Stockland

601 Pacific Highway, St Leonards

Transport Assessment

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Arup
Arup Pty Ltd ABN 18 000 966 165

Arup
Level 10 201 Kent Street
PO Box 76 Millers Point
Sydney 2000
Australia
www.arup.com

ARUP

Contents

1 Introduction

1.1 Background

Stockland has commissioned Arup to carry out a traffic and transport assessment of the Planning Proposal for the site at 601 Pacific Highway, St Leonards (the site). The site is proposed to consist of a mixed use residential building, with speciality retail and office space.

1.2 Scope of works

This transport assessment will address the following:

- An overview of the existing transport and planning context
- Generation of car trips
- Traffic impacts of the development
- Public transport accessibility
- Car parking arrangements
- Pedestrian and bicycle access
- Green initiatives

2 Existing Conditions

2.1 Site description

The site has an area of 2,844m^2, located on a prominent 'gateway' corner in St Leonards Town Centre (North Sydney LGA), shown in Figure 1. It currently comprises a 14 storey commercial tower known as the IBM building with ground and plaza level retail plus a 158 car basement car park.

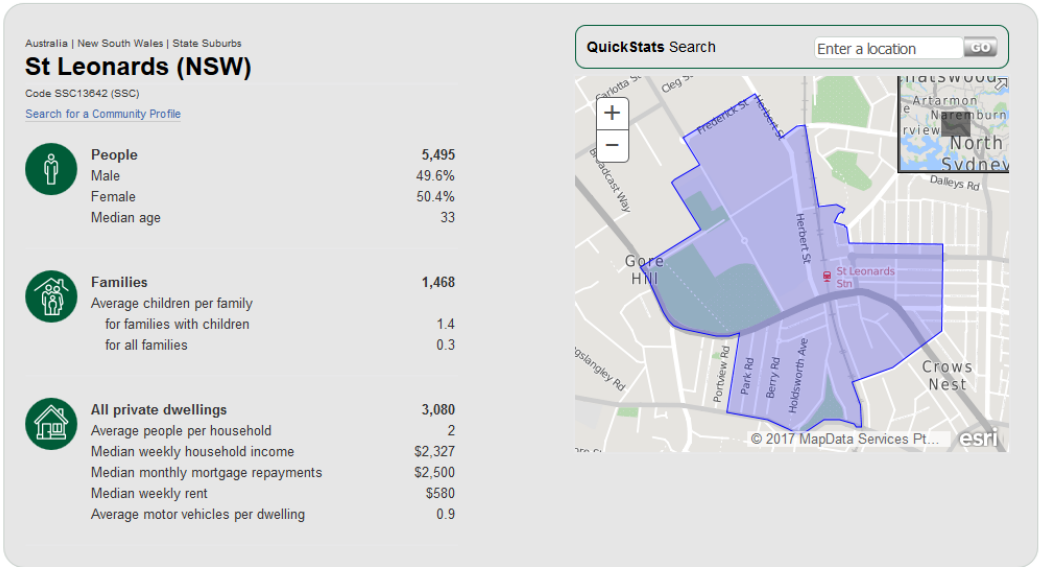
St Leonards is identified as a strategic centre by the NSW Government in 'A Plan for Growing Sydney' (the old Metropolitan Strategy for Sydney) due to the area's accessibility to public transport. The area surrounding the site has a mixture of high density residential, commercial and retail uses.

Figure 1 Site location

2.2 Travel behaviour

Journey to work data from the 2016 census for the site is shown in Figure 2. The data indicates that over 51% of the residents living in the area take the train to work.

2016 Census QuickStats



Travel to work, top responses *Employed people aged 15 years and over*	St Leonards (NSW)	%
Train	1,470	41.2
Car, as driver	759	21.3
Walked only	473	13.3
Bus	203	5.7
Worked at home	115	3.2
People who travelled to work by public transport	1,847	51.4
People who travelled to work by car as driver or passenger	881	24.5

Figure 2: Existing travel patterns

Source: ABS Census Quickstatshttp://visual.bts.nsw.gov.au/jtwbasic/ - 1844

2.3 Public transport

The site has good access to public transport and is located within 100m walking distance from St Leonards Station and within 100m walking distance from bus stops located on Pacific Highway which are illustrated in Figure 3. It is also within 250m walking distance of the future Crows Nest Metro Station.

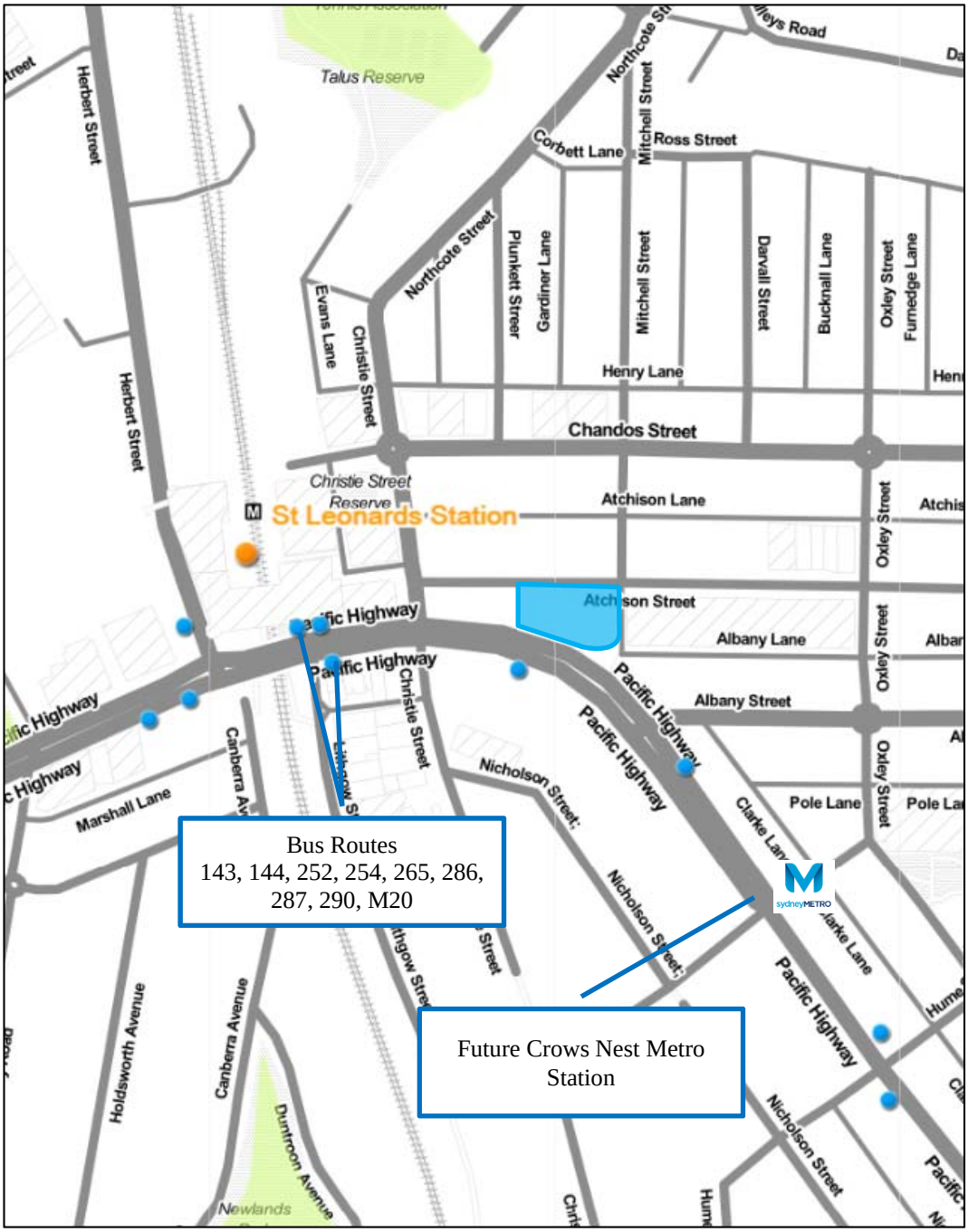


Figure 3: Existing public transport around the site

2.3.1 Bus

The existing bus routes serving the site are shown in Figure 4. Bus M20 provides access to the city via the Pacific Highway, while the other buses serve various suburbs regionally.

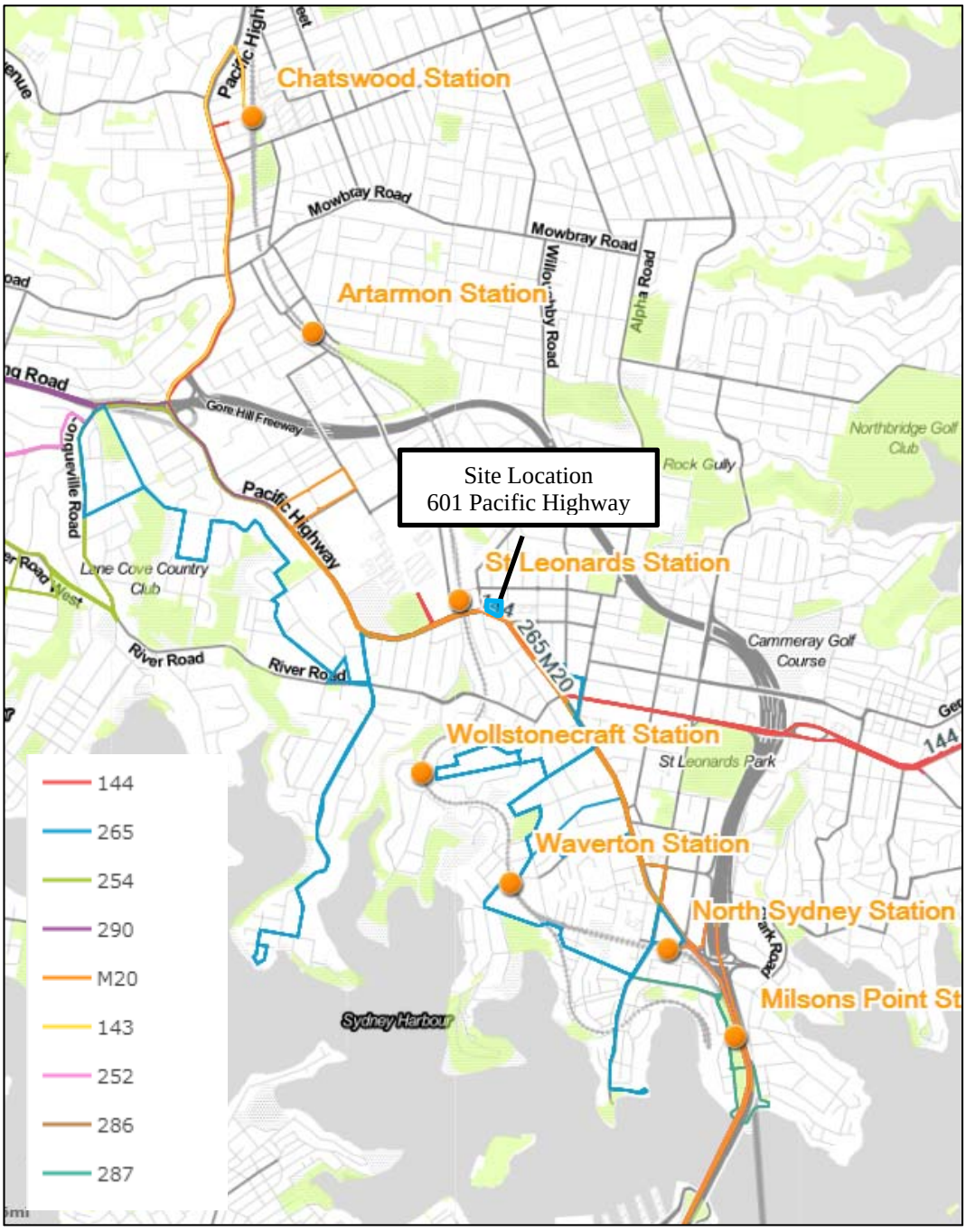


Figure 4: Bus routes serving the site

The bus routes connecting to the bus stops shown in Figure 3 are summarised in Table 1. Buses connect the local area to the Sydney CBD, Chatswood CBD, Crows Nest, Epping, Lane Cove and surrounding suburbs. The bus stops are well served, with frequent services throughout the day and express buses operating during the peak periods.

Table 1: Bus routes

Bus Route	Service description
Route 143, Manly and Macquarie University	Services every 30 minutes throughout the day in each direction.
Route 144, Chatswood and manly via Royal North Shore Hospital	Services every 30 minutes throughout the day in each direction.
Route 252, Lane Cove West and City via Pacific Highway	Services every 30 minutes throughout the day in each direction.
Route 254, Riverview and City via Pacific Highway	Services every 30 minutes throughout the day in each direction.
Route 257, Chatswood to Balmoral Beach	Services every 30 minutes throughout the day in each direction.
Route 265, McMahons Point and Lane Cove via Greenwich Wharf	Services every 30 minutes throughout the day in each direction.
Route 286, Denistone East and City via Pacific Highway	Services every 30 minutes during the peak periods between Monday to Friday
Route 287, Ryde and Milsons Point via Pacific Highway and North Sydney	Services every 30 minutes during the peak periods between Monday and Friday in each direction
Route 290, Epping and City via Macquarie Centre and Pacific Highway	Services every 15 minutes during the peak periods between Monday and Friday in each direction Services every hour at all other times.
M20, Botany and Gore Hill	Services every 10 minutes during the peak periods in each direction. Services every 15 minutes at all other times.

2.3.2 Trains

St Leonards Station services the T1 North Shore and Northern lines, and the Central Coast and Newcastle lines. The station is well connected to other major stations such as Central Station, Chatswood Station and Epping Station. The station is well served by trains with services every 3 minutes during the peak periods in both directions of travel. The advent of Sydney Metro will provide additional connectivity to and from the site. From Crows Nest Station (approximately 250m from the site), Central Station may be reached in 11 minutes (indicative), and Sydney Metro's Martin Place Station in 7 minutes (indicative). The Sydney Metro route and station locations are shown in Figure 5.

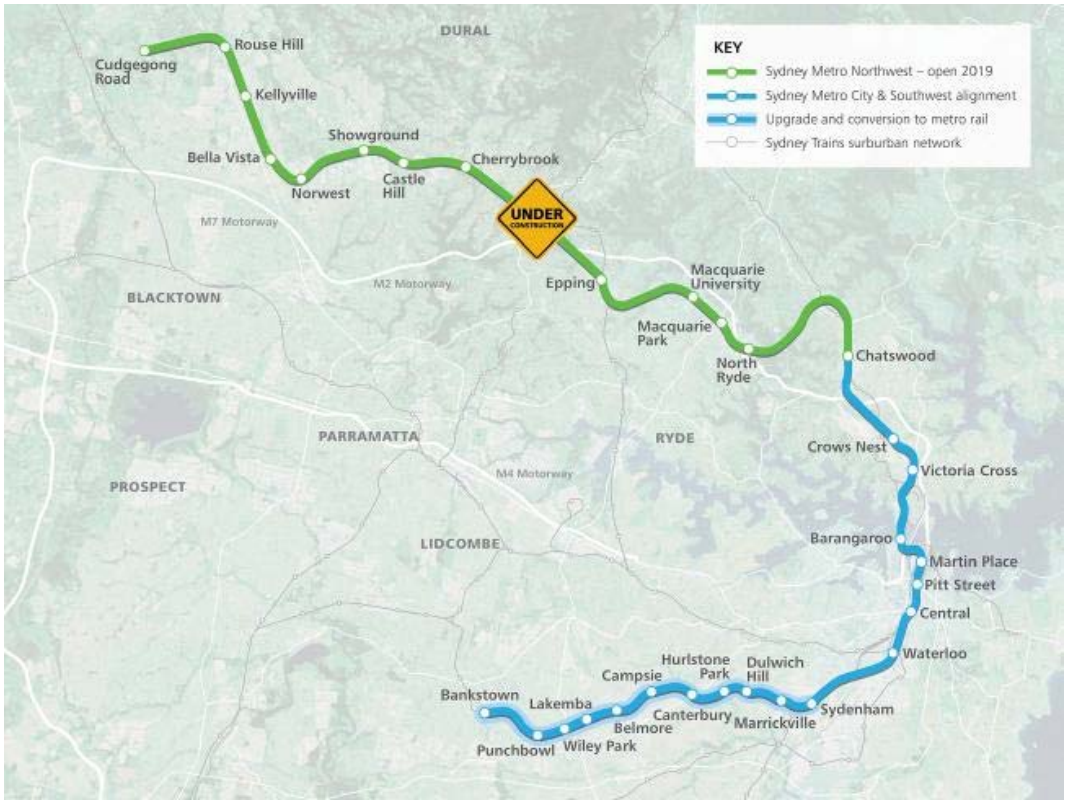


Figure 5: Sydney Metro route and station locations

2.3.3 Walking

Walking facilities surrounding the site are efficient with a comprehensive network of footpaths linking key attractors, such as the train station, bus stops and the hospital.

2.3.4 Cycling

The recommended RMS cycle routes are shown in Figure 6. Atchison Street provides east-west cycle routes, while Herbert Street and Canberra Avenue provide north-south cycle routes. The site is well situated to take advantage of these cycle routes to encourage use of green travel methods.

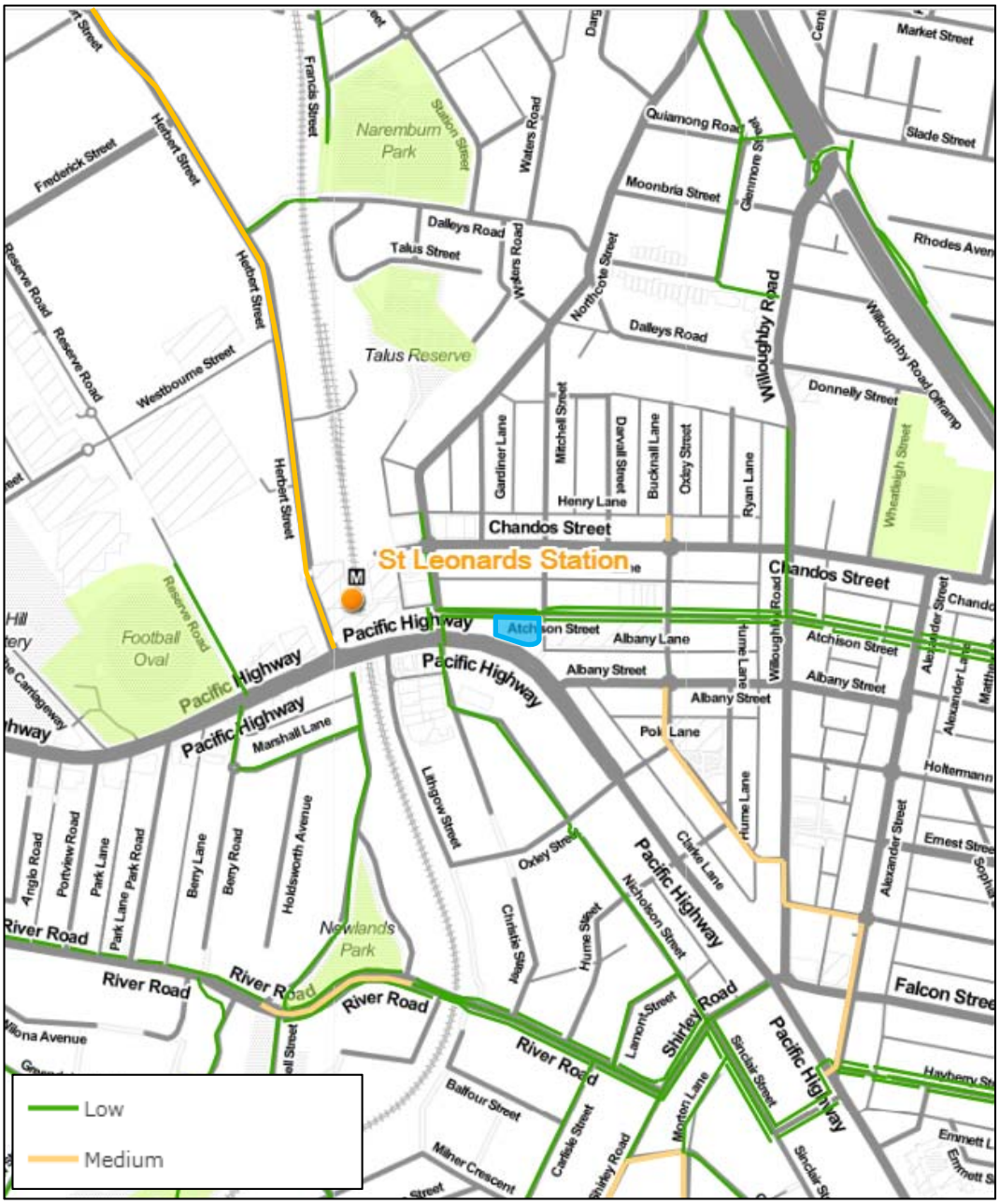


Figure 6: RMS recommended cycle routes near the site

2.3.5 Travel times

The transport interchange at St Leonards serves a number of areas across Sydney. An accessibility map (as shown in Figure 7) illustrates the locations within 30 minute public transport travel time of the site.

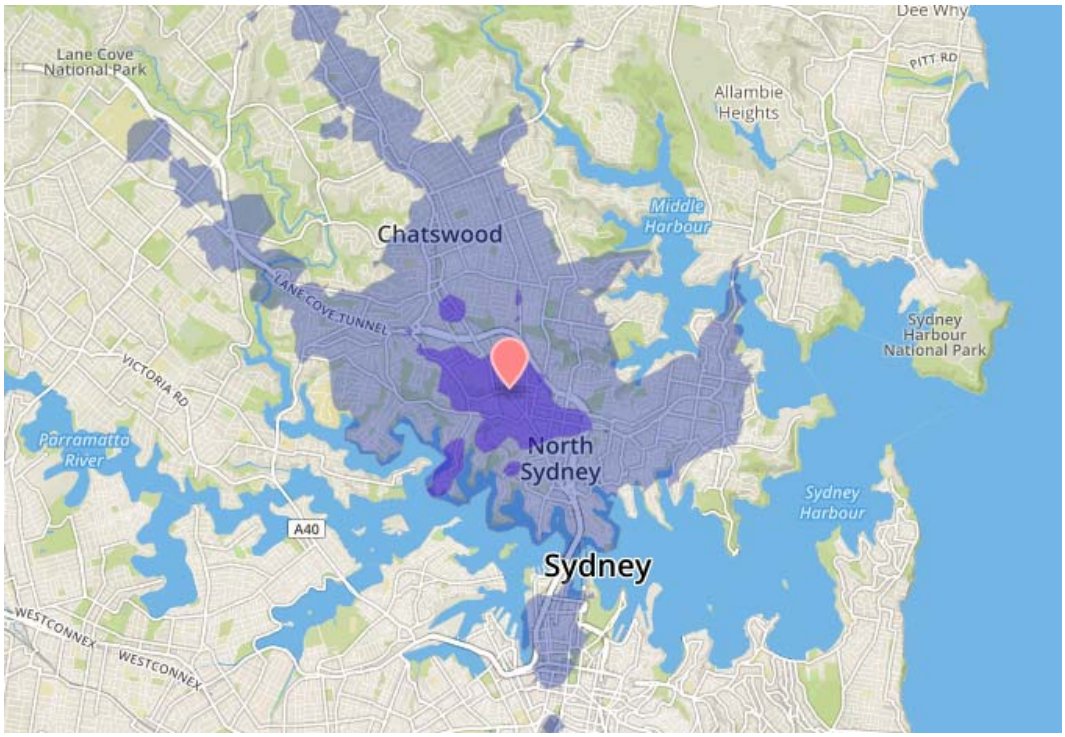


Figure 7: Locations within 30 minute public transport travel time of site

2.4 Vehicle access

Existing vehicular access to the site is located off Atchison Street. Loading bays are located near the entry shown in Figure 8. Driveway surveys were carried out at the site in August 2017 during peak hours, with the following results:

- AM, 7:30am to 8:30am, 38 cars entered, 6 cars departed the site
- PM, 5:00am to 6:00pm, 2 cars entered, 31 cars departed the site

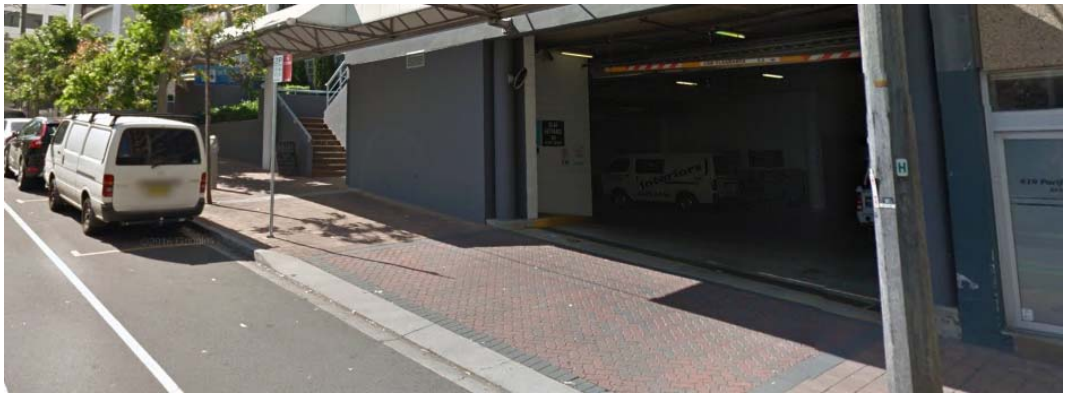


Figure 8: Vehicle access to the existing site

2.5 Road network

The main roads surrounding the site are Pacific Highway to the south, Atchison Street to the north, Christie Street to the west, and Mitchell Street to the east, shown in Figure 9. To manage the extensive network of roads for which council is responsible under the *Roads Act 1993*, RMS in partnership with local government established an administrative framework of *State*, *Regional*, and *Local Road* categories. State Roads are managed and financed by RMS and Regional and Local Roads are managed and financed by councils.

Regional Roads perform an intermediate function between the main arterial network of State Roads and council controlled Local Roads. Due to their network significance RMS provides financial assistance to councils for the management of their Regional Roads. Vehicle entry to the site fronts Atchison Street, which is a local road.

Figure 9: Classified roads surrounding the site

Christie Street is a regional road north of Pacific Highway operating with a 50km/h speed restriction.

Mitchell Street is a two-way local street that adjoins Albany Lane in the south. There is no parking or driveway access from the section of Mitchell Street immediately adjacent to the site.

Atchison Street operates as a one-way eastbound local street with parking on both sides and includes a line marked contra-flow bicycle lane. Atchison Street runs parallel to Pacific Highway and provides the access driveways to the site and adjacent properties.

Figure 10: Atchison Street, St Leonards

Pacific Highway is a divided six-lane, two-way arterial road with restricted parking opportunities available on each side of the road outside of the peak periods. The Pacific Highway within the vicinity of the site connects the North Sydney CBD to the Northern Suburbs and various motorways including the M1 Sydney to Newcastle Freeway, M2 Lane Cove Tunnel/Gore Hill Freeway and M1 Warringah Freeway/Bradfield Highway. It is a major bus corridor servicing a large number of bus routes connecting the Sydney CBD to the Northern suburbs. There are 60km/h speed restrictions in the section of Pacific Highway relevant to the study area.

2.6 Existing traffic volumes

Traffic count data for the purposes of the analysis was sourced from two previous studies, namely the St Leonards South Strategy, Paramics Base Model – AM Peak, Calibration and Validation Report and St Leonards South Strategy, Paramics Base Model – PM Peak, Calibration and Validation Report for this section of the Pacific Highway (Lane Cove Council, 2013).

Additional data for streets surrounding the site were obtained from a previous traffic impact assessment, Traffic, Parking and Accessibility Report (Brown, 2014), which accompanied a planning proposal for Leighton and Charter Hall's development sites to the east of the site. Existing mid-block traffic volumes during the AM and PM peak periods are shown in Figure 11 and Figure 12.

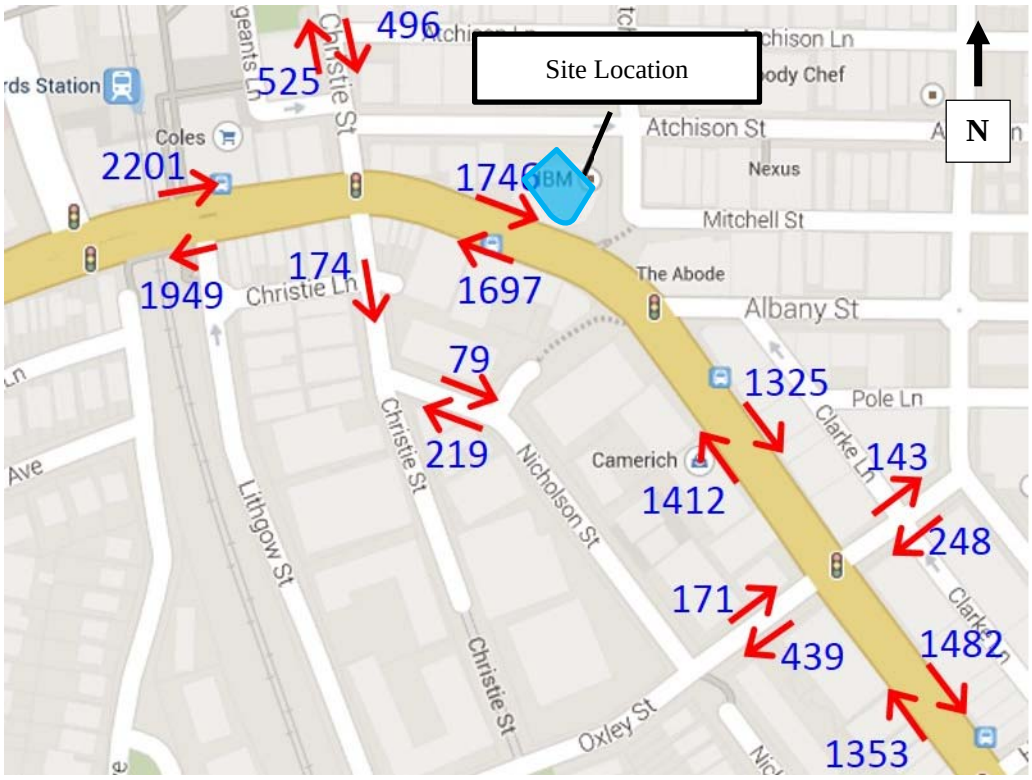


Figure 11: Existing AM peak mid-block traffic volumes

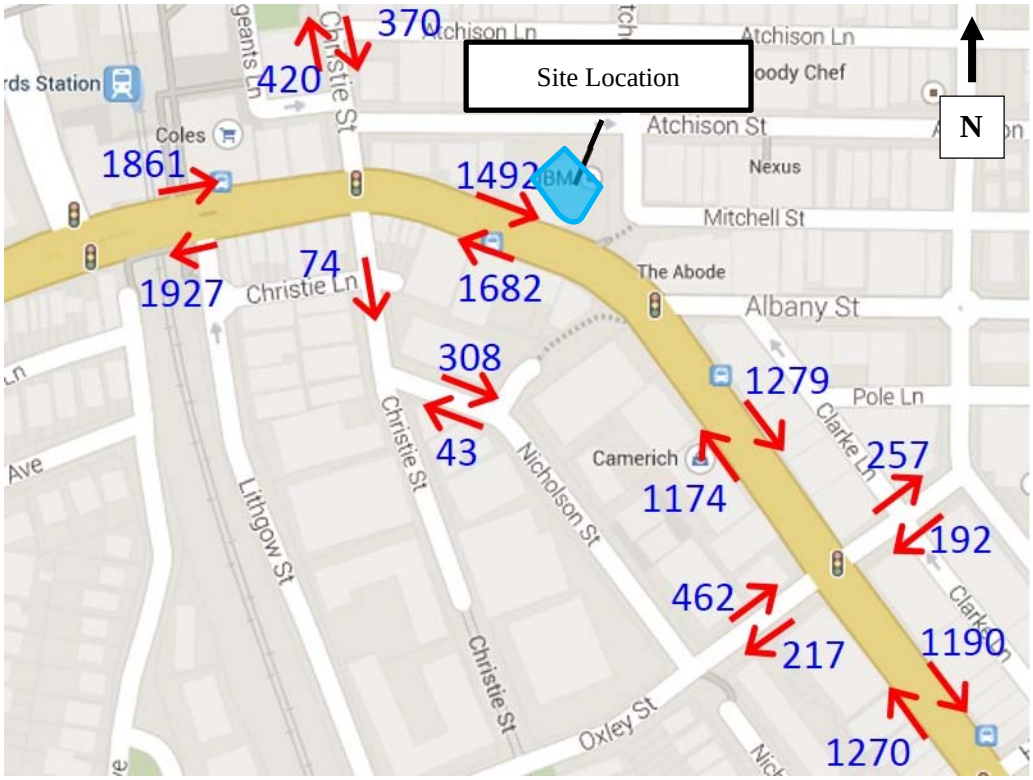


Figure 12: Existing PM peak mid-block traffic volumes

Daily traffic movements in the precinct are presented in Figure 13 below.

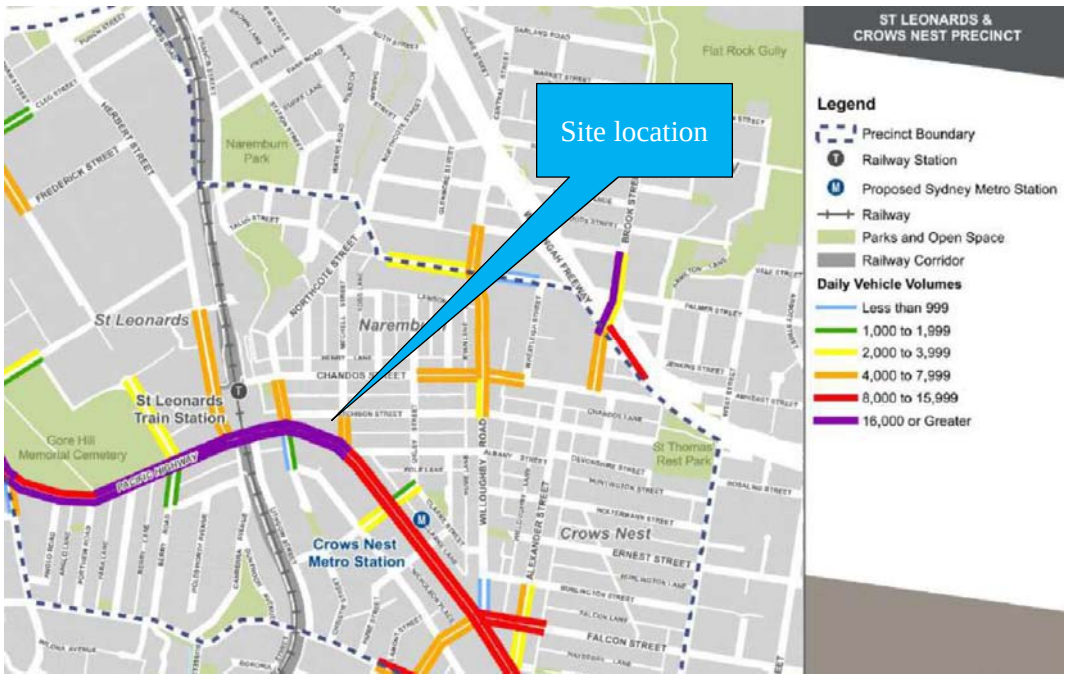


Figure 13 Daily traffic flows

Source: St Leonards and Crows Nest Station Precinct Transport Study (Cardno, 2017)

3 Description of Planning Proposal

3.1 Overview

The Planning Proposal for the site located at 601 Pacific Highway seeks approval to rezone the land and would facilitate a future redevelopment. As demonstrated in the indicative concept design that accompanies the Planning Proposal, the future development could consist of:

- 516 units, 45,696m^2 residential GFA
  - 25% 1 bedroom units (129 units)
  - 70% 2 bedroom units (361 units)
  - 5% 3 bedroom units (26 units)
- 11,160m^2 non-residential GFA
  - 1,791m^2 speciality retail
  - 7,511m^2 office
  - 1,858m^2 community (childcare)
- 255 car parking spaces located in the basement (final parking number subject to detailed DA design)

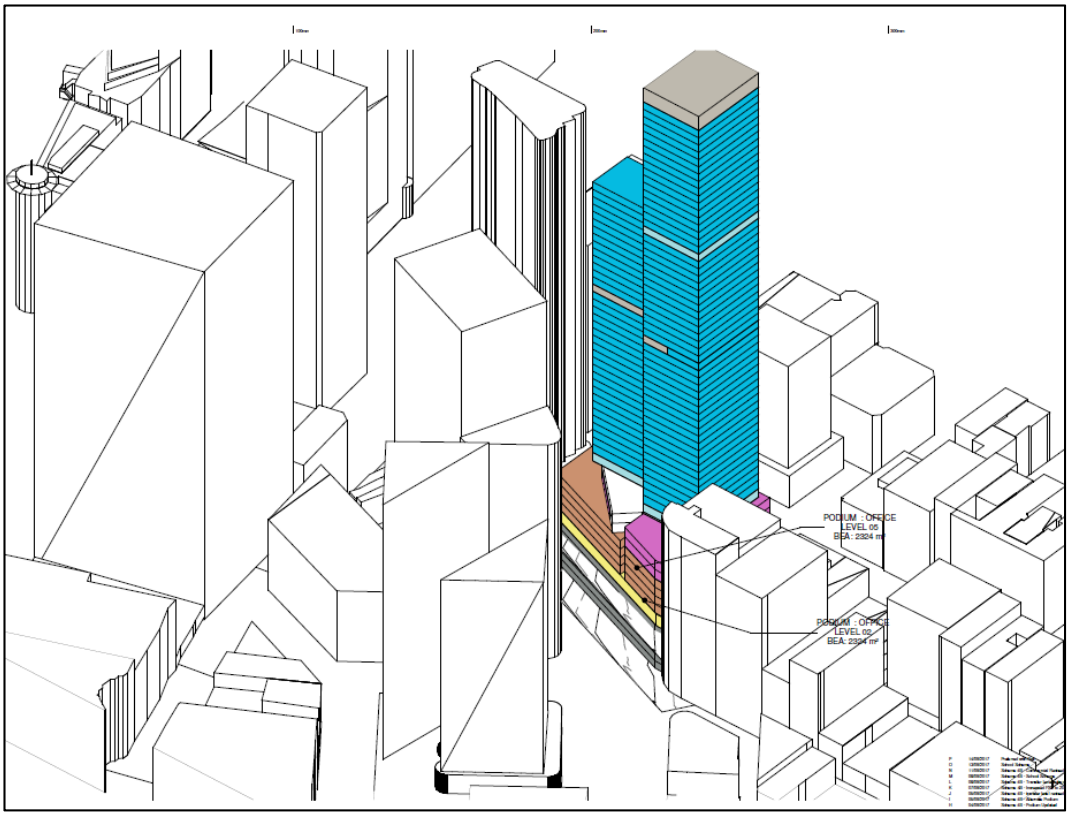


Figure 14: 601 Pacific Highway, indicative concept design

Source: Architectus

3.2 Vehicle access

According to the indicative concept design, vehicle access is proposed to be located off Atchison Street, with the location unchanged from the existing arrangement. The car park is designed as an efficient ramp system shown in Figure 15 and Figure 16. The car park has been designed to meet AS2890.1 requirements. Loading will be carried out at basement 1, with two MRV (8.8m truck) and one SRV (6.4m truck) spaces, shown in Figure 15.

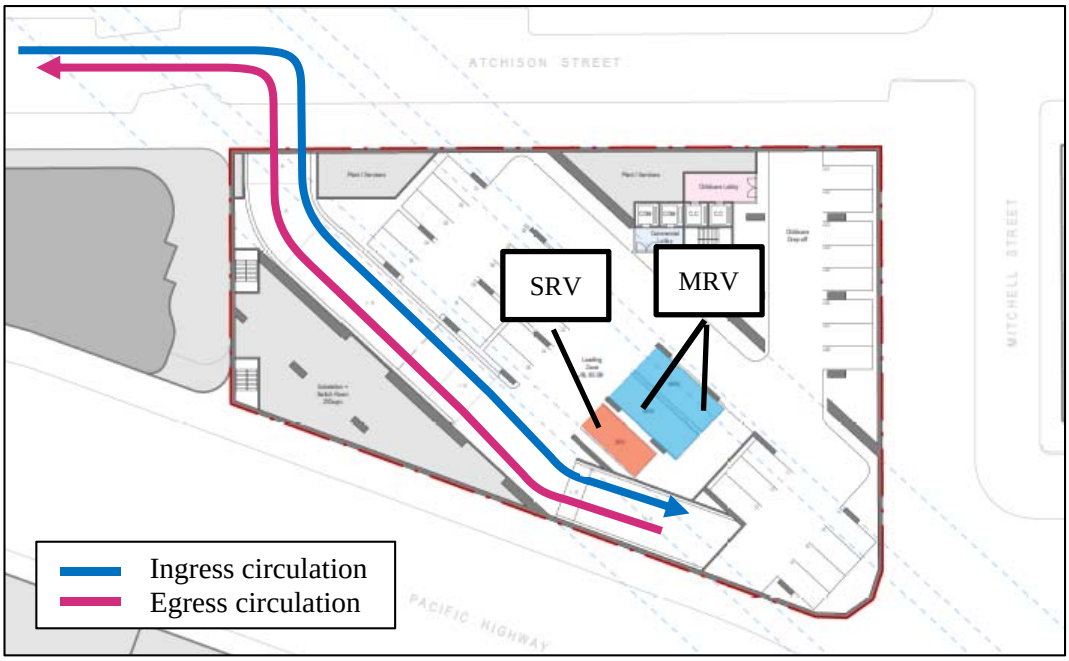


Figure 15: B1 layout, vehicles entering from Atchison Street

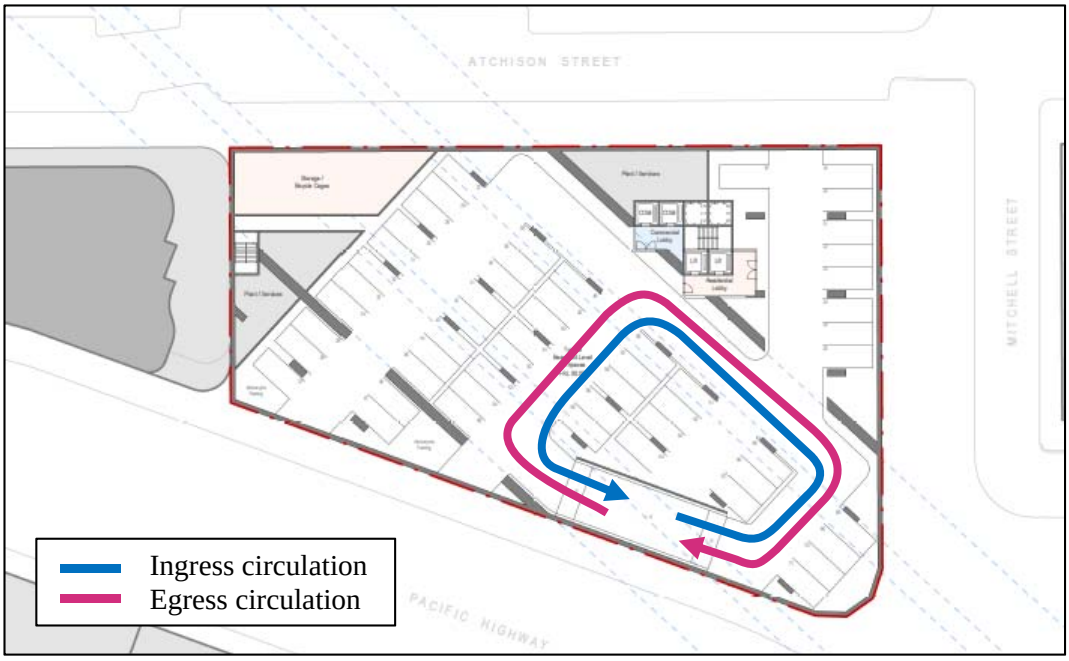


Figure 16: Typical lower basement layout, vehicles circulating car park ramp

Source: Architectus

4 Parking Assessment

4.1 On street parking

As the site is located within the commercial core of St Leonards there are only metered restricted parking opportunities available on surrounding streets. Christie Street and Atchison Street are all metered with a 2 hour restriction between 8.30am and 6pm, Monday to Friday and 8.30am- 12.30pm Saturday. The section of Pacific Highway within the vicinity of the site operates as a T3 transit lane during 3pm to 7pm Monday to Friday and has a 1 hour restriction at other times. Due to the lack of unrestricted parking opportunities on surrounding streets, residents and office workers are generally discouraged from parking on streets.

4.2 Off-street parking

The maximum parking provisions for this site are outlined in the existing North Sydney DCP 2013. For the purposes of this amendment in the context of the Planning Proposal, the car parking rate for the St Leonards Precincts 2&3 have been adopted. The relevant parking rates and the required parking for this development have been summarised in Table 2.

Table 2: North Sydney Council car parking rates Precinct 2&3

Development type		**DCP requirement**
Residential (assuming Zone B4)	1 bedroom	0.25 spaces per apartment
	2 bedrooms	0.5 space per apartment
	3+ bedrooms	0.5 spaces per apartment
	Visitor parking	Not required
Non-residential	Commercial / retail / childcare	1 space per 400m^2 of GFA

Based on the North Sydney guidelines, a maximum of 255 car spaces would be able to be provided on site for the indicative concept design, shown Table 3. The final amount of parking is subject to detailed DA design

Table 3: Parking requirements and provisions

Development type		**Number of apartments / GFA**	**DCP maximum parking**	**Proposed parking provision**
Residential (assuming Zone B4)	1 bedroom	129 units	32	226
	2 bedrooms	361 units	181	
	3 bedrooms	26 units	13	
	Visitor parking	NA	0	
Commercial	Office	7,511m^2	19	19
Specialty retail	Small local serving shops	1,791m^2	5	5
Community	Childcare	1,858m^2	5	5
Maximum allowable car parking spaces			255 spaces	255 spaces

5 Transport Assessment

5.1 Person trip generation

The person trips generated by a development of the scale shown in the indicative concept design are 0.64 per unit during the AM peak hour and 0.54 per unit during the PM peak hour. This equates to a development person trip generation of 330 trips during the AM peak hour and 279 trips during the PM peak hour. The mode split for the development is estimated to be as presented in Table 4.

Table 4 Mode Share and peak period person trips and

Mode Share		AM Peak Trips	PM Peak Trips
Car Driver	11%	36	31
Car Passenger	5%	17	14
Train / metro	32%	106	89
Bus	15%	50	42
Walk	34%	112	95
Cycling/Other	3%	10	8
Total	**100%**	**330**	**279**

The commercial trips generated by the site during peak hours are 0.5 trips per employee. Assuming that for every 15m^2 of commercial floor area, there is one employee, the site will attract 500 employees (7,511m^2 commercial floor area). This equates to 250 trips during the AM peak hour, and 250 trips during the PM peak hour.

5.2 Public transport

A development in accordance with the indicative concept design is forecast to generate demand for 106 trips by train/metro and 50 trips by bus during the AM peak hour. The distance to the train station is less than a 5 minute walk, while the bus stops on Pacific Highway are also within a 5 minute walk.

In addition, the Crows Nest Metro Station will be within viable walking distance for residents and employees. Once operational, the Sydney Metro is expected to operate at a 4 minute frequency and will provide high quality public transport access to the site. Sydney Metro will also relieve capacity at St Leonards train station to facilitate the additional trips generated by any new development on the subject site.

5.3 Vehicle trip generation

Residential

Recent surveys undertaken by the RMS of high density residential developments in key centres such as St Leonards has one of the lowest traffic generation rates during peak hours. For every 100 residential car parking spaces, only 10 car trips are generated during the AM peak hour and 5 car trips during the PM peak hour. Any residential development on this site would be considered to be reasonably similar to the results of the recent surveys.

Notwithstanding, the average rate of 0.15 trips / space in the AM peak hour and 0.12 trips / space in the PM peak hour has been adopted for the analysis.

Office

Office traffic generation rates are directly proportional to the number of off-street parking spaces provided within the site. This is because existing on-street parking on Christie Street and Atchison Street are all metered with a 2 hour restriction between 8.30am and 6pm, Monday to Friday. For the purpose of this report, we have assumed that all 23 car spaces will be occupied, with a conservative 50% of the car trips made during the road network peak hour.

Specialty Retail

Specialty retail at the site would predominantly be smaller shops serving the local precinct. A majority of the trips made would be by residents walking or consist of car stopover trips. As such, traffic generation would be minimal.

Childcare

The childcare centre within the site may accommodate up to 150 children. Given it’s location within a high density mixed use precinct, it could be expected that up to 75% of children are walked to the site. The remainder (equivalent to 37 children) would be dropped off.

Existing traffic generation

The existing traffic generated is discounted to gain an understanding of the net increase in traffic that would be generated from the site.

Net traffic generation

A breakdown of the calculations are shown in Table 5. The site is estimated to generate a net increase of no more than 31 car trips during the peak hours.

Table 5: Trip generation upon completion of the site

Development type	**Number**	**Unit**	**AM peak hour**		**PM peak hour**	
			Rate	Car trips	Rate	Car trips
Residential	226	Parking spaces	15 car trips per 100 spaces	34	12 car trips per 100 spaces	27
Office	19	Parking spaces	50% arrive during peak hour	10	50% leave during peak hour	10
Childcare	150	Children	0.7 / child (75% walk up)	26	0.4 / child (75% walk up)	15
Specialty retail	5	Parking spaces	Serving local residents	5	Serving local residents	5
Existing site	158*	Parking spaces	Surveyed ins and outs	-44	Surveyed ins and outs	-33
Net trips generated			**Future Total**	**31**	**Future Total**	**24**

* Existing spaces within the car park

5.4 Traffic distribution

Traffic distribution profiles for are shown in Figure 17 and Figure 18. These were based on existing journey to work data discussed in section 2.2 and the general location of the destination in relation to the site.

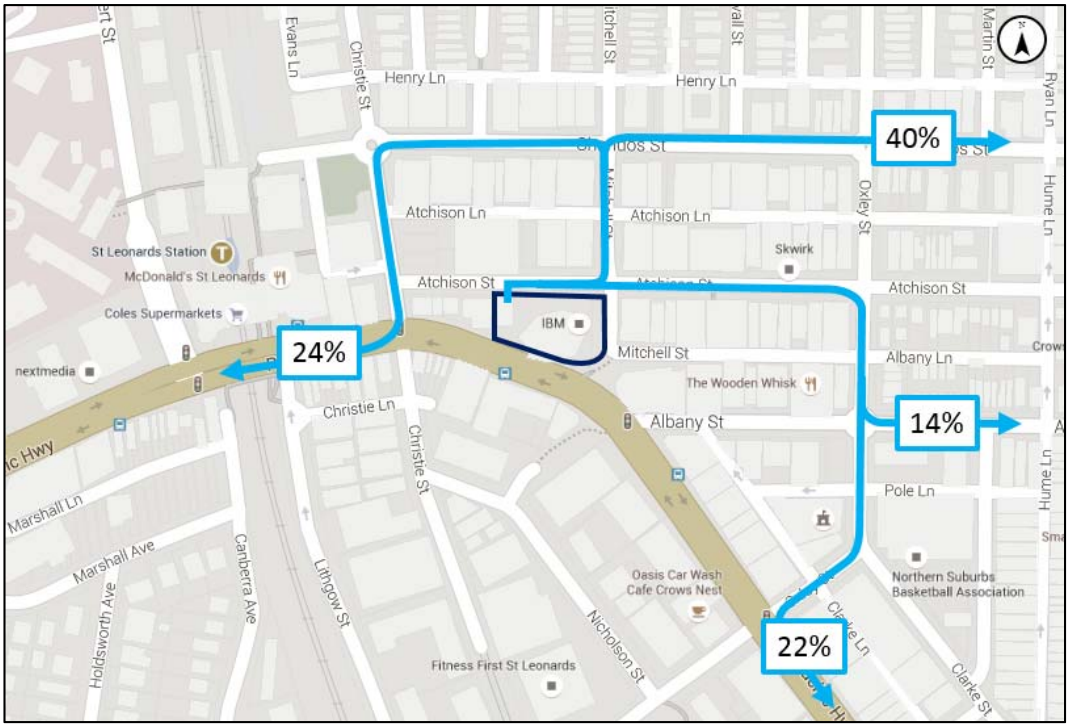


Figure 17: Trip distribution of vehicles leaving the site

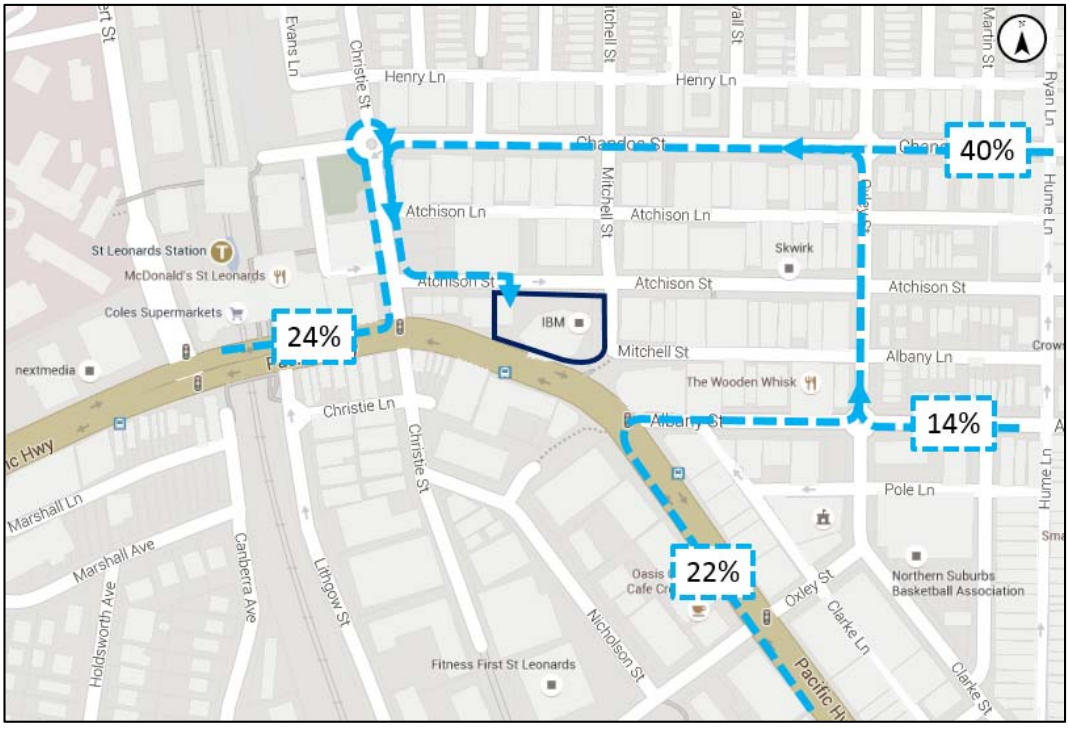


Figure 18: Trip distribution of vehicles entering the site

5.5 Road network impacts

Based on the traffic distribution and generation assumptions in sections 5.1 and 0, the likely increase in traffic from the site is shown in Figure 19 and Figure 20.

Figure 19: Traffic increase from completion, leaving the site

Figure 20: Traffic increase from completion, entering the site

The future estimated traffic generated from the site, after considering the discount in existing traffic (section 2.4) is negligible during the peak periods. This estimate considers recent residential traffic generation rates and driveway surveys as well as conservative commercial traffic generation assumptions.

In addition, given the proximity of the site to significant levels of employment in North Sydney, the estimated vehicle trip generation is considered to be conservative. Further, the opening of the Sydney Metro from 2024 which will increase the alternative transport options available to residents.

5.6 Motorcycle parking

Motorcycle 1 space / 10 car spaces = 28 motorcycle spaces. These spaces will need to be allocated in the final planning of the basements.

5.7 Accessible parking

1-2% of all non-residential parking spaces are to be designated as accessible = 3 to 6 spaces.

5.8 Bicycle parking

5.8.1 Residential

Occupants: 1 space / dwelling = 517 bicycle lockers (Class 1 preferred) or racks in locked room (Class 2)

Visitors/ customers: 1 space / 10 dwellings = 51 racks (Class 3)

It is noted that where an apartment in a residential building has a basement storage area on title that is large enough to accommodate a bike and being no smaller than a Class 1 bike locker, then additional bike parking for that apartment is not required.

5.8.2 Commercial

Occupants: 1 space / 150m^2 = 34 racks in locked room (Class 2)

Visitors/ customers: 1 space / 400m^2 = 13 racks (Class 3)

5.8.3 Bicycle parking provision

Bicycle parking would need to be provided at all basement levels for use by residents and commercial/community facilities as appropriate. These will be designed in future planning of the basements.

5.9 Car share

The installation of car share parking to replace general off-street parking is optional and at the discretion of the developer. Subject to future detailed design and planning, the site could provide 6 car share spaces.

6 Travel demand management

6.1 Green Travel Plan

A Green Travel Plan (GTP) is a tool to minimise the negative impact of private vehicle travel on the environment. The GTP is a package of measures put in place to encourage more sustainable travel, and describes ways in which the use of sustainable transport may be encouraged. Using public transport, cycling, walking, working from home, carpooling, making business vehicles more fuel efficient and the use alternative fuels are all more sustainable means of transport than single occupant driving.

More generally, the principles of a GTP are applied to all people travelling to and from a site. The main objectives of the GTP are to reduce the need to travel and promotion of sustainable means of transport.

The more specific objectives include:

- To reduce the level of single occupancy car borne trips associated with commuting.
- To facilitate the sustainable and safe travel of visitors to the site.
- To reduce site traffic congestion and associated pollution in order to enhance, improve and make safe journeys of minority/sustainable transport mode users.
- To work in partnership with neighbouring organisations/developments, local authorities, retailers and other relevant bodies in achieving the maximum mode shift away from the private car.
- To continually develop, implement, monitor, evaluate and review the progress of the travel plan strategy.
- To facilitate all residents' access to key facilities such as retail, leisure, health and education.

6.2 Green Travel Plan Measures

In order to meet the objectives and targets of a GTP, the following physical and management measures should be implemented in future design and planning of the site.

- Travel packs
- General marketing and promotion
- Car sharing
- Alternatives to travel during the day
- Cycling
- Public transport
- Walking
- Residents' travel plan group

7 Conclusion

This review has described the potential traffic and transport impacts of a redevelopment at 601 Pacific Highway, St Leonards, in line with the Planning Proposal. Key findings of the review are as follows:

- The site is located within the current zoning of B3 Commercial Core of St Leonards, where parking is restricted discouraging residents from parking on-street
- The indicative concept design identifies 255 off-street parking bays which is consistent with the current North Sydney Council DCP requirements. The final amount of parking is subject to detailed DA design.
- The site is located within 100m of various modes of St Leonards Station and bus stops, thus any future development is expected to not generate a large parking demand
- Based on the traffic distribution and generation assumptions, the analysis indicates that the potential increase in traffic is negligible and is not envisaged to affect the existing intersection performances adversely
- Any future development in line with the Planning Proposal would be responsible for a small increase in peak hour traffic flows along surrounding key roads. Due to the small increase in development traffic, it is expected that surrounding key roads will continue to operate in the same way
- Secure bicycle parking would be provided as a component of any future proposed development
- Travel demand management measures have also been suggested to improve the mode share of public transport and active transport. These items should be considered further at detailed design stage.