Stockland

Lourdes Retirement Village

Transport Assessment

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Job number 244326

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Contents

1 Introduction

Stockland commissioned Arup to undertake a transport assessment as part of the concept masterplan and strategy for Lourdes Retirement Village. The assessment will support the planning submission to change the existing zoning of Lourdes Retirement Village.

Lourdes Retirement Village is an existing site located in the Upper North Shore suburb of Killara. The current accommodation at Lourdes consists of 108 independent living units (ILU's), 49 serviced apartments (SA's), and an 83 bed Aged Care facility.

The project will ensure Lourdes Retirement village can provide the range of accommodation that future retirees are seeking.

1.1 Background

The Village was initially constructed in 1983, and now needs significant renewal. Since 1983 the village has been developed on a piecemeal basis without the benefit of a whole of site master plan.

The only major event has been the redevelopment of the nursing home in 2003 and additional garages. The layout of the site restricts accessibility for residents and visitors with disabilities.

The two storey buildings provide limited access to the upper levels and access ramps and pathways are substandard. Internally the units are very small and lack facilities to enable ageing in place and many existing dwellings do not provide the range of accommodation that future retirees are seeking.

1.2 Scope

This traffic impact assessment supports the concept masterplan application of Lourdes Retirement Village (the site) and outlines the following:

- Existing transport conditions
- Forecast traffic generation
- Road network impacts
- Parking provisions
- Access arrangements
- Public transport availability

2 Existing conditions

2.1 Site location

The site sits within the Ku-Ring-Gai Council jurisdiction. It is located some 1.5km from Killara Station and 17km north of Sydney CBD. The site is located east of the Pacific Highway with the location shown in Figure 2.

Figure 1 Local context plan

Source: Google maps, modified by Arup

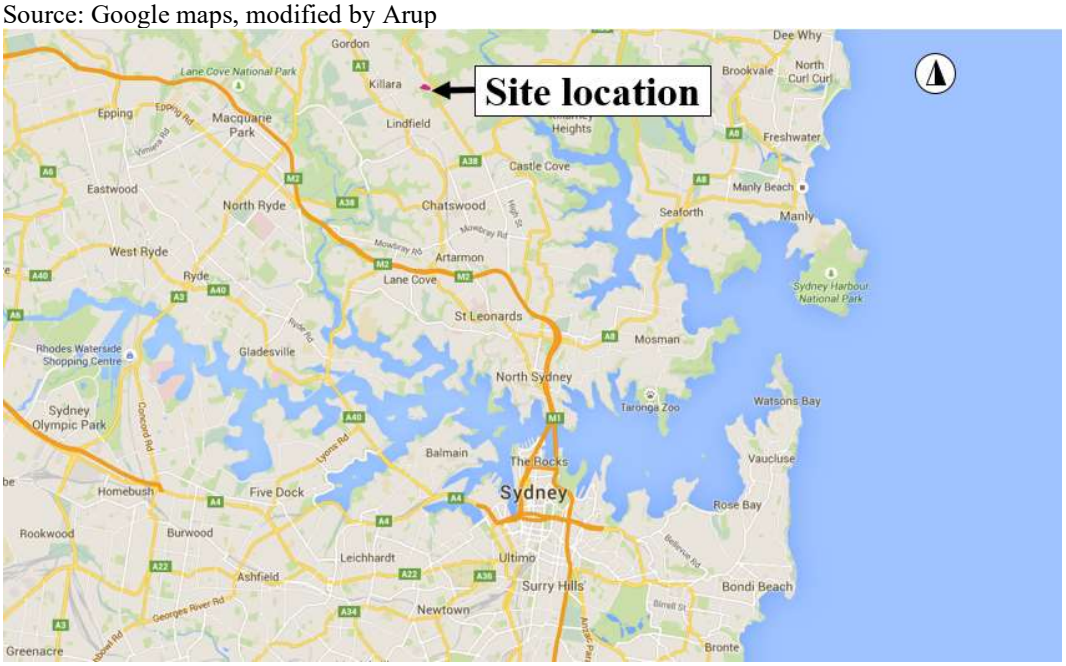

Figure 2 Regional context plan

Source: Google maps, modified by Arup

2.2 Site accommodation

The site currently consists of a variety of accommodation types that have been built over the past 30 years. The site is approx. 4.9Ha in size at the eastern end of Stanhope Road.

Lourdes Retirement Village is an established retirement village currently offering:

- 108, one, two and three bedroom independent living units
- 49 serviced apartments
- 83 bed Registered Aged Care Facility
- Chapel
- Community Activity Centre with café, pool, library and craft room

2.3 Road network and access

Access to the site is illustrated in Figure 3.

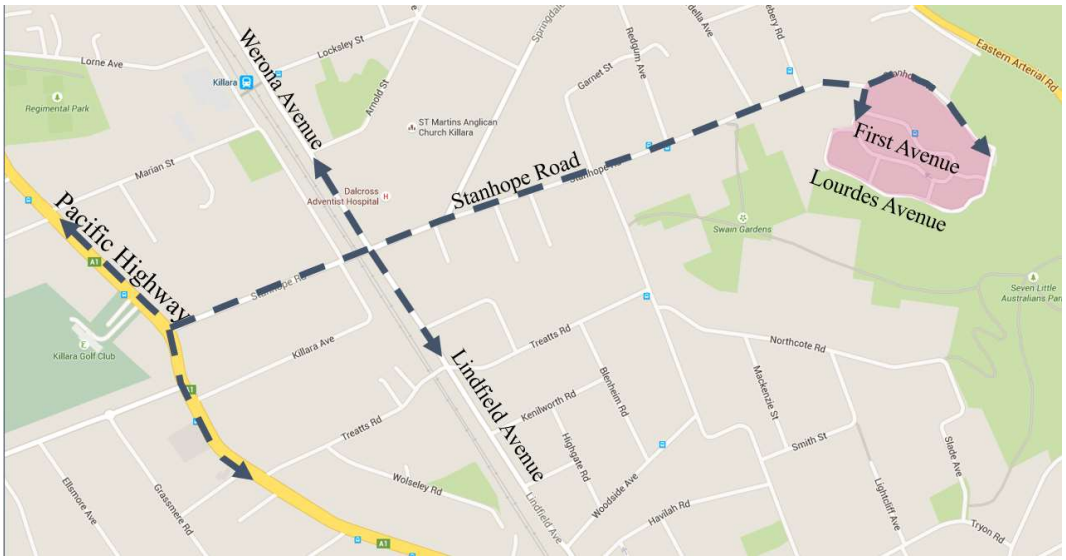

Figure 3 Road access of the site

Source: Google maps, modified by Arup

2.3.1 Stanhope Road

The site is bounded by Stanhope Road to the north. The main access point is located east of Rosebery Road shown in Photograph 1.

Photograph 1 Main entrance to site

A secondary access is located at the end of Stanhope Road, shown in Photograph 2. This access is not currently being utilised by residents.

Photograph 2 Eastern entrance from site

Stanhope Road, east of Springdale Road, is a two-way local road which provides access to low density residential housing. Intermittent kerbside parking is permitted on either sides of the road. Stanhope Road provides a link to the Pacific Highway and has a posted speed limit of 50km/h.

2.3.2 Main Street

Main Street forms a loop for internal access to the site and also connects Stanhope Road. Steep topography can be found on this road which is an issue for residents. This can be seen in Photograph 3.

Photograph 3 Main Street

2.3.3 Pacific Highway

The Pacific Highway, which is a state classified road, runs north to south, parallel to the rail corridor. It also provides access to the Sydney CBD. The Pacific Highway / Stanhope Road intersection is unsignalised. Right turns from Stanhope Road onto the Pacific Highway are permitted. The Pacific Highway has a posted speed limit of 60km/h within the vicinity of the site. The intersection of Pacific Highway / Stanhope Road can be seen in Photograph 4.

Photograph 4 Stanhope Road, facing Pacific Highway

2.3.4 Werona Avenue

Werona Avenue forms an intersection with Stanhope Road from the north and south approach respectively, as shown in Figure 4. The intersection is signalised with a posted speed limit of 50km/h on all approaches. Parking is permitted on the eastern side of Werona Avenue.

Figure 4: Werona Avenue / Stanhope Road intersection

Source: Google maps

2.4 Public transport

Local bus route 556, operates daily from Lindfield Station to East Killarra. It services the site directly via the Main Street loop and three bus stops within the site as illustrated in Figure 5. The bus route operates daily with the following peak hour frequencies:

Table 1 Bus route 556 peak hour frequencies

Day	Time	Frequency
Weekday	7am to 8am	2 services
	12pm to 1pm	1 service
	5pm to 6pm	2 services
Weekends	12pm to 1pm	1 service

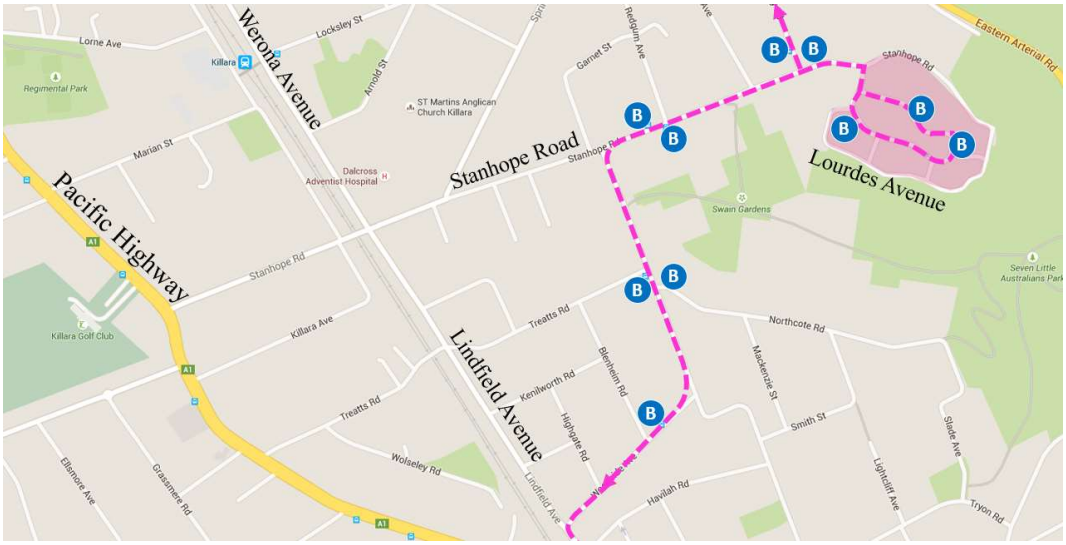

Figure 5 Local bus route 556

2.5 Walking

Pedestrian access to the site is generally poor and relatively undesirable given the steep topography of the area. Footpaths along Stanhope Road leading to the site are generally narrow and discontinuous with no pedestrian crossing facilities. Being located some 1.4km away from Killara Station, the site is well outside the suitable walking distance.

The site is therefore mainly accessed by private vehicles or the local bus 556.

2.6 Traffic surveys

2.6.1 Intersection counts

Intersection counts were carried out at the signalised intersection of Werona Avenue / Stanhope Road, on:

- Tuesday 16 June 2015, from 7am to 9am
- Tuesday 16 June 2015, from 4pm to 6pm
- Saturday 13 June 2015, from 11am to 1pm

The counts assist in understanding the impacts the development of the site would have on the intersection and are discussed in section 4.3.

2.6.2 Weekly tube counts

Traffic flow data was collected over a one week period at two locations on Stanhope Road as shown in Figure 6. The counts were undertaken each side of the two entry points to the Village. This was done so that a count of Village activity could be determined by subtracting the eastern count from the western count. There is very little Village access provided further east from this point.

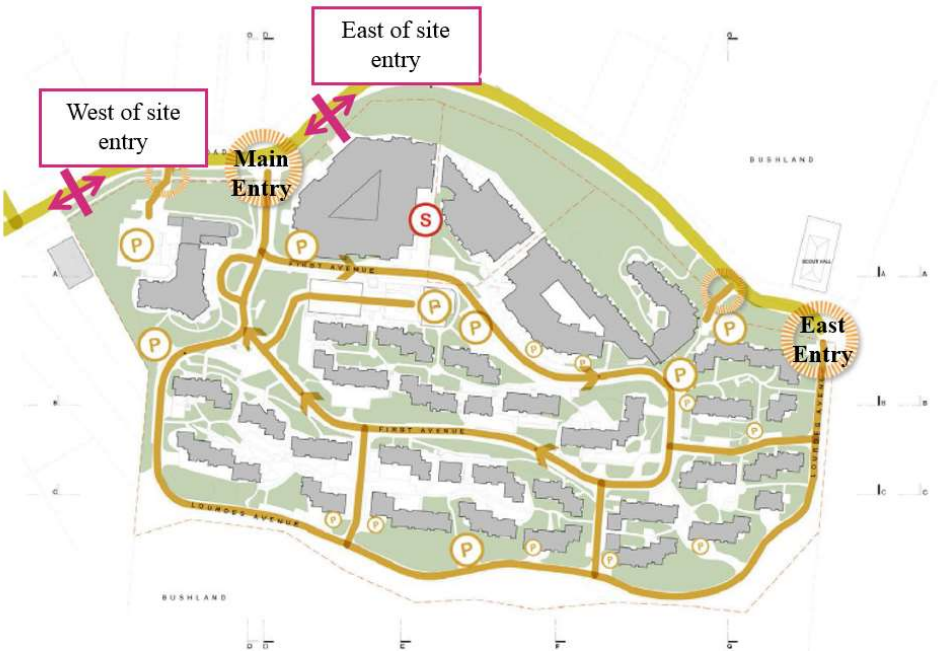

Figure 6: Traffic count locations - weekly tube counts

The hourly flows for the period were taken over a seven day period from Monday 15 June to Sunday 21 June 2015. The busier period on Stanhope Road west of the Village is between 9am and 4pm. This confirms that the Village occupants choose to avoid the road peak hours which occur before 9am and after 5pm.

The 7 day average traffic flows indicates that an estimated 320 vehicles per day access the village, while an estimated average of 174 vehicles leave the site per day. This indicates that during the period of the survey, there were more people staying in the village rather than leaving.

2.6.3 Entries into site

Survey results demonstrate a weekly average of 20 vehicles per hour entered the site at approximately 12pm during the weekdays. This was found to be the highest number of vehicles entering during the week. Weekend vehicle entries were found to be lower but had a similar peak hour of 12pm.

The number of vehicles entering the site is determined by subtracting the easterly count from the west count, as discussed in section 2.6.2. The average daily traffic counts for vehicles entering the site is shown in Figure 7.

This confirms that residents avoid the network peak hours on weekdays. Over the week, an average of 275 vehicles per day entered the site.

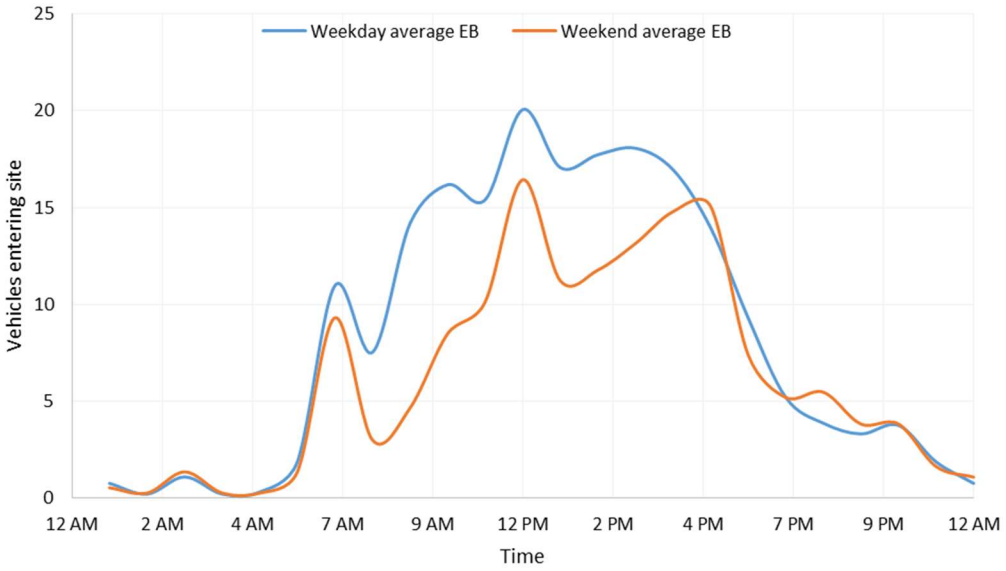

Figure 7 Average daily traffic entering the site

2.6.4 Leaving the site

The peak period for people leaving the site was at 1pm for both weekdays and weekends. The highest average number of people leaving the site was found to be 21 vehicles on a weekday. The average daily traffic counts for vehicles leaving the site is shown in Figure 8.

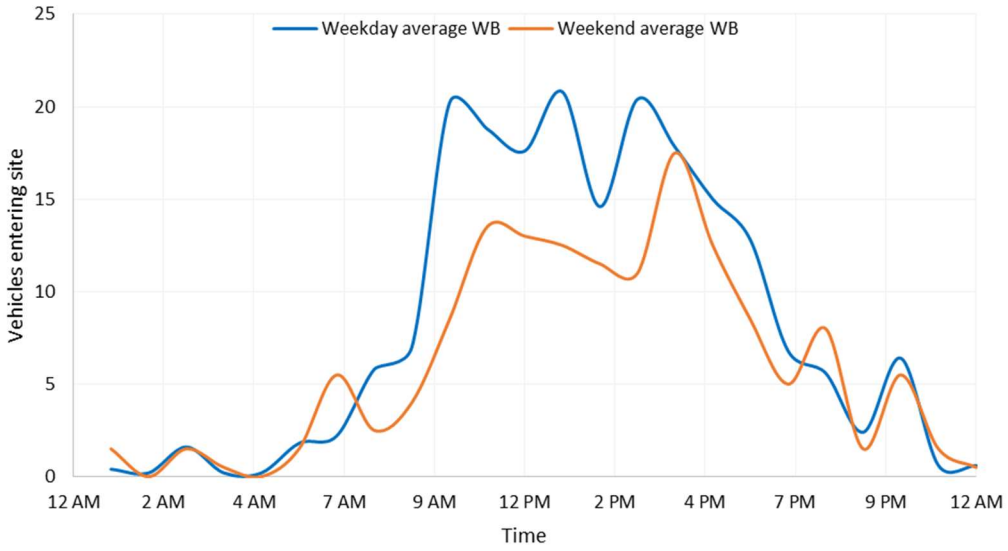

Figure 8 Average daily traffic leaving the site

3 Planning proposal

This Traffic and Transport Assessment accompanies a Planning Proposal which seeks to amend the following planning provisions to the Ku-Ring-Gai LEP 2015:

- Land Use Zone: The land use zoning is proposed to be changed to an R3 Medium Density Residential Zone to allow for taller seniors' housing development to occur.
- Height: The maximum building height is proposed to be increased to between 9.5 and 22 metres across the site.
- Floor Space Ratio: The maximum floor space ratio is proposed to be increased to 0.75:1

3.1 Indicative masterplan

An indicative master plan has been prepared by Plus Architecture to support a Planning Proposal to amend the land use, height and floor space ratio controls for the site. The proposed master plan provides solutions to the site's existing issues, whilst maintaining the Village's landscaped character and minimising impacts on surrounding neighbours.

The indicative masterplan will comprise of 141 new units, 110 aged care facility suites and 63 town houses. A new purpose-built community centre will also form part of the initial development stage. A model of the masterplan is shown in Figure 9.

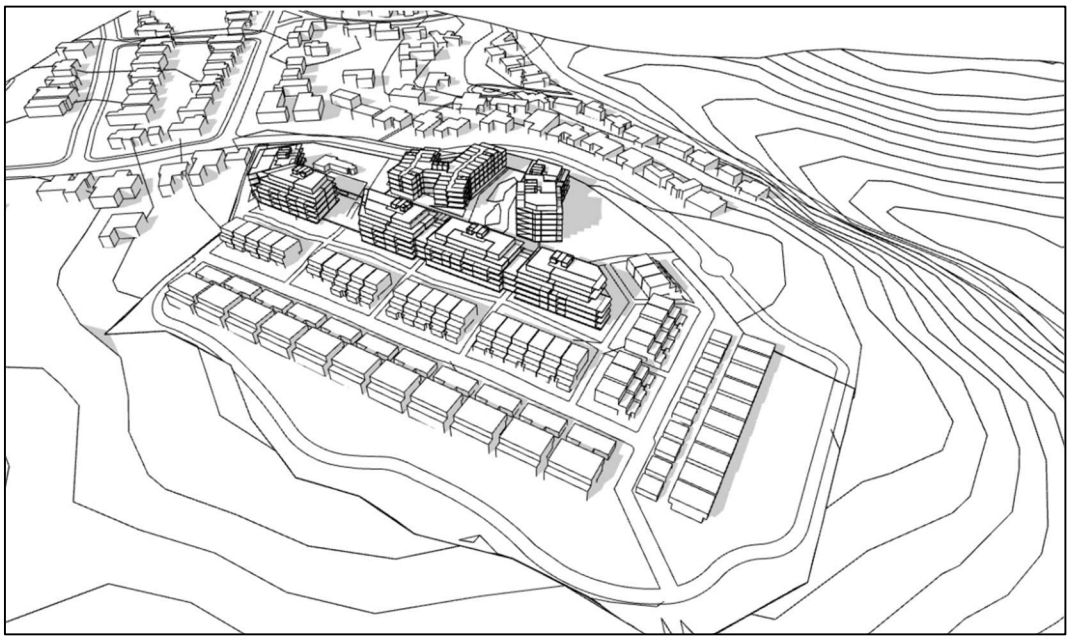

Figure 9 Masterplan model - view looking north-west

Source: Plus Architecture

3.2 Ministerial Directions – Environmental Planning and Assessment Act 1979

Ministerial Direction 3.4, issued under Section 9.1 of the *Environmental Planning and Assessment Act 1979,* requires the proposal to be consistent with the Minister for Planning's objectives for integrating land use and transport. However, where the proposal is inconsistent with the planning objectives, the proposal should identify the inconsistencies and give consideration to the objectives of the Ministerial Direction as set out in (5).

An overview of how the proposal is consistent with Ministerial Direction 3.4 is shown in Table 2.

Table 2 Alignment with Ministerial Direction 3.4

Planning objective	Alignment
Improving access to housing, jobs and services by walking, cycling and public transport	• Consistent as the proposal includes a new purpose-built footpath network which will improve local access to services by walking and cycling. • Consistent as the proposal will facilitate bus access in the Lourdes Retirement Village for public transport access to Killara and Lindfield.
Increasing the choice of available transport and reducing dependence on cars	Given the nature of the site as a retirement village for the elderly, the site would mainly need to be accessed by private vehicles and buses. Short walking routes would be established using footpaths to the bus stops as required.
Reducing travel demand including the number of trips generated by development and the distances travelled, especially by car	• Consistent as the proposal includes a connected footpath network to the external roads. • Consistent as the continued provision for bus services to access the site will reduce external private vehicle trips generated from the site.
Supporting the efficient and viable operation of public transport services	Consistent as the proposal will facilitate bus access in the Lourdes Retirement Village for public transport access to Killara and Lindfield.
Providing for the efficient movement of freight	Consistent as the internal road network of the proposal will facilitate freight/service vehicle access within the Lourdes Retirement Village.

4 Transport and parking assessment

4.1 Internal site roadways

The master plan proposes the realignment of several internal roads to provide an efficient network to provide access to the future building arrangements. The indicative layout of the internal road network is shown in Figure 10.

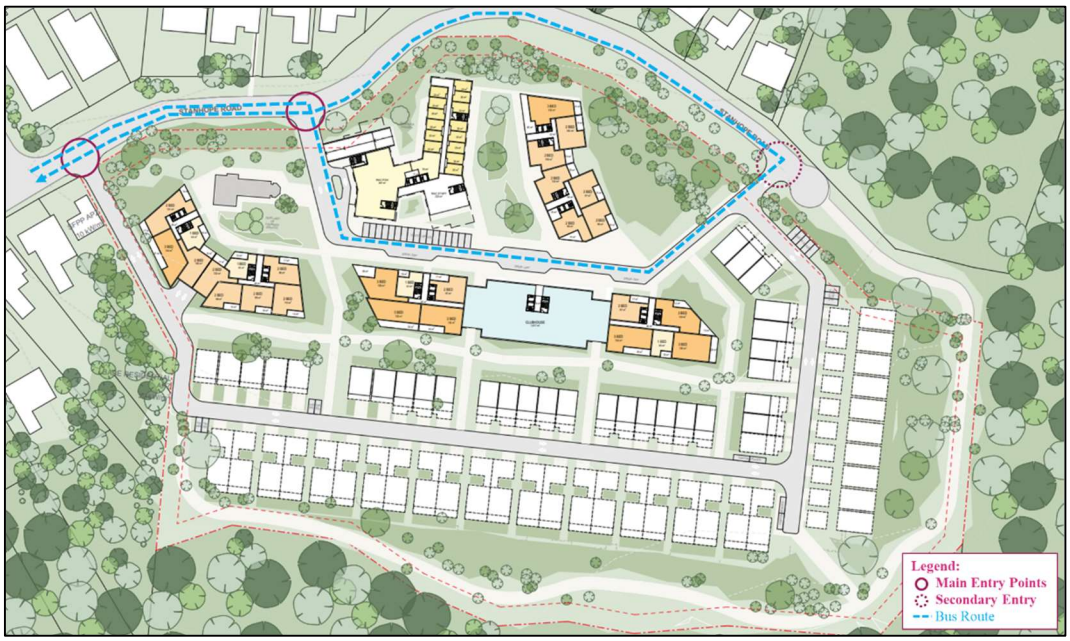

Figure 10 Indicative road internal road network
Source: Plus Architecture

4.1.1 Traffic access

The location of the existing main access is not proposed to be changed and would be realigned to provide connectivity to a local centre, apartments and aged care facilities.

An additional main access is proposed to the west of the existing main access and would provide connectivity to the townhouses to the south. A secondary access is proposed to the east of the existing main access and would facilitate egress from the local centre and provide additional connectivity to the townhouses.

4.1.2 Buses

The existing bus stops within the site are proposed to be maintained. However, the bus stops would be relocated on Main Street near the local centre and would be easily accessible to residents.

4.2 Parking and service assessment

The parking and service access arrangements of the indicative masterplan are shown in Figure 11. Basement parking is proposed across the site for the northern buildings, whereas single car garages are proposed for the terrace homes along the southern and eastern roads.

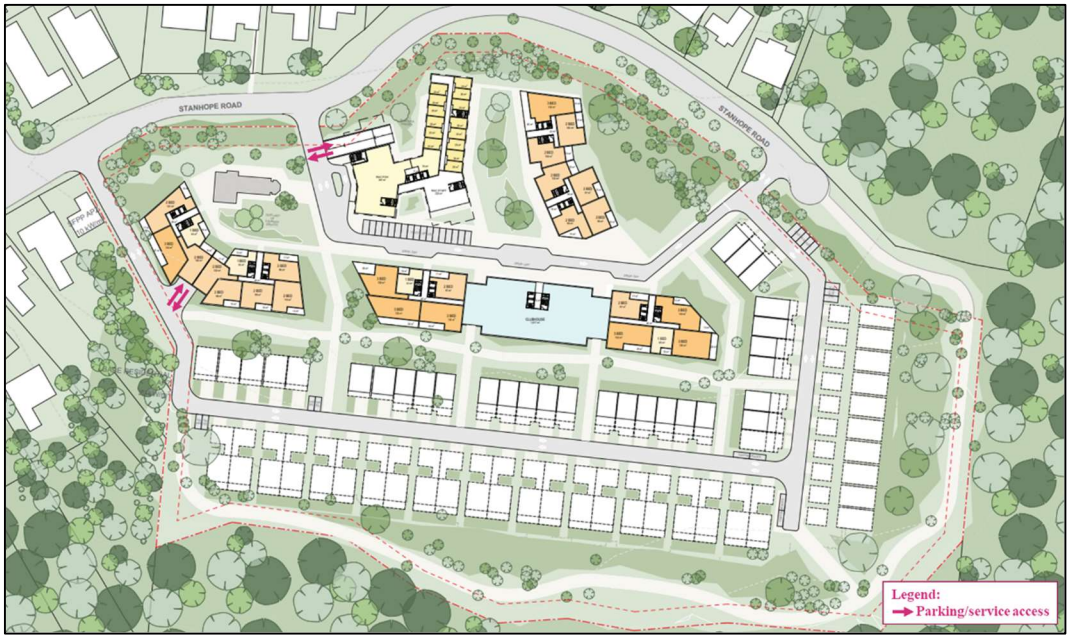

Figure 11 Indicative parking and service access arrangements

Source: Plus Architecture

4.2.1 Off-street parking

Each building is proposed to have access to parking in basement levels. The parking strategy aims to reduce excavation by using the natural falls in the site to locate parking below common spaces.

The Ku-Ring-Gai Local Centres Development Control Plan 2016 (KDCP) stipulates the minimum parking rates for multi-dwelling housing, seniors apartments and aged care. These parking rates are shown in Table 3.

Table 3 KDCP parking rates

Land use	Parking rate
Multi-dwelling housing (townhouses)	• 1 bedroom unit – 1 space per unit • 2 bedroom unit –1.25 spaces per unit • 3 bedroom unit – 1.5 spaces per unit • Visitor parking – 1 space per 4 units
Seniors apartments	Resident funded development – 2 spaces per 3 self-contained units plus 1 visitor space for every 5 units
Aged care (hostel, nursing and convalescent homes)	1 space per 10 beds (visitors) plus 1.5 spaces per 2 employees plus 1 space per ambulance

For seniors housing and aged care, the KDCP also states "for self contained units, additional visitor parking will not be required if at least half the spaces for residents are unassigned and accessible to visitors." The site is proposed to comply with these requirements and therefore would not require visitor parking spaces for the seniors housing and aged care.

The breakdown of parking spaces required using the parking rates from the KDCP is shown in Table 4.

Table 4 KDCP parking spaces required

Site	No. of apartments	No. of aged care facility suites, staff and ambulances	No. of town houses	Parking requirement	Visitor's parking requirement
Block 1A	72	-	-	48	15
Block 1B	33	-	-	22	7
Block 2A	36	-	-	24	8
Block 3A	-	110 suites 40 staff 1 ambulance	-	21	11
Townhouses	-		63	95	16
Total	**141**	**-**	**63**	**210**	**57**
Total minimum parking spaces required				**267 spaces**	

The indicative masterplan proposes to provide approximately 255 parking spaces at basement levels. In addition, two off-street parking spaces per townhouse are proposed, which equates to 126 parking spaces. Approximately 17 on-street parking spaces are proposed to be distributed around the site for townhouse visitor use. This equates to a total of 398 parking spaces at the site, which exceeds the minimum requirement of 267 parking spaces from the KDCP.

4.2.2 Accessible spaces

The State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 provides parking rates for disabled spaces. Schedule 3 of the policy states that 5% of the total number of car parking spaces must be designed to enable the width of the spaces to be increased to 3.8 metres.

Therefore, of the 398 proposed car spaces, 20 spaces should be designed as such. The spaces would be designed in accordance to AS2890.

4.2.3 Service vehicles

Service areas with 4.5m clearance are proposed to be located in the basement near the aged care facility and the townhouses. The design height is in accordance with the KDCP guidelines. The service areas are proposed to be centralised points for deliveries and larger waste collections.

4.3 Road network analysis

This section investigates the impacts that the site would have on the key Werona Avenue / Stanhope Road intersection. Based on the survey findings discussed in section 2.6.1, the following peak hours (highest traffic volume through the intersection) were found:

- AM Peak - 8am to 9am
- PM Peak - 5pm to 6pm
- Saturday Peak - 11.30am to 12.30pm

For the purpose of this study, the above peak hour times will be used in the traffic modelling.

It is noted that the traffic counts were originally undertaken in 2015. To adjust for background traffic growth between 2015 to 2021, a compound annual growth rate of 3 per cent was applied to the 2015 traffic counts. This is considered conservative as the surrounding land use is primarily low-density residential.

4.3.1 Forecast traffic generation

The *RMS Guide to Traffic Developments* provides indicative traffic generation rates for "Medium density residential flat buildings" and "Housing for aged and disabled persons". The rates recommended are shown in Table 5.

Table 5: Traffic generation rates

Land use	Vehicle trips per dwelling per day	Vehicle trips per peak hour
Medium density residential flat building (town houses)	5 to 6.5	0.5 to 0.65
Housing for aged and disabled persons	1 to 2	0.1 to 0.2

For the purposes of traffic generation within the site, the town houses are considered medium density residential flat buildings and the aged care facility and apartments are considered housing for aged and disabled persons.

Based on the 63 town houses and 251 apartments and aged care facility suites, the site is expected to conservatively generate up to 912 trips per day.

Arrival profile

The existing profile in which residents arrive and leave the site can be assessed based on the weekly tube counts, discussed in section 2.6.2. The traffic generated in each peak hour, by the completion of the site is shown in Table 6.

This is derived by multiplying the daily 912 trips generated, by the proportion of residents arriving during the particular peak hour. As a conservative estimate, it is assumed that trips generated to the site would leave within the same hour.

Table 6 Arrival profile and traffic generated

Peak period	Existing proportion of daily arrivals and departures to site during the hour	Existing two-way trips generated by site during the hour (vehicles)	Trips generated by masterplan (daily trips multiplied by proportion)	Additional trips generated
8am to 9am	3%	13 trips	28 trips	15 trips
5pm to 6pm	7%	38 trips	64 trips	26 trip
11.30am to 12.30pm	10%	29 trips	92 trips	63 trips

4.3.2 Trip distribution

The proportion of trips generated to the site in each direction is shown in Figure 12. It is assumed that a similar split will be adopted for trips leaving the site.

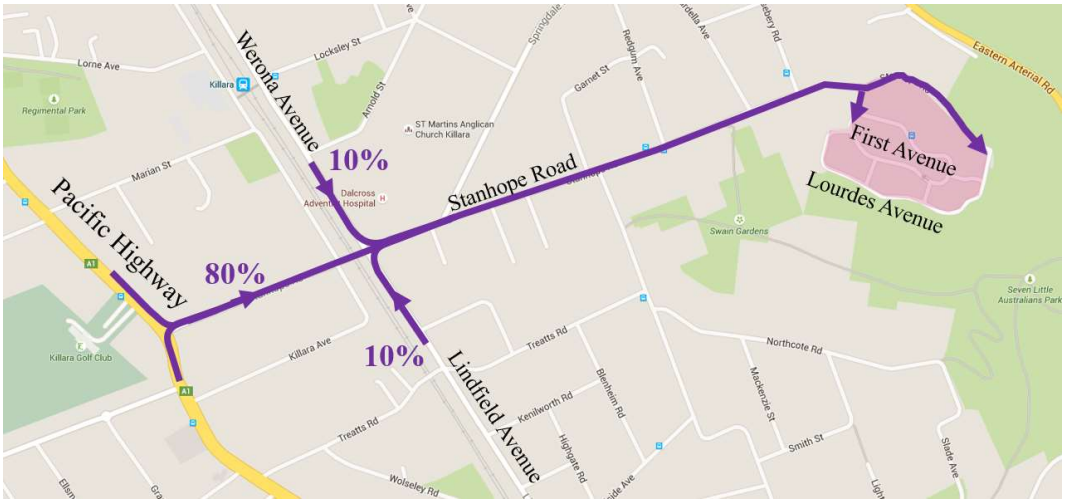

Figure 12 Inbound trip distribution to the site

4.3.3 Traffic modelling

The intersections have been assessed using Transport for NSW approved SIDRA 8.0 software. The existing intersection performance is assessed in this report in terms of the following three factors for each intersection.

- Degree of Saturation
- Average Delay (seconds per vehicle)
- Level of Service

In urban areas, the traffic capacity of the major road network is generally a function of the performance of key intersections. This performance is quantified in terms of Level of Service (LoS), is based on the average delay per vehicle. LoS ranges from A = very good to F = unsatisfactory (see Table 7).

Table 7: Level of service criteria for intersections

Level of Service	Average delay (seconds)	Description
A	Less than 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At Capacity. At signals, incidents will cause excessive delays. Roundabouts require other control mode
F	Greater than 71	Unsatisfactory with excessive queuing

Another common measure of intersection performance is the Degree of Saturation (DoS), which provides an overall measure of the capability of the intersection to accommodate additional traffic. A DoS of 1.0 indicates that an intersection is operating at capacity. The desirable maximum degree of saturation for an intersection is 0.9.

4.3.4 Traffic assessment

The results of the surrounding intersections are summarised in Table 8. This includes the following scenarios:

- Existing traffic conditions scenario to calibrate to existing 2021 traffic conditions
- Existing traffic conditions with addition of site generated traffic

The existing condition of the intersection operates at an efficient level of service B both with and without the proposed development. Based on a conservative modelling approach, the completion of the site is not expected to affect the key intersection of Werona Avenue / Stanhope Road.

Table 8 SIDRA results

Intersection	Scenario		LoS	Delay	DoS
Werona Avenue / Stanhope Road	AM Peak	Existing	B	28	0.660
		Existing+Development	B	28	0.670
	PM Peak	Existing	B	24	0.547
		Existing+Development	B	25	0.569
	Saturday Peak	Existing	B	26	0.488
		Existing+Development	B	26	0.516

5 Conclusion

The site sits within the Ku-Ring-Gai Council Local Government Area. The indicative masterplan will comprise of 141 new units, 110 aged care facility suites and 63 town houses. A new purpose built community centre will also form part of the initial development stage. A traffic and transport assessment has been carried out to examine the existing and future transport issues. The key findings are:

- Tube counts indicate that peak arrivals into the site occurred around 12pm while peak departures occurred around 2pm. This confirms that residents avoid the network peak hours on weekdays.
- The site has an efficient bus route which services the various key locations directly.
- Pedestrian access to the site is generally poor and relatively undesirable given the steep topography of the area. Footpaths along Stanhope Road leading to the site are generally narrow and discontinuous with no pedestrian crossing facilities.

  The master plan proposes the realignment of several internal roads which provides an efficient network to provision the future building arrangements.
- The location of the existing main access is not proposed to be changed and would provide connectivity to the local centre, apartments and aged care facilities. An additional main access is proposed to the west of the existing main access and would provide connectivity to the townhouses to the south. A secondary access is proposed to the east of the existing main access and would facilitate egress from the local centre and provide additional connectivity to the townhouses.
- The existing bus stops within the site are proposed to be maintained. However, the bus stops would be relocated on Main Street near the local centre and would be easily accessible to residents.
- The existing condition of the intersection operates at an efficient level of service B. Based on a conservative modelling approach, the completion of the site is not expected to affect the key intersection of Werona Avenue / Stanhope Road.