Member of the Surbana Jurong Group

local people
global experience

Draft Traffic and Transport Study Report

4 Pennant Avenue, Gordon – Concept Development Scheme

Prepared for Ku-ring-gai Council
26 March 2021

SMEC INTERNAL REF. 30013017

Document Control

Document:	Draft Traffic and Transport Study Report
File Location:	X:\Projects\300130\30013017 Ku-ring-gai Council Traffic Studies\100 Concept Feasibility\105 Deliverables\115-3 Progress Reports
Project Name:	4 Pennant Avenue, Gordon – Concept Development Scheme
Project Number:	30013017
Revision Number:	Final

Revision History

Revision No.	Date	Prepared by	Reviewed by	Approved for Issue by
1 Draft	8 March 2021	Maryam Yadak	Colin Henson	Alen Krljic
Final	26 March 2021	Maryam Yadak	Colin Henson	Alen Krljic

Issue Register

Distribution List	Date Issued	Number of Copies
Ku-ring-gai Council	26 March 2021	1

SMEC Company Details

Approved by:	Alen Krljic		
Address:	Level 5, 20 Berry Street North Sydney NSW 2060 Australia		
Signature:			
Tel:	+61 2 9925 5508	Fax:	+61 2 9925 5566
Email:	Alen Krljic@smec.com	Website:	www.smec.com

Important Notice

This report is confidential and is provided solely for the purposes of preparing a Traffic Impact Assessment for a Concept Plan relating to the development at 4 Pennant Avenue, Gordon and the capacity of the local road network. This report is provided pursuant to a Consultancy Agreement between SMEC Australia Pty Limited ("SMEC") and Ku-ring-gai Council, under which SMEC undertook to perform a specific and limited task for Ku-ring-gai Council. This report is strictly limited to the matters stated in it and subject to the various assumptions, qualifications and limitations in it and does not apply by implication to other matters. SMEC makes no representation that the scope, assumptions, qualifications and exclusions set out in this report will be suitable or sufficient for other purposes nor that the content of the report covers all matters which you may regard as material for your purposes.

This report must be read as a whole. The executive summary is not a substitute for this. Any subsequent report must be read in conjunction with this report.

The report supersedes all previous draft or interim reports, whether written or presented orally, before the date of this report. This report has not and will not be updated for events or transactions occurring after the date of the report or any other matters which might have a material effect on its contents or which come to light after the date of the report. SMEC is not obliged to inform you of any such event, transaction or matter nor to update the report for anything that occurs, or of which SMEC becomes aware, after the date of this report.

Unless expressly agreed otherwise in writing, SMEC does not accept a duty of care or any other legal responsibility whatsoever in relation to this report, or any related enquiries, advice or other work, nor does SMEC make any representation in connection with this report, to any person other than Ku-ring-gai Council. Any other person who receives a draft or a copy of this report (or any part of it) or discusses it (or any part of it) or any related matter with SMEC, does so on the basis that he or she acknowledges and accepts that he or she may not rely on this report nor on any related information or advice given by SMEC for any purpose whatsoever.

Table of Contents

Appendices

List of Tables

List of Figures

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 Traffic Impact Assessment (TIA) for a Concept Plan Scheme relating to the development at 4 Pennant Avenue, Gordon. This TIA assesses the impacts of the proposal and the capacity of the local road network.

The subject site at 4 Pennant Avenue, Gordon has long been a local bowling club. In August 2017, the Gordon Bowling Club Limited advised Council they wished to terminate the lease with Council and vacate the property due to declining membership.

The site is currently zoned RE1 Public Recreation under the Ku-ring-gai Local Environmental Plan 2015 and classified as 'community 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. The site presents an opportunity for Council to utilise asset recycling, with future divestment to be invested into new assets or revitalisation of existing assets, such as the Marian Street Theatre or St Ives Indoor Sports Courts.

Council resolved to proceed with the R2 Low Density zoning on the site as conditioned by the Gateway Determination on the 30 June 2020. This study will also consider an option of a seniors living community, compliant with the relevant SEPP.

1.2 Scope of Report

The scope for this traffic and transport impact assessment includes:

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

1.3 The Site

The subject site is situated on the eastern end of Pennant Avenue in Gordon, centred approximately 140m east of its intersection with Browns Road. The site is bounded by existing low-density residential developments. It is supposed to be serviced by local access roads including Bushlands Avenue to the north, Browns Road to the west, Cecil Street to the south and Yarrabah Avenue to the east. The total site area is approximately 1.12 ha and is located approximately 500m south west of the Gordon Local Centre. Figure 1-1 shows the location of subject site. Also, Figure 1-2 shows the subject site frontage and driveway to Pennant Avenue.

Figure 1-1 Site Location

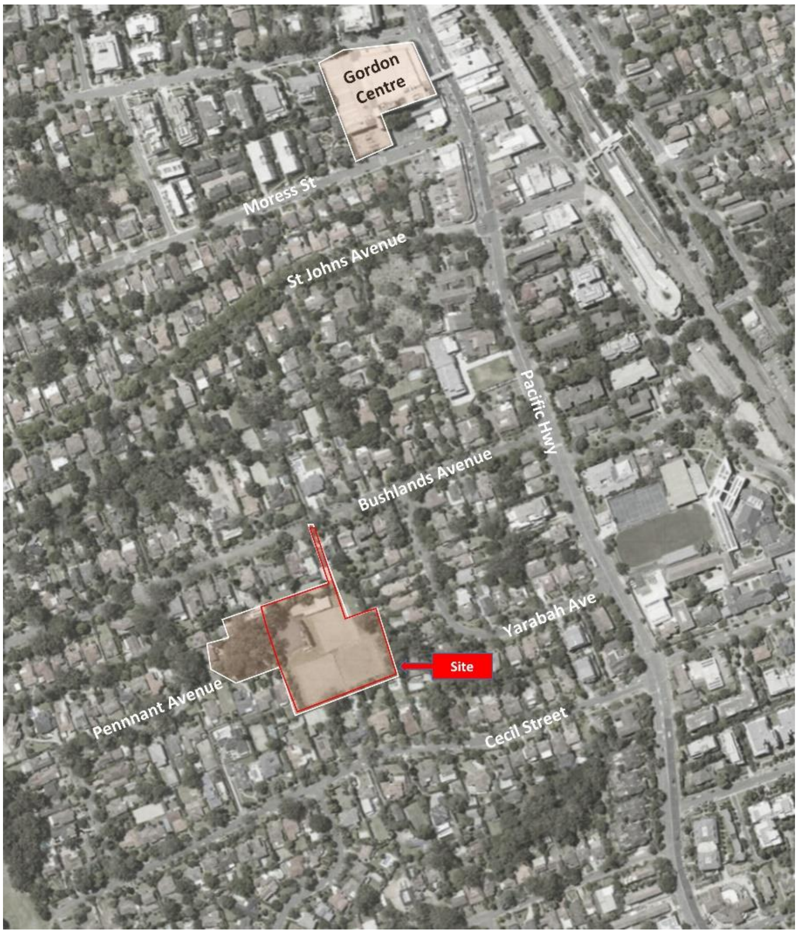


Figure 1-2 Site frontage and driveway to Pennant Avenue, looking east

1.4 Report Structure

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

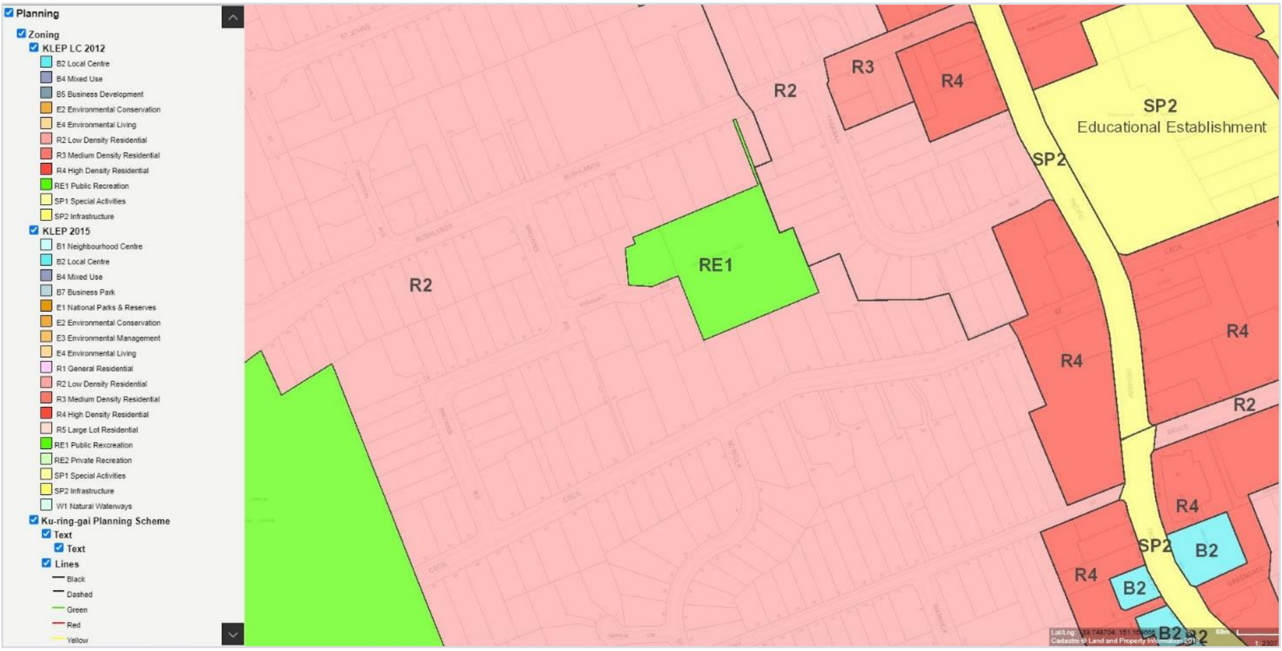
- Section 2 - Discusses existing transport conditions concerning land use and zoning, existing travel pattern and mode share, general traffic, active transport and public transport
- Section 3 - Describes the proposed development details
- Section 4 - Describes the traffic and transport impacts associated 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 public recreation zoning under Ku-ring-gai LEP (2015), as shown in Figure 2-1 below.

Figure 2-1 Land Use Zoning for 4 Pennant Avenue, Gordon



As shown in Figure 2-1 above, all adjacent land parcels are currently zoned as low density residential comprising detached dwellings on sizeable lots and limited numbers of medium and high-density housing types concentrated in areas with high transport and service provision. Also, no active or planned development approvals which could influence this Transport Study are understood to be currently held over the adjacent properties.

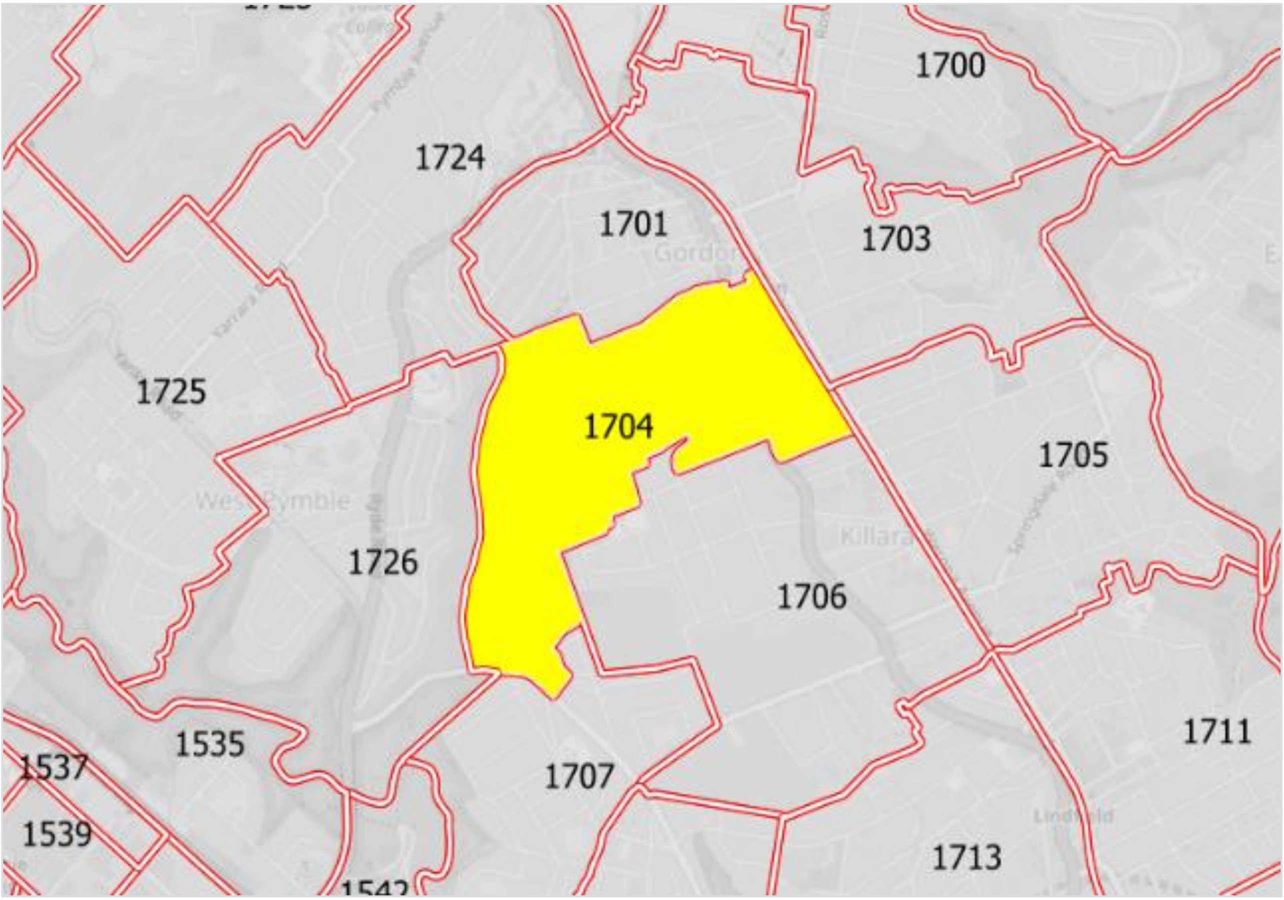
2.2 Population and Employment Demographics

The Australian Bureau of Statistics Census is a primary source of population and employment forecasts at the small area (travel zone) level for the Sydney Greater Metropolitan Area (GMA). This study considered the 2011 Census data and the 2016 Census data. The 2016 Census Journey To Work data showed an increasing trend of using the train and walking and working at home. There is no more recent information available and given the reversion of travel to private transport during and after the COVID 19 pandemic in 2020, this study used a conservative approach of using the 2011 Census data. The 2011 data is considered to provide a higher estimate of the potential effect of traffic generation on the road network.

The population and employment demographics were analysed for the selected travel zone, as shown in Figure 2-2. 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 1704 was selected for 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
1704	Gordon Station_West	2,086	2,731	2,921	3,237	3,669	4,096

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
1704	Gordon Station_West	6.2%	1.4%	2.2%	2.7%	2.3%

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 6.2% per annum between 2011 and 2016. Also, the population in the selected travel zone is forecast to grow with the highest average population growth of 2.7% per annum between 2026 and 2031.

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
1704	Gordon Station_West	709	757	835	900	965	1,032

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

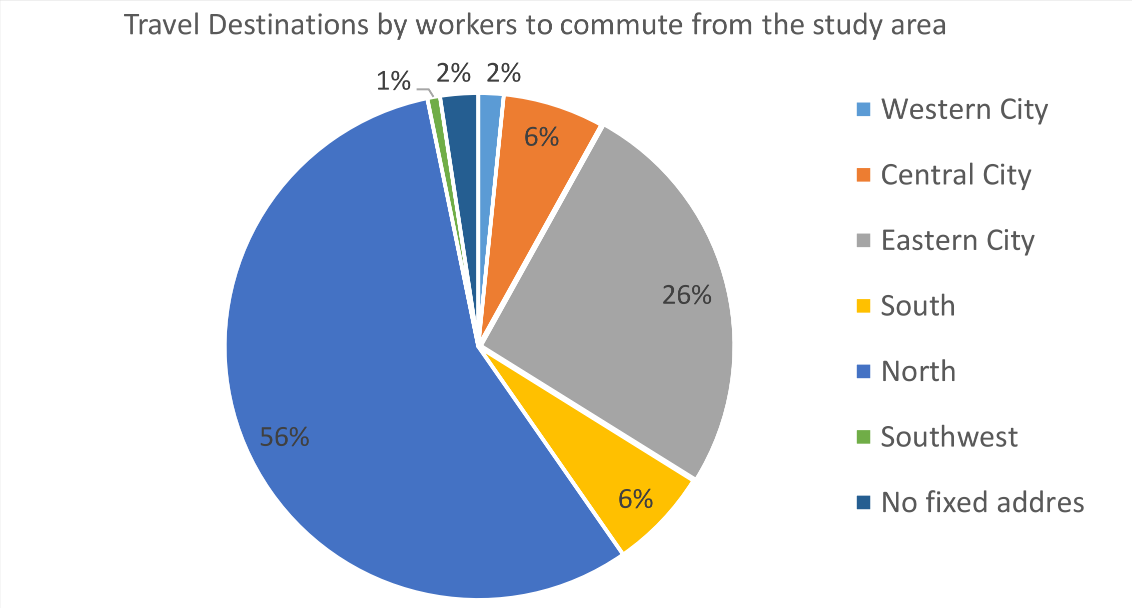
TZ Code	TZ Name	Annual employment Growth Rate				
		2011-2016	2016-2021	2021-2026	2026-2031	2031-2036
1704	Gordon Station_West	1.4%	2.1%	1.5%	1.4%	1.4%

As shown in Table 2-4, the employment within the selected travel zone has increased in recent years with the highest employment growth of 2.1% per annum between 2016 and 2021. Also, the employment in the selected travel zone is forecast to grow with the highest average employment growth of 1.5% 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. JTW data provides the mode share of people who travel to this zone for their job, as well as the transport 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			50%	50%			
2	Central City			88%				12%
3	Eastern City	25%		41%	3%			31%
4	South			75%	12%			13%
5	North	20%	3%	46%	13%	1%		17%
6	Southwest							100%
7	No fixed address			33%				67%

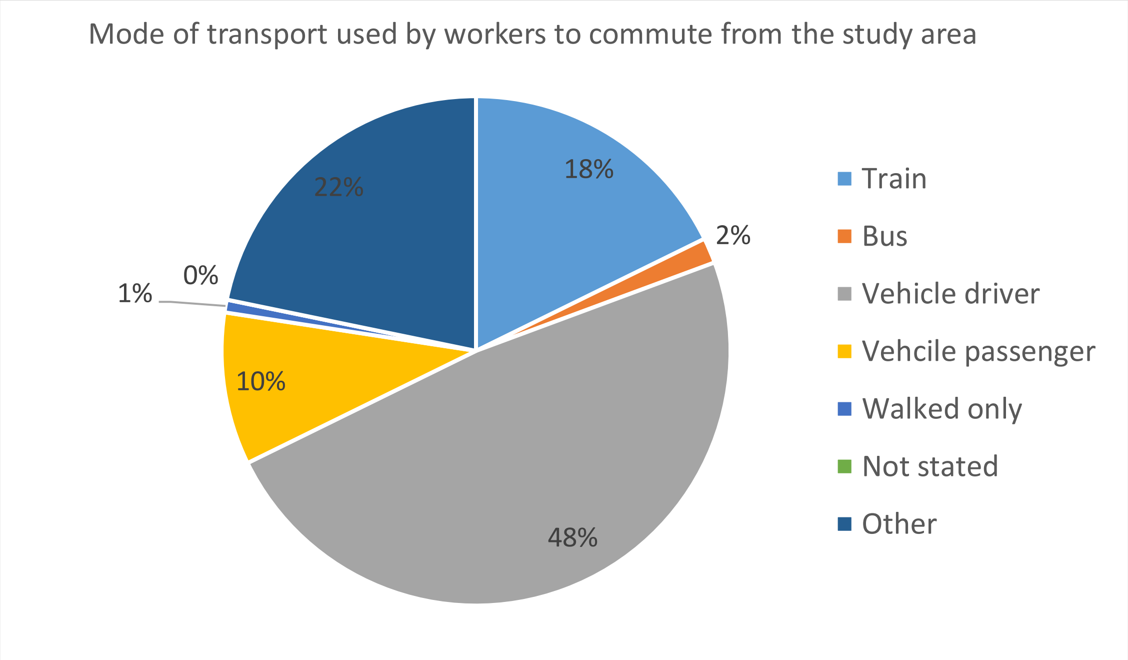
Source: BTS Journey to Work

*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 with the exception of the Southwest District, the main mode of transport to work is by car for all destinations, with a mode share of 88% to Central City and 75% to South. The other notable mode of transport is train with the mode share of 25% to Eastern City and 20% to North. All work trips to Southwest District are made by other mode which excludes train, bus, ferry, tram/LR, vehicle driver or passenger as well as Worked at Home or Did not go to work.

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 2011 analysis indicates that the majority of people use a private vehicle to travel to their job from selected travel zone with 48 per cent driving themselves and 10 per cent being a passenger. A total of 20 per cent use public transport with 18 per cent travelling by train and two per cent travelling by bus. Only one per cent of workers walk to their employment destinations. A total of 22 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 2016 Census Journey To Work data showed 37% by train, 2% by bus, 38% car driver, 0% car passenger, 5% walker, 10% worked at home, and 8% did not go to work. This suggests an increasing trend of using the train and walking and working at home.

It may be concluded that travelling by private car is the most dominant transport mode choice for daily commuters from the selected travel zone. This is largely a result of limited public transport coverage, adverse topography and large distances between origins and destinations.

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

- Pacific Highway

Pacific Highway is a state road which runs in a north-south direction. In the vicinity of the site, it has three and two lanes in southbound and northbound direction respectively. It is a divided road with a posted speed of 60km/hr, reduced in sections to 40km/h during School Zone hours. The Pacific Highway has historically been the highway link for passengers and freight between Sydney and northern NSW and the arterial road link in the north Shore from Hornsby to Chatswood and Central Sydney. The highway role has been supplemented in recent years by the Sydney

Motorway network, most recently the North Connex motorway. The arterial road role has been reinforced by land use growth and density on the North Shore, which has also contributed to local traffic access demand to schools and multi-storey residential development in the corridor. The highway has a paved footpath on both sides.

- Cecil Street

Cecil Street is a collector road that runs in an east-west direction between the Pacific Highway in the east and Browns Road in the west. It is a two-lane two-way road with a single lane of traffic in either direction within an undivided carriageway of 8.5m width, and a footpath both sides.

- Bushlands Avenue

Bushlands Avenue is a local access road that runs in an east-west direction between the Pacific Highway in the east and Lynn Ridge Avenue in the west. It is a two-way road with a single lane of traffic in either direction within an undivided carriageway of 6.5m width, a continuous paved footpath on the north side and segments of footpath on the south side.

- Yarabah Avenue

Yarabah Avenue is a local access road that serves as an access to residential properties. It forms a left-in left-out intersection with Pacific Highway and a priority T-controlled intersection with Bushlands Avenue. It is a two-lane, two-way undivided road, approximately 6.5m wide with a posted speed limit of 50km/hr.

- Browns Road

Browns Road is a local access road that serves as an access to residential properties. It forms a priority T-controlled intersection with Pennant Avenue, Cecil Street and Bushlands Avenue. It is a two-lane, two-way undivided road, approximately 6.5m wide with a posted speed limit of 50km/hr. There is a continuous paved footpath on the eastern side of Browns Road, and segments on the western side.

Figure 2-5 Browns Road intersection with Pennant Avenue looking south.

- Pennant Avenue

Pennant Avenue is a no-through local road that connects properties with the subject site. It forms a priority T-controlled intersection with Browns Road. This road is within the 50km/h speed limit local area but does not have a speed limit posted. Pennant Avenue has a varying cross section with approximately 4.8m carriageway width, substantial existing street trees, driveways to about six fronting properties. At the eastern end of Pennant Avenue outside the subject site is a widened paved turnaround for waste trucks and other vehicles with a central raised drain. Pedestrians and cyclists use the carriageway, and there is no separate footpath. There are no designated parking restrictions.

Figure 2-6 Pennant Avenue looking west from the subject site

2.4.2 Site parking and traffic generation

The existing Bowling Club site has paved on-site parking for up to 40 cars. Kerbside parallel unrestricted parking is also available on the site frontage on Pennant Avenue. In past years this may have accommodated dozens of cars on a busy bowls event day, reducing Pennant Avenue to a single traffic lane. Observed occupancy of kerbside parking in Pennant Avenue during site inspections in 2020 showed parking occupancy of less than 5 per cent.

In past years, on a busy bowls event day the site may have generated up to an estimated 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:

- Pacific Highway/ Cecil Street

The intersection of Pacific Highway/ Cecil Street currently operates as a four-way signalised intersection, which is four lane two-way undivided on Cecil Street and five lane two-way divided on Pacific Highway. Vehicles traveling northbound on Pacific Highway are not permitted to turn right onto Cecil Street.

- Pacific Highway/ Bushlands Avenue

This is a priority-controlled T-intersection with left in left out movement which is two lane two-way undivided and unmarked on Bushlands Avenue and six lane two-way divided on Pacific Highway.

- Pacific Highway/ Yarabah Avenue

This is a priority-controlled T-intersection with left in left out movement which is two lane two-way undivided and unmarked on Yarrabah Avenue and six lane two-way divided on Pacific Highway.

2.4.4 Traffic Volumes

2.4.4.1 Existing intersection volume estimates

Traffic survey counts undertaken in 2018 were received from Ku-ring-gai Council for the Pacific Highway/ Cecil Street intersection. Traffic volumes were atypically lower in 2020 due to the COVID-19 pandemic and movement restrictions.

For the purpose of this study, traffic survey data at Pacific highway/ Cecil Street intersection was processed and analysed. In order to determine 2020 turning volumes, Roads and Maritime's Traffic Volume Viewer was used to obtain directional traffic flow information, including the average 2008 to 2020 AADT for all vehicles at Pacific Highway between Bruce Avenue and Cecil Street - Station ID: 53198.

The analysis indicates an average growth rate of -7.6% across Pacific Highway between 2018 and 2020 on an annual basis. In determining 2020 traffic volumes on a conservative side, 2018 traffic survey counts were assumed to be constant until 2020 for the AM and PM peak hour periods. The existing intersection traffic volumes at Pacific Highway/ Cecil Street are presented in Appendix A. The intersection traffic surveys indicated an AM peak between 7:30 am and 8:30 am and a PM peak between 4:45 pm and 5:45 pm and Saturday peak between 10:30 am and 11:30 am.

2.4.5 Existing Intersection 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]
Pacific Highway/ Cecil street	18	B	0.8	331

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

Intersection	Avg. Delay	LoS	DoS	95th Back of Queue Length [m]
Pacific Highway/ Cecil street	13	B	0.65	222

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

Intersection	Avg. Delay	LoS	DoS	95th Back of Queue Length [m]
Pacific Highway/ Cecil street	9	A	0.6	138

Based on the intersection modelling results presented in Table 2-7 to Table 2-9, 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

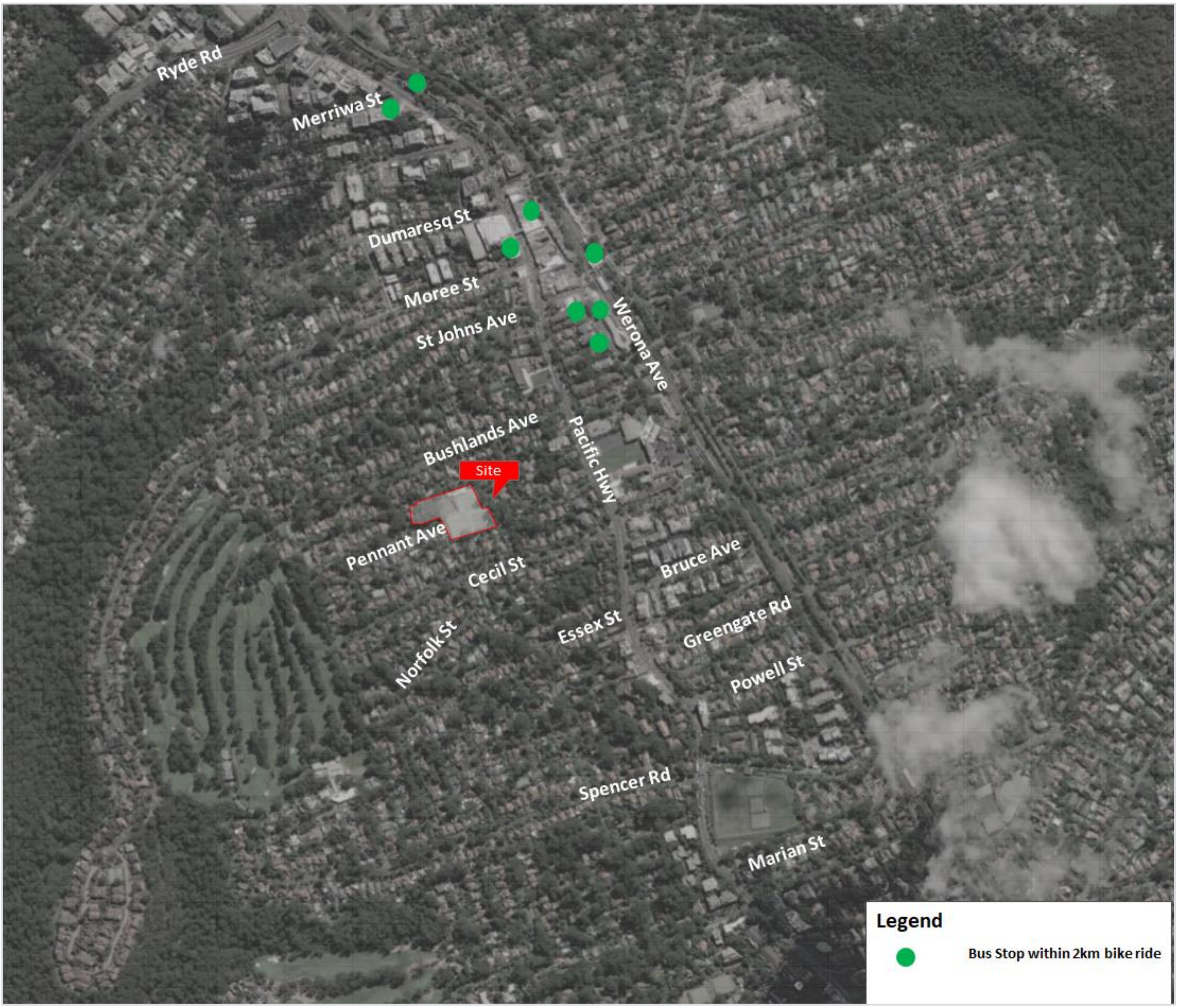
Accessibility to a public transport system is often measured by the location of stops/stations and their coverage area. In public bus service assessment, a 400-metre walking distance or 5.5-minutes walking time (considering 1.2 metre/second walking speed) is considered as comfortable walking distance/time 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 2-7 shows the existing bus stops located in 400m, 800m and 2km bike ride from the site.

Figure 2-7 Bus stops in 400m, 800m and 2km bike ride from the site



The review of public transport services indicates that the subject site benefits from existing bus services, however there is no bus stop within 400m and 800m and the nearest bus stop is located about 1.1 km or 7 minutes bike ride distance from the site at Gordon Station. As shown in Figure 2-7, there are 8 bus stops which are located between 800m and 2km bike ride from the site. Also, Figure 2-8 illustrates the network of bus routes servicing the bus stops in the area.

Figure 2-8 Bus network map in the vicinity of the site

Table 2-10 below provides a summary of bus routes, including route number, route description, as well as information concerning service frequencies. A review of bus services shows that there is no bus route in 400m and 800m from the site. There are also 6 routes operating between 800m and 2km from the site including routes 560, 195, 196, 197, 575 and 582. Gordon train station acts as a hub for bus services, and Forest Bus lines operate routes from Gordon train station to areas north and east of the railway.

Table 2-10 Public Transport (Bus) Routes and Services

Route No	Route Description	AM Peak	PM Peak	Weekend
560	Gordon to West Pymble (Loop services)	28	23	60
195	Gordon to St Ives Chase (Loop Service)	17	30	50
196	Mona Vale to Gordon	75	No service	60
	Gordon to Mona Vale	20	55	60
197	Mona Vale to Macquarie University via Gordon	15	20	60
	Macquarie University to Mona Vale via Gordon	15	10	60
575	Hornsby to Macquarie University via Turramurra	25	20	30
	Macquarie University to Hornsby via Turramurra	20	20	30
582	St Ives Shopping Centre to Gordon	20	20	60

Route No	Route Description	AM Peak	PM Peak	Weekend
	Gordon to St Ives Shopping Centre	15	30	60

2.5.2 Rail Services

The nearest train station is the Gordon Station located approximately 1.1 km away, equal to 15min walk or 9min bike ride from the subject site. The station is currently serviced by T1 North Shore Line, T9 Northern Line and CCN Central Coast and New Castle Line. Table 2-11 provides information on train operating hours and average frequencies of existing rail services to and from the Gordon Station.

Table 2-11 Train Operating Hours and Service Frequencies

Train Line	Direction of Travel	Operating hours (from Gordon 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	4:18 am to 00:41 am	4:18 am to 00:26 am	3 min	3 min	7 min
	City to Berowra via Gordon	5:00 am to 2:01 am	5:38 am to 1:51 am	5 min	5 min	5 min
T9 Northern Line	Hornsby to Northshore via City	5:30 am to 1:40 am	5:38 am to 1:51 am	15 min	15 min	15 min
	Northshore to Hornsby via City	5:09 am to 00:26 am	4:26 am to 00:26 am	15 min	15 min	30 min
CNN Central Coast and Newcastle Line	Newcastle Interchange to Central via Gordon	7:21 am to 8:36 am	No service	15 min	No service	No service
	Central to Newcastle Interchange or Gordon	5:32 pm to 6:17 pm	No service	No service	15 min	No service

2.6 Active Transport (Walking and Cycling)

Existing active transport (walking and cycling) infrastructure surrounding the subject site is shown in Figure 2-9. These include the Ku-ring-gai Bike Plan[1] and planned routes in close proximity as well as any nearby routes in the Principal Bicycle Network/Co-Designed Bicycle Network in Future Transport 2056. In the future, cycling connections will form part of the Principal Bicycle Network, allowing customers to travel between centres across Greater Sydney. The network will also form part of Greater Sydney's Green Grid - connecting open spaces with centres and residential areas. The vision for Growing the Network (Visionary) for year 2056 shows Gordon as a node for bike routes based on the Pacific Highway Corridor to the north and south and to Belrose and Terry Hills and Palm Beach to the east. Gordon therefore is planned to become a major node in the Future Transport 2056 bike route network.

Figure 2-9 Active Transport Routes

As shown in Figure 2-9, existing pedestrian and cycle routes are limited and no formal foot path currently exists on Pennant Avenue. However, paved footpaths are provided on both sides of Cecil Street, northern and eastern side of Yarabah Avenue, eastern and southern side of Browns Road and the northern side of Bushlands Avenue.

There is also a narrow paved pedestrian connection (1.7m wide) between the site and Bushlands Avenue on northern side of the site which is shown in Figure 2-11, the use of this path can reduce by about 300m the walking distance to Gordon town centre, to Gordon train station and to bus stops.

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 serviced by Gordon Route#2 shown as a Green line. This route goes along Browns Road which connects to Pennant Ave within 50m to the subject site and links to Gordon Station, golf clubs and open space.

[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

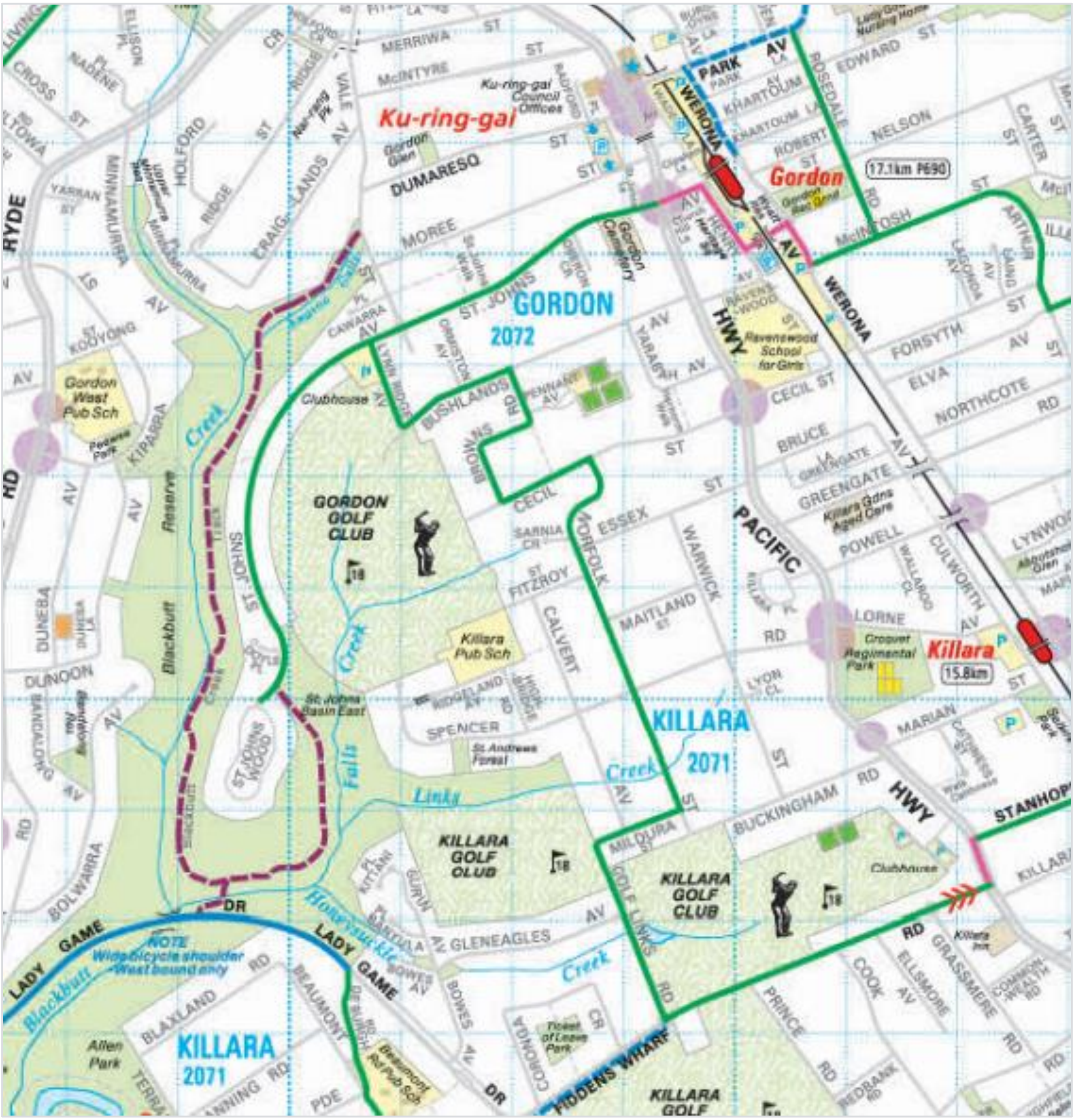


Figure 2-11 Pedestrian connection from the subject site to Bushlands Avenue, looking north

3 Proposed Development Details

3.1 Development Site Plan

- Scenario 1- Low density residential:

The proposed development consists of subdividing the land into nine residential lots. Primary access to the site is provided from Pennant Avenue via the construction of a new internal street.

8 out of 9 lots are 5 bed dwellings and 1 lot is a 6 bed dwelling. All have double garages and area for additional on-site parking. Service vehicles would use the proposed internal street for one-way traffic movement clockwise and loading and unloading, including waste collection vehicles. All vehicles can enter and exit the subject site in a forward gear/ direction. The carriageway is envisaged as a 3.5m wide Shared Zone for pedestrian, cyclists, and vehicles with a designated 10km/h speed limit. Figure 3-1 below shows the Proposed Plan for low density residential at 4 Pennant Avenue, Gordon.

Figure 3-1 Proposed Plan for 4 Pennant Avenue, Gordon (Source: Studio GL)

- Scenario 2- Seniors Living option:

The proposed development consists of subdividing the land into 17 dwelling units. 12 out of 17 lots are 3 bed dwellings and 5 lots are 2 bed dwelling. All have double garages so there are a total of 34 car spaces for the site. Primary access to the site is provided from Pennant Avenue via the construction of a new internal street and priority intersection.

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 3-2 below shows the Proposed Plan for seniors living at 4 Pennant Avenue, Gordon.

Figure 3-2 Proposed plan for seniors living option at 4 Pennant Avenue, Gordon (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 Pacific Highway/ Cecil Street intersection was undertaken to determine if the intersections will operate satisfactorily under future transport and 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. There are no bus stops within 400m of the subject site, and even the bus stops on the Pacific Highway are located well north and south of the subject site. The capacity to accommodate additional passengers 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 #195, #196, #560, #582 to Gordon and #197, #575 and #565 Chatswood to Macquarie University via Killara (with stops in Norfolk Street and Pacific Highway near Cecil Street) provide frequent rapid journeys comparable to car travel in the peak hours. On-site observations in November 2020 (during pandemic restrictions) indicated low bus 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.

Discussions with Council and TfNSW officers in early 2021 indicate that the existing bus services will be maintained in the short term and medium term.

The main interchange to train is at Gordon train station, 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

The vision set out in the NSW Government's Future Transport Strategy 2056 for Greater Sydney is one where “people can access jobs and services in their nearest metropolitan city and strategic centre within 30 minutes.”

The Ku-ring-gai LGA is notable in that it does not contain a strategic (or metropolitan) centre, so residents need to leave the LGA to access their nearest strategic centre. Strategic centres to the south and north are relatively well serviced from Ku-ring-gai by rail, but by comparison strategic centres east and west are poorly serviced from Ku-ring-gai by public transport.

The site is located in Gordon, west of Pacific Highway which are all within 30 minutes travel of a Strategic Centre: Macquarie Park, Hornsby, Chatswood, St Leonards and North Sydney. 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. Some residences have many times this number of deliveries. 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 and increased traffic.

Food Delivery meals are mostly 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 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

Commercial and retail land uses located in the Gordon Local Centre are primarily clustered along the Pacific Highway. Gordon Strip retail lines both sides of the Pacific Highway and St Johns Avenue in the form of fine grain, shop buildings in an array of typologies and styles, ranging from 19th Century-style, two storey brick commercial buildings, single storey retail shops and more modern, two to four storey commercial buildings.

Food and beverage operators dominate, and the presence of such retailers is indicative of the high-level of foot traffic and custom associated with the Gordon Local Centre. Gordon Centre, located on 802-808 Pacific Highway, is a two-level retail centre anchored by major tenants Harvey Norman and Woolworths as well as over 20 specialty retailers ranging from personal services, pharmacies, and banks. Gordon Village Arcade is located on 767 Pacific Highway,

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

directly across from Gordon Centre and connected by a sky pedestrian bridge over the Pacific Highway. The arcade comprises a mix of health service providers, cafes, and specialty retail. There are banks and hardware.

Figure 4-1 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 – Blackbutt Creek Walking Track, Greengate Park
- Leisure/ hospitality – Gordon Golf Club, The Greengate Hotel
- Cultural - Gordon Uniting Church, St Johns Anglican Church
- Community Services –, First Gordon Scouts, (Ku-ring-gai Council offices are a one kilometre walk to the north)
- Educational- Killara Public School, Pinjarra Pre School, Ravenswood School for Girls

4.7 Level of access to active transport networks

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

There is a continuous paved footpath on the east side of Browns Road, on both sides of Cecil Avenue, and on the north side of Bushlands Avenue. A paved crossing to link from the existing paved walkway at the north east corner of the subject site to the Bushlands Avenue carriageway and hence to the paved footpath on the north side of Bushlands Avenue will greatly improve local access to active transport. This verge crossing design will need to deal with the drainage swale on the southern verge of Bushlands Avenue, and will enhance the already excellent links to destinations including:

- Gordon town centre
- Schools
- Blackbutt Creek Track

- Local and regional bike routes.

The site is well located to encourage walking as a mode choice to Pacific Highway bus stops and taxis and Gordon train station.

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.

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 Pennant Avenue 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 the adjacent streets, 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 4-2 Movement and Place (TfNSW)

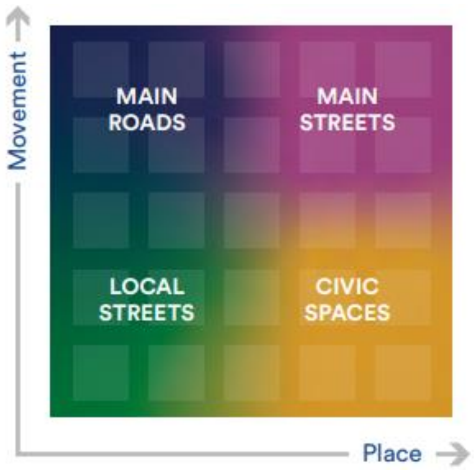


Figure 20: Four street environments have been identified for analysing the combinations of movement and place in NSW

:

There is no strong case for changing the management of Pennant Avenue for vehicular traffic because there will be minimal increase in 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 path and footpath network, including a Shared Zone
- Bike parking is each dwelling

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

- Provision to chare/recharge/discharge to the household or grid with electric vehicle batteries.

- Provision of a designated Car Share bay on the kerbside in the vicinity. While this may be possible, car share providers will only locate vehicles where there is a high likelihood for the car to turn over and be used, and therefore be economically viable for a service provider. It would therefore be unlikely in the short term in the low density option, although there may be more feasible in the seniors living option.

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.

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

Historic changes in travel choices away from buses to trains and cars led to the progressive reduction of buses in the Gordon area and the Pacific Highway corridor. The bus services between Gordon and Chatswood were progressively reduced then removed from 2005 to 2009 due to low patronage.

There are no plans for future changes to the bus services in the area unless continued changes in land use and density evolve to support more bus patronage rather than just more walking to the train stations. Planned road network changes by Council to convert St Johns Avenue from two-way traffic to one-way traffic (westbound) would require buses arriving at the interchange to divert via Ravenswood Avenue and Henry Street. The potential exists, after conversion of St Johns Avenue (to one-way westbound) for a dedicated Bus Lane in the westbound direction from the bus interchange to Pacific Highway to improve bus operation.

Train network services will be improved by the planned opening in 2024 of the Sydney Metro line from Chatswood through Sydney CBD to Bankstown, which will improve interchange opportunities from the existing North Shore rail line from Gordon train station, such as interchange at Chatswood and the new Victoria Cross metro station at North Sydney and at Crows Nest.

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 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 to be on conservative side.

4.14.2 Scenario 2: Seniors living

Regarding seniors living dwellings, the following amended advice is provided within the Technical Direction.

- Rates

Weekday daily vehicle trips = 2.1 per dwelling

Weekday peak hour vehicle trips = 0.4 per dwelling

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

Daily vehicle trips = 17 dwellings × 2.1 trips per dwellings = 36 vtpd

Weekday peak hour = 17 dwellings × 0.4 trips per dwellings = 7 vtph

Saturday peak hour = 17 dwellings × 0.4 trips per dwellings = 7 vtph

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 onto the Pacific Highway passing through Pacific Highway/ Cecil Street intersection 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 Gordon.
- Based on Journey to work data analysis as presented in section 2.3, it is assumed that 56% of the total trips generated from the future development site in the AM peak will go to north Pacific Highway, while 44% of the total trips go to the south Pacific Highway. Similarly, 56% of the total trips attracted to the proposed development in the PM peak come from north Pacific Highway, while 44% of the total attracted trips in the PM peak come from south Pacific Highway.
- Also, 71% of total trips attracted to the development site in the AM peak come from north Pacific Highway and 29% of attracted trips come from south Pacific Highway. Similarly, 71% of trips generated from the proposed development in the PM peak go to north Pacific Highway and 29% of generated trips go to south.
- Conservatively, it was assumed that all inbound and outbound trips are made using Pacific Highway/ Cecil Street intersection.
- 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.

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 Pacific Highway/ Cecil Street intersection are calculated as shown below in Figure 4-3 to Figure 4-5:

Note that for traffic wanting to turn left onto the Pacific Highway to head northbound there is an alternative and attractive route to travel via Bushlands Avenue so as not to be unnecessarily held at a red traffic signal at Cecil Street. There is adequate spare capacity for this to occur at Bushlands Avenue. The trip distribution and network capacity analysis was however undertaken for the worst case of travel via Cecil Street.

Figure 4-3 Trip Distribution Assumptions for Future Development Site at intersections of Pacific Highway/ Cecil Street in AM peak

Figure 4-4 Trip Distribution Assumptions for Future Development Site at intersections of Pacific Highway/ Cecil Street in PM peak

Figure 4-5 Trip Distribution Assumptions for Future Development Site at intersections of Pacific Highway/ Cecil 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 existing Pacific Highway/ Cecil Street intersection, 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 traffic growth rate of 2.2% per annum was also applied to the existing through traffic volumes over a 6-year period (Refer to Section 2.2 for population growth rate).

Figure 4-6 to Figure 4-8 below show the intersection turning flows at Pacific Highway/ Cecil Street for scenario 1 (low density option) during the 2026 AM, PM peak and Saturday peak hours respectively.

Figure 4-6 Intersection Turning Flows for low density option for 2026 AM Peak Hour

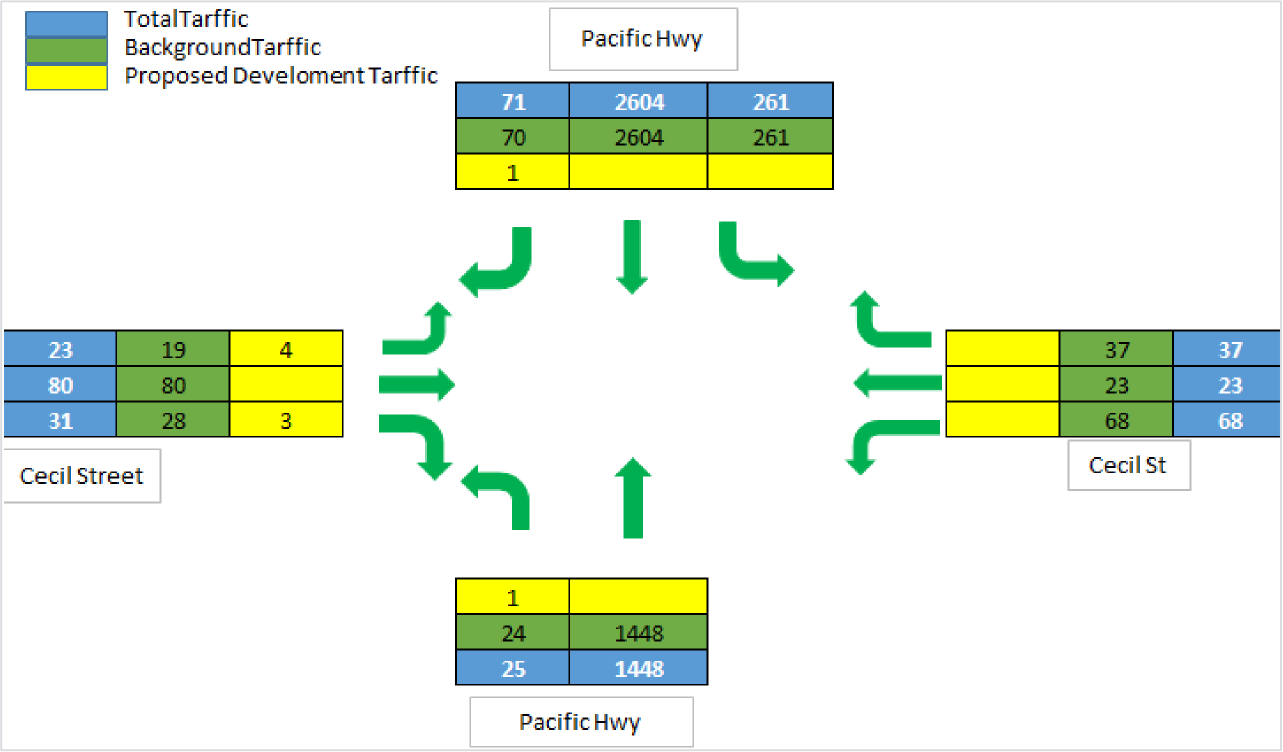


Figure 4-7 Intersection Turning Flows for low density option for 2026 PM Peak Hour

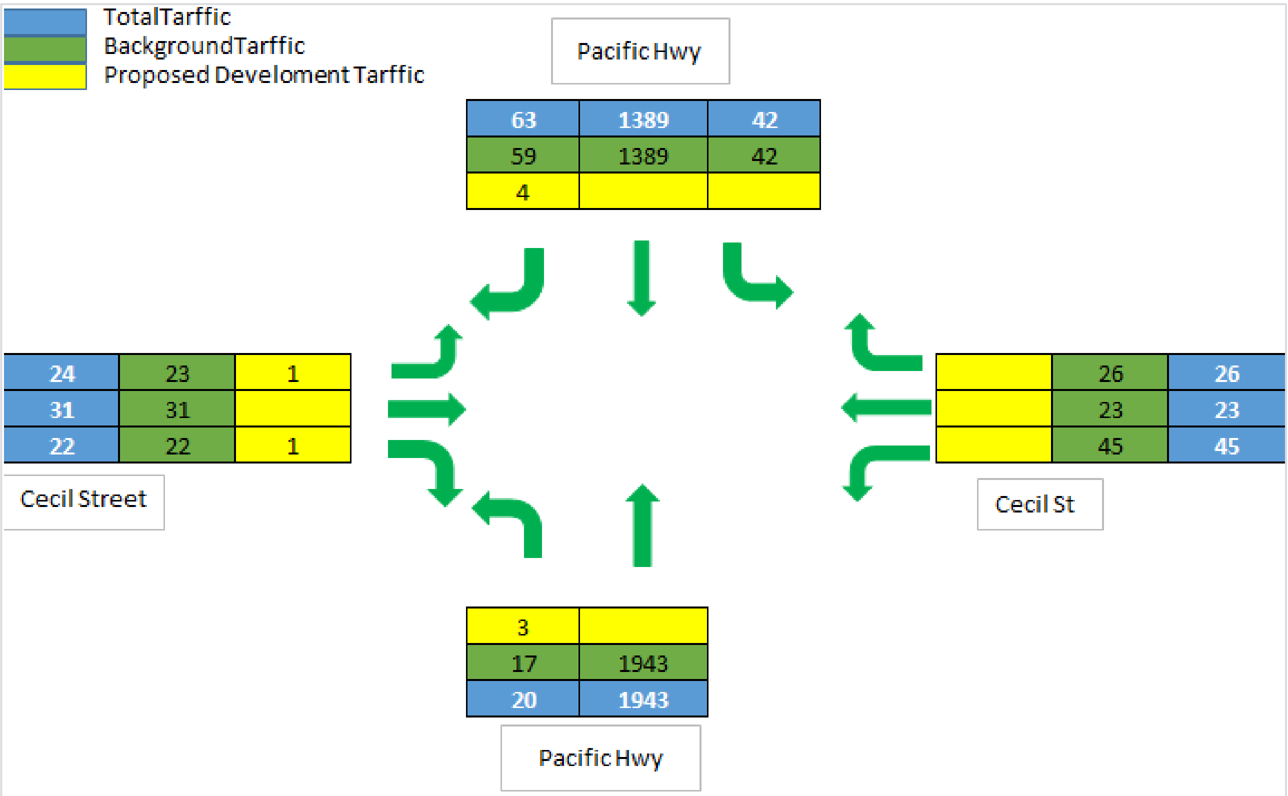


Figure 4-8 Intersection Turning Flows for low density option for 2026 Saturday Peak Hour

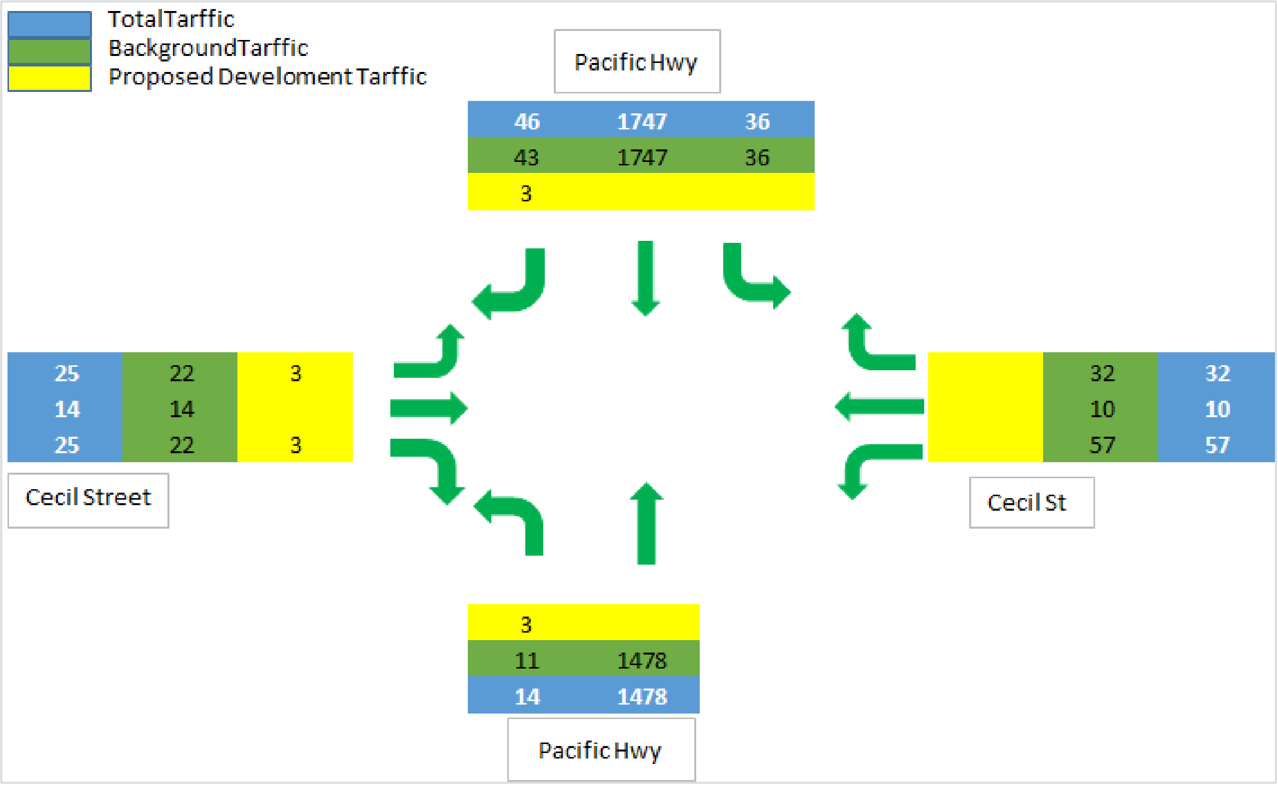


Figure 4-9 to Figure 4-11 below show the intersection turning flows at Pacific Highway/ Cecil Street for scenario 2 (seniors living option) during the 2026 AM, PM peak and Saturday peak hours respectively.

Figure 4-9 Intersection Turning Flows for senior living option for 2026 AM Peak Hour

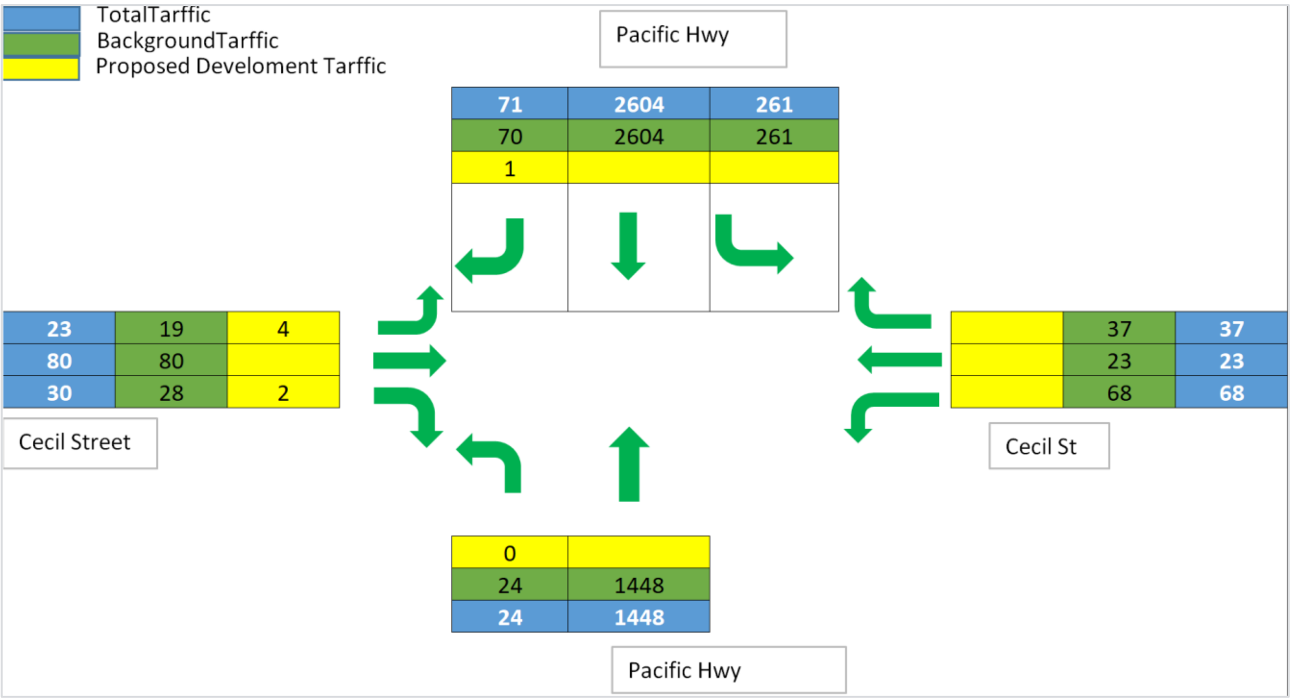


Figure 4-10 Intersection Turning Flows for senior living option for 2026 PM Peak Hour

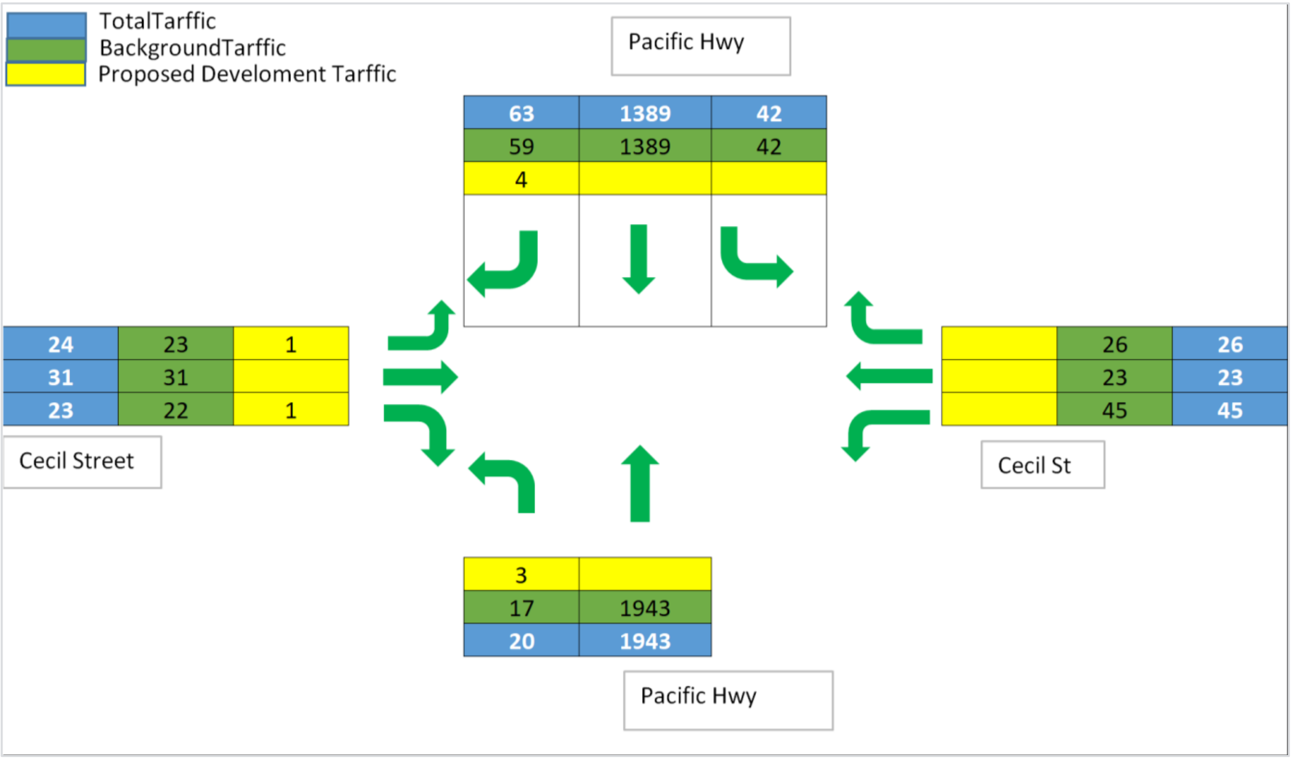
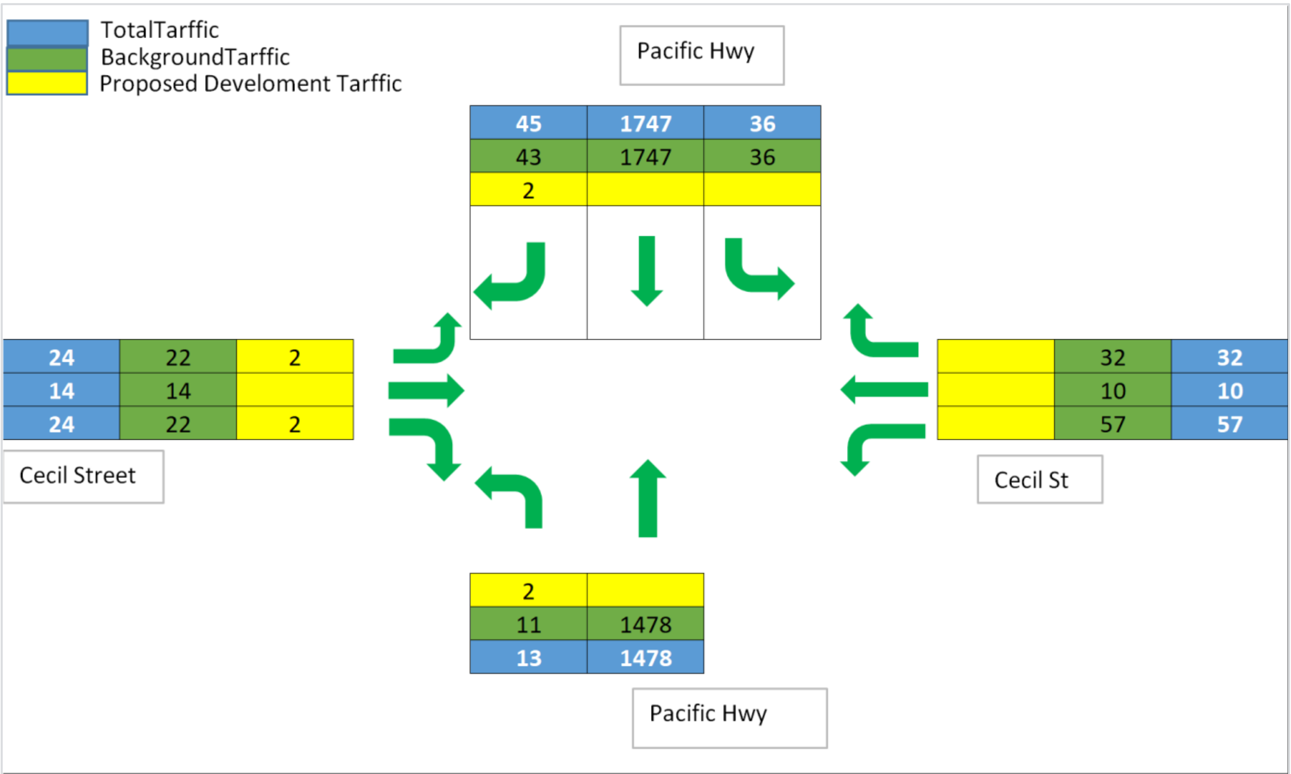


Figure 4-11 Intersection Turning Flows for senior living option for 2026 Saturday Peak Hour



4.17 Intersection Performance Assessment

The SIDRA Intersection modelling software version 8 was used to analyse the operational performance of Pacific Highway/ Cecil Street intersection, with the future year traffic volumes indicated in Figure 4-6 to Figure 4-11 above.

The existing intersection layout have been maintained for assessments in the future year. The intersection was assessed based on one peak hour during each of the AM, PM and Saturday periods.

Table 4-1 to Table 4-3 outline the performance of Pacific Highway/ Cecil Street intersection 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 Pacific Highway/ Cecil Street intersection with the future year traffic volumes, AM peak

Intersection	Scenario	Delay (s)	LoS	DoS	95th Back of Queue Length [m]
Pacific Highway/ Cecil street	2020 Base Case	18	B	0.8	331
	2026 Base Case	27	C	0.96	505
	2026 Scenario 1	29	C	0.92	532
	2026 Scenario 2	29	C	0.92	531

Table 4-2 Intersection performance analysis results at Pacific Highway/ Cecil Street intersection with the future year traffic volumes, PM peak

Intersection	Scenario	Delay (s)	LoS	DoS	95th Back of Queue Length [m]
Pacific Highway/ Cecil street	2020 Base Case	13	B	0.65	222
	2026 Base Case	15	B	0.88	285
	2026 Scenario 1	15	B	0.94	286
	2026 Scenario 2	15	B	0.94	286

Table 4-3 Intersection performance analysis results at Pacific Highway/ Cecil Street intersection with the future year traffic volumes, Saturday peak

Intersection	Scenario	Delay (s)	LoS	DoS	95th Back of Queue Length [m]
Pacific Highway/ Cecil street	2020 Base Case	9	A	0.55	138
	2026 Base Case	10	A	0.63	184
	2026 Scenario 1	10	A	0.63	187
	2026 Scenario 2	10	A	0.63	186

From Table 4-1 to Table 4-3, it can be seen that the intersection of Pacific Highway/ Cecil Street would perform with acceptable LOS of D or better for 2026 Base Case, 2026 low-density residential development and 2026 seniors living during peak hours and the queue lengths at 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, rail, 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 February- March 2021)

5 Summary

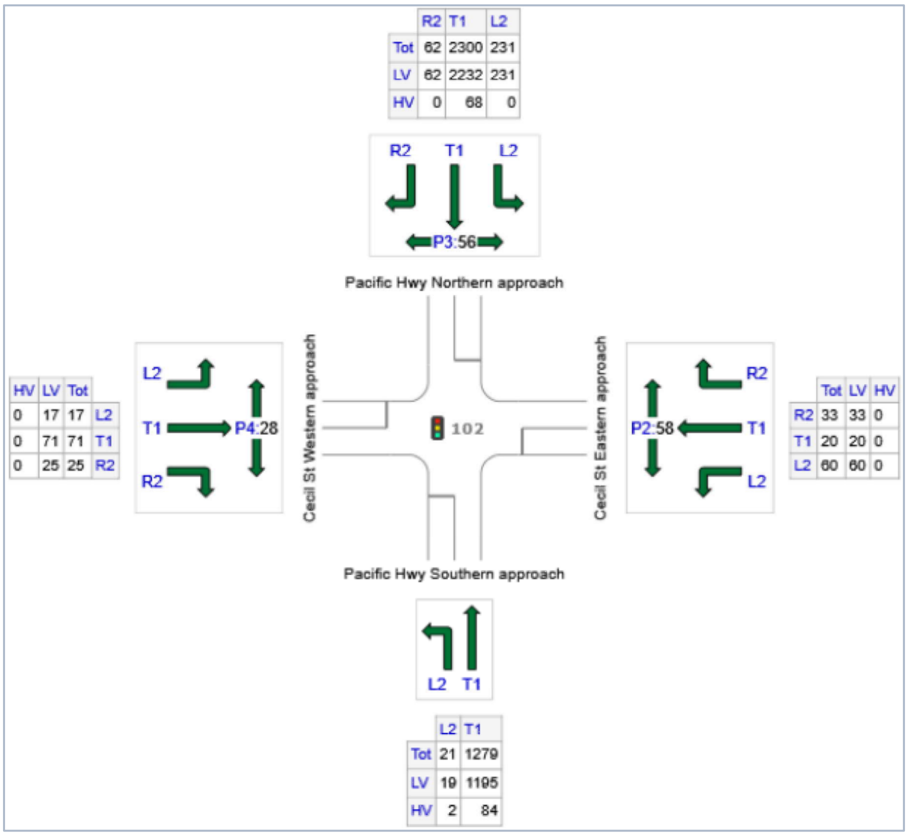
This Transport Assessment report has been prepared by SMEC as part of the Studio GL team on behalf of Ku-ring-gai Council and considers the impacts of the proposed low density residential development at 4 Pennant Avenue, Gordon.

In particular, the assessment considers the impacts associated with the proposed residential development on the intersection of Pacific Highway/ Cecil Street. The following points are noted from the assessment:

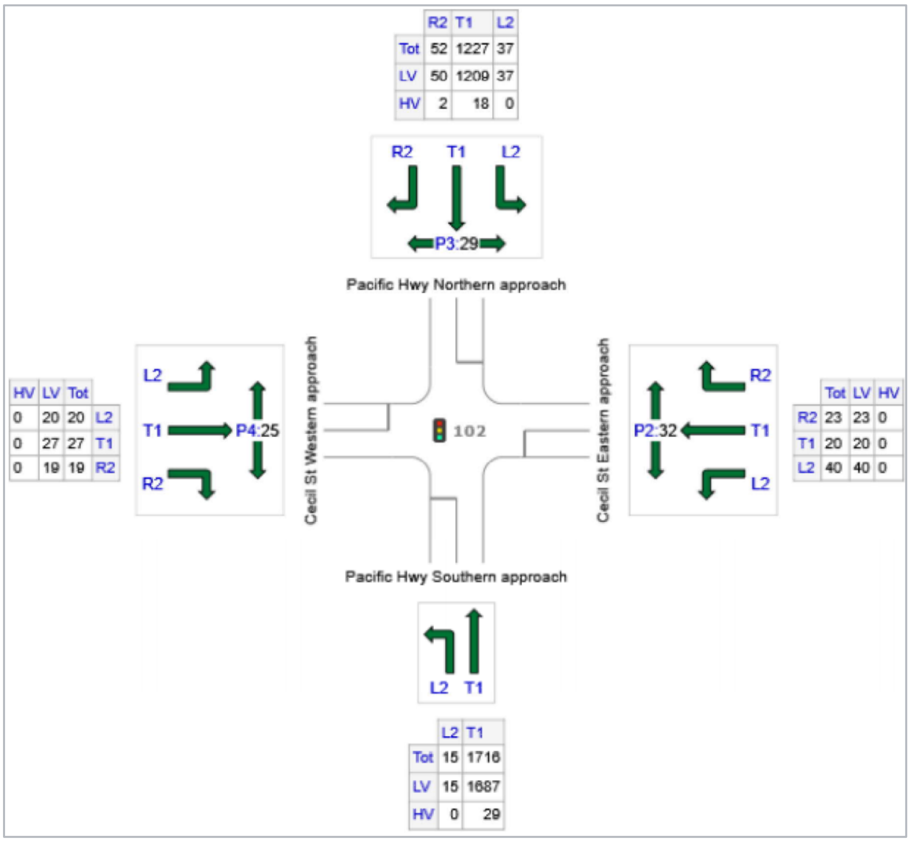
- For the current analysis, Pacific Highway/ Cecil Street are performing at acceptable level of service during AM, PM and Saturday peak hours under 2020 Base Year traffic volumes
- SIDRA model runs for 2026 Base Case scenario show that the intersection of Pacific Highway/ Cecil Street is expected to 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 low density residential and seniors living options 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 design and footpath in the north corner of the site to create a through-site-link to be used by existing and new residents walking and cycling to Gordon Town Centre, bus stops, railway stations, and to recreational areas and schools.
- The existing layout of Pennant Avenue has developed informally over the years, with no kerbs and no separate footpaths. Creation of kerbs and footpaths would require removal of existing mature trees. The existing short 100m length and the varying cross sections between trees has some attractive place characteristics and an effect on mitigating vehicle speeds. The peak vehicular and pedestrian traffic generation from the proposed development is likely to be less than the previous use as a busy bowling club which was not identified to have a reported crash history or safety issues.
- There is a continuous paved footpath on the east side of Browns Road, on both sides of Cecil Avenue, and on the north side of Bushlands Avenue. A paved crossing to link from the existing paved walkway at the north east corner of the subject site to the Bushlands Avenue carriageway and hence to the paved footpath on the north side of Bushlands Avenue will greatly improve local access to active transport and local facilities. This verge crossing design will need to deal with the drainage swale on the southern verge of Bushlands Avenue, and will enhance the already excellent links to destinations including Gordon town centre and Gordon train station. Lighting of the path would also improve 24/7 use of the path.
- No further upgrading of the 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

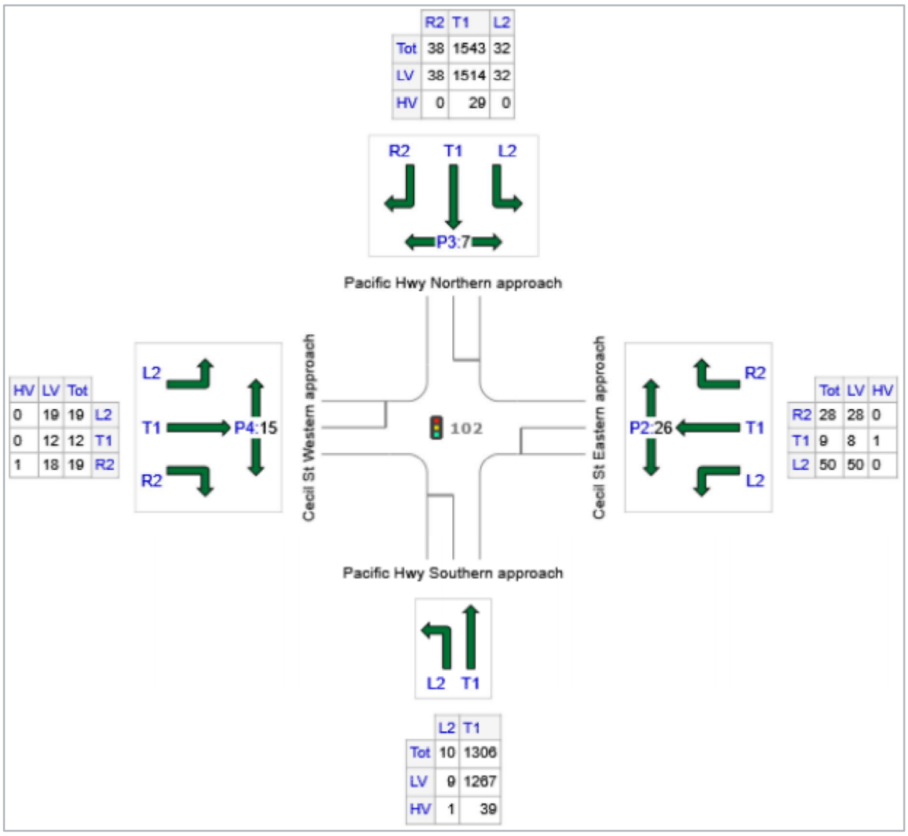
Existing intersection traffic volumes during the 2020 AM peak



Existing intersection traffic volumes during the 2020 PM peak



Existing intersection traffic volumes during Saturday peak



Appendix B Existing SIDRA Assessment Results

MOVEMENT SUMMARY

Site: 102 [Pacific Hwy_Cecil St 2020 BC AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 136 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy Southern approach												
1	L2	22	9.5	0.554	16.1	LOS B	23.1	170.7	0.56	0.52	0.56	35.2
2	T1	1346	6.6	0.554	12.8	LOS B	23.7	175.5	0.57	0.53	0.57	34.9
Approach		1368	6.6	0.554	12.8	LOS B	23.7	175.5	0.57	0.53	0.57	34.9
East: Cecil St Eastern approach												
4	L2	63	0.0	0.243	60.3	LOS E	3.8	26.5	0.93	0.75	0.93	24.2
5	T1	21	0.0	0.211	56.5	LOS E	3.3	23.2	0.93	0.73	0.93	24.5
6	R2	35	0.0	0.211	59.7	LOS E	3.3	23.2	0.93	0.73	0.93	24.3
Approach		119	0.0	0.243	59.4	LOS E	3.8	26.5	0.93	0.74	0.93	24.2
North: Pacific Hwy Northern approach												
7	L2	243	0.0	0.790	20.6	LOS C	45.7	326.3	0.77	0.75	0.77	33.3
8	T1	2421	3.0	0.790	15.9	LOS B	46.1	330.7	0.72	0.67	0.72	33.8
9	R2	65	0.0	0.426	30.6	LOS C	3.0	21.3	0.70	0.73	0.70	29.7
Approach		2729	2.6	0.790	16.7	LOS B	46.1	330.7	0.72	0.68	0.72	33.6
West: Cecil St Western approach												
10	L2	18	0.0	0.180	70.5	LOS E	1.5	10.2	0.98	0.70	0.98	22.3
11	T1	75	0.0	0.759	72.7	LOS E	6.8	47.7	1.00	0.88	1.17	22.2
12	R2	26	0.0	0.759	76.5	LOS E	6.8	47.7	1.00	0.89	1.19	22.2
Approach		119	0.0	0.759	73.2	LOS E	6.8	47.7	1.00	0.86	1.15	22.2
All Vehicles		4336	3.7	0.790	18.2	LOS B	46.1	330.7	0.69	0.64	0.69	33.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	61	62.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	59	62.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	29	62.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		149	62.3	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: 102 [Pacific Hwy_Cecil St 2020 BC PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 142 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy Southern approach												
1	L2	16	0.0	0.645	13.4	LOS B	30.9	219.3	0.55	0.51	0.55	36.2
2	T1	1806	1.7	0.645	10.1	LOS B	31.2	221.9	0.55	0.51	0.55	35.9
Approach		1822	1.7	0.645	10.1	LOS B	31.2	221.9	0.55	0.51	0.55	35.9
East: Cecil St Eastern approach												
4	L2	42	0.0	0.230	68.5	LOS E	2.8	19.3	0.96	0.73	0.96	22.9
5	T1	21	0.0	0.242	65.1	LOS E	3.0	20.7	0.96	0.73	0.96	23.2
6	R2	24	0.0	0.242	68.3	LOS E	3.0	20.7	0.96	0.73	0.96	22.9
Approach		87	0.0	0.242	67.6	LOS E	3.0	20.7	0.96	0.73	0.96	23.0
North: Pacific Hwy Northern approach												
7	L2	39	0.0	0.164	9.4	LOS A	4.7	33.3	0.32	0.33	0.32	37.3
8	T1	1292	1.5	0.503	7.5	LOS A	20.3	144.1	0.41	0.38	0.41	36.8
9	R2	55	3.8	0.597	37.4	LOS D	3.2	22.9	0.76	0.81	0.86	28.1
Approach		1385	1.5	0.597	8.8	LOS A	20.3	144.1	0.42	0.39	0.43	36.4
West: Cecil St Western approach												
10	L2	21	0.0	0.268	78.8	LOS E	1.5	10.5	1.00	0.70	1.00	21.1
11	T1	28	0.0	0.600	77.5	LOS E	3.6	24.9	1.00	0.78	1.07	21.5
12	R2	20	0.0	0.600	81.0	LOS F	3.6	24.9	1.00	0.78	1.07	21.5
Approach		69	0.0	0.600	78.9	LOS E	3.6	24.9	1.00	0.75	1.05	21.4
All Vehicles		3364	1.5	0.645	12.5	LOS B	31.2	221.9	0.52	0.48	0.52	35.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	34	65.2	LOS F	0.1	0.1	0.96	0.96
P3	North Full Crossing	31	65.2	LOS F	0.1	0.1	0.96	0.96
P4	West Full Crossing	26	65.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		91	65.2	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.

Organisation: SMEC AUSTRALIA | Processed: Monday, 8 March 2021 2:28:03 PM
Project: C:\Users\my12391\Desktop\Kurringgai Council\SIDRA\Pacific Hwy_Cecil St.sip8

MOVEMENT SUMMARY

Site: 102 [Pacific Hwy_Cecil St 2020 BC SAT]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 136 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy Southern approach												
1	L2	11	10.0	0.469	11.4	LOS B	15.8	113.5	0.38	0.36	0.38	49.6
2	T1	1375	3.0	0.469	5.8	LOS A	16.0	115.0	0.39	0.36	0.39	54.6
Approach		1385	3.0	0.469	5.8	LOS A	16.0	115.0	0.39	0.36	0.39	54.5
East: Cecil St Eastern approach												
4	L2	53	0.0	0.551	76.9	LOS E	3.6	25.5	1.00	0.76	1.02	25.1
5	T1	9	11.1	0.410	71.5	LOS E	2.7	19.1	1.00	0.73	1.00	24.8
6	R2	29	0.0	0.410	76.0	LOS E	2.7	19.1	1.00	0.73	1.00	25.0
Approach		92	1.1	0.551	76.1	LOS E	3.6	25.5	1.00	0.75	1.01	25.0
North: Pacific Hwy Northern approach												
7	L2	34	0.0	0.171	9.8	LOS A	4.3	30.4	0.28	0.30	0.28	50.0
8	T1	1624	1.9	0.525	5.7	LOS A	19.4	137.8	0.38	0.35	0.38	54.6
9	R2	40	0.0	0.207	16.5	LOS B	1.1	7.9	0.43	0.69	0.43	42.9
Approach		1698	1.8	0.525	6.0	LOS A	19.4	137.8	0.38	0.36	0.38	54.2
West: Cecil St Western approach												
10	L2	20	0.0	0.244	76.4	LOS E	1.4	9.5	1.00	0.70	1.00	24.6
11	T1	13	0.0	0.400	72.9	LOS E	2.3	16.2	1.00	0.72	1.00	24.6
12	R2	20	5.3	0.400	77.5	LOS E	2.3	16.2	1.00	0.72	1.00	25.3
Approach		53	2.0	0.400	76.0	LOS E	2.3	16.2	1.00	0.71	1.00	24.9
All Vehicles		3227	2.3	0.551	9.1	LOS A	19.4	137.8	0.41	0.38	0.41	51.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	27	62.2	LOS F	0.1	0.1	0.96	0.96
P3	North Full Crossing	7	62.2	LOS F	0.0	0.0	0.96	0.96
P4	West Full Crossing	16	62.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		51	62.2	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.

Appendix C Future SIDRA Assessment Results

MOVEMENT SUMMARY

Site: 102 [Pacific Hwy_Cecil St 2026 BC AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 136 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy Southern approach												
1	L2	25	9.5	0.620	16.4	LOS B	27.5	203.7	0.60	0.56	0.60	35.1
2	T1	1524	6.6	0.620	13.2	LOS B	28.5	210.6	0.61	0.56	0.61	34.8
Approach		1549	6.6	0.620	13.2	LOS B	28.5	210.6	0.60	0.56	0.60	34.8
East: Cecil St Eastern approach												
4	L2	72	0.0	0.276	60.6	LOS E	4.3	30.2	0.94	0.75	0.94	24.1
5	T1	24	0.0	0.239	56.8	LOS E	3.8	26.4	0.93	0.73	0.93	24.4
6	R2	39	0.0	0.239	60.0	LOS E	3.8	26.4	0.93	0.73	0.93	24.2
Approach		135	0.0	0.276	59.7	LOS E	4.3	30.2	0.93	0.74	0.93	24.2
North: Pacific Hwy Northern approach												
7	L2	275	0.0	0.908	30.4	LOS C	70.1	500.2	0.92	0.92	0.97	30.5
8	T1	2741	3.0	0.908	28.5	LOS C	70.4	505.3	0.83	0.84	0.91	30.1
9	R2	74	0.0	0.622	40.6	LOS D	4.3	30.0	0.82	0.83	0.91	27.4
Approach		3089	2.6	0.908	29.0	LOS C	70.4	505.3	0.84	0.85	0.92	30.1
West: Cecil St Western approach												
10	L2	20	0.0	0.227	72.2	LOS E	1.7	11.6	0.99	0.71	0.99	22.1
11	T1	84	0.0	0.960	91.6	LOS F	8.8	61.9	1.00	1.13	1.59	19.9
12	R2	29	0.0	0.960	96.5	LOS F	8.8	61.9	1.00	1.15	1.63	19.8
Approach		134	0.0	0.960	89.8	LOS F	8.8	61.9	1.00	1.07	1.51	20.2
All Vehicles		4907	3.7	0.960	26.5	LOS C	70.4	505.3	0.77	0.76	0.83	30.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	61	62.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	59	62.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	29	62.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		149	62.3	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: 102 [Pacific Hwy_Cecil St 2026 BC PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 142 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy Southern approach												
1	L2	18	0.0	0.730	14.7	LOS B	39.6	281.1	0.62	0.59	0.62	35.7
2	T1	2045	1.7	0.730	11.4	LOS B	40.2	285.1	0.62	0.59	0.62	35.4
Approach		2063	1.7	0.730	11.4	LOS B	40.2	285.1	0.62	0.59	0.62	35.4
East: Cecil St Eastern approach												
4	L2	47	0.0	0.259	68.7	LOS E	3.1	21.8	0.96	0.74	0.96	22.9
5	T1	24	0.0	0.275	65.4	LOS E	3.4	23.7	0.97	0.74	0.97	23.1
6	R2	27	0.0	0.275	68.6	LOS E	3.4	23.7	0.97	0.74	0.97	22.9
Approach		99	0.0	0.275	67.9	LOS E	3.4	23.7	0.96	0.74	0.96	22.9
North: Pacific Hwy Northern approach												
7	L2	44	0.0	0.202	9.6	LOS A	6.0	42.5	0.34	0.34	0.34	37.3
8	T1	1462	1.5	0.620	8.4	LOS A	29.0	205.7	0.46	0.43	0.46	36.5
9	R2	62	3.8	0.877	97.8	LOS F	6.2	45.0	0.97	1.19	1.64	19.0
Approach		1568	1.5	0.877	12.0	LOS B	29.0	205.7	0.48	0.45	0.50	35.2
West: Cecil St Western approach												
10	L2	24	0.0	0.309	79.1	LOS E	1.7	12.1	1.00	0.71	1.00	21.1
11	T1	33	0.0	0.691	78.7	LOS E	4.1	29.0	1.00	0.83	1.15	21.4
12	R2	23	0.0	0.691	82.1	LOS F	4.1	29.0	1.00	0.83	1.15	21.4
Approach		80	0.0	0.691	79.8	LOS E	4.1	29.0	1.00	0.79	1.11	21.3
All Vehicles		3811	1.5	0.877	14.6	LOS B	40.2	285.1	0.58	0.54	0.59	34.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	34	65.2	LOS F	0.1	0.1	0.96	0.96
P3	North Full Crossing	31	65.2	LOS F	0.1	0.1	0.96	0.96
P4	West Full Crossing	26	65.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		91	65.2	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: 102 [Pacific Hwy_Cecil St 2026 BC SAT]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 136 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy Southern approach												
1	L2	12	10.0	0.531	11.8	LOS B	19.3	138.5	0.41	0.39	0.41	49.3
2	T1	1556	3.0	0.531	6.2	LOS A	19.6	140.7	0.42	0.39	0.42	54.2
Approach		1567	3.0	0.531	6.3	LOS A	19.6	140.7	0.42	0.39	0.42	54.2
East: Cecil St Eastern approach												
4	L2	60	0.0	0.628	77.7	LOS E	4.2	29.4	1.00	0.79	1.08	24.9
5	T1	11	11.1	0.465	71.8	LOS E	3.0	21.7	1.00	0.74	1.00	24.7
6	R2	34	0.0	0.465	76.3	LOS E	3.0	21.7	1.00	0.74	1.00	25.0
Approach		104	1.1	0.628	76.7	LOS E	4.2	29.4	1.00	0.77	1.05	24.9
North: Pacific Hwy Northern approach												
7	L2	38	0.0	0.202	9.9	LOS A	5.2	36.8	0.29	0.31	0.29	49.9
8	T1	1839	1.9	0.618	6.2	LOS A	25.9	184.2	0.41	0.39	0.41	54.2
9	R2	45	0.0	0.309	19.6	LOS B	1.5	10.6	0.50	0.71	0.50	41.4
Approach		1922	1.8	0.618	6.6	LOS A	25.9	184.2	0.41	0.39	0.41	53.7
West: Cecil St Western approach												
10	L2	23	0.0	0.283	76.7	LOS E	1.6	11.1	1.00	0.71	1.00	24.5
11	T1	15	0.0	0.465	73.2	LOS E	2.6	18.9	1.00	0.73	1.00	24.6
12	R2	23	5.3	0.465	77.8	LOS E	2.6	18.9	1.00	0.73	1.00	25.2
Approach		61	2.0	0.465	76.3	LOS E	2.6	18.9	1.00	0.72	1.00	24.8
All Vehicles		3655	2.3	0.628	9.6	LOS A	25.9	184.2	0.44	0.41	0.44	51.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	27	62.2	LOS F	0.1	0.1	0.96	0.96
P3	North Full Crossing	7	62.2	LOS F	0.0	0.0	0.96	0.96
P4	West Full Crossing	16	62.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		51	62.2	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: 102 [Pacific Hwy_Cecil St Scenario 1_2026 AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 136 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy Southern approach												
1	L2	26	9.5	0.627	17.0	LOS B	28.2	208.5	0.61	0.57	0.61	34.9
2	T1	1524	6.6	0.627	13.8	LOS B	29.2	215.6	0.62	0.57	0.62	34.6
Approach		1551	6.6	0.627	13.9	LOS B	29.2	215.6	0.62	0.57	0.62	34.6
East: Cecil St Eastern approach												
4	L2	72	0.0	0.276	60.6	LOS E	4.3	30.2	0.94	0.75	0.94	24.1
5	T1	24	0.0	0.239	56.8	LOS E	3.8	26.4	0.93	0.73	0.93	24.4
6	R2	39	0.0	0.239	60.0	LOS E	3.8	26.4	0.93	0.73	0.93	24.2
Approach		135	0.0	0.276	59.7	LOS E	4.3	30.2	0.93	0.74	0.93	24.2
North: Pacific Hwy Northern approach												
7	L2	275	0.0	0.918	34.0	LOS C	73.8	526.4	0.94	0.95	1.01	29.6
8	T1	2741	3.0	0.918	32.1	LOS C	74.1	531.8	0.85	0.88	0.95	29.2
9	R2	75	0.0	0.642	43.5	LOS D	4.5	31.6	0.84	0.86	0.95	26.8
Approach		3091	2.6	0.918	32.6	LOS C	74.1	531.8	0.86	0.88	0.96	29.2
West: Cecil St Western approach												
10	L2	24	0.0	0.214	70.8	LOS E	1.7	12.1	0.98	0.71	0.98	22.2
11	T1	84	0.0	0.902	81.2	LOS F	8.7	60.8	1.00	1.05	1.44	21.1
12	R2	33	0.0	0.902	85.0	LOS F	8.7	60.8	1.00	1.06	1.45	21.1
Approach		141	0.0	0.902	80.3	LOS F	8.7	60.8	1.00	1.00	1.36	21.3
All Vehicles		4917	3.7	0.918	28.8	LOS C	74.1	531.8	0.79	0.78	0.86	30.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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	61	62.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	59	62.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	29	62.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		149	62.3	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.

Organisation: SMEC AUSTRALIA | Processed: Tuesday, 2 March 2021 9:58:49 AM
Project: C:\Users\my12391\Desktop\Kurringgai Council\SIDRA\Pacific Hwy_Cecil St.sip8

MOVEMENT SUMMARY

Site: 102 [Pacific Hwy_Cecil St Scenario 1_2026 SAT]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 136 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy Southern approach												
1	L2	15	10.0	0.532	11.9	LOS B	19.3	139.0	0.41	0.39	0.41	49.3
2	T1	1556	3.0	0.532	6.2	LOS A	19.7	141.2	0.42	0.39	0.42	54.2
Approach		1571	3.1	0.532	6.3	LOS A	19.7	141.2	0.42	0.39	0.42	54.1
East: Cecil St Eastern approach												
4	L2	60	0.0	0.628	77.7	LOS E	4.2	29.4	1.00	0.79	1.08	24.9
5	T1	11	11.1	0.465	71.8	LOS E	3.0	21.7	1.00	0.74	1.00	24.7
6	R2	34	0.0	0.465	76.3	LOS E	3.0	21.7	1.00	0.74	1.00	25.0
Approach		104	1.1	0.628	76.7	LOS E	4.2	29.4	1.00	0.77	1.05	24.9
North: Pacific Hwy Northern approach												
7	L2	38	0.0	0.203	9.9	LOS A	5.2	37.2	0.29	0.31	0.29	49.9
8	T1	1839	1.9	0.623	6.2	LOS A	26.4	187.4	0.41	0.39	0.41	54.2
9	R2	48	0.0	0.333	19.9	LOS B	1.6	11.5	0.51	0.71	0.51	41.2
Approach		1925	1.8	0.623	6.6	LOS A	26.4	187.4	0.41	0.40	0.41	53.7
West: Cecil St Western approach												
10	L2	26	0.0	0.321	77.0	LOS E	1.8	12.6	1.00	0.71	1.00	24.5
11	T1	15	0.0	0.505	73.5	LOS E	2.9	20.6	1.00	0.73	1.00	24.5
12	R2	26	5.3	0.505	78.1	LOS E	2.9	20.6	1.00	0.73	1.00	25.2
Approach		67	2.1	0.505	76.6	LOS E	2.9	20.6	1.00	0.73	1.00	24.8
All Vehicles		3667	2.3	0.628	9.8	LOS A	26.4	187.4	0.44	0.41	0.44	51.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	27	62.2	LOS F	0.1	0.1	0.96	0.96
P3	North Full Crossing	7	62.2	LOS F	0.0	0.0	0.96	0.96
P4	West Full Crossing	16	62.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		51	62.2	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: 102 [Pacific Hwy_Cecil St Scenario 1_2026 PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 142 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy Southern approach												
1	L2	21	0.0	0.732	14.8	LOS B	39.7	281.9	0.62	0.59	0.62	35.7
2	T1	2045	1.7	0.732	11.4	LOS B	40.3	286.1	0.63	0.59	0.63	35.4
Approach		2066	1.7	0.732	11.5	LOS B	40.3	286.1	0.63	0.59	0.63	35.4
East: Cecil St Eastern approach												
4	L2	47	0.0	0.259	68.7	LOS E	3.1	21.8	0.96	0.74	0.96	22.9
5	T1	24	0.0	0.275	65.4	LOS E	3.4	23.7	0.97	0.74	0.97	23.1
6	R2	27	0.0	0.275	68.6	LOS E	3.4	23.7	0.97	0.74	0.97	22.9
Approach		99	0.0	0.275	67.9	LOS E	3.4	23.7	0.96	0.74	0.96	22.9
North: Pacific Hwy Northern approach												
7	L2	44	0.0	0.204	9.7	LOS A	6.1	43.0	0.34	0.34	0.34	37.3
8	T1	1462	1.5	0.626	8.5	LOS A	29.6	209.5	0.46	0.43	0.46	36.5
9	R2	66	3.8	0.939	125.9	LOS F	7.6	55.2	1.00	1.29	1.85	16.5
Approach		1573	1.5	0.939	13.5	LOS B	29.6	209.5	0.48	0.46	0.52	34.7
West: Cecil St Western approach												
10	L2	25	0.0	0.322	79.2	LOS E	1.8	12.7	1.00	0.71	1.00	21.1
11	T1	33	0.0	0.705	78.9	LOS E	4.2	29.6	1.00	0.83	1.17	21.3
12	R2	24	0.0	0.705	82.3	LOS F	4.2	29.6	1.00	0.83	1.17	21.4
Approach		82	0.0	0.705	80.0	LOS E	4.2	29.6	1.00	0.80	1.12	21.3
All Vehicles		3820	1.5	0.939	15.2	LOS B	40.3	286.1	0.58	0.55	0.60	34.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	34	65.2	LOS F	0.1	0.1	0.96	0.96
P3	North Full Crossing	31	65.2	LOS F	0.1	0.1	0.96	0.96
P4	West Full Crossing	26	65.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		91	65.2	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.

Organisation: SMEC AUSTRALIA | Processed: Tuesday, 2 February 2021 4:00:17 PM
Project: C:\Users\my12391\Desktop\Kurringgai Council\SIDRA\Pacific Hwy_Cecil St.sip8

MOVEMENT SUMMARY

Site: 102 [Pacific Hwy_Cecil St Scenario 2_2026 AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 136 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy Southern approach												
1	L2	25	9.5	0.627	17.0	LOS B	28.1	208.3	0.61	0.57	0.61	34.9
2	T1	1524	6.6	0.627	13.8	LOS B	29.1	215.3	0.62	0.57	0.62	34.6
Approach		1549	6.6	0.627	13.8	LOS B	29.1	215.3	0.62	0.57	0.62	34.6
East: Cecil St Eastern approach												
4	L2	72	0.0	0.276	60.6	LOS E	4.3	30.2	0.94	0.75	0.94	24.1
5	T1	24	0.0	0.239	56.8	LOS E	3.8	26.4	0.93	0.73	0.93	24.4
6	R2	39	0.0	0.239	60.0	LOS E	3.8	26.4	0.93	0.73	0.93	24.2
Approach		135	0.0	0.276	59.7	LOS E	4.3	30.2	0.93	0.74	0.93	24.2
North: Pacific Hwy Northern approach												
7	L2	275	0.0	0.918	33.9	LOS C	73.7	525.8	0.94	0.95	1.01	29.6
8	T1	2741	3.0	0.918	32.1	LOS C	74.0	531.3	0.85	0.88	0.95	29.2
9	R2	75	0.0	0.641	43.4	LOS D	4.5	31.6	0.84	0.86	0.95	26.8
Approach		3091	2.6	0.918	32.5	LOS C	74.0	531.3	0.86	0.88	0.95	29.2
West: Cecil St Western approach												
10	L2	24	0.0	0.212	70.8	LOS E	1.7	12.0	0.98	0.71	0.98	22.2
11	T1	84	0.0	0.895	80.4	LOS F	8.6	60.0	1.00	1.04	1.42	21.2
12	R2	32	0.0	0.895	84.1	LOS F	8.6	60.0	1.00	1.05	1.43	21.2
Approach		140	0.0	0.895	79.6	LOS E	8.6	60.0	1.00	0.99	1.35	21.4
All Vehicles		4915	3.7	0.918	28.7	LOS C	74.0	531.3	0.79	0.78	0.86	30.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	61	62.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	59	62.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	29	62.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		149	62.3	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: 102 [Pacific Hwy_Cecil St Scenario 2_2026 PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 142 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy Southern approach												
1	L2	21	0.0	0.732	14.8	LOS B	39.7	281.9	0.62	0.59	0.62	35.7
2	T1	2045	1.7	0.732	11.4	LOS B	40.3	286.1	0.63	0.59	0.63	35.4
Approach		2066	1.7	0.732	11.5	LOS B	40.3	286.1	0.63	0.59	0.63	35.4
East: Cecil St Eastern approach												
4	L2	47	0.0	0.259	68.7	LOS E	3.1	21.8	0.96	0.74	0.96	22.9
5	T1	24	0.0	0.275	65.4	LOS E	3.4	23.7	0.97	0.74	0.97	23.1
6	R2	27	0.0	0.275	68.6	LOS E	3.4	23.7	0.97	0.74	0.97	22.9
Approach		99	0.0	0.275	67.9	LOS E	3.4	23.7	0.96	0.74	0.96	22.9
North: Pacific Hwy Northern approach												
7	L2	44	0.0	0.204	9.7	LOS A	6.1	43.0	0.34	0.34	0.34	37.3
8	T1	1462	1.5	0.626	8.5	LOS A	29.6	209.5	0.46	0.43	0.46	36.5
9	R2	66	3.8	0.939	125.9	LOS F	7.6	55.2	1.00	1.29	1.85	16.5
Approach		1573	1.5	0.939	13.5	LOS B	29.6	209.5	0.48	0.46	0.52	34.7
West: Cecil St Western approach												
10	L2	25	0.0	0.322	79.2	LOS E	1.8	12.7	1.00	0.71	1.00	21.1
11	T1	33	0.0	0.705	78.9	LOS E	4.2	29.6	1.00	0.83	1.17	21.3
12	R2	24	0.0	0.705	82.3	LOS F	4.2	29.6	1.00	0.83	1.17	21.4
Approach		82	0.0	0.705	80.0	LOS E	4.2	29.6	1.00	0.80	1.12	21.3
All Vehicles		3820	1.5	0.939	15.2	LOS B	40.3	286.1	0.58	0.55	0.60	34.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	34	65.2	LOS F	0.1	0.1	0.96	0.96
P3	North Full Crossing	31	65.2	LOS F	0.1	0.1	0.96	0.96
P4	West Full Crossing	26	65.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		91	65.2	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: 102 [Pacific Hwy_Cecil St Scenario 2_2026 SAT]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 136 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy Southern approach												
1	L2	14	10.0	0.532	11.9	LOS B	19.3	138.8	0.41	0.39	0.41	49.3
2	T1	1556	3.0	0.532	6.2	LOS A	19.6	141.0	0.42	0.39	0.42	54.2
Approach		1569	3.0	0.532	6.3	LOS A	19.6	141.0	0.42	0.39	0.42	54.1
East: Cecil St Eastern approach												
4	L2	60	0.0	0.628	77.7	LOS E	4.2	29.4	1.00	0.79	1.08	24.9
5	T1	11	11.1	0.465	71.8	LOS E	3.0	21.7	1.00	0.74	1.00	24.7
6	R2	34	0.0	0.465	76.3	LOS E	3.0	21.7	1.00	0.74	1.00	25.0
Approach		104	1.1	0.628	76.7	LOS E	4.2	29.4	1.00	0.77	1.05	24.9
North: Pacific Hwy Northern approach												
7	L2	38	0.0	0.203	9.9	LOS A	5.2	37.1	0.29	0.31	0.29	49.9
8	T1	1839	1.9	0.621	6.2	LOS A	26.2	186.3	0.41	0.39	0.41	54.2
9	R2	47	0.0	0.325	19.8	LOS B	1.6	11.2	0.51	0.71	0.51	41.3
Approach		1924	1.8	0.621	6.6	LOS A	26.2	186.3	0.41	0.39	0.41	53.7
West: Cecil St Western approach												
10	L2	25	0.0	0.308	76.9	LOS E	1.7	12.1	1.00	0.71	1.00	24.5
11	T1	15	0.0	0.491	73.4	LOS E	2.8	20.0	1.00	0.73	1.00	24.5
12	R2	25	5.3	0.491	78.0	LOS E	2.8	20.0	1.00	0.73	1.00	25.2
Approach		65	2.0	0.491	76.5	LOS E	2.8	20.0	1.00	0.72	1.00	24.8
All Vehicles		3663	2.3	0.628	9.7	LOS A	26.2	186.3	0.44	0.41	0.44	51.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	27	62.2	LOS F	0.1	0.1	0.96	0.96
P3	North Full Crossing	7	62.2	LOS F	0.0	0.0	0.96	0.96
P4	West Full Crossing	16	62.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		51	62.2	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.

local people
global experience

SMEC is recognised for providing technical excellence and consultancy expertise in urban, infrastructure and management advisory. From concept to completion, our core service offering covers the life-cycle of a project and maximises value to our clients and communities. We align global expertise with local knowledge and state-of-the-art processes and systems to deliver innovative solutions to a range of industry sectors.