



# **1-7 Rangers Road & 50 Yeo Street, Neutral Bay**

## **Transport Assessment**

Prepared for:

**Fabcot Pty Ltd**

16 December 2022



## PROJECT INFORMATION

<b>Project Name:</b>	1-7 Rangers Road & 50 Yeo Street, Neutral Bay
<b>Client:</b>	Fabcot Pty Ltd
<b>Project Number:</b>	2190
<b>Prepared By:</b>	JMT Consulting

## DOCUMENT HISTORY

Document Title	Revision	Date issued	Author
1-7 Rangers Road & 50 Yeo Street transport assessment	Issue	16.12.22	JM

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# 1 Introduction

## 1.1 Background

JMT Consulting was engaged by Fabcot Pty Ltd to undertake a transport assessment to support a Planning Proposal for the site at 1-7 Rangers Road and 50 Yeo Street, Neutral Bay. The Planning Proposal consists of the following:

- Woolworths supermarket with supporting ground floor retail
- Commercial floor space
- Residential apartments
- Basement car parking for all uses including public parking, resident parking and Woolworths Direct to Boot offering

## 1.2 Site location

The extent of the site is shown in Figure 1 below. Located within the North Sydney LGA, the site is zoned B4 (mixed use) and has a site area of approximately 5,200m<sup>2</sup>. It is adjacent to the key Military Road transport corridor and bounded by Rangers Road, Yeo Street and Military Lane.



Figure 1 Site location

### 1.3 Report purpose

This report has been prepared to summarise the traffic and transport implications of the Planning Proposal. Specifically the assessment considers the following items:

- Existing transport conditions, including:
  - Surrounding road network
  - Vehicle site access
  - Car parking
  - Loading and servicing arrangements
  - Public transport provision
  - Pedestrian and cycling network
- Proposed site access arrangements
- Proposed vehicle loading and servicing arrangements
- Proposed parking rates to be adopted as part of a future development application for the site, including indicative parking numbers based on the reference scheme prepared by Koichi Takada Architects (KTA)
- Additional traffic movements resulting from the Planning Proposal and impacts to the adjacent road network
- Public transport, walking and cycling measures



## 2 Existing Transport Conditions

### 2.1 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. Due to their network significance TfNSW provides financial assistance to councils for the management of their Regional Roads. Key State and Regional roads which provide access to the site are illustrated in Figure 2 below, which demonstrates the site is very well connected to the surrounding road network.

The site is primarily serviced by Military Road which is classified as a State Road. Regional Roads in the vicinity of the site include Spofforth Street, Belgrave Street, Ernest Street and Rangers Road to the south-east of the site. The site is also serviced by local roads managed by Council including direct frontage to Yeo Street.

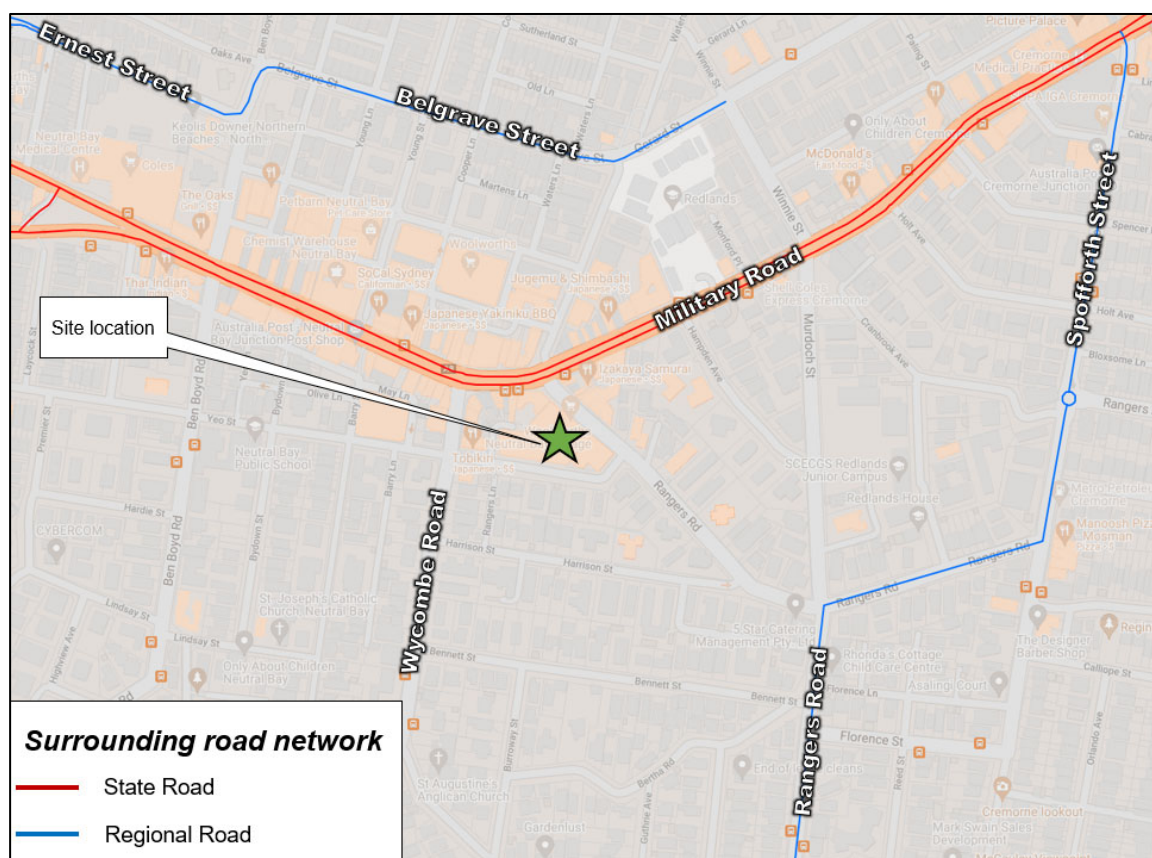


Figure 2 Existing road network



## 2.2 Existing site uses and site access

The existing site comprises of a Woolworths supermarket containing approximately 3,300m<sup>2</sup> GFA and 100 on-site car parking spaces. Access to the car park is provided via a driveway from Yeo Street as shown in Figure 3 below. Site access to the on-site loading is provided via Military Lane.



Figure 3 Existing site view from Yeo Street

Source: Google Street View



Figure 4 Existing vehicle site access



## 2.3 Public transport services

The site is located adjacent to the Military Road corridor which is one of Sydney's busiest and most important bus corridors - served by an established bus network that caters for a wide range of trips. The current bus network contains a variety of all-stops, limited stops and express services, joining and leaving the corridor at several locations. A number of bus stops are located directly opposite the site on Military Road as well as Wycombe Road as illustrated in Figure 5.



Figure 5 Existing bus stops servicing the site

A full list of the extensive bus network servicing the Military Road corridor is provided in Table 1.

Table 1 Military Road bus services

Route No.	Route (To / From)	Typical Frequency
143	Manly to Chatswood	Weekdays: 15-30 minutes peak only Weekends: No services
144	Manly to Chatswood	Weekdays: 10-15 minutes peak / 15 minutes off peak Weekends: 15 minutes
151	Mona Vale to City Queen Victoria Building (QVB)	Weekdays: Late night – early morning service Weekends: Late night – early morning service

Route No.	Route (To / From)	Typical Frequency
168	North Balgowlah to Milsons Point	Weekdays: 40-60 minutes Weekends: No services
169	Manly to City Wynyard	Weekdays: 30 minutes peak / 1 hour off peak Weekends: 60 minutes
173	Narraweena to Milsons Point	Weekdays: 4 AM peak services only Weekends: No services
178	Comer Heights to City Wynyard	Weekdays: No peak service / 30 minutes off peak Weekends: 15-30 minutes
180	Collaroy Plateau to City Wynyard	Weekdays: No peak service / 30 minutes off peak Weekends: 30 minutes
188	Mona Vale to City Wynyard	Weekdays: 3 morning services only Weekends: 2 morning services only
225	Cremorne Point Wharf to Neutral Bay	Weekdays: 13-15 minutes peak / 30 minutes off peak Weekends: 30 minutes
228	Clifton Gardens to Milsons Point	Weekdays: 35-40 minutes peak / 1 hour off peak Weekends: No services
229	Beauty Point to Milsons Point	Weekdays: 1 hour all day Weekends: No services
230	Mosman Wharf to Milsons Point	Weekdays: 15-20 minutes peak / 30 minutes off peak Weekends: 30 minutes
243	Spit Junction to City Wynyard	Weekdays: 20 minutes peak / 1 hour off peak Weekends: 30 minutes
244	Chowder Bay Mosman to City Wynyard	Weekdays: 20 minutes peak / 30 minutes off peak Weekends: 1 hour
245	Balmoral to City Wynyard	Weekdays: 15 minutes peak / 1 hour off peak Weekends: 1 hour
246	Balmoral Heights to City Wynyard	Weekdays: 2-10 minutes peak only Weekends: No services
247	Taronga Zoo to City Wynyard	Weekdays: 30 minutes Weekends: 30 minutes
248	Seaforth to City Wynyard	Weekdays: 20 minutes morning peak only Weekends: No services

Route No.	Route (To / From)	Typical Frequency
249	Beauty Point to City Wynyard	Weekdays: 3 morning peak services only Weekends: No services
257	Chatswood to Balmoral	Weekdays: 15-30 minutes peak / 15-30 minutes off peak Weekends: 30 minutes Saturdays & 30 minutes Sundays
263	Crows Nest to City Bridge St	Weekdays: 10-15 minutes peak / 40 minutes off peak Weekends: 1 hour 10 minutes
B1	Mona Vale to City Wynyard	Weekdays: 2-7 minutes peak / 8-12 minutes off peak Weekends: 8-15 minutes
E54	Mona Vale to Milsons Point	Weekdays: 5-10 minutes peak / 30 minutes off peak Weekends: No services
E50	Manly to Milsons Point (Express)	Weekdays: 10 minutes morning peak only Weekends: No services
E65	South Curl Curl to City Wynyard	Weekdays: 5 minutes morning peak only Weekends: No services
E66	Allambie to City Wynyard	Weekdays: 13 minutes morning peak only Weekends: No services
E68	Brookvale to City Wynyard	Weekdays: 15 minutes morning peak only Weekends: No services
E69	Manly to City Wynyard	Weekdays: 6 minutes morning peak only Weekends: No services
E71	Manly to City Wynyard (Express)	Weekdays: minutes peak only Weekends: No services

## 2.4 Public transport accessibility

A key 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 6 a number of key employment centres across Sydney can be reached within 30 minutes public transport travel time of the site, including Central / Redfern, Sydney CBD, North Sydney CBD, St Leonards, Chatswood and Manly. The highly accessible nature of the site will facilitate the use of public transport, particularly the Military Road bus corridor.

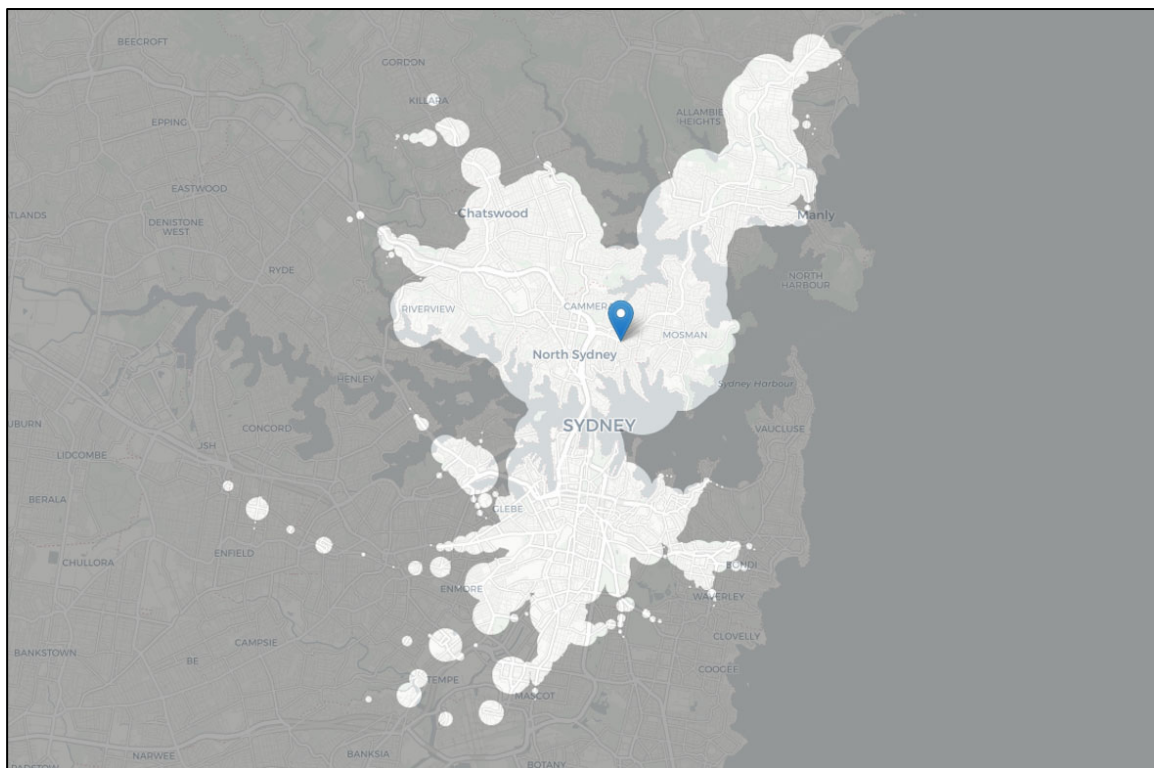


Figure 6 30 minute public transport catchment from site

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



## 2.5 Walking and cycling

Good quality footpaths are provided along all streets in the vicinity of the site. This includes signalised pedestrian crossings on all legs of the signalised intersections at Military Road / Wycombe Road and Wycombe Road / Yeo Street. A zebra crossing is also provided adjacent to the site across Yeo Street near the intersection with Rangers Road.

There is a developing cycleway network in the vicinity of the site as illustrated in Figure 7 below. The site is located on the 'Route 5' cycleway as identified in the North Sydney Integrated Cycling Strategy, which will ultimately provide a connection between the North Sydney CBD and Mosman via Neutral Bay.



Figure 7 North Sydney cycling network

Source: North Sydney Council

## 2.6 Traffic flows

Traffic counts were undertaken on Thursday 11 November 2021 and Saturday 13 November 2021 to understand the existing level of traffic movements on the road network surrounding the site. The survey locations are summarised below and shown in Figure 8.

- Rangers Road / Yeo Street
- Yeo Street / Woolworths car park entry
- Wycombe Road / Yeo Street
- Wycombe Road / Military Road
- Rangers Road / Military Road



Figure 8 Traffic survey locations

The traffic surveys have been used as the basis for the traffic modelling carried out to understand the implications of the Planning Proposal on the surrounding road network.

## 2.7 Historical traffic growth

The Annual Average Daily traffic (AADT) data from the nearest Transport for NSW counting station 22001, which operates on Military Road west of the site, was extracted from TfNSW's traffic volume viewer to appreciate the pattern of traffic changes along the Military Road corridor within the study area. As can be seen in Figure 9 below, traffic flows during the morning peak hour on Military Road have remained largely static over the 10 year period since 2009. There was a significant reduction in 2020 and 2021 however this would primarily be due to the COVID-19 pandemic. It could be expected however that, with the increasing popularity of working from home, traffic flows on Military Road would not reach their pre-pandemic levels for some time. Importantly the data analysis indicates that traffic flows during peak hours on Military Road have not increased and therefore no future traffic growth rate has been assumed as part of the traffic modelling undertaken for this study.

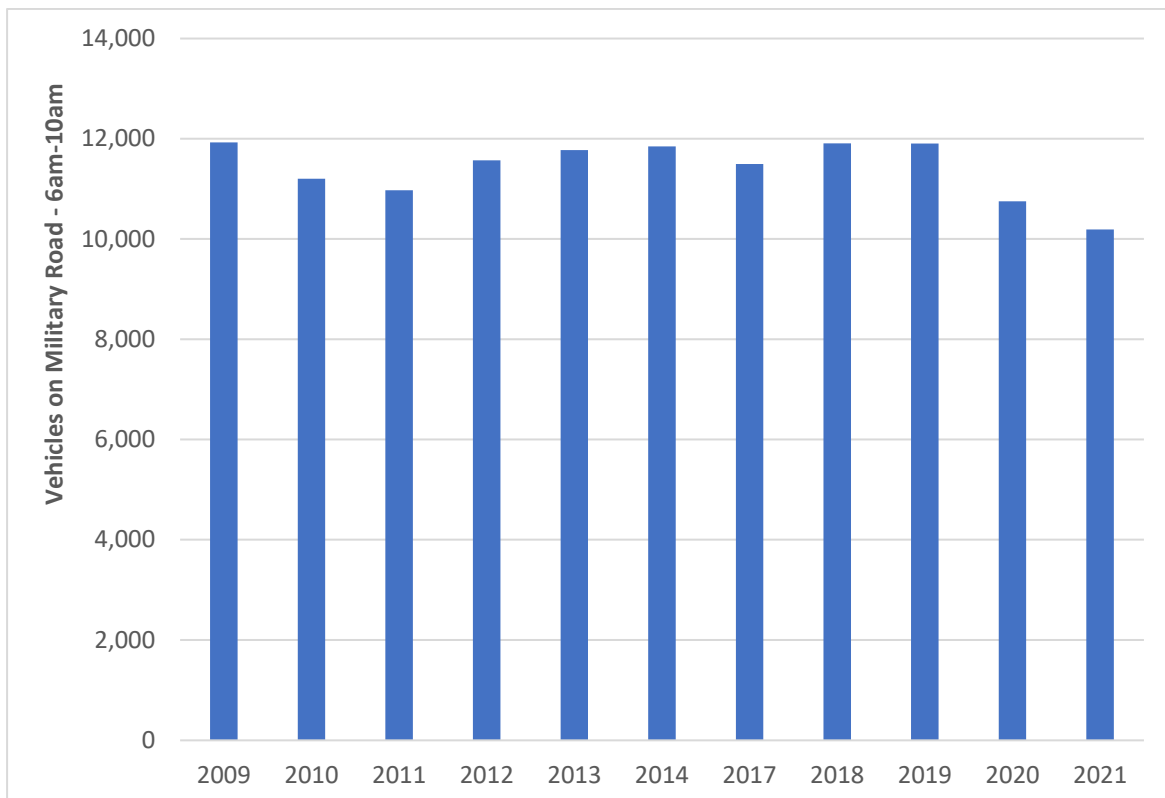


Figure 9 Historical traffic flows – Military Road



### 3 Transport and Access Strategy

#### 3.1 Site access arrangements

Under the reference scheme prepared by Koichi Takada vehicle access (including B99s) would be obtained from Yeo Street to the west of the current access point as shown in Figure 10. Vehicles would access the on-site car parking area through a series of ramps on the western boundary of the site. The site would also offer a 'Direct to Boot service to facilitate online order pickups. A parking area will be provided at basement level for customers to access the Direct to Boot service with access also obtained via Yeo Street.

To ensure safe egress and separation from general traffic, it is proposed that service vehicles accessing the loading dock would do so via Military Lane similar to existing site arrangements.

Pedestrian access and site permeability would be significantly improved via a through site link and public plaza connecting Rangers Road to Yeo Street. Additional pedestrian access points would also be available via Rangers Road and Yeo Street.

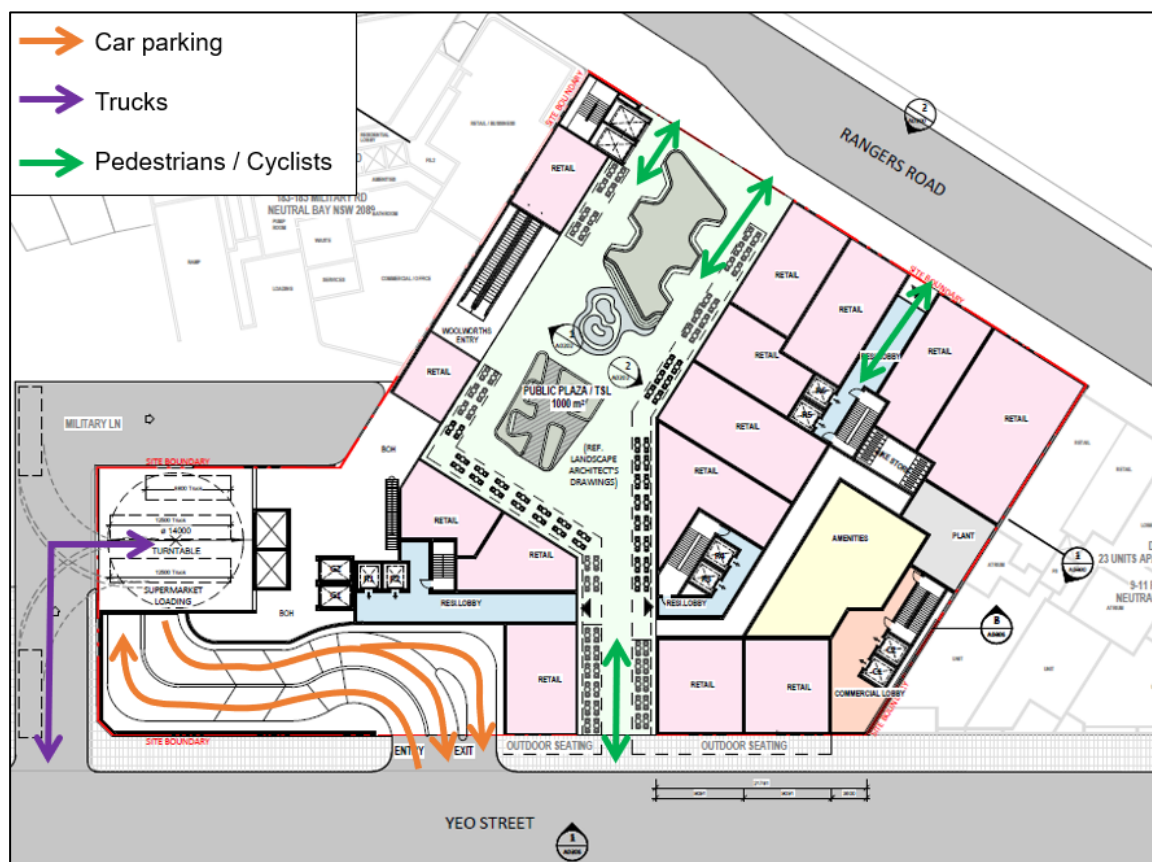


Figure 10 Proposed site access



### 3.2 Loading dock

The reference scheme includes an on-site loading dock which can accommodate up to three vehicles at any one time, those being:

- One Heavy Rigid Vehicle (HRVs), 12.5m in length
- One Medium Rigid Vehicle (MRV), 8.8m in length
- One Small Rigid Vehicle (SRV), 6.4m in length

This loading provision is considered suitable to accommodate the needs of the site based on the development yields associated with the reference scheme. The loading dock is located on the ground floor at the western end of the site accessed via Military Lane.

Currently large trucks have to access the small and outdated loading dock by reversing into the site. Large trucks are unable to drive forwards into the site and must reverse in across the Yeo Street footpath. The proposal would provide for a contemporary loading area, accessed via Military Lane, which includes a turntable that allows for trucks to enter and exit in a forwards direction.

The loading dock has been designed in accordance with the requirements outlined in the relevant Australian Standard (AS2890.2, 2018). The final design of the loading dock will be carried out at the Development Application stage of the project.

### 3.3 Car park access and design

As part of the reference scheme developed for the Planning Proposal a basement car park has been designed to facilitate the future development. The car park and associated elements such as car parking space dimensions, circulation aisles and ramp would be designed in accordance with the relevant Australian Standard for car parking facilities, namely AS2890.1: 2004 and AS2890.6:2009.

Car parking spaces have been designed to comply with a Class 1 car park facility for the residential and commercial uses as specified in the Australian Standard (generally low turnover long term parking) with 2.4m wide spaces and aisle widths of 5.8m. For the retail car parking areas 2.6m wide spaces with 6.2m aisles have been provided in accordance with the requirements of Class 3 parking areas.

The final design of the car park will be carried out at the Development Application stage of the project.

### 3.4 Car parking

The proposed level of car parking for the site, for each of the proposed uses, is outlined in the following sections of this report. The parking numbers are based on the reference scheme prepared by Koichi Takada for the purposes of the Planning Proposal. It should be noted that the reference scheme is conceptual in nature and further investigations will need to be undertaken at subsequent stages to confirm the final parking number and layout. The final car parking requirements and provision for the site will be confirmed at the Development Application (DA) stage of the project.

#### 3.4.1 Residential car parking

An assessment of car parking requirements for the proposal against requirements set out in North Sydney DCP has been. This analysis demonstrates that the proposed parking provision for the residential component of 58 spaces under the reference scheme is consistent with the maximum permissible parking provision allowable under the DCP.

#### 3.4.2 Retail car parking

The North Sydney Council Development Control Plan (DCP) notes the following maximum parking rates for retail uses:

- Supermarkets - 4.0 spaces per 100m<sup>2</sup> GFA (1 space / 25m<sup>2</sup>)
- Speciality retail – 1.67 spaces per 100m<sup>2</sup> GFA (1 space / 60m<sup>2</sup>)

Adopting the floor space in the reference scheme prepared for the Planning Proposal a maximum of 164 spaces could be provided, comprising of 132 parking bays for the supermarket and 32 parking bays for speciality retail. The current reference scheme proposes 164 parking spaces for the retail uses of the site which is consistent with Council's controls. Providing an appropriate level of on-site car parking to meet customer needs will reduce demand for parking on surrounding streets and encourages customers to park in the basement.

#### 3.4.3 Commercial car parking

The North Sydney DCP notes a maximum parking rate of 1 space per 60m<sup>2</sup> GFA for commercial uses. The reference scheme complies with this maximum parking rate by providing 40 parking spaces for the approximately 2,400m<sup>2</sup> of commercial floor space.

### 3.4.4 Public car parking

As part of the proposal public car parking spaces would be provided within the site for the benefit of existing businesses and visitors of the Neutral Bay town centre. This public sub-terranean parking responds to a need identified by both local residents and businesses of the village – businesses in particular noted that the lack of car public parking was impacting the viability of their businesses. Provision of public car parking will reduce the reliance by visitors to the town centre using surrounding residential streets for parking – providing relief for residents.

The importance of public car parking to support the vibrancy and feasibility of the Neutral Bay town centre is recognised in the Military Road Corridor Planning Study which notes the following key objectives (see also Figure 11):

- *Provide public parking to support local shops.*
- *Replace on-street parking with off-street public car parking to free up public domain.*

The balance between parking and other uses needs to be carefully managed. Creating more public and private parking spaces in the centre increases traffic congestion. This is not sustainable in the long term and does not support Council's overarching objective of enabling cycling and walking as the key modes of transport.

Notwithstanding, on-street parking is recognised as a valuable public asset that not only facilitates access to the Neutral Bay town centre, particularly for less mobile members of the community, but can also act as a buffer between higher speed carriageway traffic and the footpath.

The total number of on-street parking spaces in Neutral Bay will be maintained unless no alternative parking arrangements are feasible. Any loss of parking will be offset through improvements to Neutral Bay's public domain, walking, cycling and public transport safety and amenity.

Council accommodates public parking as a service to the community and will continue to do so. It is recognised that access to public parking will need to support all members of the community, including the less mobile, and support existing and future local shops.

#### Objectives

- Improve amenity for alternative modes of transport including walking and cycling.
- Provide public parking to support local shops.
- Replace on-street parking with off-street public car parking to free up public domain.
- Maintain adequate space for loading and services in high pedestrian activity areas.
- Deliver public domain and local access benefits as described in Chapter 2.2 - Public Domain
- Incorporate site access requirements as described in Chapter 3.4
- For significant development sites, any private redevelopment proposal will need to demonstrate that satisfactory arrangements have been made to ensure that there is no net increase in traffic generation as a result of the development

Figure 11 Extract from Military Road corridor planning study re parking

### 3.5 Bicycle parking

The North Sydney Council DCP outlines minimum bicycle parking requirements for new developments. Up to 135 bicycle parking spaces may be required based on the reference scheme prepared for the Planning Proposal. This will be confirmed at the DA stage of the development.

For residents and staff bicycle parking will be located in a secure location only accessible via key or swipe card. This will either be in individual storage units (Class 1 facility) or a large secure bicycle parking room within the site boundary (Class 2 facility). For retail and residential visitors class 3 bike parking (i.e. bike rails) will be provided in a publicly accessible location with good passive surveillance.

### 3.6 Green travel plan

#### 3.6.1 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.

#### 3.6.2 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 tenants of the development.

#### 3.6.3 Potential measures

A suite of potential measures is described below to be implemented as part of the GTP, which can be developed further as the Planning Proposal progresses.



Table 2 List of potential GTP measures

Action	Responsibility
<b>Cycling</b>	
Provide sufficient cycle parking to meet needs, which is easily accessible and secure	Developer
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
Supply a communal toolkit for staff consisting of puncture repair equipment, a bike pump, a spare lock and lights.	Building manager
Promote the participation in annual events such as 'Ride to Work Day'	Tenants
<b>Walking</b>	
Identify tenants living near work that may be interested in walking to work	Building manager
Identify through the travel survey what incentives might need to be put in place for non-walkers to consider a mode shift	
<b>Public Transport</b>	
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
<b>Carshare / Carpooling</b>	
Establish a car pooling program to help people find someone to share in their daily commute.	Building manager and tenants
Develop a map showing car-share spots in the area to encourage staff and visitors to use a shared car (e.g. GoGet) if they are required to drive	Building manager and tenants
<b>General actions</b>	
Promotion including: <ul style="list-style-type: none"> <li>• Allow staff the flexibility to commute outside peak periods to reduce overall congestion and travel time.</li> <li>• Identify a tenant/champion to complete travel coordinator duties</li> <li>• Provide a welcome pack upon initial occupation of each tenant which includes details around sustainable travel options</li> </ul>	Tenants

### 3.6.4 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 on a yearly basis by undertaking 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.

## 4 Traffic Impact Assessment

The following section summarises the traffic assessment undertaken to consider the road network impacts of the Planning Proposal. Given the focus of the proposal around retail uses, the critical weekday PM peak hour and Saturday peak hour have been considered in the analysis. As retail uses generate minimal traffic movements during the AM weekday peak hour this has not been considered at this stage.

### 4.1 Traffic generation

#### 4.1.1 Existing retail traffic generation

As previously noted the site currently operates as a Woolworths supermarket with approximately 100 car parking spaces. Traffic surveys indicated that currently the site generates the following levels of traffic:

- 101 vehicle movements during the AM peak hour (8am – 9am) or 3.72 trips / 100m<sup>2</sup> GLA<sup>1</sup>
- 229 vehicle movements during the PM peak hour (5pm – 6pm) or 8.44 trips / 100m<sup>2</sup> GLA
- 205 vehicle movements during the Saturday peak hour (12pm – 1pm) or 7.56 trips / 100m<sup>2</sup> GLA

#### 4.1.2 Residential traffic generation

The forecast traffic generation for the residential uses has been determined based on the Sydney wide average traffic generation rates for high density residential uses as published by TfNSW which are as follows:

- AM peak hour: 0.15 vehicle trips per unit
- PM peak hour: 0.19 vehicle trips per unit
- Saturday peak hour: 0.22 vehicle trips per unit

#### 4.1.3 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

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<sup>1</sup> GFA to GLA conversion factor of 0.80 adopted for this analysis

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. The surveyed data for these sites is highlighted in Table 3 below. Minimal traffic generation would be expected for the Saturday peak hour.

Table 3 Peak hour vehicle trip generation per parking space

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: Roads and Maritime, Technical Direction 2013/14

#### 4.1.4 Future retail traffic generation

Surveys undertaken by Transport for NSW at a number of retail centres in NSW have been used to determine the level of traffic generation from future retail uses. The floor area for each retail centre has been plotted against the surveyed traffic generation rate, and a regression analysis undertaken to establish the relationship between floor area and traffic generation. This is illustrated in Figure 12 and indicates that as retail floor space increases the rate of traffic generation reduces -reflecting the fact that as more speciality stores are added to a centre already containing an anchor tenant the rate of traffic generation will reduce.

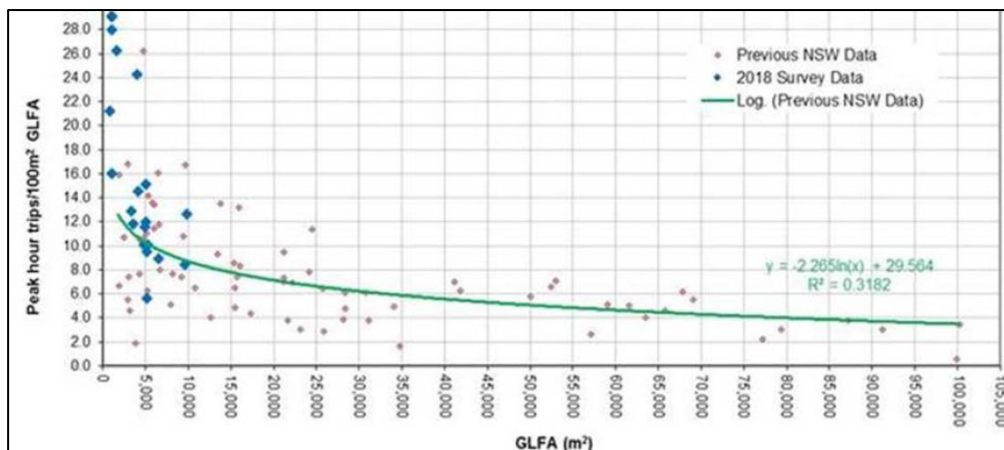


Figure 12 Relationship between retail floor area and traffic generation

The analysis recognises that the site is an established retail centre with a major anchor tenant (Woolworths). The additional retail floor space proposed comprises of uses that are ancillary to this anchor tenants and complement the range of services offered on the site. Therefore the additional floor space will not generate a large number of additional traffic movements, but instead it will provide existing customers with a wider offering as they travel to the site.

The existing and proposed retail floor area were then used as inputs to determine a ratio between existing and post-development traffic generation rates. This ratio was applied to the existing traffic generation rates at the site to determine the forecast future level of traffic, taking into account passing trade which typically comprises approximately 25% of all traffic as noted in the *RMS guide traffic generating developments* document. These forecasts are shown in the tables below

Table 4 Forecast traffic generation for future retail (AM peak hour)

Existing PM Peak Hour					Future PM Peak Hour					
Existing GLA	Existing gen. rate	Existing entry/exits	Passing trade trips	Total traffic generation	Future GLA	Future traffic gen. rate	Future entry/exits	Passing trade trips	Total traffic generation	Growth in trips
2,713	3.72	101	25	76	4,127	3.42	141	35	106	30

Table 5 Forecast traffic generation for future retail (PM peak hour)

Existing PM Peak Hour					Future PM Peak Hour					
Existing GLA	Existing gen. rate	Existing entry/exits	Passing trade trips	Total traffic generation	Future GLA	Future traffic gen. rate	Future entry/exits	Passing trade trips	Total traffic generation	Growth in trips
2,713	8.44	229	57	172	4,127	7.75	320	80	240	68

Table 6 Forecast traffic generation for future retail (Saturday peak hour)

Existing Saturday Peak Hour					Future Saturday Peak Hour					
Existing GLA	Existing gen. rate	Existing entry/exits	Passing trade trips	Total traffic generation	Future GLA	Future traffic gen. rate	Future entry/exits	Passing trade trips	Total traffic generation	Growth in trips
2,713	7.56	205	51	154	4,127	6.94	286	72	214	60



#### 4.1.5 Public car parking

The public car parking spaces to be provided as part of the site redevelopment would not themselves generate additional traffic movements compared with current conditions. Instead they facilitate improved parking opportunities for people already travelling to the Neutral Bay town centre and relying on street parking on Military Road or surrounding residential streets. The public car parking spaces will also provide opportunities for Council to replace existing on-street parking to free up public domain in certain locations – as per the recommendations of the Military Road Corridor Planning Study.

As a conservative assumption however, based on advice from Council, the public car parking has been assumed to generate traffic at the following rates:

- 0.5 trips / parking space in the AM peak hour
- 1 trip / parking space in the PM peak hour
- 1 trip / parking space in the Saturday peak hour

Similar to the retail uses passing trade is assumed to account for 25% of all trips associated with the public car parking.

#### 4.1.6 Net traffic generation

Considering the various uses envisaged within the Planning Proposal the overall increase in traffic generation is summarised in Table 7 below.

Table 7 Net traffic generation

Use	Quantum	Unit	Net Increase in Traffic Generation		
			AM Peak Hour	PM Peak Hour	Sat Peak Hour
Residential	63	apartments	9	12	14
Commercial	40	parking spaces	16	10	4
Retail	5,159	m <sup>2</sup> GFA	30	68	60
Public parking	88	spaces	44	88	88
<b>Total</b>			<b>99</b>	<b>178</b>	<b>166</b>

## 4.2 Traffic distribution

The forecast direction of travel to the site utilised in the traffic modelling is shown in Figure 13. The number of different arrival and departure routes available to customers contributes to spreading the traffic load and minimising the impact on the surrounding road network.

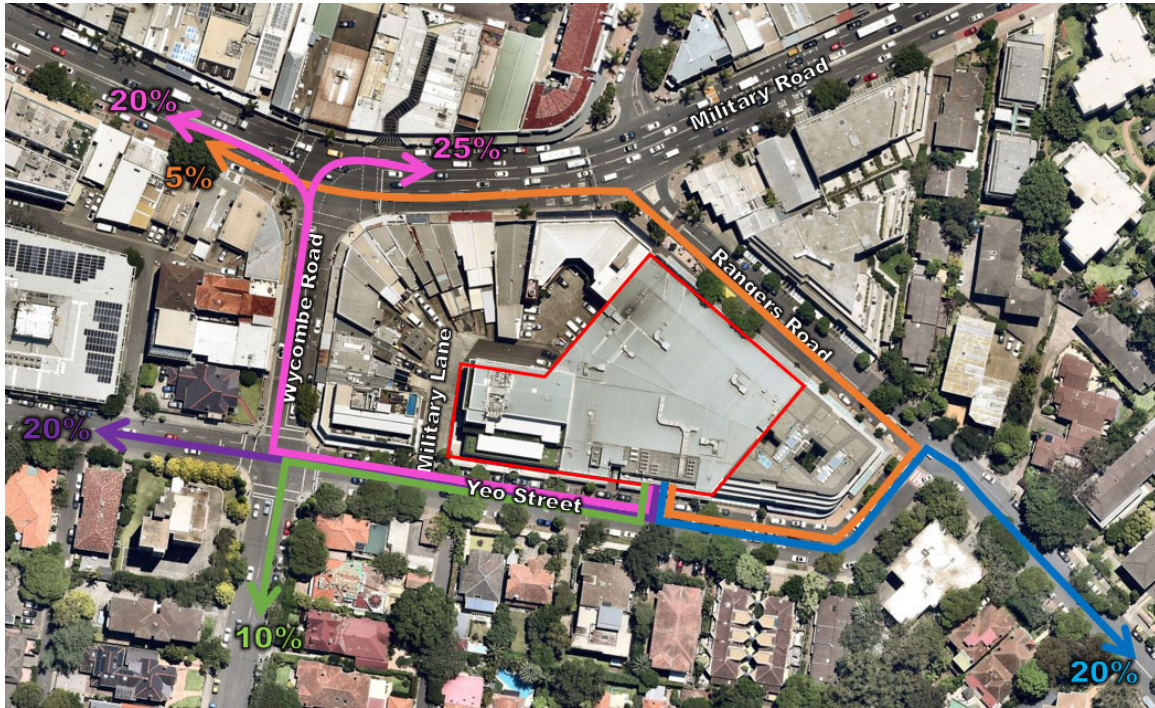


Figure 13 Forecast traffic distribution

The resulting increase in traffic movements at each intersection based on the forecast traffic generation and distribution is shown in the figures below. Through this it can be seen that, as a result of the relatively low net traffic increase and multiple routes available, that the increase in vehicles travelling through intersections around the site is generally modest at less than 20 vehicles per hour or one vehicle every three minutes.

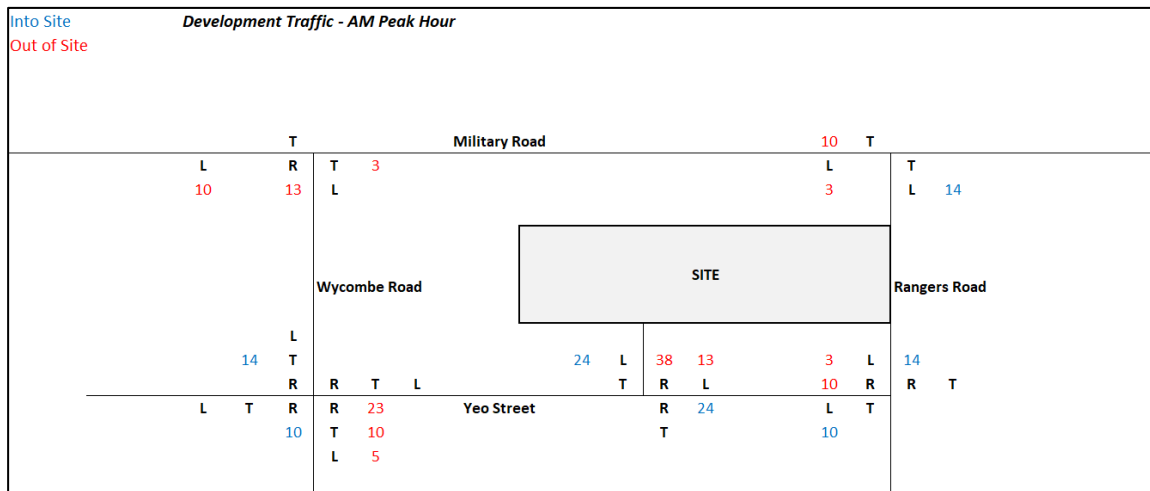


Figure 14 Forecast increase in traffic movements by intersection (AM peak hour)

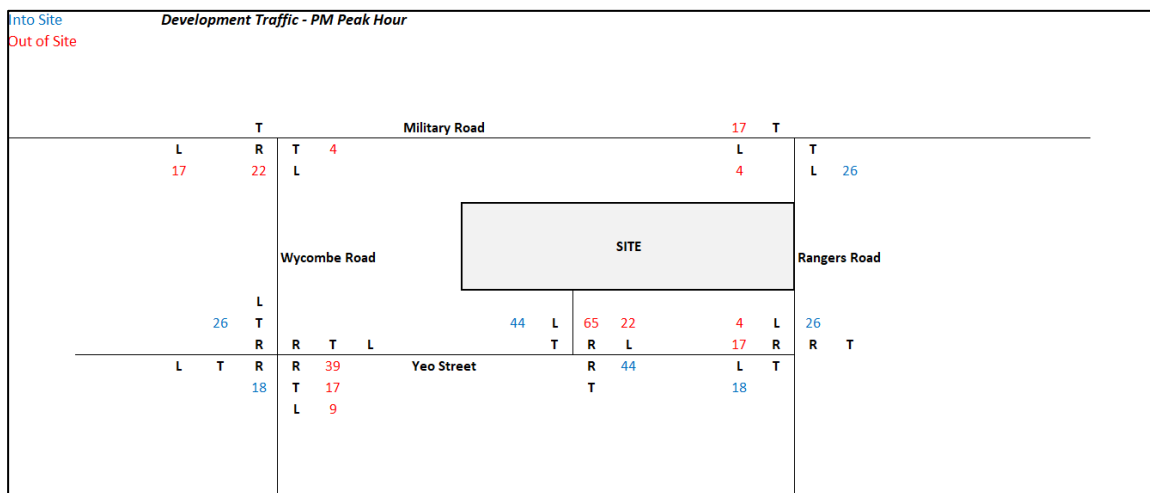


Figure 15 Forecast increase in traffic movements by intersection (PM peak hour)

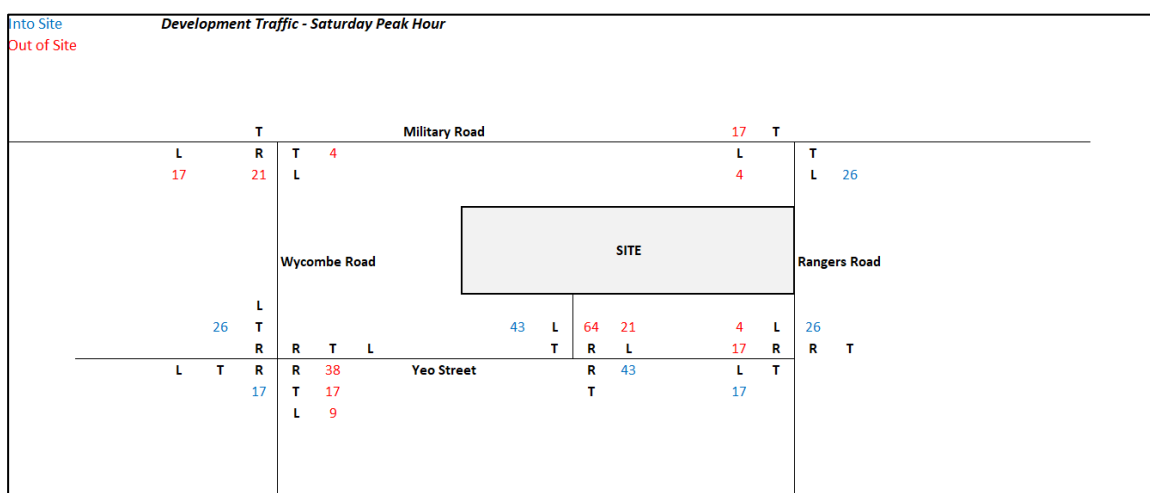


Figure 16 Forecast increase in traffic movements by intersection (Sat peak hour)

### 4.3 Traffic modelling

Extensive traffic investigations has been undertaken to understand the traffic carrying capacity of Yeo Street. Figure 17 below illustrates traffic movements on Yeo Street (in the westbound direction) adjacent to the site. The blue component represents existing traffic movements on Yeo Street. The green component of the graph shows the projected increase in traffic numbers associated with the Planning Proposal. The capacity of Yeo Street, based on AUSTROADS, is denoted through the dotted line. The analysis shows that, even with the Planning Proposal in place, traffic movements on Yeo Street still remain well below the capacity of the road as can be seen through the gap between the top of the graph and the dotted line.

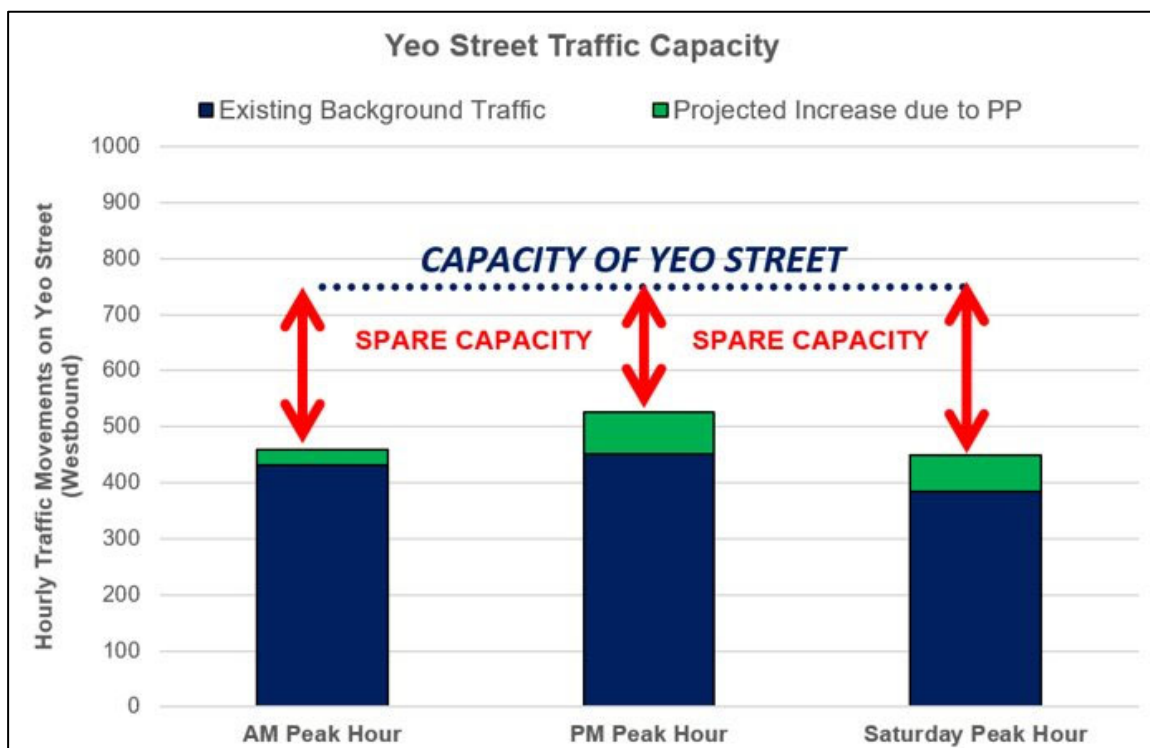


Figure 17 Yeo Street traffic capacity

In addition to Yeo Street detailed traffic modelling has also been undertaken (in accordance with Transport for NSW guidelines) on surrounding intersections - including Military Road. The modelling shows, with the Planning Proposal in place along with the additional public car parking, drivers will experience fairly minor increase in wait times of no more than 20 seconds – with delays typically lower than 10 seconds. This is illustrated in Figure 18, with detailed traffic modelling outputs provided in Appendix A of this document. The modelling undertaken indicates that the proposal is not anticipated to result in unacceptable traffic impacts on the surrounding road network.



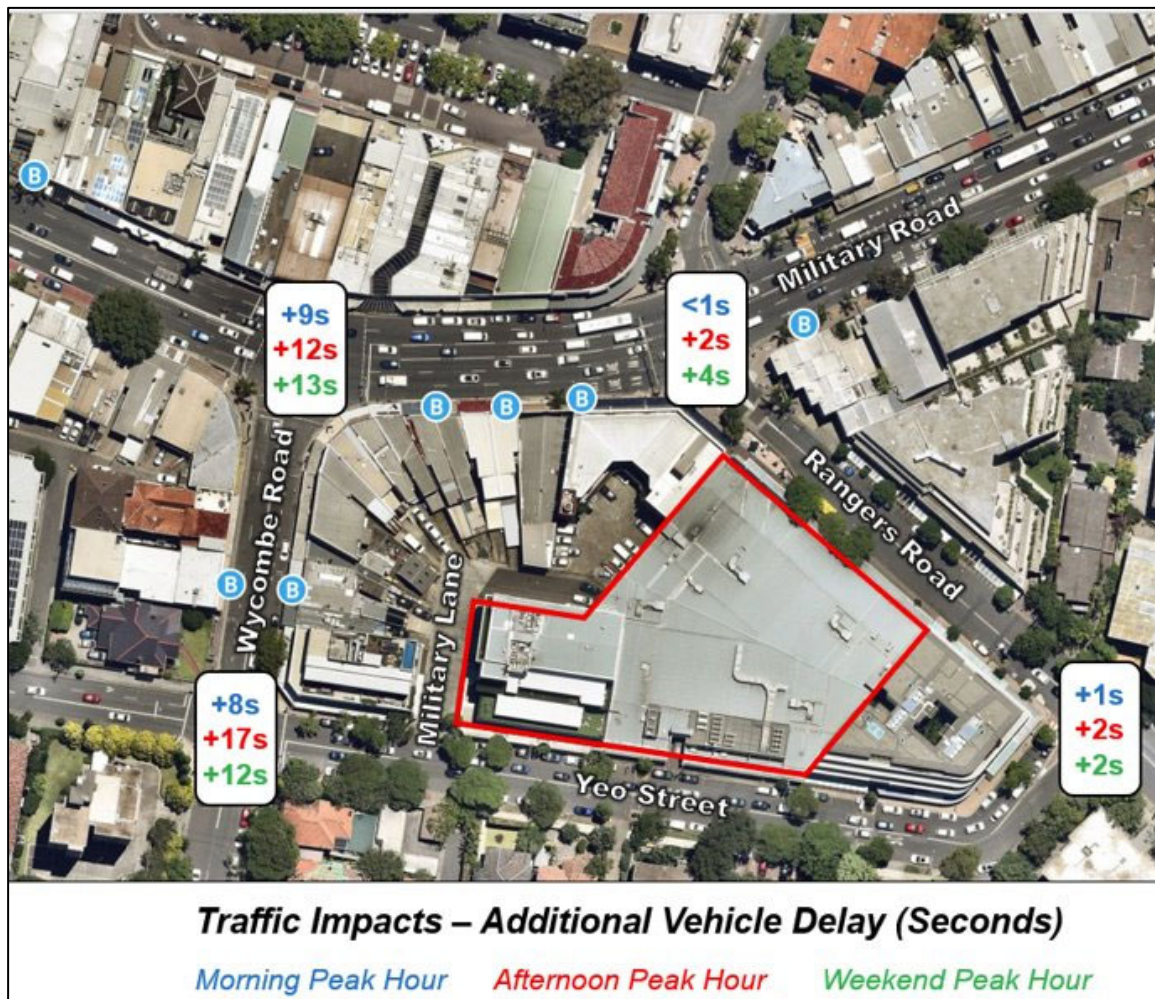


Figure 18 Traffic modelling findings

It is also worthwhile noting that a significant level of traffic already travelling along key roads in the vicinity of the site such as Military Road do so for the purpose of accessing nearby retail centres such as Big Bear Shopping Centre. While not specifically considered in the traffic analysis, all traffic associated with the proposal would not ‘new’ – instead trips (particularly from those in the local area not currently served by a full line supermarket) would be intercepted at Neutral Bay that would otherwise have continued along Military Road towards these existing centres.

The traffic modelling undertaken for the project has also not considered the future reduction in traffic along Military Road expected to result from the future Western Harbour Tunnel and Beaches Link project. This project will provide a new underground motorway bypass of the Spit and Military Road and Warringah Road corridors. Transport for NSW estimates the project will result in a 10% reduction in traffic along Military Road which has not been considered as part of the traffic analysis undertaken for the Planning Proposal.

## 5 Summary

---

This transport assessment report has been undertaken by JMT Consulting to support a Planning Proposal for the site at 1-11 Rangers Road, Neutral Bay. The proposal seeks to amend the North Sydney Local Environmental Plan to increase maximum height and density controls on the site, facilitating the future development of a mixed-use site including retail, commercial and residential floor space. Key findings of the transport assessment are as follows:

- Vehicle access to the site for general vehicles would be provided on Yeo Street, close to the existing access point for the site.
- Service vehicle access to an on-site loading dock is to be provided Military Lane to segregate cars in the basement and trucks using the loading dock – providing a strong safety outcome.
- The proposal brings with it a number of transport benefits – one of the most significant being improvement in traffic safety including the ability for all trucks to enter and exit the loading dock in a forwards direction.
- Car parking and bicycle parking on the site for all uses will be delivered in accordance with the parking rates outlined in the North Sydney DCP, with the final number of spaces to be determined at the Development Application stage of the project.
- The proposal includes sub-terranean public car parking spaces which benefit existing businesses and visitors of the Neutral Bay town centre and align with recommendations of the Military Road Corridor Planning Study.
- Traffic modelling undertaken indicates that the proposal is not anticipated to result in unacceptable traffic impacts on the surrounding road network – with all intersections in the vicinity of the site continuing to operate at acceptable levels of service.
- The NSW Government's future Western Harbour Tunnel and Beaches Link project will benefit the Military Road corridor by reducing the extent of regional traffic flows, with Transport for NSW projecting a 10% reduction in traffic along the corridor.
- Travel demand management measures have been suggested to improve the mode share of public transport and active transport. These items should be considered further at subsequent stages of the project.

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

## Appendix A: Traffic Modelling Outputs

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# MOVEMENT SUMMARY

 **Site: 101 [Rangers Road - Yeo Street (Site Folder: Sat Future)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

 **Network: N101 [Sat Future (Network Folder: General)]**

New Site  
Site Category: (None)  
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ]	%	[ Total HV ]	%	v/c	sec		[ Veh. veh	Dist ] m			km/h
South: Rangers Road (S)														
1	L2	All MCs	341	0.3	341	0.3	0.238	5.6	LOS A	0.0	0.0	0.00	0.42	53.0
2	T1	All MCs	131	3.2	131	3.2	0.238	0.1	LOS A	0.0	0.0	0.00	0.42	53.0
Approach			472	1.1	472	1.1	0.238	4.1	NA	0.0	0.0	0.00	0.42	53.0
North: Rangers Road (N)														
8	T1	All MCs	29	3.6	29	3.6	0.066	0.0	LOS A	0.1	0.9	0.48	0.56	52.2
9	R2	All MCs	57	0.0	57	0.0	0.066	8.2	LOS A	0.1	0.9	0.48	0.56	34.7
Approach			86	1.2	86	1.2	0.066	5.4	NA	0.1	0.9	0.48	0.56	45.7
West: Yeo Street (W)														
10	L2	All MCs	49	0.0	49	0.0	0.364	8.9	LOS A	0.6	4.2	0.38	0.96	33.3
12	R2	All MCs	251	0.4	251	0.4	0.364	10.9	LOS A	0.6	4.2	0.38	0.96	46.2
Approach			300	0.4	300	0.4	0.364	10.6	LOS A	0.6	4.2	0.38	0.96	45.3
All Vehicles			858	0.9	858	0.9	0.364	6.5	NA	0.6	4.2	0.18	0.62	49.1

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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# MOVEMENT SUMMARY

 Site: 101 [Military Road - Wycombe Road (Site Folder: PM Existing)]

 Network: N101 [PM Existing (Network Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ]	%	[ Total HV ]	%	v/c	sec		[ Veh. veh	Dist ] m			km/h
South: Wycombe Road (S)														
1	L2	All MCs	73	3.0	73	3.0	0.207	59.0	LOS E	2.6	18.4	0.88	0.76	22.3
3	R2	All MCs	133	3.0	133	3.0	*0.378	57.7	LOS E	4.9	34.9	0.92	0.79	4.6
Approach			205	3.0	205	3.0	0.378	58.2	LOS E	4.9	34.9	0.90	0.78	12.6
East: Military Road (E)														
4	L2	All MCs	75	2.0	75	2.0	0.199	11.8	LOS A	2.4	17.4	0.35	0.46	23.4
5	T1	All MCs	1902	7.0	1902	7.0	*0.997	67.2	LOS E	10.8	80.0	0.96	1.21	20.8
Approach			1977	6.8	1977	6.8	0.997	65.2	LOS E	10.8	80.0	0.94	1.18	20.8
West: Military Road (W)														
11	T1	All MCs	2523	7.0	2523	7.0	0.933	39.6	LOS C	37.3	276.7	0.93	0.97	26.3
Approach			2523	7.0	2523	7.0	0.933	39.6	LOS C	37.3	276.7	0.93	0.97	26.3
All Vehicles			4705	6.7	4705	6.7	0.997	51.1	LOS D	37.3	276.7	0.93	1.05	23.0

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

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

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

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Eff. Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[ Ped ped	Dist ] m			sec	m	m/sec
South: Wycombe Road (S)											
P1	Full	53	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90
East: Military Road (E)											
P2	Full	53	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90
West: Military Road (W)											
P4	Full	53	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90
All Pedestrians		158	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90

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

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

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

# MOVEMENT SUMMARY

Site: 101 [Military Road - Rangers Road (Site Folder: PM Existing)]

Network: N101 [PM Existing (Network Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site  
Site Category: (None)  
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ]	%	[ Total HV ]	%	v/c	sec		[ Veh. veh	Dist ] m			km/h
South: Rangers Road (S)														
1	L2	All MCs	120	2.0	120	2.0	0.183	9.5	LOS A	0.3	1.9	0.56	0.80	27.2
Approach			120	2.0	120	2.0	0.183	9.5	LOS A	0.3	1.9	0.56	0.80	27.2
East: Military Road (E)														
4	L2	All MCs	54	2.0	54	2.0	0.859	8.2	LOS A	0.0	0.0	0.00	0.05	53.8
5	T1	All MCs	1867	7.0	1867	7.0	0.859	3.1	LOS A	41.7	309.7	0.00	0.02	54.3
Approach			1921	6.9	1921	6.9	0.859	3.3	NA	41.7	309.7	0.00	0.02	54.2
West: Military Road (W)														
11	T1	All MCs	2594	7.0	2594	7.0	0.843	0.4	LOS A	0.0	0.0	0.00	0.00	56.3
Approach			2594	7.0	2594	7.0	0.843	0.4	NA	0.0	0.0	0.00	0.00	56.3
All Vehicles			4635	6.8	4635	6.8	0.859	1.8	NA	41.7	309.7	0.01	0.03	55.1

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Eff. Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[ Ped ped	Dist ] m			sec	m	m/sec
South: Wycombe Road (S)											
P1	Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
East: Yeo Street (E)											

P2 Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
North: Wycombe Road (N)										
P3 Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
West: Yeo Street (W)										
P4 Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
All Pedestrians	211	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09

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

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

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

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# MOVEMENT SUMMARY

 **Site: 101 [Rangers Road - Yeo Street (Site Folder: PM Existing)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

 **Network: N101 [PM Existing (Network Folder: General)]**

New Site  
Site Category: (None)  
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ]	%	[ Total HV ]	%	v/c	sec		[ Veh. veh	Dist ] m			km/h
South: Rangers Road (S)														
1	L2	All MCs	239	3.0	239	3.0	0.170	5.6	LOS A	0.0	0.0	0.00	0.42	53.1
2	T1	All MCs	95	3.0	95	3.0	0.170	0.0	LOS A	0.0	0.0	0.00	0.42	53.1
Approach			334	3.0	334	3.0	0.170	4.0	NA	0.0	0.0	0.00	0.42	53.1
North: Rangers Road (N)														
8	T1	All MCs	29	3.0	29	3.0	0.034	0.0	LOS A	0.1	0.4	0.35	0.39	54.3
9	R2	All MCs	24	3.0	24	3.0	0.034	7.8	LOS A	0.1	0.4	0.35	0.39	39.6
Approach			54	3.0	54	3.0	0.034	3.5	NA	0.1	0.4	0.35	0.39	51.5
West: Yeo Street (W)														
10	L2	All MCs	28	3.0	28	3.0	0.328	8.6	LOS A	0.5	3.4	0.33	0.93	34.7
12	R2	All MCs	265	3.0	265	3.0	0.328	9.8	LOS A	0.5	3.4	0.33	0.93	46.9
Approach			294	3.0	294	3.0	0.328	9.7	LOS A	0.5	3.4	0.33	0.93	46.4
All Vehicles			681	3.0	681	3.0	0.328	6.4	NA	0.5	3.4	0.17	0.64	49.4

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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# MOVEMENT SUMMARY

 Site: 101 [Military Road - Wycombe Road (Site Folder: PM Future)]

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

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ]	%	[ Total HV ]	%	v/c	sec		[ Veh. veh	Dist ] m			km/h
South: Wycombe Road (S)														
1	L2	All MCs	91	3.0	91	3.0	0.258	59.7	LOS E	3.2	23.2	0.89	0.77	22.2
3	R2	All MCs	155	3.0	155	3.0	* 0.441	58.5	LOS E	5.8	41.3	0.93	0.80	4.6
Approach			245	3.0	245	3.0	0.441	58.9	LOS E	5.8	41.3	0.92	0.79	12.7
East: Military Road (E)														
4	L2	All MCs	75	2.0	75	2.0	0.200	11.8	LOS A	2.4	17.4	0.35	0.46	23.4
5	T1	All MCs	1907	7.0	1907	7.0	* 1.000	68.8	LOS E	10.8	80.0	0.96	1.23	20.5
Approach			1982	6.8	1982	6.8	1.000	66.6	LOS E	10.8	80.0	0.94	1.20	20.5
West: Military Road (W)														
11	T1	All MCs	2523	7.0	2523	7.0	0.933	39.6	LOS C	37.3	276.7	0.93	0.97	26.3
Approach			2523	7.0	2523	7.0	0.933	39.6	LOS C	37.3	276.7	0.93	0.97	26.3
All Vehicles			4751	6.7	4751	6.7	1.000	51.9	LOS D	37.3	276.7	0.93	1.06	22.8

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

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

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

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Eff. Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[ Ped ped	Dist ] m			sec	m	m/sec
South: Wycombe Road (S)											
P1	Full	53	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90
East: Military Road (E)											
P2	Full	53	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90
West: Military Road (W)											
P4	Full	53	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90
All Pedestrians		158	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90

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

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

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

# MOVEMENT SUMMARY

Site: 101 [Military Road - Rangers Road (Site Folder: PM Future)]

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

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site  
Site Category: (None)  
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ]	%	[ Total HV ]	%	v/c	sec		[ Veh. veh	Dist ] m			km/h
South: Rangers Road (S)														
1	L2	All MCs	125	2.0	125	2.0	0.187	9.4	LOS A	0.3	1.9	0.56	0.80	27.4
Approach			125	2.0	125	2.0	0.187	9.4	LOS A	0.3	1.9	0.56	0.80	27.4
East: Military Road (E)														
4	L2	All MCs	71	2.0	71	2.0	0.866	8.3	LOS A	0.0	0.0	0.00	0.06	53.3
5	T1	All MCs	1867	7.0	1867	7.0	0.866	3.3	LOS A	42.5	315.1	0.00	0.02	53.9
Approach			1938	6.8	1938	6.8	0.866	3.5	NA	42.5	315.1	0.00	0.02	53.9
West: Military Road (W)														
11	T1	All MCs	2605	7.0	2605	7.0	0.847	0.4	LOS A	0.0	0.0	0.00	0.00	56.2
Approach			2605	7.0	2605	7.0	0.847	0.4	NA	0.0	0.0	0.00	0.00	56.2
All Vehicles			4668	6.8	4668	6.8	0.866	1.9	NA	42.5	315.1	0.01	0.03	54.9

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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**Site: 101 [Wycombe Road - Yeo Street (Site Folder: PM Future)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Signals - EQUISAT (Fixed-Time/SCATS) Isolated      Cycle Time = 70 seconds (Site User-Given Cycle Time)

- \* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Eff. Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[ Ped ped	Dist ] m			sec	m	m/sec
South: Wycombe Road (S)											
P1	Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
East: Yeo Street (E)											



P2 Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
North: Wycombe Road (N)										
P3 Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
West: Yeo Street (W)										
P4 Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
All Pedestrians	211	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09

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

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

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

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# MOVEMENT SUMMARY

 **Site: 101 [Rangers Road - Yeo Street (Site Folder: PM Future)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

New Site  
Site Category: (None)  
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ]	%	[ Total HV ]	%	v/c	sec		[ Veh. veh	Dist ] m			km/h
South: Rangers Road (S)														
1	L2	All MCs	256	3.0	256	3.0	0.179	5.6	LOS A	0.0	0.0	0.00	0.43	53.0
2	T1	All MCs	95	3.0	95	3.0	0.179	0.0	LOS A	0.0	0.0	0.00	0.43	53.0
Approach			351	3.0	351	3.0	0.179	4.1	NA	0.0	0.0	0.00	0.43	53.0
North: Rangers Road (N)														
8	T1	All MCs	29	3.0	29	3.0	0.055	0.0	LOS A	0.1	0.8	0.41	0.49	52.8
9	R2	All MCs	49	3.0	49	3.0	0.055	7.5	LOS A	0.1	0.8	0.41	0.49	36.0
Approach			79	3.0	79	3.0	0.055	4.7	NA	0.1	0.8	0.41	0.49	47.2
West: Yeo Street (W)														
10	L2	All MCs	34	3.0	34	3.0	0.365	8.8	LOS A	0.6	4.2	0.34	0.94	34.1
12	R2	All MCs	283	3.0	283	3.0	0.365	10.3	LOS A	0.6	4.2	0.34	0.94	46.5
Approach			317	3.0	317	3.0	0.365	10.1	LOS A	0.6	4.2	0.34	0.94	46.0
All Vehicles			746	3.0	746	3.0	0.365	6.7	NA	0.6	4.2	0.19	0.65	48.9

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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# MOVEMENT SUMMARY

 Site: 101 [Military Road - Wycombe Road (Site Folder: Sat Existing)]

 Network: N101 [Sat Existing (Network Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ]	%	[ Total HV ]	%	v/c	sec		[ Veh. veh	Dist ] m			km/h
South: Wycombe Road (S)														
1	L2	All MCs	73	0.0	73	0.0	0.203	59.4	LOS E	2.6	17.9	0.88	0.75	22.4
3	R2	All MCs	142	3.7	142	3.7	* 0.407	58.1	LOS E	5.2	37.9	0.92	0.79	4.6
Approach			215	2.5	215	2.5	0.407	58.5	LOS E	5.2	37.9	0.91	0.78	12.3
East: Military Road (E)														
4	L2	All MCs	64	11.5	64	11.5	0.205	11.9	LOS A	2.6	19.0	0.35	0.43	24.4
5	T1	All MCs	2134	3.1	2134	3.1	* 1.024	78.9	LOS F	11.1	80.0	0.96	1.27	18.7
Approach			2198	3.3	2198	3.3	1.024	76.9	LOS F	11.1	80.0	0.94	1.24	18.7
West: Military Road (W)														
11	T1	All MCs	2317	2.4	2317	2.4	0.929	40.6	LOS C	34.4	246.0	0.92	0.98	25.9
Approach			2317	2.4	2317	2.4	0.929	40.6	LOS C	34.4	246.0	0.92	0.98	25.9
All Vehicles			4729	2.8	4729	2.8	1.024	58.3	LOS E	34.4	246.0	0.93	1.09	21.3

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

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

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

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Eff. Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[ Ped ped	Dist ] m			sec	m	m/sec
South: Wycombe Road (S)											
P1	Full	53	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90
East: Military Road (E)											
P2	Full	53	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90
West: Military Road (W)											
P4	Full	53	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90
All Pedestrians		158	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90

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

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

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

# MOVEMENT SUMMARY

Site: 101 [Military Road - Rangers Road (Site Folder: Sat Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [Sat Existing (Network Folder: General)]

New Site  
Site Category: (None)  
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ]	%	[ Total HV ]	%	v/c	sec		[ Veh. veh	Dist ] m			km/h
South: Rangers Road (S)														
1	L2	All MCs	168	2.5	168	2.5	0.274	10.5	LOS A	0.4	3.1	0.61	0.86	25.7
Approach			168	2.5	168	2.5	0.274	10.5	LOS A	0.4	3.1	0.61	0.86	25.7
East: Military Road (E)														
4	L2	All MCs	58	3.6	58	3.6	0.911	9.6	LOS A	0.0	0.0	0.00	0.05	51.3
5	T1	All MCs	2026	3.3	2026	3.3	0.911	4.8	LOS A	49.6	357.2	0.00	0.01	51.7
Approach			2084	3.3	2084	3.3	0.911	4.9	NA	49.6	357.2	0.00	0.02	51.7
West: Military Road (W)														
11	T1	All MCs	2354	2.5	2354	2.5	0.744	0.2	LOS A	0.0	0.0	0.00	0.00	57.9
Approach			2354	2.5	2354	2.5	0.744	0.2	NA	0.0	0.0	0.00	0.00	57.9
All Vehicles			4606	2.9	4606	2.9	0.911	2.7	NA	49.6	357.2	0.02	0.04	54.5

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Eff. Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[ Ped ped	Dist ] m			sec	m	m/sec
South: Wycombe Road (S)											
P1	Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
East: Yeo Street (E)											



P2 Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
North: Wycombe Road (N)										
P3 Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
West: Yeo Street (W)										
P4 Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
All Pedestrians	211	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09

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

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

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

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# MOVEMENT SUMMARY

 **Site: 101 [Rangers Road - Yeo Street (Site Folder: Sat Existing)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

 **Network: N101 [Sat Existing (Network Folder: General)]**

New Site  
Site Category: (None)  
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ]	%	[ Total HV ]	%	v/c	sec		[ Veh. veh	Dist ] m			km/h
South: Rangers Road (S)														
1	L2	All MCs	327	0.3	327	0.3	0.231	5.6	LOS A	0.0	0.0	0.00	0.42	53.0
2	T1	All MCs	131	3.2	131	3.2	0.231	0.1	LOS A	0.0	0.0	0.00	0.42	53.0
Approach			458	1.1	458	1.1	0.231	4.0	NA	0.0	0.0	0.00	0.42	53.0
North: Rangers Road (N)														
8	T1	All MCs	26	4.0	26	4.0	0.042	0.0	LOS A	0.1	0.6	0.45	0.50	53.0
9	R2	All MCs	33	0.0	33	0.0	0.042	8.4	LOS A	0.1	0.6	0.45	0.50	36.4
Approach			59	1.8	59	1.8	0.042	4.7	NA	0.1	0.6	0.45	0.50	48.5
West: Yeo Street (W)														
10	L2	All MCs	44	0.0	44	0.0	0.329	8.8	LOS A	0.5	3.4	0.36	0.94	34.0
12	R2	All MCs	236	0.4	236	0.4	0.329	10.4	LOS A	0.5	3.4	0.36	0.94	46.6
Approach			280	0.4	280	0.4	0.329	10.1	LOS A	0.5	3.4	0.36	0.94	45.7
All Vehicles			797	0.9	797	0.9	0.329	6.2	NA	0.5	3.4	0.16	0.61	49.6

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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# MOVEMENT SUMMARY

 Site: 101 [Military Road - Wycombe Road (Site Folder: Sat Future)]

 Network: N101 [Sat Future (Network Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ]	%	[ Total HV ]	%	v/c	sec		[ Veh. veh	Dist ] m			km/h
South: Wycombe Road (S)														
1	L2	All MCs	84	0.0	84	0.0	0.235	60.0	LOS E	3.0	20.9	0.89	0.76	22.3
3	R2	All MCs	155	3.4	155	3.4	* 0.443	58.5	LOS E	5.8	41.5	0.93	0.80	4.6
Approach			239	2.2	239	2.2	0.443	59.1	LOS E	5.8	41.5	0.92	0.79	12.5
East: Military Road (E)														
4	L2	All MCs	64	11.5	64	11.5	0.202	11.8	LOS A	2.6	19.0	0.35	0.43	24.4
5	T1	All MCs	2139	3.1	2139	3.1	* 1.012	71.7	LOS F	11.1	80.0	0.96	1.23	20.0
Approach			2203	3.3	2203	3.3	1.012	69.9	LOS E	11.1	80.0	0.94	1.21	20.0
West: Military Road (W)														
11	T1	All MCs	2317	2.4	2317	2.4	0.929	40.6	LOS C	34.4	246.0	0.92	0.98	25.9
Approach			2317	2.4	2317	2.4	0.929	40.6	LOS C	34.4	246.0	0.92	0.98	25.9
All Vehicles			4759	2.8	4759	2.8	1.012	55.1	LOS D	34.4	246.0	0.93	1.07	22.1

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

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

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

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

\* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Eff. Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[ Ped ped	Dist ] m			sec	m	m/sec
South: Wycombe Road (S)											
P1	Full	53	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90
East: Military Road (E)											
P2	Full	53	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90
West: Military Road (W)											
P4	Full	53	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90
All Pedestrians		158	67.2	LOS F	0.2	0.2	0.98	0.98	221.0	200.0	0.90

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

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

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

# MOVEMENT SUMMARY

Site: 101 [Military Road - Rangers Road (Site Folder: Sat Future)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [Sat Future (Network Folder: General)]

New Site  
Site Category: (None)  
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[ Total HV ]		[ Total HV ]					[ Veh. veh	Dist ]			km/h
			veh/h	%	veh/h	%	v/c	sec			m			
South: Rangers Road (S)														
1	L2	All MCs	177	2.4	177	2.4	0.279	10.3	LOS A	0.5	3.3	0.60	0.85	25.9
Approach			177	2.4	177	2.4	0.279	10.3	LOS A	0.5	3.3	0.60	0.85	25.9
East: Military Road (E)														
4	L2	All MCs	83	2.5	83	2.5	0.922	10.1	LOS A	0.0	0.0	0.00	0.07	50.2
5	T1	All MCs	2026	3.3	2026	3.3	0.922	5.4	LOS A	48.3	347.6	0.00	0.02	50.8
Approach			2109	3.2	2109	3.2	0.922	5.6	NA	48.3	347.6	0.00	0.02	50.8
West: Military Road (W)														
11	T1	All MCs	2363	2.5	2363	2.5	0.747	0.2	LOS A	0.0	0.0	0.00	0.00	57.9
Approach			2363	2.5	2363	2.5	0.747	0.2	NA	0.0	0.0	0.00	0.00	57.9
All Vehicles			4649	2.9	4649	2.9	0.922	3.0	NA	48.3	347.6	0.02	0.04	54.0

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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**Site: 101 [Wycombe Road - Yeo Street (Site Folder: Sat Future)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Signals - EQUISAT (Fixed-Time/SCATS) Isolated      Cycle Time = 70 seconds (Site User-Given Cycle Time)

- \* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Eff. Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[ Ped ped	Dist ] m			sec	m	m/sec
South: Wycombe Road (S)											
P1	Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
East: Yeo Street (E)											



P2 Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
North: Wycombe Road (N)										
P3 Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
West: Yeo Street (W)										
P4 Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09
All Pedestrians	211	29.3	LOS C	0.1	0.1	0.92	0.92	183.2	200.0	1.09

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

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

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

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