Kambala School
Traffic Impact Assessment

Prepared for:

Kambala School

17 July 2020

The Transport Planning Partnership

Kambala School

Traffic Impact Assessment

Client: Kambala School

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Quality Record

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V01	07/04/20	Charbel Hanna	Oasika Faiz	Ken Hollyoak	-
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V03	17/07/20	Oasika Faiz	Oasika Faiz	Ken Hollyoak	

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1 Introduction

This report supports a State Significant Development Application (SSDA) submitted to the Department of Planning, Infrastructure and Environment (DPIE) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act), for the proposed redevelopment of the sports precinct of Kambala School at 794 -796 New South Head Road, Rose Bay.

This application is SSD by way of clause 8 and schedule 1 under *State Environmental Planning Policy (State and Regional Development) 2011* on the basis that the development is for the purpose of an existing school and has a Capital Investment Value of more than $20 million.

This report has been prepared having regard to the Secretary's Environmental Assessment Requirements issued for the project by DPIE, ref no SSD-10385 issued on 24 November 2019.

1.1.1 Secretary's Environmental Assessment Requirements

On 24 November 2019, the Department of Planning and Environment (DoPE) issued the Secretary's Environmental Assessment Requirements (SEARS). Specifically, a traffic and accessibility impact assessment is required as part of the Environmental Impact Statement (EIS), in accordance with the SEARs for the proposed development.

The issues raised in the SEARs have been considered during the preparation of this report and are summarised in Table 1.1.

Table 1.1: Review of Compliance with SEARs

SEARS Transport, Traffic, Parking and Access	Report Reference
Transport and Accessibility Include a transport and accessibility impact assessment, which details, but not limited to the following:	
• accurate details of the current daily and peak hour vehicle, existing and future public transport networks and pedestrian and cycle movement provided on the road network located adjacent to the proposed development	Section 2.5, 2.6 and 2.8
• details of estimated total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips	Section 3.3
• the adequacy of existing public transport or any future public transport infrastructure within the vicinity of the site, pedestrian and bicycle networks and associated infrastructure to meet the likely future demand of the proposed development	Section 2.5 and 2.6
• measures to integrate the development with the existing/future public transport network	Section 7.2
• the impact of trips generated by the development on nearby intersections, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/associated funding for, and details of, upgrades or road improvement works, if required (Traffic modelling is to be undertaken using SIDRA network modelling for current and future years)	Section 6.3

SEARS Transport, Traffic, Parking and Access	Report Reference
• the identification of infrastructure required to address any impacts on traffic efficiency and road safety impacts associated with the proposed development, including details on improvements required to affected intersections, additional school bus routes along bus capable roads (i.e. minimum 3.5m wide travel lanes), additional bus stops or bus bays	Section 6.3
• details of travel demand management measures to minimise the impact on general traffic and bus operations, including details of a location-specific sustainable travel plan (Green Travel Plan) and the provision of facilities to increase the non-car mode share for travel to and from the site	Section 6.3 + GTP (separate document)
• the proposed walking and cycling access arrangements and connections to public transport services	Section 4.2
• the proposed access arrangements, including car and bus pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones	Section 4.1
• proposed bicycle parking provision, including end of trip facilities, in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance	Section 5.3
• proposed number of on-site car parking spaces for staff and visitors and corresponding compliance with existing parking codes and justification for the level of car parking provided on-site	Section 4.2
• an assessment of the cumulative on-street parking impacts of cars and bus pick-up/drop-off, staff parking and any other parking demands associated with the development	Section 5.2.2
• an assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures and personal safety in line with CPTED	Section 6.4
• emergency vehicle access, service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times)	Section 2.4
• the preparation of a preliminary Construction Traffic and Pedestrian Management Plan to demonstrate the proposed management of the impact in relation to construction traffic o assessment of cumulative impacts associated with other construction activities (if any); o an assessment of road safety at key intersection and locations subject to heavy vehicle construction traffic movements and high pedestrian activity; o details of construction program detailing the anticipated construction duration and highlighting significant and milestone stages and events during the construction process; o details of anticipated peak hour and daily construction vehicle movements to and from the site; o details of on-site car parking and access arrangements of construction vehicles, construction workers to and from the site, emergency vehicles and service vehicle; o details of temporary cycling and pedestrian access during construction; o demonstrate how pedestrian and cycle rider movements along footways and cycleways are maintained at all times during construction activities. Should the development require closure to either facility, detail the adequate safety and diversion measures out in place to limit time delay and detour distances; o details of any crane locations and road closures; and o details of any potential impacts to the bus network.	Separate document prepared by TTPP

1.2 Background

Need for a Campus Masterplan

Kambala is an independent day and boarding school for girls up to 18 years. Kambala also has an early learning centre catering for approximately 70 girls and boys aged between 6 months and 5 years. The school was established in the late 1800s and moved to the current campus in 1913. The campus has evolved in an organic and ad-hoc manner over the last 100 years as the school and its demands have grown.

A new campus-wide planning approach offers the opportunity to strategically plan for the future in a sustainable and effective manner and to preserve the unique aesthetic and heritage qualities of the campus. The preparation of a campus-wide planning approach is also consistent with the School's 2019 - 2023 Strategic Plan which identified the need for a broader strategic plan to coordinate renewal and development in a feasible and staged manner.

1.3 References

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

- An inspection of the site and its surrounds;
- traffic surveys undertaken in-house;
- Woollahra Development Control Plan 2015;
- Woollahra Local Environmental Plan 2014;
- Roads and Maritime Guide to Traffic Generating Developments, and;
- other documents as referenced in this report.

1.4 Report Structure

The remainder of this report is set out as follows:

- Chapter 2 sets out the existing conditions of the site;
- Chapter 3 presents the existing travel patterns to/from the site;
- Chapter 4 describes the proposed development;
- Chapter 5 provides a parking assessment of the proposed development;
- Chapter 6 provides a traffic assessment of the proposed development;
- Chapter 7 describes the travel demand measures to be put in place for the proposed development, and;
- Chapter 8 provides a summary of the report.

2 Existing Conditions

2.1 The Site

Kambala is located at 794 -796 New South Head Road, Rose Bay and is within the Woollahra Council local government area (LGA). Situated in the eastern suburbs of Sydney, the School is approximately 8km east of the Sydney CBD. The School is located on New South Head Road which is a classified road connecting the City with the eastern beaches. The School is surrounded by predominantly residential uses.

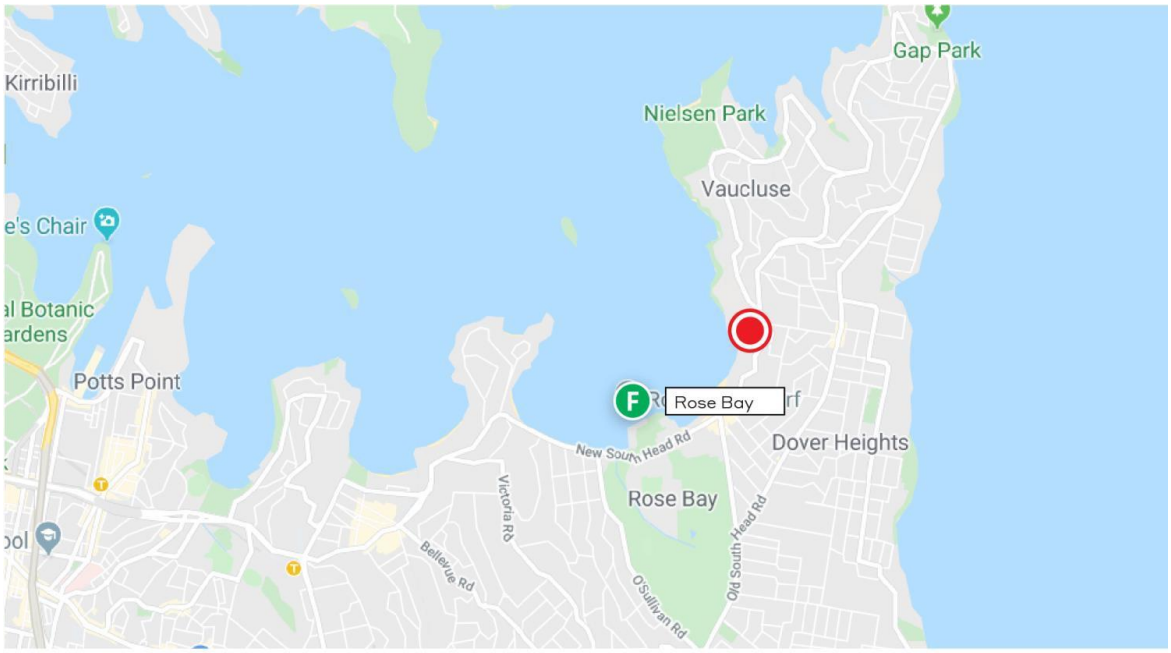
The campus is bound by New South Head (to the east), Bayview Hill Road (to the north) and Tivoli Avenue (to the west). Fernbank Boarding House is located at 1A -3 Bayview Hill Road opposite the Kambala School grounds. No works are proposed to this part of the campus in this DA. The locational context of the School is illustrated at Figure 2.1. Figure 2.2 provides an aerial map of the School and its immediate surrounds.

The School campus slopes down from New South Head Road in the east to the west and comprises a series of existing buildings in the western part of the campus that range in height and age. The south western and north western part of the campus accommodates much of the school's existing built form, while the eastern part has the school's sporting fields and courts.

The Kambala School building known as Tivoli House is in the heart of the campus. The house, its interiors, gateposts, gates and flanking walls with railing facing Tivoli Avenue, as well as 2 Norfolk Island Pines are listed as a heritage item in Woollahra Local Environmental Plan 2014 (WLEP 2014).

Within the School campus, the site of this SSDA is illustrated in Figure 2.3. The site proposed for new buildings is on top of the existing sports field and music building, as shown in green. The site proposed for demolition works and associated façade redevelopment and landscaping works is shown in red and is limited to a portion of the existing Hawthorne Building and the Arts building. The site of new landscape works is shown in yellow and includes all external spaces connecting these works. It is anticipated that the construction works will be staged, so the construction site for any given stage will be smaller than the overall site identified in Figure 2.3. The four key main buildings proposed are identified in Figure 2.4.

Figure 2.1: Kambala School Location Context Plan



The Site NOT TO SCALE

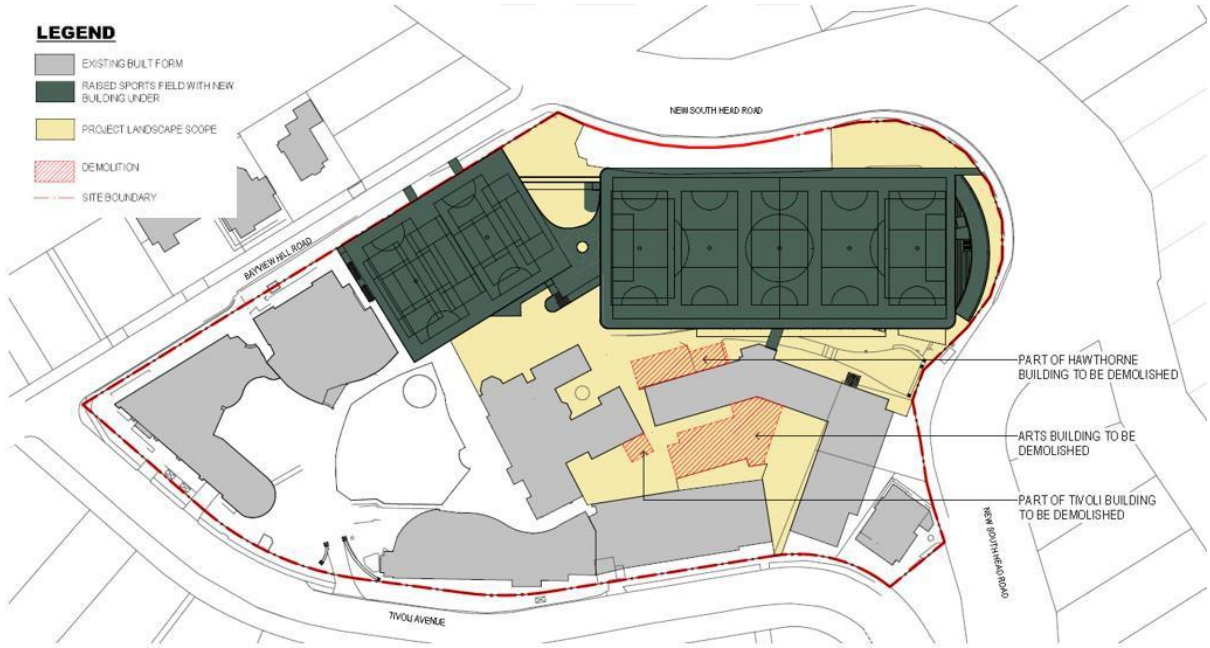
Source: Ethos Urban

Figure 2.2: Aerial Map of the Kambala Campus

The Site NOT TO SCALE

Base Map Source: Nearmap

Figure 2.3: Project Scope



Source: AJC

Figure 2.4: Key Plan

Source: AJC

2.1.1 Legal Description and Ownership

The campus comprises several allotments, the legal descriptions of which are provided in Table 2.1 below. The existing campus has a site area of approximately 22511m^2.

Table 2.1: Legal Description

Address	Lot	Plan
794-796 New South Head Road	Lot 67	DP 2538
	Lot C	DP 210074
	Lot 1	DP 1089403
3 Tivoli Avenue	Null	SP 64653
3 Bayview Hill Road	Lot 1	DP 175832
1A Bayview Hill Road	Lot 45	DP 2538
1 Bayview Hill Road	Lot 46	DP 2538

2.2 Surrounding Road Network

Kambala School is bound between Bayview Hill Road to the north, Tivoli Avenue to the west and New South Head Road to the east. A brief description of the roads is provided below:

Bayview Hill Road is a cul-de-sac local road that is one-way westbound along the boundary of the site (i.e. between New South Head Road and Tivoli Avenue) and two-way west of Tivoli Avenue. East of Tivoli Avenue it is 5m wide with kerbside parking permitted on the northern side of the road. Bayview Hill road is 7m wide west of Tivoli Avenue. The default speed limit along the road is 50km/hr but is governed by school zone speed limits during school days.

Tivoli Avenue is a two-way, two-lane local road with a 9m wide carriageway. The road connects to Bayview Hill Road in the north and New South Head Road in the south. Kerbside parking is provided on both sides along the length of Tivoli Avenue. The default speed limit along the road is 50km/hr but is governed by school zone speed limits during school holidays.

New South Head Road is a two-way, four-lane state road with a 12m wide carriageway. Limited kerbside parking is permitted within the vicinity of the site. There is a posted speed limit of 60km/h outside of school zones.

2.3 Parking Restrictions

On-street parking restrictions surrounding the site are presented in Figure 2.5

Figure 2.5: Parking Restrictions

It should be noted that parking spaces along Tivoli Avenue and Bayview Hill Road were generally at capacity during school hours.

2.4 Vehicle Access

The site currently provides three (3) vehicle access gates which are located on New South Head Road and Tivoli Avenue as shown in Figure 2.6.

Figure 2.6: Vehicle Access Locations

Base Map Source: Nearmap, photograph dated 21/01/20

The separate vehicle entry and exit driveways on Tivoli Avenue, near Bayview Hill Road, provides access into the school's car park, which provides parking for staff and childcare centre visitors.

The remaining vehicle access points, i.e. on Tivoli Avenue and New South Head Road, provides access to service and emergency vehicles only.

2.5 Public Transport

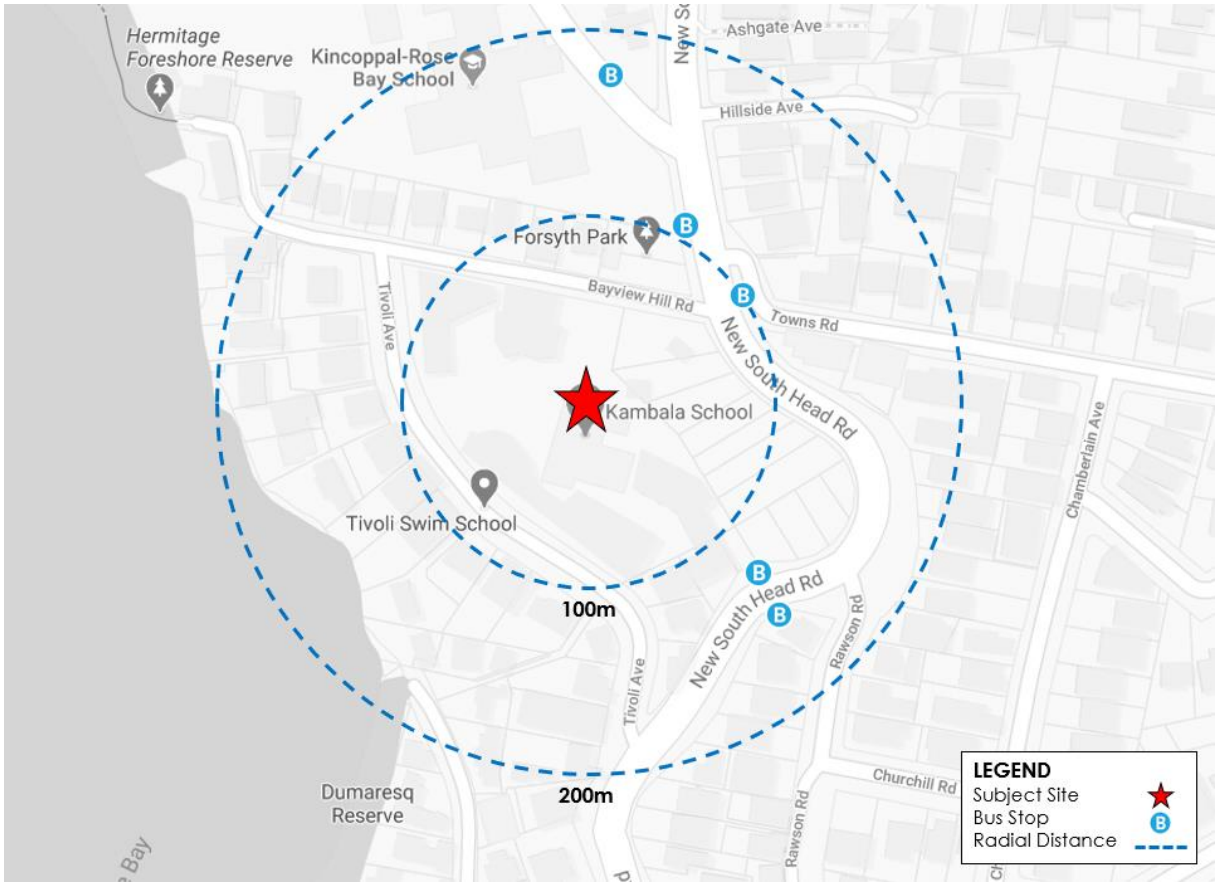
The site is primarily served by buses, with the nearest bus stop located on New South Head Road in front of the main school gate. This stop is serviced by the following bus routes:

- 324 – Watsons Bay to Walsh Bay via Old South Head Rd
- 325 – Watsons Bay to Walsh Bay via Vaucluse Rd
- 386 – Vaucluse to Bondi Junction via New South Head Rd & Old South Head Rd

Buses are available seven days a week and provide services every 15 minutes during peak periods and every 30 minutes outside peak hours. All bus services travel to Edgecliff Railway Station via a 23-28-minute trip.

The locations of these bus stops are presented in Figure 2.7.

Figure 2.7: Public Transport Map



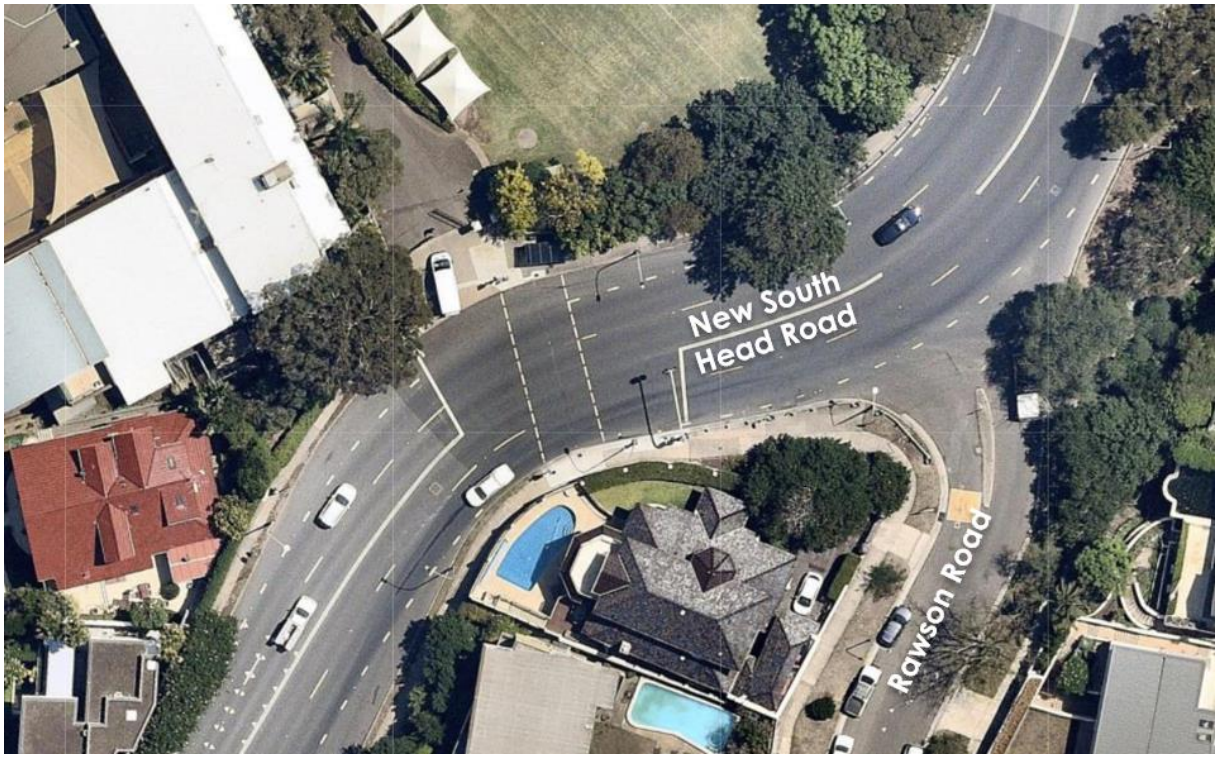
Base Map Source: Google Maps Australia

2.6 Pedestrian and Cycling Facilities

Pedestrian footpaths are provided on all roads surrounding the site.

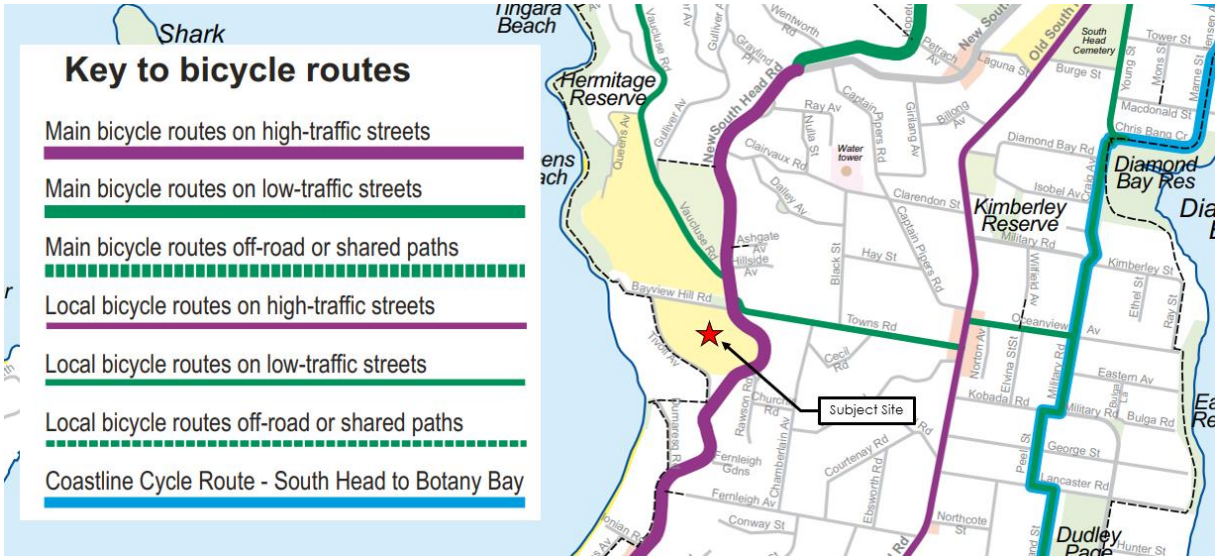
Controlled pedestrian crossings are provided at the intersection of New South Head Road and Vaucluse Road north-east of the subject site and at the intersection of New South Head Road and Tivoli Avenue south of the site. There is also a controlled pedestrian crossing in front of the main school gate some 30m west of Rawson Road as shown in Figure 2.8.

Figure 2.8: Pedestrian Crossing in front of Main School Gate



Within the vicinity, on-road cycling routes are provided along New South Head Road, Vaucluse Road and Towns Road. Cycling routes surrounding the site are shown in Figure 2.9.

Figure 2.9: Cycling Map



Base Map Source: Cycling in Waverley and Woollahra (https://www.woollahra.nsw.gov.au/__data/assets/pdf_file/0016/36511/Cycle-route-map.pdf)

2.7 Existing Pick-Up / Drop-Off Activities

Pick-Up / Drop-Off (PUDO) activities for junior year classes are primarily undertaken along Bayview Hill Road and Tivoli Avenue as shown in Figure 2.10.

Figure 2.10: Pick-Up / Drop-Off Areas

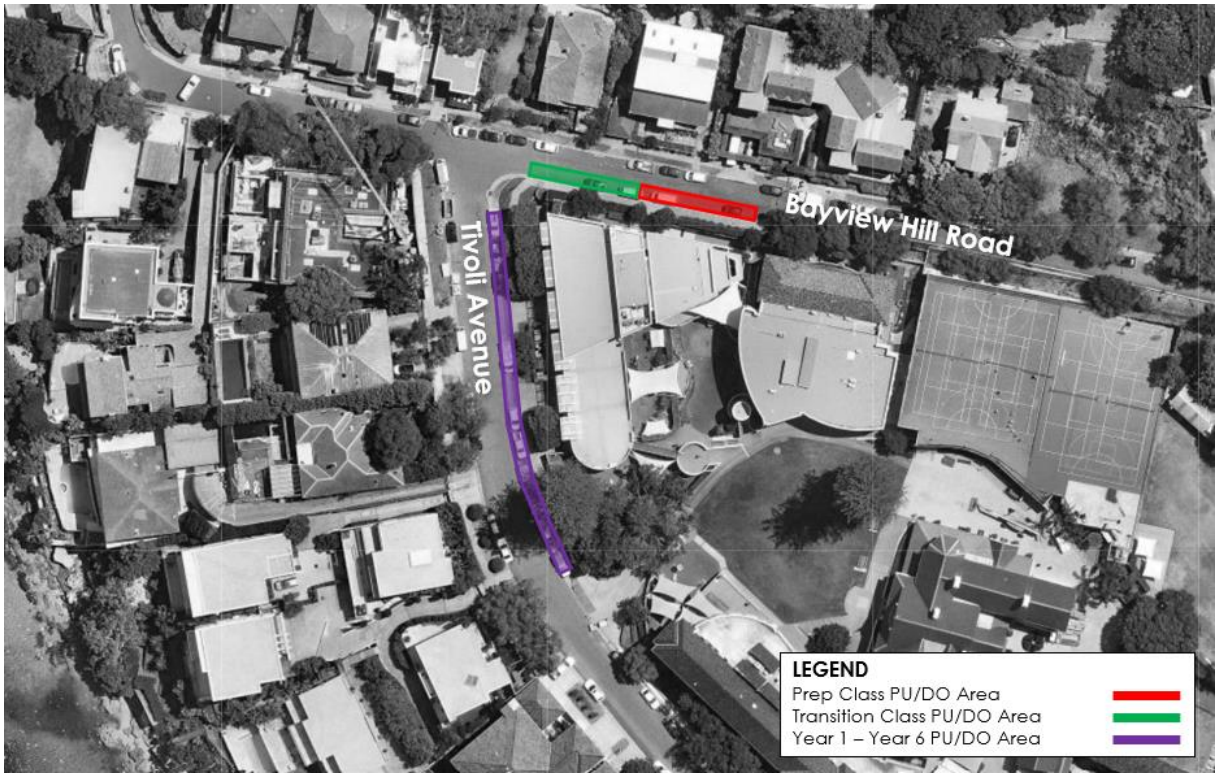


Table 2.2 indicates the staggered pick-up times for primary school students along Bayview Hill Road and Tivoli Avenue.

Table 2.2: Junior Year Group Pick-Up Times

Year Group	Time	Location
Prep	2:40pm	Bayview Hill Road
Transition	2:50pm	Bayview Hill Road
Year 1	3:00pm	Tivoli Avenue*
Year 2	3:05pm	Tivoli Avenue
Year 3	3:15pm	Tivoli Avenue
Year 4	3:15pm	Tivoli Avenue
Year 5	3:25pm	Tivoli Avenue
Year 6	3:25pm	Tivoli Avenue

** Note: effective as of Term 2, 2020.*

It should be noted that informal drop-off activities are also undertaken on-street further south along Tivoli Avenue in front of a school gate as shown in Figure 2.11 and Figure 2.12. Both primary and high school students were observed to be dropped off at this location.

It should also be noted that there are no designated high school student PUDO areas within the vicinity of the school. High school students were observed to be dropped-off either within primary school drop-off zones (with other primary school students), at the school gate along Tivoli Avenue or along Rawson Road (east of the school which would then require students to cross NSHR at the signalised pedestrian crossing and thus enter the school via the main school gate). A small number of high school students were also observed to be dropped off along NSHR in front of the main school gate.

Figure 2.11: School Gate along Tivoli Avenue

Figure 2.12: School Access Gate along Tivoli Avenue

2.8 Existing Traffic Volumes

Traffic surveys were conducted on Thursday 20 February between 7:00am and 9:00am and between 2:00pm and 5:00pm to determine the existing traffic generated by the school during peak PUDO periods and the operation of the nearby intersections surrounding the school.

The following intersections were surveyed during the abovementioned periods:

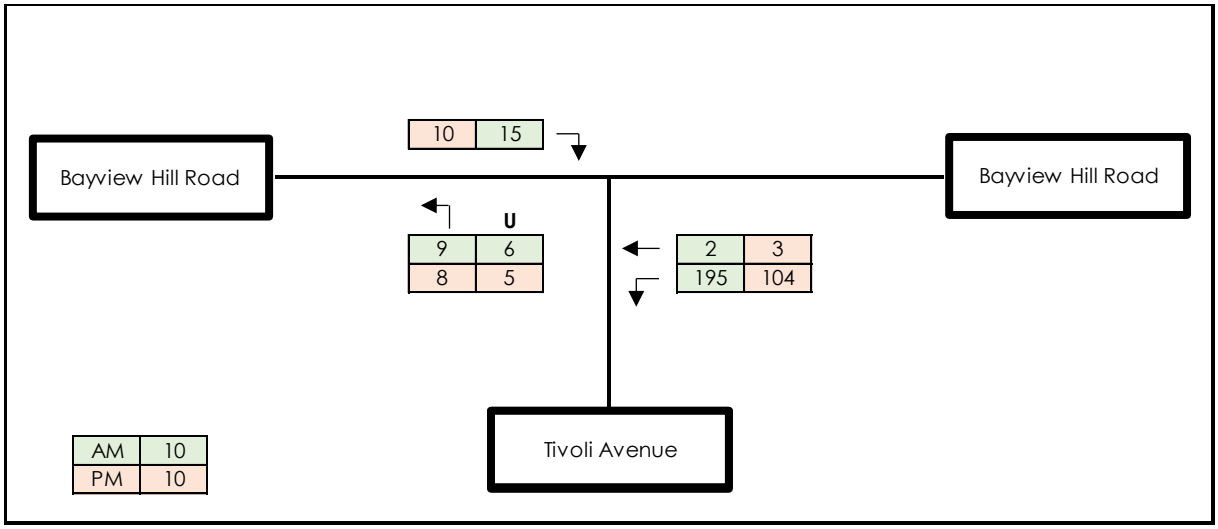
- New South Head Road / Tivoli Avenue
- New South Head Road / Bayview Hill Road
- Tivoli Avenue / Bayview Hill Road

Figure 2.13 shows the abovementioned intersections relative to the school.

Figure 2.13: Surveyed Intersections

Traffic volumes at the above intersections are provided in the following figures (Figure 2.14, Figure 2.15 and Figure 2.16).

Figure 2.14: Tivoli Avenue / Bayview Hill Road Peak Hour Total Vehicle Movements



Note: "U" indicates a U-turn movement.

Figure 2.15: New South Head Road / Bayview Hill Road Peak Hour Total Vehicle Movements

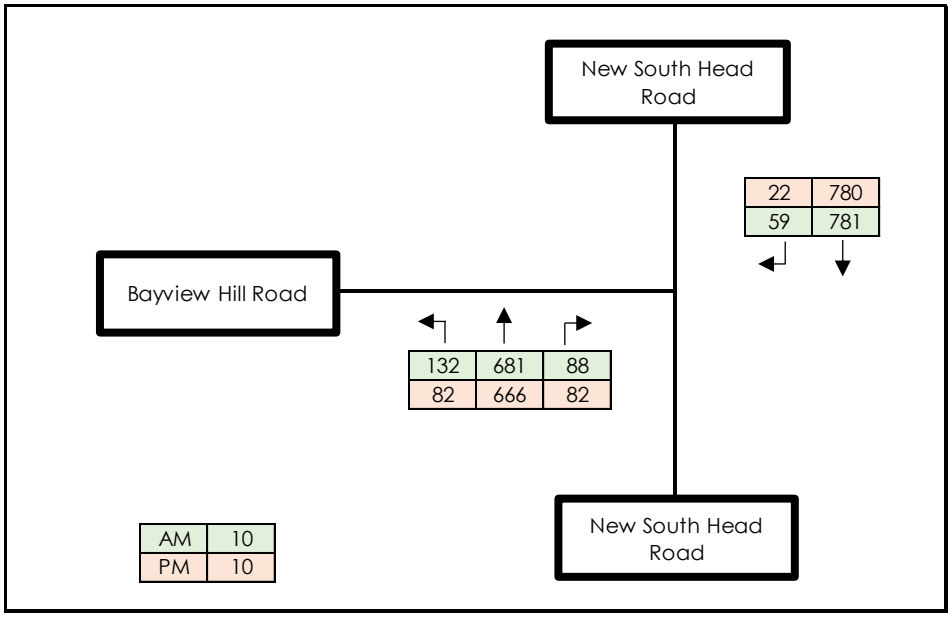
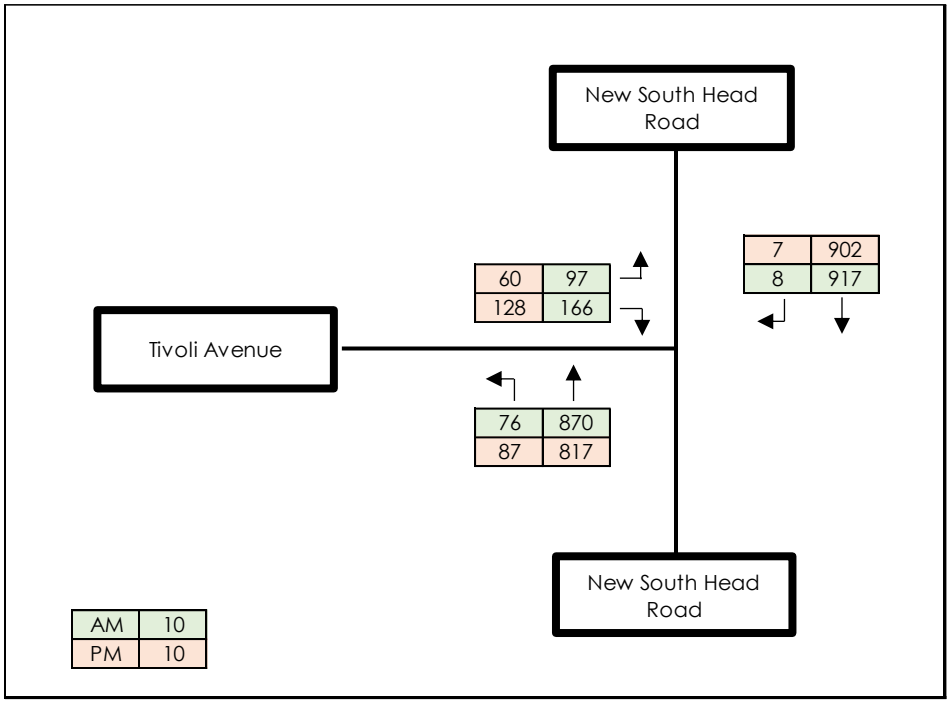


Figure 2.16: New South Head Road / Tivoli Avenue Peak Hour Total Vehicle Movements



The raw vehicle movement data is provided in Appendix A.

Total vehicle movements into and out of the school car park are provided in Table 2.3

Table 2.3: Car Park Total Traffic Movements during Survey Period

TIME	IN	OUT
7:00am – 9:00am	97	68
2:30pm – 5:30pm	114	184
Total	**211**	**252**

2.9 Existing Intersection Performance

Intersection capacity analysis has been undertaken using SIDRA Intersection 8 modelling software to ascertain the operation of the key intersections surrounding the site as outlined in Section 2.8.

2.9.1 Level of Service Criteria

Roads and Maritime uses "Level of Service" (LoS) as a measure of performance for all intersection types operating under prevailing traffic conditions. The level of service ranges from "A" to "F" which is directly related to the average delay which vehicles experience when travelling through an intersection. Levels of service A through to D are considered to provide acceptable performance with LoS A providing better performance than LoS D. LoS D

is the long-term desirable level of service. Levels of service E and F are considered to provide unsatisfactory intersection performance.

At signalised intersections, the average delay is the volume weighted average of all movements. For roundabouts and priority (give-way and stop-sign) controlled intersections, the average delay is taken to be the delay of the movement which incurs the greatest delay.

Table 2.4 shows the criteria that SIDRA intersection adopts in assessing the LoS.

Table 2.4: SIDRA Intersection LoS Criteria

Level of Service (LoS)	Average Delay per Vehicle (secs/veh)	Traffic Signals & Roundabouts	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 would cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	Greater than 70	Unsatisfactory, requires additional capacity	Unsatisfactory, requires other control mode or major treatment

2.9.2 Modelling Results

A summary of the AM and PM school peak hour traffic modelling results is provided in Table 2.5.

Table 2.5: Existing Peak Hour Intersection Analysis Results

Intersection	Control	AM Peak		PM Peak	
		Average Delay (sec)	Level of Service	Average Delay (sec)	Level of Service
NSHR – Tivoli Avenue	Signals	12	A	9	A
NSHR – Bayview Hill Road	Priority	10	A	10	A
Tivoli Avenue – Bayview Hill Road	Priority	7	A	7	A

3 Existing Travel Patterns

3.1 Travel Questionnaires

Online questionnaires were distributed to school staff and students via email in February 2020 to determine their travel mode choice and behaviour to/from the school. A total of 978 surveys were completed by staff and students as of 24/03/20.

A summary of the existing staff and student travel modes is provided in Table 3.1. It is assumed that the mode of travel employed by staff is used for both arrival and departure.

Table 3.1: Summary of Existing Staff and Student Travel Modes

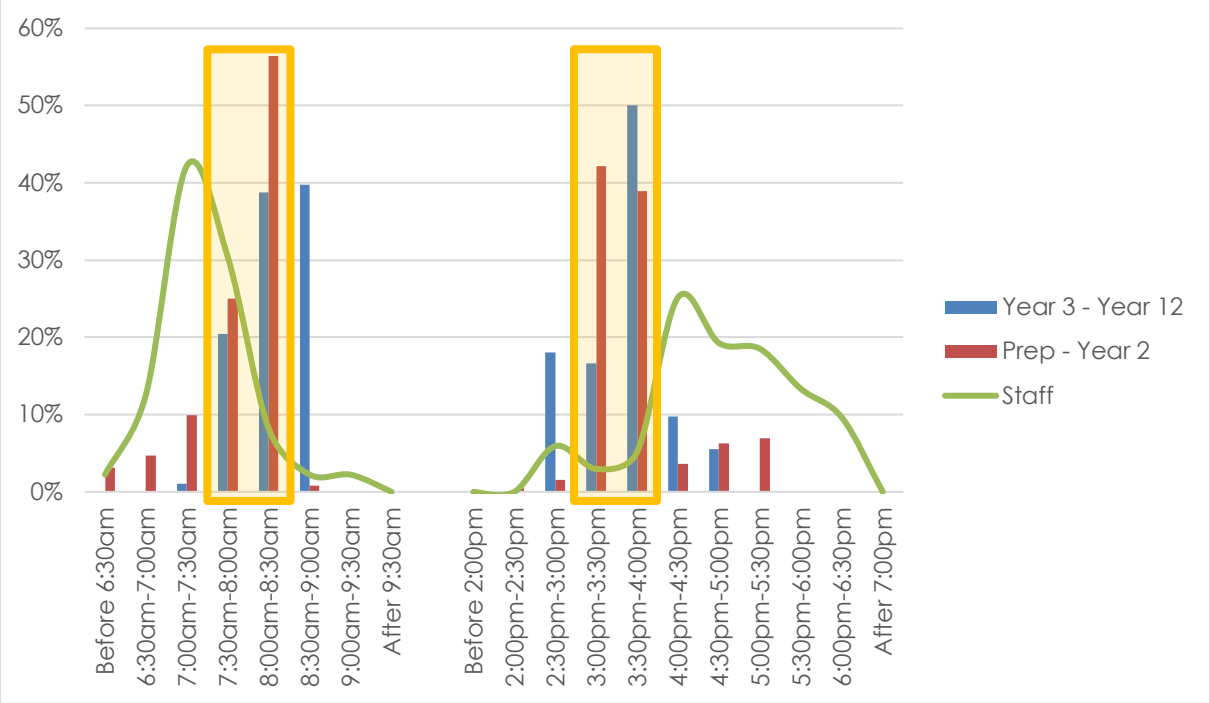
Mode	Staff	Kindergarten – Year 6		Year 7 – Year 12	
		Arrival	Departure	Arrival	Departure
Car (as driver, no passengers)	84%	-	-	2%	2%
Car (as driver, with passengers)	1%	-	-	1%	1%
Car (as passenger, driver didn't stay)	0%	-	-	-	-
Car (as passenger, driver stayed)	1%	-	-	-	-
Car (as passenger, no other students)	-	31%	33%	21%	16%
Car (as passenger, with other students)	-	47%	48%	27%	16%
Motorcycle / Scooter	2%	-	-	0%	0%
Walk	1%	8%	6%	15%	17%
Public Bus	6%	8%	7%	27%	40%
School Bus (incl. Scot's College Bus)	0%	6%	6%	4%	4%
Train and Bus	1%	0%	0%	3%	4%
Cycle	3%	0%	0%	0%	0%
Other	1%	0%	0%	0%	<1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Based on the travel survey questionnaires, the following average car occupancy numbers were recorded:

- Staff: 1.02 persons per vehicle (including driver)
- Prep – Year 6: 1.90 persons per vehicle
- Year 7 – Year 12: 1.99 persons per vehicle

A summary of the staff and student arrival and departure travel patterns is shown in Figure 3.1.

Figure 3.1: Arrival and Departure Times



Note: orange highlighted boxes indicate the adjoining road network peak hour.

It should be noted that Table 3.2 indicates the proportions of vehicles which arrive and depart in the peak hour, based on the information provided above in Figure 3.1.

Table 3.2: Peak Hour Vehicle Generation Proportions

Group	Arrival	Departure
Staff	38.5%	8.2%
Prep – Year 6	73.31%	74.58%
Year 7 – Year 12	81.41%	82.27%

3.2 Child Care Centre

A large majority of children that attend the Child Care Centre (i.e. Hampshire House) 5 days per week arrive and depart from the centre via private vehicle. A very small number (~5%) walk with their parent or guardian to the centre.

It should be noted that of the 68 total children, 26 arrive with their parents/guardians who are also staff at the school. Additionally, of these 26 children, 9 have either 1 or more siblings at Hampshire House and/or Kambala School. Similarly, of the 42 children who do not belong to staff at the school, 37 have either 1 or more siblings in Hampshire House and/or Kambala School.

Based on this information, the following car occupancy rate has been deduced.

- Child Care Centre 2.06 persons per vehicle*

= includes staff, students and children

3.3 Existing Mode Trip Generation

Based on the travel questionnaires undertaken, an estimate of the existing site traffic generation for each travel mode is shown in Table 3.3.

Table 3.3: Estimated Existing Staff and Student Trips for each Travel Mode

Mode	Staff	Prep – Year 6		Year 7 – Year 12	
		Arrival	Departure	Arrival	Departure
Car (as driver, no passengers)	193	-	-	12	12
Car (as driver, with passengers)	2	-	-	6	6
Car (as passenger, driver didn't stay)	0	-	-	0	0
Car (as passenger, driver stayed)	2	-	-	0	0
Car (as passenger, no other students)	0	124	132	129	99
Car (as passenger, with other students)	0	188	192	166	99
Motorcycle / Scooter	5	-	-	0	0
Walk	2	32	24	92	105
Public Bus	14	32	28	166	246
School Bus (incl. Scot's College Bus)	0	24	24	25	25
Train and Bus	2	0	0	18	25
Cycle	7	0	0	0	0
Other	2	0	0	0	0
Total	**230**	**399**	**399**	**616**	**616**

It's noted that arrival/ departure patterns span over a three-hour period in both the morning and afternoon peak periods.

3.4 Pick Up / Drop Off Locations

As determined by the questionnaires distributed online, the following figures (Figure 3.2 and Figure 3.3) indicate the PUDO locations for students at Kambala School.

Figure 3.2: Pick Up / Drop Off Locations (Prep - Year 6)

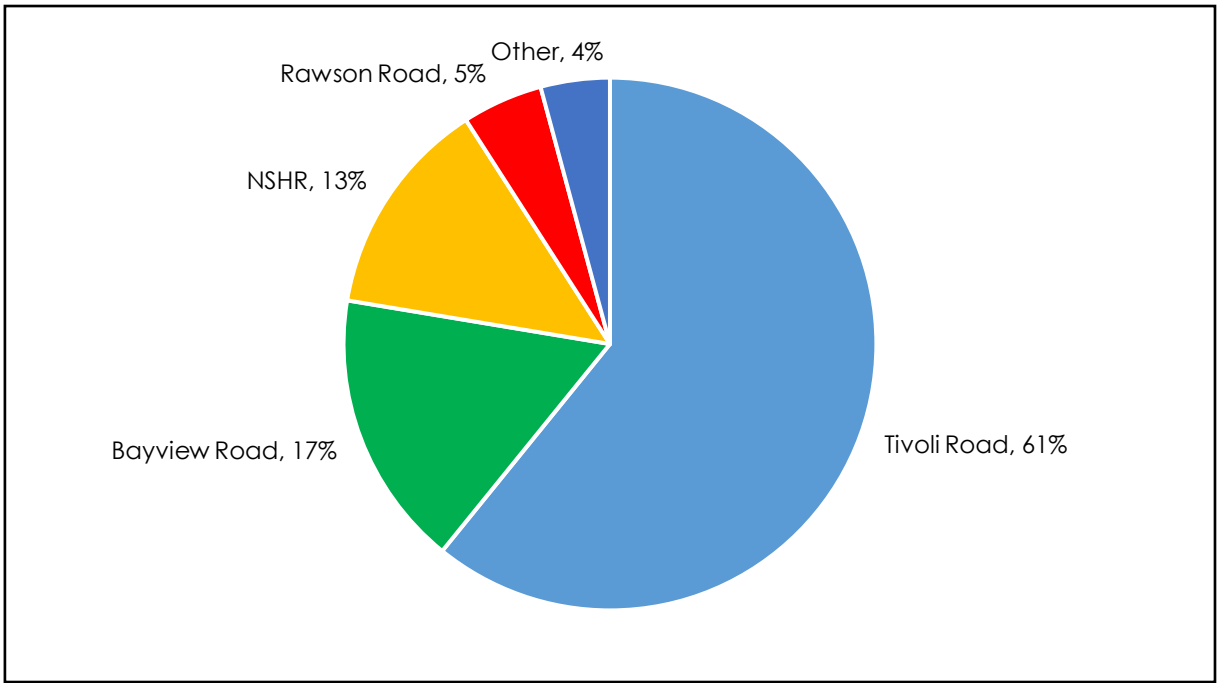
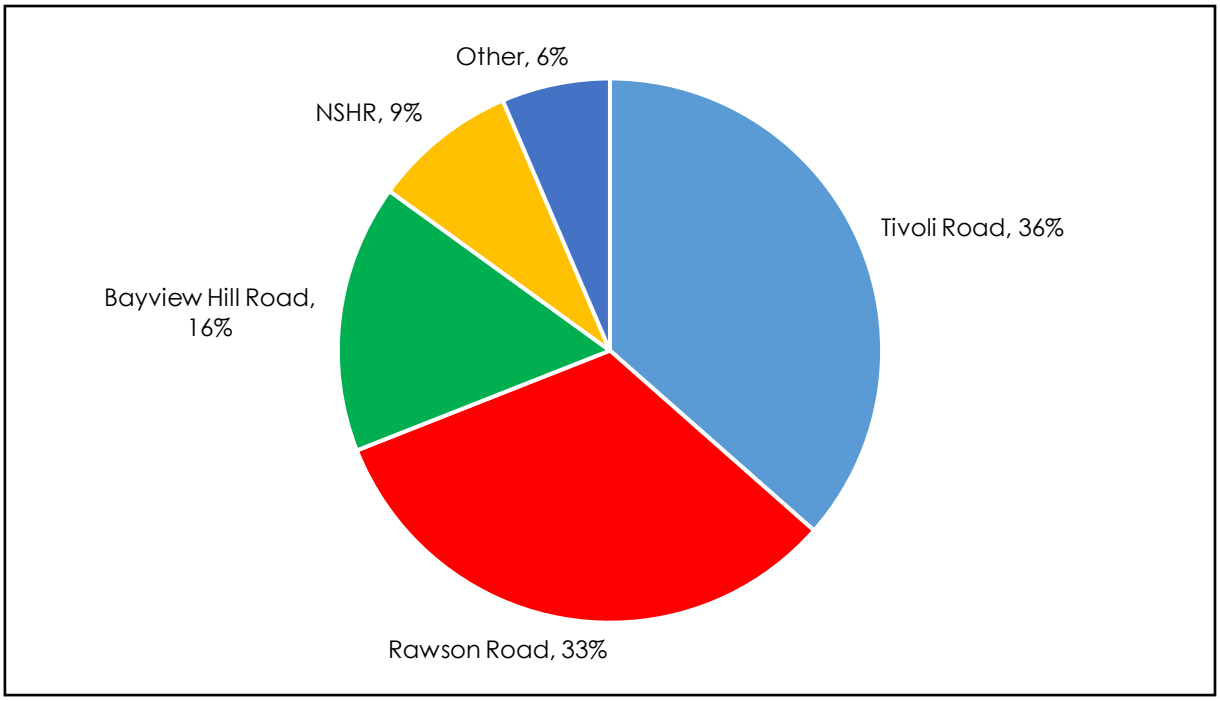


Figure 3.3: Pick Up / Drop Off Locations (Year 7 - Year 12)



It should be noted that "Other" includes side streets east of the site such as Towns Road, Chamberlain Avenue, Churchill Road and/or the school car park. Additionally, a significant number of students (particularly students of the high school) are picked up/ dropped off along Rawson Road with a small number picked up/ dropped off along New South Head Road in front of the main gate at the school.

4 Proposed Development

4.1 Overview of Proposed Development

This SSDA includes detailed plans for a new sport, wellbeing and senior learning precinct. Accordingly, consent is sought for the following:

- The excavation of part of the existing sports field to facilitate the construction of the following:
  - sports facilities including weights room and dance rooms;
  - indoor multipurpose sports courts for use by up to 1500 people;
  - innovative and flexible teaching and learning spaces;
  - amenities, store rooms, plant, circulation and ancillary spaces
  - reinstatement of the sports field surface on the roof (sports field and perimeter fencing)
  - spectator seating / bleachers;
- The removal of the tennis courts (currently on the roof of the music building), and the construction of the following:
  - a wellbeing centre, called the SHINE centre, to accommodate the Kambala SHINE program
  - a new staff centre, called the KITE centre, to accommodate staff workstations, meeting areas, staff development workshop rooms and amenities
  - reinstatement of the tennis courts, lighting and perimeter fencing on the new roof
- a new eastern forecourt for the school, new external landscaped areas and new courtyards;
- minor works to the existing music building to facilitate a new connection to the new courtyard;
- the partial demolition of the Hawthorne building and the construction of a new façade, roof and landscaping; and
- the demolition of the Arts building and the construction of new facades to adjacent affected buildings, and new landscaping to the footprint of the demolished building

The proposal also seeks to increase the capacity of the school from the permitted number of 950 students to 1,020 students (increase of 70 students). No increases to staff numbers are proposed. It is understood that the existing school enrolments currently exceed the existing cap with 1,020 students enrolled. Therefore, the proposed increase in the school capacity would enable the school to continue its existing operation.

Additionally, the improved facilities and learning areas would be provided for future students, including family and supporters during weekend sporting events and will not be open to the general public.

It is assumed that the increase in the number of students would be distributed evenly across the various year groups, excluding children at the Child Care Centre.

4.2 Proposed Access and Car Park Arrangements

The existing car park and access points to the school would remain unchanged.

4.3 Service Vehicle and Emergency Vehicle Access

Service vehicle and emergency vehicle access to the school would remain unchanged.

Existing service vehicle and emergency vehicle access is provided at the main school gate on NSHR and at the access driveway on Tivoli Avenue as shown previously in Figure 2.6.

A new service ramp is to be provided from the ground level to the level 3 sports field for up to a small rigid vehicle (SRV), for use by Roads and Maritime Services (Roads and Maritime) or their contractors to perform maintenance operations to the embankment, over which they have an easement. In addition, the school would use the ramp on a day to day basis for the maintenance and servicing of the sports field and transportation of sports equipment using a buggy/gater.

5 Parking Assessment

5.1 Existing Car Parking Provision

The school currently provides 123 car spaces comprising the following:

- Staff Car Parking 100 spaces
- Child Care Centre Parking 12 spaces
- Accessible Parking 3 spaces
- Visitor parking 8 spaces.

5.2 Car Parking Requirements

5.2.1 State Environmental Planning Policy (Educational Establishments)

There is no specific car parking rate under the Education State Environmental Planning Policy (SEPP). However, generally, any modifications must not reduce the number of existing car parking spaces provided and/or must not contravene any existing condition of the most recent development consent relation to car parking.

5.2.2 Woollahra Council Development Control Plan 2015 (Woollahra DCP)

The Woollahra DCP specifies parking rates for both Child Care Centres and Educational Establishment.

The DCP recommends parking for Child Care Centres be provided at the following rates…

- Staff Parking 0.5 spaces per 100m^2
- Visitor Parking 1 space per 4 children

Parking requirements for Educational Establishments are specified at a minimum rate of 1 space per 100m^2, with parking for disabled persons to be provided at a minimum rate of 1 car space per 50 spaces or part thereof.

However, the proposed expansion (as described in Section 4.1) would provide services and facilities to existing students, rather than provide capacity for additional students. The proposed minor increase in the student numbers (up to 70 students) would bring the school's permitted capacity to 1,020 students. No increases to staff numbers is proposed.

On this basis, while the proposed development includes some 5,655m^2 of development, it is not appropriate to increase the school's parking provision.

Furthermore, Kambala, like many schools in recent times, is to implement a Green Travel Plan to reduce car travel to the school and encourage staff and students to travel by alternative modes of transport e.g. bus, cycling etc. On this basis, any increases to the site's parking provisions would counter any initiatives implemented by the Green Travel Plan.

5.3 Bicycle Parking Requirements

The bicycle parking requirements for the proposed development have been assessed in accordance with Council's DCP and is outlined below:

- Child Care Centre — 1 space per 10 staff + 2 spaces per centre
- Educational Establishments — 1 space per 10 staff + 1 space per 20 students.

The proposed development includes an increase to the student cap by 70 students and no increases to staff. The proposed increase in students would only apply to primary and secondary students with no changes proposed to the childcare centre operations.

On this basis, based on a rate of one space per 20 students, the proposed development is required four bicycle parking spaces for students.

It is proposed to comply with this requirement.

5.4 Motorcycle Parking Requirements

Council's DCP requires motorcycle parking to be provided at a rate of 1 motorcycle parking space per 10 car spaces for all types of development.

No increases to car parking is proposed.

5.5 Proposed Pick-Up / Drop-Off Facilities

It is proposed to maintain existing pick-up / drop-off arrangements for the Child Care Centre, Primary School and High School.

6 Traffic Assessment

The proposal also seeks to increase the capacity of the school from the permitted number of 950 students to 1,020 students (increase of 70 students). No increases to staff numbers are proposed. It is understood that the existing school enrolments currently exceed the existing cap with 1,020 students. Therefore, the proposed increase in the school capacity would enable the school to continue its existing operation. Nonetheless, as a sensitivity analysis of the surrounding road network and to account for any fluctuations in school population, a traffic assessment has been undertaken to assess the impact of a potential increase in student population by 70 students.

This section outlines the traffic assessment associated with the proposed development assuming that there would be no modal shift away from car usage (or any other mode). It is however noted that travel demand strategies are proposed to be implemented at the school, as detailed in Section 7.2, which aim to influence the way people move to/from the school to encourage sustainable travel and reduce traffic and parking impacts within the communities. Such measures could facilitate a modal shift away from car and an increased uptake in more sustainable transport options.

On this basis, the below generally represents a very conservative assessment by assuming that there would be no modal shift away from car usage (or other mode).

6.1 Future Estimated Modal Splits

Based on the existing modal splits at the school as outlined in Section 3, the future mode splits generated by proposed development have been estimated in Table 6.1. These figures assume that there would be no modal shift away from car usage (or other modes).

The future modal split figures have been based upon the net increase in student capacity compared to the approved cap of the school (i.e. a net additional 70 students). It should be noted that that the proposed development does not include an increase to staff numbers.

For the purposes of this assessment, the 70 additional students have been evenly distributed between the junior and senior schools based on existing student proportions.

Table 6.1: Additional Proposed Travel Demand

Mode	Staff	Prep – Year 6		Year 7 – Year 12	
		Arrival	Departure	Arrival	Departure
Car (as driver, no passengers)	0	0	0	1	1
Car (as driver, with passengers)	0	0	0	0	0
Car (as passenger, driver didn't stay)	0	0	0	0	0
Car (as passenger, driver stayed)	0	0	0	0	0
Car (as passenger, no other students)	0	9	9	9	7
Car (as passenger, with other students)	0	13	13	11	7
Motorcycle / Scooter	0	0	0	0	0
Walk	0	2	2	6	7
Public Bus	0	2	2	11	17
School Bus (incl. Scot's College Bus)	0	2	2	2	2
Train and Bus	0	0	0	1	2
Cycle	0	0	0	0	0
Other	0	0	0	0	0
Total	**0**	**28**	**28**	**42**	**42**

Based on the above, the proposed development is expected to result in a net increase of 43 and 37 students which use a car as a mode of transport to and from school respectively.

Factoring in the car occupancy values calculated in Section 3.1 (1.9-1.99 persons per car), this would result in the following number of vehicles generated to and from the school:

- AM Traffic Generation 22 vehicles
- PM Traffic Generation 19 vehicles.

However, the traffic proportions specified in Table 3.2 indicate that not all vehicles arrive during the adjoining road network peak hour. The proportions in Table 3.2 would result in the following number of vehicles added during the road network peak hour:

- AM Peak Hour Traffic Generation 16 vehicles
- PM Peak Hour Traffic Generation 16 vehicles.

Noting that student traffic generation to the school involves pick-up/ drop-off activities as opposed to long term stays, vehicles are anticipated to arrive and depart in the same hour. Therefore, the above would equate to 32 two-way vehicle movements per hour in the both the AM and PM peak hours.

6.2 Future Case Scenario with Proposed Expansion

The resultant increase in the number of students and subsequently the number of vehicle trips to and from the school have been added to the existing base models as specified in Section

2.8. This has been done to determine the effect of the proposed development on the surrounding road network.

6.2.1 Traffic Distribution

As mentioned previously, the additional 16 vehicles in both the AM and PM peak hours would be distributed across the existing proportion of primary and high school students. As such, this results in the following vehicle split:

- Primary School Generated Vehicles 39% of additional vehicles
- High School Generated Vehicles 61% of additional vehicles

Incorporating the Pick Up / Drop Off location factors specified in Section 3.4, the proposed development would attract vehicles to the following areas in both the AM and PM peak hours (refer to Table 6.2).

Table 6.2: Vehicles Generated to Pick Up / Drop Off Locations

Area	Primary School		High School		Total Additional Vehicles	Total Vehicle Movements
	Proportion	Additional Vehicles	Proportion	Additional Vehicles		
Tivoli Avenue	61%	4	36%	3	7	14
Bayview Hill Road	17%	1	16%	2	3	6
NSHR	13%	1	9%	1	2	2
Rawson Road	5%	0	33%	3	3	6
Other*	4%	0	6%	1	1	2
Total	**100%**	**6**	**100%**	**10**	**16**	**30**

**Note: refers to areas such as Churchill Rd, Chamberlain Ave, Towns Road, School Car Park etc.*

Figure 6.1 to Figure 6.6 indicate the additional vehicles added to the adjoining road network as a result of the development proposal.

Vehicles seeking to access drop-off / pick-up zones on Bayview Hill Road and Tivoli Avenue have been distributed onto the adjoining road network based on existing turning movement proportions. That is, approximately 30% would turn left into Bayview Hill Road from NSHR while the rest would turn right from NSHR. Similarly, when leaving the site, it is assumed that vehicle movements at the intersection of NSHR / Tivoli Avenue would follow existing movement proportions.

Vehicles seeking to drop-off / pick-up students in front of the main school gate on NSHR would do so by travelling north along NSHR. When leaving the site, it is assumed that vehicles would continue north along NSHR.

With regard to drop-off / pick-up procedures on Rawson Road, it has been assumed that a third of vehicles would turn right into Rawson Road via NSHR, a third would turn left into the road via NSHR while the rest would access Rawson Road via the east (Churchill Road, Chamberlain Avenue, Dudley Road, etc.); departure routes would follow the reverse path.

To provide a conservative assessment of the proposed development, the small number of vehicles assumed to use "Other" areas for drop-off / pick-up procedures have been distributed to Tivoli Avenue. Approach and departure routes would follow those mentioned previously for Bayview Hill Road and Tivoli Avenue.

As such, the following figures indicate the additional vehicle movements distributed to the adjoining road network based on the proposed development.

Figure 6.1: Bayview Hill Road / Tivoli Avenue Additional AM Traffic Generation

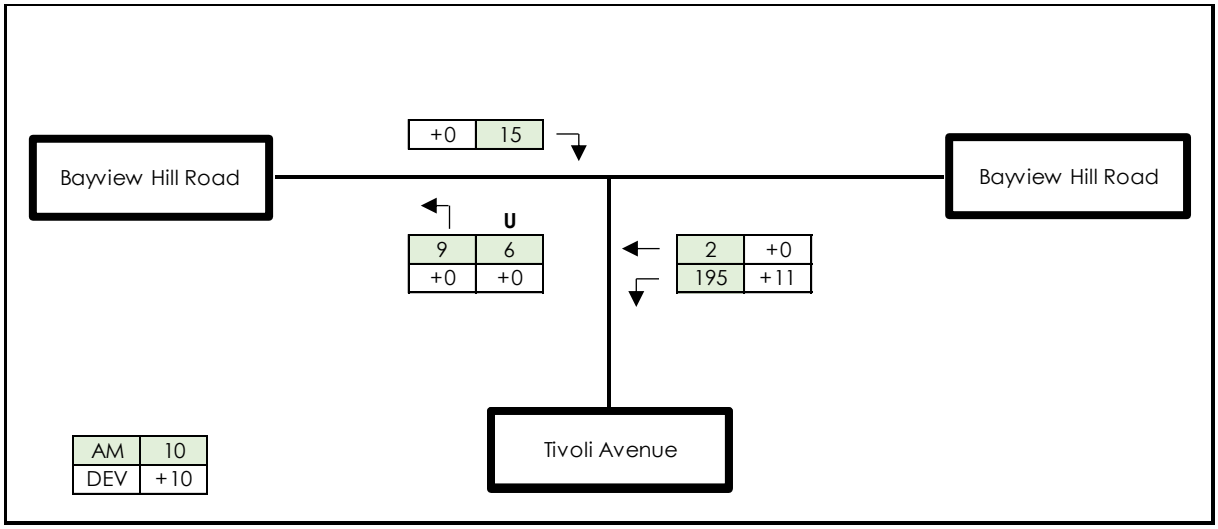


Figure 6.2: New South Head Road / Bayview Hill Road Additional AM Traffic Generation

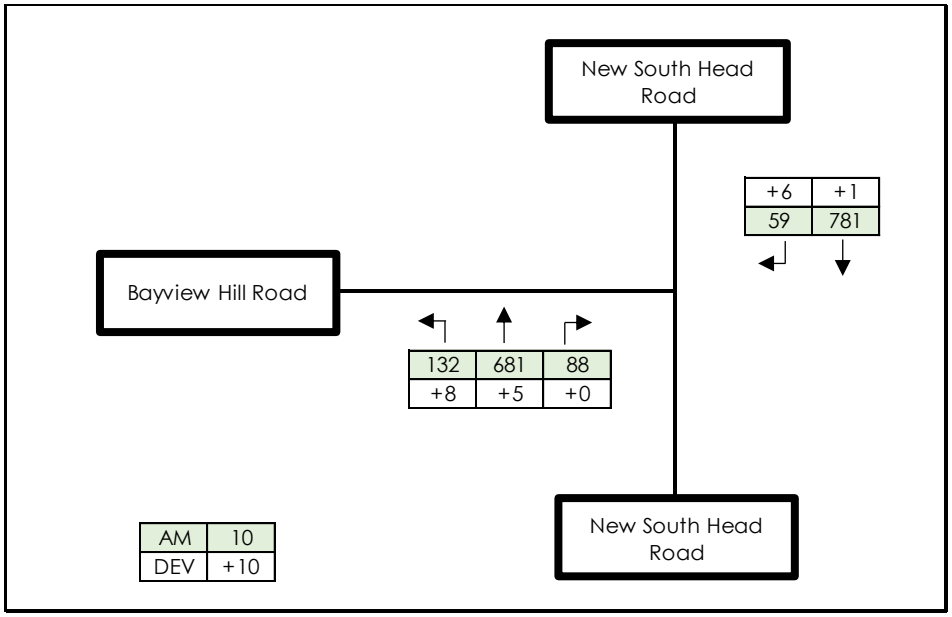


Figure 6.3: New South Head Road / Tivoli Avenue Additional AM Traffic Generation

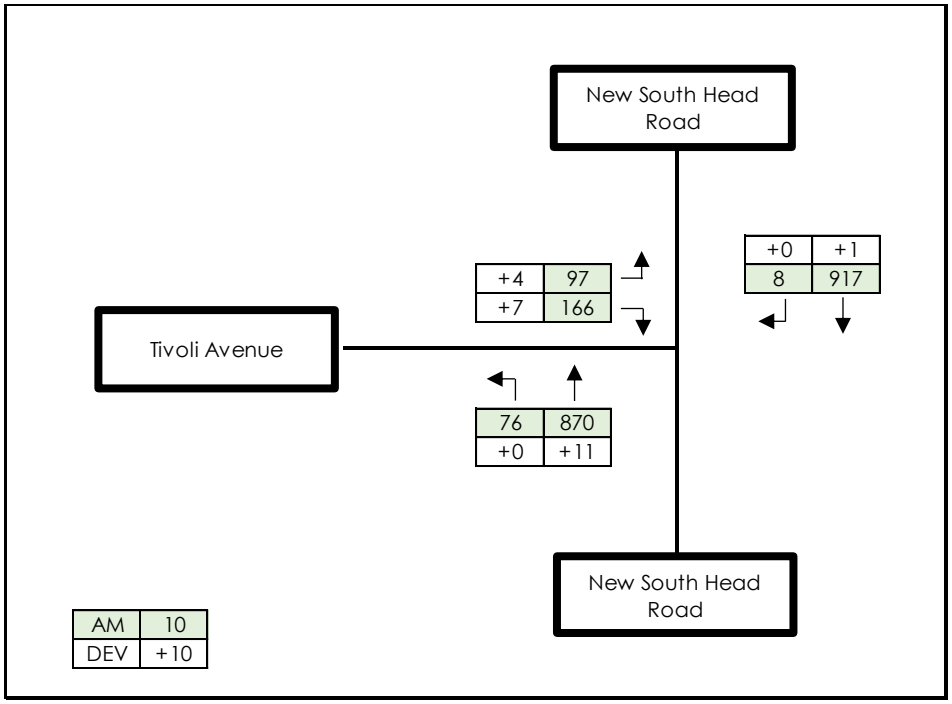


Figure 6.4: Tivoli Avenue / Bayview Hill Road Additional PM Traffic Generation

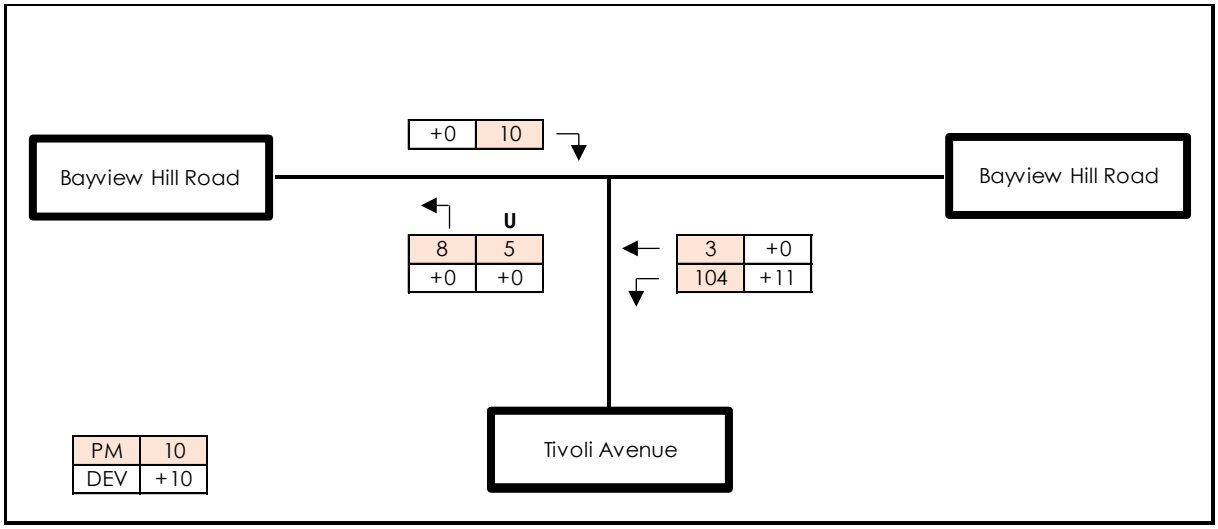


Figure 6.5: New South Head Road / Bayview Hill Road Additional PM Traffic Generation

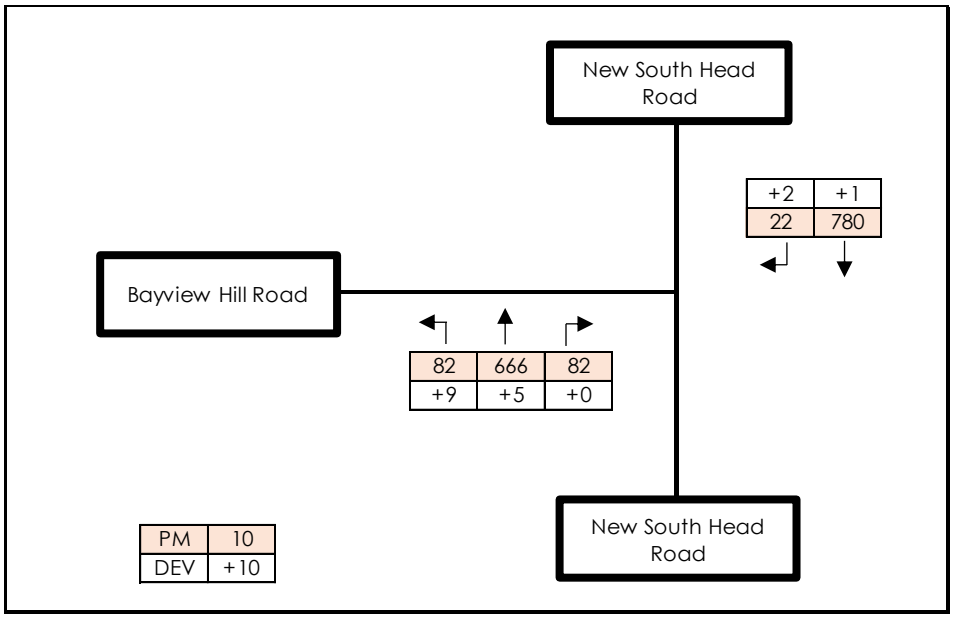
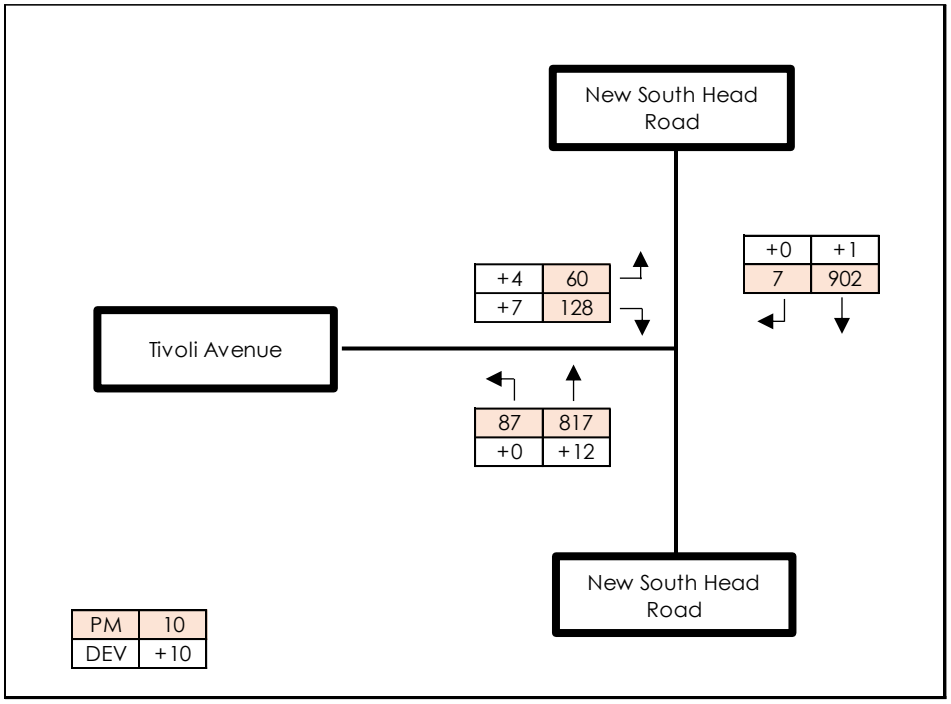


Figure 6.6: New South Head Road / Tivoli Avenue Additional PM Traffic Generation



6.3 Traffic Impact

A proposed increase in 32 vehicle movements per hour equates to an increase of one vehicle every two minutes and is considered to be a negligible increase in traffic. Notwithstanding, to provide a thorough assessment, the estimated increase to traffic has been modelled in SIDRA based on the volumes presented in Figure 6.1, Figure 6.2 and Figure 6.3.

The results of the existing scenario and post development scenario are presented in Table 6.3 and Table 6.4 respectively.

Table 6.3: Existing Peak Hour Intersection Analysis Results

Intersection	Control	AM Peak		PM Peak	
		Average Delay (sec)	Level of Service	Average Delay (sec)	Level of Service
NSHR – Tivoli Avenue	Signals	12	A	9	A
NSHR – Bayview Hill Road	Priority	10	A	10	A
Tivoli Avenue – Bayview Hill Road	Priority	7	A	7	A

Table 6.4: Post Development Peak Hour Intersection Analysis Results

Intersection	Control	AM Peak		PM Peak	
		Average Delay (sec)	Level of Service	Average Delay (sec)	Level of Service
NSHR – Tivoli Avenue	Signals	12	A	9	A
NSHR – Bayview Hill Road	Priority	11	A	10	A
Tivoli Avenue – Bayview Hill Road	Priority	7	A	7	A

As can be seen from the above tables, the impact of the proposed development is negligible, increasing the delay of only the intersection of NSHR / Bayview Hill Road by 1 second in the AM peak hour. Full vehicle movement summaries are provided in Appendix B.

6.4 Road and Personal Safety (CPTED Principles)

Further to the above, a number of potential design measures have been considered to maintain road and personal safety in line with the Crime Prevention through Environmental Design (CPTED) principles of surveillance, access control and space and activity management.

The following design measures should be considered as part of the proposed development:

- Ensure appropriate lighting is provided especially at pedestrian access points, parking areas and footpaths,
- Proposed safety signages in different languages around designated drop-off and pick-up areas to enhance awareness for a larger audience and thus mitigate the risk of any safety issues around the schools,
- Trim or remove foliage blocking sight lines and ensure there is minimal obstruction to lines of sight near key pedestrian facilities and pedestrian access points,
- Consider the implementation of Closed Circuit Television (CCTV) where practical to maximise surveillance opportunities out of school hours,
- Install boom gates, ticketed entry or other access control devices to regulate and restrict vehicle movements to/from the schools for authorised personnel only,
- Ensure security on pedestrian access points to the school to reduce opportunities for perpetrators to enter the school undetected,
- Ensure regular maintenance is in place including rubbish removal, graffiti remove, repair of light fixtures, trimming of vegetation and/or regular patrols, where feasible, and
- All staff should undergo crime awareness training to identify any potential suspicious behaviour and reporting procedures within or near the schools.

7 Travel Demand Measures

Travel demand management is a term for strategies to encourage a modal shift away from single occupant private vehicle trips and influence the way people move to/from a site to deliver better environmental outcomes to encourage sustainable travel and reduce traffic and parking impacts within communities.

A key element of travel demand management is the preparation of a Green Travel Plan (GTP). The primary purpose of GTPs at schools is to encapsulate a strategy for managing travel demand that embraces the principles of sustainable transport whilst recognising the unique context of travel planning at education facilities. In its simplest form, GTPs encourage travel using transport modes that have low environmental impacts, for example active transport modes including walking, cycling, public transport, and encourages better management of car use.

In the case of GTPs for schools, this is of vital importance as schools are often located in local residential areas which can negatively impact local traffic and parking amenity during the concentrated peak periods of school pick up and drop off times. Furthermore, on-site car parking is often a luxury as schools cannot afford to apportion limited land resources due to teaching space and play space requirements.

Therefore, the implementation of a GTP would assist manage travel demand at the school, particularly with consideration to the future expansion of the school. It is expected that the GTP document would target staff and parents at the school.

7.1 School Feedback

As part of the survey questionnaire distributed to both staff and students at the school, staff and students were asked why they chose drive to the school. The majority of responses related to convenience, as shown in Figure 7.1 and Figure 7.2.

Figure 7.1: Reasons for Vehicle Usage – Staff

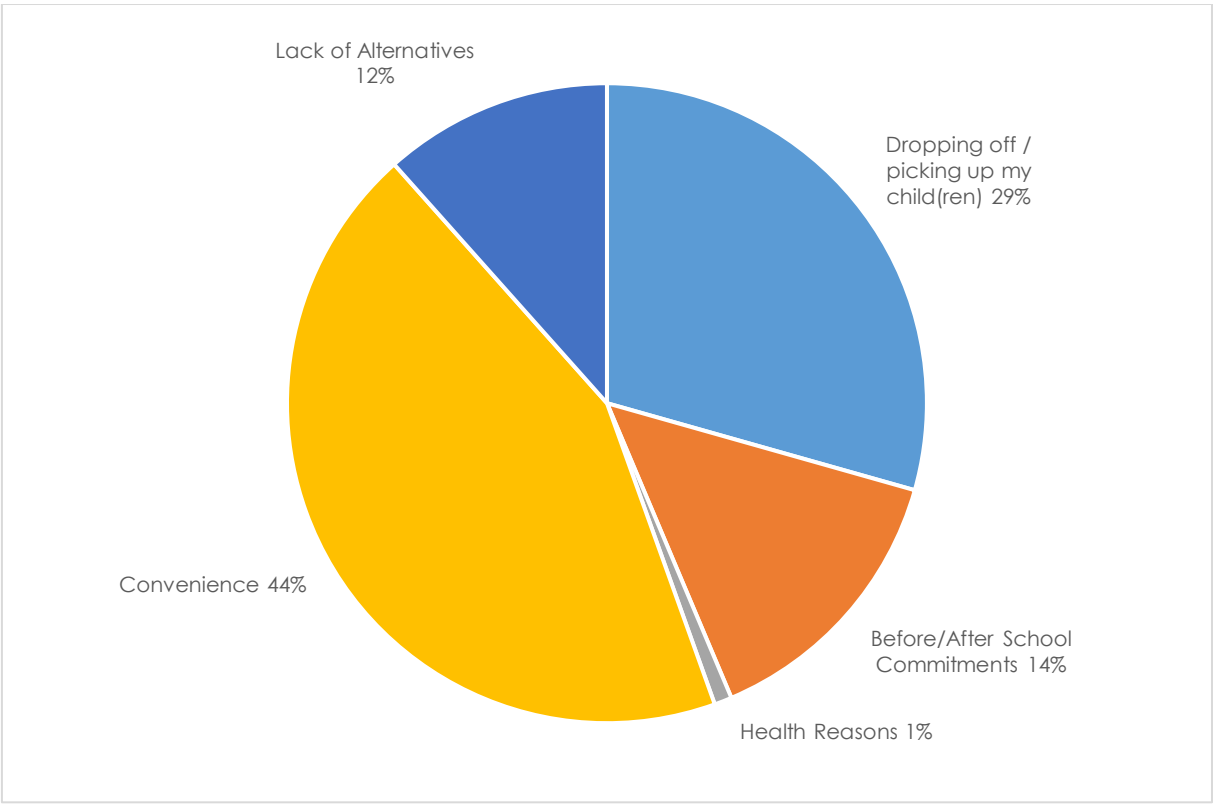
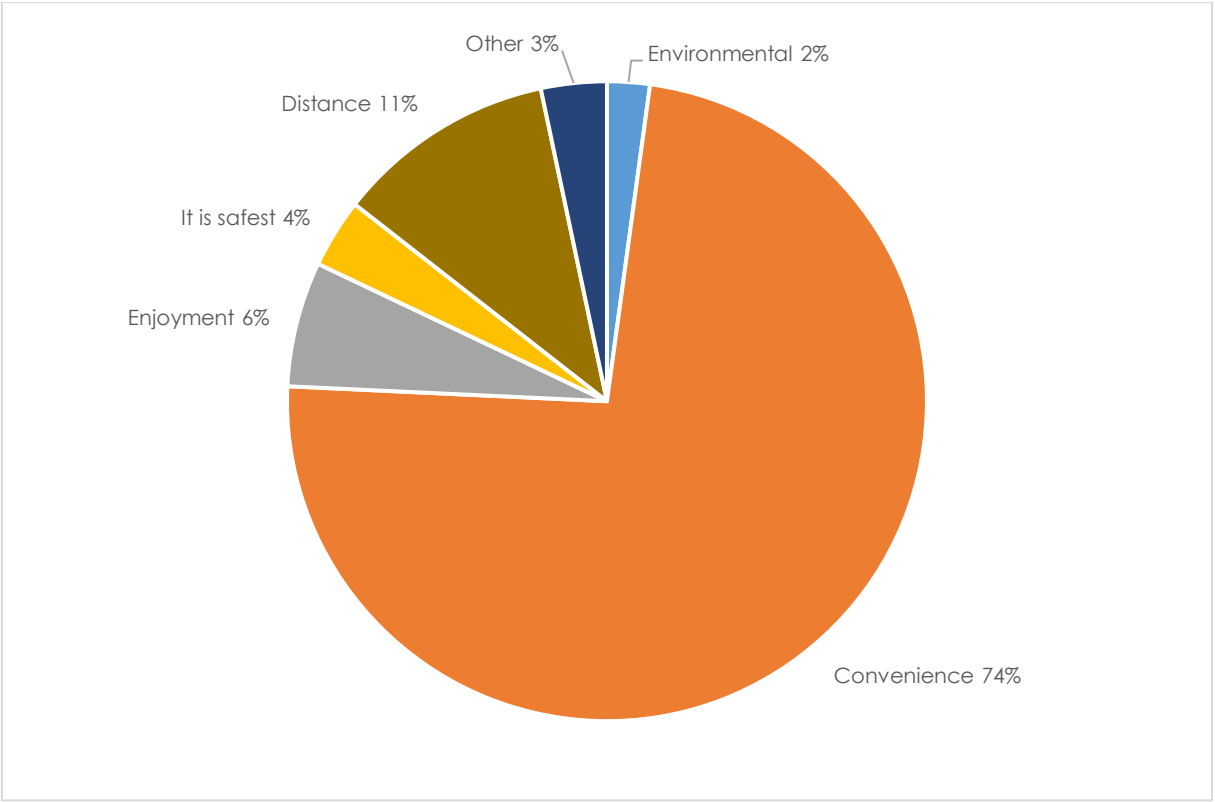


Figure 7.2: Reasons for Travel Choice – Students (Year 3 – Year 12)



On this basis, it would be necessary to both disincentivise car travel and improve the convenience of other travel modes to see a shift in travel mode away from car. Measures would include reducing/ restricting car parking provision on-site and providing facilities such as bike parking, school shuttle bus services and also raise awareness of existing transport infrastructure around the site that staff, students and parents/ guardians may not be aware of.

7.2 Green Travel Plan Initiatives

Based on the above, the following general travel strategies will be considered for implementation in the GTP to encourage more sustainable travel:

- organise a carpool system/registry which could reduce single private vehicle car trips to and from the school;
- provide a public transport timetable, car share vehicle locations and cycle maps on noticeboards to make staff, students and parents/guardians more aware of alternative transport options;
- organise a walking/cycling group, or similar, to promote walking/use of bicycles of staff and students living in the same area
- organise lessons to teach students and staff to ride a bike;
- provision of appropriate hi-visibility uniforms for students to ride to school;
- enhance existing bicycle repair tools and end-of-trip facilities including shower and changing rooms as well as bicycle infrastructure;
- arrange activities and promotions to encourage staff and students to use public transport
    - hosting and participating in active travel events such as Ride2Work Day and National Bike Week
    - provision of an Opal card or GoGet car share discounts or incentives for staff
    - affiliation to a local bicycle retailer and service centre to provide discounts for staff and students.

The above measures should be considered as part of the GTP for the school. It can be expected that such measures if implemented would be able to shift travel demand away from car usage by up to 5%.

7.2.1 School Bus

Kambala is investigating the potential to provide a new school shuttle bus that would provide a direct service between the school and Edgecliff train station and/or services to local suburbs.

The questionnaire survey of staff and students indicates that there is large interest in catching a school bus if it provided access to nearby suburbs and train stations (Edgecliff) as shown in Table 7.1.

Table 7.1: Willingness to use School Bus if available

Group	Yes	No
Staff	50%	50%
Prep – Year 6	83%	17%
Year 7 – Year 12	67%	33%

A standard bus can hold between 50-70 passengers while a shuttle bus/ mini-bus can hold around 14 passengers. It is envisaged that a shuttle bus may be provided to enable more frequent and multiple services back and forth between stops or a standard bus would be provided to accommodate a large number of passengers over less frequent services.

Notwithstanding, a new bus service would have capacity to easily shift 50-70 students' travel modes, thereby, resulting a in nil detriment to traffic impact from the proposed increase of up to 70 students.

7.2.2 Monitoring of the GTP

For the GTP to be effective, it is recommended that the GTP be monitored on a regular basis, e.g. per term or yearly, through travel surveys, staff meetings, parent consultations or similar. Travel surveys would show how staff, students and parents travel to/from the site and identify whether the proposed initiatives and measures outlined in the GTP are effective or are required to be replaced or modified to ensure that the best outcomes are achieved. Regular consultation with staff, students and parents would also be beneficial to help understand people's reasons for travelling the way they do and to help identify any potential barriers to change their travel behaviours.

In order to ensure successful implementation of the GTP, a Travel Plan Coordinator (TPC) should be appointed to oversee the measures and resultant impacts of the GTP.

A more detailed Green Travel Plan has been prepared as part of the SSD package of works and is provided in Appendix C, it is however envisaged that that any consent of the approval would require a commitment to prepare an Operational Transport Management Plan prior to Construction Certificate to outline the proposed traffic management measures to be implemented at the school, including mode share targets and proposed travel strategies to reduce private vehicle trips.

8 Conclusion

This study details our assessment of the traffic and transport implications associated with the proposed expansion of the school. The key findings of this report are presented below.

- It is proposed to deliver a new sports precinct which would involve redevelopment of the existing sports field and partial redevelopment of the surrounding existing buildings.
- The proposal would result in the increase of the number of permitted students by 70 i.e. from 950 students to 1,020 students.
- It is understood that the existing school enrolments currently exceed the existing cap with 1,020 students. Therefore, the proposed increase in the school capacity would enable the school to continue its existing operation. Nonetheless, as a sensitivity analysis of the surrounding road network and to account for any fluctuations in school population, a traffic assessment has been undertaken to assess the impact of a potential increase in student population by 70 students.
- Overall, an increase in 70 students is expected to generate an additional 16 vph during both the school AM and PM peak periods.
- The intersections of NSHR / Tivoli Avenue, NSHR / Bayview Hill Road and Tivoli Avenue Bayview Hill Road all operate at LoS A in both the existing and development scenarios.
- To manage the impacts associated with the proposal, the school will implement travel demand management measures to minimise its impact on the surrounding road network, including the:
  - provision of a green travel plan for the school
- The proposed travel demand measures are expected to reduce school car usage by 5%.
- The achievement of a 5% modal shift will ensure that traffic levels post development are similar to those currently achieved.

Overall, it is concluded that the traffic and parking aspects of the proposed scheme would be managed and thus be acceptable. With the implementation of green travel strategies, the vehicle trip generation of the proposed scheme would significantly be reduced such that it would be comparable with that generated by the approved school capacity.

Thus, the surrounding key intersections would operate at a satisfactory level.

Regular management and extensive education/consultation with key stakeholders of the schools, including staff and parents, would need to be conducted to ensure the success of the proposed mitigation measure and green travel strategies/initiatives.

Appendix A

Traffic Surveys

Time		New South Head Road (N)											Towns Road											New South Head Road (S)										
15 min		Left			Through			Right			Peds	TOT	Left			Through			Right			Peds	TOT	Left			Through			Right			Peds	TOT
Start	End	Lights	Heavie	Total	Lights	Heavie	Total	Lights	Heavie	Total			Lights	Heavie	Total	Lights	Heavie	Total	Lights	Heavie	Total			Lights	Heavie	Total	Lights	Heavie	Total	Lights	Heavie	Total		
07:30	7:45	10	0	**10**	230	9	**239**	3	1	**4**	**0**	**253**	33	1	**34**	3	0	**3**	4	0	**4**	**10**	**41**	9	0	**9**	119	14	**133**	18	2	**20**	**0**	**162**
07:45	8:00	15	0	**15**	193	9	**202**	12	0	**12**	**2**	**229**	26	1	**27**	5	0	**5**	13	0	**13**	**2**	**45**	21	0	**21**	141	9	**150**	15	3	**18**	**0**	**189**
08:00	8:15	34	0	**34**	174	10	**184**	31	0	**31**	**2**	**249**	17	0	**17**	6	0	**6**	15	0	**15**	**4**	**38**	56	0	**56**	181	14	**195**	23	1	**24**	**0**	**275**
08:15	8:30	40	2	**42**	153	3	**156**	12	0	**12**	**1**	**210**	15	1	**16**	1	0	**1**	9	0	**9**	**3**	**26**	46	0	**46**	188	15	**203**	25	1	**26**	**0**	**275**
08:30	8:45	29	0	**29**	157	10	**167**	7	0	**7**	**1**	**203**	15	0	**15**	1	0	**1**	7	0	**7**	**4**	**23**	21	0	**21**	143	14	**157**	9	0	**9**	**1**	**187**
08:45	9:00	10	0	**10**	140	12	**152**	5	0	**5**	**0**	**167**	20	0	**20**	1	0	**1**	9	0	**9**	**7**	**30**	16	0	**16**	127	11	**138**	14	0	**14**	**0**	**168**
09:00	9:15	12	0	**12**	188	6	**194**	4	0	**4**	**0**	**210**	20	0	**20**	1	0	**1**	6	0	**6**	**4**	**27**	7	0	**7**	93	7	**100**	9	1	**10**	**0**	**117**
09:15	9:30	12	1	**13**	144	8	**152**	1	0	**1**	**1**	**166**	20	1	**21**	1	0	**1**	6	0	**6**	**3**	**28**	7	0	**7**	115	9	**124**	17	1	**18**	**0**	**149**
14:30	14:45	13	0	**13**	164	10	**174**	2	0	**2**	**0**	**189**	9	0	**9**	1	0	**1**	7	0	**7**	**9**	**17**	9	1	**10**	131	7	**138**	5	0	**5**		**153**
14:45	15:00	15	2	**17**	181	8	**189**	6	0	**6**	**1**	**212**	14	0	**14**	1	0	**1**	7	0	**7**	**3**	**22**	12	0	**12**	129	10	**139**	10	0	**10**		**161**
15:00	15:15	18	0	**18**	221	17	**238**	2	0	**2**	**0**	**258**	12	1	**13**	2	0	**2**	5	0	**5**	**40**	**20**	20	0	**20**	164	6	**170**	11	1	**12**		**202**
15:15	15:30	38	0	**38**	198	14	**212**	7	0	**7**	**0**	**257**	16	0	**16**	4	0	**4**	8	0	**8**	**50**	**28**	29	0	**29**	168	4	**172**	18	0	**18**		**219**
15:30	15:45	21	0	**21**	170	10	**180**	7	0	**7**	**2**	**208**	12	0	**12**	1	0	**1**	7	0	**7**	**23**	**20**	22	0	**22**	143	7	**150**	17	0	**17**		**189**
15:45	16:00	8	1	**9**	145	5	**150**	6	0	**6**	**1**	**165**	9	1	**10**	1	0	**1**	4	0	**4**	**5**	**15**	11	0	**11**	168	6	**174**	34	1	**35**		**220**
16:00	16:15	12	0	**12**	153	6	**159**	6	0	**6**	**3**	**177**	11	0	**11**	2	0	**2**	7	0	**7**	**3**	**20**	14	0	**14**	153	4	**157**	24	0	**24**		**195**
16:15	16:30	18	0	**18**	197	5	**202**	5	0	**5**	**0**	**225**	10	1	**11**	1	0	**1**	10	0	**10**	**5**	**22**	10	0	**10**	162	3	**165**	18	1	**19**		**194**
16:30	16:45	28	0	**28**	172	9	**181**	4	0	**4**	**2**	**213**	14	0	**14**	0	0	**0**	12	0	**12**	**6**	**27**	7	0	**7**	163	4	**167**	20	0	**20**		**194**
16:45	17:00	20	0	**20**	171	8	**179**	7	0	**7**	**1**	**206**	11	0	**11**	5	0	**5**	9	0	**9**	**7**	**25**	10	0	**10**	161	3	**164**	33	0	**33**		**207**
17:00	17:15	13	0	**13**	151	4	**155**	12	0	**12**	**1**	**180**	24	1	**25**	2	0	**2**	8	0	**8**	**11**	**35**	16	0	**16**	171	4	**175**	27	0	**27**		**218**
17:15	17:30	21	0	**21**	158	6	**164**	4	0	**4**	**0**	**189**	19	0	**19**	1	0	**1**	5	0	**5**	**12**	**25**	12	0	**12**	194	2	**196**	37	0	**37**		**245**
AM TOT		**162**	**3**	**165**	**1379**	**67**	**1446**	**75**	**1**	**76**	**7**	**1687**	**166**	**4**	**170**	**19**	**0**	**19**	**69**	**0**	**69**	**37**	**258**	**183**	**0**	**183**	**1107**	**93**	**1200**	**130**	**9**	**139**	**1**	**1522**
PM TOT		**225**	**3**	**228**	**2081**	**102**	**2183**	**68**	**0**	**68**	**11**	**2479**	**161**	**4**	**165**	**21**	**0**	**21**	**89**	**0**	**89**	**174**	**276**	**172**	**1**	**173**	**1907**	**60**	**1967**	**254**	**3**	**257**	**0**	**2397**

PEAK HOUR		New South Head Road (N)											Towns Road											New South Head Road (S)										
		Left			Straight			Right			Peds	TOTAL	Left			Straight			Right			Peds	TOTAL	Left			Straight			Right			Peds	TOTAL
		Lights	Heavie	Total	Lights	Heavie	Total	Lights	Heavie	Total			Lights	Heavie	Total	Lights	Heavie	Total	Lights	Heavie	Total			Lights	Heavie	Total	Lights	Heavie	Total	Lights	Heavie	Total		
07:30	**8:30**	99	2	101	750	31	781	58	1	59	5	941	91	3	94	15	0	15	41	0	41	19	150	132	0	132	629	52	681	81	7	88	0	901
15:00	**16:00**	85	1	86	734	46	780	22	0	22	3	888	49	2	51	8	0	8	24	0	24	118	83	82	0	82	643	23	666	80	2	82	0	830

Time		Bayview Hill Road (E)								Tivoli Avenue										Bayview Hill Road (W)							
15 min		Left			Through			Peds	TOT	Left			Right			U-turns			Peds	TOT	Through			Right			Peds	TOT
Start	End	Lights	Heavie	Total	Lights	Heavie	Total			Lights	Heavie	Total	Lights	Heavie	Total	Lights	Heavie	Total			Lights	Heavie	Total	Lights	Heavie	Total		
07:30	7:45	17	1	**18**	0	0	**0**	**0**	**18**	4	1	**5**	0	0	**0**	3	0	**3**	**5**	**8**	0	0	**0**	3	0	**3**	**0**	**3**
07:45	8:00	34	0	**34**	1	0	**1**	**0**	**35**	1	0	**1**	0	0	**0**	1	1	**2**	**1**	**3**	0	0	**0**	5	0	**5**	**5**	**5**
08:00	8:15	87	0	**87**	0	0	**0**	**0**	**87**	1	0	**1**	0	0	**0**	0	0	**0**	**0**	**1**	0	0	**0**	5	0	**5**	**0**	**6**
08:15	8:30	56	0	**56**	1	0	**1**	**0**	**57**	2	0	**2**	0	0	**0**	1	0	**1**	**1**	**3**	0	0	**0**	2	0	**2**	**0**	**2**
08:30	8:45	25	0	**25**	0	0	**0**	**0**	**25**	1	0	**1**	0	0	**0**	3	0	**3**	**0**	**4**	0	0	**0**	2	0	**2**	**1**	**2**
08:45	9:00	27	0	**27**	0	0	**0**	**2**	**27**	0	0	**0**	0	0	**0**	1	0	**1**	**3**	**1**	0	0	**0**	2	0	**2**	**4**	**2**
09:00	9:15	12	0	**12**	0	0	**0**	**0**	**12**	3	0	**3**	0	0	**0**	4	0	**4**	**1**	**7**	0	0	**0**	4	1	**5**	**0**	**5**
09:15	9:30	6	0	**6**	2	0	**2**	**0**	**8**	1	0	**1**	0	0	**0**	0	0	**0**	**3**	**1**	0	0	**0**	4	0	**4**	**0**	**4**
14:30	14:45	9	1	**10**	0	0	**0**	**0**	**10**	2	0	**2**	0	0	**0**	2	0	**2**	**2**	**4**	0	0	**0**	4	0	**4**	**0**	**4**
14:45	15:00	22	0	**22**	2	0	**2**	**0**	**24**	2	0	**2**	0	0	**0**	1	0	**1**	**3**	**3**	0	0	**0**	1	0	**1**	**0**	**1**
15:00	15:15	20	0	**20**	2	0	**2**	**3**	**22**	1	0	**1**	0	0	**0**	1	0	**1**	**4**	**4**	0	0	**0**	2	0	**2**	**3**	**2**
15:15	15:30	43	0	**43**	0	0	**0**	**0**	**43**	2	0	**2**	0	0	**0**	1	1	**2**	**3**	**4**	0	0	**0**	4	0	**4**	**2**	**4**
15:30	15:45	30	0	**30**	0	0	**0**	**0**	**30**	4	0	**4**	1	0	**1**	0	0	**0**	**4**	**5**	0	0	**0**	1	0	**1**	**2**	**1**
15:45	16:00	11	0	**11**	1	0	**1**	**0**	**12**	1	0	**1**	1	0	**1**	2	0	**2**	**1**	**4**	0	0	**0**	3	0	**3**	**1**	**3**
16:00	16:15	29	0	**29**	1	0	**1**	**0**	**30**	2	0	**2**	0	0	**0**	6	1	**7**	**2**	**9**	0	0	**0**	3	0	**3**	**0**	**3**
16:15	16:30	18	0	**18**	0	0	**0**	**3**	**18**	0	0	**0**	1	0	**1**	1	0	**1**	**1**	**2**	0	0	**0**	2	0	**2**	**0**	**2**
16:30	16:45	13	0	**13**	0	0	**0**	**0**	**13**	1	0	**1**	0	0	**0**	2	0	**2**	**5**	**3**	0	0	**0**	1	0	**1**	**0**	**1**
16:45	17:00	17	0	**17**	2	0	**2**	**0**	**19**	2	0	**2**	0	0	**0**	1	0	**1**	**4**	**3**	0	0	**0**	5	0	**5**	**0**	**5**
17:00	17:15	32	0	**32**	0	0	**0**	**0**	**32**	3	0	**3**	0	0	**0**	3	0	**3**	**14**	**6**	0	0	**0**	5	0	**5**	**1**	**5**
17:15	17:30	16	0	**16**	0	0	**0**	**0**	**16**	2	0	**2**	0	0	**0**	0	0	**0**	**6**	**2**	0	0	**0**	5	0	**5**	**1**	**5**
AM TOT		**264**	**1**	**265**	**4**	**0**	**4**	**2**	**269**	**13**	**1**	**14**	**0**	**0**	**0**	**13**	**1**	**14**	**14**	**28**	**0**	**0**	**0**	**27**	**1**	**28**	**10**	**29**
PM TOT		**260**	**1**	**261**	**8**	**0**	**8**	**6**	**269**	**22**	**0**	**22**	**3**	**0**	**3**	**20**	**2**	**22**	**49**	**25**	**0**	**0**	**0**	**36**	**0**	**36**	**10**	**36**

PEAK HOUR		Bayview Hill Road (E)								Tivoli Avenue										Bayview Hill Road (W)							
		Left			Straight			Peds	TOTAL	Left			Right			U-turns			Peds	TOTAL	Straight			Right			Peds	TOTAL
		Lights	Heavie	Total	Lights	Heavie	Total			Lights	Heavie	Total	Lights	Heavie	Total	Lights	Heavie	Total			Lights	Heavie	Total	Lights	Heavie	Total		
07:45	**8:45**	202	0	202	2	0	2	0	204	5	0	5	0	0	0	5	1	6	2	11	0	0	0	14	0	14	6	15
14:45	**15:45**	115	0	115	4	0	4	3	119	9	0	9	1	0	1	3	1	4	14	16	0	0	0	8	0	8	7	8

Time		New South Head Road (N)								New South Head Road (S)								Tivoli Avenue							
15 min		Through			Right			Peds	TOT	Left			Through			Peds	TOT	Left			Right			Peds	TOT
Start	End	Lights	Heavie	Total	Lights	Heavie	Total			Lights	Heavie	Total	Lights	Heavie	Total			Lights	Heavie	Total	Lights	Heavie	Total		
07:30	7:45	282	9	**291**	3	1	**4**	**4**	**295**	27	0	**27**	157	14	**171**	**0**	**198**	9	1	**10**	25	0	**25**	**3**	**35**
07:45	8:00	223	11	**234**	2	0	**2**	**4**	**236**	13	1	**14**	176	13	**189**	**0**	**203**	13	1	**14**	32	0	**32**	**7**	**46**
08:00	8:15	197	10	**207**	1	0	**1**	**1**	**208**	12	0	**12**	243	17	**260**	**0**	**272**	37	0	**37**	54	0	**54**	**11**	**91**
08:15	8:30	179	6	**185**	1	0	**1**	**3**	**186**	23	0	**23**	237	13	**250**	**0**	**273**	36	0	**36**	55	0	**55**	**13**	**91**
08:30	8:45	167	10	**177**	2	0	**2**	**4**	**179**	15	0	**15**	165	15	**180**	**0**	**195**	9	0	**9**	22	0	**22**	**5**	**31**
08:45	9:00	163	10	**173**	2	0	**2**	**5**	**175**	13	0	**13**	148	8	**156**	**0**	**169**	7	0	**7**	41	0	**41**	**4**	**48**
09:00	9:15	206	8	**214**	2	0	**2**	**2**	**216**	11	0	**11**	103	9	**112**	**0**	**123**	11	1	**12**	14	0	**14**	**5**	**26**
09:15	9:30	181	9	**190**	0	0	**0**	**0**	**190**	4	1	**5**	145	7	**152**	**0**	**157**	7	1	**8**	18	0	**18**	**1**	**26**
14:30	14:45	183	8	**191**	1	0	**1**	**1**	**192**	10	0	**10**	141	8	**149**	**0**	**159**	5	0	**5**	18	1	**19**	**4**	**24**
14:45	15:00	212	7	**219**	0	0	**0**	**3**	**219**	9	0	**9**	168	10	**178**	**0**	**187**	4	0	**4**	24	0	**24**	**6**	**28**
15:00	15:15	248	20	**268**	3	0	**3**	**1**	**271**	10	0	**10**	200	6	**206**	**0**	**216**	6	0	**6**	19	0	**19**	**5**	**25**
15:15	15:30	224	15	**239**	2	0	**2**	**15**	**241**	30	0	**30**	207	6	**213**	**0**	**243**	20	0	**20**	39	2	**41**	**33**	**61**
15:30	15:45	203	12	**215**	0	0	**0**	**7**	**215**	19	1	**20**	189	8	**197**	**0**	**217**	19	0	**19**	53	0	**53**	**30**	**72**
15:45	16:00	174	6	**180**	2	0	**2**	**0**	**182**	27	0	**27**	195	6	**201**	**0**	**228**	15	0	**15**	15	0	**15**	**10**	**31**
16:00	16:15	169	3	**172**	4	0	**4**	**0**	**176**	15	0	**15**	188	3	**191**	**0**	**206**	13	0	**13**	29	1	**30**	**17**	**43**
16:15	16:30	209	6	**215**	1	0	**1**	**2**	**216**	12	1	**13**	193	4	**197**	**0**	**210**	10	0	**10**	46	0	**46**	**4**	**56**
16:30	16:45	196	11	**207**	4	0	**4**	**0**	**211**	13	0	**13**	186	4	**190**	**0**	**203**	12	0	**12**	33	0	**33**	**16**	**45**
16:45	17:00	181	8	**189**	3	0	**3**	**3**	**193**	19	0	**19**	208	3	**211**	**0**	**230**	9	0	**9**	25	0	**25**	**16**	**34**
17:00	17:15	192	4	**196**	1	0	**1**	**2**	**197**	19	0	**19**	201	4	**205**	**0**	**224**	18	0	**18**	45	0	**45**	**20**	**63**
17:15	17:30	190	6	**196**	3	0	**3**	**2**	**199**	11	0	**11**	241	2	**243**	**0**	**254**	26	0	**26**	50	0	**50**	**7**	**76**
AM TOT		**1598**	**73**	**1671**	**13**	**1**	**14**	**23**	**1685**	**118**	**2**	**120**	**1374**	**96**	**1470**	**0**	**1590**	**129**	**4**	**133**	**261**	**0**	**261**	**49**	**394**
PM TOT		**2381**	**106**	**2487**	**24**	**0**	**24**	**36**	**2512**	**194**	**2**	**196**	**2317**	**64**	**2381**	**0**	**2577**	**157**	**0**	**157**	**396**	**4**	**400**	**168**	**558**

PEAK HOUR		New South Head Road (N)								New South Head Road (S)								Tivoli Avenue							
		Straight			Right			Peds	TOTAL	Left			Straight			Peds	TOTAL	Left			Right			Peds	**TOTAL**
		Lights	Heavie	Total	Lights	Heavie	Total			Lights	Heavie	Total	Lights	Heavie	Total			Lights	Heavie	Total	Lights	Heavie	Total		
07:30	**8:30**	881	36	917	7	1	8	12	925	75	1	76	813	57	870	0	946	95	2	97	166	0	166	34	263
15:00	**16:00**	849	53	902	7	0	7	23	909	86	1	87	791	26	817	0	904	60	0	60	126	2	128	78	189

Appendix B

SIDRA Movement Summaries

MOVEMENT SUMMARY

Site: 1 [EX.AM Bayview Hill - Tivoli]

Existing AM Base Case
Created by: CH
Site Category: (None)
Giveway / Yield (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: Tivoli Avenue												
1	L2	9	1.0	0.012	3.4	LOS A	0.0	0.3	0.01	0.54	0.01	39.5
3u	U	6	1.0	0.012	7.3	LOS A	0.0	0.3	0.01	0.54	0.01	44.1
Approach		16	1.0	0.012	5.0	LOS A	0.0	0.3	0.01	0.54	0.01	40.9
East: Bayview Hill Road												
4	L2	205	1.0	0.111	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	37.2
5	T1	2	1.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		207	1.0	0.111	3.4	NA	0.0	0.0	0.00	0.45	0.00	37.2
West: Bayview Hill Road												
12	R2	16	1.0	0.014	4.3	LOS A	0.1	0.4	0.30	0.50	0.30	37.4
Approach		16	1.0	0.014	4.3	NA	0.1	0.4	0.30	0.50	0.30	37.4
All Vehicles		239	1.0	0.111	3.5	NA	0.1	0.4	0.02	0.46	0.02	37.6

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.

MOVEMENT SUMMARY

Site: 2 [EX.AM NSHR - Bayview Hill]

Existing AM Base Case
Created by: CH
Site Category: (None)
Giveway / Yield (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: New South Head Road												
1	L2	139	1.0	0.223	3.4	LOS A	0.0	0.0	0.00	0.15	0.00	39.2
2	T1	717	1.0	0.223	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	39.7
Approach		856	1.0	0.223	0.6	NA	0.0	0.0	0.00	0.08	0.00	39.7
North: New South Head Road												
8	T1	822	1.0	0.243	1.0	LOS A	1.3	8.9	0.13	0.04	0.15	39.2
9	R2	62	1.0	0.243	10.3	LOS A	1.3	8.9	0.43	0.14	0.47	37.2
Approach		884	1.0	0.243	1.7	NA	1.3	8.9	0.16	0.05	0.17	39.1
All Vehicles		1740	1.0	0.243	1.1	NA	1.3	8.9	0.08	0.06	0.09	39.4

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.

MOVEMENT SUMMARY

Site: 5.TCS3969 [EX.AM NSHR - Tivoli]

Existing AM Base Case
Peak Hour:
Created by: CH
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 117 seconds (Site User-Given Phase Times)

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: New South Head Road												
1	L2	80	1.0	0.050	4.0	LOS A	0.4	2.5	0.14	0.50	0.14	38.1
2	T1	916	5.0	0.343	5.7	LOS A	9.4	68.8	0.38	0.34	0.38	36.1
Approach		996	4.7	0.343	5.6	LOS A	9.4	68.8	0.36	0.35	0.36	36.3
North: New South Head Road												
8	T1	965	5.0	0.359	5.9	LOS A	10.0	73.1	0.39	0.35	0.39	37.0
9	R2	8	1.0	0.359	9.3	LOS A	9.6	69.7	0.39	0.35	0.39	36.2
Approach		974	5.0	0.359	5.9	LOS A	10.0	73.1	0.39	0.35	0.39	37.0
West: Tivoli Avenue												
10	L2	102	1.0	0.341	51.0	LOS D	5.3	37.2	0.93	0.77	0.93	16.3
12	R2	175	1.0	0.699	54.6	LOS D	9.6	68.1	0.98	0.85	1.05	22.9
Approach		277	1.0	0.699	53.3	LOS D	9.6	68.1	0.96	0.82	1.00	21.0
All Vehicles		2246	4.3	0.699	11.6	LOS A	10.0	73.1	0.45	0.41	0.45	33.8

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	53	52.8	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	52.8	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		105	52.8	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [EX.PM Bayview Hill - Tivoli]

Existing PM Base Case
Created by: CH
Site Category: (None)
Giveway / Yield (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: Tivoli Avenue												
1	L2	8	1.0	0.010	3.4	LOS A	0.0	0.3	0.02	0.54	0.02	39.5
3u	U	5	1.0	0.010	7.0	LOS A	0.0	0.3	0.02	0.54	0.02	44.1
Approach		14	1.0	0.010	4.8	LOS A	0.0	0.3	0.02	0.54	0.02	40.8
East: Bayview Hill Road												
4	L2	109	1.0	0.059	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	37.2
5	T1	3	1.0	0.002	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		113	1.0	0.059	3.3	NA	0.0	0.0	0.00	0.44	0.00	37.3
West: Bayview Hill Road												
12	R2	11	1.0	0.008	3.9	LOS A	0.0	0.2	0.21	0.47	0.21	37.5
Approach		11	1.0	0.008	3.9	NA	0.0	0.2	0.21	0.47	0.21	37.5
All Vehicles		137	1.0	0.059	3.5	NA	0.0	0.3	0.02	0.45	0.02	37.8

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.

MOVEMENT SUMMARY

Site: 2 [EX.PM NSHR - Bayview Hill]

Existing PM Base Case
Created by: CH
Site Category: (None)
Giveway / Yield (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: New South Head Road												
1	L2	86	1.0	0.209	3.4	LOS A	0.0	0.0	0.00	0.10	0.00	39.6
2	T1	701	5.0	0.209	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	39.8
Approach		787	4.6	0.209	0.4	NA	0.0	0.0	0.00	0.05	0.00	39.8
North: New South Head Road												
8	T1	821	5.0	0.215	0.4	LOS A	0.5	3.5	0.06	0.01	0.06	39.6
9	R2	23	1.0	0.215	9.6	LOS A	0.5	3.5	0.15	0.04	0.16	39.1
Approach		844	4.9	0.215	0.7	NA	0.5	3.5	0.07	0.02	0.07	39.6
All Vehicles		1632	4.7	0.215	0.5	NA	0.5	3.5	0.03	0.03	0.03	39.7

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.

MOVEMENT SUMMARY

Site: 5.TCS3969 [EX.PM NSHR - Tivoli]

Existing PM Base Case
Created by: CH
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 108 seconds (Site User-Given Phase Times)

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: New South Head Road												
1	L2	92	1.0	0.057	3.9	LOS A	0.4	2.6	0.14	0.50	0.14	38.1
2	T1	860	1.0	0.297	3.9	LOS A	6.8	48.2	0.32	0.28	0.32	37.3
Approach		952	1.0	0.297	3.9	LOS A	6.8	48.2	0.30	0.31	0.30	37.4
North: New South Head Road												
8	T1	949	1.0	0.328	4.1	LOS A	7.8	54.9	0.33	0.30	0.33	37.9
9	R2	7	1.0	0.328	7.5	LOS A	7.5	52.8	0.33	0.30	0.33	37.3
Approach		957	1.0	0.328	4.1	LOS A	7.8	54.9	0.33	0.30	0.33	37.9
West: Tivoli Avenue												
10	L2	63	1.0	0.264	50.3	LOS D	3.1	21.8	0.94	0.75	0.94	16.4
12	R2	135	1.0	0.582	52.6	LOS D	6.9	48.8	0.99	0.79	0.99	23.3
Approach		198	1.0	0.582	51.9	LOS D	6.9	48.8	0.97	0.78	0.97	21.6
All Vehicles		2106	1.0	0.582	8.5	LOS A	7.8	54.9	0.38	0.35	0.38	35.3

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	53	48.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	48.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		105	48.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [EX+D.AM Bayview Hill - Tivoli]

Existing AM Base Case + Development Traffic
Created by: CH
Site Category: (None)
Giveway / Yield (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: Tivoli Avenue												
1	L2	9	1.0	0.012	3.4	LOS A	0.0	0.3	0.01	0.54	0.01	39.5
3u	U	6	1.0	0.012	7.3	LOS A	0.0	0.3	0.01	0.54	0.01	44.1
Approach		16	1.0	0.012	5.0	LOS A	0.0	0.3	0.01	0.54	0.01	40.9
East: Bayview Hill Road												
4	L2	217	1.0	0.118	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	37.2
5	T1	2	1.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		219	1.0	0.118	3.4	NA	0.0	0.0	0.00	0.45	0.00	37.2
West: Bayview Hill Road												
12	R2	16	1.0	0.014	4.4	LOS A	0.1	0.4	0.31	0.50	0.31	37.3
Approach		16	1.0	0.014	4.4	NA	0.1	0.4	0.31	0.50	0.31	37.3
All Vehicles		251	1.0	0.118	3.5	NA	0.1	0.4	0.02	0.46	0.02	37.6

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.

MOVEMENT SUMMARY

Site: 2 [EX+D.AM NSHR - Bayview Hill]

Existing AM Base Case + Development Traffic
Created by: CH
Site Category: (None)
Giveway / Yield (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: New South Head Road												
1	L2	147	1.0	0.226	3.4	LOS A	0.0	0.0	0.00	0.16	0.00	39.2
2	T1	722	1.0	0.226	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	39.7
Approach		869	1.0	0.226	0.6	NA	0.0	0.0	0.00	0.08	0.00	39.7
North: New South Head Road												
8	T1	823	1.0	0.249	1.1	LOS A	1.4	9.8	0.14	0.05	0.15	39.1
9	R2	68	1.0	0.249	10.6	LOS A	1.4	9.8	0.48	0.16	0.52	36.9
Approach		892	1.0	0.249	1.9	NA	1.4	9.8	0.17	0.06	0.18	39.0
All Vehicles		1761	1.0	0.249	1.2	NA	1.4	9.8	0.08	0.07	0.09	39.3

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.

MOVEMENT SUMMARY

Site: 5.TCS3969 [EX+D.AM NSHR - Tivoli]

Existing AM Base Case + Development Traffic
Peak Hour:
Created by: CH
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 117 seconds (Site User-Given Phase Times)

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: New South Head Road												
1	L2	80	1.0	0.050	4.0	LOS A	0.4	2.5	0.14	0.50	0.14	38.1
2	T1	927	5.0	0.348	5.7	LOS A	9.6	70.0	0.38	0.34	0.38	36.1
Approach		1007	4.7	0.348	5.6	LOS A	9.6	70.0	0.36	0.35	0.36	36.3
North: New South Head Road												
8	T1	966	5.0	0.360	5.9	LOS A	10.0	73.3	0.39	0.35	0.39	37.0
9	R2	8	1.0	0.360	9.3	LOS A	9.6	69.8	0.39	0.35	0.39	36.2
Approach		975	5.0	0.360	5.9	LOS A	10.0	73.3	0.39	0.35	0.39	37.0
West: Tivoli Avenue												
10	L2	106	1.0	0.355	51.2	LOS D	5.5	38.8	0.93	0.77	0.93	16.2
12	R2	182	1.0	0.740	55.9	LOS D	10.2	72.3	0.98	0.87	1.09	22.7
Approach		288	1.0	0.740	54.2	LOS D	10.2	72.3	0.96	0.84	1.04	20.9
All Vehicles		2271	4.3	0.740	11.9	LOS A	10.2	73.3	0.45	0.41	0.46	33.7

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	53	52.8	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	52.8	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		105	52.8	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [EX+D.PM Bayview Hill - Tivoli]

Existing PM Base Case + Development Traffic
Created by: CH
Site Category: (None)
Giveway / Yield (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: Tivoli Avenue												
1	L2	8	1.0	0.010	3.4	LOS A	0.0	0.3	0.02	0.54	0.02	39.5
3u	U	5	1.0	0.010	7.1	LOS A	0.0	0.3	0.02	0.54	0.02	44.1
Approach		14	1.0	0.010	4.8	LOS A	0.0	0.3	0.02	0.54	0.02	40.8
East: Bayview Hill Road												
4	L2	121	1.0	0.066	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	37.2
5	T1	3	1.0	0.002	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		124	1.0	0.066	3.3	NA	0.0	0.0	0.00	0.44	0.00	37.3
West: Bayview Hill Road												
12	R2	11	1.0	0.008	4.0	LOS A	0.0	0.2	0.22	0.47	0.22	37.5
Approach		11	1.0	0.008	4.0	NA	0.0	0.2	0.22	0.47	0.22	37.5
All Vehicles		148	1.0	0.066	3.5	NA	0.0	0.3	0.02	0.45	0.02	37.8

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.

MOVEMENT SUMMARY

Site: 2 [EX+D.PM NSHR - Bayview Hill]

Existing PM Base Case + Development Traffic
Created by: CH
Site Category: (None)
Giveway / Yield (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: New South Head Road												
1	L2	96	1.0	0.213	3.4	LOS A	0.0	0.0	0.00	0.11	0.00	39.5
2	T1	706	5.0	0.213	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	39.8
Approach		802	4.5	0.213	0.4	NA	0.0	0.0	0.00	0.06	0.00	39.8
North: New South Head Road												
8	T1	822	5.0	0.218	0.5	LOS A	0.5	3.9	0.07	0.02	0.07	39.6
9	R2	25	1.0	0.218	9.8	LOS A	0.5	3.9	0.17	0.04	0.18	39.0
Approach		847	4.9	0.218	0.7	NA	0.5	3.9	0.07	0.02	0.07	39.6
All Vehicles		1649	4.7	0.218	0.6	NA	0.5	3.9	0.04	0.04	0.04	39.7

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.

MOVEMENT SUMMARY

Site: 5.TCS3969 [EX+D.PM NSHR - Tivoli]

Existing PM Base Case + Development Traffic
Created by: CH
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 108 seconds (Site User-Given Phase Times)

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: New South Head Road												
1	L2	92	1.0	0.057	3.9	LOS A	0.4	2.6	0.14	0.50	0.14	38.1
2	T1	873	1.0	0.302	3.9	LOS A	7.0	49.2	0.32	0.29	0.32	37.3
Approach		964	1.0	0.302	3.9	LOS A	7.0	49.2	0.30	0.31	0.30	37.4
North: New South Head Road												
8	T1	951	1.0	0.328	4.1	LOS A	7.8	55.0	0.33	0.30	0.33	37.9
9	R2	7	1.0	0.328	7.5	LOS A	7.5	52.9	0.33	0.30	0.33	37.3
Approach		958	1.0	0.328	4.1	LOS A	7.8	55.0	0.33	0.30	0.33	37.9
West: Tivoli Avenue												
10	L2	67	1.0	0.282	50.4	LOS D	3.3	23.3	0.94	0.75	0.94	16.4
12	R2	142	1.0	0.629	53.2	LOS D	7.4	52.0	0.99	0.82	1.02	23.2
Approach		209	1.0	0.629	52.3	LOS D	7.4	52.0	0.98	0.79	1.00	21.5
All Vehicles		2132	1.0	0.629	8.8	LOS A	7.8	55.0	0.38	0.35	0.39	35.2

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	53	48.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	48.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		105	48.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Appendix C

Green Travel Plan

Kambala School
Green Travel Plan

Prepared for:

Kambala School

17 July 2020

The Transport Planning Partnership

E: info@ttpp.net.au

Kambala School
Green Travel Plan

Client: Kambala School

Version: V03

Date: 17 July 2020

TTPP Reference: 19465

Quality Record

Version	Date	Prepared by	Reviewed by	Approved by	Signature
V01	20/04/20	Charbel Hanna	Oasika Faiz	Ken Hollyoak	-
V02	23/06/20	Charbel Hanna	Oasika Faiz	Ken Hollyoak	-
V03	17/07/20	Charbel Hanna	Oasika Faiz	Ken Hollyoak	

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APPENDICES

1 Introduction

1.1 Background

This Green Travel Plan (GTP) supports a State Significant Development Application (SSDA) submitted to the Department of Planning, Infrastructure and Environment (DPIE) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act), for the proposed redevelopment of the sports precinct of Kambala School at 794 -796 New South Head Road, Rose Bay.

This application is SSD by way of clause 8 and schedule 1 under *State Environmental Planning Policy (State and Regional Development) 2011* on the basis that the development is for the purpose of an existing school and has a Capital Investment Value of more than $20 million.

This report has been prepared having regard to the Secretary's Environmental Assessment Requirements issued for the project by DPIE, ref no SSD-10385 issued on 24 November 2019, which states under "Transport and Accessibility":

- *details of travel demand management measures to minimise the impact on general traffic and bus operations, including details of a location-specific sustainable travel plan (Green Travel Plan) and the provision of facilities to increase the non-car mode share for travel to and from the site*

1.1.1 Overview of Proposed Development

This SSDA includes detailed plans for a new sport, wellbeing and senior learning precinct. Accordingly, consent is sought for the following:

- The excavation of part of the existing sports field to facilitate the construction of the following:
  - sports facilities including weights room and dance rooms;
  - indoor multipurpose sports courts for use by up to 1500 people;
  - innovative and flexible teaching and learning spaces;
  - amenities, store rooms, plant, circulation and ancillary spaces
  - reinstatement of the sports field surface on the roof (sports field and perimeter fencing)
  - spectator seating / bleachers;
- The removal of the tennis courts (currently on the roof of the music building), and the construction of the following:

  - a wellbeing centre, called the SHINE centre, to accommodate the Kambala SHINE program
  - a new staff centre, called the KITE centre, to accommodate staff workstations, meeting areas, staff development workshop rooms and amenities
  - reinstatement of the tennis courts, lighting and perimeter fencing on the new roof
- a new eastern forecourt for the school, new external landscaped areas and new courtyards;
- minor works to the existing music building to facilitate a new connection to the new courtyard;
- the partial demolition of the Hawthorne building and the construction of a new façade, roof and landscaping; and
- the demolition of the Arts building and the construction of new facades to adjacent affected buildings, and new landscaping to the footprint of the demolished building

Additionally, the proposal seeks to increase the capacity of the school from the permitted number of 950 students to 1,020 students (increase of 70 students). No increases to staff numbers are proposed. It is understood that the existing school enrolments currently exceed the existing cap with 1,020 students enrolled. Therefore, the proposed increase in the school capacity would enable the school to continue its existing operation. On this basis, this GTP aims to improve the travel behaviour of existing students and staff members.

1.2 The Role of Travel Plans

The purpose of a Green Travel Plan (GTP) is to encapsulate a strategy for managing travel demand that embraces the principles of sustainable transport. In its simplest form, this GTP encourages use of transport modes that have low environmental impact, such as active transport modes (e.g. walking, cycling), public transport, and better management of car use.

Active transport presents a number of interrelated benefits including:

- improved health benefits;
- reduced traffic congestion, noise and air pollution caused by cars;
- greater social connections with communities, and;
- cost savings to the economy and individual.

A GTP is a package of coordinated strategies and measures to promote and encourage active and sustainable travel. This GTP aims to influence the way students, staff, parents and visitors travel to and from the school to deliver better environmental outcomes and provide a range of travel choices, whilst also reducing reliance on private car usage, particularly single occupancy car trips (for staff and high school students) and single passenger car trips (for students).

The planning of the new development would need to accommodate innovative ideas to better manage the transport demand of the project. It will be necessary to introduce new measures to ensure that trips generated by the future expansion of the school are not solely private car based.

Key drivers for the GTP are detailed in Section 1.4.

In order to ensure that the GTP meets its intended objectives, a review of '*best practice*' guidelines such as the City of Sydney '*Guide to Travel Plans*', has been undertaken.

From the above, the key themes applicable to this GTP include:

- **Site audit and data collection:** A desktop audit has been undertaken in order to identify and document the existing issues and opportunities relevant to site and its accessibility particularly by non-car modes. Opportunities to improve amenity, incentivise non-car travel and the removal of barriers to use of sustainable transport modes are then dealt with under the Site-Specific Measures.
- **Audit of Policies:** An audit of key policy documents has been undertaken to assist define the direction and purpose of the GTP, aligned with the key targets and objectives from a local and regional perspective.
- **Bicycle parking and car parking management:** This GTP provides a strategy for management of both bicycle parking and car parking moving forward, and how they interact with travel choices.
- **Local alliances:** The development of relationships between the Proponent and various stakeholders will assist the Proponent in delivering improved transport options.

1.3 Travel Plan Pyramid

The GTP will need to be tailored to the schools to ensure appropriate measures are in place for the different users (e.g. students, staff, parents and visitors) to promote a modal shift away from car usage.

The key elements of the GTP are shown in the Travel Plan Pyramid in Figure 1.1.

Figure 1.1: Travel Plan Pyramid

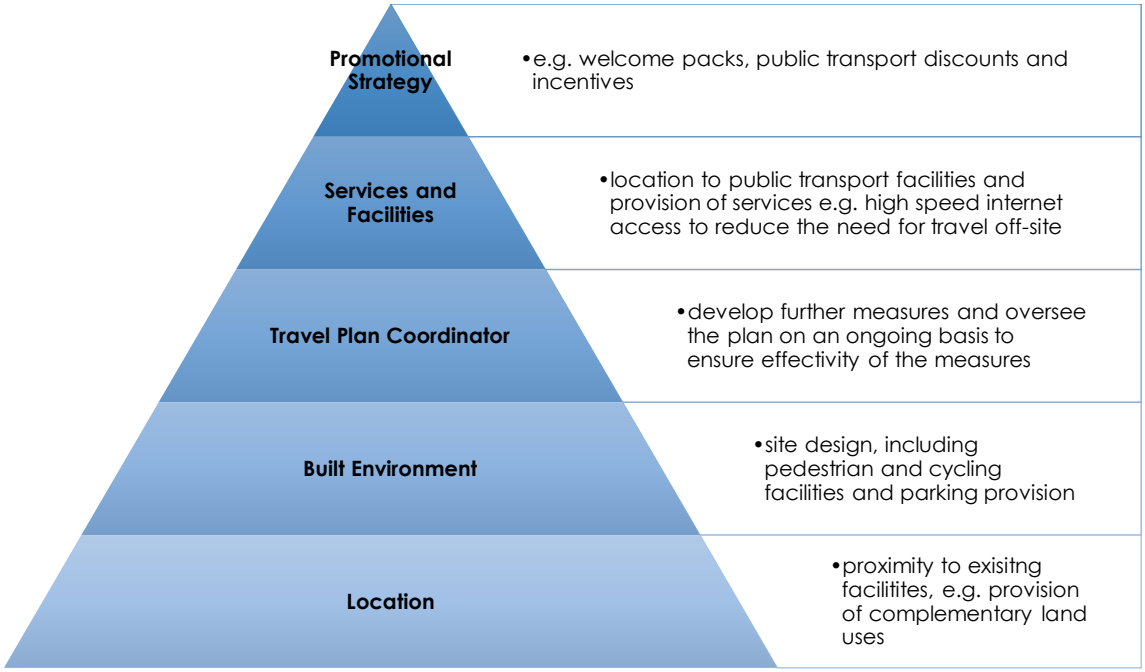


Figure 1.1 demonstrates that the key foundations to ensure the success of a GTP are:

- **Location** – i.e. proximity to existing public transport services and proximity to mixed land uses, e.g. shops and services, such that walking or cycling becomes the natural choice.
- **Built Environment** – i.e. provision of high-quality pedestrian and cycling facilities, end-of-trip facilities and reduced car parking provision to encourage sustainable transport choices.

1.4 Drivers of the Travel Plan

Further to the above, there are a number of social, environmental and economic drivers for developing and implementing a GTP for the schools as detailed below.

1.4.1 Car Parking

Car parks utilise valuable land resources and impact amenity. If the area continues to grow and there is no modal shift towards non-car transport modes, the car parking demand could increase significantly. As such, the provision of car parking must reflect the site's proximity to public transport to influence a modal shift to sustainable transport modes. In this instance, the site is located within close proximity to high frequency bus services.

1.4.2 Environmental Impacts

The transport sector (road, rail, air and ship) is Australia's third largest source of greenhouse gas emissions (GHG), accounting for 18 per cent of emissions in Australia in 2015 (Climate Council of Australia, 2016). Mitigating this impact is a key driver of the GTP. Within Australia, the transport sector has the highest rate of growth of GHG emissions per year having risen by about 63 per cent since 1990, with cars and light commercial vehicles responsible for over 60 per cent of Australia's transport pollution levels (Climate Council of Australia, 2018). In comparison, travel modes such as walking and cycling have the lowest emissions while public transportation has significantly lower impact than private vehicles.

1.4.3 Health Benefits

The use of sustainable transport modes can have wide-ranging health benefits due to a corresponding reduction in greenhouse gas emissions and increase in physical activity from walking and cycling. The shift from private cars to sustainable transport "can yield much greater health 'co-benefits' than improving fuel and vehicle efficiencies" (World Health Organisation, 2011). The potential benefits can include reduced respiratory diseases from better air quality, prevention of heart disease, some cancers, type 2 diabetes and some obesity-related risks.

Active transport modes also provide more sustained health benefits because physical activity becomes part of one's everyday routine. Sustainable transport modes also improve air quality by reducing air pollution and reducing exposure to particulates, sulphates and atmospheric ozone. According to a report prepared by The Australian Institute of Health and Welfare in 2007, air pollution is responsible for causing about 3,000 premature deaths in Australia each year, which represents 2.3 per cent of total deaths in Australia per year – more than the number of deaths from car accidents. Reducing pollution has both significant environmental and health benefits.

1.4.4 Social Equity

Transport has a fundamental role in supporting social equity through providing access to essential amenities, employment opportunities and social and recreational goods. Greater levels of walking and cycling hold significant benefits in terms of equity and community cohesion. Car dependency accentuates inequalities of access amongst certain groups who are less likely to drive including the unemployed, persons on low incomes, children and young people, the aged, and persons with disabilities. As such, sustainable transport modes can provide a more affordable alternative to car use.

1.4.5 Ease of Access

Ease of access has a significant impact on choices of work and living. Negative experiences and costs associated with travel can reduce the competitiveness of a commercial, retail, industrial and community precinct. High quality and efficient transport systems are key to attracting and retaining students and staff. Support for active transport modes is also highly desired by employers and employees, because it improves health and productivity.

2 Existing Transport Policy Context

The review of existing relevant policy clearly demonstrates a number of themes that should inform the approach to ongoing management of transport demand, and investment in the transport network. These themes include:

- Provision of high-quality local transport infrastructure and improved bike paths and networks and improving accessibly and connectivity
- Addressing car parking issues in key locations, including residential and business districts and encouraging active transport
- Creating connected, liveable communities where people can walk, cycle and use public transport to promote healthier, active communities.

2.1 Greater Sydney Region Plans: 30-minute City (2018)

The Greater Sydney Region Plan aims to deliver a 30-minute city where jobs, services and quality public transport spaces are in easy reach of people's residencies.

However, a recent study conducted by Deloitte Access Economics found that only 75 of the 313 Sydney neighbourhoods could currently be deemed to have easy access to major job hubs and other key services within half an hour. Based on the findings of the Deloitte study and work undertaken by Arup, a number of key performance criteria have been identified in order to achieve a 30-minute city:

- **Access to healthcare** – hospitals provide an important facility to many people and play a role for employment, education and training facilities. Parking is often limited at hospitals and as such, access via a variety of transport modes are required.
- **Access to retail services** – access to all forms of retail (supermarkets and specialist stores) is essential to achieve a 30-minute city. There has already been an increase in the number of mixed-use developments within Sydney to create micro-communities, which provide mixed retail services, residential, commercial and community facility uses.
- **Access to schools** – access to good schools relies on housing affordability, which also shape where teachers live. In particular, many students have good access to local schools, however some have to travel outside their catchment areas for specialist and selective schools. As such, it is important to create strong transport links to provide good access to local schools and connect teachers with their place of residents and work.
- **Access to further education facilities** – public transport links for TAFE and universities are vital as students and teachers often travel out of the local catchment to the educational facility as they are often located in areas with high property prices.
- **Quality of public transport facilities** –Whilst Sydney is a liveable city; it is often constrained by transport issues. As such, the provision of good quality, reliable public transport facilities are essential to achieve a 30-minute city.

- **Access to jobs** – people being able to live close to their jobs is fundamental to delivering a 30-minute city. The current Sydney CBD has the highest concentration of jobs but as found by the Deloitte study, the average one-way commute for those travelling into the CBD from outside the city is 63 minutes. The locations with the best access to jobs currently are located near to railway stations, or close to major employment centres such as the Sydney CBD.
- **Access to residents** – a way of minimising travel needs is to locate jobs and services close to where residents live.

2.2 Local Planning Documentation

2.2.1 Woollahra Local Strategic Planning Statement (Draft September 2019)

The *Woollahra Local Strategic Planning Statement* sets out a 20-year land use vision and planning priorities for the future of the Woollahra area.

With regard to transport and parking, the Strategic Plan sets the following objectives:

- Plan and deliver cycleway connections in collaboration with government agencies and neighbouring councils consistent with Future Transport 2056's conceptual Greater Sydney Principal Bicycle Network and Council's Integrated Transport Strategy (2020).
- Collaborate with Transport for NSW and other government agencies, on planning future infrastructure and investment including the Oxford Street Remake program and upgrades of Harbour-side facilities.
- Support implementation of the Woollahra Integrated Transport Strategy (2020) including:
    - Preparing and Active Transport Plan
    - Planning and promoting the use of shared vehicles
    - Increasing integration of transport infrastructure and services across the Eastern City District
- Advocate to Transport for NSW for increased ferry and bus services
- Advocate for increasing the role of Edgecliff as a key transport interchange in our area
- Plan and create pedestrianised street settings across our area that priorities people and placemaking
- Continue to encourage use of active transport modes and prioritise expansions of active transport connections
- Monitor changing freight and servicing needs, investigating approaches to address future demand as required
- Promote increased walkability, pedestrian safety, and permeability across our area, through initiatives such as the Greater Sydney Green Grid and Bondi to Manly Walk.

3 Existing Transport Conditions

3.1 Rail Services

Train services are available at Edgecliff Station located 4.6 km southwest of the site. The T4 Eastern Suburbs and Illawarra Line operates from this station with connections to the CBD and further south to Sutherland Shire. Services are generally provided approximately every 3-6 minutes during the morning and evening peak periods.

The existing rail network map is displayed in Figure 3.1.

Figure 3.1: Existing Rail Network Map

Source: TfNSW Sydney Trains Network Map

3.2 Bus Services

Similar to the above, the Integrated Public Transport Service Planning Guidelines state that bus services influence the travel mode choices of sites within 400 metres (approximately 5 minutes) of a bus stop. However, data collected by TfNSW Transport Performance and Analytics from 2014/15 household travel surveys suggest that walking trips to a bus stop extend further than the traditional 400m distance to a bus stop, as shown in Table 3.1.

Table 3.1: Population of Walkers to a Bus Stop (Weekday Trips)

Walking Distance	Population	Percentage of Population
Up to 400m	155,948	49%
401m to 800m	91,077	28%
801m and greater	73,632	23%
Total	320,657	100%

Data Source: TfNSW Transport Performance and Analytics Household Travel Surveys 2014/2015

However, the site is located adjacent to STA bus services right outside the school's main gate on New South Head Road.

The following bus routes run past the school along New South Head Road:

- 324 – Watsons Bay to Walsh Bay via Old South Head Rd
- 325 – Watsons Bay to Walsh Bay via Vaucluse Rd
- 386 – Vaucluse to Bondi Junction via New South Head Rd & Old South Head Rd

Buses are available seven days a week and provide services every 15 minutes during peak periods and every 30 minutes outside peak hours.

The Kambala private school bus service (provided by Inspire Transport) as well as the Scot's College's private school bus service also stop in front of the main school gate on NSHR. The Kambala School Bus timetable is provided in Figure 3.2.

Figure 3.2: Kambala School Bus Timetable

Stop	Pick-up time	Drop-off time
Cnr of Little Bay Rd and Namatjira Place	7:22 AM	~
Little Bay Rd Near Nurla Ave	~	4:24 PM
Anzac Pde Near Forrest St	7:24 AM	~
Anzac Pde Near Franklin St	~	4:19 PM
Anzac Pde Near Beauchamp Rd	7:26 AM	4:17 PM
Maroubra Rd Near Flower St	7:30 AM	4:16 PM
Maroubra Rd Near French St	~	4:15 PM
Malabar Rd - Maroubra Bay Public School	~	4:13 PM
Malabar Rd Near Liguria St	~	4:11 PM
Malabar Rd Opp Mermaid Ave	7:32 AM	~
Malabar Rd Near Denning St	~	4:10 PM
Malabar Rd Near Nymboida St	7:32 AM	~
Arden St Near Malabar Rd	7:35 AM	4:07 PM
Arden St Near Carr St	7:38 AM	4:05 PM
Coogee Oval, Arden St Near Dolphin St	7:40 AM	~
Arden St Near Dolphin St	~	4:04 PM
Arden St Near Burnie St	~	4:01 PM
Arden St Near Brandon St	7:44 AM	~
Macpherson St Near Leichhardt St	7:46 AM	3:58 PM
Leichhardt St Near Macpherson St	7:47 AM	~
Leichhardt St Near Bronte Rd	~	3:57 PM
Murray St Near Bronte Rd	~	3:56 PM
Murray St Near Gibson St	7:50am	~
Alfred St Opp Belgrave St	~	3:53 PM
Alfred St Near Birrell St	7:50 AM	~
Bondi Rd Near Watson St	~	3:50 PM
Glenayr Av Near Hall St	8:03 AM	3:43 PM
Glenayr Av Near Warners Ave	~	3:41 PM
Glenayr Av Near Blair St	8:05 AM	~
Blair St Near Mitchell St	~	3:40pm
School Students are picked up and dropped directly at the school gates	8:15 AM	3:30pm

Source: https://www.inspiretransport.com.au/kambala-school-bus-hire-school-run/

The school bus service runs through the following suburbs (reading down the list indicates the order of suburbs on approach to the school, naturally reading up the list indicates the order of suburbs on leave of the school):

- Chifley
- Malabar
- Matraville
- Maroubra
- South Coogee
- Coogee
- Clovelly
- Waverley
- Bronte

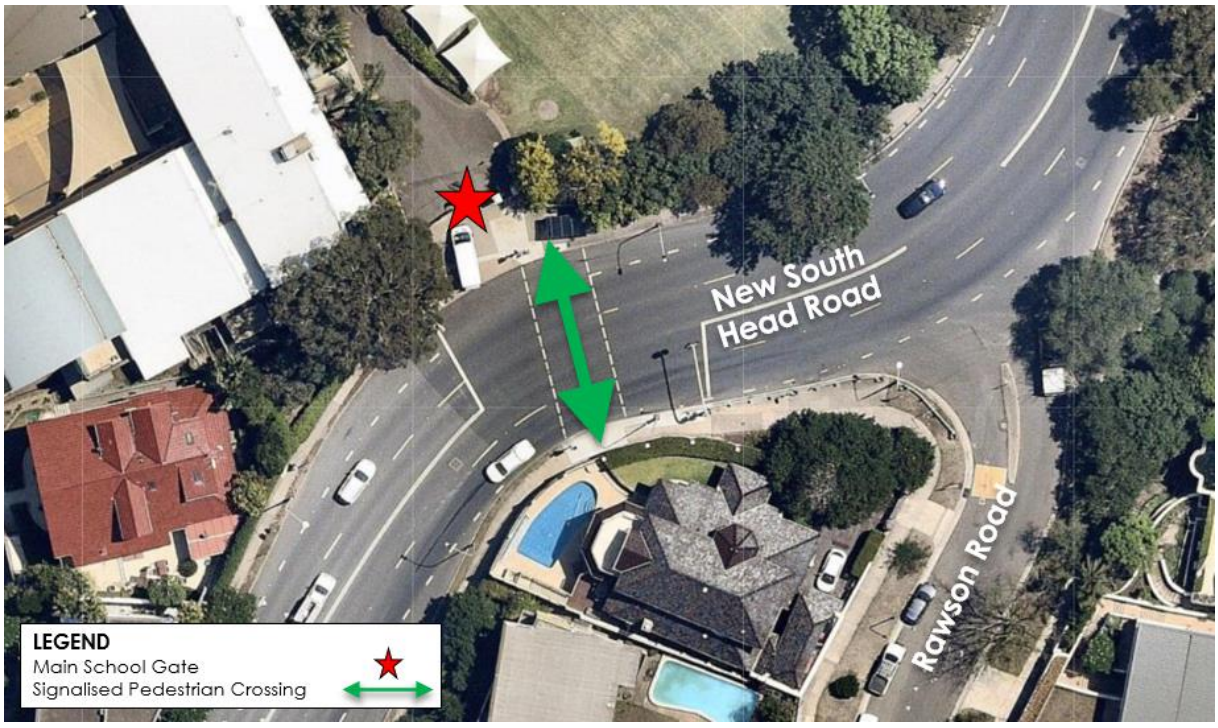
- Bondi
- Bondi Beach
- School (bus stop In front of main school gate on New South Head Road).

3.3 Existing Pedestrian Infrastructure

Well established pedestrian facilities are provided within the immediate vicinity of the site. Sealed pedestrian footpaths are provided along the site frontage, with a dedicated pedestrian facility provided in front of the main school gate in the form of a signalised pedestrian crossing. At present, these pedestrian facilities are heavily used during school peak drop off and pick up times.

The existing signalised pedestrian crossing is shown in Figure 3.3.

Figure 3.3: Signalised Pedestrian Crossing

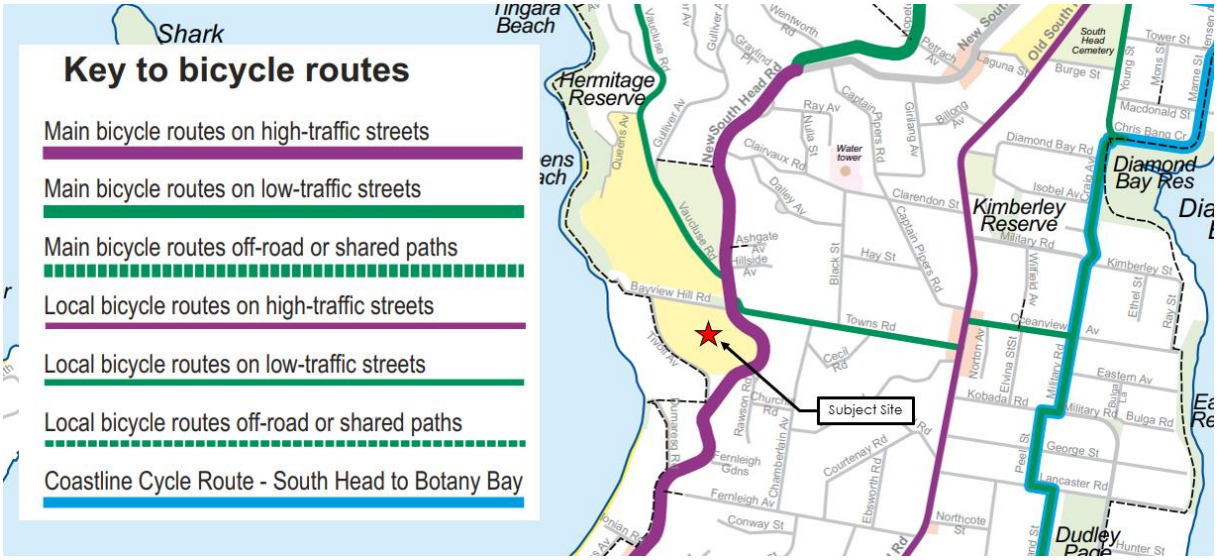


Base Map Source: Nearmap Australia

3.4 Existing Cycling Infrastructure

Further to this, a good cycle network is currently provided within the immediate vicinity of the site. A dedicated on-road cycle path is currently provided on the north side of Queens Park Road, which provides good connectivity to the wider cycle network in the area. The existing cycle network is shown in Figure 3.4.

Figure 3.4: Cycling Map



Base Map Source: Cycling in Waverley and Woollahra (https://www.woollahra.nsw.gov.au/__data/assets/pdf_file/0016/36511/Cycle-route-map.pdf)

It should be noted that cycling is generally not observed by students. It is understood that this may be the case due to the incline/grade of New South Head Road along the frontage of the school (average of 6%) as well as the high volume of traffic which runs past.

3.5 Car Share

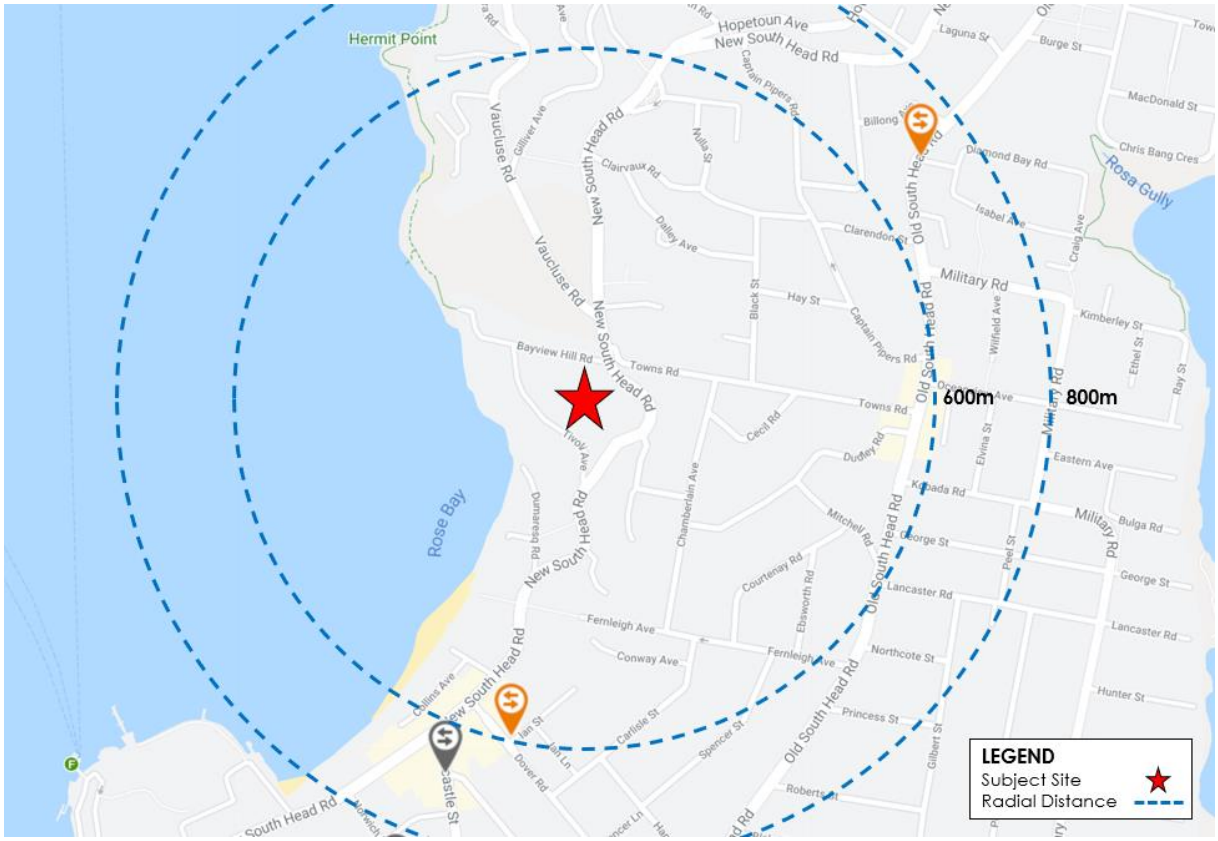
Car sharing is a flexible, cost effective alternative to car ownership and is a convenient and reliable way for staff to use a car when they need one. GoGet is a car share company operated in Australia, with a number of vehicles positioned within the area.

Car share is a concept by which members join a car ownership club, choose a rate plan and pay an annual fee. The fees cover fuel, insurance, maintenance, and cleaning. The vehicles are mostly sedans, but also include SUVs and station wagons. Each vehicle has a home location, referred to as a "pod", either in a parking lot or on a street, typically in a highly populated urban neighbourhood. Members reserve a car by web or telephone and use a key card to access the vehicle.

Notably, the City of Sydney Council has reported that "a single car share vehicle can replace up to 12 private vehicles that would otherwise compete for local parking". As such, the provision of car sharing facilities or the promotion of using existing car sharing facilities in the vicinity should be able to reduce both the parking demand for the site and the traffic generated by it.

Figure 3.5 shows the location of the existing GoGet vehicles within an 800m radius catchment of the site.

Figure 3.5: Location of Existing GoGet Vehicles



Base Map Source: GoGet.

As can be seen from Figure 3.5 above, three (3) GoGet vehicle locations are within an 800m radius of the site.

3.6 Mode Split Analysis

3.6.1 Staff and Students

Online questionnaires were distributed to school staff and parents via email in February 2020 to determine their travel mode choice and behaviour.

A summary of existing staff and student travel modes is provided in Table 3.2 and Table 3.3.

Table 3.2: Summary of Existing Staff and Student Travel Modes

Mode	Staff	Kindergarten – Year 6		Year 7 – Year 12	
		Arrival	Departure	Arrival	Departure
Car (as driver, no passengers)	84%	-	-	2%	2%
Car (as driver, with passengers)	1%	-	-	1%	1%
Car (as passenger, driver didn't stay)	0%	-	-	-	-
Car (as passenger, driver stayed)	1%	-	-	-	-
Car (as passenger, no other students)	-	31%	33%	21%	16%
Car (as passenger, with other students)	-	47%	48%	27%	16%
Motorcycle / Scooter	2%	-	-	0%	0%
Walk	1%	8%	6%	15%	17%
Public Bus	6%	8%	7%	27%	40%
School Bus (incl. Scot's College Bus)	0%	6%	6%	4%	4%
Train and Bus	1%	0%	0%	3%	4%
Cycle	3%	0%	0%	0%	0%
Other	1%	0%	0%	0%	<1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Table 3.3: Summary of Existing Staff and Student Travel Modes (Simplified)

Mode	Staff	Kindergarten – Year 6		Year 7 – Year 12	
		Arrival	Departure	Arrival	Departure
Private Motor Vehicle	88%	78%	81%	51%	35%
Walk or Cycle	4%	8%	6%	15%	17%
Bus / Train	7%	14%	13%	34%	48%
Other	1%	0%	0%	0%	<1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

3.6.2 Child Care Centre

A large majority of children that attend the Child Care Centre (i.e. Hampshire House) 5 days per week arrive and depart from the centre via private vehicle. A very small number (~5%) walk with their parent or guardian to the centre.

It should be noted that of the 68 total children, 26 arrive with their parents/guardians who are also staff at the school. Additionally, of these 26 children, 9 have either 1 or more siblings at Hampshire House and/or Kambala School. Similarly, of the 42 children who do not belong to staff at the school, 37 have either 1 or more siblings in Hampshire House and/or Kambala School.

Based on this information, the following car occupancy rate has been deduced.

- Child Care Centre 2.06 persons per vehicle*

= includes staff, students, and children

3.7 School Feedback

As part of the survey questionnaire distributed to both staff and students at the school, staff and students were asked why they chose drive to the school. The majority of responses related to convenience, as shown in Figure 3.6 and Figure 3.7.

Figure 3.6: Reasons for Vehicle Usage – Staff

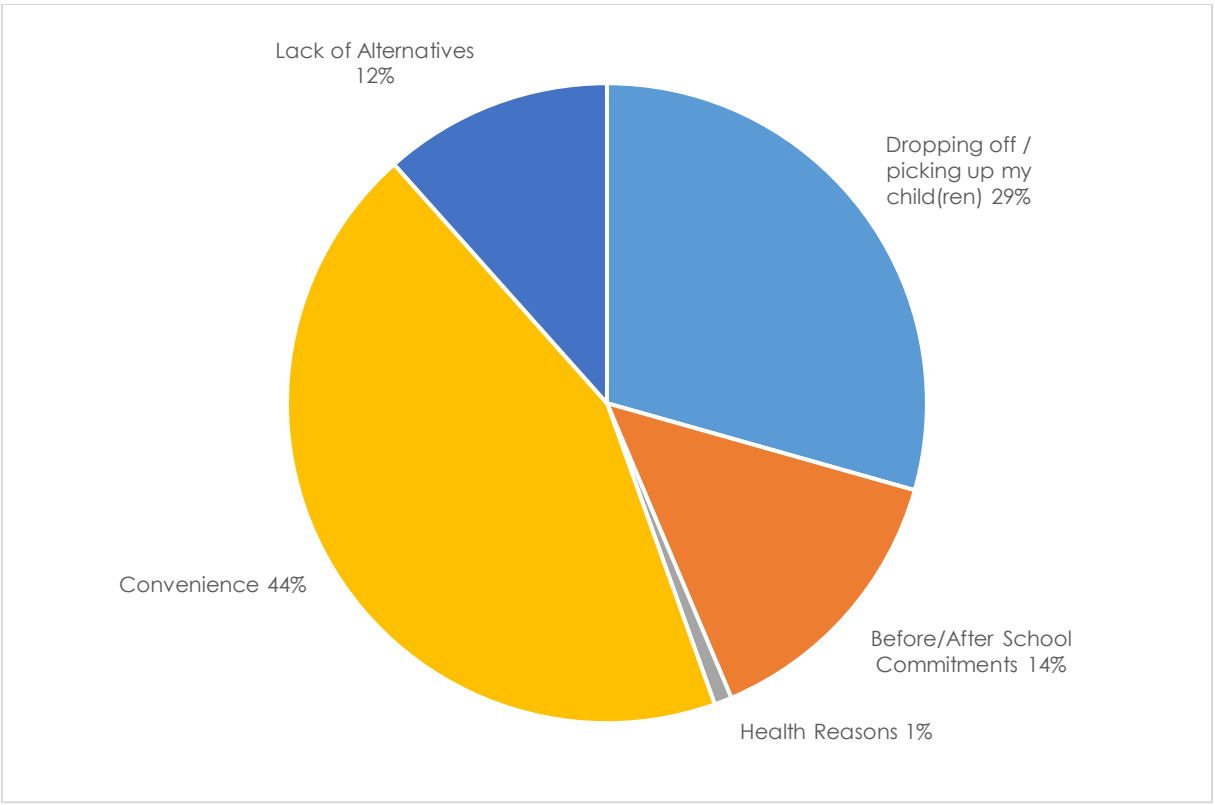
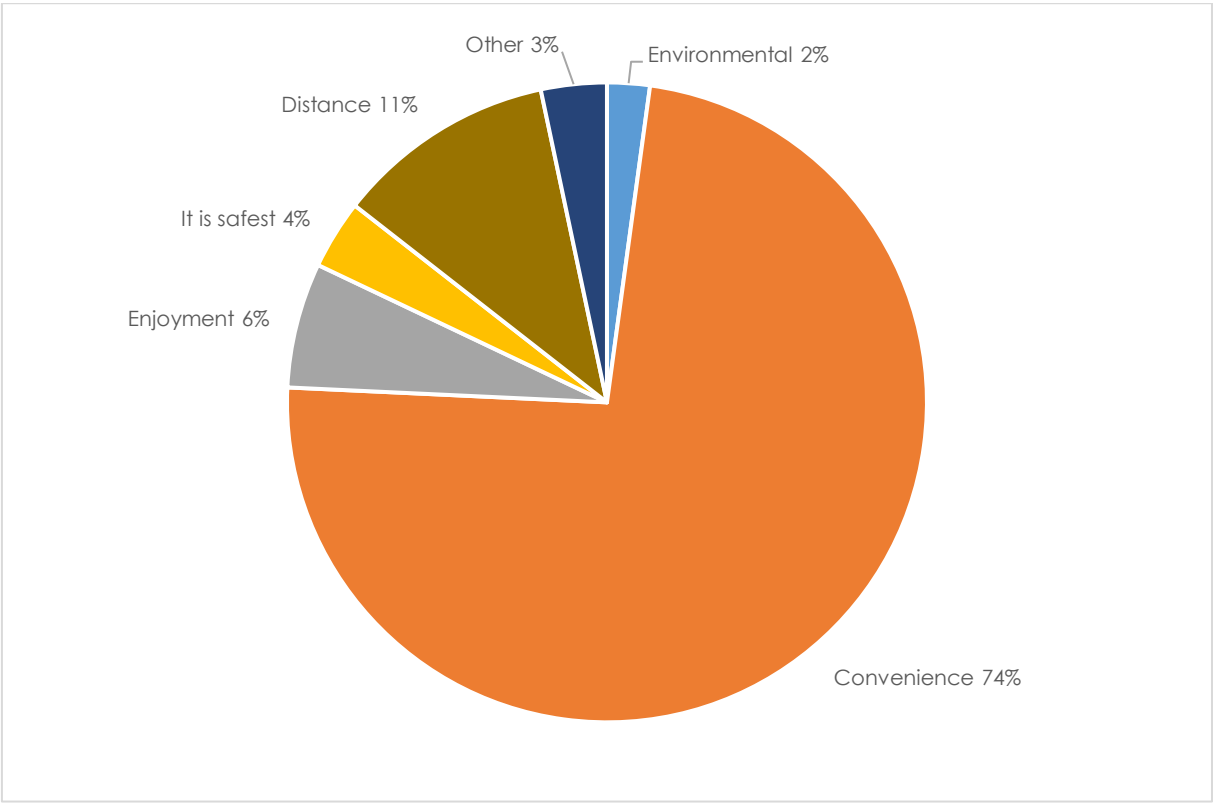


Figure 3.7: Reasons for Travel Choice – Students (Year 3 – Year 12)



On this basis, it would be necessary to both disincentivise car travel and improve the convenience of other travel modes to see a shift in travel mode away from car. Measures would include reducing/ restricting car parking provision on-site and providing facilities such as bike parking, school shuttle bus services and also raise awareness of existing transport infrastructure around the site that staff, students and parents/ guardians may not be aware of.

4 Objectives and Targets

4.1 Future Student and Staff Numbers

The proposal also seeks to increase the capacity of the school from the permitted number of 950 students to 1,020 students (increase of 70 primary and secondary students). No increases to staff numbers are proposed. It is understood that the existing school enrolments currently exceed the existing cap with 1,020 students enrolled. Therefore, the proposed increase in the school capacity would enable the school to continue its existing operation. On this basis, this GTP aims to improve the travel behaviour of existing students and staff members.

4.2 Objectives

The following objectives have been identified in order to achieve the vision of the GTP.

Objective 1: Facilitate a shift towards more sustainable transport modes

- Improve access, safety, amenity and convenience of sustainable transport modes for travel to and from the site
- Provide incentives for sustainable travel and establish a culture of active and public transport use.
- Continue to encourage non-car-based travel modes by limiting the convenience of car access to the site.

Objectives 2: Make the site a great place to live, work and visit

- Improve access and mobility and enhance the sense of place.
- Reduce the need to travel by co-locating complementary land uses.

4.3 Mode Share Targets

As indicated previously, the aim of the GTP is to encourage a modal shift away from cars by implementing measures that influence the travel patterns of staff. To ensure that the GTP is having the desired effect, implementation would be regularly monitored. The success of the GTP is measured by setting modal share targets and identifying the measures and actions that have the greatest impact.

The results of the modal split analysis indicated that private motor vehicle is the predominant mode share type among all users, although some differences were observed between student arrival and departure mode types.

Noting that a modal shift of between 3-5% would be a significant achievement (as stated by the experts in the LEC), it is considered that the private motor vehicle mode share target for each user type should be:

- Staff: **83%**
- primary school students: **73% and 76% (for arrival and departure respectively)**
- secondary school students: **46% and 30% (for arrival and departure respectively)**

It has been assumed that a mode shift away from private vehicle is not feasible for children at the child care centre.

A summary of the existing and projected modal splits for each user type is provided in Table 4.1

Table 4.1: Existing and Projected Modal Splits

Main Method of Travel	Staff Modal Split		Primary Student Modal Split				Secondary Student Modal Split			
	Existing	Proposed	Existing		Proposed		Existing		Proposed	
			Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep
Car	88%	83%	78%	81%	73%	76%	51%	35%	46%	30%
Walk	4%	7%	8%	6%	10%	8%	15%	17%	17%	19%
Public Transport	7%	10%	14%	13%	17%	16%	34%	48%	37%	51%
Total	**100%**	**100%**	**100%**		**100%**		**100%**		**100%**	

5 Methods of Encouraging Modal Shift

To achieve the objectives of the GTP, measures will be put in place to influence the travel patterns to/from the site, with a view to encouraging modal shift away from cars.

5.1 Potential Site-Specific Measures

The school will consider the following measures to encourage more sustainable travel use. Measures to encourage more sustainable travel use for primary school student trips would be targeted towards parents/caretakers at the school since these students are clearly not old enough to drive.

A school newsletter will be distributed to all parents to encourage walking and active travel to school. In addition to this, a small committee of interested people, including students and parents, will be established to represent the school to promote initiatives for safe, greener and more active travel. A number of teachers will be appointed to attend/organise the committee meetings with students and parents to represent the school to promote active travel.

5.1.1 Walking

Staff employed at the site could be encouraged to walk by implementing a '10,000 steps per day initiative'. This involves the provision of high-quality pedestrian facilities, including pedestrian paths to/from key public transport hubs and bus stops. Staff members who have achieved the 10,000-step goal over a set period could be rewarded.

In addition to this, a workplace walking group would be established, where all staff would be invited, particularly those who live locally, to walk together to get to the school. Information regarding the workplace walking group would be sent via email, posted on noticeboards and/or on the school website to promote participation and encourage staff who live locally to walk to work.

If successful, this could form the basis of a walking bus. A Walking School Bus™, which is a community and parent based initiative, is a group of primary school children who walk to and from school along a safe and enjoyable set route, accompanied by a minimum of two parent driver/supervisors per 'bus'. In this way the teachers could be the accompanying adults.

5.1.2 Cycling

Provision of high-quality bicycle parking and end-of-trip facilities will encourage people to travel by bicycles. To further encourage staff and students to use these bicycle parking

facilities, it is recommended that adequate weather protection and security features will be in place to ensure safe bicycle storage.

Similar to walking groups, cycling groups could be established to encourage staff and students to arrive by bicycles. All staff and students will be encouraged to travel to the site by bicycles though word of mouth and bicycle maps posted on noticeboards, newsletters and the school website. In addition, the school could participate in active travel events such as Ride2Work or Ride2School day and National Bike Week.

Other measures could include engaging a local bicycle retailer and service centre to provide discounts for staff and students, as well as the organisation of further educational programmes to teach staff and students how to properly and safely ride a bike.

5.1.3 Public Transport

Public transport noticeboards will be provided to make staff, students, visitors parents more aware of the alternative transport options available. The format of the noticeboards will be based upon the travel access guide. In addition to this, the school will consider the provision of Opal Cards with a monthly allowance to facilitate travel for staff or alternatively provide a one-off pre-loaded Opal Card upon commencement of employment to influence their travel behaviour and habits on day one of employement.

5.1.4 School Bus

Kambala is investigating the potential to provide a new school shuttle bus that would provide a direct service between the school and Edgecliff train station and/or services to local suburbs.

The questionnaire survey of staff and students indicates that there is large interest in catching a school bus if it provided access to nearby suburbs and train stations (Edgecliff) as shown in Table 5.1.

Table 5.1: Willingness to use School Bus if available

Group	Yes	No
Staff	50%	50%
Prep – Year 6	83%	17%
Year 7 – Year 12	67%	33%

A standard bus can hold between 50-70 passengers while a shuttle bus/ mini-bus can hold around 14 passengers. It is envisaged that a shuttle bus may be provided to enable more frequent and multiple services back and forth between stops or a standard bus would be provided to accommodate a large number of passengers over less frequent services.

5.1.5 Travel Share

A carpooling forum will be developed to encourage staff to travel in groups. The forum would provide a platform for people travelling on the same route to find each other and form groups. The forum will be posted on the staff website, noticeboards and in newsletters.

5.1.6 Off-site Measures

The school will consult with Council with a view to implementing several off-site measures to improve the transport connections to and from the site including:

- Investigations with Council to accommodate the bus and cycle facilities within the proposed development and/or upgrade or provide pedestrian facilities.
- Improved signage and way finding from key public transport hubs, to improve the walking and cycling experience. Signage would include wayfinding for cyclists to direct them to the best and safest route to the school.
- Investigations with Council to facilitate additional car sharing facilities.

5.2 GTP Information

The information provided within the GTP will be provided to staff and parents in the form of a package of easy to understand travel information known as a Travel Access Guide (TAG).

This will be included in the information pack provided to staff and parents on day one during their induction.

TAGs provide customised travel information for people travelling to and from a site, using sustainable forms of transport – walking, cycling and public transport. It provides a simple quick visual look at a location making it easy to see the relationship of site to train stations, light rail stations, bus stops and walking and cycling routes.

Such TAGs encourage the use of active transport and can reduce associated greenhouse gas emissions and traffic congestion while improving health through active transport choices.

They can take many forms from a map printed on the back of business cards or brochures. Best practice suggests that the information should be as concise, simple and site centred as possible and where possible provided on a single side/sheet. If instructions are too complex, people are likely to ignore them.

This TAG should be available for pick up at various locations at the site such as, at front entrances, school website and noticeboards for visitors and parents.

A draft TAG has been prepared for the site and is provided in Appendix A.

5.3 Information and Communication

Several opportunities exist to provide staff with information about nearby transport options. Connecting staff with information would help to facilitate journey planning and increase their awareness of convenient and inexpensive transport options which support change in travel behaviour.

Transport NSW info

- Bus, train and ferry routes, timetables and journey planning are provided by Transport for New South Wales through their Transport Info website: http://www.transportnsw.info/

Cycling in Waverley and Woollahra & Woollahra Bicycle Strategy 2009

- Waverley and Woollahra Councils Bike Plan provides a range of information relating to local cycleways in the area: https://www.woollahra.nsw.gov.au/services/traffic_and_transport/cycling

Similarly, such phone apps as Trip View display Sydney public transport timetable data and show a summary view showing current and subsequent services, as well as a full timetable viewer. This timetable data is stored on the phone, so it can be used offline.

Connecting staff via social media may provide a platform to informally pilot new programs or create travel-buddy networks and communication.

The above web links and any social media platforms may be included within the GTP/TAG.

5.4 Actions

A summary of the key strategies and framework action table is shown in Table 5.2. It should be noted that this framework action table would be updated as required. However, it is stressed that the availability of the suggested strategies is a key factor in influencing travel patterns.

Table 5.2: Framework Action Table

Strategy	Action	Targeted Audience	Timeline	Responsibility
Managing Car Use				
Car Pooling	Establish a car-pooling system to reduce single car occupancy and promote social interaction	Staff	On-going	Travel Plan Coordinator
Promoting Public Transport				
Bus/train	Consider providing a pre-loaded Opal Card or monthly Opal Card allowance to encourage public transport use	Staff	On-going	Travel Plan Coordinator
Bus/train	Investigate the potential to provide a new school shuttle bus to Edgecliff train station and/or local suburbs	Staff and Parents	Prior School Expansion	
Promoting Cycling and Walking				
Provision of End-of-Trip Facilities	Provide bicycle parking, showers, lockers and change rooms	Staff and Parents	Prior School Expansion	School
'10,000 steps per day initiative'	Reward staff members who have achieved the 10,000-step goal over a set period	Staff	On-going	Travel Plan Coordinator
Walking/Cycling groups	Walking and cycling groups to encourage staff to travel to school together	Staff	On-going	Travel Plan Coordinator
Cycling Educational Programmes	Provide cycling educational programmes for staff/students	Staff and Parents	On-going	Travel Plan Coordinator
Other				
Green Travel Plan	Provide staff with the Green Travel Plan to encourage active travel	Staff and Parents	Prior School Expansion/ Staff and Parent Induction	Travel Plan Coordinator
Transport Access Guide	Provide staff with a TAG on day one of induction and post the TAG on noticeboards, front entrances, the School's online website, etc.	Staff and Parents	Prior School Expansion/ Staff and Parent Induction	Travel Plan Coordinator
Ongoing Review	Ongoing review of the GTP to introduce additional measures as required	-	Ongoing	Travel Plan Coordinator

6 Management and Monitoring of the Plan

6.1 Management

There is no standard methodology for the implementation and management of a GTP. However, the GTP will be monitored to ensure that it is achieving the desired benefits. The mode share targets set out in Section 4.3 are used in this regard to ensure there is an overall goal in the management of the GTP.

The monitoring of the GTP would require travel surveys to be undertaken with a focus to establish travel patterns including mode share of trips to and from the Site.

The implementation of the GTP will need a formal Travel Plan Co-ordinator (TPC), who will have responsibility for developing, implementing and monitoring the GTP. The TPC will be an appointed staff member of the school or an independent expert.

It will also be necessary to provide feedback to staff and parents to ensure that they can see the benefits of sustainable transport.

Indeed, there are several keys to the development and implementation of a successful GTP. These include:

- Communications – Good communications are an essential part of the GTP. It will be necessary to explain the reason for adopting the plan, promote the benefits available and provide information about the alternatives to driving alone.
- Commitment – GTPs involve changing established habits or providing the impetus for people in new developments to choose a travel mode other than private car use. To achieve co-operation, it is essential to promote positively the wider objectives and benefits of the plan. This commitment includes the provision of the necessary resources to implement the plan, beginning with the introduction of the 'carrots' or incentives for changing travel modes upon occupation.
- Consensus – It will be necessary to obtain broad support for the introduction of the plan from the staff.

Once the plan has been adopted, it is essential to maintain interest in the scheme. Each new initiative in the plan will need to be publicised and marketing of the project as a whole will be important.

6.2 Remedial Actions

A continuous review will take place to identify remedial actions should the modal share targets not be achieved. However, the following measures are proposed both as discrete

measures (e.g. car share) and those being proposed as part of the proposed expansion of the school:

- Increased cycle parking
- Increased / improved changing facilities / lockers
- Increase in shuttle bus frequency (if required)
- Increase use of car share (e.g. GoGet for staff).

Alternatively, the TPC could work with council to see how the measures might be aligned with those identified in council's bicycle strategy: https://www.woollahra.nsw.gov.au/__data/assets/pdf_file/0003/48144/090831rep-GS11920_Woollahra_Bike_Strategy_exhibition_draft.pdf

6.3 Consultation

The results of the Green Travel Plan will be communicated with Council, staff, parents and to the wider community via the school website and/or newsletters.

As such, it is recommended that a summary letter is produced presenting the results of the survey within one month of the undertaking of the travel surveys (say 3-months post-expansion). The letter/report may be also appended to the GTP and submitted to Council for comment. Subsequent surveys would be undertaken after 1, 3 and 5 years.

Communication to staff and the wider community may be carried out in a similar form by public display of the GTP on the school website. Alternatively, a news article on the matter could be included on the website.

6.4 Conclusion

It is recommended that travel surveys be undertaken 3-months post-expansion of the school with this draft GTP updated accordingly to suit the site's existing modal splits and findings of the travel surveys, including opportunities and constraints to influence a modal shift away from car usage. Subsequent surveys should be undertaken after 1, 3 and 5 years.

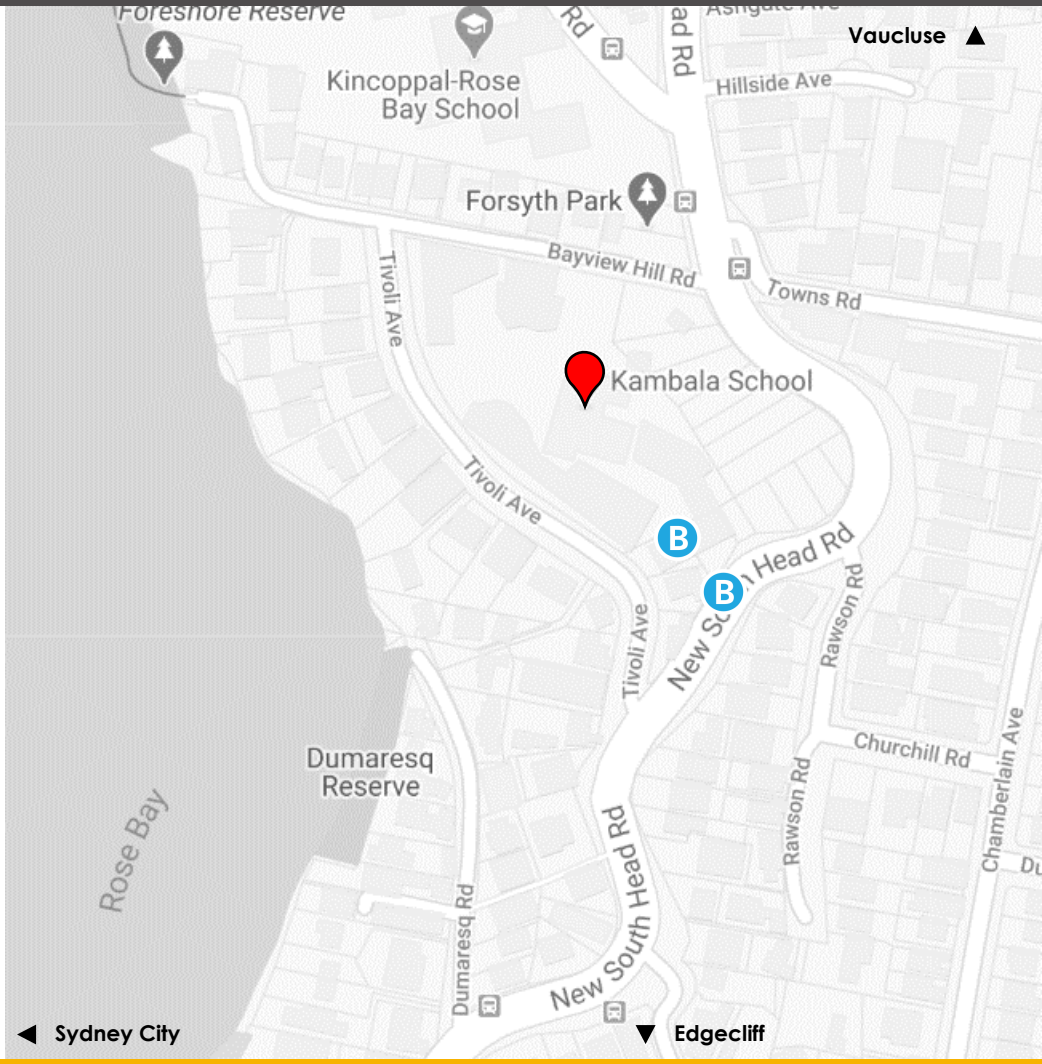
Appendix A

Travel Access Guide

KAMBALA

Kambala School

Use active and public transport to get around!



Transport Access Guide

Getting Around

Walk

Walk to/from Kambala School, noting the following travel times from key locations in the surrounding area:

• Coles Rose Bay	10 minutes
• IGA Rose Bay	12 minutes
• Johnstons Lookout	10 minutes
• Kimberley Reserve	16 minutes
• Diamond Bay Reserve	19 minutes
• Dudley Page Reserve	18 minutes
• Rodney Reserve	25 minutes

Start walking today to achieve a goal of 10,000 steps per day!

Public Transport Information

Plan your trip using Sydney's Trip Planning Tool:
transportnsw.info/trip

Or the RMS Cycleway Finder:
https://www.rms.nsw.gov.au/maps/cycleway_finder

Bus & Train

Bus services are available on New South Head Road in front of the Main School Gate.

Such services provide connections to local areas such as Watsons Bay, Bondi Beach and Double Bay, as well as Edgecliff Train Station.

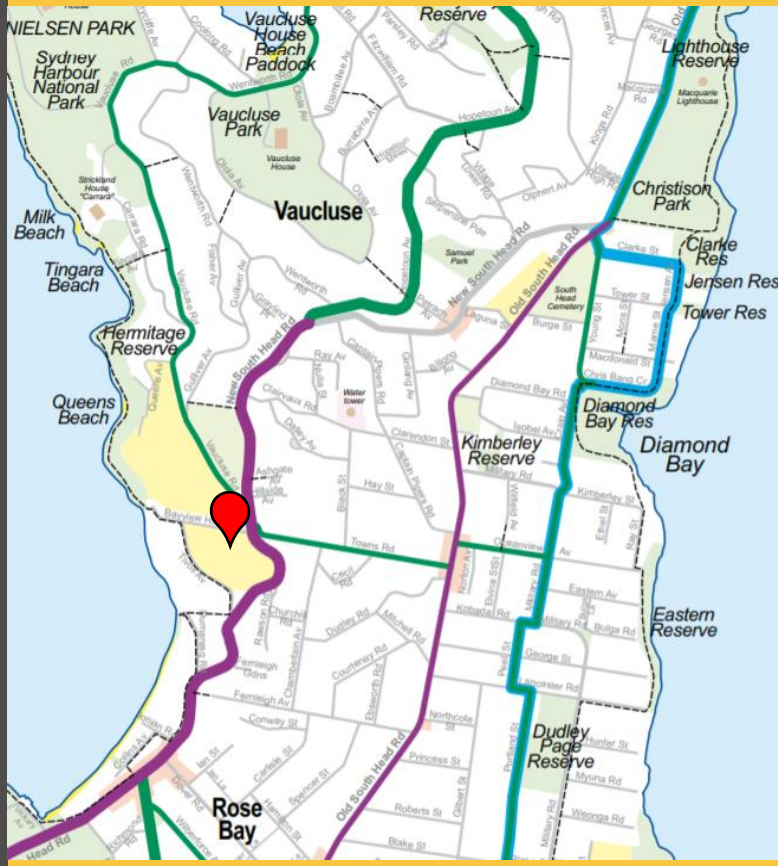
The following bus services are provided at the main school gate:

- **324** – Watsons Bay to Walsh Bay via Old South Head Road
- **325** – Watsons Bay to Walsh Bay via Vaucluse Road
- **386** – Vaucluse to Bondi Junction via New South Head Road and Old South Head Road

Edgecliff Train Station services the Bondi Junction to Waterfall or Cronulla line with trains running every 3 minutes during peak hours.

Cycle

There are many cycle friendly roads in the proximity of the site, providing connectivity to Vaucluse, Watsons Bay and Bondi Beach.



Visit Woollahra Municipal Council's page on cycling:
https://www.woollahra.nsw.gov.au/recreation/cycleways

The Transport Planning Partnership
Suite 402 Level 4, 22 Atchison Street
St Leonards NSW 2065

P.O. Box 237
St Leonards NSW 1590

02 8437 7800

info@ttpp.net.au

www.ttpp.net.au

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