

Traffic Impact Assessment;

McIntyre Tennis Courts

For The Scots College
10 October 2019

parking;
traffic;
civil design;
wayfinding;
ptc.

Document Control

McIntyre Tennis Courts, Traffic Impact Assessment

Issue	Date	Issue Details	Author	Reviewed	For the attention of
1	10/10/19	Final Issue	JJ/KB	AM	Paul Oates
2					
3					

Contact

Andrew Morse

+61 2 8920 0800

+61 414 618 002

andrew.morse@ptcconsultants.co

COMMERCIAL IN CONFIDENCE

The information contained in this document, including any intellectual property rights arising from designs developed and documents created, is confidential and proprietary to **ptc.**

This document may only be used by the person/organisation to whom it is addressed for the stated purpose for which it is provided and must not be imparted to or reproduced, in whole or in part, by any third person without the prior written approval of a **ptc.** authorised representative. **ptc.** reserves all legal rights and remedies in relation to any infringement of its rights in respect of its intellectual property and/or confidential information.

© 2019

ptc.

Suite 102, 506 Miller Street

Cammeray NSW 2062

info@ptcconsultants.co

t + 61 2 8920 0800

ptcconsultants.co

Contents

1.	Introduction	1
1.1	Project Description	1
1.2	Purpose of this Report	2
2.	Background Information	3
2.1	Site Location	3
2.2	Surrounding Land Use	4
2.3	Site Context	4
3.	Development Proposal	5
4.	Existing Transport Facilities	6
4.1	Road Network	6
4.2	Key Intersections	9
4.3	Vehicular Access	10
4.4	Parking Facilities	11
4.5	Public Transport	12
4.5.1	Ferry Services	12
4.5.2	STA Bus Services	13
4.5.3	School Bus Service	14
4.6	Active Transport	15
4.6.1	Bicycle Network and Facilities	15
4.6.2	On-Site Bicycle Network and Facilities	16
4.6.3	Pedestrian Facilities	16
4.7	Service Vehicle Access	17
4.8	Emergency Vehicle Access	17
5.	Parking Provision	18
5.1	Planning Policy Requirements	18
5.2	Existing Parking Facilities	18
5.2.1	On-Site Parking Facilities	18
5.2.2	On-Street Parking Facilities	18
5.3	Proposed Parking Provision	19
5.3.1	Car Parking Provision	19
5.3.2	Accessible Parking Provision	20
5.3.3	Motorcycle Parking Provision	21
5.3.4	Bicycle Parking Provision	21
6.	Traffic Assessment	22
6.1	Traffic Volumes	22
6.2	Development Traffic Generation and Distribution	23
6.3	SIDRA Analysis	25
6.3.1	Cranbrook Road & Victoria Road	27
6.3.2	Carrington Avenue & Cranbrook Lane & Cranbrook Road	28
7.	Access and Car Park Design Assessment	29
7.1	Vehicular Access & Circulation	29

7.2	Sight Distance	29
7.3	Car Park Arrangement	30
7.3.1	Typical Requirements	30
7.3.2	Accessible Parking	30
7.3.3	Bicycle Parking	30
7.3.4	Motorcycle Parking	30
8.	Conclusion	31
Attachment 1	- Architectural Plans	32
Attachment 2	- SIDRA Results	33
Attachment 3	- Compliance Assessment	34
Figure 1	- Site Location	1
Figure 2	- Aerial view of the subject site & surrounds (Source: Nearmap)	3
Figure 3	- Surrounding Land Use (Source: NSW Planning Portal)	4
Figure 4	- Car Park of Proposed Development	5
Figure 5	- Road Hierarchy	6
Figure 6	- New South Head Road - Westbound towards Victoria Road	7
Figure 7	- Victoria Road - Southbound towards Cranbrook Road	7
Figure 8	- Cranbrook Road – Eastbound towards Cranbrook Lane	8
Figure 9	- Cranbrook Lane – Northbound	8
Figure 10	- Key Intersections	9
Figure 11	- Existing Vehicle Access	10
Figure 12	- Existing on-site parking facilities	11
Figure 13	- Ferry Services	12
Figure 14	- STA bus services	13
Figure 15	- The Scots College Bus Routes	14
Figure 16	- Cycling Network (Source: Woollahra Municipal Council)	15
Figure 17	- Pedestrian Facilities	16
Figure 18	- Service Vehicle Access	17
Figure 19	- Existing on-street parking provisions	19
Figure 20	- Location of Intersection Survey	22
Figure 21	- Inbound Trip Distribution	24
Figure 22	- Outbound Trip Distribution	25
Figure 23	- SIDRA model of Cranbrook Road / Victoria Road intersection	26
Figure 24	- SIDRA model of Cranbrook Lane / Cranbrook Road / Carrington Avenue intersection	27
Table 1	- New South Head Road	7
Table 2	- Victoria Road	7
Table 3	- Cranbrook Road	8
Table 4	- Cranbrook Lane	8
Table 5	- Pedestrian Facilities	16
Table 6	- Car parking provision requirement and proposed parking provision	19
Table 7	- Accessible parking provision requirement and proposed parking provision	20
Table 8	- Motorcycle parking provision requirement and proposed parking provision	21
Table 9	- Bicycle parking provision requirement and proposed parking provision	21
Table 10	- Intersection Performance - Level of Service	26
Table 11	- SIDRA result summary	27

1. Introduction

1.1 Project Description

ptc. has been engaged by The Scots College to prepare a Traffic Impact Assessment (TIA) to accompany a Development Application (DA) to Woollahra Municipal Council for the development of an underground car park beneath the existing McIntyre Tennis Courts located at 53 Victoria Road, Bellevue Hill.

The location of the subject site is outlined in Figure 1.

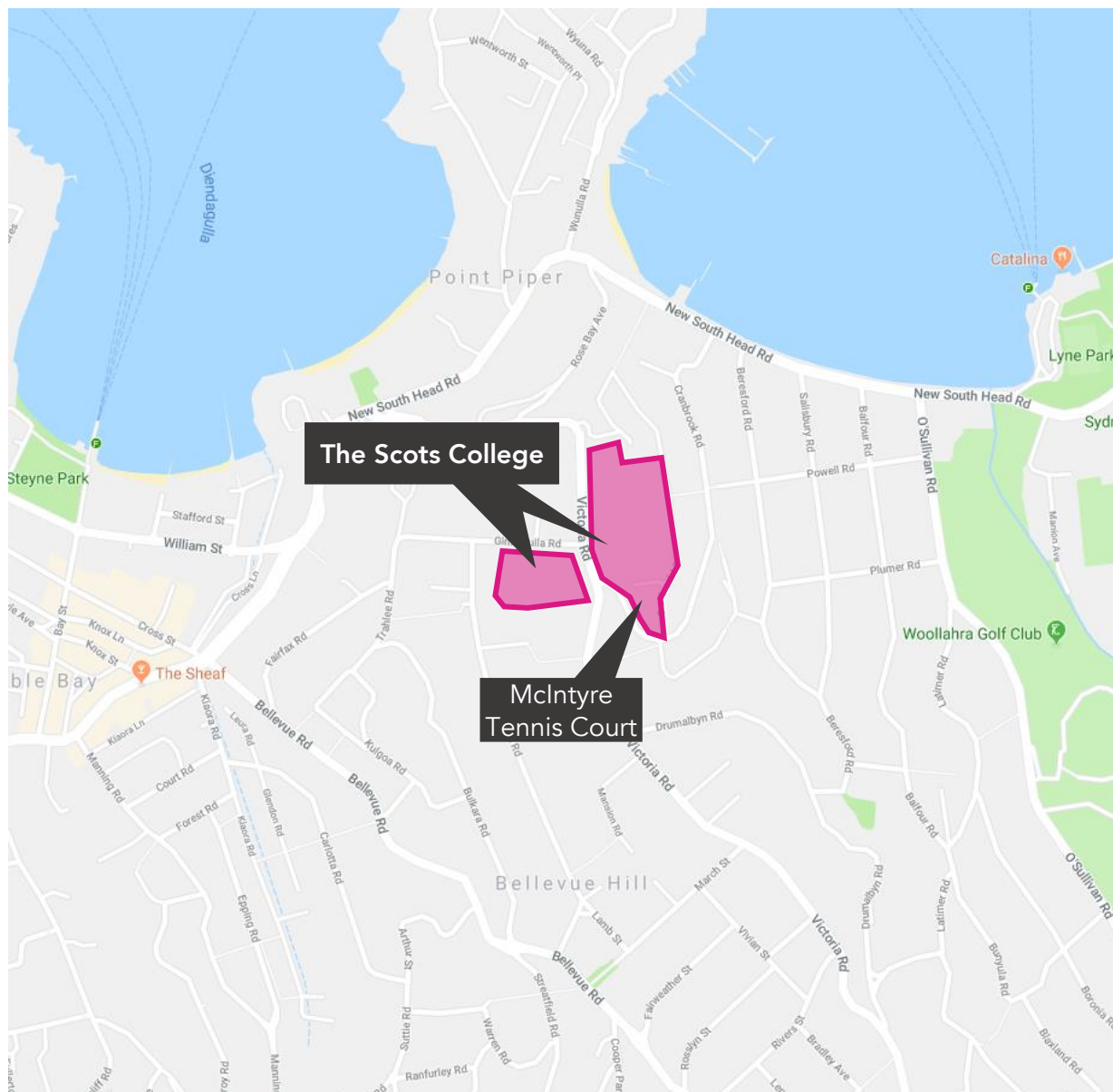


Figure 1 - Site Location

1.2 Purpose of this Report

This report presents the following considerations relating to the traffic and parking assessment of the development:

- Section 1 - Introduction of the project;
- Section 2 - Background information, including a description of the site and current use;
- Section 3 - A description of the proposed development;
- Section 4 - A description of the road network serving the development site, the existing transportation options and active transport facilities;
- Section 5 - A description of the proposed parking provision;
- Section 6 - Determination of the traffic activity associated with the development proposal, and the adequacy of the surrounding road network.
- Section 7 - Assessment of the proposed parking, access and circulation arrangements,
- Section 8 - Conclusion

2. Background Information

2.1 Site Location

The subject site belongs to a property (The Scots College) with a listed street address of 18 Cranbrook Lane, Bellevue Hill and lies within the following lots:

- Lot No. 1, DP929570;
- Lot No. 1, DP663629;
- Lot No. 1, DP1064059.

The proposed development is located in Bellevue Hill, which is approximately 5km east of the Sydney CBD. The nearest town centre, Double Bay, is located approximately 1km west of the College.

The subject site is bordered by Cranbrook Road to the West and South and Cranbrook Lane to the East, as shown in Figure 2.

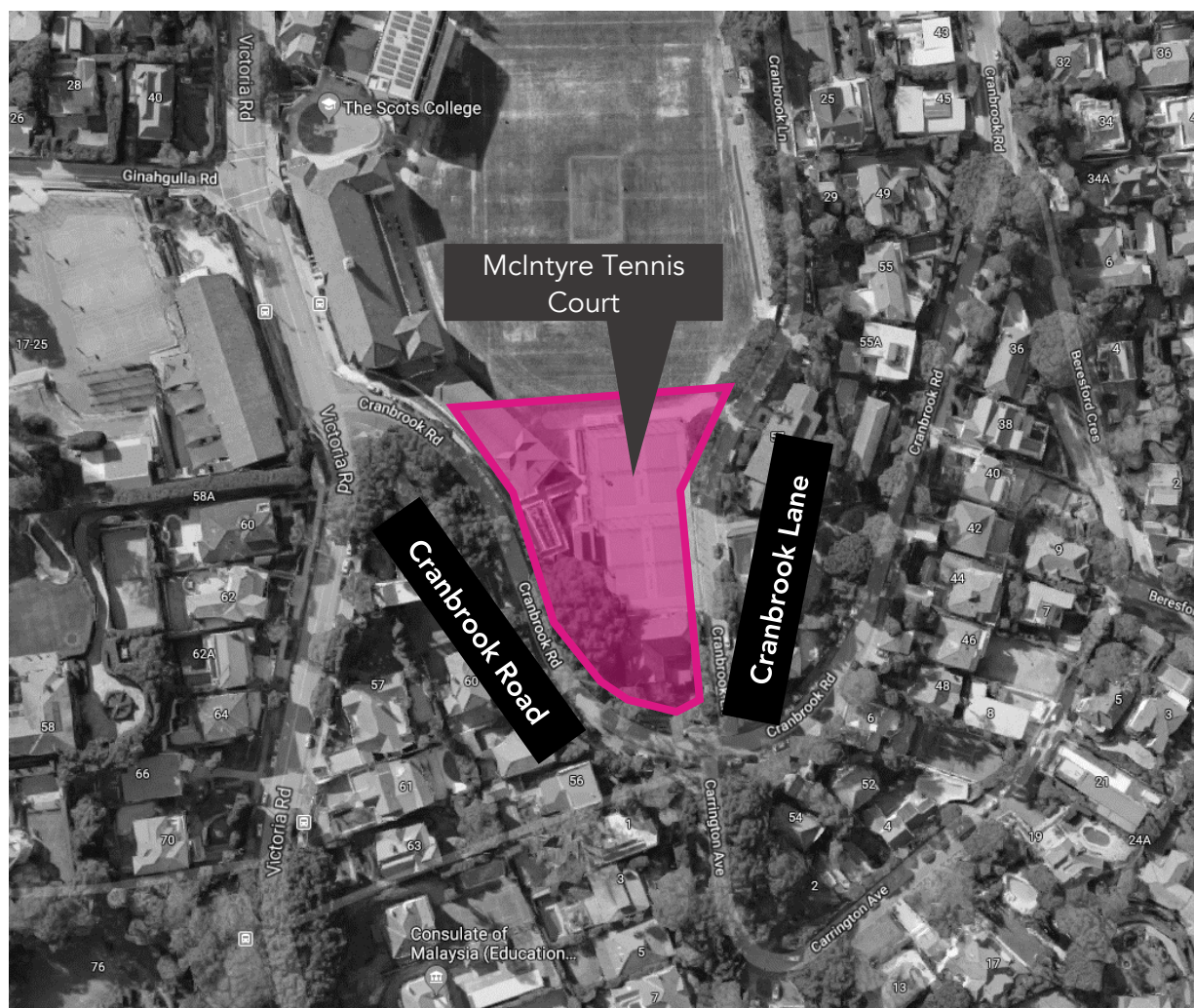


Figure 2 - Aerial view of the subject site & surrounds (Source: Nearmap)

2.2 Surrounding Land Use

In the context of the surrounding land use, the development area is classified as an Infrastructure Zone (SP2) and is primarily surrounded by residential land uses (Low Density Residential (R2) and Medium Density Residential (R3)), as shown in Figure 3.

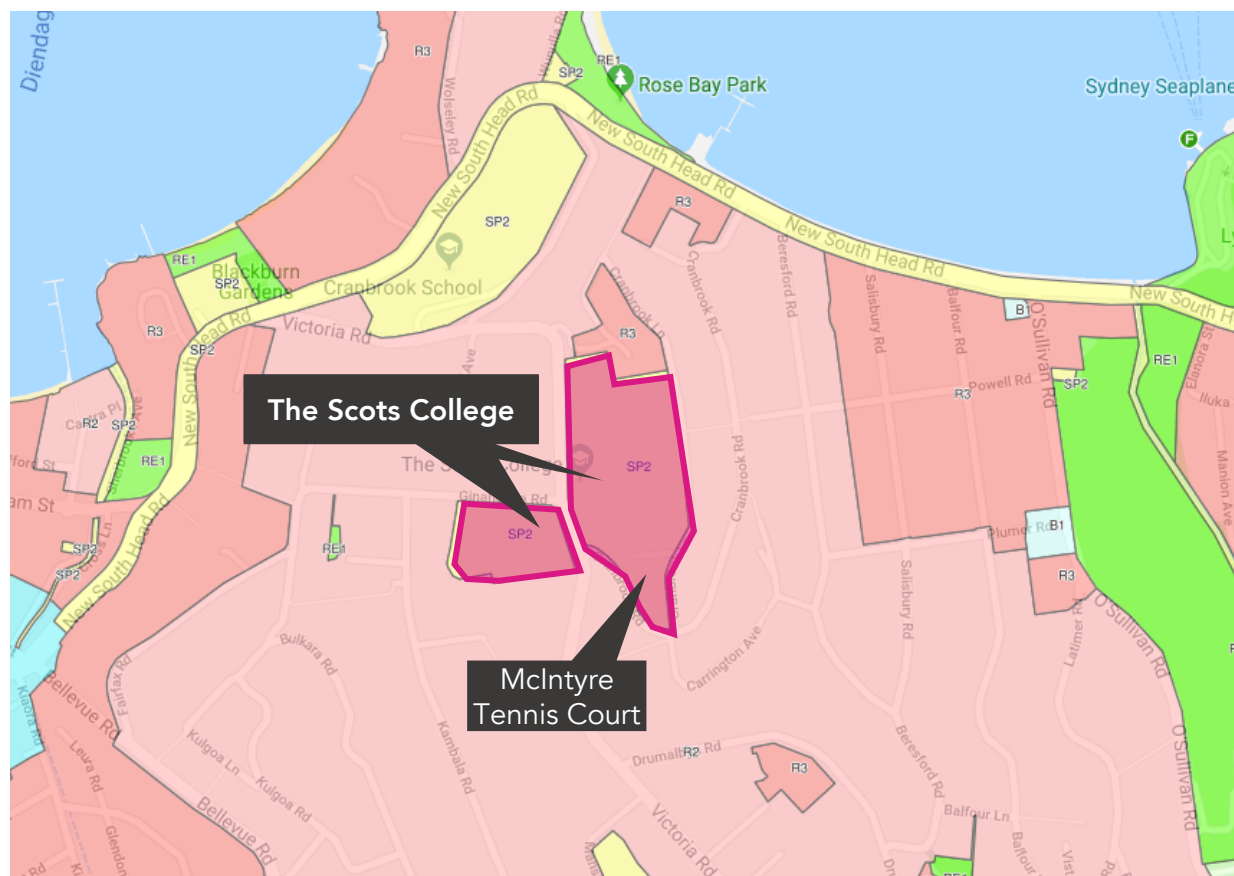


Figure 3 - Surrounding Land Use (Source: NSW Planning Portal)

2.3 Site Context

The subject site is located on the premises of The Scots College and currently, it accommodates tennis courts for the use by the Scots College students.

The Scots College, established in 1893, is a private educational facility for boys, providing primary and secondary education (K-12). The school is split into two campuses, the main Campus and the Ginahgulla Campus, located on the eastern and western side of Victoria Road.

The core school hours are between 8:15am and 3:15pm exclusive of out-of-school activities operating from 6:30am prior to commencement of school hours and up to 6:30pm post school hours.

3. Development Proposal

The development proposal involves the construction of a two storey underground car park and the reconstruction of the tennis courts. The proposed car park consists of 83 car parking spaces and is anticipated to be predominantly utilised by staff employed by The Scots College throughout the morning and afternoon periods. The car park will be made available to visitors throughout the evening periods and on weekends.

The proposal involves a construction of a driveway along Cranbrook Lane to be utilised as an access driveway for the proposed car park. The layout of the proposed car park is illustrated in Attachment 1.

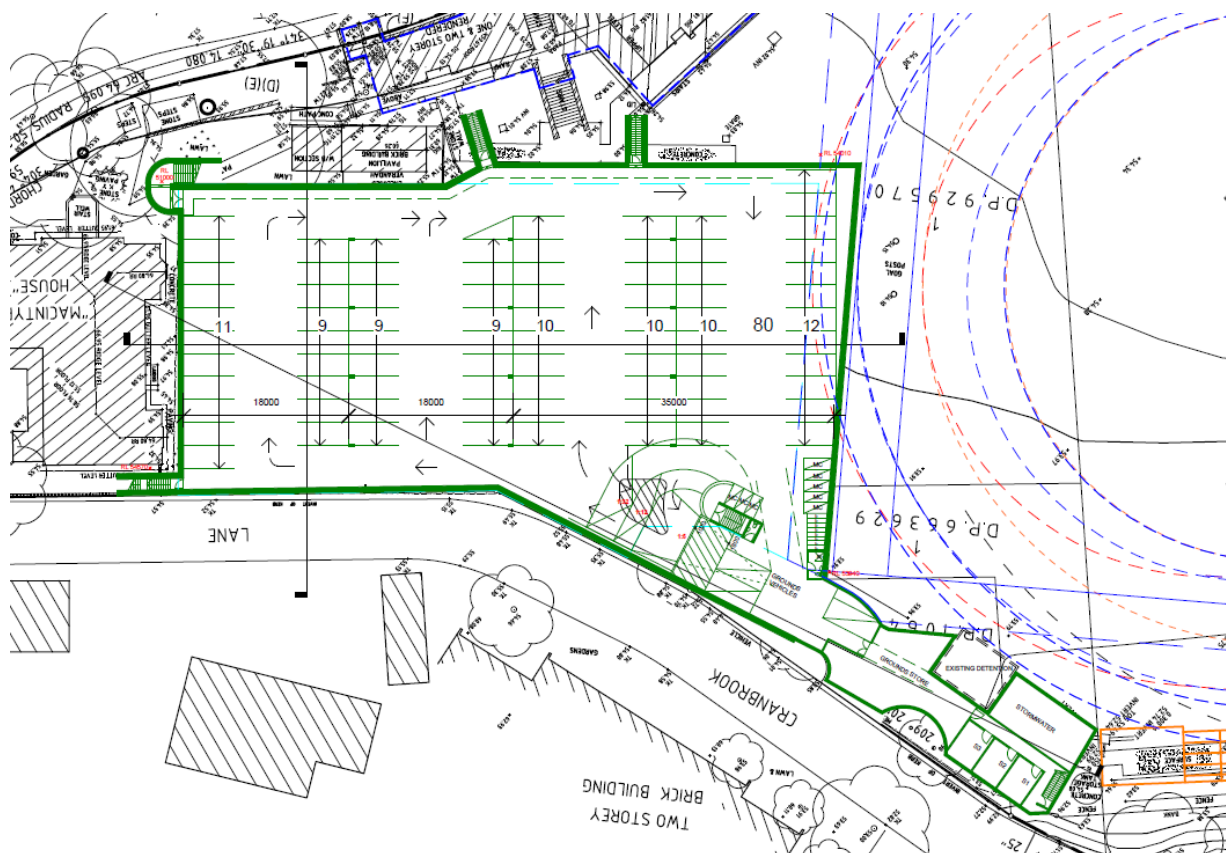


Figure 4 - Car Park of Proposed Development

4. Existing Transport Facilities

4.1 Road Network

The subject site is located to the south of New South Head Road, in the suburb of Bellevue Hill and in this regard, has a good connection to the eastern Sydney arterial road network and the wider Sydney area.

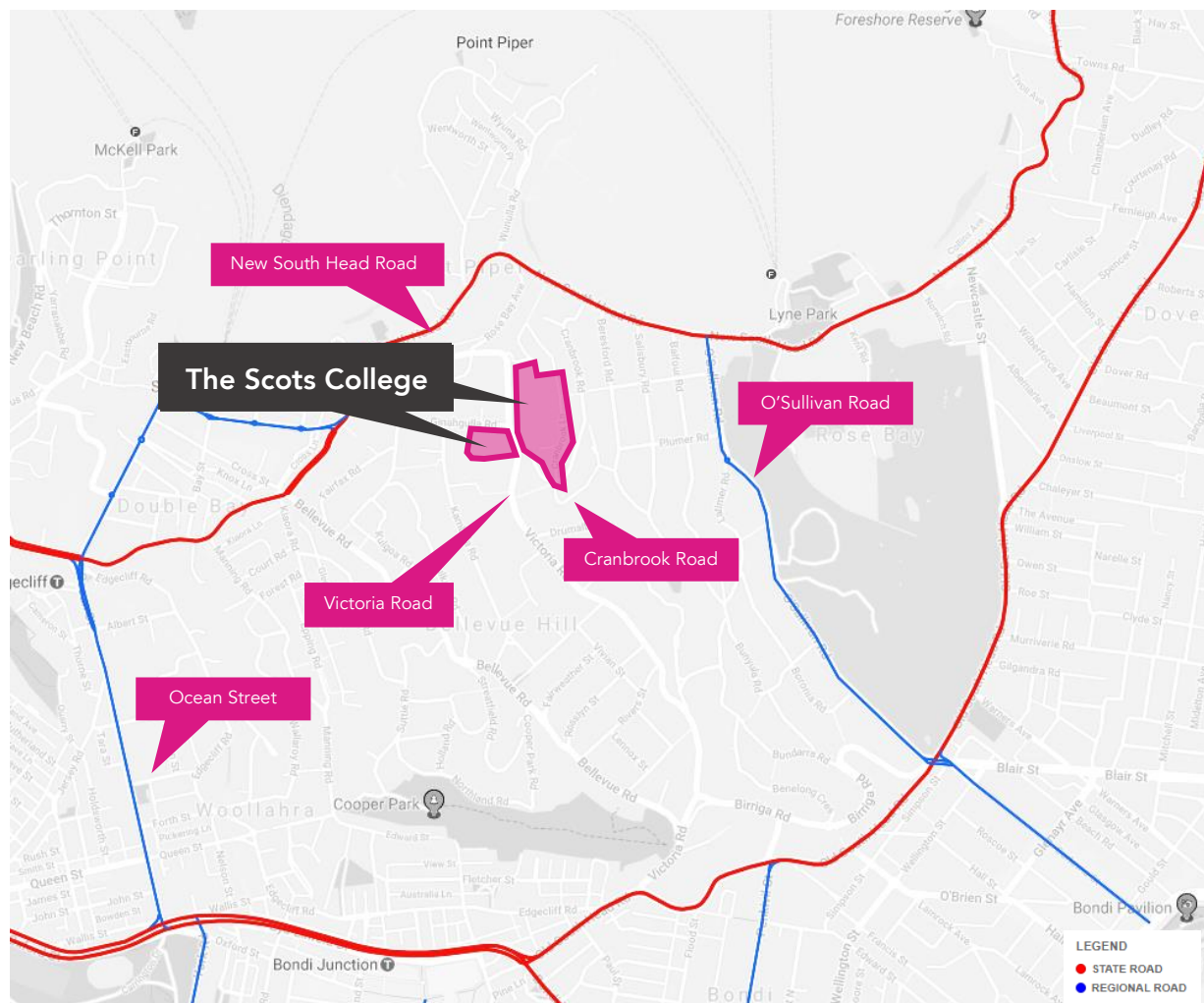


Figure 5 - Road Hierarchy

The NSW administrative road hierarchy comprises the following road classifications, which align with the generic road hierarchy:

- State Roads: Freeways and Primary Arterials (RMS Managed);
- Regional Roads: Secondary or sub-arterials (Council Managed, Part funded by the State);
- Local Roads: Collector and local access roads (Council Managed).

Within the vicinity, the road network serving the site includes:

Table 1 - New South Head Road

New South Head Road	
Road Classification	State Road
Alignment	East / West
Number of Lanes	2/3 lanes in each direction
Carriageway Type	Un-divided
Carriageway Width	18 metres
Speed Limit	60 kph (outside School Zone times)
School Zone	Yes
Parking Controls	Eastbound – ½P 9am to 4pm Mon to Friday, No parking 4pm to 6pm Westbound – un-restricted
Site Frontage	No



Figure 6 - New South Head Road - Westbound towards Victoria Road

Table 2 - Victoria Road

Victoria Road	
Road Classification	Local Road
Alignment	East / West
Number of Lanes	1 lanes in each direction
Carriageway Type	Un-divided
Carriageway Width	12 metres
Speed Limit	50 kph (outside School Zone times)
School Zone	Yes
Parking Controls	Generally un-restricted, with mixed restriction along other sections
Site Frontage	Yes



Figure 7 - Victoria Road - Southbound towards Cranbrook Road

Table 3 - Cranbrook Road

Cranbrook Road	
Road Classification	Local Road
Alignment	East / West
Number of Lanes	1 lanes in each direction
Carriageway Type	Un-divided
Carriageway Width	8 metres
Speed Limit	50 kph (outside School Zone times)
School Zone	Yes
Parking Controls	Unrestricted parking
Site Frontage	Yes



Figure 8 - Cranbrook Road – Eastbound towards Cranbrook Lane

Table 4 - Cranbrook Lane

Cranbrook Road	
Road Classification	Local Road
Alignment	North / South
Number of Lanes	1 lanes in each direction
Carriageway Type	Un-divided
Carriageway Width	6 metres
Speed Limit	50 kph (outside School Zone times)
School Zone	Yes
Parking Controls	Partial sections of No Parking along either side of the roadway
Site Frontage	Yes



Figure 9 - Cranbrook Lane – Northbound

4.2 Key Intersections

The key intersections within the vicinity of the site and their configurations are listed below and shown in Figure 10.

- New South Head Road and Victoria Road – three arm signalised intersection
- Victoria Road and Cranbrook Road – three arm priority intersection
- Cranbrook Road and Cranbrook Lane – four arm priority intersection

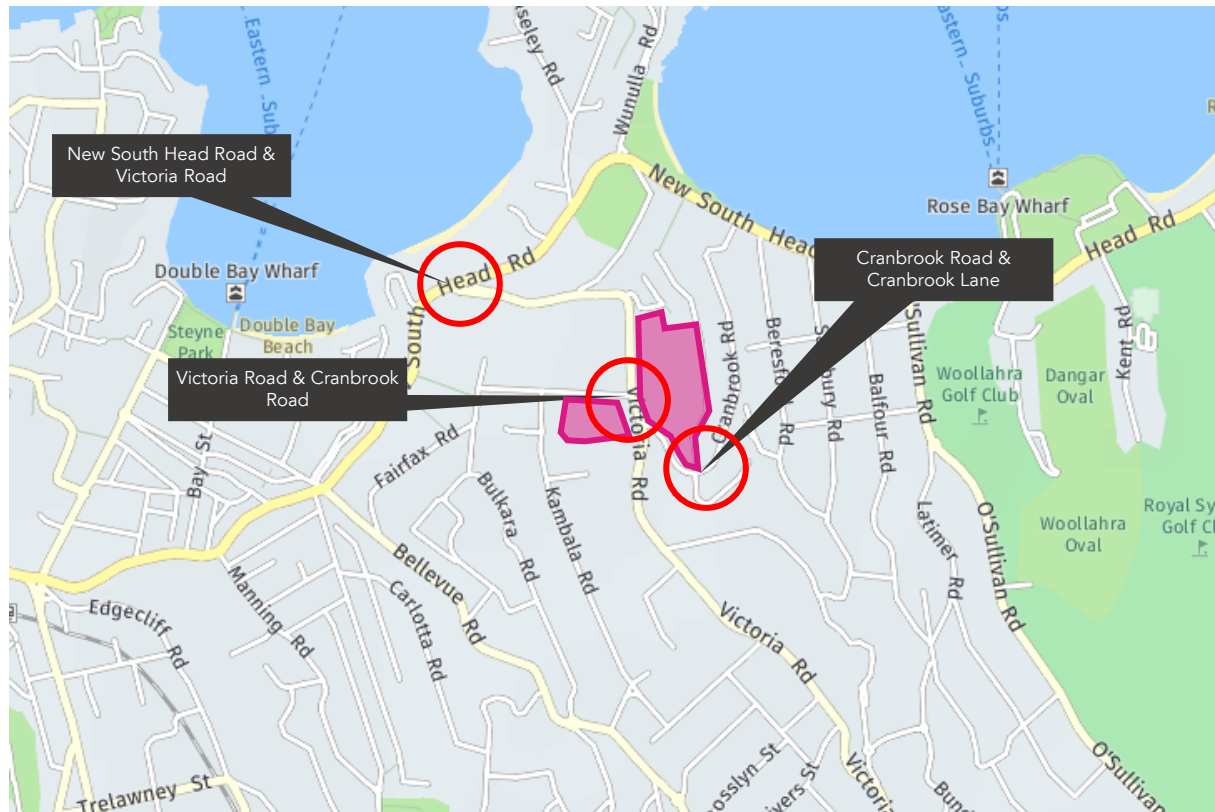


Figure 10 - Key Intersections

4.3 Vehicular Access

Vehicular access to the College is provided in a number of locations in order to serve the car parking areas, loading areas and for emergency vehicles. The existing vehicle access locations are presented in Figure 11:

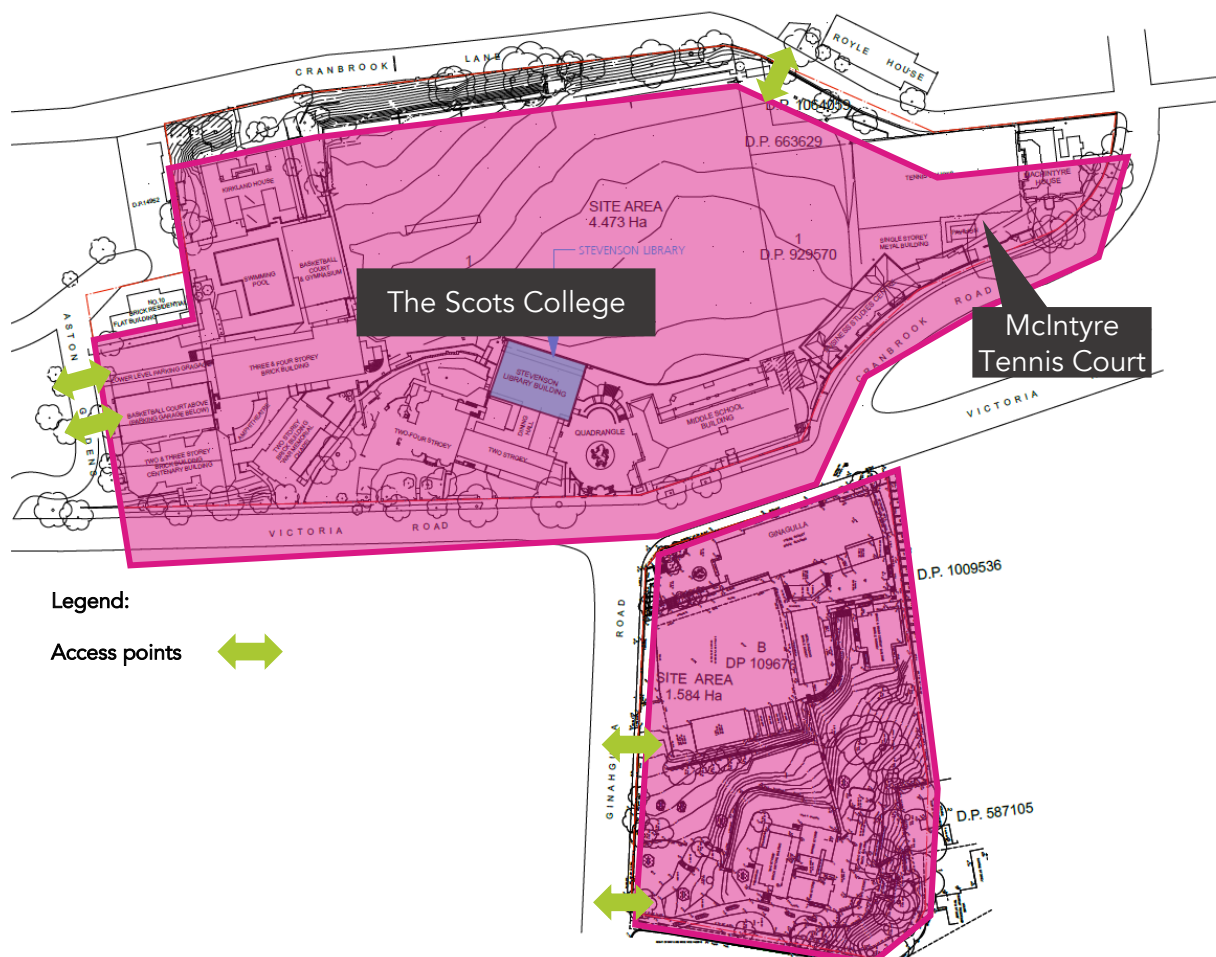


Figure 11 - Existing Vehicle Access

4.4 Parking Facilities

The College currently accommodates 79 on-site parking spaces, comprising:

- 17 car parking spaces in the Ginahgulla car park;
- 3 car parking spaces adjacent to the Fairfax House;
- 5 car parking spaces at Aspinall House;
- 48 car parking spaces at Aston Gardens;
- 3 car parking spaces at Royal House; and
- 3 car parking spaces at Tintern.

The location of these spaces are shown in Figure 12.

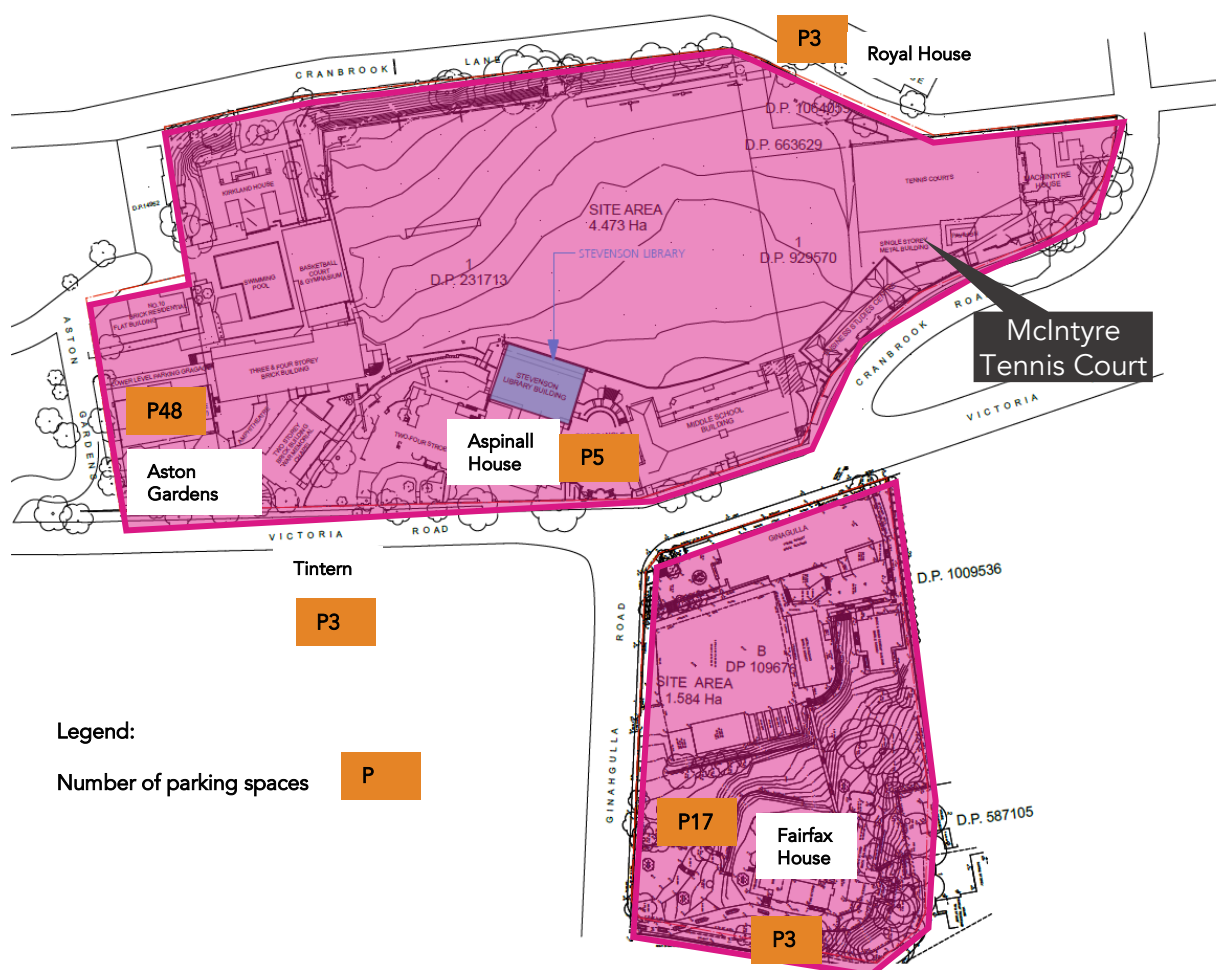


Figure 12 - Existing on-site parking facilities

4.5 Public Transport

4.5.1 Ferry Services

The subject site is located approximately 1.2 kilometres from Double Bay Wharf, as shown in Figure 13.

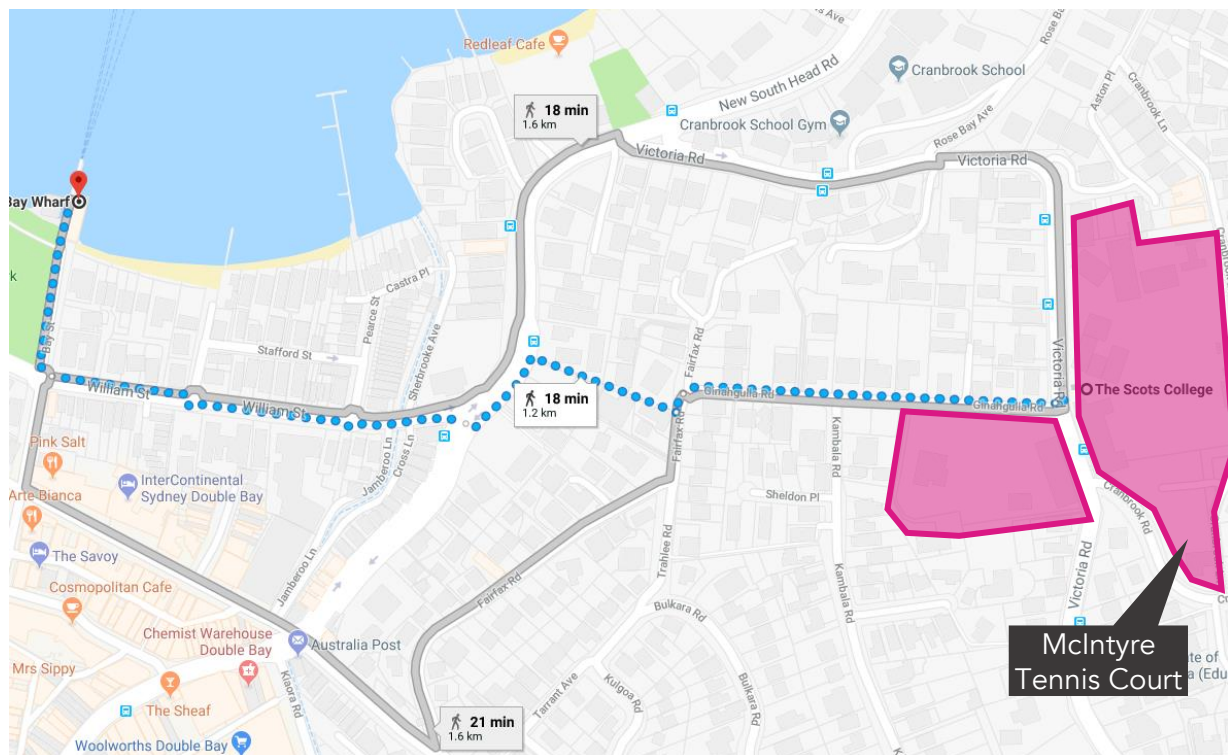


Figure 13 - Ferry Services

Double Bay Wharf is operated by Sydney Ferries and operates the F7 Eastern Suburbs service between Circular Quay and the Eastern Suburbs and are summarised as follows;

F7 Eastern Suburbs:

- Circular Quay to Double Bay – approximately 30 minutes intervals between 07:00 and 21:00
- Double Bay to Circular Quay – approximately 30 minute intervals between 06:50 and 19:20

4.5.2 STA Bus Services

The subject site is well serviced by buses on Route 326 – Edgecliff to Bondi Junction (via Bellevue Hill), which operates from 5 bus stops in the vicinity of the subject site, as shown in Figure 14.

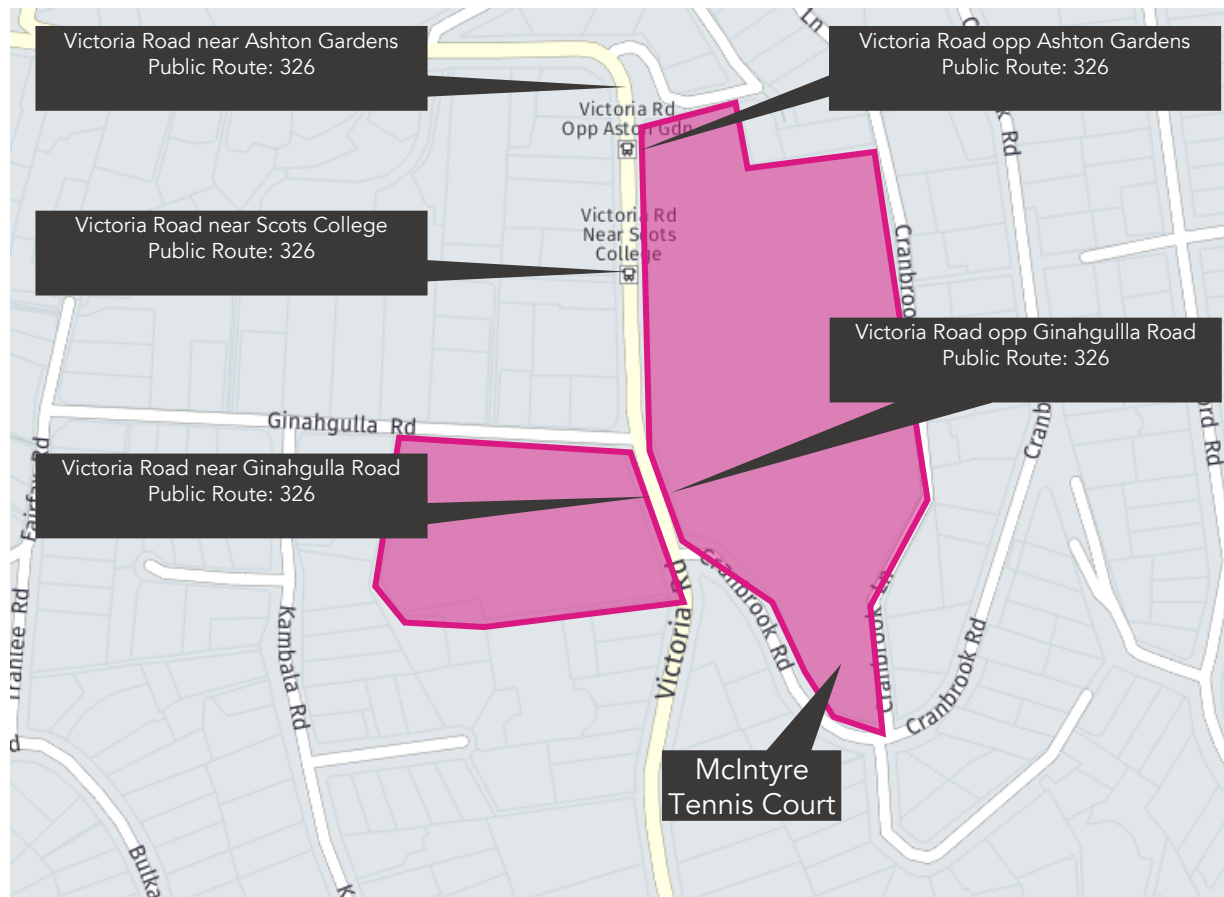


Figure 14 - STA bus services

The bus service is operational between 06:30 and 00:15 and provide access from the local area to the City at approximately 60 minute intervals, with additional services at peak times.

4.5.3 School Bus Service

The Scots College provides subsidised private bus services to students from Monday to Friday. The service is extended to other family members who attend neighbouring schools.

There are 16 College bus routes (highlighted in Figure 15) available to students in surrounding suburbs, in addition to this is the Eastern Suburbs Bus Service and State Transit Buses.



Figure 15 - The Scots College Bus Routes

4.6 Active Transport

4.6.1 Bicycle Network and Facilities

Woollahra Municipal Council has developed the Woollahra Bicycle Strategy 2009, which reviewed the 'Woollahra Waverly Bike Plan 2000' and set out to develop a bicycle strategy for future implementation.

The key elements of the bicycle strategy are;

- Completing major (regional) routes that provide regional connectivity;
- Every Street a Cycling Street – promoting and facilitating cycling on all local roads with minimum new construction;
- Recreational routes for safe and family-friendly cycling in the vicinity of parks and reserves;
- Developing cycle facilities at/to public transport Interchanges and urban villages;
- Integrated policies and planning instruments – inclusion of cycle facilities and considerations within road construction and maintenance programs as well as in development planning; and
- Targets to provide a balance between civil works and encouraged programs, including a ride-to-school strategy to develop sustainable travel habits and cycling confidence from a young age.



Figure 16 - Cycling Network (Source: Woollahra Municipal Council)

As shown in Figure 16, the school is served by an existing on-road cycle route along Victoria Road and a proposed off-road route along New South Head Road. These routes provide access to the local cycle network and links to the greater Sydney cycle network.

4.6.2 On-Site Bicycle Network and Facilities

Due to the hilly nature of the surrounding road network, the use of bicycles to access the site is minimal and there are no existing on-site bicycle parking facilities within the college.

4.6.3 Pedestrian Facilities

Facilities are available to the public within the vicinity of the site. These are summarised in Table 5 and shown in Figure 17.

Table 5 - Pedestrian Facilities

Road	Pedestrian Facilities
Victoria Road	East Side – 4.0m wide footway West Side – 4.0m wide footway Signalised crossings on all arms of the Victoria Road / Ginahgulla Road intersection
Cranbrook Road	East Side – 1.5m wide footway West Side – 1.5m wide footway
Cranbrook Lane	East Side – 1.2m wide footway



Figure 17 - Pedestrian Facilities

4.7 Service Vehicle Access

The subject site provides two access points for service vehicles as shown in Figure 18.

The existing access points are able to accommodate Medium Rigid Vehicles (MRV) and Council waste collection vehicles.

The service vehicle access is generally scheduled outside of the school operating hours to minimise potential conflicts with staff, students and the peak periods of the local road network.

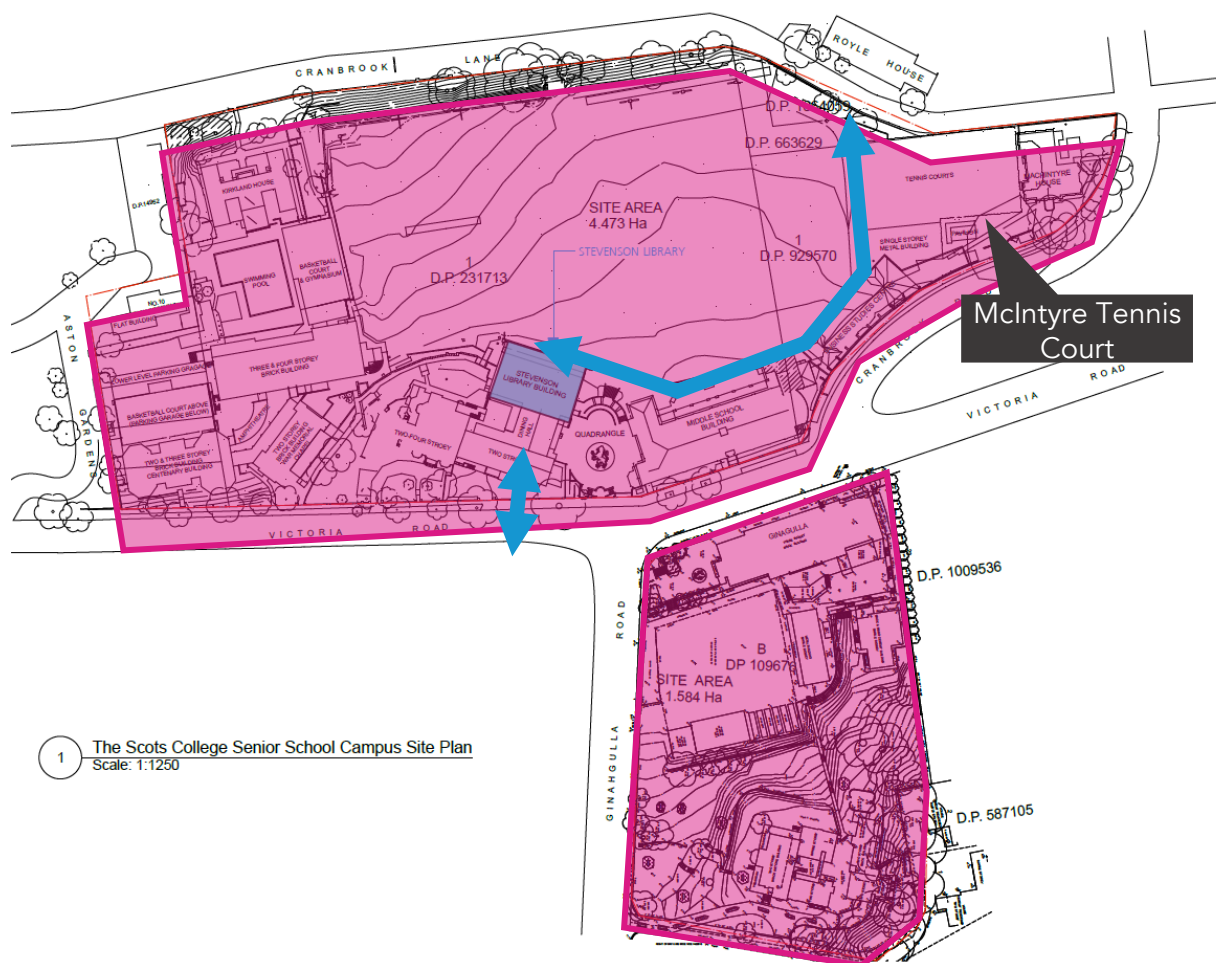


Figure 18 - Service Vehicle Access

4.8 Emergency Vehicle Access

The Scots College provides access for emergency vehicles directly from the local road network along Victoria Road, Cranbrook Road, Cranbrook Lane and Ginahgulla Road.

5. Parking Provision

5.1 Planning Policy Requirements

Typically, parking requirements are established with reference to the local planning controls i.e. Development Control Plan (DCP) and Local Environmental Plan (LEP). In regard to the proposed development, reference is made to the Woollahra Development Control Plan (DCP) 2015, in which the following parking requirements for educational establishments are stated:

- Minimum 1 car space per 100m² gross floor area;
- Minimum 1 car space for people with disabilities per 50 car spaces or part thereof;
- Minimum 1 motorcycle space per 10 car spaces;
- Minimum Bicycle parking: 1 per 10 staff, 1 per 20 students.

5.2 Existing Parking Facilities

5.2.1 On-Site Parking Facilities

As described in Section 4.4, the Scots College currently accommodates 79 on-site car parking spaces at various locations within the school. The McIntyre Tennis Courts currently provides no off-street car parking spaces.

5.2.2 On-Street Parking Facilities

The road network in the vicinity of the college provides on-street parking provisions, which are subject to a variety of parking controls. The existing on-street parking controls are shown in Figure 19. This shows that there is a significant amount of on-street parking provisions within the local vicinity of the college, which is available to staff, students and the local community.

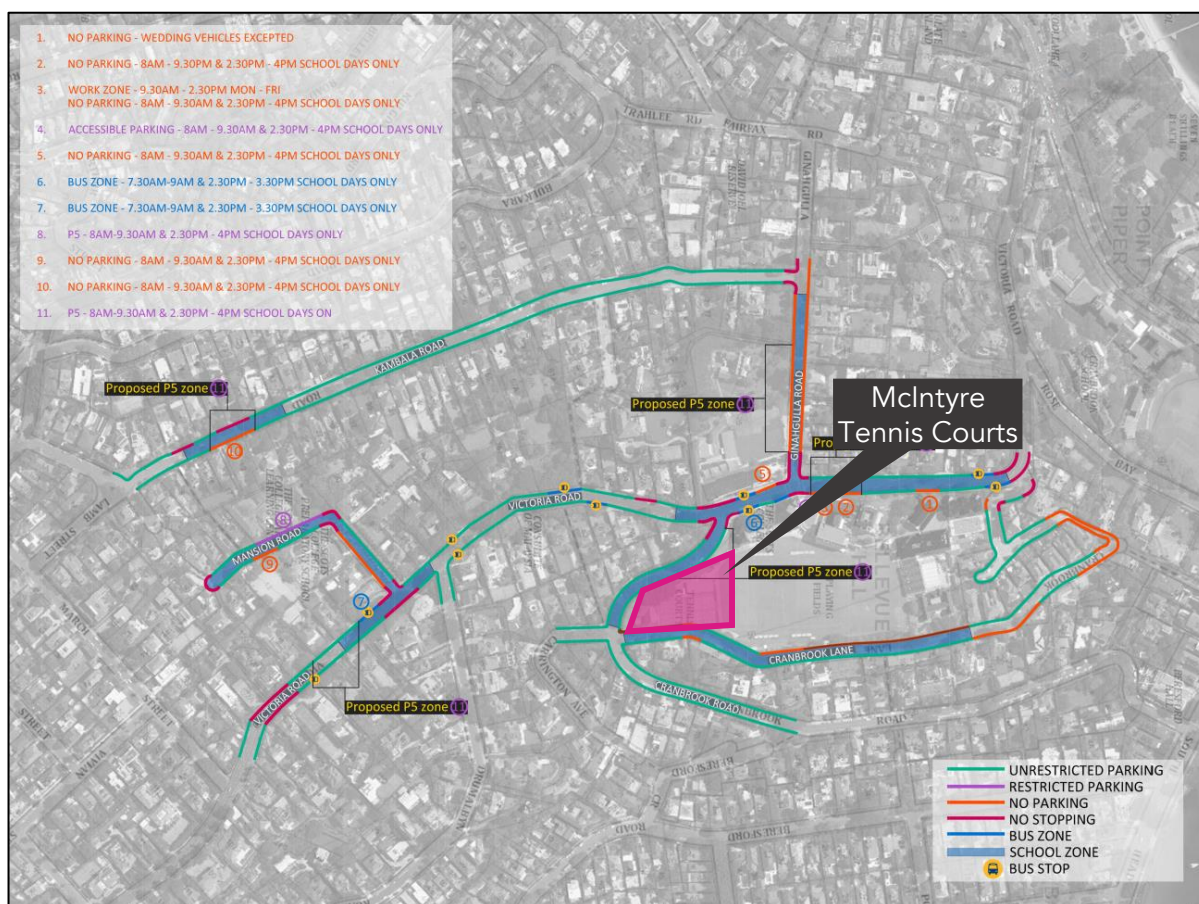


Figure 19 - Existing on-street parking provisions

5.3 Proposed Parking Provision

5.3.1 Car Parking Provision

It should be noted that the McIntyre Tennis Court is part of The Scots College, hence the parking provision has been analysed considering the entire school. The requirements stipulated in the DCP and proposed parking provision are summarised in Table 6.

Table 6 - Car parking provision requirement and proposed parking provision

Location	Parking Provision Rate	GFA	No. Car Parking Spaces
DCP Requirements			
Overall – The Scots College	Min 1 space per 100m ² GFA	22,410m ²	225 (224.1)
Proposed Parking Provision			
Aspinall House			5
Aston Gardens At-Grade			27
Aston Gardens Basement			21
Fairfax House			3

Ginahgulla Campus			17 (Separate DA to be submitted in conjunction with the McIntyre DA)
McIntyre Campus			83
Royle House			3
Tintern			3
Offset*	-	-	80
Total:			242

*It is noted that in the 1994 Class 1 appeal against the refusal of DA93/111, Commissioner Pearlman J accepted the evidence of the Colston Budd traffic report that there are 80 spaces within the school frontages, which offset the on-site parking requirements.

It is anticipated that the McIntyre car park will solely be utilised by staff employed by The Scots College throughout the school operating hours.

5.3.2 Accessible Parking Provision

The accessible parking requirements have been calculated in accordance with the DCP. The requirements and proposed parking provision are summarised in Table 7.

Table 7 - Accessible parking provision requirement and proposed parking provision

Location	Parking Provision Rate	Car Parking Spaces	No. of Parking Spaces
DCP Requirements			
Overall – The Scots College	1 space per 50 car spaces or part thereof	162	4 (3.18)
Proposed Parking Provision			
Aspinall House	1 space per 50 car spaces or part thereof	162	1
Aston Gardens At-Grade			0
Aston Gardens Basement			0
Fairfax House			0
Ginahgulla Campus			1
McIntyre Campus			3
Royle House			0
Tintern			0
Total:			5

The proposal of providing 3 accessible car parking space adheres to the requirements of the DCP.

5.3.3 Motorcycle Parking Provision

In accordance with the DCP, the parking requirements for motorcycle parking have been calculated and summarised in Table 8.

Table 8 - Motorcycle parking provision requirement and proposed parking provision

Location	Parking Provision Rate	Car Parking Spaces	No. of Parking Spaces
DCP Requirements			
Overall – The Scots College	1 space per 10 car spaces	162	16 (16.2)
Proposed Parking Provision			
Aspinall House	1 space per 10 car spaces	162	0
Aston Gardens At-Grade			0
Aston Gardens Basement			0
Fairfax House			0
Ginahgulla Campus			8
McIntyre Campus			8
Royle House			0
Tintern			0
Total:			16

5.3.4 Bicycle Parking Provision

As part of this DA, the proponent seeks to increase the current student cap from 1120 to 1520. The bicycle parking requirements have been calculated in accordance with the DCP. The requirements and proposed parking provision are summarised in Table 9.

Table 9 - Bicycle parking provision requirement and proposed parking provision

Land Use	Parking Provision Rate	Proposed Increase of Number of staff/students	Parking Provision Requirement
DCP Requirements			
Overall – The Scots College	1 space per 10 FTE staff	-	0
	1 space per 20 students	400	20
Proposed Parking Provision			
Aspinall House	1 space per 10 FTE staff	-	0
Aston Gardens At-Grade			0
Aston Gardens Basement			0
Fairfax House			0
Ginahgulla Campus	1 space per 20 students	300	12
McIntyre Campus			8
Royle House			0
Tintern			0
Total:			20

6. Traffic Assessment

The proposed development involves the construction of an underground car park, beneath the tennis courts. As the proposal does not involve alterations to the buildings accommodating the students, it is anticipated that no changes will occur to the existing traffic volume due to the proposed development.

However, the proposed development will likely increase the traffic generation along Cranbrook Road and Cranbrook Lane as the proposed development is to provide 83 off street parking bays dedicated to staff. Therefore, to determine the impact such changes will have on the intersections, a SIDRA analysis has been conducted.

6.1 Traffic Volumes

An intersection survey was undertaken on Wednesday, 11th April 2018 between 7:30am-9:30am and 2:00pm-4:00pm at the following intersections:

- Cranbrook Road & Victoria Road;
- Carrington Avenue & Cranbrook Lane & Cranbrook Road

The intersection survey locations are shown in Figure 20.

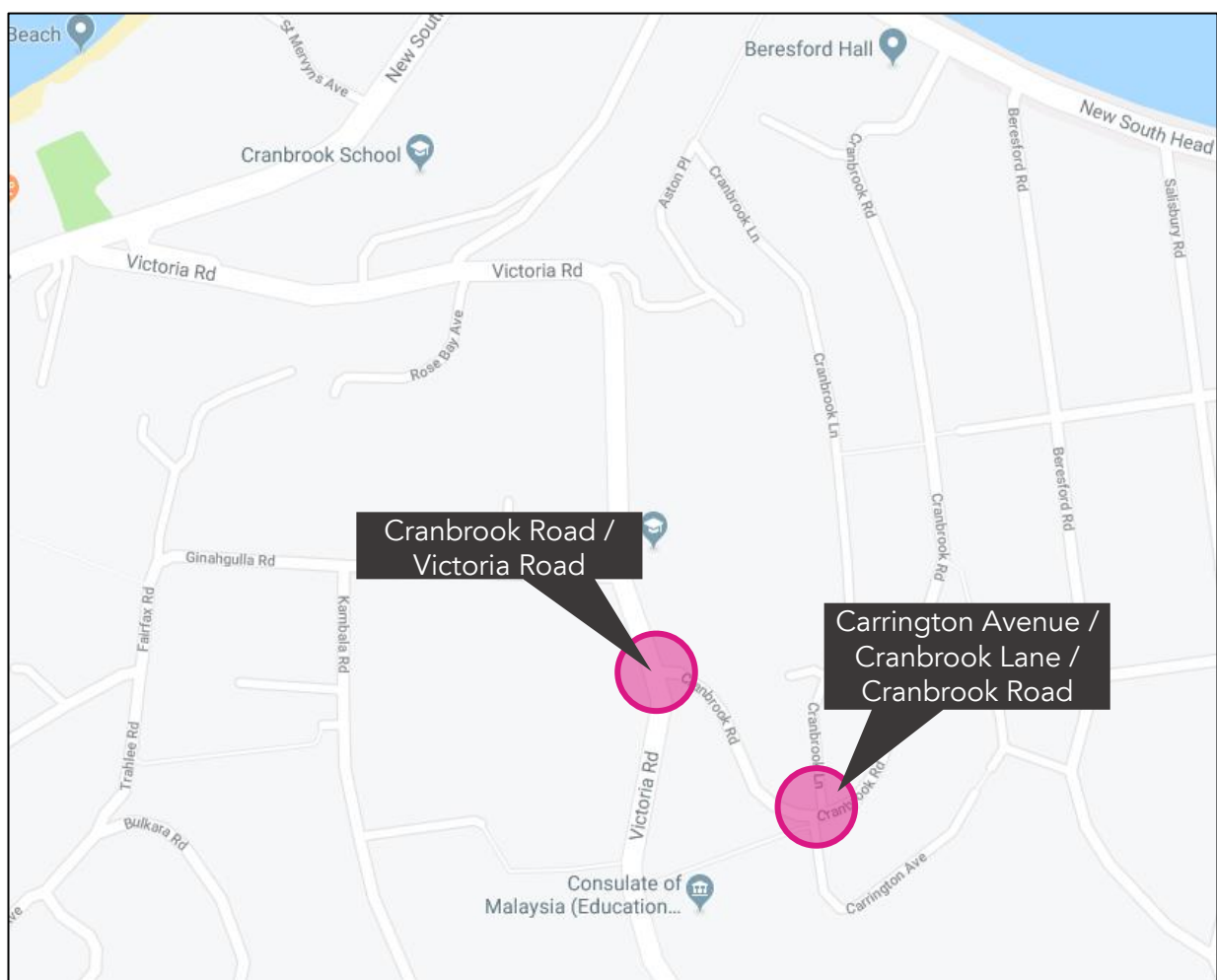


Figure 20 - Location of Intersection Survey

The peak hour for the intersections of study has been determined as follows:

- Morning Peak: 7:45am-8:45am
- Afternoon Peak: 2:45pm-3:45pm

6.2 Development Traffic Generation and Distribution

The following assumptions were made to determine the quantity and assignment of the additional trips generated by the proposed development:

- The proposed development involves the reconstruction of the existing tennis courts and the construction of a basement car park. Taking into consideration that neither of these facilities generate traffic, it is assumed that the existing traffic volumes in the vicinity of the subject site will not increase;
- The proposal involves the provision of 83 car parking spaces, which will be utilised by staff throughout the day.
- It is assumed that the traffic related to the proposed car park during peak periods will be tidal, as per the existing situation, with the majority of staff arriving in the morning and departing in the afternoon. Following this, it is assumed that throughout the AM peak period, the vehicular trips are distributed as 80% inbound and 20% outbound whilst throughout the PM peak period, the vehicular trips are 20% inbound and 80% outbound.
- For the Inbound Vehicle Trip Distribution, the following has been assumed:
 - 50% of the vehicles are travelling from the west via New South Head Road and Cranbrook Road.
 - 50% of the vehicles are travelling from the east via Victoria Road.
 - For vehicles utilising Victoria Road, it is assumed that 55% are travelling from the north and 45% are travelling from the south, taking the survey data into consideration. The assumed distribution is shown in Figure 21.

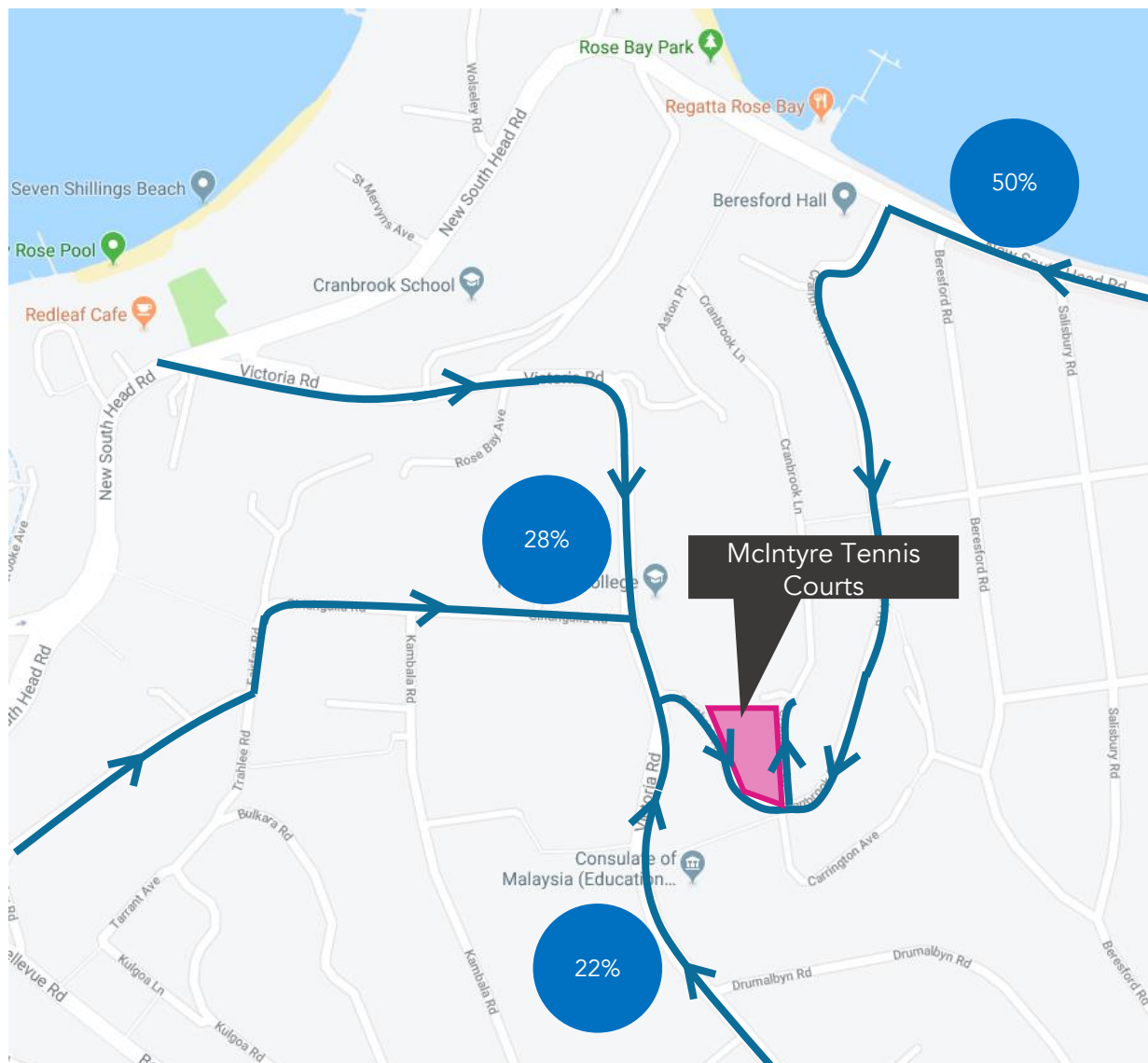


Figure 21 - Inbound Trip Distribution

- For the Outbound Vehicle Trip Distribution, the following has been assumed:
 - 50% of the vehicles are assumed to be eastbound via Cranbrook Road and New South Head Road.
 - 50% of the vehicles are assumed to be westbound via Cranbrook Road and Victoria Road.
 - It is assumed that of the 50% of the outbound vehicles that travelled towards the Cranbrook Road / Victoria Road intersection, 55% of the vehicles will travel southbound via Victoria Road, towards Bondi Junction town centre whilst 45% of the vehicles will travel northbound via Victoria Road towards Double Bay town centre. The outbound trip distribution is shown in Figure 22.

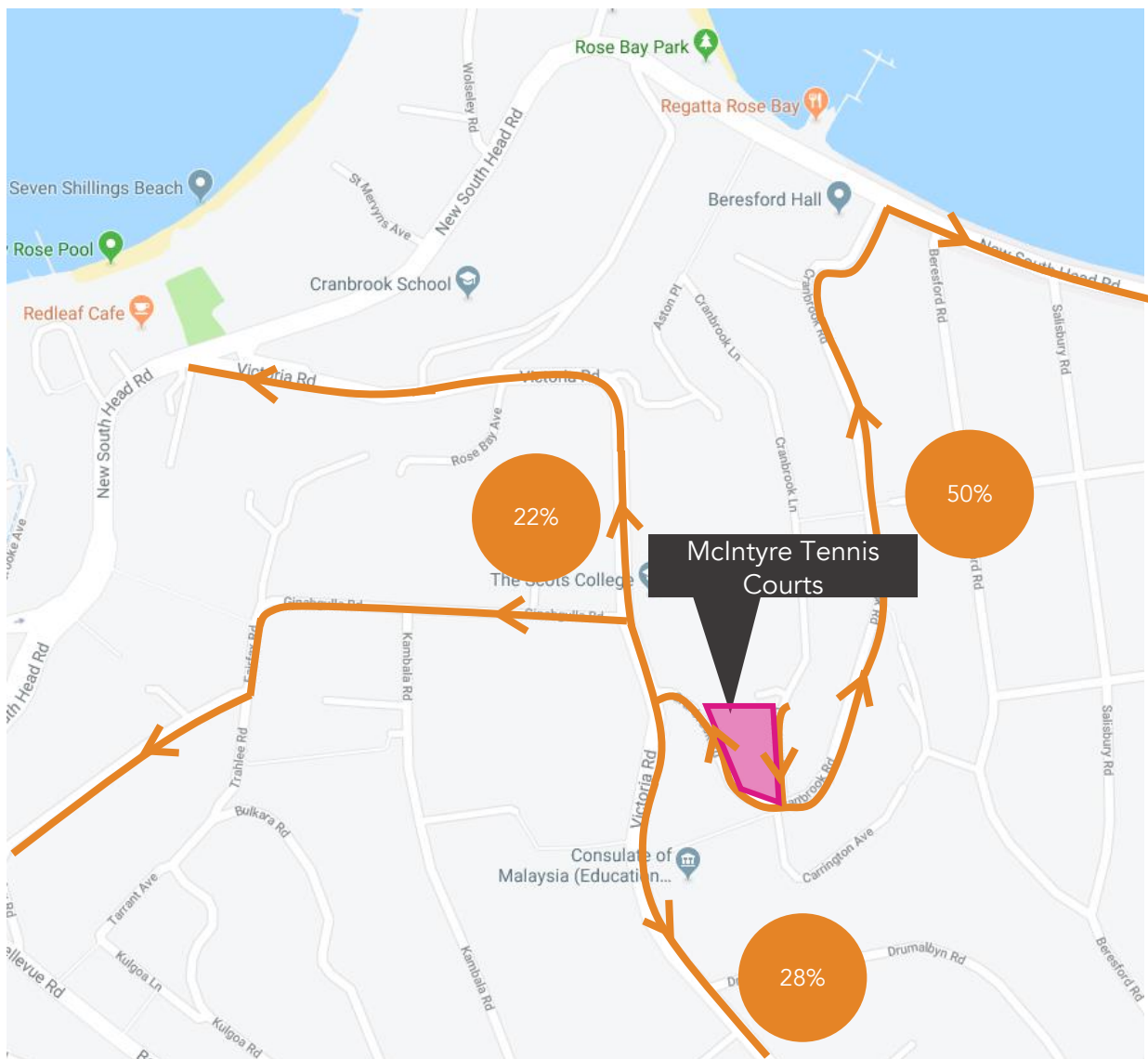


Figure 22 - Outbound Trip Distribution

6.3 SIDRA Analysis

A volume analysis was performed using the SIDRA Intersection 8 software, a micro-analytical tool for individual intersection and whole-network modelling. The models are based on the collected traffic survey data. SIDRA provides a number of performance indicators outlined below:

- Degree of Saturation – The total usage of the intersection expressed as a factor of 1 with 1 representing 100% use/saturation. (e.g. 0.8=80% saturation)
- Average Delay – The average delay encountered by all vehicles passing through the intersection. It is often important to review the average delay of each approach as a side road could have a long delay time, while the large free flowing major traffic will provide an overall low average delay.
- 95% Queue Lengths (Q95) – is defined to be the queue length in metres that has only a 5-percent probability of being exceeded during the analysis time period. It transforms the average delay into measurable distance units.

- Level of Service (LoS) – This is a categorization of average delay, intended for simple reference. It is a good indicator of overall performance for individual intersections. The RMS adopts the following bands:

Table 10 - Intersection Performance - Level of Service

LoS	Average Delay (secs/vehicle)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	<14	Good operation	
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating 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	>70	Extra capacity required	Extreme delay, major treatment required

A SIDRA analysis has been conducted for the following key intersections based upon the survey data collected on 11th April 2018:

- Cranbrook Road / Victoria Road;
- Carrington Avenue / Cranbrook Lane / Cranbrook Road

The analysis has been undertaken to assess the potential traffic impact to the above mentioned intersections due to the proposed development. The models are shown in Figure 23 and Figure 24.

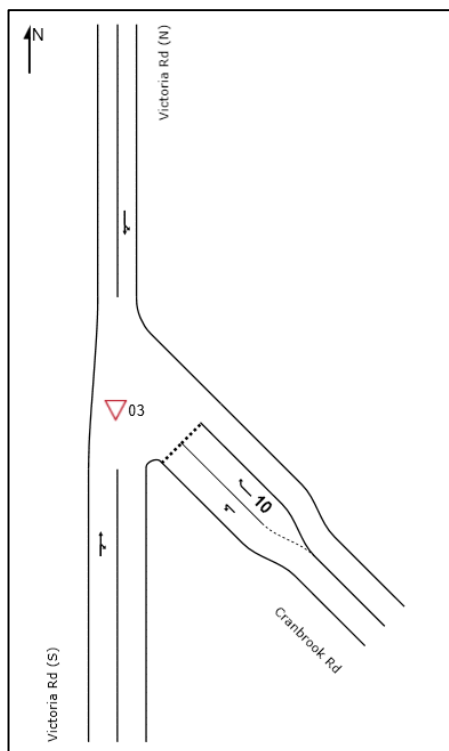


Figure 23 - SIDRA model of Cranbrook Road / Victoria Road intersection

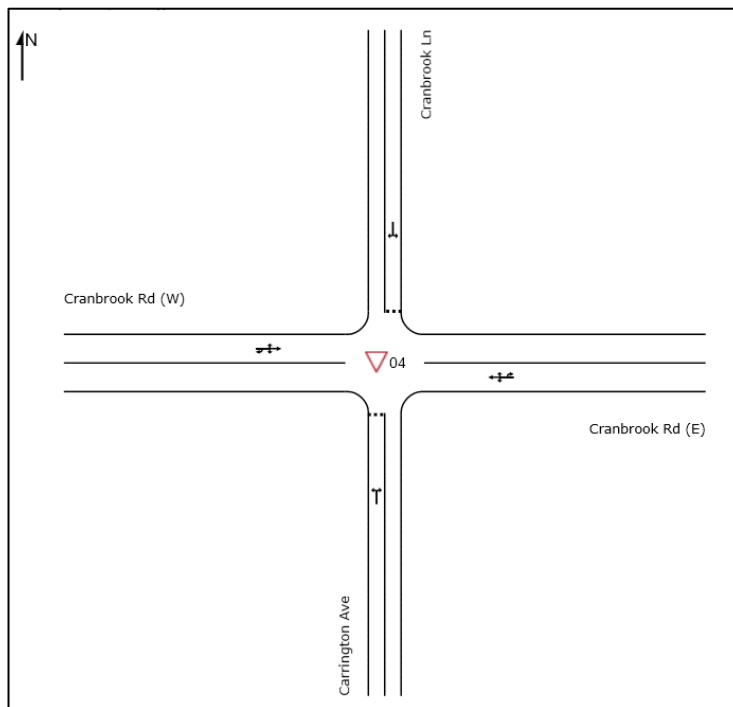


Figure 24 - SIDRA model of Cranbrook Lane / Cranbrook Road / Carrington Avenue intersection

The full movement summary outputs from SIDRA are provided in **Attachment 2**.

Table 11 - SIDRA result summary

Intersection Leg	Time	Period	Level of Service	Degree of Saturation (v/c)	Average Delay (s)	95% Queue Length (m)
Cranbrook Road / Victoria Road	AM Peak	Existing	A	0.312	3.1	7.9
		Development	A	0.317	3.3	8.8
	PM Peak	Existing	A	0.121	3.6	2.6
		Development	A	0.123	3.8	2.8
Carrington Avenue / Cranbrook Lane / Cranbrook Road	AM Peak	Existing	A	0.113	1.1	1.1
		Development	A	0.130	2.0	2.4
	PM Peak	Existing	A	0.090	1.6	1.4
		Development	A	0.094	2.6	2.2

6.3.1 Cranbrook Road & Victoria Road

The results from the analysis indicate that the level of service, post development, remains at LOS A and each performance measure increases marginally for both AM and PM peaks. The intersections will continue to operate with a minimum spare capacity of approximately 65% and 85% in the AM and PM peaks respectively. Based on these results, the proposed car park will cause minimal impact to the local road network.

6.3.2 Carrington Avenue & Cranbrook Lane & Cranbrook Road

The SIDRA analysis indicates that the intersection remains at LOS A and each performance measure increases marginally for both AM and PM peaks. The intersection will continue to operate with a spare capacity of approximately 85%. Therefore, the traffic impact due to the proposed development will be minor.

7. Access and Car Park Design Assessment

The following section presents an assessment of the proposed underground car park with reference to the requirements of AS 2890.1:2004 (Off-street car parking). This section is to be read in conjunction with the architectural plans (see Attachment 1) and the car park assessment undertaken by ptc. (see Attachment 3).

The proposed car park is to be predominantly utilised by staff with the car park to be available for use by visitors throughout the evening periods and weekends. Therefore, as the car park will mainly be utilised as employee parking, the car park represents a typical Class 1A facility.

7.1 Vehicular Access & Circulation

The proposal involves the demolition of the existing and the construction of a new, 7.3m wide access driveway on the eastern side of the subject site along Cranbrook Lane. It is anticipated that a typical B99 vehicle would be the largest vehicle requiring access to the subject site. Therefore, a swept path analysis has been conducted, showing that the proposed driveway is able to facilitate access for B99 vehicles.

In relation to the circulation, a minimum 4.1m circulation roadway width has been provided with minimum 6.2m aisle widths provided to allow vehicles to manoeuvre into the parking spaces. It is noted that the circulation roadways are to accommodate one-way traffic flow hence the width is deemed sufficient for safe vehicular access. The aisle width adheres to the requirement for a typical Class 1A facility.

Swept path analysis of the proposed ramp access demonstrates sufficient width to accommodate two-way movement with a B99 vehicle. It is noted that hatched line marking is installed as a guidance measure for vehicles utilising the ramp for exiting purposes.

Accessible parking spaces are provided outside of the car park, at-grade adjacent to the school's boundary.

7.2 Sight Distance

The sight distance requirements are described in Section 3.2 of AS 2890.1 and are prescribed on the basis of the sign posted speed limit or 85th percentile vehicle speeds along the frontage road.

Ginahgulla Road has a posted speed limit of 50kph, which requires a desirable visibility distance of 69 metres and a minimum distance of 45 metres. The proposed location of the access driveway has no permanent obstruction within the required clearance distance.

The proposed car park allows for all vehicles to enter and exit in a forward direction, therefore minimising potential conflict points and maintaining the overall safety of the road network.

The proposed driveway also provides the minimum sight lines for pedestrian safety, as stipulated in AS2890.1. Triangular pedestrian sight splay (2.0m x 2.5m) has been provided on the exit side of the driveway.

7.3 Car Park Arrangement

7.3.1 Typical Requirements

The car park access and parking arrangements have been assessed against the requirements of AS2890.1:2004, with reference to Class 1A (residential/employee) facilities. The development is to provide the following dimensions for the parking spaces:

Class 1A (residential/employee) facilities:

- Car Spaces: 2.5m x 5.4m
- Aisle Width: 5.8m (minimum)

The parking space assessment indicates that the parking spaces exceeds the minimum requirements stipulated in AS2890.1.

All parking bays shall be installed in accordance with AS2890.1, including the provision of 300mm door clearance to high physical obstructions.

7.3.2 Accessible Parking

All accessible parking spaces have been individually assessed against the requirements of AS2890.6. Accessible parking spaces are to be designed based on the following dimensions:

- Accessible Space: 2.4m x 5.4m
- Adjacent Shared Bay: 2.4m x 5.4m (with a bollard)

All shared bays and accessible spaces shall be installed in accordance with AS2890.6, including the installation of bollards and relevant pavement marking. A minimum height clearance of 2.5m is to be maintained above all accessible and shared bays.

7.3.3 Bicycle Parking

All bicycle parking spaces are provided in accordance with AS2890.3:2015.

Approved bicycle parking devices shall be installed as per the following requirements of AS2890.3:2015:

- Horizontal parking: 0.5m x 1.8m

A minimum height clearance of 2.2m is to be maintained above all bicycle parking spaces. All proposed bicycle parking meets the above requirements.

7.3.4 Motorcycle Parking

All motorcycle parking spaces have been assessed against the requirements of AS2890.1. All motorcycle spaces are to provide the following dimensions:

- Length: 2.5m
- Width: 1.2m

All proposed motorcycle spaces meet the above requirements.

8. Conclusion

ptc. has been engaged by The Scots College to prepare a Traffic Impact Assessment (TIA) for the proposed development of an underground car park directly underneath the McIntyre Tennis Courts servicing 29-53 Victoria Road, Bellevue Hill. This assessment accompanies a Development Application (DA) to be presented to Woollahra Municipal Council.

Existing accessibility to the college is provided by a number of facilities. The wider state and regional road network connects to local roads, which service the school. The college is also accessible by public transport, although the relatively low bus frequency and the longer distance to the ferry make this mode of share only moderately attractive.

In regard to car parking, currently the school provides 79 on-site spaces, which are predominantly used by staff. In addition, according to a Class 1 appeal against the refusal of DA93/111, Commissioner Pearlman J accepted the evidence of the Colston Budd traffic report that there are 80 spaces within the frontage of the college, which offset the on-site parking requirements. With this application, The Scots College proposes to provide additional 83 parking spaces at the McIntyre Tennis Courts (80 in a basement and 3 accessible at-grade spaces adjacent to the oval). It is also noted that a separate development application is being put forward to redevelop an existing car park and to provide 17 parking spaces at the Ginahgulla campus, 9 of which will have a dual use as a pick-up and drop-off area and as staff / visitor parking bays outside of peak periods.

With these provisions, The Scots College will accommodate a total of 162 on-site and 80 off-site parking spaces for use by staff, eligible students and visitors. This provision meets the requirements stipulated by the Woollahra DCP of 142 parking spaces (225 – 80 offset according to the above mentioned verdict). Furthermore, it is anticipated that the provision of the car parking spaces, dedicated to The Scots College staff, will relieve the pressure on the existing on-street parking availabilities.

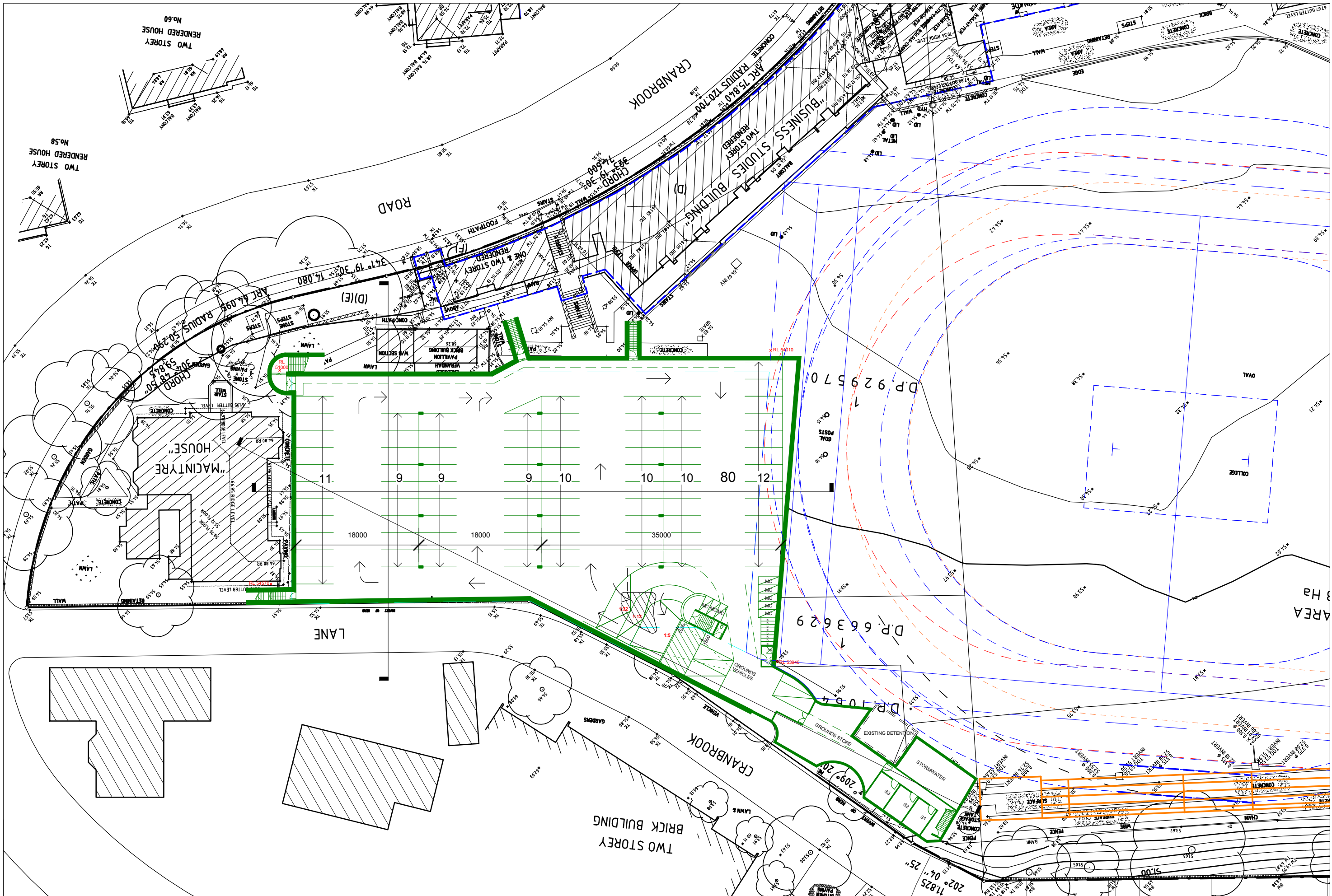
The development also involves the provision of motorcycle and bicycle spaces, which is hoped to encourage staff and students to utilise alternative modes of share.

In regard to the future traffic volumes, this proposal will not generate any additional traffic, however, it is anticipated that the distribution of vehicle movements will be changed, as vehicles using the new facility will need to access/depart Cranbrook Road, either from the east or west.

The SIDRA analysis indicates that the performance of the key intersections in the vicinity of the subject site will have no major impact, with all performance indicators increasing marginally post-development. Therefore, it is anticipated that the proposed development will be able to accommodate the proposed changes to the traffic distribution in the vicinity of the school.

In light of the above, the proposed development is endorsed in the context of parking and traffic.

Attachment 1 - Architectural Plans



ADAI
ARCHITECTS
PO Box 156
DOUBLE BAY NSW 1360
P: 0407 414 755
Email: davidf@dfarchitects.com.au

Rev.	Date	Revision Description
1	07/10/19	DEVELOPMENT APPLICATION

DO NOT SCALE.
CHECK DIMENSIONS ON SITE.
DRAWING COPYRIGHT:
ADAI ARCHITECTS.
IF CONTRADICTIONS OCCUR CONTACT
THE ARCHITECT



The Scots College
THE SCOTS COLLEGE - MACINTYRE COURTS
29-53 Victoria Rd,
Bellevue Hill NSW 2023



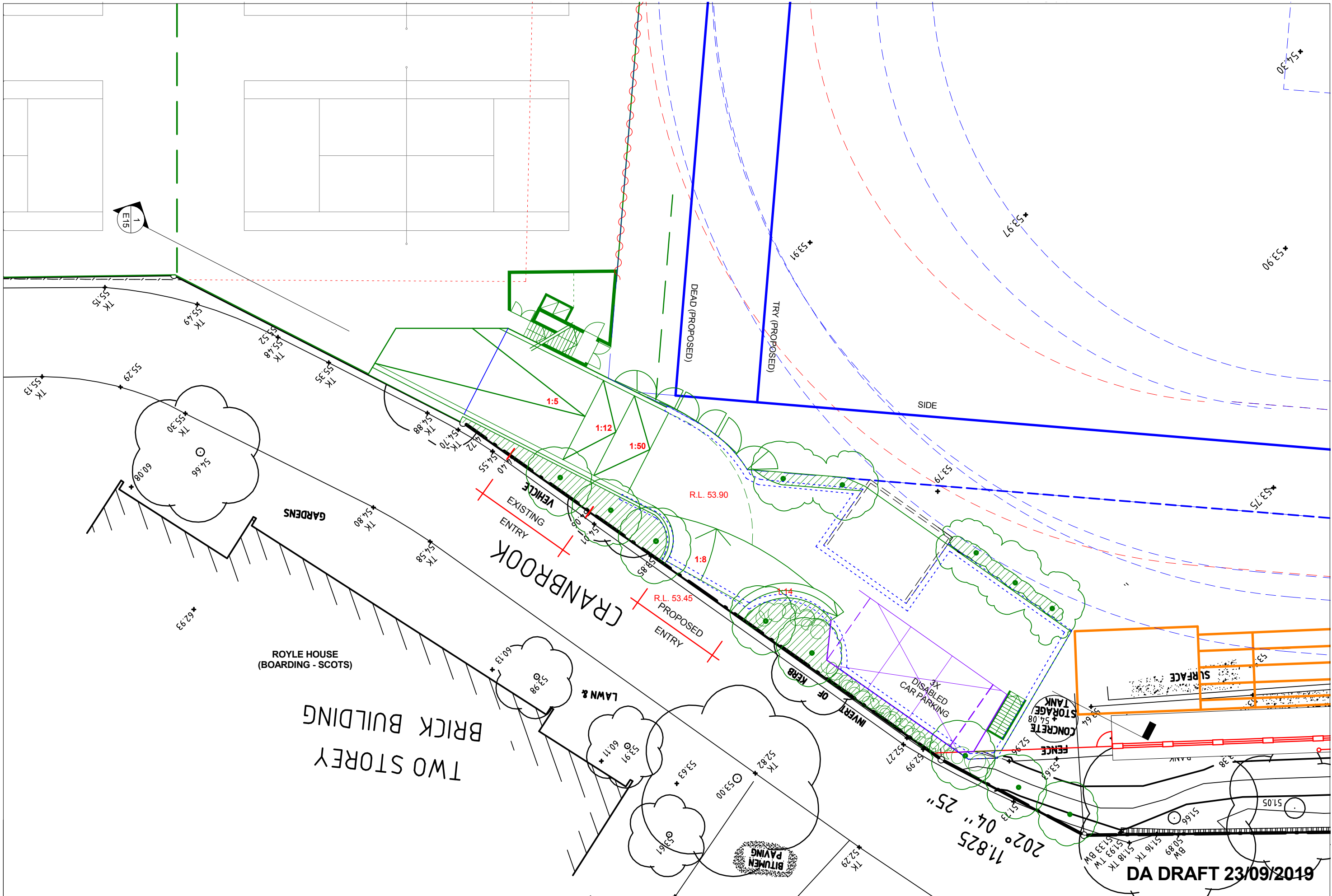
Drw: Author
Chk: Checker Proj Date: 01-09-2015 Scale 1 : 500 @A3

PROPOSED CARPARK LEVEL
1-500

Dwg Set
DA

Drawing Number
D01

Rev
1



Rev.	Date	Revision Description
1	27/09/19	DA DRAFT

DO NOT SCALE.
CHECK DIMENSIONS ON SITE.
DRAWING COPYRIGHT:
ADAI ARCHITECTS.
IF CONTRADICTIONS OCCUR CONTACT
THE ARCHITECT



The Scots College
THE SCOTS COLLEGE - MACINTYRE COURTS
29-53 Victoria Rd,
Bellevue Hill NSW 2023



PROPOSED COURT LEVEL 1-250
Dwg Set: DA
Drawing Number: E04
Rev: 1
Drw: Author
Chk: Checker Proj Date: 01-09-2015 Scale 1 : 250 @A3

DA DRAFT 23/09/2019

9/27/2019 10:56:08 AM

Attachment 2 - SIDRA Results

MOVEMENT SUMMARY

▽ Site: 04 [1.d Cran Rd-Cran Ln (AM) - Existing]

Site Category: (None)
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows 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: Carrington Ave												
1	L2	9	11.1	0.010	6.2	LOS A	0.0	0.3	0.28	0.55	0.28	42.5
3	R2	2	0.0	0.010	7.6	LOS A	0.0	0.3	0.28	0.55	0.28	47.0
Approach		12	9.1	0.010	6.5	LOS A	0.0	0.3	0.28	0.55	0.28	43.5
East: Cranbrook Rd (E)												
4	L2	4	0.0	0.096	6.3	LOS A	0.1	0.6	0.04	0.04	0.04	56.0
5	T1	178	1.2	0.096	0.1	LOS A	0.1	0.6	0.04	0.04	0.04	59.0
6	R2	5	20.0	0.096	6.5	LOS A	0.1	0.6	0.04	0.04	0.04	56.0
6u	U	2	0.0	0.096	8.1	LOS A	0.1	0.6	0.04	0.04	0.04	56.0
Approach		189	1.7	0.096	0.5	NA	0.1	0.6	0.04	0.04	0.04	58.7
North: Cranbrook Ln												
7	L2	6	16.7	0.014	6.4	LOS A	0.0	0.4	0.33	0.58	0.33	50.7
9	R2	6	0.0	0.014	7.7	LOS A	0.0	0.4	0.33	0.58	0.33	49.5
Approach		13	8.3	0.014	7.0	LOS A	0.0	0.4	0.33	0.58	0.33	50.1
West: Cranbrook Rd (W)												
10	L2	20	15.8	0.113	6.3	LOS A	0.2	1.1	0.06	0.09	0.06	55.8
11	T1	193	0.0	0.113	0.1	LOS A	0.2	1.1	0.06	0.09	0.06	57.9
12	R2	12	0.0	0.113	6.1	LOS A	0.2	1.1	0.06	0.09	0.06	53.3
12u	U	3	0.0	0.113	8.0	LOS A	0.2	1.1	0.06	0.09	0.06	52.5
Approach		227	1.4	0.113	1.0	NA	0.2	1.1	0.06	0.09	0.06	57.4
All Vehicles		441	1.9	0.113	1.1	NA	0.2	1.1	0.07	0.09	0.07	57.2

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

MOVEMENT SUMMARY

▽ Site: 04 [1.d Cran Rd-Cran Ln (PM) - Existing]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows 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: Carrington Ave												
1	L2	17	0.0	0.014	5.9	LOS A	0.1	0.4	0.23	0.54	0.23	44.6
3	R2	2	0.0	0.014	7.0	LOS A	0.1	0.4	0.23	0.54	0.23	47.2
Approach		19	0.0	0.014	6.1	LOS A	0.1	0.4	0.23	0.54	0.23	45.0
East: Cranbrook Rd (E)												
4	L2	3	0.0	0.077	6.1	LOS A	0.1	0.8	0.06	0.07	0.06	55.3
5	T1	132	6.4	0.077	0.1	LOS A	0.1	0.8	0.06	0.07	0.06	58.2
6	R2	9	0.0	0.077	6.0	LOS A	0.1	0.8	0.06	0.07	0.06	56.7
6u	U	3	0.0	0.077	7.7	LOS A	0.1	0.8	0.06	0.07	0.06	55.4
Approach		147	5.7	0.077	0.8	NA	0.1	0.8	0.06	0.07	0.06	57.9
North: Cranbrook Ln												
7	L2	5	0.0	0.022	5.9	LOS A	0.1	0.5	0.31	0.59	0.31	51.1
9	R2	15	0.0	0.022	7.2	LOS A	0.1	0.5	0.31	0.59	0.31	49.6
Approach		20	0.0	0.022	6.8	LOS A	0.1	0.5	0.31	0.59	0.31	50.0
West: Cranbrook Rd (W)												
10	L2	14	0.0	0.090	6.0	LOS A	0.2	1.4	0.09	0.12	0.09	55.7
11	T1	141	0.7	0.090	0.1	LOS A	0.2	1.4	0.09	0.12	0.09	57.1
12	R2	13	0.0	0.090	6.0	LOS A	0.2	1.4	0.09	0.12	0.09	52.4
12u	U	7	0.0	0.090	7.7	LOS A	0.2	1.4	0.09	0.12	0.09	51.7
Approach		175	0.6	0.090	1.3	NA	0.2	1.4	0.09	0.12	0.09	56.4
All Vehicles		361	2.6	0.090	1.6	NA	0.2	1.4	0.10	0.14	0.10	55.8

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: 04 [1.d Cran Rd-Cran Ln (AM) - Development]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows 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: Carrington Ave												
1	L2	9	11.1	0.010	6.2	LOS A	0.0	0.3	0.28	0.55	0.28	42.5
3	R2	2	0.0	0.010	7.9	LOS A	0.0	0.3	0.28	0.55	0.28	47.0
Approach		12	9.1	0.010	6.5	LOS A	0.0	0.3	0.28	0.55	0.28	43.5
East: Cranbrook Rd (E)												
4	L2	4	0.0	0.120	6.4	LOS A	0.3	2.4	0.16	0.12	0.16	53.8
5	T1	178	1.2	0.120	0.3	LOS A	0.3	2.4	0.16	0.12	0.16	56.5
6	R2	39	2.7	0.120	6.4	LOS A	0.3	2.4	0.16	0.12	0.16	55.6
6u	U	2	0.0	0.120	8.1	LOS A	0.3	2.4	0.16	0.12	0.16	54.2
Approach		223	1.4	0.120	1.5	NA	0.3	2.4	0.16	0.12	0.16	56.2
North: Cranbrook Ln												
7	L2	15	7.1	0.033	6.2	LOS A	0.1	0.8	0.34	0.60	0.34	50.7
9	R2	15	0.0	0.033	8.1	LOS A	0.1	0.8	0.34	0.60	0.34	49.3
Approach		29	3.6	0.033	7.2	LOS A	0.1	0.8	0.34	0.60	0.34	50.1
West: Cranbrook Rd (W)												
10	L2	54	5.9	0.130	5.9	LOS A	0.2	1.2	0.06	0.15	0.06	55.3
11	T1	193	0.0	0.130	0.1	LOS A	0.2	1.2	0.06	0.15	0.06	56.8
12	R2	12	0.0	0.130	6.2	LOS A	0.2	1.2	0.06	0.15	0.06	52.1
12u	U	3	0.0	0.130	8.0	LOS A	0.2	1.2	0.06	0.15	0.06	51.3
Approach		261	1.2	0.130	1.6	NA	0.2	1.2	0.06	0.15	0.06	56.2
All Vehicles		525	1.6	0.130	2.0	NA	0.3	2.4	0.12	0.17	0.12	55.4

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: PARKING AND TRAFFIC CONSULTANTS | Processed: Tuesday, 8 October 2019 2:25:57 PM

Project: Z:\PCI - PROJECT WORK FILES\NSW\THE SCOTS COLLEGE - McINTYRE CAR PARK\Analysis\191008 - Intersection Survey.sip8

MOVEMENT SUMMARY

▽ Site: 04 [1.d Cran Rd-Cran Ln (PM) - Development]

Site Category: (None)
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carrington Ave												
1	L2	17	0.0	0.014	5.9	LOS A	0.1	0.4	0.23	0.54	0.23	44.6
3	R2	2	0.0	0.014	7.3	LOS A	0.1	0.4	0.23	0.54	0.23	47.2
Approach		19	0.0	0.014	6.1	LOS A	0.1	0.4	0.23	0.54	0.23	45.0
East: Cranbrook Rd (E)												
4	L2	3	0.0	0.083	6.1	LOS A	0.2	1.2	0.09	0.09	0.09	54.6
5	T1	132	6.4	0.083	0.1	LOS A	0.2	1.2	0.09	0.09	0.09	57.4
6	R2	18	0.0	0.083	6.0	LOS A	0.2	1.2	0.09	0.09	0.09	56.3
6u	U	3	0.0	0.083	7.7	LOS A	0.2	1.2	0.09	0.09	0.09	54.9
Approach		156	5.4	0.083	1.1	NA	0.2	1.2	0.09	0.09	0.09	57.1
North: Cranbrook Ln												
7	L2	39	0.0	0.088	6.0	LOS A	0.3	2.2	0.30	0.60	0.30	51.1
9	R2	48	0.0	0.088	7.4	LOS A	0.3	2.2	0.30	0.60	0.30	49.7
Approach		87	0.0	0.088	6.8	LOS A	0.3	2.2	0.30	0.60	0.30	50.4
West: Cranbrook Rd (W)												
10	L2	22	0.0	0.094	5.9	LOS A	0.2	1.5	0.09	0.14	0.09	55.4
11	T1	141	0.7	0.094	0.1	LOS A	0.2	1.5	0.09	0.14	0.09	56.7
12	R2	13	0.0	0.094	6.0	LOS A	0.2	1.5	0.09	0.14	0.09	52.1
12u	U	7	0.0	0.094	7.7	LOS A	0.2	1.5	0.09	0.14	0.09	51.3
Approach		183	0.6	0.094	1.5	NA	0.2	1.5	0.09	0.14	0.09	56.0
All Vehicles		445	2.1	0.094	2.6	NA	0.3	2.2	0.14	0.23	0.14	54.3

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: 03 [1.c Victoria-Cranbrook Rd (AM) - Existing]

Site Category: (None)
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Victoria Rd (S)												
2	T1	458	2.3	0.312	0.5	LOS A	1.1	7.9	0.23	0.14	0.23	54.8
3b	R3	113	0.0	0.312	8.1	LOS A	1.1	7.9	0.23	0.14	0.23	54.2
Approach		571	1.8	0.312	2.0	NA	1.1	7.9	0.23	0.14	0.23	54.6
SouthEast: Cranbrook Rd												
21b	L3	88	2.4	0.063	7.0	LOS A	0.3	1.8	0.26	0.59	0.26	46.7
23a	R1	92	1.1	0.174	10.0	LOS A	0.6	4.0	0.63	0.84	0.63	33.1
Approach		180	1.8	0.174	8.6	LOS A	0.6	4.0	0.45	0.72	0.45	41.0
North: Victoria Rd (N)												
7a	L1	154	2.1	0.166	3.7	LOS A	0.0	0.0	0.00	0.25	0.00	49.3
8	T1	164	7.7	0.166	0.0	LOS A	0.0	0.0	0.00	0.25	0.00	55.7
Approach		318	5.0	0.166	1.8	NA	0.0	0.0	0.00	0.25	0.00	53.1
All Vehicles		1068	2.8	0.312	3.1	NA	1.1	7.9	0.20	0.27	0.20	51.4

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: PARKING AND TRAFFIC CONSULTANTS | Processed: Tuesday, 8 October 2019 2:29:56 PM

Project: Z:\PCI - PROJECT WORK FILES\NSW\THE SCOTS COLLEGE - McINTYRE CAR PARK\Analysis\191008 - Intersection Survey.sip8

MOVEMENT SUMMARY

▽ Site: 03 [1.c Victoria-Cranbrook Rd (PM) - Existing]

Site Category: (None)
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows 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: Victoria Rd (S)												
2	T1	111	9.5	0.095	0.4	LOS A	0.4	2.6	0.24	0.22	0.24	52.9
3b	R3	55	0.0	0.095	7.3	LOS A	0.4	2.6	0.24	0.22	0.24	52.7
Approach		165	6.4	0.095	2.7	NA	0.4	2.6	0.24	0.22	0.24	52.8
SouthEast: Cranbrook Rd												
21b	L3	105	0.0	0.072	6.9	LOS A	0.3	2.1	0.22	0.58	0.22	47.1
23a	R1	68	12.3	0.079	6.6	LOS A	0.3	2.0	0.38	0.64	0.38	37.8
Approach		174	4.8	0.079	6.8	LOS A	0.3	2.1	0.28	0.60	0.28	44.4
North: Victoria Rd (N)												
7a	L1	108	1.0	0.121	3.7	LOS A	0.0	0.0	0.00	0.25	0.00	49.3
8	T1	120	13.2	0.121	0.0	LOS A	0.0	0.0	0.00	0.25	0.00	55.7
Approach		228	7.4	0.121	1.8	NA	0.0	0.0	0.00	0.25	0.00	53.1
All Vehicles		567	6.3	0.121	3.6	NA	0.4	2.6	0.16	0.35	0.16	49.8

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: PARKING AND TRAFFIC CONSULTANTS | Processed: Tuesday, 8 October 2019 2:23:00 PM

Project: Z:\PCI - PROJECT WORK FILES\NSW\THE SCOTS COLLEGE - McINTYRE CAR PARK\Analysis\191008 - Intersection Survey.sip8

MOVEMENT SUMMARY

▽ Site: 03 [1.c Victoria-Cranbrook Rd (AM) - Development]

Site Category: (None)
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Victoria Rd (S)												
2	T1	443	2.4	0.317	0.6	LOS A	1.2	8.8	0.26	0.16	0.26	54.2
3b	R3	127	0.0	0.317	8.1	LOS A	1.2	8.8	0.26	0.16	0.26	53.8
Approach		571	1.8	0.317	2.3	NA	1.2	8.8	0.26	0.16	0.26	54.1
SouthEast: Cranbrook Rd												
21b	L3	94	2.2	0.066	7.0	LOS A	0.3	1.9	0.25	0.58	0.25	46.8
23a	R1	96	1.1	0.179	10.0	LOS A	0.6	4.1	0.63	0.84	0.63	33.2
Approach		189	1.7	0.179	8.5	LOS A	0.6	4.1	0.44	0.71	0.44	41.2
North: Victoria Rd (N)												
7a	L1	173	1.8	0.166	3.7	LOS A	0.0	0.0	0.00	0.28	0.00	48.7
8	T1	145	8.7	0.166	0.0	LOS A	0.0	0.0	0.00	0.28	0.00	55.2
Approach		318	5.0	0.166	2.0	NA	0.0	0.0	0.00	0.28	0.00	52.2
All Vehicles		1078	2.7	0.317	3.3	NA	1.2	8.8	0.22	0.29	0.22	50.8

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: PARKING AND TRAFFIC CONSULTANTS | Processed: Tuesday, 8 October 2019 2:30:04 PM

Project: Z:\PCI - PROJECT WORK FILES\NSW\THE SCOTS COLLEGE - McINTYRE CAR PARK\Analysis\191008 - Intersection Survey.sip8

MOVEMENT SUMMARY

▽ Site: 03 [1.c Victoria-Cranbrook Rd (PM) - Development]

Site Category: (None)
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows 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: Victoria Rd (S)												
2	T1	111	9.5	0.099	0.5	LOS A	0.4	2.8	0.25	0.23	0.25	52.6
3b	R3	59	0.0	0.099	7.4	LOS A	0.4	2.8	0.25	0.23	0.25	52.5
Approach		169	6.2	0.099	2.9	NA	0.4	2.8	0.25	0.23	0.25	52.5
SouthEast: Cranbrook Rd												
21b	L3	124	0.0	0.085	6.9	LOS A	0.3	2.4	0.23	0.58	0.23	47.1
23a	R1	83	10.1	0.095	6.6	LOS A	0.3	2.4	0.38	0.65	0.38	37.8
Approach		207	4.1	0.095	6.8	LOS A	0.3	2.4	0.29	0.61	0.29	44.4
North: Victoria Rd (N)												
7a	L1	114	0.9	0.123	3.7	LOS A	0.0	0.0	0.00	0.25	0.00	49.2
8	T1	120	13.2	0.123	0.0	LOS A	0.0	0.0	0.00	0.25	0.00	55.6
Approach		234	7.2	0.123	1.8	NA	0.0	0.0	0.00	0.25	0.00	52.9
All Vehicles		611	5.9	0.123	3.8	NA	0.4	2.8	0.17	0.37	0.17	49.4

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2018 Akcelik and Associates Pty Ltd | sidrasolutions.com


Organisation: PARKING AND TRAFFIC CONSULTANTS | Processed: Thursday, 10 October 2019 11:02:42 AM

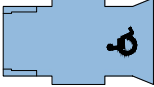
Project: Z:\PCI - PROJECT WORK FILES\NSW\THE SCOTS COLLEGE - McINTYRE CAR PARK\Analysis\191008 - Intersection Survey.sip8


Attachment 3 - Compliance Assessment





Car Space Dimensions

- 

CAR SPACE
Width: 2.5m
Length: 5.4m
- 


ACCESSIBLE CAR SPACE
Width: 2.4m
Length: 5.4m
- 

SHARED BAY
Width: 2.4m
Length: 5.4m
- 


MOTORCYCLE SPACE
Width: 1.2m
Length: 2.5m
- 

BICYCLE SPACE
Width: 0.5m
Length: 1.8m


Vehicle Specifications

- 


5.2



0.95 3.05
- B99 Vehicle (Realistic min radius) (2004)

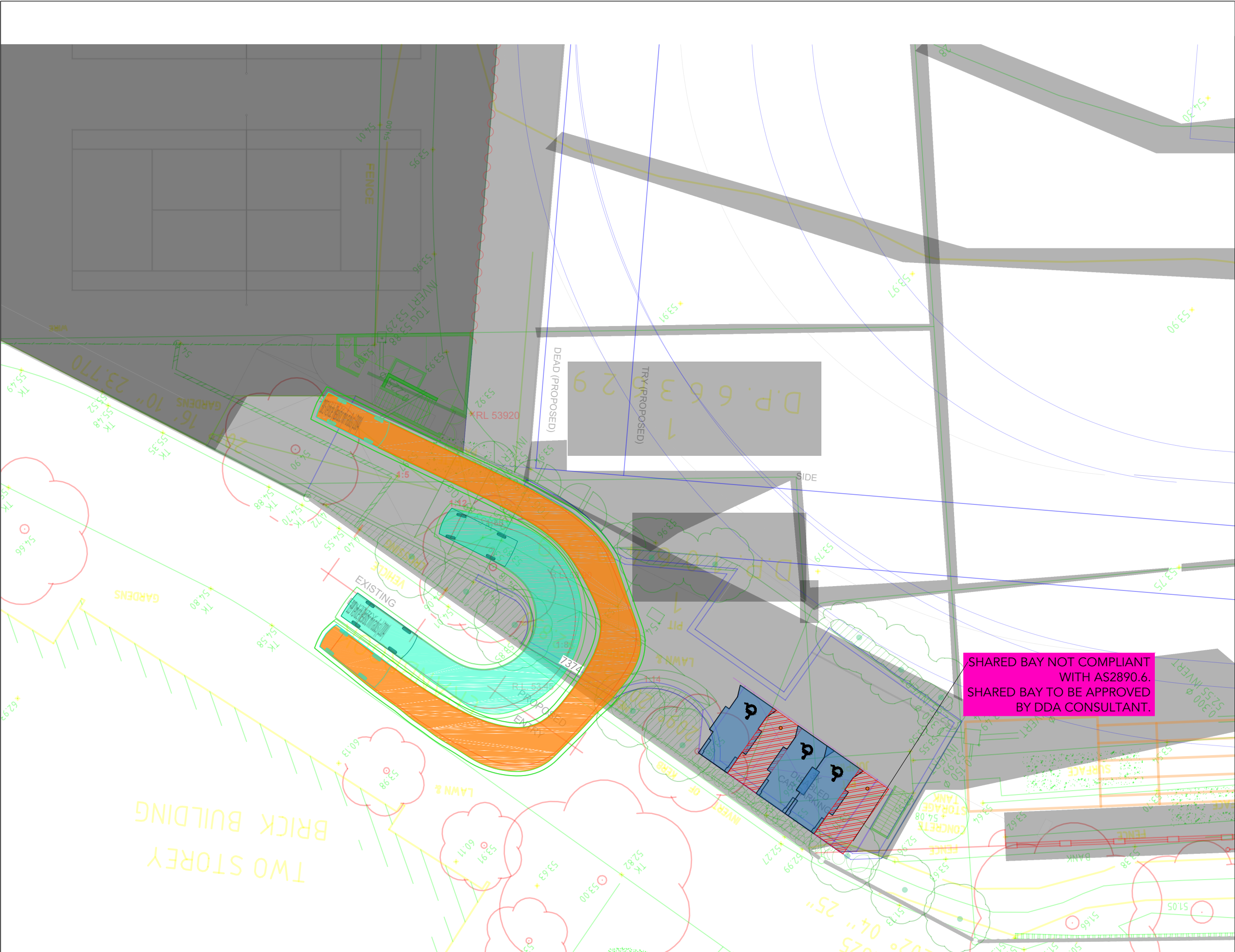
Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m
- 

4.91



0.92 2.8
- B85 Vehicle (Realistic min radius) (2004)

Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m



Car Space Dimensions

- CAR SPACE
Width: 2.5m
Length: 5.4m
- ACCESSIBLE CAR SPACE
Width: 2.4m
Length: 5.4m
- SHARED BAY
Width: 2.4m
Length: 5.4m
- MOTORCYCLE SPACE
Width: 1.2m
Length: 2.5m
- BICYCLE SPACE
Width: 0.5m
Length: 1.8m

Vehicle Specifications

- B99 Vehicle (Realistic min radius) (2004)
Overall Length 5.200m
Overall Width 1.940m
Overall Body Height 1.878m
Min Body Ground Clearance 0.272m
Track Width 1.840m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 6.250m
- B85 Vehicle (Realistic min radius) (2004)
Overall Length 4.910m
Overall Width 1.870m
Overall Body Height 1.421m
Min Body Ground Clearance 0.159m
Track Width 1.770m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 5.750m