report;

Avalon Beach Parking Strategy

For Northern Beaches Council
17 June 2019

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ptc.

Document Control

Avalon Beach Parking Strategy, Report

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1	9th May 2019	Draft	DAD/DS	CL	Michelle Carter Northern Beaches Council
2	17th June 2019	Final – updated with Council comments	DAD	CL	Michelle Carter Northern Beaches Council
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Contact

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1. Executive Summary

The objectives of the Avalon Car Parking Study were to:

- Understand the current parking situation in the Local Government Area (area); demand and supply.

- Identify opportunities for improvement, disposal, retention and enlargement of current supply.

- Ensure supply satisfies demand of various land uses and is utilised efficiently now and in the future.

- Encourage sustainable transport modes and reduce reliance on the motor vehicle.

- Assess the adequacy of the Development Control Plan (DCP) requirements.

However the outcome of this study is only part of the overall steps required to affect meaningful change to the parking situation at Avalon Village. To ensure an equitable and effective outcome, Council should implement a robust framework to manage change. We recommend Council follows the framework detailed in **Figure 1** before implementing any change.
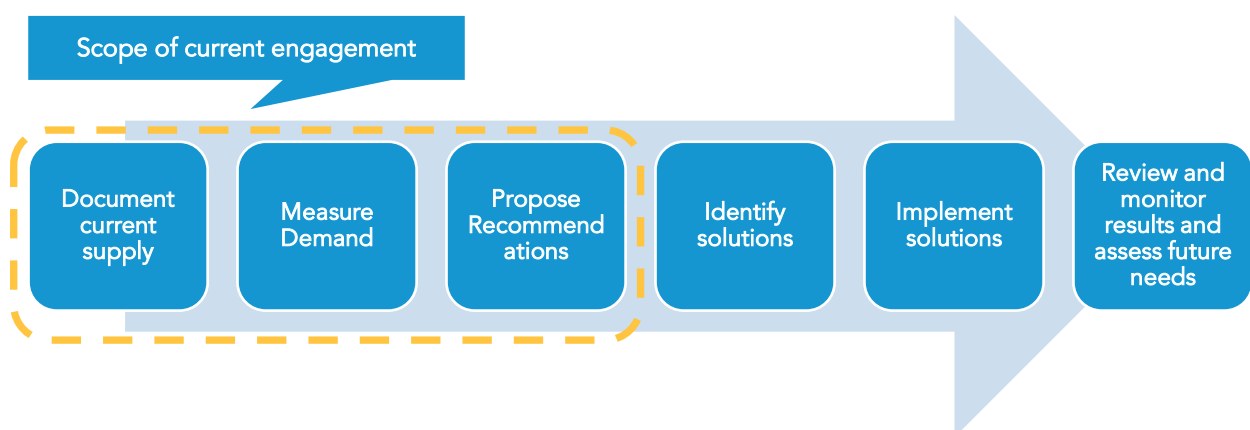
Figure 1 - **ptc**. methodology

1.1 Findings

The broad findings of the parking study / survey undertaken are:

- Off street car parks are operating above practical capacity (>90% occupancy) during peak periods on Weekdays.

- On street parking occupancy is generally well below capacity. However, distribution of the occupancy is not consistent across the Study Area, with streets closest to the commercial centre of the Village exhibiting high occupancy levels.

- Similarly, away from the main commercial centre of the Village, certain unrestricted on street parking supply is underutilised.

- Whilst the drop off arrangements at Avalon Public Primary School are acceptable, pick up arrangements are causing significant congestion issues.

- The area appears to have sufficient number of disable parking spaces

- A relatively high number of parkers in the 1P and 2P spaces appear to be overstaying the time restrictions.

1.2 Recommendations

The following table highlights our recommendations to address the key parking and traffic issues observed within Avalon Village:

Table 1 - Recommendation

No.	Recommendations	Key Potential Initiatives
1	Improve the use of existing supply	• Improve allocation of existing parking spaces, subject to due community consultation • Review time restrictions for on street and off street spaces close to the Village commercial centre • Improve utilisation of on street parking supply through formalizing spaces and adopting technology solutions to improve enforcement policies
2	Encourage more non-car trips - Active & Sustainable Transport	• Collaborate with Transport of NSW and update Council website to promote use of public transport • Establish pedestrian and bicycle pathways identified by the Avalon PAMP • Discuss opportunities for a car share network in Avalon with a reputable provider
3	Increase Parking Supply	• Formalise unofficial spaces near Avalon Beach car park • Formalise paid parking spaces on Avalon Parade, east of Barrenjoey Road
4	Traffic and Physical Improvements	• Change parking restrictions on Old Barrenjoey Road Avalon Public School pick up area • Consider the development of a Travel Access Guide for Avalon Public School • Modify the layout at Old Barrenjoey Road / Avalon Parade junction

2. Introduction

2.1 Background

Avalon Beach is a suburb within the local government area of the Northern Beaches Council, located approximately 37km from the Sydney CDB.

Avalon Village ("Village") is the main commercial area of the suburb and is home to many cafes, alfresco dining and boutique retail shopping options. The Village is also home to a Woolworths supermarket and the local RSL club (Avalon Beach RSL Club) as well as other local community facilities such as the Lawn Bowls club, Community Library and a skate park.

Figure 2 - Avalon Village

The combination of local community facilities and tourist attractions within the area make it a traffic hotspot, particularly during the summer months, which in turn results parking shortage issues.

Council is looking to develop a Place Plan which aims to further integrate the community with the Village and identify areas of investment priorities to improve the traffic and parking issues the Village currently experiences.

The study was based on a new survey of parking volumes, conditions and availability in the Village. This information has been used to assess the current parking supply, future parking demand, and possible locations for additional parking, if required.

2.2 Scope of the Report

The study reviewed the specific context of the Avalon area, current and anticipated future land use patterns and related development growth. The other key focus points of the study were:

- Provide Council with up to date information on the location, quantum and category of existing public parking (both on & off-street);

- Examine the current status of parking in terms of capacity and demand, which may lead to developing future demand for parking to manage the anticipated long-term future growth;

- Identify the best strategy for the management of on-street parking by various methods such as effective parking restrictions to maximise the turn-over of spaces, enforcement techniques, etc.;

- Ensure that the parking provision is equitable and caters for the needs for all users (e.g. people with disability, seniors, kiss & ride, etc.);

- Explore corresponding mechanisms by which constraints to available parking can encourage increased public transport usage, where there is an effective transport choice;

- Explore effective means by which improved public transport can influence parking demand either now or in the future;

- Identify any potential future changes to planning controls which will impact on the provision of parking in the commercial centre (e.g. implementation of appropriate parking rates in the DCP).

2.3 Study Area

The scope of this Parking Strategy encompassed an area within approximately a 400m radius of the Village ("Study Area"). The areas analysed as part of this study are illustrated in **Figure 3**.

No	Off Street Car Parks
CP1	Woolworths
CP2	44 Avalon Parade
CP3	RSL & Bowling Club
CP4	Avalon Beach

Figure 3 - Study Area

2.4 Parking Inventory

The existing parking inventory was documented for the Study Area in terms of location and number of spaces as well as the applicable restriction.

The location of these spaces by their respective types is highlighted in **Figure 4** below.

Figure 4 - Parking Inventory Map

2.4.1 Off Street Car Parks

There are four off street car parks within the Study Area (as identified in **Figure 3**). The inventory of these car parks are identified in **Table 3** below.

Table 2 - Off Street Car Park Inventory

Car Park	Unrestricted	3P Weekday / 2P Weekend	Ticketed	Disabled	Motorcycle	Total
CP1- Woolworth		75		4	1	**80**
CP2 - 44 Avalon Parade	31	73		3	1	**108**
CP3 - RSL & Bowling Club	86			3		**89**
CP4 - Avalon Beach	13[1]		66	2	2	**83**
Total	**130**	**148**	**66**	**12**	**4**	**360**

The only off-street parking spaces that require payment are located at CP4-Avalon Beach car park via a pay and display ticketed system.

The number of Disabled parking spaces relative to the total capacity at each car park exceeds the Building Code of Australia requirements[2], which calls for 1 accessible car space for every 50 car spaces for the first 1000 spaces, and 1 in every 100 in excess of 1000 spaces.

2.4.2 On Street Parking Spaces

There are a total 868 off street parking spaces within the Study Area.

Table 3 - On Street Car Parking Inventory

Street	Unrestricted	Restricted	Disabled	Others	Total
Avalon Parade	63	98	1	8	**170**
Barrenjoey Road	20	14		3	**37**
Bellevue Avenue	85	18	2	1	**106**
Central Road	67	9[3]	1	2	**79**
Dress Cir Road	26				**26**
Edmund Hock Avenue		29[4]		5	**34**

[1] On-dirt spaces

[2] NCC2016 Vol. 1 Table D3.5

[3] five of these spaces are not available for parkers between 6pm to 8pm on Saturday and 8am to 10am on Sunday.

[4] 19 of these spaces are not available for parkers between 8.30am to 6.00pm on Weekdays and between 8.30am to 12.30pm on Saturday

Street	Unrestricted	Restricted	Disabled	Others	Total
Elouera Road	53				**53**
Kevin Avenue	25				**25**
Koala Place	19				**19**
Old Barrenjoey Road	28	171	3	6	**208**
Sanders Lane	13	2			**15**
Surfside Avenue	21				**21**
The Crescent	70				**70**
Wickham Lane	5				**5**
Total	**495**	**341**	**7**	**25**	**868**

The majority (57%) of the on street spaces within the Study Area are unrestricted, although it is noted that they are largely located at the periphery of the Village (Please see **Figure 4**).

The only on-street parking spaces that require payment are located on Avalon Parade east of Barrenjoey Road, also via a pay and display ticketed system.

Table 4 - Other spaces

Street / Area	Bike Rack	Bus Zone	Loading Zone	Mail Zone	Total
Avalon Beach	1				**1**
Avalon Parade	1	5	2	1	**9**
Barrenjoey Road		3			**3**
Bellevue Avenue		1			**1**
Central Road		2			**2**
Edmund Hock Avenue			5		**5**
Old Barrenjoey Road		4	2		**6**
Total	**2**	**15**	**9**	**1**	**27**

3. Document Review

We undertook a review of the relevant literature provided by Council to ensure a comprehensive understanding of the context of the study, including:

- Walk Avalon - Avalon Pedestrian Access and Mobility Plan (PAMP) 2017

- My Place: Avalon - Spotlight on Avalon - Snapshot and community engagement summary (Version 1 2019)

- Move – Northern Beaches Transport Strategy 2038 (Draft)

- Avalon Village – Snapshot 2018

- Avalon Parade Traffic Count data (Feb 2018)

- Sanders Lane Kerb Extension plans

We also conducted a review of the parking provision requirements associated with new commercial developments in Avalon, as stipulated within the Council DCP which govern parking in the Study Area. With reference to the up to date version of the *RMS Guide to Traffic Generating Developments*, some of the car parking requirements within the current DCP appears to be relatively inadequate (refer to **Table 5**). Given the limited public transport options within the Local Government Area, lower parking requirements for new restaurants / cafés and retail premises, may lead to shortage of on-street parking availability within the town centre.

Table 5 - DCP Parking Rates Compared with RMS Parking Rates

Land Use	DCP Car Parking Requirement	RMS Guide Parking Requirement
Business and Commercial Premises	2.5 spaces per 100m² GFA	1 space every 40m² GFA
Restaurants and Cafés	1 space every 30m² GFA	15 spaces every 100m² GFA or 1 space every 3 seats (whichever is greater)
Retail Premises	1 space every 30m² GLA	6.1 spaces every 100m² GLFA for developments under 10,000m² GLFA

4. Demographic Review

The following sections discuss key characteristics of the Avalon Beach / Northern Beaches population that are likely to influence parking demand at the Village. Please refer to **Attachment 1** for details of the statistics referred to in the subsequent sections.

4.1 Population Change

Figure 5 below illustrates population of Avalon is expected to decline marginally in the future from an estimated 11,205 residents in 2019 to approximately 11,121 by 2036 (0.75% decline)[5].
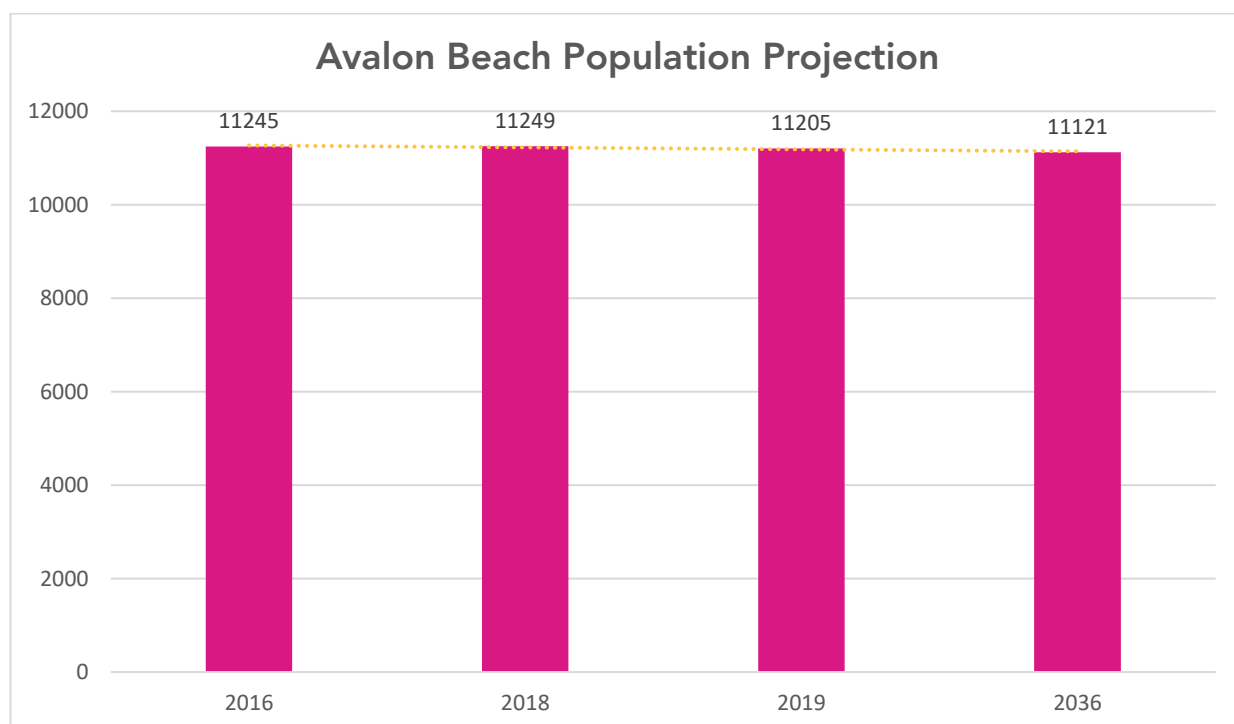
Figure 5 - Avalon Beach Population Projection

4.2 Population Age Distribution

44% of Avalon residents are aged over 50 years which, compared to 35% in the Northern Beaches area and 31% in Greater Sydney, suggests a relatively older population. Furthermore, this category of residents is also the fastest growing segment in the area (5.6% growth between 2011 and 2016).

4.3 Journey to Work

Journey to Work data from the 2016 Census is only available at a Local Government Area (LGA) level. As such we have analysed the data for Northern Beaches LGA as a proxy for Avalon.

The majority of Northern Beaches residents work within the local LGA (52.1%), whilst the remaining are largely employed either in Sydney (18.6%) or generally in the North Shore region of Sydney (15.5%[6]).

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[5] Source: Population and household forecasts, 2016 to 2036, prepared by .id, the population experts, November 2017.

[6] North Sydney + Willoughby + Ryde + Ku-ring-gai + Mosman

Similarly, the majority of workers within the Northern Beaches LGA are residents of the LGA (76.7%).

4.4 ABS Method of Travel to Work and Vehicle Ownership Data

Avalon Beach residents are more car dependent (63.7%) than their counterparts in the Northern Beaches (57.9%) and Greater Sydney (56.6%) by a considerable margin. It is noted that whilst public transport usage is growing (Train: 0.4% and Bus: 0.8% growth between 2011 and 2016), overall car mode share is also the fastest growing (1.6% growth between 2011 and 2016) transport option for local residents.

A more significant proportion of Avalon residents (12.8%) work from home compared to residents of the Northern Beaches Council (7.1%) and Greater Sydney (4.4%).

Given the lack of train network in the LGA, bus services are the primary form of public transport used by local residents.

The high car dependence of Avalon Beach residents is also reflected in motor vehicle ownership per household, with the proportion of households with 2 or more motor vehicles (66%) being significantly higher than the same within the Northern Beaches (53%) and Greater Sydney (46%). The number of households with 3 or more motor vehicles is also the fastest growing category within Avalon Beach.

4.5 Summary

Similar to most outer-suburban areas in Australia, Avalon Beach / Northern Beaches exhibit a high level of car dependency amongst residents.

Whilst a relatively stable population should not contribute to a significant increase in parking demand within the Village in future, the demand from shorter stay parkers (for example retirees) may increase over the medium term. Furthermore, a continued increase in number of household with three or more motor vehicles may also contribute towards an increase parking demand at Avalon Village.

5. Existing Transport & Accessibility

5.1 Public Transport Network

There are no train networks servicing the Northern Beaches LGA. As such, the primary public transport option for residents and visitors are bus services.

5.1.1 Scheduled Bus Services

There are nine bus stops within the Study Area as highlighted in **Figure 6** below.
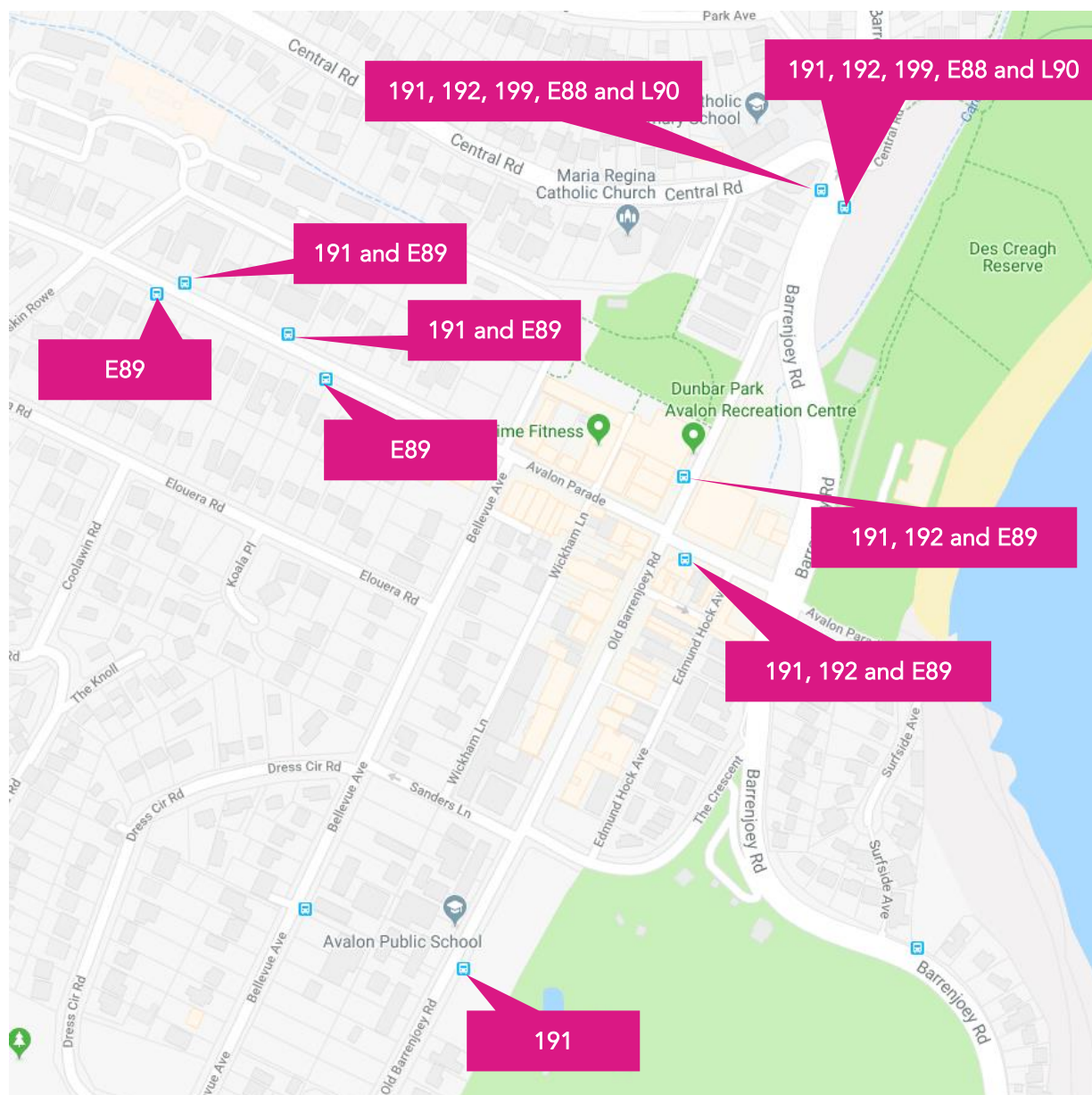
Figure 6 - Location of bus stops within the Study area

Table 6 below details the bus routes currently servicing the Study Area.

Table 6 - Bus Route Summary

Bus Route	Coverage	Operation
191	Avalon Beach to Taylors Point (Loop Service)	Mon- Sun, every 30 mins
192	Avalon Beach to Stokes Point (Loop Service)	Mon- Sun, every 30 mins
E89	Avalon Beach to City Wynyard (Express Service)	Mon-Fri: 4 services every 20 mins (6.21am to 7.22am)
E89	City Wynyard to Avalon Beach (Express Service)	Mon-Fri: 4 services every 30 mins (4.55pm to 6.32pm)
199	Manly to Palm Beach	Mon-Fri, every 15 mins Sat-Sun, every 15 to 30 mins
E88	North Avalon Beach to City Wynyard (Express Service)	Mon-Fri, every 10 to 30 mins (5.03am to 8.36am)
E88	City Wynyard to North Avalon Beach (Express Service)	Mon-Fri, every 10 to 30 mins (4.07pm to 8.07pm)
L90	Palm Beach to City Wynyard (Limited Stops)	Mon-Sat, approximately every 60 mins
719N	Avalon Public School to Barrenjoey High School	Mon-Fri, 1 service, 8.10am to 8.39am
715N	Barrenjoey High School to Avalon Public School	Mon-Fri, 1 service, 8.38am to 9.04am

A graphical representation of the bus routes within Avalon is presented in **Figure 7** below.
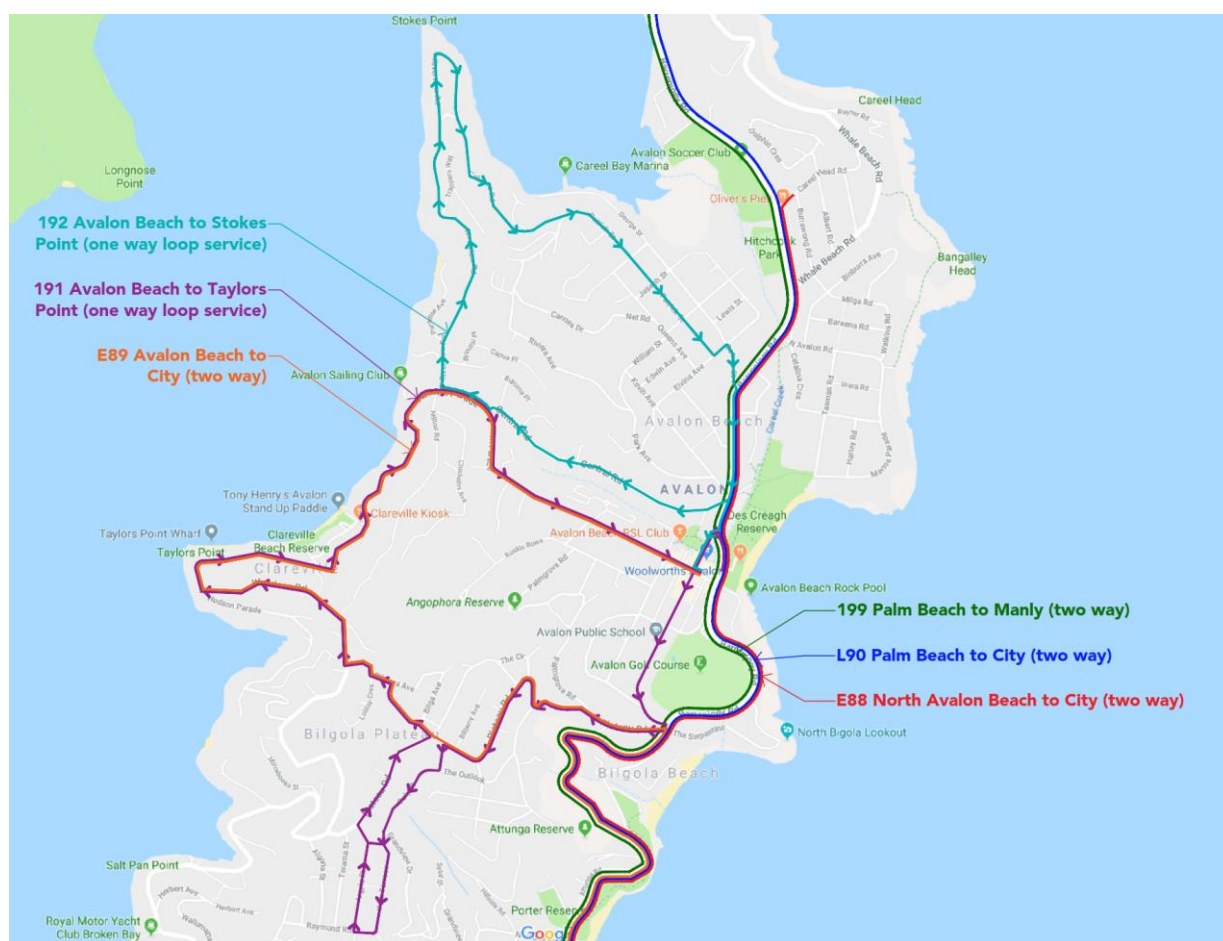
Figure 7 - Avalon Bus Routes

5.1.2 Keoride

Keoride is an on demand service that connects passengers between Palm Beach and North Narrabeen to bus stops on the Northern Beaches B-Line. The service picks up customers from either customer homes, a designated point of interest within the service area or the nearest bus stop and transports them directly to the closest B-Line transport hub at Narrabeen, Warriewood or Mona Vale.

We attempted to contact Keoride to obtain feedback on the adoption of this service within Avalon, however we did not receive a response.

5.1.3 Summary

From the layout of the bus stops and bus services, it appears that they satisfy the 800-metre walking distance catchment[7].

A review of the Avalon Public School Travel Survey comments (Refer **Attachment 3**), indicated that the reason most parents gave for not using the bus was "bus services are not reliable".

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[7] Within a 10-minute potential walkability as defined by *RMS Planning Guidelines for Walking and Cycling 2004*

5.2   Council Pedestrian Access and Mobility Plan (PAMP)

Council provided us with a copy of the current Pedestrian Access and Mobility Plan (PAMP), which was prepared in July 2017. The community engagement conducted as part of the study, indicated that 54% of respondents do not walk more often due to the lack of marked or dedicated footpaths on local roads.

The site audits conducted as part of the PAMP identified the following key pedestrian access issues within the Study Area:

- Poor quality footpath surfaces

- Pedestrians crossing busy roads at non-permitted crossing locations

- Missing pedestrian links

- Lack of pedestrian crossings

- Poor quality pedestrian crossings

- Street furniture or overgrown vegetation in footpaths, blocking the path of pedestrians

- Lack of disabled or pram access

The PAMP outlines recommended actions to be implemented in relation to pedestrian access throughout the area. The proposed actions include installation of new pedestrian refuges / upgrade to pedestrian refuges, signalised pedestrian crossings, wombat crossing, and constructing new footpaths.

The lack of pedestrian pathways was also mentioned by   parents responding to the Avalon Public School Travel Survey conducted as part of this study (See **Attachment 3** for details).

6. Parking Surveys

In order to gain an understanding of the existing parking supply and demand for each Study Area, we conducted parking surveys within the Study Area identified in **Figure 3**.

Avalon Beach is a popular holiday destination. Since the survey was undertaken post the peak summer period, it is recommended that additional surveys be undertaken during a peak summer period to highlight any potential issues that may arise due to increased demand from tourists visiting the Study Area.

6.1 Methodology

We undertook hourly Licence Plate surveys over a period of seven days from Thursday 4th April 2019 to Wednesday 10th April 2019 between 7am-7pm.

A five person survey team collected data in order to determine:

- The occupancy for each street and car park;

- The average length of stay (ALOS) of each vehicle parking on street and in off street car parks;

- The volume of cars in each time restriction bracket; and

- The turnover for each street and car park.

The survey results are detailed in **Attachment 1** (Tableau File) and can be interrogated by day, by car park/street, by bay type, by time and by different user type (Short Stay <= 3 hours, Medium Stay 3-6 hours, and Long Stay >= 6 hours) using the free Tableau Reader, which can be obtained via the following link:

https://www.tableau.com/products/reader/download

6.2 Occupancy Surveys Results

6.2.1 Weekday Occupancy
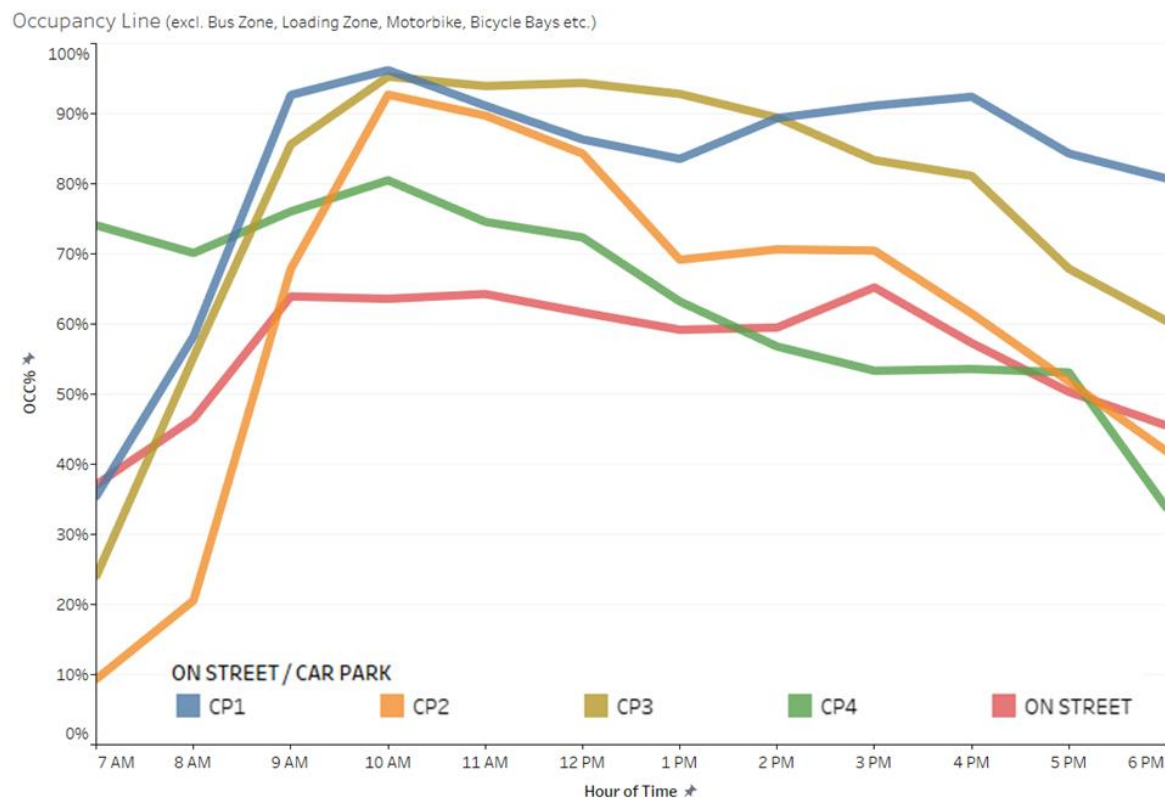
Figure 8 – Occupancy % by Time (Weekday Average)

Whereas CP1, CP2 and CP3 exhibit a similar occupancy pattern, the occupancy levels at CP4 are lower as it is the only car park with paid parking and is located further away from the commercial area in the Village.

CP1 (Woolworths) has a relatively consistent and high occupancy rate throughout an average weekday operating largely over 80% occupancy from 8.30 am onwards. This trend is expected as Woolworths is the only large supermarket in the area and is likely to generate high turnover short term parking demand.

Whilst on street occupancy on a typical weekday does not surpass 70%, the distribution of this occupancy is not spread evenly throughout the Study Area. As expected, the streets closest to the commercial centre of the Village have a much higher occupancy than the streets further away (Refer **Table 7** below).

Table 7 - On Street Parking Weekday Average Occupancy Comparison

Street	Section	Weekday Average Occupancy
Avalon Pde	From Barrenjoey Rd to Bellevue Ave	80.1%
Old Barrenjoey Rd	From Barrenjoey Rd to The Crescent	75.0%
Other Streets		47.0%

Graphically, the occupancy of on-street spaces on Wednesday is illustrated in Figure 9 below:

Figure 9 - On Street Occupancy Heat Map (8am, 11am, 2pm and 5pm Wednesday)

6.2.2 Weekend Occupancy

Occupancy Line (excl. Bus Zone, Loading Zone, Motorbike, Bicycle Bays etc.)
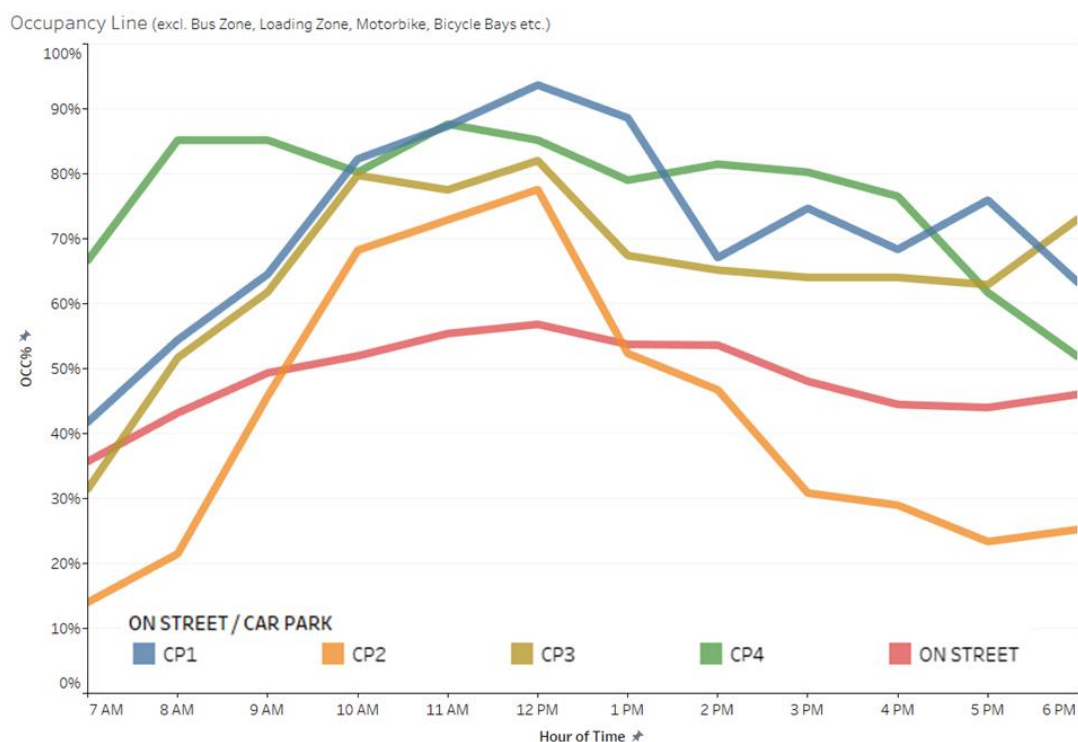
Figure 10 – Occupancy % by Time (Saturday)

Occupancy Line (excl. Bus Zone, Loading Zone, Motorbike, Bicycle Bays etc.)
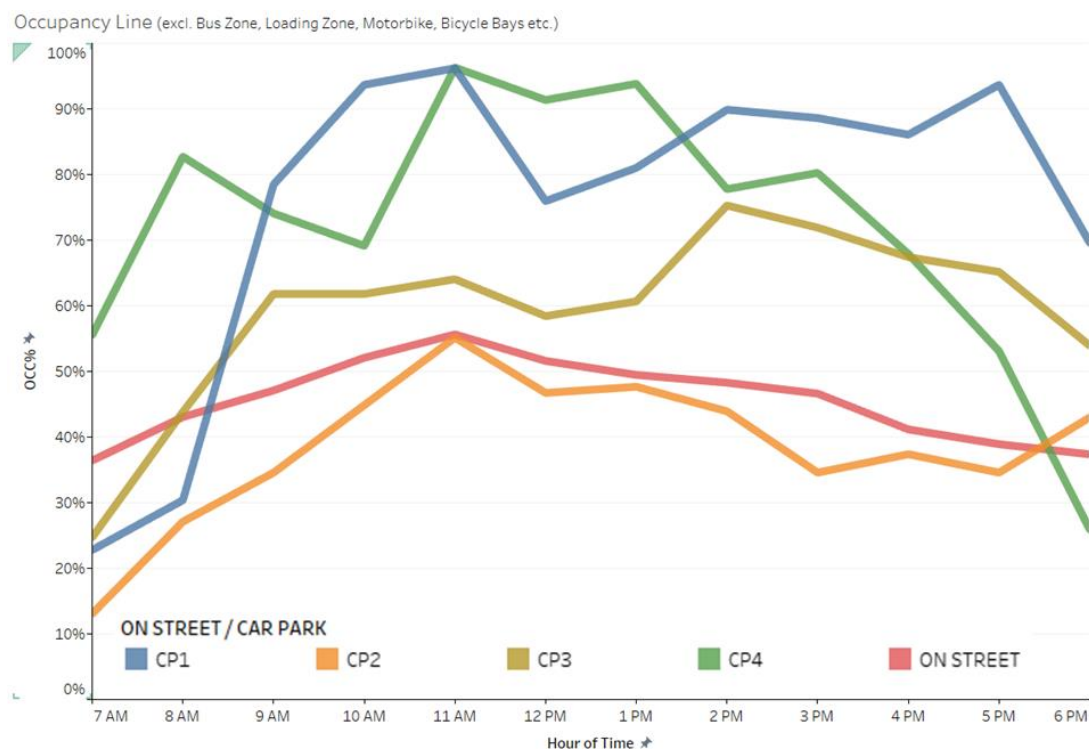
Figure 11 – Occupancy % by Time (Sunday)

Overall occupancy within the Study Area on weekends is lower than weekdays, with peak occupancy generally occurring between 11am and 12 pm.

We note that occupancy rates in CP2 and CP3 on Sunday are significantly lower than on Saturday.

6.2.3 Summary

Table 8 - Peak Occupancy by Location

Location	Average Weekday (10am)	Saturday (12 pm)	Sunday (11 am)
CP1-Woolworths	96.5%	93.7%	96.2%
CP2 - 44 Avalon Parade	92.7%	77.6%	44.9%
CP3 - RSL & Bowling Club	95.3%	82.0%	64.0%
CP4 - Avalon Beach	80.5%	85.2%	96.3%
On - Street	63.7%	56.8%	55.6%
Total	**72.0%**	**64.9%**	**61.6%**

On weekdays, the peak occupancy of all car parks except the Avalon Beach car park was in excess of practical capacity[8], whilst only CP1 and CP4 were operating over (or near) practical capacity at weekend peaks.

The following table summarises the peak occupancy on a "Typical" weekday by user type.

Table 9 - Peak Occupancy by User Type - Weekday Average

Location	Long Stay (>6 Hours)	Short & Medium Stay (<=6 Hours)	Total
CP1-Woolworth	2	75	77
CP2 - 44 Avalon Parade	17	83	100
CP3 - RSL & Bowling Club	53	31	84
CP4 - Avalon Beach	21	45	66
On - Street	221	**304**	525
Total	**314**	**538**	**852**

Whilst only a relatively small propotion of long stay parkers (22%[9]) were in CP2 and CP3, they nevertheless occupy 36%[10] of the capacity of these car parks, which are located close to the commercial centre in the Village.

For example at peak on Wednesday the spaces identified by the red dots in the diagram below (**Figure 12**) were occupied by long stay parkers.

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[8] Assumed to be 90% for a car park without dynamic signage.

[9] 70/314

[10] 70/197
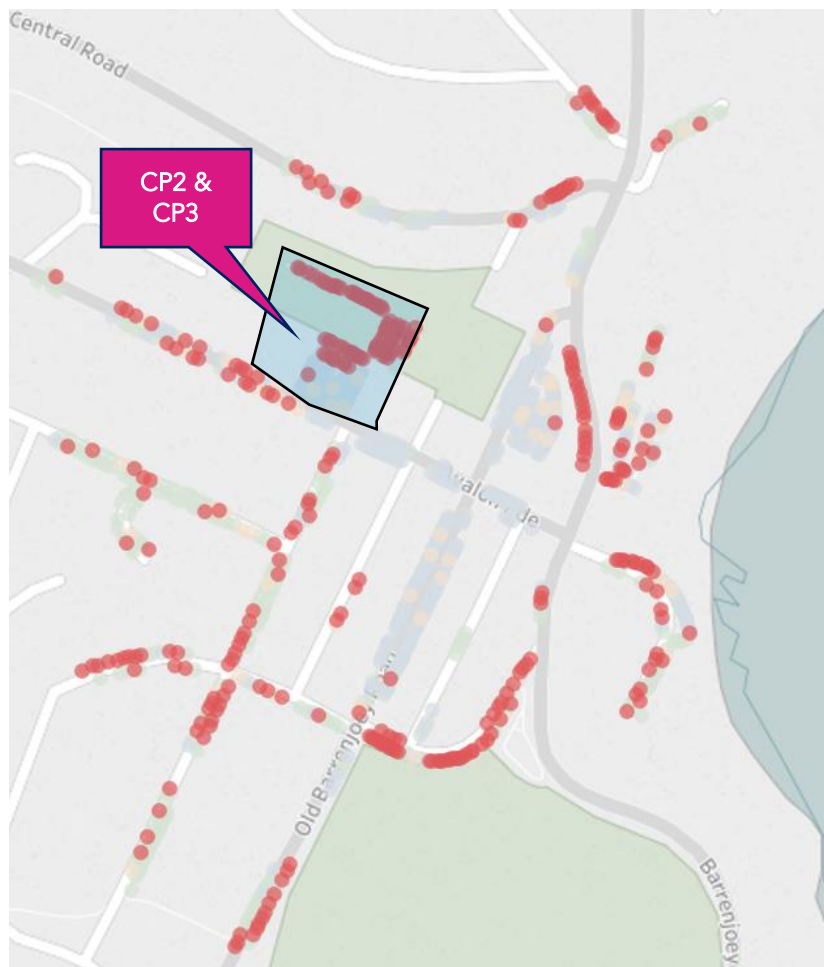
Figure 12 - Spaces occupied by long stay parkers (red dots) at peak on Wednesday

In a town centre such as the Village, we would expect shorter parking stays in the more conveniently located spaces which would have a higher turnover and longer stay parkers parking in lower turnover spaces further from the commercial centre.

6.2.4 Average Length of Stay

Average Length of Stay (ALOS) is the average period of time a car is parked in a particular car space. The longer a car is parked in a space, the fewer times each space can turn over (i.e. become available for new parkers).

The following table shows that the overall ALOS of all spaces was similar on weekdays (2.26 hours) and Sunday (2.23 hours) but slightly lower on Saturday at 2.03 hours. CP3 (RSL & Bowling Club) had the longest ALOS on all days, while CP1 (Woolworths) always had the shortest ALOS, likely due to:

- All spaces in CP3 being unrestricted; and

- CP1 serving a specific retail demand (i.e. Woolworths customers).

Table 10 - Average Length of Stay (hours/car)

Location	Average Weekday	Saturday	Sunday
CP1-Woolworth	1.37	1.21	1.19
CP2 - 44 Avalon Parade	2.02	1.77	1.96
CP3 - RSL & Bowling Club	4.46	3.56	3.39
CP4 - Avalon Beach	2.26	1.78	1.92
On - Street	2.34	2.18	2.56
Total	**2.26**	**2.03**	**2.23**

The following graphs show the number of cars by parking duration (0-12 hrs) for both on-street and off-street spaces[11] for weekday average, Saturday and Sunday respectively.

Figure 13 - Length of Stay Distribution - Weekday Average

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[11] Excluding Bus Zone, Loading Zone, Motorbike, Bicycle and No Parking/No Stopping spaces.

Length of Stay Distribution - Saturday
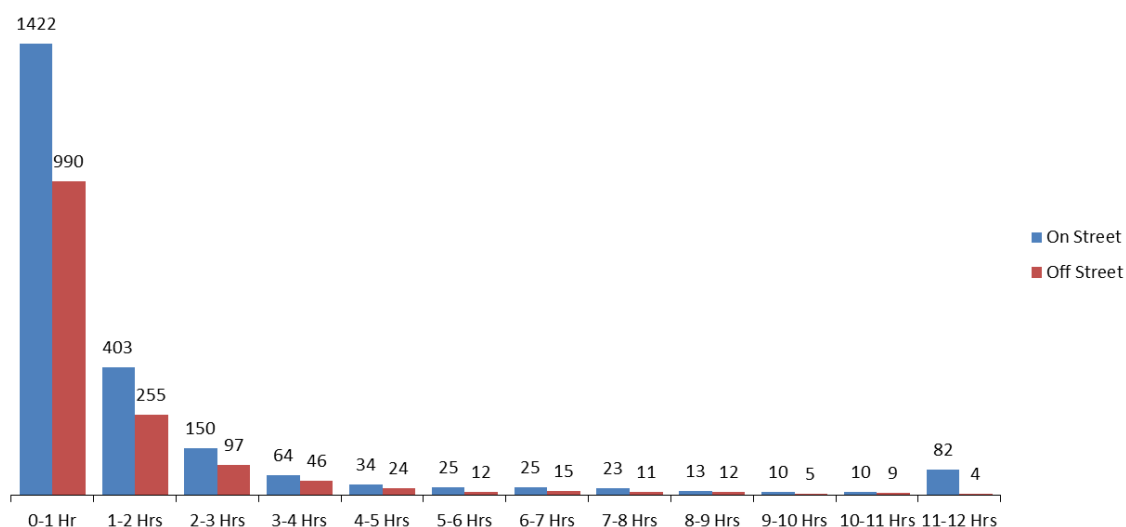
Figure 14 - Length of Stay Distribution - Saturday

Length of Stay Distribution - Sunday
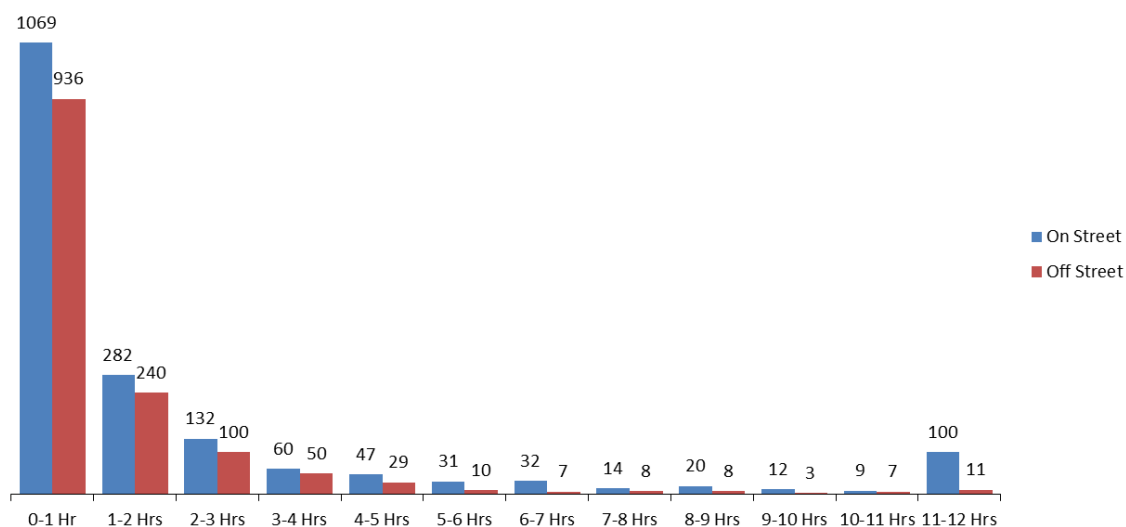
Figure 15 - On Street Average Length of Stay Distribution - Sunday

The results indicate that the modal length of stay was 0-3 hours (85%[12] on weekdays, 89%[13] on Saturday and 86%[14] on Sunday), whilst only 9%[15] (weekdays), 6%[16] (Saturday) and 7%[17] (Sunday) vehicles stayed longer

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[12] 3,238 / 3,792 = 85%

[13] 3,317 / 3,741 = 89%

[14] 2,759 / 3,217 = 86%

[15] 331 / 3,792 = 9%

[16] 219 / 3,741 = 6%

[17] 231 / 3,217 = 7%

than 6 hours. These long stay parkers are assumed to be staff, local workers, contractors, commuters and/or residents.

6.2.5 Turnover

Parking space turnover refers to the average number of times a car space is occupied over a day (total cars divided by total spaces).

The following table summarises the turnover rates by locations for weekday average, Saturday and Sunday.

Table 11 - Turnover rates (cars/space) by Location

Location	Weekday Average	Saturday	Sunday
On-street Parking	2.88	2.68	2.14
CP1 – Woolworth	7.16	7.10	7.63
CP2 – 44 Avalon Pde	3.62	2.86	2.36
CP3 – RSL & Bowling Club	2.07	2.19	2.09
CP4 – Avalon Beach	3.38	5.16	4.53
Total	3.21	3.12	2.68

Turnover rates were similar on weekdays (3.21 cars) and Saturday (3.12 cars) and slightly lower on Sunday (2.68 cars) indicating less visitors/activities at Avalon Village on Sundays.

As expected, the turnover of CP1- Woolworths was significantly higher than other car parks and on-street parking spaces across all days, which is mainly because:

- It has the highest utilisation rate (generally over 90% on weekdays, over 75% on Saturday and over 80% on Sunday),

- It provides the most convenient parking spaces for shoppers (i.e. short stay parkers), and

- There is no unrestricted parking provided (3P weekdays / 2P weekend).

6.2.6 Overstay

Table 12 below highlights the on-street and off-street incidents of overstay by space type on a "typical" weekday.

Table 12 - Level of Overstay - Weekday Average

Space Type	On-Street All Vehicles	On-Street Overstay Vehicles	% of Total On-Street Vehicles	Off-Street All Vehicles	Off-Street Overstay Vehicles	% of Total Off-Street Vehicles
1P	749	104	13.9%	N/A	N/A	N/A
2P	746	72	9.7%	N/A	N/A	N/A
3P	N/A	N/A	N/A	849	28	3.3%

Space Type	On-Street All Vehicles	On-Street Overstay Vehicles	% of Total On-Street Vehicles	Off-Street All Vehicles	Off-Street Overstay Vehicles	% of Total Off-Street Vehicles
4P	12	1	8.3%	N/A	N/A	N/A
Total	1,507	177	11.7%	849	28	3.3%

On-street parkers in shorter time restricted spaces (1P and 2P) were the least compliant parkers (13.9% and 9.7% vehicles overstayed respectively), while only 3.3% parkers stayed longer than 3 hours in 3P spaces in off-street car parks (CP1-Woolworths and CP2- Avalon Parade).

6.2.7 Disabled Parking

Figure 16 below highlights the observed occupancy of all the accessible parking spaces within the Study Area.
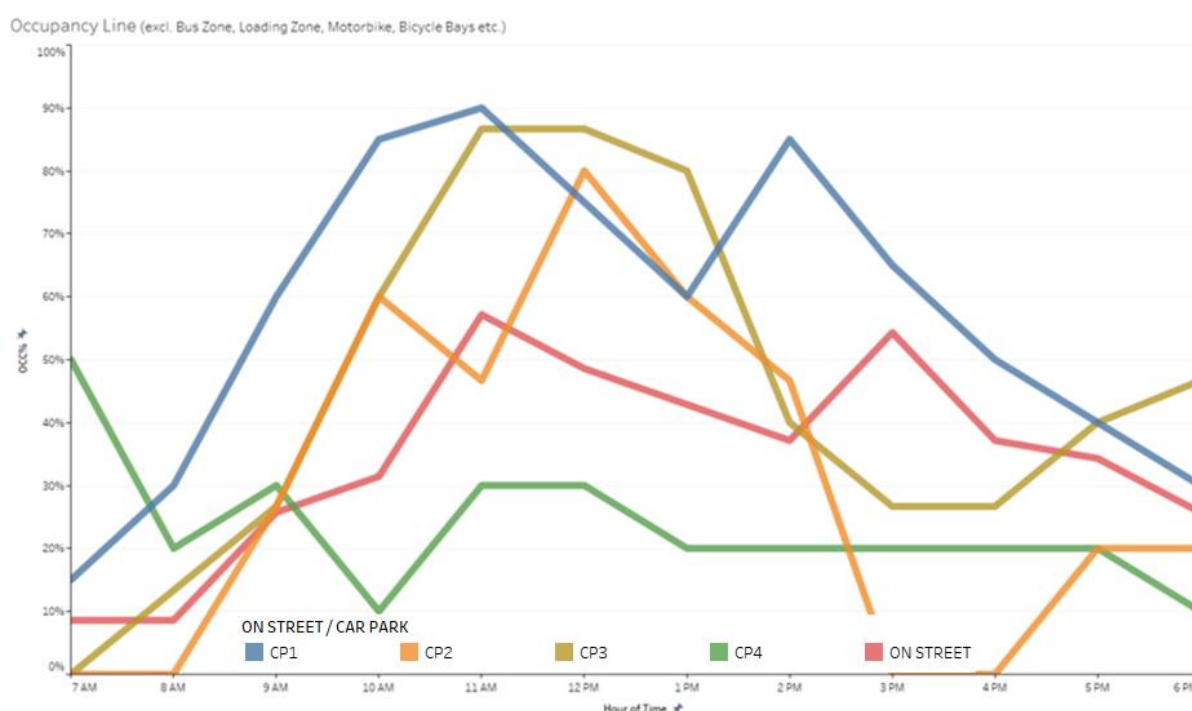
Figure 16 - Average Weekday Occupancy of Disabled Spaces

Based on the chart above, it appears that there is an adequate number of Disabled parking spaces within the Study Area as occupancy does not seem to exceed 90% (on average) anytime of the day on Weekdays. Weekend occupancy of disabled spaces was generally lower. However Council should monitor this closely, as Avalon Beach has a relatively older population (Refer Section 4.2) and the demand for Disabled parking spaces could increase over time.

6.2.8 Key Findings

Key findings from our surveys are summarised below:

- Whilst the overall occupancy within the Study Area was approximately 72% on weekdays and between 65% and 62% on weekends, the distribution of the occupancy levels, particularly of on street spaces, is not even.

- On street spaces closest to the town centre had a higher occupancy level than spaces further away (Refer **Table 7** above).

- The occupancy for all off street car parks at peak on weekdays, with the exception of CP4 (Avalon Beach) was above practical capacity (> 90%). On-street spaces during weekday peak averaged 63.7%.

- At peak, 36%[18] of spaces in CP2 and CP3 were occupied by long stay parkers, thus reducing the supply available to short stay parkers (i.e. shoppers).

- On all days, CP3 (RSL & Bowling Club) exhibited the longest ALOS; whilst CP1 (Woolworths) had the shortest ALOS. This is expected as all spaces in CP3 are unrestricted and CP1 provides the most convenient parking option for shoppers (retail customers in particular).

- For all vehicles parked in both on street and off street spaces, the modal length of stay was 0-3 hours (85%[19] on weekdays, 89%[20] on Saturday and 86%[21] on Sunday)

- Turnover rates were similar on weekdays (3.21 cars) and Saturday (3.12 cars) but slightly lower on Sunday (2.68 cars).

- The non-compliance levels (i.e. overstay) at time restricted on-street 1P and 2P spaces (13.9% and 9.7% respectively) on weekdays were significantly higher than that of 3P spaces in car parks (only 3.3%).

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[18] 70/197

[19] 3,238 / 3,792 = 85%

[20] 3,317 / 3,741 = 89%

[21] 2,759 / 3,217 = 86%

7. Avalon Public School Survey

To assist in the assessment and observation of the traffic operation, parking demand and travel characteristics within and around the school, parents/guardians were surveyed via an online survey. The survey was issued to both Avalon Public Primary School ("Avalon Public") and Maria Regina Catholic Primary School. However no responses were received from the latter.

The online survey was open from 5th to 23rd April 2019. The full presentation of the survey output is in **Attachment 3**.

There were a total of 221 survey responses equating to approximately 25%[22] of total enrolments at Avalon Public and therefore considered to be statistically valid. The responses were generally evenly distributed across Kindergarten to Year 5, with the percentage of Year 6 student parents being the lowest (see **Figure 17** below).

1. What year group is your child in?
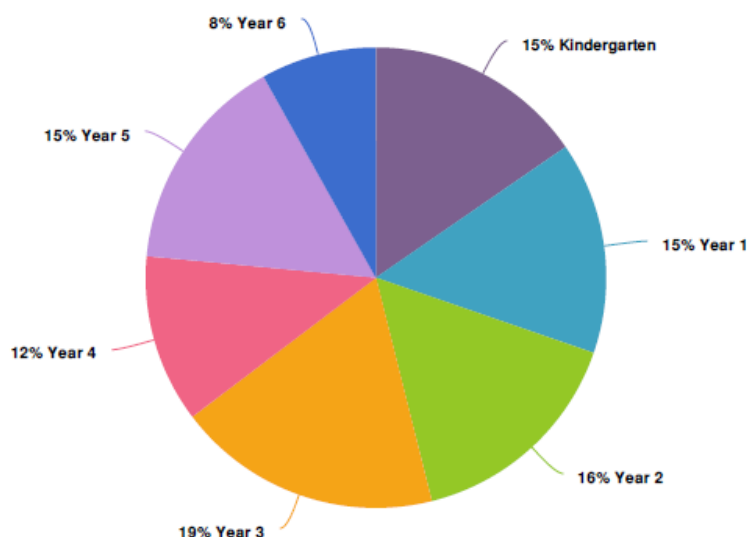
Figure 17 - Year Group of Survey Responses

7.1 Journey to School

As illustrated in **Figure 18**, majority of the student population are general driven to school (65%) either by their parents or a member of another family. 14% of the total indicated that their children walk to school, whilst 11% indicated that their children cycle or scooter. Only 10% of students catch the bus to school.

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[22] Total enrolment 871 (https://www.goodschools.com.au/compare-schools/in-AvalonBeach-2107/avalon-public-school)

14% Walk
10% Cycle
1% Scooter
10% Bus
4% Car (passenger with another family)
61% Car (with parents)
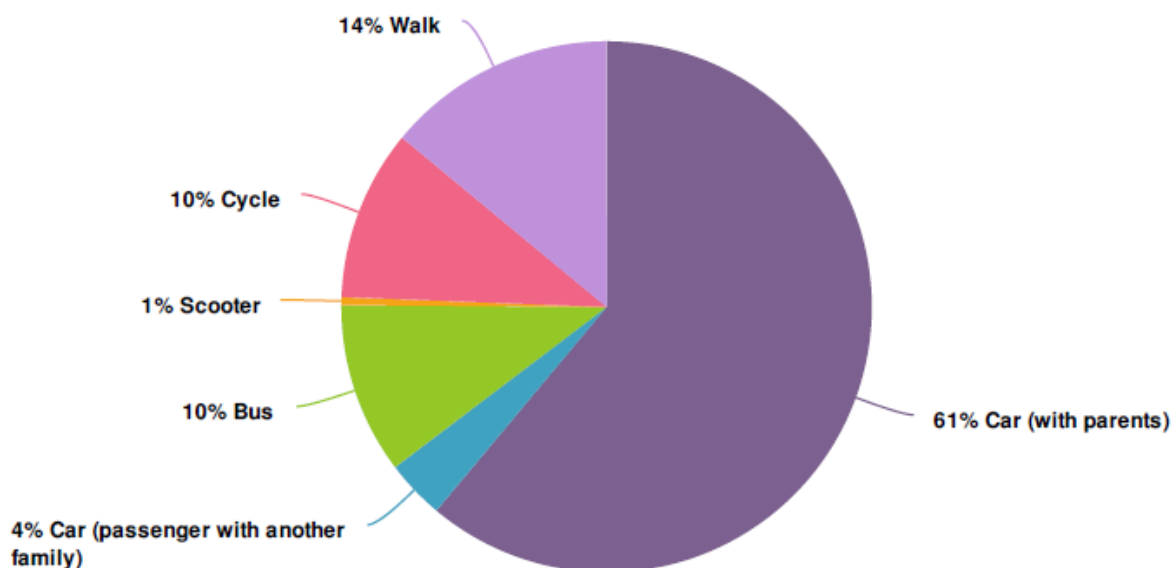
Figure 18 - Student Journey to School Characteristics

Respondents were also asked as to why they prefer the car as the method of transport to school. The dominant reasons seem to be because they generally drop the children at school on the way to work or other tasks that require a car, or mainly because of convenience. Given that the school caters to primary students, safety also seems to be an important consideration why alternate modes of transport such as the bus and walking / cycling is not being considered.

7.2 Journey from School

On a typical afternoon, survey shows that car is still the dominant form of transport for students. However larger number of students appear to opt for the bus on the return journey home, compared to the journey to school. This could potentially be due to the unavailability of a parent to pick them up due to work schedules. This is illustrated in **Figure 19**.
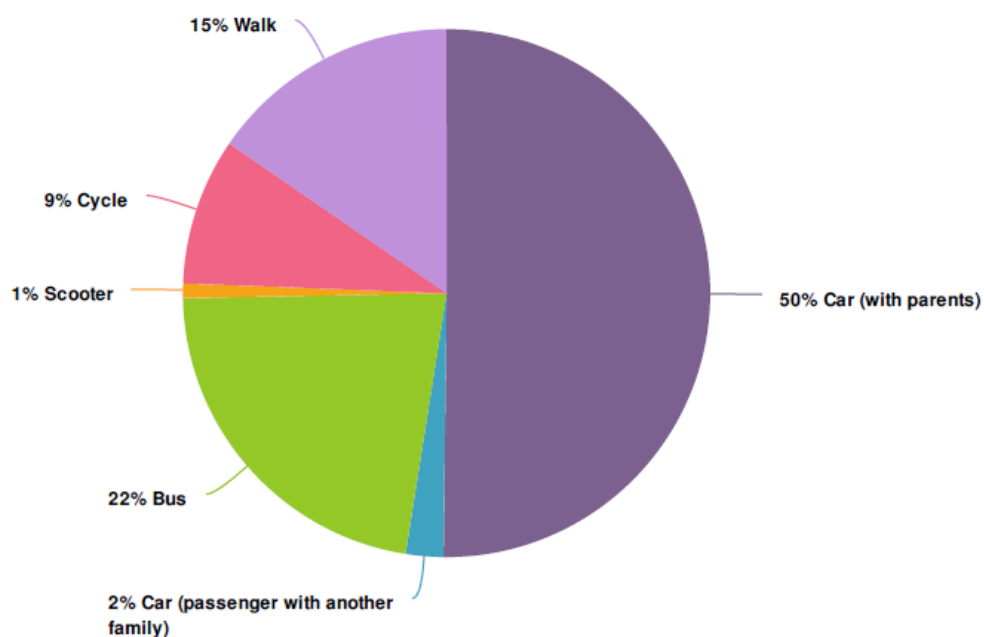
Figure 19 - Student Journey from School Characteristics

The dominant reason for picking up students from school appears to be the same as those given for dropping them off at school (i.e. Need to utilise the car for other purposes and concern for student safety).

7.3 Carpool Culture

As part of the survey, students were asked the question "If you travel to/from school by car, how many other Avalon Public School students travel with you?" The answers are illustrated on **Figure 20** and **Figure 21**. Carpooling is an option for students to travel to school. The majority of students being dropped off or picked up to / from school share a ride with other students.
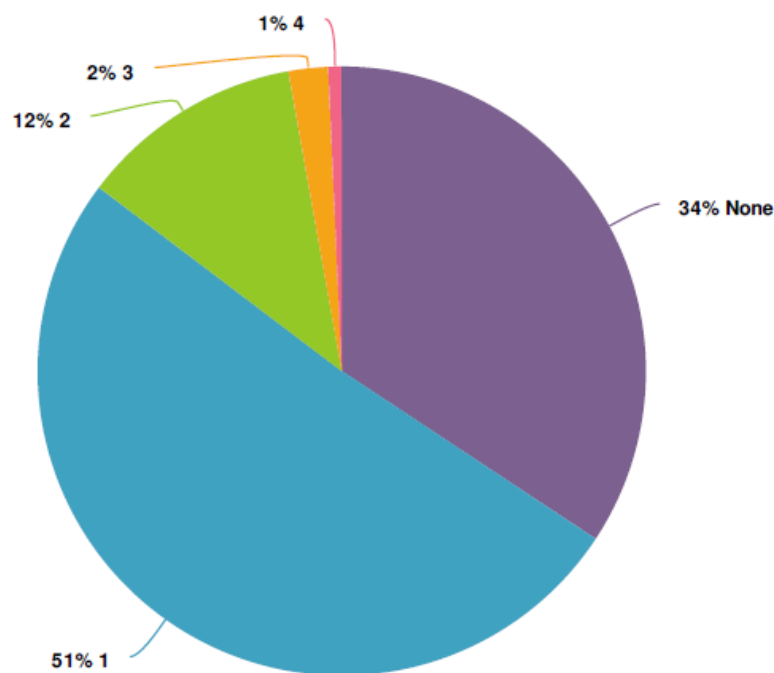
Figure 20 - Carpool Culture - Morning
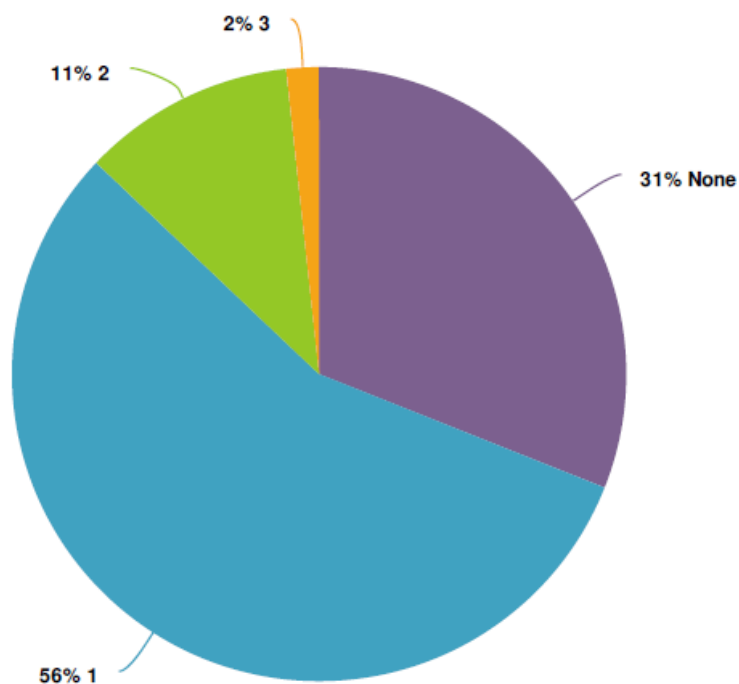
Figure 21 - Carpool Culture - Afternoon

7.4 Drop Off and Pick Up Arrangements

The peak hours of drop off within the school is between 7:00am and 8:30am. There are a number of locations where students are being dropped off. The most popular being the drop off at Old Barrenjoey Road, followed by the drop off area at Bellevue Avenue as the next preferred option. Please see **Figure 22** below.
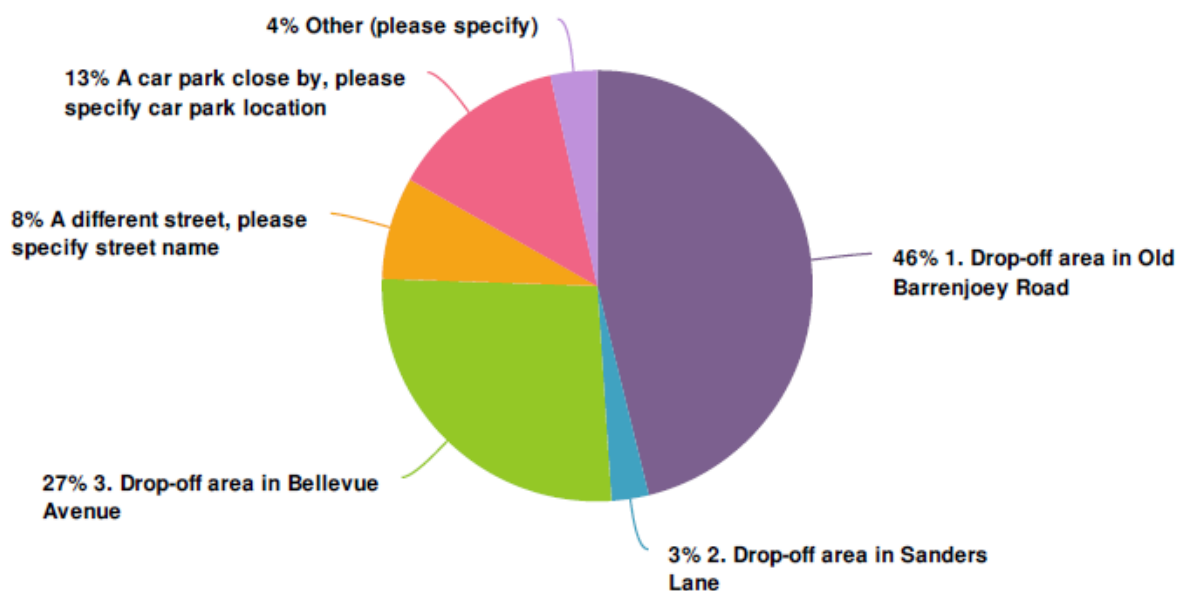
Figure 22 - Drop Off Location

Respondents who answered "Other" to the question regarding drop off location, generally indicated either parking somewhere at Avalon Village or along Old Barrenjoey Road (not the drop off location).

In terms of the pick-up arrangements, the peak pick-up time, on a typical day, is between 3:15pm and 3:40pm. This is generally shorter than the drop off peak hours. Based on the survey, whilst Old Barrenjoey Road still appears to be the most popular area for pick up, it is significantly less popular pick up option compared to a as drop off location. This is illustrated in **Figure 23.**
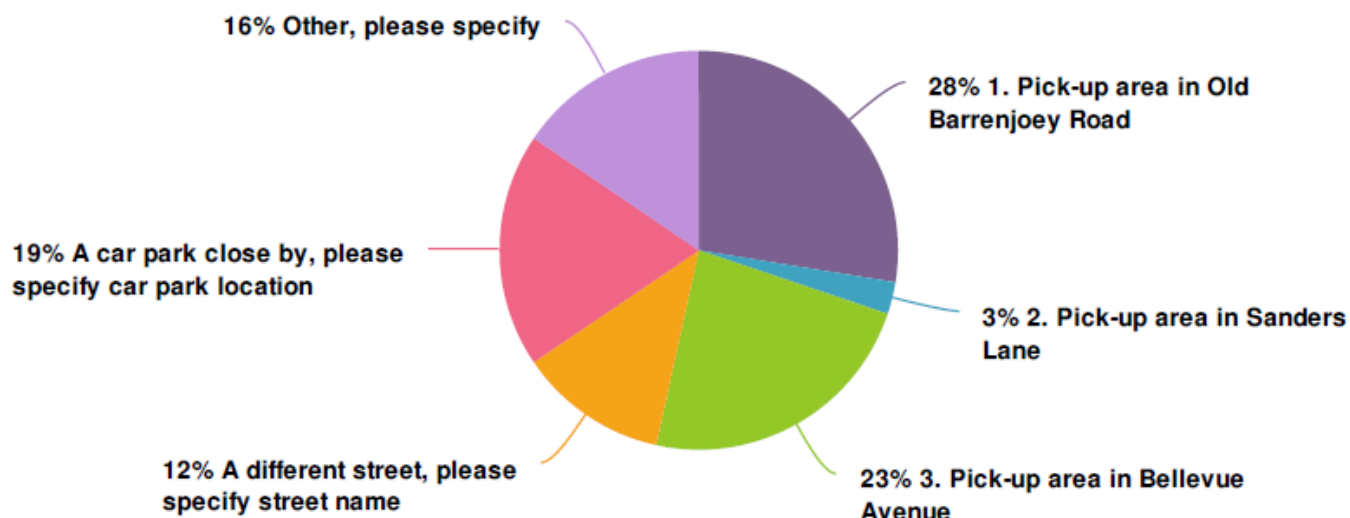
Figure 23 - Pick Up Location

Respondents were also asked where students waited to be picked up by their parents / guardians when leaving the school. The majority of students (66%) typically wait inside the school to be picked up, whilst the remaining wait at either Old Barrenjoey Road, Bellevue Avenue or Sanders Lane. This is illustrated in **Figure 24**.
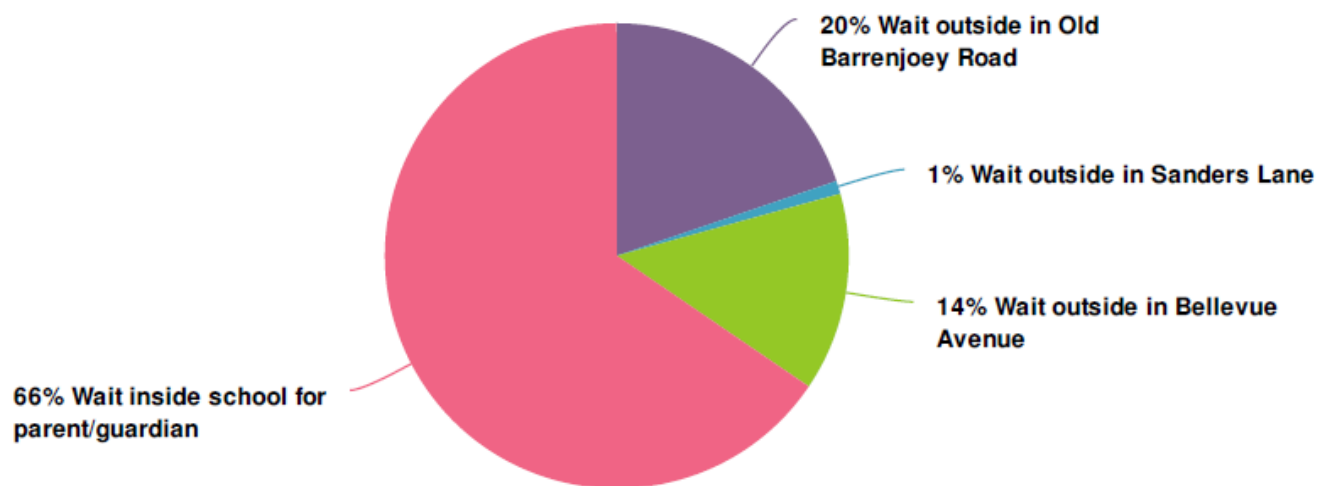
Figure 24 - Pick Up Characteristics

7.5 Other Comments

At the end of the survey, respondents were asked to provide any suggestions as to how to reduce car dependency to the school campus. The following are some of the most frequently mentioned suggestions:

- Improve bus service timings and reliability of service, particularly in the mornings

- Implement a private bus service for students

- Provide bus passes for all students

- Organise a "Walking Bus" initiative

- Implement / improve pedestrian and bicycle pathways around the Village

- Implement / improve pedestrian crossings at key junctions, particularly at Avalon Parade and Old Barrenjoey Road

8. Future Parking Demand & Supply

To determine the effect of future parking demand on parking supply we developed a forecasting model, which uses existing data on:

- public parking supply available at peak (excluding reserved spaces for special use, Loading Zones, Mail Zones, Taxi Zones etc.) plus

- peak occupancy data by parking restriction

in order to determine the excess or shortfall in parking supply over time.

The model is based on peak occupancy as determined by the surveys outlined in **Section 6.2.1** and **Section 6.2.2.** We used peak occupancy   as it represents the 'worst' case scenario with respect to parking demand when estimating the likely excess or shortfall in supply.

Firstly, the model uses the survey data to establish the present parking supply and demand. These figures are then extrapolated to predict future demand using population change as the factor to determine future parking requirements. At present given the projected marginal decline in population (Refer **Section 4.1**) at Avalon Beach, population has been assumed to be stable over the projected period.

Alternatively, a growth / decline factor can be applied within the model, if considered more appropriate (to test different scenarios).

We have also made an allowance for the effect of changes in mode share in response to changes in transport options and or as a result of the implementation of parking demand strategies.

For the purpose of the projections in this Report two scenarios have been assumed:

- a mode shift factor of 1% increase in car usage every 5 years and;

- a mode shift factor of 2% increase in car usage every 5 years.

The assumptions above will naturally increase the demand for parking within the Study Area. Should public transport networks in the area improve leading to increased public transport usage, this would have an inverse impact on parking demand. Similarly, if residents change to more sustainable modes (walking, cycling) this may also reduce parking demand over time.

No allowance has been made for increases of, or changes to, land use or potential changes in vacancy rates of property within the Study Area. We have also assumed no change to the parking supply.

The calculations for projected parking demand are detailed in **Attachment 4** and indicate that if parking demand increases 2% due to increased car usage every 5 years, and there is no change in supply or parking behaviour, peak occupancy levels at the off street car parks in the Village would reach close to actual capacity by 2034 (**Table 14**).

On street capacity appears to be sufficient to accommodate the projected increases in demand.

Table 13 - Summary outcomes of future projections of parking demand (1% increase in driver mode share every 5 years)

	2019	2024	2029	2034
On street Restricted	66%	67%	68%	68%
On street Unrestricted	58%	59%	59%	60%
Subtotal On Street	62%	62%	63%	64%
Off street Restricted	91%	92%	93%	94%
Off street Unrestricted	93%	93%	94%	95%
Subtotal Off Street	91%	92%	93%	94%
TOTAL	**71%**	**71%**	**72%**	**73%**

Table 14 - Summary outcomes of future projections of parking demand (2% increase in driver mode share every 5 years)

	2019	2024	2029	2034
On street Restricted	66%	68%	69%	71%
On street Unrestricted	58%	59%	61%	62%
Subtotal On Street	62%	63%	64%	65%
Off street Restricted	91%	93%	94%	96%
Off street Unrestricted	93%	94%	96%	98%
Subtotal Off Street	91%	93%	95%	97%
TOTAL	**71%**	**72%**	**73%**	**75%**

9. Current & Emerging Issues

As a result of our work, the following current and emerging issues with respect to parking have been identified within the Study Area:

Table 15 - Current & Emerging Issues

Issue No.	Issue
1	A significant proportion of car parking spaces in CP2 and CP3 are being utilised by long stay parkers, reducing the availability for short term parkers close to the Village commercial centre.
2	Certain on street parking supply within the Study Area is significantly underutilised.
3	There is currently a lack any wayfinding signage in the Village to direct parkers to available off street parking supply.
4	Overstay percentages in 1P and 2P parking spaces are relatively high.
5	Car dependency among residents of Avalon Beach appears to be higher than other comparable Sydney locations.
6	The lack of appropriate pedestrian and bicycle pathways / crossings may be inhibiting a higher rate of Active travel (particularly amongst children).
7	Higher parking demand from tourists during peak summer months, particularly near the beach (our surveys did not capture the high season).
8	Whilst the drop off arrangements at Avalon Public Primary School are acceptable, pick up arrangements are causing significant congestion issues.
9	The junction at Avalon Parade and Old Barrenjoey road witnesses significant conflicts between pedestrians and vehicle traffic.

10. Parking strategy goals and framework

10.1 Policy and Strategic Framework

The strategic vision of creating a vibrant and thriving community will require consideration of numerous factors to achieve a reduction in car usage and encourage the uptake of public transport by the residents of Avalon Beach.

For example, to ensure parking caters for the expected increase in the ageing population, priority for this user group will need to be achieved through monitoring the requirement of additional seniors and disability parking spaces near commercial area. As stated in **Section 6.2.7**, there currently appears to be a sufficient number of disabled spaces in the Study Area.

Effective parking enforcement to maximise the intent of time restrictions (i.e. to ensure equitable use by the community) will need to be implemented where there are a significant number of drivers overstaying, which impacts on the turnover of parking.

In order to achieve these objectives, a strong focus is required on creating safe pedestrian and active centres where users can work, shop and dine.

10.2 Goals

The main goals of the proposed parking strategy are as follows:
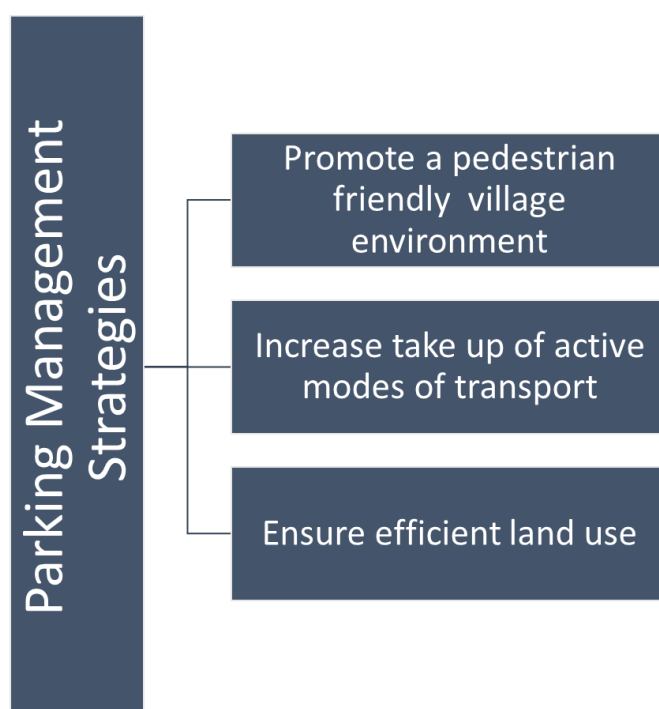
Figure 25 - Main goals of parking strategy

10.3 Change Framework

To achieve these goals and address the issues outlined in **Section 9**, Council should implement a robust framework to manage change. We recommend Council follows the framework detailed in **Figure 26** before implementing any change.
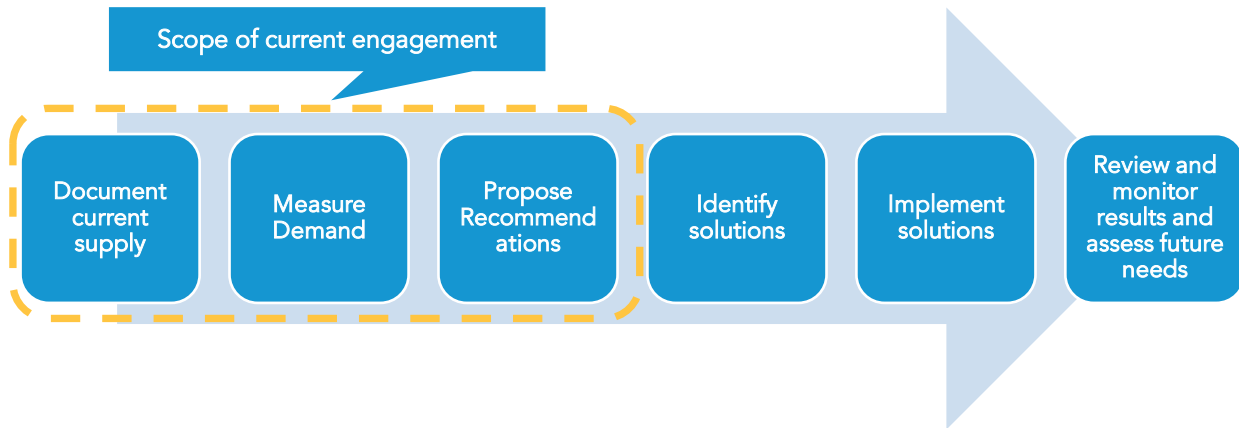
Figure 26 - Strategy Framework

The first three items fall under our current assignment.

- Document Supply – Following our inventory collection Council now has up to date records of the parking supply in the Study Area (both on street and off street), showing category (e.g. Loading Zone, disabled parking etc.) and time restrictions (restricted vs unrestricted parking etc.). This provides a base position from which to manage future change.

- Measure Demand – Regular occupancy and length of stay surveys are required to measure demand at different times of the day and days of the week, as well as during different seasons/holiday periods, to ensure appropriate parking controls and compliance thereof.

- Propose Recommendations – Identify options for improving the use of current supply and encouraging non-car trips for Council consideration and evaluation.

- Identify Solutions – Following detailed reviews of the potential solutions, Council to shortlist and prioritise solutions that would provide the best return on investments.

- Implement Solutions – As parking occupancy in a given area approaches 90%, being practical capacity, proposed solutions are to be implemented in a controlled manner after community consultation. Supply records are to be updated for any change.

- Review and Monitor results – it is important to monitor the outcome of any change through regular data collection to ensure appropriate parking controls are in place.

All changes should be referenced back to the current situation (as outlined in **Section 6.2** of this report) to measure success. It is also proposed that community consultation is incorporated as part of the above framework and that information about parking strategies and implementation plans are incorporated into the Council's website, social media, local newspaper/s, and any other communication tools as appropriate.

10.4 Options

Strategies available to manage parking primarily fall under three main categories which are discussed in further detail in the following sections of this Report:

- Improve the use of existing supply (refer **Section 11**).

- Encourage more non-car trips (refer **Section 12**), and

- Increase supply (refer **Section 13**).

11. Improve the use of existing supply

11.1 User Group Allocation

STRATEGY: *Council to consider the needs and priorities of the various user groups to create a safe environment and improve kerbside road efficiency whilst fostering a vibrant environment in the Village.*

As in many commercial centres and business zones, there is strong competition for the parking supply from a number of user groups, as illustrated in **Figure 27** below:

Figure 27 - User Groups

The hierarchy illustrated in **Figure 28** is a guideline for use in developing an action plan to prioritise user groups:
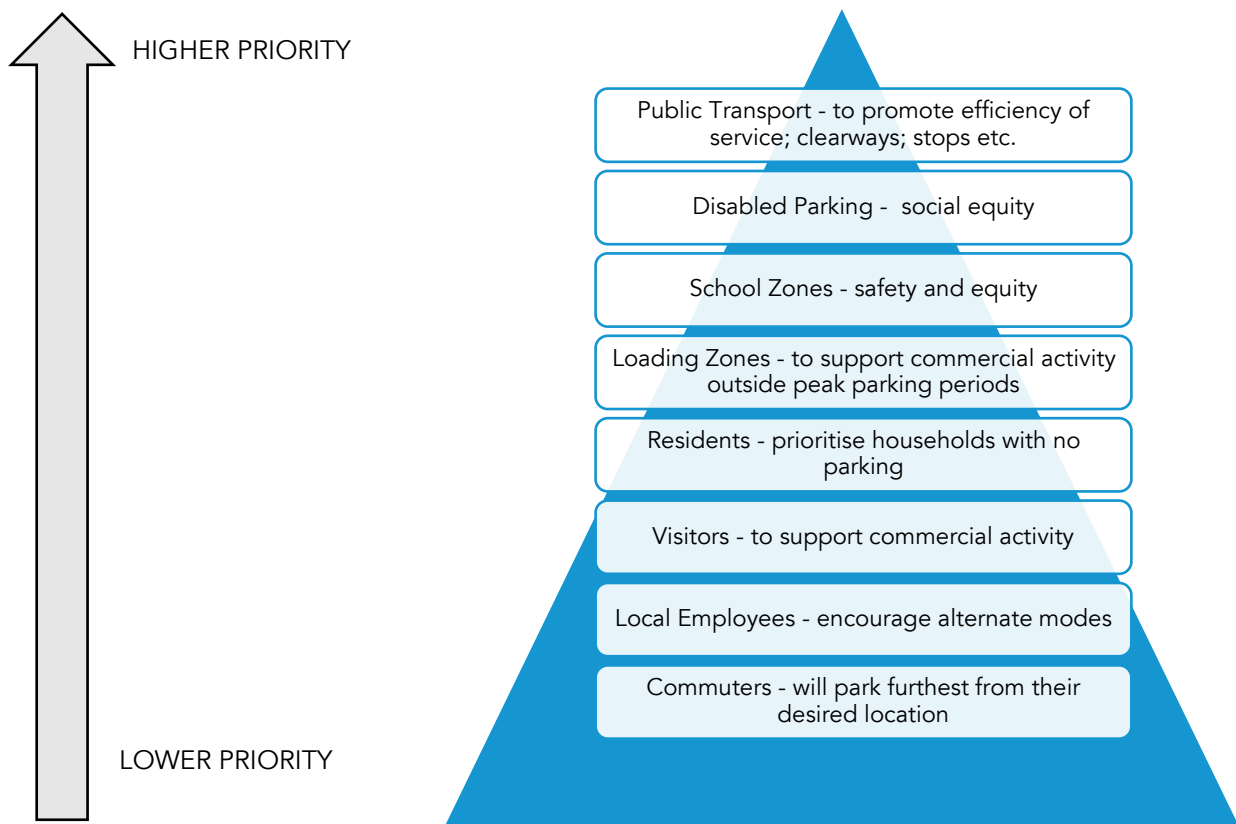
Figure 28 - Kerbside Hierarchy

An objective of the proposed Strategy should be to promote alternate modes of transport and therefore public transport access and car share are given high priorities in the hierarchy. Accessible parking for disabled parkers and school zones are also prioritised to promote social equity and safety. Loading Zones to support retail and commercial activity are given the next priority; however, Council should promote loading access outside peak parking/traffic times.

Local employees and commuters are ranked lowest priority as the strategy should be designed to promote alternate modes of transport where possible and they, being all day parkers, are the user groups most likely to park furthest from their destination.

RECOMMENDED ACTIONS:

11.1.1 Consult with user groups

Consult with special needs groups such as those representing disabled, school, senior, bicycle groups as well as delivery/transport companies to determine the demand and locations for parking for these groups.

11.1.2 All day parking

Consult with local businesses to determine the demand for all day parking (staff working in the area) not satisfied by the current parking provision and where staff currently park. Also, to understand the utilisation of private car parks and whether there is scope to increase utilisation at non-peak times by making the spaces available for others to use.

This will enable Council to better determine the parking demand profile within the Study Area and better inform required parking ratios for future developments. It will also help determine if there is insufficient parking adjacent to local businesses because their staff are parking in the most conveniently located spaces that should be used by short term parkers.

11.2 Review Time Restrictions

The utilisation of existing supply can be improved by maximising turnover, by matching supply to demand and ensuring that shorter term stays are satisfied closest to the town or business centre and longer stays in the periphery of the town centre. By providing wayfinding and capacity signage for off-street car parks available spaces can be fully utilised.

The specific strategies proposed are as follows:

STRATEGY: *The closer the parking supply is to the commercial centre the shorter the time restriction.*

An example of recommended time restrictions based on the distance from the Village commercial centre is as follows:

- 0-150m: 1P

- 150-300m: 2P

- +300m unrestricted

Allowance needs to be made concerning specific locations (e.g. pick up and drop off in front of schools, etc.) to be determined on a case by case basis. Further, consideration should be given to areas of special need as required.

Council to provide motorcycle parking in areas deemed inappropriate for parking cars to increase kerbside and off-street supply.

STRATEGY: *Where occupancy levels exceed 90%[23] on a consistent basis, consider a change in time restrictions to manage parking demand.*

A review of parking controls should be undertaken on a regular basis to maximise supply by encouraging turnover. As a parking area approaches practical capacity, deemed 90%, consideration should be given to reducing the time restriction and, ultimately, introducing (or extending) paid parking therefore managing demand through a pricing strategy.

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[23] Concept of practical capacity; being the level of utilisation at which potential parkers perceive parking is full
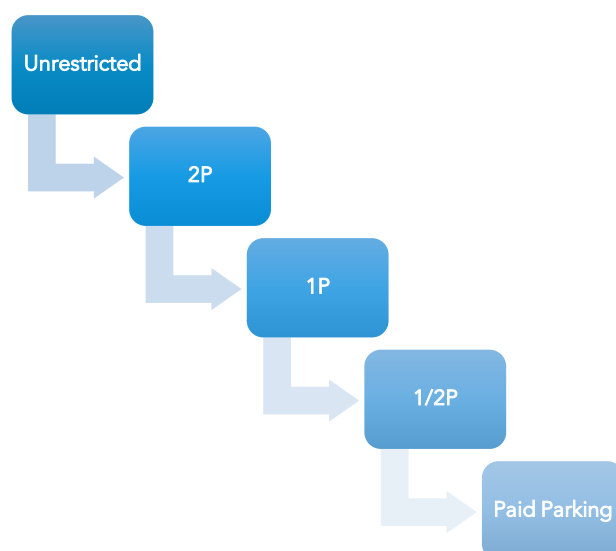
Figure 29 – Typical process for managing demand using time restrictions

Following the framework discussed in **Section 10.3**, parking data from either regular occupancy surveys or smart parking solutions (e.g. access control equipment or sensors) should be analysed to measure parking demand and where appropriate consider changing time restrictions to manage demand i.e. reduced time restrictions will increase turnover and therefore supply. Conversely, if areas record low levels of occupancy Council may extend or remove time restrictions.

RECOMMENDED ACTIONS:

11.2.1 Introduce time restrictions to unrestricted spaces in CP2 and CP3

The breakdown of peak occupancy by types of parkers (Long term vs Short & Medium term) is summarised in **Table 16** below.

Table 16 – CP1, CP2 and CP3 - Peak Occupancy by User Type and ALOS - Weekday Average

Location	Long Stay (>6 Hours)	Short & Medium Stay (<=6 Hours)	ALOS	Recommendation
CP1-Woolworth	2	75	1.37	Reduce restrictions to 2P on all days during peak periods.
CP2 - 44 Avalon Parade	17	83	2.02	Change time restriction on the 31 unrestricted spaces within the car park to match all other spaces (3P Weekday and 2P Weekend)
CP3 - RSL & Bowling Club	53	31	4.46	Introduce time restriction to all spaces within CP3 to match CP2 spaces

The current Average Length of Stay (ALOS) at CP1 is 1.37 hours, which is significantly less than the 3P parking restriction in place at the car park on weekdays. Therefore given that most parkers are currently staying less than 2 hours, Council may consider reducing the current time restriction on Weekdays from 3P to 2P as per the current weekend restrictions to further improve turnover at the car park.

Both CP2 and CP3 are located close to the commercial centre of the Village. Based on our surveys, we note that at peak on weekdays, a significant proportion of these spaces are being utilised by long stay parkers.

We recommend Council consider extending the time restriction to all the spaces at CP2 and CP3 (as per the time restricted spaces in CP2), with regular enforcement to displace all-day parkers at these car parks to residential streets further from the town centre, such as Bellevue Avenue and Elouera Road.

11.2.2 Introduce time restrictions to unrestricted on-street parking near commercial centre

On street parking supply near the   Village should be time restricted, thus encouraging turnover of spaces most convenient to short term parkers such as shoppers. **Figure 30** identifies two potential on street areas that could be converted to time restricted parking.
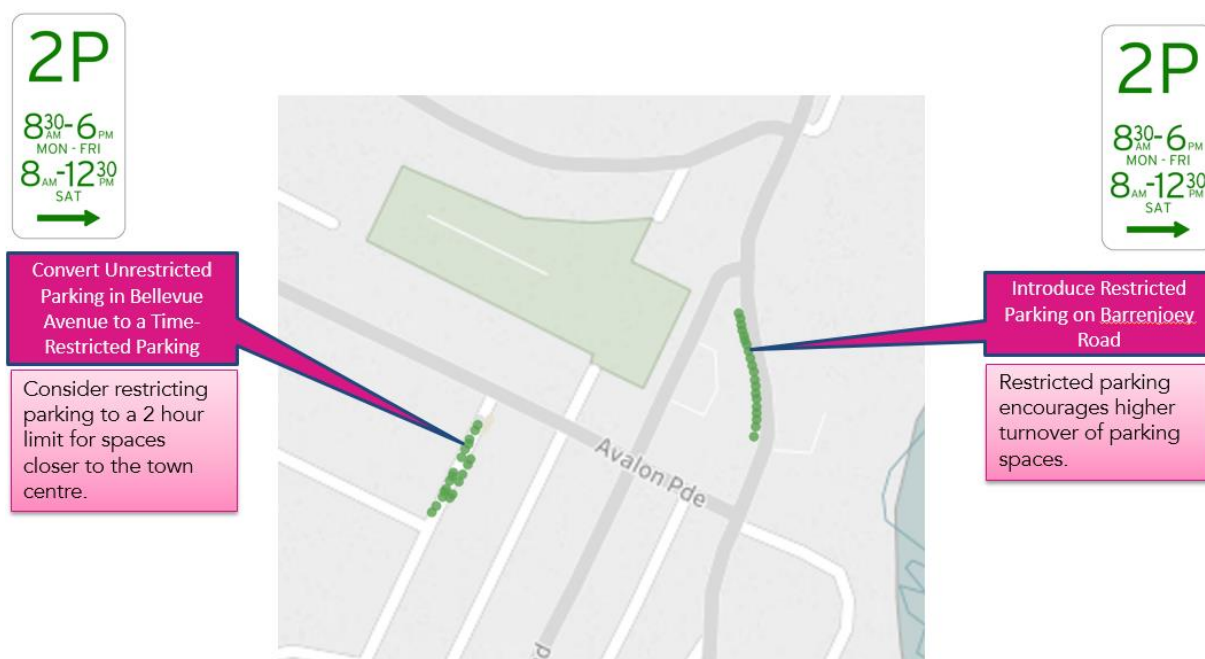

Figure 30- Potential on street parking supply to introduce time restrictions

11.3 Paid Parking

It is an economic principle that there is no such thing as "Free Parking":

- Parking involves costs to build and maintain as well as lost opportunity (earnings) associated with alternative uses of the land dedicated to it,

- "Free" time restricted parking is expensive to enforce (refer to **Section 11.6**)

- Parkers who overstay the time limit risk incurring fines, and

- Free parking penalises people who use public transport and other alternative modes, which are in fact the more environmentally sustainable means of transport.

The implementation of paid parking allows for the User Pays mechanism, which has been successfully adopted by many councils.

Current paid parking in Avalon is in the following locations:

Table 17 - Paid Parking in the area

Car Park	No. spaces	Operating hours	Low Season (1st May to 30th Sept)	Peak Season (1st Oct to 30th April)	Control
CP4 - Avalon Beach	81	6.00am to 9.00pm everyday	$8 per hour / $35 per day	$10 per hour / $40 per day	Pay and Display parking meters
Avalon Parade	45	6.00am to 9.00pm everyday	$8 per hour / $35 per day	$10 per hour / $40 per day	Pay and Display parking meters

Pay and Display parking meters have been installed in CP4 (Avalon Beach car park) and at the Eastern corner of Avalon Parade (close to the beach) to collect fees (Refer **Table 17** above). Whilst easy to use and relatively inexpensive compared to a perimeter controlled access control system there is generally revenue leakage of approximately 5-10% based on our experience at other car parks as enforcement officers are still required to patrol the car park to ensure compliance.

11.4 Improve utilisation of on street parking supply

The parking survey indicated that the distribution on street occupancy was not consistent across the Study Area, and that certain on street parking supply appears to be underutilised. For example, **Figure 31** below highlights the occupancy of the unrestricted parking spaces on Elouera Road and Bellevue Avenue (between Elouera Road and Sanders Lane). Both these streets are located approximately 150 meters from the shops on Avalon Parade, and have approximately 84 unrestricted parking spaces between them.

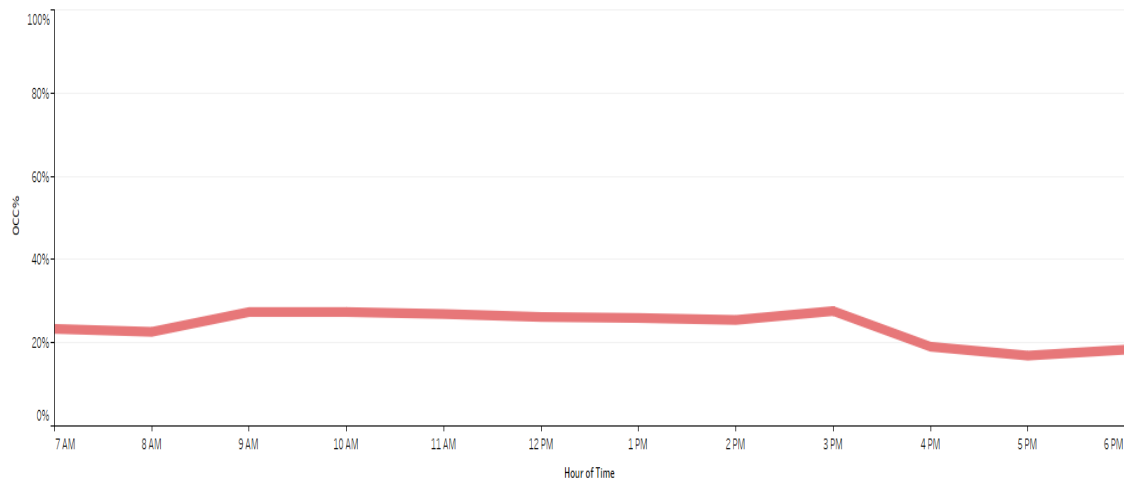Occupancy Line (excl. Bus Zone, Loading Zone, Motorbike, Bicycle Bays etc.)

Figure 31 - Occupancy of the unrestricted parking spaces on Elouera Road and Bellevue Avenue (between Elouera Road and Sanders Lane)

Council may consider the following potential strategies to improve the utilisation of these unrestricted parking spaces with low occupancy rates:

- Formalise available spaces with signage and / or linemarking (subject to appropriate traffic studies)

- Identify all available parking supply on Council website

11.5 Signage & Wayfinding

One of the most common problems in town centres is that the location of off-street car parks is not always well known. Even for residents, some car parks may have a higher profile than others.

Furthermore, within each car park, there is available capacity at certain times of the day and days of the week and in some instances, physical areas where there is low utilisation most of the time.

Maximising the use of the current car park supply entails the provision of reliable and up to date information to drivers as to the location and availability of parking within the area.

STRATEGY: *Provide wayfinding through a parking signage plan where applicable for the main off-street car parks. Alternatively, or in conjunction with the signage, Council could consider mobile based apps to promote efficient use of available space.*

This would direct drivers to available parking, reducing traffic circulation and congestion. In implementing a signage strategy, it is important to consider that street signs compete with many other visual stimuli for drivers and there is a fine line to walk between good signage and signage clutter. For this reason, the location of signs at key decision points as well as the size and content of the sign are of extreme importance.

RECOMMENDED ACTIONS:

11.5.1 Prepare integrated signage plans

Integrated signage plans should be prepared for the off-street parking supply, considering technology solutions such as dynamic signage, and mobile apps /web based real time data to "find a park". **Figure 32** provides an example of a potential concept design plan for the Village.
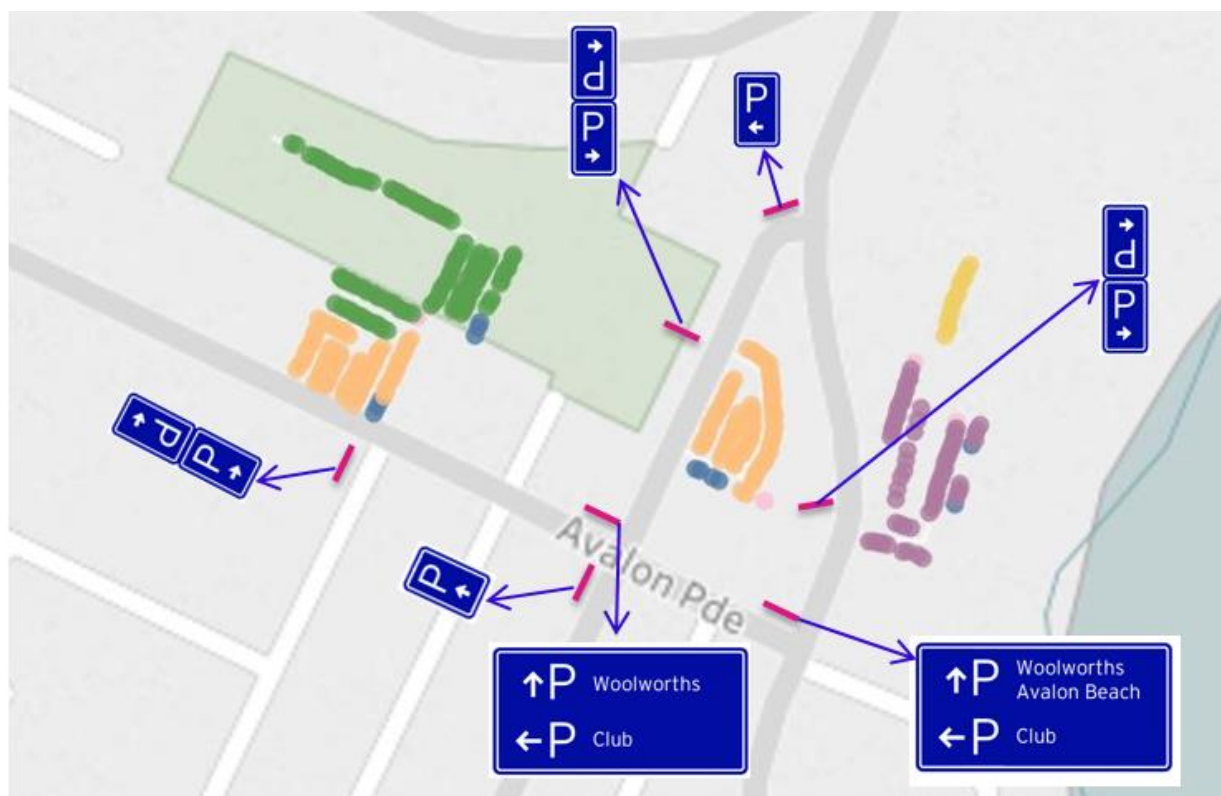
Figure 32 - Example off street car park signage plan

Dynamic signage at the entrance to a car park can relieve traffic congestion as it prevents cars entering a car park and circulating the aisles when no spaces are available. This solution could potentially be useful for CP2 and CP3 as the bulk of the spaces in these car parks is not visible from Avalon Parade (location of access to car parks). Example of dynamic signage at the entrance to an at-grade car park is illustrated in **Figure 33** below:

Figure 33 - Example dynamic signage[24]

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[24] https://mosman.nsw.gov.au/residents/transport/public-parking-and-carparks

11.5.2 Update Council website with parking information

Load maps showing the location of various parking areas on the Council website so that people can check the location of car parks and where parking is available prior to undertaking a visit (especially if they only do so occasionally).

11.6 Enforcement Policy

The success of any strategy to increase the availability of parking through the management of time restrictions is dependent upon the consistent application of an enforcement regime. An economically viable solution requires the adoption of technology in conjunction with appropriate resourcing.

STRATEGY: *Consider more efficient ways to ensure that time restrictions are complied with to maximise turnover of spaces. The selected methodologies and polices are to be applied consistently across all streets and car parks.*

The principal purposes of parking management are to:

- Assist in ensuring the safety of pedestrians, drivers of motor vehicles and all other road users,

- Ensure the equitable use of the limited available parking spaces in an environment where demand for such spaces reaches capacity at peak times,

- Ensure effective traffic flow within the area,

- Provide a general service to the community, and

- Promote environmentally sustainable motor vehicle use.

In seeking to maximise the utilisation of available parking supply the role of the Enforcement Officer is crucial to the extent that unless the parking time limits are enforced, drivers will tend to abuse them by staying longer thus impacting on turnover. This applies in both on street and off-street parking areas.

RECOMMENDED ACTIONS:

11.6.1 Adopt technology solutions

Investigate and action technology solutions for improving the efficiency and productivity of the enforcement team. It should be noted that the shorter the time restrictions (anything less than 2 hours) the more time consuming, expensive and ineffective manual enforcement activity is as the Enforcement Officer is required to patrol their area more frequently to check for infringements and may not have the ability to do so.

Examples of the technology solutions available to improve the efficiency of the enforcement team are as follows:

Table 18 - Enforcement Technology Options

Method	Advantages	Disadvantages
Licence Plate Recognition cameras can be mounted on vehicles or placed in fixed locations.	- Increased coverage and productivity of enforcement team - Can be integrated with mobile apps for paid parking by license plate - Increased compliance therefore increased turnover and increased parking supply. - Data can be transmitted to dynamic signage or parking apps/ web applications to provide real time parking availability	Data capture is not 100% accurate at the current time
In-ground sensors Relay information to car park management system which identifies overstays. In Europe there are suppliers (e.g. AIPark based in Germany) which can provide a single sensor to cover up to 30 spaces which is mounted on a lamp post and can be solar powered. It has a cloud-based engine that can provide extensive predictive and usage data to a central location or to users through smart devices	- Targeted enforcement reducing patrols and increasing productivity - Increased compliance therefore increased turnover and increased parking supply - Data can be transmitted to dynamic signage or parking apps/ web applications to provide real time parking availability - Collect information on occupancy and LOS to assess effectiveness of time restrictions	- Accuracy can be impacted by debris over sensor - Generally, battery operated with a life of 3-5 years maximum although solar powered sensors are available. - Individual bays must be line marked.

11.6.2 Publicise the benefits of time restricted parking

Conduct a publicity campaign utilising the local newspaper, the Council website and social media to inform the community of the enforcement regime and the importance of enforcing time restrictions in managing parking availability.

12. Encourage more non-car trips - Active & Sustainable Transport

12.1 Public Transport

Reduced car dependency must be supported by an efficient and convenient public transport network and as such to achieve this objective the Council is reliant on the support of the State in developing the bus network in the area.

STRATEGY: *Reduce car dependency by working closely with Transport for NSW (TfNSW) in optimising bus connections, improving bus stops and increasing the regularity of services.*

RECOMMENDED ACTIONS:

12.1.1 Collaborate with TfNSW

We recommend Council establish a framework to facilitate collaboration with TfNSW aimed at optimising routes and improving amenity and frequency of services ensuring that all bus stops are fully accessible to patrons with a disability or mobility impairment.

STRATEGY: *Ensure the Council website and social media platforms promote public transport including smart scheduling apps.*

In order to reduce private car usage, the alternative transport options available should be promoted by Council to encourage the uptake of public transport. There are currently a number of smartphone applications available in the market which can be used to better inform the public of their next connecting service. Mobile apps such as TripView, Moovit and TripGo provide real-time data of the estimated times of the next scheduled service as well as updated information regarding any services which may be experiencing delays.

RECOMMENDED ACTIONS:

12.1.2 Update Council website to promote use of public transport

Council to advertise the use of transport apps on their website and social media platforms (i.e. Facebook, Twitter) to assist in changing the behaviour of the community by allowing the public to make more informed decisions with regards to their next trip.

12.2 Walking and Cycling Considerations

STRATEGY: *Ensure a safe and accessible environment for pedestrians and cyclists.*

In order to provide a safe and accessible environment for the community, improvements to pedestrian and cycling amenity within the area will need to be considered. Streetscape design is required to incorporate shared use by pedestrians, cyclists etc. including speed reductions where appropriate.

RECOMMENDED ACTIONS:

12.2.1 Establish pathways recommended by the PAMP

A detailed study of the pedestrian pathways within the Study Area was conducted in 2017 by GTA Consulting[25]. The recommended establishment / upgrades of pathways and cycleway would potentially reduce some level of car dependency amongst the local residents, particularly for parents of students of Avalon Public; the lack of safe pathways was one of the main issues highlighted in the school survey conducted as part of this study.

12.2.2 Update Council Website

Alternative travel modes such as cycling and walking can be promoted through Council's website. Currently the website provides information regarding popular walkways and cycle routes within the area; however, it could be improved by including the walkways and cycle routes within an easy-to-read map. Public reserves and recreational areas within the locality can be promoted on Council's social media platforms to further encourage walking and cycling.

12.2.3 Bike Plan

A Bike Plan should be prepared so as to align with the key objectives of the state-wide *NSW Bike Plan (2010)* and the *RMS How to Prepare a Bike Plan (2012)* guideline.

12.3 Car Share Schemes

STRATEGY: *Explore the feasibility of a Car Share network at Avalon*

Car share is an inexpensive and sustainable means of allowing the community to use public transport or car-pooling for day to day trips whilst having the safety net of access to a vehicle in the event of an emergency.

Car Share networks are generally most successful in areas where:

- The population density is relatively high (i.e. apartment dwellings)
- There is a good public transport and active travel (walking / cycling pathways) network
- The local community is fairly insular (in the sense that they generally work or live within the local community)

Avalon Beach generally does not exhibit the characteristics mentioned above, with the exception of it being an insular community.

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[25] Walk Avalon - Avalon Pedestrian Access and Mobility Plan (PAMP)

RECOMMENDED ACTIONS:

12.3.1 Discuss opportunities for a car share network in Avalon with an appropriate service providers

A car share network could potentially be viable with sufficient incentives for users. Council should consider exploring a trial with a car sharing service provider to see if a car share network would be viable in Avalon.

12.4 Electric Vehicle (EV) Charging Facilities

STRATEGY: *Monitor development of EV vehicle adoption*

2,284 EVs were sold in Australia in 2017, a 67% increase in comparison to the previous year, surpassing the global increase of 56% in the same period. However, EVs still represent only 0.2% of the market at present.

Another point to consider is EV drivers' behaviours in regards to charging. As observed in a comprehensive study conducted in the USA analysing data from 5,800 EVs, 87% of the time drivers charged their vehicles at home[26].

Technology change within the EV sector is rapid and will likely impact the charging requirements in the near future. For example, companies such as Tesla, Honda, Nissan and Toyota are committed to the development of solid-state batteries. The main benefit this technology brings to the EV industry is the reduction in charging times. Currently, level 2 charging stations take up to 8 hours to add 300 km range and super-fast chargers (level 3) take around 1 hour to add the same range. Solid batteries are expected to drastically reduce the time needed to fully charge an EV to just a few minutes.

RECOMMENDED ACTIONS:

12.4.1 Consider limited EV charging stations rollout aimed at tourist market

Based on observation of current trends in the market, whilst EV ownership is expected to ramp up in future, we do not believe an extensive network of EV charging stations at Avalon would be commercially feasible or particularly beneficial for most visitors to the Village.

However, Council may wish to consider a limited rollout of EV charging stations with the aim of primarily catering to out-of-area tourists visiting the area. Range anxiety is one of the major concerns of EV owners and the availability of charging infrastructure may help improve the attractiveness of Avalon as a gateway destination for EV owners.

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[26] Idaho National Laboratory, 2015, Plug-in Electric Vehicle and Infrastructure Analysis:
http://avt.inel.gov/pdf/arra/FinalReportHqltySept2015.pdf

13. Increase Parking Supply

13.1 Avalon Beach On Street and Off Street Parking Supply

STRATEGY: *Increase parking supply near Avalon Beach to cater for Peak summer demand*

Overall parking occupancy in the Village, even at peak, is not close to practical capacity (Refer **Table 8**). As such, the need for additional parking supply at this stage is not critical. However, we understand that parking demand increases significantly, particularly from tourists, during the peak summer months and have consequently identified relatively simple potential parking supply increase opportunities near Avalon Beach.

RECOMMENDED ACTIONS:

13.1.1 Formalise unofficial spaces near Avalon Beach (CP4 – Avalon Beach Car Park)

There are currently approximately 13 "unofficial" spaces at the northern end of CP4-Avalon Beach car park which are located on the "dirt / sand patch" leading to Des Creagh Reserve (Refer to **Figure 34** below). Subject to any physical constraints, we recommend that Council explore the opportunity to formalise these spaces and include them within the paid parking capacity of CP4.
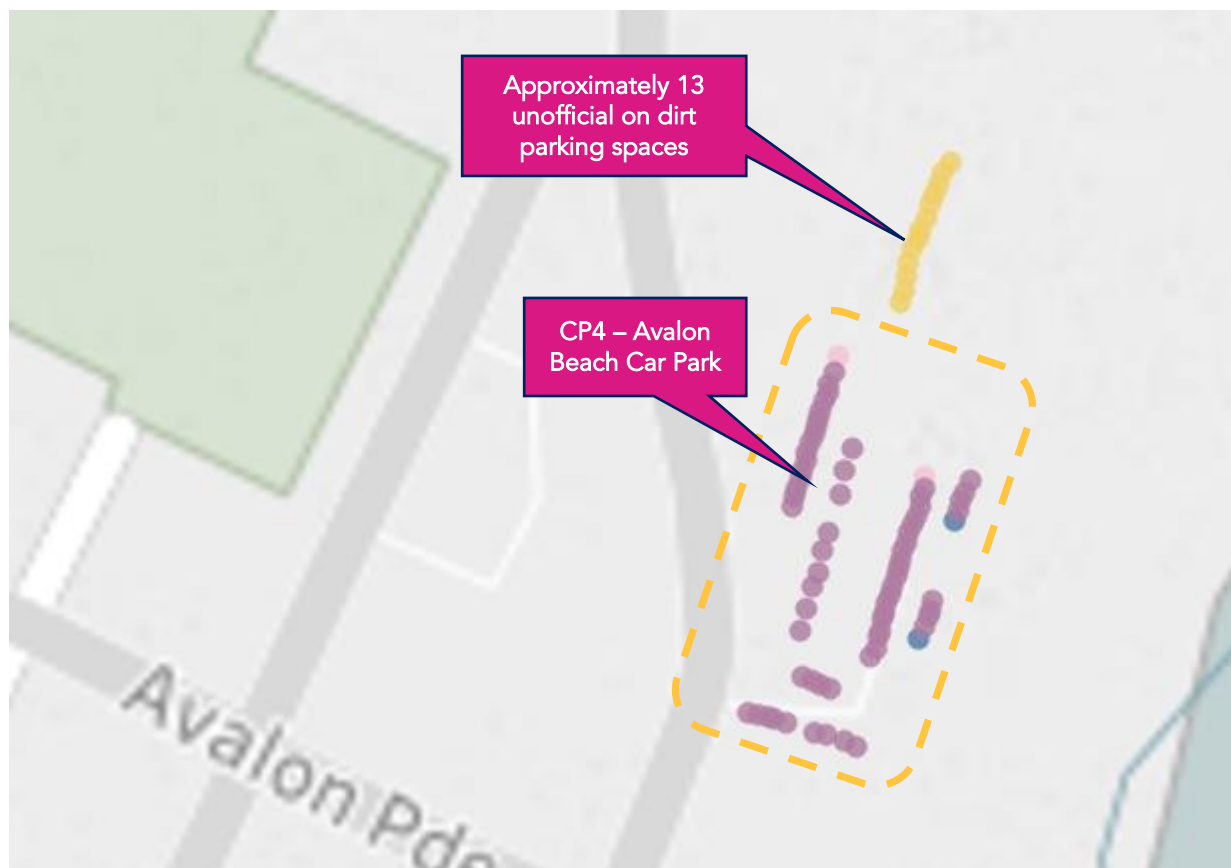

Figure 34 - Location of on-dirt spaces near CP4

13.1.2 Formalise paid parking spaces on Avalon Parade (near Avalon Beach)

With appropriate line marking, the on-street car park on Avalon Parade, west of Barrenjoey Road could potentially increase in capacity by a significant amount. We also recommend extending paid parking currently applied on the beach side to the rest of the area. A concept layout (subject to detailed design) of the car park is illustrated in **Figure 35**.
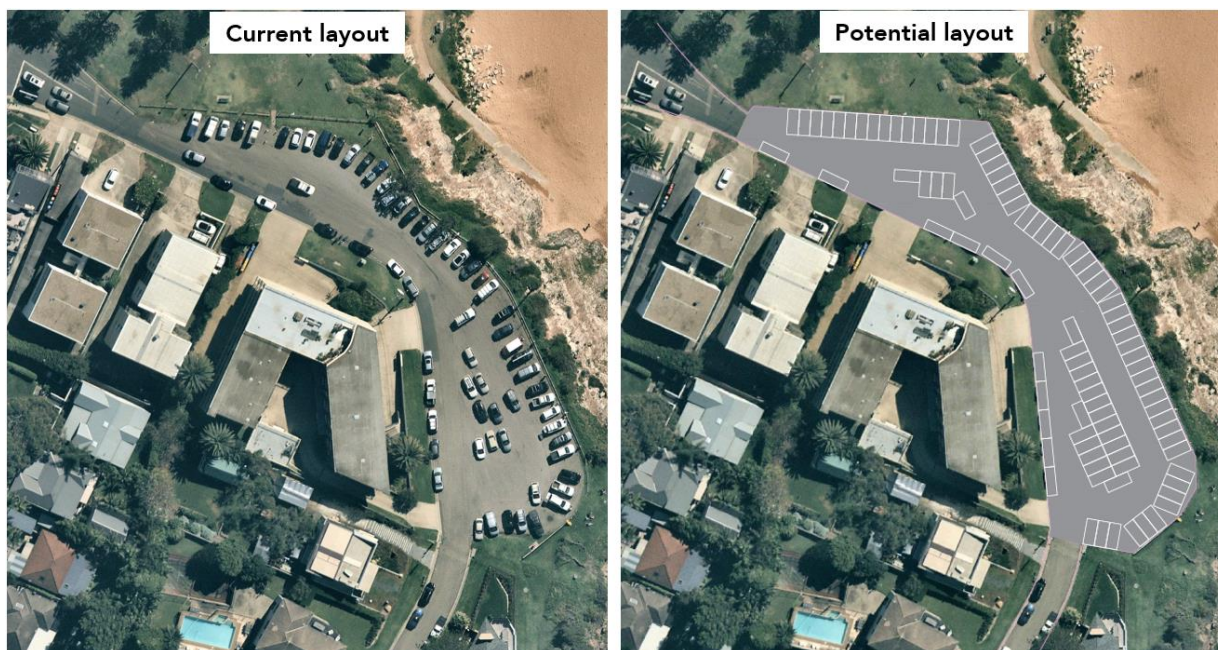

Figure 35 - Current vs Potential parking layout at western end of Avalon Parade.

14. Traffic and Physical Improvements

14.1 Avalon Public Primary School - Drop Off and Pick Up Areas on Old Barrenjoey Road and Bellevue Avenue

STRATEGY: *Improve traffic flow through rates at the drop off and pick up areas on Old Barrenjoey Road and Bellevue Avenue*

Based on our observations, the primary traffic issue at Avalon Public School arises from parents / guardians arriving early and parking in the Pick Up area on Old Barrenjoey Road, particularly on the south eastern side of the road. Despite the 2-minute limit applied to the spaces, drivers park up to an hour or more and wait for their children. Consequently, other parents queue down the road for a significant time, waiting to get into the pick-up spaces. This creates a back log of traffic that at times backs up all the way into the Village, which subsequently blocks bus routes as well. A similar problem, albeit to a lesser extent, was observed at the Pick Up area on Bellevue Avenue.

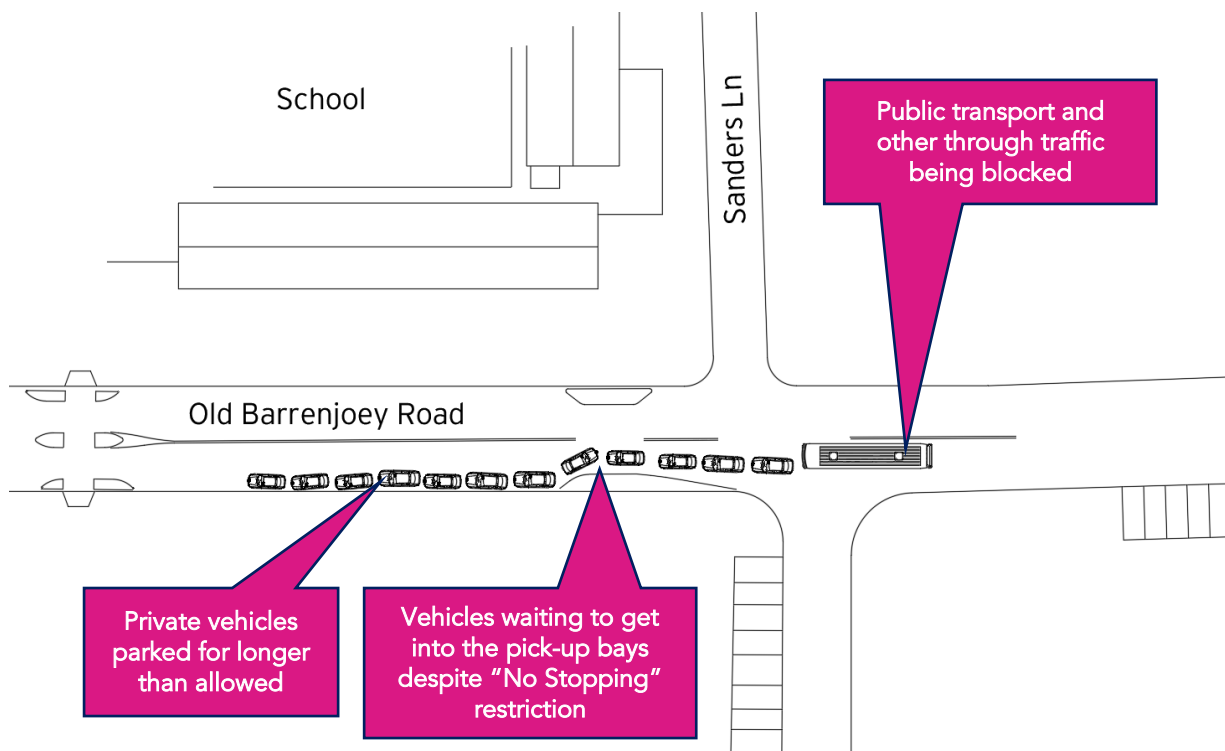This occurrence is illustrated in **Figure 36**.

Figure 36 - Pick Up Situation at Old BarrenJoey Road

RECOMMENDED ACTIONS:

14.1.1 Change parking restrictions on Old Barrenjoey Road and Bellevue Avenue

As per our experience with other schools, we recommend changing the currently posted "P 2 Minute Drop Off Only" to "No Parking". This restriction provides a stronger message that could potentially prevent overstay of vehicles on the bays, whilst legally allowing them to stop for 2 minutes to drop off or pick up students. Examples of these restrictions are illustrated in **Figure 37**.
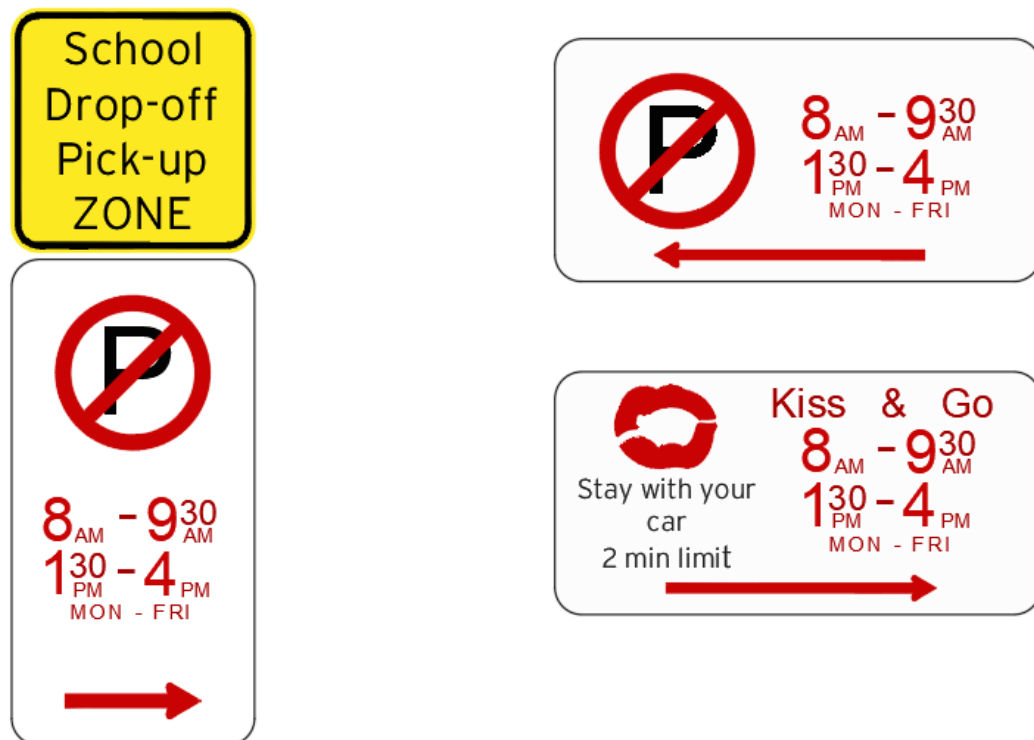

Figure 37 - Examples of Drop-off & Pick-up Signs

This restriction is in line with the Drop-off and Pick-up Initiative set out by TfNSW Centre for Road Safety. It is noted that this would require an agreement with the school community and sufficient material to inform everyone involved, i.e. drivers, parents, guardians, students, volunteers, etc. This may also be included in the Travel Access Guide as discussed in **Section 14.1.2**.

14.1.2 Consider the development of a Travel Access Guide for Avalon Public

Information regarding bus routes, potential "Walking Bus" initiatives and underutilised parking supplies could be provided to staff and parents in the form of a package of easy to understand travel information known as a Travel Access Guide (TAG).

This should be included in the information pack provided to students and staff as part of their school orientation in advance of day one of term. If necessary, the TAG should provide customised travel information for parents to/ from a particular area. The TAG should be available for pick up at various locations of the school campus such as front entrance, library, cafeteria etc. The TAG should be regularly reviewed and updated.

14.1.3 Work with Avalon Public and the community to identify potential temporary parking supply

Given that Avalon Public is a primary school, parents seem to have a preference to pick up their kids (Refer to **Figure 24**) from with the school premises.

Council / Avalon Public may wish to explore temporary off-street parking supply for parents / guardians during the Pick Up period. For example, Avalon Beach Village Church is located approximately 300m north of Avalon Public and has an off street car park with an approximate capacity of 11 spaces. These parking spaces appear to be unused on weekday afternoons and could potentially be used by parents / guardians of students.

14.2 Traffic Arrangements at Old Barrenjoey Road / Avalon Parade Junction

STRATEGY: *Improve pedestrian safety at Old Barrenjoey Road / Avalon Parade Junction*

In addition to the shortage of pedestrian and bicycle pathways around the Village, the Old Barrenjoey Road / Avalon Parade Junction was singled out as a major safety concern by parents and guardians in the online school survey (Refer **Section 7.5**), making them reluctant to allow their children to walk / cycle to school. Given the location of this intersection, it also affects the functionality of the Village in terms of pedestrian walkability. Involving pedestrian-priority crossings on each of the four legs, this significantly impedes traffic flow, and also poses safety risks for pedestrians.
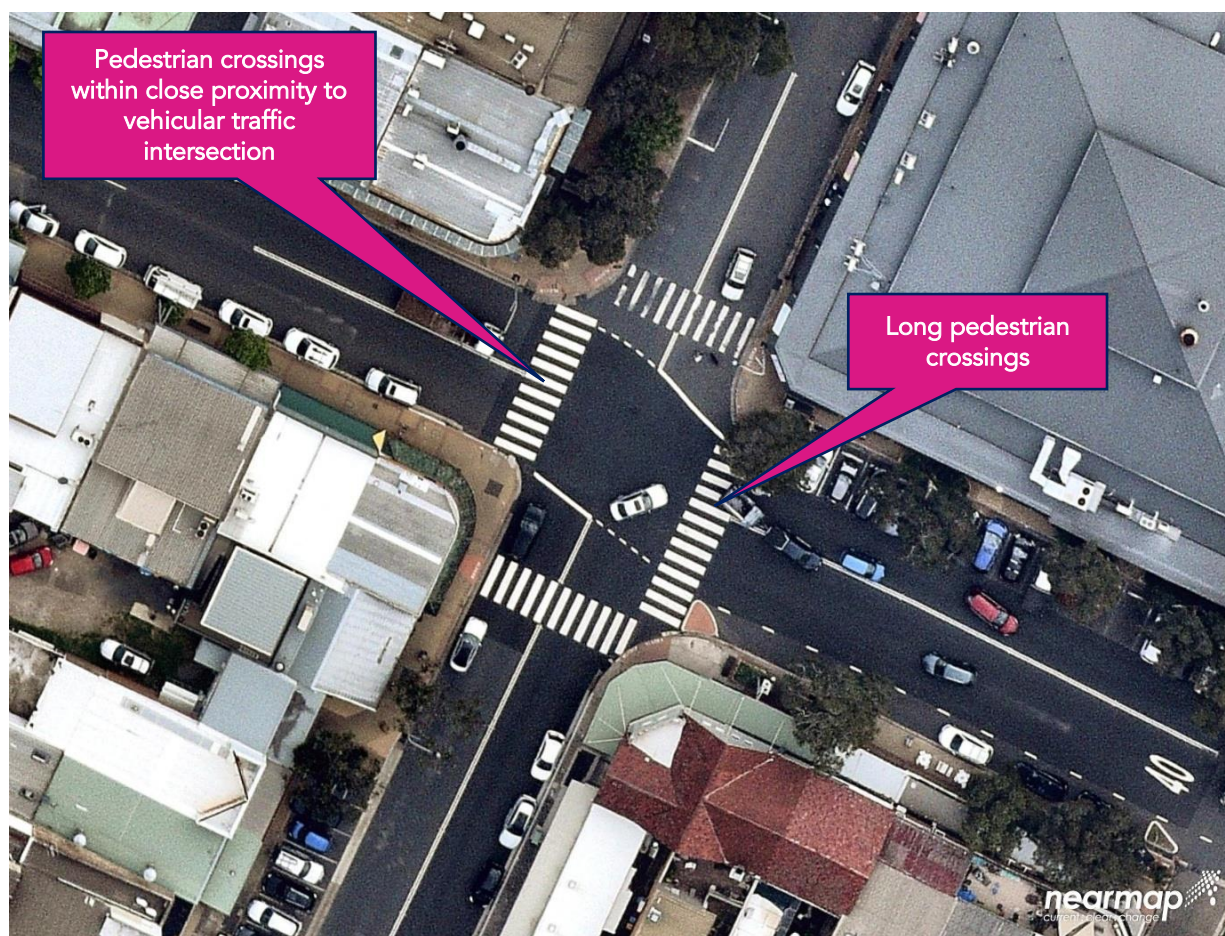

Figure 38 - Intersection of Old Barrenjoey Road and Avalon Parade

RECOMMENDED ACTIONS:

14.2.1 Modify the layout of pedestrian crossings

We propose a number of measures to improve the traffic flow and pedestrian safety at the intersection. In principle, separating the movements from each other would reduce the conflict. The design (subject to verification) contemplates the following:

- Locating pedestrian crossings away from the intersection;

- Providing RMS fence;

- Narrowing the width of the road at the crossings;

- Incorporating traffic calming devices;

- Creating priority right of way for vehicles travelling along Avalon Parade.
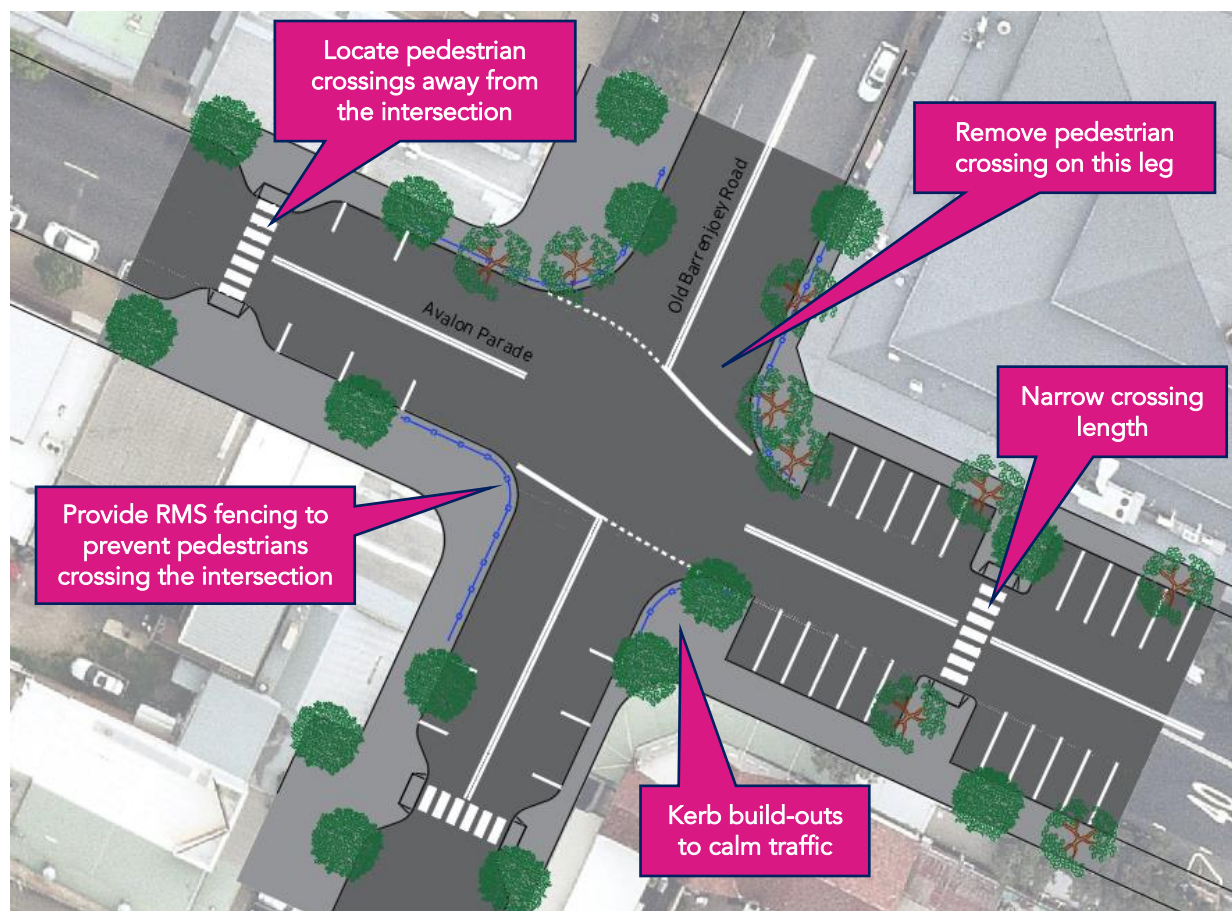

Figure 39 - Concept of Proposed Intersection Modification

This concept layout involves the reconfiguration of parking spaces; while on-street parallel car spaces may be removed as part of the reconfiguration; additional 90° parking spaces are provided. Consequently, the total number of parking spaces will possibly remain the same. This may also affect the layout of the current bus stop at the south-eastern corner of the intersection along Avalon Parade.

It is noted that this concept layout is a high-level desktop study, and should this be considered, a proper traffic assessment and design process will have to be undertaken.

Attachment 1 Avalon Beach / Northern Beaches Demographic / Travel to Work Tables

Attachment 2 Parking Survey Results – Tableau File

Attachment 3 School Survey Results

Attachment 4 Parking Demand model