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Final Traffic and Transport Study Report

47 Warrane Road, Roseville Chase – Concept Development Scheme

Prepared for Ku-ring-gai Council
23 March 2021

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SMEC Company Details

Approved by:	ALEN KRILJIC		
Address:	Level 5, 20 Berry Street, North Sydney NSW 2060		
Signature:			
Tel:	02 9925 5508	Fax:	02 9925 5566
Email:	Alen.Krljic@smec.com	Website:	www.smec.com

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1 Introduction

1.1 Background

SMEC has been commissioned as part of the Studio GL team on behalf of Ku-ring-gai Council to undertake a Transport Impact Assessment (TIA) for a Concept Plan Scheme relating to the development at 47 Warrane Road, Roseville Chase. This TIA assesses the impacts of the proposal and the capacity of the local road network.

The site, owned by Council, was occupied by the former East Roseville Bowling Club which had continuously leased the site from 1948 until 2017. The site is currently zoned RE1 Public Recreation under the Ku-ring-gai LEP (2015) and classified as 'operational land'.

The site is not considered appropriate for more intensive recreation uses, and its future under the current zoning is not considered the highest or best use of the site. Council resolved to proceed with the R2 Low Density residential zoning on the site as conditioned by the Gateway Determination on the 30 June 2020. It was also decided to investigate an option for R3 Medium Density residential development on the site as well.

1.2 Scope of Report

The scope for this traffic and transport impact assessment for the R2 Low Density residential includes:

- A review and assessment of existing transport conditions adjacent to the site
- A description of the proposed development
- A description of the proposed development's traffic generation, distribution, and access routes
- A review and assessment of future road and traffic conditions adjacent to the site
- Analysis of future intersection performance post development of the site
- Identification of any likely development related impacts to all road users
- Preparation of available options to mitigate any adverse impacts

1.3 Site Location

The subject site has a total area of approximately 1.01ha and is situated 270m from the Roseville Chase neighbourhood centre on Babbage Road. The site is bounded by existing low-density residential development. It is serviced by local access roads including Babbage Road to the north, Warrane Road to the west, Malga Avenue to the east and Rowe Street to the south. Figure 1-1 shows the location of subject site. Also, Figure 1-2 shows the subject site frontage and driveway to Warrane Road.

Figure 1-1 Site location

Figure 1-2 Site frontage and driveway to Warrane Road

1.4 Report Structure

The remainder of this report is structured with sections as follows:

- Section 2 - Discusses existing transport conditions concerning land use and zoning, existing travel pattern and mode share, general traffic, active transport, and public transport
- Section 3 - Describes the proposed development details
- Section 4 - Describes the traffic and transport impacts associated with the development
- Section 5 - Summarises the impacts of development and proposed measures to mitigate adverse impacts

2 Existing Transport Conditions

2.1 Land Use and Zoning

Currently the subject site is being utilised as a RE1 public recreation under Ku-ring-gai LEP (2015), as shown in Figure 2-1 below.

Figure 2-1 Land Use Zoning for 47 Warrane Road, Roseville Chase

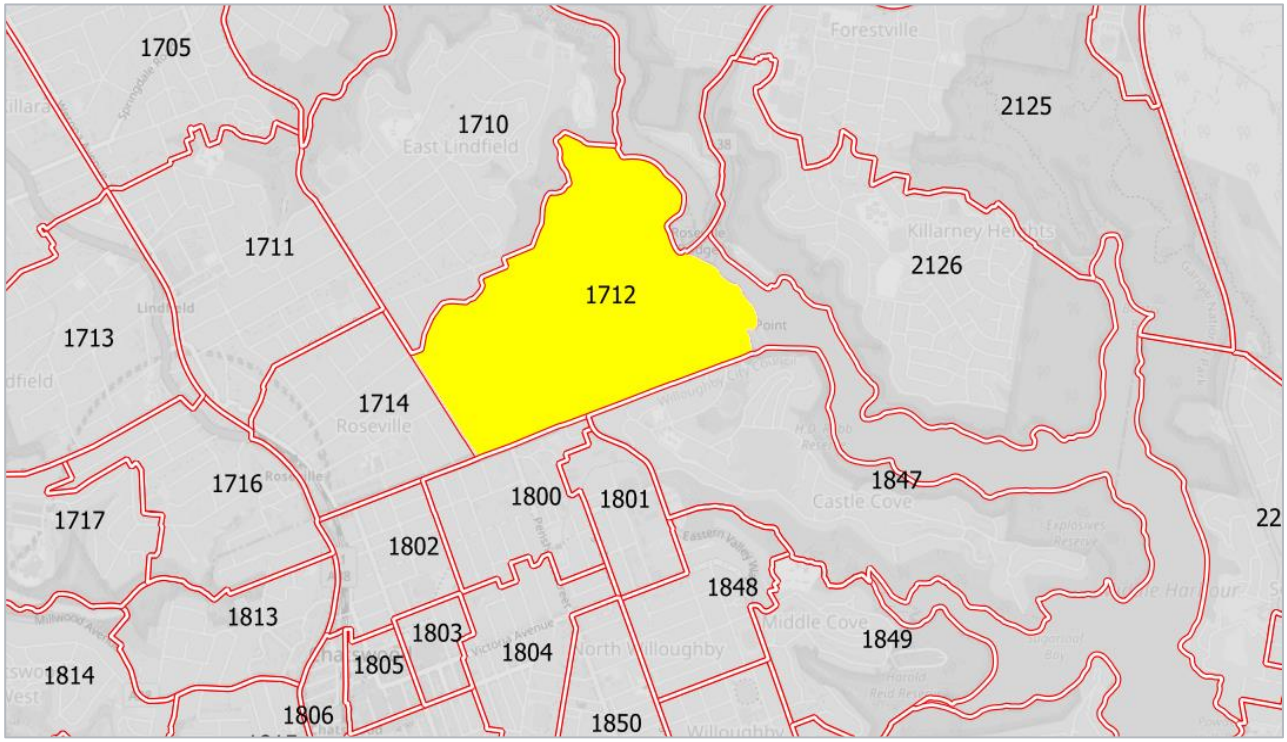
As shown in Figure 2-1 above, all adjacent land parcels are currently zoned as low density residential under Ku-ring-gai LEP (2015). Also, no active or planned development approvals which could influence this TIA are understood to be currently held over the adjacent properties.

2.2 Population and Employment Demographics

The Australian Bureau of Statistics, 2016 Census, LU 16 is the primary source of population and employment forecasts at the small area (travel zone) level for the Sydney Greater Metropolitan Area (GMA). The population and employment demographics were analysed for the selected travel zone, as shown in Figure 2-2. The Australian Bureau of Statistics data was also compared with the 2011 Census data. Both population and employment in the selected travel zone are growing.

The methodology for selection of the travel zone was on the basis of zone centroid being within the subject site. As such, one travel zone of TZ 1712 was selected for the purpose of analysis.

Figure 2-2 Selected Travel Zone for Analysis of Demographics



2.2.1 Population

LU16 forecast population data has been reviewed for the selected travel zone between 2011 and 2036. Table 2-1 shows population projections at five-year intervals from 2011 to 2036 for the selected travel zone.

Table 2-1 LU 16 Population Forecast for Selected Travel Zone

TZ Code	TZ Name	Population					
		2011	2016	2021	2026	2031	2036
1712	Roseville Chase	3,190	3,249	3,269	3,278	3,284	3,367

Source: Australian Bureau of Statistics (ABS)

The annual average population growth rate for the selected travel zone between 2011 and 2036 has also been calculated and is presented in Table 2-2 below.

Table 2-2 Annual Population Growth Rates for Selected Travel Zone

TZ Code	TZ Name	Annual population Growth Rate				
		2011-2016	2016-2021	2021-2026	2026-2031	2031-2036
1712	Roseville Chase	0.4%	0.1%	0.1%	0.0%	0.5%

As shown in Table 2-2, the residential population within the selected travel zone has increased in recent years with the largest population growth of 0.4% per annum between 2011 and 2016. Also, the population in the selected travel zone is forecast to remain the same or grow with the highest average population growth of 0.5% per annum between 2031 and 2036.

2.2.2 Employment

LU 16 forecast employment data for the selected travel zone has also been reviewed for the period between 2011 and 2036. Table 2-3 shows the employment projections at five-year intervals from 2011 to 2036 for the selected travel zone.

Table 2-3 LU16 Employment Forecast for Selected Travel Zone

TZ Code	TZ name	Employment					
		2011	2016	2021	2026	2031	2036
1712	Roseville Chase	525	479	513	558	595	635

Source: Australian Bureau of Statistics (ABS)

The annual employment growth rate for the selected travel zone between 2011 and 2036 has also been calculated and is presented in Table 2-4.

Table 2-4 Annual Employment Growth Rates for Selected Travel Zone

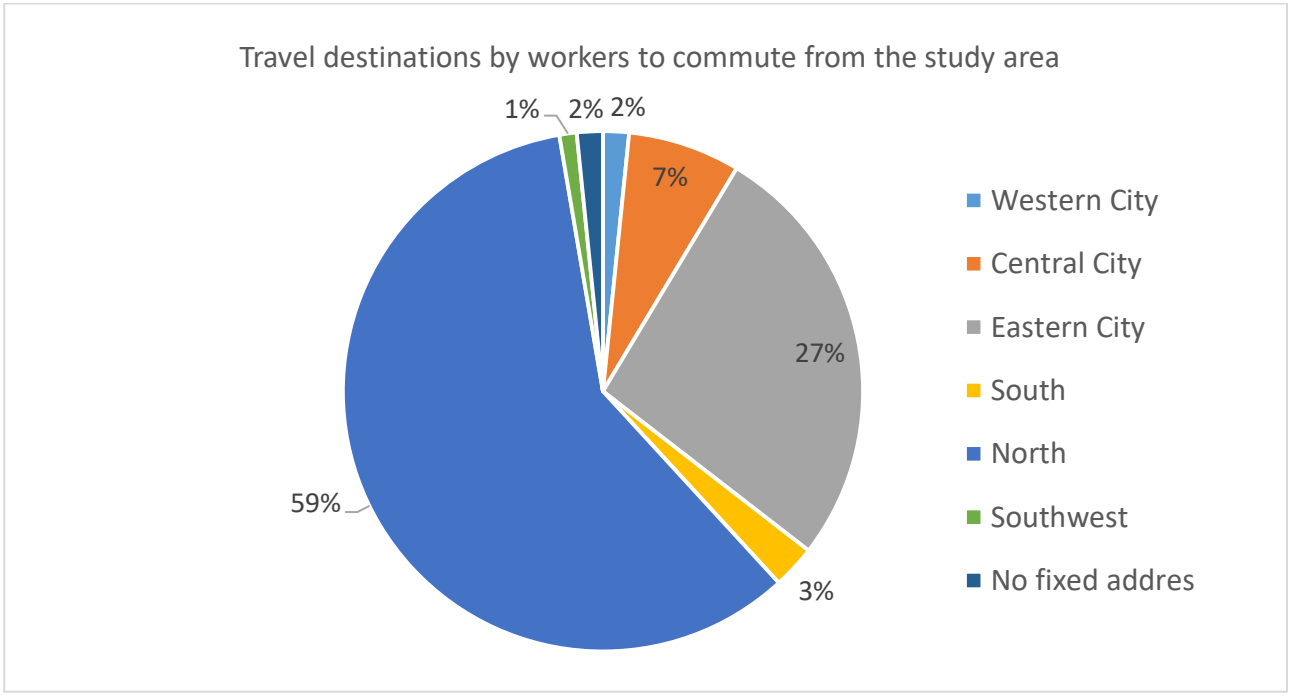
TZ Code	TZ Name	Annual employment Growth Rate				
		2011-2016	2016-2021	2021-2026	2026-2031	2031-2036
1712	Roseville Chase	-1.8%	1.4%	1.7%	1.3%	1.3%

As shown in Table 2-4, the employment within the selected travel zone decreased between 2011 and 2016. Also, the employment rate in the Roseville Chase travel zone has decreased in recent years with the employment growth of 1.4% per annum between 2016 and 2021. The employment in the selected travel zone is forecast to grow with the highest average employment growth of 1.7% per annum between 2021 and 2026.

2.3 Existing Travel Patterns and Mode Share

Journey to Work (JTW) data (2011) from the Australian Bureau of Statistics (ABS) has been analysed to determine how people travel to and from the selected travel zone shown in Figure 2-2. JTW data provides the mode share of people who travel to this zone for their job, as well as the mode share for people who live in this zone and travel elsewhere for work. Figure 2-3 below shows the travel destinations for the workforce who live in the selected travel zone.

Figure 2-3 Travel Destinations of workforce in Selected Travel Zone



As shown in Figure 2-3, the highest number of residents in the selected travel zone work in North District which includes Hornsby, Hunter's Hill, Ku-ring-gai, Lane Cove, Northern Beaches, Mosman, Willoughby, Ryde and North Sydney. The other notable travel destination is Eastern City which includes City of Sydney, Bayside, Burwood, Canada Bay, Inner West, Randwick, Strathfield, Woollahra, and Waverly.

Table 2-5 below shows the commuter transport mode share for the workforce destinations outside the selected travel zone.

Table 2-5 Travel Destinations of Workforce in Selected Travel Zone by Mode of Travel

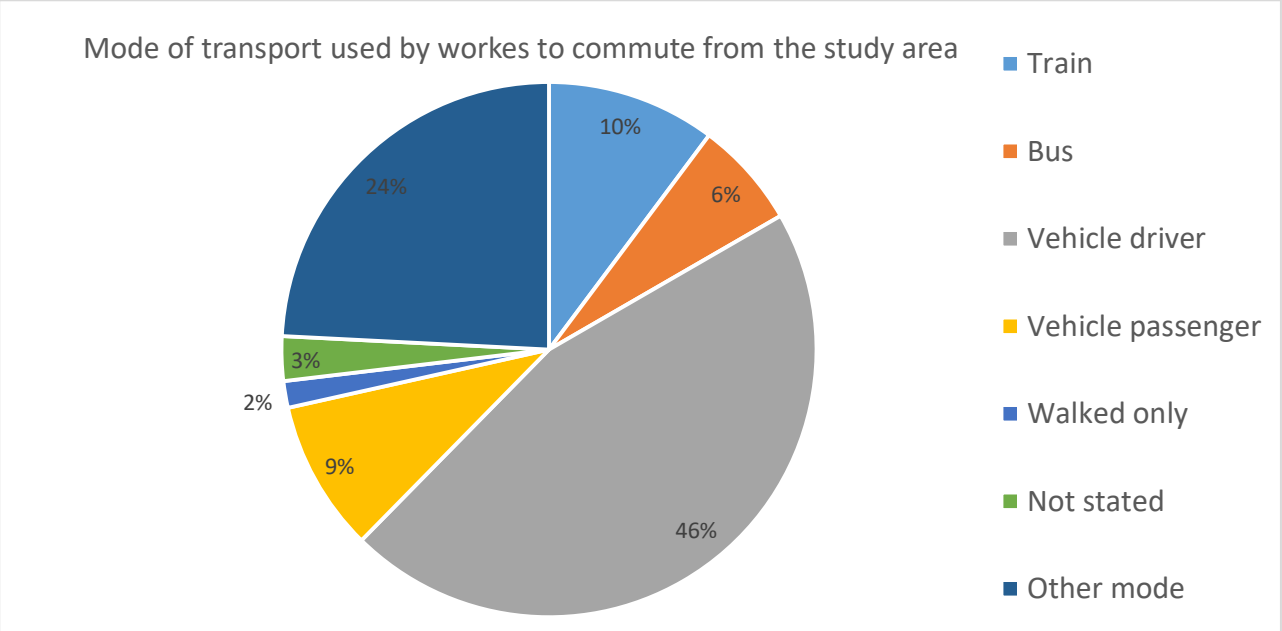
WORKFORCE DESTINATION		TRAIN	BUS	VEHICLE DRIVER	VEHICLE PASSENGER	WALKED ONLY	MODE NOT STATED	OTHER MODE
1	Western City			100%				
2	Central City			85%				15%
3	Eastern City	16%	8%	48%	6%		2%	20%
4	South	20%		60%				20%
5	North	9%	7%	37%	13%	3%	4%	27%
6	Southwest			100%				
7	No fixed address			33%				67%

Source: BTS Journey to Work

*Other mode: All other modes (excludes train, bus, ferry, tram/LR, vehicle driver or passenger) as well as Worked at Home or Did not go to work

A review of JTW data from 2011 reveals that that all work trips to the Western City and Southwest are made by car. Also, the main mode of transport to work is by car for all other destinations with the mode share of 85% to central City and 60% to South. The other notable mode of transport is train with the mode share of 16% to Eastern City and 20% to South District. Figure 2-4 provides graphical representation of the mode share for people travelling to work from the selected travel zone.

Figure 2-4 Journey to Work Mode Share – Selected Travel Zone as Place of Residence



Source: 2011 JTW, BTS Selected Travel Zones

The analysis indicates that the majority of people use a private vehicle to travel to their job from selected travel zone with 46 per cent driving themselves and 9 per cent being a passenger. A total of 16 per cent use public transport with 10 per cent travelling by train and 6 per cent travelling by bus. Only two per cent of workers walk to their employment destinations. A total of 24 per cent use all other modes excluding train, bus, ferry, tram/LR, vehicle driver or passenger as well as workers who worked at home or did not go to work

The Australian Bureau of Statistics 2016 Census Journey to Work data indicated that Sydney Inner City (33%) and Chatswood (24%) and the major work destinations from the site vicinity in Roseville Chase. These are followed by Kur-rin-gai (16%) and North Sydney (9%) and Warringah (4%) and Ryde-Hunters Hill (4%). The main destinations are therefore to the south and the west.

It may be concluded that travelling by private car is by far the most dominant transport mode choice for daily commuters from selected travel zone.

Considering the high proportion of private car mode share, it may be concluded that future population growth in the area will only increase pressure on the road network in the selected travel zone, thus emphasising the importance and need for alternative modes of transport to support future growth, as well as the need for potential capacity upgrades to the current road network, where appropriate.

2.4 Existing Road Network Characteristics

This section describes the existing road network supporting the site and traffic volumes. In this regard, a site visit was undertaken on 17th November 2020 to provide familiarity with the site and surrounding network. Details of key roads are described below.

2.4.1 Roads

- Warringah Road/ Babbage Road

Warringah Road/ Babbage Road is a state road which has three lanes northbound and three to four lanes in the southbound direction. It is a divided road with a posted speed of 60km/hr.

- Malga Avenue

Malga Avenue is a collector road that runs in a north-south direction between Griffith Avenue in the south and Babbage Road in the north. It is a two-lane two-way road with a single lane of traffic in either direction within an undivided carriageway of 6.5m width.

- Boundary Street

Boundary Street east of Babbage Road is a collector road that runs in an east-west direction. It is a two-lane two-way road with a single lane of traffic in either direction within an undivided carriageway of 6.5m width.

- Warrane Road

Warrane Road is a local access road that runs in a north-south direction with no through access in the north and Boundary Street in the south. It is a two-way road with a single lane of traffic in either direction within an undivided carriageway of 6.5m width. Warrane Road is a cul-de-sac for traffic at the north, with through access only for pedestrians and cyclists.

2.4.2 Site parking and traffic generation

The existing Bowling Club site has a paved on-site parking for up to 20 cars and overflow on-site parking on grass for a similar number of cars. Kerbside parallel unrestricted parking is also available on the site frontage on Warrane Road. In past years this may have accommodated dozens of cars on a busy bowls event day. Observed occupancy of kerbside parking in Warrane Road during site inspections in 2020 showed parking occupancy of less than 10 per cent.

In past years, on a busy bowls event day the site may have generated up to 40 car trips per hour. The current traffic generation of the subject site is negligible, less than 5 vehicles per day. The subject site bowling club use has not operated recently and therefore the peak traffic generation of the site could not be surveyed.

2.4.3 Intersections

The following existing intersections are likely to be utilised for site access and include:

- Clive Street/ Babbage Road

The intersection of Clive Street/ Babbage Road currently operates as a three- way signalised intersection, which is six lane two-way divided on Babbage Road and five lane two-way divided on Clive Street.

- Clive Street/ Boundary Street

The intersection of Clive Street/ Boundary Street currently operates as a four-way signalised intersection, which is five lane two-way undivided on Clive Street, four lane two-way on Boundary Street western approach and three lane two-way on Boundary Street eastern approach.

- Boundary Street/ Babbage Road

The intersection of Boundary Street/ Babbage Road currently operates as a priority-controlled T-intersection with right turn permitted from Babbage Road onto Boundary Street. The intersection is seven lane divided on Babbage Road and one lane exit on Boundary Street.

- Other local Intersections

Malga Avenue-Ormonde Road has a grade separated bridge intersection with Warringah Road with left turn ramps in and out of the eastbound carriageway of Warringah Road, and indirect left turns in at Babbage Road and out at Babbage Road. The vehicle links to the subject site are indirect, via Rowe Street. There is also indirect local left turn access off Warringah Road at Rowe Street, Allan Street, Duntroon Avenue, and Malvern Avenue.

2.4.4 Traffic Volumes

For the purpose of this study, traffic survey counts were undertaken on 19th November and 21stNovember 2020. It should be noted that these counts were undertaken during the COVID-19 pandemic, and therefore may reflect the changed transport conditions, including lower road traffic volumes and lower use of public transport than non-pandemic conditions. The traffic survey data was processed and analysed. The analysis indicates an AM peak between 7:45am and 8:45am, PM peak between 4:45pm and 5:45pm and Saturday peak between 11:30am and 12:30pm. The existing intersection traffic volumes at Clive Street/ Boundary Street, Babbage Road/ Clive Street and Babbage Road/ Boundary Street intersections are presented in Appendix A.

2.4.5 Existing Intersection and Network Performance Analysis

The SIDRA Intersection software (version 8.0) has been used for the traffic model development at key intersections. Road and Maritime's Traffic Modelling Guideline, Version 1, February 2013 (modelling guideline) was used as the main guideline for the base year models development.

2.4.5.1 Level of service criteria

Intersection performance assessment was undertaken using SIDRA Intersection models. The performance of an intersection can be measured by the intersection average delay per vehicle which corresponds to a Level of Service (LoS) measure for the intersection.

Performance of an intersection is measured in accordance with the Austroads Guide to Traffic Management-Part 3: Traffic Studies and Analysis (2013). The guideline recommends that for priority intersections - such as roundabout and sign controlled intersections - the Level of Service (LoS) value is determined by the critical movement with the highest delay whereas for a signalised intersection Level of Service (LoS) criteria are related to the average overall intersection delay measured in seconds per vehicle.

Intersection Levels of Service (LoS) was assessed using the standard Road and Maritime Level of Service criteria for intersections which is reproduced in Table 2-6.

Table 2-6 Level of Service Criteria for Intersections

Level of Service	Average Delay per Vehicle (sec/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	<14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	>70	Unsatisfactory with excessive queuing	Unsatisfactory with excessive queuing

Source: RTA Guide to Traffic Generating Developments

2.4.5.2 Intersection Performance Analysis Results

SIDRA modelling was undertaken at key intersections in order to assess existing intersection performance. The results of the analyses are presented in Table 2-7 to Table 2-9. The detailed assessment is provided in Appendix B.

Table 2-7 Existing base case intersection modelling results, AM peak

Intersection	Avg. Delay	LoS	DoS	95th Back of Queue Length [m]
Clive Street/ Boundary Street	24	B	0.68	120
Babbage Road/ Clive Street	25	B	0.89	268
Babbage Road/ Boundary Street	37	C	0.92	25

Table 2-8 Existing base case intersection modelling results, PM peak

Intersection	Avg. Delay	LoS	DoS	95th Back of Queue Length [m]
Clive Street/ Boundary Street	25	B	0.48	134
Babbage Road/ Clive Street	30	C	0.83	198
Babbage Road/ Boundary Street	25	B	0.83	18

Table 2-9 Existing base case intersection modelling results, Saturday

Intersection	Avg. Delay	LoS	DoS	95th Back of Queue Length [m]
Clive Street/ Boundary Street	30	C	0.57	134
Babbage Road/ Clive Street	26	B	0.80	182
Babbage Road/ Boundary Street	24	B	0.83	18

Based on the intersection modelling results presented in Table 2-7 to Table 2-9 above, the intersection is performing with acceptable level of service during both AM peak, PM peak and Saturday peak hours under 2020 base case traffic volumes.

2.5 Public Transport

Accessibility to a public transport system is often measured by the location of stops/stations and their coverage area. In public bus service assessment, 400-metre walking distance or 5.5-minutes walking time (considering 1.2 metre/second walking speed) is considered as comfortable walking distance/time to reach a bus stop.

For the purpose of this study, existing public transport facilities, including bus and rail services have been reviewed within 400m, 800m and 2km bike ride from the subject site.

2.5.1 Bus Services

Figure 2-5 shows the existing bus stops located in 400m, 800m and 2km bike ride from the site. Also, Figure 2-6 shows access path from the site towards Malaga Avenue Bridge footpath to bus stop and shelter on both sides of Warringah Road.

Figure 2-5 Bus stops in 400m, 800m and 2km bike ride from the site

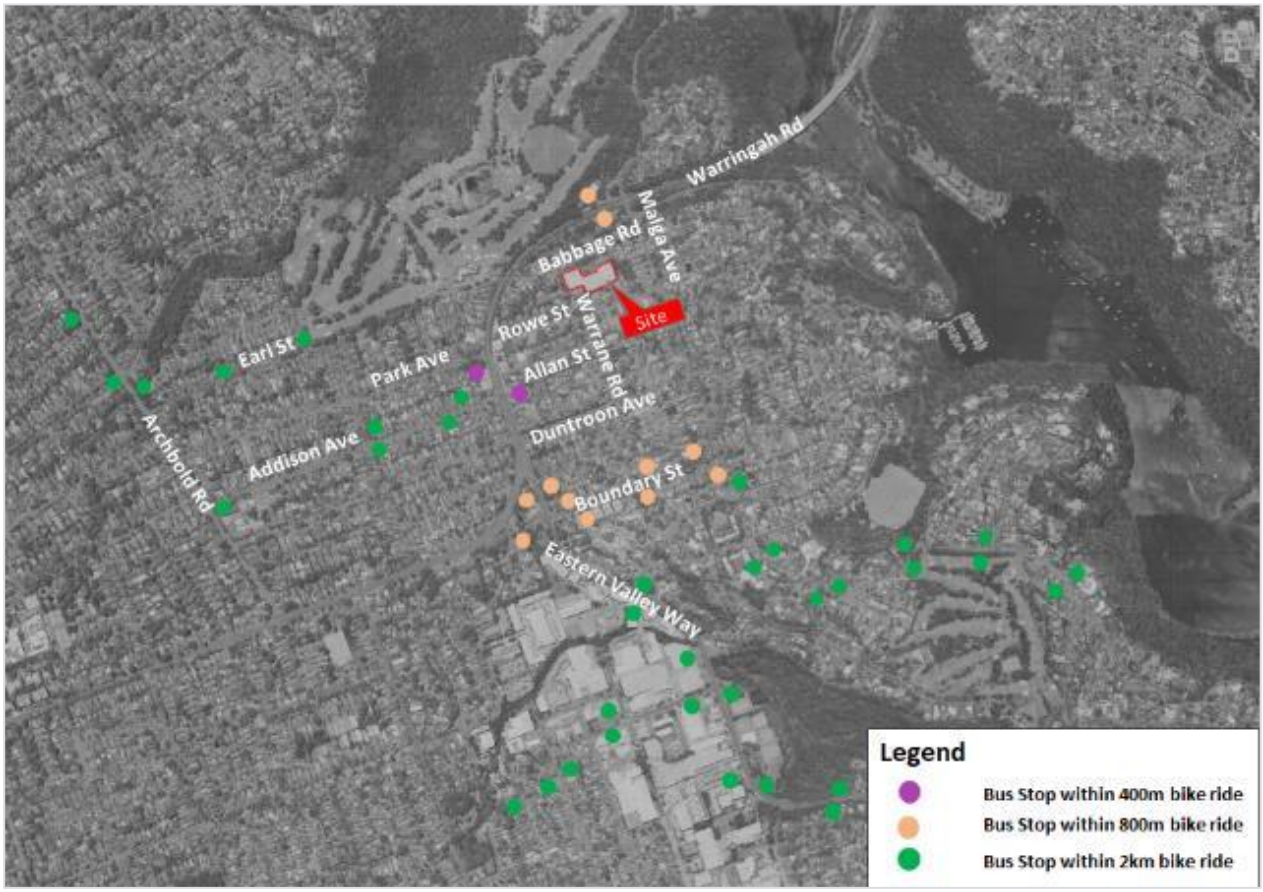


Figure 2-6 View to the east towards good access paths and Malaga Avenue Bridge footpath to bus stop and shelter on both sides of Warringah Road

The review of public transport services indicates that the subject site benefits from existing bus services, with two bus stops provided in 400m bike ride, 11 bus stops between 400m and 800m bike ride and 35 bus tops between 800m and 2km bike ride from the subject site. Also, Figure 2-7 and Figure 2-8 illustrate the network of bus routes servicing the bus stops in the area.

Figure 2-7 North Shore & West bus network map in the vicinity of the site

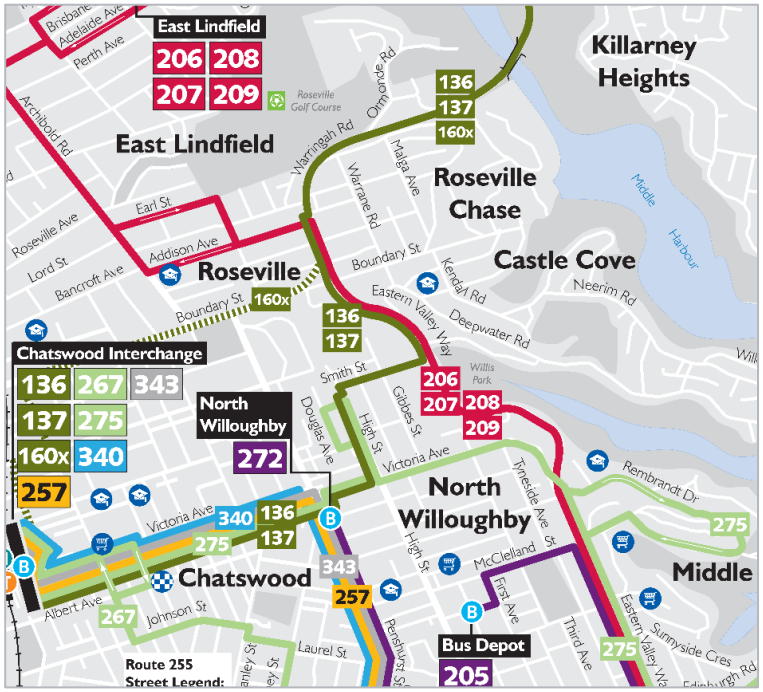
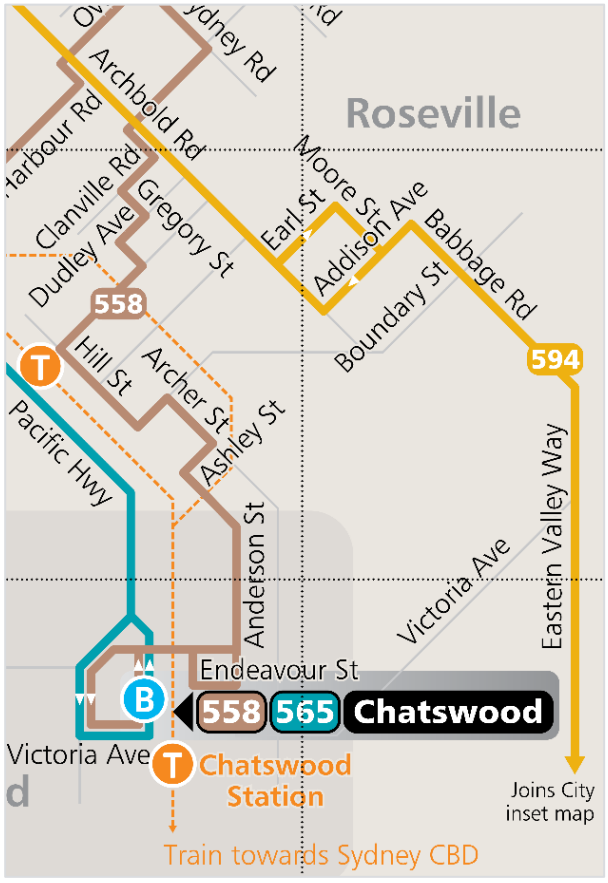


Figure 2-8 Chatswood, Hornsby and Berowra bus network map in the vicinity of the site



2.5.2 Rail Services

The nearest train station is the Roseville Station located approximately 2.2 km away, equal to 30 minute walk or 14 minute bike ride, or a short bus ride from the subject site. The station is currently serviced by T1 North Shore Line and T9 Northern Line. Table 2-10 provides information on train operating hours and average frequencies of existing rail services to and from the Gordon Station.

Table 2-10 Train Operating Hours and Service Frequencies

Train Line	Direction of Travel	Operating hours (from Roseville Station)		Average Frequency of Services		
		Weekday	Weekend	AM Peak (7:00am-9:00am)	PM Peak (4:00pm-6:00pm)	Off Peak (10:00am-3:00pm)
T1 Northshore & Line	Berowra to City via Gordon	4:24 am to 00:47 am	4:25 am to 00:33 am	6 min	3 min	7 min
	City to Berowra via Gordon	4:53 am to 1:54 am	5:30 am to 1:43 am	3 min	7 min	7 min
T9 Northern Line	Hornsby to Northshore via City	5:23 am to 1:33 am	5:30 am to 1:43 am	15 min	15 min	15 min
	Northshore to Hornsby via City	5:15 am to 00:32 am	4:33 am to 00:33 am	15 min	15 min	15 min

2.6 Active Transport (Walking and Cycling)

Existing active transport (walking and cycling) infrastructure surrounding the subject site is shown in Figure 2-9.

Figure 2-9 Active Transport Route

The Ku-ring-gai Bike Plan[1] planned routes in close proximity are shown in Figure 2-10.

The Principal Bicycle Network/Co-Designed Bicycle Network featured in Future Transport 2056 shows a route between Chatswood and Frenchs Forest, to the Northern Beaches Hospital and on to Brookvale/Dee Why. Ku-ring-gai Council and Willoughby Council have understood this to connect via the Roseville Bridge and therefore potentially being strategically located close to the subject site in Roseville Chase. Ku-ring-gai Council and Willoughby Council have worked together to seek funding from Transport for NSW to undertake a Cycle Route Corridor Investigation from Chatswood to Dee Why via Frenchs Forest and Ku-ring-gai Council and Willoughby Council will continue to pursue funding opportunities to progress the development of this route.

As shown in Figure 2-9, no formal footpath currently exists along Warrane Road adjacent to the site. However, footpaths are provided on western side of Warrane Road south of Allan Street, both sides of Babbage Road, western side of Malga Avenue, both sides of Allan Street and Rowe Street.

There are no official off-road and on-road cycle routes, however as the Ku-ring-gai cycle map shows in Figure 2-10 the site is directly serviced by Roseville Route #1 shown as a Green line. This route goes along Warrane Road which connects east via Addison Avenue to Roseville, and Chatswood, and via the Roseville Bridge to Forestville and the Northern Beaches on marked cycling routes.

The connection between the northern end of Warrane Road and Babbage Road is currently unpaved and should be constructed as a formal cycling path plus a paved footpath for pedestrians.

[1] https://www.krg.nsw.gov.au/files/assets/public/hptrim/information-management-publications-public-website-ku-ring-gai-council-website-streets-and-transport/ku-ring-gai_bicycle_plan_-_final_report.pdf

Figure 2-10 Ku-ring-gai Cycle Map

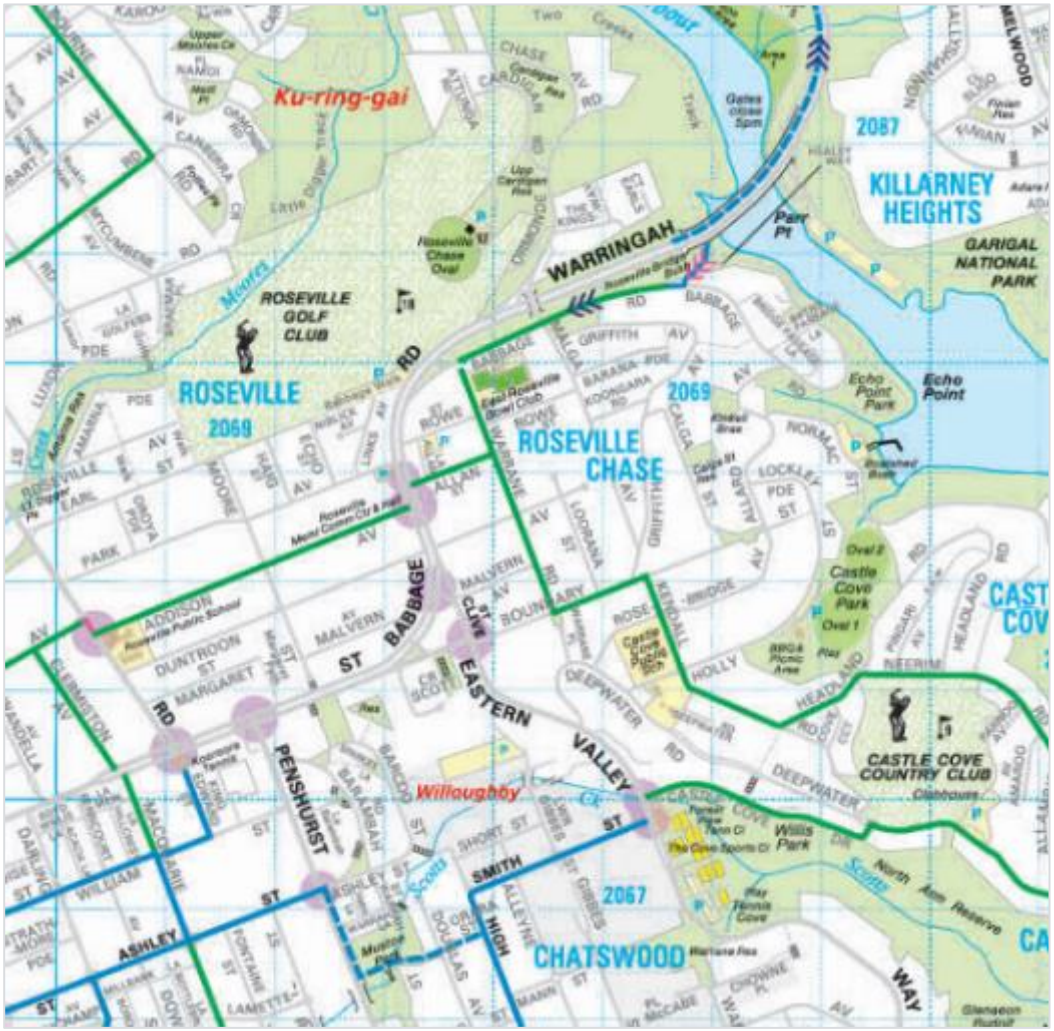


Figure 2-11 View from Babbage Road south to Warrane Road cul-de-sac, showing a need for a shared path on the east side of Warrane Road

3 Proposed Development

3.1 Development Plan

The proposed development consists of subdividing the land into 9 residential lots. Primary access to the site is provided from Warrane Road via the construction of a new internal street and priority intersection.

All 9 lots are for 4 bed dwellings with a double garage and area on the internal road and driveways for additional on-site visitor parking. Service vehicles would use the proposed internal street for movement and loading and unloading, including waste collection vehicles. A standard T-shaped turning head is provided so that all vehicles can enter and exit the subject site in a forward gear. Figure 3-1 below shows the Proposed Plan for low density residential at 47 Warrane Road, Roseville Chase.

Figure 3-1 Proposed Plan for 47 Warrane Road, Roseville Chase (Source: Studio GL)

4 Transport Impact Assessment

This section of the report discusses traffic and transport impacts generated from the proposed development on the existing road network adjacent to the site. In particular an assessment of the existing intersections including Clive Street/Boundary Street, Babbage Road/Boundary Street and Babbage Road /Clive Street intersection was undertaken to determine if the intersections will operate satisfactorily under future traffic conditions.

4.1 Journey to Work characteristics

Existing JTW characteristics are presented in the Existing section above. The development has been designed to accommodate the existing characteristics such as 2 garage car spaces per dwelling, but to nudge future travel behaviours and mode splits away from the private car. These design characteristics to encourage more active travel are discussed in the following sections.

4.2 Assessment of the level of access to public transport

Existing access to public transport is presented and discussed in the Existing section above. The capacity to accommodate additional passenger was reviewed and confirmed. Bus travel to destinations or to train stations is the main mode of public transport. Local bus services including bus routes #280, #281, #283 to Chatswood and #271, #274, #270 to Sydney CBD provide frequent rapid journeys comparable to car travel in the peak hours. On-site observations in November 2020 (during pandemic restrictions) indicated low patronage and even with some relaxation of restrictions in February 2021, buses were still not crowded (not exceeding one passenger per 2 seats). It can be concluded that there is existing spare capacity on the bus network.

The site is well located to encourage mode choice to public transport, within 400m of bus stops with shelters both sides of Warringah Road near Malga Avenue and at Roseville Chase Neighbourhood Centre near Allan Street. There are varied and frequent bus services to surrounding areas, including Chatswood Railway Station and North Sydney and Sydney CBD. Bus services to these centres generally provide faster commuting than interchange with trains at say Chatswood or Roseville. The 160X bus service Dee Why to Chatswood express service at 10-minute frequencies from 5 am to midnight includes stops at Roseville Chase, Forestville, and Norther Beaches Hospital centre at Frenchs Forest.

Discussions with Council and TfNSW officers in February 2021 indicate that the existing bus services will be maintained in the short term and medium term. In the longer term the Dee Why to Chatswood B-Line rapid bus transit system may supplement some of the existing services, with distinctive B-Line livery buses and enhanced B-Line stop facilities at Roseville Chase Neighbourhood Centre. However, there is no firm program to establish this new B-Line service, and the existing 160X Express Bus currently operates a similarly fast frequent bus service along this route, taking advantage of existing No Stopping and Clearway restrictions along the main route.

Figure 4-1 Mooted B-Line Extension (Source: Kur-ring gai Council).

The main interchange to train is at Chatswood, where there is adequate capacity on trains to accommodate the proposed development trip generation.

This interchange to rail capacity will be boosted around 2024 before opening of the subject development by the opening of the additional Metro rail line and stations from Chatswood to North Sydney, Sydney CBD and Bankstown.

4.3 Degree of access to nearby employment/strategic centres

Average peak hour weekday bus journey times from the subject site are as follows:

- To Chatswood :25 min
- To North Sydney 30 min
- To St Leonards:30 min
- To Northern Beaches Hospital:25 min

This conforms with the Greater Sydney Commission goal of a 30-minute city by public transport and active transport.

4.4 Changes in freight/logistics and retail business models

The efficient movement of goods is important for urban residents' quality of life and economic prosperity. This means that goods movement must be well integrated with the movement of people.

In a liveable community, a number of different types of activities will generate demand for goods movements. For residential uses, over the last decade, consumer shopping behaviour has rapidly shifted. Individuals are becoming increasingly reliant on direct-to-home-deliveries of everyday products such as groceries, pharmaceuticals, clothing, and other household goods. While exact demands will vary considerably as a function of both the built environment and shopper demographics, a 2020 study of a residential street in a Sydney suburb estimated an average of 1.5 deliveries per day per residence, including postage and couriers. Online shoppers often have options to control the speed and delivery time of shipments, resulting in deliveries at all times of day. Failed deliveries can result in unsatisfied customers and expensive repeated trips for a carrier.

Food Delivery meals are for home. Most orders[2]—82 percent—were placed from home, while only 16 percent were placed from the workplace. Orders spike on weekends. The highest-volume days for the online platforms were Friday, Saturday, and Sunday, when 74 percent of orders were placed.

Waste Removal: Both businesses and residences generate waste. In most communities, waste is picked up via truck by Council and/or by private operators. Waste can be picked up from the kerbside or from dumpsters located off-street. Failed waste pickup can result in accumulated waste in a community, which can cause detrimental environmental and public health impacts.

Road vehicles are by far the dominant mode used for urban goods movement[3], so spaces must be provided on-street or off-street for loading and unloading. These spaces must also accommodate the rapid growth in on-demand, quick in-and-out courier and express deliveries to both residences and businesses, increasingly on a 24/7 basis. This is driven in large part by the growth in e-commerce. Other users include independent couriers and service and repair trades vehicles, which often require close access to a site.

These needs must compete with other demands for kerb space. One consequence is increased conflicts between trucks and vulnerable road users (VRUs). Another consequence is that delivery vehicles often must circulate to find a space, thereby adding to congestion and delivery costs. For time-sensitive deliveries, such as restaurant meals, drivers

1. [2] https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/the-changing-market-for-food-delivery#
2. [3] NACTO. Urban Street Design Guide, 2017. National Association of City Transportation Officials, New York City

must often park illegally, potentially incurring fines, and this contributes to the popularity of using motorcycles or bicycles for smaller deliveries.

The subject site proposal can accommodate these freight transport demands. Detail design may need to consider varying treatments to serve different needs, including appropriate kerb radii where large trucks must be accommodated, the need to accommodate on-street loading where off-street space is not available, and laybys to accommodate package (express) deliveries. Management of on-street loading / parking or time-of-day regulations are unlikely to be warranted in this location.

To accommodate sustainable short-duration courier and express deliveries the development can encourage the use of smaller vehicles and low-carbon vehicles.

The proposal responds to these changes in freight and logistics and retail business models by providing adequate delivery areas. As low-density development comprised of separate dwellings, there are limited opportunities for communal facilities for deliveries and waste. The proposal supports the growing demand for parcel deliveries and on-on demand freight.

4.5 Access to local services

The local services available within 5 minutes/400m walking distance are adequate and include:

- Retail - Roseville Chase shops – restaurants, sports, foot care, hairdressers, funeral parlour, florist, floor coverings, bottle shop, party shop, pool supplies, kitchen, and bathroom shops,
- Convenience store – BP mini-mart and petrol station
- Medical – foot care, pharmacy,
- Educational - Roseville Kids Care
- Banking - cash card ATM
- Auto Repair

Castle Cove Neighbourhood Centre is located around 750m/10 min walk from the site. Also, Roseville Primary School and Castle Cove Primary School are about 1 kilometre from the subject site.

Figure 4-2 Local services within 400m of the subject site

4.6 Access to recreational, leisure, cultural and community services

Services within 5 minutes/400m walking distance are adequate and include:

- Recreational - Babbage Road Playground, Roseville Chase Oval, Roseville Golf Club,
- Leisure - Roseville Bridge Walkway, and walking trails
- Cultural - there are several churches within 1 kilometre south of the subject site.
- Community Services - Roseville Chase Memorial Community Centre Hall, 1st East Roseville Scout Hall,

Figure 4-3 Local services within 400m of the subject site

4.7 Level of access to active transport networks

Walking and cycling paths exist along the site frontage and nearby streets, as described in the Existing chapter above.

The proposed completion of the shared path across the Warrane Road cul-de-sac to Babbage Road and a footpath along the east side of Warrane Road across the site frontage will enhance the already excellent links to destinations including:

- Roseville Bridge
- Two Creeks Track
- Davidson Park and Middle Harbour foreshore
- Echo Point Park and Marina
- Headland Lookout
- Local and regional bike routes.

The site is well located to encourage walking as a mode choice within 400m of bus stops on Warringah Road and Roseville Chase Neighbourhood Centre. Within approximately one-kilometre walk is Castle Cove Public School, Roseville Public School, and various recreational facilities and walking paths.

Construction of a shared path footpath along the Warrane Road site frontage connecting north through the cul-de-sac to Babbage Road footpaths would improve conditions for pedestrians.

The site is well located close to local and regional bike routes to encourage cycling as a mode chose. Bike parking would be provided in the proposed development.

Construction of a shared path footpath along the Warrane Road site frontage connecting north through the cul-de-sac to Babbage Road footpaths would improve conditions for cyclists. This is supported in the context of the wider network in the Kur-ring-gai Bike Plan and Kur-ring-gai Cycle Map.

4.8 Movement and Place

Movement and Place is a cross-government framework[4] for planning and managing our roads and streets across NSW. The framework delivers on NSW policy and strategy directions to create successful streets and roads by balancing the movement of people and goods with the amenity and quality of places. The proposed development is a good strategic fit for the local frontage road Warrane Road in the Movement and Place framework.

This study reviewed opportunities to change road space allocation to and around the site in relation to pedestrians, cyclists, public transport, freight and private vehicles to enhance the place function of the proposal. Kerbside parallel parking acts to slow traffic in the singe traffic lane each way in Warrane Road, Babbage Street, and Rowe Street, with adequate verge width for tree planting and footpaths, either existing or potential in future. All these streets have acceptable low movement and place balances for their Local Street status shown in the following diagram.

Figure 4-4- Movement and Place (TfNSW)

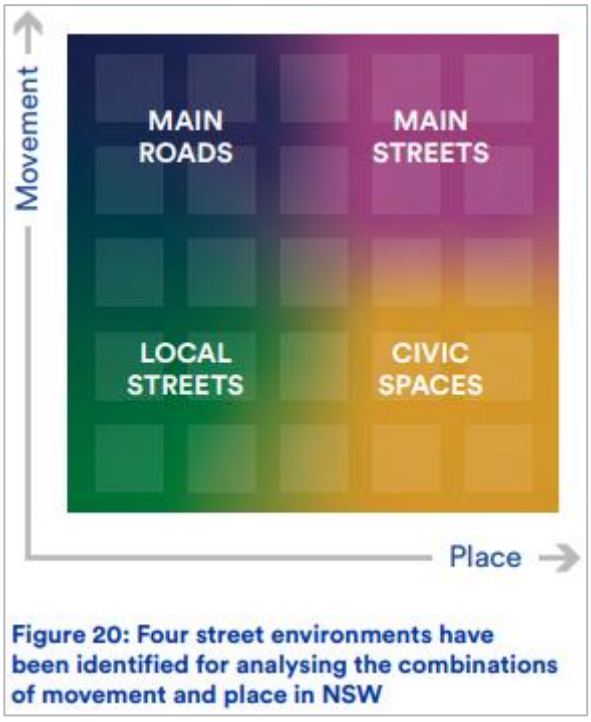


Figure 20: Four street environments have been identified for analysing the combinations of movement and place in NSW

:

There is no strong case for opening Warrane Street to Babbage Road for vehicular traffic because of the likely increase in through traffic and vehicle speeds on local streets. There is no strong case for changing road allocations

4.9 Provisions to Minimise private vehicle use

Proposed provisions to minimise private vehicle use and emissions and parking impacts include

- Improvements to the Shared path and footpath network
- Bike parking in each dwelling
- Provision to chare/recharge/discharge to the household or grid with electric vehicle batteries.

[4] Practitioners Guide to Movement and Place , TfNSW, March 2020

- Provision of a designated Car Share bay on the kerbside in Warrane Road. This may be moreis feasible in the longer term as we understand that car share providers will only locate vehicles where there high likelihood for the car to turn over and be used, and therefore be economically viable for a service provider. It would be unlikely at this current low urban density in this area, although any increases in density may increase the economic feasibility of a car share bay.

4.10 Strategies to further reduce vehicle trip generation

In addition to the initiatives above, further reductions of vehicle trip generation emissions and parking demand from those described in TfNSW /RMS guidelines are expected to better the forecast demands generated from the current controls. These expectations are based on current trends towards more working at home and more on-line teaching and learning.

4.11 Potential for adaptability of car parking structures

The proposed car garages can be re-purposed as storage or recreational space as often happens in metropolitan Sydney. Other at-grade parking can be re-purposed if demand for car parking reduces in future.

4.12 Capacity of public transport

The capacity of public transport was assessed as adequate to accommodate the additional demand /passengers resulting from the subject proposal, as discussed above. Rail station platform capacity, bus stop capacity, and accessibility/mobility were assessed in this study and are considered adequate.

4.13 New public transport proposals

New public transport proposals included in Future Transport 20156 were considered to have a further beneficial effect on the proposal in terms of travel behaviour including:

- B-Line bus extension
- Metro Rail extensions
- Better bus services generally
- Beaches Link use by buses

4.14 Traffic Generation

The RMS' Guide to Traffic Generating Development's provides specific advice on the traffic generation potential of various land uses. However, the RMS has released a Technical Direction (TDT 2013/4) releasing the results of updated traffic surveys and as a result amended land use traffic generation rates.

4.14.1 Scenario 1: low density residential

Regarding low density residential dwellings, the following amended advice is provided within the Technical Direction.

- Rates

Daily vehicle trips = 10.7 per dwelling in Sydney, 7.4 per dwelling in regional areas

Weekday average evening peak hour vehicle trips = 0.99 per dwelling in Sydney (maximum 1.39), 0.78 per dwelling in regional areas (maximum 0.90).

Weekday average morning peak hour vehicle trips = 0.95 per dwelling in Sydney (maximum 1.32), 0.71 per dwelling in regional areas (maximum 0.85). (The above rates do not include trips made internal to the subdivision, which may add up to an additional 25 %).

Therefore, the additional traffic generated by the proposed residential lots during the weekday and weekend peak period can be calculated as follows (rounded up) by adopting the maximum hourly rates;

Daily vehicle trips = 9 dwellings × 10.7 trips per dwellings = 96 vtpd

Weekday AM peak hour = 9 dwellings × 0.95 trips per dwellings = 9 vtph

Weekday PM peak hour = 9 dwellings × 0.99 trips per dwellings = 9 vtph

Saturday peak hour = 9 dwellings × 0.99 trips per dwellings = 9 vtph

It should be noted that the highest peak hour trip rate of 0.99 was used for Saturday as a conservatively high estimate, and the traffic generation should be progressively less as the active transport initiatives take effect.

4.15 Trip Distribution

Before carrying out any traffic assessment the additional peak hour traffic generated by the development needs to be distributed through the adjoining road network. This involves making many assumptions as to distribution patterns to and from the development. In distributing the peak hour traffic through the adjacent road network, the following assumptions have been made for this site:

- Traffic from the development will be distributed as 80% outbound and 20% inbound in the AM peak and conversely, 20% inbound and 80% outbound in the PM peak. Also, the traffic distribution will be 50% inbound and 50% outbound during Saturday peak hour.
- All vehicle trips were distributed north and south in accordance with Journey to Work data. This represents the worst-case trip distribution and the actual distribution may be more spread and include local roads and destinations within Roseville Chase. In practice there may be more trips to and from the Northern Beaches, especially given the close proximity of the site to Frenchs Forest and the Northern Beaches Hospital Precinct. More traffic to the Northern Beaches will be a lesser impact on the key elements of the road network than the worst case analysed in this report.
- Based on Journey to Work data analysis as presented in section 2.3, it is assumed that 59% of the total trips generated from the future development site in the AM peak will go to north through Babbage Road, while 41% of the total trips go to the south travelling along Eastern Valley Way. Similarly, 59% of the total trips attracted to the proposed development in the PM peak come from the north, while 41% of the total attracted trips in the PM peak come from the south.
- Also, 75% of total trips attracted to the development site in the AM peak come from north and 25% of attracted trips come from south. Similarly, 75% of trips generated from the proposed development in the PM peak go to the north and 25% of generated trips go to the south.

Based on the assumptions listed above the resulting predicted peak hour trip distributions for traffic generated by the full development of the site at the intersections of Clive Street/Boundary Street, Babbage Road/Boundary Street and Babbage Road/Clive Street are calculated as shown below in Figure 4-5 to Figure 4-7

Figure 4-5 Trip Distribution Assumptions for Future Development Site at intersections of Clive Street/Boundary Street, Babbage Road/Boundary Street and Babbage Road/Clive Street in AM peak

This assignment via the shortest path is considered to be a conservative assumption – in some circumstances the trip patterns chosen by individuals are likely to be more distributed such as trips to the Northern Beaches via Malga Avenue and other local roads leading to a more dispersed increase in traffic generated by the subject development.

Figure 4-6 Trip Distribution Assumptions for Future Development Site at intersections of Clive Street/Boundary Street, Babbage Road/Boundary Street and Babbage Road/Clive Street in PM peak

Figure 4-7 Trip Distribution Assumptions for Future Development Site at intersections of Clive Street/Boundary Street, Babbage Road/Boundary Street and Babbage Road/Clive Street in Saturday peak

4.16 Potential impact resulting from future use (expansion /intensification) and cumulative effects

In order to determine the intersection turning movement volumes at the intersections of Clive Street/Boundary Street, Babbage Road/Boundary Street and Babbage Road/Clive Street, a spreadsheet Transport Model was created to assign traffic generated from the subject site to the existing intersection. The Transport Model was developed using the traffic generation, traffic distribution and peak hour directional split assumptions, as outlined in Sections 4.1 and 4.2 above.

An external background traffic growth rate of 1.7% per annum was also applied to the existing through traffic volumes over a 6-year period (Refer to Section 2.2 for employment growth rate).

Figure 4-8 to Figure 4-10 below show the intersection turning flows at three intersections during the 2026 AM and PM peak hours respectively.

Figure 4-8 Intersection Turning Flows for 2026 AM Peak Hour

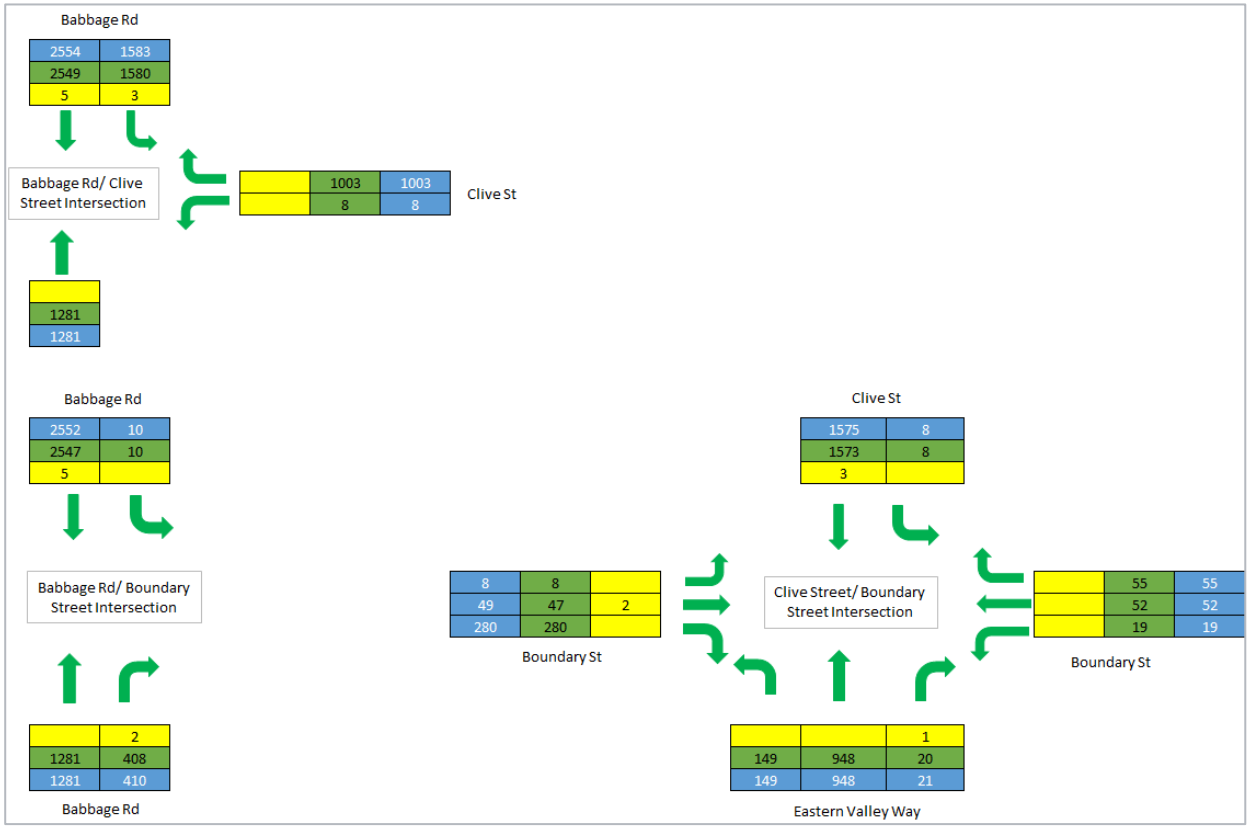


Figure 4-9 Intersection Turning Flows for 2026 PM Peak Hour

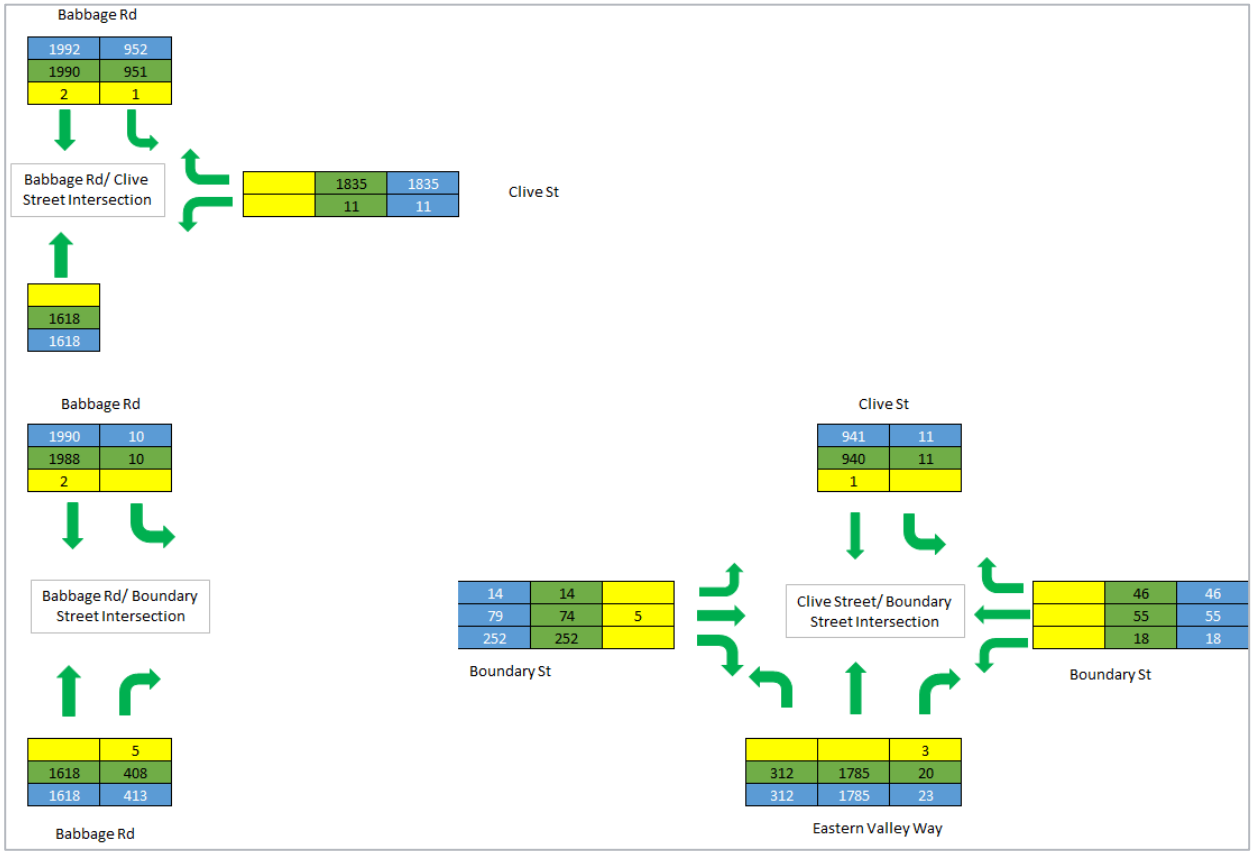
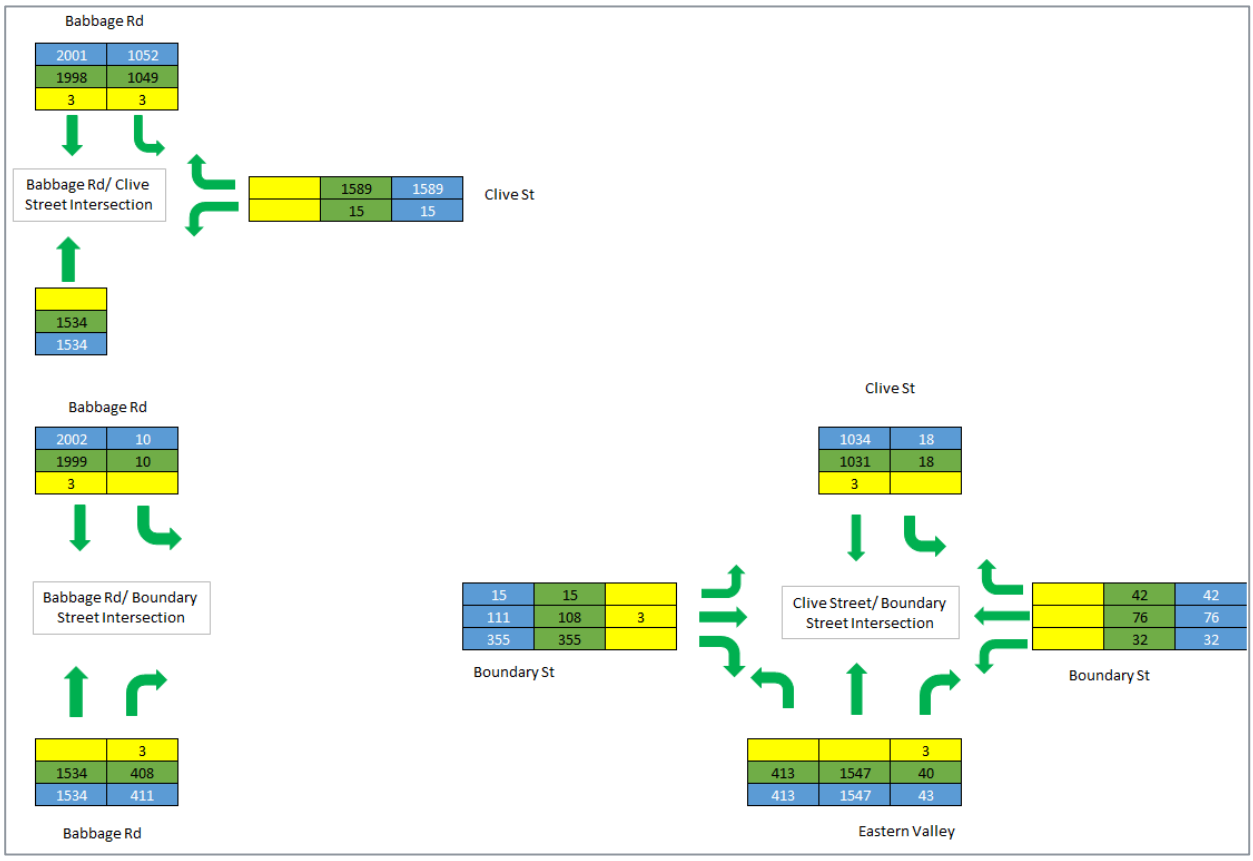


Figure 4-10 Intersection Turning Flows for 2026 Saturday Peak Hour



4.17 Intersection analysis

The SIDRA Intersection modelling software version 8 was used to analyse the operational performance of intersections including Clive Street/Boundary Street, Babbage Road/Boundary Street and Babbage Road/Clive Street, with the future year traffic volumes indicated in Table 4-1 to Table 4-3 above. The existing intersections layout have been maintained for assessments in the future year. The intersections were assessed based on one peak hour during each of the AM, PM and Saturday periods.

Table 4-1 to Table 4-3 outlines the performance of Clive Street/Boundary Street, Babbage Road/Boundary Street and Babbage Road/Clive Street intersections for 2026 AM, PM and Saturday peak hours. Detailed SIDRA model outputs are provided in Appendix C of this report.

Table 4-1 Intersection performance analysis results at Clive Street/Boundary Street, Babbage Road/Boundary Street and Babbage Road/Clive Street intersections with the future year traffic volumes, AM peak

Intersection	Scenario	Delay (s)	LoS	DoS	95th Back of Queue Length [m]
Clive Street/Boundary Street	2020 Base Year	24	B	0.7	120
	2026 Base Case	38	C	0.95	217
	2026 Scenario 1	45	D	0.98	253
	2020 Base Year	37	C	0.92	25

Intersection	Scenario	Delay (s)	LoS	DoS	95th Back of Queue Length [m]
Babbage Road/Boundary Street	2026 Base Case	39	C	0.94	29
	2026 Scenario 1	49	D	0.97	37
Babbage Road/Clive Street	2020 Base Year	25	B	0.89	268
	2026 Base Case	46	D	0.99	450
	2026 Scenario 1	46	D	0.99	455

Table 4-2 Intersection performance analysis results at Clive Street/Boundary Street, Babbage Road/Boundary Street and Babbage Road/Clive Street intersections with the future year traffic volumes, PM peak

Intersection	Scenario	Delay (s)	LoS	DoS	95th Back of Queue Length [m]
Clive Street/Boundary Street	2020 Base Case	25	B	0.48	134
	2026 Base Case	25	B	0.54	161
	2026 Scenario 1	25	B	0.56	162
Babbage Road/Boundary Street	2020 Base Case	25	B	0.83	18
	2026 Base Case	49	D	0.97	40
	2026 Scenario 1	54	D	0.98	45
Babbage Road/Clive Street	2020 Base Case	30	C	0.83	198
	2026 Base Case	40	C	0.93	284
	2026 Scenario 1	41	C	0.93	285

Table 4-3 Intersection performance analysis results at Clive Street/Boundary Street, Babbage Road/Boundary Street and Babbage Road/Clive Street intersections with the future year traffic volumes, Saturday

Intersection	Scenario	Delay (s)	LoS	DoS	95th Back of Queue Length [m]
Clive Street/Boundary Street	2020 Base Case	30	C	0.57	134
	2026 Base Case	32	C	0.63	168
	2026 Scenario 1	32	C	0.64	168
Babbage Road/Boundary Street	2020 Base Case	24	B	0.83	18
	2026 Base Case	34	C	0.9	265
	2026 Scenario 1	34	C	0.9	265
Babbage Road/Clive Street	2020 Base Case	26	B	0.8	182
	2026 Base Case	34	C	0.9	265
	2026 Scenario 1	34	C	0.9	265

From Table 4-1 to Table 4-3, it can be seen that the intersections would perform with acceptable LOS of D or better for 2026 Base Case and 2026 low-density residential development during peak hours and the queue lengths at all intersections are generally manageable so no road network upgrades are required.

4.18 Evidence of State Agency Discussion

The study team had discussion with Council officers and several officers in TfNSW[5] to confirm there were no local works affecting the site and to discuss future upgrades to bus, B-line extension, and Metro rail services, and were included in this report.

4.19 Emergency vehicles access

Emergency access vehicles such as ambulances and fire appliances can use the proposed internal road network.

[5] Wade Mitford and John Brody TFNSW telecom 19 February 2021)

5 Summary

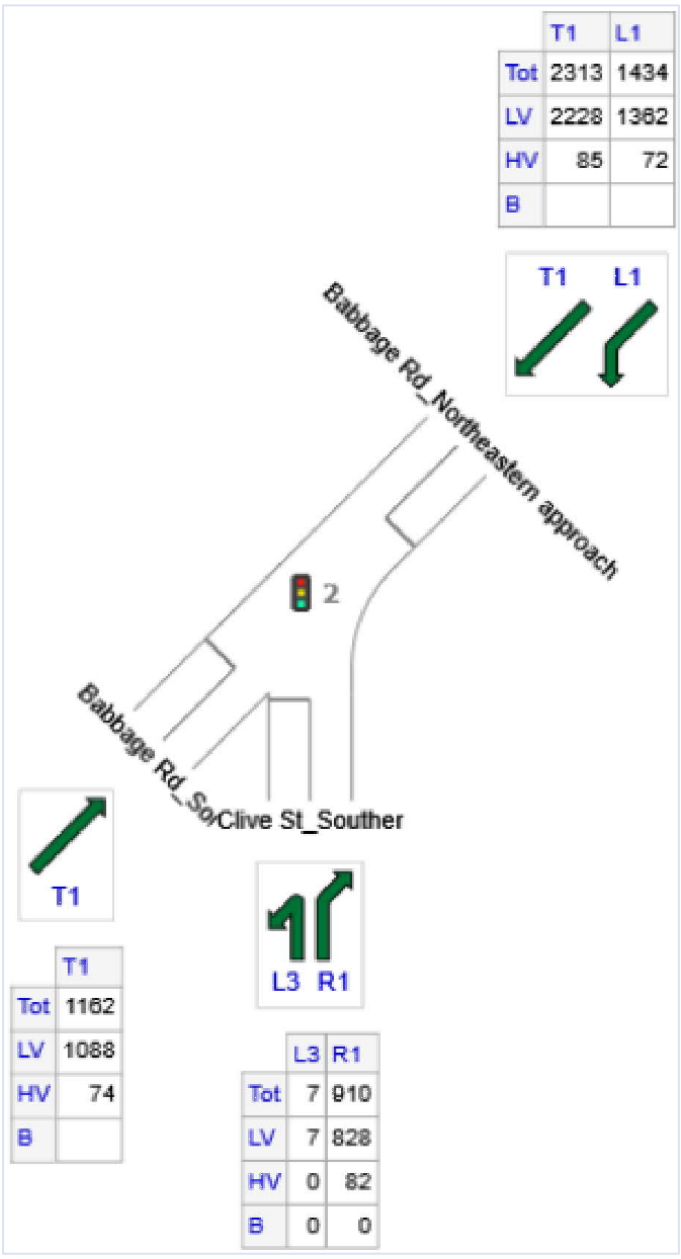
This Transport Assessment report has been prepared by SMEC as part of the Studio GL team on behalf of Ku-ring-gai Council and considers the impacts of the proposed low density residential development at 47 Warrane Road, Roseville Chase.

In particular, the assessment considers the impacts associated with the proposed residential development on three intersections including Boundary Street/ Clive Street, Babbage Road/ Boundary Street and Babbage Road/ Clive Street. The following points are noted from the assessment:

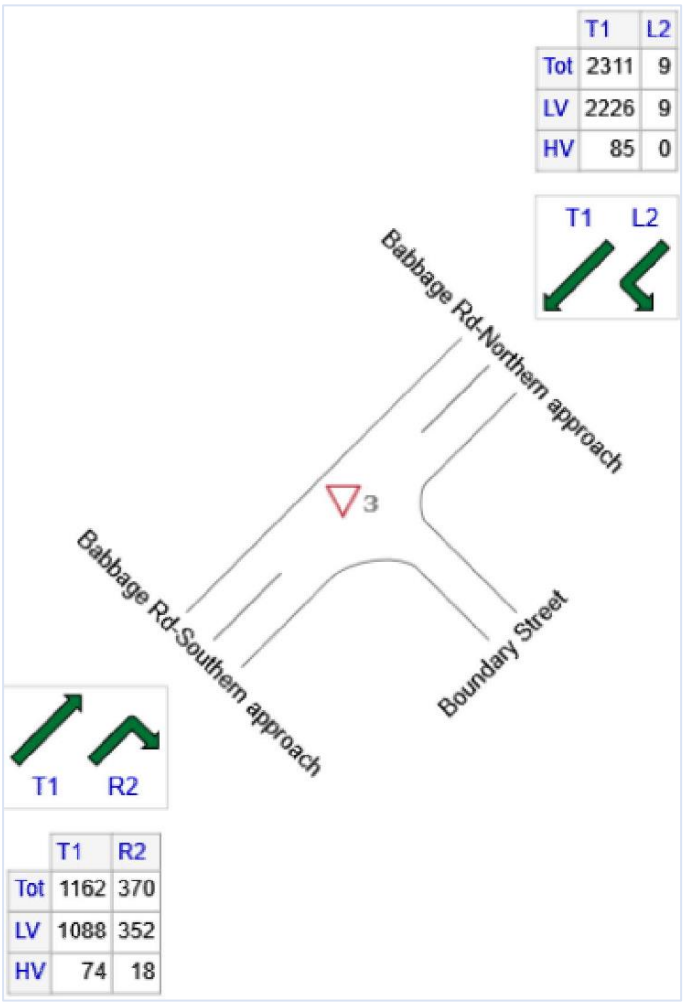
- For the current analysis, the intersections are performing at acceptable level of service during AM, PM and Saturday peak hours under 2020 Base Year traffic volumes
- SIDRA model runs for 2026 Base Case scenario show that all intersections are expected to operate at acceptable level of service (D or better) and delays during AM, PM and Saturday peak period
- Further analysis of the intersections show that the traffic generated by 9 residential lots would be modest and all intersections would operate with acceptable level of servicer (D or better) and delays in 2026 during AM, PM and Saturday peak period. The traffic impacts with the future use of the site would be comparable with the historic use of the site as a bowling club
- The development proposal will provide safe and effective transport
- Active transport should be encouraged by the connected internal site scheme design and the footpath network. The paving of the “missing link” shared path in the path network at the north end of the Warrane Road frontage road will complete the local bike network in accordance with the Kur-ring-gai Bike Plan and Bike Map and will encourage use of the established bus stops nearby and in Roseville Chase including future new B-Line style services.
- No further upgrading of the broader road network is warranted for the proposed development
- The proposed parking provision of a double garage per residence may result in an oversupply of parking and might encourage the use of private vehicles rather than alternative transport modes. All or part of the garages could be constructed to be capable of conversion to alternative uses.
- It is recommended that a transport access guide (TAG) be developed and displayed in common areas. The aim of this is to inform residents of the alternative transport options available to them and the location of critical services. This will encourage the use of alternative transport modes and will assist in the reduction of private vehicle trips.

Appendix A Intersection Turning Volumes

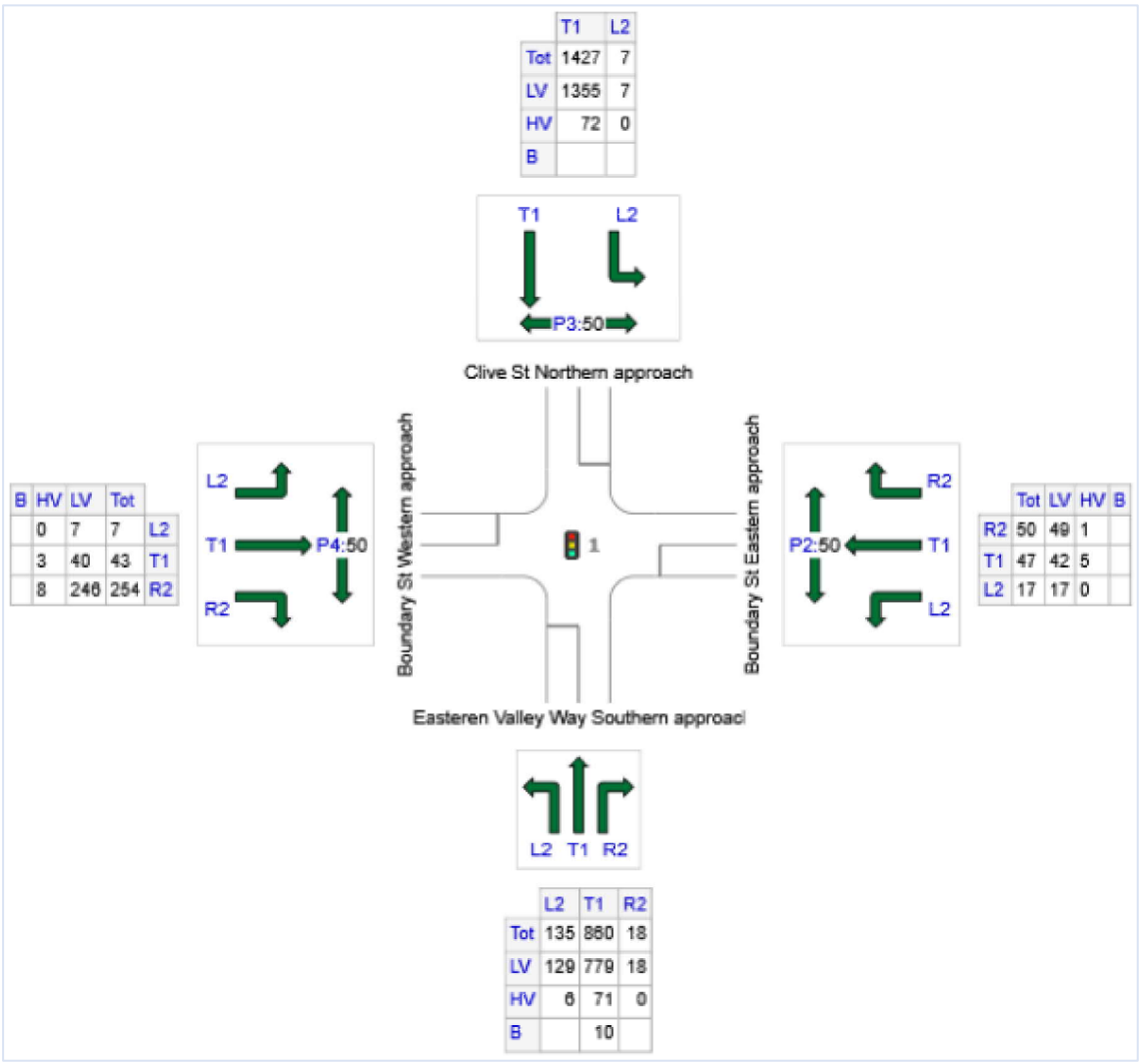
Existing intersection traffic volumes at Babbage Road/ Clive Street intersection during the 2020 AM peak



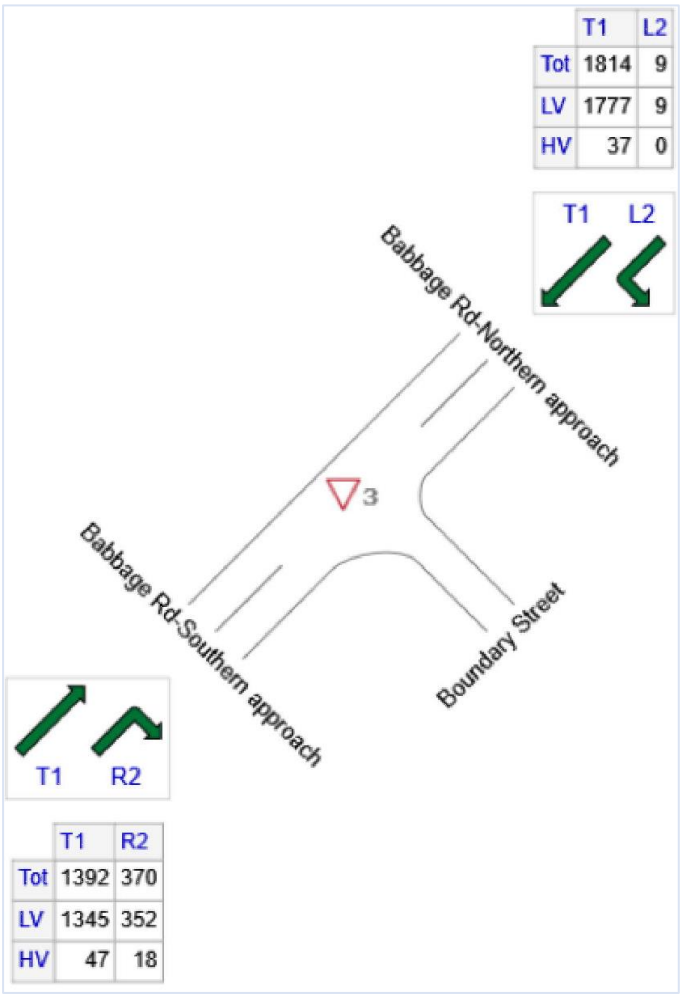
Existing intersection traffic volumes at Babbage Road/ Boundary Street intersection during the 2020 AM peak



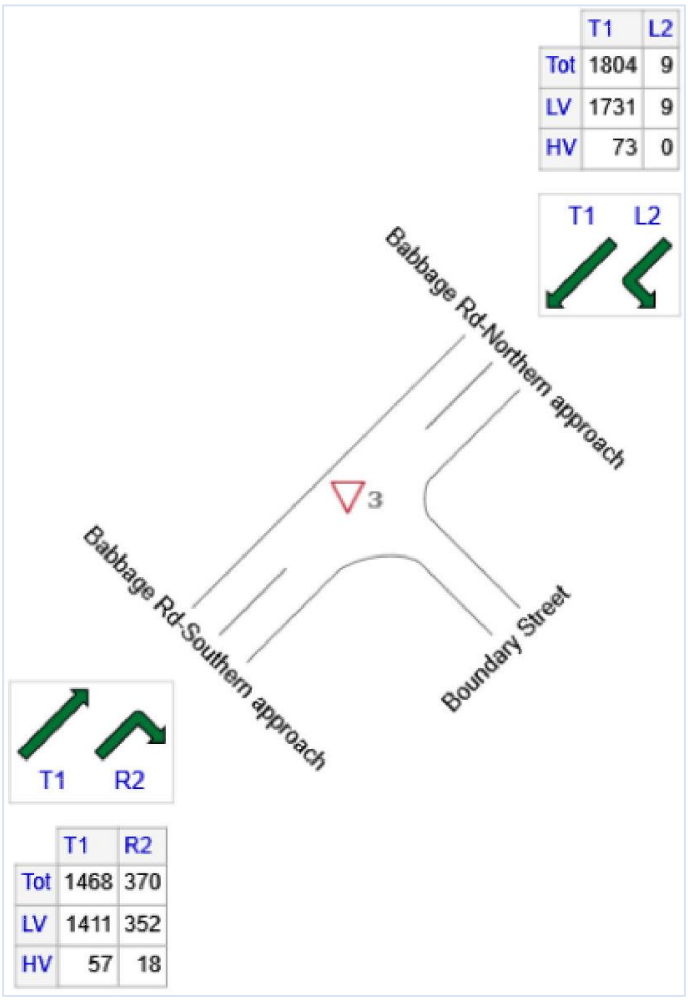
Existing intersection traffic volumes at Clive Street/ Boundary Street intersection during the 2020 AM peak



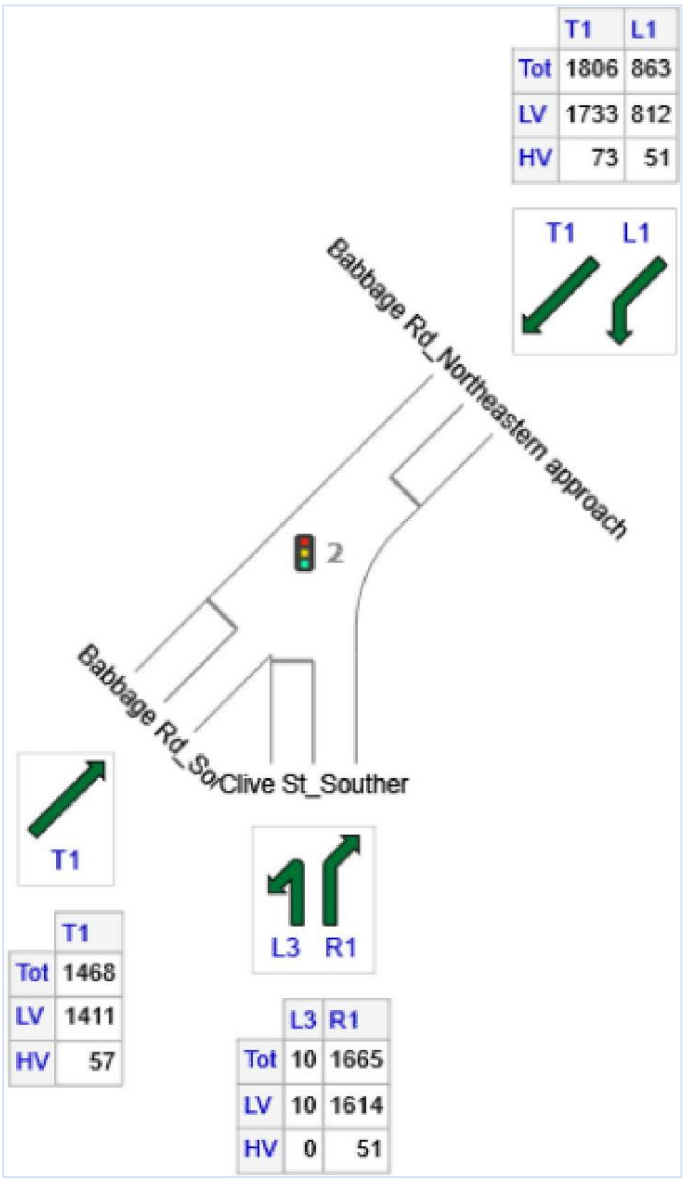
Existing intersection traffic volumes at Babbage Road/ Boundary Street intersection during the 2020 Saturday peak



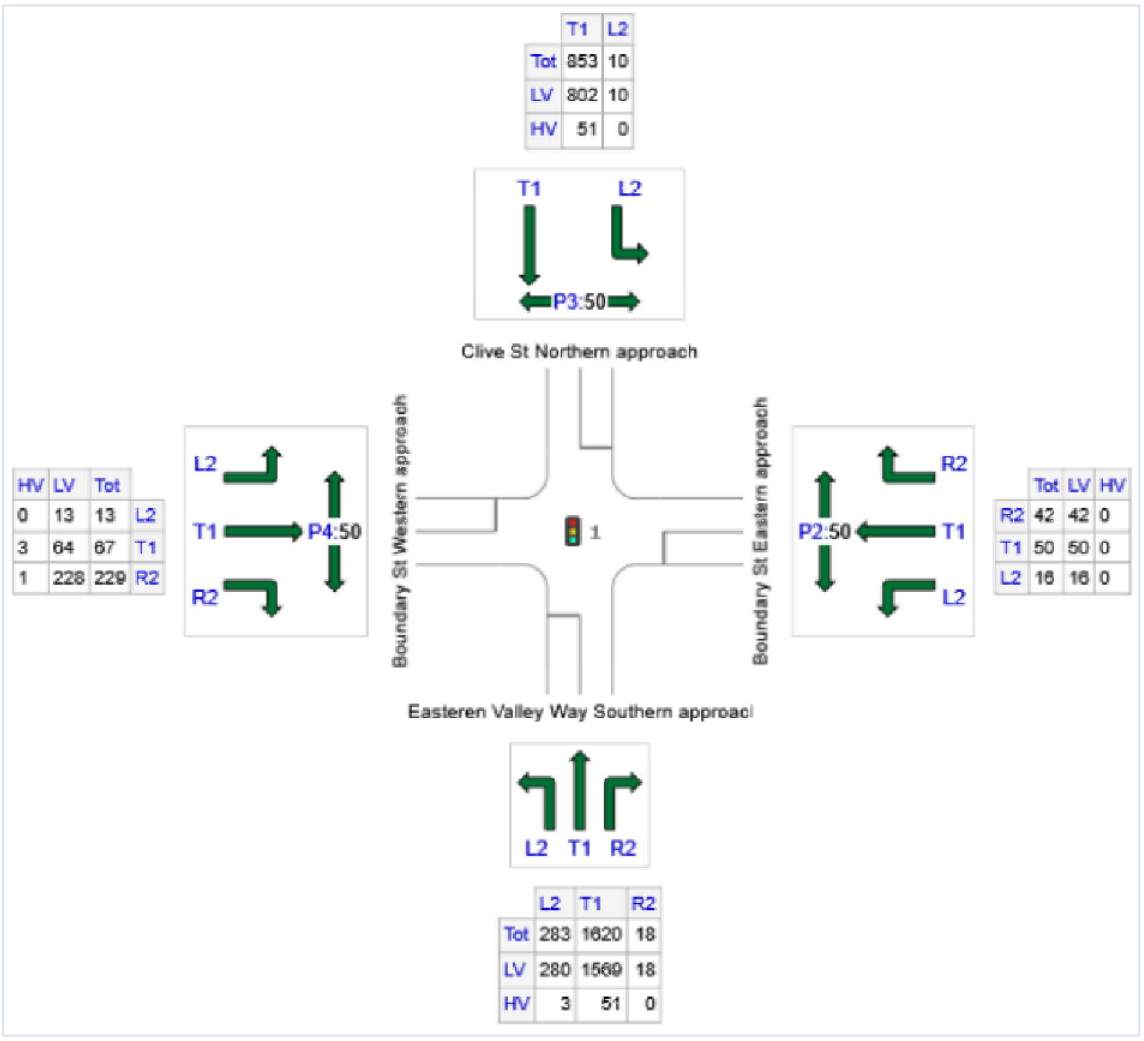
Existing intersection traffic volumes at Babbage Road/ Boundary Street intersection during the 2020 PM peak



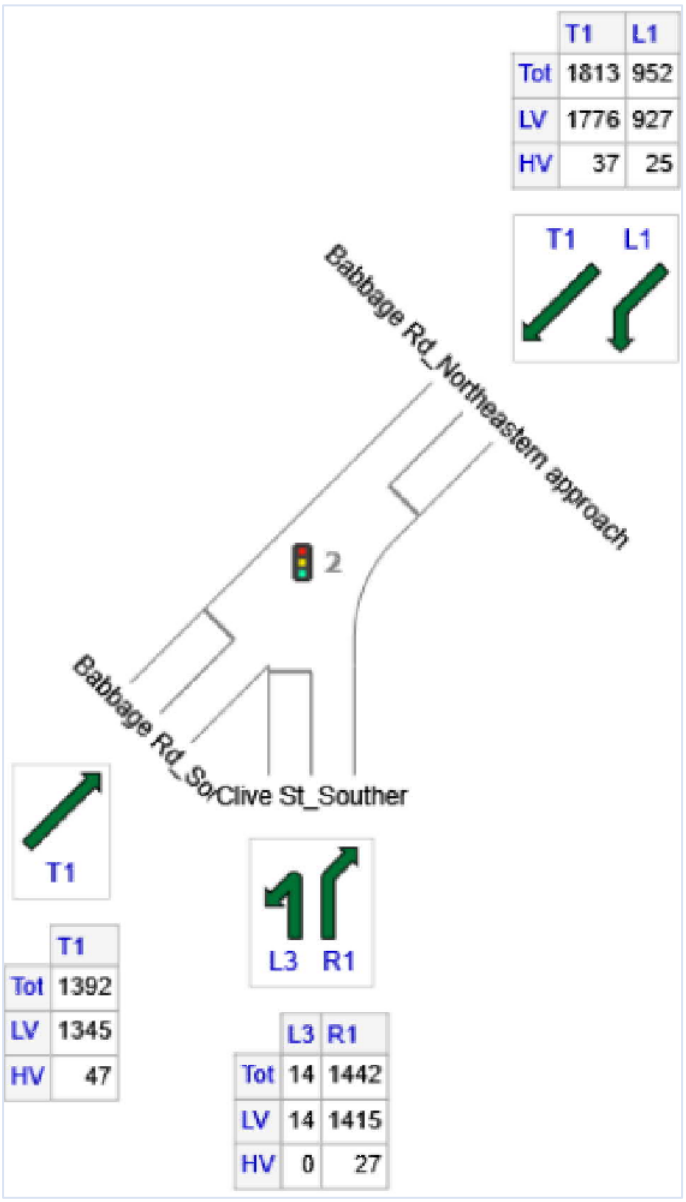
Existing intersection traffic volumes at Babbage Road/ Clive Street intersection during the 2020 PM peak



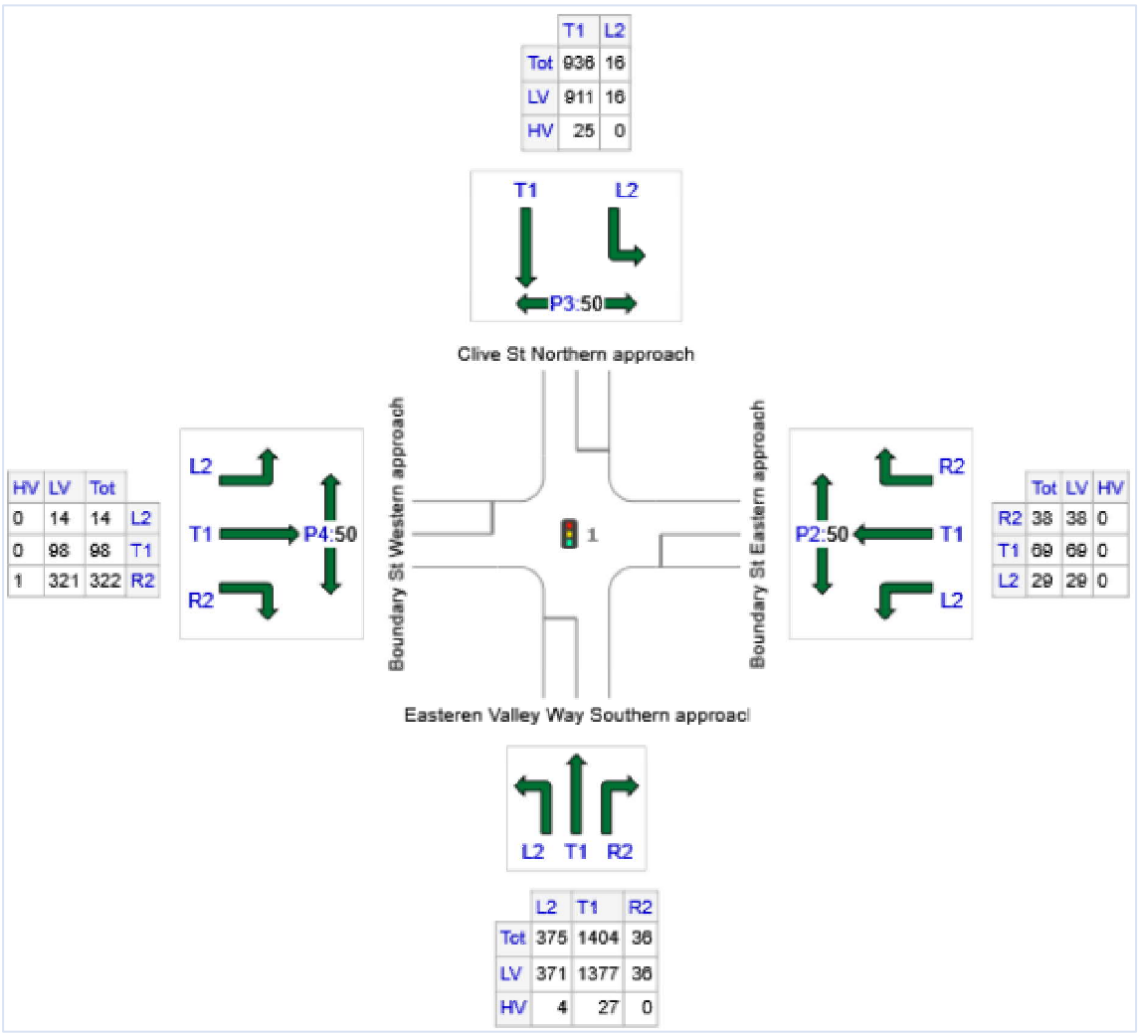
Existing intersection traffic volumes at Clive Street/ Boundary Street during the 2020 PM peak



Existing intersection traffic volumes at Babbage Road/ Clive Street intersection during the 2020 Saturday peak



Existing intersection traffic volumes at Boundary Street/ Clive Street intersection during the 2020 Saturday peak



Appendix B Existing SIDRA Assessment Results

MOVEMENT SUMMARY

Site: 3 [Babbage Rd_Boundary St 2020_AM Peak]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2020_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: Babbage Rd-Northern approach														
7	L2	9	0.0	9	0.0	0.454	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	57.2
8	T1	2433	3.7	2433	3.7	0.454	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		2442	3.7	2442	3.7	0.454	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8
SouthWest: Babbage Rd-Southern approach														
2	T1	1223	6.4	1223	6.4	0.231	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	389	4.9	389	4.9	0.918	37.0	LOS C	3.5	25.2	0.98	1.71	3.77	34.5
Approach		1613	6.0	1613	6.0	0.918	8.9	NA	3.5	25.2	0.24	0.41	0.91	45.5
All Vehicles		4055	4.6	4055	4.6	0.918	3.6	NA	3.5	25.2	0.09	0.17	0.36	53.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3 [Babbage Rd_Boundary St 2020_PM Peak]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2020_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: Babbage Rd-Northern approach														
7	L2	9	0.0	9	0.0	0.356	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	57.3
8	T1	1899	4.0	1899	4.0	0.356	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		1908	4.0	1908	4.0	0.356	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8
SouthWest: Babbage Rd-Southern approach														
2	T1	1545	3.9	1545	3.9	0.415	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
3	R2	389	4.9	389	4.9	0.828	24.5	LOS B	2.5	18.1	0.94	1.42	2.58	40.0
Approach		1935	4.1	1935	4.1	0.828	5.0	NA	2.5	18.1	0.19	0.29	0.52	50.4
All Vehicles		3843	4.1	3843	4.1	0.828	2.5	NA	2.5	18.1	0.10	0.15	0.26	54.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3 [Babbage Rd_Boundary St 2020_SAT]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2020_SAT]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: Babbage Rd-Northern approach														
7	L2	9	0.0	9	0.0	0.353	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	57.3
8	T1	1909	2.0	1909	2.0	0.353	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1919	2.0	1919	2.0	0.353	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8
SouthWest: Babbage Rd-Southern approach														
2	T1	1465	3.4	1465	3.4	0.309	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	389	4.9	389	4.9	0.826	24.3	LOS B	2.5	18.0	0.94	1.41	2.56	40.1
Approach		1855	3.7	1855	3.7	0.826	5.1	NA	2.5	18.0	0.20	0.30	0.54	50.3
All Vehicles		3774	2.8	3774	2.8	0.826	2.5	NA	2.5	18.0	0.10	0.15	0.26	54.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [Babbage Rd_Clive St 2020 BC_AM Peak]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2020_AM]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Clive St_Southern approach														
1b	L3	7	0.0	7	0.0	0.878	64.9	LOS E	2.7	20.3	0.84	0.90	1.05	7.0
3a	R1	958	9.0	958	9.0	0.878	63.5	LOS E	15.9	120.0	0.91	0.92	1.09	12.9
Approach		965	8.9	965	8.9	0.878	63.5	LOS E	15.9	120.0	0.91	0.92	1.09	12.9
NorthEast: Babbage Rd_Northeastern approach														
24a	L1	1509	5.0	1509	5.0	0.440	4.6	LOS A	2.6	19.3	0.00	0.53	0.00	41.7
25	T1	2435	3.7	2435	3.7	0.886	29.3	LOS C	37.1	267.5	0.85	0.84	0.91	15.8
Approach		3944	4.2	3944	4.2	0.886	19.8	LOS B	37.1	267.5	0.52	0.72	0.56	20.6
SouthWest: Babbage Rd_Southwestern approach														
31	T1	1223	6.4	1223	6.4	0.365	13.2	LOS A	8.0	59.4	0.52	0.46	0.52	34.8
Approach		1223	6.4	1223	6.4	0.365	13.2	LOS A	8.0	59.4	0.52	0.46	0.52	34.8
All Vehicles		6133	5.4	6133	5.4	0.886	25.4	LOS B	37.1	267.5	0.58	0.70	0.64	20.3

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [Babbage Rd_Clive St 2020 BC_PM Peak]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2020_PM]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Clive St_Southern approach														
1b	L3	11	0.0	11	0.0	0.832	44.5	LOS D	16.7	120.0	0.90	0.88	0.94	9.8
3a	R1	1753	3.1	1753	3.1	0.832	42.4	LOS C	16.7	120.0	0.90	0.88	0.94	17.4
Approach		1763	3.0	1763	3.0	0.832	42.4	LOS C	16.7	120.0	0.90	0.88	0.94	17.4
NorthEast: Babbage Rd_Northeastern approach														
24a	L1	908	5.9	908	5.9	0.300	4.6	LOS A	0.0	0.0	0.00	0.54	0.00	41.7
25	T1	1901	4.0	1901	4.0	0.833	32.8	LOS C	27.4	198.4	0.87	0.82	0.91	14.5
Approach		2809	4.6	2809	4.6	0.833	23.7	LOS B	27.4	198.4	0.59	0.73	0.62	18.3
SouthWest: Babbage Rd_Southwestern approach														
31	T1	1545	3.9	1545	3.9	0.563	25.2	LOS B	14.6	105.8	0.74	0.67	0.74	25.2
Approach		1545	3.9	1545	3.9	0.563	25.2	LOS B	14.6	105.8	0.74	0.67	0.74	25.2
All Vehicles		6118	4.0	6118	4.0	0.833	29.5	LOS C	27.4	198.4	0.72	0.76	0.74	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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [Babbage Rd_Clive St 2020 BC_SAT]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2020_SAT]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 134 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Clive St_Southern approach														
1b	L3	15	0.0	15	0.0	0.799	46.1	LOS D	16.9	120.0	0.90	0.87	0.93	9.5
3a	R1	1518	1.9	1518	1.9	0.799	43.9	LOS D	16.9	120.0	0.90	0.87	0.93	17.0
Approach		1533	1.9	1533	1.9	0.799	44.0	LOS D	16.9	120.0	0.90	0.87	0.93	17.0
NorthEast: Babbage Rd_Northeastern approach														
24a	L1	1002	2.6	1002	2.6	0.416	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	41.7
25	T1	1908	2.0	1908	2.0	0.804	26.4	LOS B	25.6	182.1	0.83	0.77	0.85	17.0
Approach		2911	2.2	2911	2.2	0.804	18.9	LOS B	25.6	182.1	0.55	0.69	0.56	21.3
SouthWest: Babbage Rd_Southwestern approach														
31	T1	1465	3.4	1465	3.4	0.495	20.1	LOS B	12.0	86.4	0.67	0.60	0.67	28.5
Approach		1465	3.4	1465	3.4	0.495	20.1	LOS B	12.0	86.4	0.67	0.60	0.67	28.5
All Vehicles		5908	2.4	5908	2.4	0.804	25.7	LOS B	25.6	182.1	0.67	0.71	0.68	21.3

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Clive St_Boundary St 2020 BC_AM Peak]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2020_AM]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Easteren Valley Way Southern approach														
1	L2	142	4.4	142	4.4	0.144	15.0	LOS B	2.3	17.8	0.40	0.64	0.40	44.5
2	T1	905	9.4	905	9.4	0.664	16.8	LOS B	15.7	117.6	0.64	0.59	0.64	38.7
3	R2	19	0.0	19	0.0	0.664	31.3	LOS C	7.1	53.2	0.77	0.70	0.77	39.0
Approach		1066	8.6	1066	8.6	0.664	16.8	LOS B	15.7	117.6	0.61	0.60	0.61	39.9
East: Boundary St Eastern approach														
4	L2	18	0.0	18	0.0	0.554	75.8	LOS F	2.9	21.5	1.00	0.77	1.01	25.9
5	T1	49	10.6	49	10.6	0.554	71.3	LOS F	2.9	21.5	1.00	0.77	1.01	25.1
6	R2	53	2.0	53	2.0	0.681	80.5	LOS F	2.4	16.9	1.00	0.84	1.17	15.7
Approach		120	5.3	120	5.3	0.681	76.0	LOS F	2.9	21.5	1.00	0.80	1.08	21.6
North: Clive St Northern approach														
7	L2	7	0.0	7	0.0	0.648	20.2	LOS B	16.4	120.0	0.64	0.59	0.64	38.5
8	T1	1502	5.0	1502	5.0	0.648	14.9	LOS B	16.4	120.0	0.64	0.60	0.64	43.2
Approach		1509	5.0	1509	5.0	0.648	14.9	LOS B	16.4	120.0	0.64	0.60	0.64	43.1
West: Boundary St Western approach														
10	L2	7	0.0	7	0.0	0.664	67.7	LOS E	6.5	47.5	1.00	0.83	1.02	18.0
11	T1	45	7.0	45	7.0	0.664	63.1	LOS E	6.5	47.5	1.00	0.83	1.02	26.2
12	R2	267	3.1	267	3.1	0.664	67.7	LOS E	6.5	47.5	1.00	0.83	1.02	26.9
Approach		320	3.6	320	3.6	0.664	67.1	LOS E	6.5	47.5	1.00	0.83	1.02	26.7
All Vehicles		3016	6.1	3016	6.1	0.681	23.6	LOS B	16.4	120.0	0.69	0.63	0.69	36.8

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	64.3	LOS F			0.96	0.96

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

MOVEMENT SUMMARY

Site: 1 [Clive St_Boundary St 2020 BC_PM Peak]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2020_PM]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Easteren Valley Way Southern approach														
1	L2	298	1.1	298	1.1	0.477	24.3	LOS B	17.0	121.3	0.63	0.65	0.63	41.2
2	T1	1705	3.1	1705	3.1	0.477	19.1	LOS B	18.7	134.4	0.63	0.59	0.63	36.6
3	R2	19	0.0	19	0.0	0.477	26.2	LOS B	18.7	134.4	0.67	0.61	0.67	41.3
Approach		2022	2.8	2022	2.8	0.477	19.9	LOS B	18.7	134.4	0.63	0.60	0.63	37.8
East: Boundary St Eastern approach														
4	L2	17	0.0	17	0.0	0.363	68.8	LOS E	2.8	19.4	0.97	0.75	0.97	27.3
5	T1	53	0.0	53	0.0	0.363	64.2	LOS E	2.8	19.4	0.97	0.75	0.97	26.4
6	R2	44	0.0	44	0.0	0.479	72.6	LOS F	1.9	13.1	0.98	0.77	0.98	16.9
Approach		114	0.0	114	0.0	0.479	68.2	LOS E	2.8	19.4	0.98	0.76	0.98	23.4
North: Clive St Northern approach														
7	L2	11	0.0	11	0.0	0.463	24.6	LOS B	10.9	80.0	0.64	0.57	0.64	35.8
8	T1	898	6.0	898	6.0	0.463	19.3	LOS B	11.3	82.8	0.64	0.57	0.64	39.8
Approach		908	5.9	908	5.9	0.463	19.3	LOS B	11.3	82.8	0.64	0.57	0.64	39.8
West: Boundary St Western approach														
10	L2	14	0.0	14	0.0	0.474	57.7	LOS E	5.8	41.6	0.93	0.79	0.93	20.1
11	T1	71	4.5	71	4.5	0.474	53.1	LOS D	5.8	41.6	0.93	0.79	0.93	28.4
12	R2	241	0.4	241	0.4	0.474	57.5	LOS E	6.3	43.9	0.93	0.80	0.93	29.2
Approach		325	1.3	325	1.3	0.474	56.6	LOS E	6.3	43.9	0.93	0.80	0.93	28.7
All Vehicles		3369	3.4	3369	3.4	0.479	24.9	LOS B	18.7	134.4	0.67	0.61	0.67	35.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	64.3	LOS F			0.96	0.96

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

MOVEMENT SUMMARY

Site: 1 [Clive St_Boundary St 2020 BC_SAT]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2020_SAT]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 134 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Easteren Valley Way Southern approach														
1	L2	395	1.1	395	1.1	0.545	28.3	LOS B	17.8	126.2	0.70	0.72	0.70	39.1
2	T1	1478	1.9	1478	1.9	0.545	24.8	LOS B	18.9	134.3	0.72	0.66	0.72	32.9
3	R2	38	0.0	38	0.0	0.545	34.6	LOS C	18.9	134.3	0.79	0.71	0.79	37.7
Approach		1911	1.7	1911	1.7	0.545	25.7	LOS B	18.9	134.3	0.72	0.68	0.72	34.9
East: Boundary St Eastern approach														
4	L2	31	0.0	31	0.0	0.567	65.6	LOS E	4.0	27.8	0.98	0.78	0.98	27.9
5	T1	73	0.0	73	0.0	0.567	61.0	LOS E	4.0	27.8	0.98	0.78	0.98	27.0
6	R2	40	0.0	40	0.0	0.389	67.2	LOS E	1.6	11.1	0.96	0.76	0.96	17.7
Approach		143	0.0	143	0.0	0.567	63.7	LOS E	4.0	27.8	0.98	0.77	0.98	25.1
North: Clive St Northern approach														
7	L2	17	0.0	17	0.0	0.557	29.6	LOS C	13.4	96.2	0.74	0.67	0.74	33.1
8	T1	985	2.7	985	2.7	0.557	24.3	LOS B	13.9	99.2	0.74	0.67	0.74	36.6
Approach		1002	2.6	1002	2.6	0.557	24.4	LOS B	13.9	99.2	0.74	0.67	0.74	36.5
West: Boundary St Western approach														
10	L2	15	0.0	15	0.0	0.550	52.3	LOS D	7.9	55.2	0.93	0.80	0.93	21.3
11	T1	103	0.0	103	0.0	0.550	47.7	LOS D	7.9	55.2	0.93	0.80	0.93	29.7
12	R2	339	0.3	339	0.3	0.550	52.2	LOS D	8.2	57.5	0.93	0.81	0.93	30.5
Approach		457	0.2	457	0.2	0.550	51.2	LOS D	8.2	57.5	0.93	0.81	0.93	30.1
All Vehicles		3513	1.7	3513	1.7	0.567	30.2	LOS C	18.9	134.3	0.76	0.69	0.76	33.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	61.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	61.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	61.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	61.3	LOS F			0.96	0.96

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

Appendix C Future SIDRA Assessment Results

MOVEMENT SUMMARY

Site: 3 [Babbage Rd_Boundary St 2026 BC_AM Peak]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2026_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
NorthEast: Babbage Rd-Northern approach														
7	L2	11	0.0	11	0.0	0.500	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	57.2
8	T1	2681	3.7	2681	3.7	0.500	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		2692	3.7	2692	3.7	0.500	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8
SouthWest: Babbage Rd-Southern approach														
2	T1	1348	6.4	1348	6.4	0.255	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	429	4.9	429	4.9	0.937	38.8	LOS C	4.0	28.8	0.98	1.84	4.26	33.8
Approach		1778	6.0	1778	6.0	0.937	9.4	NA	4.0	28.8	0.24	0.44	1.03	45.0
All Vehicles		4469	4.6	4469	4.6	0.937	3.8	NA	4.0	28.8	0.09	0.18	0.41	52.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3 [Babbage Rd_Boundary St 2026 BC_PM Peak]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2026_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: Babbage Rd-Northern approach														
7	L2	11	0.0	11	0.0	0.392	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	57.2
8	T1	2093	4.0	2093	4.0	0.392	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		2103	4.0	2103	4.0	0.392	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8
SouthWest: Babbage Rd-Southern approach														
2	T1	1703	3.9	1703	3.9	0.563	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
3	R2	429	4.9	429	4.9	0.971	49.4	LOS D	5.5	40.1	0.99	2.12	5.26	30.4
Approach		2133	4.1	2133	4.1	0.971	10.1	NA	5.5	40.1	0.20	0.43	1.06	43.8
All Vehicles		4236	4.1	4236	4.1	0.971	5.1	NA	5.5	40.1	0.10	0.22	0.53	50.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3 [Babbage Rd_Boundary St 2026 BC_SAT]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2026_SAT]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: Babbage Rd-Northern approach														
7	L2	11	0.0	11	0.0	0.389	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	57.2
8	T1	2104	2.0	2104	2.0	0.389	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		2115	2.0	2115	2.0	0.389	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8
SouthWest: Babbage Rd-Southern approach														
2	T1	1615	3.4	1615	3.4	0.413	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
3	R2	429	4.9	429	4.9	0.969	48.4	LOS D	5.4	39.3	0.99	2.10	5.18	30.6
Approach		2044	3.7	2044	3.7	0.969	10.2	NA	5.4	39.3	0.21	0.44	1.09	43.7
All Vehicles		4159	2.8	4159	2.8	0.969	5.0	NA	5.4	39.3	0.10	0.22	0.53	50.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3 [Babbage Rd_Boundary St 2026 Scenario 1_AM Peak]

Network: N101 [Clive St_Boundary St_Babbage Rd Scenari 1 2026_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: Babbage Rd-Northern approach														
7	L2	11	0.0	11	0.0	0.501	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	57.2
8	T1	2686	3.7	2686	3.7	0.501	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		2697	3.7	2697	3.7	0.501	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8
SouthWest: Babbage Rd-Southern approach														
2	T1	1348	6.4	1348	6.4	0.255	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	432	4.9	432	4.9	0.971	49.2	LOS D	5.1	37.2	0.99	2.09	5.24	30.4
Approach		1780	6.0	1780	6.0	0.971	12.0	NA	5.1	37.2	0.24	0.51	1.27	42.3
All Vehicles		4477	4.6	4477	4.6	0.971	4.8	NA	5.1	37.2	0.10	0.20	0.51	51.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3 [Babbage Rd_Boundary St 2026 Scenario 1_PM Peak]

Network: N102 [Clive St_Boundary St_Babbage Rd Scenari 1 2026_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: Babbage Rd-Northern approach														
7	L2	11	0.0	11	0.0	0.392	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	57.2
8	T1	2095	4.0	2095	4.0	0.392	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		2105	4.0	2105	4.0	0.392	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8
SouthWest: Babbage Rd-Southern approach														
2	T1	1703	3.9	1703	3.9	0.563	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
3	R2	435	4.9	435	4.9	0.984	54.1	LOS D	6.1	44.5	0.99	2.24	5.69	29.0
Approach		2138	4.1	2138	4.1	0.984	11.1	NA	6.1	44.5	0.20	0.46	1.16	42.7
All Vehicles		4243	4.1	4243	4.1	0.984	5.6	NA	6.1	44.5	0.10	0.23	0.58	50.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3 [Babbage Rd_Boundary St 2026 Scenario 1_SAT]

Network: N101 [Clive St_Boundary St_Babbage Rd Scenari 1 2026_SAT]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: Babbage Rd-Northern approach														
7	L2	11	0.0	11	0.0	0.390	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	57.2
8	T1	2107	2.0	2107	2.0	0.390	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		2118	2.0	2118	2.0	0.390	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8
SouthWest: Babbage Rd-Southern approach														
2	T1	1615	3.4	1615	3.4	0.413	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
3	R2	433	4.9	433	4.9	0.977	51.3	LOS D	5.8	42.0	0.99	2.17	5.45	29.8
Approach		2047	3.7	2047	3.7	0.977	10.9	NA	5.8	42.0	0.21	0.46	1.15	43.0
All Vehicles		4165	2.8	4165	2.8	0.977	5.4	NA	5.8	42.0	0.10	0.23	0.57	50.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [Babbage Rd_Clive St 2026 BC_AM Peak]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2026_AM]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Clive St_Southern approach														
1b	L3	8	0.0	8	0.0	0.964	87.5	LOS F	2.7	20.3	0.85	1.02	1.27	5.3
3a	R1	1056	9.0	1056	9.0	0.964	85.2	LOS F	15.9	120.0	0.92	1.03	1.29	10.2
Approach		1064	8.9	1064	8.9	0.964	85.2	LOS F	15.9	120.0	0.92	1.03	1.29	10.2
NorthEast: Babbage Rd_Northeastern approach														
24a	L1	1663	5.0	1663	5.0	0.485	4.6	LOS A	4.0	29.1	0.00	0.53	0.00	41.7
25	T1	2683	3.7	2683	3.7	0.987	71.5	LOS F	62.4	450.3	0.92	1.12	1.25	7.6
Approach		4346	4.2	4346	4.2	0.987	45.9	LOS D	62.4	450.3	0.57	0.90	0.77	11.1
SouthWest: Babbage Rd_Southwestern approach														
31	T1	1348	6.4	1348	6.4	0.407	14.1	LOS A	9.3	68.9	0.55	0.49	0.55	33.8
Approach		1348	6.4	1348	6.4	0.407	14.1	LOS A	9.3	68.9	0.55	0.49	0.55	33.8
All Vehicles		6759	5.4	6759	5.4	0.987	45.7	LOS D	62.4	450.3	0.62	0.84	0.81	13.3

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [Babbage Rd_Clive St 2026 BC_PM Peak]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2026_PM]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Clive St_Southern approach														
1b	L3	12	0.0	12	0.0	0.933	62.4	LOS E	16.7	120.0	1.00	1.00	1.18	7.2
3a	R1	1932	3.1	1932	3.1	0.933	60.3	LOS E	16.7	120.0	1.00	1.00	1.18	13.5
Approach		1943	3.0	1943	3.0	0.933	60.3	LOS E	16.7	120.0	1.00	1.00	1.18	13.5
NorthEast: Babbage Rd_Northeastern approach														
24a	L1	1001	5.9	1001	5.9	0.375	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	41.7
25	T1	2095	4.0	2095	4.0	0.923	51.1	LOS D	39.1	283.5	0.94	1.00	1.11	10.2
Approach		3096	4.6	3096	4.6	0.923	36.0	LOS C	39.1	283.5	0.63	0.85	0.75	13.4
SouthWest: Babbage Rd_Southwestern approach														
31	T1	1703	3.9	1703	3.9	0.612	25.5	LOS B	16.6	119.9	0.77	0.69	0.77	25.0
Approach		1703	3.9	1703	3.9	0.612	25.5	LOS B	16.6	119.9	0.77	0.69	0.77	25.0
All Vehicles		6742	4.0	6742	4.0	0.933	40.4	LOS C	39.1	283.5	0.77	0.85	0.88	15.8

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

MOVEMENT SUMMARY

Site: 2 [Babbage Rd_Clive St 2026 BC_SAT]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2026_SAT]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Clive St_Southern approach														
1b	L3	16	0.0	16	0.0	0.901	60.2	LOS E	16.9	120.0	0.99	0.96	1.12	7.4
3a	R1	1673	1.9	1673	1.9	0.901	58.1	LOS E	16.9	120.0	0.99	0.96	1.12	13.9
Approach		1688	1.9	1688	1.9	0.901	58.1	LOS E	16.9	120.0	0.99	0.96	1.12	13.9
NorthEast: Babbage Rd_Northeastern approach														
24a	L1	1104	2.6	1104	2.6	0.590	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	41.6
25	T1	2103	2.0	2103	2.0	0.897	39.5	LOS C	37.2	265.2	0.91	0.92	1.02	12.5
Approach		3207	2.2	3207	2.2	0.897	27.5	LOS B	37.2	265.2	0.60	0.79	0.67	16.5
SouthWest: Babbage Rd_Southwestern approach														
31	T1	1615	3.4	1615	3.4	0.534	20.6	LOS B	13.9	100.4	0.68	0.61	0.68	28.1
Approach		1615	3.4	1615	3.4	0.534	20.6	LOS B	13.9	100.4	0.68	0.61	0.68	28.1
All Vehicles		6511	2.4	6511	2.4	0.901	33.7	LOS C	37.2	265.2	0.72	0.79	0.79	17.7

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

MOVEMENT SUMMARY

Site: 2 [Babbage Rd_Clive St 2026 Scenario 1_AM Peak]

Network: N101 [Clive St_Boundary St_Babbage Rd Scenari 1 2026_AM]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Clive St_Southern approach														
1b	L3	8	0.0	8	0.0	0.964	87.5	LOS F	2.7	20.3	0.85	1.02	1.27	5.3
3a	R1	1056	9.0	1056	9.0	0.964	85.2	LOS F	15.9	120.0	0.92	1.03	1.29	10.2
Approach		1064	8.9	1064	8.9	0.964	85.2	LOS F	15.9	120.0	0.92	1.03	1.29	10.2
NorthEast: Babbage Rd_Northeastern approach														
24a	L1	1666	5.0	1666	5.0	0.486	4.6	LOS A	3.1	22.6	0.00	0.53	0.00	41.7
25	T1	2688	3.7	2688	3.7	0.989	72.7	LOS F	63.0	454.9	0.92	1.13	1.25	7.5
Approach		4355	4.2	4355	4.2	0.989	46.6	LOS D	63.0	454.9	0.57	0.90	0.77	10.9
SouthWest: Babbage Rd_Southwestern approach														
31	T1	1348	6.4	1348	6.4	0.407	14.1	LOS A	9.3	68.9	0.55	0.49	0.55	33.8
Approach		1348	6.4	1348	6.4	0.407	14.1	LOS A	9.3	68.9	0.55	0.49	0.55	33.8
All Vehicles		6767	5.4	6767	5.4	0.989	46.2	LOS D	63.0	454.9	0.62	0.84	0.81	13.2

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

MOVEMENT SUMMARY

Site: 2 [Babbage Rd_Clive St 2026 Scenario 1_PM Peak]

Network: N102 [Clive St_Boundary St_Babbage Rd Scenari 1 2026_PM]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Clive St_Southern approach														
1b	L3	12	0.0	12	0.0	0.933	62.4	LOS E	16.7	120.0	1.00	1.00	1.18	7.2
3a	R1	1932	3.1	1932	3.1	0.933	60.3	LOS E	16.7	120.0	1.00	1.00	1.18	13.5
Approach		1943	3.0	1943	3.0	0.933	60.3	LOS E	16.7	120.0	1.00	1.00	1.18	13.5
NorthEast: Babbage Rd_Northeastern approach														
24a	L1	1002	5.9	1002	5.9	0.376	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	41.7
25	T1	2097	4.0	2097	4.0	0.924	51.4	LOS D	39.3	284.9	0.94	1.00	1.12	10.1
Approach		3099	4.6	3099	4.6	0.924	36.3	LOS C	39.3	284.9	0.63	0.85	0.76	13.4
SouthWest: Babbage Rd_Southwestern approach														
31	T1	1703	3.9	1703	3.9	0.612	25.5	LOS B	16.6	119.9	0.77	0.69	0.77	25.0
Approach		1703	3.9	1703	3.9	0.612	25.5	LOS B	16.6	119.9	0.77	0.69	0.77	25.0
All Vehicles		6745	4.0	6745	4.0	0.933	40.5	LOS C	39.3	284.9	0.77	0.85	0.88	15.7

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

MOVEMENT SUMMARY

Site: 2 [Babbage Rd_Clive St 2026 Scenario1_SAT]

Network: N101 [Clive St_Boundary St_Babbage Rd Scenari 1 2026_SAT]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Clive St_Southern approach														
1b	L3	16	0.0	16	0.0	0.901	60.2	LOS E	16.9	120.0	0.99	0.96	1.12	7.4
3a	R1	1673	1.9	1673	1.9	0.901	58.1	LOS E	16.9	120.0	0.99	0.96	1.12	13.9
Approach		1688	1.9	1688	1.9	0.901	58.1	LOS E	16.9	120.0	0.99	0.96	1.12	13.9
NorthEast: Babbage Rd_Northeastern approach														
24a	L1	1107	2.6	1107	2.6	0.580	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	41.6
25	T1	2106	2.0	2106	2.0	0.897	39.4	LOS C	37.2	264.9	0.91	0.92	1.02	12.6
Approach		3214	2.2	3214	2.2	0.897	27.4	LOS B	37.2	264.9	0.60	0.79	0.67	16.5
SouthWest: Babbage Rd_Southwestern approach														
31	T1	1615	3.4	1615	3.4	0.534	20.6	LOS B	13.9	100.4	0.68	0.61	0.68	28.1
Approach		1615	3.4	1615	3.4	0.534	20.6	LOS B	13.9	100.4	0.68	0.61	0.68	28.1
All Vehicles		6517	2.4	6517	2.4	0.901	33.7	LOS C	37.2	264.9	0.72	0.79	0.79	17.7

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

MOVEMENT SUMMARY

Site: 1 [Clive St_Boundary St 2026 BC_AM Peak]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2026_AM]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Easteren Valley Way Southern approach														
1	L2	157	4.4	157	4.4	0.151	13.2	LOS A	2.3	17.8	0.36	0.63	0.36	45.4
2	T1	998	9.4	998	9.4	0.933	58.0	LOS E	28.9	216.5	0.86	1.02	1.15	21.0
3	R2	21	0.0	21	0.0	0.933	79.5	LOS F	20.5	153.1	0.99	1.19	1.37	25.8
Approach		1176	8.6	1176	8.6	0.933	52.4	LOS D	28.9	216.5	0.79	0.97	1.05	24.0
East: Boundary St Eastern approach														
4	L2	20	0.0	20	0.0	0.742	79.9	LOS F	3.3	24.8	1.00	0.86	1.20	25.2
5	T1	55	10.6	55	10.6	0.742	75.4	LOS F	3.3	24.8	1.00	0.86	1.20	24.4
6	R2	58	2.0	58	2.0	0.948	105.6	LOS F	3.1	22.2	1.00	1.06	1.75	13.0
Approach		133	5.3	133	5.3	0.948	89.3	LOS F	3.3	24.8	1.00	0.95	1.44	19.7
North: Clive St Northern approach														
7	L2	8	0.0	8	0.0	0.678	18.2	LOS B	16.4	120.0	0.62	0.58	0.62	39.8
8	T1	1656	5.0	1656	5.0	0.678	12.9	LOS A	16.4	120.0	0.63	0.58	0.63	44.8
Approach		1664	5.0	1664	5.0	0.678	12.9	LOS A	16.4	120.0	0.63	0.58	0.63	44.8
West: Boundary St Western approach														
10	L2	8	0.0	8	0.0	0.924	90.2	LOS F	8.7	62.7	1.00	1.07	1.44	14.8
11	T1	49	7.0	49	7.0	0.924	85.6	LOS F	8.7	62.7	1.00	1.07	1.44	22.6
12	R2	295	3.1	295	3.1	0.924	90.1	LOS F	8.8	63.3	1.00	1.05	1.44	23.1
Approach		353	3.6	353	3.6	0.924	89.4	LOS F	8.8	63.3	1.00	1.05	1.44	22.9
All Vehicles		3325	6.1	3325	6.1	0.948	38.0	LOS C	28.9	216.5	0.74	0.78	0.89	30.1

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	64.3	LOS F			0.96	0.96

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

MOVEMENT SUMMARY

Site: 1 [Clive St_Boundary St 2026 BC_PM Peak]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2026_PM]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Easteren Valley Way Southern approach														
1	L2	328	1.1	328	1.1	0.542	24.1	LOS B	18.6	132.7	0.63	0.66	0.63	41.3
2	T1	1879	3.1	1879	3.1	0.542	19.5	LOS B	22.4	160.6	0.65	0.60	0.65	36.4
3	R2	21	0.0	21	0.0	0.542	27.2	LOS B	22.4	160.6	0.70	0.64	0.70	40.9
Approach		2228	2.8	2228	2.8	0.542	20.2	LOS B	22.4	160.6	0.64	0.61	0.64	37.6
East: Boundary St Eastern approach														
4	L2	19	0.0	19	0.0	0.401	69.1	LOS E	3.1	21.6	0.98	0.76	0.98	27.2
5	T1	58	0.0	58	0.0	0.401	64.5	LOS E	3.1	21.6	0.98	0.76	0.98	26.4
6	R2	48	0.0	48	0.0	0.524	73.1	LOS F	2.1	14.5	0.99	0.78	0.99	16.8
Approach		125	0.0	125	0.0	0.524	68.5	LOS E	3.1	21.6	0.98	0.77	0.98	23.3
North: Clive St Northern approach														
7	L2	12	0.0	12	0.0	0.503	24.6	LOS B	12.2	90.0	0.65	0.59	0.65	35.7
8	T1	989	6.0	989	6.0	0.503	19.4	LOS B	12.6	93.1	0.65	0.59	0.65	39.8
Approach		1001	5.9	1001	5.9	0.503	19.4	LOS B	12.6	93.1	0.65	0.59	0.65	39.7
West: Boundary St Western approach														
10	L2	15	0.0	15	0.0	0.539	59.3	LOS E	6.6	46.8	0.95	0.80	0.95	19.7
11	T1	78	4.5	78	4.5	0.539	54.8	LOS D	6.6	46.8	0.95	0.80	0.95	28.1
12	R2	265	0.4	265	0.4	0.539	59.2	LOS E	7.0	49.4	0.95	0.81	0.95	28.8
Approach		358	1.3	358	1.3	0.539	58.3	LOS E	7.0	49.4	0.95	0.81	0.95	28.3
All Vehicles		3713	3.4	3713	3.4	0.542	25.3	LOS B	22.4	160.6	0.69	0.63	0.69	35.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	64.3	LOS F			0.96	0.96

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

MOVEMENT SUMMARY

Site: 1 [Clive St_Boundary St 2026 BC_SAT]

Network: N101 [Clive St_Boundary St_Babbage Rd BC 2026_SAT]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Easteren Valley Way Southern approach														
1	L2	435	1.1	435	1.1	0.631	29.3	LOS C	20.6	146.3	0.71	0.73	0.71	38.7
2	T1	1628	1.9	1628	1.9	0.631	26.8	LOS B	23.6	167.5	0.75	0.69	0.75	31.8
3	R2	42	0.0	42	0.0	0.631	37.9	LOS C	23.6	167.5	0.84	0.76	0.84	36.4
Approach		2105	1.7	2105	1.7	0.631	27.5	LOS B	23.6	167.5	0.74	0.70	0.74	33.9
East: Boundary St Eastern approach														
4	L2	34	0.0	34	0.0	0.623	67.4	LOS E	4.6	31.9	0.98	0.79	1.00	27.5
5	T1	80	0.0	80	0.0	0.623	62.9	LOS E	4.6	31.9	0.98	0.79	1.00	26.7
6	R2	44	0.0	44	0.0	0.399	68.6	LOS E	1.8	12.6	0.96	0.77	0.96	17.5
Approach		158	0.0	158	0.0	0.623	65.4	LOS E	4.6	31.9	0.97	0.78	0.99	24.7
North: Clive St Northern approach														
7	L2	19	0.0	19	0.0	0.605	31.0	LOS C	15.9	113.6	0.76	0.69	0.76	32.5
8	T1	1085	2.7	1085	2.7	0.605	25.7	LOS B	16.4	117.1	0.76	0.69	0.76	35.8
Approach		1104	2.6	1104	2.6	0.605	25.8	LOS B	16.4	117.1	0.76	0.69	0.76	35.7
West: Boundary St Western approach														
10	L2	16	0.0	16	0.0	0.633	56.7	LOS E	9.3	65.5	0.95	0.82	0.95	20.3
11	T1	114	0.0	114	0.0	0.633	52.1	LOS D	9.3	65.5	0.95	0.82	0.95	28.7
12	R2	374	0.3	374	0.3	0.633	56.6	LOS E	9.7	68.1	0.95	0.83	0.95	29.4
Approach		503	0.2	503	0.2	0.633	55.6	LOS D	9.7	68.1	0.95	0.83	0.95	29.0
All Vehicles		3871	1.7	3871	1.7	0.633	32.2	LOS C	23.6	167.5	0.78	0.72	0.79	32.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	64.3	LOS F			0.96	0.96

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

MOVEMENT SUMMARY

Site: 1 [Clive St_Boundary St 2026 Scenario 1_AM Peak]

Network: N101 [Clive St_Boundary St_Babbage Rd Scenari 1 2026_AM]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Easteren Valley Way Southern approach														
1	L2	157	4.4	157	4.4	0.148	12.5	LOS A	2.2	16.9	0.34	0.62	0.34	45.8
2	T1	998	9.4	998	9.4	0.978	83.4	LOS F	33.7	252.5	0.90	1.18	1.35	16.4
3	R2	22	0.0	22	0.0	0.978	102.2	LOS F	25.8	192.6	1.00	1.31	1.52	22.2
Approach		1177	8.6	1177	8.6	0.978	74.3	LOS F	33.7	252.5	0.83	1.11	1.22	19.2
East: Boundary St Eastern approach														
4	L2	20	0.0	20	0.0	0.930	94.8	LOS F	3.7	27.6	1.00	1.03	1.60	22.8
5	T1	55	10.6	55	10.6	0.930	90.2	LOS F	3.7	27.6	1.00	1.03	1.60	22.2
6	R2	58	2.0	58	2.0	0.681	81.3	LOS F	2.6	18.5	1.00	0.82	1.14	15.6
Approach		133	5.3	133	5.3	0.930	87.0	LOS F	3.7	27.6	1.00	0.94	1.40	20.0
North: Clive St Northern approach														
7	L2	8	0.0	8	0.0	0.665	17.0	LOS B	16.4	120.0	0.59	0.55	0.59	40.6
8	T1	1658	5.0	1658	5.0	0.665	11.7	LOS A	16.4	120.0	0.60	0.56	0.60	45.9
Approach		1666	5.0	1666	5.0	0.665	11.7	LOS A	16.4	120.0	0.60	0.56	0.60	45.9
West: Boundary St Western approach														
10	L2	8	0.0	8	0.0	0.933	92.6	LOS F	8.8	63.8	1.00	1.09	1.47	14.5
11	T1	52	7.0	52	7.0	0.933	88.0	LOS F	8.8	63.8	1.00	1.09	1.47	22.3
12	R2	295	3.1	295	3.1	0.933	92.3	LOS F	9.0	65.0	1.00	1.07	1.46	22.8
Approach		355	3.6	355	3.6	0.933	91.7	LOS F	9.0	65.0	1.00	1.07	1.46	22.6
All Vehicles		3331	6.1	3331	6.1	0.978	45.4	LOS D	33.7	252.5	0.74	0.82	0.94	27.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	64.3	LOS F			0.96	0.96

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

MOVEMENT SUMMARY

Site: 1 [Clive St_Boundary St 2026 Scenario 1_PM Peak]

Network: N102 [Clive St_Boundary St_Babbage Rd Scenari 1 2026_PM]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Easteren Valley Way Southern approach														
1	L2	328	1.1	328	1.1	0.548	23.8	LOS B	18.1	129.1	0.63	0.66	0.63	41.4
2	T1	1879	3.1	1879	3.1	0.548	19.1	LOS B	22.6	162.4	0.64	0.60	0.64	36.7
3	R2	24	0.0	24	0.0	0.548	26.7	LOS B	22.6	162.4	0.70	0.64	0.70	41.1
Approach		2232	2.8	2232	2.8	0.548	19.8	LOS B	22.6	162.4	0.64	0.61	0.64	37.8
East: Boundary St Eastern approach														
4	L2	19	0.0	19	0.0	0.430	70.4	LOS E	3.1	21.9	0.98	0.76	0.98	27.0
5	T1	58	0.0	58	0.0	0.430	65.8	LOS E	3.1	21.9	0.98	0.76	0.98	26.1
6	R2	48	0.0	48	0.0	0.562	74.9	LOS F	2.1	14.7	1.00	0.79	1.04	16.5
Approach		125	0.0	125	0.0	0.562	70.0	LOS E	3.1	21.9	0.99	0.78	1.00	23.0
North: Clive St Northern approach														
7	L2	12	0.0	12	0.0	0.498	24.0	LOS B	12.1	88.6	0.64	0.58	0.64	36.1
8	T1	991	6.0	991	6.0	0.498	18.7	LOS B	12.5	91.7	0.64	0.58	0.64	40.2
Approach		1002	5.9	1002	5.9	0.498	18.8	LOS B	12.5	91.7	0.64	0.58	0.64	40.2
West: Boundary St Western approach														
10	L2	15	0.0	15	0.0	0.547	59.4	LOS E	6.7	47.7	0.95	0.80	0.95	19.7
11	T1	83	4.5	83	4.5	0.547	54.9	LOS D	6.7	47.7	0.95	0.80	0.95	28.1
12	R2	265	0.4	265	0.4	0.547	59.3	LOS E	7.1	50.2	0.95	0.81	0.95	28.8
Approach		363	1.3	363	1.3	0.547	58.3	LOS E	7.1	50.2	0.95	0.81	0.95	28.3
All Vehicles		3722	3.4	3722	3.4	0.562	25.0	LOS B	22.6	162.4	0.68	0.63	0.68	35.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	64.3	LOS F			0.96	0.96

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

MOVEMENT SUMMARY

Site: 1 [Clive St_Boundary St 2026 Scenario1_SAT]

Network: N101 [Clive St_Boundary St_Babbage Rd Scenari 1 2026_SAT]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Easteren Valley Way Southern approach														
1	L2	435	1.1	435	1.1	0.639	29.3	LOS C	20.8	147.7	0.71	0.73	0.71	38.7
2	T1	1628	1.9	1628	1.9	0.639	27.1	LOS B	23.6	167.9	0.75	0.69	0.75	31.6
3	R2	45	0.0	45	0.0	0.639	38.7	LOS C	23.6	167.9	0.85	0.77	0.85	36.2
Approach		2108	1.7	2108	1.7	0.639	27.8	LOS B	23.6	167.9	0.74	0.70	0.74	33.8
East: Boundary St Eastern approach														
4	L2	34	0.0	34	0.0	0.623	67.4	LOS E	4.6	31.9	0.98	0.79	1.00	27.5
5	T1	80	0.0	80	0.0	0.623	62.9	LOS E	4.6	31.9	0.98	0.79	1.00	26.7
6	R2	44	0.0	44	0.0	0.399	68.6	LOS E	1.8	12.6	0.96	0.77	0.96	17.5
Approach		158	0.0	158	0.0	0.623	65.4	LOS E	4.6	31.9	0.97	0.78	0.99	24.7
North: Clive St Northern approach														
7	L2	19	0.0	19	0.0	0.607	31.0	LOS C	15.9	114.1	0.76	0.69	0.76	32.5
8	T1	1088	2.7	1088	2.7	0.607	25.7	LOS B	16.4	117.6	0.77	0.69	0.77	35.8
Approach		1107	2.6	1107	2.6	0.607	25.8	LOS B	16.4	117.6	0.77	0.69	0.77	35.7
West: Boundary St Western approach														
10	L2	16	0.0	16	0.0	0.636	56.8	LOS E	9.4	66.0	0.96	0.82	0.96	20.3
11	T1	117	0.0	117	0.0	0.636	52.2	LOS D	9.4	66.0	0.96	0.82	0.96	28.7
12	R2	374	0.3	374	0.3	0.636	56.7	LOS E	9.8	68.6	0.96	0.83	0.96	29.4
Approach		506	0.2	506	0.2	0.636	55.7	LOS D	9.8	68.6	0.96	0.83	0.96	29.0
All Vehicles		3880	1.7	3880	1.7	0.639	32.4	LOS C	23.6	167.9	0.79	0.72	0.79	32.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	64.3	LOS F			0.96	0.96

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

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