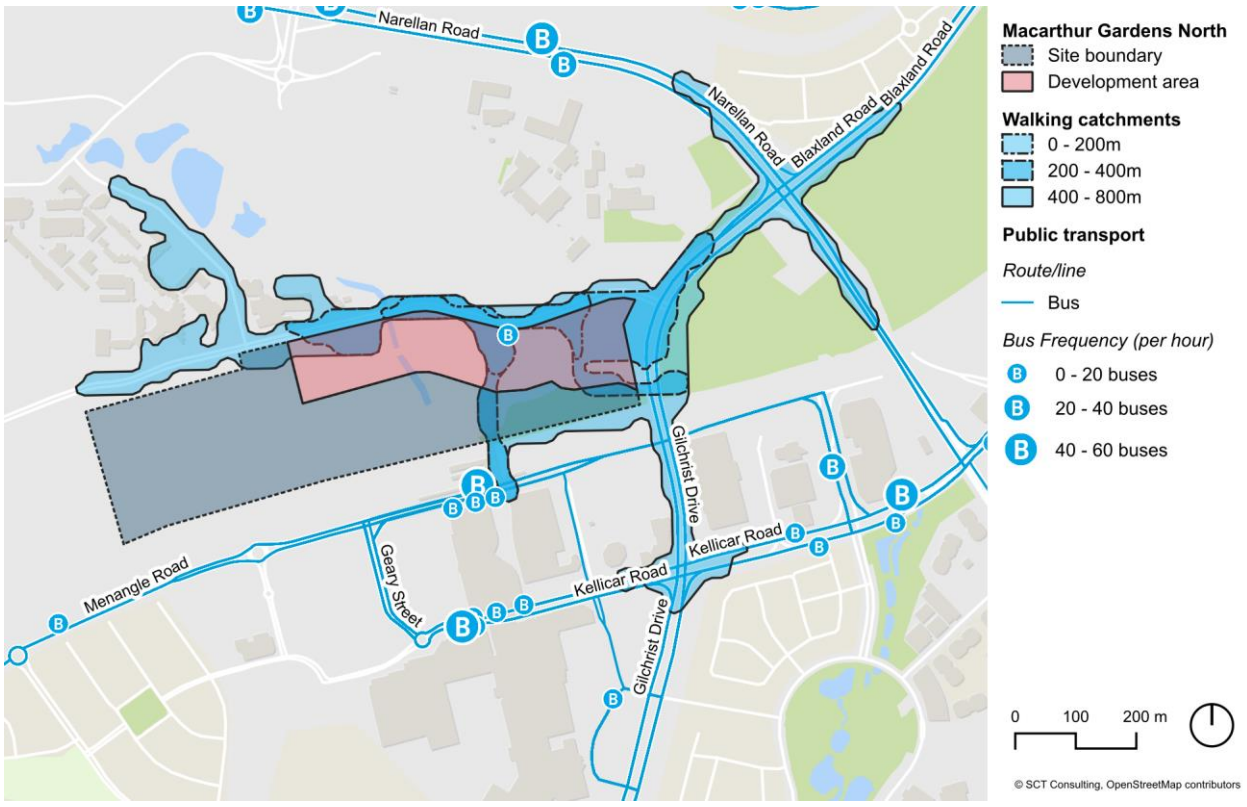
Source: https://transportnsw.info/routes/train, April 2020

^ *Two services in the AM peak hour and one service during the weekends travel from Goulburn, via Moss Vale to Campbelltown*

3.4.2 Bus

A bus interchange is located to the south of Macarthur Station and serves the local bus network to Campbelltown and Narellan primarily. The Macarthur Station interchange is served by the bus routes that run along Menangle Road, as seen in **Figure 3-5**.

Figure 3-5 Bus facilities and frequencies within walking distance from the site



The number of bus services for the weekday peak hours (6am to 9am and 3pm to 7pm) and weekend throughout the day (6am to 9pm) at the nearest bus stop located just south of the site (at the Macarthur Station interchange) are shown in **Table 3-2**. The bus data indicates that the combined frequency of bus services at the Macarthur Station

interchange is approximately (in both directions), 47 and 44 services per AM and PM peak hour respectively during weekdays and 22 and 13 services per hour throughout the day, on Saturdays and Sundays respectively.

Table 3-2 Bus route frequency for the Macarthur Station Interchange

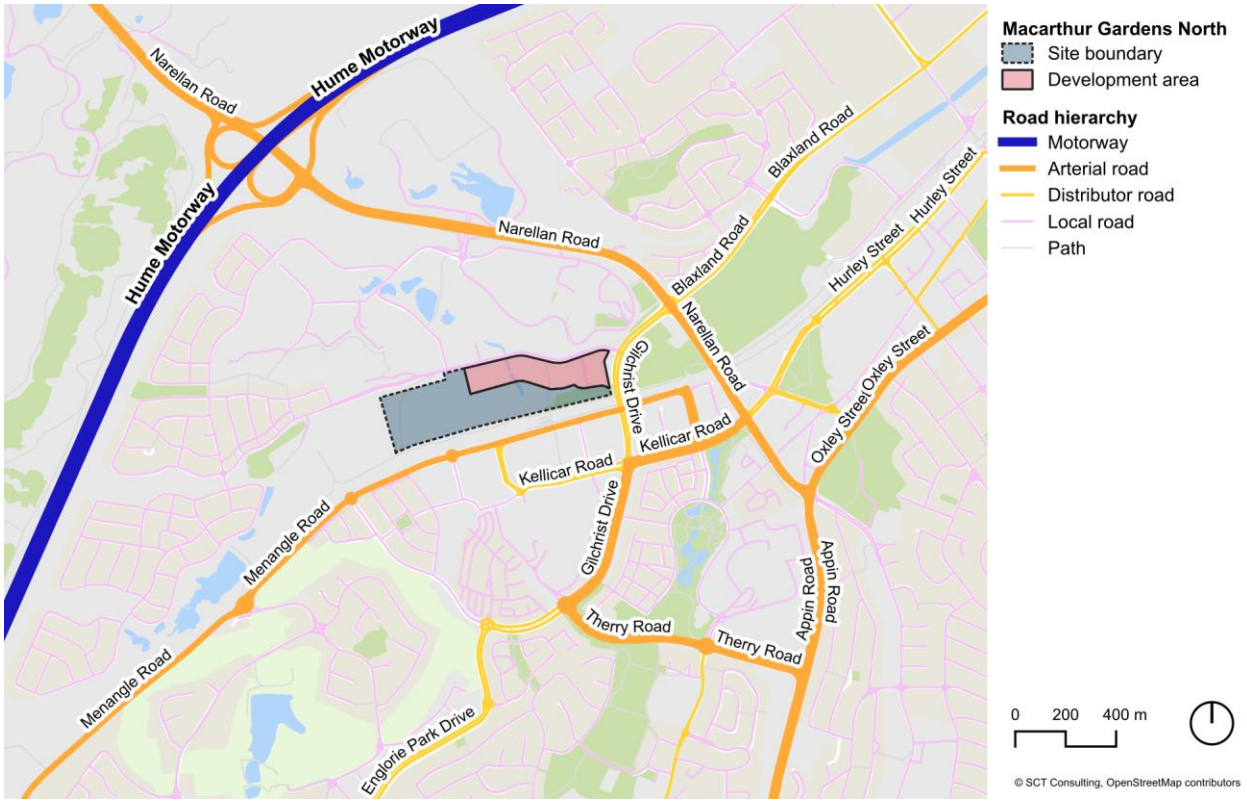
Route	To	From	Total number of services			
			Weekday		Weekend	
			AM (6-9am)	PM (3-7pm)	Sat (6am-9pm)	Sun (6am-9pm)
878	Campbelltown	Kearns via Eschol Park	-	-	-	-
	Kearns	Campbelltown via Eschol Park	-	1	13	-
879	Leumeah	Campbelltown via Blair Athol	6	9	14	12
	Campbelltown	Leumeah via Blair Athol	5	8	14	12
880	Minto	Campbelltown via Kearns and Eagle Vale	10	15	13	10
	Campbelltown	Minto via Kearns and Eagle Vale	12	11	12	12
886	Campbelltown to Glen Alpine (Loop Service)		7	10	15	13
887	Wollongong	Campbelltown	6	8	8	8
	Campbelltown	Wollongong	5	7	9	9
888	Campbelltown	St Helens Park	1	17	49	25
	St Helens Park	Campbelltown	16	-	-	-
889	Menangle	Campbelltown	2	3	2	-
	Campbelltown	Menangle	3	2	3	-
890	Campbelltown to Harrington Park via Narellan Vale and Narellan (Loop Service)		6	6	16	-
890C	Camden	Campbelltown via Narellan	2	1	10	-
	Campbelltown	Camden via Narellan	2	4	9	-
891	Mount Annan	Campbelltown via Currans Hill	7	10	26	14
	Campbelltown	Mount Annan via Currans Hill	7	8	25	15
892	Campbelltown to Mount Annan via Narellan Vale (Loop Service)		5	8	13	9
893	Narellan	Campbelltown via Elderslie | Spring Farm	7	9	22	11
	Campbelltown	Narellan via Elderslie | Spring Farm	7	9	23	11
895	Campbelltown to Camden South via Camden (Loop Service)		15	19	17	14
896	Campbelltown to Oran Park via Gregory Hills (Loop Service)		9	9	14	13
Total			**140**	**174**	**327**	**188**

Source: Opal data, 2020

3.5 Road network

The site is bounded by Goldsmith Avenue to the north, Gilchrist Drive to the east and the southern railway line to the south. It has direct access to Narellan Road | Appin Road via Goldsmith Avenue and Gilchrist Drive, that provides connection to Sydney CBD and the Southern Highlands (via the Hume Motorway). Other key roads in proximity to the site include Menangle Road and Oxley Street | Moore Street | Campbelltown Road, as seen in **Figure 3-6**.

Figure 3-6 Road classification around the site



The characteristics of the key road network surrounding the site, as shown in **Figure 3-6** are:

– **Goldsmith Avenue** - a two-way, two-lane divided local road that runs in an east-west direction between Gilchrist Drive in the east and University Drive in the west, immediate to the north of the site. The local road currently provides access to the Macarthur Heights residential development, Western Sydney University as well as Gilchrist Oval. It will provide main access into the site and connects the site with the regional road network.

– **Gilchrist Drive** - a two-way, four-lane divided distributor road that runs just east of the site between Menangle Road and Narellan Road (where it becomes Blaxland Road). It acts as the main access route, together with Williams Downes Avenue, from the site to the external road network via Goldsmith Avenue and provides vehicular connection across the railway line to Macarthur Square.

– **William Downes Avenue** - a two-way, two to three-lane undivided local road that runs just north of the site and connects to Narellan Road via a roundabout with the Western Sydney University Access Road. It acts as the main access route, together with Gilchrist Avenue, from the site to the external road network via Goldsmith Avenue.

– **Menangle Road** - a two-way, two-lane undivided arterial distributor road that runs south of the site between Narellan Road (although the two roads do not intersect) and Picton Road south west of the site. Menangle Road can be accessed from the site via Kellicar Road and provides access to Macarthur Station as well as a north-south alternative to the Hume Motorway from the site to access Menangle and Picton.

– **Narellan Road** - a two-way, six-lane divided arterial road that runs north and east of the site between the Hume Motorway and Appin Road. It is part of an important north-south corridor (A9) that skirts around the Western Sydney connecting Windsor with Penrith, Narellan and Campbelltown. It further extends south towards Appin via Appin Road (B69). It connects to site to the Hume Motorway (which provides access to Sydney's Motorway network via the M7 and M5). Narellan Road is accessed from the site via Goldsmith Avenue and Gilchrist Drive, but it can also be accessed through the internal campus road network of Western Sydney University (David Pilgrim Avenue and William Downes Avenue), although this is a longer and slower route with Local Area Traffic Management measures.

– **Oxley Street | Moore Street | Campbelltown Road** - a two-way, four-lane divided arterial road that runs in a north-south direction between Camden Valley Way in the north and Narellan Road in the south. It also acts as an alternative to the Hume Motorway and provides access to several suburbs north of the site including Campbelltown and Minto.

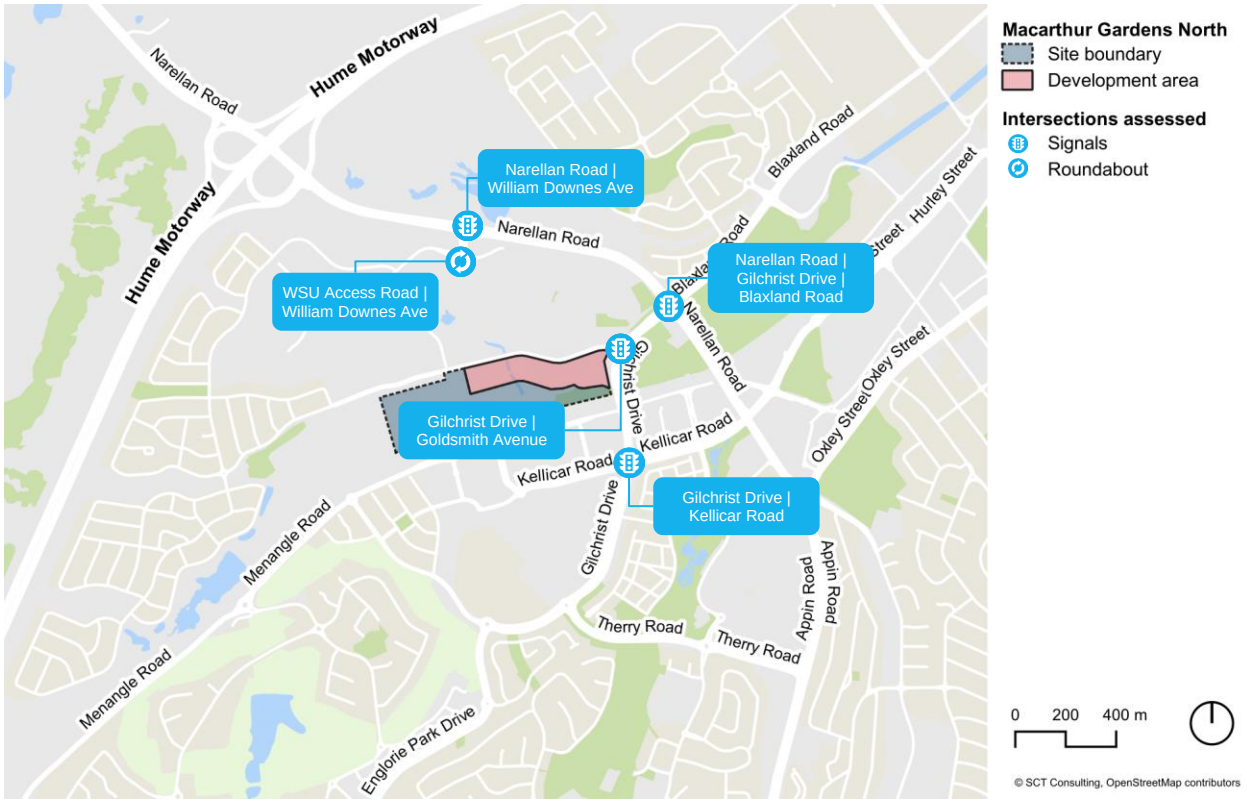
3.6 Existing traffic conditions

3.6.1 Network performance

To inform the 2021 transport report, traffic volume was collected in August 2019 for five nearby intersection which are likely to be used by MGN related traffic. The intersections, as identified in **Figure 3-7**, are:

3. Western Sydney University Access Road | William Downes Avenue (roundabout)
4. Narellan Road | William Downes Avenue (traffic signals)
5. Narellan Road | Gilchrist Drive | Blaxland Road (traffic signals)
6. Gilchrist Drive | Goldsmith Avenue (traffic signals)
7. Kellicar Road | Gilchrist Avenue (traffic signals).

Figure 3-7 Surveyed intersections surrounding the site



Based on the traffic volume data collected in 2019, a SIDRA network model (using SIDRA 8) was prepared to determine the network performance of the nominated intersections. Intersection layouts were derived from a combination of site visits, Sixmaps imagery and traffic signal design drawings. Traffic signal data was obtained from

Transport for NSW for all the signalised intersections for the surveyed dates, including 15-minute summary signal timing data and SCATS summary images.

Operational performance is typically measured through an assessment of the throughput of vehicles across a traffic network, with average delay per vehicle used to assess the performance of an individual intersection. The average delay per vehicle measure is linked to an intersection **Level of Service (LoS)**. Intersection Level of Service (LoS) is a typical measure used by traffic engineers to identify when roads are congested. The Level of Service, as defined in TfNSW Traffic Modelling Guidelines, is provided in **Table 3-3**.

Table 3-3 Level of Service definitions

Level of Service	Average delay per vehicle	Performance explanation
A	Less than 14.5s	Good operation
B	14.5s to 28.4s	Good with acceptable delays and spare capacity
C	28.5s to 42.4s	Satisfactory
D	42.5s to 56.4s	Operating near capacity
E	56.5s to 70.4s	At capacity. At signals incidents will cause excessive delays. Roundabouts require another control method.
F	70.5s or greater	At capacity. At signals incidents will cause excessive delays. Roundabouts require another control method.

Source: Roads and Maritime Services (2002), Traffic Modelling Guidelines

In addition, intersection performance is measured using **Degree of Saturation (DoS)** to complement the Level of Service measure. DoS is the measure of the volume/capacity for the worst turning movement at the intersection. A DoS of 1.0 implies the turning movement is at capacity.

These measures enable clearer target setting, with future performance of degree of saturation greater than one being unacceptable.

The results of the 2019 AM and PM peak hour SIDRA intersection performance analysis are presented in **Table 3-4.** At the time of preparation of the 2021 transport report, SIDRA Intersection 8 was the most current version of the software, and hence used for the assessment. Since then the software has been updated, and hence the previous modelling has been updated with SIDRA Intersection 9.1. The results for both versions are summarised in **Table 3-4,** and the detailed SIDRA results for the updated version are provided in **Appendix A**.

Table 3-4 Existing intersection performance (2019)

Intersection	SIDRA 8 (as per 2021 study)			SIDRA 9.1 (updated)		
	Delay	LoS	DoS	Delay	LoS	DoS
Weekday AM Peak						
WSU Access Road | William Downes Avenue	6	A	0.26	6	A	0.26
Narellan Road | William Downes Avenue	27	B	0.79	23	B	0.68
Narellan Road | Blaxland Road | Gilchrist Drive	55	D	0.96	55	D	0.94
Gilchrist Drive | Goldsmith Avenue	18	B	0.52	13	B	0.51
Kellicar Road | Gilchrist Drive	35	C	0.67	42	C	0.66
Weekday PM Peak						
WSU Access Road | William Downes Avenue	5	A	0.08	5	A	0.08
Narellan Road | William Downes Avenue	20	B	0.81	13	A	0.66

Intersection	SIDRA 8 (as per 2021 study)			SIDRA 9.1 (updated)		
	Delay	LoS	DoS	Delay	LoS	DoS
Narellan Road | Blaxland Road | Gilchrist Drive	57	E	0.99	53	D	0.92
Gilchrist Drive | Goldsmith Avenue	17	B	0.59	15	B	0.56
Kellicar Road | Gilchrist Drive	49	D	0.98	56	D	0.98

The SIDRA 9.1 results revealed that all intersections operate with an acceptable LoS D or less during the AM and PM periods. Only the intersections of Narellan Road | Blaxland Road | Gilchrist Drive and Kellicar Road | Gilchrist Drive performed worse than LoS B in both peak periods. Similarly, these two intersections were the only ones operating closer to their capacity.

During the AM peak hour, the worst performing intersection was the Narellan Road | Blaxland Road | Gilchrist Drive intersection, which operated at a LoS D and a DoS of 0.94. The intersection performs similarly during the PM peak period with a LoS D with a DoS of 0.92.

In contrast, the intersection of Kellicar Road | Gilchrist Drive performed satisfactorily at a LoS C and a DoS of 0.66 during the AM peak period. During the PM peak period, this intersection performs worst, with its LoS and DoS being D and 0.98, respectively.

The intersection performance analysis confirmed that, **with the 2019 traffic flows, significant capacity is available** at the intersection of Gilchrist Drive | Goldsmith Avenue and Narellan Road | Western Sydney University Access Road, which are the main access points of the future development trips of the site.

The 2019 traffic surveys were also used to analyse and understand the existing traffic distribution and trip generation rates for Macarthur Heights. The result of this analysis is discussed further in **Section 5.2** and applies to development trips associated with the site.

3.6.2 Traffic volume update and comparison

To evaluate the change in traffic compared to the 2021 transport study, updated traffic volume data was collected on Thursday, 5 September 2024, at the following key signalised intersections near the site:

– Narellan Road | Western Sydney University Access Road

– Gilchrist Drive | Goldsmith Avenue.

The light and heavy two-way intersection traffic volumes, as well as the pedestrian volumes at these approaches, for the AM and PM peak hours, are shown in **Table 3-5** and **Table 3-6**. Cyclist data showed that two cyclists crossed William Downes Avenue in the AM peak hour only; hence, it is not reported.

Table 3-5 Two-way intersection volumes in vehicles per hour (vph) for the AM Peak Hour (2024)

Intersection	Approach	Traffic volumes (veh | ped per hour)				
		Light vehicles	Heavy vehicles	Buses	Total	Peds
Narellan Road | William Downes Ave	South: William Downes Ave	266	5	1	271	13
	East: Narellan Road	1,785	116	33	1,934	0
	North: Access Road	6	-	-	6	13
	West: Narellan Road	3,034	130	31	3,195	16
	Total	**5,091**	**251**	**65**	**5,407**	**42**
Gilchrist Drive | Goldsmith Avenue	South: Gilchrist Drive	1,045	39	12	1,096	-
	North: Gilchrist Road	1,234	52	25	1,311	-
	West: Goldsmith Avenue	408	13	7	428	-
	Total	**2,687**	**104**	**44**	**2,835**	**-**

Table 3-6 Two-way intersection volumes (vph) for the PM Peak Hour (2024)

Intersection	Approach	Traffic volumes (veh | ped per hour)				
		Light vehicles	Heavy vehicles	Buses	Total	Peds
Narellan Road | William Downes Ave	South: William Downes Ave	319	3	-	322	1
	East: Narellan Road	2,082	59	19	2,160	1
	North: Access Road	8	2	-	10	1
	West: Narellan Road	2,188	71	24	2,283	1
	Total	**4,597**	**135**	**43**	**4,775**	**4**
Gilchrist Drive | Goldsmith Avenue	South: Gilchrist Drive	1,180	39	26	1,245	-
	North: Gilchrist Road	1,539	39	22	1,600	-
	West: Goldsmith Avenue	264	6	3	273	1
	Total	**2,983**	**84**	**51**	**3,118**	**1**

A comparison between the 2024 volumes and the 2019 volumes (used in the 2021 transport study) is summarised in **Table 3-7** and **Table 3-8**. The occasions where the traffic flows have decreased since 2019 have been highlighted in the tables.

Table 3-7 Comparison between 2019 and 2024 intersection volumes (AM Peak Hour)

Intersection	Approach	Traffic volume comparison (2019 and 2024 flows)			
		2019 (vph)	2024 (vph)	Change (vph)	Change (%)
Narellan Road | William Downes Ave	South: William Downes Ave	174	271	▲97	▲56%
	East: Narellan Road	2,031	1,934	▼97	▼5%
	North: Access Road	3	6	▲3	▲100%*
	West: Narellan Road	3,379	3,195	▼184	▼5%
	Total	**5,587**	**5,407**	**▼180**	**▼3%**
Gilchrist Drive | Goldsmith Avenue	South: Gilchrist Drive	1,241	1,096	▼145	▼12%
	North: Gilchrist Road	1,447	1,311	▼136	▼9%
	West: Goldsmith Avenue	184	428	▲244	▲133%
	Total	**2,872**	**2,835**	**▼37**	**▼1%**

* Although proportionally the increase is significant, the volumes are too small to accurately compare the traffic volumes between the two years

Table 3-8 Comparison between 2019 and 2024 intersection volumes (PM Peak Hour)

Intersection	Approach	Traffic volume comparison (2019 and 2024 flows)			
		2019 (vph)	2024 (vph)	Change (vph)	Change (%)
Narellan Road | William Downes Ave	South: William Downes Ave	421	322	▼99	▼24%
	East: Narellan Road	2,499	2,160	▼339	▼14%
	North: Access Road	1	10	▲9	▲900%*
	West: Narellan Road	2,470	2,283	▼187	▼8%
	Total	**5,391**	**4,775**	**▼616**	**▼11%**

Intersection	Approach	Traffic volume comparison (2019 and 2024 flows)			
		2019 (vph)	2024 (vph)	Change (vph)	Change (%)
Gilchrist Drive | Goldsmith Avenue	South: Gilchrist Drive	1,397	1,245	▼152	▼11%
	North: Gilchrist Road	1,755	1,600	▼155	▼9%
	West: Goldsmith Avenue	224	273	▲49	▲22%
	Total	**3,376**	**3,118**	**▼258**	**▼8%**

* Although proportionally the increase is significant, the volumes are too small to accurately compare the traffic volumes between the two years

The analysis showed that the traffic volumes have decreased across both intersections, in both the AM and PM peak hours, with the most significant reduction being at the Narellan Road | Western Sydney University Access Road intersection in the PM peak hour. The 2024 peak hour traffic survey has confirmed that the **background traffic volumes have generally reduced over the last five years**, except for the WSU access approach and the Gilchrist Drive approach, which shows that there has been some increase in 'development' traffic.

In summary, for the Narellan Road | WSU Access Road intersection:

– **The traffic along Narellan Road has decreased** on both approaches to the WSU Access Road during the peak periods and more during the PM peak hour. On the eastern approach, volumes have decreased by five (AM) and 14 (PM) per cent. On the western approach, volumes have decreased by five (AM) and eight (PM) per cent.

– Traffic volumes along the southern leg (William Downes Avenue) have increased significantly, by 56 per cent in the AM peak hour. However, the flows are low, at 174 (2019) and 271 (2024), but the proportional increase is significant. During the PM peak hour, the southern leg's flows have decreased by 24 per cent.

– Overall, the total intersection flows have reduced by three (AM) and 11 (PM) per cent.

For the Gilchrist Drive | Goldsmith Avenue intersection:

– **The flows along Gilchrist Drive have decreased** on both approaches and are very similar during both AM and PM peak hours, with between nine and 12 per cent for both approaches and peak hours.

– In the AM peak hour, traffic along Goldsmith Avenue has increased significantly by 133 per cent (from 184 to 428 vehicles per hour). The increase during the PM peak is not as significant, at 22 per cent.

– Overall, the total intersection flows have reduced by one (AM) and eight (PM) per cent.

Key outcomes for this study

Based on the comparison of the 2019 and 2024 traffic data for the two locations near the MGN site, the following outcomes and considerations have been adopted for the study:

– Background traffic volumes have generally reduced over the last five years since 2019. Therefore, it would be appropriate to adopt zero background growth between 2019 and 2024 for the future modelling.

– The intersections would likely perform better than the reported results if the 2024 flows were used, compared to the previously modelled results.

4.0 Planning Proposal

4.1 Approved master plan

The planning proposal for the previous master plan gained approval in December 2022 (3944/2021/DA-SW) for the delivery of a high-density residential and mixed-use development consisting of 1,250 new apartments, 1,960m^2 of retail and community facilities and improvements to the accessibility of the area and public open spaces.

The 2021 transport report, which assessed the potential impacts of the MGN site, was submitted as part of the approved development application (3944/2021/DA-SW). The following sections summarise the transport and traffic findings associated with the approved master plan.

4.1.1 Road network performance

Based on the proposed 1,250 new apartments and 1,960m^2 of retail, the previous study estimated the MGN site would generate **375 vehicular trips during the AM and PM peak periods, respectively**. Using the SIDRA network model, the impact these additional trips would have on the following five surrounding intersections was analysed:

1. Western Sydney University Access Road | William Downes Avenue (roundabout)
2. Narellan Road | William Downes Avenue (traffic signals)
3. Narellan Road | Gilchrist Drive | Blaxland Road (traffic signals)
4. Gilchrist Drive | Goldsmith Avenue (traffic signals)
5. Kellicar Road | Gilchrist Avenue (traffic signals).

It was found that the 375 additional trips generated by the MGN site would have minor impacts on the performance of the surrounding intersections compared to the 2029 future base scenario. The 2029 future base scenario excludes any MGN-related traffic and includes the following:

– Background traffic growth.

– Surrounding developments traffic.

– Any proposed infrastructure upgrades (delivered by others).

A comparison between the performance of the 2029 future year for the 'without' and 'with' MGN site development trips is shown in **Table 4-1**.

Table 4-1 Comparison of future (2029) intersection performance without and with the MGN development trips

Intersection	Peak hour	Without MGN development			With MGN development trips		
		Delay (s)	LoS	DoS	Delay (s)	LoS	DoS
WSU Access Road | William Downes Avenue	AM	11	A	0.078	11	A	0.274
	PM	9	A	0.156	9	A	0.138
Narellan Road | William Downes Avenue	AM	28	B	0.902	34	C	0.937
	PM	40	C	0.809	37	C	0.876
Narellan Road | Blaxland Road | Gilchrist Drive	AM	73	F	0.991	84	F	1.025
	PM	70	E	0.981	70	E	0.986
Gilchrist Drive | Goldsmith Avenue	AM	30	C	0.736	30	C	0.829
	PM	36	C	0.771	41	C	0.839
Kellicar Road | Gilchrist Drive	AM	28	B	0.806	30	C	0.851
	PM	62	E	0.979	61	E	0.970

Source: SCT Consulting, 2021 (results based on modelling completed in SIDRA Intersection 8)

The previous transport report concluded that the additional trips generated by the MGN site will have minor impacts on the performance of the surrounding intersections, compared to the 2029 scenario without the MGN site development trips.

All assessed intersections are expected to perform at the same LoS with and without the MGN site, except for the intersections of Narellan Road | Western Sydney University Access Road and Kellicar Road | Gilchrist Drive where the LoS will change from B to C in the AM peak but is still considered acceptable performance in an urban context.

Key outcomes

- All assessed intersections are expected to perform either at the same LoS with and without the site or an acceptable level of performance for an urban context (LoS C or better).
- Road upgrades may be required to Narellan Road | Blaxland Road | Gilchrist Drive and Kellicar Road | Gilchrist Drive to accommodate background traffic (and growth) irrespective of the inclusion of additional trips generated by the MGN site.
- No intersection or road upgrades were proposed in the approved development application to accommodate the vehicle trips generated MGN development.

At the time of preparation of the 2021 transport report, SIDRA Intersection 8 was the most current version of the software. Since this scenario is only referred to as context for the previous approval in this report, the scenario has not been updated and re-run with SIDRA Intersection 9.1.

4.1.2 Parking requirements and provision

The parking requirements for the approved master plan are outlined in **Table 4-2**. Applying the recommended maximum parking rates to the estimated residential yields for the MGN master plan would result in 1,166 parking spaces and 520 bicycle parking spaces being required for the site. Based on approximately 1,960 sqm GFA of retail and an average rate of one space per 95m^2, the retail component should provide 21 off-street parking spaces.

Table 4-2 MGN car and bicycle parking provision (approved master plan)

Type of dwelling	Number of dwellings	Proposed car parking rates	Car parking spaces	Proposed bicycle parking rates	Bicycle parking spaces
Studio | 1-bedroom unit	604	0.6 space per unit	363	1 space per 3 unit	201
2-bedroom unit	496	0.9 space per unit	447		165
3-bedroom unit	150	1.4 space per unit	210		50
Visitor space	1,250	1 space per 10 unit	125	1 space per 12 unit	104
Sub-total for high-density apartments			***1,145***		***520***
Retail	1,960 sqm of GFA	1 space per 95m^2 of GFA	21	-	-

Source: SCT Consulting 2021

4.1.3 Key transport and traffic outcomes

The 2021 transport report found that:

- Additional active transport facilities are proposed, including improved linkages to the Macarthur Station, the Western Sydney University and TAFE NSW – Campbelltown. A shared path south of the site along Bow Bowing Creek connecting to greater Green Grid Network as well as Gilchrist Oval in the east will also be provided.
- The proposed development is likely to generate an additional 220 train trips, 50 bus trips and 290 walking (walk only and public transport trips) trips during the AM and PM peak hours. The public and active transport networks surrounding the site are expected to be able to cope with this additional demand.
- Based on the intent to provide restrained car parking for the site given its proximity of good public transport, the total number of parking spaces for the site would be 1,164 car parking spaces. Ample on-street parking supply would be created on all local streets (except the laneways) to provide parking for visitors through the site. It is

expected that these on-street parking spaces would be short-term time-restricted such that they are reserved for visitors and not to be used by commuters, given the site's proximity to the station.

– The future (2029) road network may require infrastructure upgrades, because of the established background traffic growth, to the Narellan Road | Western Sydney University Access Road, Narellan Road | Blaxland Road | Gilchrist Drive and Kellicar Road | Gilchrist Drive intersections. These upgrades are required without the trips generated by the site.

– The proposed development is expected to generate a total of **375 vehicular trips per AM and PM peak hour** respectively. These trips will access the surrounding road network via a 35:65 split in the AM peak hour and 25:75 in the PM peak hour via the William Downes Avenue and Goldsmith Avenue respectively.

– The additional 375 trips estimated to be generated by the site in the AM and PM peak hours, will not have a major impact on the performance of the surrounding intersections, compared to the 2029 scenario without the site's additional development trips.

– **The surrounding road network is expected to be able to cope with the additional traffic**, public transport and active transport trips generated by the MGN master plan. The intersection upgrades required for three of the surrounding intersections to perform satisfactory in 2029 are required regardless of the inclusion of the additional trips generated by the MGN master plan.

4.2 The revised master plan (the proposal)

4.2.1 Overview

Landcom is considering an increase to the residential yield for the MGN master plan site, to 1,625 dwellings (1,481 market housing and 162 affordable housing dwellings) from the previously approved 1,250 apartments.

Urbis was engaged by Landcom to prepare the Urban Design and Visual Impact Assessment Report (UDVIAR) to support the Planning Proposal submission that seeks approval to vary the 32m Height of Building in the Approved Concept DA. The proposed height will be varied to 49m for Lot R2, 56m for Lot M1, 62m for Lot R1 and 85m for Lot M2.

The rest of the site will remain under the approved height provision of 32m. The proposed additional building heights will also accommodate **an additional 375 dwellings, increasing the overall yield from 1,250 to 1,625 dwellings**. The report outlines the rationale of the proposed amendments, considering their consistency with the Approved Concept DA outcomes as follows:

– No change to the approved zoning / land use

– View impact of the additional height, particularly towards Scenic Hill

– Solar amenities and overshadowing impacts

– Retain all the amenities provided in the approved Concept DA.

The revised master plan will also include an affordable housing component in addition to market housing. Subsequently, a revision of the approved building envelope designs under the latest Concept DA have been considered to bring the proposal more in line with the changing strategic context, and the urgency associated with unlocking greater housing supply close to the train stations.

To achieve this, a site specific LEP amendment to increase the current maximum height of buildings in select locations and the preparation of a new concept development application (DA) to capture a new set of maximum building envelopes are proposed to be lodged concurrently over the site. The proposal can be summarised as follows:

– LEP Amendment: amendment to the maximum Height of Building (HOB) control from 32m to steeped heights ranging from 32m (9 storeys) up to 85m (24 storeys), as seen in **Figure 4-1**, as required to facilitate an overall total dwelling yield of **1,625 dwellings (+375 dwellings over the previous concept DA)**. The scope of the LEP amendment is isolated to parts of proposed Lots 11, 12, 13 and 17. All remaining lots are proposed to be retained in accordance with the Concept Plan DA 2022 approval.

– Concept DA: establish a new concept DA with new building envelopes across proposed Lots 11, 12, 13 and 17 that will enable the delivery of a high density residential and mixed-use development comprising six (6) mixed use towers.

– Along with the increase in number of dwellings, the amended Concept Plan is going to deliver ~**10% affordable housing** across the whole development.

The proposed revised master plan is shown in **Figure 4-2**.

Figure 4-1 Macarthur Gardens North Approved Concept DA and Proposed Areas for Building Height change

Figure 1 Macarthur Gardens North Approved Concept DA and Proposed Areas for Building Height change.

Source: Macarthur Gardens North Urban Design Report (September 2024)

Figure 4-2 The proposed revised master plan

Macarthur Gardens North

Basin 3

RESIDENTIAL USES

1. High Density Residential with Ground Floor Retail
2. High Density Residential
3. Residential Communal Open Space

OPEN SPACES

4. Station Arrival Precinct - Arrival Plaza, Playground, and Retail Frontage
5. Central Park - Terraced Landscape and Multi-purpose Lawn with BBQ and Community Facilities
6. Fitness Park - Multi Purpose Outdoor Recreational Space
7. Multi-purpose Lawn
8. Bow Bowing Creek Reserve
9. Protected Areas - Eucalyptus Forest and Cumberland Plain Woodland
10. Basin 3 (Subject to separate DA)
11. Up to 1:3 Slope With Tiered Retaining Walls (Up to 1.2m high)

ACCESS AND MOVEMENT

12. New Bridge - Station Concourse Extension (scope to be confirmed with TfNSW and subject to separate planning approval)
13. 1:19 Accessible Ramps
14. Shared Cycle and Pedestrian Way Along Bow Bowing Creek
15. Connection to Gilchrist Oval
16. Connection to Future Sporting Fields
17. Pedestrian Priority Crossings

Source: Macarthur Gardens North Urban Design Report (September 2024)

4.2.2 Vehicular access

As for the approved master plan, vehicles will access the site from the surrounding road network via the William Downes Avenue (through WSU) and Goldsmith Avenue. There are four access points proposed to access the site along Goldsmith Avenue, as shown in **Figure 4-3**. It is assumed that access intersections 1, 2 and 3 will be priority intersections and access intersection 4 will be traffic signals that facilitate safe pedestrian crossing to TAFE as well as a gateway treatment.

Figure 4-3 Proposed access and movement strategy around the site

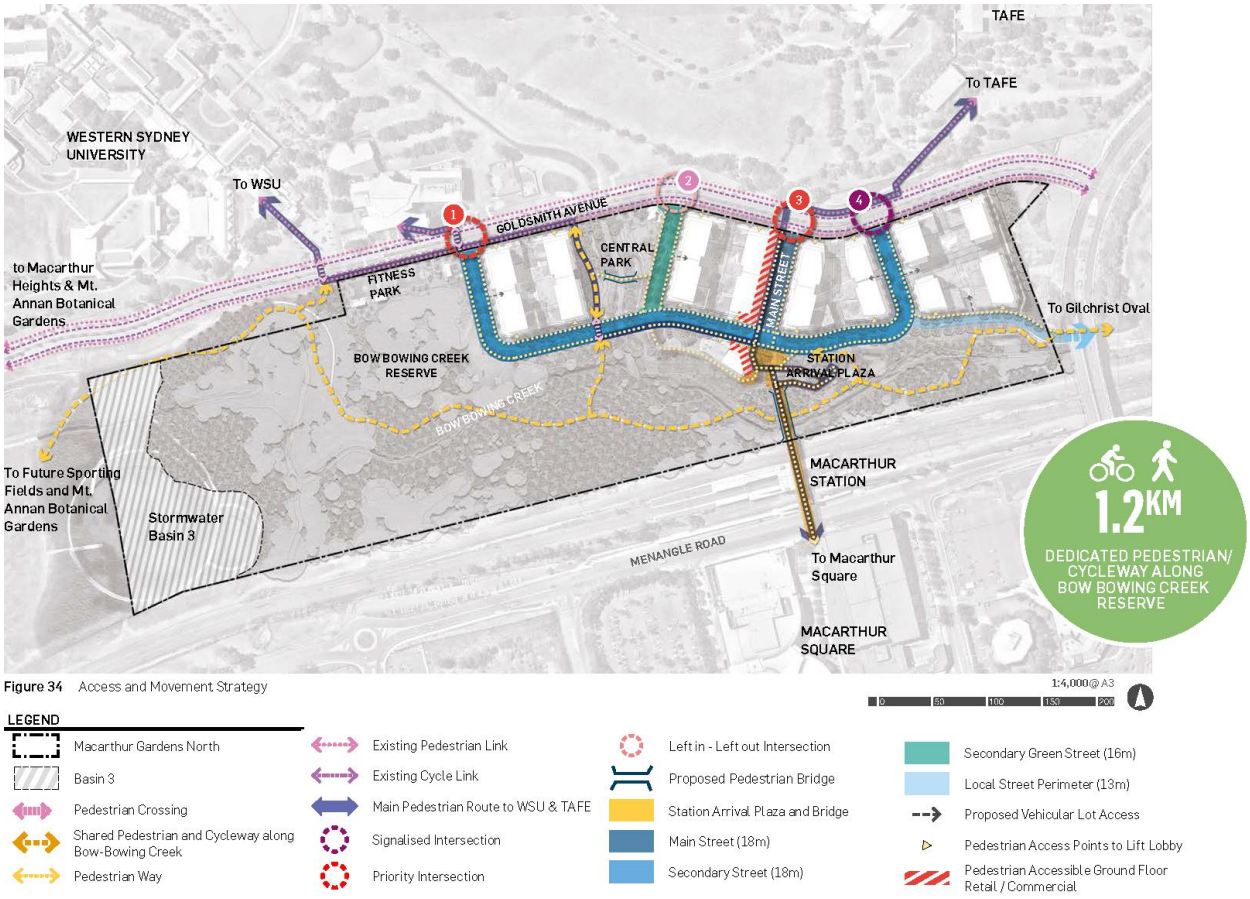


Figure 34 Access and Movement Strategy

Source: The Campbelltown City Council Development Control Plan 2015 (Part 16 – Macarthur Gardens North Precinct)

Access 4 will be relocated 50m to the west of the existing access road to Gilchrist Oval and continue to provide access to Gilchrist Oval. The existing pedestrian crossing near Access 1 will need to be relocated to the west, to align with the pedestrian desire lines and continue to facilitate safe crossing between the site and the WSU and the TAFE.

The proposed internal road network layout consists of four north-south local streets, which all run between Goldsmith Avenue and an east-west street along the southern boundary of the residential developments and extends to the existing underpass beneath Gilchrist Drive (via a local street).

4.2.3 Pedestrian and cycling access

As shown in **Figure 4-3**, the master plan would facilitate improved pedestrian connections between Macarthur Square, Macarthur Station (south of the site) and the Western Sydney University and TAFE NSW – Campbelltown (north of the site).

A pedestrian network through the site will be provided via footpaths along the internal local streets, that connect with Goldsmith Avenue to the north, to Gilchrist Oval and to Macarthur Station (via an approximate 200-400m walk). Safe pedestrian access across Goldsmith Avenue is provided at a new zebra crossing located near Access 1 and new traffic signals with controlled crossings at Access 4.

Cycling access from the site will be connected to the surrounding road network via existing facilities along Goldsmith Avenue and the rest of the network. A new shared path is also proposed south of the site along Bow Bowing Creek, connecting the site (at the eastern end) to the greater Green Grid Network, as well as Gilchrist Oval in the east. Multiple connections are also proposed between the Bow Bowing Creek and Goldsmith Avenue through the permeable street network of the site.

Landcom is also planning to replace the existing pedestrian bridge that connects the site directly to Macarthur Train Station south of the site. The replacement bridge will increase capacity (widened from 1.8m to 3.5m) and improve connectivity and accessibility between the MGN site, public transport services at Macarthur Station and Macarthur Town Centre. In addition, the bridge and ramp will also provide north-south connectivity for cyclists (though they would be required to dismount whilst using the bridge).

4.2.4 Public transport access

The improvements to the pedestrian network as part of the master plan will provide convenient access to the Macarthur Station and bus interchange, via an approximate 200-400m walk from the site. As described in **Section 3.4**, the proximity to the Macarthur Station along with the frequent number of train services available to the City and Airport, suggests that future residents of the site will be well served by public transport to these key destinations. In addition, the frequent number of bus services at the Macarthur Station Interchange will provide access to surrounding local and key employment centres in the Campbelltown and Macarthur Region.

A public transport corridor (as part of the Sydney Metro Greater West project) has been planned and reserved between the North West, Western Sydney Airport, South West and Greater Macarthur Growth Areas. The Future Transport Link through Western Sydney will provide improve transport options and accessibility for future MGN residents to future employment areas along Sydney's expanded Metro network. This will also enable MGN to be designed as a transit-oriented development with 30-minute access to jobs and economic growth across Western Sydney and for the planned Western Sydney Airport.

5.0 Transport appraisal

The site is in proximity to excellent existing and planned public and active transport, as well as the Western Sydney University and TAFE. Several actions relevant to the site focus on the improvement of public and active transport links, as well as other measures to reduce car dependence, such as constrained residential parking provision (maximum car parking rates) for developments in proximity to train stations. This is in line with the desired transport vision for the site, as outlined in several strategic documents presented in **Section 2.1**.

The introduction of the affordable housing component will encourage more public and active transport usage, as these residents are more likely to walk, cycle or use public transport, due to restricted parking provision.

The excellent access to public and active transport will encourage a further shift away from private vehicles for residents of the site. In addition, the negative background traffic growth has resulted in spare capacity being available on the surrounding road network, to accommodate any additional development trips associated with the potential uplift.

5.1 Public and active transport access

5.1.1 Improved accessibility

The revised master plan would facilitate improved pedestrian connections between Macarthur Square, Macarthur Station and the Western Sydney University and TAFE NSW – Campbelltown. The improvements will provide convenient access to the Macarthur Station and bus interchange, via a 200-400m walk from the site. The proximity to the Station along with the frequent number of train services available to the City and Airport, suggests that future residents of the site will be well served by public transport to these key destinations. In addition, frequent buses services at the Macarthur Station Interchange will provide access to surrounding local and key employment centres.

Landcom is also planning to replace the existing pedestrian bridge that connects the site directly to Macarthur Train Station south of the site, with a new and wider (from 1.8m to 3.5m wide) pedestrian bridge. The replacement bridge will improve connectivity between the MGN site, public transport services at Macarthur Station and Macarthur Town Centre and increase capacity and accessibility for pedestrians. In addition, the bridge and ramp will also provide north-south connectivity for cyclists. This is expected to encourage a mode shift towards active transport.

Cycling access from the site will be connected to the surrounding road network via existing facilities along Goldsmith Avenue and the rest of the network. A new shared path is also proposed south of the site along Bow Bowing Creek, connecting the site to the greater Green Grid Network, as well as Gilchrist Oval. Multiple connections are also proposed between the Bow Bowing Creek and Goldsmith Avenue through the permeable street network of the site.

A public transport corridor (as part of the Sydney Metro Greater West project) has been planned and reserved between the North West, Western Sydney Airport, South West and Greater Macarthur Growth Areas. This will improve transport options and accessibility for future residents to future employment areas along Sydney's expanded Metro network. It will also enable the site to be designed as a transit-oriented development with 30-minute access to jobs and economic growth across Western Sydney and for the planned Western Sydney Airport.

5.1.2 Mode shift away from private vehicles

The JTW data (2016) data indicates that public transport trips undertaken in the Campbelltown SA currently accounts for 19 per cent (18 per cent train and one per cent bus) of all trips undertaken, while three per cent of trips are walking only trips. A total of 63 per cent currently use private vehicle, either as a driver or passenger.

The 2021 transport report assumed a future mode shift of approximately 15 per cent towards public transport (ten and five per cent train and bus trips), resulting in a public transport mode split of 28 and six per cent train and bus trips, due to the proximity to the Macarthur Station and proposed improvements to the active networks. The assumption that all public transport trips would have a linked walking trip, would result in the same amount of walking trips for every public transport trip, plus the 'walk only' trips of three per cent (as identified in the JTW data).

Compared to the approved master plan, an even higher usage towards public transport and active transport of future residents of the site can however be expected for the revised master plan, due to:

– The introduction of the planned upgraded pedestrian bridge - The 'Pedestrian Bridge Assessment report' (SCT Consulting, August 2024) showed that, based on the combination of the existing, estimated background growth and MGN development-related trips, the cumulative potential users of the proposed bridge is expected to quadruple by 2041, during the AM and PM peak periods.

– The introduction of an affordable housing component - When comparing affordable housing parking rates to typical residential parking rates, approximately 50 per cent fewer car parking space provisions are required. It can therefore be assumed that only 50 per cent of the affordable housing residents will use private vehicles.

Based on the above:

– an overall future mode shift of approximately **20 per cent towards public transport** (15 per cent train and five per cent bus trips) away from cars can be assumed for the revised master plan, resulting in a public transport mode split of **33 per cent train trips and six per cent bus trips**.

– All public transport trips would have a linked walking trip, which would result in the same amount of walking trips for every public transport trip, plus the 'walk only' trips of three per cent (as identified in the JTW data).

– Overall, a **future public and active transport mode share of approximately 40 per cent** is assumed, reducing the future private vehicle trips from 63 per cent to 43 per cent.

5.2 Future parking provision

The parking requirements for the approved master plan would result in 1,166 parking spaces being required for the site. The number of bicycle parking spaces required for the apartments would be 520 spaces.

The site-specific DCP parking rates outlined in **Section 2.2** were applied to the market housing component of the revised master plan, while the rates suggested in the Housing SEPP outlined in **Section 2.3** were used for the affordable housing component, to establish the required number of parking spaces with the revised master plan. The retail parking rate has been kept as 1 space per 95m^2 GFA as outlined in the 2021 transport report. The required parking provision for the revised master plan is shown in **Table 5-1**.

Table 5-1 The MGN site car and bicycle parking provision (revised master plan)

Land use	Number of dwellings	Proposed car parking rates	Car parking spaces	Proposed bicycle parking rates	Bicycle parking spaces
Market housing					
1-bedroom unit(1)	578	0.6 space per unit	347	1 space per 3 unit	193
2-bedroom unit	675	0.9 space per unit	608		225
3-bedroom unit	228	1.4 space per unit	320		76
Visitor space	-	1 space per 10 units	149	1 space per 12 unit	123
Sub-total	**1,481**(2)	N/A	**1,424**	N/A	**617**
Affordable housing					
1-bedroom unit(1)	70	0.4 spaces per dwelling	28	1 space per 3 unit	23
2-bedroom unit	53	0.5 spaces per dwelling	27		18
3-bedroom unit	21	1 space per dwelling	21		7
Visitor space	-	-	-	1 space per 12 unit	12
Sub-total	**144**(2)	N/A	**76**		**60**
Retail					
Retail	1,960 sqm of GFA	1 space per 95m^2 of GFA	21	-	-
Sub-total	1,960 sqm	N/A	**21**		
Shared space	-	Minimum of 10 in total	-20(3)		
Total all land uses			**1,501**		**677**

Notes:

(1) Includes studio apartments

(2) To meet the 10% affordable housing target, a total of 162 units will be provided as part of the development. The location and proportional split of these additional 18 units has not been assigned within the current lot allocation at this stage. As a conservative assumption, these 18 units have been assessed within the market housing allocation, with higher parking rates and trip rates. Consequently, the transport assessment considers a greater impact on the surrounding road network due to the higher rates. In reality, the market housing will be reduced to 1,463 units to remain within the overall 1,625 unit total yield, and the transport impact marginally reduced.

(3) 10 shared spaces to be provided, which will replace 30 normal car parking spaces (equates to -20 spaces)

Applying the recommended maximum parking rates to the estimated residential yields for the revised master plan would result in 1,501 parking spaces being required for the site. Although the 1,501 spaces are more than the approved master plan requirements (of 1,166 parking spaces), the introduction of the affordable housing component has reduced the number of required spaces compared to if these were market housing dwellings.

The number of bicycle parking spaces required for the apartments would be 677 spaces. The Housing SEPP includes no specific requirements for bicycle parking spaces for affordable housing, hence the DCP rate has been applied consistent with the market housing. The DCP includes no bicycle parking requirement for commercial (including retail) land-uses. Given the retail facilities are proposed as the ground floor of the residential blocks, it is assumed that residential visitor provisions (provided as on-street bike racks) could also be used by retail visitors.

5.3 Trip generation and distribution

5.3.1 Trip generation

The approved master plan proposes a development of **1,250 apartments**. The trip rate used to determine the trips generated by the approved master plan was based on surveyed locations that resemble the site most closely being Rockdale (with a car driver and passenger mode share of 57%) and Liberty Grove (with a car driver and passenger mode share of 68%). The average of these two surveyed locations was **0.3 trips per dwelling**. Applying this rate, the approved master plan was expected to generate a total of **375 trips** in the AM and PM peak hours respectively.

The retail component of the MGN master plan is expected to be minor and will most likely be used by residents and passing trade within the local walking catchment, accessing the premises by foot or cycle. Hence the vehicular trip generation by the retail component to the external road network is expected to be negligible.

Retaining the trip generation assumptions from the approved master plan and applying these to the revised master plan (a total of **1,625 dwellings**) would result in **488 trips** being generated by the proposal, an **increase of 113 trips** compared to the approved master plan.

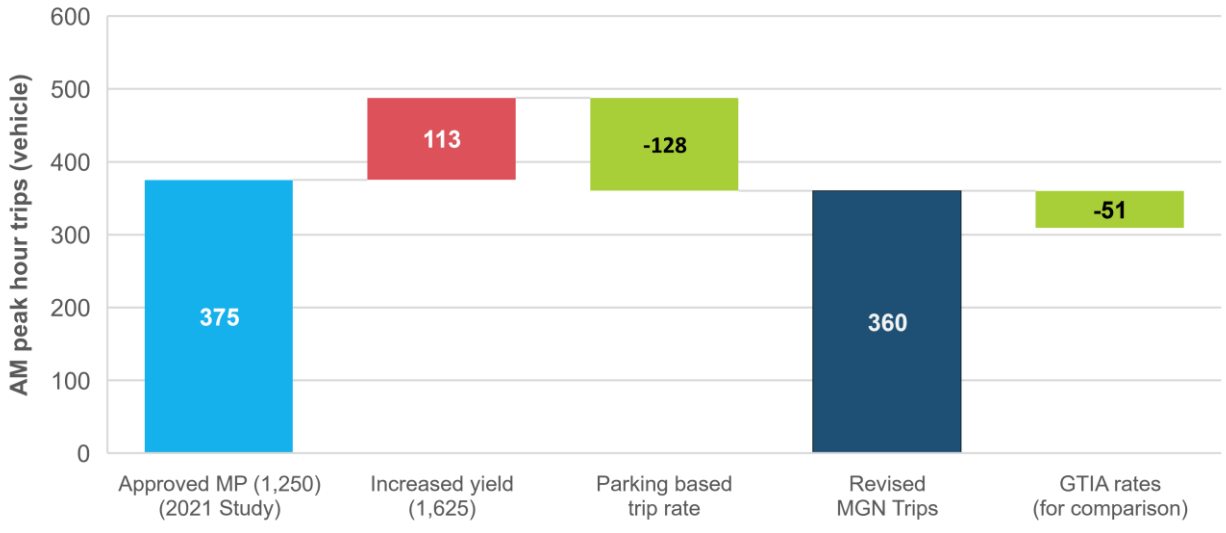
However, since the previous approval an affordable housing component has been introduced to the site. Based on the Housing SEPP (2021) reduces the parking requirements for affordable housing (compared to market housing). The reduced parking would consequently generate fewer private vehicle trips compared to a typical apartment; hence it is appropriate to adopt a trip rate linked to parking provision rather than total apartments.

By extension, this reduction in parking rate would result in a mode shift away from private vehicles, which can be facilitated based on the site's proximity to excellent public and active transport and the introduction of the upgraded pedestrian bridge, improving accessibility to Macarthur Station interchange.

Adopting the reduced parking provision and a parking-based trip rate (which already includes mode-shift) would decrease 128 trips, or a revised trip generation of **360 trips in the AM peak hour** and **338 trips in the PM peak hour**. This is a reduction compared to the approved master plan (and the modelling in the 2021 transport study).

The outcomes of these changes are summarised in **Figure 5-1** and discussed in detail in the subsequent sections.

Figure 5-1 Summary of changes to MGN trip generation



Additionally, since the previous approval, Transport for NSW published the updated Guide to Transport Impact Assessment (2024), which provides trip rates based on updated surveys for sites with high-density developments and high public transport accessibility. If the rates provided in the GTIA are adopted, this would result in a reduction of 179 trips for the revised yield (or a further reduction of 51 trips in the AM peak hour) compared to the scenario adopted for this assessment. The GTIA rates have not been used in this study to retain consistency with the previous approval, however have been included as a comparison to highlight the conservatism in the approach of this study.

Trip rates based on the number of units

The average trip rate per unit, for high-density residential flat dwellings within Sydney urban areas (such as Rockdale and Liberty Grove), as published in the *Technical Direction 2013/04a, Guide to Traffic Generating Developments* (TDT 2013/04a) can be used for the site. The trip rates for these areas are presented in **Table 5-3**.

Table 5-2 Trip rates per unit for Rockdale and Liberty Grove

Surveyed location	Peak hour trips per unit		Number of trips (MGN)	
	AM	PM	Approved MP - 1,250	Revised MP - 1,625
Rockdale	0.32	0.18		
Liberty Grove	0.28	0.41		
Average	**0.3**		**375**	**488**

Source: Roads and Maritime Technical Direction TDT 2013/04a: Guide to Traffic Generating Developments: Updated traffic surveys

Applying a trip rate of 0.3 trips per unit (consistent with the previous study) to the proposed 1,625 units would generate a total of 488 trips in the peak hour. This is an **increase of 113 trips** compared to the approved master plan.

Trip rates based on parking space provision

The average trip per car space trip rates for high-density residential flat dwellings that have good access to public transport services within Sydney urban areas (such as Rockdale and Liberty Grove), as published in the *Technical Direction 2013/04a, Guide to Traffic Generating Developments* (TDT 2013/04a) can be used for the site. The trip rates for these areas are presented in **Table 5-3**. The average weekday trip rates for the Rockdale and Liberty Grove areas are 0.24 and 0.23 trips per car space for the AM and PM peak hour periods, respectively.

Applying a trip rate of 0.24 and 0.23 trips per parking space to the required 1,501 parking spaces would generate a total of 360 and 338 trips in the AM and PM peak hours respectively. This is a reduction of **15 (AM) and 37 (PM) trips** compared to the approved master plan.

Table 5-3 Trip rates per parking space for Rockdale and Liberty Grove

Surveyed location	Trip rate (trips | parking space)		Number of trips (based on 1,501 parking spaces)	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Rockdale	0.29	0.17		
Liberty Grove	0.19	0.28		
Average	**0.24**	**0.23**	**360**	**338**

Source: Roads and Maritime Technical Direction TDT 2013/04a: Guide to Traffic Generating Developments: Updated traffic surveys

Trip rates based on updated Transport Guidelines

The updated Guide to Transport Impact Assessment (2024) provides trip rates based on updated surveys for sites with high-density developments and high public transport accessibility. All surveyed developments were composed of six storeys or more residential buildings and did not contain significant uses other than residential activity. The surveyed developments were close to public transport nodes, providing high transport service levels. The average trip rates based on the updated Guide are shown in **Table 5-4**.

Table 5-4 Trip rates at high-density residential sites with high public transport accessibility (Sydney)

Weekday rate	Trip rate (trips | dwelling)		Number of trips (based on 1,625 dwellings)	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Average rate	0.19	0.15	**309**	**244**

Source: The updated Guide to Transport Impact Assessment (Draft, 2024)

Applying the average trip rates, the total generated trips would be **309 (AM) and 244 (PM) trips**, which is a **reduction of 66 (AM) and 131 (PM) trips** compared to the approved master plan.

5.3.2 Trip distribution

The trip distribution used is consistent with the approach adopted in the 2021 transport report.

Based on the 2019 traffic surveys, there is a 35:65 split in the AM peak hour and a 25:75 in the PM peak hour of traffic using William Downes Avenue versus Goldsmith Avenue while accessing the surrounding arterial road network from the site.

Of these, 63 per cent of traffic leaves the site, and 37 per cent enters the site in the AM peak hour. During the PM peak hour, 45 per cent of traffic leaves the site, while 55 per cent enters it. Approximately 70 per cent will then travel north and 30 per cent south in the AM peak hour. During the PM peak hour, 60 per cent of traffic will travel south, and 40 per cent will travel north.

The above distribution has been adopted in the SIDRA modelling discussion in **Section 5.5**. However, in general, it reduces development-related vehicle trips at each intersection compared to the 2021 transport study for the revised with development scenario.

5.4 Reduced background growth

As described in **Section 3.6**, the traffic volumes were observed to decrease in both peak periods, with the most significant reduction being at the Narellan Road | WSU Access Road intersection during the PM peak hour.

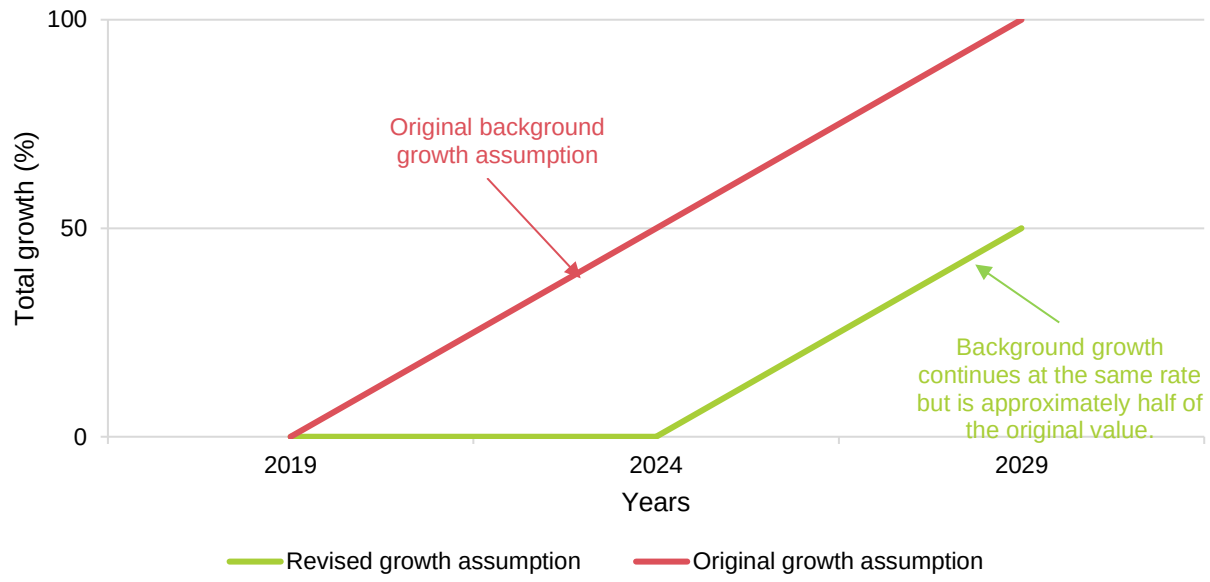
In summary, it was confirmed that the **background traffic volumes have generally reduced over the last five years**, except for the WSU access approach and the Gilchrist Drive approach. Overall, the total intersection flows have reduced by three (AM) and 11 (PM) per cent for the Narellan Road | WSU Access Road intersection and by one (AM) and eight (PM) per cent for the Gilchrist Drive | Goldsmith Avenue intersection.

The impact assessment presented in the 2021 transport report was undertaken for a future year of 2029, 10 years after the 2019 base case traffic scenario. To determine the 2029 traffic volumes, background traffic growth was established based on network background growth and traffic growth due to surrounding developments. The sources of these background traffic growth elements are consistent with the Macarthur Heights TMAP (AECOM, 2012).

Based on the observed traffic volumes, the growth anticipated (by the previous study) between 2019 and 2024 was not observed. Therefore, as illustrated in **Figure 5-2**, the 2029 future year scenario has been revised to reflect **zero growth between 2019 and 2024**.

Although the anticipated growth was not observed between 2019 and 2024, the assessment has adopted the same growth rate from 2024 as a conservative assumption. This growth was applied to the existing volumes in 2024 for five years to 2029. Hence, by 2029, the background traffic would grow to approximately half the original estimation. **Figure 5-2** illustrates the method of background growth.

Figure 5-2 Illustration of adopted background growth rate



5.5 Road network performance

5.5.1 Modelling approach

The modelling scenarios, related future year base, and trip rates are tabulated in **Table 5-5**. The rationale behind each scenario is as follows:

– **Future year base (revised assumptions)**

- This scenario will form the basis for the future year on which the development's impact should be assessed. It adopts the revised background growth assumptions as per **Section 5.4** and includes other developments proposed in the surrounding region (consistent with the 2021 transport study).

– **Future year with development**

- This scenario quantifies the impact of the MGN development by testing the network performance under the revised background growth assumptions plus the revised MGN trips (360 AM and 338 PM peak hour, consistent in **Figure 5-1**). This is the expected network performance in the future year.

– **Sensitivity analysis A: Original future year base with development using per-unit trip rates**

- This sensitivity scenario tests the network performance where the original background growth assumptions (from the 2021 transport study) still hold plus the revised MGN trips based on the original 2021 transport study assumptions (i.e. the increase of 113 trips compared to the previously approved master plan).

– **Sensitivity analysis B: Revised future year base with development using per-unit trip rates**

- This sensitivity scenario tests the network performance where the revised background assumptions are valid (i.e. the reduction in background growth as per **Section 5.4**), but the development generates traffic based on the original 2021 transport study assumptions (i.e. the increase of 113 trips compared to the previously approved master plan).

SIDRA Intersection 9.1 models were adopted from converting the previously calibrated SIDRA Intersection 8 models.

Table 5-5 Modelling scenarios' and their related future year base and trip generation rates

Modelling scenario	Future year base		Trip generation rates	
	Original[1]	Revised[2]	Original[3]	Per parking space[4]
Future year base (revised assumptions)		✔		
Future year with development		✔		✔
Sensitivity analysis A	✔		✔	
Sensitivity analysis B		✔	✔	

5.5.2 Existing conditions compared to the future year base (revised)

Increased corridor demand forces many of the intersections to operate closer to capacity than in the existing case.

In the existing year, the intersection of Narellan Road | Blaxland Road | Gilchrist Drive was observed to perform satisfactorily at LoS D, with the delay being close to the threshold of the following grade (LoS E). Increased background traffic raises the peak period delays by 6 and 5 seconds. However, as the intersection was already close to the threshold, the performance was pushed to an unsatisfactory LoS E. Additionally, improved signal timing in the peak periods reduces the DoS in both peak periods.

The Narrellan Road | William Downes Avenue intersection performed significantly worse during the PM peak period than the AM. The AM peak period's delay performance remains relatively similar, with the delay increasing by only 3 seconds. Its DoS rises from 0.68 to 0.83. Contrastly, during the PM peak, the LoS drops by three grades from an A in the existing to a LoS D. The DoS slightly increases by 0.12 from 0.66 to 0.78.

The point of difference to cause this is the absence of a peak direction. During the AM peak period, the east and west approaches are observed to have close to 1,400 more vehicles than the north and south approaches. In contrast, the PM peak period has only approximately 100 vehicles difference. The equal distribution of vehicles amongst the four approaches makes signal timing difficult and results in a higher weighted average delay. The AM period's non-peak direction experiences delays, but the peak direction's higher throughput outweighs these.

Table 5-6 Comparison between existing conditions and future year base (revised)

Intersection	Peak period	Existing			Future year base (revised)		
		Delay (s)	LoS	DoS	Delay (s)	LoS	DoS
WSU Access Road | William Downes Avenue	AM	13	A	0.26	13	A	0.27
	PM	9	A	0.08	10	A	0.14
Narellan Road | William Downes Avenue	AM	23	B	0.68	26	B	0.83
	PM	13	A	0.66	44	D	0.78
Narellan Road | Blaxland Road | Gilchrist Drive	AM	55	D	0.94	61	E	0.88
	PM	53	D	0.92	58	E	0.89
Gilchrist Drive | Goldsmith Avenue	AM	13	A	0.51	26	B	0.62
	PM	15	B	0.56	29	C	0.63
Kellicar Road | Gilchrist Drive	AM	42	C	0.66	30	C	0.81
	PM	56	D	0.98	63	E	0.87

[1] Assumes as though the same growth will occur by the testing future year (2029)
[2] Adopts revised background growth assumptions (as per **Section 5.4**)
[3] Adopts trip rates based on the number of units (refer to **Section 5.3.1**)
[4] Adopts trip rates based on the parking space provision (refer to **Section 5.3.1**)

5.5.3 Future year base (revised) compared to future year with development

This section conducts the typical comparison between the future year base and the future year with development. It aims to quantify the impact of the development on the future road network. The results from the two modelled scenarios are shown in

Key outcome

Consistent with the 2021 transport study, the key outcome is that the additional trips generated by the MGN site will have minor impacts on the performance of the surrounding intersections, compared to the 2029 scenario without the MGN site development trips.

Table 5-7.

The modelling results revealed minor differences between the future year base and future year with development scenarios.

During the future year base (revised), the Gilchrist Drive | Goldsmith Avenue intersection performed close to the threshold of LoS C during the AM peak period, with a 26-second delay. The increase in development traffic worsens the performance by 5 seconds, pushing the delay performance to the following grade (LoS C).

Key outcome

Consistent with the 2021 transport study, the key outcome is that the additional trips generated by the MGN site will have minor impacts on the performance of the surrounding intersections, compared to the 2029 scenario without the MGN site development trips.

Table 5-7 Comparison between future year base (revised) and future year with development

Intersection	Peak period	Future year base (revised)			Future year with development		
		Delay (s)	LoS	DoS	Delay (s)	LoS	DoS
WSU Access Road | William Downes Avenue	AM	13	A	0.27	13	A	0.29
	PM	10	A	0.14	10	A	0.17
Narellan Road | William Downes Avenue	AM	26	B	0.83	27	B	0.88
	PM	44	D	0.78	45	D	0.91
Narellan Road | Blaxland Road | Gilchrist Drive	AM	61	E	0.88	64	E	0.93
	PM	58	E	0.89	60	E	0.91
Gilchrist Drive | Goldsmith Avenue	AM	26	B	0.62	31	C	0.70
	PM	29	C	0.63	35	C	0.76
Kellicar Road | Gilchrist Drive	AM	30	C	0.81	32	C	0.85
	PM	63	E	0.87	66	E	0.92

5.5.4 Future year with development compared to the approved master plan

This section compares the results from the approved master plan to the revised master plan (this development). Given that the original analysis was conducted in SIDRA Intersection 8, the models for the approved master plan were converted to SIDRA Intersection 9.1 and rerun to update the results. The updated results for the approved master plan models are shown in **Table 5-8**.

Compared to the approved master plan, the network performs better in the future year with development scenario. The following changes were observed:

– Narellan Road | Blaxland Road | Gilchrist Drive
  - Delay performance improves in both periods, with the AM peak period improving from LoS F to E. LoS grade remains the same during the AM peak period.
  - During the AM peak, the intersection operates below capacity by 7 per cent in the future year with development. Comparatively, it was operating above capacity by 2 per cent in the approved master plan.
  - The PM peak period gains 8 per cent of capacity between the approved master plan and the future year with development results.
– Gilchrist Drive | Goldsmith Avenue
  - During the AM peak period, the intersection operated with 3 seconds more delay during the future year with development scenario than the approved master plan. This three-second difference pushed the LoS grade from a B to a C.
  - Although there were greater delays in the future year with development scenario, there is 8 per cent more capacity than the approved master plan scenario during the same peak period.
– Kellicar Road | Gilchrist Drive
  - The AM peak period performance is similar between the future year with development and approved master plan.
  - In contrast, the intersection in the future year with development scenario operated with 11 seconds less delay than the approved master plan during the PM peak period.

Table 5-8 Comparison between the approved master plan and the future year with development

Intersection	Peak period	Future year with development			Approved masterplan results		
		Delay (s)	LoS	DoS	Delay (s)	LoS	DoS
WSU Access Road | William Downes Avenue	AM	13	A	0.29	13	A	0.27
	PM	10	A	0.17	10	A	0.13
Narellan Road | William Downes Avenue	AM	27	B	0.88	21	B	0.81
	PM	45	D	0.91	42	C	0.87
Narellan Road | Blaxland Road | Gilchrist Drive	AM	64	E	0.93	87	F	1.02
	PM	60	E	0.91	68	E	0.99
Gilchrist Drive | Goldsmith Avenue	AM	31	C	0.70	28	B	0.78
	PM	35	C	0.76	42	C	0.81
Kellicar Road | Gilchrist Drive	AM	32	C	0.85	34	C	0.83
	PM	66	E	0.92	77	F	0.97

5.5.5 Sensitivity analysis

The two sensitivity scenarios aim to understand the network conditions in the possibility of higher trip generation rates.

In scenario A, multiple intersections are observed to operate at capacity. These were:

– Narellan Road | William Downes Avenue during the PM peak period.
  - Although it operates at capacity, its delay performance remains satisfactory at LoS D.
– Narellan Road | Blaxland Road | Gilchrist Drive during both peak periods.
  - All approaches were operating close to capacity. The delay in performance was LoS F in both peak periods.

– Kellicar Road | Gilchrist Drive during the PM peak.
  - The intersection exceeded operated at LoS F, exceeding the threshold by 7 seconds.

The results of scenario B were similar to the results of the future year with development scenario. Although this scenario uses a higher trip rate, the results revealed that the difference in network performance was minor. There were no LoS grade changes, and only the Narellan Road | William Downes Avenue intersection was observed performing close to its capacity.

The sensitivity analysis confirmed that using higher trip rates for the development traffic revealed little to no change in performance compared to using lower rates.

Table 5-9 Intersection performance of the sensitivity analysis A and B

Intersection	Peak period	Sensitivity analysis A			Sensitivity analysis B		
		Delay (s)	LoS	DoS	Delay (s)	LoS	DoS
WSU Access Road | William Downes Avenue	AM	13	A	0.28	14	A	0.29
	PM	10	A	0.14	10	A	0.18
Narellan Road | William Downes Avenue	AM	38	C	0.95	28	B	0.89
	PM	49	D	1.00	46	D	0.97
Narellan Road | Blaxland Road | Gilchrist Drive	AM	89	F	1.03	66	E	0.93
	PM	83	F	1.03	61	E	0.91
Gilchrist Drive | Goldsmith Avenue	AM	35	C	0.82	32	C	0.73
	PM	46	D	0.86	37	C	0.77
Kellicar Road | Gilchrist Drive	AM	35	C	0.85	31	C	0.90
	PM	78	F	1.00	68	E	0.92

5.6 Green travel initiatives

To support the development's mode-share aspirations, it is proposed sustainable transport and Travel Demand Management (TDM) strategies are implemented. These strategies involve the application of policies, objectives, measures and targets to influence travel behaviour, to encourage the uptake of sustainable forms of transport, i.e. non-car modes, wherever possible. TDM measures have proven to reduce congestion created by growth within urban areas and unlock urban renewal opportunities. They result in travel behaviour that uses less road space than a single-occupant vehicle commute and takes advantage of spare transport capacity outside the morning and afternoon peaks. TDM strategies generally guide all relevant customers (residents, employees and visitors) in changing their travel behaviour in the following ways:

– Reduce travel

– Re-mode (consideration of travel via alternative modes)

– Re-time (consideration of travel at alternative times)

– Re-route.

Landcom sets up a framework for encouraging more sustainable travel, which has been used as a key principle of planning for development. A Travel Plan should be developed by future developers and monitored by strata management for the MGN community to deliver best-practice travel programs and initiatives to manage travel demand for transit-oriented development. Key initiatives and measures of Travel Demand Management Strategies should be strongly suggested and further developed into a Travel Plan to:

– Reduce the need to travel.
  - Planning of MGN as a mixed-use community to maximise trip containment within the wider Macarthur Precinct and encourage the use of active transport (walking and cycling) for short trips.

– Re-think the mode of travel

- Walking and cycling:
    - A highly permeable and safe pedestrian network throughout the development and connections to surrounding regional facilities
    - Dedicated cycle routes that connect to the regional routes and major transport hubs
    - Key design principles to integrate walking and cycling networks and facilities into the planning and delivery of the development
    - High-quality, safe and accessible end-of-trip facilities (centralised cycle hubs that are integrated within the development at convenient locations, on-street secure bicycle storage located conveniently at end-of-cycle destinations, parking hubs for shared bikes, lockers and showers)
    - Promotion of bicycle initiatives – such as NSW Bicycle Week, cycle to work day, and free bike check-up events.

– Public transport:
    - Provision of access to frequent public transport services to establish a non-car travel behaviour
    - Good quality connections to public transport interchange | stops in the vicinity of the development
    - Tailored information with clear mapping and walking catchments at public transport stops
    - Provision of public transport information from home via television channel or community app.

– Parking measures to encourage alternative modes of travel:
    - Restrained parking rates with flexibility in parking arrangements such as shared parking between non-conflicting uses, shared vehicles parking and | or carpooling to accommodate the parking needs of all employees
    - Parking spaces dedicated to electric vehicles, with charging stations; The design to consider the future ability of spaces to link to electrical systems | power supply within the structure
    - Parking spaces dedicated to car-share schemes and community car-share vehicles, both on-street and incorporated in easily accessed public car parks.
- Development and use of carpooling app for the wider precinct and community.

– Re-time and Re-route journeys:
- Development of specific community app | community engagement program to enable changing travel behaviour which includes:
    - Active and public transport maps
    - Personalised journey planner
    - Notifications of the latest travel information
    - Shared vehicles information
    - Car-pooling opportunities
    - Other precinct-related information.
- Real-time information embedded into development and public transport stops.
- Employers to promote and encourage flexible working hours and arrangements.

While it is important to develop a Travel Plan that is aimed at managing travel demand and reducing reliance on car travel, it is more important to monitor and evaluate the effectiveness of individual measures and the need to adjust the measures. The planning and implementation of a targeted Travel Plan with the above green travel initiatives | principles could support the delivery of transit-oriented development at MGN that provides significant opportunities for alternative travel options and reduces the need for car travel.

At the master planning stage, there is no means to enforce the delivery of Green Travel Plan actions. It is recommended that subsequent development applications be given the requirement to develop green travel plans to realise the benefits of the site's excellent access to public and active transport networks and regional services.

6.0 Summary and conclusion

In 2022 Landcom submitted a DA for a proposed master plan for a 'high density residential and mixed-use development' for Macarthur Gardens North (the site). The DA was granted consent on 14 December 2022 i.e. 3944/2021/DA-SW. Landcom is now considering an increase to the approved residential yield for the site from the previous master plan of 1,250 apartments, to 1,625 apartments, and the introduction of an affordable housing component of 162 dwellings (assessed conservatively within this report as 144 dwellings).

This report has been prepared to assess the traffic and transport impacts for the revised master plan. The report is prepared to support the DA and is limited to a discussion of the net development yield and revised impacts due to the proposed uplift. In summary, the transport appraisal of the proposed revised master plan found that:

The site has excellent public and active transport accessibility:

– An overall future mode shift of approximately 20 per cent towards public transport away from cars can be assumed, resulting in a public transport mode split of **33 per cent train trips and six per cent bus trips**.

– The cumulative potential users of the proposed pedestrian bridge is expected to quadruple by 2041, during the AM and PM peak periods. This is likely to result in a mode shift towards active transport for the site's residents.

– Overall, a **future public and active transport mode share of approximately 40 per cent** is assumed, reducing the future private vehicle trips from 63 per cent to 43 per cent.

The affordable housing component will reduce parking requirements:

– Although the 1,501 spaces are more than the approved master plan requirements (of 1,166 parking spaces), the introduction of the affordable housing component has reduced the number of required spaces compared to if these were market housing dwellings.

– When comparing affordable housing parking rates to typical parking rates, approximately 50 per cent fewer car parking space provisions are required, so a mode shift towards active transport can be expected.

Revised trip rates assumptions can be applied:

– Using the same rates for the approved master plan, the revised master plan would generate 113 additional trips. However, further reduced trip rates for the site were adopted for the revised master plan.

– The Housing SEPP (2021) reduces the parking requirements for affordable housing (compared to market housing). The reduced parking would consequently generate fewer private vehicle trips compared to a typical apartment; hence it is appropriate to adopt a trip rate linked to parking provision rather than total apartments. The revised approach results in a reduction of 15 (AM) and 37 (PM) trips compared to the approved master plan.

Revised background growth assumptions can be applied:

– It was confirmed that the **background traffic volumes have generally reduced over the last five years**, except for the WSU access and Gilchrist Drive approaches. Overall, the total intersection flows have reduced by three (AM) and 11 (PM) per cent for the Narellan Road | WSU Access Road intersection and by one (AM) and eight (PM) per cent for the Gilchrist Drive | Goldsmith Avenue intersection

– Although the anticipated growth was not observed between 2019 and 2024, the assessment has adopted the same growth rate from 2024 as a conservative assumption. This growth was applied to the existing volumes in 2024 for five years to 2029. Hence, by 2029, the background traffic would grow to approximately half the original estimation.

The modelling revealed that the network performance is heavily impacted by the background traffic:

– Consistent with the 2021 transport study, the key outcome is that the additional trips generated by the MGN site will have minor impacts on the performance of the surrounding intersections, compared to the 2029 scenario without the MGN site development trips.

– The sensitivity analysis confirmed that using higher trip rates for the development traffic revealed little to no change in performance compared to using lower rates.

– Compared to the approved master plan, the network performs better in the future year with development scenario. In contrast to the approved master plan, all intersections are expected to perform at LoS E or lower and within their capacity. Overall, the traffic modelling confirmed that the increase in development yield resulting from the revised master plan has negligible impacts on the performance of the surrounding critical intersections.

APPENDIX A

TRANSPORT SCOPING NOTE

Memorandum

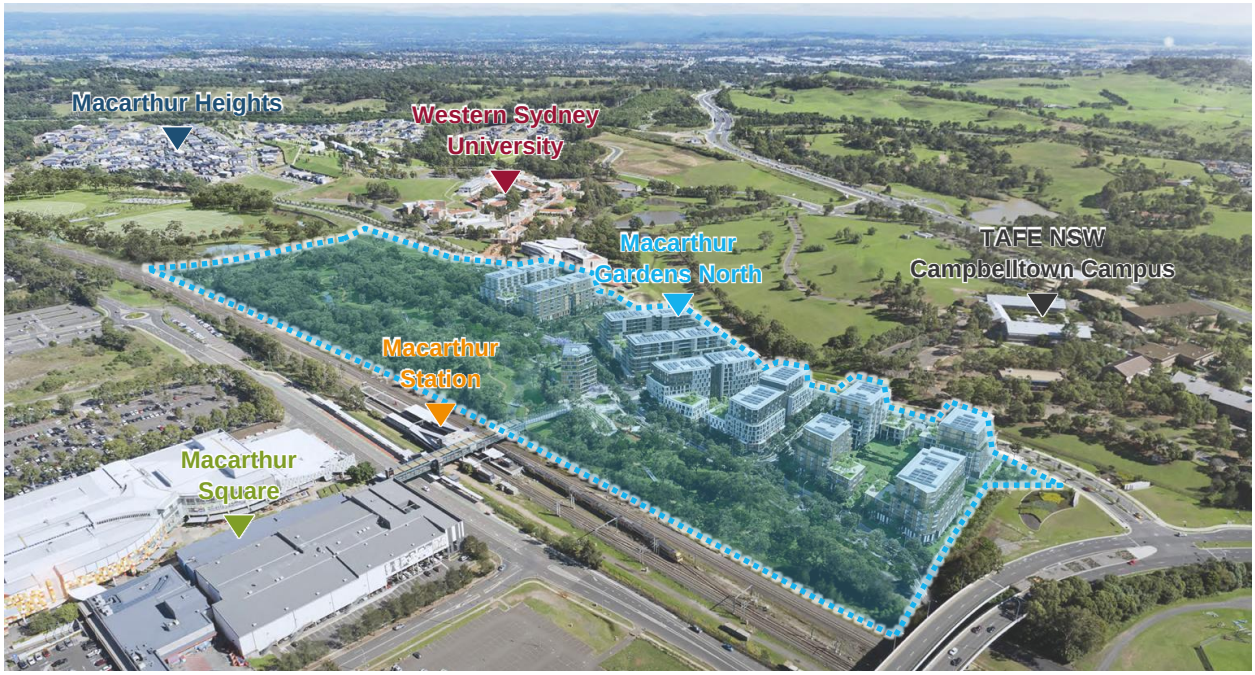
Project	Macarthur Gardens North	**Project Number**	SCT_00540
Client	Landcom		
Document Name	Transport Assessment Scoping Note		
Version	3.0	**Date**	5 June 2024
Author	Ravi Kaberwal	Principal Consultant	
Reviewer	Andy Yung	Director	
Authoriser	Andy Yung	Director	

Context

Landcom is currently in the process of delivering Macarthur Gardens North (MGN), an 18.5-hectare site immediately north of Macarthur Station (**Figure 1**). The MGN site is bounded by Goldsmith Avenue to the north, Gilchrist Drive to the east and the rail corridor (with Macarthur Station) to the south.

The project will boost housing supply in Sydney's southwest, having previously received approval in December 2022 (3944/2021/DA-SW) for the delivery of a high-density residential and mixed-use development consisting of 1,250 new apartments, 1,960m^2 of retail and community facilities and improvements to the accessibility of the area and public open spaces.

Figure 1 Overview of Macarthur Gardens North development



Source: Urbis (2023) with SCT Consulting annotations

Since the development's approval in December 2022, there has been an increased push for housing supply in response to decreasing housing affordability and shortfalls in housing supply. A key planning reform has been the

introduction of the Transit Orientated Development (TOD) Program, which facilitates increased density near transport hubs and increased height limits being permitted if a greater proportion of the development is designated as affordable housing.

Though not formally listed as TOD site, there is in principle support from Campbelltown City Council and the Department of Planning, Housing and Infrastructure (DPHI) for Landcom to pursue a planning pathway to enable the delivery of additional dwellings at MGN. Subsequently, Landcom has been investigating where the additional yield can be located on site, and within the existing approved building footprints. There is no intention to increase the developable land area of the site.

From a transport perspective, the previous approval included no upgrades or changes to the road network in the surrounding area to be provided by Landcom to support the previous yield. From a commercial perspective, the requested increase in dwellings would not provide sufficient financial perspective to enable any upgrades to the road network, and hence, a “net-zero” traffic generation approach is being pursued for the revised master plan (and associated Planning Proposal).

Through changes to the land-use mix (including dwelling types) and other policy and infrastructure levers such as parking provisions and accessibility to other modes, the project intends to demonstrate a net-zero change in traffic generated by the development. It is envisaged that through these changes, the traffic impact of the site would be less than the threshold of the previous approval (with no upgrades).

In addition to the above, Landcom will replace the existing pedestrian bridge that connects the site directly to Macarthur Train Station with a new and wider pedestrian bridge. The replacement bridge will improve connectivity between the MGN site, public transport services at Macarthur Station and Macarthur Town Centre and hence reduce private vehicle reliance for the development, as well as increasing capacity and accessibility for all users.

This scoping note is intended to summarise the context and proposed methodology for the transport assessment which will be undertaken to support the Planning Proposal.

Key objectives

- Enable an increase in dwellings near a transport hub to align with NSW Government objectives on housing supply and affordable housing
- Demonstrate the traffic generated by the amended development has a “net-zero” impact (or potential positive reduction) on the surrounding road network compared to the previously approved scheme.
- Provide recommendations for site specific restrictions or guidelines which would enable the “net-zero” objective.

Previous transport assessment

The Traffic and Transport Assessment Report (v4.0 dated 8 December 2021) was submitted as part of the approved development application (3944/2021/DA-SW). This report assessed the potential impacts of the MGN site.

The MGN site would generate 375 vehicular trips during the AM and PM peak hours respectively. The impact these additional trips will have on the five surrounding intersections was assessed using a SIDRA network model:

1. Narellan Road | Western Sydney University Access Road (roundabout)
2. Western Sydney University Access Road | William Downes Avenue (signalised intersection)
3. Narellan Road | Gilchrist Drive / Blaxland Road (signalised intersection)
4. Gilchrist Drive | Goldsmith Avenue (signalised intersection)
5. Kellicar Road | Gilchrist Avenue (signalised intersection).

A comparison between the performance of the 2029 year (with background growth and proposed infrastructure upgrades) for the ‘without’ and ‘with’ MGN site development trips is shown in **Table 1**.

Table 1 Comparison of future (2029) intersection performance without and with the MGN development trips

Intersection	Peak hour	Without MGN development			With MGN development trips		
		Delay	LoS	DoS	Delay	LoS	DoS
Western Sydney University Access Road | William Downes Avenue	AM	1,053	A	0.078	1,198	A	0.274
	PM	740	A	0.156	843	A	0.138
Narellan Road | Western Sydney University Access Road	AM	6,822	B	0.902	6,967	C	0.937
	PM	5,771	C	0.809	5,876	C	0.876
Narellan Road | Blaxland Road | Gilchrist Drive	AM	7,897	F	0.991	8,066	F	1.025
	PM	7,648	E	0.981	7,771	E	0.986
Gilchrist Drive | Goldsmith Avenue	AM	3,691	C	0.736	3,961	C	0.829
	PM	3,585	C	0.771	3,827	C	0.839
Kellicar Road | Gilchrist Drive	AM	3,889	B	0.806	4,032	C	0.851
	PM	4,992	E	0.979	5,134	E	0.970

Source: SCT Consulting, 2021

The previous Traffic and Transport Assessment concluded that the additional trips generated by the MGN site will have minor impacts on the performance of the surrounding intersections, compared to the 2029 scenario without the MGN site development trips.

All assessed intersections are expected to perform at the same LoS with and without the MGN site, except for the intersections of Narellan Road | Western Sydney University Access Road and Kellicar Road | Gilchrist Drive where the LoS will change from B to C in the AM peak but is still considered acceptable performance in an urban context.

Key outcomes

- All assessed intersections are expected to perform either at the same LoS with and without the MGN site or within acceptable performance for an urban context.
- Road upgrades may be required to Narellan Road | Blaxland Road | Gilchrist Drive and Kellicar Road | Gilchrist Drive to accommodate background traffic (and growth) irrespective of the inclusion of additional trips generated by the MGN site.
- No intersection or road upgrades were proposed in the approved development application to accommodate the vehicle trips generated MGN development.

Recommendations and next steps

A first principles approach is recommended to demonstrate how the revised master plan (and yield) would generate a net-zero change in vehicular trips compared to the previously approved scheme.

The analysis will be undertaken to determine the revised trips generated by the site (including additional dwellings proposed by the amended development scheme) based on:

1. Changes to the land use mix, including an increased proportion of affordable housing that has lower parking requirements (including car parking rates) and hence vehicular trip generation
2. Reductions to overall parking provision (including car parking rates), which would translate to lower vehicular trip generation (and mode-shift to active and public transport)
3. Re-assess mode-share assumptions based on benchmarking of other areas with similar characteristics (including density and proximity to public transport) using the Household Travel Survey, Method of Travel to Work and transport demand elasticities. Transport demand elasticities enable testing of the responsiveness of walking, cycling and public transport demands to change in the environment, such as parking availability, pedestrian environment and public transport service frequency.

Based on the revised trip generation from the first-principles analysis, if there is no increase in the trips generated by the MGN site, then the impact of the site on the surrounding road network is no worse than the previously approved scheme. No further assessment is recommended at this stage.

If the analysis indicates an increase in trips generated by the site, the intersection modelling can be updated to determine the revised intersection performance for the future year (2029). The modelling can be used to identify any interventions that may improve intersection performance (in addition to the intersection upgrades identified and being delivered by other projects that have been already included in the model).

If modelling demonstrates that physical upgrades are required to the intersections, these can be identified for Transport for NSW to implement. Otherwise, Landcom will progress with the previously approved scheme (and yield) as the uplift does not provide sufficient financial incentive to enable any upgrades to the road network.

The updated transport analysis, including first-principles analysis and modelling (if required) will be documented in a revised Traffic and Transport Assessment Report. The updated report will include a discussion of the proposed development uplift, methodology for assessment and the resultant impact on the existing transport facilities in the study area, including road, public and active transport.

Key outcomes

- Undertake first-principles assessment to determine the trips generated by the development.
  - If there is a net-zero change in vehicle trips generated (or net reduction), then there no need for revised traffic modelling. A qualitative traffic assessment and a Green Travel Plan would be developed to support the Planning Proposal.
  - If there is an increase in vehicular trips, update intersection modelling to determine the revised intersection performance.
- Document the updated analysis, modelling (if required) and outcomes for the study area in a revised Traffic and Transport Assessment Report.

APPENDIX B

EXISTING SIDRA RESULTS

MOVEMENT SUMMARY

Site: 101 AM [101 AM - William Downes Av/ WSU Access_AM (Site Folder: Existing conditions)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2019 Network AM Peak (Network Folder: Scenario E (base))]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Tafe Access South															
1	L2	All MCs	1	0.0	1	0.0	0.016	6.1	LOS A	0.0	0.3	0.51	0.50	0.51	50.8
2	T1	All MCs	14	0.0	14	0.0	0.016	6.3	LOS A	0.0	0.3	0.51	0.50	0.51	48.8
3	R2	All MCs	1	0.0	1	0.0	0.016	10.9	LOS A	0.0	0.3	0.51	0.50	0.51	51.9
Approach			16	0.0	16	0.0	0.016	6.6	LOS A	0.0	0.3	0.51	0.50	0.51	49.3
East: Tafe Access East															
4	L2	All MCs	1	0.0	1	0.0	0.052	6.0	LOS A	0.1	0.8	0.51	0.64	0.51	50.2
5	T1	All MCs	3	0.0	3	0.0	0.052	6.3	LOS A	0.1	0.8	0.51	0.64	0.51	48.7
6	R2	All MCs	47	2.2	47	2.2	0.052	11.0	LOS A	0.1	0.8	0.51	0.64	0.51	45.4
Approach			52	2.0	52	2.0	0.052	10.6	LOS A	0.1	0.8	0.51	0.64	0.51	45.9
North: Approach to Narellan Road															
7	L2	All MCs	171	0.6	171	0.6	0.255	3.3	LOS A	0.5	3.3	0.03	0.53	0.03	50.6
8	T1	All MCs	81	0.0	81	0.0	0.255	3.4	LOS A	0.5	3.3	0.03	0.53	0.03	51.3
9	R2	All MCs	477	1.5	477	1.5	0.255	7.9	LOS A	0.5	3.3	0.03	0.62	0.03	43.0
Approach			728	1.2	728	1.2	0.255	6.4	LOS A	0.5	3.3	0.03	0.59	0.03	46.0
West: William Downes Avenue															
10	L2	All MCs	118	2.7	118	2.7	0.037	3.9	LOS A	0.1	0.5	0.07	0.46	0.07	49.4
11	T1	All MCs	1	0.0	1	0.0	0.002	4.3	LOS A	0.0	0.0	0.17	0.55	0.17	50.8
12	R2	All MCs	2	0.0	2	0.0	0.002	9.0	LOS A	0.0	0.0	0.17	0.55	0.17	49.9
Approach			121	2.6	121	2.6	0.037	4.0	LOS A	0.1	0.5	0.08	0.46	0.08	49.4
All Vehicles			917	1.4	917	1.4	0.255	6.3	LOS A	0.5	3.3	0.07	0.57	0.07	46.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 AM [102 AM - Narellan Rd / WSU access_AM (Site Folder: Existing conditions)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2019 Network AM Peak (Network Folder: Scenario E (base))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 135 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: WSU Access															
1	L2	All MCs	134	3.1	134	3.1	0.155	35.7	LOS C	1.8	12.6	0.83	0.73	0.83	29.0
2	T1	All MCs	1	0.0	1	0.0	0.073	83.6	LOS F	0.0	0.3	1.00	0.57	1.00	5.6
3	R2	All MCs	49	0.0	49	0.0	0.180	70.2	LOS E	1.0	6.8	0.97	0.71	0.97	5.0
Approach			184	2.3	184	2.3	0.180	45.3	LOS D	1.8	12.6	0.87	0.73	0.87	22.2
East: Narellan Road															
4	L2	All MCs	165	0.6	165	0.6	*0.145	19.0	LOS B	2.7	19.0	0.60	0.64	0.60	40.5
5	T1	All MCs	1986	7.2	1986	7.2	0.655	39.0	LOS C	24.1	178.4	0.93	0.71	0.93	38.5
6	R2	All MCs	2	50.0	2	50.0	0.035	81.1	LOS F	0.1	0.8	0.91	0.61	0.91	18.9
Approach			2154	6.7	2154	6.7	0.655	37.5	LOS C	24.1	178.4	0.90	0.70	0.90	36.8
North: Bethlehem Monastery Access															
7	L2	All MCs	3	0.0	3	0.0	0.302	90.0	LOS F	0.2	1.4	1.00	0.62	1.00	2.2
8	T1	All MCs	1	0.0	1	0.0	*0.302	86.7	LOS F	0.2	1.4	1.00	0.62	1.00	2.2
9	R2	All MCs	1	0.0	1	0.0	0.008	66.3	LOS E	0.0	0.3	0.94	0.59	0.94	19.9
Approach			5	0.0	5	0.0	0.302	84.6	LOS F	0.2	1.4	0.99	0.62	0.99	6.0
West: Narellan Road															
10	L2	All MCs	1	0.0	1	0.0	0.684	37.0	LOS C	19.0	138.2	0.53	0.49	0.53	27.6
11	T1	All MCs	2993	4.3	2993	4.3	*0.684	7.9	LOS A	19.1	138.6	0.53	0.49	0.53	48.1
12	R2	All MCs	562	1.3	562	1.3	*0.665	41.4	LOS C	8.5	59.9	0.96	0.83	0.96	26.2
Approach			3556	3.8	3556	3.8	0.684	13.2	LOS A	19.1	138.6	0.60	0.54	0.60	42.4
All Vehicles			5899	4.8	5899	4.8	0.684	23.1	LOS B	24.1	178.4	0.72	0.61	0.72	38.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: WSU Access											
P1	Full	1	61.6	LOS F	0.0	0.0	0.96	0.96	77.0	20.0	0.26
P1B	Slip/Bypass	1	61.6	LOS F	0.0	0.0	0.96	0.96	77.0	20.0	0.26
East: Narellan Road											
P2B	Slip/Bypass	1	61.6	LOS F	0.0	0.0	0.96	0.96	77.0	20.0	0.26
North: Bethlehem Monastery Access											
P3	Full	1	61.6	LOS F	0.0	0.0	0.96	0.96	77.0	20.0	0.26
West: Narellan Road											
P41	Stage 1	1	61.6	LOS F	0.0	0.0	0.96	0.96	77.0	20.0	0.26
P42	Stage 2	1	40.8	LOS E	0.0	0.0	0.91	0.91	56.2	20.0	0.36
All Pedestrians		6	58.2	LOS E	0.0	0.0	0.95	0.95	73.5	20.0	0.27

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: 103 AM [103 AM - Narellan Rd/ Blaxland Rd/ Gilchrist Dr_AM (Site Folder: Existing conditions)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2019 Network AM Peak (Network Folder: Scenario E (base))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 135 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Narellan Road															
21	L2	All MCs	21	10.0	21	10.0	0.024	50.4	LOS D	0.4	2.7	0.49	0.64	0.49	37.6
22	T1	All MCs	957	6.5	957	6.5	*0.933	88.5	LOS F	15.5	114.3	1.00	1.12	1.32	17.4
23	R2	All MCs	368	2.0	368	2.0	0.849	77.0	LOS F	8.0	57.3	1.00	0.96	1.23	26.3
Approach			1346	5.3	1346	5.3	0.933	84.7	LOS F	15.5	114.3	0.99	1.06	1.28	19.2
NorthEast: Blaxland Road															
24	L2	All MCs	446	1.7	446	1.7	*0.684	35.6	LOS C	13.2	93.5	0.91	0.85	0.91	36.8
25	T1	All MCs	547	2.7	547	2.7	0.602	49.5	LOS D	9.9	70.6	0.95	0.80	0.95	23.6
26	R2	All MCs	388	9.8	388	9.8	*0.944	91.8	LOS F	9.5	72.1	1.00	1.08	1.43	15.5
Approach			1382	4.3	1382	4.3	0.944	56.9	LOS E	13.2	93.5	0.95	0.89	1.07	25.0
NorthWest: Narellan Road															
27	L2	All MCs	782	4.8	782	4.8	0.732	34.0	LOS C	14.8	108.1	0.69	0.87	0.69	44.6
28	T1	All MCs	196	34.9	196	34.9	0.139	15.5	LOS B	1.3	11.3	0.51	0.39	0.51	49.1
29	R2	All MCs	915	5.3	915	5.3	*0.932	54.6	LOS D	14.7	107.2	1.00	0.98	1.22	22.2
Approach			1893	8.2	1893	8.2	0.932	42.0	LOS C	14.8	108.1	0.82	0.88	0.93	31.4
SouthWest: Gilchrist Drive															
30	L2	All MCs	737	4.3	737	4.3	0.368	15.3	LOS B	5.3	38.5	0.59	0.73	0.59	31.1
31	T1	All MCs	486	3.0	486	3.0	0.553	70.9	LOS F	10.1	72.3	1.00	0.88	1.00	25.7
32	R2	All MCs	41	0.0	41	0.0	0.187	78.2	LOS F	1.5	10.2	0.90	0.72	0.90	25.6
Approach			1264	3.7	1264	3.7	0.553	38.7	LOS C	10.1	72.3	0.76	0.79	0.76	25.8
All Vehicles			5885	5.7	5885	5.7	0.944	54.6	LOS D	15.5	114.3	0.88	0.90	1.01	25.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Narellan Road											
P7	Full	1	61.6	LOS F	0.0	0.0	0.96	0.96	77.0	20.0	0.26
SouthWest: Gilchrist Drive											
P8	Full	1	61.6	LOS F	0.0	0.0	0.96	0.96	77.0	20.0	0.26
P8B	Slip/Bypass	1	34.9	LOS D	0.0	0.0	0.91	0.91	50.3	20.0	0.40
All Pedestrians		3	52.7	LOS E	0.0	0.0	0.94	0.94	68.1	20.0	0.29

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: 104 AM [104 AM - Goldsmith Av/Gilchrist Dr_AM (Site Folder: Existing conditions)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2019 Network AM Peak (Network Folder: Scenario E (base))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 135 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Gilchrist Drive															
25	T1	All MCs	1405	3.8	1405	3.8	0.462	1.3	LOS A	3.6	26.3	0.14	0.13	0.14	55.4
26	R2	All MCs	118	10.7	118	10.7	* 0.486	61.7	LOS E	4.4	33.4	0.94	0.79	0.94	25.1
Approach			1523	4.4	1523	4.4	0.486	6.0	LOS A	4.4	33.4	0.20	0.18	0.20	44.8
NorthWest: Goldsmith Avenue															
27	L2	All MCs	102	10.3	102	10.3	0.400	63.9	LOS E	3.7	27.8	0.96	0.78	0.96	19.6
29	R2	All MCs	92	1.1	92	1.1	0.400	65.9	LOS E	3.7	26.2	0.97	0.78	0.97	19.4
Approach			194	6.0	194	6.0	0.400	64.8	LOS E	3.7	27.8	0.96	0.78	0.96	19.5
SouthWest: Gilchrist Drive															
30	L2	All MCs	137	2.3	137	2.3	* 0.506	72.4	LOS F	5.6	39.8	1.00	0.84	1.00	25.3
31	T1	All MCs	1169	3.0	1169	3.0	* 0.497	5.6	LOS A	8.6	61.5	0.30	0.27	0.30	48.9
Approach			1306	2.9	1306	2.9	0.506	12.6	LOS A	8.6	61.5	0.37	0.33	0.37	41.1
All Vehicles			3023	3.8	3023	3.8	0.506	12.6	LOS A	8.6	61.5	0.33	0.28	0.33	38.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Goldsmith Avenue											
P7	Full	1	61.6	LOS F	0.0	0.0	0.96	0.96	77.0	20.0	0.26
All Pedestrians		1	61.6	LOS F	0.0	0.0	0.96	0.96	77.0	20.0	0.26

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: 105 AM [105 AM - Kellicar Rd/ Gilchrist Dr_AM (Site Folder: Existing conditions)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2019 Network AM Peak (Network Folder: Scenario E (base))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 135 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gilchrist Drive															
1	L2	All MCs	92	9.2	92	9.2	0.079	31.0	LOS C	0.7	5.5	0.26	0.61	0.26	36.5
2	T1	All MCs	895	2.5	895	2.5	*0.658	53.3	LOS D	14.5	103.9	0.87	0.77	0.87	14.0
3	R2	All MCs	122	7.8	122	7.8	0.218	56.7	LOS E	3.6	26.7	0.77	0.75	0.77	22.4
Approach			1108	3.6	1108	3.6	0.658	51.8	LOS D	14.5	103.9	0.81	0.75	0.81	11.8
East: Kellicar Road															
4	L2	All MCs	101	7.3	101	7.3	0.057	6.5	LOS A	0.0	0.0	0.00	0.52	0.00	46.1
5	T1	All MCs	147	2.9	147	2.9	*0.649	71.5	LOS F	3.1	22.3	1.00	0.81	1.08	15.5
6	R2	All MCs	41	0.0	41	0.0	*0.497	78.4	LOS F	1.7	12.2	1.00	0.74	1.00	11.1
Approach			289	4.0	289	4.0	0.649	49.8	LOS D	3.1	22.3	0.65	0.70	0.69	19.7
North: Gilchrist Drive															
7	L2	All MCs	180	4.1	180	4.1	0.136	14.4	LOS A	0.1	0.9	0.03	0.56	0.03	49.7
8	T1	All MCs	831	3.5	831	3.5	0.604	19.6	LOS B	10.1	72.6	0.53	0.47	0.53	41.5
9	R2	All MCs	464	3.4	464	3.4	0.402	47.8	LOS D	7.7	55.4	0.88	0.81	0.88	23.6
Approach			1475	3.6	1475	3.6	0.604	27.8	LOS B	10.1	72.6	0.58	0.58	0.58	32.7
West: Kellicar Road															
10	L2	All MCs	372	4.5	372	4.5	*0.658	53.6	LOS D	12.9	93.8	0.92	0.85	0.92	8.4
11	T1	All MCs	87	6.0	87	6.0	0.393	72.1	LOS F	1.8	13.2	1.00	0.74	1.00	15.8
12	R2	All MCs	33	12.9	33	12.9	0.432	78.6	LOS F	1.4	10.8	1.00	0.73	1.00	10.5
Approach			492	5.4	492	5.4	0.658	58.6	LOS E	12.9	93.8	0.94	0.82	0.94	9.8
All Vehicles			3364	3.9	3364	3.9	0.658	42.1	LOS C	14.5	103.9	0.71	0.68	0.72	21.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Gilchrist Drive											
P1	Full	1	61.6	LOS F	0.0	0.0	0.96	0.96	77.0	20.0	0.26
East: Kellicar Road											
P2	Full	1	61.6	LOS F	0.0	0.0	0.96	0.96	77.0	20.0	0.26
North: Gilchrist Drive											
P3	Full	1	61.6	LOS F	0.0	0.0	0.96	0.96	77.0	20.0	0.26
West: Kellicar Road											
P4	Full	1	61.6	LOS F	0.0	0.0	0.96	0.96	77.0	20.0	0.26
All Pedestrians		4	61.6	LOS F	0.0	0.0	0.96	0.96	77.0	20.0	0.26

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

MOVEMENT SUMMARY

Site: 101 PM [101 PM - William Downes Av/ WSU Access_PM (Site Folder: Existing conditions)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2019 Network PM Peak (Network Folder: Scenario E (base))]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Tafe Access South															
1	L2	All MCs	1	0.0	1	0.0	0.012	4.5	LOS A	0.0	0.2	0.26	0.43	0.26	52.0
2	T1	All MCs	14	0.0	14	0.0	0.012	4.7	LOS A	0.0	0.2	0.26	0.43	0.26	50.6
3	R2	All MCs	1	0.0	1	0.0	0.012	9.3	LOS A	0.0	0.2	0.26	0.43	0.26	52.9
Approach			16	0.0	16	0.0	0.012	5.0	LOS A	0.0	0.2	0.26	0.43	0.26	51.0
East: Tafe Access East															
4	L2	All MCs	1	0.0	1	0.0	0.033	4.3	LOS A	0.1	0.4	0.24	0.59	0.24	51.0
5	T1	All MCs	2	0.0	2	0.0	0.033	4.6	LOS A	0.1	0.4	0.24	0.59	0.24	49.6
6	R2	All MCs	39	0.0	39	0.0	0.033	9.2	LOS A	0.1	0.4	0.24	0.59	0.24	46.7
Approach			42	0.0	42	0.0	0.033	8.9	LOS A	0.1	0.4	0.24	0.59	0.24	47.0
North: Approach to Narellan Road															
7	L2	All MCs	54	0.0	54	0.0	0.069	3.3	LOS A	0.1	0.7	0.03	0.48	0.03	51.4
8	T1	All MCs	29	0.0	29	0.0	0.069	3.4	LOS A	0.1	0.7	0.03	0.48	0.03	52.1
9	R2	All MCs	114	0.9	114	0.9	0.069	8.0	LOS A	0.1	0.7	0.03	0.63	0.03	42.8
Approach			197	0.5	197	0.5	0.069	6.0	LOS A	0.1	0.7	0.03	0.57	0.03	46.9
West: William Downes Avenue															
10	L2	All MCs	273	1.2	273	1.2	0.083	3.9	LOS A	0.2	1.1	0.07	0.46	0.07	49.4
11	T1	All MCs	4	0.0	4	0.0	0.005	4.3	LOS A	0.0	0.1	0.15	0.48	0.15	52.1
12	R2	All MCs	2	0.0	2	0.0	0.005	8.9	LOS A	0.0	0.1	0.15	0.48	0.15	51.1
Approach			279	1.1	279	1.1	0.083	3.9	LOS A	0.2	1.1	0.07	0.46	0.07	49.6
All Vehicles			534	0.8	534	0.8	0.083	5.1	LOS A	0.2	1.1	0.08	0.51	0.08	48.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 PM [102 PM - Narellan Rd / WSU access_PM (Site Folder: Existing conditions)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2019 Network PM Peak (Network Folder: Scenario E (base))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 138 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: WSU Access															
1	L2	All MCs	279	1.1	279	1.1	* 0.653	62.9	LOS E	5.3	37.2	1.00	0.84	1.03	21.6
2	T1	All MCs	1	0.0	1	0.0	0.074	89.3	LOS F	0.1	0.4	1.00	0.57	1.00	5.5
3	R2	All MCs	69	0.0	69	0.0	* 0.430	79.0	LOS F	1.5	10.5	1.00	0.73	1.00	4.5
Approach			349	0.9	349	0.9	0.653	66.2	LOS E	5.3	37.2	1.00	0.82	1.02	18.2
East: Narellan Road															
4	L2	All MCs	36	0.0	36	0.0	0.026	13.4	LOS A	0.3	1.9	0.35	0.61	0.35	46.8
5	T1	All MCs	2665	3.4	2665	3.4	* 0.658	11.4	LOS A	23.8	170.3	0.50	0.42	0.50	51.8
6	R2	All MCs	1	0.0	1	0.0	0.013	77.3	LOS F	0.0	0.3	1.00	0.59	1.00	17.9
Approach			2702	3.4	2702	3.4	0.658	11.5	LOS A	23.8	170.3	0.50	0.42	0.50	50.6
North: Bethlehem Monastery Access															
7	L2	All MCs	2	0.0	2	0.0	0.231	91.3	LOS F	0.2	1.1	1.00	0.61	1.00	2.2
8	T1	All MCs	1	0.0	1	0.0	* 0.231	88.0	LOS F	0.2	1.1	1.00	0.61	1.00	2.2
9	R2	All MCs	1	0.0	1	0.0	0.013	73.6	LOS F	0.0	0.3	0.97	0.59	0.97	18.6
Approach			4	0.0	4	0.0	0.231	86.0	LOS F	0.2	1.1	0.99	0.61	0.99	6.8
West: Narellan Road															
10	L2	All MCs	4	0.0	4	0.0	0.525	16.5	LOS B	10.9	78.6	0.37	0.34	0.37	28.8
11	T1	All MCs	2412	3.2	2412	3.2	0.525	4.8	LOS A	11.0	78.8	0.37	0.34	0.37	52.1
12	R2	All MCs	166	0.6	166	0.6	* 0.443	58.2	LOS E	3.0	21.2	0.98	0.76	0.98	21.3
Approach			2582	3.1	2582	3.1	0.525	8.2	LOS A	11.0	78.8	0.41	0.37	0.41	47.6
All Vehicles			5638	3.1	5638	3.1	0.658	13.4	LOS A	23.8	170.3	0.49	0.42	0.49	46.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: WSU Access											
P1	Full	1	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25
P1B	Slip/Bypass	1	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25
East: Narellan Road											
P2B	Slip/Bypass	1	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25
North: Bethlehem Monastery Access											
P3	Full	1	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25
West: Narellan Road											
P41	Stage 1	1	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25
P42	Stage 2	1	45.5	LOS E	0.0	0.0	0.91	0.91	60.8	20.0	0.33
All Pedestrians		6	60.2	LOS F	0.0	0.0	0.95	0.95	75.6	20.0	0.26

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: 103 PM [103 PM - Narellan Rd/ Blaxland Rd/ Gilchrist Dr_PM (Site Folder: Existing conditions)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2019 Network PM Peak (Network Folder: Scenario E (base))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 138 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Narellan Road															
21	L2	All MCs	32	0.0	32	0.0	0.031	42.4	LOS C	0.3	2.4	0.33	0.62	0.33	44.5
22	T1	All MCs	1004	2.9	1004	2.9	*0.879	77.8	LOS F	15.2	109.4	1.00	1.02	1.19	19.2
23	R2	All MCs	481	1.5	481	1.5	*0.913	83.9	LOS F	11.3	80.1	1.00	1.02	1.31	25.0
Approach			1517	2.4	1517	2.4	0.913	79.0	LOS F	15.2	109.4	0.99	1.01	1.21	20.5
NorthEast: Blaxland Road															
24	L2	All MCs	529	3.2	529	3.2	0.719	30.7	LOS C	11.4	82.3	0.90	0.91	0.90	41.0
25	T1	All MCs	905	3.0	905	3.0	0.871	62.0	LOS E	20.7	148.7	1.00	1.01	1.13	21.0
26	R2	All MCs	713	2.2	713	2.2	*0.897	76.2	LOS F	16.1	115.1	1.00	0.99	1.21	17.7
Approach			2147	2.8	2147	2.8	0.897	59.0	LOS E	20.7	148.7	0.98	0.98	1.10	23.8
NorthWest: Narellan Road															
27	L2	All MCs	519	5.3	519	5.3	0.423	10.0	LOS A	5.7	41.8	0.35	0.67	0.35	50.6
28	T1	All MCs	1079	4.6	1079	4.6	*0.747	29.4	LOS C	14.5	104.0	0.99	0.87	0.99	40.7
29	R2	All MCs	861	2.4	861	2.4	0.757	53.0	LOS D	16.2	115.7	0.97	0.87	0.98	22.6
Approach			2459	4.0	2459	4.0	0.757	33.6	LOS C	16.2	115.7	0.85	0.83	0.85	36.1
SouthWest: Gilchrist Drive															
30	L2	All MCs	834	3.5	834	3.5	0.441	27.7	LOS B	10.6	76.7	0.68	0.78	0.68	22.3
31	T1	All MCs	576	2.4	576	2.4	*0.917	75.0	LOS F	13.1	93.3	1.00	0.98	1.18	25.9
32	R2	All MCs	24	0.0	24	0.0	0.300	107.5	LOS F	1.0	7.3	1.00	0.72	1.00	21.7
Approach			1434	3.0	1434	3.0	0.917	48.1	LOS D	13.1	93.3	0.81	0.86	0.88	22.7
All Vehicles			7557	3.1	7557	3.1	0.917	52.6	LOS D	20.7	148.7	0.90	0.91	1.00	26.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Narellan Road											
P7	Full	1	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25
SouthWest: Gilchrist Drive											
P8	Full	1	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25
P8B	Slip/Bypass	1	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25
All Pedestrians		3	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25

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: 104 PM [104 PM - Goldsmith Av/Gilchrist Dr_PM (Site Folder: Existing conditions)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2019 Network PM Peak (Network Folder: Scenario E (base))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 138 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Gilchrist Drive															
25	T1	All MCs	1779	2.6	1779	2.6	* 0.562	8.1	LOS A	19.9	142.3	0.60	0.32	0.60	39.7
26	R2	All MCs	66	4.8	66	4.8	0.318	68.4	LOS E	2.6	18.9	0.97	0.76	0.97	23.7
Approach			1845	2.7	1845	2.7	0.562	10.3	LOS A	19.9	142.3	0.61	0.34	0.61	37.3
NorthWest: Goldsmith Avenue															
27	L2	All MCs	107	6.9	107	6.9	0.523	69.2	LOS E	4.3	31.8	0.99	0.79	0.99	18.6
29	R2	All MCs	128	0.0	128	0.0	* 0.561	68.5	LOS E	5.1	35.8	0.99	0.80	0.99	18.9
Approach			236	3.1	236	3.1	0.561	68.8	LOS E	5.1	35.8	0.99	0.79	0.99	18.8
SouthWest: Gilchrist Drive															
30	L2	All MCs	106	3.0	106	3.0	0.475	69.6	LOS E	4.3	30.5	0.99	0.79	0.99	25.9
31	T1	All MCs	1364	2.9	1364	2.9	0.534	8.0	LOS A	11.9	85.1	0.42	0.39	0.42	45.5
Approach			1471	2.9	1471	2.9	0.534	12.4	LOS A	11.9	85.1	0.47	0.42	0.47	40.9
All Vehicles			3552	2.8	3552	2.8	0.562	15.1	LOS B	19.9	142.3	0.58	0.40	0.58	35.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Goldsmith Avenue											
P7	Full	1	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25
All Pedestrians		1	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25

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: 105 PM [105 PM - Kellicar Rd/ Gilchrist Dr_PM (Site Folder: Existing conditions)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2019 Network PM Peak (Network Folder: Scenario E (base))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 138 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gilchrist Drive															
1	L2	All MCs	137	5.4	137	5.4	0.084	39.9	LOS C	0.3	1.9	0.10	0.57	0.10	40.1
2	T1	All MCs	727	1.7	727	1.7	*0.955	113.1	LOS F	19.2	136.6	1.00	1.17	1.36	6.7
3	R2	All MCs	176	5.4	176	5.4	*0.983	130.0	LOS F	9.2	67.7	1.00	1.11	1.55	11.9
Approach			1040	2.8	1040	2.8	0.983	106.3	LOS F	19.2	136.6	0.88	1.08	1.23	7.0
East: Kellicar Road															
4	L2	All MCs	234	0.0	234	0.0	0.126	6.8	LOS A	0.0	0.0	0.00	0.60	0.00	46.9
5	T1	All MCs	400	0.0	400	0.0	*0.919	94.5	LOS F	9.4	66.0	1.00	1.08	1.35	14.1
6	R2	All MCs	77	0.0	77	0.0	0.714	80.0	LOS F	3.4	23.5	1.00	0.84	1.14	10.9
Approach			711	0.0	711	0.0	0.919	72.9	LOS F	9.4	66.0	0.67	0.90	0.88	15.2
North: Gilchrist Drive															
7	L2	All MCs	239	4.4	239	4.4	0.140	20.6	LOS B	0.7	4.9	0.08	0.56	0.08	49.4
8	T1	All MCs	988	1.3	988	1.3	0.552	33.3	LOS C	15.4	108.7	0.79	0.60	0.79	36.1
9	R2	All MCs	643	3.8	643	3.8	0.446	31.2	LOS C	6.4	46.1	0.93	0.77	0.93	31.1
Approach			1871	2.5	1871	2.5	0.552	31.0	LOS C	15.4	108.7	0.75	0.65	0.75	31.1
West: Kellicar Road															
10	L2	All MCs	676	4.7	676	4.7	*0.683	25.5	LOS B	15.4	112.0	0.77	0.83	0.77	16.6
11	T1	All MCs	298	1.8	298	1.8	0.627	67.5	LOS E	6.0	42.5	1.00	0.81	1.00	16.9
12	R2	All MCs	174	3.6	174	3.6	*0.924	92.3	LOS F	8.4	60.6	1.00	1.03	1.39	9.6
Approach			1147	3.8	1147	3.8	0.924	46.5	LOS D	15.4	112.0	0.86	0.85	0.92	13.6
All Vehicles			4768	2.5	4768	2.5	0.983	56.1	LOS D	19.2	136.6	0.79	0.83	0.91	17.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Gilchrist Drive											
P1	Full	1	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25
East: Kellicar Road											
P2	Full	1	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25
North: Gilchrist Drive											
P3	Full	1	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25
West: Kellicar Road											
P4	Full	1	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25
All Pedestrians		4	63.1	LOS F	0.0	0.0	0.96	0.96	78.5	20.0	0.25

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.

APPENDIX C

FUTURE SIDRA RESULTS

Naming convention for SIDRA modelling scenarios

Please refer to **Table C-1** below to understand which set of results corresponds to each SIDRA movement summaries.

Table C-1 Naming convention for SIDRA modelling scenarios

Modelling scenario	SIDRA Network folder name	Future year base		Trip generation rates	
		Original	Revised	Original	Per parking space
Uses updated yield					
Future year base (revised assumptions)	Scenario FB2: Future year base		✔		
Future year with development	Scenario D3 – Future with development		✔		✔
Sensitivity analysis A	Scenario D1 – Future with development	✔		✔	
Sensitivity analysis B	Scenario D2 – Future with development		✔	✔	
Uses original yield (approved yield)					
Approved Masterplan	Scenario D0 – Future year with dev (approved MP)	✔		✔	

MOVEMENT SUMMARY

Site: 101 AMFB2 [101 AM - William Downes Av/ WSU Access_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario FB2 - Future year base)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Tafe Access South															
1	L2	All MCs	1	0.0	1	0.0	0.016	6.3	LOS A	0.1	0.7	0.52	0.50	0.52	50.7
2	T1	All MCs	14	0.0	14	0.0	0.016	6.5	LOS A	0.1	0.7	0.52	0.50	0.52	48.7
3	R2	All MCs	1	0.0	1	0.0	0.016	11.1	LOS A	0.1	0.7	0.52	0.50	0.52	51.8
Approach			16	0.0	16	0.0	0.016	6.8	LOS A	0.1	0.7	0.52	0.50	0.52	49.2
East: Tafe Access East															
4	L2	All MCs	1	0.0	1	0.0	0.053	6.2	LOS A	0.3	2.2	0.52	0.64	0.52	50.1
5	T1	All MCs	3	0.0	3	0.0	0.053	6.5	LOS A	0.3	2.2	0.52	0.64	0.52	48.6
6	R2	All MCs	47	2.2	47	2.2	0.053	11.2	LOS A	0.3	2.2	0.52	0.64	0.52	45.2
Approach			52	2.0	52	2.0	0.053	10.8	LOS A	0.3	2.2	0.52	0.64	0.52	45.7
North: Approach to Narellan Road															
7	L2	All MCs	171	0.6	171	0.6	0.269	3.3	LOS A	1.3	8.8	0.03	0.54	0.03	50.4
8	T1	All MCs	81	0.0	81	0.0	0.269	3.4	LOS A	1.3	8.8	0.03	0.54	0.03	51.2
9	R2	All MCs	517	1.4	517	1.4	0.269	7.9	LOS A	1.3	8.9	0.03	0.62	0.03	43.0
Approach			768	1.1	768	1.1	0.269	6.4	LOS A	1.3	8.9	0.03	0.59	0.03	45.9
West: William Downes Avenue															
10	L2	All MCs	253	1.2	253	1.2	0.078	3.9	LOS A	0.4	2.7	0.08	0.46	0.08	49.3
11	T1	All MCs	1	0.0	1	0.0	0.002	4.3	LOS A	0.0	0.1	0.18	0.55	0.18	50.8
12	R2	All MCs	2	0.0	2	0.0	0.002	9.0	LOS A	0.0	0.1	0.18	0.55	0.18	49.9
Approach			256	1.2	256	1.2	0.078	3.9	LOS A	0.4	2.7	0.08	0.46	0.08	49.4

All Vehicles	1092	1.2	1092	1.2	0.269	6.1	LOS A	1.3	8.9	0.07	0.56	0.07	46.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 AMFB2 [102 AM - Narellan Rd / WSU access_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario FB2 - Future year base)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 145 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: WSU Access															
1	L2	All MCs	240	1.8	240	1.8	0.296	43.0	LOS D	6.2	43.8	0.87	0.76	0.87	26.4
2	T1	All MCs	1	0.0	1	0.0	0.039	83.3	LOS F	0.1	0.6	1.00	0.58	1.00	7.2
3	R2	All MCs	78	0.0	78	0.0	0.303	76.7	LOS F	2.7	19.0	0.99	0.73	0.99	4.4
Approach			319	1.3	319	1.3	0.303	51.4	LOS D	6.2	43.8	0.90	0.75	0.90	20.9
East: Narellan Road															
4	L2	All MCs	136	0.8	136	0.8	0.115	11.2	LOS A	2.2	15.2	0.41	0.66	0.41	44.2
5	T1	All MCs	1749	8.1	1749	8.1	0.543	20.3	LOS B	24.9	185.0	0.67	0.60	0.67	45.2
6	R2	All MCs	139	0.0	139	0.0	0.571	70.6	LOS F	9.4	66.0	0.99	0.80	0.99	19.9
Approach			2024	7.1	2024	7.1	0.571	23.1	LOS B	24.9	185.0	0.67	0.62	0.67	42.8
North: Bethlehem Monastery Access															
7	L2	All MCs	7	0.0	7	0.0	0.027	62.1	LOS E	0.4	3.1	0.88	0.67	0.88	5.1
8	T1	All MCs	1	0.0	1	0.0	*0.455	79.5	LOS F	4.3	29.8	1.00	0.76	1.00	4.9
9	R2	All MCs	118	0.0	118	0.0	*0.455	77.1	LOS F	4.3	29.8	1.00	0.76	1.00	19.0
Approach			126	0.0	126	0.0	0.455	76.2	LOS F	4.3	29.8	0.99	0.75	0.99	18.5
West: Narellan Road															
10	L2	All MCs	525	0.0	525	0.0	0.329	10.8	LOS A	5.8	40.9	0.21	0.61	0.21	47.7
11	T1	All MCs	2935	4.4	2935	4.4	*0.808	17.6	LOS B	51.2	372.0	0.76	0.70	0.76	39.4
12	R2	All MCs	631	1.2	631	1.2	*0.828	62.6	LOS E	18.4	130.3	1.00	1.03	1.11	20.3
Approach			4091	3.3	4091	3.3	0.828	23.7	LOS B	51.2	372.0	0.73	0.74	0.75	34.5

All Vehicles	6560	4.3	6560	4.3	0.828	25.9	LOS B	51.2	372.0	0.73	0.70	0.74	36.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: WSU Access											
P1	Full	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P1B	Slip/Bypass	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
East: Narellan Road											
P21	Stage 1	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P22	Stage 2	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P2B	Slip/Bypass	1	38.7	LOS D	0.0	0.0	0.92	0.92	54.1	20.0	0.37
North: Bethlehem Monastery Access											
P3	Full	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
West: Narellan Road											
P41	Stage 1	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P42	Stage 2	1	37.8	LOS D	0.0	0.0	0.92	0.92	53.2	20.0	0.38
All Pedestrians		8	59.5	LOS E	0.0	0.0	0.95	0.95	74.9	20.0	0.27

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: 103 AMFB2 [103 AM - Narellan Rd/ Blaxland Rd/ Gilchrist Dr_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario FB2 - Future year base)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Narellan Road															
21	L2	All MCs	24	8.6	24	8.6	0.028	49.0	LOS D	0.8	6.2	0.51	0.64	0.51	35.0
22	T1	All MCs	1010	6.1	1010	6.1	0.608	56.6	LOS E	21.3	156.9	0.91	0.79	0.91	24.0
23	R2	All MCs	393	1.9	393	1.9	0.502	61.7	LOS E	12.7	90.3	0.93	0.81	0.93	29.5
Approach			1427	5.0	1427	5.0	0.608	57.9	LOS E	21.3	156.9	0.91	0.79	0.91	24.4
NorthEast: Blaxland Road															
24	L2	All MCs	513	1.4	513	1.4	0.517	30.6	LOS C	23.5	166.4	0.69	0.83	0.69	39.6
25	T1	All MCs	826	1.8	826	1.8	0.807	57.2	LOS E	31.1	221.3	1.00	0.93	1.05	21.8
26	R2	All MCs	385	9.9	385	9.9	*0.875	86.2	LOS F	15.5	117.3	1.00	0.98	1.24	16.2
Approach			1724	3.5	1724	3.5	0.875	55.8	LOS D	31.1	221.3	0.91	0.91	0.98	25.1
NorthWest: Narellan Road															
27	L2	All MCs	854	4.4	854	4.4	0.814	42.6	LOS D	33.8	245.5	0.86	0.98	0.86	39.2
28	T1	All MCs	1496	4.6	1496	4.6	*0.878	66.2	LOS E	38.1	277.4	1.00	0.99	1.11	30.0
29	R2	All MCs	663	7.3	663	7.3	*0.880	78.1	LOS F	26.2	195.0	1.00	0.98	1.18	17.5
Approach			3013	5.1	3013	5.1	0.880	62.1	LOS E	38.1	277.4	0.96	0.99	1.06	28.1
SouthWest: Gilchrist Drive															
30	L2	All MCs	558	5.7	558	5.7	0.345	42.2	LOS C	15.9	116.3	0.84	0.73	0.84	16.8
31	T1	All MCs	644	2.3	644	2.3	*0.878	89.2	LOS F	25.9	185.1	1.00	1.00	1.14	23.1
32	R2	All MCs	53	0.0	53	0.0	0.714	119.1	LOS F	4.2	29.3	1.00	0.82	1.17	20.4
Approach			1256	3.7	1256	3.7	0.878	69.6	LOS E	25.9	185.1	0.93	0.87	1.01	19.5

All Vehicles	7420	4.5	7420	4.5	0.880	61.1	LOS E	38.1	277.4	0.93	0.91	1.00	25.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Narellan Road											
P7	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
SouthWest: Gilchrist Drive											
P8	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
P8B	Slip/Bypass	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		3	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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: 104 AMFB2 [104 AM - Goldsmith Av/Gilchrist Dr_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario FB2 - Future year base)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Gilchrist Drive															
25	T1	All MCs	1287	4.2	1287	4.2	0.450	10.6	LOS A	23.8	172.4	0.55	0.37	0.55	36.1
26	R2	All MCs	266	4.7	266	4.7	*0.618	41.6	LOS C	14.3	104.3	0.78	0.78	0.78	30.8
Approach			1554	4.3	1554	4.3	0.618	15.9	LOS B	23.8	172.4	0.59	0.44	0.59	33.9
NorthWest: Goldsmith Avenue															
27	L2	All MCs	230	4.6	230	4.6	0.287	33.4	LOS C	10.5	76.3	0.68	0.76	0.68	28.9
29	R2	All MCs	230	0.5	230	0.5	*0.621	65.0	LOS E	15.5	108.6	0.97	0.83	0.97	19.6
Approach			460	2.5	460	2.5	0.621	49.2	LOS D	15.5	108.6	0.82	0.80	0.82	23.3
SouthWest: Gilchrist Drive															
30	L2	All MCs	277	1.1	277	1.1	0.211	17.8	LOS B	6.6	47.0	0.36	0.68	0.36	46.6
31	T1	All MCs	1029	3.4	1029	3.4	*0.609	33.1	LOS C	29.3	210.7	0.80	0.71	0.80	26.8
Approach			1307	2.9	1307	2.9	0.609	29.8	LOS C	29.3	210.7	0.70	0.71	0.70	30.4
All Vehicles			3320	3.5	3320	3.5	0.621	26.0	LOS B	29.3	210.7	0.67	0.60	0.67	30.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Goldsmith Avenue											
P7	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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: 105 AMFB2 [105 AM - Kellicar Rd/ Gilchrist Dr_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario FB2 - Future year base)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gilchrist Drive															
1	L2	All MCs	115	7.3	115	7.3	0.089	17.1	LOS B	0.8	5.6	0.29	0.62	0.29	37.9
2	T1	All MCs	1080	2.0	1080	2.0	0.802	30.0	LOS C	19.5	139.1	0.96	0.93	1.09	17.6
3	R2	All MCs	161	5.9	161	5.9	*0.788	43.6	LOS D	6.1	44.7	1.00	0.94	1.29	21.9
Approach			1356	3.0	1356	3.0	0.802	30.5	LOS C	19.5	139.1	0.91	0.90	1.04	17.7
East: Kellicar Road															
4	L2	All MCs	113	6.5	113	6.5	0.064	6.7	LOS A	0.0	0.0	0.00	0.53	0.00	46.2
5	T1	All MCs	164	2.6	164	2.6	*0.428	34.1	LOS C	2.8	20.2	0.98	0.75	0.98	25.1
6	R2	All MCs	49	0.0	49	0.0	*0.308	40.4	LOS C	1.7	11.8	0.97	0.74	0.97	18.4
Approach			326	3.5	326	3.5	0.428	25.5	LOS B	2.8	20.2	0.64	0.67	0.64	29.0
North: Gilchrist Drive															
7	L2	All MCs	214	3.4	214	3.4	0.164	18.5	LOS B	1.5	11.0	0.31	0.64	0.31	48.2
8	T1	All MCs	1014	2.9	1014	2.9	*0.811	31.1	LOS C	19.9	142.7	0.96	0.94	1.11	34.1
9	R2	All MCs	266	5.9	266	5.9	0.652	40.7	LOS C	4.7	34.9	1.00	0.84	1.11	25.7
Approach			1494	3.5	1494	3.5	0.811	31.0	LOS C	19.9	142.7	0.88	0.88	1.00	31.5
West: Kellicar Road															
10	L2	All MCs	182	9.3	182	9.3	0.348	26.7	LOS B	5.0	37.5	0.83	0.78	0.83	13.3
11	T1	All MCs	97	5.4	97	5.4	0.257	33.3	LOS C	1.6	11.9	0.96	0.71	0.96	25.4
12	R2	All MCs	38	11.1	38	11.1	0.257	40.4	LOS C	1.3	10.0	0.97	0.73	0.97	16.9
Approach			317	8.3	317	8.3	0.348	30.3	LOS C	5.0	37.5	0.88	0.75	0.88	18.7

All Vehicles	3493	3.7	3493	3.7	0.811	30.2	LOS C	19.9	142.7	0.87	0.86	0.97	26.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Gilchrist Drive											
P1	Full	1	29.3	LOS C	0.0	0.0	0.91	0.91	44.6	20.0	0.45
East: Kellicar Road											
P2	Full	1	29.3	LOS C	0.0	0.0	0.91	0.91	44.6	20.0	0.45
North: Gilchrist Drive											
P3	Full	1	29.3	LOS C	0.0	0.0	0.91	0.91	44.6	20.0	0.45
West: Kellicar Road											
P4	Full	1	29.3	LOS C	0.0	0.0	0.91	0.91	44.6	20.0	0.45
All Pedestrians		4	29.3	LOS C	0.0	0.0	0.91	0.91	44.6	20.0	0.45

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

MOVEMENT SUMMARY

Site: 101 PMFB2 [101 PM - William Downes Av/ WSU Access_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario FB2 - Future year base)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Tafe Access South															
1	L2	All MCs	1	0.0	1	0.0	0.017	4.7	LOS A	0.1	0.6	0.32	0.45	0.32	51.6
2	T1	All MCs	18	0.0	18	0.0	0.017	5.0	LOS A	0.1	0.6	0.32	0.45	0.32	50.0
3	R2	All MCs	2	0.0	2	0.0	0.017	9.5	LOS A	0.1	0.6	0.32	0.45	0.32	52.6
Approach			21	0.0	21	0.0	0.017	5.4	LOS A	0.1	0.6	0.32	0.45	0.32	50.5
East: Tafe Access East															
4	L2	All MCs	1	0.0	1	0.0	0.034	4.6	LOS A	0.2	1.2	0.31	0.60	0.31	50.8
5	T1	All MCs	2	0.0	2	0.0	0.034	4.9	LOS A	0.2	1.2	0.31	0.60	0.31	49.4
6	R2	All MCs	39	0.0	39	0.0	0.034	9.5	LOS A	0.2	1.2	0.31	0.60	0.31	46.4
Approach			42	0.0	42	0.0	0.034	9.1	LOS A	0.2	1.2	0.31	0.60	0.31	46.7
North: Approach to Narellan Road															
7	L2	All MCs	54	0.0	54	0.0	0.098	3.3	LOS A	0.4	2.6	0.04	0.55	0.04	50.1
8	T1	All MCs	29	0.0	29	0.0	0.098	3.4	LOS A	0.4	2.6	0.04	0.55	0.04	50.8
9	R2	All MCs	195	0.5	195	0.5	0.098	8.0	LOS A	0.4	2.6	0.04	0.62	0.04	43.2
Approach			278	0.4	278	0.4	0.098	6.6	LOS A	0.4	2.6	0.04	0.60	0.04	45.7
West: William Downes Avenue															
10	L2	All MCs	361	0.9	361	0.9	0.139	3.9	LOS A	0.7	4.8	0.09	0.46	0.09	49.2
11	T1	All MCs	4	0.0	4	0.0	0.005	4.3	LOS A	0.0	0.1	0.16	0.48	0.16	52.1
12	R2	All MCs	2	0.0	2	0.0	0.005	9.0	LOS A	0.0	0.1	0.16	0.48	0.16	51.1
Approach			368	0.9	368	0.9	0.139	3.9	LOS A	0.7	4.8	0.10	0.46	0.10	49.3

All Vehicles	709	0.6	709	0.6	0.139	5.3	LOS A	0.7	4.8	0.09	0.52	0.09	47.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 PMFB2 [102 PM - Narellan Rd / WSU access_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario FB2 - Future year base)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 181 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: WSU Access															
1	L2	All MCs	349	0.9	349	0.9	0.505	90.9	LOS F	13.8	97.7	0.95	0.81	0.95	18.8
2	T1	All MCs	1	0.0	1	0.0	0.008	113.8	LOS F	0.1	0.6	0.95	0.56	0.95	7.2
3	R2	All MCs	88	0.0	88	0.0	0.179	80.0	LOS F	3.5	24.3	0.93	0.74	0.93	4.3
Approach			439	0.7	439	0.7	0.505	88.7	LOS F	13.8	97.7	0.94	0.80	0.94	14.8
East: Narellan Road															
4	L2	All MCs	45	0.0	45	0.0	0.032	21.6	LOS B	1.0	6.9	0.27	0.61	0.27	43.6
5	T1	All MCs	2371	3.8	2371	3.8	*0.724	35.3	LOS C	50.0	359.4	0.78	0.72	0.78	40.9
6	R2	All MCs	92	0.0	92	0.0	0.595	104.1	LOS F	8.0	56.1	1.00	0.79	1.00	16.4
Approach			2507	3.6	2507	3.6	0.724	37.6	LOS C	50.0	359.4	0.78	0.72	0.78	37.0
North: Bethlehem Monastery Access															
7	L2	All MCs	87	0.0	87	0.0	0.250	72.2	LOS F	6.5	45.8	0.90	0.77	0.90	4.4
8	T1	All MCs	1	0.0	1	0.0	*0.689	93.8	LOS F	14.5	101.6	1.00	0.83	1.02	4.3
9	R2	All MCs	338	0.0	338	0.0	*0.689	87.2	LOS F	14.5	101.8	1.00	0.83	1.02	17.5
Approach			426	0.0	426	0.0	0.689	84.1	LOS F	14.5	101.8	0.98	0.82	0.99	15.7
West: Narellan Road															
10	L2	All MCs	83	0.0	83	0.0	0.051	10.5	LOS A	0.6	4.2	0.12	0.58	0.12	48.4
11	T1	All MCs	1718	4.5	1718	4.5	0.526	25.4	LOS B	30.1	218.7	0.65	0.59	0.65	34.2
12	R2	All MCs	239	0.4	239	0.4	*0.779	98.9	LOS F	10.9	76.9	1.00	0.89	1.13	14.7
Approach			2041	3.9	2041	3.9	0.779	33.4	LOS C	30.1	218.7	0.67	0.63	0.69	29.3

All Vehicles	5413	3.2	5413	3.2	0.779	43.8	LOS D	50.0	359.4	0.77	0.70	0.78	30.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: WSU Access											
P1	Full	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P1B	Slip/Bypass	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
East: Narellan Road											
P21	Stage 1	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P22	Stage 2	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P2B	Slip/Bypass	1	49.0	LOS E	0.0	0.0	0.93	0.93	64.4	20.0	0.31
North: Bethlehem Monastery Access											
P3	Full	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
West: Narellan Road											
P41	Stage 1	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P42	Stage 2	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
All Pedestrians		8	80.1	LOS F	0.0	0.0	0.96	0.96	95.5	20.0	0.21

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: 103 PMFB2 [103 PM - Narellan Rd/ Blaxland Rd/ Gilchrist Dr_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario FB2 - Future year base)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Narellan Road															
21	L2	All MCs	35	0.0	35	0.0	0.040	50.6	LOS D	1.0	6.9	0.47	0.65	0.47	38.0
22	T1	All MCs	1051	2.8	1051	2.8	*0.872	76.8	LOS F	26.1	187.1	1.00	1.01	1.17	19.5
23	R2	All MCs	573	1.3	573	1.3	*0.872	75.8	LOS F	21.2	150.1	1.00	0.97	1.20	26.5
Approach			1659	2.2	1659	2.2	0.872	75.9	LOS F	26.1	187.1	0.99	0.99	1.16	21.3
NorthEast: Blaxland Road															
24	L2	All MCs	548	3.1	548	3.1	0.491	23.8	LOS B	20.3	145.6	0.60	0.80	0.60	43.0
25	T1	All MCs	1064	2.6	1064	2.6	0.781	41.3	LOS C	34.8	249.2	0.94	0.86	0.95	26.6
26	R2	All MCs	720	2.2	720	2.2	*0.889	74.2	LOS F	26.9	192.1	1.00	0.99	1.20	18.0
Approach			2332	2.6	2332	2.6	0.889	47.3	LOS D	34.8	249.2	0.88	0.88	0.94	26.8
NorthWest: Narellan Road															
27	L2	All MCs	510	5.4	510	5.4	0.513	25.2	LOS B	17.9	131.1	0.67	0.87	0.67	41.3
28	T1	All MCs	994	5.0	994	5.0	0.819	61.2	LOS E	23.2	169.0	1.00	0.94	1.10	30.2
29	R2	All MCs	365	5.8	365	5.8	0.573	63.0	LOS E	11.6	85.0	0.97	0.82	0.97	20.2
Approach			1870	5.2	1870	5.2	0.819	51.8	LOS D	23.2	169.0	0.90	0.90	0.96	31.0
SouthWest: Gilchrist Drive															
30	L2	All MCs	584	4.8	584	4.8	0.373	41.9	LOS C	15.9	115.8	0.86	0.75	0.86	16.9
31	T1	All MCs	712	1.9	712	1.9	*0.882	83.7	LOS F	26.4	188.0	1.00	1.01	1.15	24.2
32	R2	All MCs	27	0.0	27	0.0	0.345	102.0	LOS F	1.8	12.8	0.94	0.70	0.94	23.0
Approach			1324	3.1	1324	3.1	0.882	65.7	LOS E	26.4	188.0	0.94	0.89	1.02	20.3

All Vehicles	7185	3.3	7185	3.3	0.889	58.5	LOS E	34.8	249.2	0.92	0.91	1.01	25.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Narellan Road											
P7	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
SouthWest: Gilchrist Drive											
P8	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
P8B	Slip/Bypass	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
All Pedestrians		3	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25

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: 104 PMFB2 [104 PM - Goldsmith Av/Gilchrist Dr_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario FB2 - Future year base)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Gilchrist Drive															
25	T1	All MCs	1377	3.4	1377	3.4	0.505	12.5	LOS A	26.1	188.1	0.60	0.45	0.60	33.6
26	R2	All MCs	135	2.3	135	2.3	0.469	48.2	LOS D	7.0	50.2	0.79	0.75	0.79	28.7
Approach			1512	3.3	1512	3.3	0.505	15.7	LOS B	26.1	188.1	0.62	0.47	0.62	32.4
NorthWest: Goldsmith Avenue															
27	L2	All MCs	177	4.2	177	4.2	*0.625	66.0	LOS E	11.5	83.4	0.99	0.82	0.99	19.2
29	R2	All MCs	278	0.0	278	0.0	*0.635	57.6	LOS E	17.1	119.8	0.96	0.84	0.96	21.3
Approach			455	1.6	455	1.6	0.635	60.8	LOS E	17.1	119.8	0.97	0.83	0.97	20.4
SouthWest: Gilchrist Drive															
30	L2	All MCs	200	1.6	200	1.6	0.462	60.7	LOS E	11.7	83.2	0.91	0.81	0.91	29.3
31	T1	All MCs	1187	3.3	1187	3.3	*0.628	28.5	LOS C	29.7	213.5	0.77	0.70	0.77	29.5
Approach			1387	3.0	1387	3.0	0.628	33.1	LOS C	29.7	213.5	0.79	0.71	0.79	28.0
All Vehicles			3354	3.0	3354	3.0	0.635	29.0	LOS C	29.7	213.5	0.74	0.62	0.74	27.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Goldsmith Avenue											
P7	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
All Pedestrians		1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25

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: 105 PMFB2 [105 PM - Kellicar Rd/ Gilchrist Dr_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario FB2 - Future year base)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gilchrist Drive															
1	L2	All MCs	150	4.9	150	4.9	0.116	29.6	LOS C	2.5	18.4	0.28	0.63	0.28	35.2
2	T1	All MCs	851	1.5	851	1.5	0.570	42.7	LOS D	25.8	183.1	0.81	0.71	0.81	14.2
3	R2	All MCs	197	4.8	197	4.8	0.785	77.4	LOS F	14.8	107.7	1.00	0.90	1.11	15.0
Approach			1198	2.5	1198	2.5	0.785	46.7	LOS D	25.8	183.1	0.77	0.73	0.79	13.7
East: Kellicar Road															
4	L2	All MCs	291	2.2	291	2.2	0.159	7.0	LOS A	0.0	0.0	0.00	0.69	0.00	46.6
5	T1	All MCs	455	0.0	455	0.0	0.760	84.5	LOS F	16.6	116.0	1.00	0.97	1.07	15.8
6	R2	All MCs	90	0.0	90	0.0	0.429	73.8	LOS F	6.3	44.0	0.98	0.78	0.98	11.7
Approach			835	0.8	835	0.8	0.760	67.5	LOS E	16.6	116.0	0.65	0.85	0.69	16.0
North: Gilchrist Drive															
7	L2	All MCs	280	3.8	280	3.8	0.235	45.4	LOS D	7.0	50.7	0.40	0.67	0.40	44.3
8	T1	All MCs	1149	1.1	1149	1.1	*0.864	72.5	LOS F	46.7	330.3	0.98	0.94	1.05	25.1
9	R2	All MCs	188	12.9	188	12.9	0.395	79.2	LOS F	6.4	49.6	0.96	0.78	0.96	18.4
Approach			1618	2.9	1618	2.9	0.864	68.6	LOS E	46.7	330.3	0.87	0.87	0.93	20.3
West: Kellicar Road															
10	L2	All MCs	455	6.9	455	6.9	*0.859	80.6	LOS F	33.8	250.3	1.00	0.93	1.10	6.4
11	T1	All MCs	312	1.7	312	1.7	0.527	72.2	LOS F	10.6	75.4	0.97	0.79	0.97	16.7
12	R2	All MCs	178	3.6	178	3.6	*0.867	86.2	LOS F	14.2	102.3	1.00	0.96	1.24	9.7
Approach			944	4.6	944	4.6	0.867	78.9	LOS F	33.8	250.3	0.99	0.89	1.09	9.5

All Vehicles	4596	2.7	4596	2.7	0.867	62.8	LOS E	46.7	330.3	0.83	0.84	0.88	15.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Gilchrist Drive											
P1	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
East: Kellicar Road											
P2	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
North: Gilchrist Drive											
P3	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
West: Kellicar Road											
P4	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		4	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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

MOVEMENT SUMMARY

Site: 101 AMD0 [101 AM - William Downes Av/ WSU Access_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D0 - Future year with dev (approved MP))]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Tafe Access South															
1	L2	All MCs	1	0.0	1	0.0	0.016	6.3	LOS A	0.1	0.6	0.52	0.51	0.52	50.7
2	T1	All MCs	14	0.0	14	0.0	0.016	6.5	LOS A	0.1	0.6	0.52	0.51	0.52	48.7
3	R2	All MCs	1	0.0	1	0.0	0.016	11.1	LOS A	0.1	0.6	0.52	0.51	0.52	51.8
Approach			16	0.0	16	0.0	0.016	6.8	LOS A	0.1	0.6	0.52	0.51	0.52	49.2
East: Tafe Access East															
4	L2	All MCs	1	0.0	1	0.0	0.054	6.2	LOS A	0.3	2.1	0.52	0.65	0.52	50.1
5	T1	All MCs	3	0.0	3	0.0	0.054	6.5	LOS A	0.3	2.1	0.52	0.65	0.52	48.5
6	R2	All MCs	47	2.2	47	2.2	0.054	11.2	LOS A	0.3	2.1	0.52	0.65	0.52	45.2
Approach			52	2.0	52	2.0	0.054	10.8	LOS A	0.3	2.1	0.52	0.65	0.52	45.7
North: Approach to Narellan Road															
7	L2	All MCs	171	0.6	170	0.6	0.270	3.3	LOS A	1.3	8.9	0.03	0.54	0.03	50.4
8	T1	All MCs	81	0.0	81	0.0	0.270	3.4	LOS A	1.3	8.9	0.03	0.54	0.03	51.1
9	R2	All MCs	520	1.4	520	1.4	0.270	7.9	LOS A	1.3	8.9	0.03	0.62	0.03	43.0
Approach			772	1.1	771	1.1	0.270	6.4	LOS A	1.3	8.9	0.03	0.59	0.03	45.8
West: William Downes Avenue															
10	L2	All MCs	327	1.0	327	1.0	0.100	3.9	LOS A	0.5	3.5	0.08	0.46	0.08	49.3
11	T1	All MCs	1	0.0	1	0.0	0.002	4.3	LOS A	0.0	0.1	0.18	0.55	0.18	50.8
12	R2	All MCs	2	0.0	2	0.0	0.002	9.0	LOS A	0.0	0.1	0.18	0.55	0.18	49.9
Approach			331	1.0	331	1.0	0.100	3.9	LOS A	0.5	3.5	0.08	0.46	0.08	49.3

All Vehicles	1169	1.1	1169	1.1	0.270	5.9	LOS A	1.3	8.9	0.07	0.56	0.07	46.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 AMD0 [102 AM - Narellan Rd / WSU access_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D0 - Future year with dev (approved MP))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: WSU Access															
1	L2	All MCs	301	1.4	301	1.4	0.236	32.6	LOS C	6.6	47.0	0.75	0.75	0.75	30.3
2	T1	All MCs	1	0.0	1	0.0	0.016	78.2	LOS F	0.1	0.5	0.98	0.58	0.98	7.6
3	R2	All MCs	88	0.0	88	0.0	*0.714	90.2	LOS F	3.5	24.7	1.00	0.82	1.18	3.8
Approach			391	1.1	391	1.1	0.714	45.8	LOS D	6.6	47.0	0.81	0.76	0.85	22.7
East: Narellan Road															
4	L2	All MCs	97	1.1	96	1.1	0.109	12.8	LOS A	1.3	9.2	0.20	0.60	0.20	42.6
5	T1	All MCs	1801	7.9	1794	7.9	0.663	16.2	LOS B	26.5	196.5	0.58	0.52	0.58	47.6
6	R2	All MCs	139	0.0	138	0.0	*0.799	87.7	LOS F	10.6	74.5	1.00	0.88	1.09	17.2
Approach			2037	7.0	2029	7.0	0.799	20.9	LOS B	26.5	196.5	0.59	0.55	0.60	44.2
North: Bethlehem Monastery Access															
7	L2	All MCs	7	0.0	7	0.0	0.030	60.0	LOS E	0.5	3.2	0.89	0.65	0.89	5.2
8	T1	All MCs	1	0.0	1	0.0	*0.800	85.8	LOS F	4.8	33.4	1.00	0.87	1.27	4.1
9	R2	All MCs	118	0.0	118	0.0	0.800	91.0	LOS F	4.8	33.4	1.00	0.87	1.27	17.0
Approach			126	0.0	126	0.0	0.800	89.1	LOS F	4.8	33.4	0.99	0.86	1.25	16.6
West: Narellan Road															
10	L2	All MCs	525	0.0	525	0.0	0.327	10.3	LOS A	6.0	42.3	0.20	0.61	0.20	47.6
11	T1	All MCs	3186	4.1	3186	4.1	*0.814	14.3	LOS A	53.4	386.5	0.71	0.65	0.71	42.3
12	R2	All MCs	672	1.1	672	1.1	0.582	37.8	LOS C	16.7	118.1	0.89	0.82	0.89	27.5
Approach			4383	3.1	4383	3.1	0.814	17.4	LOS B	53.4	386.5	0.68	0.67	0.68	38.8

All Vehicles	6937	4.1	6929	4.1	0.814	21.3	LOS B	53.4	386.5	0.67	0.65	0.68	38.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: WSU Access											
P1	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
P1B	Slip/Bypass	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
East: Narellan Road											
P21	Stage 1	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
P22	Stage 2	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
P2B	Slip/Bypass	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
North: Bethlehem Monastery Access											
P3	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
West: Narellan Road											
P41	Stage 1	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
P42	Stage 2	1	42.9	LOS E	0.0	0.0	0.92	0.92	58.3	20.0	0.34
All Pedestrians		8	65.9	LOS F	0.0	0.0	0.96	0.96	81.2	20.0	0.25

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: 103 AMD0 [103 AM - Narellan Rd/ Blaxland Rd/ Gilchrist Dr_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D0 - Future year with dev (approved MP))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Narellan Road															
21	L2	All MCs	26	8.0	26	8.0	0.035	66.7	LOS E	1.0	7.7	0.61	0.66	0.61	31.3
22	T1	All MCs	999	6.2	999	6.2	0.935	96.8	LOS F	29.0	213.8	1.00	1.11	1.29	16.4
23	R2	All MCs	412	1.8	412	1.8	0.732	73.3	LOS F	14.9	105.6	1.00	0.86	1.05	27.0
Approach			1437	5.0	1437	5.0	0.935	89.5	LOS F	29.0	213.8	0.99	1.03	1.21	18.6
NorthEast: Blaxland Road															
24	L2	All MCs	528	1.4	528	1.4	0.643	34.0	LOS C	19.9	140.7	0.83	0.95	0.83	41.3
25	T1	All MCs	1020	1.4	1020	1.4	* 1.013	114.2	LOS F	57.2	405.0	1.00	1.33	1.44	13.5
26	R2	All MCs	378	10.0	378	10.0	* 1.022	133.4	LOS F	19.0	144.3	1.00	1.18	1.62	11.6
Approach			1926	3.1	1926	3.1	1.022	96.0	LOS F	57.2	405.0	0.95	1.20	1.31	17.5
NorthWest: Narellan Road															
27	L2	All MCs	915	4.1	915	4.1	0.960	70.0	LOS E	60.7	440.1	1.00	1.16	1.18	30.2
28	T1	All MCs	1627	4.2	1627	4.2	* 1.017	118.5	LOS F	54.4	390.5	1.00	1.29	1.40	21.0
29	R2	All MCs	733	6.6	733	6.6	* 0.999	90.4	LOS F	28.2	208.5	1.00	1.08	1.40	15.7
Approach			3275	4.7	3275	4.7	1.017	98.7	LOS F	60.7	440.1	1.00	1.21	1.34	21.4
SouthWest: Gilchrist Drive															
30	L2	All MCs	589	5.4	589	5.4	0.305	15.4	LOS B	6.5	47.9	0.55	0.72	0.55	31.0
31	T1	All MCs	742	2.0	742	2.0	0.687	58.5	LOS E	24.5	174.2	0.92	0.80	0.92	30.2
32	R2	All MCs	60	0.0	60	0.0	0.303	105.5	LOS F	4.4	30.9	1.00	0.79	1.00	21.8
Approach			1392	3.3	1392	3.3	0.687	42.3	LOS C	24.5	174.2	0.77	0.76	0.77	26.8

All Vehicles	8029	4.1	8029	4.1	1.022	86.6	LOS F	60.7	440.1	0.95	1.10	1.21	20.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Narellan Road											
P7	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
SouthWest: Gilchrist Drive											
P8	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
P8B	Slip/Bypass	1	32.5	LOS D	0.0	0.0	0.92	0.92	47.9	20.0	0.42
All Pedestrians		3	56.9	LOS E	0.0	0.0	0.95	0.95	72.3	20.0	0.28

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: 104 AMD0 [104 AM - Goldsmith Av/Gilchrist Dr_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D0 - Future year with dev (approved MP))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Gilchrist Drive															
25	T1	All MCs	1438	3.7	1428	3.7	0.511	5.2	LOS A	16.4	118.3	0.33	0.30	0.33	45.2
26	R2	All MCs	381	3.3	378	3.3	* 0.763	38.0	LOS C	21.5	154.9	0.83	0.82	0.83	32.0
Approach			1819	3.6	1806	3.7	0.763	12.1	LOS A	21.5	154.9	0.43	0.41	0.43	38.4
NorthWest: Goldsmith Avenue															
27	L2	All MCs	297	3.5	297	3.5	0.328	29.2	LOS C	12.7	91.8	0.64	0.76	0.64	30.9
29	R2	All MCs	311	0.3	311	0.3	* 0.762	66.5	LOS E	21.8	153.2	1.00	0.87	1.04	19.3
Approach			607	1.9	607	1.9	0.762	48.3	LOS D	21.8	153.2	0.82	0.82	0.84	23.6
SouthWest: Gilchrist Drive															
30	L2	All MCs	380	0.8	380	0.8	0.303	24.0	LOS B	10.9	76.9	0.43	0.71	0.43	45.0
31	T1	All MCs	1099	3.2	1099	3.2	* 0.781	43.8	LOS D	39.0	280.7	0.93	0.84	0.94	23.0
Approach			1479	2.6	1479	2.6	0.781	38.7	LOS C	39.0	280.7	0.80	0.81	0.81	27.2
All Vehicles			3905	3.0	3892	3.0	0.781	27.8	LOS B	39.0	280.7	0.63	0.62	0.64	29.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Goldsmith Avenue											
P7	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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: 105 AMD0 [105 AM - Kellicar Rd/ Gilchrist Dr_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D0 - Future year with dev (approved MP))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gilchrist Drive															
1	L2	All MCs	138	6.1	138	6.1	0.108	20.0	LOS B	1.2	8.5	0.30	0.63	0.30	37.4
2	T1	All MCs	1205	1.8	1205	1.8	0.816	32.6	LOS C	24.7	175.8	0.95	0.93	1.06	16.8
3	R2	All MCs	199	4.8	199	4.8	*0.806	47.5	LOS D	8.5	62.0	1.00	0.96	1.26	20.8
Approach			1542	2.6	1542	2.6	0.816	33.4	LOS C	24.7	175.8	0.90	0.90	1.02	16.8
East: Kellicar Road															
4	L2	All MCs	125	5.9	125	5.9	0.070	6.8	LOS A	0.0	0.0	0.00	0.53	0.00	46.3
5	T1	All MCs	181	2.3	181	2.3	*0.539	40.3	LOS C	3.6	25.9	1.00	0.77	1.01	22.7
6	R2	All MCs	54	0.0	54	0.0	*0.385	46.5	LOS D	2.2	15.1	0.99	0.74	0.99	16.7
Approach			360	3.2	360	3.2	0.539	29.6	LOS C	3.6	25.9	0.65	0.68	0.66	26.9
North: Gilchrist Drive															
7	L2	All MCs	236	3.1	234	3.1	0.180	21.3	LOS B	2.1	15.2	0.32	0.64	0.32	47.8
8	T1	All MCs	1140	2.6	1133	2.6	*0.826	34.1	LOS C	25.2	180.3	0.96	0.94	1.09	33.1
9	R2	All MCs	349	4.5	347	4.5	0.702	44.5	LOS D	7.0	51.0	1.00	0.87	1.12	24.5
Approach			1725	3.1	1715	3.1	0.826	34.5	LOS C	25.2	180.3	0.88	0.89	0.99	29.9
West: Kellicar Road															
10	L2	All MCs	225	7.5	225	7.5	0.426	30.2	LOS C	7.2	53.5	0.85	0.80	0.85	12.0
11	T1	All MCs	106	5.0	106	5.0	0.322	39.3	LOS C	2.1	15.1	0.98	0.73	0.98	23.1
12	R2	All MCs	43	9.8	43	9.8	0.331	46.5	LOS D	1.7	13.1	0.98	0.73	0.98	15.4
Approach			375	7.0	375	7.0	0.426	34.6	LOS C	7.2	53.5	0.90	0.77	0.90	16.7

All Vehicles	4002	3.3	3992	3.3	0.826	33.6	LOS C	25.2	180.3	0.87	0.86	0.96	24.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Gilchrist Drive											
P1	Full	1	34.2	LOS D	0.0	0.0	0.93	0.93	49.6	20.0	0.40
East: Kellicar Road											
P2	Full	1	34.2	LOS D	0.0	0.0	0.93	0.93	49.6	20.0	0.40
North: Gilchrist Drive											
P3	Full	1	34.2	LOS D	0.0	0.0	0.93	0.93	49.6	20.0	0.40
West: Kellicar Road											
P4	Full	1	34.2	LOS D	0.0	0.0	0.93	0.93	49.6	20.0	0.40
All Pedestrians		4	34.2	LOS D	0.0	0.0	0.93	0.93	49.6	20.0	0.40

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

MOVEMENT SUMMARY

Site: 101 PMD0 [101 PM - William Downes Av/ WSU Access_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D0 - Future year with dev (approved MP))]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Tafe Access South															
1	L2	All MCs	1	0.0	1	0.0	0.018	4.9	LOS A	0.1	0.6	0.36	0.46	0.36	51.5
2	T1	All MCs	18	0.0	18	0.0	0.018	5.1	LOS A	0.1	0.6	0.36	0.46	0.36	49.8
3	R2	All MCs	2	0.0	2	0.0	0.018	9.7	LOS A	0.1	0.6	0.36	0.46	0.36	52.4
Approach			21	0.0	21	0.0	0.018	5.6	LOS A	0.1	0.6	0.36	0.46	0.36	50.3
East: Tafe Access East															
4	L2	All MCs	1	0.0	1	0.0	0.035	4.8	LOS A	0.2	1.2	0.34	0.60	0.34	50.7
5	T1	All MCs	2	0.0	2	0.0	0.035	5.1	LOS A	0.2	1.2	0.34	0.60	0.34	49.3
6	R2	All MCs	39	0.0	39	0.0	0.035	9.6	LOS A	0.2	1.2	0.34	0.60	0.34	46.2
Approach			42	0.0	42	0.0	0.035	9.3	LOS A	0.2	1.2	0.34	0.60	0.34	46.6
North: Approach to Narellan Road															
7	L2	All MCs	54	0.0	54	0.0	0.115	3.3	LOS A	0.4	3.1	0.04	0.57	0.04	49.7
8	T1	All MCs	29	0.0	29	0.0	0.115	3.4	LOS A	0.4	3.1	0.04	0.57	0.04	50.4
9	R2	All MCs	245	0.4	245	0.4	0.115	8.0	LOS A	0.4	3.1	0.04	0.62	0.04	43.2
Approach			328	0.3	328	0.3	0.115	6.8	LOS A	0.4	3.1	0.04	0.61	0.04	45.2
West: William Downes Avenue															
10	L2	All MCs	424	0.7	424	0.7	0.132	3.9	LOS A	0.6	4.5	0.08	0.46	0.08	49.3
11	T1	All MCs	4	0.0	4	0.0	0.005	4.3	LOS A	0.0	0.1	0.16	0.48	0.16	52.1
12	R2	All MCs	2	0.0	2	0.0	0.005	9.0	LOS A	0.0	0.1	0.16	0.48	0.16	51.1
Approach			431	0.7	431	0.7	0.132	3.9	LOS A	0.6	4.5	0.08	0.46	0.08	49.4

All Vehicles	822	0.5	822	0.5	0.132	5.4	LOS A	0.6	4.5	0.08	0.53	0.08	47.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 PMD0 [102 PM - Narellan Rd / WSU access_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D0 - Future year with dev (approved MP))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: WSU Access															
1	L2	All MCs	399	0.8	399	0.8	0.540	50.1	LOS D	9.7	68.6	0.95	0.86	0.95	25.5
2	T1	All MCs	1	0.0	1	0.0	0.013	79.1	LOS F	0.1	0.5	0.97	0.57	0.97	8.3
3	R2	All MCs	102	0.0	102	0.0	*0.641	81.8	LOS F	3.7	26.0	1.00	0.80	1.10	4.2
Approach			502	0.6	502	0.6	0.641	56.6	LOS E	9.7	68.6	0.96	0.84	0.98	20.2
East: Narellan Road															
4	L2	All MCs	47	0.0	47	0.0	0.041	22.1	LOS B	0.8	5.6	0.43	0.64	0.43	43.8
5	T1	All MCs	2565	3.5	2565	3.5	*0.872	51.9	LOS D	58.7	421.4	0.98	0.90	1.01	34.7
6	R2	All MCs	92	0.0	92	0.0	*0.863	89.2	LOS F	6.7	47.1	1.00	0.88	1.20	18.5
Approach			2704	3.3	2704	3.3	0.872	52.7	LOS D	58.7	421.4	0.97	0.89	1.01	32.1
North: Bethlehem Monastery Access															
7	L2	All MCs	87	0.0	87	0.0	0.286	47.2	LOS D	4.6	31.9	0.92	0.76	0.92	6.5
8	T1	All MCs	1	0.0	1	0.0	*0.852	74.9	LOS F	12.5	87.8	1.00	0.96	1.23	4.6
9	R2	All MCs	338	0.0	338	0.0	0.852	80.1	LOS F	12.5	87.8	1.00	0.96	1.23	18.6
Approach			426	0.0	426	0.0	0.852	73.3	LOS F	12.5	87.8	0.98	0.92	1.17	17.3
West: Narellan Road															
10	L2	All MCs	83	0.0	83	0.0	0.054	7.1	LOS A	0.8	5.7	0.19	0.59	0.19	47.6
11	T1	All MCs	1853	4.2	1853	4.2	0.524	15.7	LOS B	23.2	167.9	0.61	0.55	0.61	40.2
12	R2	All MCs	286	0.4	286	0.4	*0.676	45.3	LOS D	7.0	49.0	1.00	0.81	1.04	24.8
Approach			2222	3.6	2222	3.6	0.676	19.2	LOS B	23.2	167.9	0.64	0.59	0.65	37.5

All Vehicles	5855	2.9	5855	2.9	0.872	41.8	LOS C	58.7	421.4	0.85	0.77	0.88	30.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: WSU Access											
P1	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
P1B	Slip/Bypass	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
East: Narellan Road											
P21	Stage 1	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
P22	Stage 2	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
P2B	Slip/Bypass	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
North: Bethlehem Monastery Access											
P3	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
West: Narellan Road											
P41	Stage 1	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
P42	Stage 2	1	33.0	LOS D	0.0	0.0	0.91	0.91	48.4	20.0	0.41
All Pedestrians		8	60.2	LOS F	0.0	0.0	0.95	0.95	75.6	20.0	0.26

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: 103 PMD0 [103 PM - Narellan Rd/ Blaxland Rd/ Gilchrist Dr_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D0 - Future year with dev (approved MP))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Narellan Road															
21	L2	All MCs	38	0.0	38	0.0	0.072	67.6	LOS E	1.6	11.2	0.66	0.69	0.66	29.6
22	T1	All MCs	1141	2.6	1141	2.6	*0.985	108.0	LOS F	35.0	250.4	1.00	1.23	1.43	14.9
23	R2	All MCs	614	1.2	614	1.2	*0.972	99.5	LOS F	26.7	188.6	1.00	1.11	1.42	22.7
Approach			1793	2.1	1793	2.1	0.985	104.2	LOS F	35.0	250.4	0.99	1.18	1.41	17.2
NorthEast: Blaxland Road															
24	L2	All MCs	555	3.0	555	3.0	0.480	19.7	LOS B	19.4	139.6	0.57	0.76	0.57	43.9
25	T1	All MCs	1183	2.3	1183	2.3	*0.967	76.7	LOS F	60.2	429.9	1.00	1.20	1.30	17.7
26	R2	All MCs	774	2.0	774	2.0	0.925	80.5	LOS F	30.6	218.0	1.00	1.04	1.26	17.0
Approach			2512	2.4	2512	2.4	0.967	65.3	LOS E	60.2	429.9	0.90	1.05	1.13	22.1
NorthWest: Narellan Road															
27	L2	All MCs	541	5.1	541	5.1	0.553	15.2	LOS B	11.5	84.1	0.42	0.81	0.42	46.6
28	T1	All MCs	1068	4.6	1068	4.6	0.908	38.7	LOS C	23.5	173.0	0.97	0.89	1.05	36.9
29	R2	All MCs	407	5.2	407	5.2	0.797	76.5	LOS F	15.5	113.4	1.00	0.91	1.07	17.7
Approach			2017	4.9	2017	4.9	0.908	40.1	LOS C	23.5	173.0	0.83	0.87	0.88	34.7
SouthWest: Gilchrist Drive															
30	L2	All MCs	635	4.1	635	4.1	0.404	44.2	LOS D	17.9	130.1	0.90	0.74	0.90	16.3
31	T1	All MCs	760	1.8	760	1.8	0.911	87.8	LOS F	29.1	206.9	1.00	1.05	1.19	23.3
32	R2	All MCs	28	0.0	28	0.0	*0.536	108.1	LOS F	2.1	14.4	0.99	0.71	1.01	21.7
Approach			1423	2.8	1423	2.8	0.911	68.7	LOS E	29.1	206.9	0.95	0.91	1.06	19.6

All Vehicles	7744	3.0	7744	3.0	0.985	68.4	LOS E	60.2	429.9	0.91	1.01	1.12	23.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Narellan Road											
P7	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
SouthWest: Gilchrist Drive											
P8	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
P8B	Slip/Bypass	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
All Pedestrians		3	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25

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: 104 PMD0 [104 PM - Goldsmith Av/Gilchrist Dr_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D0 - Future year with dev (approved MP))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Gilchrist Drive															
25	T1	All MCs	1499	3.1	1499	3.1	0.697	28.9	LOS C	46.4	333.2	0.90	0.66	0.90	21.3
26	R2	All MCs	176	1.8	176	1.8	0.671	57.2	LOS E	10.8	77.0	0.93	0.80	0.94	26.3
Approach			1675	3.0	1675	3.0	0.697	31.9	LOS C	46.4	333.2	0.90	0.68	0.90	22.4
NorthWest: Goldsmith Avenue															
27	L2	All MCs	207	3.6	207	3.6	*0.801	73.5	LOS F	14.7	105.9	1.00	0.90	1.13	17.8
29	R2	All MCs	384	0.0	384	0.0	*0.808	56.9	LOS E	25.5	178.6	0.98	0.91	1.05	21.4
Approach			592	1.2	592	1.2	0.808	62.7	LOS E	25.5	178.6	0.99	0.91	1.08	20.0
SouthWest: Gilchrist Drive															
30	L2	All MCs	252	1.3	252	1.3	0.425	57.1	LOS E	13.4	94.9	0.84	0.81	0.84	32.0
31	T1	All MCs	1260	3.1	1260	3.1	*0.801	41.7	LOS C	39.5	283.9	0.93	0.85	0.94	24.4
Approach			1512	2.8	1512	2.8	0.801	44.3	LOS D	39.5	283.9	0.92	0.84	0.92	24.1
All Vehicles			3778	2.6	3778	2.6	0.808	41.7	LOS C	46.4	333.2	0.92	0.78	0.94	22.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Goldsmith Avenue											
P7	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
All Pedestrians		1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25

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: 105 PMD0 [105 PM - Kellicar Rd/ Gilchrist Dr_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D0 - Future year with dev (approved MP))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gilchrist Drive															
1	L2	All MCs	163	4.5	163	4.5	0.141	32.7	LOS C	3.2	23.3	0.33	0.64	0.33	33.6
2	T1	All MCs	913	1.4	913	1.4	0.615	44.3	LOS D	28.7	203.0	0.83	0.74	0.83	13.9
3	R2	All MCs	219	4.3	219	4.3	0.829	79.4	LOS F	16.8	121.9	1.00	0.93	1.15	14.8
Approach			1295	2.3	1295	2.3	0.829	48.7	LOS D	28.7	203.0	0.80	0.76	0.82	13.3
East: Kellicar Road															
4	L2	All MCs	341	1.9	341	1.9	0.186	7.3	LOS A	0.0	0.0	0.00	0.72	0.00	46.7
5	T1	All MCs	509	0.0	509	0.0	0.856	93.8	LOS F	19.9	139.2	1.00	1.05	1.17	14.8
6	R2	All MCs	97	0.0	97	0.0	0.489	77.0	LOS F	6.8	47.9	0.99	0.78	0.99	11.5
Approach			947	0.7	947	0.7	0.856	74.0	LOS F	19.9	139.2	0.64	0.90	0.73	15.0
North: Gilchrist Drive															
7	L2	All MCs	313	3.4	313	3.4	0.308	48.1	LOS D	9.0	64.9	0.47	0.70	0.47	43.3
8	T1	All MCs	1269	1.0	1269	1.0	*0.975	108.6	LOS F	67.1	473.5	1.00	1.19	1.29	18.0
9	R2	All MCs	263	9.2	263	9.2	0.515	81.8	LOS F	9.0	68.3	0.97	0.80	0.97	18.4
Approach			1845	2.6	1845	2.6	0.975	94.5	LOS F	67.1	473.5	0.91	1.05	1.10	16.2
West: Kellicar Road															
10	L2	All MCs	509	6.2	509	6.2	*0.955	107.6	LOS F	45.4	334.6	1.00	1.05	1.27	4.8
11	T1	All MCs	325	1.6	325	1.6	0.550	74.8	LOS F	11.1	79.0	0.98	0.80	0.98	16.6
12	R2	All MCs	182	3.5	182	3.5	*0.942	99.0	LOS F	15.8	114.0	1.00	1.04	1.40	8.6
Approach			1017	4.2	1017	4.2	0.955	95.5	LOS F	45.4	334.6	0.99	0.97	1.20	8.0

All Vehicles	5104	2.5	5104	2.5	0.975	76.9	LOS F	67.1	473.5	0.85	0.93	0.98	13.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Gilchrist Drive											
P1	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
East: Kellicar Road											
P2	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
North: Gilchrist Drive											
P3	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
West: Kellicar Road											
P4	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		4	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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

MOVEMENT SUMMARY

Site: 101 AMD1 [101 AM - William Downes Av/ WSU Access_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D1 - Future with development)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Tafe Access South															
1	L2	All MCs	1	0.0	1	0.0	0.016	6.4	LOS A	0.1	0.7	0.54	0.50	0.54	50.6
2	T1	All MCs	14	0.0	14	0.0	0.016	6.6	LOS A	0.1	0.7	0.54	0.50	0.54	48.6
3	R2	All MCs	1	0.0	1	0.0	0.016	11.2	LOS A	0.1	0.7	0.54	0.50	0.54	51.7
Approach			16	0.0	16	0.0	0.016	6.9	LOS A	0.1	0.7	0.54	0.50	0.54	49.1
East: Tafe Access East															
4	L2	All MCs	1	0.0	1	0.0	0.054	6.3	LOS A	0.3	2.3	0.54	0.64	0.54	50.0
5	T1	All MCs	3	0.0	3	0.0	0.054	6.6	LOS A	0.3	2.3	0.54	0.64	0.54	48.5
6	R2	All MCs	47	2.2	47	2.2	0.054	11.3	LOS A	0.3	2.3	0.54	0.64	0.54	45.1
Approach			52	2.0	52	2.0	0.054	10.9	LOS A	0.3	2.3	0.54	0.64	0.54	45.6
North: Approach to Narellan Road															
7	L2	All MCs	171	0.6	171	0.6	0.279	3.3	LOS A	1.3	9.3	0.03	0.54	0.03	50.3
8	T1	All MCs	81	0.0	81	0.0	0.279	3.4	LOS A	1.3	9.3	0.03	0.54	0.03	51.0
9	R2	All MCs	544	1.4	544	1.4	0.279	8.0	LOS A	1.3	9.3	0.03	0.62	0.03	43.0
Approach			796	1.1	796	1.1	0.279	6.5	LOS A	1.3	9.3	0.03	0.60	0.03	45.8
West: William Downes Avenue															
10	L2	All MCs	368	0.9	368	0.9	0.113	3.9	LOS A	0.6	4.0	0.08	0.46	0.08	49.3
11	T1	All MCs	1	0.0	1	0.0	0.002	4.3	LOS A	0.0	0.1	0.18	0.55	0.18	50.8
12	R2	All MCs	2	0.0	2	0.0	0.002	9.0	LOS A	0.0	0.1	0.18	0.55	0.18	49.9
Approach			371	0.9	371	0.9	0.113	3.9	LOS A	0.6	4.0	0.08	0.46	0.08	49.3

All Vehicles	1234	1.0	1234	1.0	0.279	5.9	LOS A	1.3	9.3	0.07	0.56	0.07	46.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 AMD1 [102 AM - Narellan Rd / WSU access_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D1 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 145 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: WSU Access															
1	L2	All MCs	331	1.3	331	1.3	0.407	46.7	LOS D	8.8	62.1	0.90	0.78	0.90	26.0
2	T1	All MCs	1	0.0	1	0.0	0.039	88.2	LOS F	0.1	0.6	1.00	0.58	1.00	7.2
3	R2	All MCs	100	0.0	100	0.0	0.391	77.3	LOS F	3.5	24.7	1.00	0.75	1.00	4.4
Approach			432	1.0	432	1.0	0.407	53.9	LOS D	8.8	62.1	0.92	0.77	0.92	20.4
East: Narellan Road															
4	L2	All MCs	103	1.0	103	1.0	0.087	11.1	LOS A	1.6	11.4	0.40	0.65	0.40	44.3
5	T1	All MCs	1801	7.9	1801	7.9	0.558	20.5	LOS B	25.9	192.6	0.68	0.61	0.68	45.1
6	R2	All MCs	139	0.0	139	0.0	0.571	70.6	LOS F	9.4	66.0	0.99	0.80	0.99	19.9
Approach			2043	7.0	2043	7.0	0.571	23.5	LOS B	25.9	192.6	0.68	0.63	0.68	42.8
North: Bethlehem Monastery Access															
7	L2	All MCs	7	0.0	7	0.0	0.035	62.7	LOS E	0.4	3.1	0.89	0.67	0.89	5.0
8	T1	All MCs	1	0.0	1	0.0	*0.455	79.5	LOS F	4.3	29.8	1.00	0.76	1.00	4.9
9	R2	All MCs	118	0.0	118	0.0	*0.455	77.1	LOS F	4.3	29.8	1.00	0.76	1.00	19.0
Approach			126	0.0	126	0.0	0.455	76.3	LOS F	4.3	29.8	0.99	0.75	0.99	18.4
West: Narellan Road															
10	L2	All MCs	525	0.0	525	0.0	0.329	7.0	LOS A	5.8	40.9	0.21	0.61	0.21	47.7
11	T1	All MCs	3186	4.1	3186	4.1	*0.949	40.8	LOS C	89.3	646.9	0.98	1.00	1.11	26.6
12	R2	All MCs	691	1.1	691	1.1	*0.905	74.6	LOS F	22.1	155.9	1.00	1.12	1.23	18.3
Approach			4402	3.1	4402	3.1	0.949	42.1	LOS C	89.3	646.9	0.89	0.97	1.02	26.0

All Vehicles	7004	4.1	7004	4.1	0.949	38.0	LOS C	89.3	646.9	0.84	0.85	0.91	30.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: WSU Access											
P1	Full	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P1B	Slip/Bypass	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
East: Narellan Road											
P21	Stage 1	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P22	Stage 2	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P2B	Slip/Bypass	1	38.7	LOS D	0.0	0.0	0.92	0.92	54.1	20.0	0.37
North: Bethlehem Monastery Access											
P3	Full	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
West: Narellan Road											
P41	Stage 1	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P42	Stage 2	1	37.8	LOS D	0.0	0.0	0.92	0.92	53.2	20.0	0.38
All Pedestrians		8	59.5	LOS E	0.0	0.0	0.95	0.95	74.9	20.0	0.27

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: 103 AMD1 [103 AM - Narellan Rd/ Blaxland Rd/ Gilchrist Dr_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D1 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Narellan Road															
21	L2	All MCs	27	7.7	27	7.7	0.036	58.3	LOS E	1.2	8.7	0.61	0.65	0.61	30.0
22	T1	All MCs	1003	6.2	1003	6.2	0.619	57.6	LOS E	21.4	157.6	0.92	0.80	0.92	23.7
23	R2	All MCs	412	1.8	412	1.8	0.543	63.1	LOS E	13.5	96.1	0.95	0.82	0.95	29.2
Approach			1442	5.0	1442	5.0	0.619	59.2	LOS E	21.4	157.6	0.92	0.80	0.92	24.2
NorthEast: Blaxland Road															
24	L2	All MCs	528	1.4	528	1.4	0.526	37.9	LOS C	24.1	170.7	0.69	0.83	0.69	39.7
25	T1	All MCs	1039	1.4	1039	1.4	* 1.013	114.1	LOS F	58.4	414.0	1.00	1.32	1.44	13.6
26	R2	All MCs	380	10.0	380	10.0	0.967	106.8	LOS F	17.3	131.3	1.00	1.10	1.46	13.8
Approach			1948	3.1	1948	3.1	1.013	92.0	LOS F	58.4	414.0	0.91	1.15	1.24	18.0
NorthWest: Narellan Road															
27	L2	All MCs	919	4.1	919	4.1	1.032	95.2	LOS F	82.1	595.1	1.00	1.19	1.42	21.8
28	T1	All MCs	1635	4.2	1635	4.2	* 1.003	108.0	LOS F	55.3	396.8	1.00	1.28	1.40	22.5
29	R2	All MCs	733	6.6	733	6.6	* 1.001	115.9	LOS F	36.2	267.6	1.00	1.16	1.46	13.0
Approach			3287	4.7	3287	4.7	1.032	106.2	LOS F	82.1	595.1	1.00	1.23	1.42	19.6
SouthWest: Gilchrist Drive															
30	L2	All MCs	589	5.4	589	5.4	0.348	39.7	LOS C	16.2	118.8	0.82	0.73	0.82	17.6
31	T1	All MCs	777	1.9	777	1.9	0.938	98.5	LOS F	34.0	241.6	1.00	1.10	1.23	21.4
32	R2	All MCs	63	0.0	63	0.0	* 0.854	111.2	LOS F	5.0	34.8	1.00	0.81	1.12	21.3
Approach			1430	3.2	1430	3.2	0.938	74.8	LOS F	34.0	241.6	0.93	0.93	1.05	18.9

All Vehicles	8108	4.1	8108	4.1	1.032	88.9	LOS F	82.1	595.1	0.95	1.08	1.22	19.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Narellan Road											
P7	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
SouthWest: Gilchrist Drive											
P8	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
P8B	Slip/Bypass	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		3	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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: 104 AMD1 [104 AM - Goldsmith Av/Gilchrist Dr_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D1 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Gilchrist Drive															
25	T1	All MCs	1439	3.7	1427	3.7	0.521	16.3	LOS B	32.8	236.8	0.70	0.45	0.70	29.7
26	R2	All MCs	401	3.1	398	3.2	* 0.822	57.0	LOS E	27.6	198.1	0.97	0.89	1.03	26.3
Approach			1840	3.6	1826	3.6	0.822	25.2	LOS B	32.8	236.8	0.76	0.54	0.77	28.1
NorthWest: Goldsmith Avenue															
27	L2	All MCs	334	3.1	334	3.1	0.371	29.3	LOS C	14.6	104.8	0.65	0.77	0.65	30.8
29	R2	All MCs	349	0.3	349	0.3	* 0.806	67.6	LOS E	25.2	176.6	1.00	0.90	1.07	19.1
Approach			683	1.7	683	1.7	0.806	48.9	LOS D	25.2	176.6	0.83	0.84	0.86	23.4
SouthWest: Gilchrist Drive															
30	L2	All MCs	405	0.8	405	0.8	0.319	22.8	LOS B	11.6	81.5	0.43	0.71	0.43	45.1
31	T1	All MCs	1100	3.2	1100	3.2	* 0.808	45.8	LOS D	40.7	293.0	0.95	0.87	0.97	22.2
Approach			1505	2.5	1505	2.5	0.808	39.6	LOS C	40.7	293.0	0.81	0.82	0.82	27.0
All Vehicles			4028	2.9	4013	2.9	0.822	34.6	LOS C	40.7	293.0	0.79	0.70	0.81	26.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Goldsmith Avenue											
P7	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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: 105 AMD1 [105 AM - Kellicar Rd/ Gilchrist Dr_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D1 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gilchrist Drive															
1	L2	All MCs	138	6.1	138	6.1	0.108	20.4	LOS B	1.2	9.0	0.31	0.63	0.31	37.1
2	T1	All MCs	1222	1.8	1222	1.8	0.828	33.6	LOS C	25.6	181.9	0.96	0.95	1.08	16.4
3	R2	All MCs	199	4.8	199	4.8	*0.806	47.5	LOS D	8.5	62.0	1.00	0.96	1.26	20.8
Approach			1559	2.6	1559	2.6	0.828	34.2	LOS C	25.6	181.9	0.91	0.92	1.04	16.5
East: Kellicar Road															
4	L2	All MCs	125	5.9	125	5.9	0.070	6.8	LOS A	0.0	0.0	0.00	0.53	0.00	46.3
5	T1	All MCs	181	2.3	181	2.3	*0.539	40.3	LOS C	3.6	25.9	1.00	0.77	1.01	22.7
6	R2	All MCs	55	0.0	55	0.0	*0.394	46.5	LOS D	2.2	15.4	0.99	0.74	0.99	16.6
Approach			361	3.2	361	3.2	0.539	29.7	LOS C	3.6	25.9	0.65	0.68	0.66	26.9
North: Gilchrist Drive															
7	L2	All MCs	241	3.1	240	3.1	0.184	21.7	LOS B	2.2	15.6	0.33	0.64	0.33	47.8
8	T1	All MCs	1162	2.5	1154	2.5	*0.845	36.5	LOS C	26.7	190.6	0.97	0.98	1.13	32.1
9	R2	All MCs	361	4.4	359	4.4	0.725	45.3	LOS D	7.3	53.2	1.00	0.88	1.14	24.3
Approach			1764	3.0	1753	3.0	0.845	36.3	LOS C	26.7	190.6	0.89	0.91	1.03	29.1
West: Kellicar Road															
10	L2	All MCs	233	7.2	233	7.2	0.440	30.3	LOS C	7.5	55.4	0.85	0.80	0.85	12.0
11	T1	All MCs	106	5.0	106	5.0	0.322	39.3	LOS C	2.1	15.1	0.98	0.73	0.98	23.1
12	R2	All MCs	43	9.8	43	9.8	0.331	46.5	LOS D	1.7	13.1	0.98	0.73	0.98	15.4
Approach			382	6.9	382	6.9	0.440	34.6	LOS C	7.5	55.4	0.90	0.77	0.90	16.6

All Vehicles	4067	3.2	4056	3.2	0.845	34.7	LOS C	26.7	190.6	0.88	0.88	0.99	24.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Gilchrist Drive											
P1	Full	1	34.2	LOS D	0.0	0.0	0.93	0.93	49.6	20.0	0.40
East: Kellicar Road											
P2	Full	1	34.2	LOS D	0.0	0.0	0.93	0.93	49.6	20.0	0.40
North: Gilchrist Drive											
P3	Full	1	34.2	LOS D	0.0	0.0	0.93	0.93	49.6	20.0	0.40
West: Kellicar Road											
P4	Full	1	34.2	LOS D	0.0	0.0	0.93	0.93	49.6	20.0	0.40
All Pedestrians		4	34.2	LOS D	0.0	0.0	0.93	0.93	49.6	20.0	0.40

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

MOVEMENT SUMMARY

Site: 101 PMD1 [101 PM - William Downes Av/ WSU Access_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D1 - Future with development)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Tafe Access South															
1	L2	All MCs	1	0.0	1	0.0	0.018	5.0	LOS A	0.1	0.6	0.37	0.47	0.37	51.4
2	T1	All MCs	18	0.0	18	0.0	0.018	5.2	LOS A	0.1	0.6	0.37	0.47	0.37	49.7
3	R2	All MCs	2	0.0	2	0.0	0.018	9.8	LOS A	0.1	0.6	0.37	0.47	0.37	52.4
Approach			21	0.0	21	0.0	0.018	5.7	LOS A	0.1	0.6	0.37	0.47	0.37	50.2
East: Tafe Access East															
4	L2	All MCs	1	0.0	1	0.0	0.036	4.9	LOS A	0.2	1.3	0.36	0.61	0.36	50.7
5	T1	All MCs	2	0.0	2	0.0	0.036	5.2	LOS A	0.2	1.3	0.36	0.61	0.36	49.2
6	R2	All MCs	39	0.0	39	0.0	0.036	9.7	LOS A	0.2	1.3	0.36	0.61	0.36	46.1
Approach			42	0.0	42	0.0	0.036	9.4	LOS A	0.2	1.3	0.36	0.61	0.36	46.5
North: Approach to Narellan Road															
7	L2	All MCs	54	0.0	54	0.0	0.124	3.3	LOS A	0.5	3.4	0.04	0.57	0.04	49.5
8	T1	All MCs	29	0.0	29	0.0	0.124	3.4	LOS A	0.5	3.4	0.04	0.57	0.04	50.2
9	R2	All MCs	271	0.4	271	0.4	0.124	8.0	LOS A	0.5	3.4	0.04	0.62	0.04	43.2
Approach			354	0.3	354	0.3	0.124	6.9	LOS A	0.5	3.4	0.04	0.61	0.04	45.0
West: William Downes Avenue															
10	L2	All MCs	445	0.7	445	0.7	0.136	3.9	LOS A	0.6	4.5	0.08	0.46	0.08	49.3
11	T1	All MCs	4	0.0	4	0.0	0.005	4.3	LOS A	0.0	0.1	0.16	0.48	0.16	52.1
12	R2	All MCs	2	0.0	2	0.0	0.005	9.0	LOS A	0.0	0.1	0.16	0.48	0.16	51.1
Approach			452	0.7	452	0.7	0.136	3.9	LOS A	0.6	4.5	0.08	0.46	0.08	49.4

All Vehicles	869	0.5	869	0.5	0.136	5.4	LOS A	0.6	4.5	0.08	0.53	0.08	47.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 PMD1 [102 PM - Narellan Rd / WSU access_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D1 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 181 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: WSU Access															
1	L2	All MCs	416	0.8	416	0.8	0.600	95.9	LOS F	16.2	114.2	0.97	0.83	0.97	18.6
2	T1	All MCs	1	0.0	1	0.0	0.008	120.9	LOS F	0.1	0.6	0.95	0.56	0.95	7.2
3	R2	All MCs	106	0.0	106	0.0	0.216	80.5	LOS F	4.2	29.4	0.93	0.75	0.93	4.2
Approach			523	0.6	523	0.6	0.600	92.8	LOS F	16.2	114.2	0.96	0.81	0.96	14.3
East: Narellan Road															
4	L2	All MCs	52	0.0	52	0.0	0.038	24.6	LOS B	1.2	8.1	0.28	0.62	0.28	43.6
5	T1	All MCs	2565	3.5	2565	3.5	*0.785	39.1	LOS C	57.9	415.6	0.84	0.77	0.84	40.1
6	R2	All MCs	92	0.0	92	0.0	0.595	107.1	LOS F	8.0	56.1	1.00	0.79	1.00	16.4
Approach			2709	3.3	2709	3.3	0.785	41.2	LOS C	57.9	415.6	0.83	0.77	0.83	35.7
North: Bethlehem Monastery Access															
7	L2	All MCs	87	0.0	87	0.0	0.250	72.2	LOS F	6.5	45.8	0.90	0.77	0.90	4.4
8	T1	All MCs	1	0.0	1	0.0	*0.689	93.8	LOS F	14.5	101.6	1.00	0.83	1.02	4.3
9	R2	All MCs	338	0.0	338	0.0	*0.689	87.2	LOS F	14.5	101.8	1.00	0.83	1.02	17.5
Approach			426	0.0	426	0.0	0.689	84.1	LOS F	14.5	101.8	0.98	0.82	0.99	15.7
West: Narellan Road															
10	L2	All MCs	83	0.0	83	0.0	0.051	12.5	LOS A	0.6	4.2	0.12	0.58	0.12	48.4
11	T1	All MCs	1853	4.2	1853	4.2	0.568	26.9	LOS B	33.7	244.3	0.68	0.62	0.68	33.6
12	R2	All MCs	307	0.3	307	0.3	*1.000	137.7	LOS F	17.2	120.8	1.00	1.11	1.49	11.3
Approach			2243	3.5	2243	3.5	1.000	41.6	LOS C	33.7	244.3	0.70	0.68	0.77	26.1

All Vehicles	5902	2.9	5902	2.9	1.000	49.0	LOS D	57.9	415.6	0.80	0.74	0.83	28.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: WSU Access											
P1	Full	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P1B	Slip/Bypass	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
East: Narellan Road											
P21	Stage 1	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P22	Stage 2	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P2B	Slip/Bypass	1	49.0	LOS E	0.0	0.0	0.93	0.93	64.4	20.0	0.31
North: Bethlehem Monastery Access											
P3	Full	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
West: Narellan Road											
P41	Stage 1	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P42	Stage 2	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
All Pedestrians		8	80.1	LOS F	0.0	0.0	0.96	0.96	95.5	20.0	0.21

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: 103 PMD1 [103 PM - Narellan Rd/ Blaxland Rd/ Gilchrist Dr_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D1 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Narellan Road															
21	L2	All MCs	39	0.0	39	0.0	0.084	71.8	LOS F	1.8	12.4	0.69	0.69	0.69	28.0
22	T1	All MCs	1144	2.6	1144	2.6	*1.026	130.1	LOS F	38.0	272.0	1.00	1.33	1.57	12.7
23	R2	All MCs	614	1.2	614	1.2	*1.014	120.2	LOS F	29.1	205.6	1.00	1.18	1.56	20.1
Approach			1796	2.1	1796	2.1	1.026	125.5	LOS F	38.0	272.0	0.99	1.26	1.55	15.0
NorthEast: Blaxland Road															
24	L2	All MCs	555	3.0	555	3.0	0.485	20.2	LOS B	19.8	142.4	0.58	0.77	0.58	43.6
25	T1	All MCs	1199	2.3	1199	2.3	*1.008	98.0	LOS F	68.7	490.6	1.00	1.33	1.44	14.8
26	R2	All MCs	776	2.0	776	2.0	0.899	74.6	LOS F	29.4	209.3	1.00	1.00	1.20	18.0
Approach			2530	2.4	2530	2.4	1.008	73.7	LOS F	68.7	490.6	0.91	1.11	1.18	20.4
NorthWest: Narellan Road															
27	L2	All MCs	543	5.0	543	5.0	0.558	28.2	LOS B	19.2	140.6	0.70	0.90	0.70	40.0
28	T1	All MCs	1072	4.6	1072	4.6	0.944	81.8	LOS F	29.6	215.1	1.00	1.13	1.32	25.9
29	R2	All MCs	407	5.2	407	5.2	0.870	79.4	LOS F	17.0	124.5	1.00	0.99	1.25	17.2
Approach			2022	4.8	2022	4.8	0.944	67.0	LOS E	29.6	215.1	0.92	1.04	1.14	27.1
SouthWest: Gilchrist Drive															
30	L2	All MCs	635	4.1	635	4.1	0.404	44.3	LOS D	18.0	130.4	0.90	0.74	0.90	16.2
31	T1	All MCs	786	1.7	786	1.7	0.914	88.5	LOS F	30.3	215.1	1.00	1.06	1.19	23.0
32	R2	All MCs	30	0.0	30	0.0	*0.383	100.3	LOS F	2.1	14.4	0.96	0.71	0.96	22.8
Approach			1452	2.8	1452	2.8	0.914	69.4	LOS E	30.3	215.1	0.96	0.91	1.06	19.6

All Vehicles	7800	3.0	7800	3.0	1.026	83.1	LOS F	68.7	490.6	0.94	1.09	1.23	20.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Narellan Road											
P7	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
SouthWest: Gilchrist Drive											
P8	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
P8B	Slip/Bypass	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
All Pedestrians		3	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25

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: 104 PMD1 [104 PM - Goldsmith Av/Gilchrist Dr_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D1 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Gilchrist Drive															
25	T1	All MCs	1500	3.1	1492	3.1	0.715	30.3	LOS C	46.6	334.7	0.91	0.69	0.91	20.7
26	R2	All MCs	193	1.6	192	1.6	0.697	59.6	LOS E	12.1	86.2	0.95	0.82	0.97	25.7
Approach			1693	2.9	1684	2.9	0.715	33.7	LOS C	46.6	334.7	0.92	0.70	0.92	21.9
NorthWest: Goldsmith Avenue															
27	L2	All MCs	235	3.1	235	3.1	* 0.861	77.3	LOS F	17.3	124.4	1.00	0.95	1.21	17.2
29	R2	All MCs	420	0.0	420	0.0	* 0.862	61.8	LOS E	29.8	208.6	1.00	0.95	1.13	20.3
Approach			654	1.1	654	1.1	0.862	67.3	LOS E	29.8	208.6	1.00	0.95	1.16	19.1
SouthWest: Gilchrist Drive															
30	L2	All MCs	279	1.1	279	1.1	0.451	57.5	LOS E	14.8	104.7	0.83	0.81	0.83	32.3
31	T1	All MCs	1260	3.1	1260	3.1	* 0.853	49.8	LOS D	44.2	317.6	0.97	0.93	1.03	21.8
Approach			1539	2.7	1539	2.7	0.853	51.2	LOS D	44.2	317.6	0.95	0.91	1.00	22.2
All Vehicles			3886	2.5	3877	2.6	0.862	46.3	LOS D	46.6	334.7	0.94	0.82	0.99	21.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Goldsmith Avenue											
P7	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
All Pedestrians		1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25

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: 105 PMD1 [105 PM - Kellicar Rd/ Gilchrist Dr_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D1 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gilchrist Drive															
1	L2	All MCs	163	4.5	163	4.5	0.131	32.5	LOS C	3.3	24.3	0.33	0.64	0.33	33.2
2	T1	All MCs	927	1.4	927	1.4	0.614	43.4	LOS D	28.8	204.2	0.82	0.73	0.82	14.1
3	R2	All MCs	219	4.3	219	4.3	0.829	79.4	LOS F	16.8	121.9	1.00	0.93	1.15	14.8
Approach			1309	2.3	1309	2.3	0.829	48.0	LOS D	28.8	204.2	0.79	0.75	0.82	13.4
East: Kellicar Road															
4	L2	All MCs	341	1.9	341	1.9	0.186	7.3	LOS A	0.0	0.0	0.00	0.72	0.00	46.7
5	T1	All MCs	509	0.0	509	0.0	0.856	93.8	LOS F	19.9	139.2	1.00	1.05	1.17	14.8
6	R2	All MCs	99	0.0	99	0.0	0.531	78.3	LOS F	7.1	49.4	1.00	0.79	1.00	11.3
Approach			949	0.7	949	0.7	0.856	74.1	LOS F	19.9	139.2	0.64	0.90	0.73	15.0
North: Gilchrist Drive															
7	L2	All MCs	317	3.3	316	3.3	0.268	47.5	LOS D	8.9	64.1	0.44	0.69	0.44	43.4
8	T1	All MCs	1289	1.0	1283	1.0	*0.972	106.6	LOS F	67.2	474.6	1.00	1.18	1.28	18.2
9	R2	All MCs	276	8.8	275	8.8	0.535	81.9	LOS F	9.5	71.2	0.98	0.80	0.98	18.3
Approach			1882	2.5	1873	2.5	0.972	93.0	LOS F	67.2	474.6	0.90	1.04	1.09	16.4
West: Kellicar Road															
10	L2	All MCs	523	6.0	523	6.0	*0.980	119.7	LOS F	49.6	364.9	1.00	1.09	1.34	4.3
11	T1	All MCs	325	1.6	325	1.6	0.550	75.3	LOS F	11.1	79.0	0.98	0.80	0.98	16.6
12	R2	All MCs	182	3.5	182	3.5	*1.005	123.3	LOS F	17.7	127.8	1.00	1.13	1.57	7.2
Approach			1030	4.2	1030	4.2	1.005	106.4	LOS F	49.6	364.9	0.99	1.00	1.27	7.2

All Vehicles	5169	2.4	5161	2.4	1.005	78.4	LOS F	67.2	474.6	0.84	0.94	0.99	13.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Gilchrist Drive											
P1	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
East: Kellicar Road											
P2	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
North: Gilchrist Drive											
P3	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
West: Kellicar Road											
P4	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		4	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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

MOVEMENT SUMMARY

Site: 101 AMD2 [101 AM - William Downes Av/ WSU Access_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D2 - Future with development)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Tafe Access South															
1	L2	All MCs	1	0.0	1	0.0	0.017	6.6	LOS A	0.1	0.7	0.55	0.51	0.55	50.5
2	T1	All MCs	14	0.0	14	0.0	0.017	6.8	LOS A	0.1	0.7	0.55	0.51	0.55	48.4
3	R2	All MCs	1	0.0	1	0.0	0.017	11.4	LOS A	0.1	0.7	0.55	0.51	0.55	51.7
Approach			16	0.0	16	0.0	0.017	7.1	LOS A	0.1	0.7	0.55	0.51	0.55	49.0
East: Tafe Access East															
4	L2	All MCs	1	0.0	1	0.0	0.055	6.5	LOS A	0.3	2.3	0.55	0.65	0.55	49.9
5	T1	All MCs	3	0.0	3	0.0	0.055	6.8	LOS A	0.3	2.3	0.55	0.65	0.55	48.3
6	R2	All MCs	47	2.2	47	2.2	0.055	11.5	LOS A	0.3	2.3	0.55	0.65	0.55	44.9
Approach			52	2.0	52	2.0	0.055	11.1	LOS A	0.3	2.3	0.55	0.65	0.55	45.4
North: Approach to Narellan Road															
7	L2	All MCs	171	0.6	171	0.6	0.293	3.3	LOS A	1.4	9.9	0.03	0.55	0.03	50.1
8	T1	All MCs	81	0.0	81	0.0	0.293	3.4	LOS A	1.4	9.9	0.03	0.55	0.03	50.9
9	R2	All MCs	583	1.3	583	1.3	0.293	8.0	LOS A	1.4	10.0	0.03	0.62	0.03	43.1
Approach			835	1.0	835	1.0	0.293	6.6	LOS A	1.4	10.0	0.03	0.60	0.03	45.6
West: William Downes Avenue															
10	L2	All MCs	367	0.9	367	0.9	0.112	3.9	LOS A	0.6	4.0	0.08	0.46	0.08	49.3
11	T1	All MCs	1	0.0	1	0.0	0.002	4.3	LOS A	0.0	0.1	0.18	0.55	0.18	50.8
12	R2	All MCs	2	0.0	2	0.0	0.002	9.0	LOS A	0.0	0.1	0.18	0.55	0.18	49.9
Approach			370	0.9	370	0.9	0.112	3.9	LOS A	0.6	4.0	0.08	0.46	0.08	49.3

All Vehicles	1272	1.0	1272	1.0	0.293	6.0	LOS A	1.4	10.0	0.07	0.56	0.07	46.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 AMD2 [102 AM - Narellan Rd / WSU access_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D2 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 145 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: WSU Access															
1	L2	All MCs	322	1.3	322	1.3	0.396	45.9	LOS D	8.5	60.2	0.90	0.78	0.90	26.0
2	T1	All MCs	1	0.0	1	0.0	0.039	87.0	LOS F	0.1	0.6	1.00	0.58	1.00	7.2
3	R2	All MCs	109	0.0	109	0.0	0.425	77.6	LOS F	3.9	27.0	1.00	0.75	1.00	4.4
Approach			432	1.0	432	1.0	0.425	54.0	LOS D	8.5	60.2	0.92	0.77	0.92	20.1
East: Narellan Road															
4	L2	All MCs	151	0.7	151	0.7	*0.128	11.3	LOS A	2.4	17.1	0.41	0.66	0.41	44.2
5	T1	All MCs	1749	8.1	1749	8.1	0.543	20.3	LOS B	24.9	185.0	0.67	0.60	0.67	45.2
6	R2	All MCs	139	0.0	139	0.0	0.571	70.6	LOS F	9.4	66.0	0.99	0.80	0.99	19.9
Approach			2040	7.0	2040	7.0	0.571	23.0	LOS B	24.9	185.0	0.67	0.62	0.67	42.9
North: Bethlehem Monastery Access															
7	L2	All MCs	7	0.0	7	0.0	0.027	62.1	LOS E	0.4	3.1	0.88	0.67	0.88	5.1
8	T1	All MCs	1	0.0	1	0.0	*0.455	79.5	LOS F	4.3	29.8	1.00	0.76	1.00	4.9
9	R2	All MCs	118	0.0	118	0.0	0.455	77.1	LOS F	4.3	29.8	1.00	0.76	1.00	19.0
Approach			126	0.0	126	0.0	0.455	76.2	LOS F	4.3	29.8	0.99	0.75	0.99	18.5
West: Narellan Road															
10	L2	All MCs	525	0.0	525	0.0	0.329	10.8	LOS A	5.8	40.9	0.21	0.61	0.21	47.7
11	T1	All MCs	2935	4.4	2935	4.4	*0.808	17.6	LOS B	51.2	372.0	0.76	0.70	0.76	39.4
12	R2	All MCs	682	1.1	682	1.1	*0.895	71.3	LOS F	21.4	151.5	1.00	1.10	1.21	18.6
Approach			4142	3.3	4142	3.3	0.895	25.6	LOS B	51.2	372.0	0.73	0.76	0.77	33.4

All Vehicles	6740	4.2	6740	4.2	0.895	27.6	LOS B	51.2	372.0	0.73	0.72	0.75	35.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: WSU Access											
P1	Full	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P1B	Slip/Bypass	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
East: Narellan Road											
P21	Stage 1	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P22	Stage 2	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P2B	Slip/Bypass	1	38.7	LOS D	0.0	0.0	0.92	0.92	54.1	20.0	0.37
North: Bethlehem Monastery Access											
P3	Full	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
West: Narellan Road											
P41	Stage 1	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P42	Stage 2	1	37.8	LOS D	0.0	0.0	0.92	0.92	53.2	20.0	0.38
All Pedestrians		8	59.5	LOS E	0.0	0.0	0.95	0.95	74.9	20.0	0.27

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: 103 AMD2 [103 AM - Narellan Rd/ Blaxland Rd/ Gilchrist Dr_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D2 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Narellan Road															
21	L2	All MCs	26	8.0	26	8.0	0.031	50.4	LOS D	0.9	6.7	0.52	0.65	0.52	34.7
22	T1	All MCs	1021	6.1	1021	6.1	0.629	58.0	LOS E	21.8	160.7	0.93	0.80	0.93	23.6
23	R2	All MCs	393	1.9	393	1.9	0.518	62.8	LOS E	12.8	91.2	0.94	0.81	0.94	29.3
Approach			1440	5.0	1440	5.0	0.629	59.2	LOS E	21.8	160.7	0.92	0.80	0.92	24.1
NorthEast: Blaxland Road															
24	L2	All MCs	513	1.4	513	1.4	0.511	30.5	LOS C	23.1	164.0	0.68	0.83	0.68	39.9
25	T1	All MCs	879	1.7	879	1.7	0.831	58.2	LOS E	34.2	242.7	1.00	0.95	1.07	21.6
26	R2	All MCs	389	9.7	389	9.7	*0.933	96.6	LOS F	16.7	126.9	1.00	1.05	1.37	14.9
Approach			1781	3.4	1781	3.4	0.933	58.6	LOS E	34.2	242.7	0.91	0.94	1.02	24.3
NorthWest: Narellan Road															
27	L2	All MCs	866	4.4	866	4.4	0.891	54.9	LOS D	44.9	326.4	0.95	1.05	1.00	35.0
28	T1	All MCs	1516	4.5	1516	4.5	*0.909	72.9	LOS F	40.8	296.5	1.00	1.05	1.17	28.5
29	R2	All MCs	663	7.3	663	7.3	*0.909	83.6	LOS F	27.3	203.0	1.00	1.02	1.23	16.6
Approach			3045	5.1	3045	5.1	0.909	70.1	LOS E	44.9	326.4	0.99	1.04	1.13	26.3
SouthWest: Gilchrist Drive															
30	L2	All MCs	558	5.7	558	5.7	0.335	38.8	LOS C	15.0	109.8	0.80	0.74	0.80	17.9
31	T1	All MCs	741	2.0	741	2.0	*0.922	94.1	LOS F	31.5	223.9	1.00	1.07	1.20	22.1
32	R2	All MCs	61	0.0	61	0.0	0.828	111.4	LOS F	4.8	33.5	1.00	0.80	1.10	21.4
Approach			1361	3.4	1361	3.4	0.922	72.2	LOS F	31.5	223.9	0.92	0.92	1.03	19.4

All Vehicles	7627	4.4	7627	4.4	0.933	65.7	LOS E	44.9	326.4	0.94	0.95	1.05	24.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Narellan Road											
P7	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
SouthWest: Gilchrist Drive											
P8	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
P8B	Slip/Bypass	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		3	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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: 104 AMD2 [104 AM - Goldsmith Av/Gilchrist Dr_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D2 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Gilchrist Drive															
25	T1	All MCs	1287	4.2	1287	4.2	0.480	16.1	LOS B	28.9	209.8	0.67	0.44	0.67	29.9
26	R2	All MCs	321	3.9	321	3.9	*0.721	50.7	LOS D	20.1	145.3	0.91	0.83	0.91	27.9
Approach			1608	4.1	1608	4.1	0.721	23.0	LOS B	28.9	209.8	0.72	0.52	0.72	29.0
NorthWest: Goldsmith Avenue															
27	L2	All MCs	336	3.1	336	3.1	0.370	29.8	LOS C	14.8	106.3	0.66	0.77	0.66	30.6
29	R2	All MCs	334	0.3	334	0.3	*0.732	61.8	LOS E	22.6	158.6	0.98	0.86	0.99	20.3
Approach			670	1.7	670	1.7	0.732	45.8	LOS D	22.6	158.6	0.82	0.82	0.82	24.4
SouthWest: Gilchrist Drive															
30	L2	All MCs	346	0.9	346	0.9	0.265	20.5	LOS B	8.9	62.6	0.39	0.69	0.39	46.1
31	T1	All MCs	1029	3.4	1029	3.4	*0.716	41.2	LOS C	34.3	247.4	0.89	0.80	0.89	23.7
Approach			1375	2.8	1375	2.8	0.716	36.0	LOS C	34.3	247.4	0.77	0.77	0.77	28.2
All Vehicles			3654	3.2	3654	3.2	0.732	32.1	LOS C	34.3	247.4	0.76	0.67	0.76	27.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Goldsmith Avenue											
P7	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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: 105 AMD2 [105 AM - Kellicar Rd/ Gilchrist Dr_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D2 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gilchrist Drive															
1	L2	All MCs	115	7.3	115	7.3	0.089	17.3	LOS B	0.8	6.1	0.31	0.62	0.31	37.6
2	T1	All MCs	1127	2.0	1127	2.0	0.805	29.5	LOS C	20.3	144.5	0.95	0.93	1.08	17.8
3	R2	All MCs	161	5.9	161	5.9	*0.901	50.9	LOS D	6.7	49.5	1.00	1.07	1.61	19.9
Approach			1403	2.9	1403	2.9	0.901	31.0	LOS C	20.3	144.5	0.91	0.92	1.08	17.4
East: Kellicar Road															
4	L2	All MCs	113	6.5	113	6.5	0.064	6.7	LOS A	0.0	0.0	0.00	0.53	0.00	46.2
5	T1	All MCs	164	2.6	164	2.6	*0.428	34.1	LOS C	2.8	20.2	0.98	0.75	0.98	25.1
6	R2	All MCs	51	0.0	51	0.0	*0.322	40.5	LOS C	1.8	12.4	0.98	0.74	0.98	18.4
Approach			329	3.5	329	3.5	0.428	25.7	LOS B	2.8	20.2	0.64	0.67	0.64	28.9
North: Gilchrist Drive															
7	L2	All MCs	227	3.2	227	3.2	0.173	18.6	LOS B	1.6	11.7	0.31	0.64	0.31	48.2
8	T1	All MCs	1073	2.7	1073	2.7	*0.829	31.8	LOS C	21.6	155.0	0.97	0.97	1.14	33.7
9	R2	All MCs	299	5.3	299	5.3	0.834	46.1	LOS D	5.9	42.8	1.00	0.98	1.41	23.9
Approach			1599	3.3	1599	3.3	0.834	32.6	LOS C	21.6	155.0	0.88	0.92	1.07	30.7
West: Kellicar Road															
10	L2	All MCs	201	8.4	201	8.4	0.402	27.9	LOS B	5.7	42.7	0.85	0.79	0.85	12.8
11	T1	All MCs	97	5.4	97	5.4	0.257	33.3	LOS C	1.6	11.9	0.96	0.71	0.96	25.4
12	R2	All MCs	38	11.1	38	11.1	0.257	40.4	LOS C	1.3	10.0	0.97	0.73	0.97	16.9
Approach			336	7.8	336	7.8	0.402	30.8	LOS C	5.7	42.7	0.90	0.76	0.90	18.1

All Vehicles	3666	3.6	3666	3.6	0.901	31.2	LOS C	21.6	155.0	0.87	0.88	1.02	25.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Gilchrist Drive											
P1	Full	1	29.3	LOS C	0.0	0.0	0.91	0.91	44.6	20.0	0.45
East: Kellicar Road											
P2	Full	1	29.3	LOS C	0.0	0.0	0.91	0.91	44.6	20.0	0.45
North: Gilchrist Drive											
P3	Full	1	29.3	LOS C	0.0	0.0	0.91	0.91	44.6	20.0	0.45
West: Kellicar Road											
P4	Full	1	29.3	LOS C	0.0	0.0	0.91	0.91	44.6	20.0	0.45
All Pedestrians		4	29.3	LOS C	0.0	0.0	0.91	0.91	44.6	20.0	0.45

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

MOVEMENT SUMMARY

Site: 101 PMD2 [101 PM - William Downes Av/ WSU Access_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D2 - Future with development)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Tafe Access South															
1	L2	All MCs	1	0.0	1	0.0	0.018	5.0	LOS A	0.1	0.6	0.37	0.47	0.37	51.4
2	T1	All MCs	18	0.0	18	0.0	0.018	5.2	LOS A	0.1	0.6	0.37	0.47	0.37	49.7
3	R2	All MCs	2	0.0	2	0.0	0.018	9.8	LOS A	0.1	0.6	0.37	0.47	0.37	52.4
Approach			21	0.0	21	0.0	0.018	5.7	LOS A	0.1	0.6	0.37	0.47	0.37	50.3
East: Tafe Access East															
4	L2	All MCs	1	0.0	1	0.0	0.036	4.8	LOS A	0.2	1.2	0.35	0.61	0.35	50.7
5	T1	All MCs	2	0.0	2	0.0	0.036	5.1	LOS A	0.2	1.2	0.35	0.61	0.35	49.2
6	R2	All MCs	39	0.0	39	0.0	0.036	9.7	LOS A	0.2	1.2	0.35	0.61	0.35	46.1
Approach			42	0.0	42	0.0	0.036	9.4	LOS A	0.2	1.2	0.35	0.61	0.35	46.5
North: Approach to Narellan Road															
7	L2	All MCs	54	0.0	54	0.0	0.122	3.3	LOS A	0.5	3.3	0.04	0.57	0.04	49.5
8	T1	All MCs	29	0.0	29	0.0	0.122	3.4	LOS A	0.5	3.3	0.04	0.57	0.04	50.2
9	R2	All MCs	266	0.4	266	0.4	0.122	8.0	LOS A	0.5	3.3	0.04	0.62	0.04	43.2
Approach			349	0.3	349	0.3	0.122	6.9	LOS A	0.5	3.3	0.04	0.61	0.04	45.0
West: William Downes Avenue															
10	L2	All MCs	419	0.8	419	0.8	0.179	3.9	LOS A	0.9	6.4	0.11	0.46	0.11	49.0
11	T1	All MCs	4	0.0	4	0.0	0.005	4.3	LOS A	0.0	0.1	0.16	0.48	0.16	52.1
12	R2	All MCs	2	0.0	2	0.0	0.005	9.0	LOS A	0.0	0.1	0.16	0.48	0.16	51.1
Approach			425	0.7	425	0.7	0.179	4.0	LOS A	0.9	6.4	0.11	0.46	0.11	49.1

All Vehicles	838	0.5	838	0.5	0.179	5.5	LOS A	0.9	6.4	0.10	0.53	0.10	46.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 PMD2 [102 PM - Narellan Rd / WSU access_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D2 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 181 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: WSU Access															
1	L2	All MCs	395	0.8	395	0.8	0.571	94.4	LOS F	15.9	112.1	0.96	0.82	0.96	18.6
2	T1	All MCs	1	0.0	1	0.0	0.008	118.9	LOS F	0.1	0.6	0.95	0.56	0.95	7.2
3	R2	All MCs	100	0.0	100	0.0	0.203	80.3	LOS F	3.9	27.6	0.93	0.75	0.93	4.2
Approach			496	0.6	496	0.6	0.571	91.6	LOS F	15.9	112.1	0.96	0.81	0.96	14.4
East: Narellan Road															
4	L2	All MCs	57	0.0	57	0.0	0.041	21.6	LOS B	1.3	8.9	0.28	0.62	0.28	43.6
5	T1	All MCs	2371	3.8	2371	3.8	*0.725	35.3	LOS C	50.1	360.7	0.79	0.72	0.79	40.9
6	R2	All MCs	92	0.0	92	0.0	0.595	104.2	LOS F	8.0	56.1	1.00	0.79	1.00	16.4
Approach			2520	3.6	2520	3.6	0.725	37.5	LOS C	50.1	360.7	0.78	0.72	0.78	37.0
North: Bethlehem Monastery Access															
7	L2	All MCs	87	0.0	87	0.0	0.250	72.2	LOS F	6.5	45.8	0.90	0.77	0.90	4.4
8	T1	All MCs	1	0.0	1	0.0	*0.689	93.8	LOS F	14.5	101.6	1.00	0.83	1.02	4.3
9	R2	All MCs	338	0.0	338	0.0	*0.689	87.2	LOS F	14.5	101.8	1.00	0.83	1.02	17.5
Approach			426	0.0	426	0.0	0.689	84.1	LOS F	14.5	101.8	0.98	0.82	0.99	15.7
West: Narellan Road															
10	L2	All MCs	83	0.0	83	0.0	0.051	10.5	LOS A	0.6	4.2	0.12	0.58	0.12	48.4
11	T1	All MCs	1718	4.5	1718	4.5	0.526	25.4	LOS B	30.1	218.7	0.65	0.59	0.65	34.2
12	R2	All MCs	297	0.4	297	0.4	*0.968	123.8	LOS F	15.7	110.4	1.00	1.06	1.42	12.3
Approach			2099	3.8	2099	3.8	0.968	38.8	LOS C	30.1	218.7	0.68	0.66	0.74	27.1

All Vehicles	5541	3.1	5541	3.1	0.968	46.4	LOS D	50.1	360.7	0.78	0.71	0.80	29.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: WSU Access											
P1	Full	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P1B	Slip/Bypass	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
East: Narellan Road											
P21	Stage 1	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P22	Stage 2	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P2B	Slip/Bypass	1	49.0	LOS E	0.0	0.0	0.93	0.93	64.4	20.0	0.31
North: Bethlehem Monastery Access											
P3	Full	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
West: Narellan Road											
P41	Stage 1	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P42	Stage 2	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
All Pedestrians		8	80.1	LOS F	0.0	0.0	0.96	0.96	95.5	20.0	0.21

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: 103 PMD2 [103 PM - Narellan Rd/ Blaxland Rd/ Gilchrist Dr_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D2 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Narellan Road															
21	L2	All MCs	37	0.0	37	0.0	0.042	52.5	LOS D	1.1	7.5	0.49	0.65	0.49	37.3
22	T1	All MCs	1058	2.8	1058	2.8	*0.909	83.6	LOS F	27.7	198.7	1.00	1.07	1.24	18.3
23	R2	All MCs	573	1.3	573	1.3	*0.908	81.9	LOS F	22.2	157.4	1.00	1.02	1.27	25.4
Approach			1668	2.2	1668	2.2	0.909	82.3	LOS F	27.7	198.7	0.99	1.04	1.23	20.2
NorthEast: Blaxland Road															
24	L2	All MCs	548	3.1	548	3.1	0.486	23.7	LOS B	19.9	142.8	0.59	0.79	0.59	43.3
25	T1	All MCs	1109	2.5	1109	2.5	0.792	40.8	LOS C	36.6	261.7	0.94	0.86	0.96	26.9
26	R2	All MCs	725	2.2	725	2.2	*0.895	75.2	LOS F	27.4	195.2	1.00	1.00	1.21	17.9
Approach			2383	2.5	2383	2.5	0.895	47.4	LOS D	36.6	261.7	0.88	0.89	0.95	26.8
NorthWest: Narellan Road															
27	L2	All MCs	514	5.3	514	5.3	0.528	27.0	LOS B	18.4	134.5	0.69	0.89	0.69	40.6
28	T1	All MCs	1002	4.9	1002	4.9	0.854	65.0	LOS E	24.2	176.7	1.00	0.99	1.15	29.3
29	R2	All MCs	365	5.8	365	5.8	0.597	64.1	LOS E	11.7	85.9	0.98	0.82	0.98	20.0
Approach			1882	5.2	1882	5.2	0.854	54.5	LOS D	24.2	176.7	0.91	0.93	0.99	30.2
SouthWest: Gilchrist Drive															
30	L2	All MCs	584	4.8	584	4.8	0.367	41.1	LOS C	15.7	114.6	0.86	0.74	0.86	17.1
31	T1	All MCs	785	1.7	785	1.7	*0.912	86.6	LOS F	30.0	213.1	1.00	1.05	1.19	23.4
32	R2	All MCs	31	0.0	31	0.0	0.385	100.7	LOS F	2.1	14.4	0.95	0.71	0.95	22.9
Approach			1399	3.0	1399	3.0	0.912	67.9	LOS E	30.0	213.1	0.94	0.92	1.04	20.1

All Vehicles	7332	3.2	7332	3.2	0.912	61.1	LOS E	36.6	261.7	0.92	0.94	1.04	24.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Narellan Road											
P7	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
SouthWest: Gilchrist Drive											
P8	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
P8B	Slip/Bypass	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
All Pedestrians		3	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25

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: 104 PMD2 [104 PM - Goldsmith Av/Gilchrist Dr_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D2 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Gilchrist Drive															
25	T1	All MCs	1377	3.4	1377	3.4	0.545	18.8	LOS B	31.4	226.1	0.73	0.53	0.73	27.6
26	R2	All MCs	181	1.7	181	1.7	0.533	43.9	LOS D	9.2	65.6	0.78	0.76	0.78	30.0
Approach			1559	3.2	1559	3.2	0.545	21.7	LOS B	31.4	226.1	0.74	0.55	0.74	28.2
NorthWest: Goldsmith Avenue															
27	L2	All MCs	253	2.9	253	2.9	*0.749	66.1	LOS E	16.9	121.5	1.00	0.87	1.05	19.1
29	R2	All MCs	375	0.0	375	0.0	*0.761	55.5	LOS D	23.6	165.1	0.97	0.87	0.99	21.8
Approach			628	1.2	628	1.2	0.761	59.7	LOS E	23.6	165.1	0.98	0.87	1.02	20.7
SouthWest: Gilchrist Drive															
30	L2	All MCs	277	1.1	277	1.1	0.525	60.7	LOS E	15.8	111.9	0.89	0.82	0.89	30.4
31	T1	All MCs	1187	3.3	1187	3.3	*0.767	40.2	LOS C	36.5	262.5	0.91	0.82	0.91	24.7
Approach			1464	2.9	1464	2.9	0.767	44.1	LOS D	36.5	262.5	0.91	0.82	0.91	24.4
All Vehicles			3651	2.7	3651	2.7	0.767	37.2	LOS C	36.5	262.5	0.85	0.72	0.85	24.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Goldsmith Avenue											
P7	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
All Pedestrians		1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25

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: 105 PMD2 [105 PM - Kellicar Rd/ Gilchrist Dr_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D2 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gilchrist Drive															
1	L2	All MCs	150	4.9	150	4.9	0.117	30.9	LOS C	2.6	19.0	0.29	0.63	0.29	34.9
2	T1	All MCs	889	1.4	889	1.4	0.594	43.6	LOS D	27.3	193.7	0.82	0.73	0.82	14.1
3	R2	All MCs	197	4.8	197	4.8	0.749	75.0	LOS F	14.4	105.3	1.00	0.87	1.07	15.4
Approach			1236	2.4	1236	2.4	0.749	47.1	LOS D	27.3	193.7	0.78	0.74	0.80	13.5
East: Kellicar Road															
4	L2	All MCs	291	2.2	291	2.2	0.159	7.1	LOS A	0.0	0.0	0.00	0.69	0.00	46.6
5	T1	All MCs	455	0.0	455	0.0	0.760	84.5	LOS F	16.6	116.0	1.00	0.97	1.07	15.8
6	R2	All MCs	94	0.0	94	0.0	0.476	75.2	LOS F	6.7	46.6	0.99	0.78	0.99	11.5
Approach			840	0.8	840	0.8	0.760	67.7	LOS E	16.6	116.0	0.65	0.85	0.69	16.0
North: Gilchrist Drive															
7	L2	All MCs	293	3.6	293	3.6	0.247	46.0	LOS D	7.4	53.6	0.41	0.67	0.41	44.4
8	T1	All MCs	1201	1.1	1201	1.1	*0.911	83.6	LOS F	53.9	380.5	1.00	1.03	1.14	22.5
9	R2	All MCs	221	10.9	221	10.9	0.438	79.7	LOS F	7.5	57.4	0.96	0.79	0.96	18.5
Approach			1715	2.8	1715	2.8	0.911	76.7	LOS F	53.9	380.5	0.89	0.94	0.99	18.8
West: Kellicar Road															
10	L2	All MCs	490	6.5	490	6.5	*0.911	92.1	LOS F	39.6	292.8	1.00	0.99	1.18	5.7
11	T1	All MCs	312	1.7	312	1.7	0.527	73.5	LOS F	10.6	75.4	0.97	0.79	0.97	16.7
12	R2	All MCs	178	3.6	178	3.6	*0.921	94.3	LOS F	15.0	108.2	1.00	1.02	1.35	9.0
Approach			979	4.4	979	4.4	0.921	86.6	LOS F	39.6	292.8	0.99	0.93	1.14	8.7

All Vehicles	4770	2.6	4770	2.6	0.921	67.5	LOS E	53.9	380.5	0.84	0.87	0.92	15.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Gilchrist Drive											
P1	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
East: Kellicar Road											
P2	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
North: Gilchrist Drive											
P3	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
West: Kellicar Road											
P4	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		4	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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

MOVEMENT SUMMARY

Site: 101 AMD3 [101 AM - William Downes Av/ WSU Access_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D3 - Future with development)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Tafe Access South															
1	L2	All MCs	1	0.0	1	0.0	0.017	6.5	LOS A	0.1	0.7	0.54	0.51	0.54	50.6
2	T1	All MCs	14	0.0	14	0.0	0.017	6.7	LOS A	0.1	0.7	0.54	0.51	0.54	48.5
3	R2	All MCs	1	0.0	1	0.0	0.017	11.3	LOS A	0.1	0.7	0.54	0.51	0.54	51.7
Approach			16	0.0	16	0.0	0.017	7.0	LOS A	0.1	0.7	0.54	0.51	0.54	49.0
East: Tafe Access East															
4	L2	All MCs	1	0.0	1	0.0	0.055	6.4	LOS A	0.3	2.3	0.54	0.65	0.54	50.0
5	T1	All MCs	3	0.0	3	0.0	0.055	6.7	LOS A	0.3	2.3	0.54	0.65	0.54	48.4
6	R2	All MCs	47	2.2	47	2.2	0.055	11.4	LOS A	0.3	2.3	0.54	0.65	0.54	45.0
Approach			52	2.0	52	2.0	0.055	11.0	LOS A	0.3	2.3	0.54	0.65	0.54	45.5
North: Approach to Narellan Road															
7	L2	All MCs	171	0.6	171	0.6	0.286	3.3	LOS A	1.4	9.7	0.03	0.55	0.03	50.2
8	T1	All MCs	81	0.0	81	0.0	0.286	3.4	LOS A	1.4	9.7	0.03	0.55	0.03	51.0
9	R2	All MCs	566	1.3	566	1.3	0.286	8.0	LOS A	1.4	9.7	0.03	0.62	0.03	43.1
Approach			817	1.0	817	1.0	0.286	6.5	LOS A	1.4	9.7	0.03	0.60	0.03	45.7
West: William Downes Avenue															
10	L2	All MCs	337	0.9	337	0.9	0.103	3.9	LOS A	0.5	3.7	0.08	0.46	0.08	49.3
11	T1	All MCs	1	0.0	1	0.0	0.002	4.3	LOS A	0.0	0.1	0.18	0.55	0.18	50.8
12	R2	All MCs	2	0.0	2	0.0	0.002	9.0	LOS A	0.0	0.1	0.18	0.55	0.18	49.9
Approach			340	0.9	340	0.9	0.103	3.9	LOS A	0.5	3.7	0.08	0.46	0.08	49.3

All Vehicles	1225	1.0	1225	1.0	0.286	6.0	LOS A	1.4	9.7	0.07	0.56	0.07	46.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 AMD3 [102 AM - Narellan Rd / WSU access_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D3 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 145 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: WSU Access															
1	L2	All MCs	300	1.4	300	1.4	0.370	44.0	LOS D	7.9	55.8	0.89	0.77	0.89	26.1
2	T1	All MCs	1	0.0	1	0.0	0.039	83.7	LOS F	0.1	0.6	1.00	0.58	1.00	7.2
3	R2	All MCs	101	0.0	101	0.0	0.393	77.3	LOS F	3.6	24.9	1.00	0.75	1.00	4.4
Approach			402	1.0	402	1.0	0.393	52.5	LOS D	7.9	55.8	0.92	0.77	0.92	20.5
East: Narellan Road															
4	L2	All MCs	147	0.7	147	0.7	*0.124	11.3	LOS A	2.4	16.6	0.41	0.66	0.41	44.2
5	T1	All MCs	1749	8.1	1749	8.1	0.543	20.3	LOS B	24.9	185.0	0.67	0.60	0.67	45.2
6	R2	All MCs	139	0.0	139	0.0	0.571	70.6	LOS F	9.4	66.0	0.99	0.80	0.99	19.9
Approach			2036	7.0	2036	7.0	0.571	23.1	LOS B	24.9	185.0	0.67	0.62	0.67	42.8
North: Bethlehem Monastery Access															
7	L2	All MCs	7	0.0	7	0.0	0.027	62.1	LOS E	0.4	3.1	0.88	0.67	0.88	5.1
8	T1	All MCs	1	0.0	1	0.0	*0.455	79.5	LOS F	4.3	29.8	1.00	0.76	1.00	4.9
9	R2	All MCs	118	0.0	118	0.0	0.455	77.1	LOS F	4.3	29.8	1.00	0.76	1.00	19.0
Approach			126	0.0	126	0.0	0.455	76.2	LOS F	4.3	29.8	0.99	0.75	0.99	18.5
West: Narellan Road															
10	L2	All MCs	525	0.0	525	0.0	0.329	10.8	LOS A	5.8	40.9	0.21	0.61	0.21	47.7
11	T1	All MCs	2935	4.4	2935	4.4	*0.808	17.6	LOS B	51.2	372.0	0.76	0.70	0.76	39.4
12	R2	All MCs	669	1.1	669	1.1	*0.877	68.4	LOS E	20.5	145.1	1.00	1.08	1.18	19.1
Approach			4129	3.3	4129	3.3	0.877	25.0	LOS B	51.2	372.0	0.73	0.75	0.76	33.7

All Vehicles	6693	4.2	6693	4.2	0.877	27.0	LOS B	51.2	372.0	0.73	0.71	0.75	35.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: WSU Access											
P1	Full	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P1B	Slip/Bypass	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
East: Narellan Road											
P21	Stage 1	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P22	Stage 2	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P2B	Slip/Bypass	1	38.7	LOS D	0.0	0.0	0.92	0.92	54.1	20.0	0.37
North: Bethlehem Monastery Access											
P3	Full	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
West: Narellan Road											
P41	Stage 1	1	66.6	LOS F	0.0	0.0	0.96	0.96	82.0	20.0	0.24
P42	Stage 2	1	37.8	LOS D	0.0	0.0	0.92	0.92	53.2	20.0	0.38
All Pedestrians		8	59.5	LOS E	0.0	0.0	0.95	0.95	74.9	20.0	0.27

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: 103 AMD3 [103 AM - Narellan Rd/ Blaxland Rd/ Gilchrist Dr_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D3 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Narellan Road															
21	L2	All MCs	26	8.2	26	8.2	0.030	49.2	LOS D	0.9	6.5	0.51	0.64	0.51	35.0
22	T1	All MCs	1018	6.1	1018	6.1	0.613	56.8	LOS E	21.5	158.5	0.92	0.79	0.92	23.9
23	R2	All MCs	393	1.9	393	1.9	0.518	62.8	LOS E	12.8	91.2	0.94	0.81	0.94	29.3
Approach			1437	5.0	1437	5.0	0.613	58.3	LOS E	21.5	158.5	0.92	0.80	0.92	24.3
NorthEast: Blaxland Road															
24	L2	All MCs	513	1.4	513	1.4	0.517	30.6	LOS C	23.5	166.4	0.69	0.83	0.69	39.6
25	T1	All MCs	865	1.7	865	1.7	0.831	58.4	LOS E	33.5	238.0	1.00	0.95	1.07	21.5
26	R2	All MCs	388	9.8	388	9.8	*0.931	96.0	LOS F	16.6	126.2	1.00	1.04	1.36	15.0
Approach			1766	3.4	1766	3.4	0.931	58.6	LOS E	33.5	238.0	0.91	0.93	1.02	24.3
NorthWest: Narellan Road															
27	L2	All MCs	863	4.4	863	4.4	0.858	47.1	LOS D	38.9	282.7	0.91	1.02	0.92	37.6
28	T1	All MCs	1511	4.5	1511	4.5	*0.886	67.6	LOS E	39.0	283.6	1.00	1.01	1.13	29.7
29	R2	All MCs	663	7.3	663	7.3	*0.909	83.6	LOS F	27.3	203.0	1.00	1.02	1.23	16.6
Approach			3037	5.1	3037	5.1	0.909	65.3	LOS E	39.0	283.6	0.97	1.01	1.09	27.4
SouthWest: Gilchrist Drive															
30	L2	All MCs	558	5.7	558	5.7	0.340	40.2	LOS C	15.3	112.5	0.82	0.74	0.82	17.4
31	T1	All MCs	716	2.1	716	2.1	*0.917	94.0	LOS F	30.2	215.0	1.00	1.06	1.19	22.1
32	R2	All MCs	59	0.0	59	0.0	0.798	113.6	LOS F	4.6	32.3	1.00	0.79	1.08	21.0
Approach			1334	3.5	1334	3.5	0.917	72.3	LOS F	30.2	215.0	0.92	0.91	1.03	19.3

All Vehicles	7573	4.4	7573	4.4	0.931	63.6	LOS E	39.0	283.6	0.94	0.94	1.03	24.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Narellan Road											
P7	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
SouthWest: Gilchrist Drive											
P8	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
P8B	Slip/Bypass	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		3	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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: 104 AMD3 [104 AM - Goldsmith Av/Gilchrist Dr_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D3 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Gilchrist Drive															
25	T1	All MCs	1287	4.2	1287	4.2	0.475	15.5	LOS B	28.4	206.1	0.67	0.43	0.67	30.4
26	R2	All MCs	307	4.1	307	4.1	*0.690	50.2	LOS D	18.8	136.6	0.89	0.82	0.89	28.1
Approach			1594	4.2	1594	4.2	0.690	22.2	LOS B	28.4	206.1	0.71	0.51	0.71	29.4
NorthWest: Goldsmith Avenue															
27	L2	All MCs	308	3.4	308	3.4	0.345	30.1	LOS C	13.5	97.3	0.65	0.77	0.65	30.5
29	R2	All MCs	307	0.3	307	0.3	*0.690	61.6	LOS E	20.5	143.8	0.97	0.85	0.97	20.4
Approach			615	1.9	615	1.9	0.690	45.8	LOS D	20.5	143.8	0.81	0.81	0.81	24.4
SouthWest: Gilchrist Drive															
30	L2	All MCs	328	1.0	328	1.0	0.252	20.3	LOS B	8.3	58.7	0.38	0.69	0.38	46.2
31	T1	All MCs	1029	3.4	1029	3.4	*0.699	40.2	LOS C	33.5	241.6	0.88	0.79	0.88	24.1
Approach			1357	2.8	1357	2.8	0.699	35.4	LOS C	33.5	241.6	0.76	0.76	0.76	28.3
All Vehicles			3567	3.2	3567	3.2	0.699	31.3	LOS C	33.5	241.6	0.75	0.66	0.75	27.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Goldsmith Avenue											
P7	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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: 105 AMD3 [105 AM - Kellicar Rd/ Gilchrist Dr_AM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [2029 Network AM Peak (Network Folder: Scenario D3 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gilchrist Drive															
1	L2	All MCs	115	7.3	115	7.3	0.090	17.8	LOS B	0.8	6.1	0.31	0.62	0.31	37.6
2	T1	All MCs	1115	2.0	1115	2.0	0.828	32.1	LOS C	21.0	149.7	0.97	0.97	1.14	16.7
3	R2	All MCs	161	5.9	161	5.9	*0.788	43.6	LOS D	6.1	44.7	1.00	0.94	1.29	21.9
Approach			1390	2.9	1390	2.9	0.828	32.2	LOS C	21.0	149.7	0.92	0.94	1.09	17.0
East: Kellicar Road															
4	L2	All MCs	113	6.5	113	6.5	0.064	6.7	LOS A	0.0	0.0	0.00	0.53	0.00	46.2
5	T1	All MCs	164	2.6	164	2.6	*0.428	34.1	LOS C	2.8	20.2	0.98	0.75	0.98	25.1
6	R2	All MCs	51	0.0	51	0.0	*0.318	40.5	LOS C	1.8	12.3	0.98	0.74	0.98	18.4
Approach			328	3.5	328	3.5	0.428	25.6	LOS B	2.8	20.2	0.64	0.67	0.64	29.0
North: Gilchrist Drive															
7	L2	All MCs	224	3.3	224	3.3	0.171	19.1	LOS B	1.6	11.5	0.31	0.64	0.31	48.2
8	T1	All MCs	1058	2.8	1058	2.8	*0.848	34.5	LOS C	22.3	159.6	0.98	1.01	1.20	32.4
9	R2	All MCs	290	5.4	290	5.4	0.709	41.6	LOS C	5.3	38.7	1.00	0.88	1.17	25.3
Approach			1571	3.3	1571	3.3	0.848	33.6	LOS C	22.3	159.6	0.89	0.93	1.07	30.3
West: Kellicar Road															
10	L2	All MCs	196	8.6	196	8.6	0.374	26.9	LOS B	5.4	40.6	0.83	0.78	0.83	13.2
11	T1	All MCs	97	5.4	97	5.4	0.257	33.3	LOS C	1.6	11.9	0.96	0.71	0.96	25.4
12	R2	All MCs	38	11.1	38	11.1	0.257	40.4	LOS C	1.3	10.0	0.97	0.73	0.97	16.9
Approach			331	8.0	331	8.0	0.374	30.3	LOS C	5.4	40.6	0.89	0.76	0.89	18.5

All Vehicles	3621	3.6	3621	3.6	0.848	32.1	LOS C	22.3	159.6	0.88	0.89	1.02	25.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Gilchrist Drive											
P1	Full	1	29.3	LOS C	0.0	0.0	0.91	0.91	44.6	20.0	0.45
East: Kellicar Road											
P2	Full	1	29.3	LOS C	0.0	0.0	0.91	0.91	44.6	20.0	0.45
North: Gilchrist Drive											
P3	Full	1	29.3	LOS C	0.0	0.0	0.91	0.91	44.6	20.0	0.45
West: Kellicar Road											
P4	Full	1	29.3	LOS C	0.0	0.0	0.91	0.91	44.6	20.0	0.45
All Pedestrians		4	29.3	LOS C	0.0	0.0	0.91	0.91	44.6	20.0	0.45

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

MOVEMENT SUMMARY

Site: 101 PMD3 [101 PM - William Downes Av/ WSU Access_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D3 - Future with development)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Tafe Access South															
1	L2	All MCs	1	0.0	1	0.0	0.018	4.9	LOS A	0.1	0.6	0.35	0.46	0.35	51.5
2	T1	All MCs	18	0.0	18	0.0	0.018	5.1	LOS A	0.1	0.6	0.35	0.46	0.35	49.8
3	R2	All MCs	2	0.0	2	0.0	0.018	9.7	LOS A	0.1	0.6	0.35	0.46	0.35	52.4
Approach			21	0.0	21	0.0	0.018	5.6	LOS A	0.1	0.6	0.35	0.46	0.35	50.3
East: Tafe Access East															
4	L2	All MCs	1	0.0	1	0.0	0.035	4.8	LOS A	0.2	1.2	0.34	0.60	0.34	50.7
5	T1	All MCs	2	0.0	2	0.0	0.035	5.1	LOS A	0.2	1.2	0.34	0.60	0.34	49.3
6	R2	All MCs	39	0.0	39	0.0	0.035	9.6	LOS A	0.2	1.2	0.34	0.60	0.34	46.2
Approach			42	0.0	42	0.0	0.035	9.3	LOS A	0.2	1.2	0.34	0.60	0.34	46.6
North: Approach to Narellan Road															
7	L2	All MCs	54	0.0	54	0.0	0.115	3.3	LOS A	0.4	3.1	0.04	0.57	0.04	49.7
8	T1	All MCs	29	0.0	29	0.0	0.115	3.4	LOS A	0.4	3.1	0.04	0.57	0.04	50.4
9	R2	All MCs	244	0.4	244	0.4	0.115	8.0	LOS A	0.4	3.1	0.04	0.62	0.04	43.2
Approach			327	0.3	327	0.3	0.115	6.8	LOS A	0.4	3.1	0.04	0.61	0.04	45.2
West: William Downes Avenue															
10	L2	All MCs	401	0.8	401	0.8	0.166	3.9	LOS A	0.8	5.9	0.10	0.46	0.10	49.1
11	T1	All MCs	4	0.0	4	0.0	0.005	4.3	LOS A	0.0	0.1	0.16	0.48	0.16	52.1
12	R2	All MCs	2	0.0	2	0.0	0.005	9.0	LOS A	0.0	0.1	0.16	0.48	0.16	51.1
Approach			408	0.8	408	0.8	0.166	3.9	LOS A	0.8	5.9	0.10	0.46	0.10	49.2

All Vehicles	798	0.5	798	0.5	0.166	5.4	LOS A	0.8	5.9	0.10	0.53	0.10	47.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 PMD3 [102 PM - Narellan Rd / WSU access_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D3 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 181 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: WSU Access															
1	L2	All MCs	381	0.8	381	0.8	0.550	93.4	LOS F	15.3	107.7	0.96	0.82	0.96	18.7
2	T1	All MCs	1	0.0	1	0.0	0.008	117.4	LOS F	0.1	0.6	0.95	0.56	0.95	7.2
3	R2	All MCs	96	0.0	96	0.0	0.196	80.2	LOS F	3.8	26.6	0.93	0.74	0.93	4.2
Approach			479	0.7	479	0.7	0.550	90.8	LOS F	15.3	107.7	0.95	0.80	0.95	14.5
East: Narellan Road															
4	L2	All MCs	53	0.0	53	0.0	0.038	21.6	LOS B	1.2	8.3	0.28	0.62	0.28	43.6
5	T1	All MCs	2371	3.8	2371	3.8	*0.725	35.3	LOS C	50.1	360.3	0.79	0.72	0.79	40.9
6	R2	All MCs	92	0.0	92	0.0	0.595	104.2	LOS F	8.0	56.1	1.00	0.79	1.00	16.4
Approach			2516	3.6	2516	3.6	0.725	37.5	LOS C	50.1	360.3	0.78	0.72	0.78	37.0
North: Bethlehem Monastery Access															
7	L2	All MCs	87	0.0	87	0.0	0.250	72.2	LOS F	6.5	45.8	0.90	0.77	0.90	4.4
8	T1	All MCs	1	0.0	1	0.0	*0.689	93.8	LOS F	14.5	101.6	1.00	0.83	1.02	4.3
9	R2	All MCs	338	0.0	338	0.0	*0.689	87.2	LOS F	14.5	101.8	1.00	0.83	1.02	17.5
Approach			426	0.0	426	0.0	0.689	84.1	LOS F	14.5	101.8	0.98	0.82	0.99	15.7
West: Narellan Road															
10	L2	All MCs	83	0.0	83	0.0	0.051	10.5	LOS A	0.6	4.2	0.12	0.58	0.12	48.4
11	T1	All MCs	1718	4.5	1718	4.5	0.526	25.4	LOS B	30.1	218.7	0.65	0.59	0.65	34.2
12	R2	All MCs	279	0.4	279	0.4	*0.910	109.8	LOS F	13.8	96.7	1.00	0.99	1.30	13.6
Approach			2081	3.8	2081	3.8	0.910	36.2	LOS C	30.1	218.7	0.68	0.65	0.72	28.1

All Vehicles	5502	3.1	5502	3.1	0.910	45.3	LOS D	50.1	360.3	0.77	0.71	0.79	29.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: WSU Access											
P1	Full	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P1B	Slip/Bypass	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
East: Narellan Road											
P21	Stage 1	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P22	Stage 2	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P2B	Slip/Bypass	1	49.0	LOS E	0.0	0.0	0.93	0.93	64.4	20.0	0.31
North: Bethlehem Monastery Access											
P3	Full	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
West: Narellan Road											
P41	Stage 1	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
P42	Stage 2	1	84.6	LOS F	0.0	0.0	0.97	0.97	100.0	20.0	0.20
All Pedestrians		8	80.1	LOS F	0.0	0.0	0.96	0.96	95.5	20.0	0.21

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: 103 PMD3 [103 PM - Narellan Rd/ Blaxland Rd/ Gilchrist Dr_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D3 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Narellan Road															
21	L2	All MCs	37	0.0	37	0.0	0.041	52.0	LOS D	1.0	7.3	0.48	0.65	0.48	37.6
22	T1	All MCs	1056	2.8	1056	2.8	*0.907	83.2	LOS F	27.6	197.6	1.00	1.06	1.23	18.3
23	R2	All MCs	573	1.3	573	1.3	*0.908	81.9	LOS F	22.2	157.4	1.00	1.02	1.27	25.4
Approach			1665	2.2	1665	2.2	0.908	82.0	LOS F	27.6	197.6	0.99	1.04	1.23	20.3
NorthEast: Blaxland Road															
24	L2	All MCs	548	3.1	548	3.1	0.486	23.6	LOS B	19.9	142.8	0.59	0.79	0.59	43.3
25	T1	All MCs	1097	2.5	1097	2.5	0.780	40.2	LOS C	35.8	255.8	0.94	0.85	0.94	27.1
26	R2	All MCs	723	2.2	723	2.2	*0.893	74.9	LOS F	27.2	194.3	1.00	1.00	1.20	17.9
Approach			2369	2.5	2369	2.5	0.893	46.9	LOS D	35.8	255.8	0.87	0.88	0.94	26.9
NorthWest: Narellan Road															
27	L2	All MCs	513	5.3	513	5.3	0.525	26.6	LOS B	18.3	134.1	0.68	0.88	0.68	40.7
28	T1	All MCs	1000	4.9	1000	4.9	0.852	64.8	LOS E	24.1	175.9	1.00	0.98	1.14	29.3
29	R2	All MCs	365	5.8	365	5.8	0.597	64.1	LOS E	11.7	85.9	0.98	0.82	0.98	20.0
Approach			1878	5.2	1878	5.2	0.852	54.3	LOS D	24.1	175.9	0.91	0.92	0.99	30.3
SouthWest: Gilchrist Drive															
30	L2	All MCs	584	4.8	584	4.8	0.367	40.8	LOS C	15.7	114.1	0.85	0.75	0.85	17.2
31	T1	All MCs	762	1.8	762	1.8	*0.886	83.0	LOS F	28.2	200.1	1.00	1.02	1.15	24.2
32	R2	All MCs	30	0.0	30	0.0	0.372	101.4	LOS F	2.0	13.9	0.95	0.71	0.95	23.0
Approach			1376	3.0	1376	3.0	0.886	65.5	LOS E	28.2	200.1	0.94	0.89	1.02	20.5

All Vehicles	7289	3.2	7289	3.2	0.908	60.3	LOS E	35.8	255.8	0.92	0.93	1.03	24.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Narellan Road											
P7	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
SouthWest: Gilchrist Drive											
P8	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
P8B	Slip/Bypass	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
All Pedestrians		3	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25

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: 104 PMD3 [104 PM - Goldsmith Av/Gilchrist Dr_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D3 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Gilchrist Drive															
25	T1	All MCs	1377	3.4	1377	3.4	0.532	16.7	LOS B	29.8	214.6	0.69	0.50	0.69	29.4
26	R2	All MCs	169	1.9	169	1.9	0.538	46.5	LOS D	8.9	63.4	0.80	0.77	0.80	29.2
Approach			1546	3.2	1546	3.2	0.538	19.9	LOS B	29.8	214.6	0.70	0.53	0.70	29.3
NorthWest: Goldsmith Avenue															
27	L2	All MCs	230	3.2	230	3.2	*0.738	67.3	LOS E	15.4	110.9	1.00	0.86	1.05	18.9
29	R2	All MCs	345	0.0	345	0.0	*0.755	56.4	LOS D	21.7	151.9	0.96	0.87	0.99	21.5
Approach			575	1.3	575	1.3	0.755	60.8	LOS E	21.7	151.9	0.98	0.86	1.02	20.4
SouthWest: Gilchrist Drive															
30	L2	All MCs	256	1.2	256	1.2	0.513	60.3	LOS E	14.8	104.7	0.90	0.82	0.90	30.1
31	T1	All MCs	1187	3.3	1187	3.3	*0.711	35.7	LOS C	33.9	244.2	0.86	0.78	0.86	26.4
Approach			1443	2.9	1443	2.9	0.711	40.1	LOS C	33.9	244.2	0.87	0.78	0.87	25.7
All Vehicles			3565	2.8	3565	2.8	0.755	34.7	LOS C	33.9	244.2	0.81	0.69	0.82	25.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthWest: Goldsmith Avenue											
P7	Full	1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25
All Pedestrians		1	64.1	LOS F	0.0	0.0	0.96	0.96	79.5	20.0	0.25

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: 105 PMD3 [105 PM - Kellicar Rd/ Gilchrist Dr_PM (Site Folder: Site folder)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [2029 Network PM Peak (Network Folder: Scenario D3 - Future with development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Gilchrist Drive															
1	L2	All MCs	150	4.9	150	4.9	0.117	30.6	LOS C	2.6	19.0	0.29	0.63	0.29	34.9
2	T1	All MCs	879	1.4	879	1.4	0.588	43.4	LOS D	26.9	190.9	0.82	0.72	0.82	14.1
3	R2	All MCs	197	4.8	197	4.8	0.749	75.0	LOS F	14.4	105.3	1.00	0.87	1.07	15.4
Approach			1226	2.4	1226	2.4	0.749	46.9	LOS D	26.9	190.9	0.78	0.74	0.79	13.6
East: Kellicar Road															
4	L2	All MCs	291	2.2	291	2.2	0.159	7.1	LOS A	0.0	0.0	0.00	0.69	0.00	46.6
5	T1	All MCs	455	0.0	455	0.0	0.760	84.5	LOS F	16.6	116.0	1.00	0.97	1.07	15.8
6	R2	All MCs	93	0.0	93	0.0	0.470	75.1	LOS F	6.6	46.0	0.99	0.78	0.99	11.5
Approach			838	0.8	838	0.8	0.760	67.7	LOS E	16.6	116.0	0.65	0.85	0.69	16.0
North: Gilchrist Drive															
7	L2	All MCs	289	3.6	289	3.6	0.244	45.8	LOS D	7.3	52.6	0.40	0.67	0.40	44.4
8	T1	All MCs	1185	1.1	1185	1.1	*0.896	79.7	LOS F	51.5	363.5	1.00	1.00	1.12	23.4
9	R2	All MCs	211	11.5	211	11.5	0.419	79.2	LOS F	7.1	54.9	0.96	0.79	0.96	18.5
Approach			1685	2.8	1685	2.8	0.896	73.8	LOS F	51.5	363.5	0.89	0.91	0.98	19.3
West: Kellicar Road															
10	L2	All MCs	481	6.6	481	6.6	*0.893	87.3	LOS F	37.6	277.9	1.00	0.96	1.15	6.0
11	T1	All MCs	312	1.7	312	1.7	0.527	73.1	LOS F	10.6	75.4	0.97	0.79	0.97	16.7
12	R2	All MCs	178	3.6	178	3.6	*0.921	94.3	LOS F	15.0	108.2	1.00	1.02	1.35	9.0
Approach			970	4.4	970	4.4	0.921	84.0	LOS F	37.6	277.9	0.99	0.92	1.13	8.9

All Vehicles	4720	2.7	4720	2.7	0.921	65.9	LOS E	51.5	363.5	0.84	0.86	0.91	15.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Gilchrist Drive											
P1	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
East: Kellicar Road											
P2	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
North: Gilchrist Drive											
P3	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
West: Kellicar Road											
P4	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24
All Pedestrians		4	69.1	LOS F	0.0	0.0	0.96	0.96	84.5	20.0	0.24

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

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