St Augustine's College Sydney

Development Application
Transport Impact Assessment

Prepared by: Stantec Australia Pty Ltd for St Augustine's College Sydney

on 17/12/2021

Reference: N190000

Issue #: C

GTAconsultants now Stantec

St Augustine's College Sydney

Development Application
Transport Impact Assessment

Client: St Augustine's College Sydney

on 17/12/2021

Reference: N190000

Issue #: C

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	09/10/2020	Final	Sherry Merson	Mackenzie Brinums	Rhys Hazell	Rhys Hazell
B	30/10/2020	Final	Mackenzie Brinums	Rhys Hazell	Rhys Hazell	Rhys Hazell
C	17/12/2021	Final	Mackenzie Brinums	Rhys Hazell	Rhys Hazell	

GTAconsultants now Stantec

Melbourne | Sydney | Brisbane
Adelaide | Perth

CONTENTS

Appendices

Figures

Tables

1. INTRODUCTION

01

INTRODUCTION

1.1. Background

It is understood that a Development Application (DA2013/1366) was approved through the Land and Environment Court in 2015 for the expansion of St Augustine's College in Brookvale. The development consent includes a consent condition stating that the College is limited to a maximum student enrolment of 1,200 students.

In February 2020, Northern Beaches Council issued a letter to St Augustine's College raising matters in relation to the number of students enrolled at the College and sought further clarification from the College regarding the matter. St Augustine's College acknowledges that current student enrolments exceed the maximum 1,200 student limit imposed by the applicable consent conditions and as such, is seeking to lodge a DA with Northern Beaches Council (Council) to increase the maximum student enrolment limit from the approved 1,200 students to 1,600 students. The application does not seek to modify or deliver any additional floor area for the College.

The College has proactively pursued options to accommodate an increased student cap by better facilitating on-site parking and improving set-down/ pick-up arrangements to maintain functional operation while better distributing activity across the site and limiting impacts on residential streets. It is understood that staff numbers will also increase slightly from 150 currently to 152. It is also recognised that that specific site constraints somewhat limit the extent of such opportunities.

Overall, the College is seeking to improve the transport and parking arrangements through the following measures:

- Providing additional on-site parking by constructing a new formal 24 space car park at 60 Federal Parade and a 30-space car park in the south-east corner of the College site.
- Linemarking existing and providing additional on-site parking spaces and ensuring better management practices across the College, bringing the total on-site parking supply to 143 spaces.
- Encouraging use of the recently formalised no parking zone on Alfred Street on school days (8am to 9am and 3pm to 4pm) to better distribute set-down/ pick-up demand across the College.
- Delivering four on-site motorcycle spaces (where none are currently provided).
- Implementing a communication strategy with parents/ carers to achieve desired outcomes and define approach and departure routes for each of the set-down/ pick-up locations.
- Implementing a strategy for senior students to consider their daily travel habits, including avoiding driving to College and parking on-street, encouraging carpooling, being dropped-off or continuing to use public transport.

To understand the likely parking and transport implications of the proposal, a travel questionnaire survey has been completed by staff and students at the College based on typical travel patterns.

Clause 57 Traffic Generating Development of the State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017 has been considered as part of this assessment, specifically:

(3b) the accessibility of the site concerned, including:

> *(i) the efficiency of movement of people and freight to and from the site and the extent of multi-purpose trips, and*
>
> *(ii) the potential to minimise the need for travel by car, and*

(3c) any potential traffic safety, road congestion or parking implications of the development.

Artazan Property Group engaged GTA, now Stantec on behalf of St Augustine's College Sydney to complete a transport impact assessment as part of the DA.

1.2. Purpose of this Report

This report sets out an assessment of the anticipated transport implications associated with revised student numbers and corresponding staff numbers, including consideration of the following:

- existing traffic and parking conditions surrounding the site
- suitability of the proposed parking in terms of supply (quantum) and layout
- service vehicle requirements
- pedestrian and bicycle requirements
- the traffic generating characteristics relating to the increase in student enrolments
- the transport impact of the increase in student enrolments on the surrounding road network.

1.3. References

In preparing this report, reference has been made to the following:

- an inspection of the site and its surrounds
- Australian Standard/ New Zealand Standard, Parking Facilities, Part 1: Off-Street Car Parking AS/NZS 2890.1:2004
- Australian Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS 2890.2:2018
- Australian Standard / New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009
- traffic and car parking surveys as referenced in the context of this report
- Parking and Traffic Review Report – St Augustine's College, Brookvale, prepared by Brown Consulting dated 18 October 2013
- other documents and data as referenced in this report.

2. EXISTING CONDITIONS

02

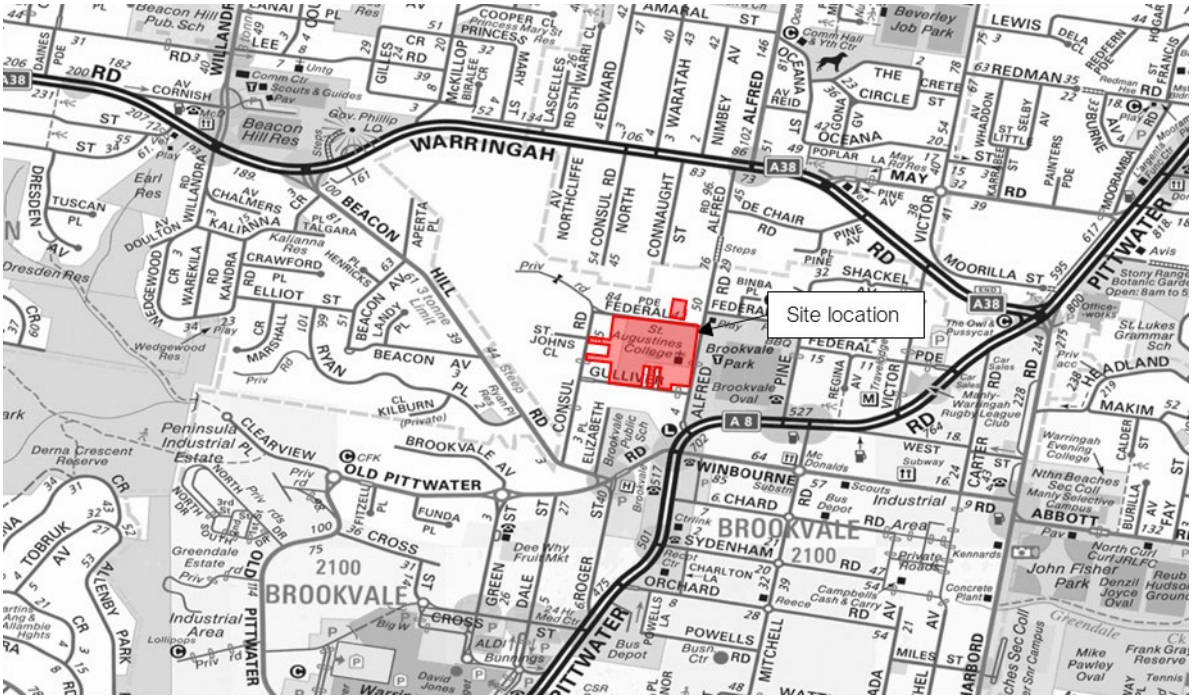
2.1. Location

St Augustine's College is located on land legally described as Lot 100 DP 1250521 and Lot B DP395193 and is bound by Alfred Road to the east, Federal Parade to the north, Consul Road to the west and Gulliver Street to the south. The site at 60 Federal Parade is also owned by the College with a frontage of approximately 25 metres to Federal Parade.

The surrounding properties predominantly include residential uses, with Brookvale Oval also located on the opposite side of Alfred Road. Further afield, local business and general industrial uses are located along and to the south of Pittwater Road.

The location of the subject site and its surrounding environs is shown in Figure 2.1 and Figure 2.2.

Figure 2.1: Subject site and its environs



Base image source: Sydway

Figure 2.2: Aerial map

Base image source: Nearmap

2.2. Transport Network

2.2.1. Road Hierarchy

Roads are classified according to the functions they perform. The main purpose of defining a road's functional class is to provide a basis for establishing the policies which guide the management of the road according to their intended service or qualities.

In terms of functional road classification, State roads are strategically important as they form the primary network used for the movement of people and goods between regions, and throughout the State. Transport for NSW (TfNSW) is responsible for funding, prioritising and carrying out works on State roads. State roads generally include roads classified as freeways, state highways, and main roads under the Roads Act 1993, and the regulation to manage the road system is stated in the Australian Road Rules.

TfNSW defines four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility to high accessibility and low mobility. These road classes are:

Arterial Roads – Controlled by TfNSW, typically no limit in flow and designed to carry vehicles long distance between regional centres.

Sub-Arterial Roads – Managed by either Council or TfNSW under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region or provide connectivity from arterial road routes (regional links).

Collector Roads – Provide connectivity between local sites and the sub-arterial road network, and typically carry between 2,000 and 10,000 vehicles per day.

Local Roads – Provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

2.2.2. Surrounding Road Network

Pittwater Road

Pittwater Road is a classified State Road that functions as a key arterial road providing connection to Sydney's northern beaches. It is a two-way road aligned in a north-south direction generally configured with two to three lanes in each direction and set within an approximate 22-metre-wide carriageway.

Kerbside parking is generally permitted on both sides of the road outside of the bus only periods during weekday peaks. Pittwater Road has a speed limit of 60km/h, with various 40km/h school zones present along its length. Pittwater Road is shown in Figure 2.3.

Beacon Hill Road

Beacon Hill Road is classified as a Regional Road and aligned in a north-south direction. It is a two-way road configured with one to two traffic lanes in each direction, set within an approximate 13-metre-wide carriageway. Beacon Hill Road has a posted speed limit of 50km/h, with a 40km/h school zone at its southern end.

Frontage Streets

Federal Parade, Alfred Road, Gulliver Street and Consul Road surround the College and are all local roads. They are two-way roads configured with one traffic lane and one parking lane in each direction. A 'no parking' zone is provided along part of the Federal Parade frontage, with a timed bus zone occupying much of the Alfred Road frontage.

On 1 September 2020, the Northern Beaches Council Local Traffic Committee approved creation of a 37 metre length of No Parking on the west side of Alfred Road between Gulliver Street and the No Stopping zone on approach to the existing Wombat crossing. The No Parking restriction is to apply 8am to 9am and 3pm to 4pm School Days. This will facilitate formal set-down/ pick-up activity and minimise impacts to any single location. Alfred Road is shown in Figure 2.4.

Figure 2.3: Pittwater Road (looking north)

Figure 2.4: Federal Parade (looking east)

Figure 2.5: Alfred Road (looking south)

Figure 2.6: Gulliver Street (looking east)

Figure 2.7: Consul Road (looking north)

2.2.3. Surrounding Intersections

The following key intersections currently exist near the site:

- Beacon Hill Road/ Consul Road (unsignalised)
- Pittwater Road/ Alfred Road (unsignalised)
- Pittwater Road/ Pine Avenue/ Mitchell Road (signalised)
- Warringah Road/ Victor Road (unsignalised).

2.3. Existing Travel Behaviour

A travel questionnaire survey was completed at the College to understand typical travel characteristics of staff and students based on habits in Term 4 2019 and what current travel patterns are in August 2020 during the COVID-19 pandemic.

Table 2.1 sets out the typical travel mode share of staff and students based on travel habits in Term 4 2019.

Table 2.1: Typical staff and student travel mode share

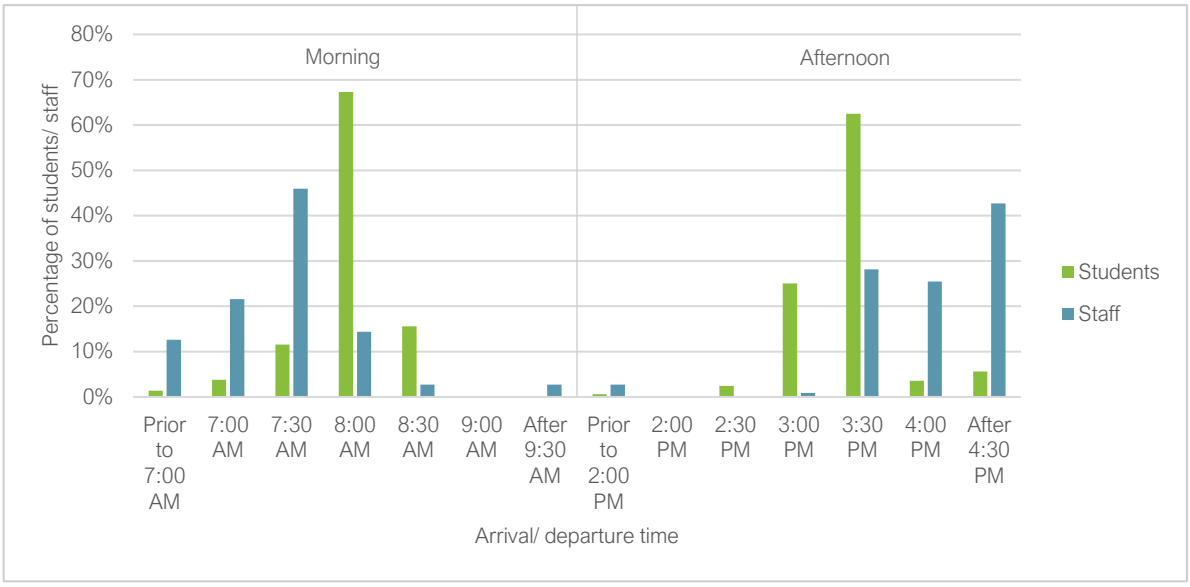
Mode of travel	Travel to school		Travel from school	
	Staff percentage	Student percentage	Staff percentage	Student percentage
Private car (as a driver)	90	1	90	1
Dropped off/ picked up	1	26	1	16
Motorcycle	1	0	1	0
Bus	2	66	2	76
Walk	6	5	6	5
Cycle	0	2	0	2
Total	**100%**	**100%**	**100%**	**100%**

Table 2.1 indicates the primary staff mode of transport is by private car and as a driver, while most students travel by bus. By comparison, the 2020 mode share surveys indicate a slightly higher mode share of staff travelling by car, with an increase of around two per cent in comparison to the 2019 data. Similarly, more students were recorded as being dropped-off and picked-up in a private car and less students recorded catching the bus in 2020 when compared with the 2019 data.

In addition, the survey also collected vehicle occupancy data, and when staff and students travel to/ from the College. Overall, there is an average of one staff per car (confirming all drive alone) and 1.4 students per car.

The profile of staff and student arrivals and departures on Thursday 6 August 2020 for all modes of transport to and from the site is shown in Figure 2.8.

Figure 2.8: Existing staff and student arrival and departure profile



Considering students account for a much higher proportion of the College population compared to staff, the AM and PM peak hours associated with traffic generation of the College have been taken to occur between 8am and 9am and between 3pm and 4pm. Table 2.2 sets out the percentage of staff and students that travel during the AM and PM peak hours. Clearly, staff tend to mostly travel outside the peak periods.

Table 2.2: Percentage of staff and students travelling in the AM and PM peak hours

Peak hour	AM	PM
Staff	18%	29%
Students	83%	88%

2.4. Traffic Volumes

GTA commissioned traffic movement counts on key roads in the vicinity of the site in November 2019 and July 2020 and during the following peak periods:

- 7:00am and 9:30am
- 2:00pm and 4:30pm.

The existing traffic volumes at the surrounding key intersections during the AM and PM peak hours identified in Section 2.3 and shown in Figure 2.9 and Figure 2.10.

Figure 2.9: Existing AM peak hour traffic volumes

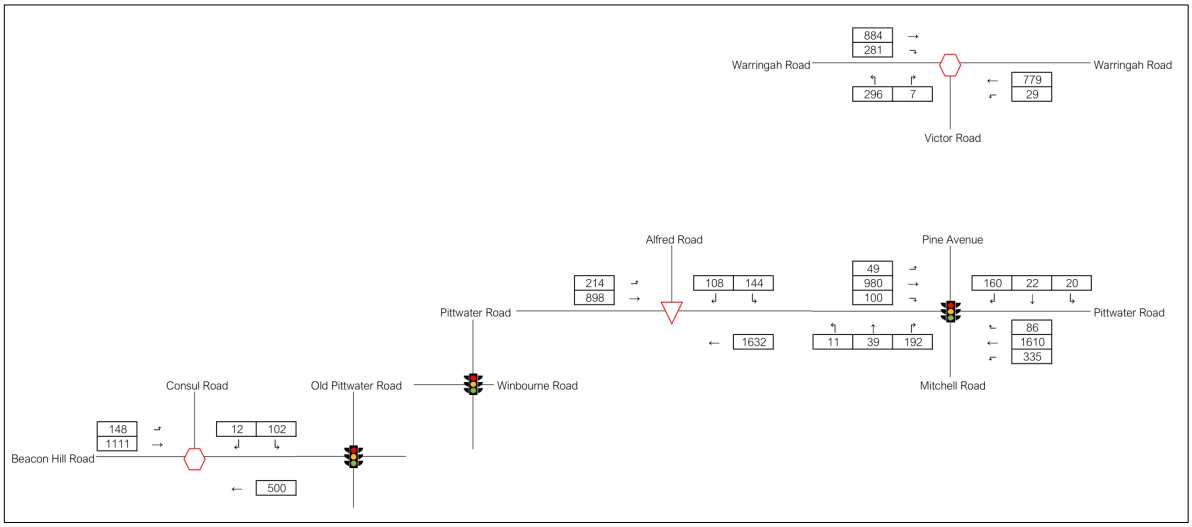
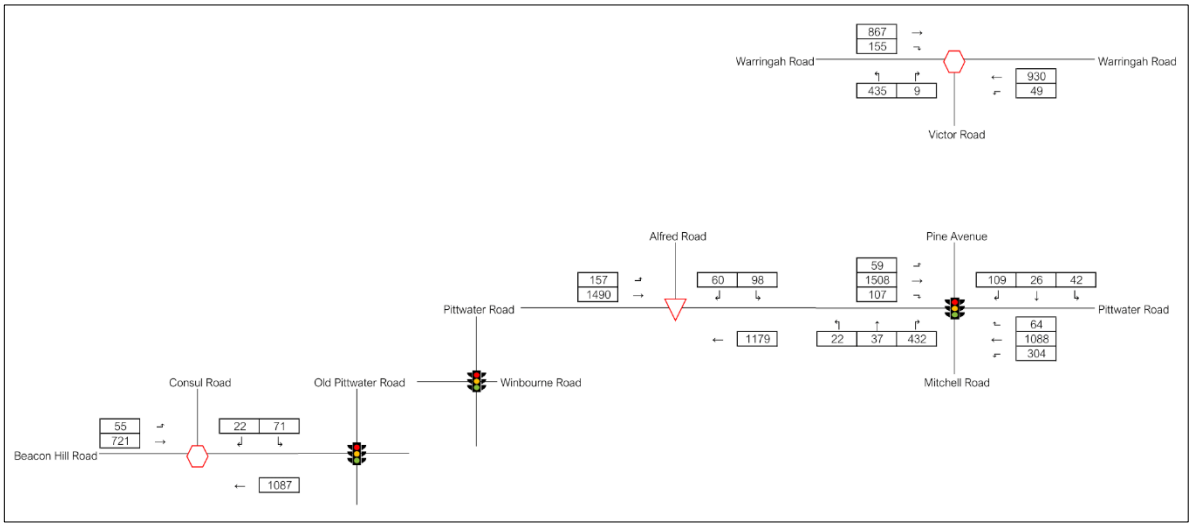


Figure 2.10:Existing PM peak hour traffic volumes



A comparison between the August 2020 traffic survey data and 2019 survey data was completed to understand any impact to typical traffic volumes due to COVID-19. The comparison indicates that traffic volumes along Pittwater Road were relatively consistent between 2020 and 2019 and are considered suitable for transport modelling purposes.

2.5. Intersection Operation

The operation of the key intersections within the study area have been assessed using SIDRA INTERSECTION[1] (SIDRA), a computer-based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the TfNSW, is vehicle delay. SIDRA determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 2.3 shows the criteria that SIDRA adopts in assessing the level of service.

Table 2.3: SIDRA level of service criteria

Level of service (LOS)	Average delay per vehicle (secs/veh)	Traffic signals, roundabout	Give way & stop sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Table 2.4 presents a summary of the existing intersection operations. Unsignalised intersection operations are based on the movements that experience the worst delay, with full results presented in Appendix A of this report. SIDRA models have been calibrated based on queues and delays observed on-site, with SCATS phasing data also used to calibrate the Pine Avenue/ Pittwater Road/ Mitchell Road signalised intersection.

[1] Program used under license from Akcelik & Associates Pty Ltd.

Table 2.4: Existing operating conditions

Intersection	Peak	Leg	Degree of saturation (DOS)	Average delay (sec)	Queue (m)[1]	Level of service (LOS)
Beacon Hill Road/ Consul Road	AM	East	0.14	0	0	A
		North	0.45	104	14	F
		West	0.36	4	0	A
	PM	East	0.31	0	0	A
		North	0.59	112	20	F
		West	0.22	3	0	A
Pittwater Road/ Alfred Road	AM	South	0.15	3	0	A
		North	0.43	0	0	A
		West	1.00	84	15	F
	PM	South	0.14	3	0	A
		North	0.31	0	0	A
		West	1.00	144	13	F
Pittwater Road/ Pine Avenue	AM	East	0.59	3	30	A
		North	0.72	61	45	E
		West	0.52	10	61	A
		Overall	**0.72**	**9**	**61**	**A**
	PM	East	0.40	5	30	A
		North	0.48	54	31	D
		West	0.84	8	119	A
		Overall	**0.84**	**10**	**119**	**A**
Pittwater Road/ Michell Road	AM	South	0.48	58	38	E
		East	0.67	5	65	A
		West	0.47	5	30	A
		Overall	**0.67**	**9**	**65**	**A**
	PM	South	0.89	77	90	F
		East	0.86	30	150	C
		West	0.56	5	30	A
		Overall	**0.89**	**25**	**150**	**B**
Warringah Road/ Victor Road	AM	South	0.39	>200	8	F
		East	0.03	6	0	A
		West	0.79	25	40	B
	PM	South	0.54	>200	11	F
		East	0.05	6	0	A
		West	0.57	23	18	B

[1] Average queue lengths have been reported for the Pittwater Road intersections with Alfred Road, Pine Avenue and Mitchell Avenue as these intersections have been modelling as a network in SIDRA. The Beacon Hill Road/ Consul Road and Warringah Road/ Victor Road intersections have been modelled as isolated intersections and therefore reported queue lengths represent a 95th percentile queue.

Table 2.4 indicates the right turns out of Consul Road, Alfred Road and Victor Road all experience a high level of delay given the high through traffic volumes on Beacon Hill Road, Pittwater Road and Warringah Road respectively. That said, these movements generally experience low demand due to the difficulty with performing the right turn, with easier alternative routes available including turning right from Pine Avenue onto Pittwater Road to travel south or turning left from Alfred Road onto Pittwater Road to travel north.

The signalised intersection of Pittwater Road/ Pine Avenue/ Mitchell Road generally operates well in both the AM and PM peak hours, with minimal average delay and queuing across the intersection. The Pine Avenue and Mitchell Road approaches experience some level of delay in the peak hours due mostly to the allocation of 'green time' to Pittwater Road traffic.

2.6. Car Parking

2.6.1. On-Street Parking

GTA completed parking surveys of publicly available on-street parking on the streets surrounding the site on Thursday 30 July 2020. The survey area is shown indicatively in Figure 2.11, with the parking supply and demand shown detailed in Table 2.5 and Table 2.6 respectively. An on-street parking plan is also provided in Figure 2.12 detailing the location of the various kerbside parking restrictions.

Figure 2.11:On-street parking survey area

Base image source: Nearmap

Table 2.5: Car parking supply

Area reference	Location	Restrictions	Supply (spaces)
1	St Johns Close	No restriction	17
2	Consul Road	No restriction, work zone	60
3	Gulliver Street	No restriction	51
4	Alfred Road	No restriction, 2P, accessible, bus zone	101
5	Brookvale Park Car Park	No parking (Council vehicle excepted), no restriction	42
6	Federal Parade	No restriction, no parking, work zone	67
		Total	**358**

Table 2.6: Car parking demand on 30 July 2020

Area reference	Location	Supply (spaces)	Demand											
			7:00am	7:30am	8:00am	8:30am	9:00am	9:30am	2:00pm	2:30pm	3:00pm	3:30pm	4:00pm	4:30pm
1	St Johns Close	**17**	10	10	10	13	10	10	9	9	9	11	12	12
2	Consul Road	**60**	37	36	36	49	46	46	44	44	40	49	42	41
3	Gulliver Street	**51**	31	44	44	42	44	50	45	46	45	40	37	34
4	Alfred Road	**101**	48	54	60	74	86	87	86	85	79	80	56	59
5	Brookvale Park Car Park	**42**	37	39	42	42	43	48	47	46	47	43	39	29
6	Federal Parade	**67**	19	19	41	50	53	54	50	50	55	48	42	40
	Total	**338**	**182**	**202**	**233**	**270**	**282**	**295**	**281**	**280**	**275**	**271**	**228**	**215**

Figure 2.12:On-street parking plan on 30 July 2020

Base image source: Nearmap

Table 2.6 indicates that peak parking demand occurs around 9:30am, with about 85 per cent of the survey area occupied and around 43 vacant spaces. It is noted that Brookvale Park car park demand generally exceeds supply after 9am however this is mostly due to the informal nature of the car park. It is also understood that there is an active DA to redevelop Brookvale Oval which includes, inter alia, formalising the car park to provide 60 marked parking spaces.

It is understood that the storage of caravans and boats on these local streets is an ongoing issue for local residents and the College. These occupy kerbside space that is otherwise for the purposes of vehicles to park and also affects the efficiency of traffic movements through the area generally. Removing the ability for the storage of such vehicles (often by residents of other areas) would likely be of benefit to all.

2.6.2. On-Site Parking

The College currently provides a total of 106 parking spaces across the campus. Parking demand surveys were completed at the College on Thursday 30 July 2020 which indicates that parking was at capacity by around 8:15am.

2.7. Set-down/ Pick-up Arrangements

The College is serviced by three set-down/ pick-up areas. There are two on-street facilities, one on Federal Parade and the other (informal to date and recently approved) on Alfred Road. The main set-down/ pick-up area is located on College grounds and immediately north of the main car park with access via Gulliver Street.

The Federal Parade set-down/ pick-up area is in the form of a 'no parking' zone, with restrictions in place between 8am and 9am, and between 3pm and 4pm school days. The zone can accommodate up to six vehicles at any one time.

As discussed, the Northern Beaches Council Local Traffic Committee resolved in September 2020 to approve a permanent signposted set-down/ pick-up area on Alfred Road. The approved signage modifications are shown in Figure 2.13 and allows for a capacity of six to seven vehicles at any one time. This set-down/ pick-up area has since been formally implemented on-site.

Figure 2.13:Approved Alfred Road kerbside signage modifications

The on-site set-down/ pick-up area with access via Gulliver Street can facilitate seven vehicles at any one time. It is managed and operates well, with additional storage for around eight vehicles within the car park and on College grounds on approach to the area. This main College set-down/ pick-up area also shows signs of constraint with respect to queuing back onto Gulliver Street (and to a lesser extent Consul Road). As is typical of schools across Sydney, the key period is immediately prior to the end of the school day when parents/ carers arrive early and wait. Once school ends, the queues quickly dissipate (typically within five minutes). With the Alfred Road set-down/ pick-up formally adopted by Council, and with improved College communication and day to day management, the balance of set-down/ pick-up activity will be able to be better managed across the College. This will limit queuing on Gulliver Street and hence, reduce impacts on through traffic unrelated to the College, and local residents generally.

2.8. Public Transport

The site is serviced by a range of frequent bus services, with the closest public bus stops on Pittwater Road near Pine Avenue/ Mitchell Road around a 250 metre walk from the College. These bus stops provide services to key surrounding destinations along Sydney's northern beaches including Manly, Mona Vale, Palm Beach, Collaroy, Avalon and Cromer, as well as providing connections to Sydney CBD. Most routes operate frequently during peak periods with services generally every 15 to 30 minutes during peak periods.

The surrounding bus network is shown in Figure 2.14.

Figure 2.14:Surrounding bus network

Base image source: transportnsw.info, accessed September 2020

2.9. Walking and Cycling Infrastructure

Federal Parade, Alfred Road, Gulliver Street and Pittwater Road provide a good level of pedestrian amenity, with footpaths provided on both sides of the road linking the College with frequent bus services along Pittwater Road. Pedestrian (zebra) crossings are provided along Alfred Road, while signalised pedestrian crossings are provided across Pittwater Road at Old Pittwater Road and Pine Avenue.

There is limited formal cycling infrastructure near the site, with existing infrastructure generally limited to the shared path on the northern side of Pittwater Road between Alfred Road and Pine Avenue.

3. PROPOSAL

03

3.1. Overview

The application seeks to increase the number of student enrolments from the currently approved 1,200 students to 1,600 students. The proposal does not seek to modify or provide any additional floor area for the College. As discussed, the College acknowledges that current enrolments exceed the approved 1,200 students, with 1,422 currently enrolled students.

Although there are no consent conditions in the current approval relating to staff numbers, it is understood for the purposes of this assessment that the Parking and Traffic Review Report (Brown Consulting, 2013) prepared to support the existing approval was based on 124 staff supporting 1,200 students. There are currently 150 Full Time Equivalent (FTE) staff at the College with this quantum to slightly increase to 152 FTE staff to support the proposed 1,600 students.

A summary of the current and proposed staff and student numbers, as well as those included in the Parking and Traffic Review Report (Brown Consulting, 2013) for the existing approval, is included in Table 3.1.

Table 3.1: Approved, current and proposed number of staff and students

Description	Parking and Traffic Review Report (Brown Consulting, 2013)	Existing	Proposed
Staff	124 [1]	150	152
Students	1,200	1,422	1,600

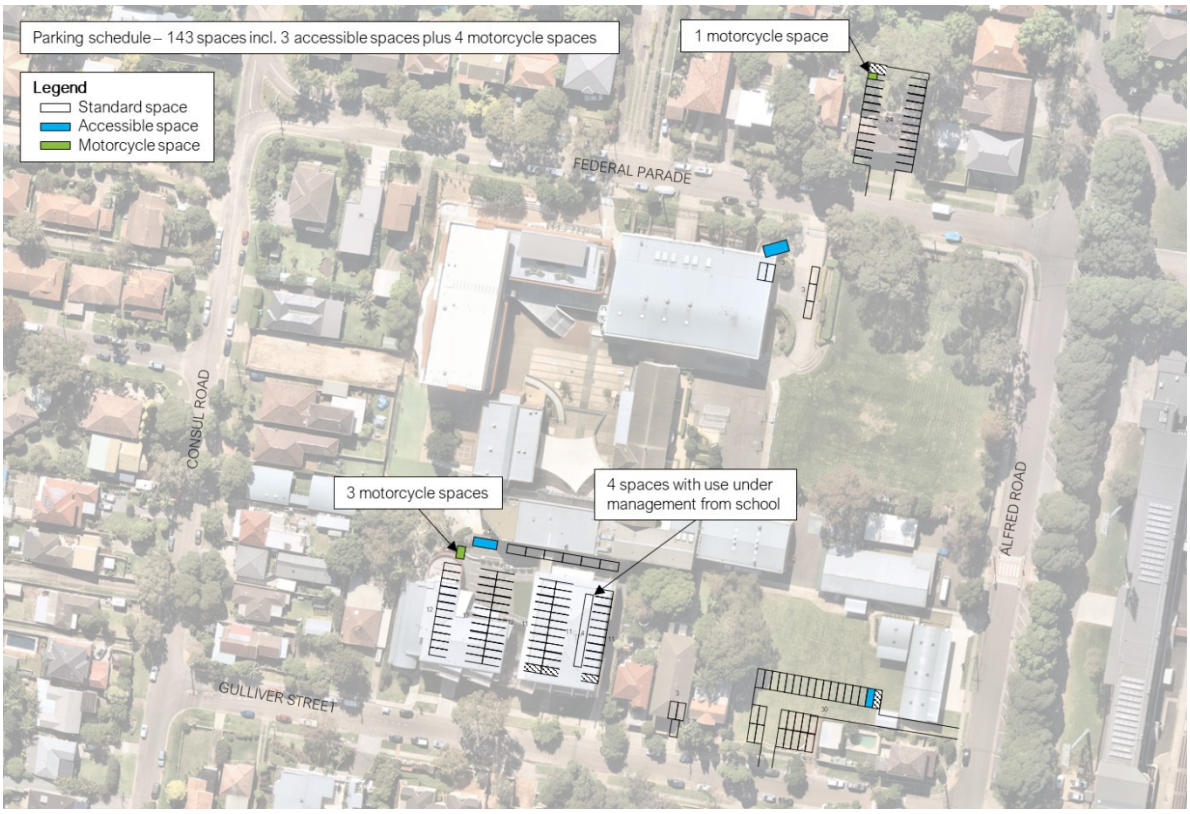
[1] Consent conditions for the existing approval do not limit staffing numbers

Considering this, the College seeks to improve existing parking and traffic conditions relating to daily operations through the following measures:

- Providing additional and dedicated on-site parking for use by College staff only to achieve a total supply of 143 spaces. This will be realised by:
  - constructing a new 24-space car park at 60 Federal Parade and a new 30-space car park in the south-east corner of the College site
  - linemarking and providing additional on-site spaces
  - implementing day to day management measures across the College.
- Managing four parking spaces within the existing undercroft staff car park to improve capacity and alleviate constraints associated with the previous approval. This involves a traffic warden directing staff where to specifically park in this area once all formal parking spaces are fully occupied.
- Encouraging continued formal use of the recently formalised 37-metre long no parking zone along the Alfred Street frontage between 8am and 9am, and between 3pm and 4pm school days. This will ensure improved management measures can be maintained and to better distribute set-down/ pick-up demand across the College.
- Providing four dedicated on-site motorcycle spaces, where none are currently provided.
- Delivering an improved communication strategy to ensure parents/ carers arrive and depart the College in the correct manner (general anti-clockwise circulation around the College) when dropping-off/ picking-up to improve traffic flow efficiency, balance the effects and limit impacts on through traffic and local residents.
- Implementing a strategy for senior students to consider their day to day travel habits, including avoiding driving to College and parking on-street, encouraging carpooling, being dropped-off or continuing to use public transport.

The proposed College parking layout is shown in Figure 3.1 and Appendix B.

Figure 3.1: Proposed parking layout plan



Base image source: Nearmap

4. PARKING ASSESSMENT

04

4.1. Car Parking Requirements

The car parking requirements for different development types are set out in Warringah Development Control Plan (DCP) 2011. DCP 2011 requires educational establishments provide parking at a rate of one space per staff member in attendance. Based on the forecast 152 FTE staff at the College, this results in a requirement of 152 parking spaces. This provision is considered highly conservative, mostly due to the knowledge that not all staff drive to the College on a daily basis.

On this basis, an empirical assessment has been completed based on the typical staff travel patterns as outlined in Section 2.3. As discussed, around 90 per cent of staff drive to/ from the College. Based on the 152 FTE staff, this equates to a requirement of 137 parking spaces.

Accessible parking should be provided at a rate of one space per 100 car parking spaces, in line with the Building Code of Australia (BCA).

The College proposes to increase the on-site parking supply from 106 spaces to 143 spaces. This includes three accessible spaces and exceeds the expected parking demand of 137 spaces. In addition, four motorcycle parking spaces will be provided in the main Gulliver Street and new Federal Parade car park to better reflect the known demand profiles. In comparison, the Parking and Traffic Review Report (Brown Consulting, 2013) indicated the current approval considers a parking provision of 106 spaces based on an anticipated parking demand of 109 spaces. This represented a technical shortfall of three spaces.

As such, the proposed 143 on-site parking spaces would deliver a surplus of six spaces based on the expected demand while also adding motorcycle parking. Overall, the proposal represents a definitive improvement over the approved operational conditions.

While it is acknowledged that some students are licensed and have the ability to drive, students will be encouraged and managed by the College to utilise other means of transport when travelling to/ from the school. This is consistent with the assumptions adopted in the previous Parking and Traffic Review Report (Brown Consulting, 2013) as part of the existing approval. That said, if students do drive and park, there is adequate capacity along the frontage streets to accommodate the minor demand. The six additional parking spaces provided on-site further to the demand expected from staff would also assist with reducing any on-street minor parking demand associated with students.

Senior students interested in driving are required to submit an application to the College Principal for permission to drive to and from school on regular school days throughout the school year. Granting of permission to drive to school is at the College's discretion. The College keeps a list of the students who have been granted permission and restricts daily use of vehicles for such purposes. The students will be given a briefing about where the College expects them to park, including guidelines and expected behaviour. Currently there are around 25 students that are registered to drive to/ from the College, with this number fluctuating up or down by around 10 per cent in any given school year. Of those that are registered to drive, many only choose to drive when they have before or after school activities, with an estimate of around 14 to 16 students driving on any given day. Carpooling is also a criterion for students in being permitted to drive to school.

Other than local residents, many of which park in their own garages and driveways, there is a general absence of land uses competing for parking in the immediate vicinity. Justified use of some on-street parking along the frontage streets is also common for schools across Sydney, especially those in established areas where schools have operated for many years. In this regard, reference to the existing 40 vacant on-street spaces is relevant. Removing the ability for caravans and boats to be stored in the area would also be of benefit to all.

4.2. Car Parking Layout Review

The new car park areas have been reviewed against the requirements the Australian Standard for Off Street Car Parking (AS/NZS2890.1:2004 and AS/NZS2890.6:2009). The review indicates the 60 Federal Parade car park is compliant with the dimensional requirements of a User Class 1A car park facility (all day employee parking) as set out in AS/NZS2890.1:2004. The new car park in the south-east corner of the College has been designed in accordance with the dimensional requirements of a User Class 2 facility.

While it is noted that the 60 Federal Parade car park is on the northern side of Federal Parade, opposite the College, its use will be restricted to authorised staff only. This would result in the need for teaching/ administration staff to cross Federal Parade daily to access the College grounds. Such arrangements are considered appropriate and manageable.

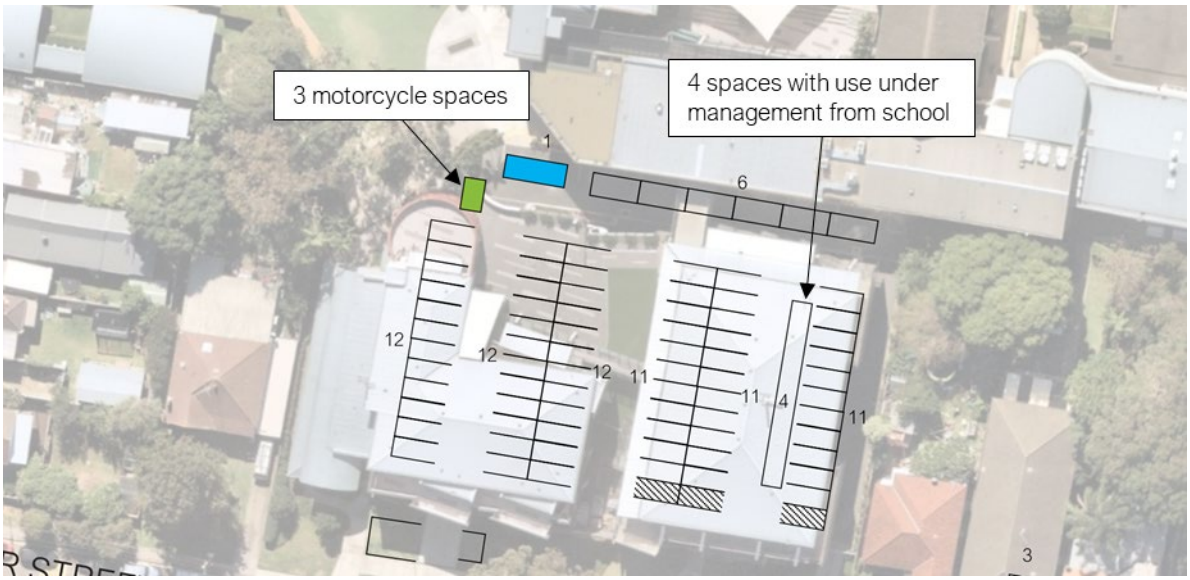
The accessible parking close to the Federal Parade College access (on the northern boundary) and the other accessible space in the main car park (on the southern boundary) ensure appropriate and practical accessible parking across the College. The northern accessible space is designed as a parallel space being 3.2 metres wide and 7.8 metres long, with an adjacent 1.6-metre-wide shared area, in accordance with AS/NZS2890.6:2009. The design of all new or modified parking spaces from the existing approval will be developed further during the detailed design stage to ensure compliance with AS/NZS2890.1:2004 and AS/NZS2890.6:2009 prior to construction certification.

Each of the proposed College car parks will include a security gate across the access driveways to prevent unauthorised use. These gates will remain open at times when most staff will arrive in the morning peak, thus avoiding any opportunity for queues to form on approach to each gate. Remote access arrangements will be in place for authorised users should access be required outside standard school hours.

There are seven tandem parking spaces proposed in the south-east car park as part of this DA. These spaces, when combined with the two spaces on the 8 Gulliver Street site as approved as part of the previous DA will result in a total of nine on-site tandem spaces. This equates to six per cent of the total parking provision. These spaces will be designated to specific staff based on work schedules and managed accordingly to avoid access complications.

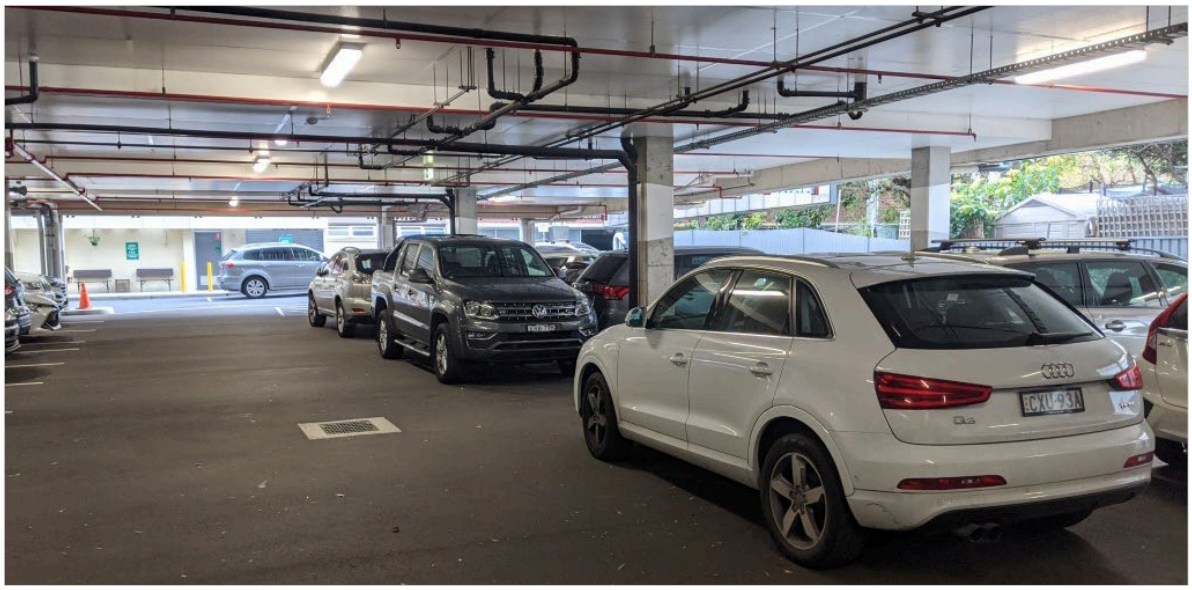
In addition, operational management measures have been implemented to control the use of four spaces that were approved as part of the previous application. This includes a traffic warden directing staff where to park in this area once all the formal car parking spaces are fully occupied in the Gulliver Street car park. With distinct geometry constraints along the Gulliver Street car park exit driveway, these spaces were unable to be practically implemented as part of the previous approval. This further increases the available on-site parking supply. The location and management of these spaces is shown in Figure 4.1 and Figure 4.2.

Figure 4.1: Location of four informal parking spaces in the main car park



Base image source: Nearmap

Figure 4.2: On-site management of the four informal parking spaces in the main car park



Overall, the on-site parking arrangements are able to be implemented and appropriately managed by the College to ensure practical day to day use.

4.3. Bicycle Parking

DCP 2011 only requires bicycle parking facilities to be provided for new buildings and for alterations or additions to existing buildings. As the proposal does not seek to modify or provide any additional floor area, there is no formal DCP 2011 requirement to expand the existing bicycle parking provision.

The travel surveys indicate that about two per cent of students currently cycle to the school. Based on 1,600 students, this equates to about 32 students. As such, it is recommended that up to 40 bicycle racks be provided on College grounds to accommodate such demand. This also allows for some additional capacity to accommodate any increase in demand over time. Indeed, it facilitates the objectives of the green travel plan which is currently implemented by the College.

4.4. Loading and Servicing

The proposal is not expected the generate an increase in loading and servicing for the site, with existing delivery arrangements via the existing driveways at the administration building on Alfred Street to be maintained.

5. TRANSPORT IMPACT ASSESSMENT

05

5.1. Traffic Generation

An assessment has been completed based on staff and student travel patterns to understand the likely change in traffic generation for the College between the existing approval and current conditions, as well as the anticipated change in traffic generation as a result of the increase in enrolments from the current 1,422 students to 1,600 students.

Table 5.1 and Table 5.2 set out the anticipated staff and student trips by mode to the College in the morning, with Table 5.3 and Table 5.4 trip mode from the College in the afternoon.

Table 5.1: Number of staff by mode of travel to the College

Mode of travel	Staff percentage	Existing approval	Current conditions	Difference from approval	Proposed	Difference from approval
Private car (as a driver)	90	112	135	+23	137	+25
Dropped off	1	1	2	+1	2	+1
Motorcycle	1	1	2	+1	2	+1
Bus	2	3	3	+0	3	+0
Walk	6	7	8	+1	8	+1
Cycle	0	0	0	+0	0	+0
Total	**100**	**124**	**150**	**+26**	**152**	**+28**

Note: Consent conditions for the existing approval do not limit staffing levels

Table 5.2: Number of students by mode of travel to the College

Mode of travel	Student percentage	Existing approval	Current conditions	Difference from approval	Proposed	Difference from approval
Private car (as a driver)	1	12	14	+2	16	+4
Dropped off	26	312	370	+58	416	+104
Motorcycle	0	0	0	+0	0	+0
Bus	66	792	939	+147	1,056	+264
Walk	5	60	71	+11	80	+20
Cycle	2	24	28	+4	32	+8
Total	**100**	**1,200**	**1,422**	**+222**	**1,600**	**+400**

Table 5.3: Number of staff by mode of travel from the College

Mode of travel	Staff percentage	Existing approval	Current conditions	Difference from approval	Proposed	Difference from approval
Private car (as a driver)	90	112	135	+23	137	+25
Picked up	1	1	2	+1	2	+1
Motorcycle	1	1	2	+1	2	+1
Bus	2	3	3	+0	3	+0
Walk	6	7	8	+1	8	+1
Cycle	0	0	0	+0	0	+0
Total	**100%**	**124**	**150**	**+26**	**150**	**+28**

Note: Consent conditions for the existing approval do not limit staffing levels

Table 5.4: Number of students by mode of travel from the College

Mode of travel	Student percentage	Existing approval	Current conditions	Difference from approval	Proposed	Difference from approval
Private car (as a driver)	1	12	14	+2	16	+4
Picked up	16	192	228	+36	256	+64
Motorcycle	0	0	0	+0	0	+0
Bus	76	912	1081	+169	1216	+304
Walk	5	60	71	+11	80	+20
Cycle	2	24	28	+4	32	+8
Total	**100**	**1,200**	**1,422**	**+222**	**1,600**	**+400**

Considering the above, the number of vehicle trips has been estimated by:

1. taking the number of staff and student vehicle trips outlined in Table 5.1 to Table 5.4 and multiplying by the percentage of trips that occur during the identified peak hours (as outlined in Table 2.2)
2. then dividing by the observed vehicle occupancy for staff and students.

It is noted that private car trips as a driver (such as staff) account for a single one-way trip, while set-down/ pick-up trips account for two-trips (inbound and outbound).

The traffic generation estimates based on the existing approval, current conditions and proposed arrangements with 1,600 students is summarised in Table 5.5.

Table 5.5: AM and PM peak hour vehicle trips

Description	AM			PM		
	Existing approval	Current conditions	Proposed	Existing approval	Current conditions	Proposed
Staff	21	25	25	33	40	41
Students	377	447	503	235	279	313
Total	**398**	**472**	**528**	**268**	**319**	**354**
Difference from approval	-	*+74*	*+130*	-	*+51*	*+86*
Difference from current conditions	-	-	*+56*	-	-	*+35*

Note: Consent conditions for the existing approval do not limit staffing levels

Table 5.5 indicates that the proposal to increase the student population to 1,600 students will generate an additional 56 vehicle trips in the AM peak hour and 35 vehicle trips in the PM peak hour when compared with the current 1,422 student population. This is clearly a minor quantum, with these estimates forming the basis of the SIDRA modelling assessment.

5.2. Traffic Impact

The distribution of traffic at the key surveyed intersections has been estimated based on existing turning movements in and out of the Consul Road, Alfred Road, Pine Avenue and Victor Road.

Considering the anticipated increase of 56 trips in the AM peak hour and 35 trips in the PM peak hour from current conditions, this represents a minor increase in turning movements at each of the key surveyed intersections.

The traffic impact of the proposed increase in student population from existing has been assessed using SIDRA, with a summary of the anticipated future operation of the key surveyed intersections summarised in Table 5.6.

Table 5.6: Future operating conditions

Intersection	Peak	Leg	Degree of saturation (DOS)	Average delay (sec)	Queue (m)[2]	Level of service (LOS)
Beacon Hill Road/ Consul Road	AM	East	0.14	0	0	A
		North	0.45	107	15	F
		West	0.36	4	0	A
	PM	East	0.31	0	0	A
		North	0.59	113	21	F
		West	0.22	3	0	A
Pittwater Road/ Alfred Road	AM	South	0.15	3	0	A
		North	0.43	0	0	A
		West	1.00	81	15	F
	PM	South	0.14	3	0	A

Intersection	Peak	Leg	Degree of saturation (DOS)	Average delay (sec)	Queue (m)[2]	Level of service (LOS)
		North	0.31	0	0	A
		West	1.00	142	13	F
Pittwater Road/ Pine Avenue	AM	East	0.59	3	30	A
		North	0.74	61	47	E
		West	0.52	10	62	A
		Overall	**0.74**	**10**	**62**	**A**
	PM	East	0.40	5	30	A
		North	0.50	55	32	D
		West	0.83	7	105	A
		Overall	**0.83**	**9**	**105**	**A**
Pittwater Road/ Michell Road	AM	South	0.48	58	38	E
		East	0.68	5	65	A
		West	0.47	5	30	A
		Overall	**0.68**	**9**	**65**	**A**
	PM	South	0.89	77	90	F
		East	0.85	29	149	C
		West	0.56	5	30	A
		Overall	**0.89**	**24**	**149**	**B**
Warringah Road/ Victor Road	AM	South	0.38	>200	7	F
		East	0.03	6	0	A
		West	0.82	27	45	B
	PM	South	0.55	>200	11	F
		East	0.05	6	0	A
		West	0.59	24	19	B

[2] Average queue lengths have been reported for the Pittwater Road intersections with Alfred Road, Pine Avenue and Mitchell Avenue as these intersections have been modelling as a network in SIDRA. The Beacon Hill Road/ Consul Road and Warringah Road/ Victor Road intersections have been modelled as isolated intersections and therefore reported queue lengths represent a 95th percentile queue.

Clearly, such minor traffic volumes would have no impact on the operation of the surveyed intersections. They would continue to operate as per existing conditions, with some minor improvements likely associated with better distribution across the recently formalised set-down/ pick-up areas.

It is noted that the results indicate minor reductions in average delay and queue lengths at the Pittwater Road intersections with Alfred Road, Pine Avenue and Mitchell Road. This is as a result of these intersections being set up as a network in SIDRA, with the program slightly modifying some of the phase times at the Pittwater Road/ Pine Avenue/ Mitchell Road intersection to reduce delay over the intersection as much as possible which has flow on effects to the Alfred Road intersection. This is not dissimilar to what occurs in reality at traffic signals with the Sydney Coordinated Adaptive Traffic System (SCATS).

As discussed, there are some constraints with the right turns on exit from Consul Road, Alfred Road and Victor Street due to the existing through volumes along Beacon Hill Road, Pittwater Road and Warringah

Road respectively. There are however alternate routes available including turning right from Pine Avenue to travel south or turning left from Alfred Road to travel north. With the exception of these turns, the remaining intersections operate satisfactorily (defined as a LOS D or better overall) with the additional traffic related to the increase in students.

It is noted that these SIDRA modelling results are consistent with the SIDRA modelling results detailed in the Parking and Traffic Review (Brown Consulting, 2013) for the existing approval, with constraints evident with the right turns from Consul Road and Alfred Road onto Beacon Hill Road and Pittwater Road, respectively.

Overall, the surrounding road network is generally expected to continue to operate satisfactorily following the proposed increase of student enrolments to 1,600 students, with the difference between the anticipated future conditions and current conditions negligible. Modelling results also indicate similar outcomes to those included in the Parking and Traffic Review (Brown Consulting, 2013) for the existing approval.

5.3. Cumulative Assessment

It is understood that there are plans to redevelop Brookvale Oval on the eastern side of Alfred Road, with DA (2019/1190) understood to be approved in late July 2020. The redevelopment will create a new grandstand on the northern side of the oval and a Centre of Excellence, along with formalising and expanding the existing car park to provide 60 parking spaces (an increase of about 15 spaces from existing).

The Brookvale Oval Redevelopment Traffic Impact Assessment prepared by TTW dated 21 October 2019 indicates the proposal will generate an additional 22 vehicle trips in the AM peak hour and 20 vehicle trips in the PM peak hour. This increase is minor in comparison to the existing traffic volumes on the surrounding road network and also likely to occur at a slightly different peak to the College, especially in the afternoon.

As such, the additional traffic generated by the Brookvale Oval redevelopment does not directly impact the conclusions outlined above.

5.4. Construction Traffic Management

5.4.1. Overview

This section seeks to provide an overview of the Construction Traffic Management Plan (CTMP) initiatives to be implemented as part of the construction works associated with the proposed development. A detailed CTMP would be prepared by the appointed contractor prior to issue of the construction certificate.

5.4.2. Principles of Traffic Management

The only construction works involved in the proposal are for the new car parks, one at 60 Federal Parade and the other in the south-east corner of the College. These works are minor from a construction traffic generation and impact perspective. Notwithstanding, the general principles of traffic management during construction activities are as follows:

- minimise the impact on pedestrian and cyclist movements
- maintain appropriate public transport access
- minimise the loss of on-street parking
- minimise the impact on adjacent and surrounding buildings
- maintain access to/ from adjacent buildings
- restrict construction vehicle movements to designated routes to/ from the site
- manage and control construction vehicle activity near the site
- carry out construction activity in accordance with approved hours of works.

5.4.3. Site Access and Loading

Construction vehicle access will be provided via the existing driveway at 60 Federal Parade, and the existing driveway on Gulliver Street for the new car park in the south-east corner of the College. It is anticipated that an on-street works zone may be required for the 60 Federal Parade works, resulting in the temporary loss of around three on-street parking spaces during approved work hours.

As part of the detailed CTMP, a traffic guidance scheme (previously known as a traffic control plan) will be prepared in accordance with the principles of the Traffic Control at Work Sites manual (TfNSW, 2020). The TCPs primarily show where construction signage will be located (such as uncontrolled intersections) along the approved truck routes to warn other road users of the increase in construction vehicle movements.

Access to the neighbouring sites by emergency vehicles would not be affected by the works as the road and footpath frontages would be unaffected. Emergency protocols on the site would include a requirement for site personnel to assist with emergency access from the street (if required). All truck movements to the site and/or incident point would be suspended and cleared.

5.4.4. Construction Staff Parking

It is anticipated that there will be up to 10 workers on-site at any given time during peak activities.

Given the site's proximity to a range of high frequency public transport services along Pittwater Road, workers will be encouraged to use public transport to access the site. During site induction, workers will be informed of the existing bus network servicing the site. Appropriate arrangements will be made for any equipment/ tool storage and drop-off requirements.

5.4.5. Heavy Vehicle Traffic Generation

Construction vehicles generated by the site would generally include up to 8.8 metre medium rigid vehicles. There is expected to be up to 1-2 trucks per hour accessing the site during the works.

This is considered negligible and could not be expected to compromise the function of the surrounding road network. Construction vehicle movements will be minimised/ avoided during peak hours where possible.

6. CONCLUSION

06

CONCLUSION

Based on the analysis and discussions presented within this report, the following conclusions are made:

1. A DA is to be lodged seeking to increase the student enrolment from the currently approved 1,200 students to 1,600 students at St Augustine's College Brookvale.
2. To accommodate the increase in students, the College seeks to improve existing parking and traffic conditions both internal to the College and on the surrounding streets. This can be achieved through the following measures:
    - Providing additional and dedicated on-site parking for use by College staff only to achieve a total supply of 143 spaces. This will be realised by:
        - constructing a new 24-space car park at 60 Federal Parade and new 30-space car park in the south-east corner of the College
        - linemarking and providing additional on-site spaces.
    - implementing an updated Traffic and Parking Management Plan for the College, detailing management measures for the various modes of transport to the College.
    - Managing four parking spaces within the existing undercroft staff car park to improve capacity and alleviate constraints associated with the previous approval.
    - Encouraging use of the recently formalised 37-metre long no parking zone between 8am and 9am, and between 3pm and 4pm school days along the Alfred Road frontage. This will allow improved management measures to be implemented and to better distribute set-down/ pick-up demand across the College.
    - Providing four dedicated on-site motorcycle spaces, where none are currently provided.
    - Delivering an improved communication strategy to ensure parents/ carers arrive and depart the College in the correct manner (general anti-clockwise circulation around the College) when dropping-off/ picking-up to improve traffic flow efficiency, balance the effects and limit impacts on through traffic and local residents.
3. The travel survey was completed by College staff and students to understand existing travel patterns and to forecast the likely parking and transport impacts of the proposal.
4. The proposal is expected to generate a parking demand of 137 parking spaces, with this demand associated with the 152 FTE staff.
5. The College proposes to increase the on-site parking supply from 106 spaces to 143 spaces. This exceeds the demand for 137 spaces by six spaces and represents a distinct improvement when compared with the existing approval (undersupply of three spaces).
6. The proposed parking layout is generally consistent with the dimensional requirements as set out in the Australian/New Zealand Standard for Off Street Car Parking (AS/NZS2890.1:2004 and AS/NZS2890.6:2009) and is considered appropriate under the day to day management of the College.
7. The proposed 60 Federal Parade car park has been designed as a Class 1A facility, while the south-east car park internal to the College has been designed as a Class 2 facility. Both include appropriate setbacks from adjacent properties.
8. The proposed parking strategy is supported for the following reasons:
    - The proposed on-site parking supply will exceed the anticipated staff parking demand.
    - The College has confirmed any tandem parking will be appropriately managed as part of daily operations with allocated staff parking as necessary.

- Access to the car parks will be managed by the College so that entry gates remain open during arrival periods and to minimise any potential queuing.
- Students are not encouraged to drive to the school, however should approved students do drive and park, there is adequate capacity along the frontage streets to accommodate the minor demand. The six additional parking spaces provided on-site further to the demand expected from staff would also assist with reducing any minor on-street parking demand associated with students.
- Senior students who are interested in driving are required to submit an application to the College. The College keeps a list of the students who have been granted permission and restricts daily use of vehicles for such purposes. These management measures will remain in place to keep track of students that are permitted to drive and assist with managing student expectations. Students will also be given a briefing about where the College requires them to park, including guidelines and behaviour matters.
- All new car parking spaces will comply with AS/NZS2890.1:2004 and AS/NZS2890.6:2009.

9. It is recommended that 40 bicycle parking spaces be provided on-site to meet anticipated demand, while also allowing for additional capacity for any increase in demand as a result of ongoing green travel initiatives that continue to be implemented by the College
10. The proposal for 1,600 students is expected to generate an additional 131 vehicle trips in any peak hour from the existing approval, and an additional 56 vehicle trips in any peak hour compared to current conditions.
11. There is adequate capacity in the surrounding road network to cater for the traffic generated by the additional students, with SIDRA modelling results indicating negligible differences to intersection operation from current conditions.
12. SIDRA modelling results for the 1,600 students is also consistent with the conclusions outlined in the Parking and Traffic Review (Brown Consulting, 2013) prepared for the previously approved 1,200 students.
13. Construction traffic impacts associated with construction of the new car parks would be minor and readily managed on the adjacent road network. A detailed Construction Traffic Management Plan would be prepared by the appointed contractor.
14. Overall, the proposal to increase the student enrolment to 1,600 students can be supported from a transport perspective.

A.SIDRA RESULTS

A

USER REPORT FOR SITE

Project: 210510sid-N190000 St Augustine College, Brookvale 1600

Template: Default Site User Report

Site: [1 Beacon Hill Road/ Consul Road - Ex AM]

Site Category: -
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Beacon Hill Road												
22	T1	526	1.0	0.144	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		526	1.0	0.144	0.0	NA	0.0	0.0	0.00	0.00	0.00	40.0
North: Consul Road												
24	L2	107	1.0	0.452	15.5	LOS B	2.0	13.9	0.73	1.17	1.10	28.4
26	R2	13	0.0	0.452	104.3	LOS F	2.0	13.9	0.73	1.17	1.10	31.9
Approach		120	0.9	0.452	24.8	LOS B	2.0	13.9	0.73	1.17	1.10	28.9
West: Beacon Hill Road												
27	L2	156	0.0	0.362	3.5	LOS A	0.0	0.0	0.00	0.11	0.00	39.8
28	T1	1169	0.2	0.362	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	39.7
Approach		1325	0.2	0.362	0.4	NA	0.0	0.0	0.00	0.05	0.00	39.7
All Vehicles		1972	0.4	0.452	1.8	NA	2.0	13.9	0.04	0.11	0.07	38.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [1 Beacon Hill Road/ Consul Road - Ex PM]

Site Category: -
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Beacon Hill Road												
22	T1	1144	0.6	0.312	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		1144	0.6	0.312	0.0	NA	0.0	0.0	0.00	0.00	0.00	40.0
North: Consul Road												
24	L2	75	1.4	0.588	28.3	LOS B	2.9	20.4	0.77	1.28	1.42	22.0
26	R2	23	0.0	0.588	111.9	LOS F	2.9	20.4	0.77	1.28	1.42	26.5
Approach		98	1.1	0.588	48.0	LOS D	2.9	20.4	0.77	1.28	1.42	23.3
West: Beacon Hill Road												
27	L2	58	0.0	0.224	3.4	LOS A	0.0	0.0	0.00	0.07	0.00	39.9
28	T1	759	0.8	0.224	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	39.8
Approach		817	0.8	0.224	0.3	NA	0.0	0.0	0.00	0.03	0.00	39.8
All Vehicles		2059	0.7	0.588	2.4	NA	2.9	20.4	0.04	0.07	0.07	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [5 Warringah Road/ Victor Road - Ex AM]

Site Category: -
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Victor Road												
30	L2	312	1.4	0.265	7.6	LOS A	1.7	12.3	0.10	0.93	0.10	47.4
32	R2	7	0.0	0.393	250.9	LOS F	1.1	7.5	0.99	1.02	1.08	7.8
Approach		319	1.3	0.393	13.2	LOS A	1.7	12.3	0.12	0.93	0.12	43.6
East: Warringah Road												
21	L2	31	0.0	0.025	5.5	LOS A	0.0	0.0	0.00	0.38	0.00	51.8
22	T1	820	9.6	0.230	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		851	9.3	0.230	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.6
West: Warringah Road												
28	T1	931	7.7	0.174	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
29	R2	296	0.0	0.789	25.3	LOS B	5.7	39.9	0.89	1.29	2.09	38.0
Approach		1226	5.8	0.789	6.1	NA	5.7	39.9	0.22	0.31	0.50	51.8
All Vehicles		2396	6.5	0.789	5.0	NA	5.7	39.9	0.13	0.29	0.27	52.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [5 Warringah Road/ Victor Road - Ex PM]

Site Category: -
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Victor Road												
30	L2	458	0.5	0.399	7.8	LOS A	3.1	21.4	0.21	0.87	0.21	47.4
32	R2	9	0.0	0.537	306.4	LOS F	1.5	10.5	0.99	1.04	1.13	6.6
Approach		467	0.5	0.537	13.9	LOS A	3.1	21.4	0.22	0.87	0.23	43.4
East: Warringah Road												
21	L2	52	0.0	0.050	5.5	LOS A	0.0	0.0	0.00	0.31	0.00	52.4
22	T1	979	8.0	0.266	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		1031	7.6	0.266	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.5
West: Warringah Road												
28	T1	913	4.7	0.168	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
29	R2	163	1.3	0.565	23.0	LOS B	2.5	17.5	0.85	1.06	1.32	39.1
Approach		1076	4.2	0.565	3.5	NA	2.5	17.5	0.13	0.16	0.20	54.9
All Vehicles		2574	4.9	0.565	4.1	NA	3.1	21.4	0.09	0.23	0.12	53.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [1 Beacon Hill Road/ Consul Road - Fut AM]

Site Category: -
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Beacon Hill Road												
22	T1	526	1.0	0.144	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		526	1.0	0.144	0.0	NA	0.0	0.0	0.00	0.00	0.00	40.0
North: Consul Road												
24	L2	111	1.0	0.483	16.6	LOS B	2.2	15.3	0.74	1.19	1.17	27.8
26	R2	14	0.0	0.483	106.8	LOS F	2.2	15.3	0.74	1.19	1.17	31.4
Approach		124	0.8	0.483	26.5	LOS B	2.2	15.3	0.74	1.19	1.17	28.3
West: Beacon Hill Road												
27	L2	160	0.0	0.364	3.5	LOS A	0.0	0.0	0.00	0.11	0.00	39.7
28	T1	1171	0.2	0.364	0.1	LOS A	0.0	0.0	0.00	0.05	0.00	39.7
Approach		1331	0.2	0.364	0.5	NA	0.0	0.0	0.00	0.06	0.00	39.7
All Vehicles		1981	0.4	0.483	2.0	NA	2.2	15.3	0.05	0.11	0.07	38.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [1 Beacon Hill Road/ Consul Road - Fut PM]

Site Category: -
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Beacon Hill Road												
22	T1	1144	0.6	0.312	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		1144	0.6	0.312	0.0	NA	0.0	0.0	0.00	0.00	0.00	40.0
North: Consul Road												
24	L2	77	1.4	0.592	28.3	LOS B	2.9	20.8	0.77	1.29	1.43	22.0
26	R2	23	0.0	0.592	112.5	LOS F	2.9	20.8	0.77	1.29	1.43	26.6
Approach		100	1.1	0.592	47.8	LOS D	2.9	20.8	0.77	1.29	1.43	23.3
West: Beacon Hill Road												
27	L2	61	0.0	0.224	3.4	LOS A	0.0	0.0	0.00	0.07	0.00	39.9
28	T1	759	0.8	0.224	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	39.8
Approach		820	0.8	0.224	0.3	NA	0.0	0.0	0.00	0.03	0.00	39.8
All Vehicles		2064	0.7	0.592	2.4	NA	2.9	20.8	0.04	0.08	0.07	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [5 Warringah Road/ Victor Road - Fut AM]

Site Category: -
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Victor Road												
30	L2	324	1.3	0.276	7.6	LOS A	1.8	12.9	0.10	0.93	0.10	47.4
32	R2	7	0.0	0.380	236.9	LOS F	1.0	7.2	0.99	1.02	1.07	8.2
Approach		332	1.3	0.380	12.7	LOS A	1.8	12.9	0.12	0.93	0.12	43.9
East: Warringah Road												
21	L2	33	0.0	0.026	5.5	LOS A	0.0	0.0	0.00	0.39	0.00	51.7
22	T1	820	9.6	0.230	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		853	9.3	0.230	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.6
West: Warringah Road												
28	T1	931	7.7	0.213	0.5	LOS A	1.3	9.4	0.11	0.00	0.11	59.3
29	R2	306	0.0	0.819	27.2	LOS B	6.4	44.8	0.91	1.36	2.30	37.2
Approach		1237	5.8	0.819	7.1	NA	6.4	44.8	0.31	0.34	0.65	50.9
All Vehicles		2421	6.4	0.819	5.5	NA	6.4	44.8	0.17	0.31	0.35	52.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [5 Warringah Road/ Victor Road - Fut PM]

Site Category: -
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Victor Road												
30	L2	466	0.5	0.406	7.8	LOS A	3.1	22.1	0.21	0.86	0.21	47.4
32	R2	9	0.0	0.547	315.0	LOS F	1.5	10.6	0.99	1.04	1.14	6.4
Approach		476	0.4	0.547	13.9	LOS A	3.1	22.1	0.22	0.87	0.23	43.3
East: Warringah Road												
21	L2	53	0.0	0.050	5.5	LOS A	0.0	0.0	0.00	0.31	0.00	52.4
22	T1	979	8.0	0.266	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		1032	7.6	0.266	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.4
West: Warringah Road												
28	T1	913	4.7	0.168	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
29	R2	169	1.2	0.587	23.5	LOS B	2.6	18.6	0.86	1.08	1.37	38.8
Approach		1082	4.2	0.587	3.7	NA	2.6	18.6	0.13	0.17	0.21	54.7
All Vehicles		2589	4.8	0.587	4.2	NA	3.1	22.1	0.10	0.24	0.13	53.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

Project: 200908sid-N190000 St Augustine College, Brookvale — **Template: Movement Summary**

Site: [2 Pittwater Road/ Alfred Road - Ex AM] — **Network: 2 [Pittwater Road / Pine Avenue / Mitchell Road - Ex AM]**

Site Category: -
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pittwater Road														
10	L2	225	1.9	225	1.9	0.146	2.7	LOS A	0.0	0.0	0.00	0.33	0.00	37.4
11	T1	945	10.8	945	10.8	0.239	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	39.4
Approach		1171	9.1	1171	9.1	0.239	0.5	NA	0.0	0.0	0.00	0.07	0.00	38.0
North: Pittwater Road														
5	T1	1718	6.9	1718	6.9	0.428	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		1718	6.9	1718	6.9	0.428	0.0	NA	0.0	0.0	0.00	0.00	0.00	40.0
West: Alfred Road														
7	L2	152	0.7	152	0.7	0.120	3.7	LOS A	0.2	1.6	0.15	0.44	0.15	34.6
9	R2	114	0.0	114	0.0	1.000	83.6	LOS F	2.2	15.4	1.00	1.71	3.55	10.1
Approach		265	0.4	265	0.4	1.000	37.9	LOS C	2.2	15.4	0.52	0.99	1.61	16.5
All Vehicles		3154	7.2	3154	7.2	1.000	3.4	NA	2.2	15.4	0.04	0.11	0.14	33.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 1872W [3 Pittwater Road/ Pine Avenue - Ex AM]

Network: 2 [Pittwater Road / Pine Avenue / Mitchell Road - Ex AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [Intersection]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, E
Output Phase Sequence: A, B, E

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pittwater Road														
5	T1	1621	6.8	1621	6.8	0.588	1.8	LOS A	3.9	30.0	0.12	0.11	0.12	35.8
6	R2	132	0.8	132	0.8	0.336	16.0	LOS B	1.6	11.2	0.35	0.84	0.35	28.4
Approach		1753	6.3	1753	6.3	0.588	2.9	LOS A	3.9	30.0	0.14	0.17	0.14	32.9
North: Pine Avenue														
7	L2	42	2.4	42	2.4	0.073	37.6	LOS C	1.1	8.0	0.73	0.70	0.73	16.0
9	R2	160	3.1	160	3.1	0.716	66.9	LOS E	6.3	45.2	1.00	0.85	1.08	10.5
Approach		202	3.0	202	3.0	0.716	60.8	LOS E	6.3	45.2	0.94	0.82	1.01	11.3
West: Pittwater Road														
10	L2	49	2.0	49	2.0	0.518	15.9	LOS B	7.9	61.2	0.41	0.40	0.41	38.9
11	T1	1080	8.9	1080	8.9	0.518	10.1	LOS A	7.9	61.2	0.39	0.37	0.39	33.3
Approach		1129	8.6	1129	8.6	0.518	10.3	LOS A	7.9	61.2	0.40	0.37	0.40	33.8
All Vehicles		3084	6.9	3084	6.9	0.716	9.4	LOS A	7.9	61.2	0.28	0.28	0.29	27.1

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

Site: 1872E [4 Pittwater Road/ Mitchell Road- Ex AM]

Network: 2 [Pittwater Road / Pine Avenue / Mitchell Road - Ex AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [Intersection]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, E
Output Phase Sequence: A, B, E

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mitchell Road														
1	L2	50	6.0	50	6.0	0.479	57.4	LOS E	3.7	28.2	0.94	0.79	0.94	6.2
3	R2	192	12.5	192	12.5	0.479	57.9	LOS E	5.0	38.4	0.95	0.80	0.95	22.6
Approach		242	11.2	242	11.2	0.479	57.8	LOS E	5.0	38.4	0.95	0.80	0.95	20.2
East: Pittwater Road														
4	L2	335	7.2	335	7.2	0.674	17.6	LOS B	8.1	64.8	0.51	0.69	0.66	40.1
5	T1	1696	6.4	1696	6.4	0.674	2.0	LOS A	8.1	64.8	0.11	0.12	0.12	55.9
Approach		2031	6.5	2031	6.5	0.674	4.6	LOS A	8.1	64.8	0.17	0.22	0.21	51.8
West: Pittwater Road														
11	T1	1000	9.2	1000	9.2	0.368	0.6	LOS A	0.6	4.4	0.03	0.03	0.03	59.0
12	R2	128	4.1	128	4.1	0.471	39.1	LOS C	4.1	30.0	0.93	0.90	1.06	10.6
Approach		1128	8.6	1128	8.6	0.471	5.0	LOS A	4.1	30.0	0.14	0.13	0.15	51.3
All Vehicles		3401	7.5	3401	7.5	0.674	8.5	LOS A	8.1	64.8	0.22	0.23	0.24	46.5

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

USER REPORT FOR NETWORK SITE

Project: 200908sid-N190000 St Augustine College, Brookvale — **Template: Movement Summary**

Site: [2 Pittwater Road/ Alfred Road - Ex PM] — **Network: 1 [Pittwater Road / Pine Avenue / Mitchell Road - Ex PM]**

Site Category: -
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pittwater Road														
10	L2	165	11.5	165	11.5	0.136	2.7	LOS A	0.0	0.0	0.00	0.26	0.00	37.8
11	T1	1568	6.3	1568	6.3	0.401	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	39.5
Approach		1734	6.8	1734	6.8	0.401	0.2	NA	0.0	0.0	0.00	0.03	0.00	38.6
North: Pittwater Road														
5	T1	1241	7.2	1241	7.2	0.310	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		1241	7.2	1241	7.2	0.310	0.0	NA	0.0	0.0	0.00	0.00	0.00	40.0
West: Alfred Road														
7	L2	103	0.0	103	0.0	0.088	3.7	LOS A	0.1	1.0	0.18	0.44	0.18	34.4
9	R2	63	0.0	63	0.0	1.000	143.9	LOS F	1.8	12.9	1.00	1.51	2.82	6.6
Approach		166	0.0	166	0.0	1.000	57.0	LOS E	1.8	12.9	0.49	0.85	1.18	12.7
All Vehicles		3141	6.6	3141	6.6	1.000	3.2	NA	1.8	12.9	0.03	0.06	0.06	32.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 1872W [3 Pittwater Road/ Pine Avenue - Ex PM]

Network: 1 [Pittwater Road / Pine Avenue / Mitchell Road - Ex PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 135 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [Intersection]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, E
Output Phase Sequence: A, B, E

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pittwater Road														
5	T1	1110	7.7	1110	7.7	0.404	2.2	LOS A	3.9	30.0	0.12	0.11	0.12	33.0
6	R2	106	3.0	106	3.0	0.276	35.6	LOS C	3.2	22.8	0.75	0.86	0.75	18.2
Approach		1216	7.3	1216	7.3	0.404	5.1	LOS A	3.9	30.0	0.18	0.18	0.18	25.3
North: Pine Avenue														
7	L2	68	17.6	68	17.6	0.109	34.6	LOS C	1.8	14.1	0.68	0.72	0.68	18.0
9	R2	109	9.2	109	9.2	0.497	66.5	LOS E	4.2	31.8	0.98	0.79	0.98	10.9
Approach		177	12.4	177	12.4	0.497	54.2	LOS D	4.2	31.8	0.86	0.76	0.86	12.8
West: Pittwater Road														
10	L2	59	0.0	59	0.0	0.841	14.7	LOS B	15.6	118.6	0.51	0.50	0.52	42.2
11	T1	1615	6.6	1615	6.6	0.841	8.1	LOS A	15.6	118.6	0.49	0.47	0.50	36.5
Approach		1674	6.4	1674	6.4	0.841	8.3	LOS A	15.6	118.6	0.49	0.47	0.50	36.8
All Vehicles		3067	7.1	3067	7.1	0.841	9.7	LOS A	15.6	118.6	0.39	0.37	0.39	29.8

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

Site: 1872E [4 Pittwater Road/ Mitchell Road - Ex PM]

Network: 1 [Pittwater Road / Pine Avenue / Mitchell Road - Ex PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 135 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [Intersection]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, E
Output Phase Sequence: A, B, E

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mitchell Road														
1	L2	59	0.0	59	0.0	0.889	78.5	LOS F	10.3	74.9	1.00	1.00	1.32	4.7
3	R2	432	6.3	432	6.3	0.889	77.2	LOS F	12.2	90.0	1.00	0.99	1.30	18.9
Approach		491	5.5	491	5.5	0.889	77.4	LOS F	12.2	90.0	1.00	0.99	1.30	17.6
East: Pittwater Road														
4	L2	304	4.9	304	4.9	0.855	40.9	LOS C	19.2	149.7	0.88	0.95	1.20	28.4
5	T1	1152	7.7	1152	7.7	0.855	27.2	LOS B	19.2	149.7	0.58	0.61	0.73	31.6
Approach		1456	7.1	1456	7.1	0.855	30.1	LOS C	19.2	149.7	0.64	0.68	0.83	30.7
West: Pittwater Road														
11	T1	1550	7.4	1550	7.4	0.562	0.7	LOS A	1.4	10.8	0.05	0.05	0.05	58.7
12	R2	140	3.8	140	3.8	0.366	47.3	LOS D	4.2	30.0	0.96	0.89	1.12	9.1
Approach		1690	7.1	1690	7.1	0.562	4.6	LOS A	4.2	30.0	0.12	0.12	0.14	52.0
All Vehicles		3637	6.9	3637	6.9	0.889	24.6	LOS B	19.2	149.7	0.45	0.46	0.57	33.4

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

USER REPORT FOR NETWORK SITE

Project: 210510sid-N190000 St Augustine College, Brookvale 1600

Template: Default Site User Report

Site: [2 Pittwater Road/ Alfred Road - Fut AM]

Network: 3 [Pittwater Road / Pine Avenue / Mitchell Road - Fut AM]

Site Category: -
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Pittwater Road														
10	L2	234	1.8	234	1.8	0.150	2.7	LOS A	0.0	0.0	0.00	0.33	0.00	37.4
11	T1	945	10.8	945	10.8	0.239	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	39.3
Approach		1179	9.0	1179	9.0	0.239	0.5	NA	0.0	0.0	0.00	0.08	0.00	37.9
North: Pittwater Road														
5	T1	1722	6.9	1722	6.9	0.429	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		1722	6.9	1722	6.9	0.429	0.0	NA	0.0	0.0	0.00	0.00	0.00	40.0
West: Alfred Road														
7	L2	156	0.7	156	0.7	0.123	3.7	LOS A	0.2	1.6	0.15	0.44	0.15	34.6
9	R2	117	0.0	117	0.0	1.000	81.2	LOS F	2.2	15.4	1.00	1.72	3.58	10.3
Approach		273	0.4	273	0.4	1.000	36.9	LOS C	2.2	15.4	0.52	0.99	1.62	16.7
All Vehicles		3174	7.1	3174	7.1	1.000	3.4	NA	2.2	15.4	0.04	0.11	0.14	33.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 1872W [3 Pittwater Road/ Pine Avenue - Fut AM]

Network: 3 [Pittwater Road / Pine Avenue / Mitchell Road - Fut AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [Intersection]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, E
Output Phase Sequence: A, B, E

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Pittwater Road														
5	T1	1621	6.8	1621	6.8	0.588	1.8	LOS A	3.9	30.0	0.12	0.11	0.12	35.8
6	R2	135	0.8	135	0.8	0.345	15.9	LOS B	1.6	11.4	0.34	0.84	0.34	28.5
Approach		1756	6.3	1756	6.3	0.588	2.9	LOS A	3.9	30.0	0.14	0.17	0.14	32.9
North: Pine Avenue														
7	L2	43	2.3	43	2.3	0.075	37.7	LOS C	1.2	8.2	0.73	0.70	0.73	16.0
9	R2	164	3.0	164	3.0	0.740	67.6	LOS E	6.5	46.7	1.00	0.86	1.11	10.4
Approach		207	2.9	207	2.9	0.740	61.4	LOS E	6.5	46.7	0.94	0.83	1.03	11.2
West: Pittwater Road														
10	L2	49	2.0	49	2.0	0.519	16.0	LOS B	8.0	61.5	0.41	0.40	0.41	38.9
11	T1	1084	8.9	1084	8.9	0.519	10.1	LOS A	8.0	61.5	0.40	0.37	0.40	33.3
Approach		1133	8.6	1133	8.6	0.519	10.3	LOS A	8.0	61.5	0.40	0.37	0.40	33.7
All Vehicles		3096	6.9	3096	6.9	0.740	9.5	LOS A	8.0	61.5	0.29	0.29	0.29	26.9

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

Site: 1872E [4 Pittwater Road/ Mitchell Road- Fut AM]

Network: 3 [Pittwater Road / Pine Avenue / Mitchell Road - Fut AM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [Intersection]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, E
Output Phase Sequence: A, B, E

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Mitchell Road														
1	L2	50	6.0	50	6.0	0.479	57.4	LOS E	3.7	28.2	0.94	0.79	0.94	6.2
3	R2	192	12.5	192	12.5	0.479	57.9	LOS E	5.0	38.4	0.95	0.80	0.95	22.6
Approach		242	11.2	242	11.2	0.479	57.8	LOS E	5.0	38.4	0.95	0.80	0.95	20.2
East: Pittwater Road														
4	L2	335	7.2	335	7.2	0.676	17.6	LOS B	8.1	64.9	0.51	0.69	0.66	40.1
5	T1	1699	6.4	1699	6.4	0.676	2.0	LOS A	8.1	64.9	0.11	0.12	0.12	55.9
Approach		2034	6.5	2034	6.5	0.676	4.6	LOS A	8.1	64.9	0.17	0.22	0.21	51.8
West: Pittwater Road														
11	T1	1005	9.2	1005	9.2	0.370	0.6	LOS A	0.6	4.5	0.03	0.03	0.03	59.0
12	R2	128	4.1	128	4.1	0.471	39.2	LOS C	4.1	30.0	0.93	0.90	1.07	10.6
Approach		1133	8.6	1133	8.6	0.471	4.9	LOS A	4.1	30.0	0.14	0.13	0.15	51.3
All Vehicles		3409	7.5	3409	7.5	0.676	8.5	LOS A	8.1	64.9	0.22	0.23	0.24	46.6

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

USER REPORT FOR NETWORK SITE

Project: 210510sid-N190000 St Augustine College, Brookvale 1600

Template: Default Site User Report

Site: [2 Pittwater Road/ Alfred Road - Fut PM]

Network: 4 [Pittwater Road / Pine Avenue / Mitchell Road - Fut PM]

Site Category: -
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Pittwater Road														
10	L2	171	11.1	171	11.1	0.138	2.7	LOS A	0.0	0.0	0.00	0.26	0.00	37.8
11	T1	1568	6.3	1568	6.3	0.403	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	39.5
Approach		1739	6.8	1739	6.8	0.403	0.2	NA	0.0	0.0	0.00	0.03	0.00	38.6
North: Pittwater Road														
5	T1	1244	7.2	1244	7.2	0.311	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		1244	7.2	1244	7.2	0.311	0.0	NA	0.0	0.0	0.00	0.00	0.00	40.0
West: Alfred Road														
7	L2	106	0.0	106	0.0	0.092	3.7	LOS A	0.2	1.1	0.18	0.44	0.18	34.4
9	R2	65	0.0	65	0.0	1.000	139.6	LOS F	1.9	13.0	1.00	1.52	2.86	6.8
Approach		172	0.0	172	0.0	1.000	55.4	LOS D	1.9	13.0	0.49	0.85	1.20	13.0
All Vehicles		3155	6.6	3155	6.6	1.000	3.2	NA	1.9	13.0	0.03	0.07	0.07	32.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 1872W [3 Pittwater Road/ Pine Avenue - Fut PM]

Network: 4 [Pittwater Road / Pine Avenue / Mitchell Road - Fut PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 135 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [Intersection]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, E
Output Phase Sequence: A, B, E

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Pittwater Road														
5	T1	1110	7.7	1110	7.7	0.404	2.2	LOS A	3.9	30.0	0.12	0.11	0.12	33.0
6	R2	108	2.9	108	2.9	0.298	27.7	LOS B	2.7	19.0	0.62	0.86	0.62	21.2
Approach		1218	7.3	1218	7.3	0.404	4.5	LOS A	3.9	30.0	0.17	0.18	0.17	27.2
North: Pine Avenue														
7	L2	69	17.4	69	17.4	0.115	36.1	LOS C	1.8	14.7	0.70	0.73	0.70	17.5
9	R2	112	8.9	112	8.9	0.509	66.6	LOS E	4.3	32.7	0.98	0.79	0.98	10.9
Approach		181	12.2	181	12.2	0.509	54.9	LOS D	4.3	32.7	0.87	0.77	0.87	12.7
West: Pittwater Road														
10	L2	59	0.0	59	0.0	0.819	12.2	LOS A	12.3	93.2	0.41	0.40	0.41	45.2
11	T1	1618	6.6	1618	6.6	0.819	5.8	LOS A	12.3	93.2	0.39	0.37	0.39	41.0
Approach		1677	6.4	1677	6.4	0.819	6.0	LOS A	12.3	93.2	0.39	0.37	0.39	41.2
All Vehicles		3076	7.1	3076	7.1	0.819	8.3	LOS A	12.3	93.2	0.33	0.32	0.33	32.1

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

Site: 1872E [4 Pittwater Road/ Mitchell Road - Fut PM]

Network: 4 [Pittwater Road / Pine Avenue / Mitchell Road - Fut PM]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 135 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [Intersection]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, E
Output Phase Sequence: A, B, E

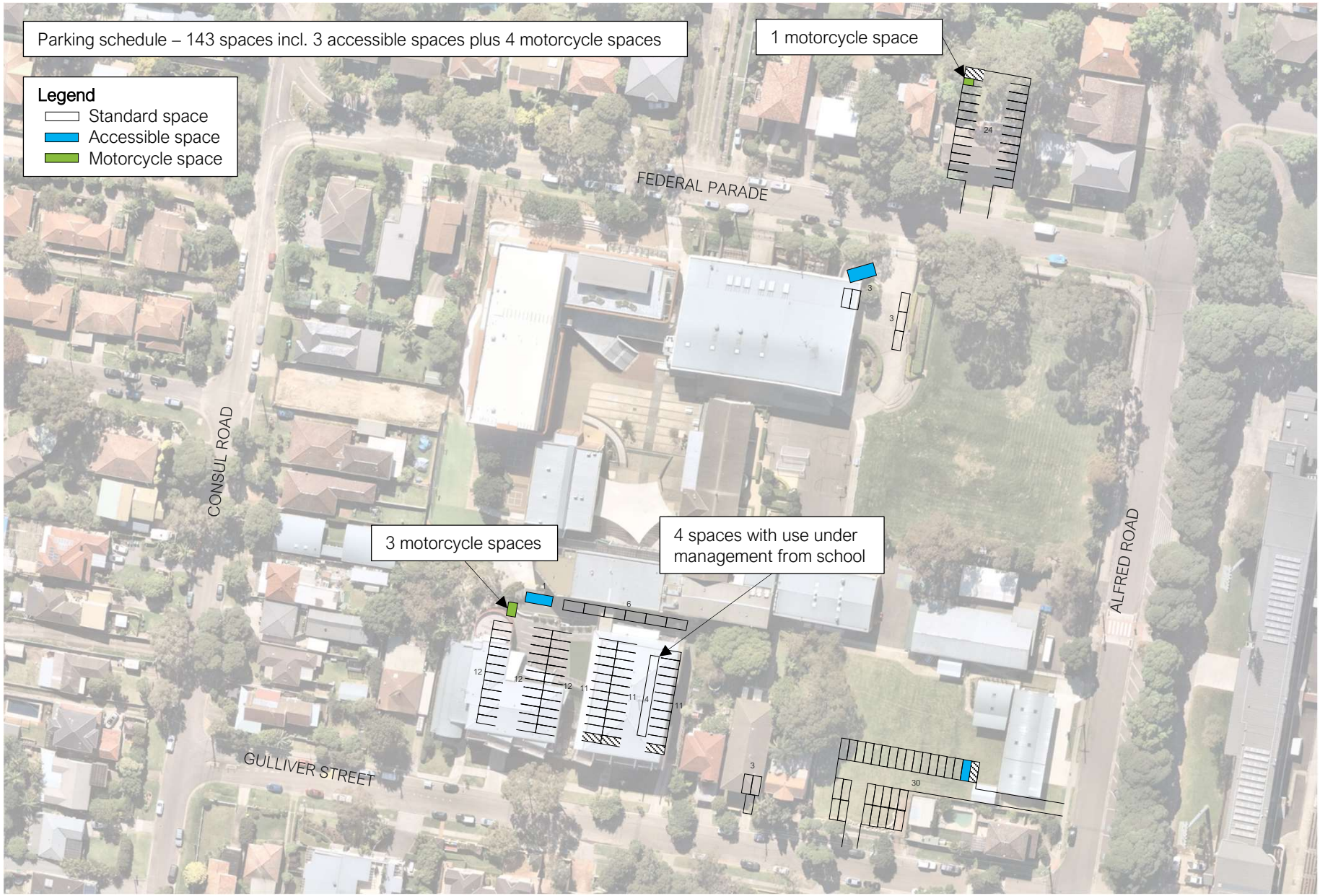
Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Mitchell Road														
1	L2	59	0.0	59	0.0	0.889	78.5	LOS F	10.3	74.9	1.00	1.00	1.32	4.7
3	R2	432	6.3	432	6.3	0.889	77.2	LOS F	12.2	90.0	1.00	0.99	1.30	18.9
Approach		491	5.5	491	5.5	0.889	77.4	LOS F	12.2	90.0	1.00	0.99	1.30	17.6
East: Pittwater Road														
4	L2	304	4.9	304	4.9	0.841	37.0	LOS C	18.3	142.6	0.85	0.91	1.14	29.9
5	T1	1154	7.7	1154	7.7	0.841	24.0	LOS B	18.3	142.6	0.55	0.58	0.68	33.4
Approach		1458	7.1	1458	7.1	0.841	26.7	LOS B	18.3	142.6	0.61	0.65	0.78	32.5
West: Pittwater Road														
11	T1	1554	7.3	1554	7.3	0.564	0.8	LOS A	1.4	11.0	0.05	0.05	0.05	58.7
12	R2	140	3.8	140	3.8	0.388	47.1	LOS D	4.2	30.0	0.94	0.88	1.09	9.1
Approach		1694	7.0	1694	7.0	0.564	4.6	LOS A	4.2	30.0	0.12	0.12	0.14	52.0
All Vehicles		3643	6.9	3643	6.9	0.889	23.2	LOS B	18.3	142.6	0.44	0.45	0.55	34.2

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

B.PROPOSED PARKING LAYOUT

B



GTAconsultants now Stantec

GTAconsultants now Stantec

www.stantec.com