

Transport and Accessibility Impact Assessment

Smalls Road Public School

SR-01-SD-TR-RP-1000-1

Prepared for NSW Department of Education c/o CGAMW / 18th October 2017

Contents

Executive Summary	6
1 Introduction.....	7
1.1 Background	7
1.2 Objectives.....	7
1.3 Structure.....	7
1.4 Draft School Catchment.....	8
1.5 Consultation	9
1.6 References	9
2 Response to SEARs	10
3 Existing Conditions	14
3.1 Site Location.....	14
3.2 Site Access.....	16
3.3 Traffic Generation.....	17
3.4 Car Parking	17
3.4.1 On-Street Parking	17
3.4.2 Off-Street Parking	20
3.5 Active Transport	20
3.5.1 Pedestrian Facilities	20
3.5.2 Cycling Facilities	21
3.6 Public Transport	22
3.6.1 Public Bus Services	22
3.6.2 School Bus Services	23
3.6.3 Other Public Transport	23
3.7 Traffic Conditions.....	24
3.7.1 Traffic Volume Summaries	24
3.7.2 Intersection Modelling	25
4 Proposed Development	26
4.1 The Development	26
4.2 Site Access.....	27
4.3 Car Parking	27
4.3.1 Drop-Off and Pick-Up Facilities	28
4.3.2 On-Street Parking	29
4.3.3 Off-Street Parking	29
4.3.4 Accessible Parking.....	30
4.4 Active Transport	30

4.4.1	Pedestrian Movements.....	30
4.4.2	Cycling Facilities	31
4.5	Public Transport	31
4.5.1	Public Bus Services	31
4.5.2	School Bus Services	31
4.6	Traffic Impacts	32
4.6.1	Traffic Growth	32
4.6.2	Trip Generation	32
4.6.3	Trip Distribution	33
4.6.4	Future Traffic Conditions	35
4.7	Road Safety.....	37
4.7.1	Site Frontages.....	37
4.7.2	Drop-Off and Pick-Up Facilities	37
4.7.3	Pedestrian Crossings	37
4.7.4	School Crossing Supervisor	37
4.8	Service and Loading	38
5	Sustainable Travel	39
6	Construction Traffic.....	40
7	Recommendations.....	41
7.1	Staggered Class Times	41
7.2	40km/hr School Zone	41
7.3	School Crossing Supervisor	41
7.4	Sustainable Travel Initiatives	41
8	Conclusion	42
	Appendix A – On-Street Parking	44
	Appendix B – Bus Occupancy.....	51
	Appendix C – Traffic Counts	52
	Appendix D – Traffic Modelling	53
	Appendix E – Sustainable Travel	54
	Appendix F – Construction Traffic	55

List of Figures

Figure 1.1: Draft school catchment.....	8
Figure 3.1: Site location	14
Figure 3.2: Site zoning	15
Figure 3.3: State and regional roads	15

Figure 3.4: Existing site access	16
Figure 3.5: On-street parking within 400m walking catchment.....	18
Figure 3.6: Weekend parking and traffic observations.....	19
Figure 3.7: Local pedestrian facilities	21
Figure 3.8: Local cycling facilities	22
Figure 3.9: Seven-day traffic volumes on Smalls Road	24
Figure 4.1: Proposed site layout.....	26
Figure 4.2: Catchment area distribution	34
Figure 4.3: Cumulative traffic distribution	34
Figure 4.4: Pre- and post-development intersection operation	36
Figure 8.1: On-street parking occupancy – weekday morning	45
Figure 8.2: On-street parking occupancy – weekday afternoon.....	46
Figure 8.3: On-street parking occupancy – weekend morning.....	47
Figure 8.4: On-street parking occupancy – weekend midday	48
Figure 8.5: On-street parking occupancy – weekend afternoon.....	49

List of Tables

Table 1.1: Projected student population	9
Table 2.1: Response to SEARs.....	10
Table 3.1: On-street parking occupancy summary	19
Table 3.2: Public bus frequencies	22
Table 3.3: Bus occupancy	23
Table 3.4: Intersection modelling results summary.....	25
Table 4.1: Intersection modelling results summary.....	35
Table 8.1: On-street parking occupancy – detailed results	50
Table 8.2: Recorded bus occupancy	51

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EXECUTIVE SUMMARY

This transport and accessibility impact assessment has been prepared to examine the proposed Smalls Road Public School and its impact on the local transport network. As a State Significant Development in a primarily residential area, it is of critical importance to adequately understand the anticipated behaviour of the proposed development to avoid unnecessary impact on local residents. This report is intended to determine this impact and make recommendations to lessen this impact where appropriate, in addition to assessing the adequacy of the development with regard to relevant standards and legislation.

A review of the current site has been undertaken including traffic counts and modelling, street parking studies, and public transport occupancy surveys. The road network surrounding the site currently operates at a good Level of Service at local intersections, with significant spare capacity available for on-street parking and local bus services.

The proposed development is expected to provide a car park with capacity for 47 parking spaces. Based on anticipated vehicle mode share of 85%, staff parking demand is at 59 spaces resulting in minimal overflow to on-street parking. With implementation of recommended sustainable travel initiatives and a target of 70% vehicle usage, parking impacts would be further reduced.

A modified and widened on-street parking zone is proposed with capacity of 2 buses and up to 26 cars. This area is expected to cater for future school bus services, and service up to 233 vehicles in twenty minutes during the afternoon pick-up period. It is expected that staff assistance and management will be required to ensure adequate operation of the pick-up zone. Whilst noting that this turnover does not reach the ultimate vehicle demand of 331 vehicles, on-street parking within local streets is demonstrated to have significant spare capacity which is expected to cater for this excess demand.

Traffic modelling for the future travel demand has been modelled for 10 years of background growth and more than 20 years of student population growth. Beyond both of these time frames it is difficult to accurately forecast the expected impacts. This limitation is particularly the case considering the opportunity for infrastructure improvements to the overall road network associated with background growth throughout the local area. Intersections are shown to continue to operate at acceptable Levels of Service, with the most significant delays occurring at the intersection of Smalls Road and Quarry Road during the morning peak (operating at Level of Service D). Any traffic impacts related to the School operation are expected to occur over a short period of time, say 30 minutes or less.

A Green Travel Plan (GTP) and a Construction Traffic Management Plan (CTMP) have also been prepared as part of this transport study. These Plans should be considered as preliminary only, due to the nature of uncertainties regarding the construction and operation of the School. More detailed plans would be expected to be developed prior to construction (for a CTMP), and following opening of the School (for a GTP).

Overall the School as proposed is considered to create acceptable levels of impact to the local transport network, and should be deemed suitable for approval of further design development.

1 INTRODUCTION

1.1 Background

The NSW Department of Education (DOE) is proposing to construct a new public school in Ryde. The proposed Smalls Road Public School shall be located on the site of the former Ryde High School. The proposed building is to be designed with an ultimate capacity for 1,000 students.

With an estimated capital construction cost of over \$30 million, the proposed school qualifies as a State Significant Development under Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011.

Taylor Thomson Whitting (TTW) has been engaged by Conrad Gargett Ancher Mortlock Woolley (CGAMW) to provide traffic advice and reporting on the proposed new school. This transport and accessibility impact assessment has been developed in response to the Secretary's Environmental Assessment Requirements for the site, which have been detailed in Section 1 of this report.

1.2 Objectives

The key objective of this report is to identify the future impacts the proposed school will have on the local transport network. In order to determine this impact, a thorough understanding of both the existing conditions and anticipated operational requirements are necessary. An impact assessment must consider the impacts for all transport users, including public transport, private vehicles, cyclists, and pedestrians.

This report also aims to assess the adequacy of the proposed development within the context of various standards and legislation, both those that apply directly to the site and those which may form part of a broader or regional context to all types of development.

1.3 Structure

Section 2 – Response to SEARs

Section 2 of this report presents the Secretary's Environmental Assessment Requirements (SEARs) related to traffic for this development, and the relevant sections of this report in which each item has been addressed. Note also that each section of this report provides reference to the relevant SEARs addressed within that section.

Section 3 – Existing Conditions

Section 3 of this report examines the existing conditions at and around the site. The site's role within the context of the broader road and public transport network is explained, along with an assessment of existing parking conditions along local streets. Traffic counts and modelling have been undertaken to determine the current operation of the road network.

Section 4 – Proposed Development

Section 4 of this report details the proposed development and its impacts on the local area with regards to traffic and transport. Details of on-site transport infrastructure including car parking, pedestrian facilities, bicycle storage, and service and loading requirements are provided and assessed for their adequacy. Connection to the local public transport network is considered, in addition to discussion of site-specific requirements for improved connectivity. Traffic modelling of the projected traffic operation has been completed to demonstrate the capacity of the road network to cater for additional traffic.

Section 5 – Sustainable Travel

Section 5 of this report introduces the Green Travel Plan that has been developed for the site in response to the relevant SEARs.

Section 6 – Construction Traffic

Section 6 of this report introduces the Draft Construction Traffic Management Plan that has been developed for the site in response to the relevant SEARs.

Section 7 – Recommendations

Section 7 details a number of recommendations to be implemented in the future in order to improve the operation and/or safety of users of the school. These recommendations relate to factors which cannot be captured in the design and preliminary development of the school, including operational management procedures or Council/RMS signage and line marking changes.

Section 8 – Conclusion

Section 8 presents the conclusions of this report, summarising the overall project impacts and key findings.

1.4 Draft School Catchment

A draft school catchment area has been provided by the Department of Education. This catchment area has been used to provide a context in which the traffic impacts of this development have been considered. Note that this catchment area is preliminary only and may be subject to change. The draft catchment is illustrated in Figure 1.1 below, highlighted in blue. Major local roads are also shown for reference.



Figure 1.1: Draft school catchment
Image source: Nearmap (dated 18th July 2017)

The draft catchment is also accompanied by a projected enrolment schedule as shown below in Table 1.1. This data is based on the potential local population if the site was open today to all grades, and was provided by the DOE for the purposes of this application.

Table 1.1: Projected student population
Source: NSW Department of Education

Year	2021	2026	2031	2036	2041
Enrolment	710	760	790	790	910

1.5 Consultation

This report has been prepared following consultation between the design team and relevant stakeholders, including:

- City of Ryde Council
 - Pre-lodgement meeting, Tuesday 29th August 2017
- Roads and Maritime Services (representative to City of Ryde)
 - Email correspondence regarding traffic modelling, Thursday 15th June, 2017

1.6 References

This report has been prepared in the context of and with knowledge of a variety of relevant documents, standards, and guidelines:

- Australian Standards, including but not limited to:
 - AS2890 – *Parking facilities*
 - AS1428 – *Design for access and mobility*
- *Guide to Traffic Management* (Austroads), including but not limited to:
 - Part 12: *Traffic Impacts of Developments* (2016)
- *Cycling Aspects of Austroads Guides* (Austroads, 2014)
- *Planning Guidelines for Walking and Cycling* (Department of Infrastructure, Planning and Natural Resources, 2004)
- *EIS Guideline: Roads and Related Facilities* (Department of Urban Affairs and Planning, 1996)
- State Environmental Planning Policies (NSW Government), including:
 - *SEPP (Infrastructure) 2007*
 - *SEPP (State and Regional Development) 2011*
 - *Draft SEPP (Educational Establishments and Child Care Facilities) 2017*
- *Guide to Traffic Generating Developments* (Roads and Traffic Authority, 2002)
- *NSW Long Term Transport Master Plan* (Transport for NSW, 2012)
- Sydney's Future Series (Transport for NSW, 2013), including:
 - *Sydney's Cycling Future*
 - *Sydney's Walking Future*
 - *Sydney's Bus Future*

Additional documentation reviewed from relevant local jurisdictions and similar nearby developments includes:

- *City of Ryde Development Control Plan 2014* (City of Ryde, 2014)
- *Ryde Local Environmental Plan* (NSW Government, 2017)
- *Traffic Impact Assessment – Denistone East Public School* (Taylor Thomson Whitting, 2017)
- *Go Active 2 School Travel Survey* (Denistone East Public School P&C Traffic Committee, 2012)

2 RESPONSE TO SEARs

Under application number SSD 17_8372 we have been provided with Secretary's Environmental Assessment Requirements (SEARs). These requirements were issued on the 1st May 2017 following consultation with local stakeholders. The key issues relevant to a Transport and Accessibility Impact Assessment include those shown in Table 2.1 and have been addressed in various sections of this report as referenced.

Note also that each section of this report provides reference back to the relevant SEARs addressed within that section.

Table 2.1: Response to SEARs

Key issues		Comments and references
1	Statutory and Strategic Context	
	Address the statutory provisions contained in all relevant environmental planning instruments, including: - State Environmental Planning Policy (State & Regional Development) 2011; - State Environmental Planning Policy (Infrastructure) 2007; - State Environmental Planning Policy No. 55 – Remediation of Land; - Draft State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017; and - Ryde Local Environmental Plan 2014.	<i>This transport and accessibility impact assessment has been prepared in the context of the relevant planning policies as listed.</i>
2	Policies	
	Address the relevant planning provisions, goals and strategic planning objectives in the following: - NSW State Priorities; - A Plan for Growing Sydney; - NSW Long Term Transport Master Plan 2012; - Sydney's Cycling Future 2013; - Sydney's Walking Future 2013; - Sydney Bus Future 2013; - Healthy Urban Development Checklist, NSW Health; and - Greater Sydney Commission's Draft North District Plan.	<i>This transport and accessibility impact assessment has been prepared in the context of the relevant strategies and objectives as listed.</i>
5	Transport and Accessibility (Construction and Operation)	
	Include a transport and accessibility impact assessment, which details, but not limited to the following:	
5.1	Accurate details of the current daily and peak hour vehicle, public transport, pedestrian and cycle movement and existing traffic and transport facilities provided on the road network located adjacent to the proposed development;	<i>Section 3.4 – Existing Conditions – Car Parking</i> <i>Section 3.5 – Existing Conditions – Active Transport</i> <i>Section 3.6 – Existing Conditions – Public Transport</i> <i>Section 3.7 – Existing Conditions – Traffic Conditions</i>
5.2	An assessment of the operation of existing and future transport networks including the bus network and their ability to accommodate the forecast number of trips to and from the development;	<i>Section 4.5 – Proposed Development – Public Transport</i> <i>Section 4.6 – Proposed Development – Traffic Impacts</i>

Key issues		Comments and references
5.3	Details of estimated total daily and peak hour trips generated by the proposal, including the sports oval and field, with consideration of existing and future usage based on traffic surveys of similar school sites;	<i>Section 4.6 – Proposed Development – Traffic Impacts</i>
5.4	The adequacy of public transport, pedestrian and bicycle access/circulation and infrastructure to meet the likely future demand of the proposed development within the impact area and connection to the external network;	<i>Section 4.4 – Proposed Development – Active Transport</i> <i>Section 4.5 – Proposed Development – Public Transport</i>
5.5	The impact of the proposed development on existing and future public transport infrastructure within the vicinity of the site in consultation with Roads and Maritime Services and Transport for NSW and identify measures to integrate the development with the transport network;	<i>Section 4.6 – Proposed Development – Traffic Impacts</i>
5.6	Details of any upgrading or road improvement works required to accommodate the proposed development;	<i>Section 4.1 – Proposed Development – The Development</i> <i>Section 4.2 – Proposed Development – Site Access</i> <i>Section 4.3 – Proposed Development – Car Parking</i>
5.7	The preparation of a Green Travel Plan that outlines proposals to encourage sustainable travel choices and details programs for implementation;	<i>Section 5 – Sustainable Travel</i>
5.8	The impact of trips generated by the development on key intersections providing access to the site, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/associated funding for upgrading or road improvements works, if required (note: traffic modelling is to be undertaken with scope to be agreed by TfNSW and RMS in advance);	<i>Section 3.7 – Existing Conditions – Traffic Conditions</i> <i>Section 4.6 – Proposed Development – Traffic Impacts</i>
5.9	The proposed active transport access arrangements and connections to public transport services to address the potential for improving accessibility to and from the site and connections to the wider region via sustainable transport modes;	<i>Section 4.4 – Proposed Development – Active Transport</i> <i>Section 4.5 – Proposed Development – Public Transport</i>
5.10	The proposed access arrangements, including car and bus pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on parking, public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones;	<i>Section 4.1 – Proposed Development – The Development</i> <i>Section 4.2 – Proposed Development – Site Access</i> <i>Section 4.3 – Proposed Development – Car Parking</i>
5.11	Measures to maintain road and personal safety in line with CPTED principles;	<i>Section 4.7 – Proposed Development – Road Safety</i> <i>Note also this report (and associated advice provided through design stage) developed by engineers with Road Safety Audit qualifications.</i> <i>CPTED principles to be addressed by Architect.</i>

Key issues	Comments and references
5.12 The proposed car and bicycle parking provision, including end of trip facilities, which must be taken into consideration of the availability of public transport and the requirements of Council's relevant parking codes and Australian Standards;	<i>Section 4.3 – Proposed Development – Car Parking</i> <i>Section 4.4 – Proposed Development – Active Transport</i>
5.13 Proposed bicycle parking facilities in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance;	<i>Section 4.4 – Proposed Development – Active Transport</i>
5.14 Details of the proposed number of car parking spaces and compliance with appropriate parking codes and justify the level of car parking provided on-site (informed by a parking utilisation survey on streets within 400 m radius from the site on a typical weekday between 8:00am – 9:30am and 2:30 pm – 4:00pm and a weekend between 10:00am – 4:00pm);	<i>Section 3.4 – Existing Conditions – Car Parking</i> <i>Section 4.3 – Proposed Development – Car Parking</i>
5.15 Details of emergency vehicle access arrangements;	<i>Section 4.2 – Proposed Development – Site Access</i>
5.16 An assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures;	<i>Section 4.6 – Proposed Development – Traffic Impacts</i>
5.17 Service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times);	<i>Section 4.8 – Proposed Development – Service and Loading</i>
5.18 In relation to construction traffic: • Assessment of cumulative impacts associated with other construction activities (if any); • An assessment of road safety at key intersections and locations subject to heavy vehicle construction traffic movements and high pedestrian activity; • Details of construction program detailing the anticipated construction duration and highlighting significant and milestone stages and events during the construction process; • Details of anticipated peak hour and daily construction vehicle movements to and from the site; • Details of access routes and arrangements of construction vehicles, construction works to and from the site, emergency vehicles and service vehicle; • Details of temporary cycling and pedestrian access during construction; • Details of proposed construction vehicle access arrangements at all stages of construction; and • Traffic and transport impacts during construction, including cumulative impacts associated with other construction activities (if any), and how these impacts will be mitigated for any associated traffic, pedestrian, cyclists, parking and public transport, including the preparation of a draft Construction Traffic Management Plan to demonstrate the proposed management of the impact.	<i>Section 6 – Construction Traffic</i>

Key issues		Comments and references
5.19	Relevant Policies and Guidelines: • Guide to Traffic Generating Developments (Roads and Maritimes Services) • EIS Guidelines – Road and Related Facilities (DoPI) • Cycling Aspects of Austroads Guides • NSW Planning Guidelines for Walking and Cycling • Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development • Standards Australia AS2890.3 (Bicycle Parking Facilities)	<i>This transport and accessibility impact assessment has been prepared in the context of the relevant policies and guidelines as listed.</i>

3 EXISTING CONDITIONS

3.1 Site Location

The subject site is located at 3B Smalls Road, Ryde, in the northern suburbs of Sydney. The parcel of land is designated as Lot 1 in DP 830420. The extents of this lot are illustrated in Figure 3.1 below, in the context of the local major road network.

The land is currently occupied by a Department of Education facility, for the Economics and Business Educators of NSW. Prior to this usage, the existing buildings were part of Ryde High School, which closed in 1986. Directly to the south-west of the site is the site of the Cerebral Palsy Alliance, designated as Lot 2 of the same deposited plan. On the south-east of the site, the Henri Durant Reserve provides a limited connection through to Lavarack Street.

All other land in the surrounding area is generally occupied by free-standing or townhouse-style residential dwellings. Figure 3.2 illustrates the various land uses in the surrounding area, as specified in the Ryde Local Environmental Plan 2014.

The site is located close to the NSW state road network. Lane Cove Road is the closest state road to the site, approximately 750 metres from the site frontage on Smalls Road. Lane Cove Road is also the major regional distributor for the area, connecting to both the M2 Motorway in the north and the M4 Motorway in the south. Figure 3.3 illustrates the state and regional roads in the vicinity of the site.



Figure 3.1: Site location

Image source: Nearmap (dated 18th July 2017)

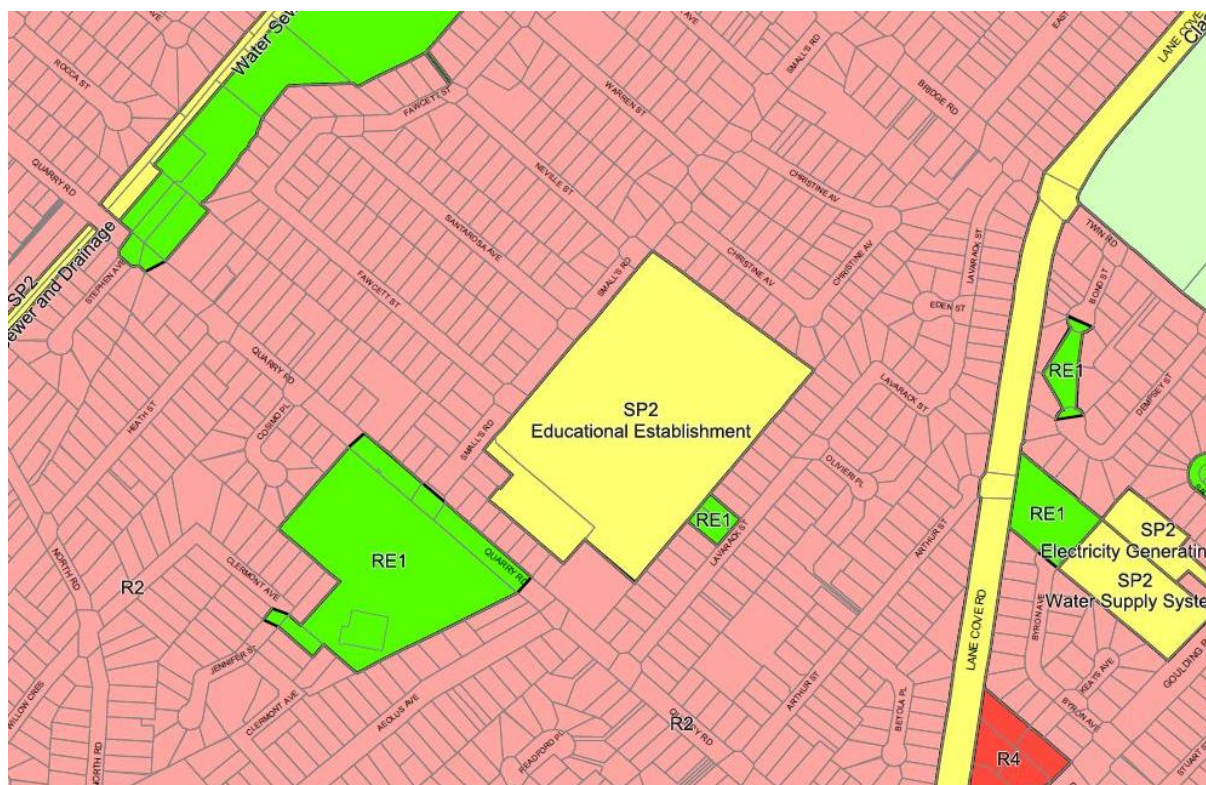


Figure 3.2: Site zoning

Image source: Ryde Local Environmental Plan 2014, Sheet LZ_N_005 (dated 17th March 2017)



Figure 3.3: State and regional roads

Image source: Nearmap (dated 18th July 2017)

3.2 Site Access

Vehicular access to the site is provided via Smalls Road only. There are currently two driveways providing access to internal loading and car park areas. Smalls Road allows for two-way traffic, and both existing driveways allow traffic to turn in and out of the site from both directions. There is one separated pedestrian access provided along the Smalls Road frontage, however both driveways are also used for informal pedestrian movements.

Smalls Road is generally a 9.3 metre wide road carriageway which widens to 11.8 metres (an increase of 2.5 metres) in the area along the site frontage where the road widens to allow parking.

Pedestrian access is also available to Lavarack Street through Henri Durant Reserve at the rear of the site. The current Department of Education site is fenced along this boundary, but a small pedestrian track allows limited movement to and from Smalls Road Reserve. The previous high school on the site also used this frontage for site pedestrian access.

The sports field portion of the site also provides a number of pedestrian access points. One wide access gate allows movements for vehicles such as ambulances to enter the site, and a vehicle crossover is provided at this frontage.

Figure 3.4 illustrates the access options available at the existing site.



Figure 3.4: Existing site access
Image source: Nearmap (dated 18th July 2017)

3.3 Traffic Generation

Secretary's Environmental Assessment Requirement 5.1: Accurate details of the current daily and peak hour vehicle, public transport, pedestrian and cycle movement and existing traffic and transport facilities provided on the road network located adjacent to the proposed development.

In order to determine the existing traffic generation of the site, traffic movements into/out of the site were observed 8:30am – 9:30am on Wednesday 9th August 2017, and 2:30pm – 3:30pm on Monday 7th August 2017. These times were selected as they relate to the anticipated peak traffic generating periods of a future school development.

The results indicated that the existing use of the site generates 17 trips during the morning school peak and 26 trips in the afternoon school peak.

3.4 Car Parking

Secretary's Environmental Assessment Requirement 5.1: Accurate details of the current daily and peak hour vehicle, public transport, pedestrian and cycle movement and existing traffic and transport facilities provided on the road network located adjacent to the proposed development.

Secretary's Environmental Assessment Requirement 5.14: Details of the proposed number of car parking spaces and compliance with appropriate parking codes and justify the level of car parking provided on-site (informed by a parking utilisation survey on streets within 400 m radius from the site on a typical weekday between 8:00am–9:30am and 2:30 pm–4:00pm and a weekend between 10:00am–4:00pm).

While the proposed development shall provide on-site parking for staff and limited visitor usage, it is expected that there may be some impact to on-street parking in the local area. Various users of the site including school visitors may wish to utilise on-street parking, and drop-off and pick-up activities will require capacity particularly along the Smalls Road frontage. In light of these impacts, this report has undertaken a study to examine the existing parking capacity in the local street system.

3.4.1 On-Street Parking

The SEARs for this development require an occupancy survey of on-street parking within a 400-metre radius of the site to be undertaken. Parking areas were assessed within a 400-metre walk of both the Smalls Road site frontage and the Lavarack Street access at the rear of the site, which are calculated to have a total capacity of approximately 542 spaces. The parking areas selected for recording are shown in Figure 3.5 below. Areas without on-street capacity shown are currently No Stopping or No Parking zones. Note that some parking along Zola Avenue and Fawcett Street is beyond the 400-metre extent of the site. However, this is expected to be interpreted by users as being within a reasonable local walking catchment (maximum 600 metres) being located between Quarry Road and Bridge Road.

Occupancy data was recorded on Thursday 29th June (typical weekday) and Saturday 29th July (typical sports field usage), 2017. These dates both fell during the NSW school term, and are understood to represent typical occupancy during school operation in the future. Full results are attached in **Appendix A** of this report.

The occupancy surveys demonstrated that there is approximately 60% to 70% vacancy or over 300 parking spaces available within 400 metres walk of the site. Indented parking directly in front of the existing site on Smalls Road was typically fully occupied, and site observation shows that these were associated with residential users rather than the

Department of Education. It is understood that the existing off-street parking provides sufficient capacity such that on-street spaces are not required. Parking further along the frontage of the Smalls Road Reserve was generally minimal.

On-street parking on Lavarack Street also typically occurred on both sides of the narrow street, resulting in a single remaining traffic lane. As this street does not provide for through traffic, total traffic volumes are generally limited. The single lane width was not observed to cause congestion or delays greater than a single vehicle giving way to oncoming traffic.

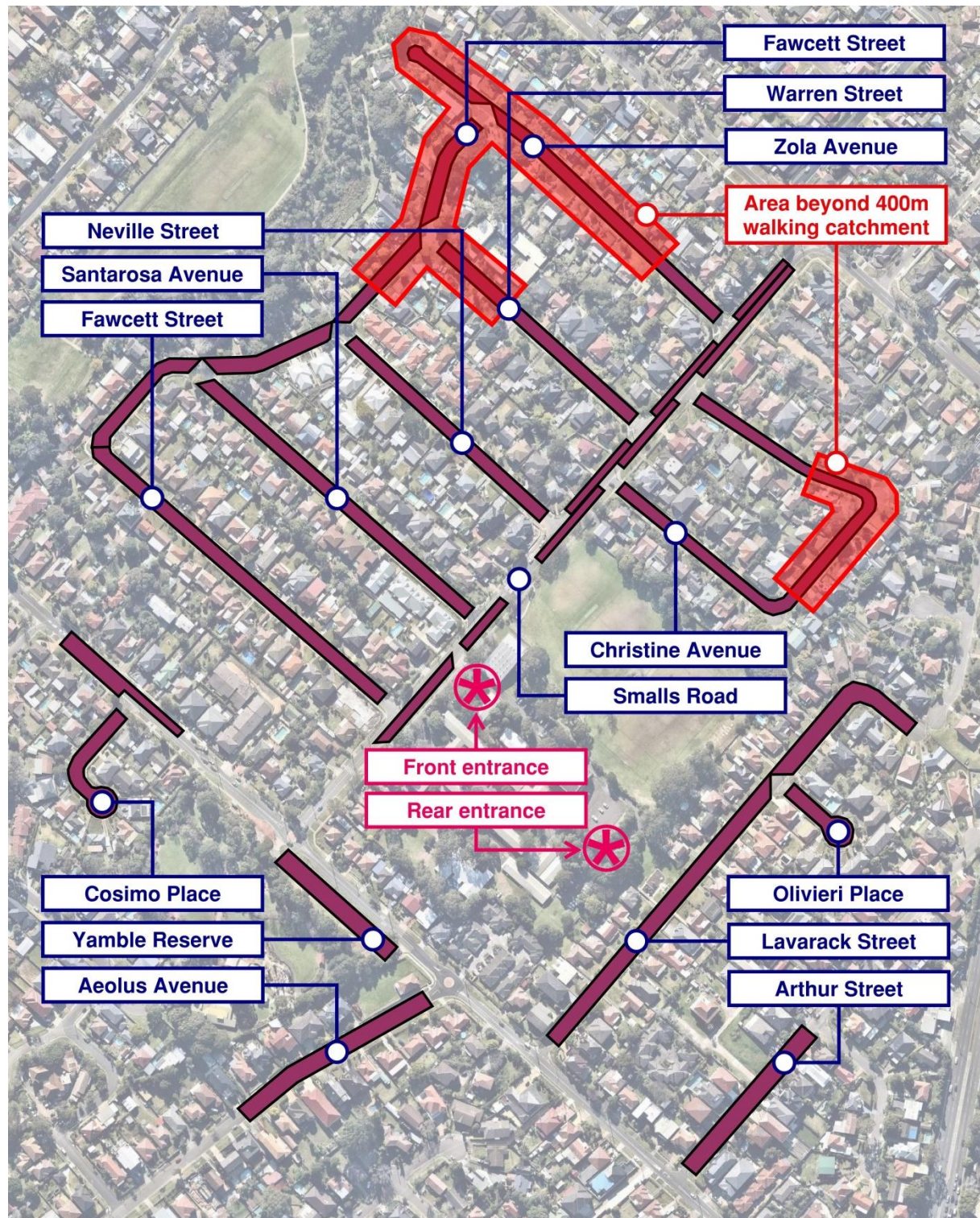


Figure 3.5: On-street parking within 400m walking catchment
Background image source: Nearmap (dated 18th July 2017)

Table 3.1: On-street parking occupancy summary

Data source: Site observations taken Thursday 29th June and Saturday 29th July, 2017

Time period	Occupancy	Availability
Weekday		
8:00am – 9:30am	26%	74%
2:30pm – 4:00pm	27%	73%
Weekend		
10:00am – 12:00pm	43%	57%
12:00pm – 2:00pm	36%	64%
2:00pm – 4:00pm	40%	60%

On weekends, the parking occupancy rises significantly along the Smalls Road frontage and the nearest sections of local streets. The fields at Smalls Road Reserve are used as a sports ground by the Ryde Saints United Football Club. Parking availability for users of the field is critical during these weekend periods. It was noted during site observations that vehicles parked along both sides of Smalls Road created a constrained narrow carriageway. Vehicle manoeuvres in and out of parallel parking spaces were observed to cause lane blockages for both directions of travel, quickly resulting in congestion along Smalls Road. Figure 3.6 shows one example of constrained traffic movements on a Saturday morning.



Figure 3.6: Weekend parking and traffic observations

Source: Site observation taken Saturday 29th July, 2017

3.4.2 Off-Street Parking

A high level review of off-street parking at the existing site has also been completed. While all site parking will be demolished in the future for the proposed works, this review helps to provide an understanding of the current impacts to on-street parking.

The existing site has capacity for an estimated 80 parking spaces (various hardstand areas are used informally and an exact value is not necessarily available). During weekday site inspections, there were typically 20 – 40 vehicles recorded on-site. With significant spare capacity available on-site, it is unlikely that existing users are creating demand for the existing on-street parking. It is therefore expected that on-street parking capacity will not increase when the existing development is removed.

3.5 Active Transport

Secretary's Environmental Assessment Requirement 5.1: Accurate details of the current daily and peak hour vehicle, public transport, pedestrian and cycle movement and existing traffic and transport facilities provided on the road network located adjacent to the proposed development.

The *Healthy Kids* initiative (a NSW government joint department initiative) defines active transport as “any kind of transport where you are using physical activity to travel to and from a destination. Walking, cycling, scooting and skateboarding are examples of active transport, as is using public transport (as it almost always includes walking to and from destinations).”

The NSW Department of Education operates a number of initiatives relating to healthy and active choices for school children. It is critical therefore that the local area around the proposed school be able to provide for active transport, not only for students but also teachers and visitors as part of a broader health movement.

3.5.1 Pedestrian Facilities

The local area is well serviced by pedestrian facilities. All major collector roads (including Smalls Road) generally provide concrete footpaths on both sides of the road, and many local residential streets also provide footpaths. Figure 3.7 illustrates the extent of pedestrian footpaths and facilities in the local area.

An at-grade pedestrian (zebra) crossing is provided south of the site boundary in Smalls Road whilst a raised zebra crossing is provided in front of the Smalls Road Reserve. These crossings are observed to cater for low pedestrian movements under existing conditions. They are located around 180 metres apart.

The roundabout at the intersection of Smalls Road and Quarry Road provides gaps for pedestrians in the splitter island on Smalls Road and the western approach on Quarry Road. Similarly at the intersection of Bridge Road and Smalls Road, the roundabout provides gaps for pedestrians in the splitter island on Smalls Road and the western approach on Bridge Road.

The bus stops in Bridge Road west of Smalls Road are provided with seats and accessible paths including tactile pavers. Bus shelters are provided in Quarry Road west of Smalls Road and a continuous concrete path is provided from the proposed school location to the bus stops in Smalls Road and Quarry Road.



Figure 3.7: Local pedestrian facilities

Background image source: Nearmap (dated 18th July 2017)

3.5.2 Cycling Facilities

There are limited formalised cycling facilities within the vicinity of the site. The City of Ryde provides a local bike map as developed by Sydways, which is publically available on the Council website. The map also provides information for cyclists to encourage greater usage of bicycles for travel within the local area.

Both Smalls Road and Quarry Road are designated as “informal on-road bike routes” on this map, along with a number of other roads through the draft catchment area. The distribution of these routes is such that no property within the catchment is more than approximately 300 metres along local streets from an on-road bike route. Dedicated off-road bike paths are provided in some locations including Santa Rosa Park (connecting toward the Macquarie Centre) and Blaxland Road (connecting to Top Ryde Shopping Centre).

Limited cyclist activity was recorded along Smalls Road under the existing scenario. The dedicated off-road bike paths on Blaxland Road and Santa Rosa Park were observed to be well utilised.

Figure 3.8 provides an extract of the bike map surrounding the draft catchment area.

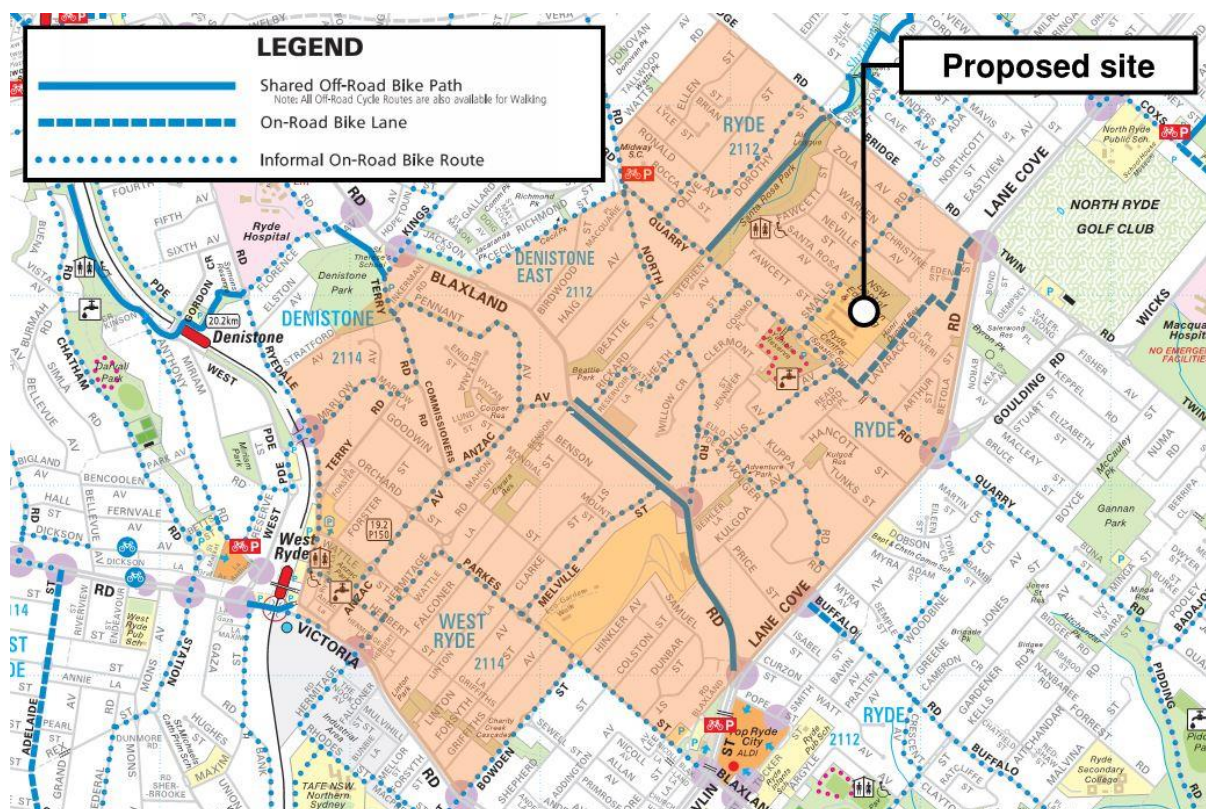


Figure 3.8: Local cycling facilities

Draft school catchment in orange. Image source: Sydway City of Ryde Bike Map (version 16-23-12)

3.6 Public Transport

Secretary's Environmental Assessment Requirement 5.1: Accurate details of the current daily and peak hour vehicle, public transport, pedestrian and cycle movement and existing traffic and transport facilities provided on the road network located adjacent to the proposed development.

Further to the availability of active transport infrastructure and services, it is necessary to gain an understanding of the existing public transport network within the vicinity of the site.

3.6.1 Public Bus Services

Public bus services operate along Quarry Road and Bridge Road. Bus routes X18 (westbound only) and 518 service Quarry Road at a bus stop around 200 metres from the site, while route 507 services Bridge Road at a stop around 500 metres from the site. All bus services in the area are operated by State Transit. The average frequency of local bus services is shown in Table 3.2 below.

Table 3.2: Public bus frequencies

Data source: Sydney Buses

Route	Destinations	Approx. Frequency During Peak
507	Macquarie University to Circular Quay via Putney	Every 30 minutes
518	Macquarie University to Circular Quay	Every 30 minutes
X18	Town Hall to Denistone East	3x westbound PM only

Occupancy surveys were undertaken during a typical weekday by observing the patronage and loading of buses at the nearby bus stops, in both the morning and afternoon periods. Occupancy was typically very low, with excess capacity on all local services, as demonstrated in Table 3.3. Percentage occupancy is based on an assumed total capacity of 70 persons per vehicle. A detailed recording of occupancy recorded on individual services is provided in **Appendix B**.

Table 3.3: Bus occupancy
Data source: Site observations taken Thursday 29th June, 2017

Route		Destinations	Average Occupancy
507	Southbound	Macquarie University to Circular Quay	9.5%
507	Northbound	Circular Quay to Macquarie University	16.7%
518	Southbound	Macquarie University to Circular Quay	20.2%
518	Northbound	Circular Quay to Macquarie University	21.7%

3.6.2 School Bus Services

A number of school bus routes operate along both Quarry Road and Bridge Road. Approximately 5-10 school buses were observed on each of these roads per hour during the relevant school traffic periods.

3.6.3 Other Public Transport

Public transport available within the vicinity of the site is primarily bus services, however there are other services provided in the broader region.

The nearest train stations to the site are Macquarie Park (2.6km) and Denistone (3.0km). Walking distances are approximately 33 minutes and 38 minutes respectively. Bus services discussed above also connect to the Macquarie area and would likely be used as a connection to and from Smalls Road.

Meadowbank Wharf is located approximately 3.5km or 45 minutes' walk from the site.

No light rail infrastructure operates in the area, and there are no major plans published for additional transport infrastructure in the area. The Sydney Metro Northwest project will convert the Epping to Chatswood rail line to metro standard.

3.7 Traffic Conditions

Secretary's Environmental Assessment Requirement 5.1: Accurate details of the current daily and peak hour vehicle, public transport, pedestrian and cycle movement and existing traffic and transport facilities provided on the road network located adjacent to the proposed development.

Secretary's Environmental Assessment Requirement 5.8: The impact of trips generated by the development on key intersections providing access to the site, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/associated funding for upgrading or road improvements works, if required (note: traffic modelling is to be undertaken with scope to be agreed by TfNSW and RMS in advance).

Intersection movement counts and mid-block tube counts were undertaken at various locations to record background traffic volumes. Analysis and modelling has been undertaken with these results to determine the level of operation of the existing road network. The extent of the traffic data collection and traffic modelling has been determined through a review of the proposed draft School catchment and anticipated area of impact. The study scope was approved by the RMS representative to City of Ryde on Thursday 15th June, 2017.

3.7.1 Traffic Volume Summaries

For seven days between Tuesday 18th July and Monday 24th July 2017, a 24-hour mid-block tube count was installed to collect traffic volume data in three locations:

- Smalls Road between Santarosa Avenue and Fawcett Street
- Quarry Road between Smalls Road and Aeolus Avenue
- Lavarack Street near Henri Durant Reserve

Counts were undertaken during the NSW school term, to record background traffic during typical times of school operation. Recorded data is attached in **Appendix C** of this report.

The recorded traffic counts demonstrated that in each location, traffic flows were consistent from day to day. Weekday daily traffic flows through the week varied by no more than 6% from the weekday average on both Smalls Road and Quarry Road, and no more than 11% on Lavarack Street. Figure 3.9 demonstrates the behaviour of traffic flows across each weekday at Smalls Road, with minimal daily variation from the average.

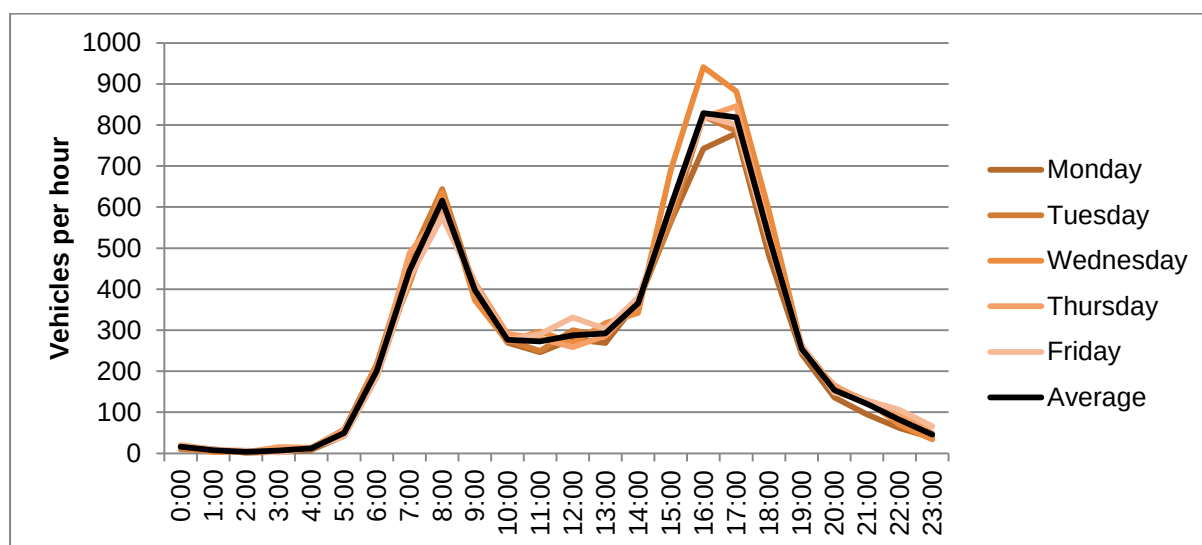


Figure 3.9: Seven-day traffic volumes on Smalls Road

Data source: Traffic counts undertaken Tuesday 18th July – Monday 24th July 2017

3.7.2 Intersection Modelling

Intersection traffic counts, recording vehicle volumes, turning manoeuvres, and pedestrian movements, were undertaken as part of this study on Tuesday 18th July 2017 from 8am to 10am and 2pm to 6pm. Recorded data is attached in **Appendix C** of this report.

SIDRA intersection modelling has been completed for the selected intersections under existing conditions and is attached in **Appendix D** of this report. All existing intersections operate at a good Level of Service, with a detailed comparison provided in Section 0 with regards to pre- and post-development conditions.

Given that traffic flow is consistent on a daily basis (as discussed above), it is expected that these modelling results are a good representation of background traffic behaviour.

Table 3.4: Intersection modelling results summary

*Data for signalised intersections is intersection total
Data for unsignalised intersections is manoeuvre with worst delay*

Intersection	Existing Operation		
	DOS	Delay (sec)	LOS
Bridge Rd / Smalls Rd (AM)	0.354	9.4	A
Bridge Rd / Smalls Rd (PM)	0.171	9.6	A
Quarry Rd / Smalls Rd (AM)	0.270	11.6	A
Quarry Rd / Smalls Rd (PM)	0.015	11.6	A
Quarry Rd / Aeolus Ave (AM)	0.324	11.6	A
Quarry Rd / Aeolus Ave (PM)	0.174	11.6	A
North Rd / Aeolus Ave (AM)	0.118	10.2	A
North Rd / Aeolus Ave (PM)	0.195	9.3	A
Blaxland Rd / North Rd (AM)	0.503	20.7	B
Blaxland Rd / North Rd (PM)	0.487	24.5	B
Blaxland Rd / Melville St (AM)	0.528	30.0	C
Blaxland Rd / Melville St (PM)	0.477	27.3	B

4 PROPOSED DEVELOPMENT

4.1 The Development

Secretary's Environmental Assessment Requirement 5.6: Details of any upgrading or road improvement works required to accommodate the proposed development.

Secretary's Environmental Assessment Requirement 5.10: The proposed access arrangements, including car and bus pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on parking, public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones.

The proposal for this State Significant Development (SSD 17_8372) seeks to demolish the existing Department of Education buildings on-site and construct a new primary school building with capacity for 1,000 students. A single building shall house 40 home bases, administration areas, a school hall, and other necessary infrastructure. A car park with 47 spaces will be located at the Smalls Road frontage of the site, which will also provide access to service and loading areas.

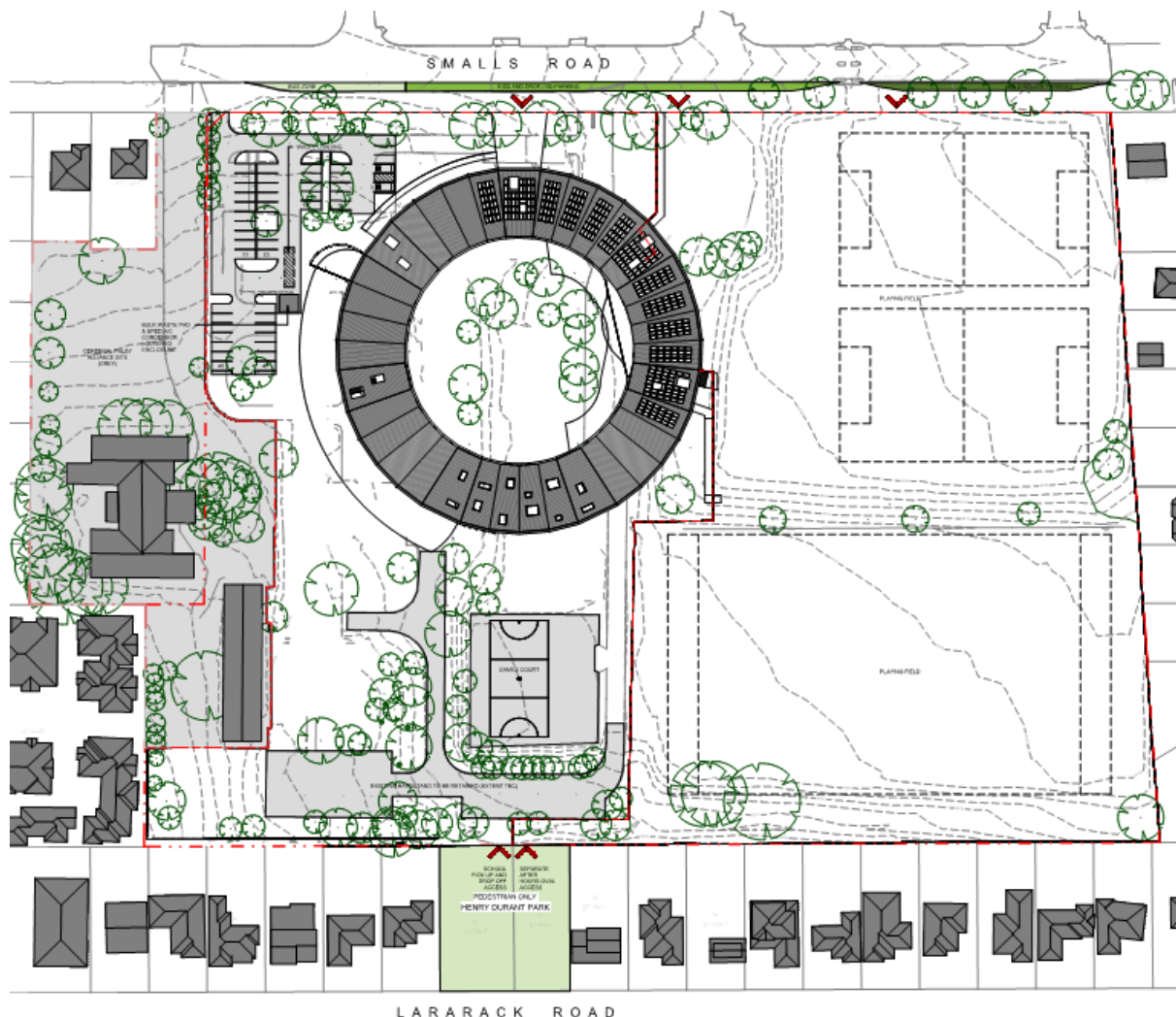


Figure 4.1: Proposed site layout

Source: SR-01-SD-AR-DR-1004-N, Conrad Gargett Ancher Mortlock Wooley

4.2 Site Access

Secretary's Environmental Assessment Requirement 5.6: Details of any upgrading or road improvement works required to accommodate the proposed development.

Secretary's Environmental Assessment Requirement 5.10: The proposed access arrangements, including car and bus pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on parking, public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones.

Secretary's Environmental Assessment Requirement 5.15: Details of emergency vehicle access arrangements.

The school site is to be connected to the external network via a single vehicular access point and a number of pedestrian entries.

An existing driveway is located at the south-western edge of the site, adjacent to the Cerebral Palsy Alliance property boundary. This driveway is to be maintained to provide access to both the car parking and service vehicle areas. The existing driveway is to be widened to allow sufficient manoeuvring space for large vehicles (such as deliveries and waste collection) to comfortably access the site.

Pedestrian access to the site shall be via two entry points along the Smalls Road frontage. Access will also be available through Henri Durant Reserve to Lavarack Street, however this access will not be intended to provide further connection through to vehicles for drop-off and pick-up activity.

Emergency vehicle access to the site shall be via the car park access driveway, or the Smalls Road street frontage where required. It is expected that the most regular emergency access required would be for ambulance vehicles. Paramedic access within the site is expected to be adequate with pedestrian access only (including stretchers etc.) without requirement for additional vehicle access.

There is limited vehicular access to the centre of the circular building, however it is not anticipated that vehicles will be required in this area. The centre of the site is understood to be within a suitable travel distance for fire brigade operators without requiring vehicle access. An open pedestrian walkway may be able to provide access for small vehicle access (such as utes to undertake minor vegetation maintenance) however this is not a necessary usage and would be utilised on rare occasions.

4.3 Car Parking

Secretary's Environmental Assessment Requirement 5.6: Details of any upgrading or road improvement works required to accommodate the proposed development.

Secretary's Environmental Assessment Requirement 5.10: The proposed access arrangements, including car and bus pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on parking, public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones.

Secretary's Environmental Assessment Requirement 5.12: The proposed car and bicycle parking provision, including end of trip facilities, which must be taken into consideration of the availability of public transport and the requirements of Council's relevant parking codes and Australian Standards.

Secretary's Environmental Assessment Requirement 5.14: Details of the proposed number of car parking spaces and compliance with appropriate parking codes and justify the level of car parking provided on-site (informed by a parking utilisation survey on streets within 400 m radius from the site on a typical weekday between 8:00am – 9:30am and 2:30 pm – 4:00pm and a weekend between 10:00am – 4:00pm).

4.3.1 Drop-Off and Pick-Up Facilities

The most significant impacts at any school occur around school start and finish times, particularly during the afternoon pick-up period as families arrive in advance and queue to collect their children. All activity typically clears in a period of 15-20 minutes. Morning drop-off is less impacting to traffic, as activity is spread over a longer time (45-60 minutes) and does not require vehicles to queue and wait.

It is generally recognised that it is not practical to provide facilities such that there shall be no impact on the local road network. Rather, it is the intention of the design to provide as much capacity as possible to reduce traffic impacts.

It is proposed that the existing Smalls Road carriageway be widened along the full length of the site and across the frontage of the reserve. The existing indented bay at the school entry would be continued along the road. The proposed area would be separated into a number of sign-posted zones, providing capacity for:

- 2 school buses (approx. 50 metres)
- 16 cars in a **No Parking** zone (approx. 100 metres)
- 10 cars in a **P10** ten-minute parking zone (approx. 60 metres)

Parking restrictions for the car parking zones would be limited to school peak times only, between 8:00 – 9:30am and 2:30 – 4:00pm on School Days only. Restrictions for the bus zone may be similarly limited, or to full School Days, pending further discussion with Council and stakeholders during the detailed design process.

The operational capacity of a drop-off and pick-up zone can be estimated based on a turnover of each parking space. With a well-managed operation (i.e. teacher assistance and ordered collection), collection time for each vehicle can be well below 60 seconds, however a conservative estimate of 90 seconds is considered for analysis. In a 20-minute pick-up period, this effectively represents around 13 possible turnover cycles for each space. With 16 spaces in the **No Parking** area, this allows 213 vehicles to be processed at the proposed pick-up zone in twenty minutes.

Additionally, ten spaces restricted to ten-minute parking would be expected to turnover at least twice in a 20-minute pickup period, allowing processing of a further 20 vehicles. A total of 233 vehicles can therefore be processed in the on-street pick-up zone.

As discussed in greater detail in Section 4.6, around 62% of students are expected to travel to and from the school via car. For a population of nearly 800 students by 2031, this requires transport for 496 students in total. School students often travel in family groups, with an average occupancy of 1.2 students per vehicle, or 413 total vehicles. Additionally, 20% of students are expected to partake in before- and after-school activities or care, reducing the peak time vehicle demand to 331 vehicles.

The proposed on-street drop-off and pick-up zone could therefore cater for an estimated 70% of demand under managed operation. The remaining 30% of vehicles (approximately 118 vehicles) would likely utilise other local roads such as Christine Avenue or Fawcett Street, or further from the site at Quarry Road and Bridge Road. This behaviour is typical for schools, in which families are observed to drop-off and pick-up at a location convenient to the individual on the way to and from work or other activities.

In order to avoid severe queuing (i.e. all vehicles arriving to wait at 3pm), consideration should be given to class finishing times be staggered into groups. Groups should be separated by at least 20 minutes to allow for queuing, collection, and departure to dissipate before the next vehicle arrivals.

The implementation of a No Parking zone restricts stopping time to 2 minutes, and drivers must remain in or within 3 metres of their vehicle. This restriction will prevent drivers from legally arriving at the pick-up zone early and causing excessive queuing along Smalls Road. At similar sites, early arrivals typically move to residential streets without causing disruption on the main road network. It is also noted that while some drivers can be expected to breach these restrictions, Council rangers often patrol school sites and enforce parking limits.

Any impacts to the local road network during the pick-up period are expected to last no longer than 30 minutes and also occur prior to commuter peak when residents arrive home.

4.3.2 On-Street Parking

The drop-off and pick-up facilities provided along Smalls Road would act as on-street parking outside school peak hours. There are generally no time restrictions on parking in the local area (i.e. parking is “unlimited” rather than 2P or otherwise) and it is anticipated that this type of parking would be maintained outside the school peak hours.

Existing statutory No Stopping restrictions are in place near the pedestrian crossing at Smalls Road Reserve. Widening of the road and indenting of the crossing would increase on-street parking capacity by reducing the statutory No Stopping distance. On-street parking capacity in this area is currently critical on weekends during sporting events, and the road widening would provide some relief to this parking capacity.

4.3.3 Off-Street Parking

The City of Ryde DCP Part 9.3 *Parking Controls* provides parking rates for various categories of development. The DCP specifies that “car parking spaces are to be provided on-site in accordance with the following requirements:”

- Educational Establishment – Primary and Secondary Schools
 - 1 space / two employees AND
 - 1 space / ten students over 17 years of age

It is expected that approximately 70 staff (including teaching and administration staff) will be employed at the school. As a primary school, no students will be over the age of 17. To align with Council’s parking controls the minimum parking provision would be 35 car parking spaces at this site.

The DOE Educational Facilities Standards & Guidelines (EFSG) specifies that a primary school with up to 24 home bases shall provide a maximum of 36 parking spaces (Primary Accommodation Summary, Section PS609.21). No maximum parking rate is provided for schools in excess of 24 home bases. The proposed site shall contain 40 home bases.

It proposed that a total of 47 parking spaces be provided on-site. This includes:

- 42 staff parking spaces
- 2 accessible parking spaces
- 1 loading and delivery space

This provision satisfies the requirements of the Ryde DCP, and is considered to be generally in accordance with the intent of the EFSG.

Mode share of private vehicle for staff may be estimated at around 85% for the initial School opening. The Green Travel Plan for this report proposed a target mode share of around 70%. With a total staff base of 70 employees, the parking demand before and after implementation of sustainable travel actions would be 59 and 49 spaces respectively.

Excess demand relative to the car park capacity is therefore around 5 to 15 spaces. Given the estimated spare capacity in the local streets on the order of 300 spaces (see Section 3.4), any excess parking demand can be accommodated in the local street network without negative impact.

4.3.4 Accessible Parking

The Building Code of Australia (BCA) specifies requirements for accessible parking spaces. For a school building (Class 9b), accessible parking is to be provided at a rate of 1 space for every 100 car parking spaces or part thereof.

The provision of 2 accessible spaces from 47 parking spaces meets and exceeds the minimum rate, thereby satisfying the requirements of the BCA.

4.4 Active Transport

Secretary's Environmental Assessment Requirement 5.4: The adequacy of public transport, pedestrian and bicycle access/circulation and infrastructure to meet the likely future demand of the proposed development within the impact area and connection to the external network.

Secretary's Environmental Assessment Requirement 5.9: The proposed active transport access arrangements and connections to public transport services to address the potential for improving accessibility to and from the site and connections to the wider region via sustainable transport modes.

Secretary's Environmental Assessment Requirement 5.12: The proposed car and bicycle parking provision, including end of trip facilities, which must be taken into consideration of the availability of public transport and the requirements of Council's relevant parking codes and Australian Standards.

Secretary's Environmental Assessment Requirement 5.13: Proposed bicycle parking facilities in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance.

4.4.1 Pedestrian Movements

No additional pedestrian infrastructure is proposed as part of the school development. All existing infrastructure is to be retained (or reconstructed where necessary along the site frontage), and is considered to be adequate for the future operation. Existing pedestrian footpaths and two zebra crossings near the school entry provide good amenity for users as discussed previously in Section 3.5.1.

Improved pedestrian connectivity shall be provided at the rear of the site through to Henri Durant Reserve. This will provide increased convenience for pedestrians located to the south of the site, including Lavarack Street (north and south) and Arthur Street. While providing improvements to pedestrian access in this location, it is critical that the reserve is not utilised for vehicle drop-off and pick-up activity. Lavarack Street is a dead-end road providing only a single travel lane (due to vehicles generally parked on both sides of the road) and any increase in traffic is not advised. The pedestrian connection through to the rear of the site has been minimised so as to not encourage large volumes of users.

It is recommended that a number of operational considerations including a 40 km/hr School Zone and a School Crossing Supervisor be implemented to improve pedestrian safety. See Section 7 for further discussion.

4.4.2 Cycling Facilities

The City of Ryde DCP Part 9.3 *Parking Controls* provides requirements for bicycle parking. The DCP specifies that “in every new building, where the floor space exceeds 600 m² GFA, provide bicycle parking equivalent to 10% of the required car spaces or part thereof.” Given the proposed parking capacity of 39 spaces, a minimum of 4 bicycle storage spaces would be required under the controls of the DCP.

The EFSG indicates that bicycle storage should generally be provided at a rate of 1 space for every 20 students (Specification SG552 Metalwork, Section 4.36). The EFSG further specifies that a primary school with up to 24 home bases should provide storage for 36 bicycles (Primary Accommodation Summary, Section PS609.41).

The proposed site shall provide capacity of up to 1000 students across 40 home bases. A bicycle storage area with space for 50 bicycles is currently proposed, meeting both the DCP and EFSG guidelines. Bicycle storage is to be provided in the form of a secure enclosure / bicycle rails. The facilities shall be designed and installed in accordance with AS2890.3 as a Class 2 / Class 3 facility.

4.5 Public Transport

Secretary’s Environmental Assessment Requirement 5.2: An assessment of the operation of existing and future transport networks including the bus network and their ability to accommodate the forecast number of trips to and from the development.

Secretary’s Environmental Assessment Requirement 5.4: The adequacy of public transport, pedestrian and bicycle access/circulation and infrastructure to meet the likely future demand of the proposed development within the impact area and connection to the external network.

Secretary’s Environmental Assessment Requirement 5.9: The proposed active transport access arrangements and connections to public transport services to address the potential for improving accessibility to and from the site and connections to the wider region via sustainable transport modes.

4.5.1 Public Bus Services

It is not recommended to provide any additional public bus services given the significant spare capacity observed on the current bus services.

Public bus services operate along Quarry Road and Bridge Road. Bus routes X18 (westbound only) and 518 service Quarry Road at a bus stop around 200 metres from the site, while route 507 services Bridge Road at a stop around 500 metres from the site. All bus services in the area are operated by State Transit.

4.5.2 School Bus Services

It is recommended that a new Smalls Road Public School bus service operate in Smalls Road. The proposal includes a bus zone along the site frontage in Smalls Road which has capacity for 2 school buses. It should be noted bus movements will need to undertake drop-off and pick-up on the school side of the road.

Exact requirements for bus services are to be finalised before opening of the site. This process will require consultation with Sydney Buses as the service operator in the area. If any increase in bus zone capacity is deemed necessary, it is expected that a loss of drop-off and pick-up zone would be offset by increased bus usage.

4.6 Traffic Impacts

Secretary's Environmental Assessment Requirement 5.2: An assessment of the operation of existing and future transport networks including the bus network and their ability to accommodate the forecast number of trips to and from the development.

Secretary's Environmental Assessment Requirement 5.3: Details of estimated total daily and peak hour trips generated by the proposal, including the sports oval and field, with consideration of existing and future usage based on traffic surveys of similar school sites.

Secretary's Environmental Assessment Requirement 5.5: The impact of the proposed development on existing and future public transport infrastructure within the vicinity of the site in consultation with Roads and Maritime Services and Transport for NSW and identify measures to integrate the development with the transport network.

Secretary's Environmental Assessment Requirement 5.8: The impact of trips generated by the development on key intersections providing access to the site, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/associated funding for upgrading or road improvements works, if required (note: traffic modelling is to be undertaken with scope to be agreed by TfNSW and RMS in advance).

4.6.1 Traffic Growth

To provide an accurate understanding of the future traffic conditions beyond the opening of the school, future modelling has been undertaken for the year 2027, assuming 10 years of traffic growth beyond the current conditions. Forecasts beyond this date are unlikely to provide accurate information due to uncertainties in the future of the area, long-term transport and road network changes, and changing behaviour of school users.

Background traffic growth across the forecast period has been assumed at 2.0% per annum. While this is a typical growth factor used where historical data is unavailable, it is also highly representative of the population growth in the local area. Between 2006 and 2016, the population in the Ryde Local Government area grew from 100,344 to 121,807, an annual growth of 1.96%.

While almost exactly matching the historical population trends, a traffic growth factor of 2.0% is expected to provide a high-end estimate of traffic growth in the area. As per data published by RMS, traffic along Lane Cove Road near to the site is currently growing at less than 1% per annum¹. Infrastructure projects in the broader region are likely to assist in lessened traffic growth along arterial roads such as Lane Cove Road.

SIDRA intersection modelling has been completed for the selected intersections for projected future conditions due to background growth and is attached in **Appendix D** of this report. See Section 4.6.5 for a full comparison of pre- and post-development operations.

4.6.2 Trip Generation

A typical source of trip generation data, the RMS *Guide to Traffic Generating Developments*, does not provide a trip generation rate specifically for school premises. Trip generation therefore must be developed based on an understanding of the particular site and trip generation at other similar sites.

¹ RMS Site ID 7270 (northbound only). 2015: 25,842 veh/day. 2016: 25,944 veh/day. 2017: 26,157 veh/day. Average annual growth = 0.61%.

Denistone East Public School is located approximately 1.5 kilometres from the Smalls Road site. Its catchment is primarily local residential, and is understood to represent a good basis for travel assumptions at the proposed Smalls Road school. In 2011 and 2012, a travel mode survey was undertaken at Denistone East PS as part of the *Go Active 2 School* program. Mode share by car (including “car” and “walking and car”) was 62% and 51% for 2011 and 2012 respectively.

An overall vehicle usage rate of 62% has been assumed for this development. This considers a percentage of the catchment within the immediately local area who are largely expected to walk (17.4%), and users of other transport modes including cycling and public transport.

The student population is expected to reach around 790 by Year 2031, based on local catchment population forecasts from the DOE. A population estimate of 800 students has therefore been assumed for the modelling analysis in this report. This provides a student population forecast of around 15 years (to Year 2032) assessed against 10 years of background traffic growth (to Year 2027). Population and traffic forecasts beyond this timeframe are unlikely to provide accurate and reliable information and have therefore been excluded from this study.

As detailed above, around 62% of students are expected to travel to and from the school via car. For a population of 800 students, this requires transport for 496 students in total. School students often travel in family groups, with an average occupancy of 1.2 students per vehicle, or 413 total vehicles. Additionally, 20% of students are expected to partake in before- and after-school activities or care, reducing the peak time vehicle demand to 331 vehicles.

During the drop-off or pick-up periods, each vehicle generates 2 trips in an arrival and departure process. Vehicle behaviour will vary, with some users undertaking an “immediate” drop-off (i.e. the vehicle stops only to drop-off or pick-up their child), while other users will stop for some amount of time (say 5 minutes to walk their child to or from the school). It is assumed that all trip movements will occur within the peak hour period.

Trip generation of staff is on the order of 30 vehicles per peak hour. Based on observation of the existing site, this staff trip generation is expected to be roughly equivalent to movements at the existing site. Trip generation of future staff has therefore not been added to traffic modelling, as it is accounted for within the existing traffic counts.

4.6.3 Trip Distribution

Distribution of additional trips has been calculated based on the geographical distribution of the draft school catchment area. With consideration given to the key intersections through the area, a shortest path method using Google Maps navigational tools was completed to divide the catchment into different intersection approaches. The approaches for each intersection chosen for analysis are detailed in Figure 4.2 below.

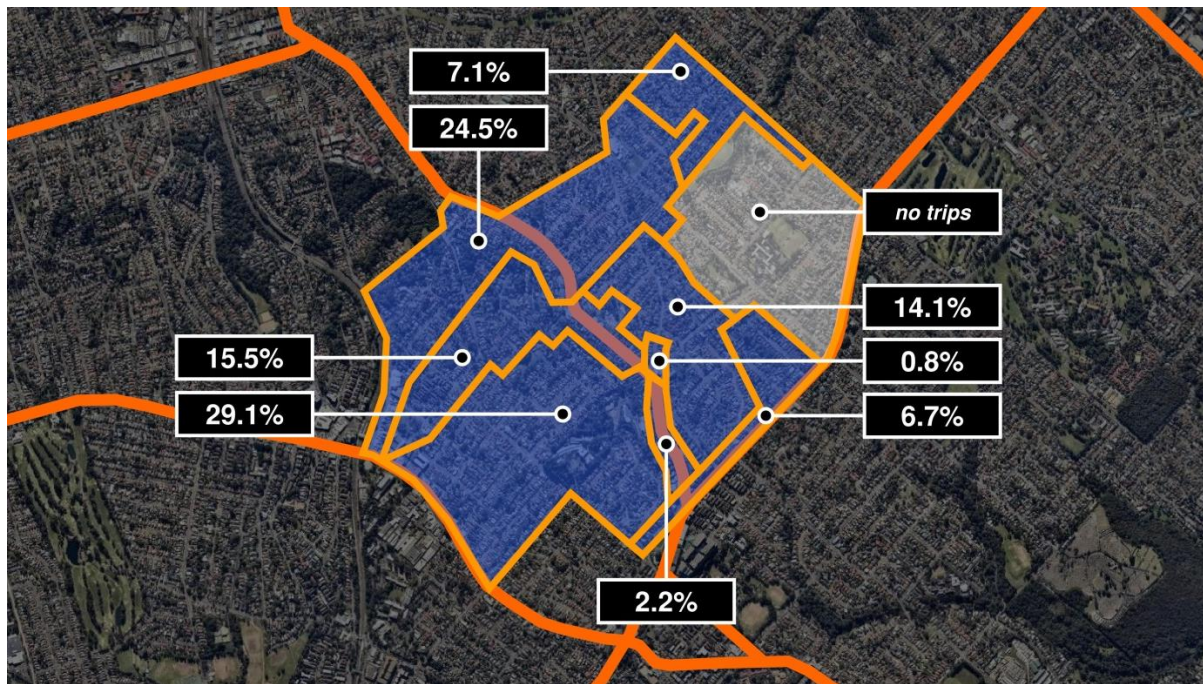


Figure 4.2: Catchment area distribution

Background image source: Nearmap (dated 18th July 2017)

Each segment in Figure 4.2 represents a catchment area distributing into one of the determined intersection approaches. As traffic moves upstream toward the school (and downstream away from it), catchment areas accumulate as demonstrated in Figure 4.3. Note that the distribution illustrated is based on the analysis applied to the morning peak; some minor variations are analysed to account for internal travel patterns in the afternoon peak. Analysis also includes consideration of vehicles returning home after dropping off their child.

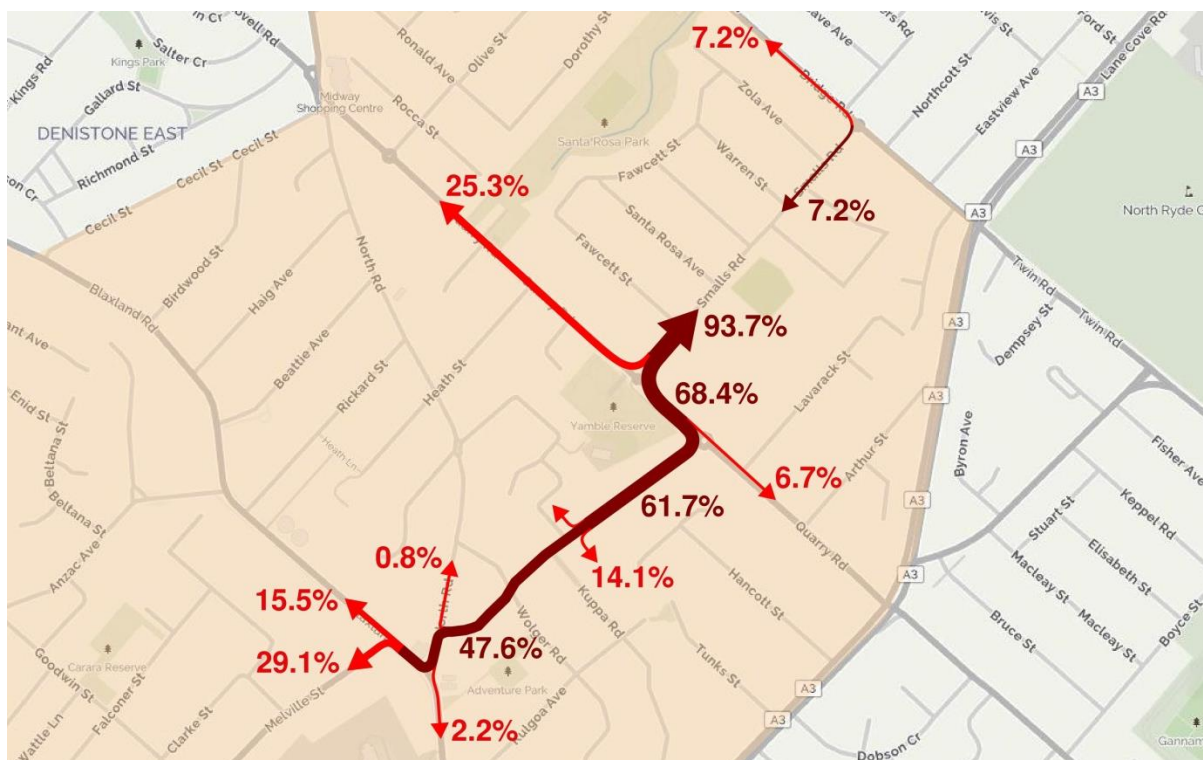


Figure 4.3: Cumulative traffic distribution

Draft school catchment in orange. Background image source: Mapquest

Values may not add to 100% due to rounding and occurrences of multiple or return trips.

The road network directly adjacent to the school site is also considered. This traffic modelling assumes that users are typically undertaking manoeuvres within the adjacent road network to reach the required side of the road (such as a drop-off and pick-up bay). The roundabouts at both ends of Smalls Road provide for convenient manoeuvring, however some traffic has been considered to undertake other turns within the local roads.

4.6.4 Future Traffic Conditions

SIDRA intersection modelling has been completed for the selected intersections for projected future conditions under background growth plus school operation and is attached in **Appendix D** of this report.

Table 4.1: Intersection modelling results summary

Modelled in SIDRA Intersection 7.0

Data for signalised intersections is intersection total

Data for unsignalised intersections is manoeuvre with worst delay

Intersection	2017			2027			2027 + School		
	DOS	Delay (sec)	LOS	DOS	Delay (sec)	LOS	DOS	Delay (sec)	LOS
Bridge Rd / Smalls Rd (AM)	0.354	9.4	A	0.449	9.9	A	0.722	11.9	A
Bridge Rd / Smalls Rd (PM)	0.171	9.6	A	0.220	10.0	A	0.833	19.2	B
Quarry Rd / Smalls Rd (AM)	0.270	11.6	A	0.356	12.3	A	0.928	35.9	C
Quarry Rd / Smalls Rd (PM)	0.015	11.6	A	0.018	13.0	A	0.873	19.8	B
Quarry Rd / Aeolus Ave (AM)	0.324	11.6	A	0.423	12.4	A	0.692	16.3	B
Quarry Rd / Aeolus Ave (PM)	0.174	11.6	A	0.230	12.2	A	0.815	20.0	B
North Rd / Aeolus Ave (AM)	0.118	10.2	A	0.149	12.1	A	0.210	16.2	B
North Rd / Aeolus Ave (PM)	0.195	9.3	A	0.242	10.8	A	0.362	13.2	A
Blaxland Rd / North Rd (AM)	0.503	20.7	B	0.606	21.6	B	0.716	23.9	B
Blaxland Rd / North Rd (PM)	0.487	24.5	B	0.589	25.4	B	0.730	28.8	C
Blaxland Rd / Melville St (AM)	0.606	33.3	C	0.731	35.8	C	0.841	43.3	D
Blaxland Rd / Melville St (PM)	0.575	30.3	C	0.708	32.3	C	0.797	35.7	C

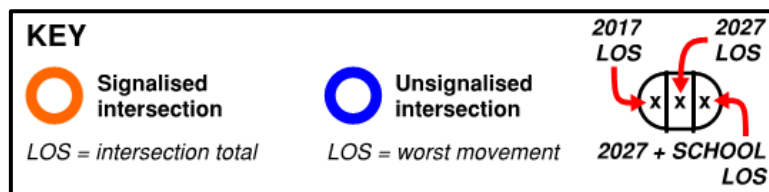
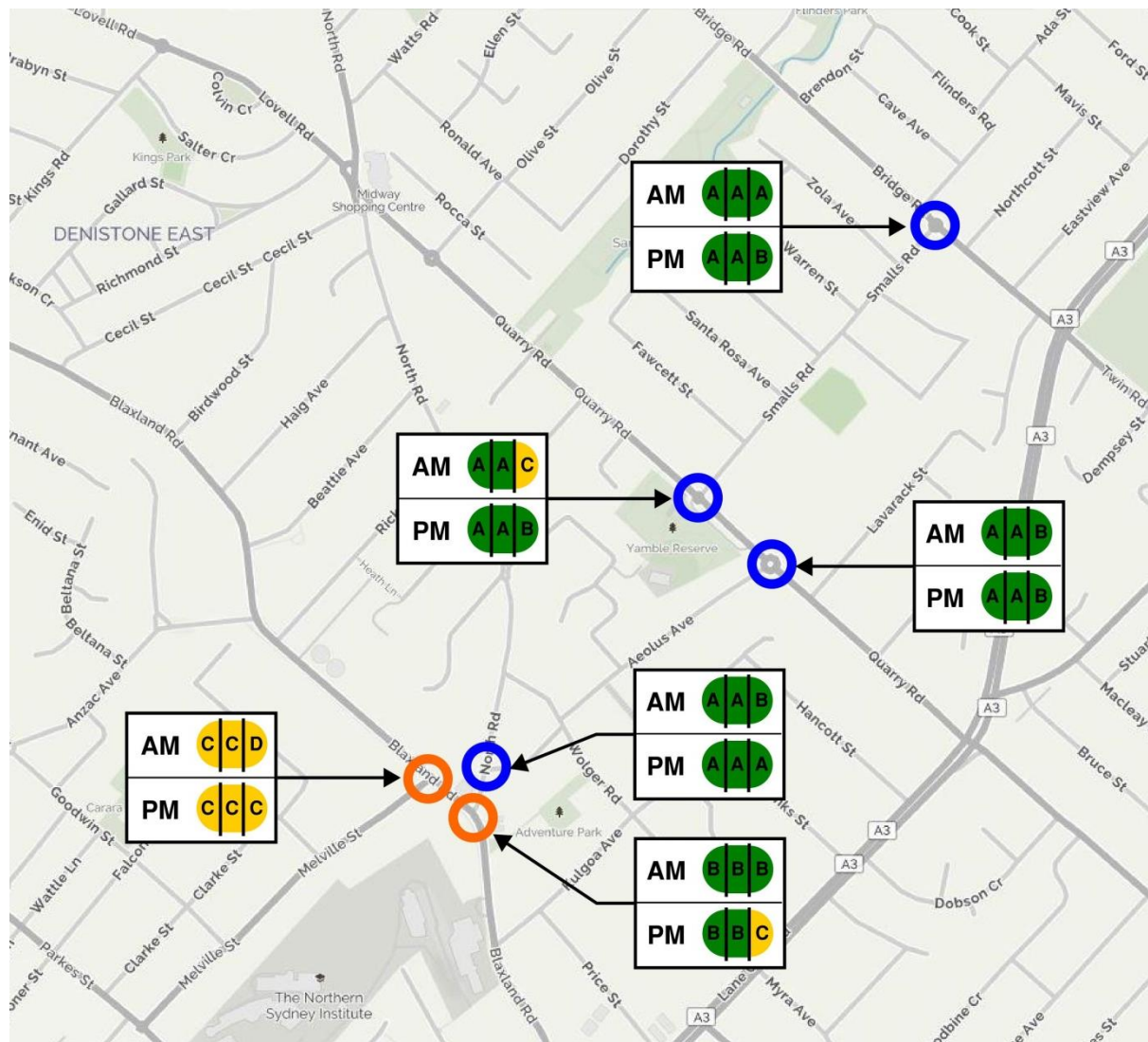


Figure 4.4: Pre- and post-development intersection operation
Modelled in SIDRA Intersection 7.0

4.7 Road Safety

Secretary's Environmental Assessment Requirement 5.16: An assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures.

To maximise the safety of students around the School, interaction with vehicles should be minimised. Where interaction cannot be avoided, measures should be in place to ensure an acceptable operation and a low level of risk.

4.7.1 Site Frontages

While the site has two available frontages, to Smalls Road and Lavarack Street, access to and from Lavarack Street has been minimised. Due to its narrow carriageway and cul-de-sac layout, Lavarack Street is not considered a suitable access point for any travel with the exception of pedestrian movements. Note that this remains unsuitable for pedestrians walking to the street to be picked up by a parent.

Safety issues associated with drop-off and pick-up on Lavarack Street may include vehicle collisions on the narrow carriageway, reversing vehicles to allow passing traffic, and reduced visibility of pedestrians between a high density of parked cars. By reducing movements along Lavarack Street and keeping all vehicular traffic on Smalls Road, issues associated with the road geometry can be avoided.

4.7.2 Drop-Off and Pick-Up Facilities

The design of the on-street No Parking zone for drop-off and pick-up is intended to provide a relatively steady flow of traffic in a forward direction. No or minimal reversing should be required during operation. This provides for increased safety of students on the roadway.

Comparatively, an angled parking layout would provide a higher concentration of parking spaces with increased capacity, however student safety could be compromised by reversing vehicles.

4.7.3 Pedestrian Crossings

Two existing pedestrian crossings are located on Smalls Road near to the site, presumably first installed in relation to the former Ryde High School on the same site.

While most usage would be anticipated during daylight hours, the existing lighting to the crossings may be insufficient and should be assessed for adequacy. These crossings are currently a Council asset and any modifications or maintenance will require discussions with or requests to Council. Future maintenance of these crossings may also be required to ensure continued safe operation.

4.7.4 School Crossing Supervisor

The recommendations listed in this report (see Section 7) include provision of a School Crossing Supervisor to improve the safety of students around pedestrian crossings.

4.8 Service and Loading

Secretary's Environmental Assessment Requirement 5.17: Service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times).

A waste collection zone is to be located within the on-site car park. Turning path analysis is understood to have been completed by TTM Group demonstrating the adequacy of the area to cater for large vehicles. During operation of a waste vehicle collecting a garbage bin, there may be some impact to traffic flow of the car park. This is not considered to be a major inconvenience, given the anticipated delivery schedule outside staff movement times, and the short period of operation to collect garbage.

A delivery zone is also to be provided within the car park, located such that delivery vehicles shall not interfere with the regular flow of vehicles through the car park.

With regards to delivery schedules, it is expected that no more than 3-4 vehicles per day would be required at the site. Typical delivery requirements may include:

- 1 medium rigid vehicle per day for general waste
- 1 medium rigid vehicle per day for recycling
- 2-3 deliveries per day in smaller vehicles (e.g. food delivery)

A detailed delivery schedule may be completed for the School once further design development and an assessment of precise needs has taken place. It is expected that the final requirements would not vary significantly from those listed above, and could be catered for easily and safely within the road capacity.

School deliveries are typically scheduled to occur outside peak hours where possible, and it is expected that this site would follow this system.

5 SUSTAINABLE TRAVEL

Secretary's Environmental Assessment Requirement 5.7: The preparation of a Green Travel Plan that outlines proposals to encourage sustainable travel choices and details programs for implementation.

A Green Travel Plan for the site has been developed and is attached in **Appendix E** of this report.

A comprehensive sustainable transport plan cannot be developed without the involvement of the School management and input from the local community. This Green Travel Plan should be considered as preliminary only. The document is intended to provide a framework within which the future School can develop and implement a site-specific plan for the future.

6 CONSTRUCTION TRAFFIC

Secretary's Environmental Assessment Requirement 5.18: In relation to construction traffic ... preparation of a draft Construction Traffic Management Plan to demonstrate the proposed management of the impact.

A Draft Construction Traffic Management Plan for the site has been developed and is attached in **Appendix F** of this report.

A detailed CTMP cannot be developed without the involvement of a builder and consideration of all final design selections. This draft CTMP is intended to provide a framework within which a future CTMP can be developed and implemented, and to demonstrate the potential operation of the construction site.

7 RECOMMENDATIONS

7.1 Staggered Class Times

It is recommended that the DOE give consideration to staggering class times to reduce the traffic impacts of the afternoon pick-up period. Many schools separate year groups into K-2 and 3-6, separated by a time of around 20 minutes. This is generally considered sufficient to allow the initial pick-up demand to arrive, queue, process, and dissipate before the following group arrives.

While it is recognised that not all demand can be separated due to siblings in different year groups travelling together, any sufficient staggering will assist in reducing the traffic impacts on local residents and the road network.

7.2 40km/hr School Zone

It is recommended that Smalls Road be converted to a 40 km/hr School Zone along the school frontage to reduce the risk and severity of a crash. This will include flashing light signposting and relevant line marking to implement the lower speed limit. The existing speed limit of 50 km/hr would be retained outside of school zone times.

7.3 School Crossing Supervisor

It is recommended that a School Crossing Supervisor be provided to supervise the crossings. The School Crossing Supervisor program is a state-wide program that contributes to the safety of infants and primary school students. School crossing supervisors help students use the crossings on roads adjacent to or nearby schools. School crossing supervisors are provided where certain transport authority guidelines and criteria are met.

School crossing supervisors are provided to increase mobility and safety around schools by enhancing the performance of pedestrian traffic facilities. School crossing supervisors provide additional measures for the safe and efficient movement of primary and infant school children. The School Crossing Supervisors program is an important component of the Safety Around Schools program.

7.4 Sustainable Travel Initiatives

The Green Travel Plan developed for this site (as introduced in Section 5) outlines a list of recommended actions that should be taken to increase sustainable travel to the site. An uptake in sustainable travel modes would lead to reductions in the traffic impacts of the site, and are considered critical to the development and operation of the new School.

8 CONCLUSION

This transport and accessibility impact assessment has been prepared to examine the proposed Smalls Road Public School and its impact on the local transport network.

The current site at Smalls Road was reviewed with regards to the existing traffic conditions. Traffic modelling of six local intersections was undertaken, demonstrating that these intersections operate at a good Level of Service. Intersections near to the site are mostly priority junctions and roundabouts, with limited vehicular delays occurring. The restricted road carriageway width along Smalls Road, Lavarack Street, and other locations near the site can result in constrained traffic movements, particularly with cars moving in and out of on-street parking.

Parking occupancy surveys were completed for the existing site, demonstrating good availability of on-street parking near to the site. Over 300 parking spaces were noted to be available (during school hours and during school term) within a 400-metre walking distance of the site. An assessment of occupancy on local bus services was also completed, with occupancy generally less than 20% on services along Quarry Road and Bridge Road.

The proposed development seeks to construct a single three-storey school building with ultimate capacity for 1,000 students. A car park with a total of 47 parking spaces (including 2 accessible), bicycle storage for 50 bikes, and service and loading facilities are also included within the site proposal. Entry to the car park and loading areas is proposed via a single (existing) driveway access from Smalls Road, while bus parking and student drop-off and pick-up would occur at a modified on-street parking zone.

Provision of 47 car parking spaces on-site is proposed to cater for staff, with a small number of spaces provided for accessible users and visitors to the School. Estimated mode share of staff travelling via private vehicle is around 85% (targeted to reduce to 70% with sustainable travel actions), resulting in a demand of 59 (to 49) spaces. It is noted that the parking provision meets and exceeds the requirements of local statutory planning provisions, which would require only 35 parking spaces. Any excess demand can be accommodated in the local street network without significant impact.

Active transport facilities including pedestrian and cycling infrastructure are currently well catered for within the road network, which has good pedestrian footpaths and an on-road cycling network. Additional facilities including bicycle storage rails and end-of-trip facilities are expected to be available to users, and a Green Travel Plan has been developed which plans to encourage active transport usage.

Public transport is expected to similarly operate well under the existing infrastructure, with bus stops and routes along both Quarry Road and Bridge Road. Additional school bus services are expected to operate along Smalls Road directly, with details to be finalised prior to opening of the School. A dedicated Bus Zone with capacity for two buses is proposed along the School frontage, however the exact details and requirements will also need to be finalised following scheduling of school services.

In addition to the Bus Zone, modifications to the street frontage are proposed to provide an on-street drop-off and pick-up zone with capacity for around 26 vehicles. Comprised of a 16-space No Parking zone and a 10-space ten-minute parking zone, the area can theoretically cater for around 233 vehicles in a 20-minute period under good management and operation. The expected peak hour vehicle demand of 331 vehicles is therefore approximately 70% catered-for in the on-street zone. Additional demand of around 118 vehicles is expected to utilise local roads or other areas, which are shown to currently have significant spare capacity throughout the day. Any impacts and demand for parking in the local streets will occur over a short period of time only, and occur outside commuter peak times.

A detailed analysis of traffic impacts has been undertaken, with a post-development analysis of relevant local intersections within the draft School catchment. With 10 years of

background traffic growth, and a conservative estimated student population of 860 students (not expected to be reached for more than 20 years), all intersections continue to operate at acceptable Levels of Service. Higher delays occur near to the School where traffic is concentrated during the drop-off and pick-up periods, however delay remains within acceptable limits (reducing to Level of Service D in the worst case). At this stage it is not possible to accurately forecast the traffic impacts of the School under a longer-term scenario, particularly given the uncertainties relating to any external developments in the area.

A preliminary Green Travel Plan has been developed for the site, providing a plan of strategies and actions which the School may wish to implement to encourage sustainable travel. Ultimately the administration, management, and School community must be involved to develop a comprehensive Plan, however this is considered a starting point for good practice. The site-specific objectives of this plan are to reduce traffic congestion, improve health and wellbeing, promote public transport usage, improve student safety, and reduce parking impacts.

A draft Construction Traffic Management Plan has also been developed, however again this cannot be sufficiently detailed until a later date. Once design development for the School has been completed and a builder engaged, a detailed Construction Traffic Management is expected to be prepared and submitted to Council. Main traffic impacts are expected to occur during excavation and concrete pours. The site has good road access for construction vehicles, with close proximity to state roads (Lane Cove Road) and mountable roundabouts.

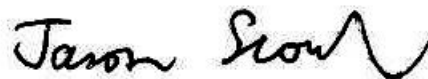
Overall the School as proposed is considered acceptable with regards to its traffic and parking impacts. While it is not possible to avoid creating any impacts, the site has been designed to minimise these impacts where possible and feasible. The capacity of the local road network with regards to both traffic and parking is considered sufficient to cater for the new School.

Prepared by
**TAYLOR THOMSON WHITTING
(NSW) PTY LTD**



MICHAEL BABBAGE
Traffic Engineer

Approved by
**TAYLOR THOMSON WHITTING
(NSW) PTY LTD**



JASON SCOUFIS
Traffic Manager

Appendix A – On-Street Parking

On-Street Parking Occupancy Survey Results

Figure 7.1: On-street parking occupancy – weekday morning

Figure 7.2: On-street parking occupancy – weekday afternoon

Figure 7.3: On-street parking occupancy – weekend morning

Figure 7.4: On-street parking occupancy – weekend midday

Figure 7.5: On-street parking occupancy – weekend afternoon

Table 7.1: On-street parking occupancy – detailed results

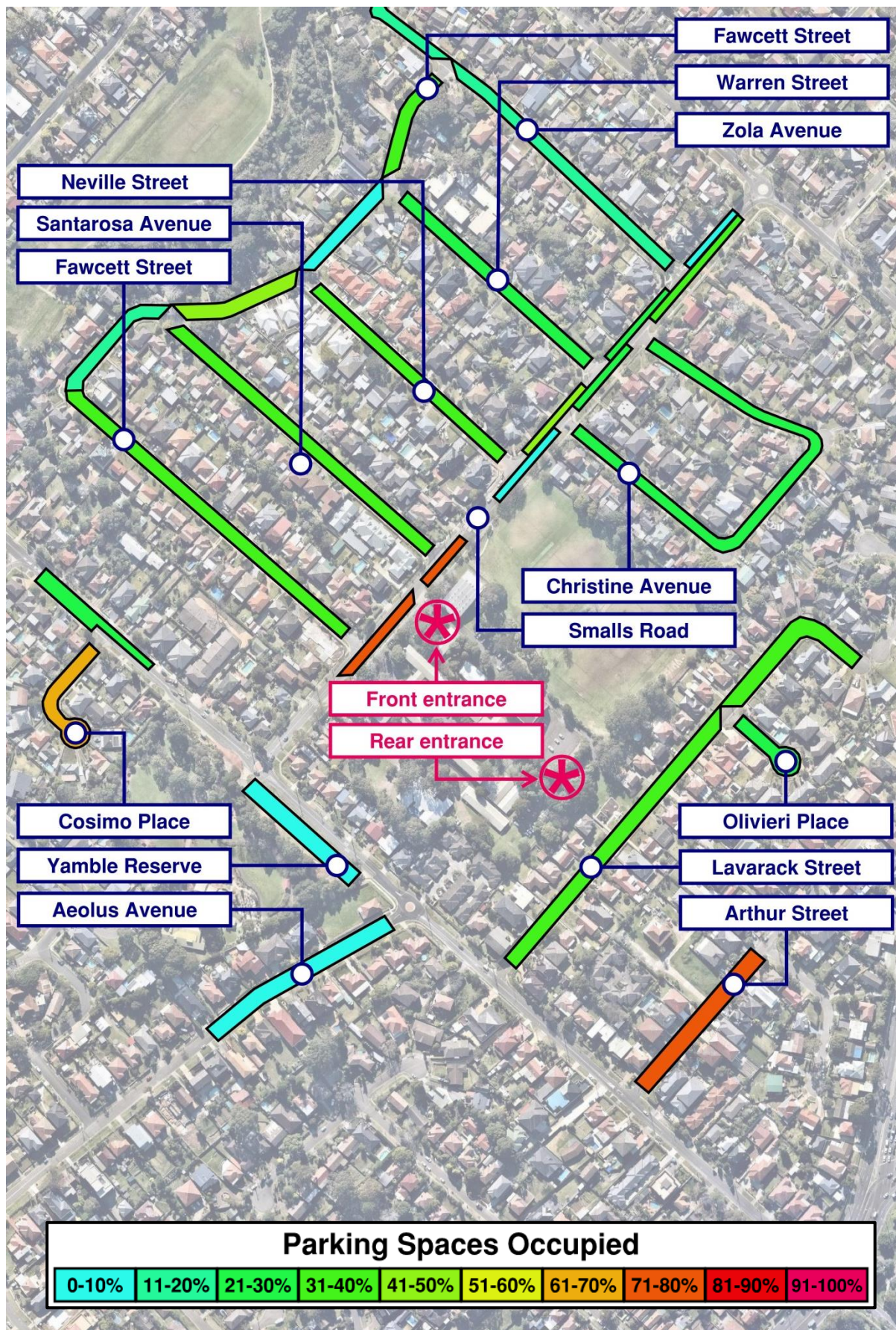


Figure 8.1: On-street parking occupancy – weekday morning
Data source: Site survey Thursday 29th June 2017 // Image source: Nearmap