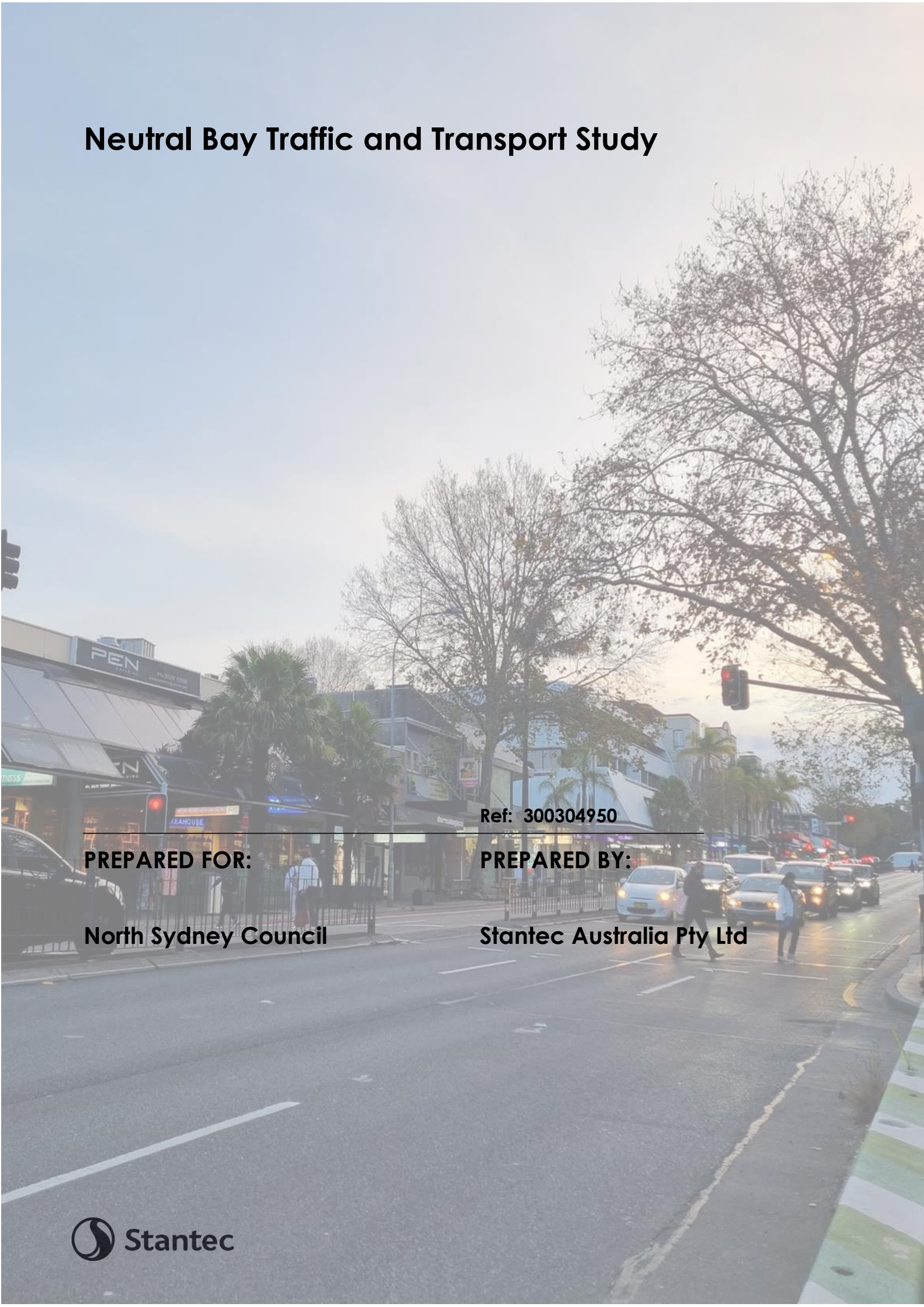
Neutral Bay Traffic and Transport Study



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PREPARED FOR:

North Sydney Council

PREPARED BY:

Stantec Australia Pty Ltd

Stantec

Revision Schedule

Revision No.	Date	Description	Prepared by	Quality Reviewer	Independent Reviewer	Project Manager Final Approval
1	02/08/2023	Draft (Stage 1: Section 1-3 only)	John Lim / Desmond Ang	Volker Buhl	Volker Buhl	Desmond Ang
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4	10/11/2023	Final v2	John Lim / Desmond Ang/ Chris Coath	Volker Buhl	Volker Buhl	Desmond Ang

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1. Introduction

1.1 Project context

North Sydney Council (Council) intends to support their community by updating the development planning framework for the Neutral Bay Town Centre through adoption of a Planning Study.

The Military Road Corridor Planning Study (MRCPS) was adopted in early 2021, but later rescinded in early 2022, due to community's concerns relating to building heights and density, parking access and arrangements, traffic impacts, demand for additional non-residential floorspace, maintenance of open public space and heritage. Further community engagement was completed following the MRCPS, and outcomes included to place a higher importance and priority on securing open space for people to enjoy, convenient and accessible parking areas and maintaining the village atmosphere. Additional details of the MRCPS are provided in Section 2.2.

In May 2022, Council endorsed commencing a revising planning study for the Neutral Bay Town Centre, with the intention to capture and address the identified community concerns, and effectively manage and guide development interest within the centre to ensure the continued commercial viability and growth of the centre, and to provide high-quality public spaces for the community.

In June 2023, Council commissioned Stantec to prepare a Traffic and Transport study (Transport Study) for Neutral Bay Town Centre. A key focus of the Transport Study will be identifying and examining key constraints in the Study Area across all modes of transport including walking, cycling, buses and private vehicles for both existing condition and future growth with public domain upgrades scenario. The outcome of the Transport Study will be used to identify infrastructure and policy needed to support the economic and social vitality of the centre, feeding into the Planning Study.

1.2 Objective of the Study

The objectives of this project are as follows:

- To develop Transport Evidence for the study area through the review of existing transport conditions and data collection. (Detailed in Section 3)
- To develop measures to reduce the existing demand for parking and recommend a set of car parking rates for key land use categories within the study area. (Detailed in Section 5)
- To assess proposed Growth Scenarios and Draft Public Domain Options, which includes analysing trip generation data for the AM and PM peak periods and identifying traffic impacts at key intersections. (Detailed in Section 6)
- To recommend improvements and strategies to support the preferred Growth Scenario and Draft Public Domain option. (Detailed in Section 7)

1.3 Study Area

The study area of this Transport Study has been retained from the MRCPS and is shown in Figure 1.1. It is bounded by Ben Boyd Road to the west, Belgrave Street / Gerard Street to the North, Winnie Street to the East and a block south of Yeo Street. The majority of the study area is located within the Neutral Bay Town Centre. Within the study area, the Neutral Bay town centre is primarily a mixed-use commercial and residential area that currently includes two major supermarkets, retail shops, a school and two Council-owned car parks, and a community centre. Running across the town centre is Military Road, a major state road that runs across the study area in an east-west alignment. It also intersects with the local streets and laneways, providing vehicular and pedestrian access to the town centre.

Figure 1.1 also includes the locations of the three key sites that will be assessed as part of this study. Details of the key sites are outlined further in Section 2.3.

Figure 1.1: Study Area (Base map: Nearmap dated 20 June 2023)

2. Strategic Context

As part of this Transport Study, to understand the previously identified issues and community concerns as well as to understand the strategic direction of North Sydney Council for the study area, the following documents and strategies have been reviewed:

State Planning Strategies and Policies

- Greater Sydney Region Plan – A Metropolis of Three Cities (2018)
- North District Plan (2018)
- Future Transport Strategy 2061 (2022)

Local Planning Strategies and Policies

- North Sydney Integrated Cycling Strategy (2013)
- North Sydney Transport Strategy (2016)
- North Sydney Vision 2040 Community Strategic Plan
- North Sydney Local Area Traffic Management Actions Plan – Zone 5 & 6 (2019)
- MRCPS – Transport Study by Aurecon (2019)
- MRCPS Stage 1 – Exhibition Outcomes and Amended Future Direction Report (2021)
- Draft NSDCP2013 Amendment – Car parking rates and associated final report (April 2023)
- Neutral Bay Town Centre Public Domain Plan by Spackman Mossop Michaels (2023)
- NBTCPS – Consultation Outcomes Report by PlanCom Consulting (2023)

Development Proposals (Key Sites)

- **Site 1** (43 to 51 Grosvenor Street and Grosvenor Lane car park): Coles Site – Pre DA meeting (June 2023)
- **Site 3.1** (183-185 Military Road): Planning proposal by PPD Planning Consultants – Amendments to North Sydney LEP 2013 (March 2023) and Transport Assessment by JMT Consulting
- **Site 3.2** (1-7 Rangers Road and 50 Yeo Street): Planning Proposal Report – Amendments to North Sydney LEP 2013 (Dec 2022) and Transport assessment by JMT Consulting

From the review, plans relevant to this Transport Study are summarised in Section 2.1 and 2.2.

2.1 State Government Policies and Plans

2.1.1 North District Plan

The North District Plan is a 20-year plan developed by Greater Cities Commission (previously Greater Sydney Commission) in 2018 to manage growth in the context of economic, social and environmental matters to achieve the 40-year vision for Greater Sydney. The North District covers multiple local government areas (LGA), including North Sydney LGA. The North District Plan focus on identifying the Planning Priorities to achieve a liveable, productive and sustainable future for the district. From the North District Plan, the Planning Priorities relevant to Neutral Bay includes:

Theme	Planning Priorities	
Liveability	N3	Providing services and social infrastructure to meet people's changing needs
	N4	Fostering healthy, creative, culturally rich and socially connected communities
	N5	Providing housing supply, choice and affordability, with access to jobs, services and public transport

	N6	Creating and renewing great places and local centres, and respecting the District's heritage
Productivity	N12	Delivering integrated land use and transport planning and a 30-minute city – Improving access to local jobs and services
Sustainability	N19	Increasing urban tree canopy cover and delivering Green Grid connections

2.2 Council Policies and Plans

2.2.1 North Sydney Vision 2040 Community Strategic Plan

The North Sydney Vision 2040 – Community Strategic Plan was prepared by North Sydney Council to shape the future of the North Sydney LGA. The plan details the Strategic Directions that the community would like to achieve, as well as the desired outcomes and specific actions from each Strategic Direction. Outcomes relevant to this study includes:

- Our Living Environment: Outcome 1.4 – Well utilised open space and recreational facilities
- Our Built Infrastructure: Outcome 2.1 – Infrastructure and assets meet diverse community needs
- Our Built Infrastructure: Outcome 2.2 – Vibrant public domain and villages
- Our Built Infrastructure: Outcome 2.3 – Prioritise sustainable and active transport
- Our Built Infrastructure: Outcome 2.4 – Efficient traffic mobility and parking
- Our Innovative City: Outcome 3.2 – Distinctive sense of place and design excellence

This plan also identified key issues and challenges for the North Sydney LGA which includes growing population, housing affordability, equitable access to open space and recreation, and transportation related, i.e. traffic congestion, pedestrian safety, increased parking demand.

2.2.2 North Sydney Transport Strategy (NSTS)

The North Sydney Transport Strategy was prepared by Council in 2016 and is Council's guiding document for the delivery of its transport planning and management functions, which includes strategic transport planning, transport advocacy and delivery of local transport projects. The following vision for transport in North Sydney is based on key Community Strategic Plan themes and the community's priorities identified during preliminary consultation: "*In 2030, transport will play a positive role in supporting a happy, healthy and prosperous North Sydney community.*"

From the Transport Vision priorities identified, the impacts of different travel modes were reviewed, resulting in a Modal Hierarchy for North Sydney:

- Priority 1 – Walking
- Priority 2 – Cycling
- Priority 3 – Public Transport
- Priority 4 – Local Deliveries & Freight
- Priority 5 – Private Vehicles

The Strategy also identified guiding principles to help achieve local living and transit-oriented development outcomes that minimise the number and distance of trips generated within a local area, increasing the uptake of walking, cycling and public transport and minimise traffic growth in line with the NSTS Vision and Priorities.

The following Mode Specific Transport Action Plans were developed to meet the objectives of the NSTS Vision:

Objectives	Mode Specific Transport Action Plans
Delivering More Walking, Cycling and Public Transport	• North Sydney Walking Action Plan (Not commenced) • North Sydney Integrated Cycling Strategy (2013) • North Sydney Public Transport and Advocacy Action Plan (Not commenced)
Managing Private Motor Vehicle Transport	• North Sydney Local Deliveries and Freight Action Plan (Not commenced) • North Sydney Parking and Traffic Action Plan (Not commenced)

2.2.3 Military Road Corridor Planning Study – Transport Study

The MRCPS – Transport Study was prepared, for Council by Aurecon in June 2019, to feed into the broader MRCPS undertaken by Council. The study:

- Analysed the existing travel patterns, transport network supply and demand from the various modes of travel,
- Developed a summary of key insights from the analysis.
- Collaborated with stakeholders to identify the Vision and Objectives for MRCPS - Transport Study and setting KPI targets against recommended implementation measures:

Objectives	Implementation	Target Measures (KPI)
Objective 1: Provide high-quality, connected infrastructure that enhances the safety and accessibility of all users and support an increase in the mode share of cycling, walking and public transport	Deliver infrastructure that supports these priority mode groups; reduce the number and severity of injuries by reducing traffic volumes/speeds and increased awareness of vulnerable road users.	Reduced volumes of cars; increased per cent of walking and cycling mode share; ratio of population to crashes; per cent of different injury types.
Objective 2: Consider the transport function against the need for increased and improved public and community spaces by identifying opportunities for reallocating space	Deliver infrastructure that provides publicly accessible space to support community functions.	Improve ratio of population to public domain space; square metre floor space for community amenity.
Objective 3: Support a sustainable future by designing adaptable transport facilities, increasing tree canopy cover, and promoting active travel for local journeys	Maintain and improve current and future per capita public domain and tree ratios through targeted road space allocation.	Improve ratio: population to public domain space; population to number of trees.
Objective 4: Manage the need for loading facilities to support commercial activity and future business growth	Maintain access for critical vehicle journeys	Ratio: businesses to deliveries infrastructure; population to disabled carparking spaces; population to umber of car share spaces; population to number of community bus trips.
Objective 5: Identify opportunities to leverage urban renewal proposals and private investment to provide improved transport outcomes	Utilise private investment to contribute to community and transport improvements	Ratio: dollars spent against floor space area.

- Develop Interventions and recommendations based on the needs identified.

2.2.4 MRCPS – Exhibitions Outcomes and Amended Future Direction Report

Council received significant feedback from the engagement process after the exhibition of the final draft MRCPS in 2020. An internal Councilor briefing was conducted for the Councilors in early 2021 to review the content of the report and discuss various matters. A summary of the transport related recommendations including amendments to the Future Direction Report is outlined in Table 2.1.

Table 2.1: Summary of Transport Related Recommendations

Amendments to the Future Direction Report relating to transport include:	Other exhibited transport recommendations that remain include:
• Staged development of the surrounding landholdings of the Grosvenor Lane car parking. • Traffic, parking and loading/unloading that the shops rely on can be accommodated within the redevelopment. • Detailed transport analysis requirements for a planning proposal. • Retain traffic through Waters Lane. • Retain traffic through Barry Street by turning it into a shared zone. • Requirements for more on-street bicycle parking as suggested by TfNSW.	• Scope for more significant pedestrian space and phase time reallocation along Military Road. • Allow for the delivery of significant public domain, walking, cycling, public transport and local safety and amenity improvements at Neutral Bay centres. • Deliver further traffic reductions on Military Road and other local roads in the town centres in the corridor. • Deliver and enhance LATM. Actions should reflect strategic, community-based solutions. • Slowing down vehicles around the town centre will help enhance the existing village atmosphere and increase pedestrian safety.

2.2.5 Local Area Traffic Management (Action Plans for Zone 5 and 6)

The LATM Action Plan for Zone 5 covers Cremorne and Neutral Bay (northern half of Military Road) while the LATM Action Plan for Zone 6 covers Cremorne, Cremorne Point, Kurraba Point, North Sydney, Neutral Bay (southern half of Military Road). The respective action plan for each zone primarily details the following:

- Issues (based on submissions) and locations of these issues
- Action Categories and Actions
- Priority (Short term / Medium term / Long term)
- Status of action (Completed / In Planning / No status)

Actions within the study area that are either “In planning” or “no status” have been identified and summarised, mainly based on the issue category (i.e., Walking, cycling, traffic and parking) within Table 2.2 and Table 2.3. These identified issues and associated actions will be reviewed further and considered in the development of recommended improvements to support the preferred scenario and public domain options

Table 2.2: Summary of uncompleted actions (Zone 5)

ID	Locations of Issues	Issue Category	Issue	Action Category	Recommended Action (from LATM)	Priority	Status
T.43 T.93 T.106	Grosvenor Street, Neutral Bay shopping area, Winnie Street between Military Road and Gerard Street	**Walking**	• Safety concerns over rat running traffic, as well as high vehicular traffic during dining hours on Grosvenor Street	Traffic Facilities & Investigations	• Implement 40km/h High Pedestrian Activity Area, with traffic calming measures.	Short to Medium	In planning
T.63 T.93	Winnie Street, Military Road bus stop near Winnie Street		• Lack of walking infrastructure identified at Cooper Lane, Martens Lane • Safety concerns over inadequate footpath widths to accommodate pedestrian volumes		• Implement 10km/h Shared Zone treatment. • Reduce footpath clutter around bus stop.	Short to Medium	No update
T.75 T.92	Waters Road near Grosvenor Street, Parraween Street at Winnie Street		• Safety concerns identified with pedestrian crossings at certain locations.		• Raise height of pedestrian crossing threshold to reduce approach speeds. • Install pedestrian crossing or kerb Buildouts.	Medium to Long	No update
T.7	Ben Boyd Lane between Belgrave Street and Grosvenor Street	**Traffic**	• Safety concerns from residents regarding the high vehicular traffic volumes (and long queues observed) along Ben Boyd Lane between Belgrave Street and Grosvenor Street	Traffic Facilities & Investigations		Long	No update
S.1	Redlands Senior Campus		• Traffic and parking issues identified around school site during drop-off / pick-up periods		• Work with Redlands School to develop a Green Travel Plan including Traffic Management Plan to reduce trips by private vehicle and minimise traffic and parking impacts associated with vehicle use.	Short	No update
P.3	Grosvenor Street	**Parking**	• Concerns with existing kerbside parking arrangements	Parking	• Convert 90-degree parking to 45-degree angle parking.	Long	No update

P.1.27a	Parking Area 27 - Neutral Bay Shopping area (between Ben Boyd Road and Waters Road)		• Inadequate parking restrictions		• Undertake area-wide review of parking restrictions.	Short	No update

Table 2.3: Summary of uncompleted Actions (Zone 6)

ID	Locations of Issues	Issue Category	Issue	Action Category	Recommended Action (from LATM)	Priority	Status
Ped.2 Ped.8	Military Road near Watson Street, Wycombe Road, Barry Street - sidewalks and crossing Yeo Street	**Walking**	• Narrow and uneven footpaths along certain areas of the town centre. Lack of traffic calming measures has resulted in an uncomfortable pedestrian experience. • Poor drainage which results in frequent flooding along footpaths, restricting pedestrian movements. • Pedestrian demand for a desire line to cross Yeo Street from Barry Street	PAMP Study	• Prepare Pedestrian Access and Mobility Study for LATM Zone 6.	Short	No update
Sl.10 Sl.12 Sl.18	Rangers Road at Yeo Street, Ben Boyd Road to Yeo Street, Military Road between Rangers Road and Wycombe Road – city bound		• Inadequate lighting at identified locations. Based on feedback provided, the lack of street lighting along certain segments of the town centre has resulted in an unsafe and uncomfortable pedestrian experience.	Street Lighting	• Upgrade street lighting.	Short	No update
T.76	Rangers Road at Yeo Street		• Request for improvements to existing pedestrian crossing	Traffic Facilities & Investigations	• Install zig zag markings on approach to crossing.	Short	No update
C.16 C.17	Military Road	**Cycling**	• Lack of dedicated cycleway infrastructure along Military Road has resulted in increased safety risks for not just cyclists, but pedestrians and motorists as well.	Cycling Strategy	• Lobby RMS for a regional separated cycleway along Military Road between Warringah Freeway and Spofforth Street including appropriate crossing facilities at key intersections.	Long	No update

P.12.29a	Parking Area 29 - business area north of Yeo Street	**Parking**	• Inadequate parking restrictions	Parking	• Undertake area-wide review of parking restrictions.	Short	No update
T.21 T.59	Bydown Street at Military Road May Lane at Yeo Street	**Traffic**	• Improper parking behaviour at certain locations has caused obstruction to visibility near intersections, resulting in increased safety risks for road users	Traffic Facilities & Investigations	• Installation of signs and kerb buildouts	Medium	No update
T.104	Yeo Street at Woolworth car park		• Traffic queues at Woolworths car park entrance/exit affecting through traffic on Yeo Street		• Collaborate with Woolworths to develop Traffic Management Plan to improve traffic flow	Long	No update

2.2.6 Neutral Bay Town Centre Planning Study (NBTCPS) Consultation Outcomes Report

The NBTCPS Consultation Outcomes Report was prepared, for Council by PlanCom in May 2023. The report provides an overview of the preliminary stakeholder engagement undertaken to inform the NBTCPS undertaken by Council. The themes of the community feedback included parking, retention of current height, trees, access, pedestrian safety, space accessible to the community, maintaining viable small shops, Military Road issues and local centre scale.

A summary of the consultation outcomes related to transport is outlined as follows:

- Maintain existing number of public parking spaces through both on-grade and underground parking, ensuring convenience and accessibility.
- Widen footpaths to cater for pedestrian comfort and accessibility.
- Upgrade and introduce through-site links to improve connectivity and wayfinding.
- Implement kerbside planting and additional trees along Military Road to enhance the street environment.
- Minimise additional traffic impact from increased development density.

2.2.7 North Sydney Parking and Traffic Background Report – Parking rates and Public Transport Accessibility

The North Sydney Parking and Traffic Background report was prepared, for Council by SCT Consulting in July 2022, as a key deliverable identified in NSTS. The study focused on the residential parking rates as specified in North Sydney's DCP and considered how locations with high public transport accessibility to minimise traffic generation with increasing population within the LGA and achieve the North Sydney Transport Strategy (NSTS) vision. The study recommended the following changes to the Council DCP:

Recommendation 1: Set residential off-street parking rates for apartments using PTAL category.

The proposed rates, as shown in Table 2.4, are linked to the relative level of public transport accessibility in the LGA, with parking category 3 being the highest PTAL scores, and parking category 1 being the lowest PTAL scores within North Sydney.

Table 2.4: Proposed residential parking rates for apartment buildings

Property Description	Potential DCP (per dwelling)			
	Studio	1 bed	2 beds	3 beds+
Apartment Buildings in category 3 areas	0.3	0.4	0.6	0.7
Apartment Buildings in category 2 areas	0.6	0.7	0.9	1.2
Apartment Buildings in category 1 areas	0.6	0.7	1.0	1.2

Recommendation 2: Reduce visitor parking provision.

It is recommended that visitor parking rates be set similar to that of the City of Sydney Council for high density residential zones, as shown in Table 2.5:

Table 2.5: Proposed residential parking rates for apartment buildings

Property Description	Potential DCP (per dwelling)
	Visitor parking
Apartment Buildings in category 3 areas	Nil
Apartment Buildings in category 2 areas	0.167
Apartment Buildings in category 1 areas	0.2

The analysis undertaken and recommendations put forward as part of this study has further informed the amendments to the Council DCP to include new provisions relating to car parking rates within areas identified as having high public transport accessibility.

2.2.8 Young Street Walking, Cycling and Streetscape Upgrades

Council has proposed walking, cycling and streetscape improvements to Young Street, from Sutherland Street to Grosvenor Street. The works proposed include the following, as shown in Figure 2.1:

- New pedestrian crossing points over Young Street at the intersection with Belgrave Street (1)
- Raised pedestrian crossing over Sutherland Street (2)
- Continuation of the Young Street cycle path and additional landscaping (3)
- Increased clearway distances on Belgrave Street to prevent major congestion at the intersection that would potentially arise as a result of the other changes (4)
- New landscaping along the project corridor

Figure 2.1: Proposed Works Concept Plan

The anticipated improvements and impacts associated with the project are summarised in Table 2.6.

Table 2.6: Summary of Anticipated Improvements and Impacts

Anticipated Improvements	Anticipated Impacts
• reduced vehicle speeds and noise on Young Street • increased safety for people walking and crossing roads • higher amenity pedestrian environment/public space. The cycle path will provide a buffer between footpaths and road areas • people who feel unable to cycle on-road will have the option to cycle to the Neutral Bay village by separated path • reduced congestion on Belgrave Street at the intersection with Young Street	• narrowed lanes on Young Street will reduce the space available to exit parked cars • seven fewer permanent car parking spaces available Young Street • 23 fewer spaces on Belgrave Street during pm peak (3pm to 7pm, weekdays) due to clearway extensions (existing parking restrictions retained at other times) • 13 fewer spaces on Belgrave Street during the am peak (6am to 10am, weekdays) due to clearway extensions (existing parking restrictions retained at other times)

2.2.9 Neutral Bay Town Centre Public Domain Plan (Draft)

The draft Neutral Bay Town Centre Public Domain Plan was prepared for Council by Spackman Mossop Michaels (SMM), with a focus on key future public open spaces at Grosvenor Lane and Rangers Road. The plan provides a long term public domain concept for Neutral Bay town centre that helps to address the decline in local jobs and commercial spaces, insufficient public spaces and facilities, and future development pressure.

It also provides an opportunity to give the community more public space, and an improved public domain with increased amenity – including opportunities for more planting, shade, active transport, public art, play streets and water sensitive urban design (WSUD). These public domain improvements aim to create a more liveable, vibrant and healthy urban fabric for the community and the environment.

The public domain concept includes and expands on the recommendations of the public domain strategy put forward in the MRCPS – Stage 1 Future Directions report. The public domain concept also explores additional interventions to further enhance the public domain experience throughout Neutral Bay Town Centre, including:

- Military Road Streetscape improvements
- Additional pedestrian crossing on Military Road
- Potential opportunity of Young Street Plaza
- Alternative options of Grosvernor Plaza and Rangers Road Plaza

The above mentioned interventions and options will be assessed as part of this Transport Study, with the analysis discussed further in the subsequent sections of this report.

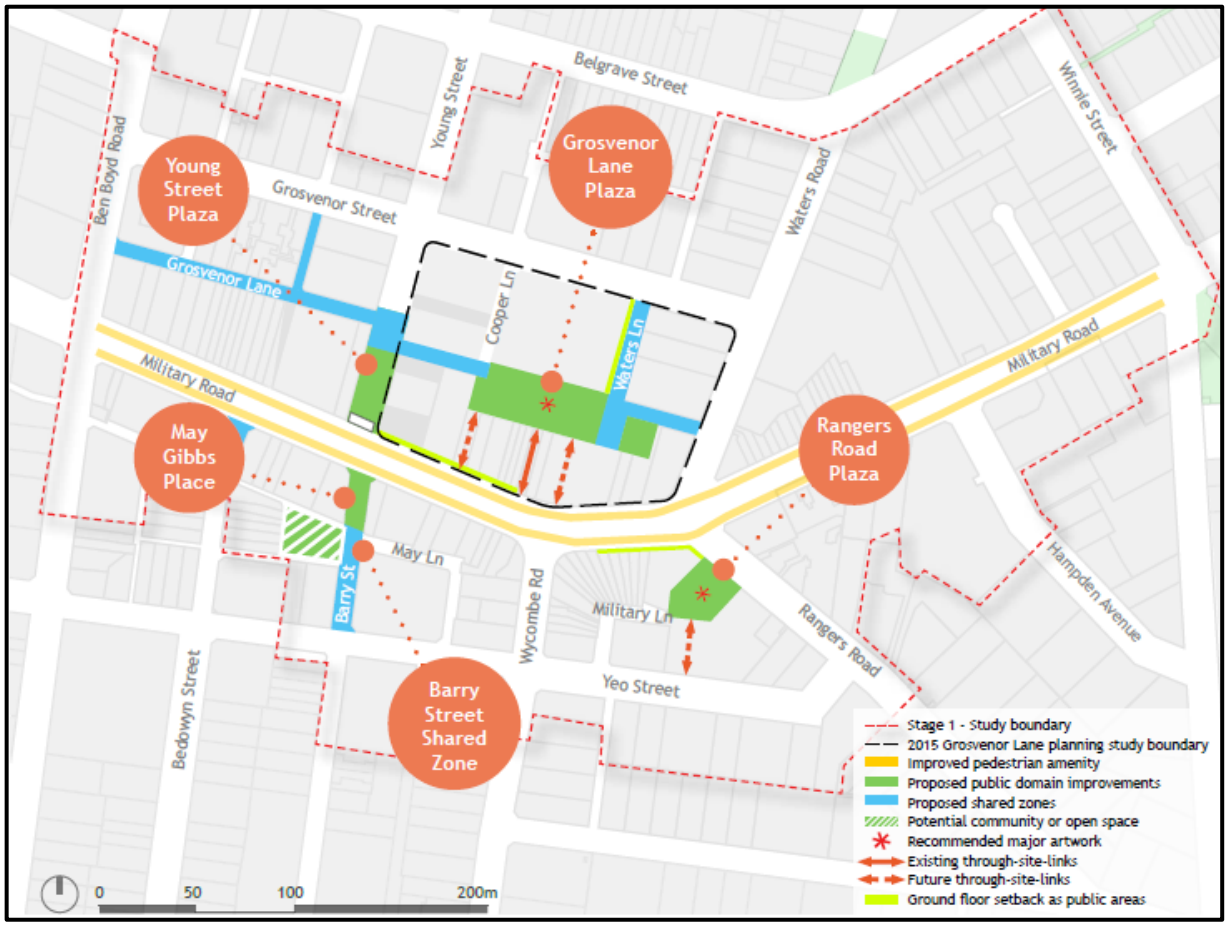


Figure 2.2: Public Domain Strategy (extracted from rescinded MRCPS)

2.3 Development Proposals (Key Sites)

Key redevelopment sites within the study area have been identified and is shown in:

- Site 1: Grosvenor Lane North
- Site 2: Grosvenor Lane South
- Site 3: Rangers Road

Figure 2.3: Key redevelopment sites (Source: Neutral Bay Public Domain Plan)

2.3.1 Site 1

Site 1 is located at 43-51 Grosvernor Street and is currently occupied by Woolworths supermarket. Based on the Pre-DA architectural plans, the redevelopment application is a mixed-use development, Coles Supermarket on the ground floor and six levels of residential units. As part of the redevelopment, the existing on-grade car park at Grosvernor Lane Plaza will also be replaced by an underground carpark and is expected to have over 350 parking spaces (for retail and residential uses) over three levels of basement parking.

Development application for Site 1 has been lodged in August 2023.

2.3.2 Site 2

Site 2 is an amalgamation of multiple lots located at 176 to 214 Military Road. The site currently supports multiple local shops and businesses and includes through site links at the existing Neutral Bay Community Centre, Theo's Arcade and The Grove shopping centre.

It is understood that no development applications have been lodged at the time of preparing this Transport Study.

2.3.3 Site 3A (183-185 Military Road, Neutral Bay)

Site 3 consists of two developments, one of which is the Woolworths Site at 1-7 Rangers Road and the other is a mixed-use development (DA previously approved, planning proposal not determined) at 183-185 Military Road. This section

summarises the transport assessment (of the Planning Proposal) undertaken by JMT Consulting for 183-185 Military Road.

Development Application

- In October 2019, development approval was provided for the construction of a five-storey mixed use building with basement level car parking. Retail and Commercial uses are proposed for the first two levels and about 43 residential units on the remaining three levels.

Planning Proposal

- The Planning Proposal submitted in April 2023 seeks to amend North Sydney's LEP to increase maximum height and density controls on the site, to facilitate future development of a mixed-use site including retail, two levels of commercial and nine levels of residential floor space.
- The Planning Proposal would also provide reduced level of car parking as compared to the maximum allowance under North Sydney Council's parking controls.
- Up to 25 public bicycle spaces would be provided as part of the proposal for the broader community of Neutral Bay.
- In conjunction with North Sydney Council and Transport for New South Wales's assessments, the transport assessment by JMT Consulting concludes that the traffic and transport impacts arising from the Planning Proposal are considered acceptable.

2.3.4 Site 3B (1-7 Rangers Road and 50 Yeo Street)

A transport assessment was carried out to assess the traffic and parking implications from the Planning Proposal for the site at 1-7 Rangers Road and 50 Yeo Street, Neutral Bay.

- The planning proposal submitted in December 2022 seeks to amend the North Sydney LEP 2013 to increase the maximum building height and increase the minimum non-residential floor space, to facilitate the future development of a Woolworths supermarket of approximately 3,300 m^2 GFA, 2,846 m^2 of retail GFA, 2,400 m^2 of commercial GFA and about 91 residential units, 65 public parking spaces and a new 1,000 m^2 public plaza.
- 1-7 Rangers Road is currently occupied by a Woolworths supermarket, an adjoining bottle shop, and some 100 on-site (basement) parking spaces. 50 Yeo Street is currently occupied by a six storey commercial building.
- Excluding the public car parking spaces, a total of 262 car parking spaces (58 spaces for residents, 164 for retail use and 40 for commercial use) has been proposed in accordance with North Sydney's Development Control Plan.
- Noting that the outcome of this assessment has yet to be determined, the transport assessment by JMT Consulting concludes that the traffic and transport impacts from the planning proposal are considered acceptable, with minor traffic impacts to the surrounding road network.

3. Existing Conditions

3.1 Land Use and Transport Context

3.1.1 Land Use

The Neutral Bay Town Centre is a local centre located in the North Sydney LGA and is located approximately 1.2 kilometres north-east of North Sydney City Centre and 3.0 kilometres north of Sydney CBD. The Town Centre provides varying community needs not limiting to retail, commercial, social, as well as local employment opportunities.

The study area is predominately a mixed-use area, with residential areas located towards the fringes. Military Road is the High Street of the Neutral Bay Town Centre, serving as the main commercial thoroughfare for Neutral Bay and comprises of shops and businesses along both sides of the street. The backstreets of both sides of Military Road are primarily supported by additional local shops and restaurants. Figure 3.1 shows the current land use zoning of the study area.

Major features of the Neutral Bay Town Centre include the Woolworths Neutral Bay Shopping Village, Woolworths Neutral Bay, Neutral Bay Junction bus stops, Redlands School, May Gibbs Place open plaza and a variety of restaurants, cafes and pubs along Grosvenor Street, Grosvenor Lane and Military Road.

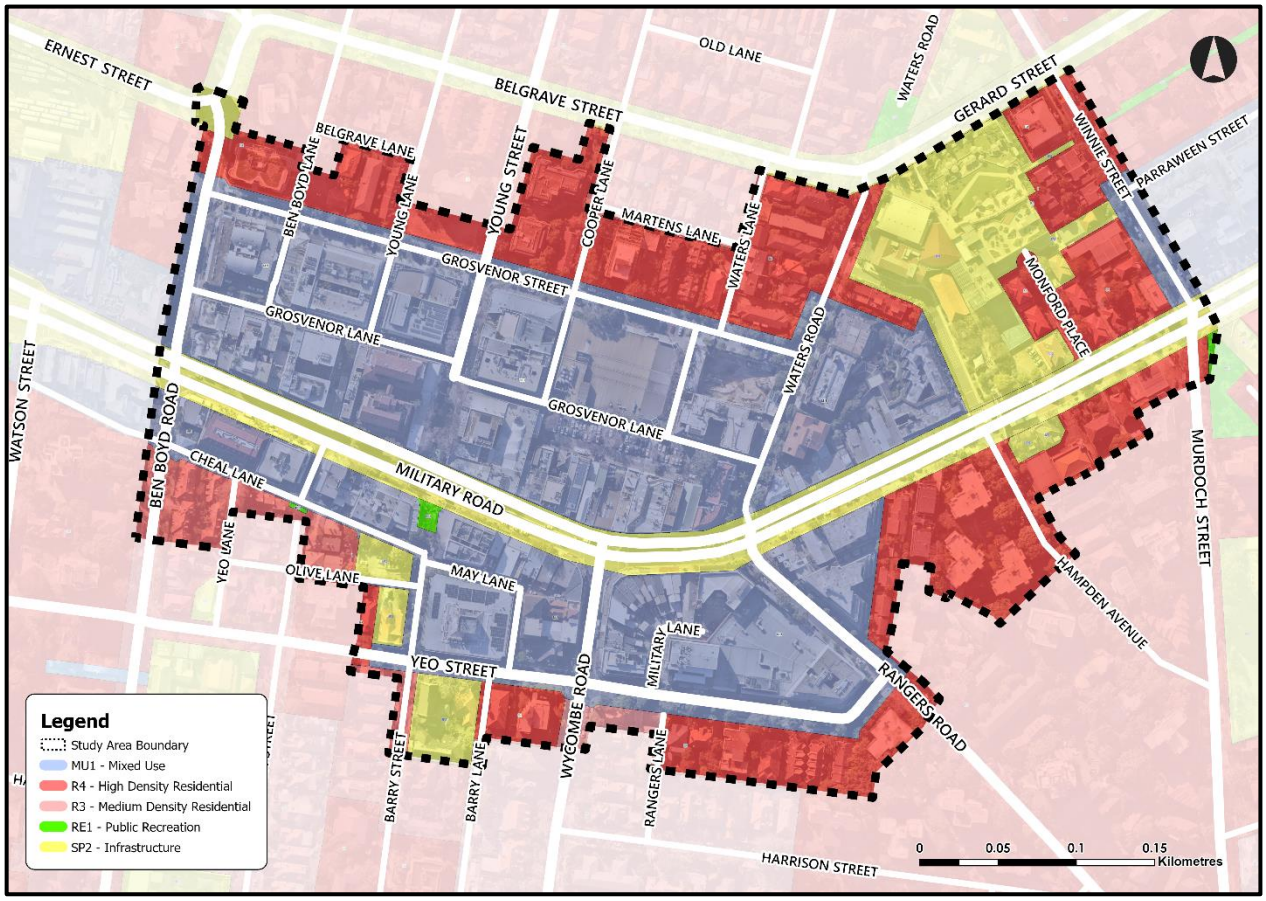


Figure 3.1: Current Land Use Zoning for the Study Area and Surroundings[1]

3.1.2 Demographic Profile

3.1.2.1 Population, Employment and Demographics

Based on 2021 Australian Bureau of Statistics (ABS), the Neutral Bay – Kirribilli SA2 population is approximately 17,186. It is important to note that the SA2 boundary extends much further than the Neutral Bay Town Centre, including the entire suburbs of Neutral Bay and Kurraba Point and Kirribilli, and parts of North Sydney. Here, these statistics reflect both the people living in the Town Centre and nearby residents living west of Warringah Freeway and south of the Town Centre. The employment number within the Neutral Bay – Kirribilli SA2, as of the 2021 Census, is 7,593. Figure 3.2 presents the

[1] Source: Australian Bureau of Statistics (abs.gov.au)

area of SA2, while Figure 3.3Figure 3.3 provides a summary of the projected growth in population and jobs from 2021 to 2046 based on Transport for NSW Travel Zone projections.

Using Transport for NSW (TfNSW) *Travel Zones 1940, 1941, 1942, 1943, 1944, 1945 and 1946* that sit within the Neutral Bay – Kirribilli SA2, the population is forecast to grow by 2,811 to 19,997 people in year 2046 (approximately 16 percent increase). For the same Travel Zones, the number of jobs is expected to grow by 1,205 to 8,798 jobs in year 2046 (approximately 16 percent increase).

Figure 3.2: Neutral Bay - Kirribilli SA2[2]

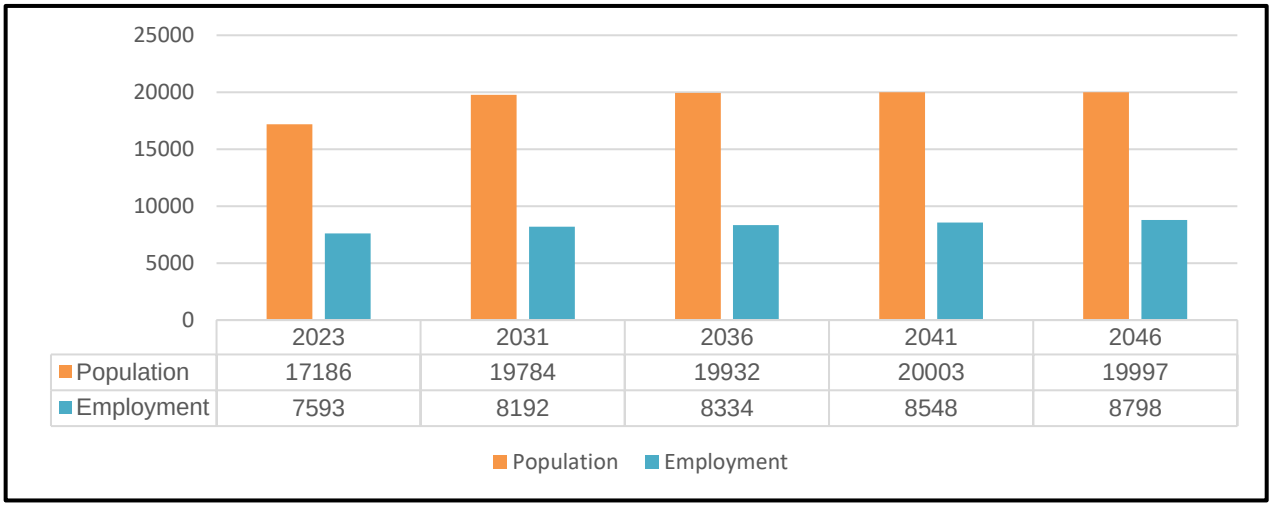


Figure 3.3: Population and Employment Growth (2021-2046)

[2] Source: Australian Bureau of Statistics (abs.gov.au)

3.1.2.2 Socio-economic Conditions

The Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) summarises information about the economic and social conditions of people and households within an area. This index includes both relative advantage and disadvantage measures.

A low score indicates relatively greater disadvantage and a lack of advantage in general. For example, an area could have a low score if there are: many households with low incomes, or many people in unskilled occupations, AND a few households with high incomes, or few people in skilled occupations.

A high score indicates a relative lack of disadvantage and greater advantage in general. For example, an area may have a high score if there are: many households with high incomes, or many people in skilled occupations, AND few households with low incomes, or few people in unskilled occupations.

IRSAD can be used:

- as a general measure of advantage and disadvantage
- to understand disadvantage, and advantage
- to offset advantage or disadvantage in their analysis.

Figure 3.4 shows the IRSAD for the Sydney region. Neutral Bay and its surrounding suburbs are given a quintile number of 5 (most advantaged).

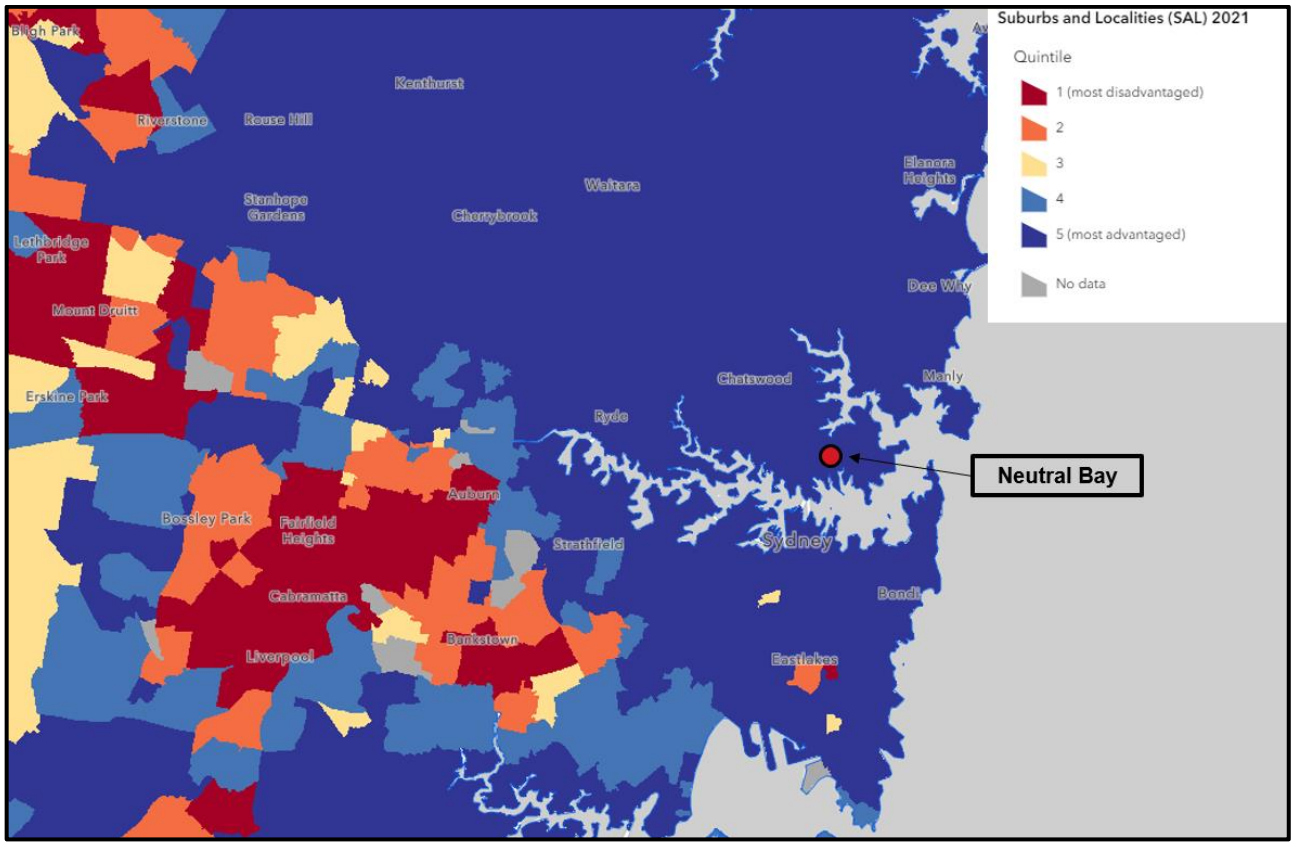


Figure 3.4: Index of Relative Socio-economic Advantage and Disadvantage (IRSAD)[3]

3.1.2.3 Car ownership

Figure 3.5 depicts household car ownership levels in both Neutral Bay and the Greater Sydney average for 2021 Census. Analysis of household car ownership in Neutral Bay compared to Greater Sydney shows that 55 percent of households owned one car, while 17 percent did not own a car, compared with 38 percent and 11 percent respectively in Greater

[3] Source: https://www.abs.gov.au/statistics/people/people-and-communities/socio-economic-indexes-areas-seifa-australia/2021#index-of-relative-socio-economic-advantage-and-disadvantage-irsad-

Sydney. Furthermore, the analysis shows 25 percent of households had access to two or more vehicles in 2021, compared to the average of 46 percent in Greater Sydney.

An overall car ownership rate in Neutral Bay at 80 percent, compared to Greater Sydney at 84 percent, can be potentially attributed to better accessibility to frequent public transport (buses) and hence a lower reliance on cars. A review of the public transport services for Neutral Bay was undertaken and is detailed in Section 3.3.

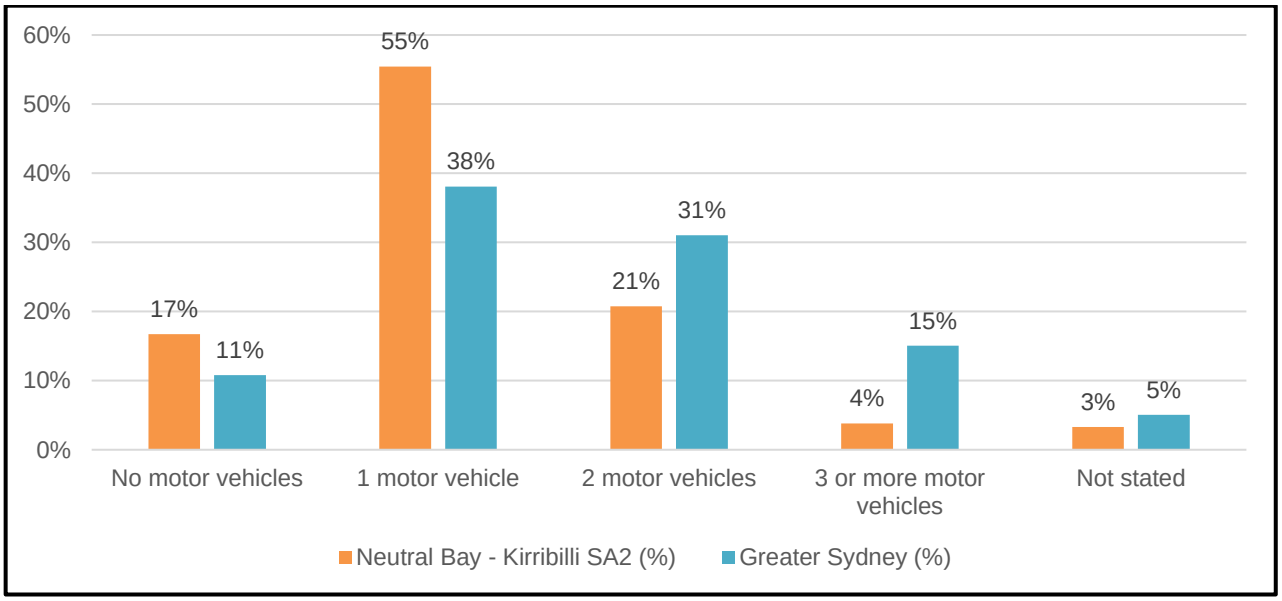


Figure 3.5: Comparison of car ownership between Neutral Bay - Kirribilli SA2 and Greater Sydney

3.1.3 Travel Patterns and Demand

The method of travel to work data collected as part of the 2016 ABS Census has been used to present the travel patterns as this timeframe better reflects normal travel behaviour (in comparison to 2021 COVID-19 travel conditions).

3.1.2.1 Mode split

Figure 3.6 shows the mode share for journey to work trips for residents within the Neutral Bay – Kirribilli SA2 based on census data in 2016. Approximately 34 percent of commute trips were made by private vehicle compared with 42 percent on public transport and 12 percent by active transport (comprising 11 percent walking and one percent cycling to work).

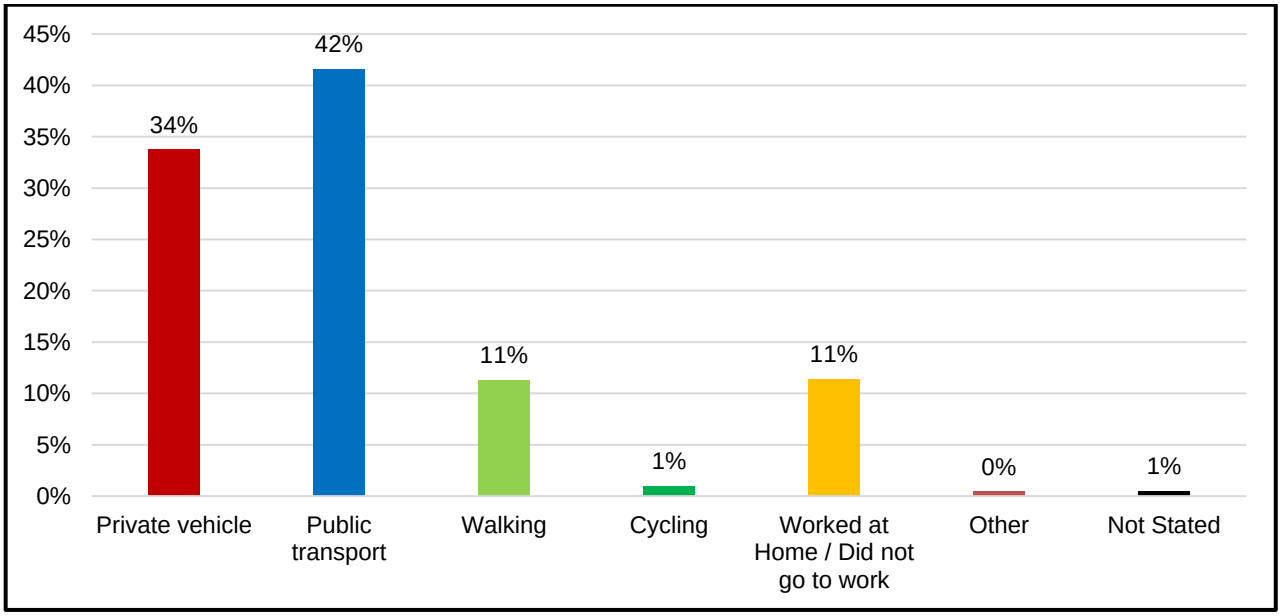


Figure 3.6: Mode Share for Commuting Trips: Employed Residents within Neutral Bay – Kirribilli SA2

Figure 3.7 illustrates the method of travel for those who travel from outside into the Neutral Bay – Kirribilli SA2 for work based on data extracted from the 2016 Census. The breakdown is as follows:

- About 47 percent travel by private vehicle including car as a driver and car as a passenger.
- About 28 percent of them used a bus or train to travel to work.
- About 9 percent used active transport to travel to work, comprising 9 percent walking and zero percent cycling to work.

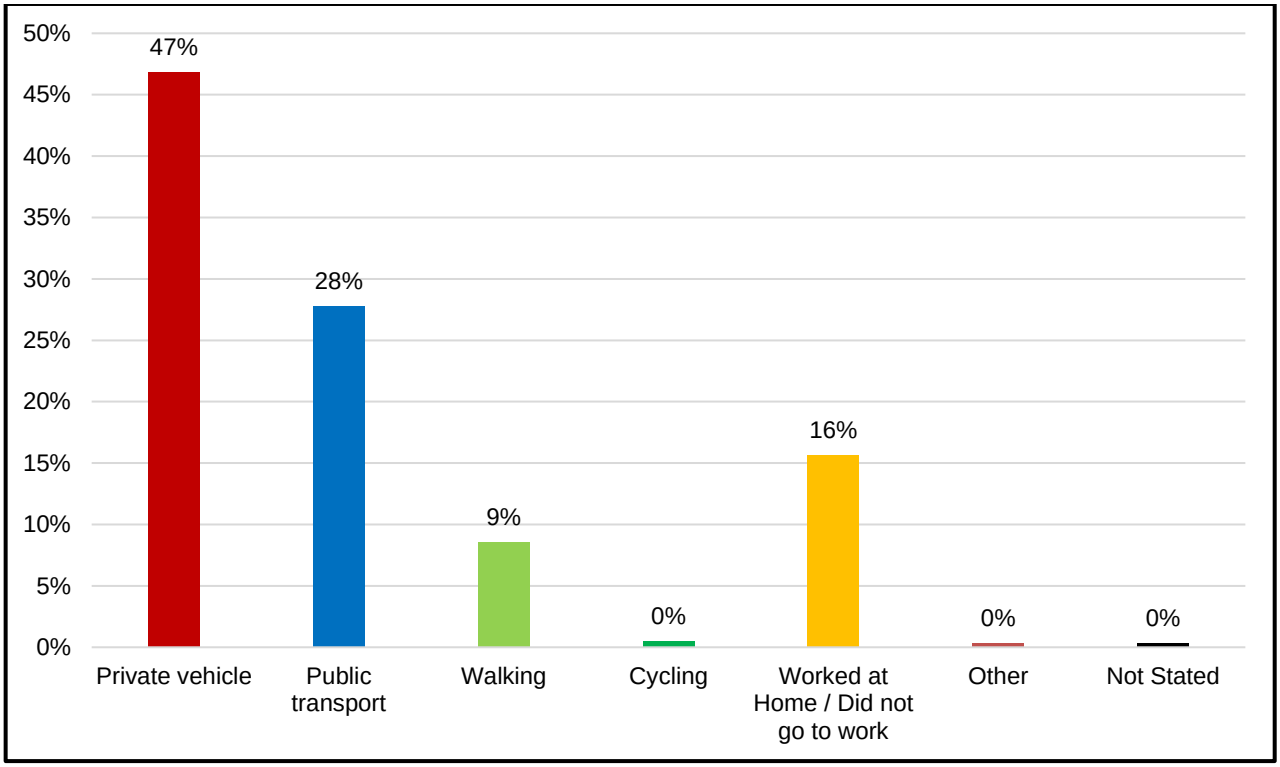


Figure 3.7: Mode Share for Commuting Trips: Employees within Neutral Bay – Kirribilli SA2

The mode split for Greater Sydney is depicted in Figure 3.8. In contrast, 58% of commuter travel within Greater Sydney is by car, while public transport and active travel (walking and cycling) account for only 23 percent and 5 percent of journey to work trips respectively.

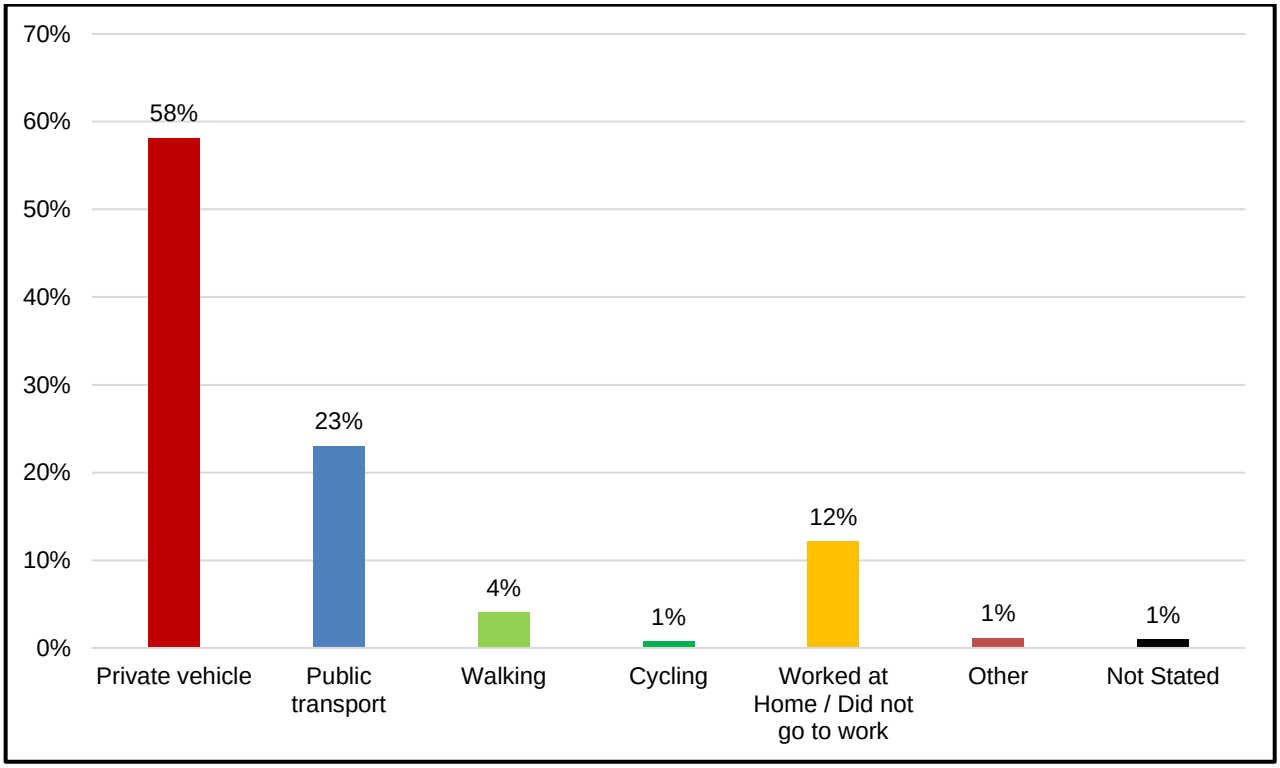


Figure 3.8: Mode Share for Commuter Travel within Greater Sydney

These mode splits results suggest that the travel behaviours for Neutral Bay are less car dependent than the average for Greater Sydney, with a higher proportion of commuters travelling via active and public transport modes.

3.1.2.2 Trip Containment

The proportion of individuals living and working in the same labour market region is referred to as the level of self-containment and is seen as a positive as it reduces the length of trips and can also lead to greater flexibility at what time the trips are undertaken (e.g. outside peak times).

Trip containment has important environmental consequences in its capacity to increase the likelihood of transport to work via methods other than private cars, given distances between home and work are probably shorter. Despite the shorter distances, car use may be the only viable commuting option unless appropriate public transport and safe active transport facilities is available between nearby areas.

At a SA2 level, Figure 3.9 shows that 19 percent of workers live and work in the Neutral Bay – Kirribilli SA2 while approximately 81 percent of workers live outside the area.

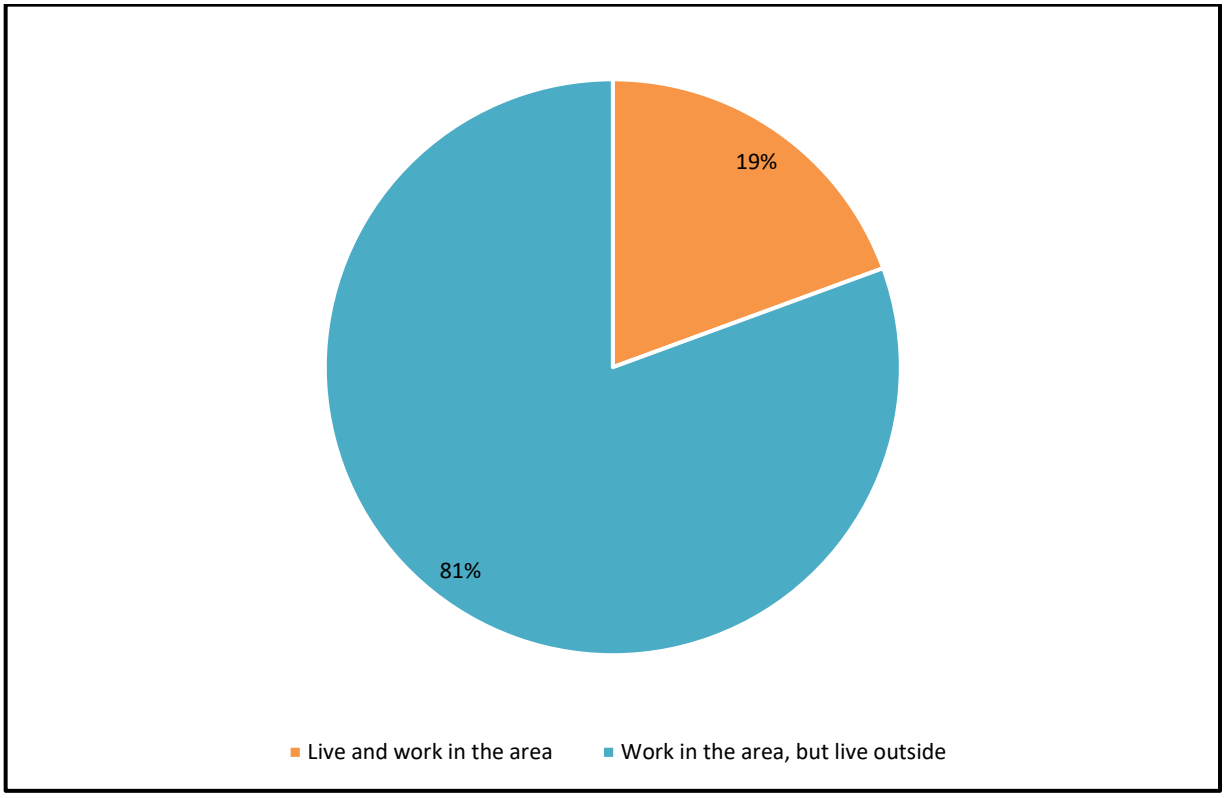


Figure 3.9: Percentage of Residential Location of Local Workers, 2016[4]

In comparison, Figure 3.10 shows the employment location of local residents who live and work in the Neutral Bay – Kirribilli SA2. As evident in this figure, 12 percent of residents work in the area, while 88 percent of residents work outside the area, which makes having good transport connections to major employment centres outside the local area an ongoing priority.

[4] Source: Australian Bureau of Statistics (abs.gov.au)

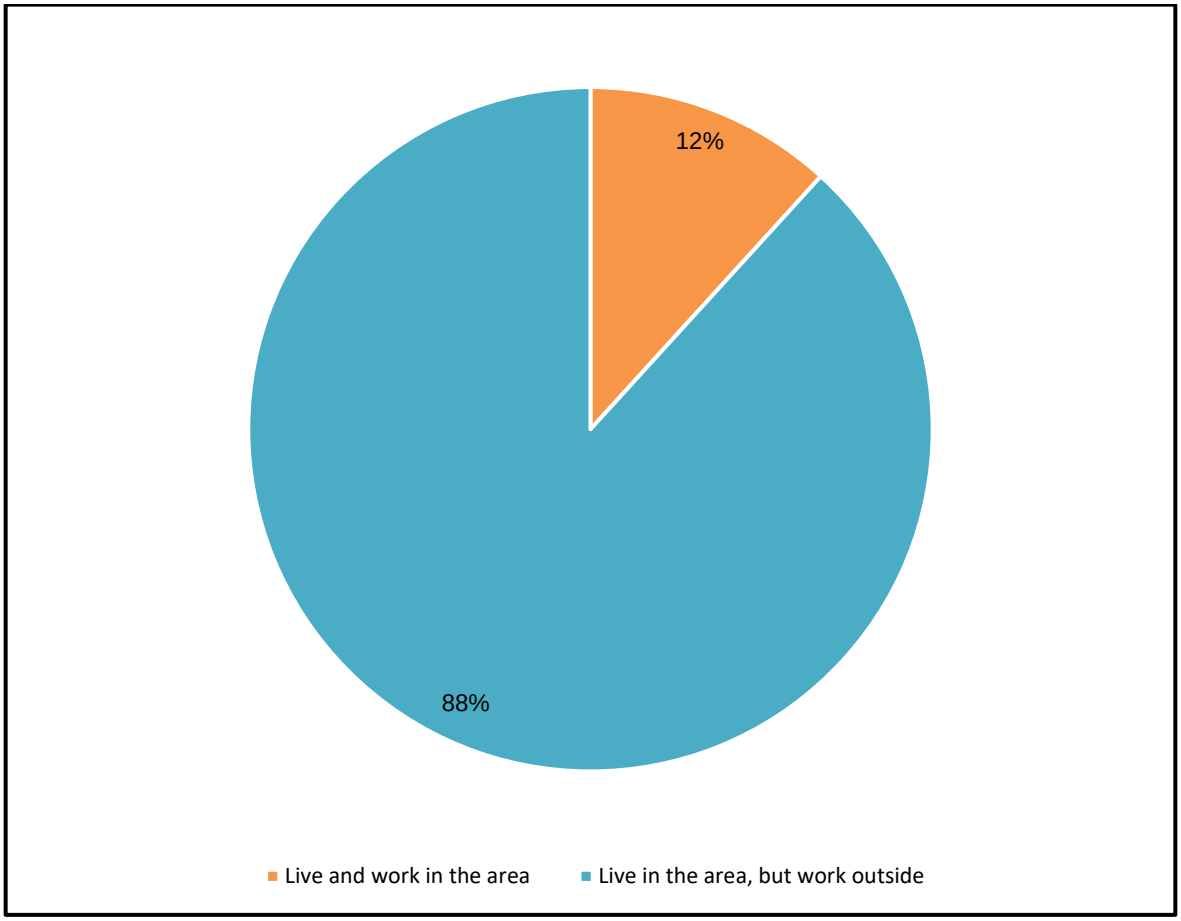


Figure 3.10: Percentage of Employment Location of Local Employed Residents, 2016

3.2 Existing Transport Networks

3.2.1 Walking Network

Figure 3.11 shows the extent of pedestrian infrastructure within the Neutral Bay Town Centre. The walking network within the Town Centre mainly consists of footpaths along street corridors and shared zones through a number of laneways, aided by pedestrian links through street closures at Young Street and May Gibbs Place, a through-site link and two enclosed arcade links between Grosvenor Lane car park and Military Road. In general, pedestrian access to key destinations within the study area is relatively easy and logical.

There are footpaths along certain streets are narrow or disjointed at some laneways. Locations of this issue are captured in the LATM actions plans and are detailed in Section 2.2.5 of this report. Additionally, LATM action plan for Zone 5 noted pedestrian safety concerns associated with the inadequate footpath space around existing bus stop on Military Road near the Redlands School to cater for the number of students that congregate at the bus stop while facilitating pedestrian through movement. This correlates with site observation whereby footpath space can be limited at bus stops along the Military Road bus corridor during peak travel hours.

Signalised intersections within the study area provide safe crossing facilities at all approaches. However, busy arterial roads such as Military Road can act as barrier to easy and safe walking in the study area rather than providing activation and amenity, particularly with extended wait times and restricted crossing times at intersections. A number of crossing points are located across the extent of Military Road and are more frequent towards the western end. The largest gap between pedestrian crossings is 260m, located between the signalised crossing at Wycombe Road and the footbridge at Hampden Avenue. Large distances between crossings limit the north-south permeability through the Town Centre. Given the availability of walking infrastructure within the study area (where footpaths are available throughout the town centre and surrounding local streets and crossing opportunities are available on the western half of the study area), the overall walking infrastructure is relatively well-formed.

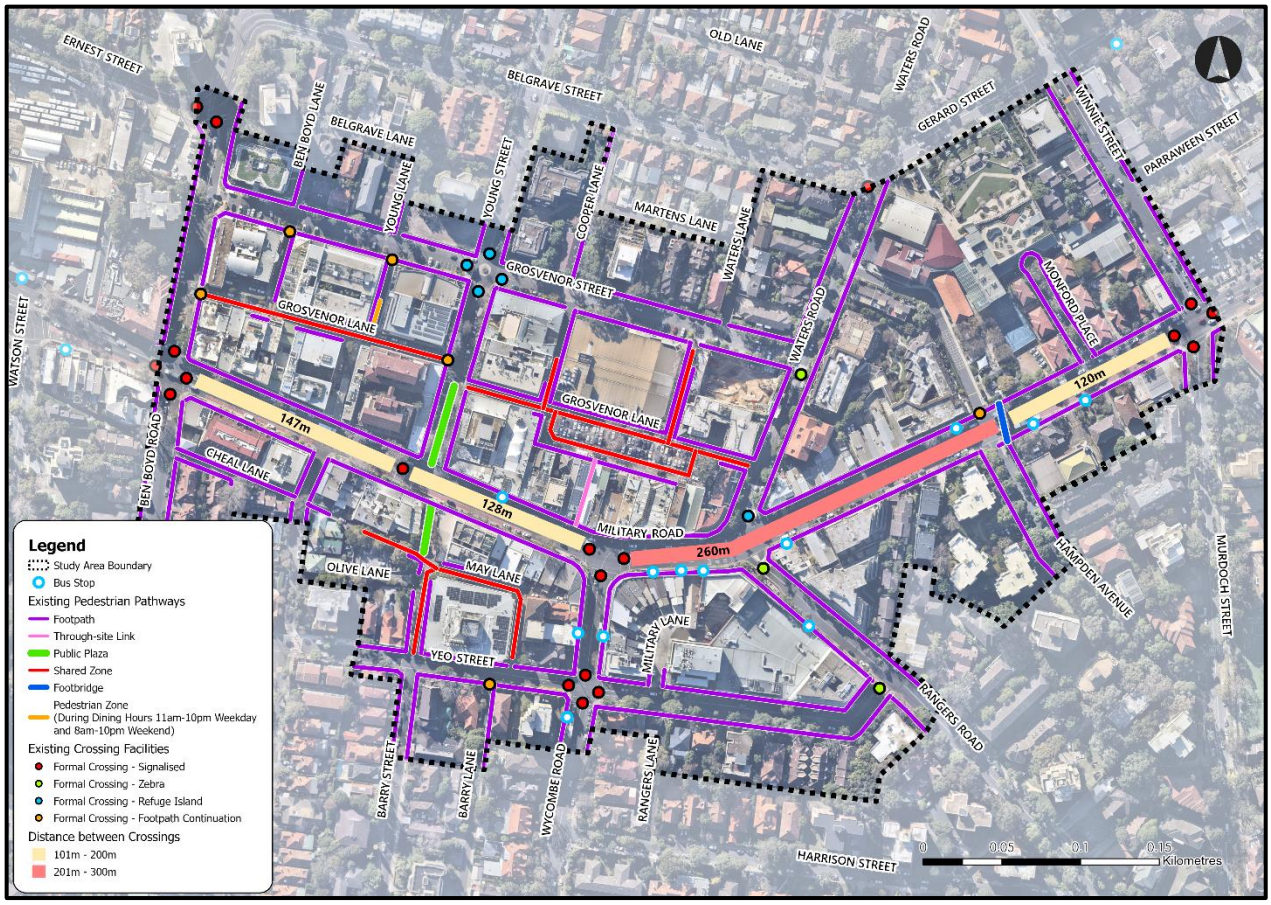


Figure 3.11: Existing Pedestrian Infrastructure within the Study Area (Base map: Nearmap)

3.2.2 Cycling Network

Figure 3.12 shows the extent of the cycleway network through and surrounding the Neutral Bay Town Centre. There are currently no dedicated separated cycleways or off-road shared paths provided within the extent of the study area.

The existing cycleway network in the area are formed of "*General Roads*" that are aligned in a north-south direction along a number of local roads including Young Street, Waters Road, Wycombe Road and Rangers Road, and in an east-west direction along Yeo Street. The TfNSW cycleway finder classifies these "*General Roads"* as roads where bicycle are approved to share space with motor vehicles. These cycleways function as local access routes connecting the Town Centre to the broader formalised cycleways at Sutherland Street to the north and Winter Avenue to the south as shown in Figure 3.13.

Figure 3.13 also shows that surrounding the Neutral Bay Town Centre, other than the separated bicycle path along Sutherland Street (to the north), there are no dedicated cycleways that connects the surrounding suburbs to the town centre. Cyclists will be required to share the road with motorists via the approved "*General Roads*". However, it is worth noting that Council is proposing a separated cycle path on Young Street between Grosvenor Street and Sutherland Street. This will provide a safe cycleway connection between the town centre and the Sutherland Street cycleway to the north.

It is evident that there is a lack of safe crossing facilities connecting the cycleways north and south of the Military Road Corridor with no bike phase provided at designated crossing point(s) at Military Road. The bike phase provides additional time for cyclists to cross the road safely, and thus reduce the risk of collisions with motor vehicles. It has also been identified in the LATM action plans (Table 2.3) that there is a lack of dedicated cycleway infrastructure along Military Road, which not only impacted cyclists, but pedestrians and motorists as well.

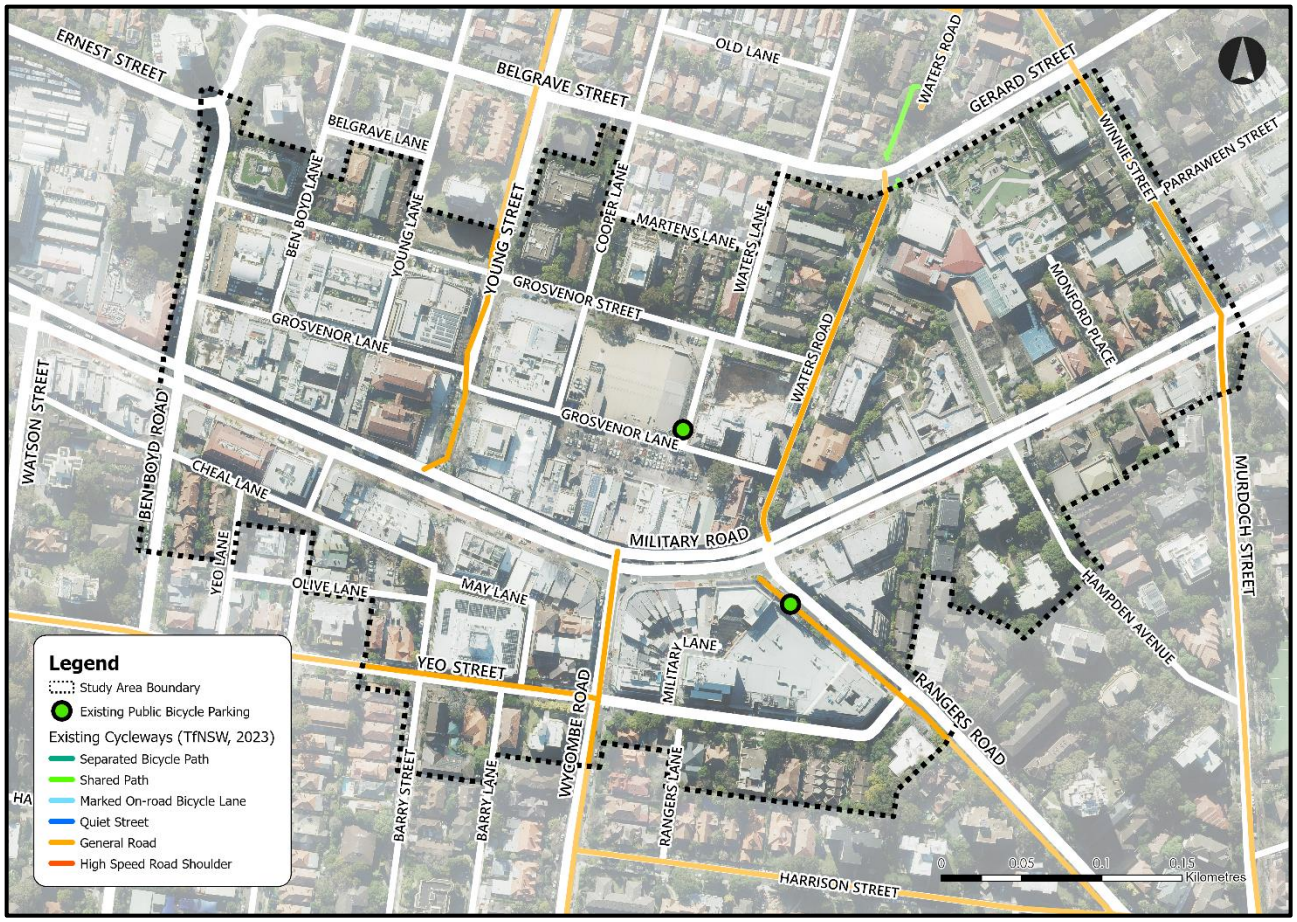


Figure 3.12: Existing Cycling Infrastructure within the Study Area[5]

[5] Source: https://roads-waterways.transport.nsw.gov.au/maps/cycleway_finder

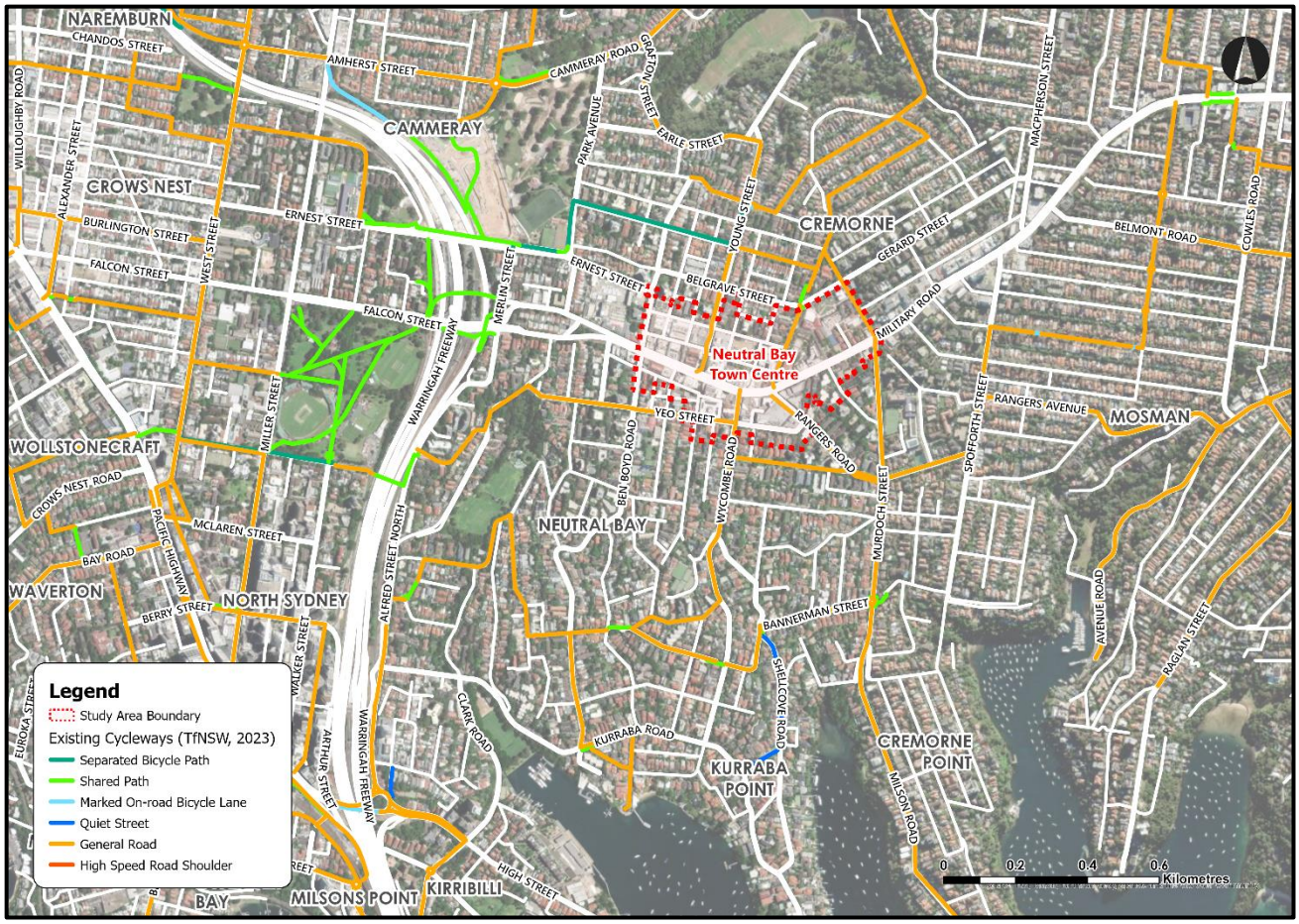


Figure 3.13: Neutral Bay Town Centre in relation to the broader Cycling Network[6]

3.3 Public Transport Network

3.3.1 Bus

Neutral Bay Town Centre is relatively well-served by a bus network with routes running east-west along Military Road as the primary connection between Northern Beaches and North Sydney and as a major road corridor through Neutral Bay. A considerable number of express and limited stop buses service the study area, including the B-Line services and other express bus routes that operate between Wynyard and the Northern Beaches area.

The existing bus network that operates through the study area is shown in Figure 3.14. A bus network map for the study area and the surrounding suburbs is shown in Figure 3.15, with the summary of the bus route destinations and service frequency provided in Table 3.1.

6 Source: https://roads-waterways.transport.nsw.gov.au/maps/cycleway_finder

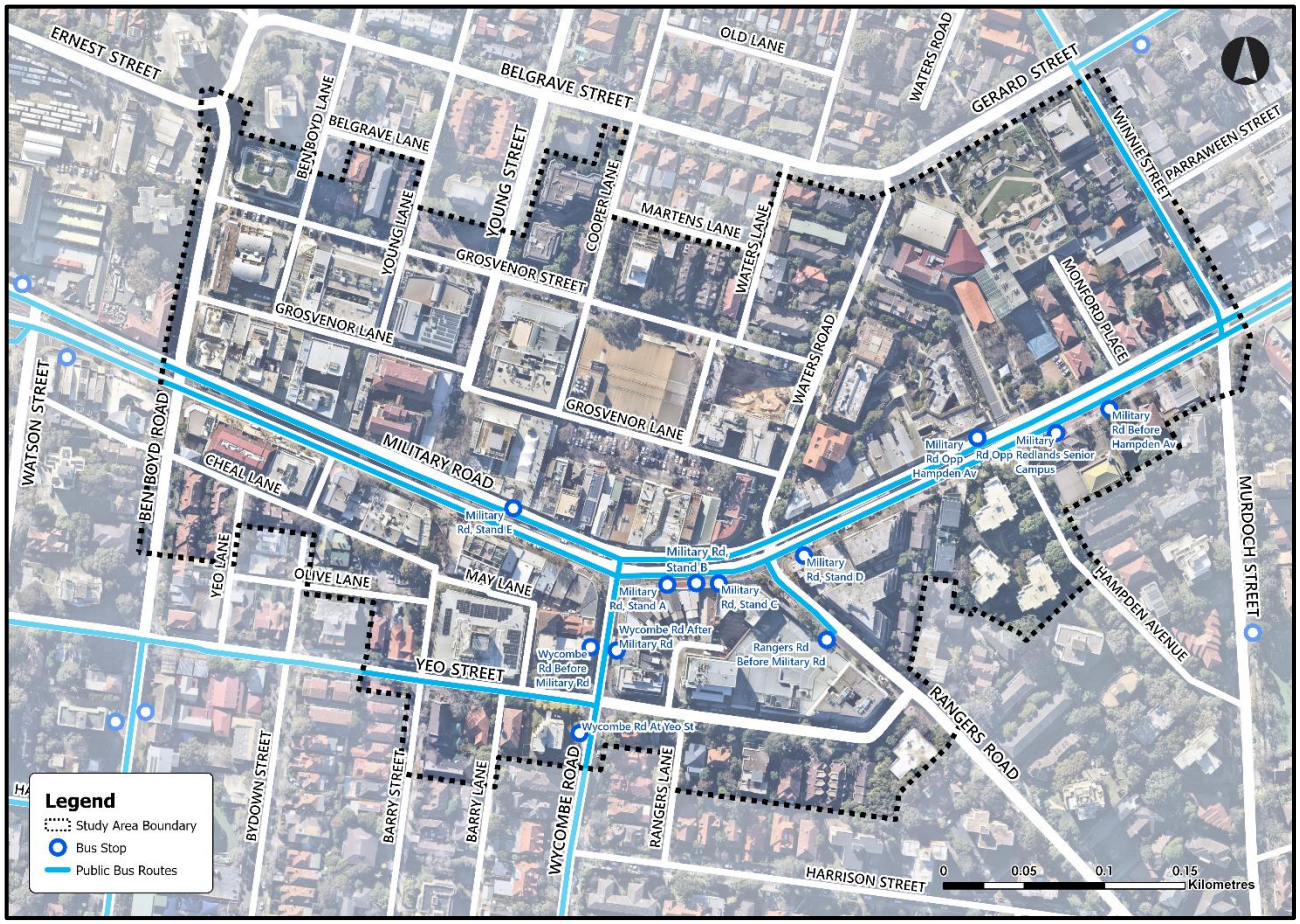


Figure 3.14: Existing Bus Network through the Study Area

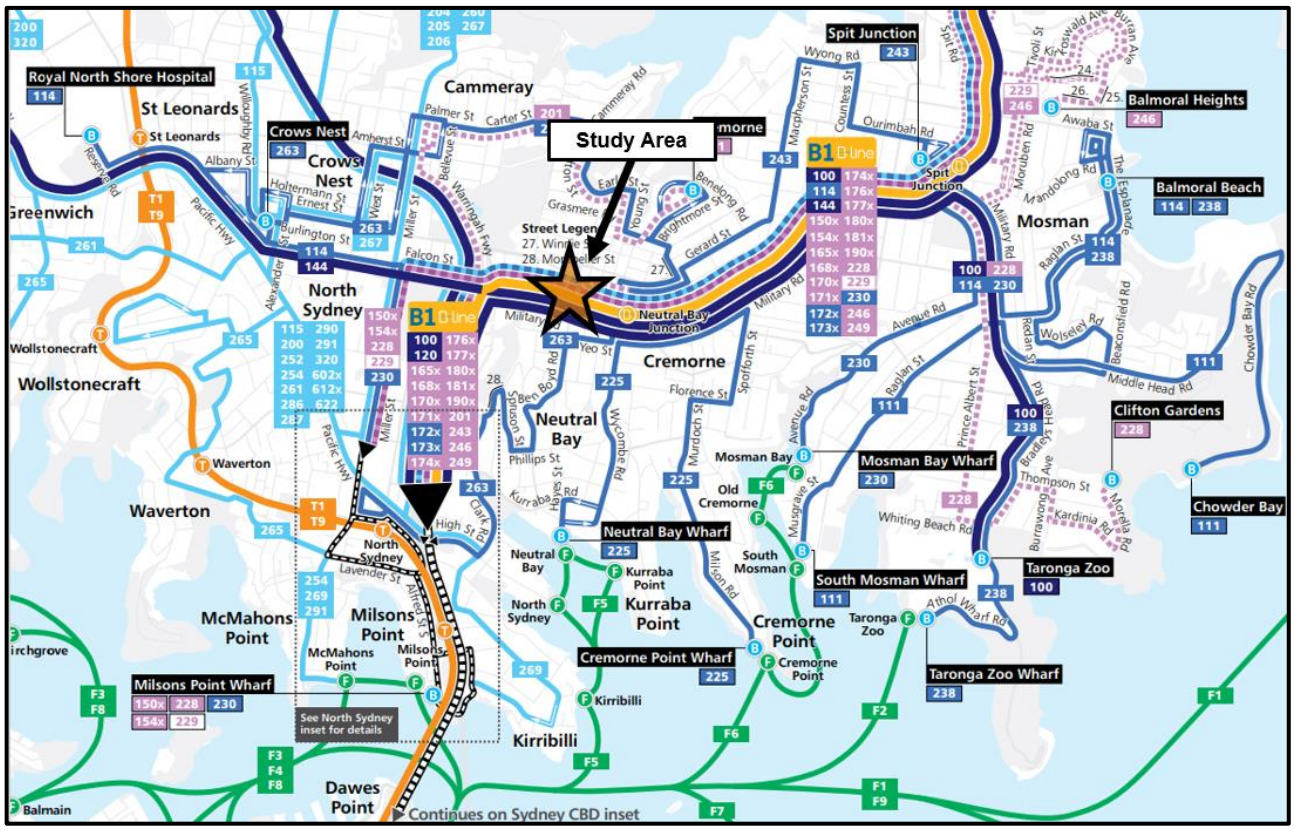


Figure 3.15: Bus network map[7]

Table 3.1: Bus Services within the Study Area

Route No.	Route Description	Frequency on / off-peak
B1	B-Line: City Wynyard to Mona Vale	6-10 mins / 15 mins
BN1	B-Line: City QVB to Mona Vale (Night Service)	-
100	Taronga Zoo to City QVB (Loop Service)	5 mins / 10 mins
114	Royal North Shore Hospital to Balmoral	10 mins / 15 mins
144	Chatswood to Manly via St Leonards	10 mins (on and off peak, and weekdays only)
144N	North Sydney to Manly (Night Service)	-
150X	Milsons Point to Manly (Express Service)	20 mins (weekday peak hours)
154X	Milsons Point to Dee Why (Express Service)	5 mins / 10 mins (weekdays only)
165X	City Wynyard to South Curl Curl (Express Service)	6-15 mins / 20 mins (weekdays only)
168X	City Wynyard to Balgowlah via North Balgowlah (Express Service)	20 mins (on and off peak, and weekdays only)
170X	City Wynyard to Manly (Express Service)	10-20 mins (weekday peak hours)
171X	City Wynyard to Balgowlah via Clontarf (Express Service)	30-40 mins (on and off-peak, weekdays only)
172X	City Wynyard to Warringah Mall via North Balgowlah (Express Service)	10-20 mins /60 mins
173X	City Wynyard to Warringah Mall via Balgowlah Shops (Express Service)	20 mins (on and off-peak)
174X	City Wynyard to Narraweena (Express Service)	20 mins (weekday peak hours)
176X	City Wynyard to Dee Why via North Curl Curl (Express Service)	10-20 mins (weekday peak hours)
177X	City Wynyard to Dee Why via Wingala (Express Service)	10-20 mins (weekday peak hours)
180X	City Wynyard to Collaroy Plateau (Express Service)	10-20 mins (weekday peak hours)
181X	City Wynyard to Narrabeen (Express Service)	12-20 mins (weekday peak hours)
190X	City Wynyard to Avalon Beach (Express Service)	12-20 mins (weekday peak hours)
225	Cremorne Point Wharf to Neutral Bay Wharf	20 mins / 30 mins
263	Crows Nest to City Bridge St via Cremorne	15 mins / 30 mins
228	Milsons Point to Clifton Gardens	Limited services during weekday peak hours
229	Milsons Point to Beauty Point via Balmoral Heights	One AM service / 60 mins (weekdays only)
230	Milsons Point to Mosman Wharf via North Sydney	8-15 mins / 30 mins
243	City Wynyard to Spit Junction via North Cremorne	25-40mins / 40 mins
246	City Wynyard to Balmoral Heights	5-15mins (weekday peak hours only)

249	City Wynyard to Beauty Point	Limited services during weekday peak hours

Figure 3.16 and Figure 3.17 indicate the service frequencies of the bus network and stops within the study area during the morning peak (7:00am to 9:00am) and the afternoon peak (4:00pm to 6:00pm) respectively. As shown, the majority of bus routes within the Town Centre utilises Military Road with the heaviest concentrations of buses along the southern extent of Military Road between Wycombe Road and Rangers Road during the morning peak hours.

At that section, during the morning peak, there is a total of 228 bus services over a two hour period. This equates to approximately 1.9 bus services per minute. A large number of these services travel to the Sydney CBD.

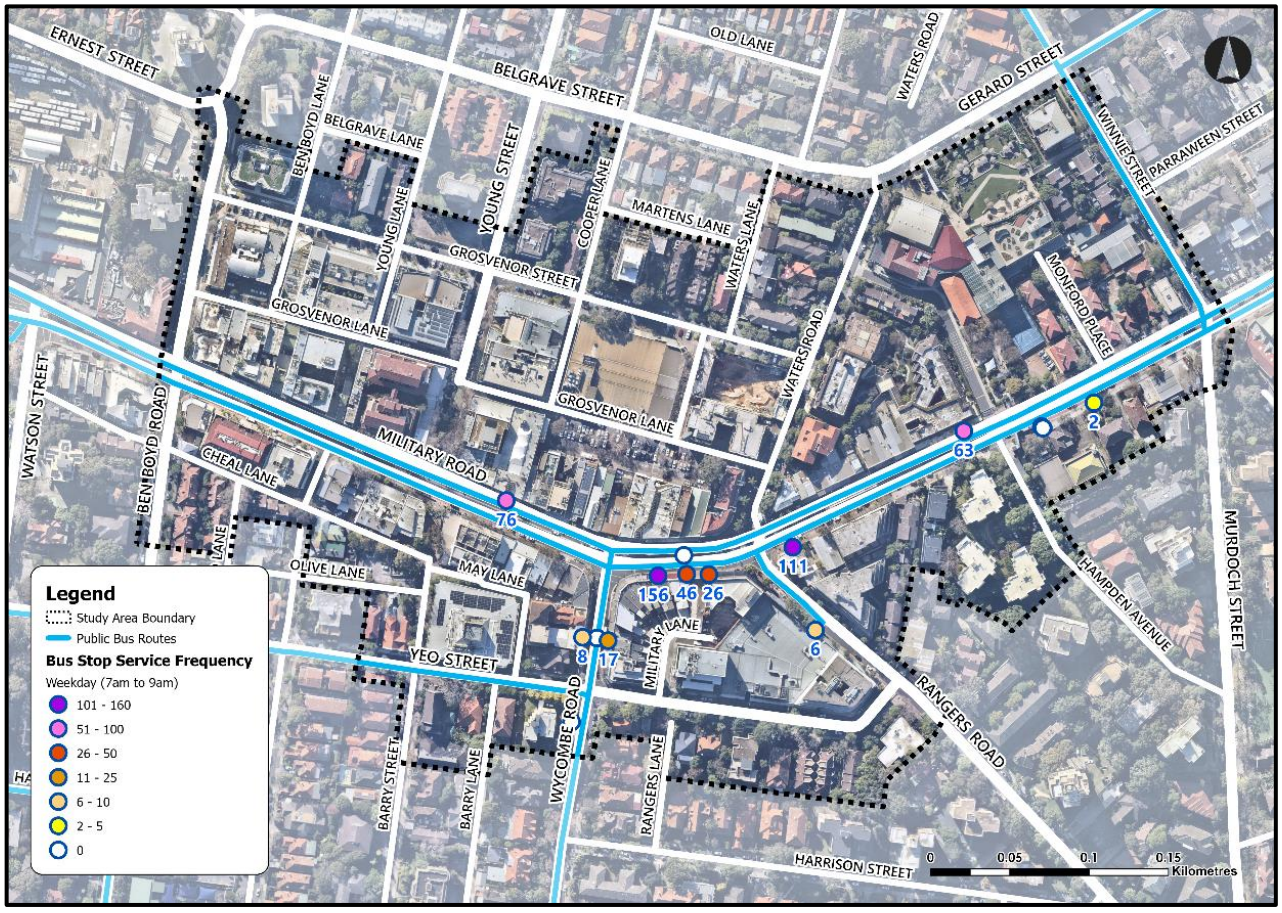


Figure 3.16: Weekday Bus Services Frequency at Bus Stops (AM Peak)

Figure 3.17: Weekday Bus Services Frequency at Bus Stops (PM Peak)

3.3.2 Train

North Sydney Station is the closest train station to Neutral Bay Town Centre, located approximately 2.5km to the south-west. North Sydney Station is situated on the T1 North Shore & Western Line and T9 Northern Line, providing access to the Harbour CBD, Strathfield and North Shore suburbs. From Monday to Friday, the T1 Line provides services every 5 to 10 minutes, while the T9 Lines provides services every 15 minutes. Direct bus feeder services connecting Neutral Bay Junction and North Sydney include Route 230, 229, 263 and 154x, with a service frequency of 5 to 10 mins.

3.3.3 Ferry

Neutral Bay Ferry Wharf is the closest ferry wharf to Neutral Bay Town Centre and is located approximately 1.4 km to the south. The wharf is about a 15 to 20 minute walk (depending on direction due to steepness) and about an eight to ten minute bus ride (during peak hour) via Route 225 which operates at a frequency of 30 minutes. As shown in Figure 3.14, the wharf is serviced by F5 Neutral Bay to Circular Quay Ferry Route.

3.3.4 Public Transport Accessibility

Public Transport Accessibility (PTAL) is a measure of public transport that determines how well-connected an area is. PTAL values are categorised from one to six, representing low to high accessibility. When measuring PTAL, an area with high accessibility will be within a short distance of a station or stop, have short waiting times, frequent services, and be close to a major rail station. For both the AM (08:00 – 09:00) and PM (17:00 – 18:00) peaks, the entire study area is classified as having PTAL level 6 (very high).

3.4 Road Network

3.4.1 Hierarchy

Key roads within the Neutral Bay Town Centre are described in Table 3.2 and shown in Figure 3.18 below.

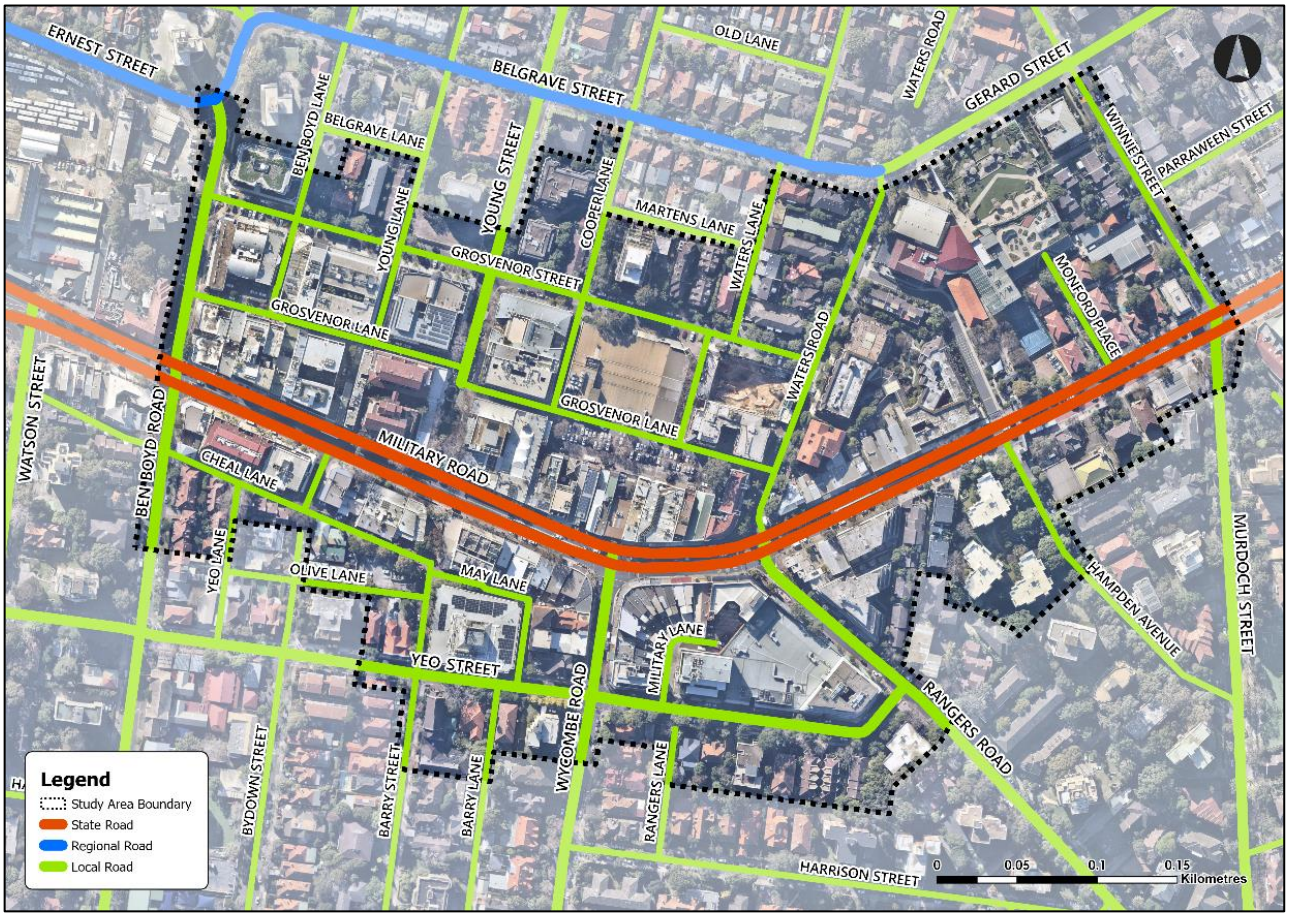


Figure 3.18: Road Network within and surrounding the Study Area

Table 3.2: Key Roads in Neutral Bay Town Centre

Road Name	Road Classification	Details
Military Road	State	Military Road is a primary arterial road through the Neutral Bay Town Centre and functions as the main movement corridor for regional traffic between Northern Beaches and North Sydney, and further to Sydney, providing connection to the Warringah Freeway and Falcon Street to the west. Being the main commercial boulevard for the Town Centre with a long stretch of active shop frontage on both sides of the road, it provides dual movement and place functions. It is aligned in an east-west direction and is a two-way road configured with three lanes in each direction, with dedicated bus lanes along segments of the corridor. Within the town centre, the road is subject to a 60 km/h speed limit. Kerbside parking is permitted outside the clearway and bus lane hours, and subject to time restrictions.
Belgrave Street	Regional	Belgrave Street is a regional collector road with an east-west alignment and located north of the study area. It provides an alternative access to Warringah Freeway via Ernest Street. It is a two-way road configured with two lanes in each direction. The road is subject to a 50 km/h speed limit. Outside of clearway hours, parking is permitted at kerbside traffic lane on each side.

Ben Boyd Road	Local	Ben Boyd Road is a local collector road that runs in a north to south alignment along the western boundary of the study area. It connects to Military Road and extends to Cremorne at Grasmere Lane. It generally has one traffic lane in each direction with restricted kerbside parking.
Waters Road	Local	Waters Road is a local collector road that extends between Military Road and Belgrave Street. A school zone applies to the segment between Grosvenor Street and Belgrave Street. It has one lane of traffic in each direction with restricted kerbside parking,
Young Street	Local	Young Street is a local access road connecting Grosvenor Lane and Grosvenor Street to Belgrave Street and further north to the residential areas in Cremorne. Within the study area, it generally has one lane of traffic in each direction with restricted kerbside parking. At the Town Centre, several on-street angled parking spaces are idented off the carriageway.
Grosvenor Street	Local	Grosvenor Street is a local access road that is aligned in an east-west direction with shop frontage along the southern side of the street. It is a two-way road configured with one lane in each direction, extending between Ben Boyd Road and Waters Road. A combination of right-angled parking and time-restricted parallel parking is provided on-street. It also provides access to the Woolworths Neutral Bay off-street carpark.
Grosvenor Lane	Local	Grosvenor Lane is a local access road with an east-west alignment. It is a one-way eastbound road and classified as a shared zone along its full length between Ben Boyd Road and Waters Road with 10 km/h speed zoning. Between Cooper Lane and Waters Lane, the street operates as a circulation road for an at-grade car park. Parallel / angled parking spaces are indented off the carriageway.
Yeo Street	Local	Yeo Street is a local collector road with an east-west alignment and runs along the southern boundary of the study area. It provides access to the Woolworths Neutral Bay Village off-street carpark and also serves as an alternative route to Warringah Freeway via Alfred Street North. It is a two-way road configured with one lane of traffic and restricted kerbside parking in each direction. Between Freshwater Lane and Watson Street, an eastbound on-road bicycle shoulder lane is provided between the kerbside parking lane and the traffic lane. A school zone applies to the segment between Ben Boyd Road and Bydown Street.
Wycombe Road	Local	Wycombe Road is a local collector road that is aligned in a north-south direction. It provides a connection between Military Road and Yeo Street, as well as the residential areas to the south. With the study area, it has two traffic lanes in the northbound direction and one traffic lane with restricted kerbside parking in the southbound direction.
Rangers Road	Local	Rangers Road is a local collector road that connects to Military Road from the south. It provides access to Yeo Street and functions as an east-west link between residential areas of Neutral Bay and Cremorne south of the Military Road corridor. A school zone applies to the segment between Grosvenor Street and Belgrave Street. Within the study area, it has one lane of traffic in each direction with restricted kerbside parking.

3.5 Parking

A map of public and private parking facilities within the Neutral Bay Town Centre is shown below in Figure 3.19.

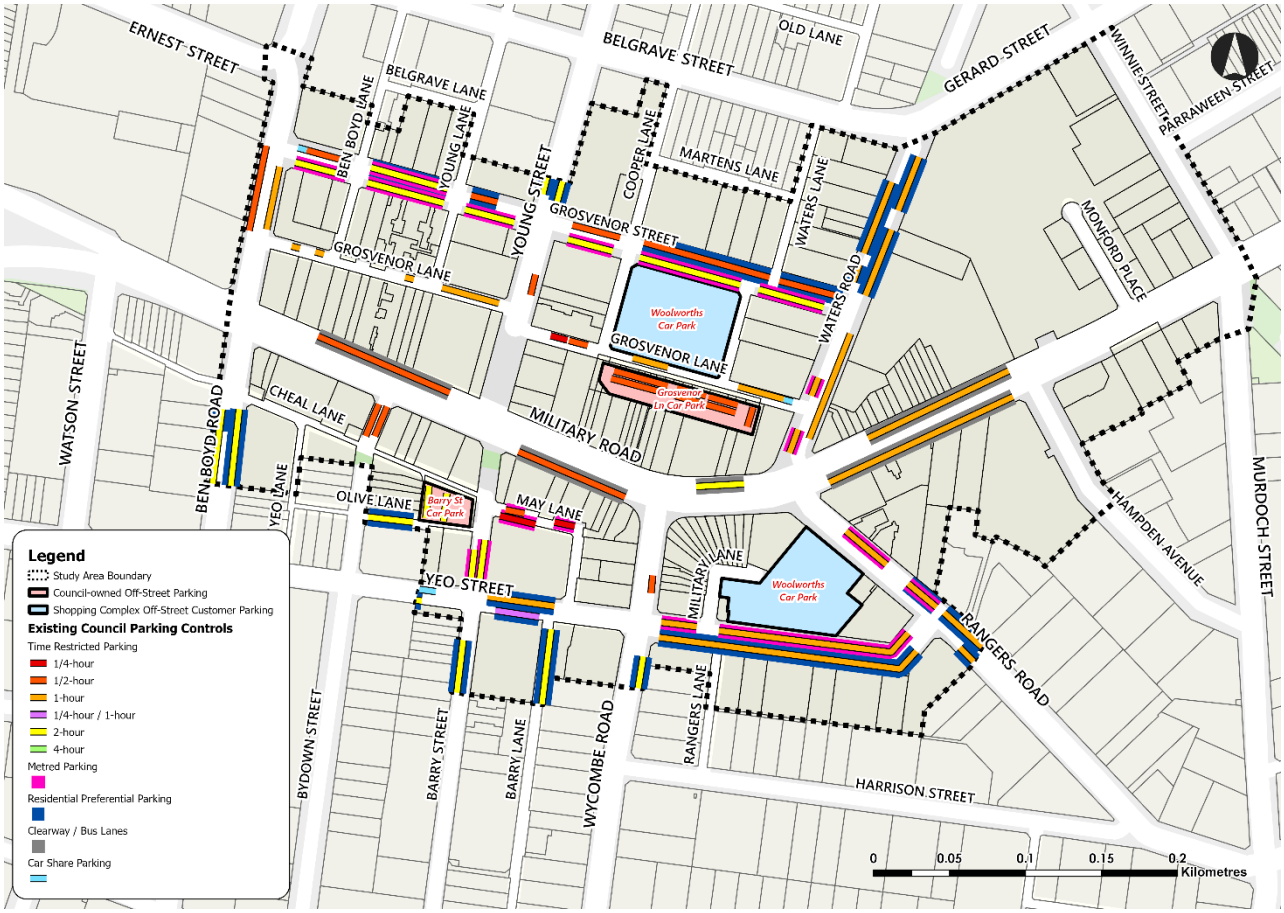


Figure 3.19: Public and Private Parking Facilities within the study area

On-street parking is generally available on most of the local roads, and on the kerbside lanes at certain sections of Military Road, outside clearway and bus lane hours. Current parking controls include a mixture of time restriction parking, metered parking and residential preferential parking. On-street accessible parking and car sharing bays (up to 4 spaces) are also provided within the study area.

Apart from the on-street parking and council-owned carparks at Grosvenor Lane and Barry Street, there are currently two Woolworths shopping complexes within the town centre which provides secure car parking facilities for customers.

3.6 Data Collection

For this Transport Study, intersection turning movement surveys and parking occupancy surveys were undertaken at key locations as discussed with Council. Details of these surveys are outlined in Section 3.6.1 and 3.6.2.

3.6.1 Intersection Turning Movement Surveys

15-minute classified intersection turning movement surveys were carried out on Wednesday, 28th June 2023. For this study, three (3) intersections within the study area were surveyed and the locations are shown in Figure 3.20. The counts included cars, heavy vehicles, buses and pedestrians.

An intersection turning movement survey was also undertaken for Council (commissioned by Stantec) for a different study on Wednesday, 20th July 2022 and Saturday, 23rd July 2022, with data from that survey and study being used in this Transport Study. The locations of the previously surveyed intersection are also shown in Figure 3.20.

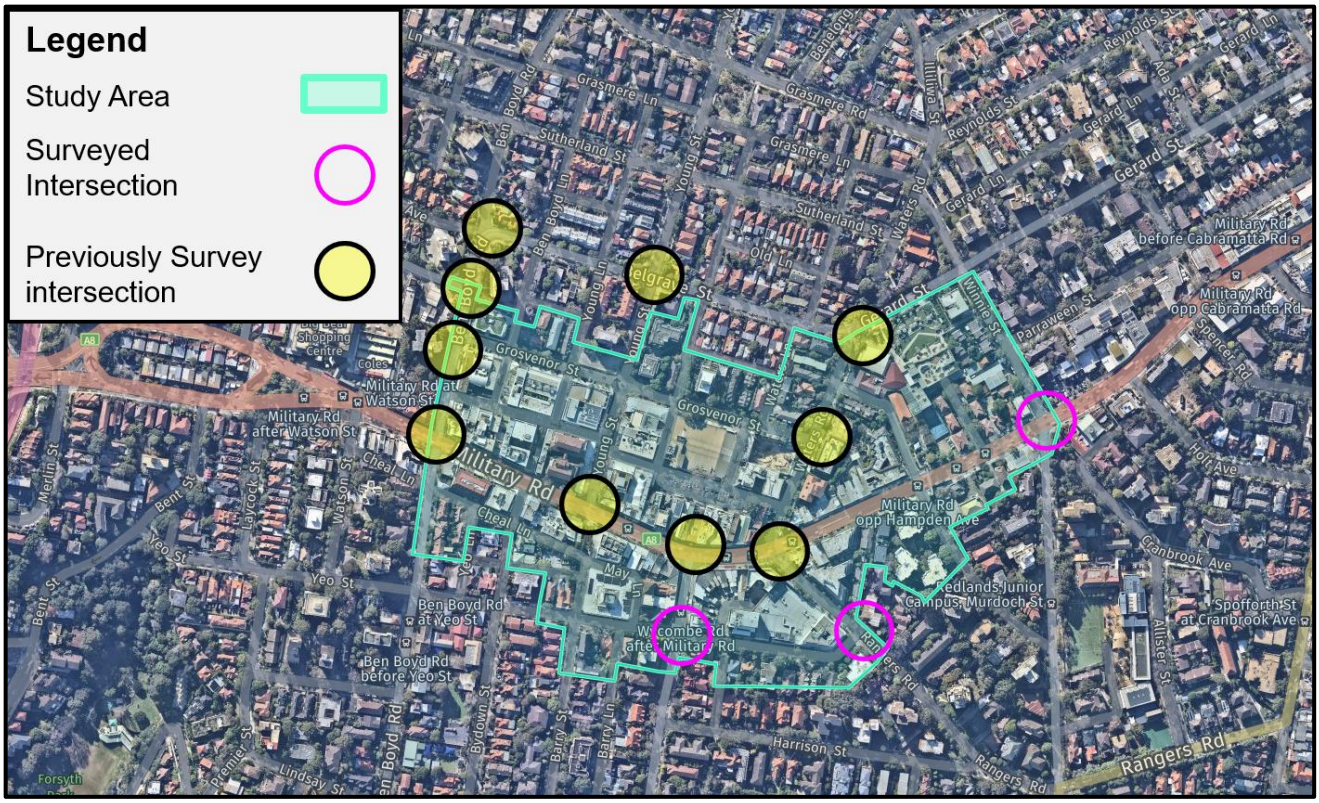


Figure 3.20: Surveyed Intersections

The recent survey counts included cars, heavy vehicles, buses and pedestrians, and covered the following time periods:

- AM Weekday Peak Period: 7:00 to 10:00
- PM Weekday Peak Period: 15:30 to 18:30

A comparison of the 2022 survey results and the recent survey results shows that, in terms of traffic volumes along Military Road, the data from both surveys are relatively consistent and suitable for use in this study. The traffic volumes for Military Road during the PM peak are shown in Figure 3.21

Figure 3.21: Traffic Volumes along Military Road (PM Peak)

As shown in Table 3.3, survey results indicate that peak periods for each intersection vary. The full survey results are provided in **Appendix A**.

Table 3.3: Peak periods of intersections (Weekday)

Intersection	AM Peak hour	PM Peak Hour
Military Road / Ben Boyd Road	07:15 to 08:15	16:45 to 17:45
Military Road / Young Street	07:15 to 08:15	16:45 to 17:45
Military Road / Wycombe Road	07:15 to 08:15	16:45 to 17:45
Military Road / Rangers Road	07:15 to 08:15	16:30 to 17:30
Military Road / Winnie Street / Murdoch Street	07:30 to 08:30	17:00 to 18:00
Rangers Road / Yeo Street	08:30 to 09:30	17:00 to 18:00
Yeo Street / Wycombe Road	08:30 to 09:30	16:45 to 17:45

3.6.2 Parking Occupancy Survey

A parking occupancy survey was also carried out on Wednesday, 28th June 2023 and Saturday, 1st July 2023. The parking occupancy survey was undertaken for the areas as shown in Figure 3.22, and covered the following time periods:

- Weekday (Wednesday): 07:00 to 19:00 (12 hours)
- Weekend (Saturday): 08:00 to 14:00 (6 hours)

The full survey results are provided in **Appendix B**.

Figure 3.22: Surveyed locations for parking

Based on the results from the parking survey, the identified peak periods are as follows:

- Weekday (Wednesday): 12:00 to 13:00
- Weekend (Saturday): 13:00 to 14:00

Summaries of parking occupancy during the respective peak periods are illustrated from Figure 3.23 to Figure 3.25.

Figure 3.23: Summary of parking occupancy during the weekday peak period

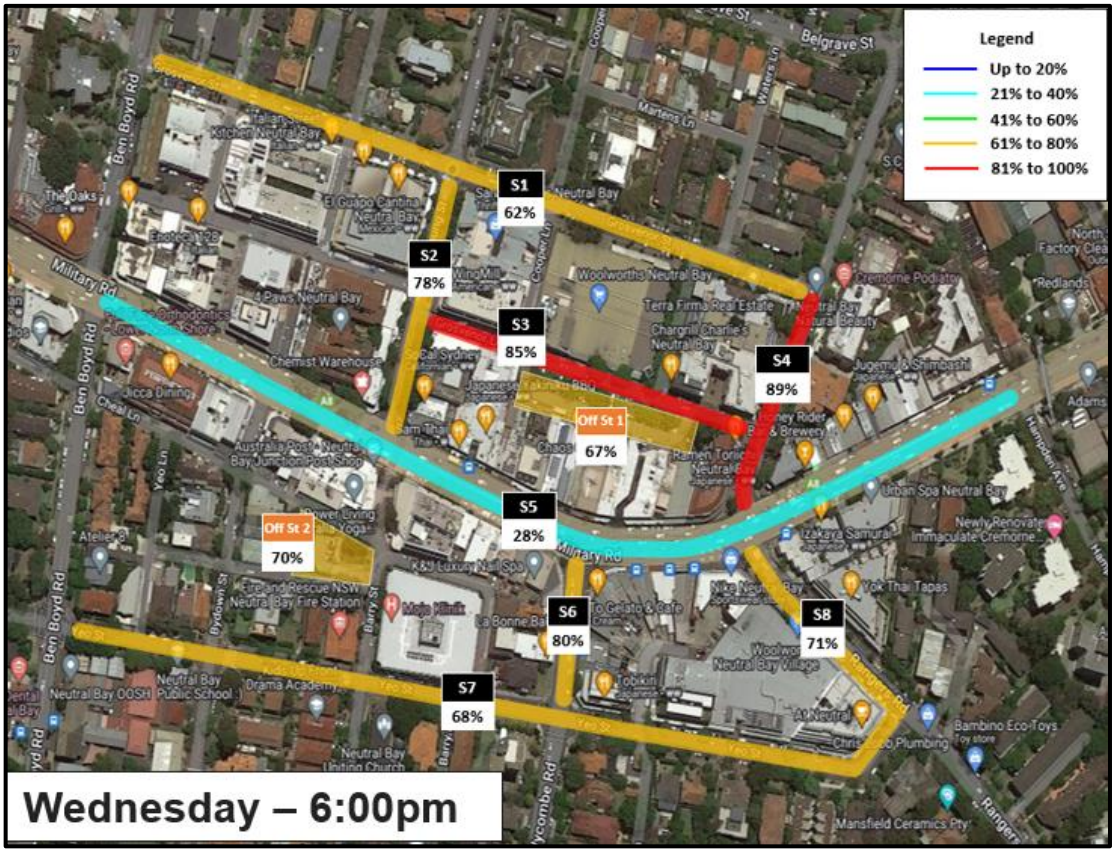


Figure 3.24: Summary of parking occupancy during the typical evening peak period

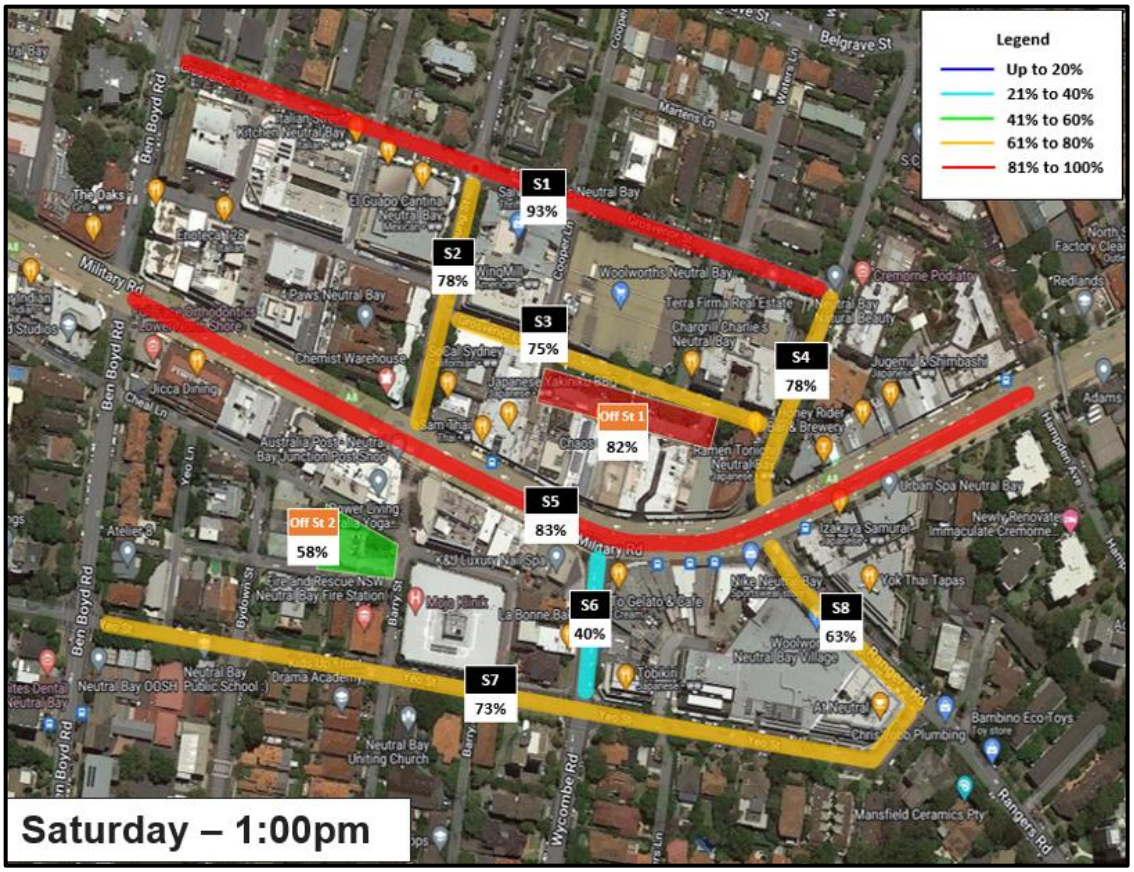


Figure 3.25: Summary of parking occupancy during the weekend peak period

Table 3.4 shows the summary of parking occupancy results of the surveyed locations during the respective peak periods.

Table 3.4: Parking Occupancy during peak periods

	Weekday Peak (12pm)	Weekday evening peak (6pm)	Weekend Peak (1pm)
Total	329 / 465 (71%)	288 / 465 (62%)	392 / 489 (80%)
North of Military Road	227 / 282 (81%)	168 / 282 (60%)	266 / 306 (87%)
South of Military Road	102 / 183 (56%)	120 / 183 (66%)	126 / 183 (69%)

The following can also be observed from the parking survey results:

- During the 12-hour window on Wednesday:
  - The peak parking period is between 12:00pm to 1:00pm at 71% occupancy, with the northern half of the study area having a significantly higher occupancy than the southern half (227 occupied versus 102 occupied).
  - Overall parking occupancy decreases after 1pm but picks up again in the evening at 6pm at 62% occupancy. In the evening, the number of occupied spaces at the northern half decreases (by 49), while the number of occupied spaces at the southern half increases (by 18).
  - Off-street car park 1 (Grosvenor Lane Carpark – 87 spaces) averages about 73% occupancy between 7:00am to 6:00pm, with peak periods of 83% between 11:00am to 2:00pm.
  - Off-street car park 2 (Barry Street Carpark – 33 spaces) has an average occupancy of 84% between 7:00am to 6:00pm, with peak periods between 9:00am to 2:00pm. At 6:00pm, the occupancy at this car park is at its lowest during the surveyed periods at 70%.
- Between 8:00am to 2:00pm on Saturday:

- The peak parking period is between 1:00pm to 2:00pm at 80% occupancy, with the northern half of the study area having a significantly higher occupancy than the southern half (226 occupied versus 126 occupied). In particular, parking at Grosvernor Street picked up significantly to being 93% occupied. This is likely due to the restaurants along Grosvernor Street attracting visitors during the typical lunch hour.
- Off-street car park 1 averages about 77% occupancy, with parking occupancy fluctuating between 82% to 86% between 10:00 am to 2:00pm.
- Off-street car park 2 averages about 62% occupancy. The parking occupancy increases to about 79% at 10:00am, before decreasing to about 58% during the typical lunch hour.

In general, the northern half of Military Road has more dining options than the southern half of Military Road. People would typically combine their weekend shopping trips with their lunch. Thus, the variance between the parking occupancy of each half of the study area during the typical lunch hours is expected.

In summary, there are currently sufficient car parking within the study area, regardless of if it's the northern half or southern half. During peak parking periods, there are locations where the car park / streets can have high parking occupancy percentage, however the results indicates that there will ultimately be sufficient parking for visitors.

3.7 Road Safety

A search of the Road Safety Crash and Casualty Statistics Portal has been undertaken for the most recent five period 2017 to 2021 inclusive. The crash statistics are confined to crashes that conform to the national guidelines for reporting and classifying road vehicle crashes. The guidelines include crashes that meet all of these criteria:

There was a total of 65 crashes identified within the study area over the five-year period from 2017 to 2021, with majority of the crashes (78%) occurred along Military Road and 14% of these crashes involved active transport users (Pedestrians and cyclists). The location of all the crashes are shown in Figure 3.26. A summary of the crash analysis (in terms of injury severity) is as follows:

- 13 crashes resulted in serious injuries. 11 of these crashes occurred along Military Road, with three crashes involving pedestrians and one crash involving a cyclist.
- 12 crashes resulted in moderate injuries. 11 of these crashes occurred along Military Road, with two crashes involving pedestrians and one crash involving a cyclist.
- 22 crashes resulted in minor/other injuries. 18 of these crashes occurred along Military Road.

In the context of road safety, a serious injury is defined as a person injured in a road crash who needed to be admitted to hospital and who didn't die within 30 days of the crash. Regardless, based on the crashes identified from 2017 to 2021, no distinct trends have been observed within this area.

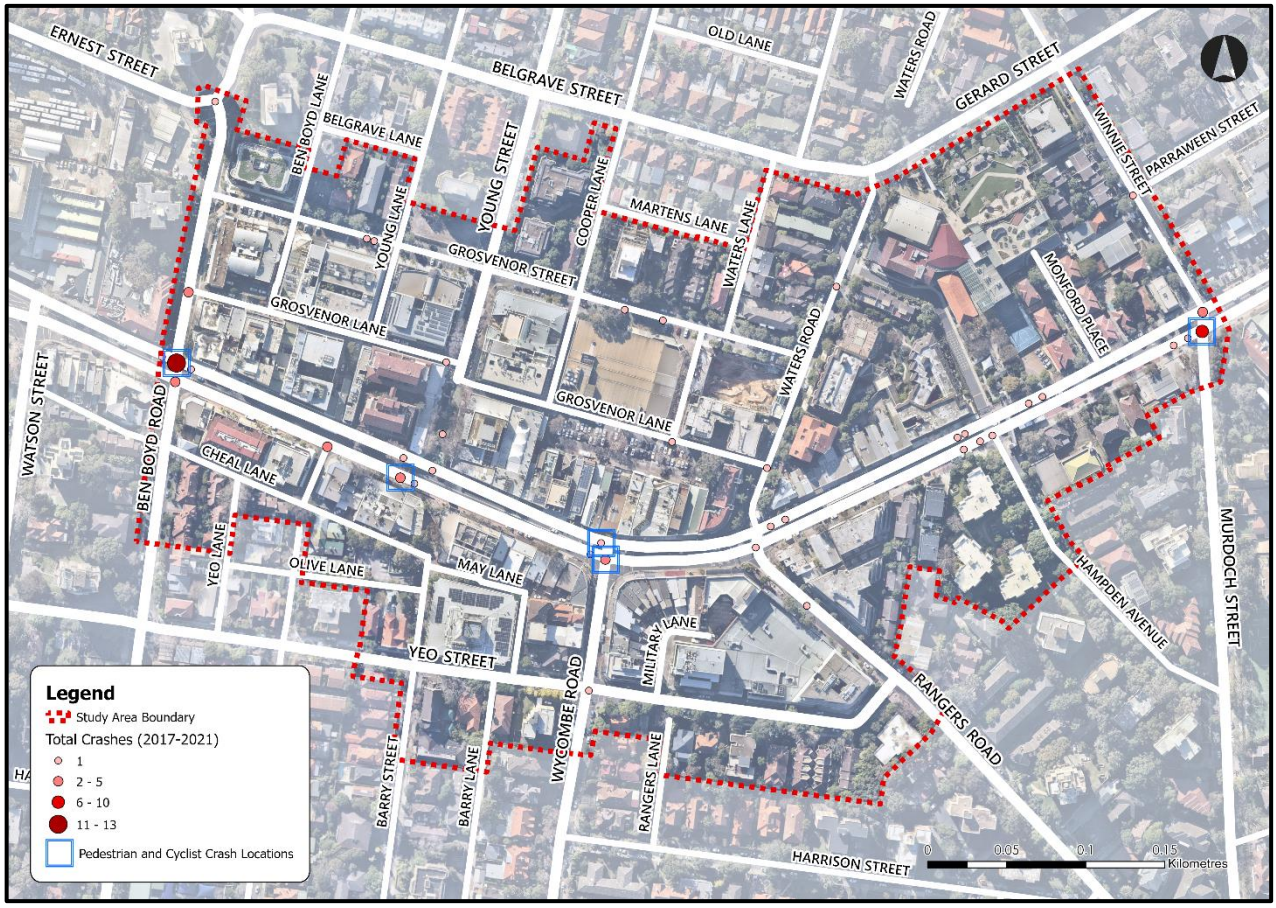


Figure 3.26: Crash Locations[8]

[8] Source: https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/nsw.html?tabnsw=7

3.8 Summary of Existing Conditions

From the review of the relevant planning strategies, development proposal plans, existing conditions and data collection, in conjunction with an appreciation of the issues and concerns identified from the earlier studies, transport evidence for Neutral Bay Town Centre has been developed for this Transport Study. This will assist in the development of informed recommendations and strategies for the public domain options to achieve the study objectives of Neutral Bay Town Centre Planning Study.

Table 3.5: Summary of review

Key concerns identified from earlier studies	Existing Conditions - Summary
• Traffic congestion around Grosvenor Lane car park and Yeo Street. • Rat-running along local streets and the lack of traffic calming measures impacts pedestrian safety and experience. • Concerns over the quality of walking infrastructure along local streets. • General concerns regarding parking such as inadequate parking restrictions and parking arrangements at certain locations • Traffic and parking issues identified around schools (Redland Campus) during pick-up/drop-off periods.	• Only 23% of workers who worked in Neutral Bay, lived in Neutral Bay. The other 77% live outside the area. Out of these 77%, majority of them travel to work by private vehicle. On the other hand, only 16% of the residents who live in Neutral Bay works in the area, the rest travel out to work, with majority also by private vehicle. This suggests an opportunity to improve trip containment and minimise inbound and outbound vehicular trips within the study area. • Other than a footbridge, there is currently no crossing opportunity along Military Road between its intersection with Winnie Street and Wycombe Road, potentially limiting the north-south permeability for the eastern half of the study area. Regardless, the overall walking infrastructure within the study area is considered to be relatively well-formed. • There is currently a lack of dedicated cycling infrastructure within the study area. Cyclists will be required to share the road space with motor vehicles. • There is no train station within the vicinity of the study area, however the study area is relatively well served by a considerable number of express and limited stop buses (including the B-Line services and other express bus routes) that carry the passengers to the surrounding suburbs, key destinations and Sydney CBD. • From the parking survey results, there are currently sufficient car parking within the study area, as the overall peak parking occupancy for the study area is at around 80%. In general, based on average parking occupancy, the off-street car parks are relatively well utilised (other than the off-street car park 2 on a weekend). • Based on the crash analysis, 13 out of 65 crashes resulted in serious injuries, with 11 of these occurring along Military road. All the crashes identified within the study area, that involved pedestrians and cyclists occurred along Military Road.

4. Proposed Growth Scenario and Draft Public Domain Option

4.1 Proposed Growth Scenario

As part of the planning study to amend the existing LEP controls, a growth scenario proposed by Council has been assessed in this Transport Study. The Growth Scenario will essentially create a shift between the non-residential land uses, re-adjusting the proportion of the various land uses within the study area. Key sites and future development sites as part of this Growth Scenario have been identified, with the locations shown in Figure 4.1.

Figure 4.1: Key sites and future redevelopment Site (Growth Scenario)

Table 4.1 outlines the proposed yields for future key and development sites within the Growth Scenario. The land uses within the Growth Scenario predominantly consist of residential, retail and commercial land uses and have been used for the purpose of this assessment.

Table 4.1: Proposed yields for key and future development sites

	Site	Residential (units)	Commercial GFA (m^2)	Retail GFA (m^2)
Key sites	1	86	2,464	3,913
	2A	50	2,327	960
	2B	39	2,094	757
	3A	18	1,524	419
	3B	84	2,210	4,228
Other sites	4	24	1,005	596
	5	23	1,085	638
	6	43	1,567	922

	7	47	1,954	1,150
	8	5	0	125
	9	47	1,977	1,163
	10	38	1,737	1,022
	11	56	2,168	1,275
	12	12	507	298
	13	7	337	198
	14	21	871	513
	15	16	0	397
	16	9	0	210
	17A	17	688	405
	17B	25	975	574
	18	8	0	197
	19A	15	0	390
	19B	7	0	173
	20A	6	455	268
	20B	8	696	410
	20C	15	811	477
	21	18	693	408
Total		**744**	**28,145**	**22,086**

4.2 Comparison of Growth Scenario with existing scenario and existing LEP controls

Table 4.2 and Table 4.3 outline the comparisons between the Growth Scenario with existing LEP controls and existing land uses. A summary of the comparisons is as follows:

- From comparison 1, the overall non-residential GFAs is expected to increase by about 174% in the Growth scenario, with a relatively minor decrease in the number of residential units expected.
- From comparison 2, the overall non-residential GFAs remains unchanged with a negligible decrease by about 0.5% In the Growth Scenario, the retail GFA is expected to decrease by about 33% while commercial GFA is expected to increase by about 60%. There will be a relatively significant increase in the number of residential units, by about 684 units.

Even though the Neutral Bay Town Centre Planning Study recommends to amend the existing LEP controls, to effectively assess the transport implications of the Growth Scenario to the existing road network, it is only considered appropriate to use the comparisons / variance outlined in Table 4.3 be used for further analysis (on the basis that the existing traffic conditions best reflects the implications from the existing land uses).

Table 4.2: Comparison 1 – Growth Scenario with existing LEP controls

	Existing LEP control (units / m^2 GFA)	Growth Scenario (units / m^2 GFA)	Variance (units / m2 GFA)
Residential	775	744	- 31
Commercial	10,274	28,145	17,871 (174%)
Retail	10,274	22,086	11,812 (115%)

Table 4.3: Comparison 2 – Growth Scenario with existing scenario

	Existing Scenario (units / m^2 GFA)	Growth Scenario (units / m^2 GFA)	Variance (units / m^2 GFA)
Residential	60	744	684
Commercial	17,599	28,145	10,546 (60%)
Retail	32,884	22,086	- 10,798 (33%)

4.3 Public domain upgrades

As part of the study, the following public domain options and upgrades have also been proposed:

4.3.1 Grosvenor Lane Plaza

In addition to the development of key sites 1 and 2 (detailed in Section 2.3), Grosvenor Lane Plaza is expected to be redeveloped into a fully pedestrianised plaza and is illustrated in Figure 4.2. A summary of the proposed upgrades is as follows:

- New public park space for gathering, community events and other activities, replacing the existing car park at Grosvenor Plaza. These parking spaces are expected to be reallocated within the underground carpark as part of Key Site 1 development.
- Grosvenor Lane will be closed to traffic between Cooper Lane and Waters Lane (considered in the traffic assessment of this study).
- Realignment of building setback to allow widening of existing footpaths including footpath spaces at bus zones.
- Secure undercover bike parking.
- Small public carpark off Grosvenor Lane.
- New vehicular access points for users of the site.

At the time of preparing this report, the public domain design is in the process of being finalised, with additional details to be provided in the Public Domain Concept Design report (prepared by SMM).

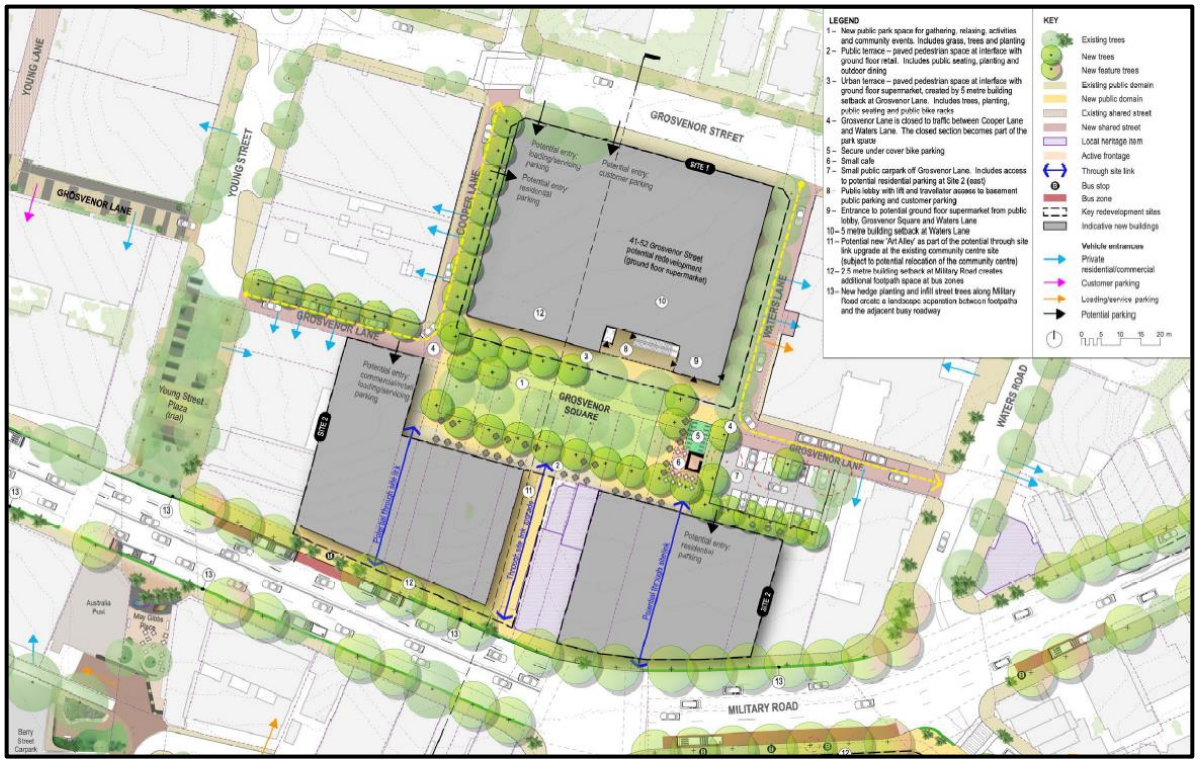


Figure 4.2: Grosvenor Plaza (Preferred Option - Draft)

As shown in Figure 4.3, the implementation of Grosvenor Lane Plaza will be delivered in stages, with the initial stage focused on developing the Coles site.

This prioritisation ensures that the existing local shops to the south of the plaza can preserve their parking and loading facilities, enabling them to continue operating seamlessly. This approach acknowledges the significance of maintaining a lively local business environment and meeting the needs of the surrounding community during the construction phase.

During Stage 1, restricted access will be permitted to service the existing local shops southern portion of the plaza. When Stage 2 is completed, the plaza will be fully pedestrianised, with service/loading facilities located underground at each development site.

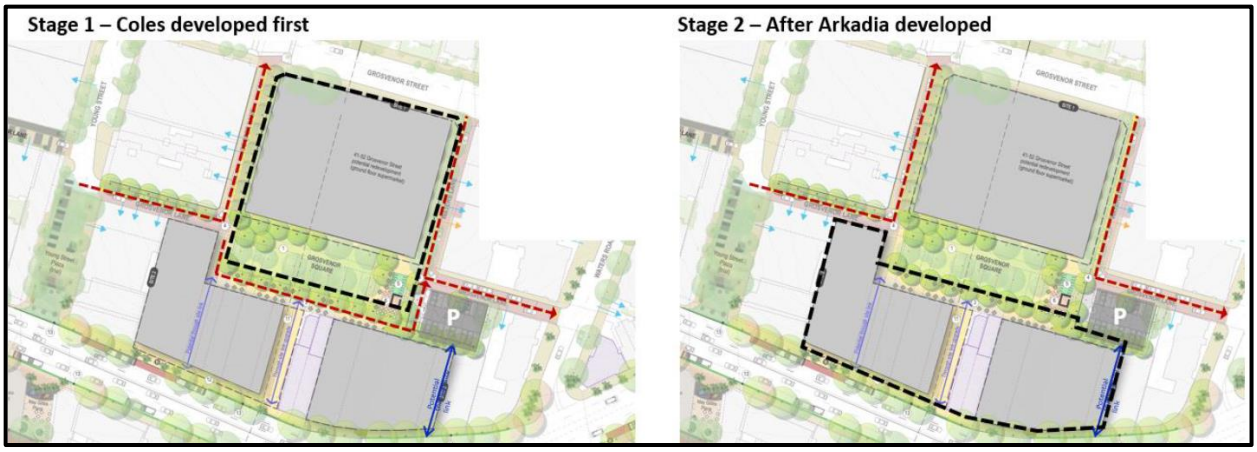


Figure 4.3: Stage Development of Grosvernor Lane Plaza (Indicative)

4.3.2 Rangers Road Plaza

In addition, the development of Key Site 3, Rangers Road Plaza, is also expected to be redeveloped. A summary of the proposed upgrades is as follows:

- 1000m^2 plaza area which also includes public seatings, outdoor dining and others.
- Through site link that connects Rangers Road Plaza to Yeo Street.
- Realignment of building setbacks to create direct visual and physical link between plaza and the northern half of the town centre, as well as creating additional footpath spaces at bus zones.
- Potential upgrade of Military Lane to a shared zone in the future.
- Potential new pedestrian crossing across Military Road (subject to further investigations).

The preferred option for Rangers Road Plaza is illustrated in Figure 4.4 below.

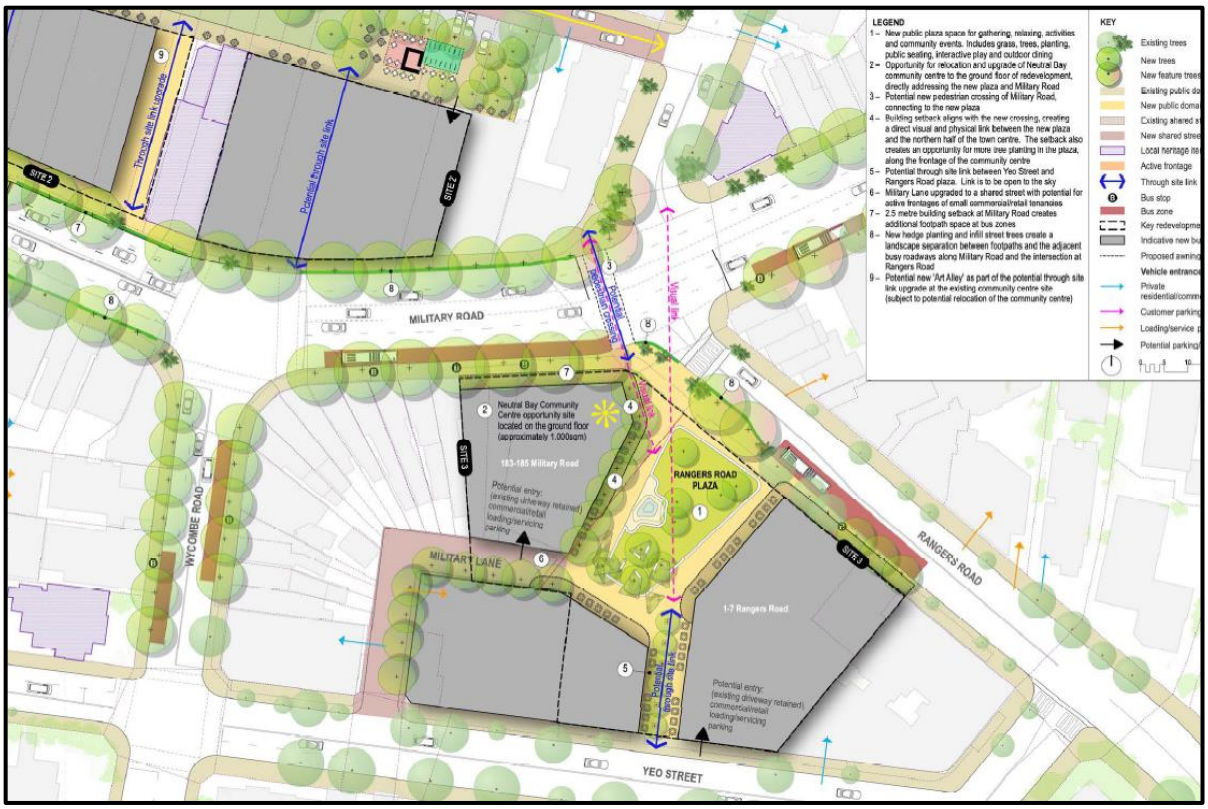


Figure 4.4: Rangers Road (Preferred option - Draft)

5. Parking Review and Recommendations

5.1 Policy Influences

As discussed earlier in this report, there are a number of local planning strategies and policies that will influence the development of the Neutral Bay Town Centre. These strategies will further influence the way in which car parking should be provided and managed within the centre. Council's current policy positions denotes the prioritisation of movement of people and goods by walking, cycling and public transport over private vehicle transport, and recognises the need to balance car ownership and the demand and supply of parking to minimise further growth in traffic and encourage mode shift to sustainable transport options.

5.2 Current North Sydney Council DCP Car Parking Rates

On 26 April 2023, North Sydney Council resolved to adopt an amendment to *Section 10 – Car Parking and Transport* within Part B of the DCP to include new provisions relating to car parking rates within areas identified as having high public transport accessibility, including parts of Crows Nest, St Leonards, North Sydney and Milsons Point. This amendment to the DCP came into effect on 04 May 2023.

The DCP also specifies car parking rates for all other mixed use zoned locations. These car parking rates apply maximum car parking rates. The current DCP parking rates for multi-dwelling housing, office premises and retail premises (shop/supermarket, restaurant) are listed in Table 5.1.

Table 5.1: North Sydney DCP Parking Rates (Maximum)

Locations	Residential	Retail Premises	Office Premises
Locations other than High Accessibility Areas and within B3 Commercial Core / B4 Mixed Use zone: **Neutral Bay**, **Cremorne**, **McMahons Point**	Residential flat buildings / Shop top housing: • 0.5 space per studio / 1 bedroom unit • 1 space per 2+ bedrooms unit • 1 motorcycle parking space per 10 car parking spaces • Zero provision for visitor parking	• **Food and drink premises** (excluding Pubs): 2 spaces per 100m^2 GFA • **Supermarkets**: 4 spaces per 100m^2 GFA • **For uses not listed**: 1.68 spaces per 100m^2 GFA	1.7 spaces per 100m^2 GFA
Locations other than High Accessibility Areas and within B1 Neighbourhood Centre Zone: **Cammeray**, **Waverton**	Residential flat buildings / Shop top housing: • 1 space per studio / 1-2 bedrooms unit • 1.5 space per 4+ bedrooms unit • 0.25 visitor space per unit (minimum of 1 space)	• **Food and drink premises** (excluding Pubs): 2 spaces per 100m2 GFA • **Supermarkets**: 4 spaces per 100m^2 GFA • **For uses not listed**: 1 space per 100m^2 GFA	1.7 spaces per 100m^2 GFA
High Accessibility Areas: **North Sydney**, **Milsons Point**, **St Leonards** and **Crows Nest**	Residential flat buildings / Shop top housing: • 0.3 space per studio • 0.4 space per 1 bedroom unit • 0.7 space per 2 bedrooms unit • 1 space per 3+ bedrooms unit • 1 motorcycle parking space per 10 car parking spaces	• 0.25 space per 100m^2 GFA	0.25 space per 100m^2 GFA

	• Zero provision for visitor parking		

These recently adopted car parking rates provide a key benchmark from which more specific rates for Neutral Bay can be considered.

The set of current DCP parking rates employed by North Sydney Council, which differ between areas within and outside of high public transport accessibility areas as outlined in Table 5.1, has created a spectrum within which Neutral Bay town centre must sit. To sit outside of these limits, this would compromise the validity and merits of the recently adopted parking requirements. This parking spectrum is further illustrated in Figure 5.1.

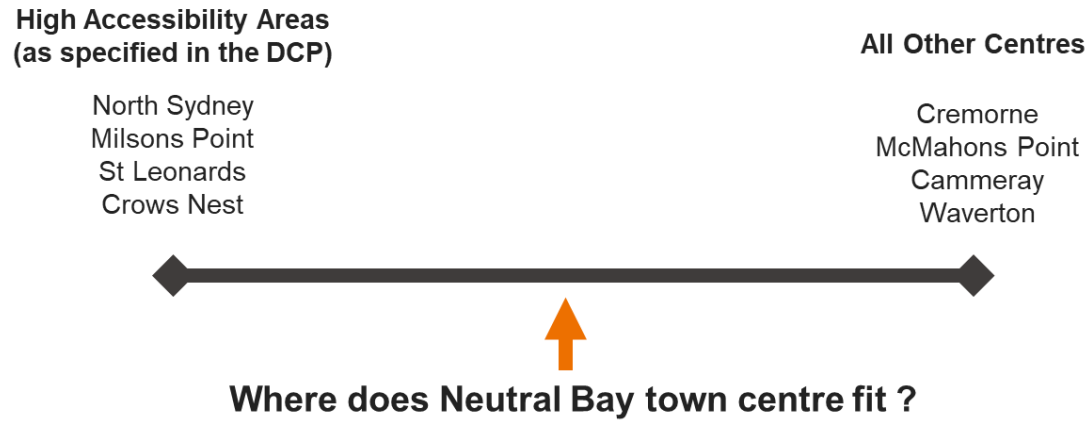


Figure 5.1: Parking Rate Spectrum

5.3 Benchmarking

The spectrum concept identified above provides a focus for the benchmarking of Neutral Bay against other centres.

The following analysis of demographic and travel behaviour data provides an assessment of Neutral Bay in comparison to other centres within North Sydney Council as shown in Figure 5.2. Having an understanding of how Neutral Bay compares to these other centres provides the ability to identify a point within the spectrum of where Neutral Bay should exist.

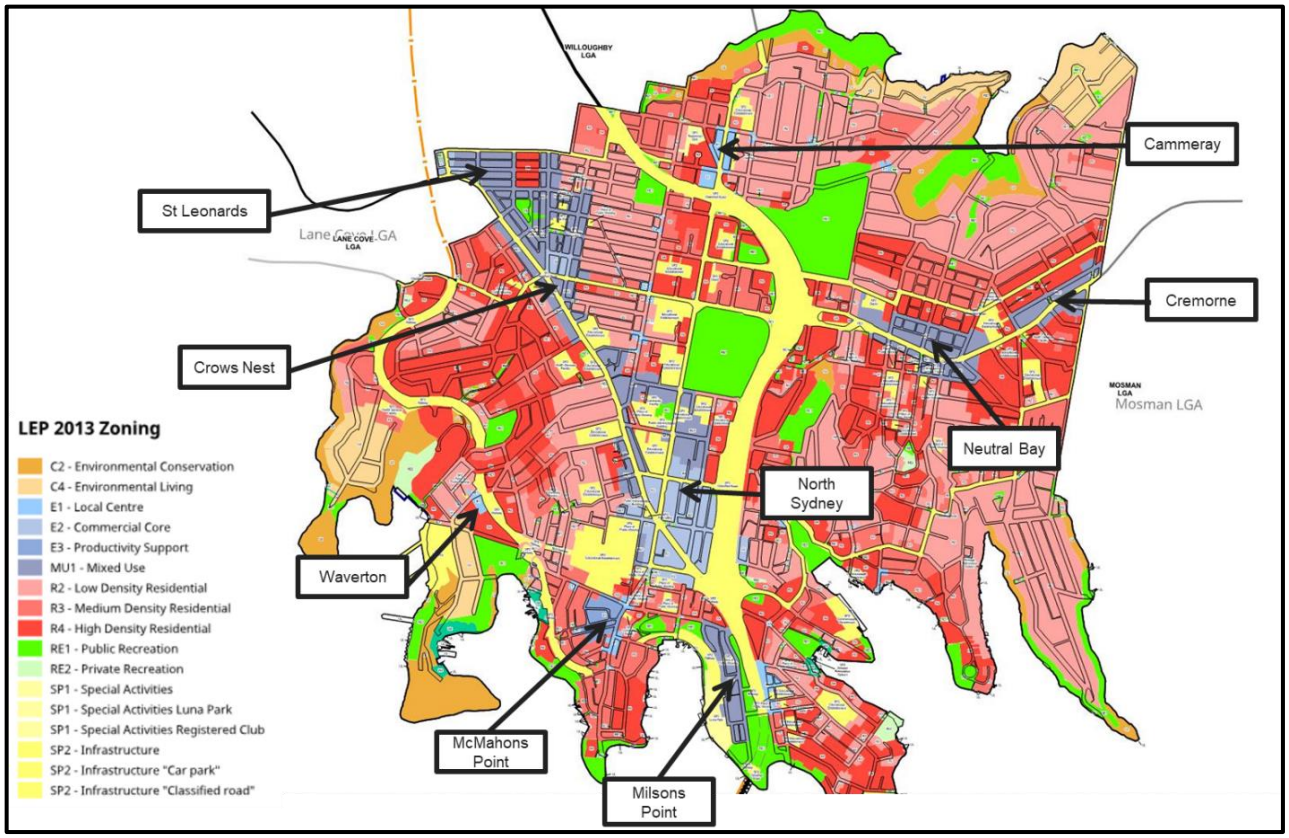


Figure 5.2: Centres within North Sydney LGA

5.3.1 Method of Travel to Work

The method of travel to work was analysed for the 2016 ABS Census because this timeframe better reflects normal travel behaviour (in comparison to 2021 COVID-19 travel conditions). The method of travel to work for all centres within North Sydney LGA is shown in Figure 5.3.

Compared to the centres within the “high accessibility areas”, Neutral Bay was found to have higher car mode shares and comparable public transport mode share. The walking mode share is much lower by comparison which may be due to the reduced walkability within Neutral Bay with the presence of major arterial road, Military Road, through the town centre.

Compared to all the other centres, car mode share for Neutral Bay was found to be in the mid-range. Public transport mode share for Neutral Bay was measured to be on the higher end and comparable to most of these centres. The mode shares for walking are relatively similar across these centres with the exception of McMahons Point situated in proximity of North Sydney and Milsons Point.

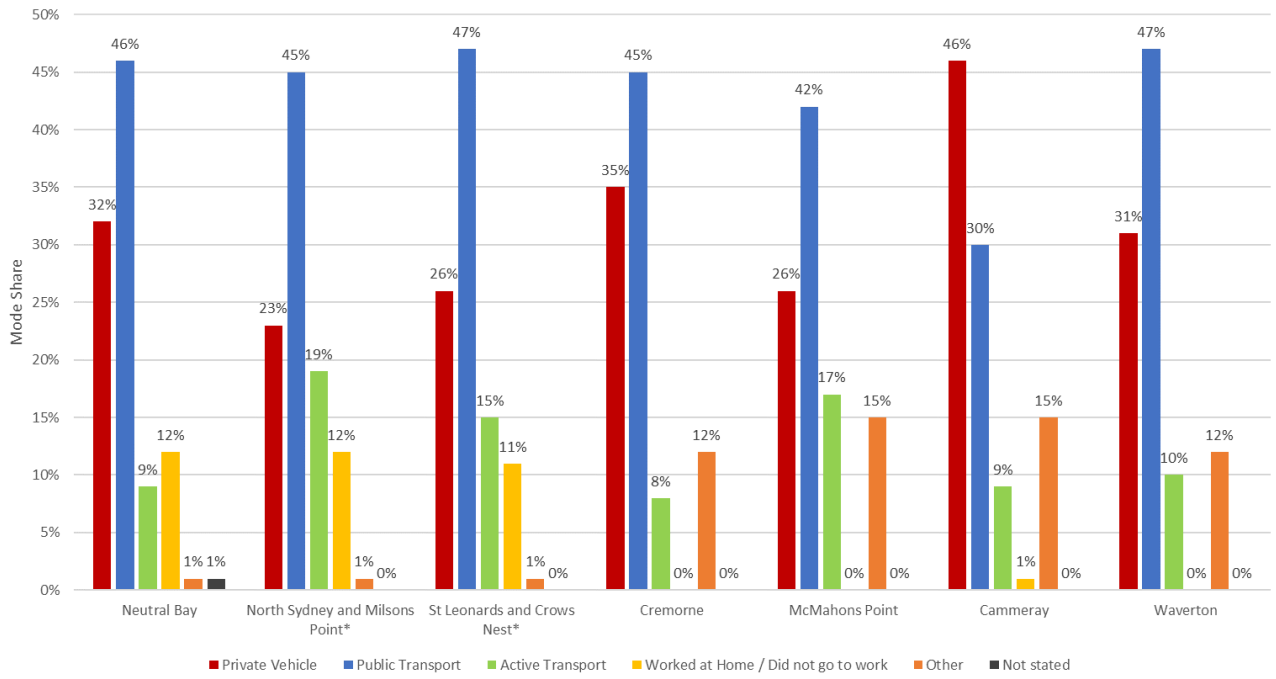


Figure 5.3: Method of Travel to Work (ABS Census, 2016)

* High accessibility areas as identified in North Sydney Council DCP

5.3.2 Public Transport Accessibility

The Public Transport Accessibility Level (PTAL) as defined by the NSW Government is shown in Figure 5.4. This measure is based on the distance from a point of interest to the nearest public transport stop and service frequencies at that stop. This shows that the centres across the North Sydney LGA, including Neutral Bay, are classified as having similar, high levels of public transport accessibility (PTAL level 6).

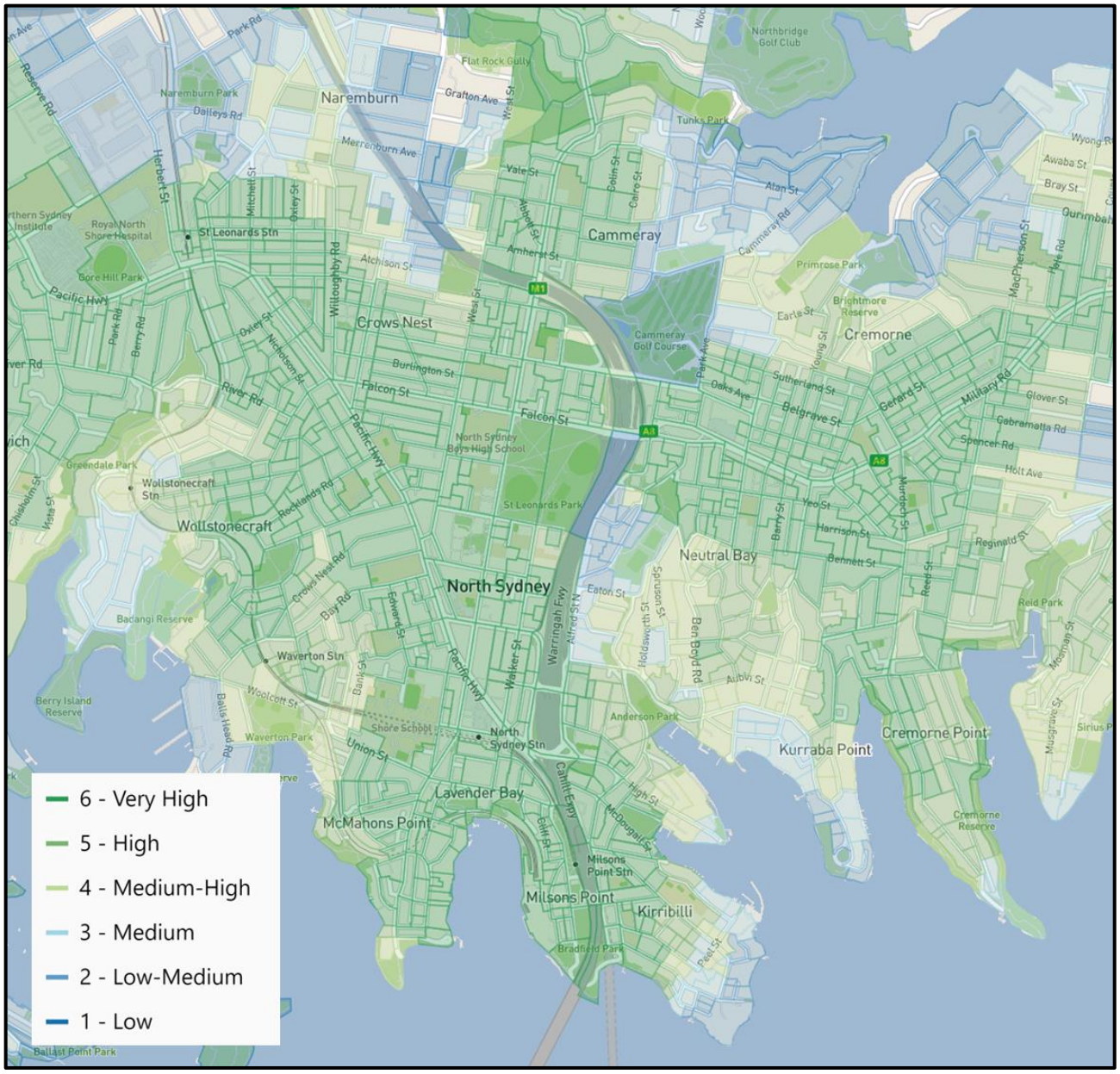


Figure 5.4: Public transport accessibility level

5.3.3 Walk Score

Walk Score measures walkability on a scale from 0 – 100 based on walking routes to destinations such as grocery stores, schools, parks, restaurants, and retail. The walk score for centres within North Sydney LGA are shown in Table 5.2.

Table 5.2: Walk Scores and Transit Scores at Town Centres within North Sydney LGA

Town Centre	Walk Score
Neutral Bay	**85**
North Sydney*	92
Milsons Point*	91
St Leonards*	87
Crows Nest*	92

Cremorne	86
McMahons Point	86
Cammeray	85
Waverton	85

* High accessibility areas as identified in North Sydney Council DCP

For Walk Score, in comparison to the "high accessibility areas", Neutral Bay is lower rated than North Sydney, Milsons Point and Crows Nest, however it is comparable to St Leonards. Comparing to all the other centres, walk score for Neutral Bay is similar in rating to Cremorne, Cammeray, Waverton and McMahons Point.

5.3.4 Car Ownership

Data from ABS Census 2021 has been used to show the relationship between dwelling size and vehicle ownership. The average car ownership and the proportion of dwellings with zero motor vehicles for different dwelling sizes are shown in Table 5.3 and Table 5.4 respectively. It is noted that this data includes only multi-dwelling housing (flats/apartments).

The results show that the average car ownership for Neutral Bay was found to be in the mid-range of other centres. The rates for "high accessibility areas" and McMahons Point (in proximity to North Sydney and Milsons Point) lie on the lower end, while Cremorne, Waverton and Cammeray sit towards the higher end. These results for car ownership generally correlates with the proportion of households in multi-dwelling housing without motor vehicles.

Table 5.3: Average Car Ownership for Dwellings in Flats/Apartments (ABS Census 2021)

Dwelling Type	Neutral Bay	North Sydney and Milsons Point*	St Leonards and Crows Nest*	Cremorne	McMahons Point	Cammeray	Waverton
1-Bedroom	0.62	0.55	0.56	0.7	0.58	1.02	0.67
2-Bedroom	1.03	0.92	0.99	1.01	0.82	1.03	1.02
3-Bedroom	1.31	1.28	1.22	1.36	1.81	1.56	0.93
Total	0.89	0.84	0.81	0.91	0.77	1.12	0.94

* High accessibility areas as identified in North Sydney Council DCP

Table 5.4: Percent of Dwellings in Flats/Apartments Owning Zero Cars (ABS Census 2021)

Dwelling Type	Neutral Bay	North Sydney and Milsons Point	St Leonards and Crows Nest	Cremorne	McMahons Point	Cammeray	Waverton
1-Bedroom	44%	48%	47%	35%	42%	11%	33%
2-Bedroom	15%	21%	15%	17%	29%	16%	17%

3-Bedroom	6%	7%	8%	0%	0%	0%	18%
Total	26%	28%	30%	23%	34%	12%	20%

* High accessibility areas as identified in North Sydney Council DCP

5.4 Recommendation

5.4.1 Potential Parking Rates Amendment

Across the benchmark statistics, Neutral Bay is more car dependent than High Accessibility Areas, however, not to the extent of most of the other mixed use, commercial and local centres such as Cremorne, Cammeray and Waverton. Parking rate requirements could therefore logically sit higher than those applying to the “high accessibility areas”, however, not to the extent that are applied to all other centres. The set of recommended parking rates are set out as follows in Figure 5.5.

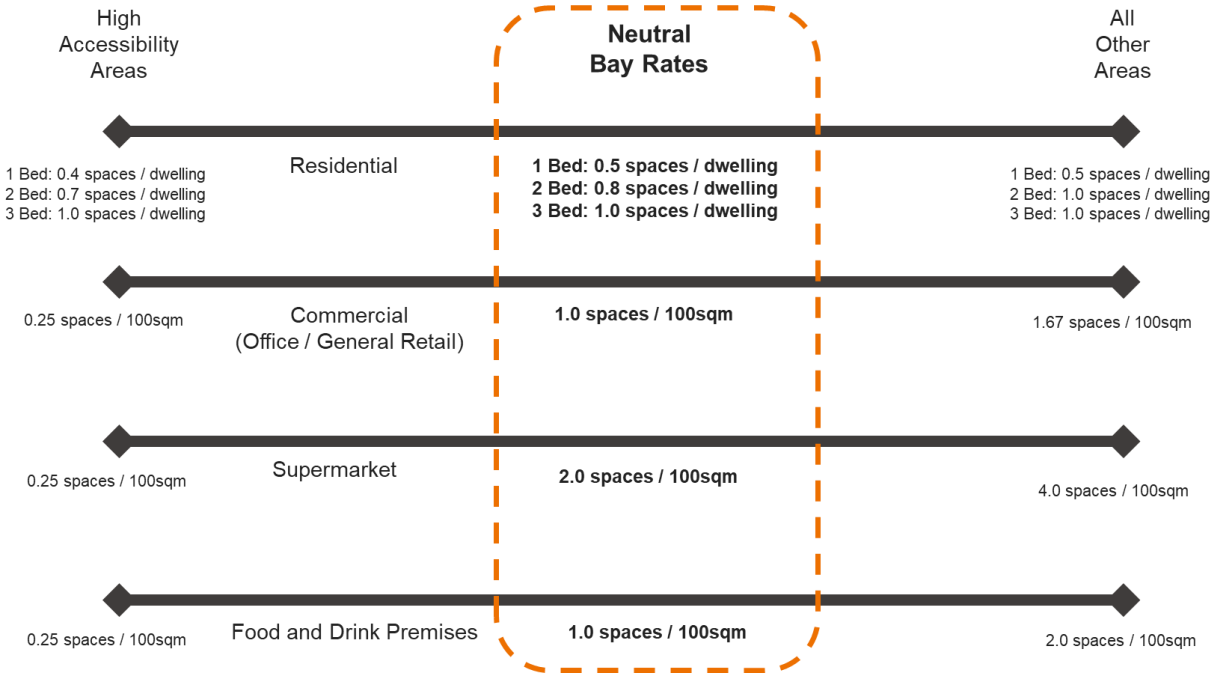


Figure 5.5: Recommended Parking Rates

The selection of these rates also provides an element of flexibility to allow a market response for Neutral Bay in the short term. This would mean initially not pushing maximum rates as low as may be possible or has been done by the “high accessibility areas”. These rates do however include (particularly as it relates to residential parking rates) a limitation and shift toward lower car ownership compared with current ownership levels.

It would be recommended that the adoption of parking rates regularly reviewed to consider their effectiveness in achieving the planning outcomes and be updated to respond to changing land use outcomes, mode shift trends and policy positions.

5.4.2 Parking Management Strategies

To support the adoption of maximum car parking rates, that successfully achieve mode shift as intended and not just overspill parking into the surrounding residential areas, it is recommended that a proactive approach be adopted to parking management.

This includes balancing the availability of parking within surrounding residential streets for residents and commercial visitors and staff of the activity centre.

This can be managed through a combination of timed parking restrictions, specific resident parking permit schemes and paid parking. Existing parking controls of the town centre is detailed above in Section 3.5.

Currently, all three of these measures are in place within and surrounding the Neutral Bay Town Centre and as such significant augmentation of parking restrictions is not considered necessary at this time.

Having regard to the car parking supply and occupancy information discussed earlier within this report, it is clear that particular areas within the town centre experience high levels of demand at certain times while other areas experience lesser demands. This is not uncommon however can be supported by an effective parking wayfinding strategy, to provide drivers with information as early as possible within their journey as to where parking vacancies exist. This assists to effectively utilise parking assets and reduces vehicle congestion by vehicles trying to find a car parking space. The recommendations relating to wayfinding is further explored in the subsequent sub-section.

This can be coupled with smart parking technology to provide such wayfinding as a real time digital interface to provide improved user information.

Continued enforcement also remains critical to ensure that centre operates as intended. The addition of smart Parking technologies can further enhance enforcement operations.

The investigation of further parking management practices is recommended to encourage mode shift to active and sustainable transport modes. Parking management practices may include consideration of, but not limited to:

- Area-wide review of parking restrictions to increase parking turnover in areas with short-stay land uses. An increase in longer-stay off-street parking spaces, which may be anticipated from the future developments such as the Coles redevelopment site at 43-51 Grosvernor Street, provides opportunity to introduce reduction in timed parking restrictions to on-street parking within the town centre. For example, areas for consideration within the town centre whereby a reduction of timed parking restrictions can be applied include the 2-hour parking zones along:
    - Grosvenor Street
    - Military Road between Wycombe Road and Waters Road
    - Barry Street north of Yeo Street
- Investigate demand for car-share and identify potential opportunities (if required) for additional on-street car share spaces. Car share bay locations should be evenly spread out across the town centre and provided in close proximity to areas where they are needed such as higher-density residential developments.

5.4.2.1 Wayfinding

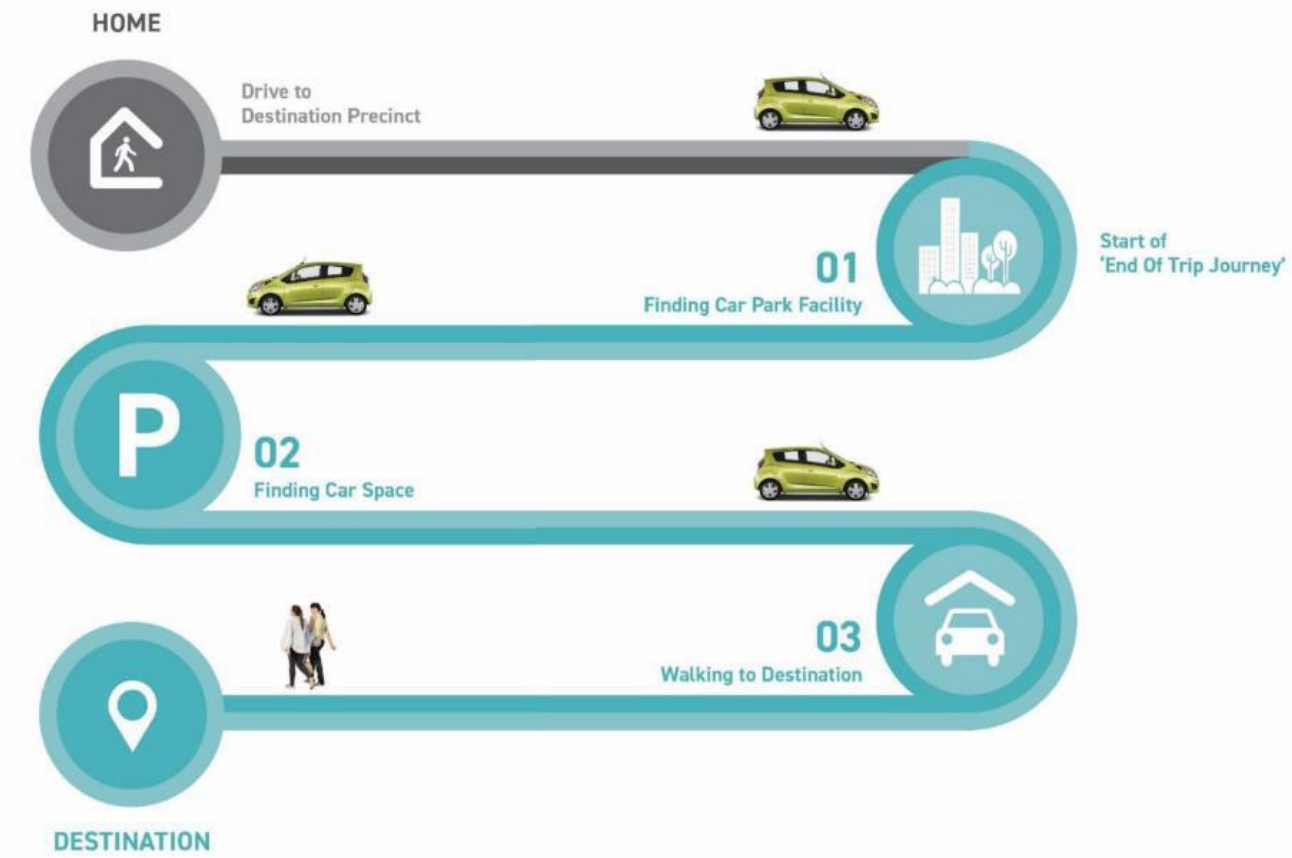
In effectively managing car parking, a broader consideration must be given rather than just the provision of restrictions applying to a car parking space. The effective ability to locate where available car parking exists plays a critically important role in managing car parking within a finite supply. While a suitable supply of parking may exist across the Neutral Bay Town Centre, drivers are often not aware of certain provisions of parking or that certain areas are being underutilised.

Consideration should be given to the concept of the *End of Trip Journey*. This journey begins when a driver reaches the edges of the Neutral Bay Town centre and comprises three elements:

- Circulating the town centre to find a parking facility
- The act of parking the vehicle safely
- Walking from the parking space to one's ultimate destination.

This is depicted in Figure 5.6.

Figure 5.6 – Stages of the car parking user experience[9]



Drivers often have a preconceived idea of how long the end of trip journey will take and are typically willing to compromise on different elements of this overall 'end of trip' journey with some drivers willing to park quickly and walk further while others will circulate in their vehicle as long as possible to find the closest possible parking space.

These compromises may be made on the basis of, but not limited to, physical capability, mindset for a particular trip purpose or knowledge of potential parking availability.

In this case it is therefore critically important to:

- Provide drivers with suitable information as early as possible in their journey to allow them to make informed decisions about which elements of the end of trip journey that they are willing to compromise on a given day.
- Provide quality pedestrian connections between parking areas and key destinations within the town centre to enable the walking component of the journey to be undertaken by different user types in different weather conditions and at different times of the day.

Research indicates that up to 30% of vehicle traffic within activity centres can be related to drivers circulating to find a car parking space[10]. While recognising that private car is likely to remain as the dominant mode of travel to Neutral Bay Town Centre, the considerations for efficient and safe travels within the centre are important as they align with the Strategic Directions from the North Sydney Vision 2040 Community Strategic Plan, in particular, Outcome 2.4 – *Efficient traffic mobility and parking*.

Adding more information about car parking options at the key decision points will enhance the user experience, spread demand, and reduce vehicle through-traffic on streets where higher pedestrian amenity is desired. These decision points can be categorised into the following three types:

1. **Primary decision points** are located on the approaches to Neutral Bay Town Centre, along key access roads or intersections.
2. **Secondary decision points** are located either to direct users from the key movement corridors, onto minor roads, or in a particular direction within a parking precinct.

[9] Coath, C., Yousif, Ali. (2018). Car Parking: Human Centred. AITPM 2018 National Conference

[10] Austroads, Guide to Traffic Management, Part 11 – Parking

3. **Destination decision points** are often located at the entrances to car parks.

Following the determination of the key decision points, the relevant signage can be implemented. A consistent approach to signage across Neutral Bay Town Centre, and more broadly the municipality, naturally creates a better user experience.

An indicative strategy of decision point signage (primary and secondary decision points) that accounts for the key customer parking locations within the town centre has been developed and is shown in Figure 5.7. Potential decision points and routes shown in this strategy have been proposed based on the review of the existing road network and understanding of the future key sites. It is expected that further analysis and stakeholder consultations will still be required to finalise the parking wayfinding strategy for the study area.

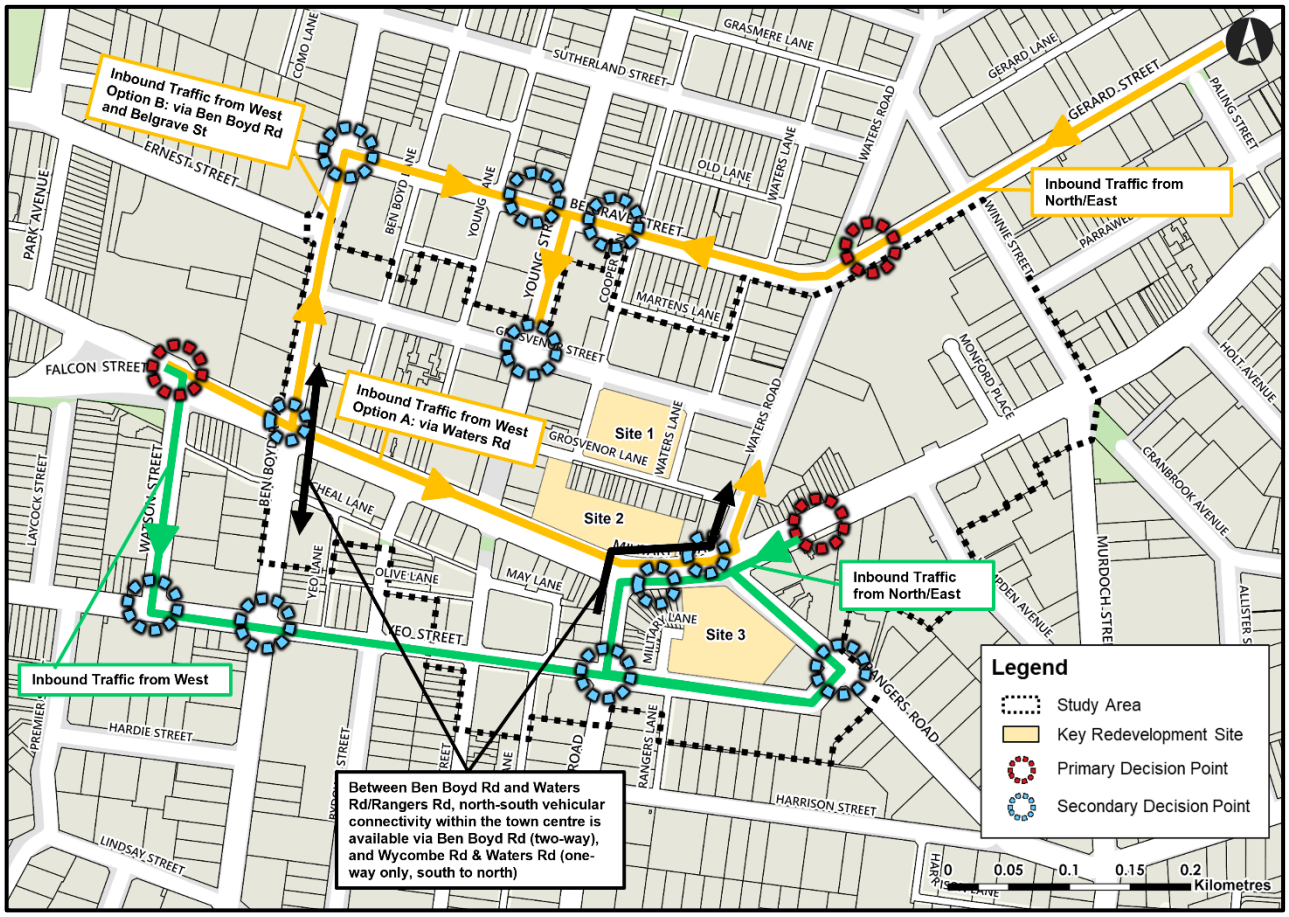


Figure 5.7: Indicative Parking Wayfinding Strategy

The wayfinding and information signage described above can exist in either a static or dynamic (real time variable electronic signage) form.

- Static signage can be installed relatively quickly and for a low cost but can only provide users with information regarding directions, type of parking supply (e.g. 1 hour, unrestricted, etc) and the number of spaces.
- An alternative is dynamic signage, which uses sensor technology to inform drivers of the availability of parking spaces in real time, improving the user experience and efficiency of parking allocation. Examples of dynamic signatures are shown in Figure 5.8 and Figure 5.9.

It also allows for ongoing data collection relating to car park use which can be a valuable tool in managing parking policy into the future. Taking this technology a step further allows users to use a smart phone application to see parking availability in real time.

Further investigation is recommended to determine the feasibility and type of signage to be implemented for the town centre. Consideration should be given to the ongoing benefits that dynamic signage can provide as has been evidenced in other locations with successful outcomes reducing travel times and vehicle emissions.

Figure 5.8 – Dynamic Parking Signage Example 1[11]

Figure 5.9 – Dynamic Parking Signage Example 2[12]

[11] Duncan Solutions

[12] Bass Coast Shire Council

6. Traffic Impact Analysis

It is noted that SIDRA modelling has not been undertaken for this transport study. At this stage, the assessment relies on 2022 SIDRA modelling results from an earlier study for Neutral Bay. As mentioned in Section 3.6.1, the comparison of the 2022 survey results and the recent survey results shows that, in terms of traffic volumes along Military Road, the data from both surveys are relatively consistent and can be considered suitable for use in this study. A summary of the 2022 SIDRA modelling results is provided within Section 6.2.1.

The purpose of this exercise is to understand the potential impacts from the Growth Scenario to the surrounding road network by undertaking a qualitative analysis using the existing SIDRA results and determine suitable actions as next steps. This section discusses the following:

- Scenarios assessed
- Existing traffic operations
- Trips generation and distribution
    - Trip generation (Study area)
    - Comparison of trip generation rates
    - Trip distribution – assumptions applied, arrival and departure split, anticipated origin and destination
    - Trip Generation (Site level)
- Anticipated impact to intersections (Development traffic from Growth Scenario only)
- Anticipated impacts to intersections in year 2041 (accounting for background traffic growth)
- Potential issues and recommended actions

The workings and assumptions for expected trips distribution, with arrival and departing traffic volumes at the analysed intersections have also been summarised in **Appendix C.**

6.1 Scenarios assessed

For this transport study, the following scenarios have been assessed:

1) Existing (base)
    - Year 2022
2) Future (base)
    - Year 2041
    - Assumed average annual growth rate of 0.55% (Source: NSW Population Projections)
3) Future (base + Growth Scenario)
    - Year 2041
    - Includes development traffic generated from Site 1 to 21
    - Re-routing of traffic from closing Grosvenor Lane between Cooper Lane and Waters Lane

6.2 Intersection Performance

6.2.1 Existing Operations

Intersection analysis was undertaken using SIDRA 9.0 which modelled the weekday peaks (AM and PM) and weekend interpeak periods for the Military Road intersections. Table 6.1 presents a summary of the existing operation of the intersections (July 2022), with full results presented in **Appendix D** of this report. The SIDRA results of key intersections identified within the study are further illustrated in Figure 6.2 and Figure 6.3.

The concepts of intersection capacity and Level of Service (LOS), as defined in the Guidelines published by the Roads and Maritime Services (2002), are described in **Appendix E** together with the criteria for their assessment. The

assessment of the LOS of signalised intersections is based on the evaluation of the average delay (seconds/vehicle) on all vehicles.

Table 6.1: Existing (2022) intersection operating conditions

Intersection	Peak	Degree of saturation (DOS)	Average delay (sec)	95th percentile queue (m)	Level of service (LOS)
Military Road/ Ben Boyd Road	AM	0.998	42	316	C
	PM	0.974	34	580	C
	Sat	0.991	19	229	B
Military Road/ Young Street	AM	0.997	40	229	C
	PM	0.969	22	229	B
	Sat	0.984	35	672	C
Military Road/ Wycombe Road	AM	0.998	42	141	C
	PM	0.991	31	196	C
Military Road/ Rangers Road/ Waters Road	AM	0.615	35	19	C
	PM	0.503	19	18	B
Ben Boyd Road/ Grosvenor Lane	AM	0.229	4	6	A
	PM	0.210	4	5	A
	Sat	0.314	5	8	A
Young Street/ Grosvenor Lane	AM	0.071	8	2	A
	PM	0.112	8	4	A
Waters Road/ Grosvenor Lane	AM	0.067	8	2	A
	PM	0.121	8	3	A
Ben Boyd Road/ Grosvenor Street	AM	0.177	9	5	A
	PM	0.187	8	6	A
	Sat	0.221	9	7	A
Young Street/ Grosvenor Street	AM	0.185	10	9	A
	PM	0.210	10	9	A
Waters Road/ Grosvenor Street	AM	0.093	7	2	A
	PM	0.139	6	4	A
Ben Boyd Road/ Ernest Street	AM	0.902	41	73	C
	PM	0.512	19	91	B
Ben Boyd Road/ Oaks Avenue/ Belgrave Street	AM	0.915	372	24	F
	PM	0.431	106	11	F
Belgrave Street/ Young Street	AM	0.916	13	193	A
	PM	0.833	12	65	A
Belgrave Street/ Waters Road/ Gerard Street	AM	0.710	11	65	A
	PM	0.905	16	106	B

On the basis of the above assessment, it is clear that the network generally operates well with minimal queues and delays at each intersection. The exceptions to this are the intersections along the Military Road corridor which are over-saturated and approaching capacity. These intersections experience some delays and reduced levels of service on the minor road approaches with long queues for eastbound and westbound traffic on Military Road. The queue lengths along Military Road are illustrated in Figure 6.1.

While LOS C or better is generally achieved, LOS F currently occurs at the Ben Boyd Road/ Oaks Avenue/ Belgrave Street intersection in the weekday AM and PM peaks due to excessive delays occurring for the southbound movement at the

northern approach of this intersection. At this priority-controlled intersection, the movement has the lowest priority and will naturally have the poorest LOS within this type of intersection. It is noted that in both the AM and PM peak, this impacts about 0.8% of the users of this intersection.

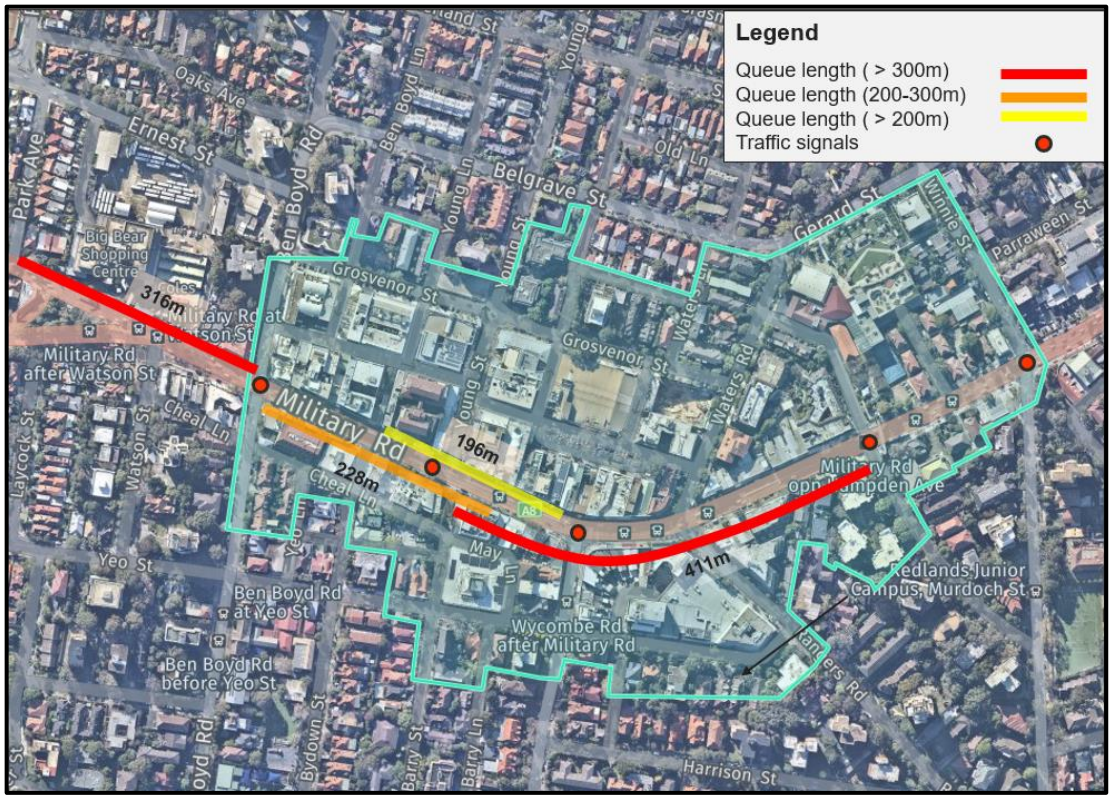


Figure 6.1: Queue length along Military Road

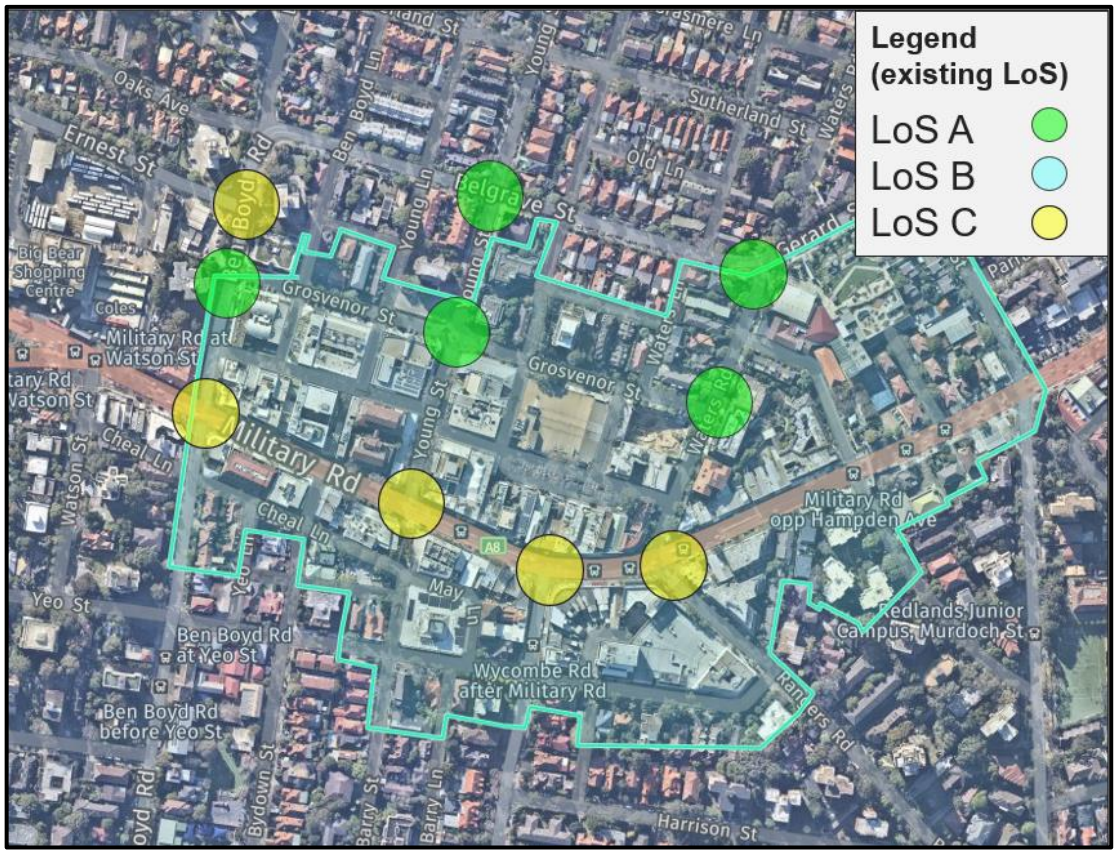


Figure 6.2: SIDRA results of key intersections (Existing – AM Peak)

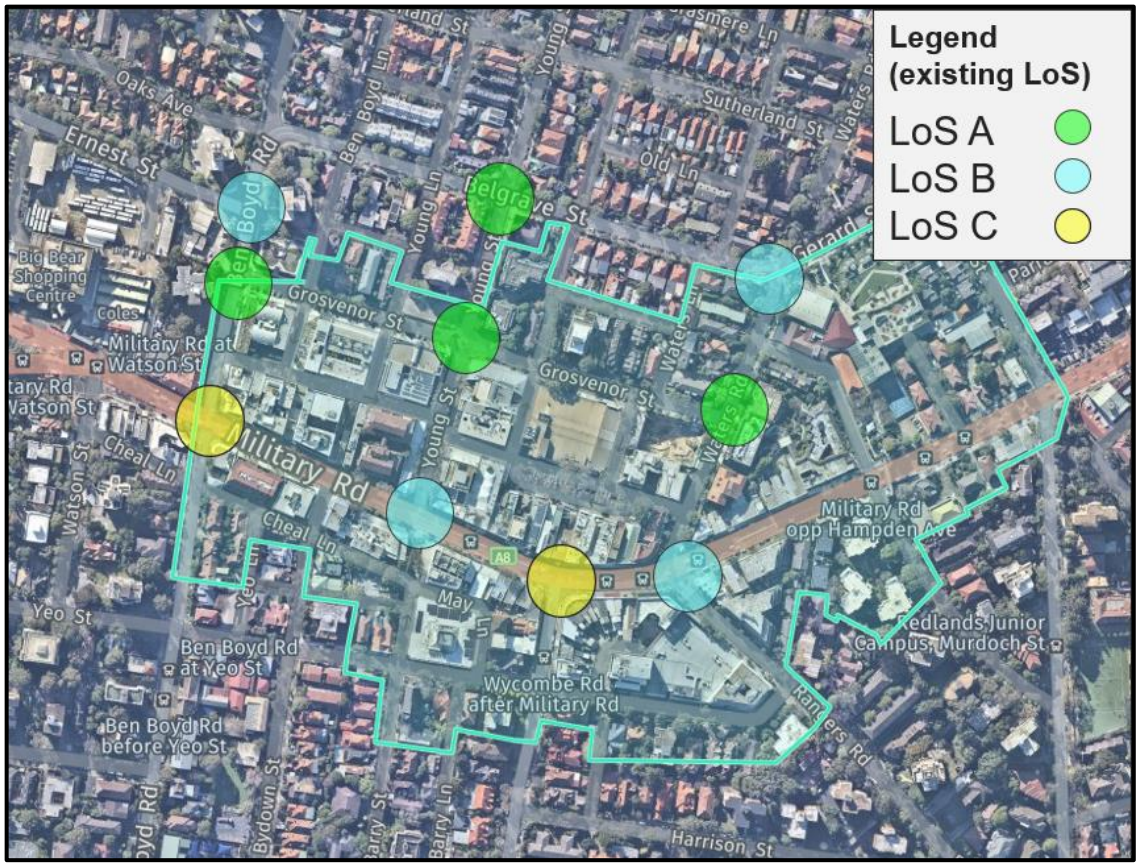


Figure 6.3: SIDRA results of key intersections (Existing – PM Peak)

6.3 Trip Generation and Distribution

6.3.1 Trip Generation (Study area)

Table 6.2 outlines the trips generation rates (obtained from RMS Technical Direction (TDT) 2013/04a) used for this assessment and its application onto the variance from the Growth Scenario identified from Table 4.3.

As mentioned earlier in this report, Neutral Bay has been rated as having high level of public transport accessibility, at PTAL level 6. The study area is relatively well serviced by a considerable number of express and limited stop buses (including the B-Line services and other express bus routes) that carry the passengers to the surrounding suburbs, key destinations and Sydney CBD. However, considering that there is no rail station serving this area, an adjustment has been made to the trip generation rate for residential land use. Instead of adopting the Sydney average rates, the 75 percentile of Sydney range from the AM peak (0.07 to 0.32 trips per unit) and the PM peak (0.06 to 0.41 trips per unit) has been adopted in this assessment.

Table 6.2: Trip Generation

Land use (increase / decrease)	Period	Trip Generation rates	Note(s)	Trips Generated
Residential (684 Units)	AM	0.24 trips per units	Sydney average for high density residential flat dwellings - 0.19 trips per unit. 75 percentile of Sydney range used.	164
	PM	0.31 trips per unit		210
	Weekend	0.31 trips per unit	No weekend rates available. PM peak rates used.	210
Commercial / Office (increase in GFA by **10,546** m^2)	AM	1.6 trips per 100 m^2 GFA	-	169
	PM	1.2 trips per 100 m^2 GFA	-	127
Retail (decrease in GFA by **10,798** m^2)	AM	3.05 trips per 100 m^2 GFA	50% applied to AM peak. Saturday rate used (worst case).	-329
	PM	6.1 trips per 100 m^2 GFA		-679
	Weekend	6.1 trips per 100 m^2 GFA		-659
Total	**AM**	**4**		
	PM	**-342**		
	Weekend	**-448**		

The anticipated trip generation from the Growth Scenario across the study area is generally low, with vehicular trip reductions expected during the PM and weekend peak.

The decrease in vehicular trips is largely attributed to the significant decrease in retail GFAs, as retail land uses typically have higher trip generation rates as compared to commercial land uses. In addition, the overall increase in non-residential GFAs is relatively low, with retail land use being replaced by a lower trip generating land use.

Detailed further in Section 6.3.4, an analysis of trip generation at a site level has also been carried out to better determine the cumulative vehicular trips at each of the key intersections within the study area.

On the basis that weekend peak results in the highest vehicular trip reduction and is unlikely to have any adverse impact on the road network within the study area, the weekend peak analysis has been excluded for the rest of this assessment.

6.3.2 Comparison of Trip Generation rates

A comparison of trips generation rates using the typical vehicle trips per unit, vehicle trips per car spaces (using existing parking rates and recommended parking rates) is provided within Table 6.3 and Table 6.4.

Table 6.3: Comparison of trip generation rates (Residential)

Residential		Trips generated based on vehicle trips per residential unit	Trips generated based on vehicle trips per car space (existing DCP parking rates)	Trips generated based on vehicle trips per car space (recommended parking rates)
AM Peak	**684 dwellings**	**164** (0.24 trips per units)	**150** (0.22 trips per parking space, 684 parking spaces)	**120** (0.22 trips per parking space, 547 parking spaces[13])
PM Peak		**212** (0.31 trips per units)	**143** (0.21 trips per parking space, 684 parking spaces)	**115** (0.21 trips per parking space, 547 parking spaces)

Table 6.4: Comparison of trip generation rates (Commercial)

Commercial		Trips generated based on vehicle trips per 100 m^2 GFA (restrained)	Trips generated based on vehicle trips per 100 m^2 GFA (recommended parking rates)
AM Peak	**10,546m^2 GFA**	**169** (1.6 trips per 100 m^2)	**105** (1.0 trips per 100 m^2)
PM Peak		**127** (1.2 trips per 100 m^2)	**74** (0.7 trips per 100 m^2)

A summary of this comparison is as follow:

- Using vehicle trips per car space, the adoption of recommended parking rates for residential use is expected to result in a 37% decrease in vehicular trips for both AM and PM peak.
- For commercial, there is no trip generation rate using car spaces. However, based on Section 5.6 of TfNSW traffic generation guidelines, the commercial premise within the study area would be classified under a "restrained" situation where council parking code is to be referred.

The adoption of the recommended parking rates would result in a factor being applied to the trip generation rate and further result in a reduction of vehicular trips by about 38% and 42% in the AM and PM peak respectively.

- Overall, the trip generation based on the TfNSW typical rates results is significantly higher as compared to the trip generation with recommended parking rates factored in. Regardless, this assessment will use the "worst case" for each land use, with a comparison of impacts provided in Section 6.4. Worst case scenarios are generally used in

[13] This figure has been derived using the recommended parking rates from Figure 5.5. In this study, the proposed dwellings have been assumed to be two bedrooms apartments, with using an average of 85m^2 floorspace. *(0.8 spaces per dwellings multiply by 684 dwellings = 547 parking spaces)*

transport assessment to identify potential disruptions and changes to the transport network, and allow the appropriate actions and mitigation measures to be developed.

6.3.3 Trip Distribution

When determining the trip distribution as well as the proportion of traffic travelling to/from the study area's access roads, the following assumptions have been used:

- The arrival and departure split for each land use outlined in Table 6.5 have been derived based on previous experiences on similar studies and is typically accepted for use. In this assessment, a 50/50 split has been adopted for the retail in the PM peak.
- Mode of travel and destination of travel have been obtained from the Australian Bureau of Statistic (ABS) and analysed further to determine each set of traffic distribution. This provides an indication of where people are travelling to for work and the percentage of them who drive.
- Google Maps have been used to derive the anticipated routes to/from each site and to understand the intersections expected to be used, which in turn lead to the development of cumulative traffic at each intersection across the network.

Table 6.6 to Table 6.8 shows the anticipated arrival and departure split for each of the Study area's access point. An example of the trip distribution for residential land use in the AM peak is illustrated in Figure 6.4. Illustrations detailing the other land uses during each peak period are provided in **Appendix B.**

It is noted that the "negative trips" (reduction) have also been included in the tables below as they contribute to the cumulative impact across the network and intersections.

Table 6.5: Arrival and Departure split

	AM peak		PM peak	
	Arrival	**Departure**	**Arrival**	**Departure**
Residential	10%	90%	90%	10%
Commercial	100%	0%	0%	100%
Retail	100%	0%	50%	50%

Table 6.6: Origin and destination (Residential)

Residential								
	AM				**PM**			
	Arr	**Dep**	**Arr**	**Dep**	**Arr**	**Dep**	**Arr**	**Dep**
Military Rd West	10%	80%	16	131	80%	10%	168	21
Ernest St West	0%	5%	0	8	5%	0%	11	0
Rangers Road South	0%	0%	0	0	0%	0%	0	0
Gerrard Street East	0%	5%	0	8	5%	0%	11	0
Total	**10%**	**90%**	**16**	**148**	**90%**	**10%**	**189**	**21**

Table 6.7: Origin and destination (Commercial)

Commercial								
	AM				**PM**			
	Arr	**Dep**	**Arr**	**Dep**	**Arr**	**Dep**	**Arr**	**Dep**
Military Rd West	90%	0%	176	0	0%	90%	0	132
Ernest St West	0%	0%	0	0	0%	0%	0	0
Rangers Road South	5%	0%	10	0	0%	5%	0	7
Gerrard Street East	5%	0%	10	0	0%	5%	0	7
Total	**100%**	**0%**	**195**	**0**	**0%**	**100%**	**0**	**147**

Table 6.8: Origin and destination (Retail)

Retail								
	AM				PM			
	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep
Military Rd West	90%	0%	-295	0	30%	30%	-197	-197
Ernest St West	0%	0%	0	0	10%	0%	-66	0
Rangers Road South	5%	0%	-16	0	5%	10%	-33	-66
Gerrard Street East	5%	0%	-16	0	5%	10%	-33	-66
Total	**10%**	**90%**	**-327**	**0**	**90%**	**10%**	**-329**	**-329**

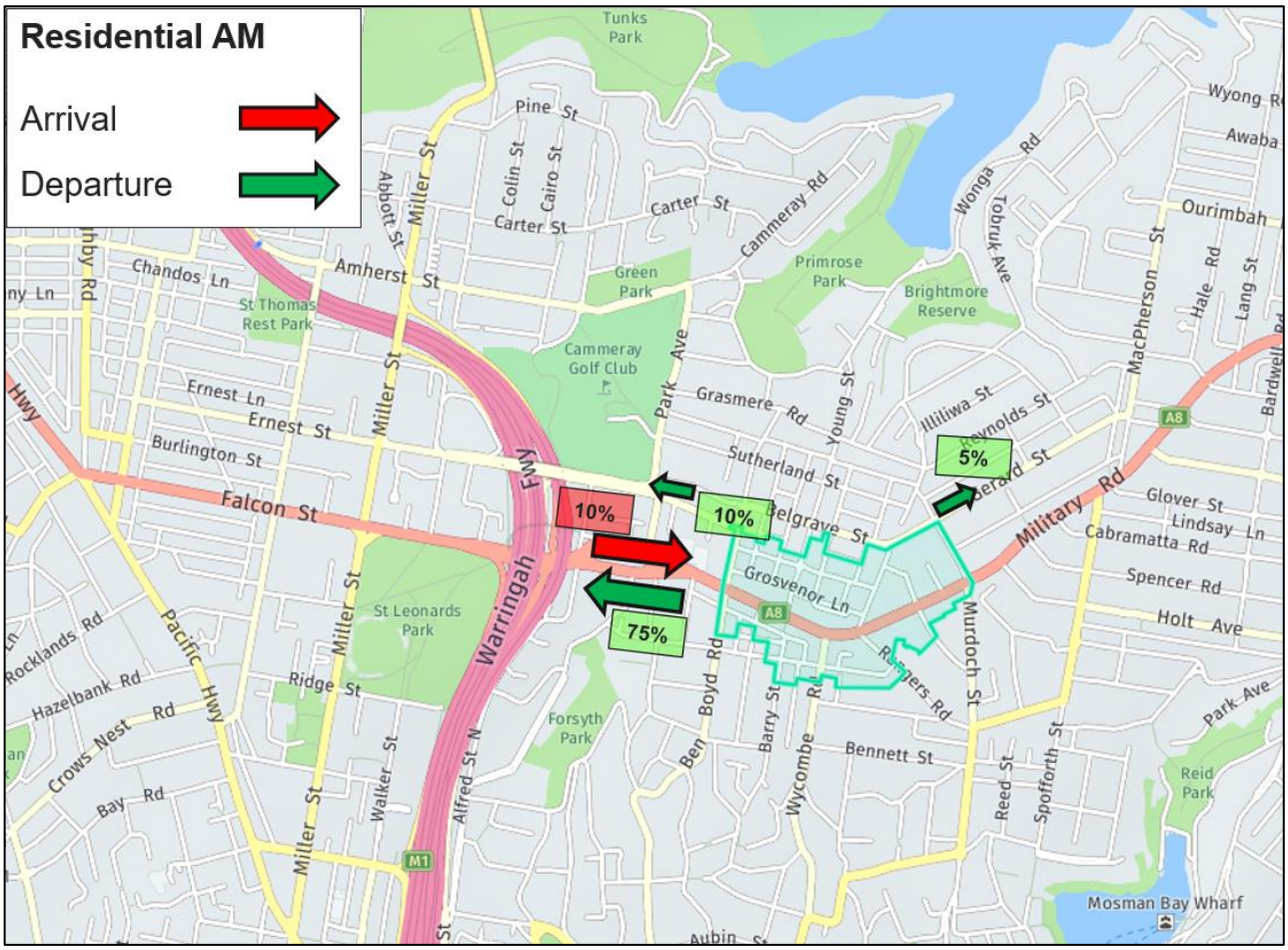


Figure 6.4: Trip Distribution for residential (AM Peak)

6.3.4 Trip Generation (Site level)

Based on the proposed yields in Table 4.1 and accounting for existing development (provided in **Appendix E**), trip generation for each site has been derived and is provided in Table 6.9. As explained earlier in Section 6.3.2, this study will adopt the typical TfNSW trip generation rates. In summary, majority of the sites within the study area are expected to have a reduction in vehicular trips, however Key Site 1 and 3B are expected to generate higher than average vehicular trips.

By understanding the trips generated from each site and the anticipated trip distribution, the cumulative traffic impact at each key intersection as a result of the Growth Scenario can be determined. This is provided in Table 6.10 and Table 6.11.

Table 6.9: Trip Generation (site level)

		AM		PM	
		Arrival	Departure	Arrival	Departure
Key Sites	1	76	19	58	67
	2A	-23	11	-38	-30
	2B	-16	8	-39	-24
	3A	-12	4	-8	-12
	3B	123	18	138	122
Other Sites	4	-14	5	-24	-18
	5	-24	5	-30	-27
	6	-15	9	-29	-21
	7	15	9	-6	7
	8	-6	1	-5	-6
	9	-8	10	48	3
	10	-24	8	-42	-30
	11	-32	6	-14	-29
	12	-1	2	-7	-3
	13	0	1	0	-1
	14	-11	5	-20	-14
	15	-22	3	0	-17
	16	-12	2	-10	-12
	17A	-43	4	-33	-42
	17B	-17	4	-3	-15
	18	-4	1	8	-1
	19A	-31	3	-18	-28
	19B	-11	1	-9	-10
	20A	1	-1	-8	-1
	20B	1	2	-8	-2
	20C	-18	3	-27	-21
	21	-17	4	-15	-38
		-144	**148**	**-140**	**-202**

6.4 Impact on intersections (Development traffic only)

The cumulative vehicular trips for each of the key intersections, from the Growth Scenario, during the AM and PM peak is summarised in Table 6.10 and Table 6.11 respectively.

Table 6.10: Development Traffic - AM Peak

Intersections	Development Traffic (AM)	% (AM)
Military Road / Ben Boyd Road	-65	-1.2%
Military Road Wycombe Road	55	1.1%
Military Road / Rangers Road	35	1.3%
Ben Boyd Road / Ernest Street	13	0.5%
Ben Boyd Road / Grosvenor Street	6	0.8%
Grosvenor Street / Young Street	6	1.0%
Grosvenor Street / Cooper Lane	89	17.7%
Grosvenor Street / Water Road	1	0.2%
Grosvenor Lane / Water Road	1	0.3%

Table 6.11: Development Traffic – PM Peak

Intersections	Development Traffic (PM)	% (PM)
Military Road / Ben Boyd Road	-121	-2.3%
Military Road Wycombe Road	118	2.5%
Military Road / Rangers Road	114	5.5%
Ben Boyd Road / Ernest Street	-57	-2.6%
Ben Boyd Road / Grosvernor Street	-178	-27.0%
Grosvenor Street / Young Street	-178	-25.9%
Grosvenor Street / Cooper Lane	42	8.1%
Grosvenor Street / Water Road	-107	-21.5%
Grosvenor Lane / Water Road	-107	-30.6%

A summary of Table 6.10 and Table 6.11 is as follows:

- During the AM and PM peak, the intersection of Grosvenor Street and Cooper Lane is expected to have the highest increase in vehicular trips. This increase constitutes to about 17% and 8% of its existing volumes in the AM and PM peak respectively. The increase in vehicular trips at this intersection is largely from the trips generated from Key Site 1 and traffic exiting from Cooper Lane.

  It is noted that traffic survey was not undertaken for this intersection, and the existing volumes have been estimated based on traffic volumes from surrounding intersections.

- The intersections of Military Road with Rangers Road and with Wycombe Road are expected to have a moderate increase in vehicular trips during the PM peak period. This is largely due to the anticipated trip generation from Key Site 3B.

- Generally, development traffic from the Growth Scenario during the AM peak are relatively minor for most intersections, with trip reductions expected for majority of the key intersections during the PM peak.

6.5 Impact on intersections (Future year 2041)

While the overall development traffic from the Growth Scenario is expected to be minor, background traffic growth for the study area will also need to be factored to understand the increase in traffic at each intersection. In this assessment, the Growth Scenario has been assumed to be fully built-out by Year 2041 with a background traffic growth of 0.55% per annum.

Table 6.12 and Table 6.13 shows the difference in traffic volumes at each of the key intersections, with the percentage of the existing volumes provided in the last column. To visualise this increase better, Figure 6.5 and Figure 6.6 shows the LOS for the existing SIDRA results, as well as anticipated vehicular trips increase at certain intersections.

The following formula is used to determine the “Difference”:

“Difference” = “Future 2041 (base + Growth Scenario)” – “Existing (base)”

Table 6.12: Future 2041 - AM Peak (Base + Growth Scenario)

	Difference (AM)	% (AM)
Military Road / Ben Boyd Road	445	9.1%
Military Road Wycombe Road	516	11.6%
Military Road / Rangers Road	328	13.4%
Ben Boyd Road / Ernest Street	259	10.9%
Ben Boyd Road / Grosvenor Street	70	11.3%
Grosvenor Street / Young Street	60	11.5%
Grosvenor Street / Cooper Lane	177	46.0%
Grosvenor Street / Water Road	44	10.6%
Grosvenor Lane / Water Road	26	10.7%

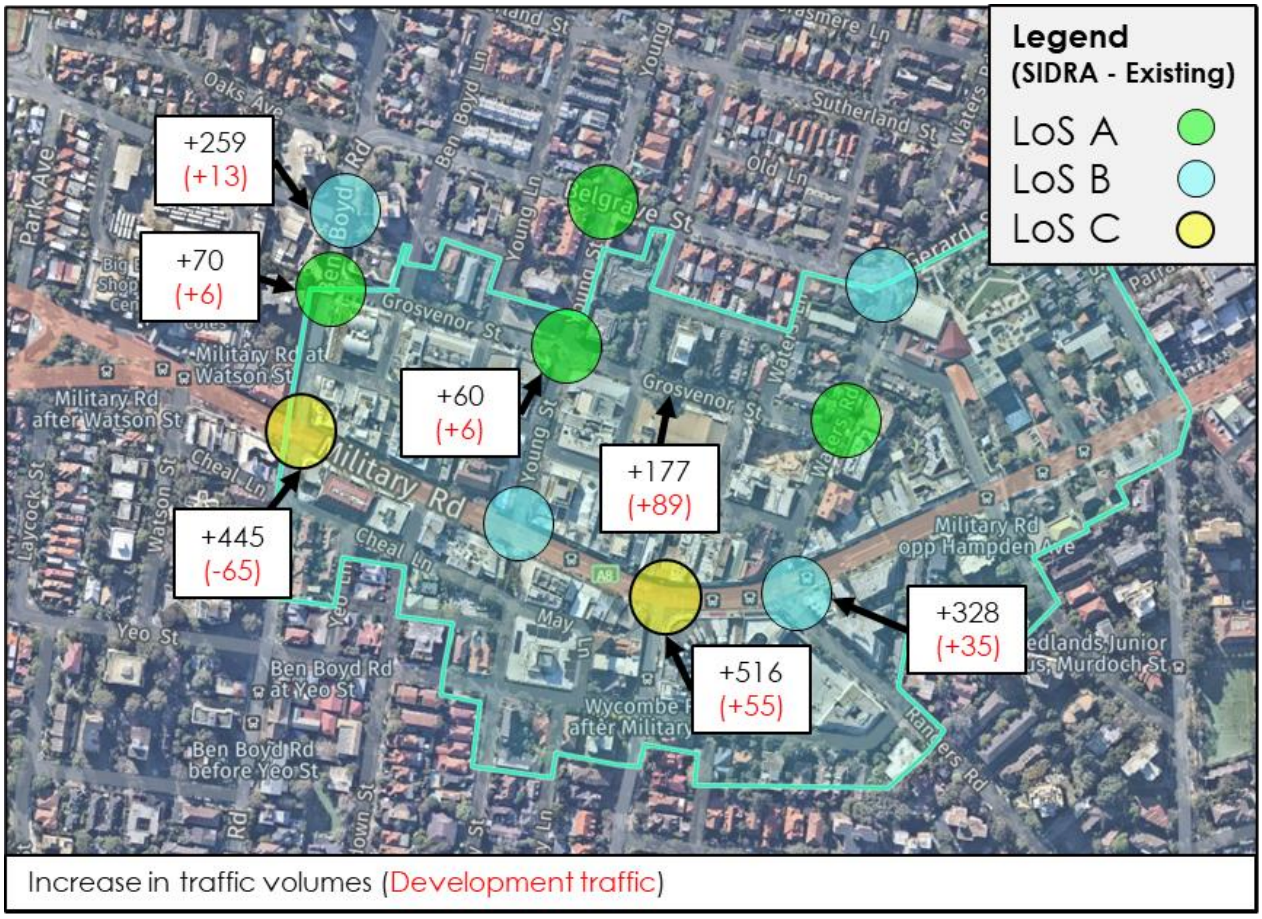


Figure 6.5: Impact on intersections (AM Peak)

A summary of the AM peak (from Table 6.12 and Figure 6.5) is as follows:

- In terms of percentage of the existing volumes, the intersection of Grosvenor Street with Cooper Lane has the highest increase in vehicular trips. SIDRA analysis has not been carried out for this intersection and will be required to determine its intersection performance and anticipated queue length at approaches, given its proximity to the proposed access points of Key Site 1.
- While the intersection of Grosvenor Street with Young Street currently has a LOS A and the increase in traffic volumes is not significant, it is recommended for this intersection to be analysed further with the intersection of Grosvenor Street with Cooper Lane, given their proximity to each other.
- While the development traffic along Military Road is relatively minor, the expected increase in traffic volumes at the intersections of Military Road is moderate (between 9% to 13% of its existing volumes) due to the background traffic growth. As mentioned in Section 6.2.1, there is currently insufficient queue length along the intersections of Military Road. The increase in traffic volumes along Military Road is expected to result in a worsen intersection performances and increase existing queue lengths.

Table 6.13: Future 2041 – PM Peak (Base + Growth Scenario)

	Difference (PM)	% (PM)
Military Road / Ben Boyd Road	367	7.8%
Military Road Wycombe Road	561	13.1%
Military Road / Rangers Road	308	16.5%
Ben Boyd Road / Ernest Street	152	7.5%
Ben Boyd Road / Grosvenor Street	-116	-19.5%
Grosvenor Street / Young Street	-114	-18.2%
Grosvenor Street / Cooper Lane	49	10.7%
Grosvenor Street / Water Road	-60	-13.4%
Grosvenor Lane / Water Road	-74	-23.4%

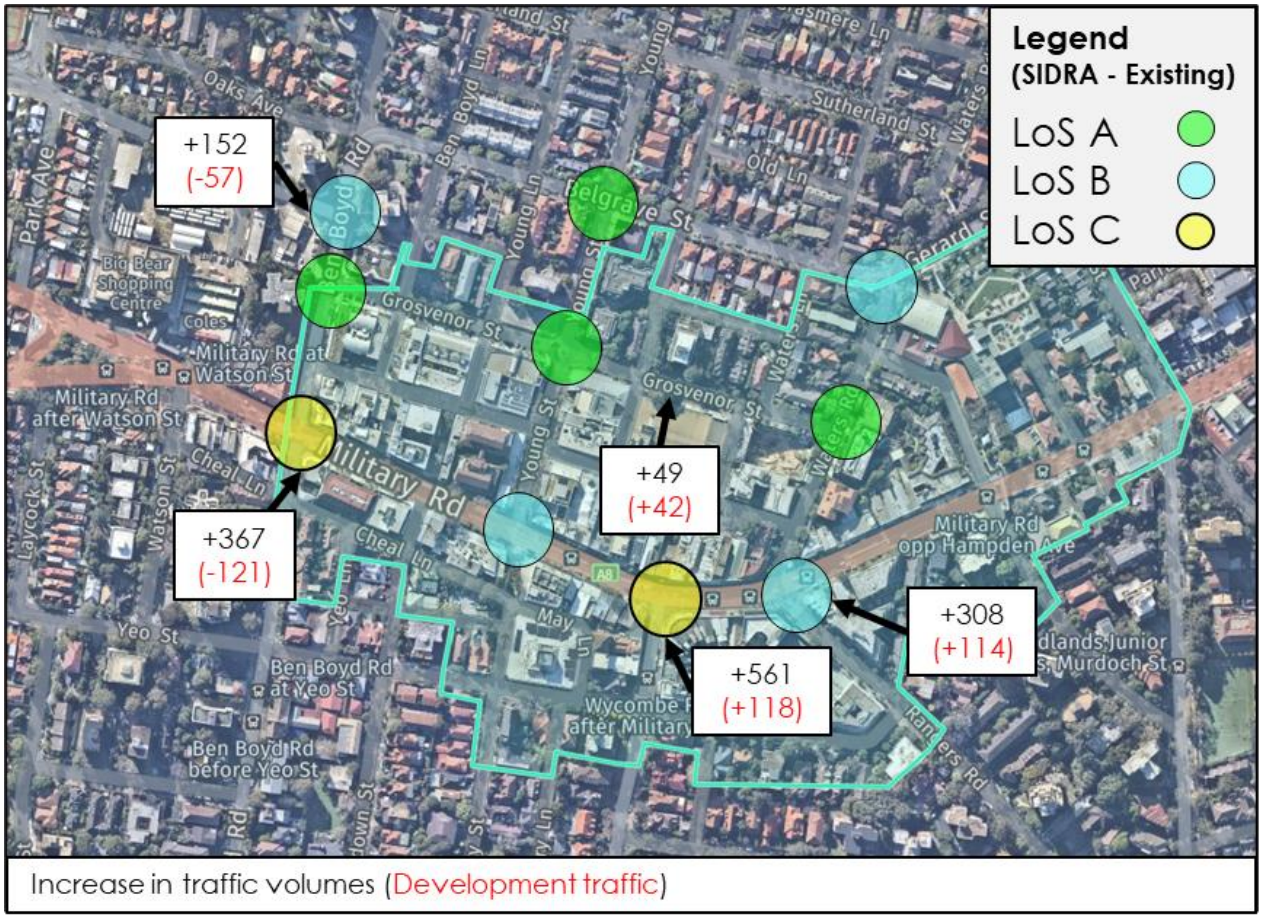


Figure 6.6: Impact on intersections (PM Peak)

A summary of the PM peak (from Table 6.13 and Figure 6.6) is as follows:

- The expected increase in traffic volumes at the intersections of Military Road is moderate, between 8% to 17% of its existing volumes. At the intersections of Military Road with Wycombe Road and with Rangers Road, development traffic contributes to about 20% and 37% of the increase respectively. Similar to the AM peak, there is currently insufficient queue length along the intersections of Military Road for the PM peak. The increase in traffic volumes along Military Road is expected to worsen intersection performances and increase existing queue lengths.
- Within the study area, other than the intersections along Military Road and intersection at Ben Boyd Road with Ernest Street, the rest of the key intersections have a relatively minor increase in traffic volumes, with majority of them having a LOS B or better. Based on this, it is not anticipated for the performances of these intersections during the PM peak to worsen.

6.6 Proposed Pedestrian Crossing on Military Road

An additional pedestrian crossing on Military Road, located on the western side of the Rangers Road/Waters Road intersection (refer Figure 6.7), has been proposed as part of the Neutral Bay Town Centre Public Domain Plan prepared by SMM in May 2023. The additional crossing serves to improve north-south pedestrian connectivity within the town centre and create an easily accessible pedestrian connection between the new Rangers Road plaza and the new public square at Grosvenor Lane via both Waters Road and the nearby through-site link on Military Road.

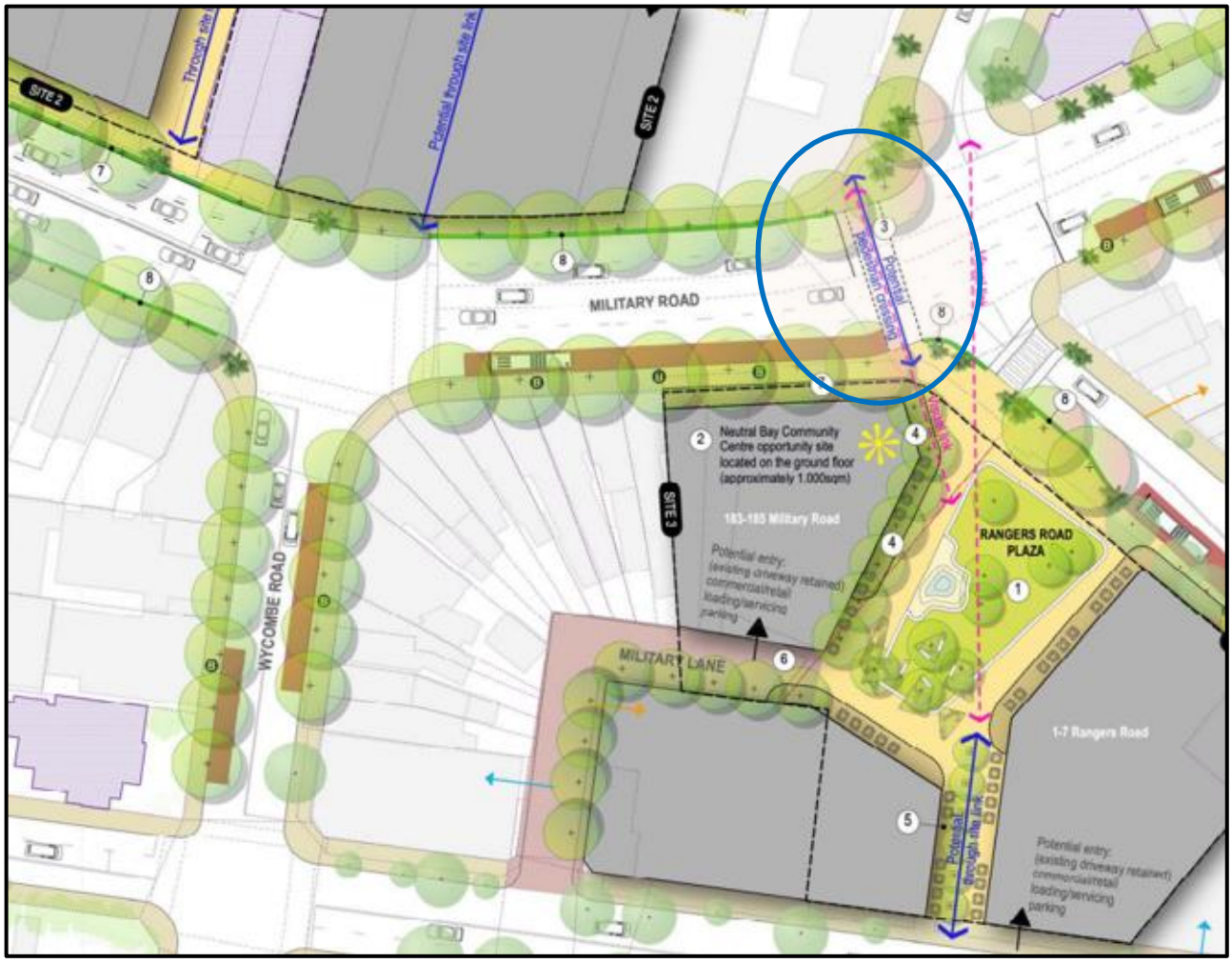


Figure 6.7: Additional Pedestrian Crossing on Military Road

A summary of the potential benefits and constraints associated with this proposed crossing, while considering the current traffic conditions and the range of public domain improvements from the Neutral Bay Town Centre Public Domain Plan, is detailed in Table 6.14.

Table 6.14: New Pedestrian Crossing at Military Road - Benefits and Constraints

Benefits	Constraints
• The provision of an additional crossing opportunity along the Military Road would improve the overall north-south connectivity within the town centre. • The provision of a pedestrian crossing at this location aligns with the pedestrian desire line between the new Grosvenor Lane Plaza and a new pedestrian laneway (Yeo Lane) that connects Rangers Road and Yeo Street via the new Rangers Road Plaza.	• Current queue length between the Military Road/Wycomne Road signalised intersection and the Military Road/Murdoch Street signalised intersection extends further than spacing between these two intersections as shown in Figure 6.1. The provision of an additional signalised crossing at this location is expected to impact traffic flow and contribute to existing traffic queues along this corridor. • In addition, the proximity between the proposed Rangers Road crossing and the current Military Road/Wycombe Road intersections (appoximately 68m) may not be sufficiently far apart for the introduction of a new signalised crossing. • Intersection modelling along the Military Road is likely required to assess the measures required for coordinated operations between the current signalised interesctions and a new signalised crossing, and therefore the feasibility of an additional signalised crossing along this corridor.

6.7 Recommended actions (next steps - traffic)

Table 6.15 details the potential issues identified and recommended actions from the traffic analysis undertaken:

Table 6.15: Potential Issues and Recommended Actions (Traffic)

Location	Potential issues identified	Recommended action
Intersection of Grosvenor Street / Cooper Lane	Relatively high increase in trips by about 48% at the intersection of Grosvenor Street with Cooper Lane, with about one-third of this increase contributed by the Growth Scenario and the remainder as a result of background traffic growth. It is noted that, as compared to the other intersections, the estimated existing volumes for this intersection are relatively low. This is currently a priority-controlled intersection and is expected to be in close proximity to several access driveways.	Consider intersection modelling to determine the potential impact(s) from the Growth Scenario in the future (year 2041).
Intersection of Grosvenor Street / Young Street	Moderate increase in traffic volumes at this intersection in the future scenario. Close proximity to the intersection of Grosvenor Street / Cooper Lane and access points could result in queuing and vehicular delay.	Consider intersection modelling to determine the potential impact(s) from the Growth Scenario in the future (year 2041).
Military Road	As part of the preferred option for Rangers Road Plaza, a pedestrian crossing at the intersection of Military Road / Rangers Road has been proposed. Based on SIDRA modelling and site observations, there are currently insufficient queue length observed at: • Military Road / Ben Boyd Road • Military Road / Young Street • Military Road / Wycombe Road The expected increase in traffic volumes along Military Road is between 8% to 16% of its existing volumes. The increase in traffic volumes along Military Road is expected to increase average delays and existing queue lengths.	Consider network modelling for the intersections along Military Road to determine potential impact(s) from proposed crossing in the first instance (future year 2041).
Intersection of Military Road with Ben Boyd Road	Moderate increase in traffic volumes by about 10% in the future; noting the Growth Scenario has resulted in an anticipated minor reduction in traffic volumes at this intersection, with majority of the traffic increase is attributed to the background traffic growth. Existing performance for this intersection is currently at an acceptable LOS C.	Consider intersection modelling at this intersection to determine performance in the future (year 2041).
Intersection of Military Road with Rangers Road	Moderate increase in traffic volumes by about 13% to 16% in the future; noting the Growth Scenario has a minimal impact to this increase, with majority of the traffic increase is attributed to the background traffic growth. Existing performance for this intersection is acceptable at an LOS C.	Consider intersection modelling at this intersection to determine performance in the future (year 2041).

7. Recommended Improvements and Strategies

In the preparation of this traffic and transport study, the following have been carried out:

- Review of planning strategies relevant to the Neutral Bay town centre and development proposal plans to appreciate issues and concerns from earlier studies.
- Developed transport evidence of the study area through review of existing transport conditions and data collection which included intersection counts and parking occupancy surveys, as well as method of travel to work using Journey to work census data
- Review of relevant parking policies, strategies and developed potential parking recommendations.
- Transport analysis of proposed Growth Scenarios and public domain options, which included analysing trip generation data for the AM and PM peak periods and identifying traffic impacts at key intersections.
- Workshops and meetings with Council throughout the project to share and discuss findings.

From the above, potential issues within the study area have been identified, with associated actions recommended. For the purpose of this report, these have been grouped broadly in five categories (Traffic, Road Safety, Parking, Active Transport (Walking and Cycling), Public Transport) and are detailed in Table 7.1 to Table 7.4

The potential issues and recommended actions are shown indicatively on a map of the study area in Figure 7.1. Whilst most of these constraints and opportunities are location-specific within the study area, a number of them are area wide and thus have not been placed on a single location.

Figure 7.1: Map of potential issues and recommendations

Table 7.1: Potential issues and Recommended Actions (Traffic)

Map Reference	Location	Issue	Recommendation
T1	Intersection of Grosvenor Street / Young Street	Moderate increase in traffic volumes at this intersection in the future scenario. Close proximity to the intersection of Grosvenor Street / Cooper Lane and access points could result in queuing and vehicular delay.	Consider intersection modelling to determine the potential impact(s) from the Growth Scenario in the future (year 2041).
T2	Intersection of Grosvenor Street / Cooper Lane	Relatively high increase in trips by about 48% at the intersection of Grosvenor Street with Cooper Lane, with about one-third of this increase contributed by the Growth Scenario and the remainder as a result of background traffic growth. It is noted that, as compared to the other intersections, the estimated existing volumes for this intersection ae relatively low. This is currently a priority-controlled intersection and is expected to be in close proximity to several access driveways. In addition to the increased vehicular movements at this intersection, its proximity to the customer car park / loading dock access is likely to raise traffic concerns (i.e., congestion, increased likelihood of accidents). Potential intersection upgrade might be required to facilitate the additional traffic movements.	Consider intersection modelling to determine the potential impact(s) from the Growth Scenario in the future (year 2041). Undertake a road safety audit of the intersection and the proposed access points of Site 1 at pre-construction stage to ensure that the locations of the proposed access points are suitable.
T3	Intersection of Military Road / Ben Boyd Road	Moderate increase in traffic volumes by about 10% in the future; noting the Growth Scenario has resulted in an anticipated minor reduction in traffic volumes at this intersection, with majority of the traffic increase is attributed to the background traffic growth. Existing performance for this intersection is currently at an acceptable LOS C.	Consider intersection modelling at this intersection to determine performance in the future (year 2041).
T4	Intersection of Military Road / Rangers Road	Moderate increase in traffic volumes by about 13% to 16% in the future; noting the Growth Scenario has a minimal impact to this increase, with majority of the traffic increase is attributed to the background traffic growth. Existing performance for this intersection is acceptable at an LOS C.	Consider intersection modelling at this intersection to determine performance in the future (year 2041).

T5	Military Road (Within study area)	As part of the preferred option for Rangers Road Plaza, a pedestrian crossing at the intersection of Military Road / Rangers Road has been proposed. Based on SIDRA modelling and site observations, there are currently insufficient queue length observed at: • Military Road / Ben Boyd Road • Military Road / Young Street • Military Road / Wycombe Road The expected increase in traffic volumes along Military Road is between 8% to 16% of its existing volumes. The increase in traffic volumes along Military Road is expected to increase average delays and existing queue lengths.	Consider network modelling for the intersections along Military Road to determine potential impact(s) from proposed crossing in the first instance (future year 2041).

Table 7.2: Potential issues and Recommended Actions (Road Safety)

Map Reference	Location	Issue	Recommendation
RS1	Cooper Lane (between Grosvenor Street and Grosvenor Lane)	**Sightlines when exiting driveways**: It appears as though trees may obstruct driver sightlines when exiting driveways, particularly the residential access driveway on Cooper Lane. There is a risk of a side-impact collision between vehicles.	Consider investigating further in the next stage of the public domain upgrades development.
RS2	Cooper Lane (between Grosvenor Street and Grosvenor Lane)	**Sightlines for drivers exiting Cooper Lane**: The skewed intersection alignment and vegetation on the south-eastern corner of the Grosvenor Street/ Cooper Lane intersection may obstruct driver sightlines to oncoming westbound traffic in Grosvenor Street. There is a risk of a side-impact collision between vehicles. The likelihood of a collision occurring is increased by the additional traffic in Cooper Lane generated by the development.	Consider investigating further in the next stage of the public domain upgrades development.
RS3	Cooper Lane (between Grosvenor Street	It is unclear what type of shared zone on Cooper Lane is indented to be. If the intention is a 10km/h Shared Zone, pedestrians have right of way over vehicles. The proposed residential access driveway on	Consider investigating further in the next stage of the public domain upgrades development.

	and Grosvenor Lane)	Cooper Lane is likely to create more traffic in Cooper Lane, hence a greater risk of vehicle/ pedestrian collision in Cooper Lane.	
RS4.1	Site 1	Trucks may not be able to safely make a left turn out the driveway: • Risk of collision with eastbound vehicle in Grosvenor Street	Location of loading dock for Site 1 to be reviewed during its development to ensure that risks and likelihoods of potential conflicts are minimised.
RS4.2		Trucks may need to reverse into the driveway: • Risk of collision with eastbound vehicle in Grosvenor Street • Risk of collision with pedestrians walking along footpath on southern side of Grosvenor Street (due to restricted visibility in heavy vehicles)	
RS4.3		The loading dock driveway is located within close proximity to Cooper Lane (minimum 6m in AS2890.1): • Risk of vehicle collision as vehicles may turn across each other's paths (e.g. vehicle waiting to turn out right from Cooper Lane may not realise there is a vehicle waiting to turn left out of the loading driveway)	
RS4.4		The loading dock driveway is an additional conflict point between vehicles/ pedestrians on the southern side of Grosvenor Street, increasing the likelihood of a vehicle/ pedestrian collision.	

Table 7.3: Recommended Actions (Parking)

Map Reference	Location	Recommendation
-	Study area wide	Consider the development and implementation of a parking wayfinding strategy for the Neutral Bay Town Centre to improve parking efficiency and identify key areas of parking for different user needs. This should adopt at a minimum a static signage approach however could be enhanced with real time variable signage. An indicative wayfinding strategy is detailed in Section 5.4.2.1.
-	Study area wide	Consider investigating demand for on-street car share spaces and identify potential opportunities (if required) for additional on-street car share spaces. It is recommended that car share bay locations should be evenly spread out across the town centre and provided in close proximity to areas where they are needed such as higher-density residential developments.

-	Study area wide	Consider area-wide review of parking restrictions to increase parking turnover in areas with short-stay land uses. An increase in longer-stay off-street parking spaces, which may be anticipated from the future developments such as the Coles redevelopment site at 43-51 Grosvenor Street, provides opportunity to introduce reduction in timed parking restrictions to existing on-street parking within the town centre. For example, areas for consideration within the town centre whereby a reduction of timed parking restrictions can be applied include the 2-hour parking zones along Grosvenor Street, Military Road between Wycombe Road and Waters Road and Barry Street north of Yeo Street

Table 7.4: Issues and Recommended Actions (Walking, Cycling and Public Transport)

Map Reference	Location	Issue	Recommendation
Walking			
W1	Grosvenor Street	Safety concerns from the community regarding rat-running traffic observed along Grosvenor Street, which currently has a speed limit of 50km/h.	Consider undertaking a review of the surrounding speed environment and potentially implement speed reduction (30km/h or 40km/h HPAA) along Grosvenor Street and other traffic calming measures.
W2	Grosvenor Street (between Young Street and Waters Road)	Higher pedestrian activity is expected around Grosvenor Street, and particularly within the area between Young Street and Waters Road where the major redevelopment sites and the proposed Grosvenor Lane plaza are located. Currently, there is a lack of dedicated north-south crossing facilities along Grosvenor Street.	Consider investigating opportunity to introduce additional formal crossing facilities for north-south crossing movements along Grosvenor Street, particularly between Young Stret and Waters Road where higher pedestrian activity is expected.
W3	Ben Boyd Lane (between Grosvenor Street and Grosvenor Lane)	From the LATM findings, there are currently narrow and disjointed footpaths on Ben Boyd Lane connecting the Grosvenor Lane shared zone to Grosvenor Street: • Narrow footpath along the western segment of Ben Boyd Lane from Grosvenor Street (approx. 0.4m wide) • Footpaths leading from Grosvenor Street ends halfway at Ben Boyd Lane	Consider investigating opportunity to implement a 10km/h shared zone.
W4	Cooper Lane (between Grosvenor Street and Grosvenor Lane)	Safety concerns from the community over inadequate footpath widths to accommodate pedestrian volumes. Significant increase in	Consider reviewing existing footpaths along Cooper Lane. Investigate opportunity for traffic calming treatments or 10

		vehicular movements expected along this street as part of the Growth Scenario.	km/h shared zone implementation along this segment of Cooper Lane.
W5	Grosvenor Lane (between Young Street and Cooper Lane)	Significant increase in vehicular movements expected along this street as part of the Growth Scenario.	Investigate opportunity for traffic calming treatments (i.e. speed humps/cushions) along this segment of Grosvenor Lane.
W6	Grosvenor Lane (between Ben Boyd Road and Young Street)	Potential high motor vehicle speeds with the downhill slope from west to east along the Grosvenor Street shared zone. Given the vulnerability of pedestrians, this has been identified as a risk.	Investigate opportunity for additional traffic calming treatments (i.e. speed humps/cushions) along this segment of Grosvenor Lane.
W7	Intersection of Military Road / Rangers Road	Footpath space can be limited at Military Road bus corridor during peak travel hours to cater for the relatively high number of passengers that clusters at the bus stop while facilitating pedestrian through movement.	Consider investigating opportunity to widen footpaths around bus stops, particularly around stops serviced by the B-Line buses with high boarding and alighting volumes. It should be noted that footpath will be widened with the increased building setbacks at certain sections of Military Road as part of Council's proposed public upgrade plan for the town centre.
W8	Intersection of Yeo Street / Barry Street	Pedestrian demand for desire line to cross Yeo Street from Barry Street (noted in LATM Zone 6 2018 report)	Consider investigating area for formal crossing facilities and potential traffic calming measures to facilitate safe pedestrian crossing, potentially addressing issue relating to rat-running traffic along Yeo Street.
W9	Yeo Street (between Rangers Road and Wycombe Road)	Safety concerns over rat-running traffic observed along Yeo Street. With the introduction of the proposed Rangers Road plaza and a site-through link off Yeo Street, higher pedestrian activity is expected in the area.	Consider undertaking a review of the surrounding speed environment and implement speed reduction along Yeo Street and other traffic calming measures; In the scenario that a site-through link is introduced as part of the implementation of the Rangers Road Plaza, a midblock formal pedestrian crossing point near the site-through link is likely required to align with the pedestrian desire line.
Cycling			
C1	Study area	Relatively low number of public bicycle parking facilities are provided within the town centre to attract increased bike riding trips.	Consider investigating opportunity to provide additional bike parking facilities close to key destinations and easily accessible locations (such as open plaza).

C2	Study area	There are no dedicated cycleways that currently connect the Town Centre to the broader formal cycleways (shared paths) at Sutherland Street to the north. However, it should be noted that council is proposing a separated cycle path on Young Street between Grosvenor Street and Sutherland Street. this will provide a safe cycleway connection between town centre and Sutherland Street cycleway to the north.	
C3	Study area	Lack of bicycle parking spaces within the town centre portion south of Military Road.	Consider investigating opportunity to provide bike parking facilities close to key destinations and easily accessible locations (such as open plaza).
Public Transport			
PT1	Study area	There are some community concerns over a lack of capacity on current bus services during morning and afternoon commute peak periods.	Consider investigating community concerns further and, if required, liaise with TfNSW for an alternative Bus Service to and from the City with terminus location at Neutral Bay. This would also relieve the pressure on existing bus services such as B-Line routes.

Stantec Australia Pty Ltd
Level 9, The Forum,
203 Pacific Highway
St Leonards NSW 2065
Tel +61 2 9496 7700

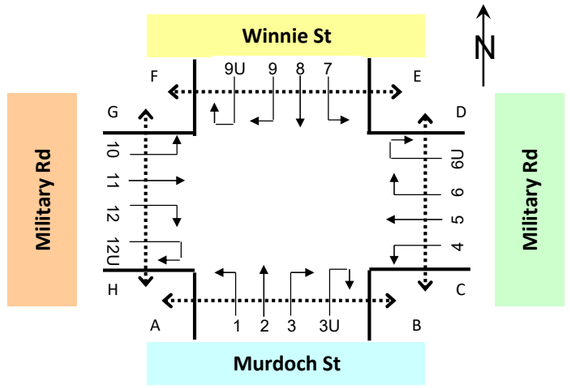
stantec.com/au

Appendices

Appendix A Traffic survey results

Job No. : AUNSW7199
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 1. Military Rd / Winnie St / Murdoch St

Day/Date : Wed, 28th June 2023
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



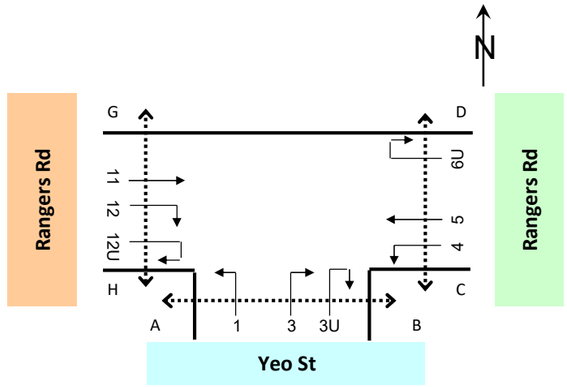
MATRIX Traffic and Transport Data

Approach			Murdoch St				Military Rd				Winnie St				Military Rd				Grand Total
Time Period			Lights	Heavies	Buses	Total	Lights	Heavies	Buses	Total	Lights	Heavies	Buses	Total	Lights	Heavies	Buses	Total	
AM	7:30	to 8:30	115	2	1	**118**	1,990	68	134	**2,192**	157	2	12	**171**	1,589	121	95	**1,805**	**4,286**
PM	17:00	to 18:00	142	0	0	**142**	1,655	24	88	**1,767**	233	0	12	**245**	2,338	16	125	**2,479**	**4,633**

Approach			Murdoch St				Military Rd				Winnie St				Military Rd				Grand Total
Time Period			Lights	Heavies	Buses	Total	Lights	Heavies	Buses	Total	Lights	Heavies	Buses	Total	Lights	Heavies	Buses	Total	
7:00	to	8:00	91	1	0	**92**	1,878	62	121	**2,061**	115	3	15	**133**	1,572	147	82	**1,801**	**4,087**
7:15	to	8:15	98	1	0	**99**	1,941	70	130	**2,141**	130	2	15	**147**	1,575	144	91	**1,810**	**4,197**
7:30	to	8:30	115	2	1	**118**	1,990	68	134	**2,192**	157	2	12	**171**	1,589	121	95	**1,805**	**4,286**
7:45	to	8:45	118	2	1	**121**	1,969	80	126	**2,175**	164	2	11	**177**	1,596	101	91	**1,788**	**4,261**
8:00	to	9:00	123	1	1	**125**	1,900	88	118	**2,106**	185	3	10	**198**	1,578	107	95	**1,780**	**4,209**
8:15	to	9:15	128	1	1	**130**	1,831	84	116	**2,031**	200	3	10	**213**	1,656	101	92	**1,849**	**4,223**
8:30	to	9:30	134	1	0	**135**	1,810	91	102	**2,003**	191	5	9	**205**	1,707	108	83	**1,898**	**4,241**
8:45	to	9:45	148	1	1	**150**	1,745	93	95	**1,933**	224	9	8	**241**	1,703	117	84	**1,904**	**4,228**
9:00	to	10:00	136	2	2	**140**	1,722	94	83	**1,899**	205	8	6	**219**	1,661	111	72	**1,844**	**4,102**
AM Totals			**350**	**4**	**3**	**357**	**5,500**	**244**	**322**	**6,066**	**505**	**14**	**31**	**550**	**4,811**	**365**	**249**	**5,425**	**12,398**
15:30	to	16:30	97	0	0	**97**	1,638	66	95	**1,799**	207	0	2	**209**	2,040	43	87	**2,170**	**4,275**
15:45	to	16:45	104	0	1	**105**	1,599	61	106	**1,766**	195	0	4	**199**	2,134	39	93	**2,266**	**4,336**
16:00	to	17:00	117	0	2	**119**	1,538	58	92	**1,688**	200	2	5	**207**	2,150	31	93	**2,274**	**4,288**
16:15	to	17:15	138	0	2	**140**	1,549	45	98	**1,692**	195	2	5	**202**	2,228	30	102	**2,360**	**4,394**
16:30	to	17:30	137	0	2	**139**	1,579	39	99	**1,717**	206	2	12	**220**	2,297	20	111	**2,428**	**4,504**
16:45	to	17:45	133	0	1	**134**	1,608	31	94	**1,733**	230	2	11	**243**	2,327	18	113	**2,458**	**4,568**
17:00	to	18:00	142	0	0	**142**	1,655	24	88	**1,767**	233	0	12	**245**	2,338	16	125	**2,479**	**4,633**
17:15	to	18:15	119	0	1	**120**	1,619	19	88	**1,726**	237	0	12	**249**	2,328	15	133	**2,476**	**4,571**
17:30	to	18:30	116	0	1	**117**	1,525	16	81	**1,622**	236	0	8	**244**	2,252	15	132	**2,399**	**4,382**
PM Totals			**350**	**0**	**3**	**353**	**4,742**	**121**	**275**	**5,138**	**649**	**2**	**22**	**673**	**6,589**	**78**	**330**	**6,997**	**13,161**

Job No. : AUNSW7199
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 2. Rangers Rd / Yeo St

Day/Date : Wed, 28th June 2023
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



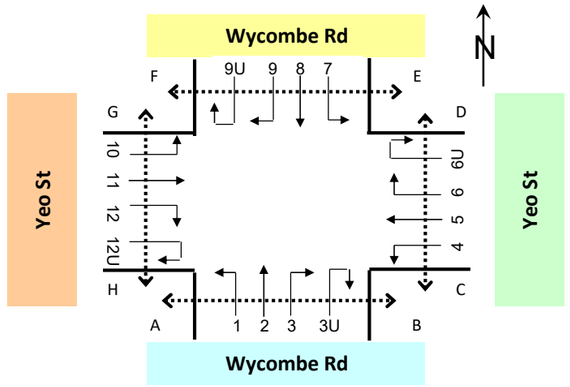
MATRIX Traffic and Transport Data

Approach	Yeo St				Rangers Rd					Rangers Rd				Grand Total
Time Period	Lights	Heavies	Buses	Total	Lights	Heavies	Buses	Total		Lights	Heavies	Buses	Total	
AM 8:30 to 9:30	179	5	3	**187**	335	2	0	**337**		72	1	0	**73**	**597**
PM 17:00 to 18:00	296	0	0	**296**	278	0	0	**278**		86	0	0	**86**	**660**

Approach	Yeo St				Rangers Rd					Rangers Rd				Grand Total
Time Period	Lights	Heavies	Buses	Total	Lights	Heavies	Buses	Total		Lights	Heavies	Buses	Total	
7:00 to 8:00	121	2	5	**128**	236	1	1	**238**		50	0	0	**50**	**416**
7:15 to 8:15	139	3	5	**147**	258	3	2	**263**		57	0	0	**57**	**467**
7:30 to 8:30	130	3	6	**139**	280	3	2	**285**		60	0	0	**60**	**484**
7:45 to 8:45	144	3	7	**154**	302	4	2	**308**		69	0	0	**69**	**531**
8:00 to 9:00	140	4	5	**149**	322	4	1	**327**		78	0	0	**78**	**554**
8:15 to 9:15	164	3	4	**171**	342	2	0	**344**		78	1	0	**79**	**594**
8:30 to 9:30	179	5	3	**187**	335	2	0	**337**		72	1	0	**73**	**597**
8:45 to 9:45	177	5	1	**183**	315	1	0	**316**		59	1	0	**60**	**559**
9:00 to 10:00	180	4	0	**184**	292	1	0	**293**		56	1	0	**57**	**534**
AM Totals	**441**	**10**	**10**	**461**	**850**	**6**	**2**	**858**		**184**	**1**	**0**	**185**	**1,504**
15:30 to 16:30	182	2	0	**184**	328	3	0	**331**		61	1	0	**62**	**577**
15:45 to 16:45	193	1	0	**194**	285	4	0	**289**		62	1	0	**63**	**546**
16:00 to 17:00	226	1	0	**227**	258	3	0	**261**		63	0	0	**63**	**551**
16:15 to 17:15	248	1	0	**249**	264	2	0	**266**		69	0	0	**69**	**584**
16:30 to 17:30	262	0	0	**262**	277	1	0	**278**		71	0	0	**71**	**611**
16:45 to 17:45	288	0	0	**288**	269	0	0	**269**		70	0	0	**70**	**627**
17:00 to 18:00	296	0	0	**296**	278	0	0	**278**		86	0	0	**86**	**660**
17:15 to 18:15	277	0	0	**277**	266	0	0	**266**		82	0	0	**82**	**625**
17:30 to 18:30	272	0	0	**272**	243	0	0	**243**		80	0	0	**80**	**595**
PM Totals	**716**	**2**	**0**	**718**	**848**	**4**	**0**	**852**		**212**	**1**	**0**	**213**	**1,783**

Job No. : AUNSW7199
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 3. Yeo St / Wycombe Rd

Day/Date : Wed, 28th June 2023
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



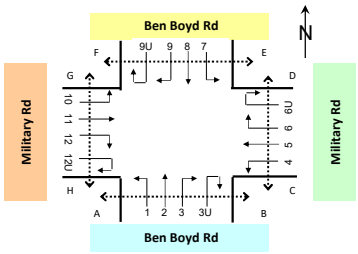
MATRIX Traffic and Transport Data

	Approach	Wycombe Rd				Yeo St				Wycombe Rd				Yeo St				Grand Total
	Time Period	Lights	Heavies	Buses	Total	Lights	Heavies	Buses	Total	Lights	Heavies	Buses	Total	Lights	Heavies	Buses	Total	
AM	8:30 to 9:30	236	4	3	**243**	340	2	0	**342**	73	5	7	**85**	355	4	4	**363**	**1,033**
PM	16:45 to 17:45	229	0	2	**231**	280	0	0	**280**	60	0	9	**69**	415	0	2	**417**	**997**

Approach	Wycombe Rd				Yeo St				Wycombe Rd				Yeo St				Grand Total
Time Period	Lights	Heavies	Buses	Total	Lights	Heavies	Buses	Total	Lights	Heavies	Buses	Total	Lights	Heavies	Buses	Total	
7:00 to 8:00	190	3	3	**196**	231	1	0	**232**	43	3	7	**53**	201	5	8	**214**	**695**
7:15 to 8:15	200	3	3	**206**	269	2	0	**271**	42	3	8	**53**	229	6	7	**242**	**772**
7:30 to 8:30	200	5	4	**209**	293	3	0	**296**	37	3	7	**47**	243	7	6	**256**	**808**
7:45 to 8:45	224	3	4	**231**	312	4	0	**316**	43	3	9	**55**	272	5	7	**284**	**886**
8:00 to 9:00	221	4	4	**229**	335	4	0	**339**	50	4	8	**62**	303	5	5	**313**	**943**
8:15 to 9:15	232	5	4	**241**	361	2	0	**363**	61	5	7	**73**	338	4	3	**345**	**1,022**
8:30 to 9:30	236	4	3	**243**	340	2	0	**342**	73	5	7	**85**	355	4	4	**363**	**1,033**
8:45 to 9:45	213	4	3	**220**	319	1	0	**320**	70	5	5	**80**	333	5	2	**340**	**960**
9:00 to 10:00	205	4	2	**211**	297	1	0	**298**	66	4	7	**77**	322	4	1	**327**	**913**
AM Totals	**616**	**11**	**9**	**636**	**863**	**6**	**0**	**869**	**159**	**11**	**22**	**192**	**826**	**14**	**14**	**854**	**2,551**
15:30 to 16:30	183	0	2	**185**	291	2	0	**293**	48	0	8	**56**	287	2	3	**292**	**826**
15:45 to 16:45	175	0	2	**177**	262	3	0	**265**	52	0	9	**61**	327	1	2	**330**	**833**
16:00 to 17:00	185	0	2	**187**	242	2	0	**244**	52	0	8	**60**	369	1	2	**372**	**863**
16:15 to 17:15	192	0	2	**194**	274	1	0	**275**	58	0	8	**66**	394	1	2	**397**	**932**
16:30 to 17:30	203	0	2	**205**	286	1	0	**287**	56	0	8	**64**	402	0	3	**405**	**961**
16:45 to 17:45	229	0	2	**231**	280	0	0	**280**	60	0	9	**69**	415	0	2	**417**	**997**
17:00 to 18:00	222	0	2	**224**	286	0	0	**286**	69	1	8	**78**	405	0	4	**409**	**997**
17:15 to 18:15	208	0	2	**210**	253	0	0	**253**	78	1	10	**89**	397	0	3	**400**	**952**
17:30 to 18:30	192	0	2	**194**	234	0	0	**234**	86	1	7	**94**	380	0	3	**383**	**905**
PM Totals	**578**	**0**	**6**	**584**	**811**	**3**	**0**	**814**	**190**	**1**	**23**	**214**	**1,069**	**2**	**9**	**1,080**	**2,692**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 1. Military Road / Ben Boyd Road

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



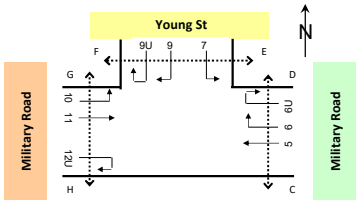
MATRIX Traffic and Transport Data

	Approach	Ben Boyd Rd			Military Rd			Ben Boyd Rd			Military Rd			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:15 to 8:15	206	9	**215**	2,214	225	**2,439**	181	3	**184**	1,883	194	**2,077**	**4,915**
PM	16:45 to 17:45	239	0	**239**	1,747	134	**1,881**	201	4	**205**	2,234	145	**2,379**	**4,704**

Approach	Ben Boyd Rd			Military Rd			Ben Boyd Rd			Military Rd			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	177	10	**187**	2,128	193	**2,321**	154	3	**157**	1,896	186	**2,082**	**4,747**
7:15 to 8:15	206	9	**215**	2,214	225	**2,439**	181	3	**184**	1,883	194	**2,077**	**4,915**
7:30 to 8:30	241	13	**254**	2,151	234	**2,385**	202	4	**206**	1,844	187	**2,031**	**4,876**
7:45 to 8:45	258	12	**270**	2,047	219	**2,266**	195	4	**199**	1,822	189	**2,011**	**4,746**
8:00 to 9:00	256	13	**269**	1,887	203	**2,090**	180	6	**186**	1,736	185	**1,921**	**4,466**
AM Totals	**433**	**23**	**456**	**4,015**	**396**	**4,411**	**334**	**9**	**343**	**3,632**	**371**	**4,003**	**9,213**
16:15 to 17:15	233	2	**235**	1,592	142	**1,734**	206	3	**209**	2,263	142	**2,405**	**4,583**
16:30 to 17:30	239	2	**241**	1,694	151	**1,845**	200	5	**205**	2,236	152	**2,388**	**4,679**
16:45 to 17:45	239	0	**239**	1,747	134	**1,881**	201	4	**205**	2,234	145	**2,379**	**4,704**
17:00 to 18:00	237	2	**239**	1,719	123	**1,842**	205	4	**209**	2,244	149	**2,393**	**4,683**
17:15 to 18:15	236	2	**238**	1,627	112	**1,739**	184	5	**189**	2,238	152	**2,390**	**4,556**
PM Totals	**469**	**4**	**473**	**3,219**	**254**	**3,473**	**390**	**8**	**398**	**4,501**	**294**	**4,795**	**9,139**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 2. Military Road / Young St

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



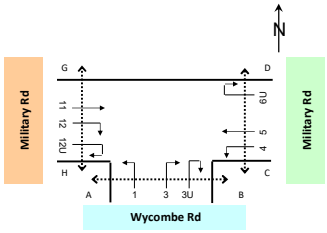
MATRIX Traffic and Transport Data

	Approach		Military Road			Young St			Military Road			Grand Total
	Time Period		Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:15	to 8:15	2,240	227	**2,467**	0	0	**0**	1,679	177	**1,856**	**4,323**
PM	16:45	to 17:45	1,767	126	**1,893**	0	0	**0**	2,060	145	**2,205**	**4,098**

Approach		Military Road			Young St			Military Road			Grand Total
Time Period		Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00	to 8:00	2,145	192	**2,337**	0	0	**0**	1,703	168	**1,871**	**4,208**
7:15	to 8:15	2,240	227	**2,467**	0	0	**0**	1,679	177	**1,856**	**4,323**
7:30	to 8:30	2,176	233	**2,409**	0	0	**0**	1,614	174	**1,788**	**4,197**
7:45	to 8:45	2,076	218	**2,294**	0	0	**0**	1,575	175	**1,750**	**4,044**
8:00	to 9:00	1,894	199	**2,093**	0	0	**0**	1,467	179	**1,646**	**3,739**
AM Totals		**4,039**	**391**	**4,430**	**0**	**0**	**0**	**3,170**	**347**	**3,517**	**7,947**
16:15	to 17:15	1,616	139	**1,755**	0	0	**0**	2,067	136	**2,203**	**3,958**
16:30	to 17:30	1,713	146	**1,859**	0	0	**0**	2,062	144	**2,206**	**4,065**
16:45	to 17:45	1,767	126	**1,893**	0	0	**0**	2,060	145	**2,205**	**4,098**
17:00	to 18:00	1,744	117	**1,861**	0	0	**0**	2,057	146	**2,203**	**4,064**
17:15	to 18:15	1,664	107	**1,771**	0	0	**0**	2,067	150	**2,217**	**3,988**
PM Totals		**3,280**	**246**	**3,526**	**0**	**0**	**0**	**4,134**	**286**	**4,420**	**7,946**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 3. Military Road / Wycombe Road

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



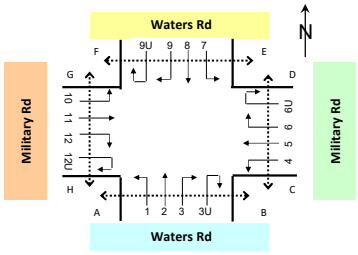
MATRIX Traffic and Transport Data

	Approach	Wycombe Rd			Military Rd				Military Rd			
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total		Lights	Heavies	Total	Grand Total
AM	7:15 to 8:15	160	14	**174**	2,173	228	**2,401**		1,690	175	**1,865**	**4,440**
PM	16:45 to 17:45	171	10	**181**	1,725	130	**1,855**		2,090	147	**2,237**	**4,273**

Approach	Wycombe Rd			Military Rd				Military Rd			
Time Period	Lights	Heavies	Total	Lights	Heavies	Total		Lights	Heavies	Total	Grand Total
7:00 to 8:00	135	11	**146**	2,083	197	**2,280**		1,729	167	**1,896**	**4,322**
7:15 to 8:15	160	14	**174**	2,173	228	**2,401**		1,690	175	**1,865**	**4,440**
7:30 to 8:30	186	18	**204**	2,104	236	**2,340**		1,606	173	**1,779**	**4,323**
7:45 to 8:45	191	17	**208**	2,003	222	**2,225**		1,552	172	**1,724**	**4,157**
8:00 to 9:00	205	16	**221**	1,816	201	**2,017**		1,450	179	**1,629**	**3,867**
AM Totals	**340**	**27**	**367**	**3,899**	**398**	**4,297**		**3,179**	**346**	**3,525**	**8,189**
16:15 to 17:15	161	8	**169**	1,574	142	**1,716**		2,092	138	**2,230**	**4,115**
16:30 to 17:30	175	11	**186**	1,678	147	**1,825**		2,097	145	**2,242**	**4,253**
16:45 to 17:45	171	10	**181**	1,725	130	**1,855**		2,090	147	**2,237**	**4,273**
17:00 to 18:00	165	11	**176**	1,722	127	**1,849**		2,074	149	**2,223**	**4,248**
17:15 to 18:15	154	11	**165**	1,669	120	**1,789**		2,098	150	**2,248**	**4,202**
PM Totals	**315**	**19**	**334**	**3,243**	**262**	**3,505**		**4,190**	**288**	**4,478**	**8,317**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 4. Military Road / Waters Road

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



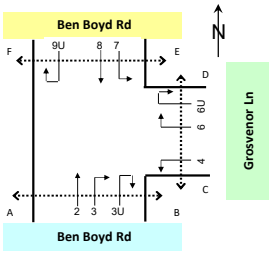
MATRIX Traffic and Transport Data

	Approach	Waters Rd			Military Rd			Waters Rd			Military Rd			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:15 to 8:15	26	10	**36**	2,190	218	**2,408**	93	5	**98**	1,765	183	**1,948**	**4,490**
PM	16:30 to 17:30	68	2	**70**	1,655	148	**1,803**	152	0	**152**	2,208	151	**2,359**	**4,384**

Approach	Waters Rd			Military Rd			Waters Rd			Military Rd			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	23	6	**29**	2,098	191	**2,289**	69	1	**70**	1,783	177	**1,960**	**4,348**
7:15 to 8:15	26	10	**36**	2,190	218	**2,408**	93	5	**98**	1,765	183	**1,948**	**4,490**
7:30 to 8:30	40	11	**51**	2,119	225	**2,344**	101	6	**107**	1,709	184	**1,893**	**4,395**
7:45 to 8:45	48	11	**59**	2,013	213	**2,226**	104	8	**112**	1,645	179	**1,824**	**4,221**
8:00 to 9:00	45	12	**57**	1,826	191	**2,017**	101	8	**109**	1,546	188	**1,734**	**3,917**
AM Totals	**68**	**18**	**86**	**3,924**	**382**	**4,306**	**170**	**9**	**179**	**3,329**	**365**	**3,694**	**8,265**
16:15 to 17:15	78	2	**80**	1,543	142	**1,685**	149	0	**149**	2,196	141	**2,337**	**4,251**
16:30 to 17:30	68	2	**70**	1,655	148	**1,803**	152	0	**152**	2,208	151	**2,359**	**4,384**
16:45 to 17:45	62	0	**62**	1,697	130	**1,827**	141	0	**141**	2,199	153	**2,352**	**4,382**
17:00 to 18:00	61	0	**61**	1,686	127	**1,813**	136	0	**136**	2,184	156	**2,340**	**4,350**
17:15 to 18:15	61	1	**62**	1,625	120	**1,745**	113	0	**113**	2,200	158	**2,358**	**4,278**
PM Totals	**139**	**3**	**142**	**3,168**	**262**	**3,430**	**262**	**0**	**262**	**4,396**	**299**	**4,695**	**8,529**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 5. Ben Boyd Road / Grosvenor Lane

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



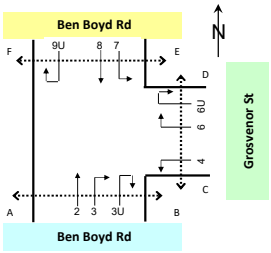
MATRIX Traffic and Transport Data

	Approach	Ben Boyd Rd			Grosvenor Ln			Ben Boyd Rd			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:45 to 8:45	448	20	**468**	0	0	**0**	202	6	**208**	**676**
PM	16:15 to 17:15	415	6	**421**	0	0	**0**	219	4	**223**	**644**

Approach	Ben Boyd Rd			Grosvenor Ln			Ben Boyd Rd			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	317	22	**339**	0	0	**0**	165	3	**168**	**507**
7:15 to 8:15	367	22	**389**	0	0	**0**	197	3	**200**	**589**
7:30 to 8:30	404	20	**424**	0	0	**0**	207	4	**211**	**635**
7:45 to 8:45	448	20	**468**	0	0	**0**	202	6	**208**	**676**
8:00 to 9:00	453	18	**471**	0	0	**0**	187	9	**196**	**667**
AM Totals	**770**	**40**	**810**	**0**	**0**	**0**	**352**	**12**	**364**	**1,174**
16:15 to 17:15	415	6	**421**	0	0	**0**	219	4	**223**	**644**
16:30 to 17:30	396	4	**400**	0	0	**0**	215	5	**220**	**620**
16:45 to 17:45	395	1	**396**	0	0	**0**	220	5	**225**	**621**
17:00 to 18:00	412	2	**414**	0	0	**0**	217	4	**221**	**635**
17:15 to 18:15	426	2	**428**	0	0	**0**	203	5	**208**	**636**
PM Totals	**841**	**8**	**849**	**0**	**0**	**0**	**422**	**9**	**431**	**1,280**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 6. Ben Boyd Road / Grosvenor Street

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



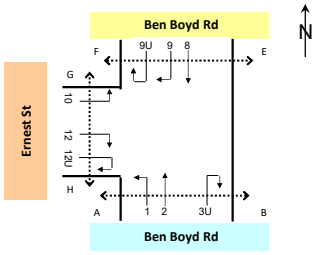
MATRIX Traffic and Transport Data

	Approach	Ben Boyd Rd			Grosvenor St			Ben Boyd Rd				Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total		
AM	7:45 to 8:45	327	17	**344**	169	7	**176**	102	1	**103**		**623**
PM	16:15 to 17:15	313	6	**319**	193	2	**195**	82	1	**83**		**597**

Approach	Ben Boyd Rd			Grosvenor St			Ben Boyd Rd				Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total		
7:00 to 8:00	244	18	**262**	143	3	**146**	84	2	**86**		**494**
7:15 to 8:15	282	20	**302**	163	4	**167**	100	2	**102**		**571**
7:30 to 8:30	290	18	**308**	161	6	**167**	113	1	**114**		**589**
7:45 to 8:45	327	17	**344**	169	7	**176**	102	1	**103**		**623**
8:00 to 9:00	335	17	**352**	160	8	**168**	100	3	**103**		**623**
AM Totals	**579**	**35**	**614**	**303**	**11**	**314**	**184**	**5**	**189**		**1,117**
16:15 to 17:15	313	6	**319**	193	2	**195**	82	1	**83**		**597**
16:30 to 17:30	303	5	**308**	194	2	**196**	80	2	**82**		**586**
16:45 to 17:45	288	2	**290**	209	2	**211**	76	2	**78**		**579**
17:00 to 18:00	301	3	**304**	206	1	**207**	76	4	**80**		**591**
17:15 to 18:15	310	3	**313**	192	1	**193**	76	4	**80**		**586**
PM Totals	**623**	**9**	**632**	**385**	**3**	**388**	**158**	**5**	**163**		**1,183**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 7. Ben Boyd Road / Ernest Street

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



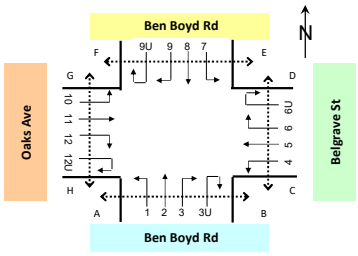
MATRIX Traffic and Transport Data

	Approach	Ben Boyd Rd				Ben Boyd Rd			Ernest St			Grand Total
	Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:45 to 8:45	278	13	**291**		1,560	19	**1,579**	472	24	**496**	**2,366**
PM	16:45 to 17:45	246	2	**248**		716	14	**730**	1,020	13	**1,033**	**2,011**

Approach	Ben Boyd Rd				Ben Boyd Rd			Ernest St			Grand Total
Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	245	17	**262**		1,157	23	**1,180**	369	22	**391**	**1,833**
7:15 to 8:15	264	17	**281**		1,352	19	**1,371**	405	21	**426**	**2,078**
7:30 to 8:30	255	14	**269**		1,523	19	**1,542**	442	20	**462**	**2,273**
7:45 to 8:45	278	13	**291**		1,560	19	**1,579**	472	24	**496**	**2,366**
8:00 to 9:00	282	12	**294**		1,570	17	**1,587**	465	18	**483**	**2,364**
AM Totals	**527**	**29**	**556**		**2,727**	**40**	**2,767**	**834**	**40**	**874**	**4,197**
16:15 to 17:15	263	5	**268**		769	18	**787**	825	14	**839**	**1,894**
16:30 to 17:30	262	5	**267**		754	15	**769**	942	11	**953**	**1,989**
16:45 to 17:45	246	2	**248**		716	14	**730**	1,020	13	**1,033**	**2,011**
17:00 to 18:00	263	3	**266**		677	11	**688**	1,038	10	**1,048**	**2,002**
17:15 to 18:15	246	3	**249**		623	12	**635**	1,085	5	**1,090**	**1,974**
PM Totals	**509**	**8**	**517**		**1,392**	**30**	**1,422**	**1,910**	**19**	**1,929**	**3,868**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 8. Ben Boyd Road / Oaks Avenue

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



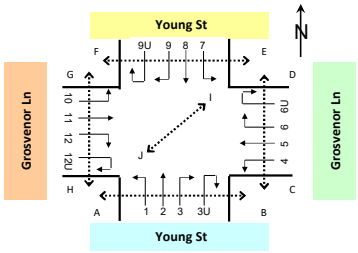
MATRIX Traffic and Transport Data

	Approach	Ben Boyd Rd			Belgrave St			Ben Boyd Rd			Oaks Ave			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:45 to 8:45	652	31	**683**	1,550	19	**1,569**	32	0	**32**	27	0	**27**	**2,311**
PM	16:45 to 17:45	1,178	14	**1,192**	700	13	**713**	36	2	**38**	34	1	**35**	**1,978**

Approach	Ben Boyd Rd			Belgrave St			Ben Boyd Rd			Oaks Ave			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	512	32	**544**	1,150	23	**1,173**	24	0	**24**	15	0	**15**	**1,756**
7:15 to 8:15	561	30	**591**	1,344	19	**1,363**	26	0	**26**	19	0	**19**	**1,999**
7:30 to 8:30	602	27	**629**	1,514	18	**1,532**	30	0	**30**	23	0	**23**	**2,214**
7:45 to 8:45	652	31	**683**	1,550	19	**1,569**	32	0	**32**	27	0	**27**	**2,311**
8:00 to 9:00	645	23	**668**	1,559	19	**1,578**	27	0	**27**	25	0	**25**	**2,298**
AM Totals	**1,157**	**55**	**1,212**	**2,709**	**42**	**2,751**	**51**	**0**	**51**	**40**	**0**	**40**	**4,054**
16:15 to 17:15	997	16	**1,013**	753	17	**770**	26	2	**28**	38	1	**39**	**1,850**
16:30 to 17:30	1,109	14	**1,123**	737	15	**752**	32	2	**34**	37	1	**38**	**1,947**
16:45 to 17:45	1,178	14	**1,192**	700	13	**713**	36	2	**38**	34	1	**35**	**1,978**
17:00 to 18:00	1,199	10	**1,209**	666	11	**677**	38	1	**39**	34	1	**35**	**1,960**
17:15 to 18:15	1,244	7	**1,251**	619	14	**633**	30	0	**30**	20	1	**21**	**1,935**
PM Totals	**2,241**	**23**	**2,264**	**1,372**	**31**	**1,403**	**56**	**2**	**58**	**58**	**2**	**60**	**3,785**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 9. Young Street / Grosvenor Lane

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



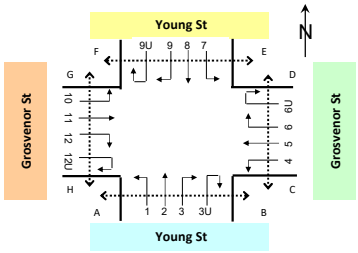
MATRIX Traffic and Transport Data

	Approach	Young St			Grosvenor Ln			Young St			Grosvenor Ln			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:45 to 8:45	4	0	**4**	0	0	**0**	79	6	**85**	98	3	**101**	**190**
PM	16:45 to 17:45	10	0	**10**	1	0	**1**	94	0	**94**	147	1	**148**	**253**

Approach	Young St			Grosvenor Ln			Young St			Grosvenor Ln			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	2	0	**2**	0	0	**0**	63	0	**63**	77	4	**81**	**146**
7:15 to 8:15	2	0	**2**	0	0	**0**	74	3	**77**	85	4	**89**	**168**
7:30 to 8:30	3	0	**3**	0	0	**0**	77	5	**82**	89	3	**92**	**177**
7:45 to 8:45	4	0	**4**	0	0	**0**	79	6	**85**	98	3	**101**	**190**
8:00 to 9:00	2	0	**2**	0	0	**0**	74	6	**80**	90	1	**91**	**173**
AM Totals	**4**	**0**	**4**	**0**	**0**	**0**	**137**	**6**	**143**	**167**	**5**	**172**	**319**
16:15 to 17:15	9	0	**9**	1	0	**1**	83	0	**83**	132	1	**133**	**226**
16:30 to 17:30	9	0	**9**	1	0	**1**	91	0	**91**	134	1	**135**	**236**
16:45 to 17:45	10	0	**10**	1	0	**1**	94	0	**94**	147	1	**148**	**253**
17:00 to 18:00	8	0	**8**	0	0	**0**	85	0	**85**	145	0	**145**	**238**
17:15 to 18:15	9	0	**9**	0	0	**0**	90	0	**90**	154	0	**154**	**253**
PM Totals	**18**	**0**	**18**	**1**	**0**	**1**	**173**	**0**	**173**	**286**	**1**	**287**	**479**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 10. Young Street / Grosvenor Street

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



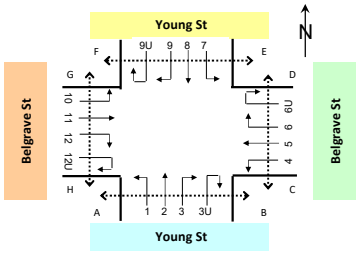
MATRIX Traffic and Transport Data

	Approach	Young St			Grosvenor St			Young St			Grosvenor St			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:45 to 8:45	54	1	**55**	189	6	**195**	147	2	**149**	121	6	**127**	**526**
PM	17:15 to 18:15	97	0	**97**	222	1	**223**	180	0	**180**	123	0	**123**	**623**

Approach	Young St			Grosvenor St			Young St			Grosvenor St			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	39	0	**39**	162	4	**166**	125	0	**125**	61	3	**64**	**394**
7:15 to 8:15	39	0	**39**	183	5	**188**	143	0	**143**	77	4	**81**	**451**
7:30 to 8:30	38	0	**38**	195	6	**201**	144	2	**146**	99	5	**104**	**489**
7:45 to 8:45	54	1	**55**	189	6	**195**	147	2	**149**	121	6	**127**	**526**
8:00 to 9:00	48	1	**49**	171	7	**178**	152	2	**154**	116	6	**122**	**503**
AM Totals	**87**	**1**	**88**	**333**	**11**	**344**	**277**	**2**	**279**	**177**	**9**	**186**	**897**
16:15 to 17:15	73	1	**74**	200	1	**201**	144	0	**144**	109	0	**109**	**528**
16:30 to 17:30	82	1	**83**	207	1	**208**	162	0	**162**	106	0	**106**	**559**
16:45 to 17:45	98	1	**99**	228	1	**229**	179	0	**179**	111	0	**111**	**618**
17:00 to 18:00	89	0	**89**	224	0	**224**	189	0	**189**	117	0	**117**	**619**
17:15 to 18:15	97	0	**97**	222	1	**223**	180	0	**180**	123	0	**123**	**623**
PM Totals	**170**	**1**	**171**	**422**	**2**	**424**	**324**	**0**	**324**	**232**	**0**	**232**	**1,151**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 11. Young Street / Belgrave Street

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



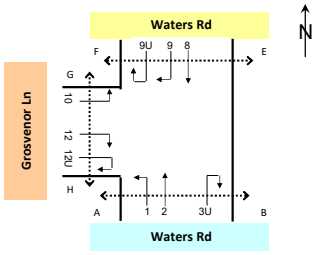
MATRIX Traffic and Transport Data

	Approach	Young St			Belgrave St			Young St			Belgrave St			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:45 to 8:45	127	1	**128**	1,533	19	**1,552**	147	1	**148**	573	31	**604**	**2,432**
PM	16:45 to 17:45	156	0	**156**	690	11	**701**	156	1	**157**	1,074	10	**1,084**	**2,098**

Approach	Young St			Belgrave St			Young St			Belgrave St			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	92	2	**94**	1,188	23	**1,211**	120	0	**120**	467	30	**497**	**1,922**
7:15 to 8:15	107	2	**109**	1,354	18	**1,372**	139	0	**139**	498	29	**527**	**2,147**
7:30 to 8:30	119	1	**120**	1,510	17	**1,527**	145	0	**145**	533	26	**559**	**2,351**
7:45 to 8:45	127	1	**128**	1,533	19	**1,552**	147	1	**148**	573	31	**604**	**2,432**
8:00 to 9:00	122	1	**123**	1,558	20	**1,578**	145	1	**146**	550	24	**574**	**2,421**
AM Totals	**214**	**3**	**217**	**2,746**	**43**	**2,789**	**265**	**1**	**266**	**1,017**	**54**	**1,071**	**4,343**
16:15 to 17:15	125	0	**125**	729	16	**745**	149	0	**149**	899	12	**911**	**1,930**
16:30 to 17:30	138	0	**138**	715	13	**728**	163	1	**164**	997	10	**1,007**	**2,037**
16:45 to 17:45	156	0	**156**	690	11	**701**	156	1	**157**	1,074	10	**1,084**	**2,098**
17:00 to 18:00	141	0	**141**	668	7	**675**	157	2	**159**	1,113	5	**1,118**	**2,093**
17:15 to 18:15	160	0	**160**	621	8	**629**	140	3	**143**	1,162	4	**1,166**	**2,098**
PM Totals	**285**	**0**	**285**	**1,350**	**24**	**1,374**	**289**	**3**	**292**	**2,061**	**16**	**2,077**	**4,028**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 12. Waters Road / Grosvenor Lane

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



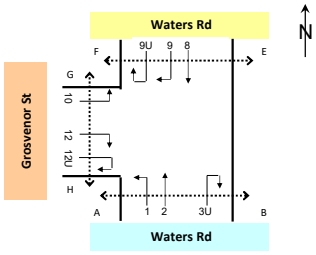
MATRIX Traffic and Transport Data

	Approach	Waters Rd				Waters Rd			Grosvenor Ln			Grand Total
	Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
AM	8:00 to 9:00	79	6	**85**		69	2	**71**	75	8	**83**	**239**
PM	16:45 to 17:45	71	2	**73**		107	0	**107**	133	3	**136**	**316**

Approach	Waters Rd				Waters Rd			Grosvenor Ln			Grand Total
Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	50	5	**55**		42	0	**42**	62	3	**65**	**162**
7:15 to 8:15	67	5	**72**		63	0	**63**	65	7	**72**	**207**
7:30 to 8:30	70	5	**75**		74	1	**75**	62	8	**70**	**220**
7:45 to 8:45	68	6	**74**		73	2	**75**	67	8	**75**	**224**
8:00 to 9:00	79	6	**85**		69	2	**71**	75	8	**83**	**239**
AM Totals	**129**	**11**	**140**		**111**	**2**	**113**	**137**	**11**	**148**	**401**
16:15 to 17:15	69	2	**71**		102	0	**102**	131	3	**134**	**307**
16:30 to 17:30	65	2	**67**		106	0	**106**	130	3	**133**	**306**
16:45 to 17:45	71	2	**73**		107	0	**107**	133	3	**136**	**316**
17:00 to 18:00	68	0	**68**		99	0	**99**	136	2	**138**	**305**
17:15 to 18:15	78	0	**78**		83	0	**83**	131	1	**132**	**293**
PM Totals	**147**	**2**	**149**		**185**	**0**	**185**	**262**	**4**	**266**	**600**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 13. Waters Road / Grosvenor Street

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



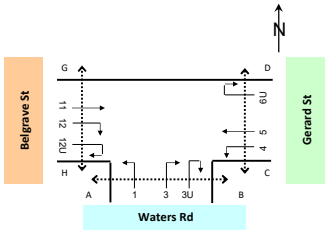
MATRIX Traffic and Transport Data

	Approach	Waters Rd				Waters Rd			Grosvenor St			Grand Total
	Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
AM	8:00 to 9:00	122	9	**131**		184	2	**186**	103	1	**104**	**421**
PM	16:45 to 17:45	171	5	**176**		116	1	**117**	156	0	**156**	**449**

Approach	Waters Rd				Waters Rd			Grosvenor St			Grand Total
Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	91	5	**96**		129	0	**129**	55	1	**56**	**281**
7:15 to 8:15	107	6	**113**		176	0	**176**	74	1	**75**	**364**
7:30 to 8:30	110	8	**118**		195	0	**195**	91	1	**92**	**405**
7:45 to 8:45	105	9	**114**		197	2	**199**	100	1	**101**	**414**
8:00 to 9:00	122	9	**131**		184	2	**186**	103	1	**104**	**421**
AM Totals	**213**	**14**	**227**		**313**	**2**	**315**	**158**	**2**	**160**	**702**
16:15 to 17:15	151	5	**156**		123	1	**124**	161	0	**161**	**441**
16:30 to 17:30	151	5	**156**		116	1	**117**	165	0	**165**	**438**
16:45 to 17:45	171	5	**176**		116	1	**117**	156	0	**156**	**449**
17:00 to 18:00	162	2	**164**		112	1	**113**	152	0	**152**	**429**
17:15 to 18:15	176	1	**177**		98	0	**98**	145	0	**145**	**420**
PM Totals	**327**	**6**	**333**		**221**	**1**	**222**	**306**	**0**	**306**	**861**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 14. Waters Road / Belgrave Street

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



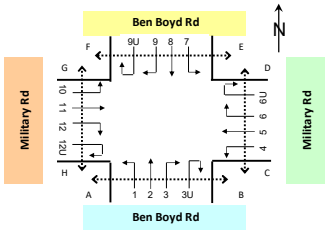
MATRIX Traffic and Transport Data

	Approach	Waters Rd			Gerard St				Belgrave St			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total		Lights	Heavies	Total	
AM	7:45 to 8:45	142	4	**146**	1,676	19	**1,695**		537	27	**564**	**2,405**
PM	17:15 to 18:15	161	0	**161**	665	8	**673**		1,368	6	**1,374**	**2,208**

Approach	Waters Rd			Gerard St				Belgrave St			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total		Lights	Heavies	Total	
7:00 to 8:00	105	3	**108**	1,273	23	**1,296**		433	29	**462**	**1,866**
7:15 to 8:15	123	3	**126**	1,480	17	**1,497**		452	28	**480**	**2,103**
7:30 to 8:30	138	3	**141**	1,652	17	**1,669**		498	24	**522**	**2,332**
7:45 to 8:45	142	4	**146**	1,676	19	**1,695**		537	27	**564**	**2,405**
8:00 to 9:00	148	3	**151**	1,687	19	**1,706**		520	23	**543**	**2,400**
AM Totals	**253**	**6**	**259**	**2,960**	**42**	**3,002**		**953**	**52**	**1,005**	**4,266**
16:15 to 17:15	180	3	**183**	802	14	**816**		867	12	**879**	**1,878**
16:30 to 17:30	174	3	**177**	780	11	**791**		960	10	**970**	**1,938**
16:45 to 17:45	174	3	**177**	754	9	**763**		1,036	11	**1,047**	**1,987**
17:00 to 18:00	167	1	**168**	722	7	**729**		1,073	6	**1,079**	**1,976**
17:15 to 18:15	161	0	**161**	665	8	**673**		1,368	6	**1,374**	**2,208**
PM Totals	**341**	**3**	**344**	**1,467**	**22**	**1,489**		**2,235**	**18**	**2,253**	**4,086**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 1. Military Road / Ben Boyd Road

Day/Date : Sat, 23rd July 2022
Weather : Rainy
Description : Classified Intersection Count
: Peak Hour Summary



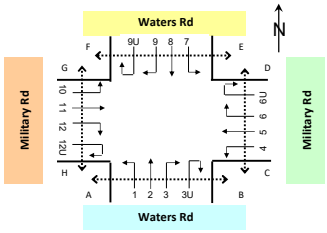
MATRIX Traffic and Transport Data

Approach	Ben Boyd Rd			Military Rd			Ben Boyd Rd			Military Rd			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
12:15 to 13:15	268	5	**273**	1,930	57	**1,987**	242	4	**246**	2,122	53	**2,175**	**4,681**

Approach	Ben Boyd Rd			Military Rd			Ben Boyd Rd			Military Rd			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
11:45 to 12:45	281	4	**285**	1,862	44	**1,906**	228	2	**230**	2,109	57	**2,166**	**4,587**
12:00 to 13:00	281	7	**288**	1,880	50	**1,930**	238	4	**242**	2,062	54	**2,116**	**4,576**
12:15 to 13:15	268	5	**273**	1,930	57	**1,987**	242	4	**246**	2,122	53	**2,175**	**4,681**
12:30 to 13:30	251	4	**255**	1,915	56	**1,971**	247	4	**251**	2,120	47	**2,167**	**4,644**
12:45 to 13:45	256	4	**260**	1,886	53	**1,939**	248	3	**251**	2,060	47	**2,107**	**4,557**
Total	**537**	**8**	**545**	**3,748**	**97**	**3,845**	**476**	**5**	**481**	**4,169**	**104**	**4,273**	**9,144**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 4. Military Road / Waters Road

Day/Date : Sat, 23rd July 2022
Weather : Rainy
Description : Classified Intersection Count
: Peak Hour Summary



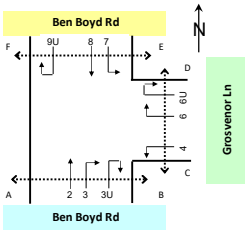
MATRIX Traffic and Transport Data

Approach	Waters Rd			Military Rd			Waters Rd			Military Rd			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
12:15 to 13:15	154	2	**156**	1,842	57	**1,899**	119	1	**120**	2,030	57	**2,087**	**4,262**

Approach	Waters Rd			Military Rd			Waters Rd			Military Rd			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
11:45 to 12:45	152	2	**154**	1,824	45	**1,869**	139	1	**140**	2,015	62	**2,077**	**4,240**
12:00 to 13:00	156	3	**159**	1,804	52	**1,856**	137	1	**138**	1,984	62	**2,046**	**4,199**
12:15 to 13:15	154	2	**156**	1,842	57	**1,899**	119	1	**120**	2,030	57	**2,087**	**4,262**
12:30 to 13:30	146	1	**147**	1,801	59	**1,860**	119	0	**119**	2,010	53	**2,063**	**4,189**
12:45 to 13:45	131	2	**133**	1,826	60	**1,886**	136	0	**136**	1,990	50	**2,040**	**4,195**
Total	**283**	**4**	**287**	**3,650**	**105**	**3,755**	**275**	**1**	**276**	**4,005**	**112**	**4,117**	**8,435**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 5. Ben Boyd Road / Grosvenor Lane

Day/Date : Sat, 23rd July 2022
Weather : Rainy
Description : Classified Intersection Count
: Peak Hour Summary



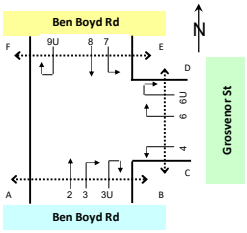
MATRIX Traffic and Transport Data

Approach	Ben Boyd Rd			Grosvenor Ln			Ben Boyd Rd				Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total		
12:15 to 13:15	479	3	**482**	0	0	**0**	264	5	**269**		**751**

Approach	Ben Boyd Rd			Grosvenor Ln			Ben Boyd Rd				Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total		
11:45 to 12:45	460	5	**465**	0	0	**0**	245	2	**247**		**712**
12:00 to 13:00	468	6	**474**	0	0	**0**	254	5	**259**		**733**
12:15 to 13:15	479	3	**482**	0	0	**0**	264	5	**269**		**751**
12:30 to 13:30	462	4	**466**	0	0	**0**	269	4	**273**		**739**
12:45 to 13:45	454	3	**457**	0	0	**0**	271	3	**274**		**731**
Total	**914**	**8**	**922**	**0**	**0**	**0**	**516**	**5**	**521**		**1,443**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 6. Ben Boyd Road / Grosvenor Street

Day/Date : Sat, 23rd July 2022
Weather : Rainy
Description : Classified Intersection Count
: Peak Hour Summary



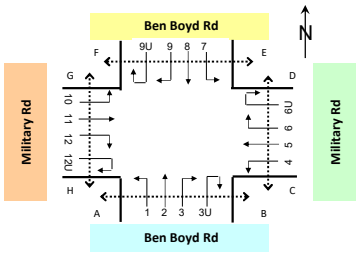
MATRIX Traffic and Transport Data

Approach	Ben Boyd Rd			Grosvenor St			Ben Boyd Rd				Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total		
12:15 to 13:15	366	3	**369**	243	3	**246**	99	2	**101**		**716**

Approach	Ben Boyd Rd			Grosvenor St			Ben Boyd Rd				Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total		
11:45 to 12:45	342	4	**346**	211	1	**212**	105	1	**106**		**664**
12:00 to 13:00	349	5	**354**	230	3	**233**	98	2	**100**		**687**
12:15 to 13:15	366	3	**369**	243	3	**246**	99	2	**101**		**716**
12:30 to 13:30	342	3	**345**	250	2	**252**	109	2	**111**		**708**
12:45 to 13:45	344	2	**346**	245	2	**247**	102	1	**103**		**696**
Total	**686**	**6**	**692**	**456**	**3**	**459**	**207**	**2**	**209**		**1,360**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 1. Military Road / Ben Boyd Road

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



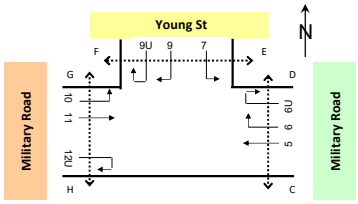
MATRIX Traffic and Transport Data

	Approach	Ben Boyd Rd			Military Rd			Ben Boyd Rd			Military Rd			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:15 to 8:15	206	9	**215**	2,214	225	**2,439**	181	3	**184**	1,883	194	**2,077**	**4,915**
PM	16:45 to 17:45	239	0	**239**	1,747	134	**1,881**	201	4	**205**	2,234	145	**2,379**	**4,704**

Approach	Ben Boyd Rd			Military Rd			Ben Boyd Rd			Military Rd			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	177	10	**187**	2,128	193	**2,321**	154	3	**157**	1,896	186	**2,082**	**4,747**
7:15 to 8:15	206	9	**215**	2,214	225	**2,439**	181	3	**184**	1,883	194	**2,077**	**4,915**
7:30 to 8:30	241	13	**254**	2,151	234	**2,385**	202	4	**206**	1,844	187	**2,031**	**4,876**
7:45 to 8:45	258	12	**270**	2,047	219	**2,266**	195	4	**199**	1,822	189	**2,011**	**4,746**
8:00 to 9:00	256	13	**269**	1,887	203	**2,090**	180	6	**186**	1,736	185	**1,921**	**4,466**
AM Totals	**433**	**23**	**456**	**4,015**	**396**	**4,411**	**334**	**9**	**343**	**3,632**	**371**	**4,003**	**9,213**
16:15 to 17:15	233	2	**235**	1,592	142	**1,734**	206	3	**209**	2,263	142	**2,405**	**4,583**
16:30 to 17:30	239	2	**241**	1,694	151	**1,845**	200	5	**205**	2,236	152	**2,388**	**4,679**
16:45 to 17:45	239	0	**239**	1,747	134	**1,881**	201	4	**205**	2,234	145	**2,379**	**4,704**
17:00 to 18:00	237	2	**239**	1,719	123	**1,842**	205	4	**209**	2,244	149	**2,393**	**4,683**
17:15 to 18:15	236	2	**238**	1,627	112	**1,739**	184	5	**189**	2,238	152	**2,390**	**4,556**
PM Totals	**469**	**4**	**473**	**3,219**	**254**	**3,473**	**390**	**8**	**398**	**4,501**	**294**	**4,795**	**9,139**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 2. Military Road / Young St

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



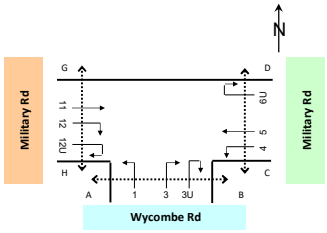
MATRIX Traffic and Transport Data

	Approach		Military Road			Young St			Military Road			Grand Total
	Time Period		Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:15	to 8:15	2,240	227	**2,467**	0	0	**0**	1,679	177	**1,856**	**4,323**
PM	16:45	to 17:45	1,767	126	**1,893**	0	0	**0**	2,060	145	**2,205**	**4,098**

Approach		Military Road			Young St			Military Road			Grand Total
Time Period		Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00	to 8:00	2,145	192	**2,337**	0	0	**0**	1,703	168	**1,871**	**4,208**
7:15	to 8:15	2,240	227	**2,467**	0	0	**0**	1,679	177	**1,856**	**4,323**
7:30	to 8:30	2,176	233	**2,409**	0	0	**0**	1,614	174	**1,788**	**4,197**
7:45	to 8:45	2,076	218	**2,294**	0	0	**0**	1,575	175	**1,750**	**4,044**
8:00	to 9:00	1,894	199	**2,093**	0	0	**0**	1,467	179	**1,646**	**3,739**
AM Totals		**4,039**	**391**	**4,430**	**0**	**0**	**0**	**3,170**	**347**	**3,517**	**7,947**
16:15	to 17:15	1,616	139	**1,755**	0	0	**0**	2,067	136	**2,203**	**3,958**
16:30	to 17:30	1,713	146	**1,859**	0	0	**0**	2,062	144	**2,206**	**4,065**
16:45	to 17:45	1,767	126	**1,893**	0	0	**0**	2,060	145	**2,205**	**4,098**
17:00	to 18:00	1,744	117	**1,861**	0	0	**0**	2,057	146	**2,203**	**4,064**
17:15	to 18:15	1,664	107	**1,771**	0	0	**0**	2,067	150	**2,217**	**3,988**
PM Totals		**3,280**	**246**	**3,526**	**0**	**0**	**0**	**4,134**	**286**	**4,420**	**7,946**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 3. Military Road / Wycombe Road

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



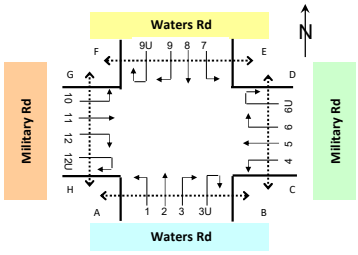
MATRIX Traffic and Transport Data

	Approach	Wycombe Rd			Military Rd				Military Rd			
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total		Lights	Heavies	Total	Grand Total
AM	7:15 to 8:15	160	14	**174**	2,173	228	**2,401**		1,690	175	**1,865**	**4,440**
PM	16:45 to 17:45	171	10	**181**	1,725	130	**1,855**		2,090	147	**2,237**	**4,273**

Approach	Wycombe Rd			Military Rd				Military Rd			
Time Period	Lights	Heavies	Total	Lights	Heavies	Total		Lights	Heavies	Total	Grand Total
7:00 to 8:00	135	11	**146**	2,083	197	**2,280**		1,729	167	**1,896**	**4,322**
7:15 to 8:15	160	14	**174**	2,173	228	**2,401**		1,690	175	**1,865**	**4,440**
7:30 to 8:30	186	18	**204**	2,104	236	**2,340**		1,606	173	**1,779**	**4,323**
7:45 to 8:45	191	17	**208**	2,003	222	**2,225**		1,552	172	**1,724**	**4,157**
8:00 to 9:00	205	16	**221**	1,816	201	**2,017**		1,450	179	**1,629**	**3,867**
AM Totals	**340**	**27**	**367**	**3,899**	**398**	**4,297**		**3,179**	**346**	**3,525**	**8,189**
16:15 to 17:15	161	8	**169**	1,574	142	**1,716**		2,092	138	**2,230**	**4,115**
16:30 to 17:30	175	11	**186**	1,678	147	**1,825**		2,097	145	**2,242**	**4,253**
16:45 to 17:45	171	10	**181**	1,725	130	**1,855**		2,090	147	**2,237**	**4,273**
17:00 to 18:00	165	11	**176**	1,722	127	**1,849**		2,074	149	**2,223**	**4,248**
17:15 to 18:15	154	11	**165**	1,669	120	**1,789**		2,098	150	**2,248**	**4,202**
PM Totals	**315**	**19**	**334**	**3,243**	**262**	**3,505**		**4,190**	**288**	**4,478**	**8,317**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 4. Military Road / Waters Road

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



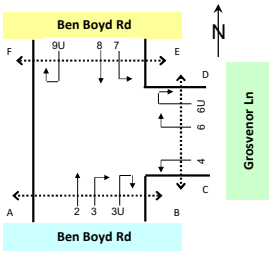
MATRIX Traffic and Transport Data

	Approach	Waters Rd			Military Rd			Waters Rd			Military Rd			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:15 to 8:15	26	10	**36**	2,190	218	**2,408**	93	5	**98**	1,765	183	**1,948**	**4,490**
PM	16:30 to 17:30	68	2	**70**	1,655	148	**1,803**	152	0	**152**	2,208	151	**2,359**	**4,384**

Approach	Waters Rd			Military Rd			Waters Rd			Military Rd			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	23	6	**29**	2,098	191	**2,289**	69	1	**70**	1,783	177	**1,960**	**4,348**
7:15 to 8:15	26	10	**36**	2,190	218	**2,408**	93	5	**98**	1,765	183	**1,948**	**4,490**
7:30 to 8:30	40	11	**51**	2,119	225	**2,344**	101	6	**107**	1,709	184	**1,893**	**4,395**
7:45 to 8:45	48	11	**59**	2,013	213	**2,226**	104	8	**112**	1,645	179	**1,824**	**4,221**
8:00 to 9:00	45	12	**57**	1,826	191	**2,017**	101	8	**109**	1,546	188	**1,734**	**3,917**
AM Totals	**68**	**18**	**86**	**3,924**	**382**	**4,306**	**170**	**9**	**179**	**3,329**	**365**	**3,694**	**8,265**
16:15 to 17:15	78	2	**80**	1,543	142	**1,685**	149	0	**149**	2,196	141	**2,337**	**4,251**
16:30 to 17:30	68	2	**70**	1,655	148	**1,803**	152	0	**152**	2,208	151	**2,359**	**4,384**
16:45 to 17:45	62	0	**62**	1,697	130	**1,827**	141	0	**141**	2,199	153	**2,352**	**4,382**
17:00 to 18:00	61	0	**61**	1,686	127	**1,813**	136	0	**136**	2,184	156	**2,340**	**4,350**
17:15 to 18:15	61	1	**62**	1,625	120	**1,745**	113	0	**113**	2,200	158	**2,358**	**4,278**
PM Totals	**139**	**3**	**142**	**3,168**	**262**	**3,430**	**262**	**0**	**262**	**4,396**	**299**	**4,695**	**8,529**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 5. Ben Boyd Road / Grosvenor Lane

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



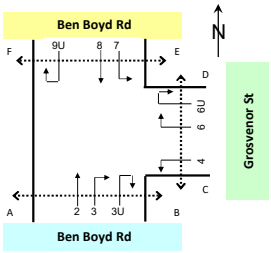
MATRIX Traffic and Transport Data

	Approach	Ben Boyd Rd			Grosvenor Ln			Ben Boyd Rd			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:45 to 8:45	448	20	**468**	0	0	**0**	202	6	**208**	**676**
PM	16:15 to 17:15	415	6	**421**	0	0	**0**	219	4	**223**	**644**

Approach	Ben Boyd Rd			Grosvenor Ln			Ben Boyd Rd			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	317	22	**339**	0	0	**0**	165	3	**168**	**507**
7:15 to 8:15	367	22	**389**	0	0	**0**	197	3	**200**	**589**
7:30 to 8:30	404	20	**424**	0	0	**0**	207	4	**211**	**635**
7:45 to 8:45	448	20	**468**	0	0	**0**	202	6	**208**	**676**
8:00 to 9:00	453	18	**471**	0	0	**0**	187	9	**196**	**667**
AM Totals	**770**	**40**	**810**	**0**	**0**	**0**	**352**	**12**	**364**	**1,174**
16:15 to 17:15	415	6	**421**	0	0	**0**	219	4	**223**	**644**
16:30 to 17:30	396	4	**400**	0	0	**0**	215	5	**220**	**620**
16:45 to 17:45	395	1	**396**	0	0	**0**	220	5	**225**	**621**
17:00 to 18:00	412	2	**414**	0	0	**0**	217	4	**221**	**635**
17:15 to 18:15	426	2	**428**	0	0	**0**	203	5	**208**	**636**
PM Totals	**841**	**8**	**849**	**0**	**0**	**0**	**422**	**9**	**431**	**1,280**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 6. Ben Boyd Road / Grosvenor Street

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



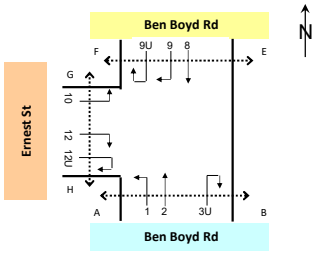
MATRIX Traffic and Transport Data

	Approach	Ben Boyd Rd			Grosvenor St			Ben Boyd Rd				Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total		
AM	7:45 to 8:45	327	17	**344**	169	7	**176**	102	1	**103**		**623**
PM	16:15 to 17:15	313	6	**319**	193	2	**195**	82	1	**83**		**597**

Approach	Ben Boyd Rd			Grosvenor St			Ben Boyd Rd				Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total		
7:00 to 8:00	244	18	**262**	143	3	**146**	84	2	**86**		**494**
7:15 to 8:15	282	20	**302**	163	4	**167**	100	2	**102**		**571**
7:30 to 8:30	290	18	**308**	161	6	**167**	113	1	**114**		**589**
7:45 to 8:45	327	17	**344**	169	7	**176**	102	1	**103**		**623**
8:00 to 9:00	335	17	**352**	160	8	**168**	100	3	**103**		**623**
AM Totals	**579**	**35**	**614**	**303**	**11**	**314**	**184**	**5**	**189**		**1,117**
16:15 to 17:15	313	6	**319**	193	2	**195**	82	1	**83**		**597**
16:30 to 17:30	303	5	**308**	194	2	**196**	80	2	**82**		**586**
16:45 to 17:45	288	2	**290**	209	2	**211**	76	2	**78**		**579**
17:00 to 18:00	301	3	**304**	206	1	**207**	76	4	**80**		**591**
17:15 to 18:15	310	3	**313**	192	1	**193**	76	4	**80**		**586**
PM Totals	**623**	**9**	**632**	**385**	**3**	**388**	**158**	**5**	**163**		**1,183**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 7. Ben Boyd Road / Ernest Street

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



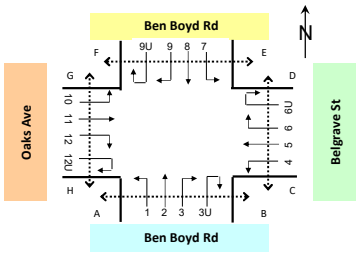
MATRIX Traffic and Transport Data

	Approach	Ben Boyd Rd				Ben Boyd Rd			Ernest St			Grand Total
	Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:45 to 8:45	278	13	**291**		1,560	19	**1,579**	472	24	**496**	**2,366**
PM	16:45 to 17:45	246	2	**248**		716	14	**730**	1,020	13	**1,033**	**2,011**

Approach	Ben Boyd Rd				Ben Boyd Rd			Ernest St			Grand Total
Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	245	17	**262**		1,157	23	**1,180**	369	22	**391**	**1,833**
7:15 to 8:15	264	17	**281**		1,352	19	**1,371**	405	21	**426**	**2,078**
7:30 to 8:30	255	14	**269**		1,523	19	**1,542**	442	20	**462**	**2,273**
7:45 to 8:45	278	13	**291**		1,560	19	**1,579**	472	24	**496**	**2,366**
8:00 to 9:00	282	12	**294**		1,570	17	**1,587**	465	18	**483**	**2,364**
AM Totals	**527**	**29**	**556**		**2,727**	**40**	**2,767**	**834**	**40**	**874**	**4,197**
16:15 to 17:15	263	5	**268**		769	18	**787**	825	14	**839**	**1,894**
16:30 to 17:30	262	5	**267**		754	15	**769**	942	11	**953**	**1,989**
16:45 to 17:45	246	2	**248**		716	14	**730**	1,020	13	**1,033**	**2,011**
17:00 to 18:00	263	3	**266**		677	11	**688**	1,038	10	**1,048**	**2,002**
17:15 to 18:15	246	3	**249**		623	12	**635**	1,085	5	**1,090**	**1,974**
PM Totals	**509**	**8**	**517**		**1,392**	**30**	**1,422**	**1,910**	**19**	**1,929**	**3,868**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 8. Ben Boyd Road / Oaks Avenue

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



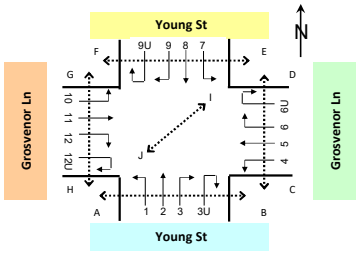
MATRIX Traffic and Transport Data

	Approach	Ben Boyd Rd			Belgrave St			Ben Boyd Rd			Oaks Ave			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:45 to 8:45	652	31	**683**	1,550	19	**1,569**	32	0	**32**	27	0	**27**	**2,311**
PM	16:45 to 17:45	1,178	14	**1,192**	700	13	**713**	36	2	**38**	34	1	**35**	**1,978**

Approach	Ben Boyd Rd			Belgrave St			Ben Boyd Rd			Oaks Ave			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	512	32	**544**	1,150	23	**1,173**	24	0	**24**	15	0	**15**	**1,756**
7:15 to 8:15	561	30	**591**	1,344	19	**1,363**	26	0	**26**	19	0	**19**	**1,999**
7:30 to 8:30	602	27	**629**	1,514	18	**1,532**	30	0	**30**	23	0	**23**	**2,214**
7:45 to 8:45	652	31	**683**	1,550	19	**1,569**	32	0	**32**	27	0	**27**	**2,311**
8:00 to 9:00	645	23	**668**	1,559	19	**1,578**	27	0	**27**	25	0	**25**	**2,298**
AM Totals	**1,157**	**55**	**1,212**	**2,709**	**42**	**2,751**	**51**	**0**	**51**	**40**	**0**	**40**	**4,054**
16:15 to 17:15	997	16	**1,013**	753	17	**770**	26	2	**28**	38	1	**39**	**1,850**
16:30 to 17:30	1,109	14	**1,123**	737	15	**752**	32	2	**34**	37	1	**38**	**1,947**
16:45 to 17:45	1,178	14	**1,192**	700	13	**713**	36	2	**38**	34	1	**35**	**1,978**
17:00 to 18:00	1,199	10	**1,209**	666	11	**677**	38	1	**39**	34	1	**35**	**1,960**
17:15 to 18:15	1,244	7	**1,251**	619	14	**633**	30	0	**30**	20	1	**21**	**1,935**
PM Totals	**2,241**	**23**	**2,264**	**1,372**	**31**	**1,403**	**56**	**2**	**58**	**58**	**2**	**60**	**3,785**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 9. Young Street / Grosvenor Lane

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



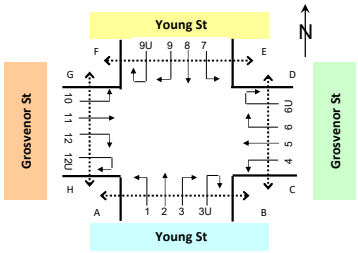
MATRIX Traffic and Transport Data

	Approach	Young St			Grosvenor Ln			Young St			Grosvenor Ln			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:45 to 8:45	4	0	**4**	0	0	**0**	79	6	**85**	98	3	**101**	**190**
PM	16:45 to 17:45	10	0	**10**	1	0	**1**	94	0	**94**	147	1	**148**	**253**

Approach	Young St			Grosvenor Ln			Young St			Grosvenor Ln			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	2	0	**2**	0	0	**0**	63	0	**63**	77	4	**81**	**146**
7:15 to 8:15	2	0	**2**	0	0	**0**	74	3	**77**	85	4	**89**	**168**
7:30 to 8:30	3	0	**3**	0	0	**0**	77	5	**82**	89	3	**92**	**177**
7:45 to 8:45	4	0	**4**	0	0	**0**	79	6	**85**	98	3	**101**	**190**
8:00 to 9:00	2	0	**2**	0	0	**0**	74	6	**80**	90	1	**91**	**173**
AM Totals	**4**	**0**	**4**	**0**	**0**	**0**	**137**	**6**	**143**	**167**	**5**	**172**	**319**
16:15 to 17:15	9	0	**9**	1	0	**1**	83	0	**83**	132	1	**133**	**226**
16:30 to 17:30	9	0	**9**	1	0	**1**	91	0	**91**	134	1	**135**	**236**
16:45 to 17:45	10	0	**10**	1	0	**1**	94	0	**94**	147	1	**148**	**253**
17:00 to 18:00	8	0	**8**	0	0	**0**	85	0	**85**	145	0	**145**	**238**
17:15 to 18:15	9	0	**9**	0	0	**0**	90	0	**90**	154	0	**154**	**253**
PM Totals	**18**	**0**	**18**	**1**	**0**	**1**	**173**	**0**	**173**	**286**	**1**	**287**	**479**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 10. Young Street / Grosvenor Street

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



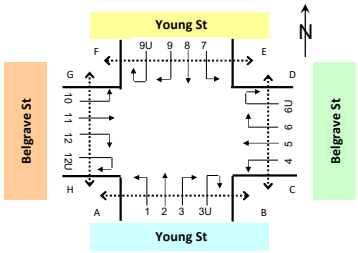
MATRIX Traffic and Transport Data

	Approach	Young St			Grosvenor St			Young St			Grosvenor St			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:45 to 8:45	54	1	**55**	189	6	**195**	147	2	**149**	121	6	**127**	**526**
PM	17:15 to 18:15	97	0	**97**	222	1	**223**	180	0	**180**	123	0	**123**	**623**

Approach	Young St			Grosvenor St			Young St			Grosvenor St			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	39	0	**39**	162	4	**166**	125	0	**125**	61	3	**64**	**394**
7:15 to 8:15	39	0	**39**	183	5	**188**	143	0	**143**	77	4	**81**	**451**
7:30 to 8:30	38	0	**38**	195	6	**201**	144	2	**146**	99	5	**104**	**489**
7:45 to 8:45	54	1	**55**	189	6	**195**	147	2	**149**	121	6	**127**	**526**
8:00 to 9:00	48	1	**49**	171	7	**178**	152	2	**154**	116	6	**122**	**503**
AM Totals	**87**	**1**	**88**	**333**	**11**	**344**	**277**	**2**	**279**	**177**	**9**	**186**	**897**
16:15 to 17:15	73	1	**74**	200	1	**201**	144	0	**144**	109	0	**109**	**528**
16:30 to 17:30	82	1	**83**	207	1	**208**	162	0	**162**	106	0	**106**	**559**
16:45 to 17:45	98	1	**99**	228	1	**229**	179	0	**179**	111	0	**111**	**618**
17:00 to 18:00	89	0	**89**	224	0	**224**	189	0	**189**	117	0	**117**	**619**
17:15 to 18:15	97	0	**97**	222	1	**223**	180	0	**180**	123	0	**123**	**623**
PM Totals	**170**	**1**	**171**	**422**	**2**	**424**	**324**	**0**	**324**	**232**	**0**	**232**	**1,151**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 11. Young Street / Belgrave Street

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



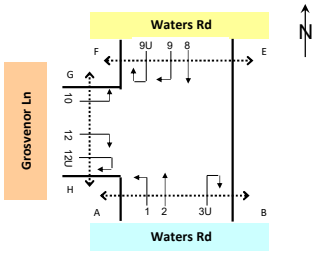
MATRIX Traffic and Transport Data

	Approach	Young St			Belgrave St			Young St			Belgrave St			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:45 to 8:45	127	1	**128**	1,533	19	**1,552**	147	1	**148**	573	31	**604**	**2,432**
PM	16:45 to 17:45	156	0	**156**	690	11	**701**	156	1	**157**	1,074	10	**1,084**	**2,098**

Approach	Young St			Belgrave St			Young St			Belgrave St			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	92	2	**94**	1,188	23	**1,211**	120	0	**120**	467	30	**497**	**1,922**
7:15 to 8:15	107	2	**109**	1,354	18	**1,372**	139	0	**139**	498	29	**527**	**2,147**
7:30 to 8:30	119	1	**120**	1,510	17	**1,527**	145	0	**145**	533	26	**559**	**2,351**
7:45 to 8:45	127	1	**128**	1,533	19	**1,552**	147	1	**148**	573	31	**604**	**2,432**
8:00 to 9:00	122	1	**123**	1,558	20	**1,578**	145	1	**146**	550	24	**574**	**2,421**
AM Totals	**214**	**3**	**217**	**2,746**	**43**	**2,789**	**265**	**1**	**266**	**1,017**	**54**	**1,071**	**4,343**
16:15 to 17:15	125	0	**125**	729	16	**745**	149	0	**149**	899	12	**911**	**1,930**
16:30 to 17:30	138	0	**138**	715	13	**728**	163	1	**164**	997	10	**1,007**	**2,037**
16:45 to 17:45	156	0	**156**	690	11	**701**	156	1	**157**	1,074	10	**1,084**	**2,098**
17:00 to 18:00	141	0	**141**	668	7	**675**	157	2	**159**	1,113	5	**1,118**	**2,093**
17:15 to 18:15	160	0	**160**	621	8	**629**	140	3	**143**	1,162	4	**1,166**	**2,098**
PM Totals	**285**	**0**	**285**	**1,350**	**24**	**1,374**	**289**	**3**	**292**	**2,061**	**16**	**2,077**	**4,028**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 12. Waters Road / Grosvenor Lane

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



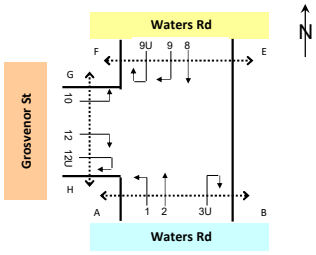
MATRIX Traffic and Transport Data

	Approach	Waters Rd				Waters Rd			Grosvenor Ln			Grand Total
	Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
AM	8:00 to 9:00	79	6	**85**		69	2	**71**	75	8	**83**	**239**
PM	16:45 to 17:45	71	2	**73**		107	0	**107**	133	3	**136**	**316**

Approach	Waters Rd				Waters Rd			Grosvenor Ln			Grand Total
Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	50	5	**55**		42	0	**42**	62	3	**65**	**162**
7:15 to 8:15	67	5	**72**		63	0	**63**	65	7	**72**	**207**
7:30 to 8:30	70	5	**75**		74	1	**75**	62	8	**70**	**220**
7:45 to 8:45	68	6	**74**		73	2	**75**	67	8	**75**	**224**
8:00 to 9:00	79	6	**85**		69	2	**71**	75	8	**83**	**239**
AM Totals	**129**	**11**	**140**		**111**	**2**	**113**	**137**	**11**	**148**	**401**
16:15 to 17:15	69	2	**71**		102	0	**102**	131	3	**134**	**307**
16:30 to 17:30	65	2	**67**		106	0	**106**	130	3	**133**	**306**
16:45 to 17:45	71	2	**73**		107	0	**107**	133	3	**136**	**316**
17:00 to 18:00	68	0	**68**		99	0	**99**	136	2	**138**	**305**
17:15 to 18:15	78	0	**78**		83	0	**83**	131	1	**132**	**293**
PM Totals	**147**	**2**	**149**		**185**	**0**	**185**	**262**	**4**	**266**	**600**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 13. Waters Road / Grosvenor Street

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



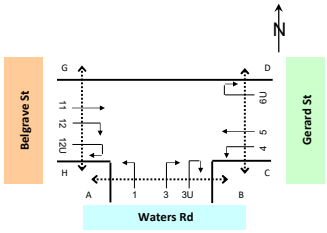
MATRIX Traffic and Transport Data

	Approach	Waters Rd				Waters Rd			Grosvenor St			Grand Total
	Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
AM	8:00 to 9:00	122	9	**131**		184	2	**186**	103	1	**104**	**421**
PM	16:45 to 17:45	171	5	**176**		116	1	**117**	156	0	**156**	**449**

Approach	Waters Rd				Waters Rd			Grosvenor St			Grand Total
Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	91	5	**96**		129	0	**129**	55	1	**56**	**281**
7:15 to 8:15	107	6	**113**		176	0	**176**	74	1	**75**	**364**
7:30 to 8:30	110	8	**118**		195	0	**195**	91	1	**92**	**405**
7:45 to 8:45	105	9	**114**		197	2	**199**	100	1	**101**	**414**
8:00 to 9:00	122	9	**131**		184	2	**186**	103	1	**104**	**421**
AM Totals	**213**	**14**	**227**		**313**	**2**	**315**	**158**	**2**	**160**	**702**
16:15 to 17:15	151	5	**156**		123	1	**124**	161	0	**161**	**441**
16:30 to 17:30	151	5	**156**		116	1	**117**	165	0	**165**	**438**
16:45 to 17:45	171	5	**176**		116	1	**117**	156	0	**156**	**449**
17:00 to 18:00	162	2	**164**		112	1	**113**	152	0	**152**	**429**
17:15 to 18:15	176	1	**177**		98	0	**98**	145	0	**145**	**420**
PM Totals	**327**	**6**	**333**		**221**	**1**	**222**	**306**	**0**	**306**	**861**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 14. Waters Road / Belgrave Street

Day/Date : Wed, 20 July 2022
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



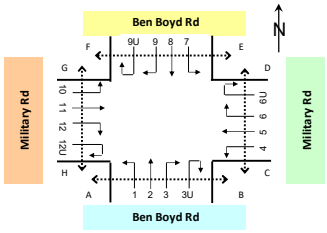
MATRIX Traffic and Transport Data

	Approach	Waters Rd			Gerard St				Belgrave St			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total		Lights	Heavies	Total	
AM	7:45 to 8:45	142	4	**146**	1,676	19	**1,695**		537	27	**564**	**2,405**
PM	17:15 to 18:15	161	0	**161**	665	8	**673**		1,368	6	**1,374**	**2,208**

Approach	Waters Rd			Gerard St				Belgrave St			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total		Lights	Heavies	Total	
7:00 to 8:00	105	3	**108**	1,273	23	**1,296**		433	29	**462**	**1,866**
7:15 to 8:15	123	3	**126**	1,480	17	**1,497**		452	28	**480**	**2,103**
7:30 to 8:30	138	3	**141**	1,652	17	**1,669**		498	24	**522**	**2,332**
7:45 to 8:45	142	4	**146**	1,676	19	**1,695**		537	27	**564**	**2,405**
8:00 to 9:00	148	3	**151**	1,687	19	**1,706**		520	23	**543**	**2,400**
AM Totals	**253**	**6**	**259**	**2,960**	**42**	**3,002**		**953**	**52**	**1,005**	**4,266**
16:15 to 17:15	180	3	**183**	802	14	**816**		867	12	**879**	**1,878**
16:30 to 17:30	174	3	**177**	780	11	**791**		960	10	**970**	**1,938**
16:45 to 17:45	174	3	**177**	754	9	**763**		1,036	11	**1,047**	**1,987**
17:00 to 18:00	167	1	**168**	722	7	**729**		1,073	6	**1,079**	**1,976**
17:15 to 18:15	161	0	**161**	665	8	**673**		1,368	6	**1,374**	**2,208**
PM Totals	**341**	**3**	**344**	**1,467**	**22**	**1,489**		**2,235**	**18**	**2,253**	**4,086**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 1. Military Road / Ben Boyd Road

Day/Date : Sat, 23rd July 2022
Weather : Rainy
Description : Classified Intersection Count
: Peak Hour Summary



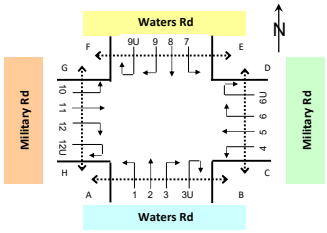
MATRIX Traffic and Transport Data

Approach	Ben Boyd Rd			Military Rd			Ben Boyd Rd			Military Rd			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
12:15 to 13:15	268	5	**273**	1,930	57	**1,987**	242	4	**246**	2,122	53	**2,175**	**4,681**

Approach	Ben Boyd Rd			Military Rd			Ben Boyd Rd			Military Rd			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
11:45 to 12:45	281	4	**285**	1,862	44	**1,906**	228	2	**230**	2,109	57	**2,166**	**4,587**
12:00 to 13:00	281	7	**288**	1,880	50	**1,930**	238	4	**242**	2,062	54	**2,116**	**4,576**
12:15 to 13:15	268	5	**273**	1,930	57	**1,987**	242	4	**246**	2,122	53	**2,175**	**4,681**
12:30 to 13:30	251	4	**255**	1,915	56	**1,971**	247	4	**251**	2,120	47	**2,167**	**4,644**
12:45 to 13:45	256	4	**260**	1,886	53	**1,939**	248	3	**251**	2,060	47	**2,107**	**4,557**
Total	**537**	**8**	**545**	**3,748**	**97**	**3,845**	**476**	**5**	**481**	**4,169**	**104**	**4,273**	**9,144**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 4. Military Road / Waters Road

Day/Date : Sat, 23rd July 2022
Weather : Rainy
Description : Classified Intersection Count
: Peak Hour Summary



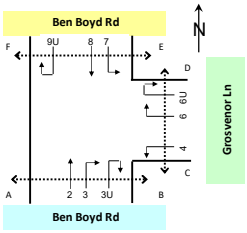
MATRIX Traffic and Transport Data

Approach	Waters Rd			Military Rd			Waters Rd			Military Rd			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
12:15 to 13:15	154	2	**156**	1,842	57	**1,899**	119	1	**120**	2,030	57	**2,087**	**4,262**

Approach	Waters Rd			Military Rd			Waters Rd			Military Rd			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
11:45 to 12:45	152	2	**154**	1,824	45	**1,869**	139	1	**140**	2,015	62	**2,077**	**4,240**
12:00 to 13:00	156	3	**159**	1,804	52	**1,856**	137	1	**138**	1,984	62	**2,046**	**4,199**
12:15 to 13:15	154	2	**156**	1,842	57	**1,899**	119	1	**120**	2,030	57	**2,087**	**4,262**
12:30 to 13:30	146	1	**147**	1,801	59	**1,860**	119	0	**119**	2,010	53	**2,063**	**4,189**
12:45 to 13:45	131	2	**133**	1,826	60	**1,886**	136	0	**136**	1,990	50	**2,040**	**4,195**
Total	**283**	**4**	**287**	**3,650**	**105**	**3,755**	**275**	**1**	**276**	**4,005**	**112**	**4,117**	**8,435**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 5. Ben Boyd Road / Grosvenor Lane

Day/Date : Sat, 23rd July 2022
Weather : Rainy
Description : Classified Intersection Count
: Peak Hour Summary



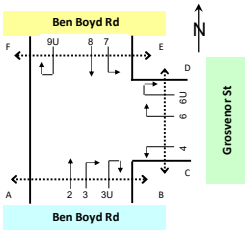
MATRIX Traffic and Transport Data

Approach	Ben Boyd Rd			Grosvenor Ln			Ben Boyd Rd				Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total		
12:15 to 13:15	479	3	**482**	0	0	**0**	264	5	**269**		**751**

Approach	Ben Boyd Rd			Grosvenor Ln			Ben Boyd Rd				Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total		
11:45 to 12:45	460	5	**465**	0	0	**0**	245	2	**247**		**712**
12:00 to 13:00	468	6	**474**	0	0	**0**	254	5	**259**		**733**
12:15 to 13:15	479	3	**482**	0	0	**0**	264	5	**269**		**751**
12:30 to 13:30	462	4	**466**	0	0	**0**	269	4	**273**		**739**
12:45 to 13:45	454	3	**457**	0	0	**0**	271	3	**274**		**731**
Total	**914**	**8**	**922**	**0**	**0**	**0**	**516**	**5**	**521**		**1,443**

Job No. : AUNSW4228
Client : Stantec Australia Pty Ltd
Suburb : Neutral Bay
Location : 6. Ben Boyd Road / Grosvenor Street

Day/Date : Sat, 23rd July 2022
Weather : Rainy
Description : Classified Intersection Count
: Peak Hour Summary



MATRIX Traffic and Transport Data

Approach	Ben Boyd Rd			Grosvenor St			Ben Boyd Rd				Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total		
12:15 to 13:15	366	3	**369**	243	3	**246**	99	2	**101**		**716**

Approach	Ben Boyd Rd			Grosvenor St			Ben Boyd Rd				Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total		
11:45 to 12:45	342	4	**346**	211	1	**212**	105	1	**106**		**664**
12:00 to 13:00	349	5	**354**	230	3	**233**	98	2	**100**		**687**
12:15 to 13:15	366	3	**369**	243	3	**246**	99	2	**101**		**716**
12:30 to 13:30	342	3	**345**	250	2	**252**	109	2	**111**		**708**
12:45 to 13:45	344	2	**346**	245	2	**247**	102	1	**103**		**696**
Total	**686**	**6**	**692**	**456**	**3**	**459**	**207**	**2**	**209**		**1,360**

Appendix B Parking survey results

Client Stantec Australia Pty Ltd
Date Wed, 28th June 2023
Time 07:00-19:00 (12 hours)
Description Parking Occupancy Survey

MATRIX Traffic and Transport Data

Street Name	Side of Street	Between	Restriction	Applicable Hours	Supply	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Grosvenor St	North	Ben Boyd Rd & Ben Boyd Ln	No Stopping														
			No Parking	Authorised car share vehicles excepted area 100	1	1	1	1	1	1	1	1	1	1	1	1	1
			1/2P	8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat) Permit holder excepted area 27	6	1	3	3	0	3	1	4	4	2	4	1	5
			No Stopping														
		Ben Boyd Ln & Young Ln	2P	Meter 8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat) Permit holder excepted area 27	9	3	8	8	7	7	8	6	6	5	6	3	6
			No Stopping														
		Young Ln & Young St	1/2P	8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat) Permit holder excepted area 27	3	0	2	2	2	2	2	3	3	2	1	3	3
			No Stopping							1							
		Young St & Cooper Ln	1/2P	90' angle rear in only vehicles under 6m only 8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat)	12	2	9	8	8	6	9	8	7	10	2	9	9
			No Stopping														
		Cooper Ln & Waters Ln	1/2P	8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat) Permit holder excepted area 27	15	4	8	8	8	7	9	9	7	8	12	9	9
			No Stopping														
		Waters Ln & Waters Rd	1/2P	8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat) Permit holder excepted area 27	5	2	4	4	4	4	5	4	3	5	4	4	3
			No Stopping														
	South	Waters Rd & Waters Ln	No Stopping														
			Work zone	7am-5pm(Mon-Fri) & 8am-1pm(Sat)	17	1	13	5	5	5	10	0	0	1	4	2	7
			No Stopping														
		Waters Ln & Cooper Ln	2P	90' angle rear in only vehicles under 6m only meter 8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat)	22	4	4	4	9	8	10	15	7	5	8	3	9
			No Stopping														
		Cooper Ln & Young St	2P	8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat)	5	2	2	3	3	3	3	5	3	4	3	5	4
			No Stopping														
		Young St & Young Ln	2P	90' angle rear in only vehicles under 6m only meter 8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat)	13	4	5	3	2	3	4	4	5	6	3	6	7
			No Stopping														
		Young Ln & Ben Boyd Ln	2P	90' angle rear in only vehicles under 6m only meter 8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat) Permit holder excepted area 27	20	6	12	10	10	10	12	8	9	7	8	10	12
			No Stopping														
		Ben Boyd Ln & Ben Boyd Rd	2P	90' angle rear in only vehicles under 6m only meter 8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat) Permit holder excepted area 27	12	6	5	4	6	2	6	11	11	7	10	10	12
			No Stopping														
Total					140	36	76	63	65	62	80	78	66	63	66	66	87
% Capacity						26%	54%	45%	46%	44%	57%	56%	47%	45%	47%	47%	62%
Young St	East	Grosvenor St & Grosvenor Ln	No Stopping														
			No Parking														
			No Stopping														
		Grosvenor Ln & Military Rd	1/2P	60' angle front in only vehicles under 6m only 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	5	5	5	5	4	5	4	5	5	5	4	4	5
			Loading zone	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	2	2	2	2	2	0	1	1	1	0	1	0	2
			No Stopping														
	West	Military Rd & Grosvenor Ln	No Stopping														
			Mail zone		2	0	0	0	0	0	0	0	0	0	0	0	0
			No Stopping	Mon-Sun													
		Grosvenor Ln & Grosvenor St	No Stopping														

Total					**9**	**7**	**7**	**7**	**6**	**5**	**5**	**6**	**6**	**5**	**5**	**4**	**7**
% Capacity						**78%**	**78%**	**78%**	**67%**	**56%**	**56%**	**67%**	**67%**	**56%**	**56%**	**44%**	**78%**
Grosvenor Ln	North	Young St & Cooper Ln	No Stopping														1
			Loading zone		**1**	0	0	0	1	1	0	0	1	1	0	1	1
			1/4P	8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat)	**2**	2	2	2	2	0	2	1	2	1	2	2	2
			1/2P & Taxi zone	1/2P - 11am-6pm(Mon-Sun) / Taxi zone - 4am-11am(Mon-Sun)	**3**	0	2	2	2	2	2	2	2	2	2	2	2
			No Stopping														
		Cooper Ln & Waters Ln	Taxi zone		**2**	0	0	0	0	0	0	1	1	0	0	0	0
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**4**	2	3	3	4	4	3	4	4	4	4	4	4
			No Stopping														
			No Parking	Community buses excepted	**2**	0	0	0	0	0	1	0	0	0	0	0	0
			No Stopping														1
		Waters Ln & Waters Rd	Loading zone	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**2**	2	1	2	0	2	2	2	1	2	2	2	2
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**3**	1	3	3	3	3	3	3	3	2	2	2	3
			NP	Authorised car share vehicles excepted area 100	**1**	1	1	1	1	1	1	1	1	1	1	1	1
			No Stopping														
	South	Waters Rd & Grosvenor Ln E	No Stopping														
		Grosvenor Ln & Grosvenor Ln	No Stopping														
		Grosvenor Ln & Young St	No Stopping														
Total					**20**	**8**	**12**	**13**	**13**	**13**	**14**	**14**	**15**	**13**	**13**	**14**	**17**
% Capacity						**40%**	**60%**	**65%**	**65%**	**65%**	**70%**	**70%**	**75%**	**65%**	**65%**	**70%**	**85%**
Waters Rd	East	11 Waters St & Military Rd	No Stopping														
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**2**	0	1	0	2	2	2	2	2	2	2	2	2
			No Parking														
			Reserved	Disabled	**1**	1	0	1	1	1	1	0	1	1	0	0	0
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**7**	3	7	7	6	7	7	7	7	7	7	7	7
			No Stopping														
	West	Military Rd & Grosvenor Ln	No Stopping														
			Loading zone		**2**	2	2	1	1	0	0	1	1	1	0	1	1
			No Stopping														
			1P	Meter 8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat)	**2**	1	2	0	1	1	2	1	1	2	1	2	2
			No Parking	Solo M-Cycle in marked space excepted	**1**	0	0	0	0	0	0	1	0	0	0	0	0
			No Stopping														1
		Grosvenor Ln & Grosvenor St	1P		**3**	0	1	1	1	3	3	2	3	2	2	3	3
			No Stopping														
Total					**18**	**7**	**13**	**10**	**12**	**14**	**15**	**14**	**15**	**15**	**12**	**15**	**16**
% Capacity						**39%**	**72%**	**56%**	**67%**	**78%**	**83%**	**78%**	**83%**	**83%**	**67%**	**83%**	**89%**
	North	Ben Boyd Rd & Young St	No Stopping														
			No Parking	10am-3pm(Mon-Fri)	**3**	0	0	0	0	0	0	0	0	0	0	0	0
			1/2P	10am-3pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**15**	0	0	0	9	11	13	13	9	0	0	0	0
			No Stopping														
		Young St & Waters Rd	No Stopping														
			Bus zone														
			No Stopping														
			2P	10am-3pm(Mon-Fri) & 8:30am-4pm(Sat)	**7**	0	0	0	5	6	7	5	6	0	0	0	0
			No Parking														
		Waters Rd & 260 Military Rd	No Stopping														
			1P	10am-3pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**2**	0	0	0	0	1	2	0	0	0	0	0	0
			No Parking								1						
			No Stopping														
			1P	10am-3pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**5**	0	0	0	1	2	3	4	1	0	0	0	0
			Bus zone														

Military Rd			No Stopping														
	South	Hampden Ave & Rangers Rd	No Stopping														
			1P	10am - 6pm (Mon - Fri), 8:30am - 12:30pm (Sat)	**2**	0	0	0	0	1	2	2	2	1	1	2	1
			No Parking														
			1P	10am - 6pm (Mon - Fri), 8:30am - 12:30pm (Sat)	**3**	0	0	0	2	1	1	3	2	2	3	3	3
			No Parking														
			1P	10am - 6pm (Mon - Fri), 8:30am - 12:30pm (Sat)	**7**	0	0	0	7	7	6	7	7	7	6	6	5
			Loading zone + Bus zone	Loading zone - 10am-6pm(Mon-Fri) / Bus zone - 6am-10am(Mon-Fri)	**4**	0	0	0	0	0	0	1	1	0	0	0	0
		Rangers Rd & Wycombe Rd	No Stopping														
			Bus zone														
		Wycombe Rd & May Gibbs Pl	No Stopping														
			1/2P	10am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**14**	0	0	0	10	9	13	12	12	4	5	9	9
		May Gibbs Pl & Bydown St	Mail zone		**1**	0	0	0	0	0	0	0	0	0	0	0	0
			No Stopping														
		Bydown St & Ben Boyd Rd	No Stopping														
			1/2P	10am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**8**	0	0	0	2	2	3	1	1	2	2	1	2
			No Stopping														
Total					**71**	**0**	**0**	**0**	**36**	**40**	**51**	**48**	**41**	**16**	**17**	**21**	**20**
% Capacity						**0%**	**0%**	**0%**	**51%**	**56%**	**72%**	**68%**	**58%**	**23%**	**24%**	**30%**	**28%**
Wycombe Rd	East	Military Rd & Yeo St	No Stopping														
			Bus zone														
			Bus Zone + 1/2P	Bus zone - 6:30am-9:30am(Mon-Fri) / 1/2P - 9:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**2**	0	0	1	1	1	2	0	1	1	0	0	2
			1/2P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**2**	0	2	2	2	2	2	1	0	2	2	1	2
			Mail zone		**1**	0	0	0	0	0	0	0	0	0	0	0	0
			No Stopping														
	West	Yeo St & Military Rd	No Stopping														
			Bus zone														
			No Stopping														
Total					**5**	**0**	**2**	**3**	**3**	**3**	**4**	**1**	**1**	**3**	**2**	**1**	**4**
% Capacity						**0%**	**40%**	**60%**	**60%**	**60%**	**80%**	**20%**	**20%**	**60%**	**40%**	**20%**	**80%**
	North	Ben Boyd Rd & Yeo Ln	No Stopping														
		Yeo Ln & Bydown St	1P	8:30am-6pm(Mon-Fri) Permit holders excepted Area 29	**4**	2	2	4	4	2	2	3	3	4	3	3	3
			No Stopping														
		Bydown St & Barry St	1P	8:30am-6pm(Mon-Fri) Permit holders excepted Area 29	**4**	3	3	4	4	3	3	3	3	3	3	2	2
			No Parking	Authorised car share vehicles excepted area 100	**2**	2	2	2	2	1	2	2	2	2	2	2	2
			No Stopping	Fire brigade vehicles excepted	**1**	0	0	0	0	0	0	0	0	0	0	0	0
			No Stopping												1		
		Barry St & May Ln	1P	8:30am-6pm(Mon-Fri) Permit holders excepted Area 29	**7**	2	5	6	6	3	6	7	5	7	6	4	7
		May Ln & Wycombe Rd	No Parking														
			No Stopping														
		Wycombe Rd & Military Ln	1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**2**	0	1	1	2	0	2	1	2	2	2	0	2
			2P	Disabled	**1**	0	0	1	1	1	1	1	0	0	1	0	0
			No Stopping														
		Military Ln & Rangers Rd	1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**1**	0	1	1	1	1	1	1	1	0	1	1	1
			1P	motorbikes in marked space only	**3**	2	2	2	2	2	2	2	2	2	2	2	2
			1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**4**	2	2	2	3	2	4	4	4	3	3	2	4
			1P	motorbikes in marked space only	**3**	2	3	3	3	3	3	3	3	3	3	3	3
			1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**2**	0	1	2	0	1	1	1	1	1	2	2	2
			No Parking														
			1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**3**	0	0	1	2	2	2	1	1	0	1	1	2
			No Stopping														
			1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**3**	1	1	1	0	2	3	2	1	1	2	1	3

Yeo St			Reserved	motorbikes in marked space only	**5**	0	0	0	0	0	0	0	0	0	0	0	0
			1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**3**	1	2	2	2	2	2	2	1	2	1	2	3
			Reserved	motorbikes in marked space only	**3**	0	0	0	0	0	0	0	0	0	0	0	0
	South	Rangers Rd & Rangers Ln	No Stopping														
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat) Permit holders excepted Area 29	**6**	2	5	5	5	5	5	4	4	5	4	5	4
			1P	Motorcycles only	**3**	0	0	0	0	0	0	0	0	0	0	0	0
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat) Permit holders excepted Area 29	**3**	0	3	3	3	2	2	3	3	3	3	2	3
			No Parking														
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat) Permit holders excepted Area 29	**1**	1	1	1	1	1	1	1	1	1	1	1	1
			No Parking														
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat) Permit holders excepted Area 29	**3**	1	3	3	3	2	2	3	3	3	2	2	2
		Rangers Ln & Wycombe Rd	No Parking														
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat) Permit holders excepted Area 29	**3**	3	2	3	2	2	2	2	3	3	2	3	3
		Wycombe Rd & Barry Ln	No Stopping														
		Barry Ln & Barry St	No Stopping														
			1P + 1/4P	1P - 9:30am-4pm(Mon-Fri) & 8:30am-12:30pm(Sat) Permit holders excepted Area 29 1/4P - 7:30am-9:30am & 4pm-6pm (Mon-Fri)	**5**	2	4	3	4	3	4	4	4	4	4	3	5
		Barry St & Bydown St	No Stopping														
			2P	8:30am-6pm(Mon-Fri) Permit holders excepted Area 29	**4**	1	2	3	3	3	4	3	3	4	4	4	1
		Bydown St & Ben Boyd Rd	No Stopping														
			2P	8:30am-6pm(Mon-Fri) Permit holders excepted Area 29	**2**	0	0	0	2	2	1	2	2	2	0	0	1
			4P	Disabled 8:30am-6pm(Mon-Sun)	**1**	0	0	0	0	0	0	0	1	1	0	0	0
			No Stopping														
Total					**82**	**27**	**45**	**53**	**55**	**45**	**55**	**55**	**53**	**56**	**53**	**45**	**56**
% Capacity						**33%**	**55%**	**65%**	**67%**	**55%**	**67%**	**67%**	**65%**	**68%**	**65%**	**55%**	**68%**
Rangers Rd	East	Military Rd & 8 Rangers Rd	No Stopping														1
			1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**6**	5	4	4	6	5	6	6	6	6	3	6	6
			Reserved	Motorcycles only	**3**	0	0	0	0	0	1	1	1	2	1	1	1
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat) Permit holders excepted area 29	**3**	3	3	2	3	1	3	3	0	1	1	2	3
			Reserved	Motorcycles only	**2**	0	0	1	1	1	2	2	1	1	1	1	1
	West	Yeo St & Military Rd	No Stopping														
			Reserved	Disabled only	**2**	0	0	0	0	0	2	1	0	1	1	0	0
			Taxi zone		**2**	0	0	2	0	2	0	1	0	0	0	1	2
			Taxi zone & Bus zone	Taxi zone - other times Bus zone - 5:45am-10am & 5:45pm-11:45pm	**6**	0	0	0	3	4	0	2	1	1	3	1	3
			No Stopping														
Total					**24**	**8**	**7**	**9**	**13**	**13**	**14**	**16**	**9**	**12**	**10**	**12**	**17**
% Capacity						**33%**	**29%**	**38%**	**54%**	**54%**	**58%**	**67%**	**38%**	**50%**	**42%**	**50%**	**71%**
Off Street Parking 1			1 1/2P	One period per day 8am-10pm(Mon-Fri) & 8am-8pm(Sat) & 8am-5pm(Sun&Public Hols)	**63**	31	60	58	52	61	62	61	57	56	47	48	54
			Reserved	Motorcycles only	**11**	3	3	3	3	3	3	3	3	3	3	2	2
			Reserved	Disabled	**4**	1	3	2	4	3	4	4	4	4	3	1	1
			1 1/2P	One period per day 8am-10pm(Mon-Fri) & 8am-8pm(Sat) & 8am-5pm(Sun&Public Hols) Small vehicles only	**1**	0	0	0	0	0	0	0	0	0	0	0	0
			Loading zone		**8**	4	4	5	5	5	3	4	3	3	3	3	1
Total					**87**	**39**	**70**	**68**	**64**	**72**	**72**	**72**	**67**	**66**	**56**	**54**	**58**
% Capacity						**45%**	**80%**	**78%**	**74%**	**83%**	**83%**	**83%**	**77%**	**76%**	**64%**	**62%**	**67%**
		Basement	2P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**19**	15	15	19	19	11	19	19	18	14	17	16	14
			2P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**7**	6	7	6	5	7	7	7	3	4	7	6	5

Off Street Parking 2		Rooftop	2P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat) Small cars only	**2**	0	0	2	2	2	2	1	1	1	1	1	1
			2P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**1**	1	1	1	1	1	1	1	1	0	1	1	0
			No Parking														
			2P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**4**	4	4	4	4	4	4	3	3	3	4	3	3
Total					**33**	**26**	**27**	**32**	**31**	**25**	**33**	**31**	**26**	**22**	**30**	**27**	**23**
% Capacity						**79%**	**82%**	**97%**	**94%**	**76%**	**100%**	**94%**	**79%**	**67%**	**91%**	**82%**	**70%**

Client	Stantec Australia Pty Ltd
Date	Sat, 1st July 2023
Time	08:00-14:00 (6 hours)
Description	Parking Occupancy Survey

MATRIX Traffic and Transport Data

Street Name	Side of Street	Between	Restriction	Applicable Hours	Supply	8:00	9:00	10:00	11:00	12:00	13:00
Grosvenor St	North	Ben Boyd Rd & Ben Boyd Ln	No Stopping								
			No Parking	Authorised car share vehicles excepted area 100	**1**	1	1	1	1	1	1
			1/2P	8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat) Permit holder excepted area 27	**6**	1	0	3	4	6	5
			No Stopping								
		Ben Boyd Ln & Young Ln	2P	Meter 8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat) Permit holder excepted area 27	**9**	2	4	3	3	7	9
			No Stopping								
		Young Ln & Young St	1/2P	8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat) Permit holder excepted area 27	**3**	0	0	1	0	2	3
			No Stopping								
		Young St & Cooper Ln	1/2P	90' angle rear in only vehicles under 6m only 8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat)	**12**	1	1	4	7	7	11
			No Stopping								
		Cooper Ln & Waters Ln	1/2P	8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat) Permit holder excepted area 27	**15**	4	9	12	13	12	14
			No Stopping								
		Waters Ln & Waters Rd	1/2P	8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat) Permit holder excepted area 27	**5**	2	3	2	1	4	5
			No Stopping								
	South	Waters Rd & Waters Ln	No Stopping								
			Work zone	7am-5pm(Mon-Fri) & 8am-1pm(Sat)	**17**	12	12	4	4	10	14
			No Stopping								
		Waters Ln & Cooper Ln	2P	90' angle rear in only vehicles under 6m only meter 8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat)	**22**	1	2	1	12	19	20
			No Stopping								
		Cooper Ln & Young St	2P	8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat)	**5**	0	2	4	4	5	5
			No Stopping								
		Young St & Young Ln	2P	90' angle rear in only vehicles under 6m only meter 8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat)	**13**	0	2	3	2	11	13
			No Stopping								
		Young Ln & Ben Boyd Ln	2P	90' angle rear in only vehicles under 6m only meter 8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat) Permit holder excepted area 27	**20**	7	11	9	10	17	18
			No Stopping								
		Ben Boyd Ln & Ben Boyd Rd	2P	90' angle rear in only vehicles under 6m only meter 8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat) Permit holder excepted area 27	**12**	6	4	1	3	9	12
			No Stopping								
Total					**140**	**37**	**51**	**48**	**64**	**110**	**130**
% Capacity						**26%**	**36%**	**34%**	**46%**	**79%**	**93%**
	East	Grosvenor St & Grosvenor Ln	No Stopping								
			No Parking								

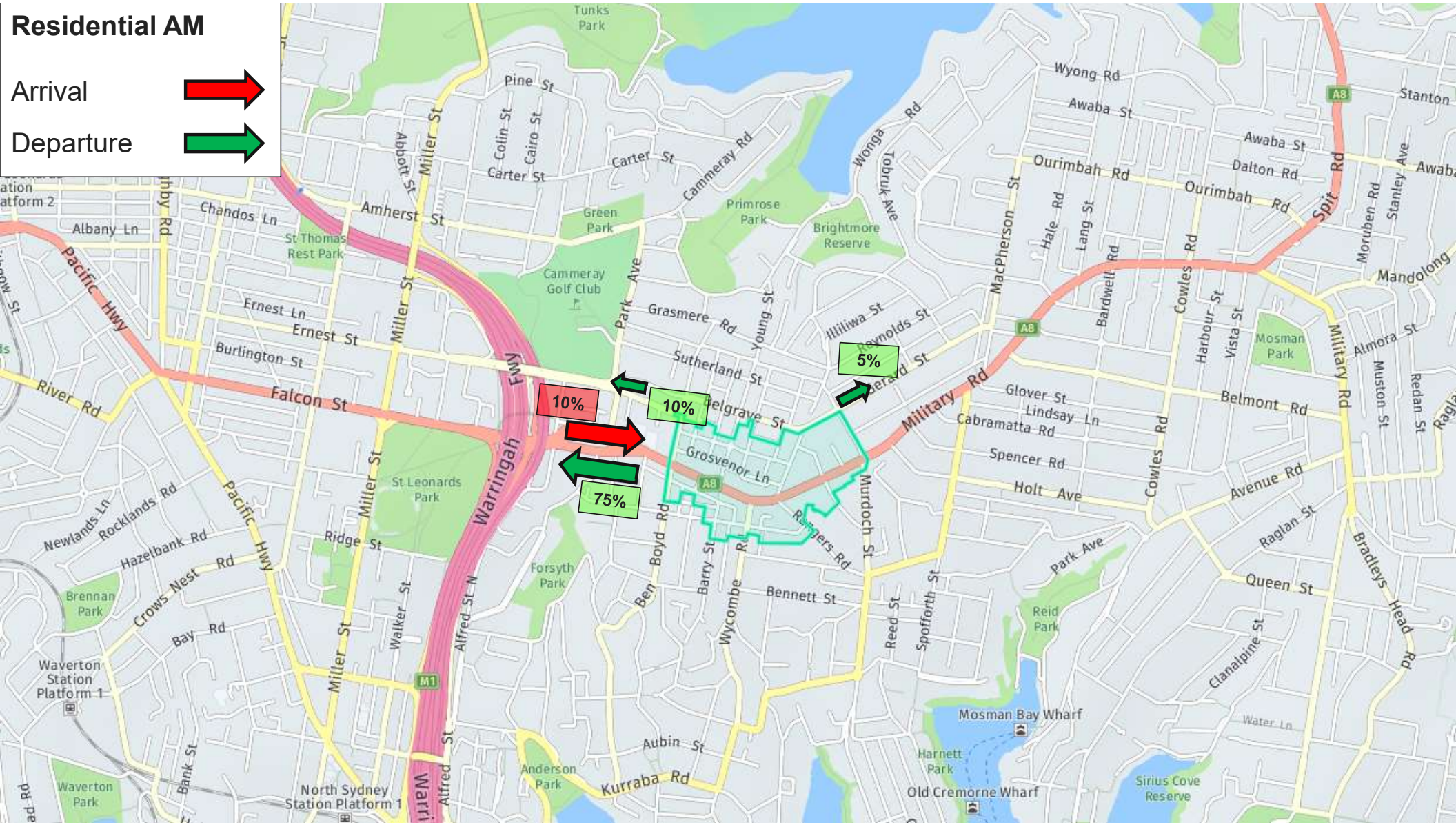
Young St			No Stopping								
		Grosvenor Ln & Military Rd	1/2P	60' angle front in only vehicles under 6m only 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**5**	3	5	5	5	5	5
			Loading zone	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**2**	1	1	1	1	2	2
			No Stopping								
	West	Military Rd & Grosvenor Ln	No Stopping								
			Mail zone		**2**	0	0	0	0	0	0
			No Stopping	Mon-Sun							
		Grosvenor Ln & Grosvenor St	No Stopping								
Total					**9**	**4**	**6**	**6**	**6**	**7**	**7**
% Capacity						**44%**	**67%**	**67%**	**67%**	**78%**	**78%**
Grosvenor Ln	North	Young St & Cooper Ln	No Stopping								
			Loading zone		**1**	0	0	1	1	0	0
			1/4P	8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat)	**2**	0	2	2	1	2	2
			1/2P & Taxi zone	1/2P - 11am-6pm(Mon-Sun) / Taxi zone - 4am-11am(Mon-Sun)	**3**	0	2	2	2	3	3
			No Stopping								
		Cooper Ln & Waters Ln	Taxi zone		**2**	0	0	0	0	0	0
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**4**	3	4	4	4	4	4
			No Stopping								
			No Parking	Community buses excepted	**2**	0	0	0	0	0	0
			No Stopping								
		Waters Ln & Waters Rd	Loading zone	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**2**	0	1	2	2	2	2
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**3**	0	2	3	3	3	3
			NP	Authorised car share vehicles excepted area 100	**1**	1	1	1	1	1	1
			No Stopping								
	South	Waters Rd & Grosvenor Ln E	No Stopping								
		Grosvenor Ln & Grosvenor Ln	No Stopping								
		Grosvenor Ln & Young St	No Stopping								
Total					**20**	**4**	**12**	**15**	**14**	**15**	**15**
% Capacity						**20%**	**60%**	**75%**	**70%**	**75%**	**75%**
Waters Rd	East	11 Waters St & Military Rd	No Stopping								
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**2**	0	2	1	2	2	2
			No Parking								
			Reserved	Disabled	**1**	1	1	0	0	0	0
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**7**	6	6	7	7	7	7
			No Stopping								
	West	Military Rd & Grosvenor Ln	No Stopping								
			Loading zone		**2**	0	0	1	0	0	0
			No Stopping								
			1P	Meter 8:30am-6pm (Mon-Fri) & 8:30am-4pm(Sat)	**2**	0	1	1	2	2	2
			No Parking	Solo M-Cycle in marked space excepted	**1**	0	0	0	1	0	0
			No Stopping								
		Grosvenor Ln & Grosvenor St	1P		**3**	0	1	2	3	3	3
			No Stopping								
Total					**18**	**7**	**11**	**12**	**15**	**14**	**14**

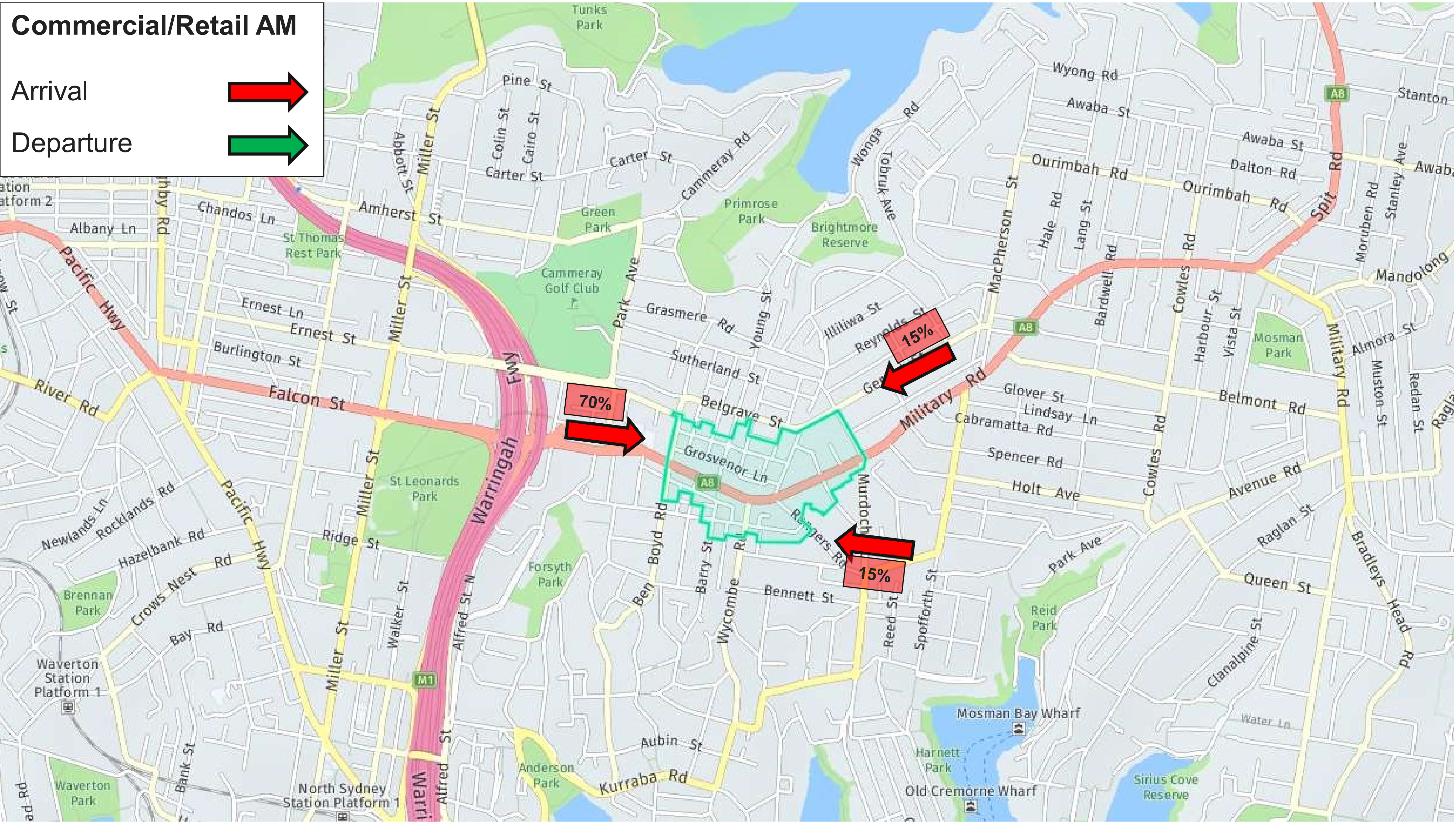
% Capacity						39%	61%	67%	83%	78%	78%
Military Rd	North	Ben Boyd Rd & Young St	No Stopping								
			No Parking	10am-3pm(Mon-Fri)	**3**	2	2	2	3	3	3
			1/2P	10am-3pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**15**	3	7	10	13	14	11
			No Stopping								
		Young St & Waters Rd	No Stopping								
			Bus zone								
			No Stopping								
			2P	10am-3pm(Mon-Fri) & 8:30am-4pm(Sat)	**7**	5	6	5	6	6	7
			No Parking								
		Waters Rd & 260 Military Rd	No Stopping								
			1P	10am-3pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**2**	0	0	2	2	2	2
			No Parking								
			No Stopping								
			1P	10am-3pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**5**	1	1	3	5	5	5
			Bus zone							1	1
			No Stopping								
	South	Hampden Ave & Rangers Rd	No Stopping								
			1P	10am - 6pm (Mon - Fri), 8:30am - 12:30pm (Sat)	**2**	1	1	0	0	1	2
			No Parking								
			1P	10am - 6pm (Mon - Fri), 8:30am - 12:30pm (Sat)	**3**	0	1	3	2	2	2
			No Parking								
			1P	10am - 6pm (Mon - Fri), 8:30am - 12:30pm (Sat)	**7**	5	7	4	5	3	2
			Loading zone + Bus zone	Loading zone - 10am-6pm(Mon-Fri) / Bus zone - 6am-10am(Mon-Fri)	**4**	2	4	1	1	2	4
		Rangers Rd & Wycombe Rd	No Stopping								
			Bus zone								
		Wycombe Rd & May Gibbs Pl	No Stopping								
			1/2P	10am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**14**	4	7	12	11	12	13
		May Gibbs Pl & Bydown St	Mail zone		**1**	0	0	0	0	0	0
			No Stopping								
		Bydown St & Ben Boyd Rd	No Stopping								
			1/2P	10am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**8**	4	5	7	7	8	7
			No Stopping								
Total					**71**	**27**	**41**	**49**	**55**	**59**	**59**
% Capacity						38%	58%	69%	77%	83%	83%
Wycombe Rd	East	Military Rd & Yeo St	No Stopping								
			Bus zone								
			Bus Zone + 1/2P	Bus zone - 6:30am-9:30am(Mon-Fri) / 1/2P - 9:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**2**	0	0	1	1	2	1
			1/2P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**2**	0	1	1	0	2	1
			Mail zone		**1**	0	0	0	0	0	0
			No Stopping								
	West	Yeo St & Military Rd	No Stopping								
			Bus zone								
			No Stopping								

Total					**5**	**0**	**1**	**2**	**1**	**4**	**2**
% Capacity						**0%**	**20%**	**40%**	**20%**	**80%**	**40%**
Yeo St	North	Ben Boyd Rd & Yeo Ln	No Stopping								
		Yeo Ln & Bydown St	1P	8:30am-6pm(Mon-Fri) Permit holders excepted Area 29	**4**	3	3	4	4	4	4
			No Stopping								
		Bydown St & Barry St	1P	8:30am-6pm(Mon-Fri) Permit holders excepted Area 29	**4**	2	1	3	3	4	3
			No Parking	Authorised car share vehicles excepted area 100	**2**	2	2	2	1	0	0
			No Stopping	Fire brigade vehicles excepted	**1**	0	0	0	0	0	0
			No Stopping								
		Barry St & May Ln	1P	8:30am-6pm(Mon-Fri) Permit holders excepted Area 29	**7**	3	2	4	5	6	7
		May Ln & Wycombe Rd	No Parking								
			No Stopping								
		Wycombe Rd & Military Ln	1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**2**	2	2	2	2	2	2
			2P	Disabled	**1**	1	1	1	1	1	1
			No Stopping								
		Military Ln & Rangers Rd	1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**1**	1	1	1	1	1	1
			1P	motorbikes in marked space only	**3**	1	1	1	1	1	1
			1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**4**	1	3	3	3	3	3
			1P	motorbikes in marked space only	**3**	1	0	3	2	3	3
			1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**2**	0	0	1	2	2	2
			No Parking								
			1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**3**	3	3	3	3	3	3
			No Stopping								
			1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**3**	1	2	2	3	3	3
			Reserved	motorbikes in marked space only	**5**	0	0	0	0	0	0
			1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**3**	0	1	2	3	2	3
			Reserved	motorbikes in marked space only	**3**	0	0	0	0	0	0
	South	Rangers Rd & Rangers Ln	No Stopping								
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat) Permit holders excepted Area 29	**6**	4	4	5	4	5	5
			1P	Motorcycles only	**3**	0	0	0	0	0	0
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat) Permit holders excepted Area 29	**3**	2	2	3	3	3	3
			No Parking								
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat) Permit holders excepted Area 29	**1**	1	1	1	1	1	1
			No Parking								
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat) Permit holders excepted Area 29	**3**	2	2	3	2	2	3
		Rangers Ln & Wycombe Rd	No Parking								
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat) Permit holders excepted Area 29	**3**	2	3	3	3	3	3
		Wycombe Rd & Barry Ln	No Stopping								
		Barry Ln & Barry St	No Stopping								
			1P + 1/4P	1P - 9:30am-4pm(Mon-Fri) & 8:30am-12:30pm(Sat) Permit holders excepted Area 29 1/4P - 7:30am-9:30am & 4pm-6pm (Mon-Fri)	**5**	1	1	3	4	4	4
		Barry St & Bydown St	No Stopping								

			2P	8:30am-6pm(Mon-Fri) Permit holders excepted Area 29	**4**	2	4	4	4	4	4
		Bydown St & Ben Boyd Rd	No Stopping								
			2P	8:30am-6pm(Mon-Fri) Permit holders excepted Area 29	**2**	1	2	2	2	1	1
			4P	Disabled 8:30am-6pm(Mon-Sun)	**1**	0	0	0	0	0	0
			No Stopping								
Total					**82**	**36**	**41**	**56**	**57**	**58**	**60**
% Capacity						**44%**	**50%**	**68%**	**70%**	**71%**	**73%**
Rangers Rd	East	Military Rd & 8 Rangers Rd	No Stopping								
			1P	Meter 8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**6**	2	6	5	6	5	6
			Reserved	Motorcycles only	**3**	0	0	1	0	1	1
			1P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat) Permit holders excepted area 29	**3**	0	1	2	3	3	2
			Reserved	Motorcycles only	**2**	0	1	1	1	1	1
	West	Yeo St & Military Rd	No Stopping								
			Reserved	Disabled only	**2**	0	0	1	1	1	1
			Taxi zone		**2**	0	1	0	0	0	0
			Taxi zone & Bus zone	Taxi zone - other times Bus zone - 5:45am-10am & 5:45pm-11:45pm	**6**	0	1	2	3	3	4
			No Stopping								
Total					**24**	**2**	**10**	**12**	**14**	**14**	**15**
% Capacity						**8%**	**42%**	**50%**	**58%**	**58%**	**63%**
Off Street Parking 1			1 1/2P	One period per day 8am-10pm(Mon-Fri) & 8am-8pm(Sat) & 8am-5pm(Sun&Public Hols)	**63**	37	54	61	62	63	63
			Reserved	Motorcycles only	**11**	6	6	4	6	3	2
			Reserved	Disabled	**4**	0	3	4	3	3	2
			1 1/2P	One period per day 8am-10pm(Mon-Fri) & 8am-8pm(Sat) & 8am-5pm(Sun&Public Hols) Small vehicles only	**1**	0	1	1	1	1	1
			Loading zone		**8**	1	2	3	3	4	3
Total					**87**	**44**	**66**	**73**	**75**	**74**	**71**
% Capacity						**51%**	**76%**	**84%**	**86%**	**85%**	**82%**
Off Street Parking 2		Basement	2P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**19**	5	9	12	12	8	6
		Rooftop	2P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**7**	4	6	7	7	6	7
			2P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat) Small cars only	**2**	0	1	2	2	1	1
			2P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**1**	1	1	1	0	1	1
			No Parking								
			2P	8:30am-6pm(Mon-Fri) & 8:30am-12:30pm(Sat)	**4**	3	3	4	4	3	4
Total					**33**	**13**	**20**	**26**	**25**	**19**	**19**
% Capacity						**39%**	**61%**	**79%**	**76%**	**58%**	**58%**

Appendix C Trip Distribution


Residential AM
Arrival
Departure
10%
10%
5%
75%
Falcon St
Warringah Fwy
Military Rd
Grosvenor Ln
Belgrave St
Sutherland St
Grasmere Rd
Cammeray Golf Club
Green Park
Primrose Park
Brightmore Reserve
St Thomas Rest Park
St Leonards Park
Forsyth Park
Anderson Park
Mosman Park
Reid Park
Harnett Park
Waverton Station Platform 1
North Sydney Station Platform 1
Mosman Bay Wharf
Old Cremorne Wharf
Sirius Cove Reserve
Kurraba Rd
Bennett St
Carter St
Amherst St
Miller St
Pacific Hwy
River Rd
Spit Rd
Ourimbah Rd
Belmont Rd
Glover St
Cabramatta Rd
Spencer Rd
Holt Ave
Avenue Rd
Queen St
Park Ave
Ridge St
Bay Rd
Crows Nest Rd
Hazelbank Rd
Rocklands Rd
Newlands Ln
Albany Ln
Chandos Ln
Ernest St
Burlington St
Pine St
Wyong Rd
Awaba St
Dalton Rd
Mandolong
Almora St
Raglan St
Bradleys Head Rd
Clanalpine St
Water Ln
Aubin St
Bennett St
Wycombe Rd
Barry St
Ben Boyd Rd
Murdoch St
Reed St
Spofforth St
Rangers Rd
Alfred St N
Walker St
Bank St
Waverton Park
Tunks Park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Arrival
Departure
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15%
15%
Falcon St
Military Rd
Warringah Fwy
Grosvenor Ln
Belgrave St
Sutherland St
Grasmere Rd
Ben Boyd Rd
Rangers Rd
Murdoch
Bennett St
Wycombe
Barry St
Young St
Reynolds St
Illiliwa St
Park Ave
Miller St
Pacific Hwy
Ernest St
Ernest Ln
Burlington St
Amherst St
Chandos Ln
Albany Ln
River Rd
Ridge St
Cammeray Golf Club
St Leonards Park
Forsyth Park
Green Park
Primrose Park
Brightmore Reserve
Tunks Park
St Thomas Rest Park
Cammeray Rd
Carter St
Pine St
Colin St
Cairo St
Abbott St
Wonga Rd
Tobruk Ave
MacPherson St
Ourimbah Rd
Wyong Rd
Awaba St
Dalton Rd
Spit Rd
Stanton
Glover St
Lindsay Ln
Cabramatta Rd
Spencer Rd
Holt Ave
Belmont Rd
Avenue Rd
Raglan St
Queen St
Park Ave
Cowles Rd
Harbour St
Vista St
Bardwell Rd
Hale Rd
Lang St
Mosman Park
Almora St
Muston St
Redan St
Mandolong
Military Rd
Bradleys Head Rd
Clanalpine St
Reid Park
Reed St
Spofforth St
Mosman Bay Wharf
Harnett Park
Old Cremorne Wharf
Sirius Cove Reserve
Water Ln
Aubin St
Kurraba Rd
Anderson Park
Alfred St N
Walker St
Newlands Ln
Rocklands Rd
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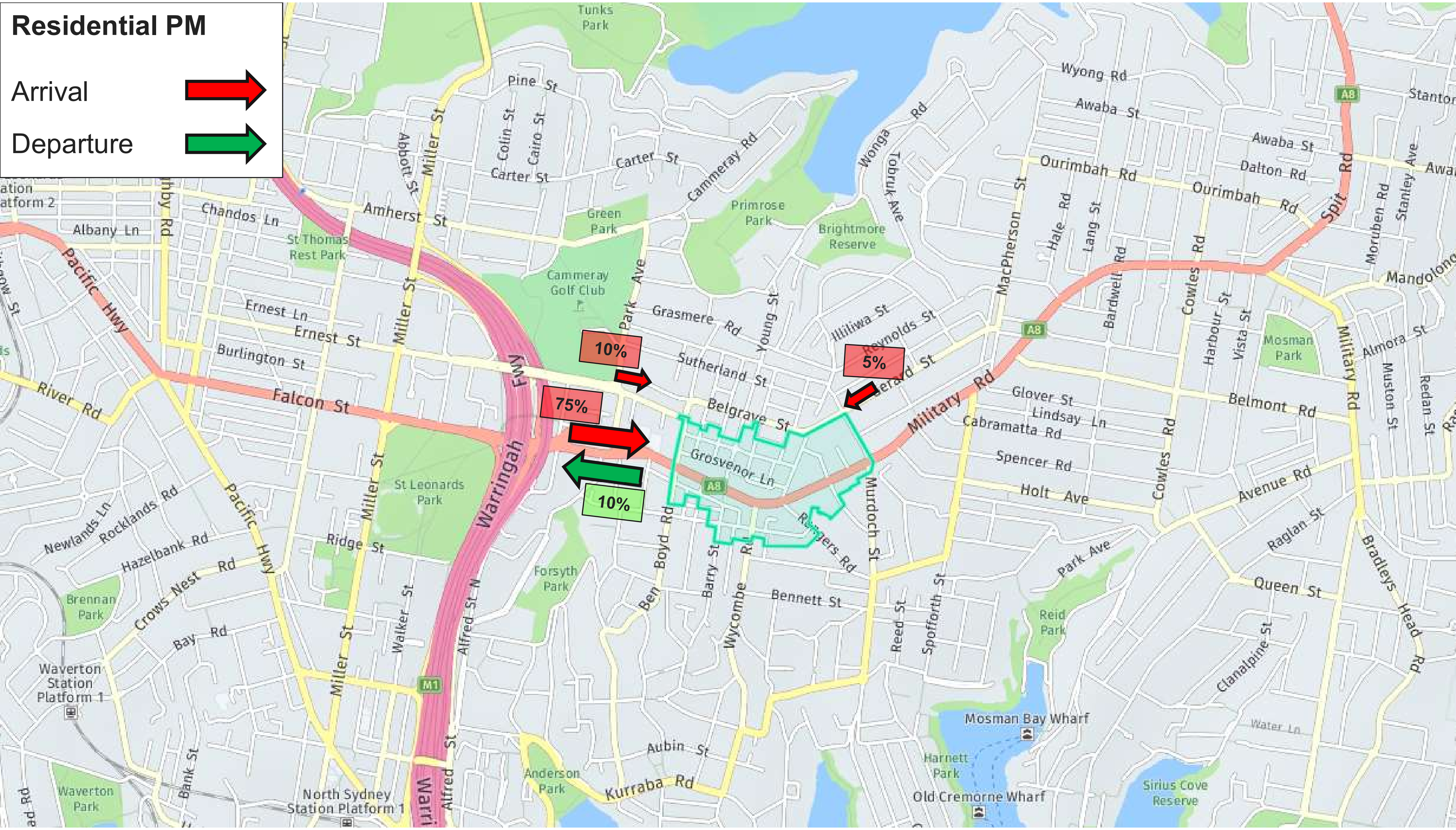
Crows Nest Rd
Bay Rd
Brennan Park
Waverton Station Platform 1
Waverton Park
Bank St
North Sydney Station Platform 1
A8
M1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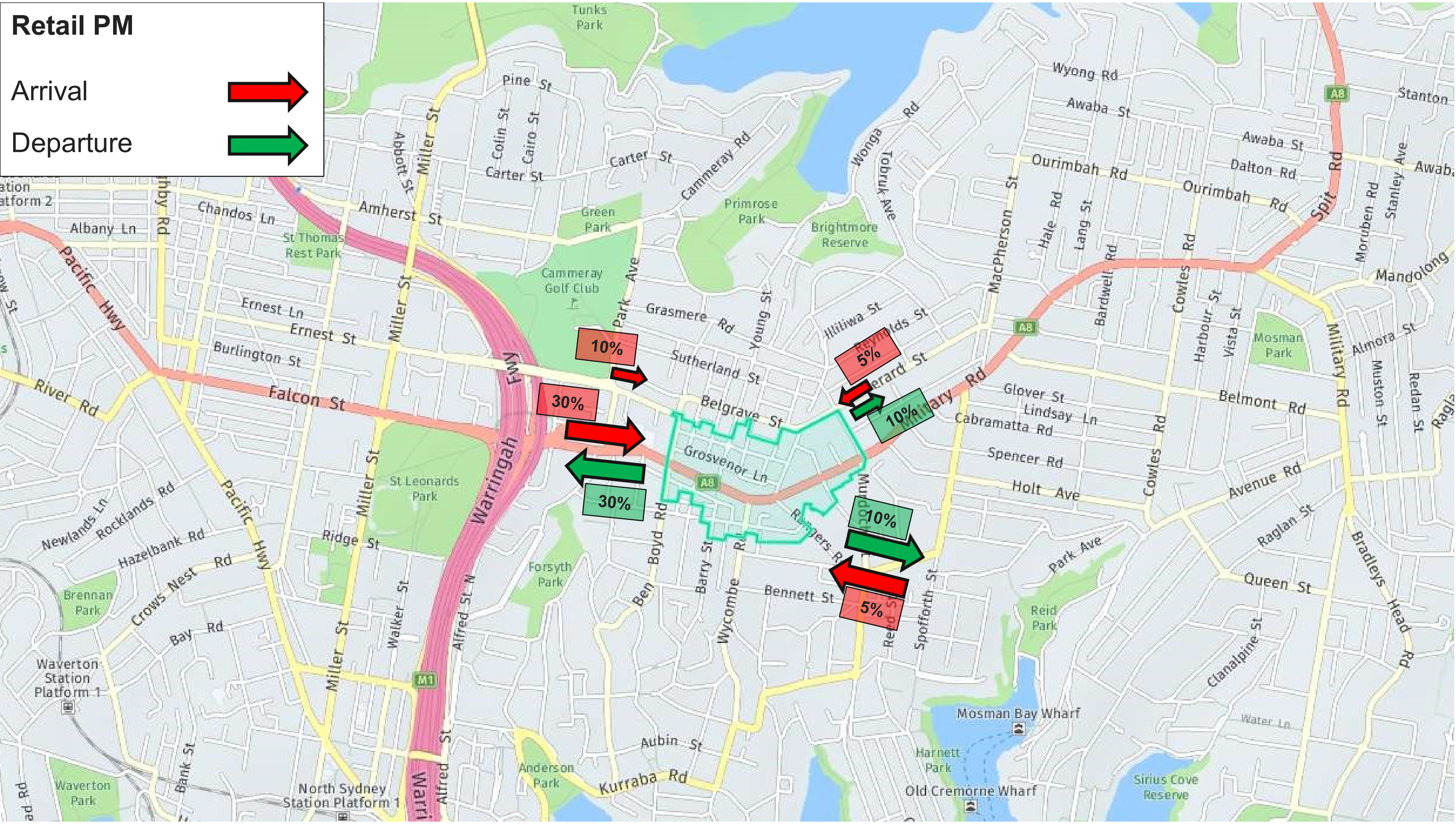
Arrival
Departure
75%
10%
10%
5%
Military Rd
Falcon St
Warringah Fwy
Pacific Hwy
Grosvenor Ln
Belgrave St
Sutherland St
Ernest St
Ben Boyd Rd
Murdoch St
Spit Rd
Ourimbah Rd
Belmont Rd
Cammeray Golf Club
St Leonards Park
Forsyth Park
Primrose Park
Brightmore Reserve
Mosman Park
Reid Park
Mosman Bay Wharf
Old Cremorne Wharf
Sirius Cove Reserve
Anderson Park
Waverton Park
Brennan Park
Tunks Park
Green Park
St Thomas Rest Park
Harnett Park
Kurraba Rd
Miller St
Amherst St
Ridge St
Bennett St
Aubin St



Retail PM
Arrival
Departure
10%
30%
30%
5%
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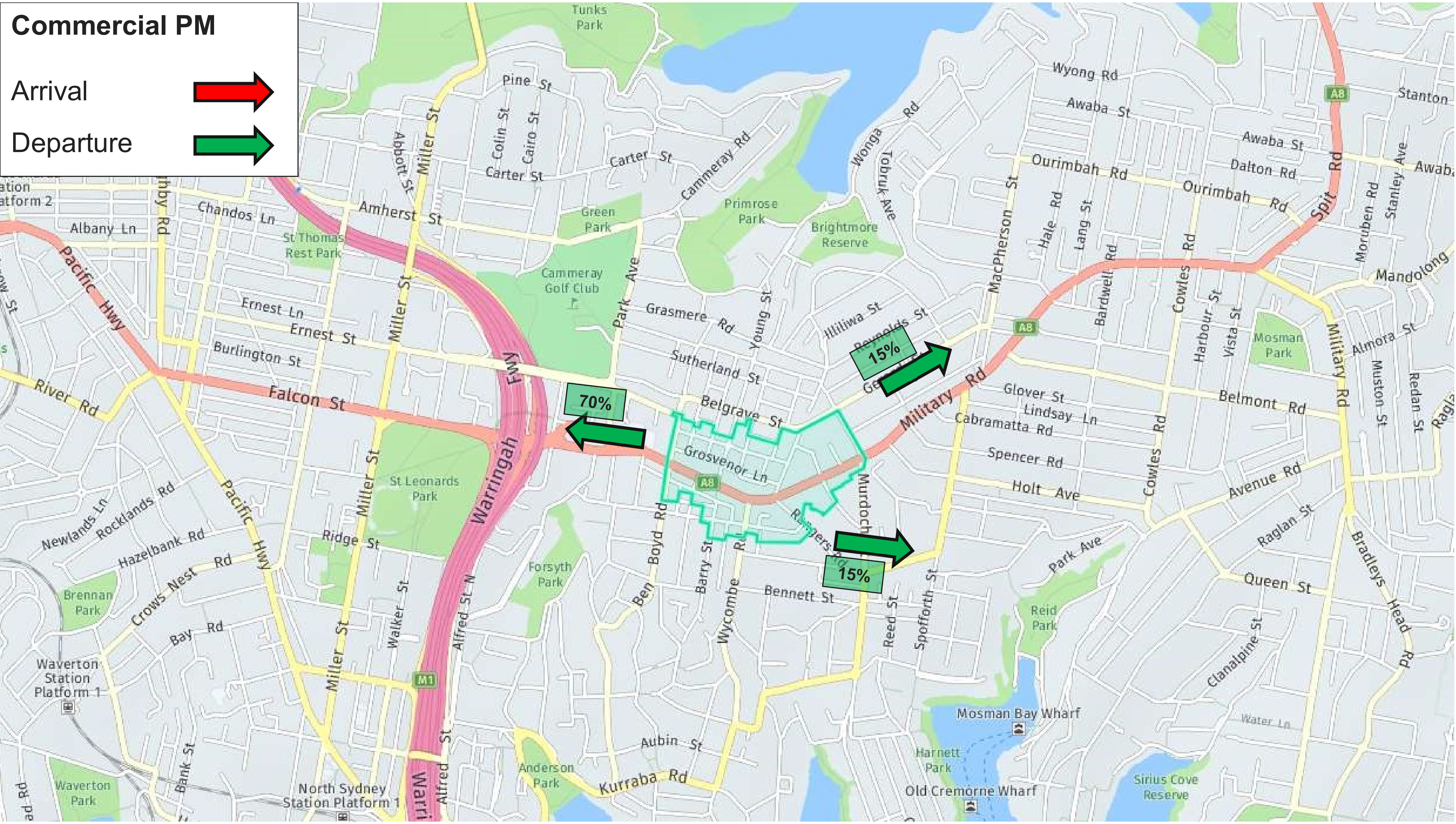
Falcon St
Military Rd
Warringah Fwy
Pacific Hwy
Miller St
Ernest St
Belgrave St
Grosvenor Ln
Sutherland St
Ben Boyd Rd
Bennett St
Spofforth St
Cabramatta Rd
Spencer Rd
Holt Ave
Belmont Rd
Ourimbah Rd
Spit Rd
Cammeray Golf Club
St Leonards Park
Forsyth Park
Primrose Park
Brightmore Reserve
Mosman Park
Reid Park
Mosman Bay Wharf
Old Cremorne Wharf
Sirius Cove Reserve
Anderson Park
Kurraba Rd
North Sydney Station Platform 1
Waverton Station Platform 1
Waverton Park
Brennan Park


Commercial PM
Arrival
Departure
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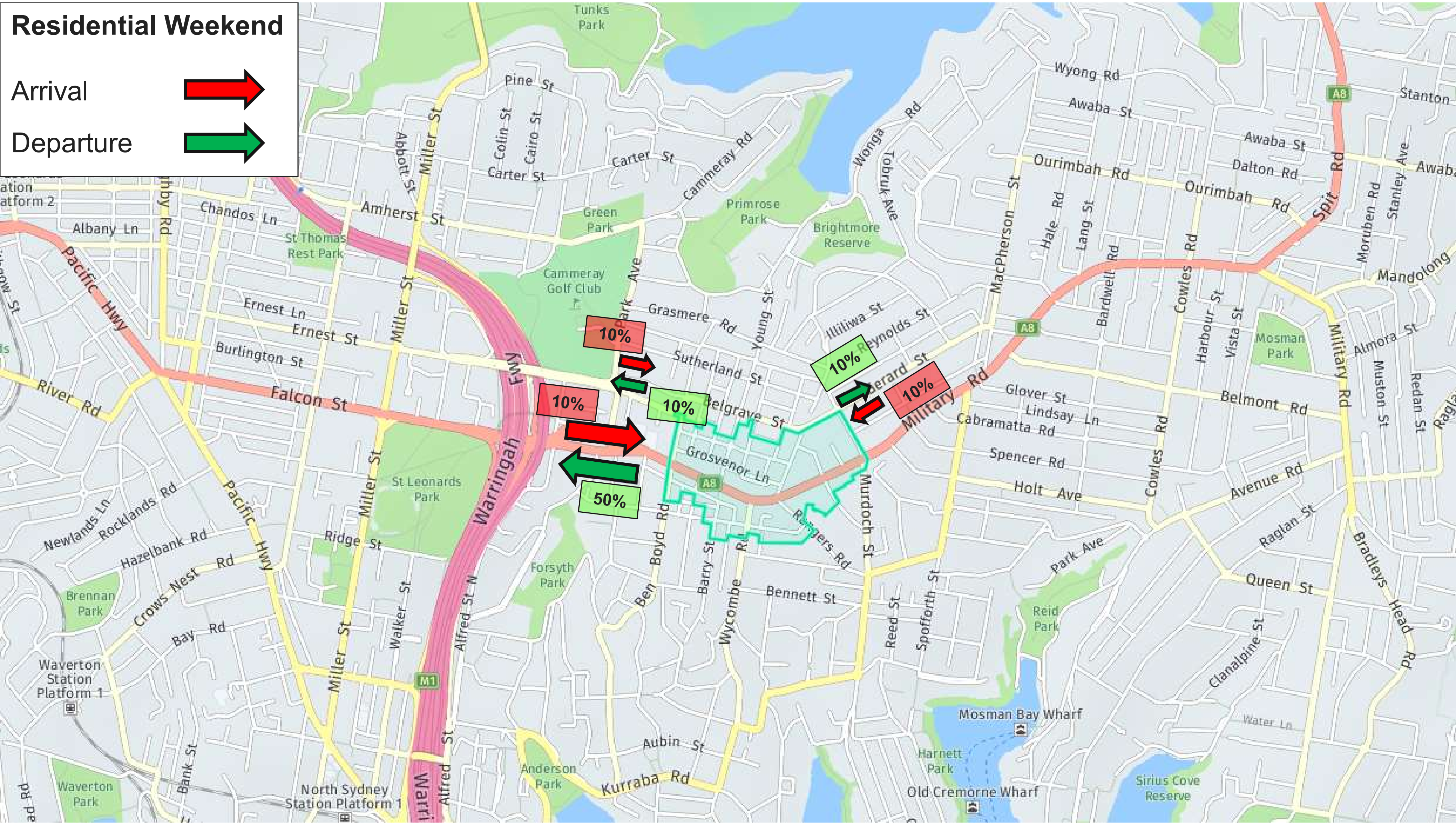
15%
Falcon St
Military Rd
Warringah Fwy
Pacific Hwy
Miller St
Belgrave St
Grosvenor Ln
Sutherland St
Grasmere Rd
Ben Boyd Rd
Bennett St
Spofforth St
Murdoch St
Spit Rd
Ourimbah Rd
Belmont Rd
Cabramatta Rd
Spencer Rd
Holt Ave
Avenue Rd
Queen St
Bradleys Head Rd
Kurraba Rd
Aubin St
Amherst St
Ernest St
Burlington St
River Rd
Cammeray Golf Club
St Leonards Park
Primrose Park
Brightmore Reserve
Forsyth Park
Reid Park
Mosman Park
Tunks Park
Green Park
Anderson Park
Waverton Park
Brennan Park
Mosman Bay Wharf
Old Cremorne Wharf
Sirius Cove Reserve
Harnett Park
North Sydney Station Platform 1
Waverton Station Platform 1



Residential Weekend
Arrival
Departure
10%
10%
10%
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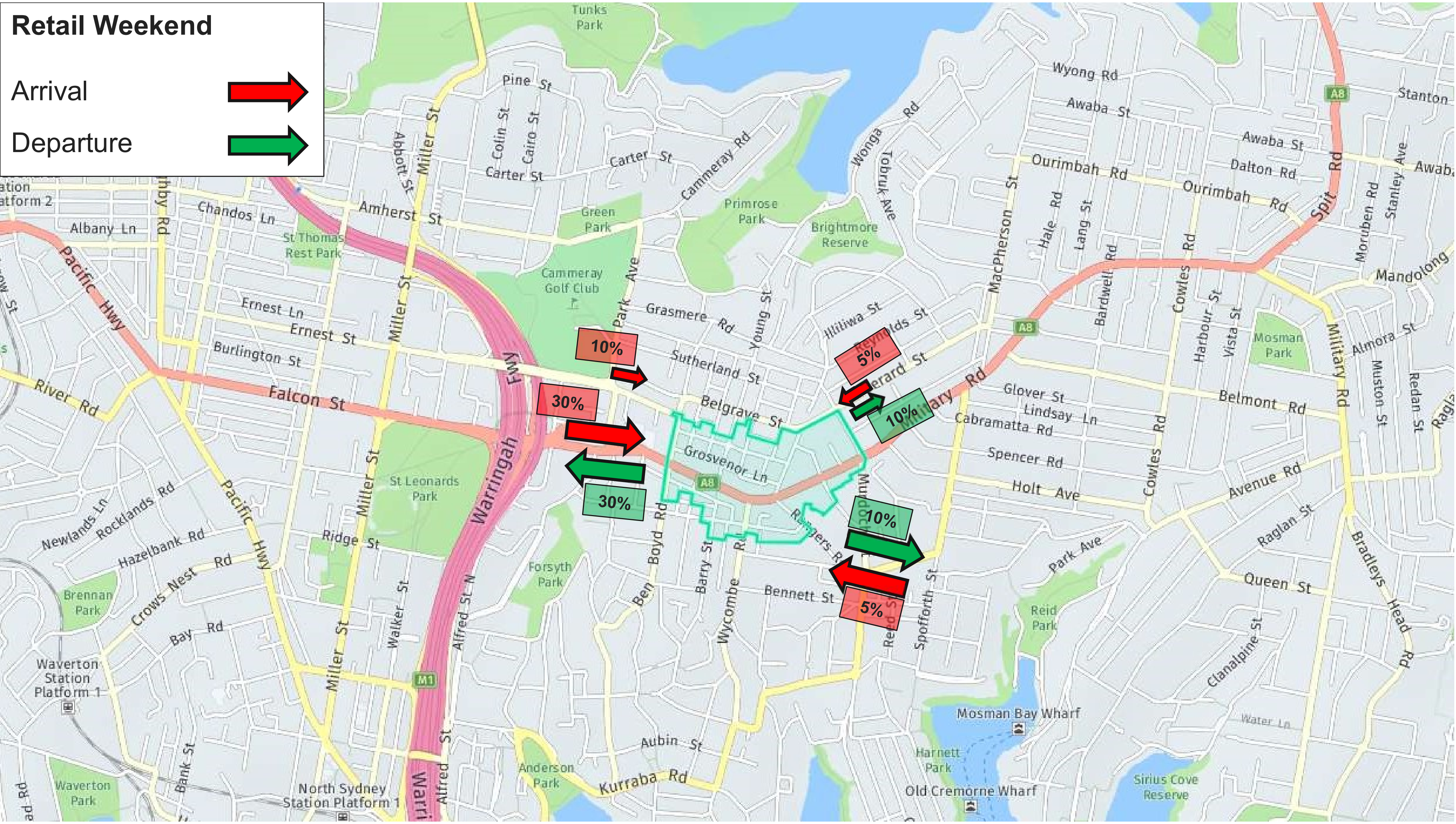
50%
Falcon St
Military Rd
Warringah Fwy
Grosvenor Ln
Belgrave St
Sutherland St
Grasmere Rd
Ernest St
Pacific Hwy
Miller St
Cammeray Golf Club
St Leonards Park
Forsyth Park
Primrose Park
Brightmore Reserve
Tunks Park
Green Park
St Thomas Rest Park
Brennan Park
Waverton Park
Anderson Park
Mosman Park
Reid Park
Harnett Park
Sirius Cove Reserve
Mosman Bay Wharf
Old Cremorne Wharf
Waverton Station Platform 1
North Sydney Station Platform 1
Ourimbah Rd
Belmont Rd
Spit Rd
Bradleys Head Rd
Kurraba Rd
Bennett St
Murdoch St
Ben Boyd Rd
Wycombe Rd
Amherst St
Chandos Ln
Albany Ln
Burlington St
Ernest Ln
River Rd
Ridge St
Carter St
Pine St
Cammeray Rd
Park Ave
Young St
Reynolds St
Illiliwa St
Glover St
Lindsay Ln
Cabramatta Rd
Spencer Rd
Holt Ave
Avenue Rd
Raglan St
Queen St
Park Ave
MacPherson St
Cowles Rd
Wyong Rd
Awaba St
Dalton Rd
Mandolong
Almora St
Clanalpine St
Aubin St
Walker St
Alfred St N
Crows Nest Rd
Bay Rd
Hazelbank Rd
Rocklands Rd
Newlands Ln
Spofforth St
Reed St
Barry St
Water Ln
Stanton


Retail Weekend
Arrival
Departure
10%
30%
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5%
Falcon St
Military Rd
Grosvenor Ln
Belgrave St
Sutherland St
Warringah Fwy
Pacific Hwy
Miller St
Ben Boyd Rd
Spofforth St
Spit Rd
Cammeray Golf Club
St Leonards Park
Mosman Bay Wharf
Old Cremorne Wharf
North Sydney Station Platform 1
Waverton Station Platform 1

Appendix D SIDRA – Existing Operations (2022)

MOVEMENT SUMMARY

Site: I-01 [I-01 2022 EX AM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX AM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Military Road / Ben Boyd Road
2018 Existing Weekday AM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ben Boyd Road (S)														
1	L2	101	4.2	101	4.2	0.636	71.7	LOS F	8.0	58.4	1.00	0.81	1.03	9.3
2	T1	143	5.9	143	5.9	0.849	75.0	LOS F	11.2	82.2	1.00	0.96	1.25	6.8
3	R2	23	4.5	23	4.5	0.849	80.6	LOS F	11.2	82.2	1.00	0.98	1.28	6.8
Approach		267	5.1	267	5.1	0.849	74.2	LOS F	11.2	82.2	1.00	0.91	1.17	7.8
East: Military Road (E)														
4	L2	29	6.9	29	6.9	0.245	9.5	LOS A	2.9	35.2	0.20	0.24	0.20	43.3
5	T1	2356	9.8	2356	9.8	* 0.998	62.0	LOS E	32.2	228.5	0.93	1.15	1.25	13.2
Approach		2385	9.8	2385	9.8	0.998	61.4	LOS E	32.2	228.5	0.92	1.13	1.24	11.1
North: Ben Boyd Road (N)														
7	L2	7	0.0	7	0.0	0.346	61.3	LOS E	5.7	40.4	0.94	0.75	0.94	3.0
8	T1	155	1.4	155	1.4	* 0.866	68.0	LOS E	6.9	49.0	0.97	0.86	1.12	8.6
9	R2	55	3.8	55	3.8	0.866	82.5	LOS F	6.9	49.0	1.00	0.99	1.35	4.5
Approach		217	1.9	217	1.9	0.866	71.4	LOS F	6.9	49.0	0.97	0.89	1.17	7.2
West: Military Road (W)														
10	L2	285	4.9	285	4.9	0.318	11.6	LOS A	8.6	74.2	0.37	0.61	0.37	20.6
11	T1	1746	9.9	1746	9.9	0.774	10.3	LOS A	43.2	315.8	0.63	0.60	0.63	20.5
Approach		2031	9.2	2031	9.2	0.774	10.5	LOS A	43.2	315.8	0.59	0.60	0.59	20.6
All Vehicles		4900	9.0	4900	9.0	0.998	41.4	LOS C	43.2	315.8	0.79	0.89	0.96	11.7

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: Ben Boyd Road (S)											
P1	Full	66	6.0	LOS A	0.1	0.1	0.29	0.29	32.7	32.0	0.98
East: Military Road (E)											
P2	Full	52	64.3	LOS F	0.2	0.2	0.96	0.96	98.4	41.0	0.42
North: Ben Boyd Road (N)											
P3	Full	106	6.0	LOS A	0.1	0.1	0.29	0.29	32.7	32.0	0.98

West: Military Road (W)										
P4 Full	46	64.3	LOS F	0.2	0.2	0.96	0.96	98.4	41.0	0.42
All Pedestrians	271	27.1	LOS C	0.2	0.2	0.53	0.53	56.5	35.3	0.62

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: I-02 [I-02 2022 EX AM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX AM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Military Road / Young Street
2018 Existing Weekday AM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Military Road (E)														
5	T1	2409	9.7	2409	9.7	* 0.997	63.6	LOS E	27.6	195.8	0.93	1.13	1.24	9.7
Approach		2409	9.7	2409	9.7	0.997	63.6	LOS E	27.6	195.8	0.93	1.13	1.24	6.6
West: Military Road (W)														
11	T1	1788	9.7	1788	9.7	0.751	7.4	LOS A	31.4	228.5	0.47	0.44	0.47	34.4
Approach		1788	9.7	1788	9.7	0.751	7.4	LOS A	31.4	228.5	0.47	0.44	0.47	34.4
All Vehicles		4197	9.7	4197	9.7	0.997	39.7	LOS C	31.4	228.5	0.73	0.84	0.91	10.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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
West: Military Road (W)											
P4	Full	93	64.4	LOS F	0.4	0.4	0.96	0.96	100.0	42.8	0.43
All Pedestrians		93	64.4	LOS F	0.4	0.4	0.96	0.96	100.0	42.8	0.43

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: I-03 [I-03 2022 EX AM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX AM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Military Road / Wycombe Road
2018 Existing Weekday AM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wycombe Road (S)														
1	L2	108	6.8	108	6.8	* 0.987	117.9	LOS F	10.2	75.8	1.00	1.16	1.75	2.2
3	R2	106	10.9	106	10.9	0.720	76.1	LOS F	7.5	57.8	1.00	0.85	1.12	3.6
Approach		215	8.8	215	8.8	0.987	97.2	LOS F	10.2	75.8	1.00	1.01	1.44	2.7
East: Military Road (E)														
4	L2	56	19.6	56	19.6	0.048	10.9	LOS A	1.1	9.0	0.31	0.63	0.31	23.4
5	T1	2284	9.9	2284	9.9	* 0.998	68.5	LOS E	16.1	114.2	0.94	1.16	1.27	6.1
Approach		2340	10.1	2340	10.1	0.998	67.2	LOS E	16.1	114.2	0.93	1.14	1.25	4.4
West: Military Road (W)														
11	T1	1779	9.7	1779	9.7	0.801	2.8	LOS A	19.4	141.2	0.22	0.21	0.22	44.8
Approach		1779	9.7	1779	9.7	0.801	2.8	LOS A	19.4	141.2	0.22	0.21	0.22	44.8
All Vehicles		4334	9.9	4334	9.9	0.998	42.2	LOS C	19.4	141.2	0.64	0.75	0.83	7.9

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: Wycombe Road (S)											
P1	Full	89	6.9	LOS A	0.1	0.1	0.32	0.32	36.3	35.2	0.97
East: Military Road (E)											
P2	Full	240	64.8	LOS F	0.9	0.9	0.97	0.97	99.6	41.8	0.42
West: Military Road (W)											
P4	Full	65	64.3	LOS F	0.2	0.2	0.96	0.96	102.5	45.8	0.45
All Pedestrians		395	51.6	LOS E	0.9	0.9	0.82	0.82	85.7	41.0	0.48

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: I-04 [I-04 2022 EX AM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX AM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Military Road / Waters Road / Rangers Road
2018 Existing Weekday AM Peak
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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rangers Road (S)														
1	L2	54	21.6	54	21.6	0.089	8.7	LOS A	0.3	2.5	0.54	0.75	0.54	38.5
Approach		54	21.6	54	21.6	0.089	8.7	LOS A	0.3	2.5	0.54	0.75	0.54	38.5
East: Military Road (E)														
4	L2	50	4.0	50	4.0	0.095	5.6	LOS A	0.0	0.0	0.00	0.23	0.00	54.8
5	T1	2294	9.7	2294	9.7	0.544	0.1	LOS A	89.6	634.9	0.00	0.01	0.00	59.3
Approach		2344	9.6	2344	9.6	0.544	0.2	NA	89.6	634.9	0.00	0.01	0.00	59.1
North: Waters Road (N)														
7	L2	113	5.6	113	5.6	0.615	35.1	LOS C	2.6	19.2	0.91	1.17	1.48	21.4
Approach		113	5.6	113	5.6	0.615	35.1	LOS C	2.6	19.2	0.91	1.17	1.48	21.4
West: Military Road (W)														
10	L2	73	5.5	73	5.5	0.517	4.8	LOS A	0.0	0.0	0.00	0.05	0.00	55.2
11	T1	1820	9.9	1820	9.9	0.517	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.1
Approach		1893	9.7	1893	9.7	0.517	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.0
All Vehicles		4403	9.7	4403	9.7	0.615	1.2	NA	89.6	634.9	0.03	0.06	0.04	56.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: I-05 [I-05 2022 EX AM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX AM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Ben Boyd Road / Grosvenor Lane
2018 Existing Weekday AM Peak
Site Category: (None)
Give-Way (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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ben Boyd Road (S)														
2	T1	339	5.3	339	5.3	0.229	0.5	LOS A	0.8	5.9	0.14	0.12	0.14	35.3
3	R2	107	2.9	107	2.9	0.229	4.1	LOS A	0.8	5.9	0.19	0.17	0.19	32.1
Approach		446	4.7	446	4.7	0.229	1.4	NA	0.8	5.9	0.16	0.13	0.16	34.5
North: Ben Boyd Road (N)														
7	L2	9	0.0	9	0.0	0.068	3.9	LOS A	0.0	0.0	0.00	0.06	0.00	45.7
8	T1	213	2.0	213	2.0	0.068	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	48.2
Approach		222	1.9	222	1.9	0.068	0.2	NA	0.0	0.0	0.00	0.02	0.00	48.1
All Vehicles		668	3.8	668	3.8	0.229	1.0	NA	0.8	5.9	0.10	0.10	0.10	39.2

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.

MOVEMENT SUMMARY

Site: I-06 [I-06 2022 EX AM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX AM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Grosvenor Lane / Young Street
2018 Existing Weekday AM Peak
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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
North: Young Street (N)														
7	L2	88	6.0	88	6.0	0.050	3.9	LOS A	0.0	0.0	0.00	0.52	0.00	27.5
Approach		88	6.0	88	6.0	0.050	3.9	NA	0.0	0.0	0.00	0.52	0.00	27.5
West: Grosvenor Lane (W)														
10	L2	35	0.0	35	0.0	0.071	7.4	LOS A	0.3	2.2	0.19	0.93	0.19	29.4
11	T1	63	5.0	63	5.0	0.071	7.9	LOS A	0.3	2.2	0.19	0.93	0.19	31.9
Approach		98	3.2	98	3.2	0.071	7.8	LOS A	0.3	2.2	0.19	0.93	0.19	30.8
All Vehicles		186	4.5	186	4.5	0.071	5.9	NA	0.3	2.2	0.10	0.73	0.10	30.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: I-07 [I-07 2022 EX AM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX AM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Grosvenor Lane / Waters Road
2018 Existing Weekday AM Peak
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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Waters Road (S)														
2	T1	79	6.7	79	6.7	0.042	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		79	6.7	79	6.7	0.042	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
North: Waters Road (N)														
8	T1	79	1.3	79	1.3	0.041	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		79	1.3	79	1.3	0.041	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
West: Grosvenor Lane (W)														
10	L2	44	7.1	44	7.1	0.067	8.0	LOS A	0.2	1.9	0.20	0.91	0.20	33.5
12	R2	29	17.9	29	17.9	0.067	8.4	LOS A	0.2	1.9	0.20	0.91	0.20	32.9
Approach		74	11.4	74	11.4	0.067	8.2	LOS A	0.2	1.9	0.20	0.91	0.20	33.3
All Vehicles		232	6.4	232	6.4	0.067	2.6	NA	0.2	1.9	0.06	0.29	0.06	39.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: I-08 [I-08 2022 EX AM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX AM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Ben Boyd Road / Grosvenor Street
2018 Existing Weekday AM Peak
Site Category: (None)
Give-Way (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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ben Boyd Road (S)														
2	T1	227	5.6	227	5.6	0.092	0.1	LOS A	0.4	3.2	0.06	0.08	0.06	45.1
3	R2	97	6.5	97	6.5	0.092	4.3	LOS A	0.4	3.2	0.23	0.33	0.23	39.3
Approach		324	5.8	324	5.8	0.092	1.3	NA	0.4	3.2	0.11	0.15	0.11	42.1
East: Grosvenor Street (E)														
4	L2	103	3.1	103	3.1	0.177	6.0	LOS A	0.7	5.4	0.29	0.61	0.29	35.9
6	R2	73	4.3	73	4.3	0.177	9.0	LOS A	0.7	5.4	0.29	0.61	0.29	34.5
Approach		176	3.6	176	3.6	0.177	7.2	LOS A	0.7	5.4	0.29	0.61	0.29	35.3
North: Ben Boyd Road (N)														
7	L2	2	0.0	2	0.0	0.062	3.4	LOS A	0.0	0.0	0.00	0.01	0.00	47.6
8	T1	118	0.9	118	0.9	0.062	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.2
Approach		120	0.9	120	0.9	0.062	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.0
All Vehicles		620	4.2	620	4.2	0.177	2.8	NA	0.7	5.4	0.14	0.25	0.14	39.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: I-09 [I-09 2022 EX AM - Import (Site Folder: Original)]

Network: N101 [2022 EX AM (Network Folder: Existing - Belgrave Road Network)]

Grosvenor Street / Young Street
2028 Young Street Closure Weekday AM Peak
Site Category: (None)
Roundabout

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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Young Street (S)														
1	L2	22	0.0	22	0.0	0.040	4.6	LOS A	0.2	1.4	0.41	0.52	0.41	24.4
2	T1	16	0.0	16	0.0	0.040	4.4	LOS A	0.2	1.4	0.41	0.52	0.41	24.4
3	R2	2	0.0	2	0.0	0.040	7.2	LOS A	0.2	1.4	0.41	0.52	0.41	24.4
3u	U	1	0.0	1	0.0	0.040	8.8	LOS A	0.2	1.4	0.41	0.52	0.41	27.1
Approach		41	0.0	41	0.0	0.040	4.7	LOS A	0.2	1.4	0.41	0.52	0.41	24.5
East: Grosvenor Street (E)														
4	L2	19	5.6	19	5.6	0.185	4.8	LOS A	1.1	7.8	0.32	0.54	0.32	35.2
5	T1	102	5.2	102	5.2	0.185	4.6	LOS A	1.1	7.8	0.32	0.54	0.32	35.8
6	R2	88	0.0	88	0.0	0.185	7.4	LOS A	1.1	7.8	0.32	0.54	0.32	35.8
6u	U	2	0.0	2	0.0	0.185	10.0	LOS A	1.1	7.8	0.32	0.54	0.32	35.8
Approach		212	3.0	212	3.0	0.185	5.9	LOS A	1.1	7.8	0.32	0.54	0.32	35.7
North: Young Street (N)														
7	L2	53	2.0	53	2.0	0.130	4.5	LOS A	0.6	4.1	0.21	0.53	0.21	29.6
8	T1	51	0.0	51	0.0	0.130	4.2	LOS A	0.6	4.1	0.21	0.53	0.21	31.5
9	R2	49	2.1	49	2.1	0.130	7.2	LOS A	0.6	4.1	0.21	0.53	0.21	29.6
9u	U	1	0.0	1	0.0	0.130	9.7	LOS A	0.6	4.1	0.21	0.53	0.21	29.6
Approach		154	1.4	154	1.4	0.130	5.3	LOS A	0.6	4.1	0.21	0.53	0.21	30.4
West: Grosvenor Street (W)														
10	L2	27	3.8	27	3.8	0.099	4.7	LOS A	0.5	3.7	0.29	0.51	0.29	35.1
11	T1	58	0.0	58	0.0	0.099	4.4	LOS A	0.5	3.7	0.29	0.51	0.29	35.1
12	R2	24	17.4	24	17.4	0.099	7.5	LOS A	0.5	3.7	0.29	0.51	0.29	33.8
12u	U	1	0.0	1	0.0	0.099	9.9	LOS A	0.5	3.7	0.29	0.51	0.29	35.1
Approach		111	4.8	111	4.8	0.099	5.2	LOS A	0.5	3.7	0.29	0.51	0.29	34.8
All Vehicles		517	2.6	517	2.6	0.185	5.5	LOS A	1.1	7.8	0.29	0.53	0.29	33.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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: I-10 [I-10 2022 EX AM - Import (Site Folder: Original)]

Network: N101 [2022 EX AM (Network Folder: Existing - Belgrave Road Network)]

Grosvenor Street / Waters Road
2028 Young Street Closure Weekday AM Peak
Site Category: (None)
Give-Way (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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Waters Road (S)														
1	L2	45	11.6	45	11.6	0.078	4.7	LOS A	0.3	2.1	0.10	0.19	0.10	37.0
2	T1	79	4.0	79	4.0	0.078	0.1	LOS A	0.3	2.1	0.10	0.19	0.10	37.0
Approach		124	6.8	124	6.8	0.078	1.8	NA	0.3	2.1	0.10	0.19	0.10	37.0
North: Waters Road (S)														
8	T1	52	0.0	52	0.0	0.127	0.6	LOS A	0.6	4.3	0.28	0.42	0.28	37.5
9	R2	154	0.0	154	0.0	0.127	5.1	LOS A	0.6	4.3	0.28	0.42	0.28	33.0
Approach		205	0.0	205	0.0	0.127	4.0	NA	0.6	4.3	0.28	0.42	0.28	34.4
West: Grosvenor Street (W)														
10	L2	52	0.0	52	0.0	0.093	4.8	LOS A	0.3	2.4	0.19	0.56	0.19	36.2
12	R2	45	2.3	45	2.3	0.093	7.1	LOS A	0.3	2.4	0.19	0.56	0.19	35.6
Approach		97	1.1	97	1.1	0.093	5.9	LOS A	0.3	2.4	0.19	0.56	0.19	35.9
All Vehicles		426	2.2	426	2.2	0.127	3.8	NA	0.6	4.3	0.21	0.38	0.21	35.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: I-11 [I-11 2022 EX AM - Import (Site Folder: Original)]

Network: N101 [2022 EX AM (Network Folder: Existing - Belgrave Road Network)]

Ben Boyd Road / Ernest Street
2028 Young Street Closure Weekday AM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ben Boyd Road (S)														
1	L2	113	6.5	113	6.5	0.205	36.0	LOS C	5.4	40.1	0.75	0.73	0.75	14.3
2	T1	171	4.3	171	4.3	0.205	26.1	LOS B	6.4	46.8	0.68	0.57	0.68	6.7
Approach		283	5.2	283	5.2	0.205	30.0	LOS C	6.4	46.8	0.71	0.63	0.71	10.7
North: Ben Boyd Road (N)														
8	T1	121	1.7	121	1.7	* 0.902	44.2	LOS D	10.4	73.4	0.99	0.99	1.11	4.2
9	R2	1502	1.2	1502	1.2	* 0.902	47.6	LOS D	10.4	73.4	0.99	0.98	1.11	12.0
Approach		1623	1.2	1623	1.2	0.902	47.3	LOS D	10.4	73.4	0.99	0.98	1.11	11.5
West: Ernest Street (W)														
10	L2	486	4.3	486	4.3	0.274	25.1	LOS B	8.9	64.6	0.63	0.73	0.63	16.1
Approach		486	4.3	486	4.3	0.274	25.1	LOS B	8.9	64.6	0.63	0.73	0.63	16.1
All Vehicles		2393	2.3	2393	2.3	0.902	40.8	LOS C	10.4	73.4	0.88	0.89	0.97	12.1

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: Ben Boyd Road (S)											
P1	Full	4	21.6	LOS C	0.0	0.0	0.58	0.58	49.5	33.4	0.68
West: Ernest Street (W)											
P4	Full	117	28.6	LOS C	0.3	0.3	0.66	0.66	57.9	35.2	0.61
All Pedestrians		121	28.3	LOS C	0.3	0.3	0.66	0.66	57.6	35.1	0.61

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: I-12 [I-12 2022 EX AM - Import (Site Folder: Original)]

Network: N101 [2022 EX AM (Network Folder: Existing - Belgrave Road Network)]

Ben Boyd Rd / Belgrave St
2028 Young Street Closure Weekday AM Peak
Site Category: (None)
Give-Way (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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ben Boyd Road (S)														
2	T1	60	1.8	60	1.8	0.098	0.0	LOS A	0.0	0.0	0.00	0.35	0.00	41.6
3	R2	602	4.5	602	4.5	0.268	3.9	LOS A	0.0	0.0	0.00	0.48	0.00	28.1
Approach		662	4.3	662	4.3	0.268	3.5	NA	0.0	0.0	0.00	0.47	0.00	30.2
East: Belgrave Street (E)														
4	L2	1613	1.2	1613	1.2	0.438	4.6	LOS A	39.2	277.4	0.00	0.53	0.00	37.2
Approach		1613	1.2	1613	1.2	0.438	4.6	NA	39.2	277.4	0.00	0.53	0.00	37.2
North: Ben Boyd Road (N)														
7	L2	17	0.0	17	0.0	0.915	224.8	LOS F	3.4	24.1	0.79	1.14	1.86	1.4
8	T1	15	0.0	15	0.0	0.915	372.4	LOS F	3.4	24.1	0.79	1.14	1.86	1.4
Approach		32	0.0	32	0.0	0.915	293.7	LOS F	3.4	24.1	0.79	1.14	1.86	1.4
West: Oaks Avenue														
10	L2	14	0.0	14	0.0	0.031	5.7	LOS A	0.1	0.9	0.17	0.55	0.17	41.7
11	T1	9	0.0	9	0.0	0.031	11.8	LOS A	0.1	0.9	0.17	0.55	0.17	39.8
Approach		23	0.0	23	0.0	0.031	8.2	LOS A	0.1	0.9	0.17	0.55	0.17	41.1
All Vehicles		2329	2.0	2329	2.0	0.915	8.3	NA	39.2	277.4	0.01	0.52	0.03	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.
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: I-13 [I-13 2022 EX AM - Import (Site Folder: Original)]

Network: N101 [2022 EX AM (Network Folder: Existing - Belgrave Road Network)]

Belgrave St / Young St
2028 Young Street Closure Weekday AM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Young Street (S)														
1	L2	59	1.8	59	1.8	0.557	67.6	LOS E	3.8	27.1	0.99	0.79	1.02	5.3
2	T1	44	0.0	44	0.0	0.405	61.4	LOS E	4.2	29.2	0.98	0.76	0.98	9.5
3	R2	23	0.0	23	0.0	0.405	65.9	LOS E	4.2	29.2	0.98	0.76	0.98	5.6
Approach		126	0.8	126	0.8	0.557	65.1	LOS E	4.2	29.2	0.98	0.77	1.00	6.9
East: Belgrave Street (E)														
4	L2	27	3.8	27	3.8	0.452	10.1	LOS A	27.3	193.1	0.37	0.35	0.37	36.9
5	T1	1520	1.1	1520	1.1	0.452	5.3	LOS A	27.3	193.1	0.36	0.35	0.36	36.6
6	R2	60	0.0	60	0.0	0.452	9.9	LOS A	4.9	34.3	0.30	0.35	0.30	37.9
Approach		1607	1.1	1607	1.1	0.452	5.6	LOS A	27.3	193.1	0.36	0.35	0.36	36.7
North: Young Street (N)														
7	L2	21	0.0	21	0.0	0.183	60.2	LOS E	2.5	17.6	0.93	0.72	0.93	6.1
8	T1	84	0.0	84	0.0	* 0.916	76.2	LOS F	8.5	59.2	0.98	0.98	1.39	4.6
9	R2	47	0.0	47	0.0	0.916	88.6	LOS F	8.5	59.2	1.00	1.08	1.56	4.3
Approach		153	0.0	153	0.0	0.916	77.8	LOS F	8.5	59.2	0.98	0.98	1.38	4.7
West: Belgrave Street (W)														
10	L2	32	6.7	32	6.7	0.101	6.4	LOS A	1.6	11.6	0.10	0.14	0.10	43.2
11	T1	519	4.7	519	4.7	0.498	2.8	LOS A	3.3	23.9	0.14	0.18	0.14	40.8
12	R2	38	2.8	38	2.8	* 0.498	7.9	LOS A	3.3	23.9	0.19	0.22	0.19	38.8
Approach		588	4.7	588	4.7	0.498	3.3	LOS A	3.3	23.9	0.14	0.18	0.14	40.9
All Vehicles		2475	1.9	2475	1.9	0.916	12.5	LOS A	27.3	193.1	0.38	0.37	0.40	26.7

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
East: Belgrave Street (E)											
P2	Full	49	57.4	LOS E	0.2	0.2	0.94	0.94	86.7	35.2	0.41
West: Belgrave Street (W)											
P4	Full	42	57.3	LOS E	0.1	0.1	0.94	0.94	86.7	35.2	0.41
All Pedestrians		92	57.4	LOS E	0.2	0.2	0.94	0.94	86.7	35.2	0.41

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: I-14 [I-14 2022 EX AM - Import (Site Folder: Original)]

Network: N101 [2022 EX AM (Network Folder: Existing - Belgrave Road Network)]

Belgrave St / Waters Rd
2028 Young Street Closure Weekday AM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Waters Road (S)														
1	L2	66	1.6	66	1.6	0.293	61.6	LOS E	3.9	27.8	0.95	0.76	0.95	6.4
3a	R1	82	2.6	82	2.6	* 0.710	74.3	LOS F	5.5	39.5	1.00	0.83	1.15	9.4
Approach		148	2.1	148	2.1	0.710	68.7	LOS E	5.5	39.5	0.98	0.80	1.06	8.2
NorthEast: Gerard Street (NE)														
24a	L1	221	0.0	221	0.0	* 0.602	7.4	LOS A	8.1	57.2	0.17	0.62	0.17	30.8
26a	R1	1536	1.2	1536	1.2	0.602	6.0	LOS A	8.1	57.2	0.10	0.59	0.10	33.4
Approach		1757	1.0	1757	1.0	0.602	6.1	LOS A	8.1	57.2	0.11	0.59	0.11	33.0
West: Belgrave Street (W)														
10a	L1	580	4.4	580	4.4	0.386	9.0	LOS A	9.0	65.4	0.31	0.66	0.31	38.3
Approach		580	4.4	580	4.4	0.386	9.0	LOS A	9.0	65.4	0.31	0.66	0.31	38.3
All Vehicles		2485	1.9	2485	1.9	0.710	10.5	LOS A	9.0	65.4	0.21	0.62	0.21	29.1

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: Waters Road (S)											
P1	Full	36	4.7	LOS A	0.0	0.0	0.27	0.27	31.3	31.9	1.02
NorthEast: Gerard Street (NE)											
P6	Full	215	59.7	LOS E	0.8	0.8	0.96	0.96	86.7	35.2	0.41
All Pedestrians		251	51.8	LOS E	0.8	0.8	0.86	0.86	78.8	34.7	0.44

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: I-01 [I-01 2022 EX PM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX PM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Military Road / Ben Boyd Road
2018 Existing Weekday PM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ben Boyd Road (S)														
1	L2	63	0.0	63	0.0	0.672	75.7	LOS F	8.7	60.9	1.00	0.83	1.05	9.4
2	T1	160	0.0	160	0.0	0.960	85.9	LOS F	10.7	75.2	1.00	1.01	1.39	6.0
3	R2	28	0.0	28	0.0	0.960	101.9	LOS F	10.7	75.2	1.00	1.12	1.61	5.4
Approach		252	0.0	252	0.0	0.960	85.2	LOS F	10.7	75.2	1.00	0.98	1.33	6.7
East: Military Road (E)														
4	L2	31	6.5	31	6.5	0.041	7.6	LOS A	0.2	1.6	0.08	0.50	0.08	40.1
5	T1	1850	7.1	1850	7.1	0.818	3.7	LOS A	18.9	133.8	0.31	0.29	0.31	47.2
Approach		1881	7.1	1881	7.1	0.818	3.8	LOS A	18.9	133.8	0.30	0.29	0.30	47.1
North: Ben Boyd Road (N)														
7	L2	8	12.5	8	12.5	0.438	63.1	LOS E	6.9	49.0	0.96	0.77	0.96	3.0
8	T1	157	0.7	157	0.7	* 0.974	73.3	LOS F	6.9	49.0	0.97	0.88	1.19	8.1
9	R2	51	4.2	51	4.2	0.974	104.2	LOS F	6.9	49.0	1.00	1.11	1.68	3.7
Approach		216	2.0	216	2.0	0.974	80.2	LOS F	6.9	49.0	0.98	0.93	1.30	6.6
West: Military Road (W)														
10	L2	241	0.4	241	0.4	0.435	13.7	LOS A	13.8	119.8	0.45	0.56	0.45	18.7
11	T1	2138	6.7	2138	6.7	* 0.967	51.2	LOS D	82.6	579.7	0.93	1.08	1.16	6.4
Approach		2379	6.1	2379	6.1	0.967	47.4	LOS D	82.6	579.7	0.88	1.03	1.09	6.2
All Vehicles		4727	6.0	4727	6.0	0.974	33.6	LOS C	82.6	579.7	0.66	0.73	0.80	13.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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: Ben Boyd Road (S)											
P1	Full	134	6.0	LOS A	0.2	0.2	0.29	0.29	32.7	32.0	0.98
East: Military Road (E)											
P2	Full	74	64.3	LOS F	0.3	0.3	0.96	0.96	98.5	41.0	0.42
North: Ben Boyd Road (N)											
P3	Full	208	6.1	LOS A	0.2	0.2	0.30	0.30	32.7	32.0	0.98

West: Military Road (W)										
P4 Full	86	64.4	LOS F	0.3	0.3	0.96	0.96	98.5	41.0	0.42
All Pedestrians	502	24.6	LOS C	0.3	0.3	0.51	0.51	53.7	34.9	0.65

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: I-02 [I-02 2022 EX PM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX PM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Military Road / Young Street
2018 Existing Weekday PM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Military Road (E)														
5	T1	1893	6.7	1893	6.7	0.664	4.3	LOS A	17.0	125.9	0.28	0.26	0.28	38.7
Approach		1893	6.7	1893	6.7	0.664	4.3	LOS A	17.0	125.9	0.28	0.26	0.28	38.7
West: Military Road (W)														
11	T1	2205	6.6	2205	6.6	* 0.969	37.1	LOS C	32.6	228.5	0.76	0.87	0.95	13.4
Approach		2205	6.6	2205	6.6	0.969	37.1	LOS C	32.6	228.5	0.76	0.87	0.95	11.7
All Vehicles		4098	6.6	4098	6.6	0.969	22.0	LOS B	32.6	228.5	0.54	0.59	0.64	16.7

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
West: Military Road (W)											
P4	Full	273	64.9	LOS F	1.0	1.0	0.97	0.97	100.5	42.8	0.43
All Pedestrians		273	64.9	LOS F	1.0	1.0	0.97	0.97	100.5	42.8	0.43

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: I-03 [I-03 2022 EX PM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX PM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Military Road / Wycombe Road
2018 Existing Weekday PM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wycombe Road (S)														
1	L2	81	6.5	81	6.5	0.508	71.1	LOS F	5.5	40.3	0.99	0.78	0.99	3.6
3	R2	109	4.8	109	4.8	* 0.776	78.6	LOS F	7.9	57.8	1.00	0.88	1.19	3.3
Approach		191	5.5	191	5.5	0.776	75.4	LOS F	7.9	57.8	1.00	0.84	1.11	3.4
East: Military Road (E)														
4	L2	75	9.3	75	9.3	0.187	12.4	LOS A	4.1	43.7	0.37	0.47	0.37	25.1
5	T1	1780	6.9	1780	6.9	0.648	9.5	LOS A	16.1	114.2	0.53	0.50	0.53	21.3
Approach		1855	7.0	1855	7.0	0.648	9.6	LOS A	16.1	114.2	0.52	0.50	0.52	21.6
West: Military Road (W)														
11	T1	2237	6.6	2237	6.6	* 0.991	45.8	LOS D	27.9	195.8	0.86	1.01	1.11	11.0
Approach		2237	6.6	2237	6.6	0.991	45.8	LOS D	27.9	195.8	0.86	1.01	1.11	9.1
All Vehicles		4283	6.7	4283	6.7	0.991	31.4	LOS C	27.9	195.8	0.72	0.78	0.86	10.7

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: Wycombe Road (S)											
P1	Full	138	7.6	LOS A	0.2	0.2	0.33	0.33	36.9	35.2	0.95
East: Military Road (E)											
P2	Full	375	65.1	LOS F	1.4	1.4	0.97	0.97	100.0	41.8	0.42
West: Military Road (W)											
P4	Full	118	64.4	LOS F	0.5	0.5	0.96	0.96	100.1	42.8	0.43
All Pedestrians		631	52.4	LOS E	1.4	1.4	0.83	0.83	86.2	40.5	0.47

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: I-04 [I-04 2022 EX PM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX PM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Military Road / Waters Road / Rangers Road
2018 Existing Weekday PM Peak
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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Rangers Road (S)														
1	L2	65	0.0	65	0.0	0.356	11.0	LOS A	0.9	6.2	0.47	0.79	0.57	36.0
Approach		65	0.0	65	0.0	0.356	11.0	LOS A	0.9	6.2	0.47	0.79	0.57	36.0
East: Military Road (E)														
4	L2	35	0.0	35	0.0	0.104	5.6	LOS A	0.0	0.0	0.00	0.15	0.00	55.7
5	T1	1792	7.3	1792	7.3	0.438	0.1	LOS A	12.2	86.9	0.00	0.01	0.00	59.4
Approach		1827	7.1	1827	7.1	0.438	0.2	NA	12.2	86.9	0.00	0.01	0.00	59.3
North: Waters Roa (N)														
7	L2	148	0.0	148	0.0	0.503	19.1	LOS B	2.5	17.8	0.67	1.13	1.04	30.1
Approach		148	0.0	148	0.0	0.503	19.1	LOS B	2.5	17.8	0.67	1.13	1.04	30.1
West: Military Road (W)														
10	L2	66	1.5	66	1.5	0.268	4.8	LOS A	0.0	0.0	0.00	0.14	0.00	39.9
11	T1	2286	6.6	2286	6.6	0.765	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	57.7
Approach		2352	6.5	2352	6.5	0.765	0.3	NA	0.0	0.0	0.00	0.02	0.00	57.5
All Vehicles		4393	6.4	4393	6.4	0.765	1.0	NA	12.2	86.9	0.03	0.06	0.04	55.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: I-05 [I-05 2022 EX PM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX PM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Ben Boyd Road / Grosvenor Lane
2018 Existing Weekday PM Peak
Site Category: (None)
Give-Way (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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ben Boyd Road (S)														
2	T1	315	0.3	315	0.3	0.210	0.5	LOS A	0.8	5.3	0.14	0.13	0.14	35.1
3	R2	102	0.0	102	0.0	0.210	4.1	LOS A	0.8	5.3	0.19	0.17	0.19	31.8
Approach		417	0.3	417	0.3	0.210	1.4	NA	0.8	5.3	0.16	0.14	0.16	34.2
North: Ben Boyd Road (N)														
7	L2	17	0.0	17	0.0	0.079	3.9	LOS A	0.0	0.0	0.00	0.11	0.00	42.4
8	T1	220	2.4	220	2.4	0.079	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	47.3
Approach		237	2.2	237	2.2	0.079	0.3	NA	0.0	0.0	0.00	0.04	0.00	46.9
All Vehicles		654	1.0	654	1.0	0.210	1.0	NA	0.8	5.3	0.10	0.10	0.10	39.1

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: I-06 [I-06 2022 EX PM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX PM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Grosvenor Lane / Young Street
2018 Existing Weekday PM Peak
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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
North: Young Street (N)														
7	L2	99	0.0	99	0.0	0.053	3.9	LOS A	0.0	0.0	0.00	0.52	0.00	27.5
Approach		99	0.0	99	0.0	0.053	3.9	NA	0.0	0.0	0.00	0.52	0.00	27.5
West: Grosvenor Lane (W)														
10	L2	85	1.2	85	1.2	0.112	7.5	LOS A	0.5	3.7	0.20	0.89	0.20	24.3
11	T1	82	0.0	82	0.0	0.112	8.0	LOS A	0.5	3.7	0.20	0.89	0.20	31.9
Approach		167	0.6	167	0.6	0.112	7.7	LOS A	0.5	3.7	0.20	0.89	0.20	27.1
All Vehicles		266	0.4	266	0.4	0.112	6.3	NA	0.5	3.7	0.13	0.75	0.13	27.2

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.

MOVEMENT SUMMARY

Site: I-07 [I-07 2022 EX PM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX PM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Grosvenor Lane / Waters Road
2018 Existing Weekday PM Peak
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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Waters Road (S)														
2	T1	77	2.7	77	2.7	0.040	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		77	2.7	77	2.7	0.040	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
North: Waters Road (N)														
8	T1	113	0.0	113	0.0	0.058	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		113	0.0	113	0.0	0.058	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
West: Grosvenor Lane (W)														
10	L2	98	3.2	98	3.2	0.121	7.9	LOS A	0.5	3.4	0.19	0.91	0.19	33.6
12	R2	45	0.0	45	0.0	0.121	7.9	LOS A	0.5	3.4	0.19	0.91	0.19	32.9
Approach		143	2.2	143	2.2	0.121	7.9	LOS A	0.5	3.4	0.19	0.91	0.19	33.4
All Vehicles		333	1.6	333	1.6	0.121	3.4	NA	0.5	3.4	0.08	0.39	0.08	37.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: I-08 [I-08 2022 EX PM - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX PM - Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Ben Boyd Road / Grosvenor Street
2018 Existing Weekday PM Peak
Site Category: (None)
Give-Way (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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ben Boyd Road (S)														
2	T1	213	1.0	213	1.0	0.083	0.1	LOS A	0.4	2.7	0.04	0.08	0.04	45.3
3	R2	93	0.0	93	0.0	0.083	4.1	LOS A	0.4	2.7	0.18	0.33	0.18	39.9
Approach		305	0.7	305	0.7	0.083	1.3	NA	0.4	2.7	0.09	0.15	0.09	42.4
East: Grosvenor Street (E)														
4	L2	158	1.3	158	1.3	0.187	5.8	LOS A	0.8	5.8	0.20	0.58	0.20	37.4
6	R2	64	0.0	64	0.0	0.187	8.2	LOS A	0.8	5.8	0.20	0.58	0.20	35.7
Approach		222	0.9	222	0.9	0.187	6.5	LOS A	0.8	5.8	0.20	0.58	0.20	36.8
North: Ben Boyd Road (N)														
7	L2	3	0.0	3	0.0	0.043	3.4	LOS A	0.0	0.0	0.00	0.02	0.00	47.4
8	T1	79	2.7	79	2.7	0.043	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	48.2
Approach		82	2.6	82	2.6	0.043	0.1	NA	0.0	0.0	0.00	0.02	0.00	48.1
All Vehicles		609	1.0	609	1.0	0.187	3.0	NA	0.8	5.8	0.12	0.29	0.12	39.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: I-09 [I-09 2022 EX PM - Import (Site Folder: Original)]

Network: N101 [2022 EX PM (Network Folder: Existing - Belgrave Road Network)]

Grosvenor Street / Young Street
2028 Young Street Closure Weekday PM Peak
Site Category: (None)
Roundabout

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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Young Street (S)														
1	L2	47	2.2	47	2.2	0.106	4.9	LOS A	0.6	3.9	0.45	0.58	0.45	23.5
2	T1	40	0.0	40	0.0	0.106	4.6	LOS A	0.6	3.9	0.45	0.58	0.45	23.5
3	R2	14	0.0	14	0.0	0.106	7.5	LOS A	0.6	3.9	0.45	0.58	0.45	23.5
3u	U	3	0.0	3	0.0	0.106	9.1	LOS A	0.6	3.9	0.45	0.58	0.45	26.4
Approach		104	1.0	104	1.0	0.106	5.2	LOS A	0.6	3.9	0.45	0.58	0.45	23.7
East: Grosvenor Street (E)														
4	L2	20	0.0	20	0.0	0.210	4.8	LOS A	1.3	8.8	0.35	0.55	0.35	35.3
5	T1	123	0.9	123	0.9	0.210	4.6	LOS A	1.3	8.8	0.35	0.55	0.35	35.8
6	R2	95	0.0	95	0.0	0.210	7.5	LOS A	1.3	8.8	0.35	0.55	0.35	35.8
6u	U	3	0.0	3	0.0	0.210	10.1	LOS A	1.3	8.8	0.35	0.55	0.35	35.8
Approach		241	0.4	241	0.4	0.210	5.8	LOS A	1.3	8.8	0.35	0.55	0.35	35.7
North: Young Street (N)														
7	L2	73	0.0	73	0.0	0.162	4.6	LOS A	0.8	5.3	0.25	0.53	0.25	29.6
8	T1	72	0.0	72	0.0	0.162	4.4	LOS A	0.8	5.3	0.25	0.53	0.25	31.5
9	R2	38	0.0	38	0.0	0.162	7.3	LOS A	0.8	5.3	0.25	0.53	0.25	29.6
9u	U	6	0.0	6	0.0	0.162	9.9	LOS A	0.8	5.3	0.25	0.53	0.25	29.6
Approach		188	0.0	188	0.0	0.162	5.3	LOS A	0.8	5.3	0.25	0.53	0.25	30.5
West: Grosvenor Street (W)														
10	L2	22	0.0	22	0.0	0.107	4.9	LOS A	0.5	3.8	0.34	0.53	0.34	34.8
11	T1	74	0.0	74	0.0	0.107	4.6	LOS A	0.5	3.8	0.34	0.53	0.34	34.8
12	R2	13	0.0	13	0.0	0.107	7.6	LOS A	0.5	3.8	0.34	0.53	0.34	34.0
12u	U	8	0.0	8	0.0	0.107	10.1	LOS A	0.5	3.8	0.34	0.53	0.34	34.8
Approach		117	0.0	117	0.0	0.107	5.4	LOS A	0.5	3.8	0.34	0.53	0.34	34.7
All Vehicles		651	0.3	651	0.3	0.210	5.5	LOS A	1.3	8.8	0.33	0.54	0.33	33.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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: I-10 [I-10 2022 EX PM - Import (Site Folder: Original)]

Network: N101 [2022 EX PM (Network Folder: Existing - Belgrave Road Network)]

Grosvenor Street / Waters Road
2028 Young Street Closure Weekday PM Peak
Site Category: (None)
Give-Way (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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Waters Road (S)														
1	L2	95	2.2	95	2.2	0.117	4.6	LOS A	0.5	3.6	0.09	0.26	0.09	33.9
2	T1	91	3.5	91	3.5	0.117	0.1	LOS A	0.5	3.6	0.09	0.26	0.09	33.9
Approach		185	2.8	185	2.8	0.117	2.4	NA	0.5	3.6	0.09	0.26	0.09	33.9
North: Waters Road (S)														
8	T1	34	0.0	34	0.0	0.079	0.7	LOS A	0.3	2.5	0.29	0.41	0.29	37.6
9	R2	89	1.2	89	1.2	0.079	5.3	LOS A	0.3	2.5	0.29	0.41	0.29	33.2
Approach		123	0.9	123	0.9	0.079	4.0	NA	0.3	2.5	0.29	0.41	0.29	34.7
West: Grosvenor Street (W)														
10	L2	91	0.0	91	0.0	0.139	4.9	LOS A	0.5	3.8	0.21	0.55	0.21	36.9
12	R2	74	0.0	74	0.0	0.139	6.2	LOS A	0.5	3.8	0.21	0.55	0.21	36.2
Approach		164	0.0	164	0.0	0.139	5.4	LOS A	0.5	3.8	0.21	0.55	0.21	36.5
All Vehicles		473	1.3	473	1.3	0.139	3.9	NA	0.5	3.8	0.18	0.40	0.18	35.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: I-11 [I-11 2022 EX PM - Import (Site Folder: Original)]

Network: N101 [2022 EX PM (Network Folder: Existing - Belgrave Road Network)]

Ben Boyd Road / Ernest Street
2028 Young Street Closure Weekday PM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ben Boyd Road (S)														
1	L2	102	1.0	102	1.0	0.231	43.1	LOS D	5.5	38.8	0.81	0.74	0.81	12.7
2	T1	159	0.7	159	0.7	0.231	32.7	LOS C	5.8	40.8	0.67	0.55	0.67	5.5
Approach		261	0.8	261	0.8	0.231	36.8	LOS C	5.8	40.8	0.73	0.63	0.73	9.1
North: Ben Boyd Road (N)														
8	T1	81	2.6	81	2.6	* 0.244	11.0	LOS A	5.4	38.4	0.41	0.57	0.41	12.3
9	R2	687	1.8	687	1.8	0.489	17.2	LOS B	10.3	73.4	0.48	0.67	0.48	23.0
Approach		768	1.9	768	1.9	0.489	16.5	LOS B	10.3	73.4	0.47	0.66	0.47	22.4
West: Ernest Street (W)														
10	L2	1087	1.3	1087	1.3	* 0.512	15.5	LOS B	12.9	91.3	0.41	0.68	0.41	21.7
Approach		1087	1.3	1087	1.3	0.512	15.5	LOS B	12.9	91.3	0.41	0.68	0.41	21.7
All Vehicles		2117	1.4	2117	1.4	0.512	18.5	LOS B	12.9	91.3	0.47	0.67	0.47	19.7

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: Ben Boyd Road (S)											
P1	Full	8	15.8	LOS B	0.0	0.0	0.49	0.49	43.6	33.4	0.77
West: Ernest Street (W)											
P4	Full	95	36.3	LOS D	0.3	0.3	0.75	0.75	65.7	35.2	0.54
All Pedestrians		103	34.7	LOS D	0.3	0.3	0.73	0.73	63.9	35.1	0.55

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: I-12 [I-12 2022 EX PM - Import (Site Folder: Original)]

Network: N101 [2022 EX PM (Network Folder: Existing - Belgrave Road Network)]

Ben Boyd Rd / Belgrave St
2028 Young Street Closure Weekday PM Peak
Site Category: (None)
Give-Way (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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Ben Boyd Road (S)														
2	T1	75	4.2	75	4.2	0.340	0.0	LOS A	0.0	0.0	0.00	0.46	0.00	39.3
3	R2	1180	1.0	1180	1.0	0.340	3.7	LOS A	0.0	0.0	0.00	0.49	0.00	27.9
Approach		1255	1.2	1255	1.2	0.340	3.4	NA	0.0	0.0	0.00	0.48	0.00	29.2
East: Belgrave Street (E)														
4	L2	751	1.8	751	1.8	0.273	4.6	LOS A	4.7	33.4	0.00	0.53	0.00	37.2
Approach		751	1.8	751	1.8	0.273	4.6	NA	4.7	33.4	0.00	0.53	0.00	37.2
North: Ben Boyd Road (N)														
7	L2	22	4.8	22	4.8	0.431	24.8	LOS B	1.5	11.0	0.90	1.04	1.15	6.2
8	T1	18	5.9	18	5.9	0.431	106.0	LOS F	1.5	11.0	0.90	1.04	1.15	6.2
Approach		40	5.3	40	5.3	0.431	61.1	LOS E	1.5	11.0	0.90	1.04	1.15	6.2
West: Oaks Avenue														
10	L2	31	0.0	31	0.0	0.073	5.8	LOS A	0.3	1.8	0.23	0.54	0.23	38.2
11	T1	6	16.7	6	16.7	0.073	34.2	LOS C	0.3	1.8	0.23	0.54	0.23	35.4
Approach		37	2.9	37	2.9	0.073	10.7	LOS A	0.3	1.8	0.23	0.54	0.23	37.8
All Vehicles		2082	1.5	2082	1.5	0.431	5.1	NA	4.7	33.4	0.02	0.51	0.03	31.1

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: I-13 [I-13 2022 EX PM - Import (Site Folder: Original)]

Network: N101 [2022 EX PM (Network Folder: Existing - Belgrave Road Network)]

Belgrave St / Young St
2028 Young Street Closure Weekday PM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Young Street (S)														
1	L2	57	0.0	57	0.0	0.306	65.5	LOS E	3.4	24.1	0.97	0.75	0.97	5.5
2	T1	80	0.0	80	0.0	0.637	63.7	LOS E	6.9	48.2	1.00	0.82	1.05	9.3
3	R2	27	0.0	27	0.0	0.637	68.2	LOS E	6.9	48.2	1.00	0.82	1.05	5.5
Approach		164	0.0	164	0.0	0.637	65.1	LOS E	6.9	48.2	0.99	0.79	1.02	7.4
East: Belgrave Street (E)														
4	L2	36	0.0	36	0.0	0.360	8.3	LOS A	5.6	39.7	0.23	0.24	0.23	39.8
5	T1	643	1.8	643	1.8	0.360	4.1	LOS A	5.6	39.7	0.24	0.26	0.24	39.1
6	R2	59	0.0	59	0.0	0.360	8.4	LOS A	4.5	31.8	0.25	0.30	0.25	40.1
Approach		738	1.6	738	1.6	0.360	4.6	LOS A	5.6	39.7	0.24	0.26	0.24	39.3
North: Young Street (N)														
7	L2	29	0.0	29	0.0	0.167	62.7	LOS E	1.8	12.9	0.94	0.72	0.94	5.7
8	T1	92	0.0	92	0.0	* 0.833	69.9	LOS E	9.2	65.0	1.00	0.96	1.28	5.0
9	R2	44	2.4	44	2.4	0.833	74.7	LOS F	9.2	65.0	1.00	0.96	1.28	5.0
Approach		165	0.6	165	0.6	0.833	69.9	LOS E	9.2	65.0	0.99	0.91	1.22	5.1
West: Belgrave Street (W)														
10	L2	47	0.0	47	0.0	0.470	5.3	LOS A	1.6	11.5	0.04	0.07	0.04	46.4
11	T1	1038	1.0	1038	1.0	* 0.470	0.5	LOS A	1.6	11.5	0.04	0.08	0.04	46.7
12	R2	56	0.0	56	0.0	0.352	5.1	LOS A	0.8	5.8	0.03	0.10	0.03	46.1
Approach		1141	0.9	1141	0.9	0.470	0.9	LOS A	1.6	11.5	0.04	0.08	0.04	46.6
All Vehicles		2208	1.0	2208	1.0	0.833	12.1	LOS A	9.2	65.0	0.25	0.26	0.27	26.7

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
East: Belgrave Street (E)											
P2	Full	38	59.2	LOS E	0.1	0.1	0.96	0.96	88.6	35.2	0.40
West: Belgrave Street (W)											
P4	Full	28	59.2	LOS E	0.1	0.1	0.95	0.95	88.5	35.2	0.40
All Pedestrians		66	59.2	LOS E	0.1	0.1	0.96	0.96	88.6	35.2	0.40

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

MOVEMENT SUMMARY

Site: I-14 [I-14 2022 EX PM - Import (Site Folder: Original)]

Network: N101 [2022 EX PM (Network Folder: Existing - Belgrave Road Network)]

Belgrave St / Waters Rd
2028 Young Street Closure Weekday PM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 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	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Waters Road (S)														
1	L2	55	5.8	55	5.8	0.210	59.5	LOS E	3.1	22.8	0.92	0.74	0.92	6.8
3a	R1	132	0.0	132	0.0	* 0.905	82.1	LOS F	9.5	66.8	1.00	1.00	1.46	8.6
Approach		186	1.7	186	1.7	0.905	75.5	LOS F	9.5	66.8	0.98	0.92	1.30	8.2
NorthEast: Gerard Street (NE)														
24a	L1	123	0.9	123	0.9	0.104	10.9	LOS A	2.7	18.7	0.33	0.65	0.33	24.5
26a	R1	680	1.2	680	1.2	* 0.520	10.6	LOS A	15.0	106.4	0.40	0.69	0.40	25.0
Approach		803	1.2	803	1.2	0.520	10.6	LOS A	15.0	106.4	0.39	0.69	0.39	24.9
West: Belgrave Street (W)														
10a	L1	1102	1.1	1102	1.1	0.508	9.3	LOS A	13.5	95.3	0.28	0.66	0.28	37.9
Approach		1102	1.1	1102	1.1	0.508	9.3	LOS A	13.5	95.3	0.28	0.66	0.28	37.9
All Vehicles		2092	1.2	2092	1.2	0.905	15.7	LOS B	15.0	106.4	0.38	0.69	0.41	27.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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: Waters Road (S)											
P1	Full	19	5.6	LOS A	0.0	0.0	0.29	0.29	32.1	31.9	0.99
NorthEast: Gerard Street (NE)											
P6	Full	79	56.5	LOS E	0.3	0.3	0.93	0.93	83.6	35.2	0.42
All Pedestrians		98	46.6	LOS E	0.3	0.3	0.81	0.81	73.6	34.6	0.47

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: I-01 [I-01 2022 EX SAT - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX SAT- Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Military Road / Ben Boyd Road
2018 Existing Saturday Mid-day Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

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: Ben Boyd Road (S)														
1	L2	71	3.0	71	3.0	0.644	74.9	LOS F	5.2	36.9	1.00	0.82	1.03	18.4
2	T1	179	1.8	179	1.8	* 0.991	96.6	LOS F	9.2	65.0	1.00	1.09	1.48	13.9
3	R2	38	0.0	38	0.0	0.991	113.3	LOS F	9.2	65.0	1.00	1.20	1.67	12.7
Approach		287	1.8	287	1.8	0.991	93.5	LOS F	9.2	65.0	1.00	1.04	1.39	14.7
East: Military Road (E)														
4	L2	51	2.1	51	2.1	0.050	11.0	LOS A	0.4	2.9	0.21	0.62	0.21	41.5
5	T1	2041	2.9	2041	2.9	* 0.878	12.1	LOS A	19.8	140.0	0.61	0.59	0.63	32.1
Approach		2092	2.9	2092	2.9	0.878	12.1	LOS A	19.8	140.0	0.60	0.59	0.62	32.6
North: Ben Boyd Road (N)														
7	L2	14	0.0	14	0.0	0.366	63.1	LOS E	3.7	26.0	0.95	0.75	0.95	2.9
8	T1	186	2.3	186	2.3	0.914	73.7	LOS F	4.2	30.0	0.98	0.93	1.22	17.4
9	R2	59	0.0	59	0.0	0.914	86.9	LOS F	4.2	30.0	1.00	1.07	1.42	3.5
Approach		259	1.6	259	1.6	0.914	76.1	LOS F	4.2	30.0	0.98	0.95	1.25	13.4
West: Military Road (W)														
10	L2	306	0.3	306	0.3	0.257	16.2	LOS B	5.3	37.5	0.46	0.71	0.46	15.1
11	T1	1869	2.8	1869	2.8	0.644	8.5	LOS A	18.3	129.1	0.52	0.48	0.52	23.6
Approach		2175	2.4	2175	2.4	0.644	9.5	LOS A	18.3	130.1	0.51	0.51	0.51	21.9
All Vehicles		4813	2.5	4813	2.5	0.991	19.2	LOS B	19.8	140.0	0.60	0.60	0.65	22.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
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: Ben Boyd Road (S)											
P1	Full	116	6.0	LOS A	0.1	0.1	0.29	0.29	32.7	32.0	0.98
East: Military Road (E)											
P2	Full	58	64.3	LOS F	0.2	0.2	0.96	0.96	98.5	41.0	0.42
North: Ben Boyd Road (N)											
P3	Full	185	6.1	LOS A	0.2	0.2	0.30	0.30	32.7	32.0	0.98

West: Military Road (W)										
P4 Full	75	64.3	LOS F	0.3	0.3	0.96	0.96	98.5	41.0	0.42
All Pedestrians	434	23.9	LOS C	0.3	0.3	0.50	0.50	52.8	34.8	0.66

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: I-02 [I-02 2022 EX SAT - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX SAT- Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Military Road / Young Street
2018 Existing Saturday Mid-day Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 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
East: Military Road (E)														
5	T1	1987	2.9	1987	2.9	* 0.984	65.5	LOS E	58.1	411.7	1.00	1.20	1.31	6.4
Approach		1987	2.9	1987	2.9	0.984	65.5	LOS E	58.1	411.7	1.00	1.20	1.31	6.4
West: Military Road (W)														
11	T1	1918	2.7	1918	2.7	0.633	3.3	LOS A	8.6	60.7	0.21	0.19	0.21	50.0
Approach		1918	2.7	1918	2.7	0.633	3.3	LOS A	8.6	60.7	0.21	0.19	0.21	50.0
All Vehicles		3905	2.8	3905	2.8	0.984	34.9	LOS C	58.1	411.7	0.61	0.70	0.77	15.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
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
West: Military Road (W)											
P4	Full	316	65.0	LOS F	1.2	1.2	0.97	0.97	100.7	42.8	0.43
All Pedestrians		316	65.0	LOS F	1.2	1.2	0.97	0.97	100.7	42.8	0.43

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: I-05 [I-05 2022 EX SAT - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX SAT- Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Ben Boyd Road / Grosvenor Lane
2018 Existing Saturday Mid-day Peak
Site Category: (None)
Give-Way (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: Ben Boyd Road (S)														
2	T1	383	0.8	383	0.8	0.314	0.7	LOS A	0.5	3.2	0.20	0.14	0.20	31.9
3	R2	124	0.0	124	0.0	0.314	4.6	LOS A	0.5	3.2	0.20	0.14	0.20	41.8
Approach		507	0.6	507	0.6	0.314	1.6	NA	0.5	3.2	0.20	0.14	0.20	37.4
North: Ben Boyd Road (N)														
7	L2	36	2.9	36	2.9	0.086	3.9	LOS A	0.0	0.0	0.00	0.16	0.00	44.6
8	T1	247	1.7	247	1.7	0.086	0.0	LOS A	3.8	27.1	0.00	0.05	0.00	45.9
Approach		283	1.9	283	1.9	0.086	0.5	NA	3.8	27.1	0.00	0.07	0.00	45.5
All Vehicles		791	1.1	791	1.1	0.314	1.2	NA	3.8	27.1	0.13	0.12	0.13	40.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: I-08 [I-08 2022 EX SAT - Import - Copy (Site Folder: Calibrated)]

Network: N101 [2022 EX SAT- Calibrate (Network Folder: Existing - Military Road - Calibrated)]

Ben Boyd Road / Grosvenor Street
2018 Existing Saturday Mid-day Peak
Site Category: (None)
Give-Way (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: Ben Boyd Road (S)														
2	T1	227	1.4	227	1.4	0.108	0.0	LOS A	0.2	1.5	0.02	0.04	0.02	47.7
3	R2	161	0.0	161	0.0	0.108	4.2	LOS A	0.2	1.5	0.22	0.46	0.22	37.9
Approach		388	0.8	388	0.8	0.108	1.8	NA	0.2	1.5	0.10	0.21	0.10	41.1
East: Grosvenor Street (E)														
4	L2	197	1.6	197	1.6	0.221	5.8	LOS A	0.4	2.8	0.20	0.58	0.20	37.0
6	R2	62	0.0	62	0.0	0.221	9.3	LOS A	0.4	2.8	0.20	0.58	0.20	35.4
Approach		259	1.2	259	1.2	0.221	6.7	LOS A	0.4	2.8	0.20	0.58	0.20	36.6
North: Ben Boyd Road (N)														
7	L2	25	0.0	25	0.0	0.056	3.4	LOS A	0.0	0.0	0.00	0.13	0.00	45.5
8	T1	81	2.6	81	2.6	0.056	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	40.8
Approach		106	2.0	106	2.0	0.056	0.8	NA	0.0	0.0	0.00	0.13	0.00	43.3
All Vehicles		754	1.1	754	1.1	0.221	3.3	NA	0.4	2.8	0.12	0.32	0.12	39.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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.

Appendix E SIDRA Guidelines - Concepts of intersection capacity and Level of Service

Guidelines for Evaluation of Intersection Operation

The *RTA Guide to Traffic Generating Developments (October 2002, Issue 2.2)*, details the assessment of intersections. The assessment of the level of service of an intersection is based on the evaluation of the following Measures of Effectiveness:

(a) Average delay (seconds/veh) (all forms of control)

(b) Delay to critical movement (seconds/veh) (all forms of control)

(c) Degree of saturation (traffic signals and roundabouts)

(d) Cycle length (traffic signals)

SIDRA was used to calculate the relevant intersection parameters. The SIDRA software is an advanced lane-based micro-analytical tool for design and evaluation of individual intersections and networks of intersections including modelling of separate movement classes (light vehicles, heavy vehicles, buses, cyclists, large trucks, light rail / trams and so on). It provides estimates of capacity, level of service and a wide range of performance measures, including; delay, queue length and stops for vehicles and pedestrians, as well as fuel consumption, pollution emissions and operating costs.

It can be used to analyse signalised intersections (fixed-time / pretimed and actuated), signalised and unsignalised pedestrian crossings, roundabouts (unsignalised), roundabouts with metering signals, fully-signalised roundabouts, two-way stop sign and give-way / yield sign control, all-way stop sign control, single point interchanges (signalised), freeway diamond interchanges (signalised, roundabout, sign control), diverging diamond interchanges and other alternative intersections and interchanges. It can also be used for uninterrupted traffic flow conditions and merge analysis.

The best indicator of the level of service at an intersection is the average delay experienced by vehicles at that intersection. For traffic signals, the average delay over all movements should be taken. For roundabouts and priority control intersections (with Stop and Give Way signs or operating under the T- junction rule), the critical movement for level of service assessment should be that with the highest average delay.

With traffic signals, delays per approach tend to be equalised, subject to any over-riding requirements of signal co-ordination as well as to variations within individual movements. With roundabouts and priority-controlled intersections, the critical criterion for assessment is the movement with the highest delay per vehicle. With this type of control, the volume balance might be such that some movements suffer high levels of delay while other movements have minimal delay. An overall average delay for the intersection of 25 seconds might not be satisfactory if the average delay on one movement is 60 seconds.

The average delay for LoS 'E' should be no more than 70 seconds. The accepted maximum practical cycle length for traffic signals under saturated conditions is 120 - 140 seconds. Under these conditions 120 seconds is near maximum for two and three phase intersections and 140 seconds near maximum for more complex phase designs. Drivers and pedestrians expect cycle lengths of these magnitudes and their inherent delays in peak hours. A cycle length of 140 seconds for an intersection which is almost saturated has an average vehicle delay of about 70 seconds, although this can vary. If the average vehicle delay is more than 70 seconds, the intersection is assumed to be at LoS 'F'.

Table E1 sets out average delays for different levels of service. There is no consistent correlation between definitions of levels of service for road links as defined elsewhere in this section, and the ranges set out in **Table E1**. In assigning a level of service, the average delay to the motoring public needs to be considered, keeping in mind the location of the intersection. For example, drivers in inner urban areas of Sydney have a higher tolerance of delay than drivers in country areas. **Table E1** provides a recommended baseline for assessment.

Table E1: Level of Service Criteria for Intersections

Level of Service	Average Delay per Vehicle (sec/veh)	Traffic Signals	Priority Controlled
A	0 < x < 14	Good operation	Good operation
B	14 < x < 28	Good operation with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	28 < x < 42	Satisfactory operation	Satisfactory operation, but crash history study required
D	42 < x < 56	Operating near capacity	Operating near capacity and crash history study required
E	56 < x < 70	At capacity, incidents will cause excessive delays	At capacity, requires other control mode
F	70 < x	Requires further study	Requires other control mode

The figures in **Table E1** are intended as a guide only. Any particular assessment should take into account site-specific factors including 95th percentile queue lengths (and their effect on lane blocking), the influence of nearby intersections and the sensitivity of the location to delays. In many situations, a comparison of the current and future average delay provides a better appreciation of the impact of a proposal, and not simply the change in the level of service.

The intersection degree of saturation (DoS) can also be used to measure the performance of isolated intersections. The DoS value can be determined by computer-based assessment programs. At intersections controlled by traffic signals, both queue length and delays increase rapidly as DoS approaches 1.000. An upper limit of 0.900 is appropriate, however when DoS exceeds 0.850, overflow queues start to become a problem. Satisfactory intersection operation is generally achieved with a DoS of about 0.700 - 0.800. (Note that these figures are based on isolated signalised intersections with cycle lengths of 120 seconds. In coordinated signal systems DoS might be actively maximised at key intersections).

Although in some situations additional traffic does not alter the level of service, particularly where the level of service is 'E' or 'F', additional capacity may still be required. This is particularly appropriate for LoS 'F', where small increases in flow can cause disproportionately greater increases in delay. In this situation, it is advisable to consider means of control to maintain the existing level of absolute delay. Suggested criteria for the evaluation of the capacity of signalised intersections based on the DoS are summarised in **Table E2**.

Table E2: Criteria for Evaluating Capacity of Signalised Intersections

Level of Service	Optimum Cycle Length (seconds)	Movement Degree of Saturation (DoS)	Intersection Degree of Saturation (DoS)
A – Excellent	< 90	< 0.700	< 0.700
B – Very good	< 90	< 0.700	< 0.700
C – Good	90 - 120	0.700 – 0.800	0.700 – 0.850
D – Satisfactory	120 - 140	0.800 – 0.850	0.850 – 0.900
E – Poor	> 140	> 0.850	> 0.900
F – Extra capacity required	> 140	> 0.850	> 0.900

Appendix F Yields for existing land use

		Existing Development		
	Site	Retail GFA (m2)	Commercial GFA (m2)	Residential (units)
Key Sites	1	4285	0	0
	2A	3111	881	0
	2B	2395	0	0
	3A	685	1160	0
	3B	3300	452	0
Other Sites	4	1600	0	0
	5	1838	351	0
	6	2262	0	0
	7	1721	0	6
	8	330	0	0
	9	0	4795	0
	10	2743	0	0
	11	2003	2808	26
	12	614	0	2
	13	255	255	2
	14	1352	0	0
	15	551	1101	0
	16	608	0	0
	17A	1630	1087	0
	17B	814	1629	8
	18	0	607	2
	19A	1112	556	0
	19B	521	0	2
	20A	462	0	12
	20B	744	0	0
	20C	1513	0	0
	21	1062	531	0

Total		37510	16213	60