Image source: BVN

BaptistCare Macquarie Park Concept Master Plan

Appendix S: Transport Impact Assessment

State Significant Development Application (SSDA)

Prepared for: **BaptistCare**

1 November 2022

PROJECT INFORMATION

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1 Introduction

1.1 Background

This report has been prepared to accompany a State Significant Development Application (SSDA) for a Concept Master Plan for the site located at 157 Balaclava Road, Macquarie Park.

Specifically, consent is sought for the following in this Concept SSDA:

- A mixed use development comprising a maximum GFA of 190,000m^2 dedicated to a range of land uses including:
  - Student Housing;
  - Seniors Housing;
  - Build to Rent;
  - Retail;
  - Residential;
  - Mixed uses including commercial and allied health; and
  - A school.
- Maximum building heights and GFA for each development block;
- Public domain landscape concept, including parks, streets and pedestrian connections; and
- Vehicular and intersection upgrades.

1.2 The site

The site is located at 157 Balaclava Road, Macquarie Park and is legally identified as Lot 60 in DP 1107965. The site is located near the corner of Herring Road and Epping Road within the City of Ryde Local Government Area (LGA). It is directly south of Macquarie University and in close proximity to Macquarie Shopping Centre. The surrounding area is characterised by a mix of commercial and education uses, as well as student accommodation and residential dwellings.

The site comprises a significant land holding with street frontages to Balaclava Road and Epping Road. It currently accommodates several low-medium density buildings that are connected via internal footpaths and lower order road networks. The total site area of the BaptistCare landholding is 63,871m2.

Figure 1 Site location plan

Source: BVN

1.3 Report purpose

This report has been prepared in response to the Secretary's Environmental Assessment Requirements (SEARS) dated 17 August 2022 for SSD-46561712. Specifically, this report has been prepared to respond to those SEARS summarised in Table 1.

Table 1 SEARs requirements

Item	Description of Requirement	Section Reference (this report)
1. Statutory and Strategic Context	*Future Transport 2056 and supporting plans*	2
16. Transport and Accessibility	*Provide a Traffic and Transport Impact Assessment that includes the following:*	This report
	• *an analysis of the existing traffic network, including the road hierarchy, current daily and peak hour vehicle movements and existing performance levels of nearby intersections, utilising quantitative traffic modelling methods (e.g. SIDRA network modelling).*	3

Item	Description of Requirement	Section Reference (this report)
16. Transport and Accessibility	• *estimated total daily and peak hour vehicular trip generation by the proposal, including vehicle, public transport, pedestrian and bicycle trips*	6.4
	• *the proposed modal split for all users of the development including vehicle, pedestrian, bicycle riders, public transport, school buses and other sustainable travel modes.*	6.3

	• *an assessment of the predicted impacts of this traffic on road safety and the capacity of nearby intersections both at the commencement of operation and in a 10-year time period (using SIDRA network modelling).*
	• *The key intersections to be modelled/examined include (but are not limited to):*
	  ○ *Epping Road / Balaclava Road .*
	  ○ *Epping Road / Herring Road.*
	  ○ *Herring Road / Ivanhoe Place.*
	  ○ *Waterloo Road and Herring Road.*
	  ○ *cumulative traffic impacts from any surrounding approved development(s).*
		7

	an assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures, possible new infrastructure to insure safe pedestrian movements and personal safety in line with CPTED.	5.5
	a map of the proposed access which identifies any proposed new roads, upgraded connections, public roads, bus routes, footpaths and cycleways.	5
	consideration of vehicle circulation and manoeuvring throughout the site.	5.2
	demonstration of compliance with the appropriate parking codes.	6.1
	emergency vehicle access, service vehicle access, delivery and loading arrangements.	5.4
	the proposed walking and cycling access arrangements and connections to public transport services.	5.3
	measures to integrate the development with the existing and future public transport network.	5.3
	measures to ameliorate any adverse traffic and transport impacts due to the development (including any necessary infrastructure improvements).	7

1.4 Existing development

The BaptistCare site is a significant land holding with extensive street frontages to Balaclava Road and Epping Road (approximately 185m and 365m respectively). It accommodates several low-medium density buildings that are connected via internal footpaths and lower order road networks. The buildings accommodate aged care and retirement living and include the following:

- Residential care facilities providing various level of support including:
  - Cooinda Court (68 rooms);
  - Dorothy Henderson Lodge (66 rooms, 14 dementia rooms);
  - Shalom Centre (132 beds); and
- Willandra Retirement Village (130 independent living units).

Throughout the site there are various areas of passive open space, with well matured trees and vegetation scattered along the existing streets and between buildings.

Towards the north-west fronting Epping Road, is a strata site (legally described as SP9264) that does not form part of the site or proposed Master Plan and is subject to an approved DA for a residential flat building.

2 Transport Policy Context

2.1 Future Transport 2056

The Future Transport Strategy is an update of the 2012 Long Term Transport Master Plan for NSW. It is a 40-year strategy, supported by plans for regional NSW and for Greater Sydney. The strategy outlines that transport is an enabler of economic and social activity and contributes to long term economic, social and environmental outcome. The Future Transport strategy was recently updated in July 2022 to reflect contemporary transport planning for the state of NSW.

The availability of various services within the BaptistCare site, including residential, retail, employment, health and education, all within close walking distance of public transport within Macquarie Park, aligns with the '15-minute neighbourhoods' concept outlined in the recently released Future Transport Strategy. The 15-minute neighbourhood concept aims to support local communities and healthy lifestyles by prioritising place making, walking, cycling, micromobility and last mile freight, to support 15-minute access to connected, local transport networks, precincts and local destinations. The BaptistCare Macquarie Park Concept Master Plan will facilitate excellent access to transport, services and open space – allowing for the majority of trips to be made on foot with reduced reliance on private vehicle.

Figure 2 15-minute neighbourhood concept

Source: Future Transport Strategy (Transport for NSW, 2022)

The strategy identifies a suite of existing and future transport networks servicing the Macquarie Park strategic centre, including road, rail, light rail and rapid bus as illustrated in the following figures.

Figure 3 Existing and future transport networks (road and bus)

Source: Future Transport Strategy (Transport for NSW, 2022)

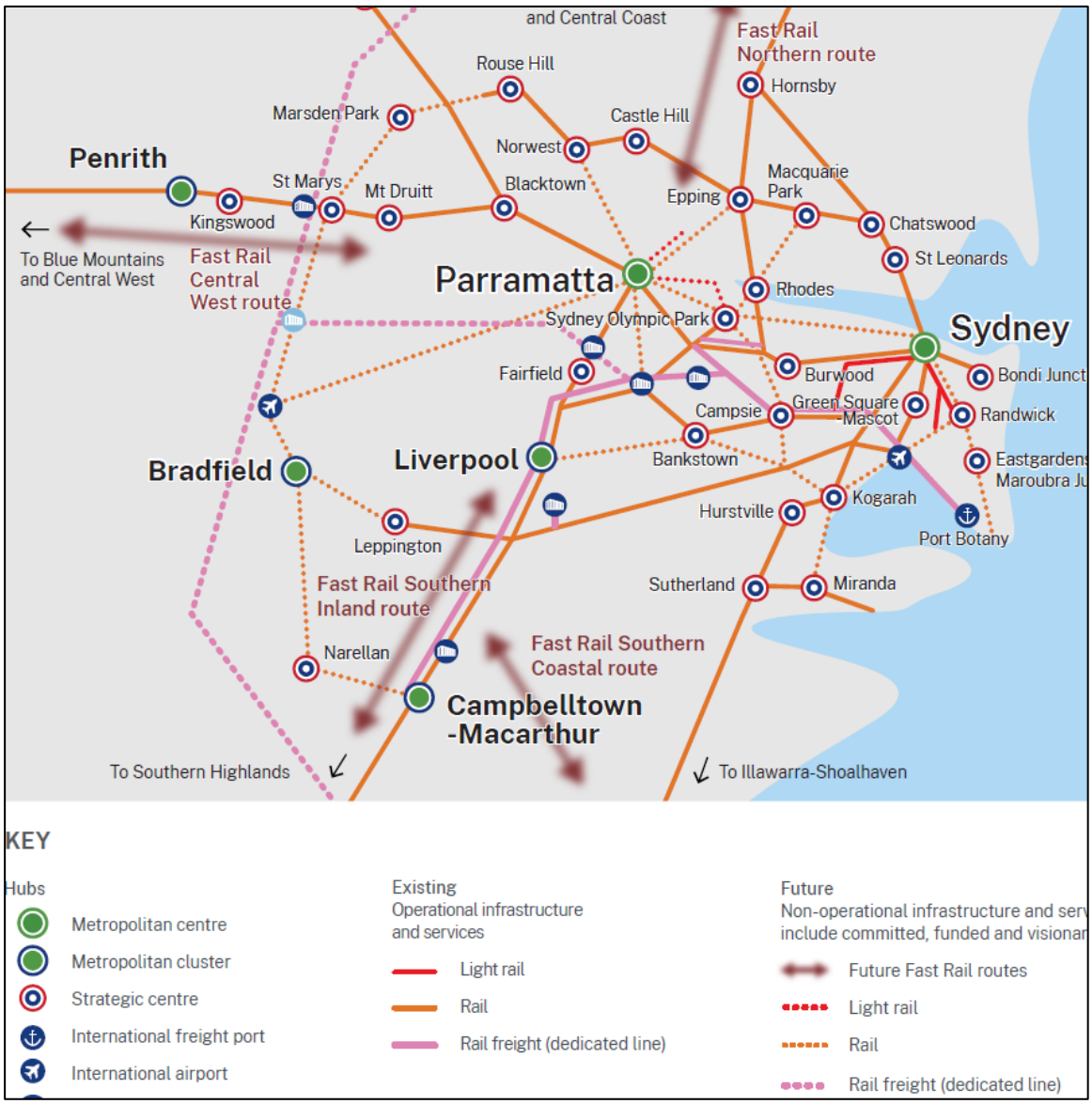

Figure 4 Existing and future transport networks (rail and light rail)

Source: Future Transport Strategy (Transport for NSW, 2022)

2.2 Transport for NSW modal strategies

Sydney's Rail Future

Sydney's rail network was released in June 2012 and provides the strategic framework to transform a 150 year old rail network, as well as a staged plan to achieve that strategy. Sydney's rail network will be modernised in five stages. The document details the proposed future improvements to the rail network servicing Macquarie Park, of which occupants of the future BaptistCare site will directly benefit from.

Sydney's Bus Future

Sydney's Bus Future (Transport for NSW, 2013) provides the framework for improving and delivering more frequent and reliable bus services throughout Sydney. The core aim of the strategy is to provide an integrated bus network with seamless connections to other transport services. The strategy also aims to tailor bus services to customer needs. In this vein, bus services will be focused into three key types, with associated priority and infrastructure investment:

- Rapid routes, which will use priority infrastructure, connect regionally throughout the city and have stops every 800m-1km
- Suburban routes, which will have stops every 400m and have mix of frequent 'turn up and go' and timetabled services
- Local routes, which will complete the network using local streets.

Residents, visitors and staff of the future BaptistCare site will take advantage of these improved connections.

Sydney's Walking Future

Sydney's Walking Future outlines a strategy to promote walking in Sydney and facilitate more convenient, better connected and safer connections. Key points to emerge from the strategy that are relevant to the project include:

- NSW Government commitment to invest in new walking links that connect people to public transport, including Central Station;
- Prioritisation of investment in walking infrastructure to be prioritised within 2km of centres and public transport interchanges; and
- Commitment to invest in walking facilities as part of the Transport Access Program, including improved circulation spaces around station precincts and safer walking links.

The BaptistCare Macquarie Park Concept Master Plan facilitates enhanced walking connections through to Herring Road and Epping Road, in line with the objectives of this document.

2.3 NSW Government technical guidelines

The following documents have been considered in this transport strategy for the BaptistCare Macquarie Park Concept Master Plan:

- ***RMS Guide to Traffic Generating Developments***

  Used to inform the traffic assessment undertaken for the project including framework for undertaking the transport impact assessment.

- ***NSW Planning Guidelines for Walking and Cycling***

  This document has been used to inform the development of the walking and cycling measures proposed in this strategy as well as appropriate rates for bicycle parking.

- ***Guide to Traffic Management – Part 12: Traffic Impacts of Developments*** (AUSTROADS)

  This guide has been referenced for the appropriate methodology to be used for traffic impact assessment of the development.

2.4 City of Ryde DCP 2014 (Macquarie Park Corridor)

The Development Control Plan (DCP) 2014 provides guidelines, objectives and controls for people who wish to carry out development in the City of Ryde. Part 4.5 provides objectives, controls and design criteria to achieve desirable development outcomes in line with Council's vision for the Macquarie Park Corridor. It contains a future fine grained street network which includes a new public road connection running through Macquarie University adjacent to the boundary of the BaptistCare site – connecting Balaclava Road with the future signalised intersection at Herring Road / Ivanhoe Place.

2.5 City of Ryde integrated transport strategy 2041

The City of Ryde Integrated Transport Strategy 2041 explores the future of local transport and land use, examining the impacts of a growing population and an expanding economy. The Strategy seeks to align with recent Sydney-wide transport and land use plans, including Future Transport 2056 and Greater Sydney Service and Infrastructure Plan 2056, and proposes 58 priority transport projects including active transport, public transport and road projects. Relevant to the BaptistCare site the strategy proposes new rapid bus connections through Macquarie Park, bus priority lanes on Epping Road and new local pedestrian and cycling links to better service the growing population. The strategy sets out mode share targets for Macquarie Park as follows:

- Private vehicle mode share – 40%
- Public transport mode share – 45%
- Active transport mode share – 15%

3 Existing Conditions

3.1 Travel behaviours

Travel behaviour of residents and employees of the future development can be estimated through review of both the existing behavioural characteristics of residents and employees of Macquarie Park. A number of data sets are available which provide context to these characteristics which can assist at deriving future trip generations for the Project. These data sets include:

- Transport for NSW House Hold Travel Survey data (HTS), which provides travel data for personal travel behaviour within the Sydney Greater Metropolitan Area.
- The Australian Bureau of Transport Statistics Journey to Work data, which is based on the travel behaviour recorded through the Australian Bureau of Statistics 5 yearly Census. The data provides information on employment locations and method of travel to work.

The choice of travel mode is influenced by a range of variables including access to public transport, location and access of employment, proximity to retail services and car ownership levels. The Macquarie Park precinct currently operates as a commercial centre providing predominantly 'destination' employment land uses (including education facilities and shopping centres), with limited residential 'origin' land uses. This will however change as residential developments continue to be delivered in Macquarie Park over the coming years.

A summary of the proportion of total trips for the Ryde – Hunters Hill SA3 area, based on outputs of the House Hold Travel Survey data, is summarised in Table 2 below.

Table 2 Existing mode share (all trips)

Mode of Travel	Mode Share
Car driver	45.9%
Car passenger	19.5%
Bus	10.3%
Train	5.4%
Walk	17.2%

Travel behaviours for residents and employees within the area surrounding the site[1] been analysed using 2016 Journey to Work Census data. The data demonstrates a high proportion of people travelling from Macquarie Park use public transport or walk to nearby employment, accounting for over two thirds of all journey to work trips. This reflects the strong availability and accessibility of public transport as well the various employment opportunities in the area.

Table 3 Existing mode share (journey to work trips)

Mode of travel	Proportion of trips	
	Residents travelling to work from Macquarie Park	*Employees travelling into Macquarie Park for work*
Car driver	28%	65%
Car passenger	2%	3%
Bus	6%	10%
Train	43%	20%
Walk / Cycle	21%	2%
Total	**100.00%**	**100.00%**

[1] SA1, code 12602150020 & Destination Zone 115003524

3.2 Road network

To manage the extensive network of roads for which councils are responsible under the Roads Act 1993, Transport for NSW (TfNSW) in partnership with local government established an administrative framework of *State, Regional,* and *Local Road* categories. State Roads are managed and financed by TfNSW and Regional and Local Roads are managed and financed by councils. Regional Roads perform an intermediate function between the main arterial network of State Roads and council controlled Local Roads. Key State and Regional roads which provide access to the site are illustrated in Figure 5.

Epping Road is State Classified Road on the southern boundary of the site which caters for regional east-west traffic travelling through the City of Ryde. Epping Road extends from the Pacific Highway and Lane Cove in the east to Epping in the west. It provides an important link between Sydney's Northern and North West suburbs and the North Shore and CBD. Balaclava Road and Herring Road are classified regional roads which provide connections through to Epping Road and form part of the road network servicing the site. The M2 Hills Motorway is an arterial road approximately 1 kilometre north-east of the site that connects with the Lane Cove Tunnel in North Ryde and provides regional connectivity through to Macquarie Park.

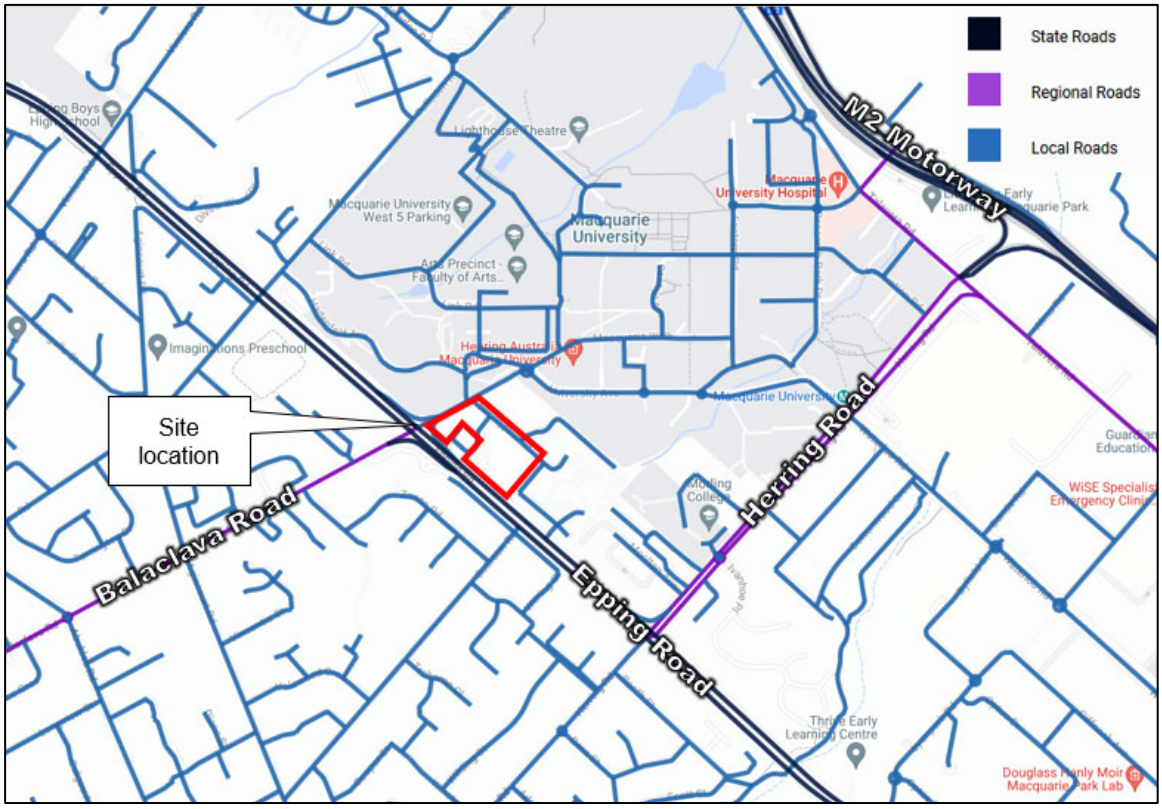

Figure 5 Road network serving the site

3.3 Site access

The site is currently accessed by vehicles through driveways fronting Balaclava Road and Epping Road as indicated in Figure 6. All traffic movements are permitted at the Balaclava Road access point, while the Epping Road access is restricted to 'left in – left out' vehicle movements only.

Figure 6 Existing vehicle site access arrangements

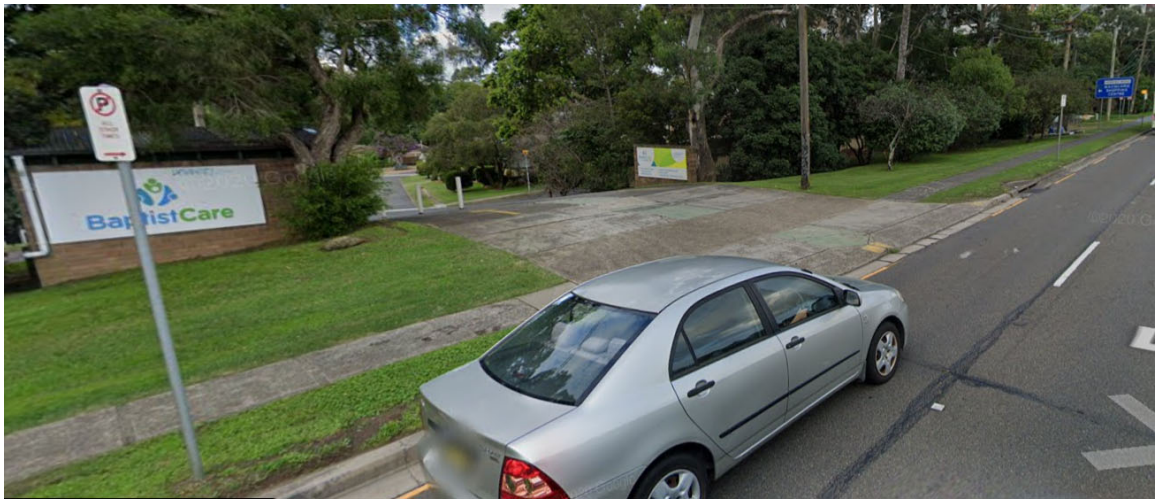

Figure 7 Existing Epping Road site access point

3.4 Public transport services

The BaptistCare Macquarie Park site benefits from a range of public transport services within close walking distance as indicated in Figure 8 below, including:

- Bus stops along Balaclava Road, University Avenue and Epping Road all within 400m of the site. These bus routes service a range of key centres including Parramatta, Epping, North Sydney, St Leonards and the Sydney CBD. Services run frequently throughout the day and evening.
- Macquarie University metro station located just over 600m (approximately 10 minutes walk) away from the site. Metro services arrive every four minutes during peak hour and provide for direct, high capacity connections between Tallawong and Chatswood. Following the opening of Sydney Metro (City and Southwest) the line will be extended through to North Sydney and the Sydney CBD – offering an improved level of public transport accessibility to the site.

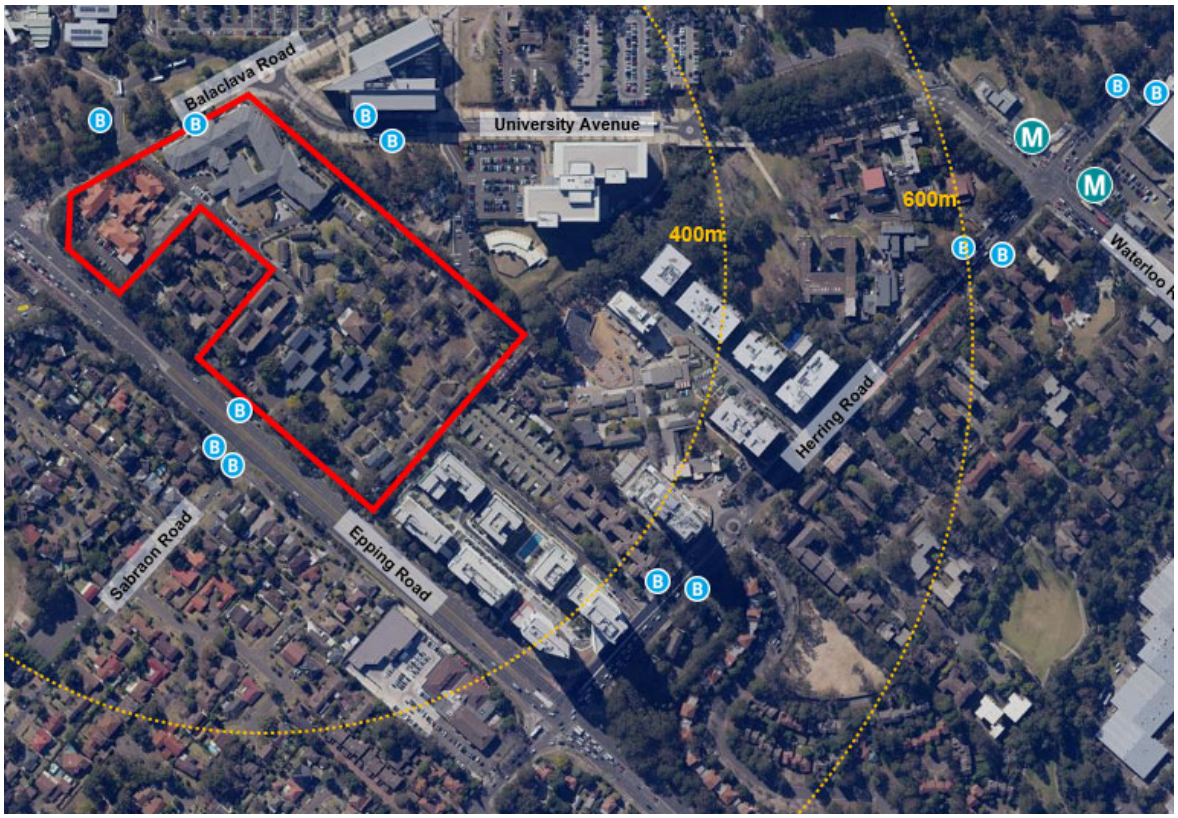

Figure 8 Public transport services

3.5 Public transport catchment

An indicator of the level of public transport accessibility a site contains is the number of locations accessible within a 30 minute public transport catchment. A key objective of the Greater Sydney Commission's Greater Sydney Region Plan is to deliver a 30-minute city where jobs, services and quality public transport spaces are in easy reach of residences.

As illustrated in Figure 9 a number of key employment centres across Sydney can be reached within 30 minutes public transport travel time of the site, including Chatswood, St Leonards, Ryde and Hornsby. The advent of future public transport services, particularly Sydney Metro City and Southwest, will improve this public transport catchment and reduce the impacts of vehicle based travel.

Figure 9 30 minute public transport catchment

Source: https://www.mapnificent.net/sydney

3.6 Active transport

The existing Macquarie Park cycle network is illustrated below in Figure 10. There are sections of well- developed, shared, off-road paths linking to the site from all directions other than to the south and west where gaps in the network are evident – including along Epping Road between Balaclava Road and Herring Road. There are a number of off-road shared cycle ways along the major roads, including Waterloo Road and Lane Cove Road. However, the network is incomplete, and parts of the network require shared access with pedestrians. The lack of a fine grain street network further restricts existing cycling opportunities, however the City of Ryde Bicycle Strategy 2022 – 2030 seeks to address these gaps through the provision of a future cycleway network (see section 4.5 for further details).

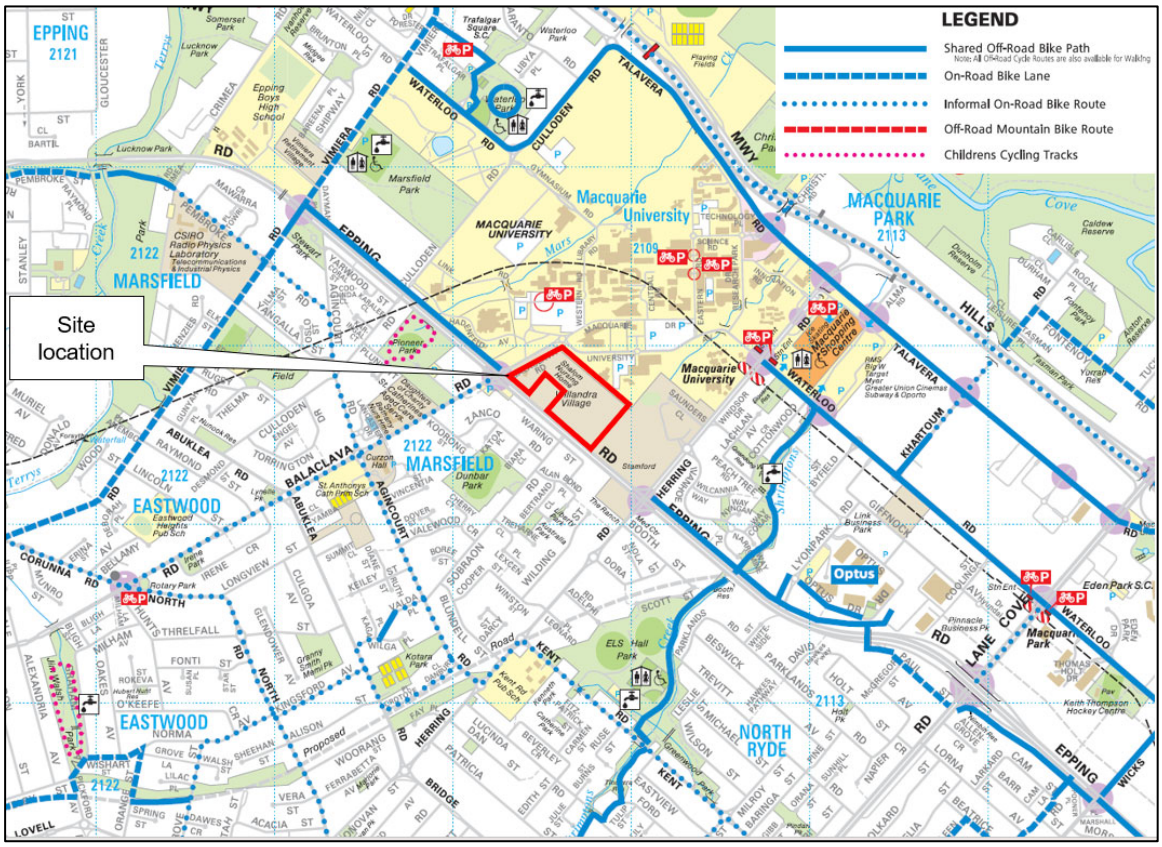

Figure 10 Macquarie Park cycling network

Source: City of Ryde Council

Pedestrian infrastructure around the site is mixed – with good quality footpaths provided on both sides of all streets however crossing opportunities are limited due to the high volume roads and lack of permeability. The provision of a future fine grained street network within Macquarie Park, including a future street connection through the BaptistCare site, which will assist in addressing this existing issue around pedestrian permeability.

4 Future Transport Context

This section describes the various transport initiatives that are planned in the Macquarie Park area which will directly benefit future users of the BaptistCare site. These measures will support the objective of promoting travel by public transport and active transport and reducing the private vehicle related impacts of the development.

4.1 Macquarie Park Precinct and Bus Interchange

Transport for NSW is proposing a precinct and bus interchange that creates a place for people to enjoy, meet and connect. The proposal would connect people to Macquarie University, Macquarie Centre, Macquarie Business Park and residential and commercial areas. The interchange upgrade – on Herring Road between Waterloo Road and Talavera Road – would improve travel efficiency and connectivity, making it easier for people to move safely into and around Macquarie Park.

Key features of the proposal include widening of footpaths, expansion of the existing bus stand capacity and improved pedestrian crossing opportunities along Herring Road.

The bus interchange is located within a 10 minute walk of the BaptistCare site and will therefore support access to and from the site via public transport.

Figure 11 Macquarie Park Precinct and Bus Interchange

Source: Transport for NSW

4.2 Macquarie Park fine grained street network

The future road network for the Macquarie Park Corridor is illustrated in the City of Ryde Development Control Plan 2014 Part 4.5. The future road network plan provides the indication of the future road hierarchy, street types and orientations throughout the Macquarie Park Corridor.

In accordance with the future road network plan, a new access road (Road 3) was identified and will provide connection from Herring Road (through the Ivanhoe Place intersection) through to the site. This is indicated in Figure 12 below. The traffic assessment undertaken for this project has assumed the delivery of this future road connection (as per planning controls for the area) however this will ultimately be subject to an agreement between Morling College and BaptistCare in relation to the design and construction of the roadway.

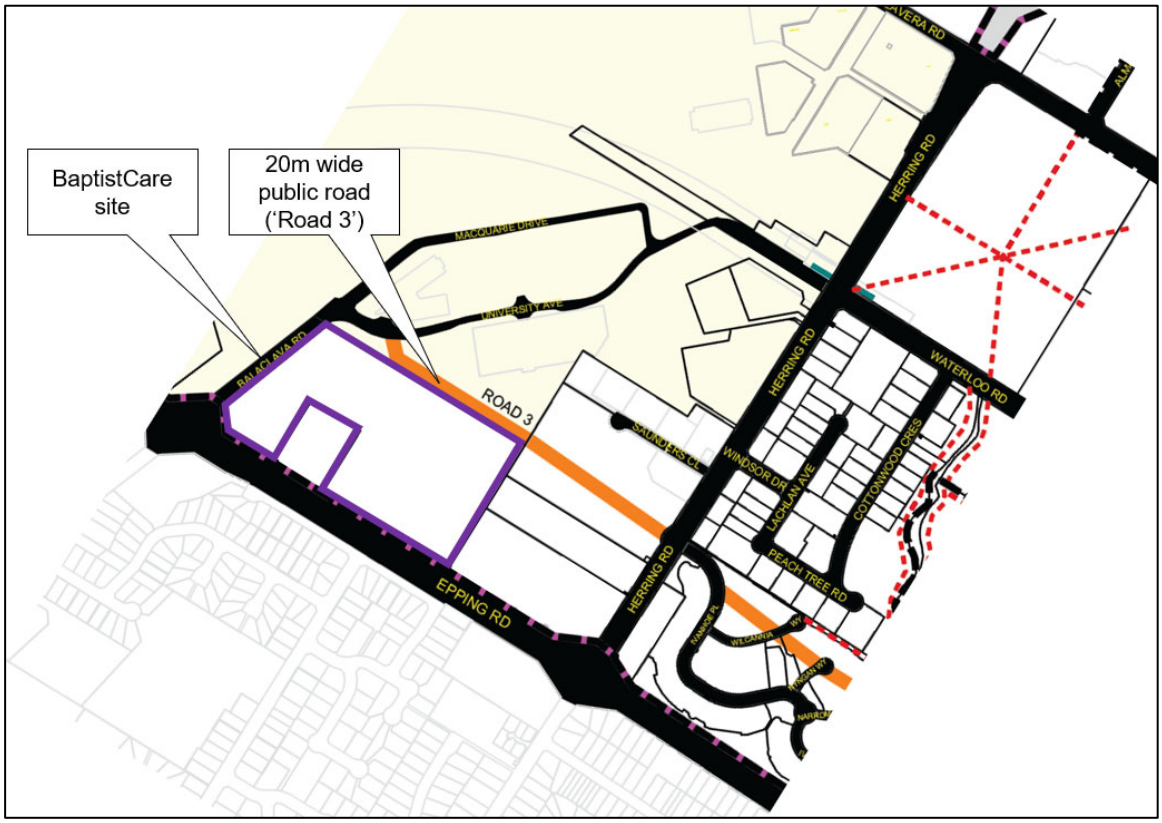

Figure 12 Future Macquarie Park street network

Source: Macquarie Park Corridor DCP

While the DCP road network indicates Road 3 to connect with University Avenue, the Herring Road Precinct Finalisation Report, which was developed in 2015 following the finalisation of the DCP, shows Road 3 to connect with Balaclava Road and run within the BaptistCare site as shown in Figure 13.

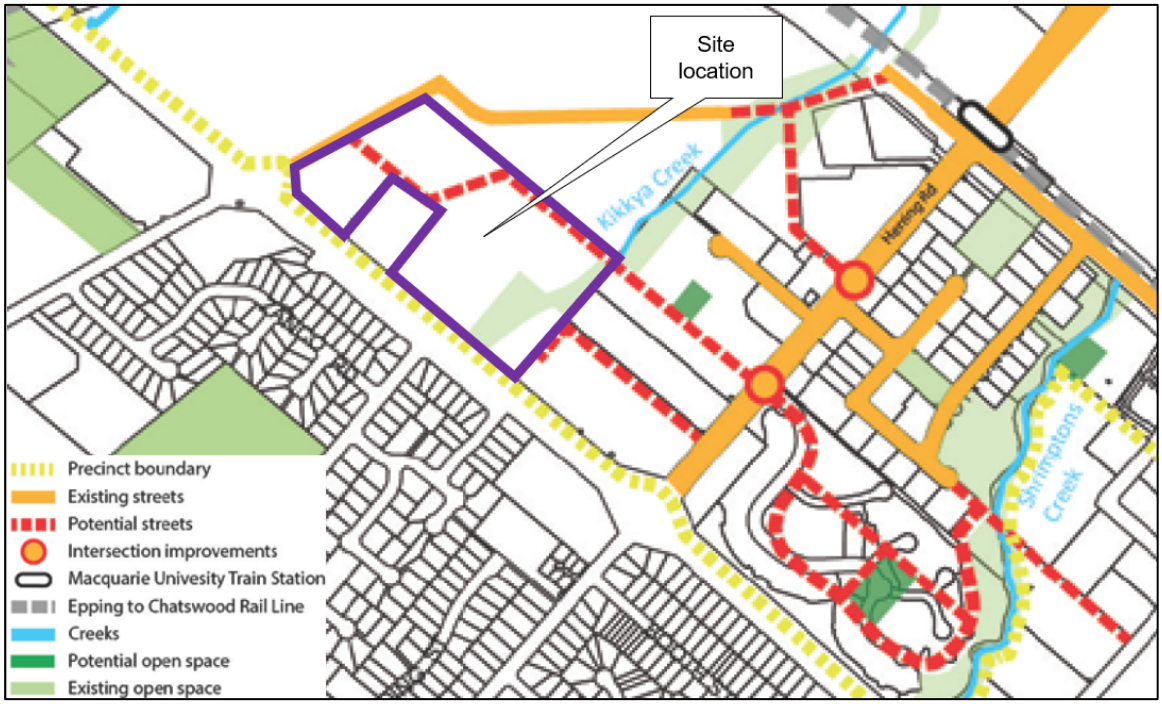

Figure 13 Herring Road precinct local road network

Source: Herring Road Precinct Finalisation Report

4.3 Herring Road upgrades

Transport for NSW is currently carrying out a number of improvements to Herring Road as indicated in Figure 14. This includes a new northbound bus lane, new traffic lights at Ivanhoe Place as well as more capacity at the Epping Road / Herring Road intersection. These upgrades will support travel within the Macquarie Park area and facilitate future access to the BaptistCare site via the Herring Road / Ivanhoe Place intersection.

Figure 14 Herring Road improvements

Source: Transport for NSW

4.4 Sydney metro

Sydney Metro is a major public transport infrastructure project currently in the construction phase within proximity of the subject site. The Sydney Metro City and Southwest metro line (currently under construction) will connect to the recently opened Sydney Metro Northwest line at Chatswood station and provide significantly improved connectivity from the southwest and Sydney CBD to Chatswood and the northwest including Macquarie Park. The expansion of the Sydney Metro network will further enhance public transport accessibility to the BaptistCare site which is within a 10 minute walk of the Macquarie University metro station. Future residents and users of the BaptistCare site will benefit from direct connections beyond Chatswood through to key employment areas such as North Sydney, Barangaroo and Central Station following the completion of this project (scheduled for 2024).

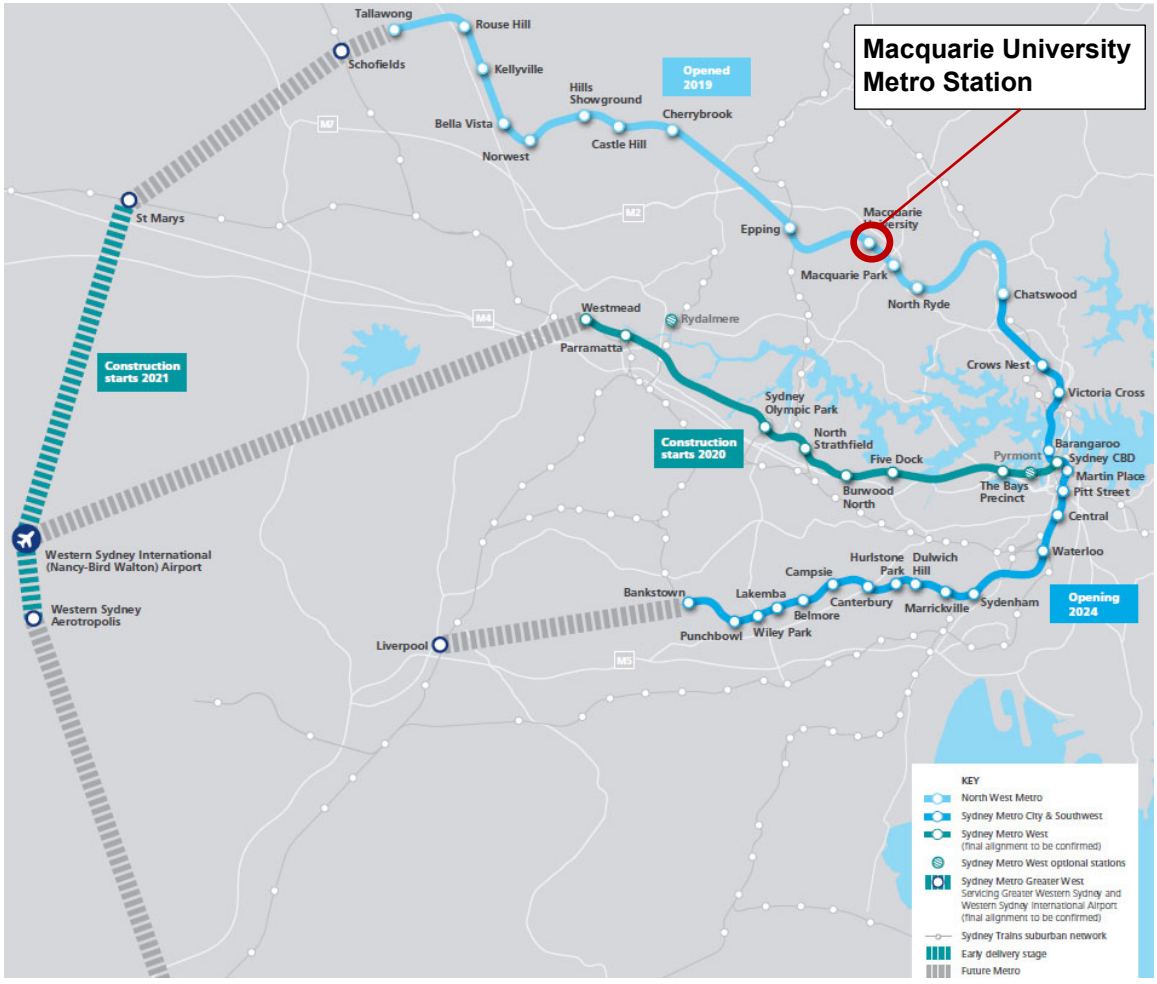

Figure 15 Sydney Metro network

Source: Transport for NSW

4.5 Planned cycling network

The City of Ryde Bicycle Strategy 2022 - 2030 outlines the proposed bicycle network to service the LGA. This network, as shown in Figure 16, includes new links that will benefit users of the BaptistCare site including links along Waterloo Road and Khartoum Road. The future road connection through the BaptistCare site, connecting with Herring Road and Balaclava Road as previously detailed in Section 4.2, will also include provision of a dedicated cycling facility to support travel via this mode of transport.

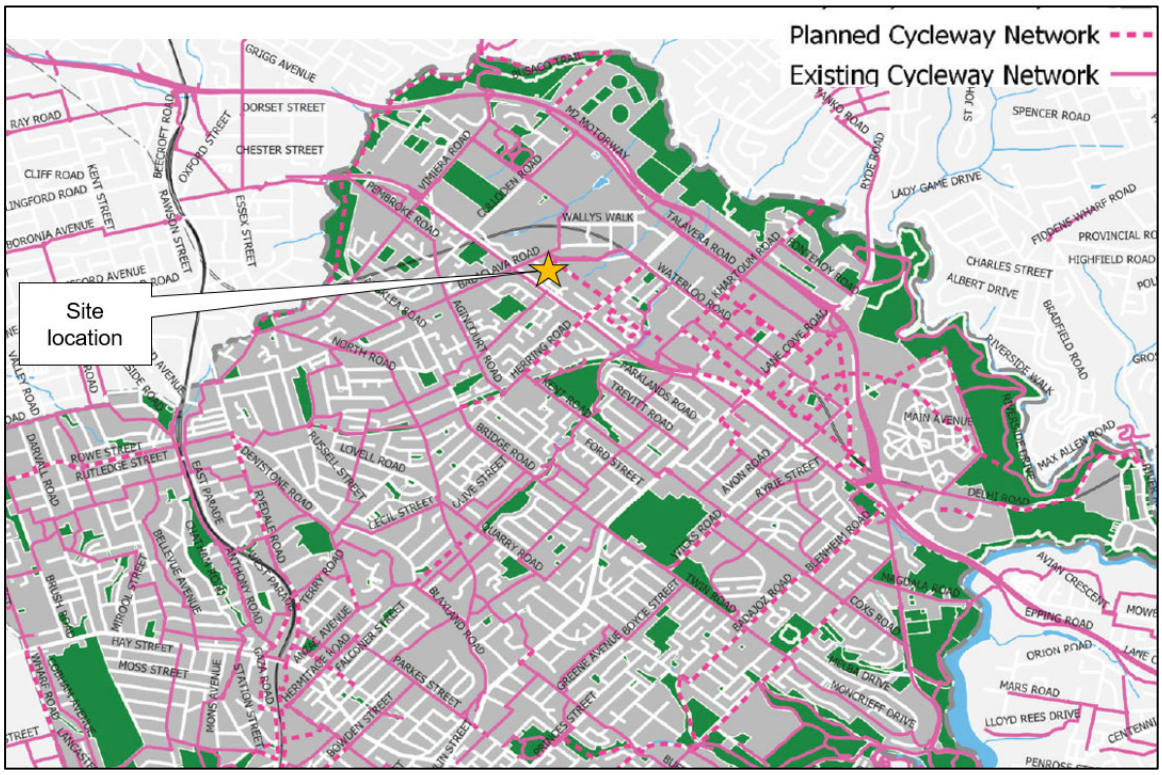

Figure 16 Future cycleway network

Source: City of Ryde Bicycle Strategy 2022 - 2030

5 Transport Access Strategy

5.1 Proposed vehicle site access

In order to maximise the accessibility of the site to the external road network, access to BaptistCare Macquarie Park site is proposed via three locations as shown in Figure 17:

- The signalised intersection of Herring Road and Ivanhoe Place which has been recently completed as part of broader works to Herring Road (see Section 4.3 for further details),
- Use of the existing vehicle access point from Epping Road which will accommodate left in – left out movements only, and
- Use of the existing vehicle access point via Balaclava Road which will accommodate traffic movements in all directions.

These access points will provide for the distribution of traffic onto the broader road network and assist in minimising the impacts of the development on the surrounding road network.

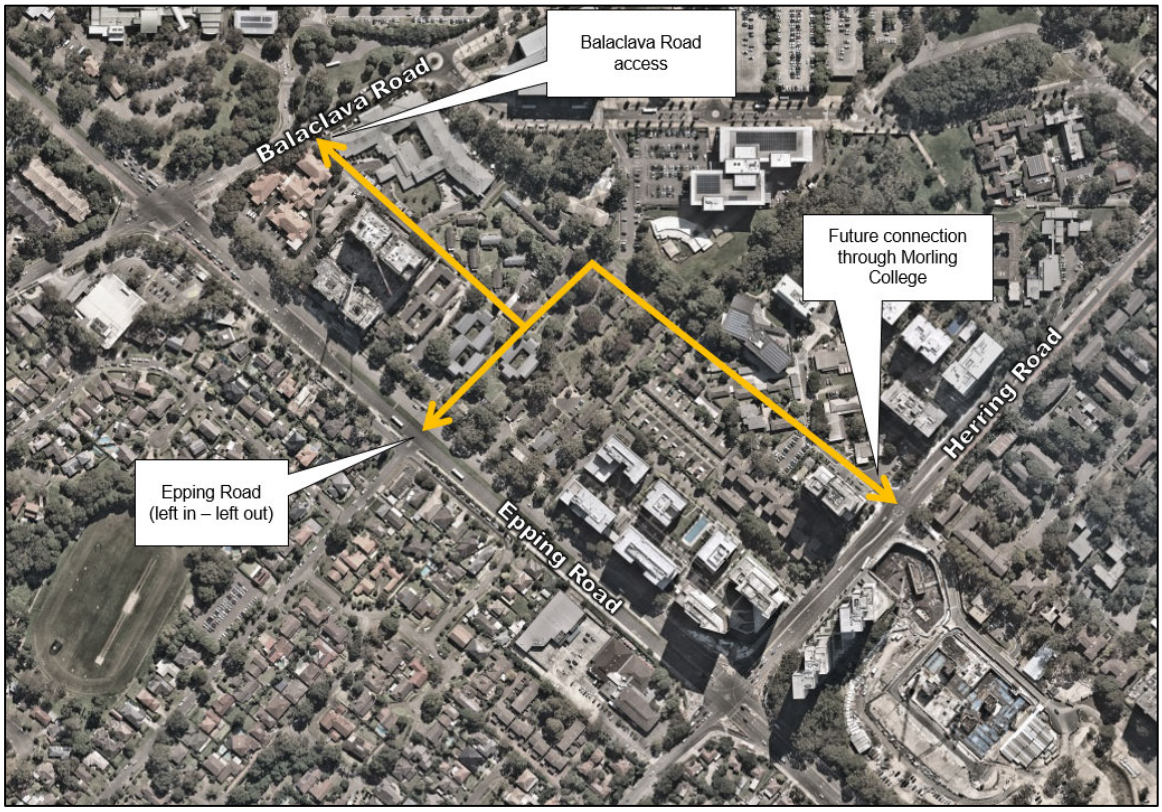

Figure 17 Proposed vehicle site access

Maintaining vehicle access from Epping Road is crucial to the success of the site development given the following:

- The existing Balaclava Road entry is constrained due to the position of two existing buildings (Shalom Cottage and Dorothy Henderson Lodge) which are likely to form the later stages of the site development; and
- The delivery of the future road connection to the Herring Road / Ivanhoe Place traffic lights is reliant upon on the development of Morling College, with the timing of this development currently unclear (despite a Stage 1 DA having been approved for the site).

Consultation was held with TfNSW in May 2022 to discuss the proposed access arrangements. TfNSW confirmed that they agreed in principle with the concept of maintaining access to the site from Epping Road (left in via a deceleration lane) however expressed concern regarding vehicle exits at this location. In response to this feedback the design has since been updated to provide for both a deceleration lane as well as an acceleration lane onto Epping Road, to be designed in accordance with AUSTROADS guidelines. The acceleration lane, which was not initially presented to TfNSW, will provide drivers with an opportunity to safely merge back into the traffic lane and is similar in nature to the left turn slip lane plus acceleration lane provided at the nearby Epping Road / Balaclava Road intersection.

The Epping Road site access point is shown indicatively in Figure 18 and detailed further in the civil engineering plans prepared as part of this submission.

Figure 18 Epping Road site access point

Image source: Arterra

5.2 Internal vehicle circulation

The internal street network shown in Figure 20 has been developed to provide a logical integration of the site with the surrounding road network, future access locations and pedestrian desire lines, providing permeability through the future development. The proposed street network includes the provision of a 'high street' which links the Balaclava Road site access with the future road connection through to Herring Road via Morling College. The delivery of this road connection is consistent with relevant planning undertaken for the Macquarie Park precinct as previously described in Section 4.2 of this document as well as that documented in the approved Concept DA for Morling College under LDA2019/0264. As can be seen in Figure 19 the Morling College masterplan makes provision for the future Road 3 to connect through to the BaptistCare site.

The traffic assessment undertaken for this project has assumed the delivery of this future road connection (as per planning controls for the area) however this will ultimately be subject to an agreement between Morling College and BaptistCare in relation to the design and construction of the roadway.

Figure 19 Morling College landscape masterplan

Source: DEM

The internal public roadway will provide access for users of the BaptistCare site as well as provide a broader public benefit by improving permeability for road users and distributing some traffic movements away from the nearby Epping Road / Herring Road intersection.

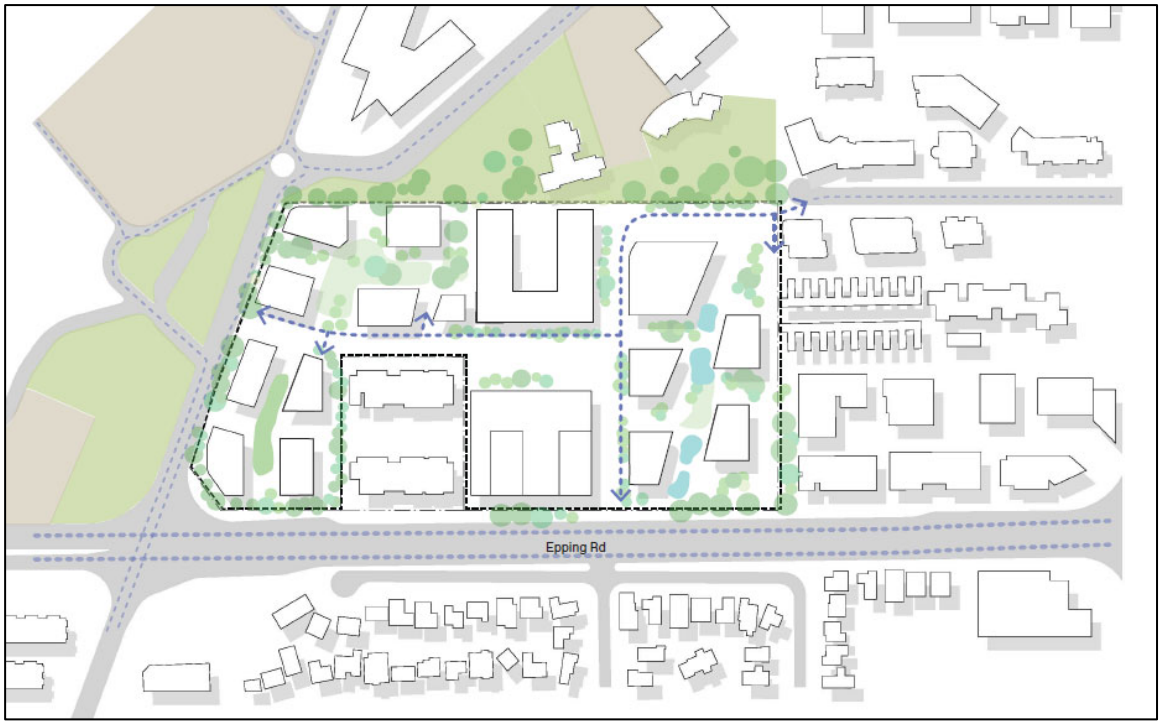

Figure 20 Internal street network

Image source: BVN

A typical cross section of the main street is shown in Figure 21 which makes provision for two-way traffic movements, car parking on both sides (with intermittent tree planting), wide footpaths as well as a shared path for cyclists and pedestrians.

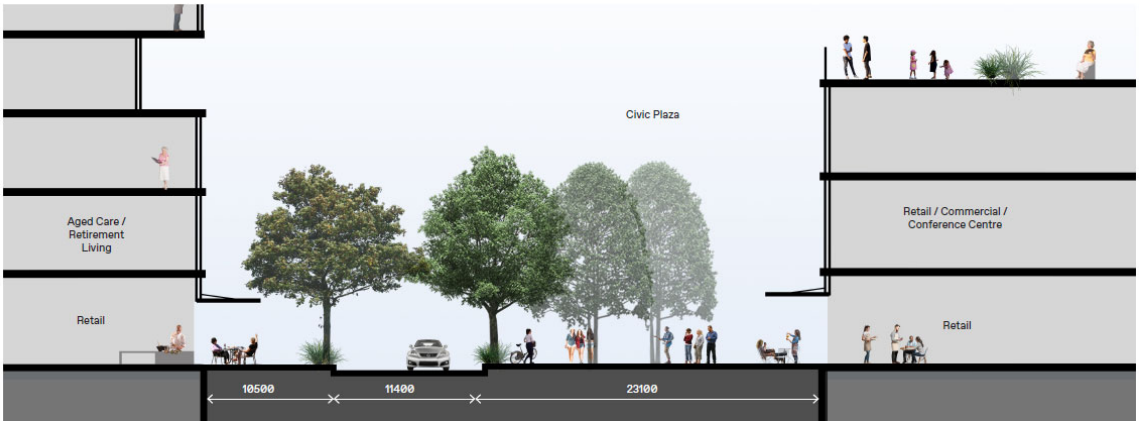

Figure 21 Typical cross section – main street

Image source: BVN

Vehicle access points will be provided for each of the development lots, with these access points to be defined as part of the detailed Development Applications for each of the respective sites. As part of the Concept Master Plan indicative vehicle site access points have been developed and are shown in Figure 22. The access points have been selected to be dispersed throughout the site, and not impact the function of the external road network and provide sufficient ability for vehicles to enter and exit from all directions possible. A standalone access point for the school drop off and pick up area has been identified which puts all school related traffic below ground – freeing up the public domain and resulting in improved amenity for pedestrians and cyclists.

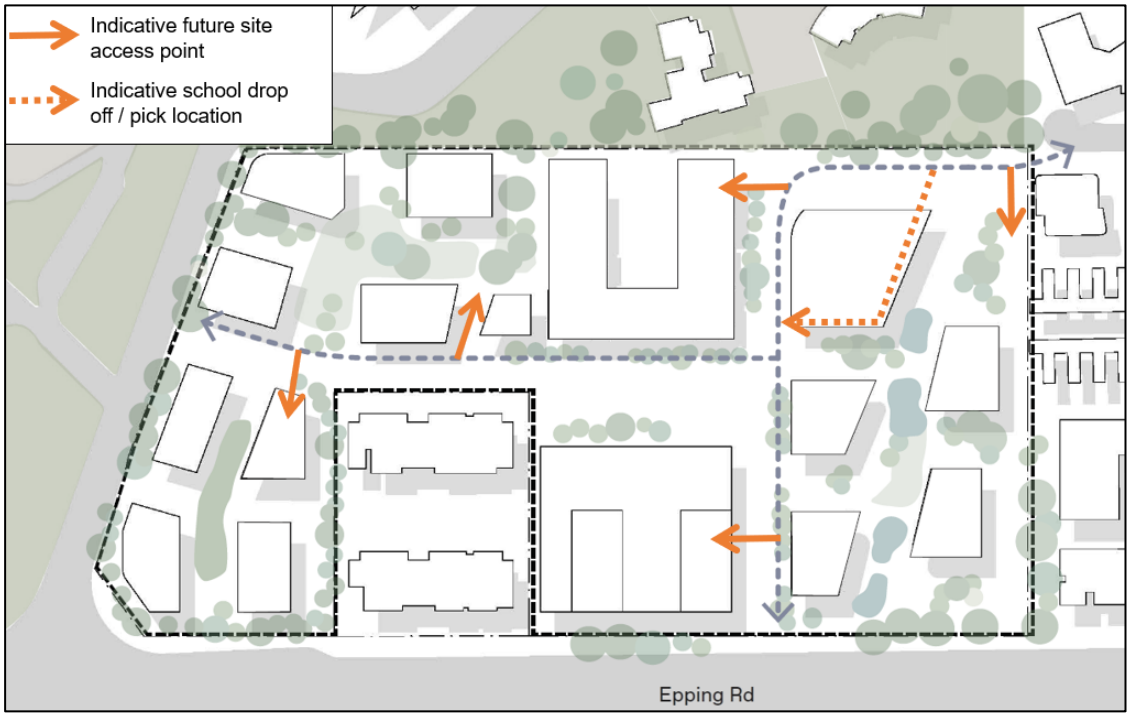

Figure 22 Indicative future building vehicle access points

5.3 Pedestrian and cycling access

The master plan has been developed to facilitate safe, clear and efficient pedestrian and cycle connections within the site and to the external transport network. The master plan offers a high level of permeability for pedestrians to connect through to bus stops on Balaclava Road and Epping Road, connect through to Macquarie University or through to the Macquarie University metro station on Herring Road. While the primary pedestrian pathway follows the main street through the site there are a network of secondary pedestrian routes within the site which offer suitable alternatives and provide access to the various superlots. Footpath widths will be generous and accommodate pedestrian demands throughout the day. Pedestrian access points from the external street network are strategically located to provide good quality access to bus stops on Balaclava Road and Epping Road. The master plan makes provision for good quality pedestrian access to the nearby Macquarie University metro station which will be via University Avenue (within Macquarie University) and via the new street connection through Morling College which connects through to Herring Road.

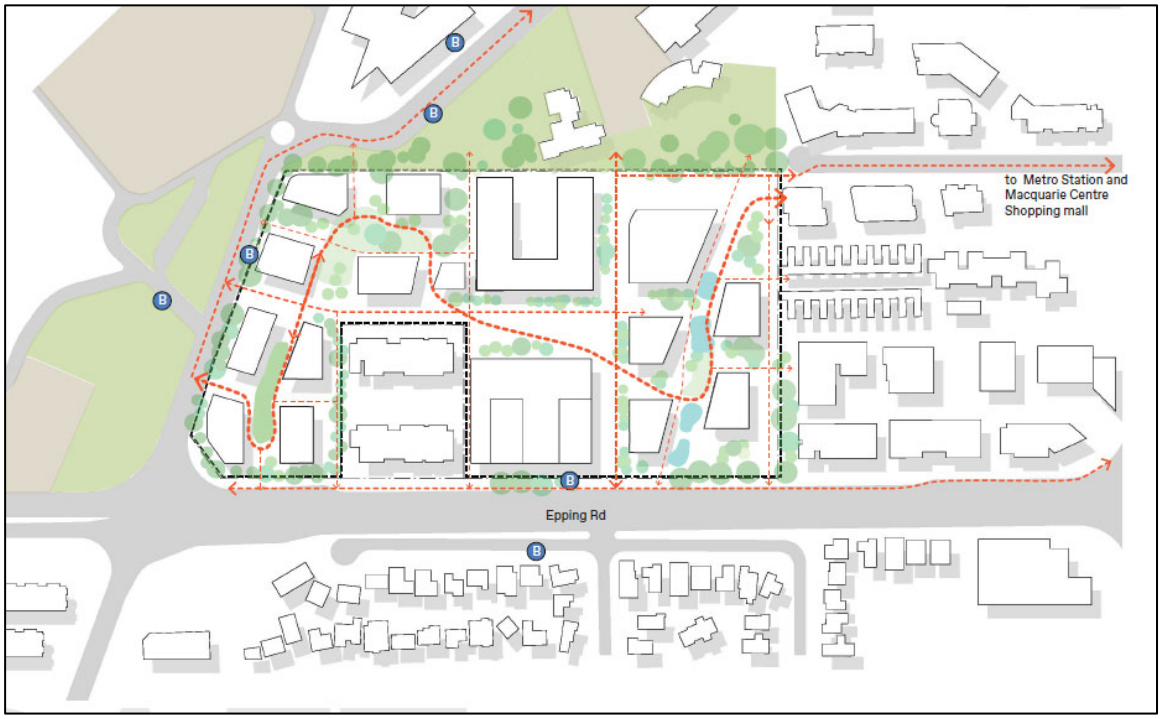

Figure 23 Pedestrian connectivity through the site

Image source: BVN

As previously noted in Section 5.2 the proposed cross section of the main street through the site includes a shared pathway which will form a connection between Balaclava Road and Herring Road – aligning with the future bicycle link identified in the City of Ryde Bicycle Strategy 2022 – 2030 (see Section 4.5). Connections will also be provided to the existing cycle route along Epping Road.

Figure 24 Cycling routes through the site

Image source: BVN

5.4 Service vehicles and emergency vehicles

The internal street network has been designed to accommodate a range of vehicles include service and emergency vehicles. These vehicles will have the ability to enter and exit the site through any of the three site access points proposed – offering a good level of flexibility. While specific arrangements for these vehicle types will be confirmed during the formation of the detailed Development Applications for each of the individual buildings, key principles to be adopted will include the following:

- All loading and servicing to be accommodated on site with minimal reliance on the street network;
- Suitably sized loading docks to be provided to accommodate expected servicing demands based on expected use;
- All service vehicles to enter and exit sites in a forwards direction;
- Suitable clearance height to be provided in on-site loading areas for service vehicles, including waste collection vehicles;
- Street network to be designed to accommodate turning movements of service and emergency vehicles; and
- Fire boosters to be located in areas easily accessible by Fire Rescue NSW vehicles.

5.5 Road user safety

A permeable pedestrian network will be provided throughout the BaptistCare Macquarie Park site through continuous pedestrian footpaths and pedestrian crossing facilities at key locations. The design of a high quality, highly permeable pedestrian network with limited delays to walk trips and which is pleasant, convenient, direct and integrated with land uses will encourage and facilitate pedestrian accessibility.

In addition to the factors described above, the pedestrian network will consider safety in design to provide well-lit pedestrian links which can be observed from local land uses and as such provide pedestrians with a perception of safety and ambience which can encourage pedestrian travel.

Cycling safety will be prioritised through the introduction of a shared pathway adjacent to the main road running through the centre of the site. This cycleway will provide connections to the internal buildings within the site as well as the broader Macquarie Park road network.

The internal roadway within the site will be designed as a slow speed environment commensurate with the high levels of pedestrian and cycling activity adjacent. This will be achieved via a number of measures including:

- Vertical deflection devices (e.g. raised thresholds)
- Bicycle parking provided adjacent to roadway
- Pedestrian crossings which are flush with the adjacent kerb
- On-street parking to create side friction and restrict vehicle movements
- Street trees (both within the road carriageway and on the street) to provide the perception of a narrower street and reduce vehicle speeds

The internal road to be delivered within the site will promote reduced vehicle speeds and therefore facilitate good levels of pedestrian safety.

5.6 Preliminary green travel plan

This report includes a preliminary Green Travel Plan (GTP) identifying some key items that could be included in more detailed plans to be completed as part of the delivery of individual buildings within the BaptistCare site. It is envisaged that the preparation of a detailed Green Travel Plan will form part of the consent conditions for the respective detailed Development Applications for the site, including consultation with and endorsement by Transport for NSW.

5.6.1 Background

A Green Travel Plan (GTP) is a package of measures put in place by the development occupants to try and encourage more sustainable travel. It is a means for a development to demonstrate a commitment and take a pro-active step towards improving the environmental sustainability of its activities.

More generally, the principles of a GTP are applied to all people travelling to and from a site. Government authorities are placing increasing emphasis on the need to reduce the number and lengths of motorised journeys and in doing so encourage greater use of alternative means of travel with less negative environmental impacts than the car.

5.6.2 Objectives

The main objectives of the GTP are to reduce the need to travel and promotion of sustainable means of transport. The more specific objectives include:

- High mode share for public transport, cycling and walking to work journeys;
- Ensuring adequate facilities are provided at the site to enable the tenants and visitors of the development to commute by sustainable transport modes;
- Reduce the number of car journeys associated with business travel;
- Facilitate the sustainable and safe travel of occupants; and
- Raise awareness of sustainable transport amongst residents of the development.

5.6.3 Potential measures

A suite of potential measures that may be included within the future detailed Green Travel Plans are described in Table 4 to be implemented as part of the GTP, which can be developed further prior to the initial occupation of each building on the BaptistCare site.

Table 4 List of potential GTP measures

Action	Responsibility
Cycling	
Provide sufficient cycle parking to meet needs, which is easily accessible and secure	Developer

Action	Responsibility
Provide adequate cycle parking facilities for visitors	Developer
Ensure cycle parking is clearly visible or provide signage to direct people to cycle bays	Building manager
Produce a map showing cycle routes and bike stands in the area	Building manager
Walking	
Produce a map showing safe walking routes to and from the site with times, distances to local facilities, such as shops and bus stops	Building manager
Public Transport	
Develop a map showing public transport routes in the area	Building manager
Put up a noticeboard with leaflets and maps showing the main public transport routes to and from the site	Building manager
Carshare / Carpooling	
Put a poster on the noticeboard where residents would register their interest in carpooling by indicating their work location	Building manager
Develop a map showing car-share spots in the area	Building manager
General actions	
Promotion including: • An events calendar. Best in conjunction with statewide events such as National Bike Week and Bike2Work Day, National Walk to Work Day. • Display boards in prominent locations to show public transport maps and timetables.	Building manager

5.6.4 Monitoring and review

In order for the GTP to be effective, it must be reviewed on a regular basis. It is important to ensure that the GTP is meeting its objectives and having the intended impact on car use and transport choices. The GTP should be reviewed periodically by undertaking resident and other users of the building travel surveys. It is recommended that the mode shares are first reviewed at least 18 months after occupation, to allow activity levels to settle at the site.

6 Mode Share, Trip Generation and Parking

6.1 Car parking rates

Car parking for the development is proposed to be generally in accordance with the requirements of Council's DCP and other relevant state planning documents including the Housing SEPP 2021. A summary of the parking rates proposed is provided in Table 5 for all uses proposed, along with the potential car parking provision based on the yields considered in this Concept Master Plan.

The Master Plan does not propose any allowance for car parking for the student accommodation component. From a market perspective, the demand that is generated for car parking for student accommodation is generally limited (or non-existent), particularly where the student accommodation is immediately adjacent to a major university such as Macquarie University. There are numerous examples of successful student accommodation developments which do not provide any car parking allowance including 74 Carlton Crescent, Summer Hill (Iglu), 66 Regent Street, Redfern (Iglu) and Scape Darling House, Darling Harbour (Scape).

In addition to the lack of market demand, it is also understood that City of Ryde Council implements maximum controls for parking under it's DCP which seeks to limit car parking and in turn the environmental impacts of traffic movements. In place of car parking for the student accommodation would be a range of alternative transport options including on-site bicycle parking, car share opportunities and motorcycle parking. Considering the end user requirements and given the close walking distance to Macquarie University, the metro station, bus interchange and a range of services within the site the proposal not to provide car parking is considered suitable.

The final car parking numbers will be confirmed at the time of the detailed development applications for each of the respective sites which considers the final quantum and mix of uses along with their bespoke parking requirements.

Table 5 Car parking rates

Land Use	Relevant Car Parking Rate	Source	Potential Parking Provision*
Residential (including build to rent and affordable housing)	1 bed - Max 0.6 spaces per Unit 2 bed - Max 0.9 spaces per Unit 3+ bed - Max 1.4 spaces per Unit Visitor - Max 1 space1 per 20 Units	City of Ryde DCP	821
Student Accommodation	0.2 spaces / private room	Housing SEPP 2021**	0
Commercial	Maximum 1 space per 100m^2 GFA	City of Ryde DCP	69
Retail	Maximum 1 space per 25m^2 GFA	City of Ryde DCP	171
Retirement Living	Minimum 0.5 spaces per bedroom	Housing SEPP 2021**	325
Aged Care	Minimum 1 space per 15 beds Minimum 0.5 spaces per staff 1 ambulance bay	Housing SEPP 2021**	240
School	1 space per two employees	City of Ryde DCP	35

* Indicative only, to be confirmed during the preparation of the detailed Development Application for each respective site

** Non-discretionary development standard

6.2 Bicycle parking

Bicycle parking will be provided for all future users in line with Council's controls, with the final number of spaces to be determined at the time of the detailed Development Application. City of Ryde Council current controls requires bicycle parking equivalent to 10% of the required car spaces (or part thereof). In line with Council controls, end of trip facilities accessible to staff (including at least 1 shower and change room) will be provided for all commercial and retail uses on the site.

6.3 Mode share

Forecast mode shares have been developed for various types of trips to and from the site based on a range of factors including:

- Existing travel behaviours of residents and employees of Macquarie Park (see Section 3.1);
- Existing and future public transport routes servicing the site;
- The proposed mix of uses the site is to accommodate; and
- The proposed constrained parking rates for the different uses

These forecast mode shares are summarised in Table 6 below.

Table 6 Forecast mode share

Mode of travel	Proportion of trips			
	Residents travelling to work from BaptistCare site	*Employees travelling into BaptistCare site for work*	*Non-work related travel to/from BaptistCare site*	*School trips*
Car driver	20%	40%	40%	23%
Car passenger	3%	4%	5%	17%
Bus	8%	12%	10%	15%
Train / Metro	45%	39%	27%	15%
Walk / Cycle	24%	5%	18%	30%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

6.4 Trip generation

The number of trips generated by each mode of transport has been estimated based on typical trip generation rates for various uses as outlined in the TfNSW Technical Direction TDT 2013/04(a) along with the forecast mode shares noted in Section 6.3. The estimated trip generation by mode of transport, for the morning and afternoon peak hours as well as across an entire 24 hour period, is summarised in Table 7 on the following page.

Table 7 Trip generation by mode

Travel mode	Residential trips				Retail/Commercial trips				School Trips				Total		
	Mode share	AM peak hour	PM peak hour	Daily	Mode share	AM peak hour	PM peak hour	Daily	Mode share	AM peak hour	PM peak hour	Daily	AM peak hour	PM peak hour	Daily
Car driver	20%	167	154	1339	40%	126	97	695	23%	154	25	370	448	276	2404
Car passenger	3%	25	23	201	4%	13	10	70	17%	126	21	302	164	53	573
Bus	8%	67	62	536	12%	38	29	209	15%	105	17	252	210	108	996
Train / Metro	45%	377	347	3013	39%	123	94	678	15%	105	17	252	605	458	3943
Walk / Cycle	24%	201	185	1607	5%	16	12	87	30%	210	35	504	427	231	2198
Total	**100%**	**837**	**770**	**6696**	**100%**	**316**	**242**	**1738**	**100%**	**700**	**115**	**1680**	**1853**	**1127**	**10114**

7 Traffic Impacts

7.1 Forecast traffic generation

7.1.1 Residential traffic generation

Reference is made to traffic surveys of residential developments in Macquarie Park undertaken to support the Ivanhoe Estate Concept Master Plan as documented in the transport report prepared by ASON Group. The surveys demonstrated an average traffic generation rate for residential uses of 0.10 per unit and 0.12 per unit in the morning and afternoon peak hours respectively. Notwithstanding this higher rates of 0.12 per unit and 0.14 per unit in the morning and afternoon peak hours respectively were adopted for the analysis. These traffic generation are considered suitable for use for this assessment given:

- The Ivanhoe Estate site is located adjacent to the BaptistCare Macquarie Park site and offers a very similar level of public transport accessibility;
- The traffic surveys underpinning the adopted rates were based on data collected prior to the COVID-19 pandemic and the normalisation of working from home practices. The data therefore is considered to provide a conservative estimate of future travel behaviours given residents no longer travel to their workplace every single day since the outset of the pandemic; and
- The traffic generation rates were supported by TfNSW as part of their review of the (now approved) Ivanhoe Estate proposal

7.1.2 Retail traffic generation

Traffic generation for retail uses across Sydney varies greatly dependent on a number of variables including the nature and quality of the retail tenancies provided, competition from nearby retail centres, car parking availability and access from the broader road network. For the purposes of this assessment traffic generation rates of 2.5 and 5.0 trips per 100m^2 GFA have been adopted for the AM and PM peak hours respectively. These rates align with those recently surveyed at the East Village Shopping Centre and utilised in major urban renewal precincts such as Melrose Park, following endorsement by TfNSW. The RMS "*Guide to Traffic Generating Developments*" document suggests that some 25% of visits to retail centres are likely to be passing trade, i.e. customers who would have driven past the development regardless of their visit to the development. The traffic assessment for the proposal has considered 25% passing trade or trips wholly contained within the BaptistCare site.

7.1.3 Commercial traffic generation

Transport for NSW published a Technical Direction that described vehicular trip rates for commercial developments. Comparable commercial developments have been considered in order to understand the likely traffic generation resulting from the site. Four sites were selected given their similar proximity to nearby public transport as well as similar car parking rates, which were sites located in North Sydney, Chatswood, Macquarie Park and Parramatta.

Given the constrained on-site parking environment, traffic generation rates per parking space have been used to estimate the likely peak hour vehicle trips generated by the site. The average peak hour trip rates per parking space for the surveyed locations were estimated to be 0.40 and 0.25 trips per parking space during the AM and PM network peak hour respectively, with the site in Macquarie Park exhibiting a slighter higher rate of 0.44 and 0.27 trips per parking space. The surveyed data for these sites is highlighted in Table 8 below, with the surveyed rates for Macquarie Park adopted in the analysis.

Table 8 Peak hour vehicle trip generation (commercial uses)

Surveyed location	North Sydney	Chatswood	Macquarie Park	Parramatta	Average
AM peak hour trips	51	47	119	185	100
PM peak hour trips	44	36	72	75	57
Parking spaces	136	150	269	402	239
AM peak hour trip rate	0.38	0.31	0.44	0.46	0.40
PM peak hour trip rate	0.32	0.24	0.27	0.19	0.25

Source: Transport for NSW, Technical Direction 2013/04a

7.1.4 Seniors living care traffic generation

The forecast traffic generation from the seniors living component has been determined using the published rates contained in the Transport for NSW document '*Trip Generation and Parking Generation Surveys - Housing for Seniors'* which provides guidance with traffic movements generated by this land use during peak hours. The document notes that seniors living developments generate traffic at the following rates:

- Network AM Peak Hour: 0.10 vehicles / unit
- Network PM Peak Hour: 0.17 vehicles / unit

7.1.5 Student accommodation traffic generation

As minimal / zero car parking would be provided for the student accommodation component there is expected to be very few traffic movements generated by this land use. As a conservative assumption a rate of 0.10 trips / 100m^2 has been assumed for the purposes of the traffic analysis.

7.1.6 School traffic generation

At this preliminary stage the traffic generation from the school has been calculated based on the following assumptions:

- Up to 1,000 students at the school, with a primary school considered as a worst case scenario from a vehicle movement perspective. Should a high school be delivered vehicle numbers would reduce given these students have a greater capacity to travel to school via non-car modes of transport.
- 75% of students arrive during the morning peak hour (8am – 9am) based on surveys of other schools, taking into consideration factors such as absenteeism, out of school hours care and other factors
- 10% of students depart during the afternoon peak hour (5pm – 6pm)
- Mode share of 35% for student drop off / pick up – noting the highly accessible nature of the site located adjacent to high density residential developments within Macquarie Park. The 35% mode share sits evenly between the existing 40% mode share surveyed for the Meadowbank Education Campus (primary school component) and the 30% mode share adopted as part of the transport assessment supporting the Meadowbank Education Campus within the Ryde LGA.
- Every vehicle arriving to the site counts as two ‘trips’ – with one inbound trip and one outbound trip.
- Average of 1.7 students per car which is the standard vehicle occupancy rate used by Schools Infrastructure when preparing transport assessments for new schools.

The above assumptions result in a trip generation rate of 0.31 trips / student during the AM peak hour and 0.04 trips / student during the afternoon peak hour. As a comparison the assessment undertaken for the Ivanhoe Estate development utilised a traffic generation rate of approximately 0.20 trips / student during the morning peak hour.

7.1.7 Overall traffic generation

The overall traffic generation expected from the site is summarised in Table 9 on the following page, which takes into account the traffic generation from existing uses on the site as well as that proposed under the Concept Master Plan proposal.

Table 9 Forecast traffic generation

Land Use	Quantum	Units	Generation Rate		Directionality				Forecast Peak Hour Traffic Generation					
					AM Peak Hour		PM Peak Hour		AM Peak Hour			PM Peak Hour		
			AM	PM	*IN*	*OUT*	*IN*	*OUT*	*IN*	*OUT*	*TOTAL*	*IN*	*OUT*	*TOTAL*
Residential*	830	Dwellings	0.14	0.12	20%	80%	80%	20%	23	93	116	80	20	100
Student Accommodation	11,832	m^2 GFA	0.10	0.10	20%	80%	80%	20%	2	9	12	9	2	12
Commercial	69	Parking spaces	0.44	0.27	80%	20%	20%	80%	24	6	30	4	15	18
Retail	6,850	m^2 GFA	2.50	5.00	50%	50%	50%	50%	64	64	128	128	128	257
Seniors Living	515	rooms	0.10	0.17	20%	80%	80%	20%	10	41	52	70	18	88
Education	1,000	students	0.31	0.04	50%	50%	50%	50%	154	154	309	21	21	41
Aged Care (existing)	439	rooms	0.10	0.10	20%	80%	80%	20%	9	35	44	35	9	44
Net Traffic Generation (Increase Compared to Existing)									**270**	**333**	**603**	**277**	**195**	**472**

* Inclusive of build to rent and affordable housing components

7.2 Traffic distribution

The distribution of traffic onto the external road network has been generally based on Journey to Work Data and other relevant studies undertaken within Macquarie Park. The expected distribution of traffic is presented in Figure 25 below.

Figure 25 Forecast traffic distribution

7.3 Traffic modelling process

The traffic modelling undertaken has utilised the Macquarie Park Aimsun traffic model originally developed by TfNSW and updated to consider the future Ivanhoe Estate project. The traffic model, originally developed by AECOM, was prepared to inform the planning process for Macquarie Park including the Macquarie Park Bus Capacity Improvements Program. The model extents covers all key intersections required to be considered under the project SEARs and is shown in Figure 26.

The model takes into consideration future growth associated with development in Macquarie Park as well as committed changes to the road network as previously detailed in Section 4.3 of this document. The outputs of the future year Aimsun traffic model have been utilised to inform the SIDRA network modelling undertaken in this study.

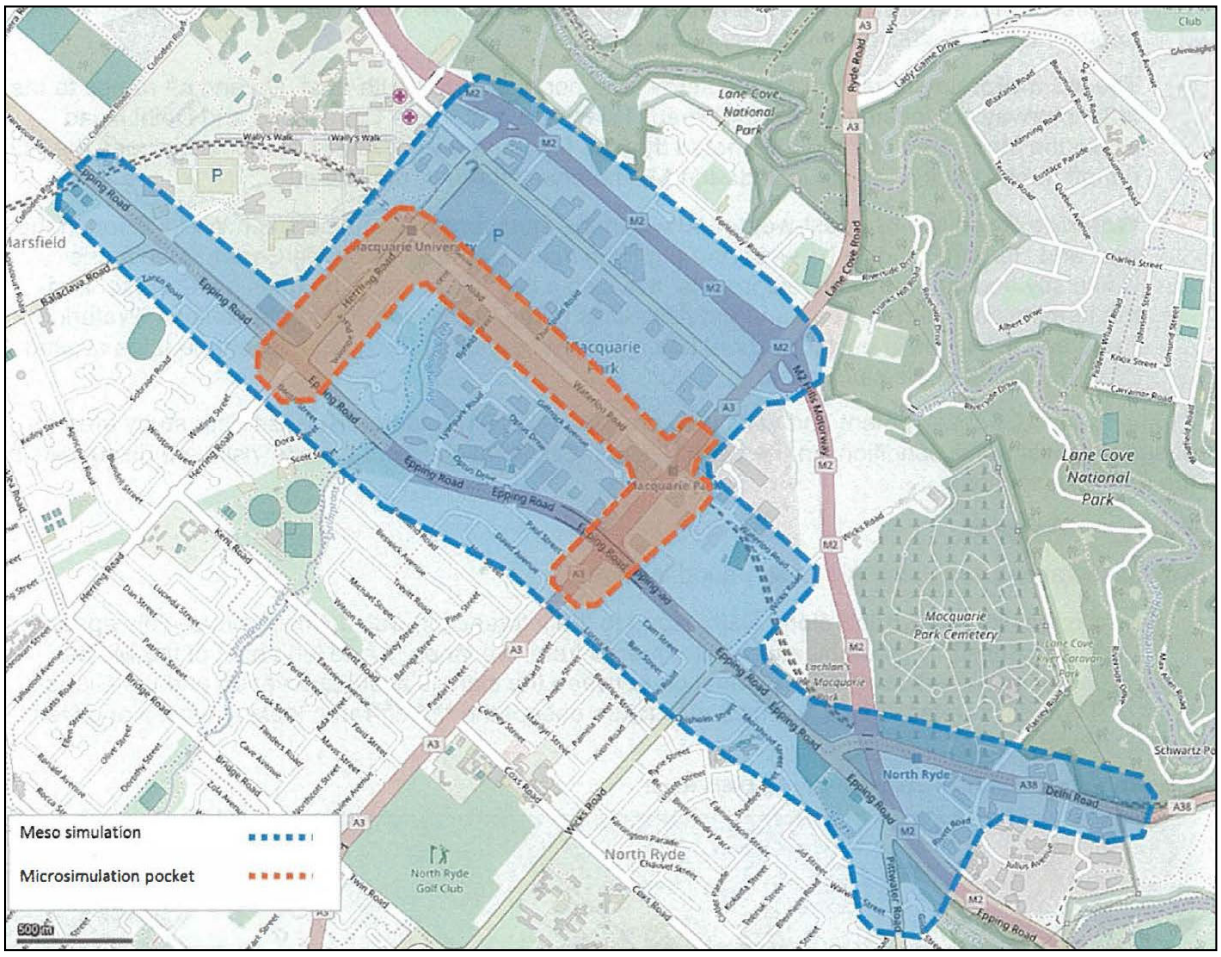

Figure 26 Macquarie Park traffic model extents

Source: AECOM

In response to the project SEARs a SIDRA Network model has been developed which considers the operation of all intersections around the site including any upstream or downstream queuing impacts from adjoining intersections. The SIDRA Network model has been coded to include the distances between the respective site access points. The outputs of the Aimsun traffic model, for the future year 2036 inclusive of the full development of the BaptistCare Macquarie Park site, have been used to inform SIDRA traffic modelling at the key intersections identified in the SEARs as indicated in Figure 27.

Figure 27 SIDRA network modelled intersections

7.4 Traffic modelling outputs

The traffic modelling metric used to analyse the performance of the road network is Level of Service (LOS). Level of Service is a measure that uses the average delay experienced by vehicles to categorically assign each approach and movement with a qualitative ordinal grade (A through F, with A being the best and F being the worst). RMS Traffic Modelling Guidelines indicate the average delay relating to each grade, this is outlined in Table 10. In typical urban environments it is typical for intersections to operate at Level of Service D or E and still remain within acceptable performance levels.

Table 10 Level of service grades / description

Level of service grade	Average delay (seconds)	Description
A	Less than 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity. At signals, incidents will cause excessive delays. Roundabouts require other control mode
F	Greater than 71	Unsatisfactory with excessive queuing

The forecast performance of the road network is summarised in Table 11 and Table 12, with detailed traffic modelling outputs provided as Appendix A of this document. The modelling indicates that the surrounding road network, with the provision of development as planned on the BaptistCare site, will generally operate in a similar manner to the 'future base' scenario. When considering the road network holistically, based on the SIDRA network modelling outputs, the overall road network Level of Service remains at 'E' in both the 'future base' and 'future base + development' scenarios.

It should also be noted that the delivery of the internal road connection between Balaclava Road and Herring Road will benefit the operation of the surrounding road network by dispersing traffic away from the Epping Road / Herring Road intersection. Drivers travelling eastbound along Epping Road and wanting to travel towards Waterloo Road and will have the opportunity to bypass the Epping Road / Herring Road intersection and instead use the internal roadway. This dispersion of traffic has not been quantified in the traffic modelling and therefore the results shown for the Epping Road / Herring Road intersection under the 'future base + development' scenario are considered conservative.

Table 11 Road network performance – AM Peak Hour (8am – 9am)

Intersection	Intersection performance – 2036 'future base'		Intersection performance – 2036 'future base + development'	
	Delay (s)	Level of Service	Delay (s)	Level of Service
Balaclava Road site access	n/a	n/a	1	A
Epping Road / Balaclava Road	38	C	42	C
Epping Road access point	n/a	n/a	1	A
Epping Road / Herring Road	87	F	128	F
Herring Road / Ivanhoe Place	25	B	36	C
Herring Road / Waterloo Road	44	D	61	E
Overall road network	n/a	E	n/a	E

Table 12 Intersection performance – PM Peak Hour (5pm – 6pm)

Intersection	Intersection performance – 2036 'future base'		Intersection performance – 2036 'future base + development'	
	Delay (s)	Level of Service	Delay (s)	Level of Service
Balaclava Road site access	n/a	n/a	2	A
Epping Road / Balaclava Road	46	D	51	D
Epping Road access point	n/a	n/a	1	A
Epping Road / Herring Road	69	E	86	F
Herring Road / Ivanhoe Place	40	C	43	D
Herring Road / Waterloo Road	45	D	48	D
Overall road network	n/a	E	n/a	E

7.5 Construction traffic impacts

A detailed Construction Traffic Management Plan (CTMP) will be prepared once development consent is granted for relevant stages and prior to issue of a Construction Certificate (CC). While the traffic impacts of construction of the development are likely to be minor, the following measures should be undertaken to minimise the impacts of the construction activities of the development:

- Traffic control would be required to manage and regulate traffic movements into and out of the site during construction.
- Disruption to road users would be kept to a minimum by scheduling intensive delivery activities outside of peak hours.
- Construction and delivery vehicles would be limited to the use of Epping Road, the M2 and the necessary local roads and restricted to non-peak periods.
- All vehicles to enter and exit the site in a forward direction with reverse movements to occur only as necessary and subject to supervision.
- All vehicles transporting loose materials will have the entire load covered and/or secured to prevent any items depositing onto the roadway during travel to and from the Site.

The CTMP will be detailed during future DA stages, and will be developed to comply with Transport for NSW requirements and Traffic Control at Works Sites manual, and prepared in consultation with City of Ryde Council, Transport for NSW and any other relevant stakeholders.

8 Summary

This transport assessment report has been prepared by JMT Consulting on behalf of BaptistCare to accompany a State Significant Development Application (SSDA) for a Concept Master Plan for the site located at 157 Balaclava Road, Macquarie Park. Key findings of the transport assessment are as follows:

- The site has excellent access to nearby public transport, with Macquarie University metro and bus interchange within easy walking distance. A number of key employment centres across Sydney can be reached within 30 minutes public transport travel time of the site, including Chatswood, St Leonards, Ryde and Hornsby. The advent of future public transport services, particularly Sydney Metro City and Southwest, will improve this public transport catchment and reduce the impacts of vehicle based travel.
- There are a number of transport initiatives that are planned in the Macquarie Park area which will directly benefit future users of the BaptistCare site – supporting the objective of promoting travel by public transport and active transport and reducing the private vehicle related impacts of the development. These initiatives include:
    - Macquarie Park Precinct and Bus Interchange project
    - Macquarie Park fine grained street network
    - Upgrades to Herring Road including new signalised intersections
    - Sydney Metro (City and Southwest) line which will provide direct connections from Macquarie Park through to North Sydney and the Sydney CBD
    - Delivery of Macquarie Park bicycle network
- In order to maximise the accessibility of the site to the external road network, access to BaptistCare Macquarie Park site is proposed via three locations – those being on Herring Road, Epping Road and Balaclava Road. These accesses will provide for the distribution of traffic onto the broader road network and assist in minimising the impacts of the development on the surrounding road network.
- The internal street network is shown in has been developed to provide a logical integration of the site with the surrounding road network, future access locations and pedestrian desire lines, providing permeability through the future development.
- Vehicle access points will be provided for each of the development lots, with these access points to be defined as part of the detailed Development Applications for each of the respective sites.
- The master plan has been developed to facilitate safe, clear and efficient pedestrian and cycle connections within the site and to the external transport network - offering a high level of permeability for pedestrians to connect through to bus stops on Balaclava Road and Epping Road, connect through to Macquarie University or through to the Macquarie University metro station on Herring Road.

- The internal street network has been designed to accommodate a range of vehicles include service and emergency vehicles.
- The internal road to be delivered within the site will facilitate good levels of pedestrian safety by providing for a slow speed environment commensurate with the high levels of pedestrian and cycling activity adjacent.
- Car parking for the development is proposed to be generally in accordance with the requirements of Council's DCP and other relevant state planning documents – with car parking numbers to be confirmed at the time of the detailed development applications for each of the respective sites.
- Detailed traffic modelling undertaken for the area surrounding the site indicates that the surrounding road network, with the provision of development as planned on the BaptistCare site, will generally operate in a similar manner to the 'future base' scenario. When considering the road network holistically, based on the SIDRA network modelling outputs, the overall road network Level of Service remains at 'E' in both the 'future base' and 'future base + development' scenarios.
- The delivery of the internal road connection between Balaclava Road and Herring Road will benefit the operation of the surrounding road network by dispersing traffic away from the Epping Road / Herring Road intersection.
- The following transport infrastructure upgrades will be delivered as part of the project to provide for a safe and efficient road network:
    - Delivery of an public road connection (within the BaptistCare site) that will form a link between Balaclava Road and Epping Road;
    - Retention of the existing vehicle access point on Epping Road including the provision of an upgraded layout including an acceleration lane and deceleration lane; and'
    - Upgraded vehicle access point on Balaclava Road.

In the above context, the traffic and transport impacts arising from the proposal are considered acceptable.

Appendix A: Traffic Modelling Outputs

MOVEMENT SUMMARY

Site: 1 [AM_Epping-Balaclava (Site Folder: Future Base)]

Network: N101 [AM Future Base (Network Folder: General)]

Epping Road-Balaclava Road
Site Category: 2031
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Balaclava Road														
1	L2	28	3.7	28	3.7	0.803	70.0	LOS E	12.5	90.3	1.00	0.97	1.10	29.9
2	T1	259	3.3	259	3.3	* 0.803	64.7	LOS E	12.5	90.3	1.00	0.97	1.10	25.0
3	R2	569	2.2	569	2.2	0.754	67.8	LOS E	12.3	87.9	1.00	0.87	1.04	19.0
Approach		857	2.6	857	2.6	0.803	66.9	LOS E	12.5	90.3	1.00	0.90	1.06	21.4
East: Epping Road														
4	L2	292	7.9	292	7.9	0.207	7.8	LOS A	1.3	10.0	0.14	0.62	0.14	57.4
5	T1	826	3.3	826	3.3	0.430	18.8	LOS B	8.5	61.3	0.49	0.44	0.49	53.1
6	R2	194	0.0	194	0.0	* 0.833	88.6	LOS F	5.9	41.4	1.00	0.82	1.09	23.4
Approach		1312	3.9	1312	3.9	0.833	26.6	LOS B	8.5	61.3	0.49	0.53	0.50	46.9
North: Balaclava Road														
7	L2	38	0.0	38	0.0	0.120	32.0	LOS C	1.1	8.7	0.70	0.69	0.70	20.9
8	T1	87	7.2	87	7.2	* 0.779	78.4	LOS F	3.9	27.3	0.98	0.85	1.18	22.7
9	R2	52	28.6	52	28.6	0.627	86.7	LOS F	2.4	21.3	1.00	0.79	1.09	21.0
Approach		177	11.9	177	11.9	0.779	70.9	LOS F	3.9	27.3	0.92	0.80	1.05	21.7
West: Epping Road														
10	L2	239	5.3	239	5.3	0.214	12.5	LOS A	3.1	23.5	0.33	0.66	0.33	50.8
11	T1	2048	1.6	2048	1.6	* 0.810	30.6	LOS C	25.6	181.2	0.83	0.76	0.83	32.7
12	R2	74	1.4	74	1.4	0.501	80.4	LOS F	3.3	23.3	1.00	0.77	1.00	26.6
Approach		2361	2.0	2361	2.0	0.810	30.3	LOS C	25.6	181.2	0.79	0.75	0.79	33.9
All Vehicles		4706	3.0	4706	3.0	0.833	37.5	LOS C	25.6	181.2	0.75	0.72	0.77	34.2

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

* 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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Balaclava Road											
P1	Full	53	70.2	LOS F	0.2	0.2	0.97	0.97	237.3	217.2	0.92
East: Epping Road											
P2	Full	53	70.2	LOS F	0.2	0.2	0.97	0.97	250.0	233.7	0.93
North: Balaclava Road											
P3	Full	53	70.2	LOS F	0.2	0.2	0.97	0.97	239.9	220.5	0.92
West: Epping Road											

MOVEMENT SUMMARY

Site: 2 [AM_ Epping-Herring (Site Folder: Future Base)]

Network: N101 [AM Future Base (Network Folder: General)]

Epping Road x Herring Road

Site Category: Four Leg Signalised
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Herring Road (250m)														
1	L2	15	0.0	15	0.0	0.013	11.5	LOS A	0.2	1.2	0.32	0.61	0.32	35.3
2	T1	658	2.9	658	2.9	* 1.037	137.7	LOS F	25.9	185.4	1.00	1.34	1.69	6.4
3	R2	360	1.2	360	1.2	* 0.841	58.5	LOS E	6.8	48.4	1.00	0.91	1.22	29.7
Approach		1033	2.2	1033	2.2	1.037	108.3	LOS F	25.9	185.4	0.99	1.18	1.50	12.9
East: Epping Road (630m)														
4	L2	107	2.0	107	2.0	0.501	29.6	LOS C	9.4	66.6	0.70	0.71	0.70	43.7
5	T1	1121	1.6	1121	1.6	0.501	29.3	LOS C	13.4	94.9	0.75	0.69	0.75	37.2
6	R2	438	3.4	438	3.4	* 1.010	130.8	LOS F	16.5	119.1	1.00	1.11	1.65	14.3
Approach		1666	2.1	1666	2.1	1.010	56.0	LOS D	16.5	119.1	0.81	0.80	0.98	26.6
North: Herring Road (180m)														
7	L2	69	19.7	69	19.7	0.099	16.2	LOS B	0.8	6.3	0.28	0.61	0.28	47.6
8	T1	284	4.8	284	4.8	0.603	66.9	LOS E	6.4	46.7	0.97	0.78	0.97	17.5
9	R2	258	1.6	258	1.6	0.973	105.6	LOS F	6.8	48.4	1.00	0.99	1.41	6.3
Approach		612	5.2	612	5.2	0.973	77.4	LOS F	6.8	48.4	0.90	0.85	1.07	14.1
West: Epping Road (600m)														
10	L2	535	1.6	535	1.6	0.778	34.2	LOS C	14.6	103.4	0.78	0.94	0.78	34.8
11	T1	2166	1.7	2166	1.7	* 1.026	116.1	LOS F	52.2	369.8	1.00	1.31	1.50	25.2
12	R2	89	0.0	89	0.0	0.489	77.3	LOS F	3.9	27.3	0.99	0.78	0.99	25.7
Approach		2791	1.6	2791	1.6	1.026	99.2	LOS F	52.2	369.8	0.96	1.22	1.35	26.0
All Vehicles		6101	2.2	6101	2.2	1.037	86.7	LOS F	52.2	369.8	0.92	1.06	1.25	22.9

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

* 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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Herring Road (250m)											
P1	Full	53	32.7	LOS D	0.1	0.1	0.66	0.66	65.0	42.0	0.65
East: Epping Road (630m)											
P2	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	105.8	47.5	0.45
North: Herring Road (180m)											
P3	Full	53	36.8	LOS D	0.2	0.2	0.70	0.70	68.4	41.0	0.60

MOVEMENT SUMMARY

Site: 3 [AM_ Herring-Ivanhoe (Site Folder: Future Base)]

Network: N101 [AM Future Base (Network Folder: General)]

Herring Road x Ivanhoe Place

Site Category: Four Leg Signalised
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Herring Road (180m)														
1	L2	12	0.0	11	0.0	0.030	10.6	LOS A	0.1	1.5	0.19	0.39	0.19	19.5
2	T1	1315	2.3	1304	2.3	* 0.741	17.6	LOS B	21.5	152.2	0.53	0.48	0.53	24.4
3	R2	262	1.2	260	1.2	0.415	25.6	LOS B	5.3	37.6	0.49	0.70	0.49	26.8
Approach		1588	2.1	1576 N1	2.1	0.741	18.9	LOS B	21.5	152.2	0.52	0.51	0.52	25.3
East: Ivanhoe Main Road (550m)														
4	L2	294	2.2	294	2.2	0.204	2.5	LOS A	1.3	9.1	0.17	0.34	0.17	29.0
5	T1	8	0.0	8	0.0	* 0.204	1.0	LOS A	1.3	9.1	0.17	0.34	0.17	28.5
6	R2	121	0.9	121	0.9	0.116	44.0	LOS D	2.0	14.0	0.78	0.66	0.78	18.3
Approach		423	1.7	423	1.7	0.204	14.3	LOS A	2.0	14.0	0.35	0.43	0.35	24.9
North: Herring Road (380m)														
7	L2	81	1.3	81	1.3	0.355	65.8	LOS E	3.9	30.5	0.91	0.77	0.91	22.2
8	T1	189	7.8	189	7.8	0.355	65.7	LOS E	3.9	30.5	0.96	0.75	0.96	16.0
9	R2	16	0.0	16	0.0	* 0.205	78.4	LOS F	0.7	4.7	0.93	0.68	0.93	15.6
Approach		286	5.5	286	5.5	0.355	66.4	LOS E	3.9	30.5	0.94	0.75	0.94	18.4
West: Morling College (70m)														
10	L2	6	0.0	6	0.0	0.201	81.8	LOS F	0.8	5.3	0.99	0.70	0.99	3.9
11	T1	11	0.0	11	0.0	* 0.201	80.7	LOS F	0.8	5.3	0.99	0.70	0.99	15.1
12	R2	13	0.0	13	0.0	0.164	83.5	LOS F	0.6	4.0	0.99	0.68	0.99	3.7
Approach		29	0.0	29	0.0	0.201	82.1	LOS F	0.8	5.3	0.99	0.69	0.99	9.3
All Vehicles		2327	2.4	2315 N1	2.5	0.741	24.7	LOS B	21.5	152.2	0.55	0.53	0.55	23.2

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

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Herring Road (180m)											
P1	Full	53	57.3	LOS E	0.2	0.2	0.88	0.88	96.6	51.0	0.53
East: Ivanhoe Main Road (550m)											
P2	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	102.0	42.5	0.42
North: Herring Road (380m)											

MOVEMENT SUMMARY

Site: 101 [AM_Herring-Waterloo (Site Folder: Future Base)]

Network: N101 [AM Future Base (Network Folder: General)]

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

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Herring Road (380m)														
1	L2	94	2.2	94	2.2	0.160	40.1	LOS C	2.4	16.8	0.60	0.71	0.60	30.8
2	T1	828	2.8	828	2.8	* 0.675	38.1	LOS C	14.2	102.1	0.82	0.71	0.82	35.3
3	R2	534	4.3	533	4.3	* 0.694	52.5	LOS D	10.2	73.8	0.90	0.82	0.90	24.2
Approach		1456	3.3	1455 N1	3.3	0.694	43.5	LOS D	14.2	102.1	0.83	0.75	0.83	31.0
East: Waterloo Road (205m)														
4	L2	262	11.2	262	11.2	0.246	21.1	LOS B	5.2	40.1	0.51	0.72	0.51	23.3
5	T1	154	4.1	154	4.1	0.246	36.4	LOS C	5.1	36.8	0.75	0.63	0.75	29.1
6	R2	127	19.0	127	19.0	* 0.699	80.2	LOS F	5.2	39.3	0.99	0.82	1.07	20.8
Approach		543	11.0	543	11.0	0.699	39.3	LOS C	5.2	40.1	0.69	0.72	0.71	23.9
North: Herring Road (135m)														
7	L2	21	100.0	21	100.0	0.094	41.3	LOS C	1.1	14.3	0.70	0.64	0.70	30.8
8	T1	16	100.0	16	100.0	0.094	34.7	LOS C	1.1	14.3	0.70	0.64	0.70	26.9
9	R2	21	100.0	21	100.0	0.091	58.0	LOS E	0.8	9.9	0.83	0.71	0.83	27.7
Approach		58	100.0	58	100.0	0.094	45.6	LOS D	1.1	14.3	0.75	0.67	0.75	28.6
West: University Avenue (340m)														
10	L2	75	8.5	75	8.5	0.091	29.0	LOS C	1.8	13.7	0.59	0.71	0.59	37.4
11	T1	278	3.8	278	3.8	* 0.684	58.7	LOS E	11.5	83.3	0.98	0.83	0.98	22.2
Approach		353	4.8	353	4.8	0.684	52.4	LOS D	11.5	83.3	0.90	0.80	0.90	25.1
All Vehicles		2409	7.6	2408 N1	7.6	0.699	43.9	LOS D	14.2	102.1	0.81	0.75	0.81	28.8

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

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Herring Road (380m)											
P1	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	246.5	230.4	0.93
East: Waterloo Road (205m)											
P2	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	242.4	225.1	0.93

MOVEMENT SUMMARY

Site: 1 [AM_Epping-Balaclava (Site Folder: Future Base + Development)]

Network: N101 [AM Future Base + Development (Network Folder: General)]

Epping Road-Balaclava Road
Site Category: 2031
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Balaclava Road														
1	L2	28	3.7	28	3.7	0.846	75.8	LOS F	13.7	98.6	1.00	1.02	1.16	28.6
2	T1	273	3.1	273	3.1	* 0.846	70.5	LOS E	13.7	98.6	1.00	1.02	1.16	18.7
3	R2	569	2.2	569	2.2	0.754	67.8	LOS E	12.3	87.9	1.00	0.87	1.04	19.0
Approach		871	2.5	871	2.5	0.846	68.9	LOS E	13.7	98.6	1.00	0.92	1.08	19.3
East: Epping Road														
4	L2	292	7.9	292	7.9	0.209	8.0	LOS A	1.5	11.5	0.16	0.62	0.16	52.8
5	T1	844	3.2	844	3.2	0.451	18.4	LOS B	8.6	61.5	0.48	0.43	0.48	48.2
6	R2	222	0.0	222	0.0	* 0.882	89.9	LOS F	6.9	48.1	1.00	0.84	1.12	10.1
Approach		1358	3.7	1358	3.7	0.882	27.8	LOS B	8.6	61.5	0.50	0.54	0.52	39.0
North: Balaclava Road														
7	L2	38	0.0	38	0.0	0.109	30.7	LOS C	1.1	8.3	0.70	0.69	0.70	15.5
8	T1	105	6.0	105	6.0	0.846	80.8	LOS F	4.8	33.9	0.98	0.90	1.27	20.4
9	R2	86	17.1	86	17.1	* 0.869	93.2	LOS F	4.3	34.8	1.00	0.95	1.39	18.3
Approach		229	9.2	229	9.2	0.869	77.2	LOS F	4.8	34.8	0.94	0.88	1.22	18.9
West: Epping Road														
10	L2	296	4.3	296	4.3	0.266	13.7	LOS A	4.4	32.3	0.37	0.67	0.37	47.1
11	T1	2077	1.6	2077	1.6	* 0.860	37.7	LOS C	29.5	208.4	0.86	0.83	0.92	29.1
12	R2	74	1.4	74	1.4	0.462	79.0	LOS F	3.2	23.0	0.99	0.77	0.99	26.8
Approach		2446	1.9	2446	1.9	0.860	36.0	LOS C	29.5	208.4	0.81	0.81	0.85	30.3
All Vehicles		4904	2.9	4904	2.9	0.882	41.5	LOS C	29.5	208.4	0.76	0.76	0.82	28.9

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

* 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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Balaclava Road											
P1	Full	53	70.2	LOS F	0.2	0.2	0.97	0.97	237.3	217.2	0.92
East: Epping Road											
P2	Full	53	70.2	LOS F	0.2	0.2	0.97	0.97	250.0	233.7	0.93
North: Balaclava Road											
P3	Full	53	70.2	LOS F	0.2	0.2	0.97	0.97	239.9	220.5	0.92

MOVEMENT SUMMARY

Site: 2 [AM_ Epping-Herring (Site Folder: Future Base + Development)]

Network: N101 [AM Future Base + Development (Network Folder: General)]

Epping Road x Herring Road

Site Category: Four Leg Signalised
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Herring Road (250m)														
1	L2	15	0.0	15	0.0	0.013	11.2	LOS A	0.2	1.2	0.31	0.60	0.31	35.7
2	T1	686	2.8	686	2.8	* 1.104	184.5	LOS F	34.9	249.7	1.00	1.52	1.94	4.9
3	R2	360	1.2	360	1.2	0.827	65.6	LOS E	6.7	47.4	1.00	0.97	1.20	27.9
Approach		1061	2.2	1061	2.2	1.104	141.7	LOS F	34.9	249.7	0.99	1.32	1.66	10.2
East: Epping Road (630m)														
4	L2	107	2.0	107	2.0	0.542	33.4	LOS C	10.7	76.1	0.75	0.75	0.75	41.6
5	T1	1166	1.5	1166	1.5	0.542	32.2	LOS C	14.5	102.7	0.79	0.72	0.79	35.5
6	R2	509	2.9	509	2.9	* 1.094	185.0	LOS F	26.0	186.8	1.00	1.24	1.93	10.5
Approach		1783	1.9	1783	1.9	1.094	75.9	LOS F	26.0	186.8	0.85	0.87	1.11	21.5
North: Herring Road (180m)														
7	L2	69	19.7	69	19.7	0.094	22.1	LOS B	1.1	8.9	0.40	0.64	0.40	43.5
8	T1	337	4.1	337	4.1	0.675	67.5	LOS E	7.7	55.8	0.97	0.81	0.99	17.4
9	R2	213	2.0	213	2.0	* 1.106	185.8	LOS F	7.9	56.3	1.00	1.15	1.89	3.6
Approach		619	5.1	619	5.1	1.106	103.0	LOS F	7.9	56.3	0.92	0.91	1.23	11.5
West: Epping Road (600m)														
10	L2	535	1.6	535	1.6	1.110	162.4	LOS F	35.8	254.3	1.00	1.21	1.92	6.0
11	T1	2166	1.7	2166	1.7	* 1.102	166.8	LOS F	48.0	340.0	1.00	1.51	1.76	16.1
12	R2	124	0.0	124	0.0	0.566	79.9	LOS F	5.5	38.8	1.00	0.80	1.00	19.3
Approach		2825	1.6	2825	1.6	1.110	162.2	LOS F	48.0	340.0	1.00	1.42	1.76	14.2
All Vehicles		6288	2.1	6288	2.1	1.110	128.4	LOS F	48.0	340.0	0.95	1.20	1.51	14.7

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

* 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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Herring Road (250m)											
P1	Full	53	34.8	LOS D	0.2	0.2	0.68	0.68	67.1	42.0	0.63
East: Epping Road (630m)											
P2	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	105.8	47.5	0.45
North: Herring Road (180m)											
P3	Full	53	39.7	LOS D	0.2	0.2	0.73	0.73	71.2	41.0	0.58

MOVEMENT SUMMARY

Site: 3 [AM_ Herring-Ivanhoe (Site Folder: Future Base + Development)]

Network: N101 [AM Future Base + Development (Network Folder: General)]

Herring Road x Ivanhoe Place

Site Category: Four Leg Signalised
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Herring Road (180m)														
1	L2	97	0.0	92	0.0	0.109	17.3	LOS B	1.5	11.1	0.46	0.65	0.46	16.5
2	T1	1349	2.3	1275	2.2	* 0.859	29.3	LOS C	25.4	180.0	0.69	0.67	0.74	17.5
3	R2	262	1.2	248	1.2	0.330	21.2	LOS B	4.0	28.6	0.39	0.67	0.39	28.1
Approach		1708	2.0	1614 N1	2.0	0.859	27.4	LOS B	25.4	180.0	0.63	0.67	0.67	20.5
East: Ivanhoe Main Road (550m)														
4	L2	294	2.2	294	2.2	0.311	9.6	LOS A	4.8	34.0	0.50	0.54	0.50	26.4
5	T1	37	0.0	37	0.0	* 0.311	8.1	LOS A	4.8	34.0	0.50	0.54	0.50	26.3
6	R2	121	0.9	121	0.9	0.147	47.8	LOS D	2.4	16.8	0.81	0.68	0.81	17.7
Approach		452	1.6	452	1.6	0.311	19.7	LOS B	4.8	34.0	0.58	0.58	0.58	23.4
North: Herring Road (380m)														
7	L2	81	1.3	81	1.3	0.338	64.3	LOS E	3.9	30.6	0.92	0.77	0.92	22.4
8	T1	189	7.8	189	7.8	0.338	64.0	LOS E	3.9	30.6	0.94	0.74	0.94	16.3
9	R2	58	0.0	58	0.0	* 0.752	89.9	LOS F	2.8	19.8	1.00	0.83	1.22	14.1
Approach		328	4.8	328	4.8	0.752	68.7	LOS E	3.9	30.6	0.95	0.77	0.99	18.0
West: Morling College (70m)														
10	L2	77	0.0	77	0.0	0.834	86.1	LOS F	5.9	41.5	1.00	0.94	1.26	3.6
11	T1	45	0.0	45	0.0	* 0.834	85.1	LOS F	5.9	41.5	1.00	0.94	1.26	14.6
12	R2	83	0.0	83	0.0	0.648	82.0	LOS F	3.8	26.8	1.00	0.80	1.06	3.8
Approach		205	0.0	205	0.0	0.834	84.2	LOS F	5.9	41.5	1.00	0.89	1.18	7.3
All Vehicles		2694	2.1	2600 N1	2.2	0.859	35.8	LOS C	25.4	180.0	0.69	0.68	0.73	19.1

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

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Herring Road (180m)											
P1	Full	53	60.9	LOS F	0.2	0.2	0.90	0.90	100.1	51.0	0.51
East: Ivanhoe Main Road (550m)											
P2	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	102.0	42.5	0.42

MOVEMENT SUMMARY

Site: 101 [AM_Herring-Waterloo (Site Folder: Future Base + Development)]

Network: N101 [AM Future Base + Development (Network Folder: General)]

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

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Herring Road (380m)														
1	L2	94	2.2	90	2.3	0.107	31.3	LOS C	2.5	18.1	0.68	0.73	0.68	34.3
2	T1	889	2.6	852	2.6	* 0.948	51.1	LOS D	41.1	291.6	0.99	1.03	1.14	31.0
3	R2	568	4.1	545	4.1	* 0.944	79.8	LOS F	13.7	99.0	1.00	0.96	1.24	18.6
Approach		1552	3.1	1487 N1	3.1	0.948	60.4	LOS E	41.1	291.6	0.98	0.99	1.15	26.2
East: Waterloo Road (205m)														
4	L2	304	9.7	304	9.7	0.355	34.7	LOS C	8.1	61.1	0.70	0.77	0.70	16.8
5	T1	154	4.1	154	4.1	0.355	47.7	LOS D	6.3	45.9	0.86	0.72	0.86	25.0
6	R2	127	19.0	127	19.0	* 0.979	111.0	LOS F	6.5	48.9	1.00	1.03	1.57	16.8
Approach		585	10.3	585	10.3	0.979	54.7	LOS D	8.1	61.1	0.81	0.81	0.93	18.9
North: Herring Road (135m)														
7	L2	21	100.0	21	100.0	0.067	27.6	LOS B	0.9	11.1	0.55	0.57	0.55	36.7
8	T1	16	100.0	16	100.0	0.067	21.1	LOS B	0.9	11.1	0.55	0.57	0.55	33.4
9	R2	21	100.0	21	100.0	0.121	65.9	LOS E	0.8	10.7	0.89	0.72	0.89	25.8
Approach		58	100.0	58	100.0	0.121	39.8	LOS C	0.9	11.1	0.67	0.63	0.67	30.5
West: University Avenue (340m)														
10	L2	75	8.5	75	8.5	0.121	40.3	LOS C	2.2	16.7	0.71	0.73	0.71	32.9
11	T1	278	3.8	278	3.8	* 0.952	93.9	LOS F	15.2	110.0	1.00	1.12	1.41	16.1
Approach		353	4.8	353	4.8	0.952	82.6	LOS F	15.2	110.0	0.94	1.04	1.26	18.9
All Vehicles		2547	7.2	2482 N1	7.4	0.979	61.7	LOS E	41.1	291.6	0.92	0.94	1.11	23.7

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

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Herring Road (380m)											
P1	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	246.5	230.4	0.93
East: Waterloo Road (205m)											

MOVEMENT SUMMARY

Site: 101 [AM Balaclava Road Access (Site Folder: Future Base + Development)]

Network: N101 [AM Future Base + Development (Network Folder: General)]

Balaclava Road Access Point
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Balaclava Road (S)														
2	T1	692	2.1	692	2.1	0.427	0.2	LOS A	0.4	2.7	0.09	0.08	0.09	58.4
3	R2	99	2.1	99	2.1	0.427	6.5	LOS A	0.4	2.7	0.09	0.08	0.09	55.0
Approach		791	2.1	791	2.1	0.427	1.0	NA	0.4	2.7	0.09	0.08	0.09	57.9
East: Site Access (E)														
4	L2	53	2.0	53	2.0	0.052	8.8	LOS A	0.1	0.6	0.30	0.87	0.30	47.1
6	R2	3	0.0	3	0.0	0.052	15.3	LOS B	0.1	0.6	0.30	0.87	0.30	50.9
Approach		56	1.9	56	1.9	0.052	9.2	LOS A	0.1	0.6	0.30	0.87	0.30	47.4
North: Balaclava Road (N)														
7	L2	2	0.0	2	0.0	0.095	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.3
8	T1	177	6.0	177	6.0	0.095	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		179	5.9	179	5.9	0.095	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles		1025	2.8	1025	2.8	0.427	1.3	NA	0.4	2.7	0.09	0.11	0.09	57.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [AM Epping Road Access (Site Folder: Future Base + Development)]

Network: N101 [AM Future Base + Development (Network Folder: General)]

Epping Road Access Point
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Epping Road (E)														
5	T1	1358	2.8	1358	2.8	0.236	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1358	2.8	1358	2.8	0.236	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Site Access (N)														
7	L2	126	2.5	126	2.5	0.069	8.3	LOS A	0.0	0.0	0.00	0.53	0.00	51.0
Approach		126	2.5	126	2.5	0.069	8.3	NA	0.0	0.0	0.00	0.53	0.00	51.0
West: Epping Road (W)														
10	L2	28	0.0	28	0.0	0.015	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	52.0
11	T1	2684	1.6	2684	1.6	0.464	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
Approach		2713	1.6	2713	1.6	0.464	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.4
All Vehicles		4197	2.0	4197	2.0	0.464	0.4	NA	0.0	0.0	0.00	0.02	0.00	59.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [PM_Epping-Balaclava (Site Folder: Future Base)]

Network: N101 [PM Future Base (Network Folder: General)]

Epping Road-Balaclava Road
Site Category: 2031
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Balaclava Road														
1	L2	133	0.8	133	0.8	0.588	55.0	LOS D	9.1	65.6	0.93	0.95	0.93	33.3
2	T1	137	6.2	137	6.2	0.588	49.5	LOS D	9.1	65.6	0.93	0.95	0.93	28.2
3	R2	428	1.0	428	1.0	0.528	61.3	LOS E	8.5	60.0	0.94	0.82	0.94	20.3
Approach		698	2.0	698	2.0	0.588	57.8	LOS E	9.1	65.6	0.93	0.87	0.93	24.7
East: Epping Road														
4	L2	598	2.1	598	2.1	0.449	8.8	LOS A	2.5	18.3	0.12	0.63	0.12	56.8
5	T1	1222	1.9	1222	1.9	* 0.858	51.4	LOS D	26.5	188.0	0.98	0.94	1.05	37.5
6	R2	100	0.0	100	0.0	0.469	85.0	LOS F	2.9	20.6	1.00	0.75	1.00	24.0
Approach		1920	1.9	1920	1.9	0.858	39.9	LOS C	26.5	188.0	0.71	0.83	0.76	40.9
North: Balaclava Road														
7	L2	179	0.0	179	0.0	0.240	18.8	LOS B	3.7	25.9	0.52	0.72	0.52	28.1
8	T1	239	2.2	239	2.2	* 0.862	75.5	LOS F	11.4	81.5	1.00	0.97	1.22	22.8
9	R2	294	5.0	294	5.0	* 0.877	76.8	LOS F	14.0	101.9	0.99	0.95	1.21	22.9
Approach		712	2.8	712	2.8	0.877	61.8	LOS E	14.0	101.9	0.88	0.90	1.04	23.3
West: Epping Road														
10	L2	114	13.0	114	13.0	0.101	13.3	LOS A	1.6	12.6	0.33	0.64	0.33	49.9
11	T1	1087	1.3	1087	1.3	0.494	35.9	LOS C	12.5	88.3	0.80	0.70	0.80	29.9
12	R2	162	0.6	162	0.6	* 0.877	89.6	LOS F	8.0	56.5	1.00	0.93	1.31	24.9
Approach		1363	2.2	1363	2.2	0.877	40.4	LOS C	12.5	88.3	0.78	0.72	0.82	29.9
All Vehicles		4693	2.1	4693	2.1	0.877	46.0	LOS D	26.5	188.0	0.79	0.82	0.84	32.9

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

* 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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Balaclava Road											
P1	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	236.3	217.2	0.92
East: Epping Road											
P2	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	249.0	233.7	0.94
North: Balaclava Road											
P3	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	238.9	220.5	0.92
West: Epping Road											

MOVEMENT SUMMARY

Site: 2 [PM_ Epping-Herring (Site Folder: Future Base)]

Network: N101 [PM Future Base (Network Folder: General)]

Epping Road x Herring Road

Site Category: Four Leg Signalised
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Herring Road (250m)														
1	L2	24	0.0	24	0.0	0.027	24.0	LOS B	0.5	3.7	0.53	0.64	0.53	24.3
2	T1	674	2.3	674	2.3	* 0.965	96.9	LOS F	21.6	153.9	1.00	1.18	1.43	8.8
3	R2	206	1.0	206	1.0	0.371	67.6	LOS E	4.2	29.6	0.94	0.78	0.94	27.4
Approach		904	2.0	904	2.0	0.965	88.3	LOS F	21.6	153.9	0.97	1.07	1.30	13.4
East: Epping Road (630m)														
4	L2	277	1.1	277	1.1	0.925	72.4	LOS F	31.2	220.7	1.00	1.15	1.18	27.5
5	T1	1524	1.2	1524	1.2	* 0.925	69.8	LOS E	31.2	220.7	1.00	1.08	1.20	22.6
6	R2	376	3.1	376	3.1	0.759	74.1	LOS F	9.7	69.4	1.00	0.88	1.10	21.9
Approach		2177	1.5	2177	1.5	0.925	70.8	LOS F	31.2	220.7	1.00	1.05	1.18	23.2
North: Herring Road (180m)														
7	L2	276	4.6	276	4.6	0.269	22.6	LOS B	8.1	58.6	0.74	0.78	0.74	43.4
8	T1	749	2.0	749	2.0	0.780	62.8	LOS E	16.6	118.5	1.00	0.89	1.03	18.2
9	R2	536	1.0	536	1.0	* 0.962	99.2	LOS F	14.0	98.9	1.00	0.98	1.29	6.5
Approach		1561	2.1	1561	2.1	0.962	68.2	LOS E	16.6	118.5	0.95	0.90	1.07	16.7
West: Epping Road (600m)														
10	L2	369	0.9	369	0.9	0.566	26.5	LOS B	7.9	56.1	0.58	0.83	0.58	39.2
11	T1	1138	1.4	1138	1.4	0.782	58.5	LOS E	16.5	116.7	1.00	0.89	1.03	37.1
12	R2	194	1.1	194	1.1	* 0.942	98.4	LOS F	9.8	69.4	1.00	0.94	1.28	22.0
Approach		1701	1.2	1701	1.2	0.942	56.1	LOS D	16.5	116.7	0.91	0.88	0.96	35.1
All Vehicles		6343	1.6	6343	1.6	0.965	68.7	LOS E	31.2	220.7	0.96	0.97	1.11	23.7

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

* 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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Herring Road (250m)											
P1	Full	53	46.5	LOS E	0.2	0.2	0.79	0.79	78.8	42.0	0.53
East: Epping Road (630m)											
P2	Full	53	58.2	LOS E	0.2	0.2	0.88	0.88	94.7	47.5	0.50
North: Herring Road (180m)											
P3	Full	53	53.9	LOS E	0.2	0.2	0.85	0.85	85.4	41.0	0.48

MOVEMENT SUMMARY

Site: 3 [PM_ Herring-Ivanhoe (Site Folder: Future Base)]

Network: N101 [PM Future Base (Network Folder: General)]

Herring Road x Ivanhoe Place

Site Category: Four Leg Signalised
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Herring Road (180m)														
1	L2	1	0.0	1	0.0	0.024	39.4	LOS C	0.3	4.0	0.56	0.45	0.56	12.8
2	T1	1049	2.0	1049	2.0	* 0.745	40.6	LOS C	21.6	152.6	0.90	0.80	0.90	13.8
3	R2	136	1.6	136	1.6	0.446	56.7	LOS E	4.9	35.0	0.85	0.77	0.85	20.5
Approach		1186	2.0	1186	2.0	0.745	42.4	LOS C	21.6	152.6	0.89	0.79	0.89	15.4
East: Ivanhoe Main Road (550m)														
4	L2	398	1.6	398	1.6	0.337	4.3	LOS A	3.7	25.9	0.30	0.43	0.30	28.3
5	T1	8	0.0	8	0.0	* 0.337	2.8	LOS A	3.7	25.9	0.30	0.43	0.30	27.9
6	R2	175	1.2	175	1.2	0.126	33.9	LOS C	2.5	17.9	0.69	0.62	0.69	20.1
Approach		581	1.4	581	1.4	0.337	13.2	LOS A	3.7	25.9	0.41	0.49	0.41	25.2
North: Herring Road (380m)														
7	L2	7	0.0	7	0.0	0.454	56.2	LOS D	9.1	67.0	0.95	0.80	0.95	24.6
8	T1	648	3.1	648	3.1	0.454	54.9	LOS D	9.1	67.0	0.97	0.82	0.97	18.3
9	R2	35	0.0	35	0.0	* 0.451	86.5	LOS F	1.6	11.4	1.00	0.72	1.00	14.5
Approach		691	2.9	691	2.9	0.454	56.5	LOS D	9.1	67.0	0.97	0.81	0.97	18.1
West: Morling College (70m)														
10	L2	21	0.0	21	0.0	0.142	73.3	LOS F	1.0	6.8	0.95	0.71	0.95	3.9
11	T1	2	0.0	2	0.0	* 0.142	72.2	LOS F	1.0	6.8	0.95	0.71	0.95	15.8
12	R2	8	0.0	8	0.0	0.123	83.6	LOS F	0.4	2.7	0.99	0.67	0.99	3.7
Approach		32	0.0	32	0.0	0.142	75.9	LOS F	1.0	6.8	0.96	0.70	0.96	5.2
All Vehicles		2489	2.1	2489	2.1	0.745	39.9	LOS C	21.6	152.6	0.80	0.72	0.80	18.7

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

* 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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Herring Road (180m)											
P1	Full	53	45.7	LOS E	0.2	0.2	0.78	0.78	85.0	51.0	0.60
East: Ivanhoe Main Road (550m)											
P2	Full	53	53.0	LOS E	0.2	0.2	0.84	0.84	85.7	42.5	0.50
North: Herring Road (380m)											
P3	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	108.0	50.3	0.47

MOVEMENT SUMMARY

Site: 101 [PM_Herring-Waterloo (Site Folder: Future Base)]

Network: N101 [PM Future Base (Network Folder: General)]

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

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Herring Road (380m)														
1	L2	115	1.8	115	1.8	0.142	15.3	LOS B	1.2	8.4	0.25	0.64	0.25	43.2
2	T1	743	3.1	743	3.1	* 0.863	14.4	LOS A	20.4	144.8	0.65	0.61	0.67	47.4
3	R2	413	4.3	413	4.3	* 0.859	89.0	LOS F	9.8	71.3	1.00	0.89	1.13	17.3
Approach		1271	3.4	1271	3.4	0.863	38.7	LOS C	20.4	144.8	0.72	0.70	0.78	32.9
East: Waterloo Road (205m)														
4	L2	571	3.9	571	3.9	0.456	37.5	LOS C	11.6	84.0	0.75	0.79	0.75	16.0
5	T1	102	3.1	102	3.1	0.456	41.9	LOS C	9.7	69.7	0.84	0.78	0.84	25.7
6	R2	119	20.4	119	20.4	* 0.882	91.7	LOS F	5.2	38.9	1.00	0.92	1.33	19.0
Approach		792	6.3	792	6.3	0.882	46.2	LOS D	11.6	84.0	0.80	0.81	0.85	18.4
North: Herring Road (135m)														
7	L2	21	100.0	21	100.0	0.070	29.3	LOS C	0.9	11.5	0.57	0.58	0.57	35.9
8	T1	16	100.0	16	100.0	0.070	22.8	LOS B	0.9	11.5	0.57	0.58	0.57	32.4
9	R2	21	100.0	21	100.0	0.146	70.3	LOS E	0.9	11.2	0.92	0.72	0.92	24.9
Approach		58	100.0	58	100.0	0.146	42.5	LOS C	0.9	11.5	0.70	0.63	0.70	29.6
West: University Avenue (340m)														
10	L2	108	3.9	108	3.9	0.161	38.7	LOS C	3.2	23.0	0.70	0.74	0.70	33.5
11	T1	331	3.2	331	3.2	* 0.865	71.3	LOS F	15.8	113.3	1.00	0.98	1.17	19.6
Approach		439	3.4	439	3.4	0.865	63.3	LOS E	15.8	113.3	0.93	0.92	1.06	22.7
All Vehicles		2559	6.5	2559	6.5	0.882	45.3	LOS D	20.4	144.8	0.78	0.77	0.85	27.1

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

* 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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Herring Road (380m)											
P1	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	246.5	230.4	0.93
East: Waterloo Road (205m)											
P2	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	242.4	225.1	0.93
North: Herring Road (135m)											

MOVEMENT SUMMARY

Site: 1 [PM_Epping-Balaclava (Site Folder: Future Base + Development)]

Network: N101 [PM Future Base + Development (Network Folder: General)]

Epping Road-Balaclava Road
Site Category: 2031
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Balaclava Road														
1	L2	133	0.8	133	0.8	0.644	60.0	LOS E	10.1	72.4	0.95	0.99	0.95	31.9
2	T1	152	5.6	152	5.6	0.644	54.5	LOS D	10.1	72.4	0.95	0.99	0.95	21.5
3	R2	428	1.0	428	1.0	0.484	58.3	LOS E	8.3	58.2	0.91	0.81	0.91	21.0
Approach		713	1.9	713	1.9	0.644	57.8	LOS E	10.1	72.4	0.93	0.88	0.93	23.6
East: Epping Road														
4	L2	598	2.1	598	2.1	0.452	10.3	LOS A	4.1	29.7	0.19	0.66	0.19	50.9
5	T1	1233	1.9	1233	1.9	* 0.920	66.2	LOS E	30.9	218.9	1.00	1.04	1.18	26.7
6	R2	129	0.0	129	0.0	0.557	85.0	LOS F	3.8	26.7	1.00	0.77	1.00	10.6
Approach		1960	1.8	1960	1.8	0.920	50.4	LOS D	30.9	218.9	0.75	0.91	0.86	30.0
North: Balaclava Road														
7	L2	179	0.0	179	0.0	0.249	19.4	LOS B	3.7	26.1	0.53	0.72	0.53	20.7
8	T1	249	2.1	249	2.1	* 0.906	82.0	LOS F	12.6	89.6	1.00	1.03	1.31	19.8
9	R2	314	4.7	314	4.7	* 0.891	77.2	LOS F	15.0	109.6	0.98	0.96	1.22	20.9
Approach		742	2.7	742	2.7	0.906	64.9	LOS E	15.0	109.6	0.88	0.93	1.08	20.4
West: Epping Road														
10	L2	172	8.6	172	8.6	0.129	8.6	LOS A	1.2	9.0	0.19	0.62	0.19	53.8
11	T1	1117	1.2	1117	1.2	0.549	39.4	LOS C	13.7	96.6	0.84	0.73	0.84	28.3
12	R2	162	0.6	162	0.6	* 0.877	89.6	LOS F	8.0	56.5	1.00	0.93	1.31	24.9
Approach		1451	2.0	1451	2.0	0.877	41.4	LOS C	13.7	96.6	0.78	0.74	0.81	29.0
All Vehicles		4865	2.0	4865	2.0	0.920	51.0	LOS D	30.9	218.9	0.80	0.86	0.89	27.1

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

* 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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Balaclava Road											
P1	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	236.3	217.2	0.92
East: Epping Road											
P2	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	249.0	233.7	0.94
North: Balaclava Road											
P3	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	238.9	220.5	0.92

MOVEMENT SUMMARY

Site: 2 [PM_ Epping-Herring (Site Folder: Future Base + Development)]

Network: N101 [PM Future Base + Development (Network Folder: General)]

Epping Road x Herring Road

Site Category: Four Leg Signalised
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Herring Road (250m)														
1	L2	24	0.0	24	0.0	0.027	25.4	LOS B	0.6	3.9	0.54	0.64	0.54	23.5
2	T1	703	2.2	703	2.2	* 1.024	130.2	LOS F	26.3	187.3	1.00	1.33	1.63	6.7
3	R2	206	1.0	206	1.0	0.388	68.7	LOS E	4.2	29.9	0.95	0.78	0.95	27.2
Approach		934	1.9	934	1.9	1.024	113.9	LOS F	26.3	187.3	0.98	1.19	1.46	10.7
East: Epping Road (630m)														
4	L2	277	1.1	277	1.1	0.980	98.2	LOS F	38.0	268.3	1.00	1.25	1.34	22.6
5	T1	1554	1.2	1554	1.2	* 0.980	93.6	LOS F	38.0	268.3	1.00	1.20	1.36	18.4
6	R2	432	2.7	432	2.7	0.875	84.7	LOS F	12.1	86.5	1.00	0.96	1.27	19.9
Approach		2262	1.4	2262	1.4	0.980	92.5	LOS F	38.0	268.3	1.00	1.16	1.34	19.2
North: Herring Road (180m)														
7	L2	276	4.6	276	4.6	0.263	25.1	LOS B	8.9	64.8	0.81	0.80	0.81	41.8
8	T1	780	1.9	780	1.9	0.771	61.2	LOS E	17.2	122.2	1.00	0.89	1.02	18.6
9	R2	546	1.0	546	1.0	* 1.026	127.9	LOS F	16.5	116.5	1.00	1.07	1.49	5.1
Approach		1602	2.0	1602	2.0	1.026	77.7	LOS F	17.2	122.2	0.97	0.93	1.15	15.1
West: Epping Road (600m)														
10	L2	369	0.9	369	0.9	0.670	32.8	LOS C	8.4	60.1	0.67	0.90	0.67	25.5
11	T1	1179	1.3	1179	1.3	0.880	74.0	LOS F	18.8	132.7	1.00	0.96	1.13	28.6
12	R2	214	1.0	214	1.0	* 0.981	114.5	LOS F	12.0	84.8	1.00	1.02	1.47	14.8
Approach		1762	1.2	1762	1.2	0.981	70.3	LOS E	18.8	132.7	0.93	0.96	1.08	26.1
All Vehicles		6560	1.6	6560	1.6	1.026	86.0	LOS F	38.0	268.3	0.97	1.05	1.24	18.7

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

* 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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Herring Road (250m)											
P1	Full	53	48.1	LOS E	0.2	0.2	0.80	0.80	80.4	42.0	0.52
East: Epping Road (630m)											
P2	Full	53	56.5	LOS E	0.2	0.2	0.87	0.87	93.0	47.5	0.51
North: Herring Road (180m)											
P3	Full	53	56.5	LOS E	0.2	0.2	0.87	0.87	88.0	41.0	0.47

MOVEMENT SUMMARY

Site: 3 [PM_ Herring-Ivanhoe (Site Folder: Future Base + Development)]

Network: N101 [PM Future Base + Development (Network Folder: General)]

Herring Road x Ivanhoe Place

Site Category: Four Leg Signalised
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Herring Road (180m)														
1	L2	88	0.0	88	0.0	0.139	26.2	LOS B	2.3	17.5	0.67	0.69	0.67	14.3
2	T1	1069	2.0	1068	2.0	* 0.779	42.7	LOS D	22.3	157.5	0.93	0.83	0.93	13.3
3	R2	136	1.6	136	1.6	0.465	57.5	LOS E	5.0	35.4	0.85	0.77	0.85	20.4
Approach		1294	1.8	1292 N1	1.8	0.779	43.1	LOS D	22.3	157.5	0.90	0.82	0.91	14.9
East: Ivanhoe Main Road (550m)														
4	L2	398	1.6	398	1.6	0.388	6.1	LOS A	5.0	35.2	0.40	0.49	0.40	27.7
5	T1	38	0.0	38	0.0	* 0.388	4.7	LOS A	5.0	35.2	0.40	0.49	0.40	27.3
6	R2	175	1.2	175	1.2	0.128	34.6	LOS C	2.6	18.1	0.70	0.63	0.70	20.0
Approach		611	1.4	611	1.4	0.388	14.2	LOS A	5.0	35.2	0.49	0.53	0.49	24.9
North: Herring Road (380m)														
7	L2	7	0.0	7	0.0	0.450	55.5	LOS D	9.4	69.5	0.95	0.80	0.95	24.7
8	T1	648	3.1	648	3.1	0.450	53.7	LOS D	9.4	69.5	0.97	0.81	0.97	18.6
9	R2	81	0.0	81	0.0	* 0.790	87.1	LOS F	3.8	26.9	1.00	0.82	1.13	14.4
Approach		737	2.7	737	2.7	0.790	57.4	LOS E	9.4	69.5	0.97	0.82	0.98	18.0
West: Morling College (70m)														
10	L2	62	0.0	62	0.0	0.665	82.0	LOS F	3.8	26.6	1.00	0.82	1.08	3.7
11	T1	20	0.0	20	0.0	0.665	80.9	LOS F	3.8	26.6	1.00	0.82	1.08	14.9
12	R2	49	0.0	49	0.0	* 0.755	90.0	LOS F	2.4	17.0	1.00	0.85	1.25	3.5
Approach		132	0.0	132	0.0	0.755	84.8	LOS F	3.8	26.6	1.00	0.83	1.15	6.2
All Vehicles		2773	1.9	2771 N1	1.9	0.790	42.5	LOS D	22.3	157.5	0.83	0.75	0.85	17.7

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

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Herring Road (180m)											
P1	Full	53	46.5	LOS E	0.2	0.2	0.79	0.79	85.7	51.0	0.59
East: Ivanhoe Main Road (550m)											
P2	Full	53	51.4	LOS E	0.2	0.2	0.83	0.83	84.1	42.5	0.51

MOVEMENT SUMMARY

Site: 101 [PM_Herring-Waterloo (Site Folder: Future Base + Development)]

Network: N101 [PM Future Base + Development (Network Folder: General)]

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

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Herring Road (380m)														
1	L2	115	1.8	115	1.8	0.140	29.4	LOS C	2.4	17.3	0.51	0.70	0.51	35.2
2	T1	784	3.0	784	3.0	* 0.898	17.9	LOS B	25.2	178.9	0.73	0.70	0.78	45.1
3	R2	433	4.1	433	4.1	* 0.899	91.5	LOS F	10.5	76.3	1.00	0.91	1.18	16.9
Approach		1332	3.2	1332	3.2	0.899	42.8	LOS D	25.2	178.9	0.80	0.77	0.88	31.4
East: Waterloo Road (205m)														
4	L2	615	3.6	615	3.6	0.493	38.8	LOS C	12.8	92.2	0.78	0.80	0.78	15.5
5	T1	102	3.1	102	3.1	0.493	43.2	LOS D	10.5	75.7	0.86	0.79	0.86	25.2
6	R2	119	20.4	119	20.4	* 0.882	91.7	LOS F	5.2	38.9	1.00	0.92	1.33	19.0
Approach		836	5.9	836	5.9	0.882	46.9	LOS D	12.8	92.2	0.82	0.82	0.86	18.0
North: Herring Road (135m)														
7	L2	21	100.0	21	100.0	0.069	28.8	LOS C	0.9	11.4	0.56	0.58	0.56	36.2
8	T1	16	100.0	16	100.0	0.069	22.2	LOS B	0.9	11.4	0.56	0.58	0.56	32.8
9	R2	21	100.0	21	100.0	0.146	70.3	LOS E	0.9	11.2	0.92	0.72	0.92	24.9
Approach		58	100.0	58	100.0	0.146	42.1	LOS C	0.9	11.4	0.69	0.63	0.69	29.7
West: University Avenue (340m)														
10	L2	108	3.9	108	3.9	0.164	39.4	LOS C	3.2	23.3	0.71	0.74	0.71	33.3
11	T1	331	3.2	331	3.2	* 0.895	76.4	LOS F	16.4	117.9	1.00	1.03	1.23	18.7
Approach		439	3.4	439	3.4	0.895	67.3	LOS E	16.4	117.9	0.93	0.96	1.10	21.8
All Vehicles		2664	6.2	2664	6.2	0.899	48.1	LOS D	25.2	178.9	0.82	0.81	0.91	26.1

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

* 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	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Herring Road (380m)											
P1	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	246.5	230.4	0.93
East: Waterloo Road (205m)											
P2	Full	53	69.3	LOS F	0.2	0.2	0.96	0.96	242.4	225.1	0.93
North: Herring Road (135m)											

MOVEMENT SUMMARY

Site: 101 [PM Balaclava Road Access (Site Folder: Future Base + Development)]

Network: N101 [PM Future Base + Development (Network Folder: General)]

Balaclava Road Access Point
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Balaclava Road (S)														
2	T1	351	6.9	351	6.9	0.316	2.2	LOS A	0.6	4.5	0.41	0.18	0.48	54.3
3	R2	102	2.1	102	2.1	0.316	10.4	LOS A	0.6	4.5	0.41	0.18	0.48	51.3
Approach		453	5.8	453	5.8	0.316	4.1	NA	0.6	4.5	0.41	0.18	0.48	53.6
East: Site Access (E)														
4	L2	32	3.3	32	3.3	0.088	12.8	LOS A	0.1	0.6	0.63	1.00	0.63	43.3
6	R2	3	0.0	3	0.0	0.088	19.0	LOS B	0.1	0.6	0.63	1.00	0.63	48.6
Approach		35	3.0	35	3.0	0.088	13.4	LOS A	0.1	0.6	0.63	1.00	0.63	44.1
North: Balaclava Road (N)														
7	L2	2	0.0	2	0.0	0.497	5.8	LOS A	0.0	0.0	0.00	0.00	0.00	57.9
8	T1	692	2.6	692	2.6	0.497	0.3	LOS A	0.0	0.0	0.00	0.00	0.00	59.4
Approach		694	2.6	694	2.6	0.497	0.3	NA	0.0	0.0	0.00	0.00	0.00	59.4
All Vehicles		1181	3.8	1181	3.8	0.497	2.1	NA	0.6	4.5	0.18	0.10	0.20	56.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM Epping Road Access (Site Folder: Future Base + Development)]

Network: N101 [PM Future Base + Development (Network Folder: General)]

Epping Road Access Point
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Epping Road (E)														
5	T1	1960	3.2	1960	3.2	0.428	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
Approach		1960	3.2	1960	3.2	0.428	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.6
North: Site Access (N)														
7	L2	72	5.9	72	5.9	0.040	6.9	LOS A	0.0	0.0	0.00	0.53	0.00	51.0
Approach		72	5.9	72	5.9	0.040	6.9	NA	0.0	0.0	0.00	0.53	0.00	51.0
West: Epping Road (W)														
10	L2	29	0.0	29	0.0	0.016	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	52.0
11	T1	1725	3.0	1725	3.0	0.301	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		1755	2.9	1755	2.9	0.301	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.4
All Vehicles		3786	3.1	3786	3.1	0.428	0.3	NA	0.0	0.0	0.00	0.01	0.00	59.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.