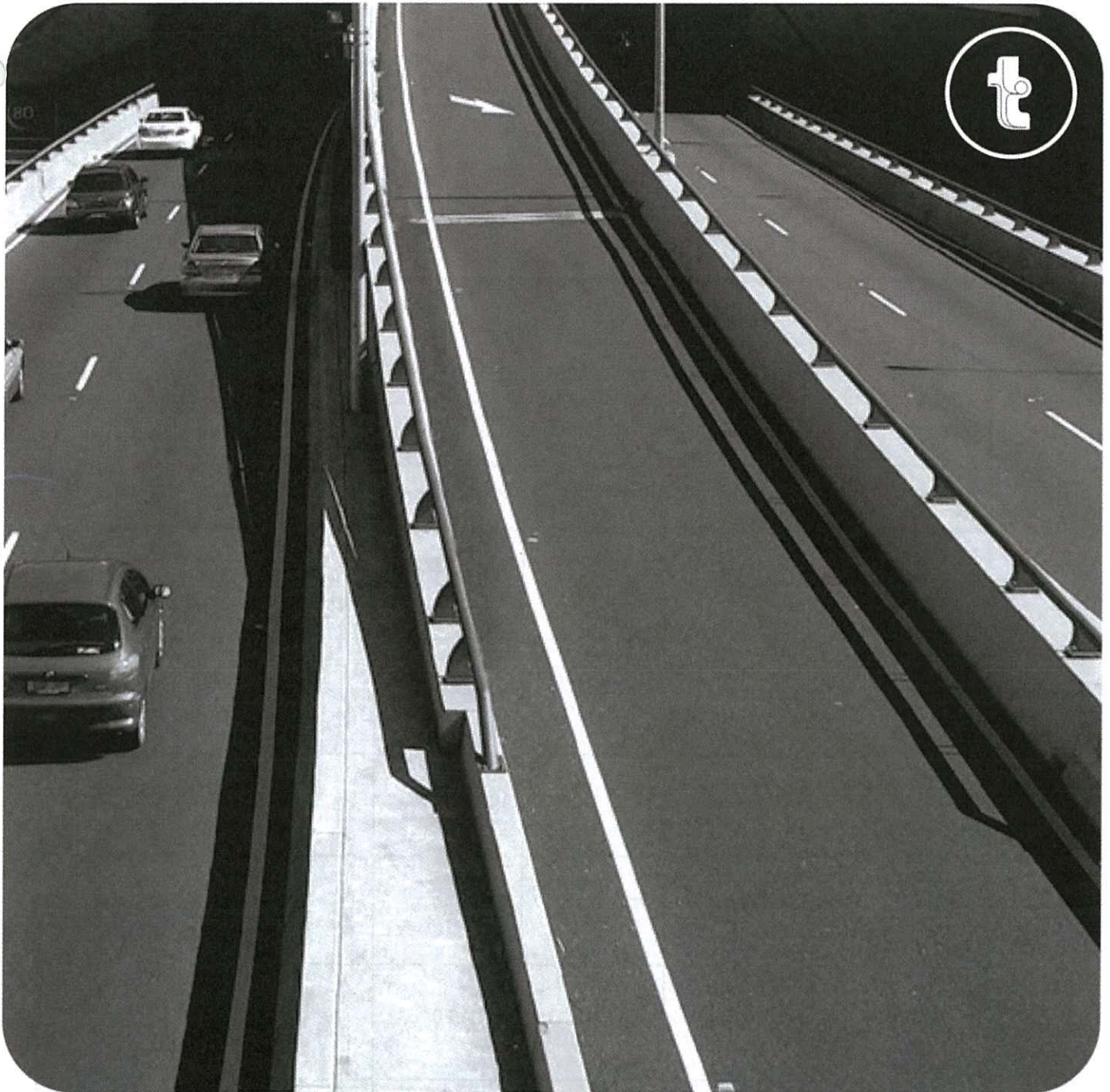




Traffic Impact Assessment

SCECGS Redlands, Cremorne at 272 Military Road, Cremorne

Concept Proposal

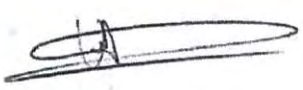
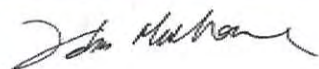
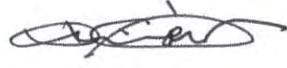
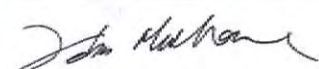
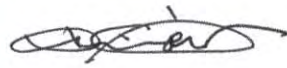
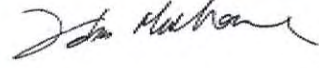
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1. Introduction

This Traffic Impact Assessment (TIA) has been prepared on behalf of SCECGS Redlands, Cremorne. It accompanies an Environmental Impact Statement (EIS) prepared in support of State Significant Development Application SSD14_6454 for the staged development of the SCECGS Redlands' Senior Campus ("Redlands").

This application seeks a staged development approval comprising a concept proposal for the school over five stages and consent for a detailed proposal for the first stage development referred to as "Stage 1". Details of the project are described below:

- (1) Concept Proposal: A Concept Proposal has been prepared for the site to guide its future redevelopment and is intended to provide a statutory framework for the long term planning of the site.
- (2) Detailed Proposal for "Stage 1" development – New Learning Hub:

An overview of the two above-mentioned Stages is provided below:

(1) Concept Proposal

The Concept Proposal will be delivered in five stages and will generally involve the following buildings and works:

Stage 1 – New Learning Hub:

- Demolition of existing buildings and structures
- Construction of a new multi-purpose education building with basement car park and associated vehicular entry off Gerard St
- Creation of a new internal vehicular link between Waters Rd and Military Rd

Stage 2 - Sports and Performing Arts Centre:

- Demolition of existing buildings and structures
- Construction of a new sports and performing arts centre

Stage 3 - Redlands Hall, Roseby Building and Liggins Building Refurbishment:

- Internal alterations and additions of existing buildings

Stage 4 - Humphery Learning Hub and Resource Centre:

- Construction of a new multi-purpose education building with swimming pool and associated facilities at roof top level



Stage 5 – Dance Centre

- Alterations to the Adams Centre at 219 Military Road
- Construction of a three storey extension to the western elevation to accommodate dance studios

★ (2) Detailed Proposal for “Stage 1” development – New Learning Hub:

- Demolition of existing buildings and structures (Mowll Building, 1, 3, 7, 9 and 11 Gerard Street, 7 and 8 Monford Place, staff offices, multi-purpose building and Design and Technology buildings on the western boundary).
- Fit-out of 7 and 8 Monford PI for temporary use as an educational facility
- Construction of a new purpose built music and education building generally comprising a four storey building with basement car park and outdoor learning area at roof level.
- Creation of new vehicular access road off Gerard Street for the new basement car park.
- Creation of new internal vehicular access link facilitating ingress from Waters Rd and egress onto Military Rd
- Associated landscaping improvements.
- New services infrastructure.
- New servicing area including loading dock and waste enclosure

The purpose of this subject Traffic Impact Assessment (TIA) report is to provide an assessment of the concept proposal as described above and detailed within the EIS. The development is located within the North Sydney Local Government Area, and the proposal has been developed with due consideration of Council’s current planning controls, as well as the requirements of the school. This report documents the findings of our investigations in relation to the concept proposal only and should be read in the context of the EIS prepared separately by Urbis. In addition, the Stage 1 DA report and associated TIA report is provided separately.



The report which now addresses the concept proposal is therefore structured as follows:

- Section 2: Provides an overview of the development location and subject site
- Section 3: Documents existing traffic conditions
- Section 4: Documents the current travel mode characteristics of the existing development
- Section 5: Describes the proposed development
- Section 6: Assesses the parking requirements
- Section 7: Assesses traffic impacts
- Section 8: Discusses a Sustainable Travel Plan
- Section 9: Provides an overview of the DGR and the necessary responses.
- Section 10: Discusses internal traffic design elements
- Section 11: Presents the transport management recommendations
- Section 12: Presents the overall study conclusions



2. Location and Site

2.1 Overview

The SCECGS Redlands' Senior Campus is located at 272 Military Road, Cremorne and houses the Secondary School and administration facilities. The campus accommodates approximately 920 students and 150 staff (full time and part time) on site, where classes are held from 8:20am to 3:20pm and the school reception open from 8:00am to 5:00pm.

The campus has an irregular configuration with a site area of approximately 15,500m². It accommodates frontages onto Military Road to the south, Waters Road to the north-west, Gerard Street to the north, Monford Place to the south and Winnie Street to the East. The site also includes an area to the south-eastern corner of Hampden Avenue and Military Road. There are six (6) existing vehicular crossings which service the sit as follows:

- two (2) driveways accessed off Military Road (entry and exit driveways respectively),
- two access driveways accessed via Gerard Street,
- a single driveways accessed via Winnie Street,
- a single unused access driveway via Waters Road.

A location plan is presented in **Figure 1**, and the subject site is shown in **Figure 2**. Reference should also be made to the Photographic Record provided in **Appendix A** which provides an appreciation of the road environment in the immediate locality. **Figure 3** provides an overview of the campus layout in its current form and identifies the various buildings and vehicle access driveways.

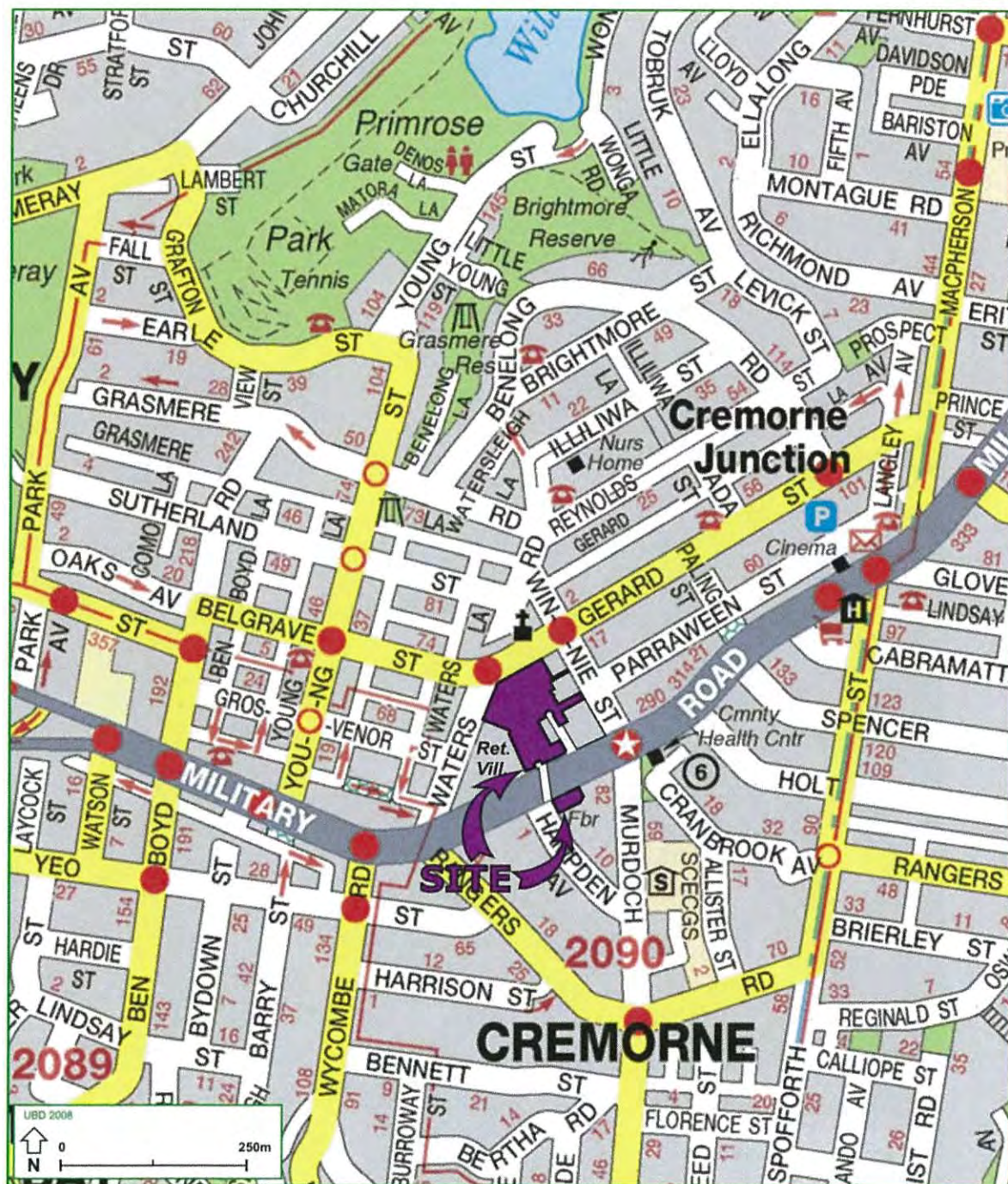


Figure 1: Location Plan



Figure 2: Site Plan



Figure 3: Military Road Campus Map

2.2 Site Access – Pedestrian & Vehicular

There are a number of vehicle and pedestrian separated accesses surrounding the School. The main vehicular access are located via three separate gates on Gerard Street, Winnie Street and Military Road. Furthermore, pedestrian access are located adjacent to the vehicle accesses located on Winnie Street and Military Road. A pedestrian overbridge is located to the east of Hampden Avenue and connects to the school campus which ensures that students/staff have safe and direct access to the site and does not require long walking distances to nearby signalised pedestrian crossings.

Figure 4 illustrates the location of the existing site accesses. **Pictures 1-6** are also provided for information purposes highlighting the various access locations.

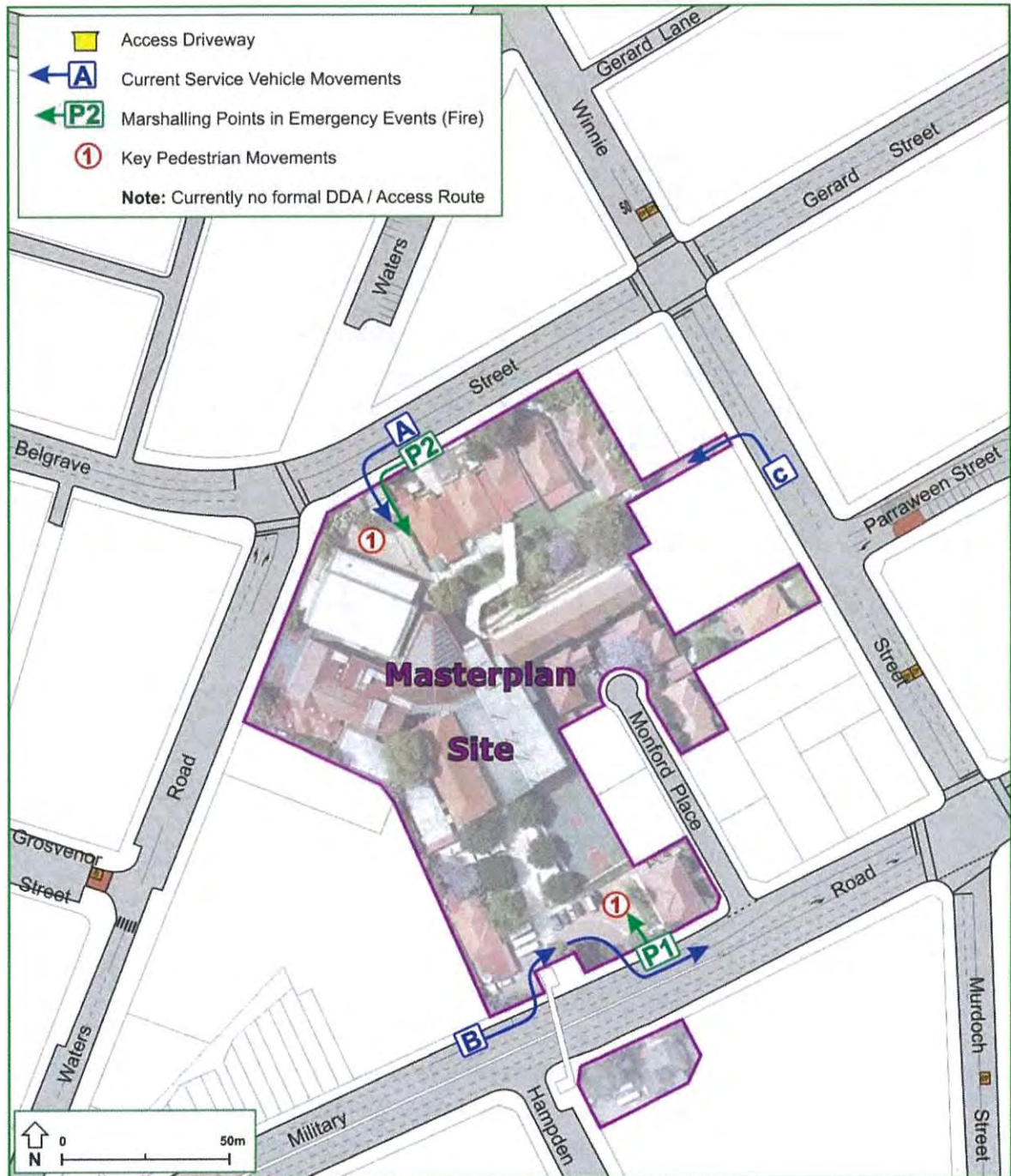
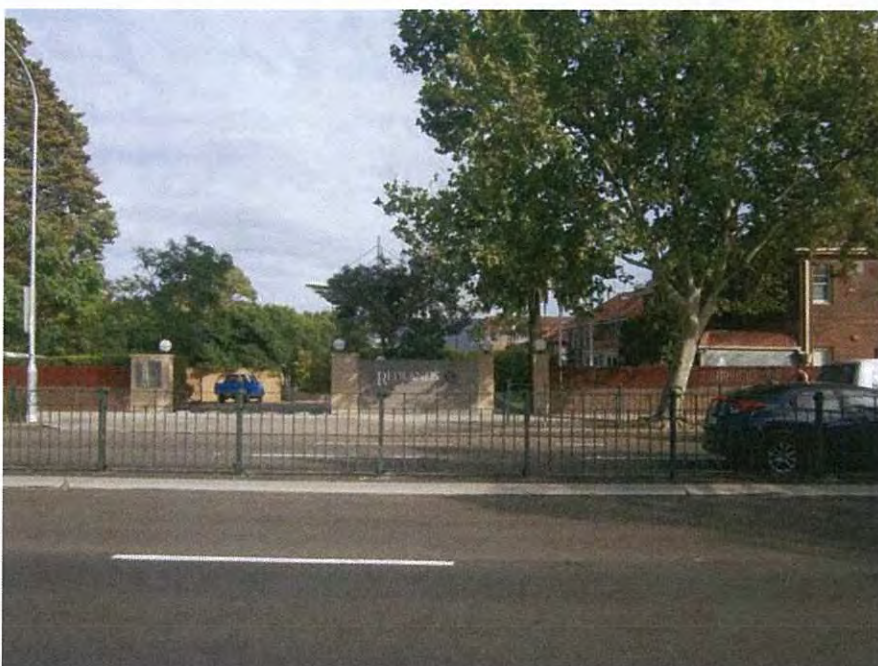


Figure 4: Existing Site Accesses



Picture 1: Existing Site Entry Access Driveway from Military Road



Picture 2: Existing Site Exit Access Driveway onto Military Road



Picture 3: Existing Site Access Driveway onto Gerard Street



Picture 4: Internal view of the Gerard Street Access Driveway. It can be seen that access to this service area is suitably managed with the use of bollards.



Picture 5: Existing Vehicular and Pedestrian Access onto Winnie Street



Picture 6: View of the existing pedestrian access from Waters Road.



3. Existing Traffic Conditions

3.1 Road Network

The broader road hierarchy surrounding the site is shown in **Figure 5**, with the following roads in proximity to the site being of particular interest:

-  **Military Road:** an RMS Main Road (MR 164) that runs in an east-west direction to the south of the site and carries approximately 78,400 vehicles per day (vpd). Military Road generally permits a speed limit of 60 km/h but is subject to a 40 km/h School Zone speed limit directly opposite the site between Winnie Street in the east and Waters Road in the west. Military Road has a divided carriageway with three lanes in either direction where parking is permitted in outer lanes, noting that clearway restrictions operate from 3pm to 7pm on its northern side and 6am to 10am on its southern side.
-  **Gerard Street:** a secondary road (SR 2036) that runs in an east-west direction between Macpherson Street in the east and Waters Road in the west. It permits speed limits of 50 km/h but is subject to a 40 km/h School Zone speed limit past the school. Gerard Street has a four-lane undivided carriageway where parking is permitted on outer lanes, noting that clearway restrictions operate from 3pm to 7pm on its northern side and 6am to 10am on its southern side.
-  **Belgrave Street:** a secondary road (SR 2036) that runs in an east-west direction between Waters Road in the east and Ben Boyd Road in the west. It permits speed limits of 50 km/h but is subject to a 40 km/h School Zone speed limit past the school. Belgrave Street has a four-lane undivided carriageway where parking is permitted on outer lanes, noting that clearway restrictions operate from 3pm to 7pm on its northern side and 6am-10am on its southern side.



- **Waters Road:** a local road that runs in a north-south direction between Reynolds Street in the north and Military Road in the south. It is posted at 50 km/h but is subject to a 40 km/h School Zone speed limit north of Grosvenor Street. Waters Road has an undivided carriageway with one lane in either direction where kerbside parking is permitted.
- **Winnie Street:** a local road that runs in a north-south direction between Waters Road in the north and Military Road in the south. It permits a 50 km/h speed limit but is subject to a 40 km/h School Zone speed limit along its entire length. Winnie Street has an undivided carriageway with one lane in either direction where kerbside parking is permitted.
- **Parraween Street:** a local road that generally runs in an east-west direction between Macpherson Street in the east and Winnie Street in the west. It permits a 40 km/h speed zoning and has an undivided carriageway with one lane in either direction. Kerbside parking is permitted on Parraween Street via parallel and 90° angle parking configurations.
- **Grosvenor Street:** a local road that runs in an east-west direction between Waters Road in the east and Ben Boyd Road in the west. It is subject to a 50 km/h speed zoning and has an undivided carriageway with one lane in either direction. Kerbside parking is permitted on Grosvenor Street via parallel and 90° angle parking configurations.
- **Monford Place:** a local road that runs in a north-south direction and forms a cul-de-sac accessed of Military Road. It is subject to a 50 km/h speed zoning and has an undivided carriageway with one lane in either direction. Kerbside parking is permitted on Monford Place.
- **Hampden Avenue:** a local road that generally runs in an east-west direction between Murdoch Street in the east and Military Road in the south. It is subject to a 50 km/h speed zoning and has an undivided carriageway with one lane in either direction. Kerbside parking is permitted on Hampden Avenue.

It can be seen from Figure 5 that the site is conveniently located with respect to the arterial and local road systems serving the region and traffic activity is generally dispersed rather than concentrated.

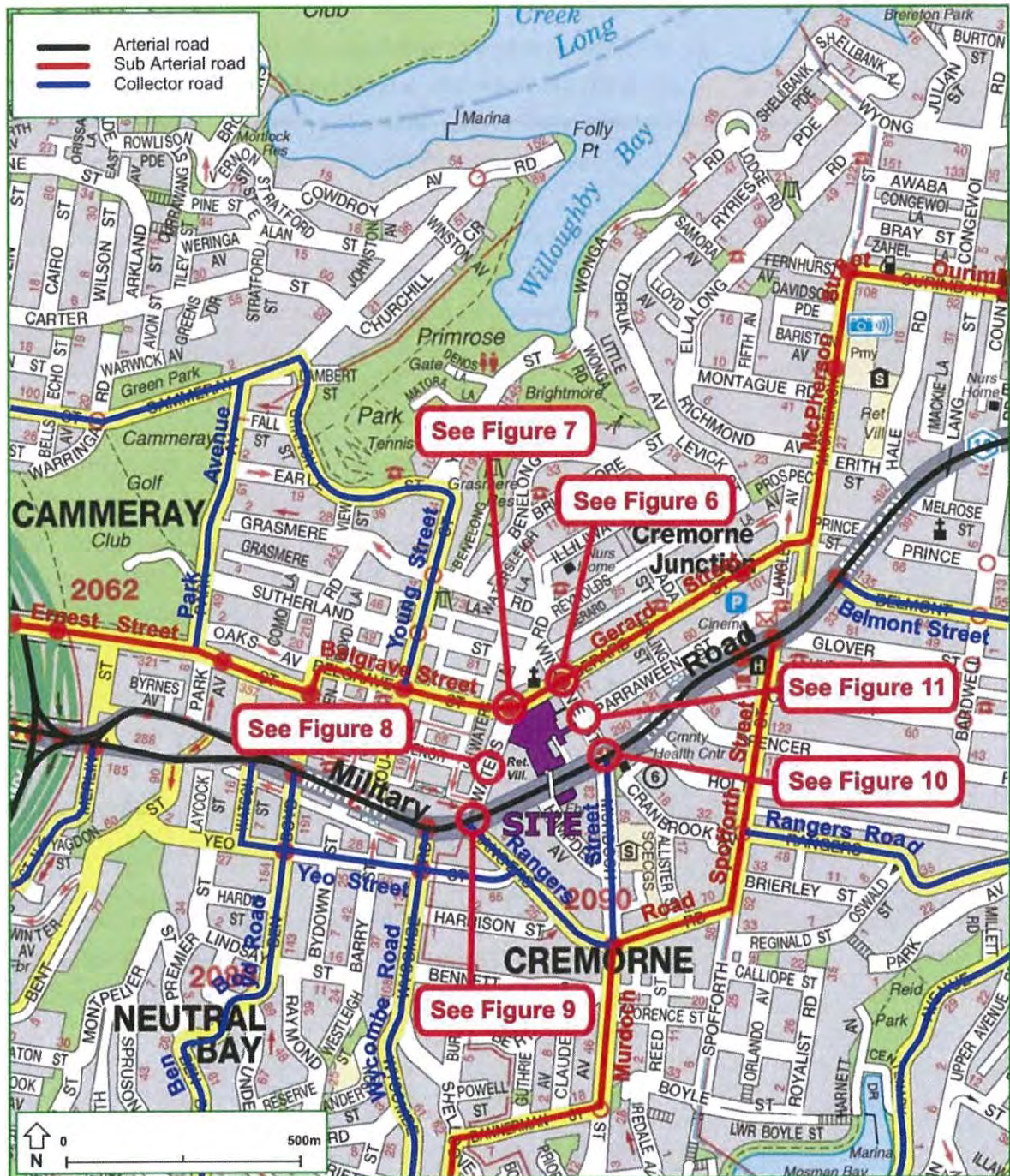


Figure 5: Road Hierarchy



3.2 Key Intersections

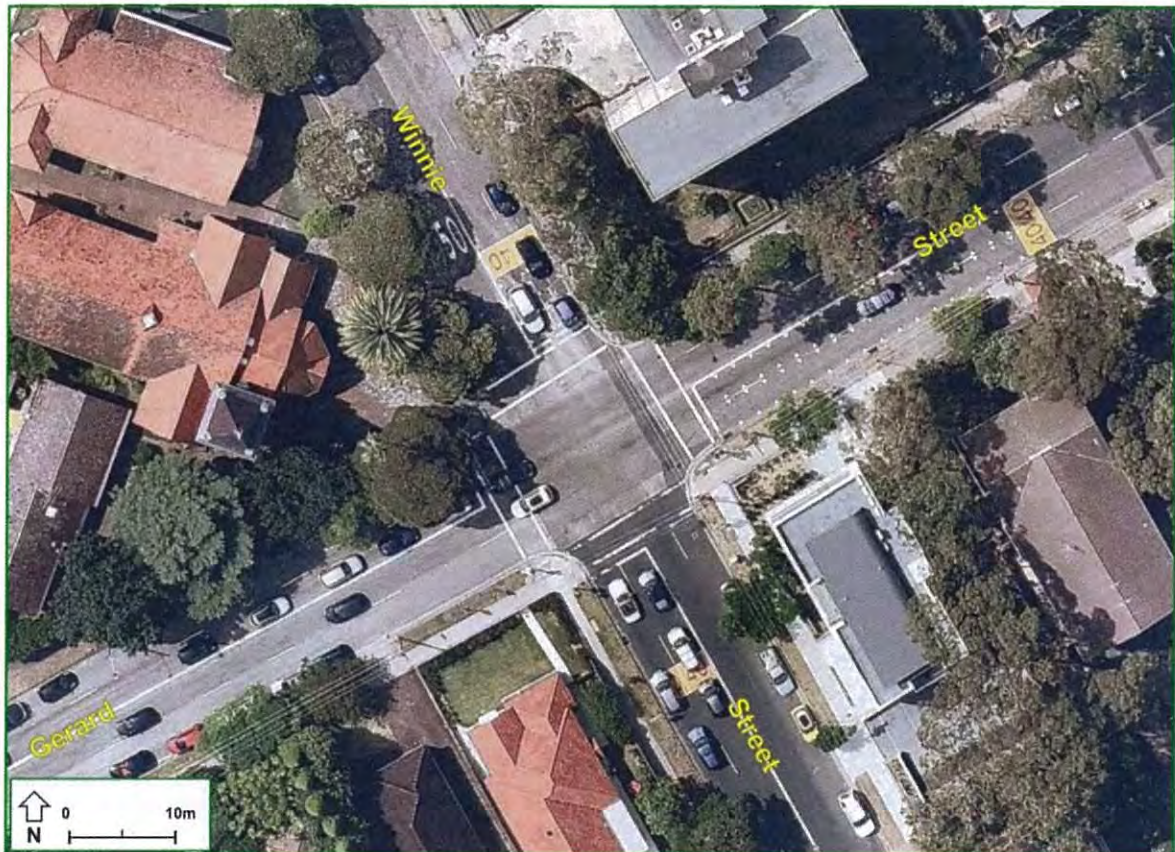


Figure 6: Intersection of Gerard Street with Winnie Street

Figure 6 illustrates that the intersection of Gerard Street with Winnie Street forms a four way signalised intersection. The western approach of Gerard Street provides two through lanes with no restricted movements whilst the eastern approach has a 'No Right Turn' signage restriction. Conversely Winnie Street has two through lanes on both its northern and southern approaches. All intersection legs are provided with signalised pedestrian crossings ensuring safe pedestrian movements.



Figure 7: Intersection of Gerard Street, Belgrave Street and Waters Road

Figure 7 provides a graphical representation of the Gerard Street / Belgrave Street / Waters Road three-way signalised intersection. The northbound approach of Waters Road provides a single left-turn lane and right-turn lane. It is noted that vehicles left turn movements from Waters Road on to Belgrave Street are permitted to turn on a red light after stopping. The western approach of Belgrave Street and eastern approach of Gerard Street provides two through lanes, with a left-arrow treatment included on Gerard Street and right turn movements banned on Belgrave Street. Signalised pedestrian crossings are provided to the south and east of the intersection providing direct access to one of the school's pedestrian access points.



Figure 8: Intersection of Waters Road with Grosvenor Street

Figure 8 shows that the intersection of Waters Road and Grosvenor Street forms a 'Giveway' controlled 'T' junction styled intersection. The southern approach of Waters Road accommodates a zebra pedestrian crossing providing pedestrian linkages to the nearby entrances to Redlands' Senior Campus on Waters Road.



Figure 9: Intersection of Military Road with Waters Road and Rangers Road

Figure 9 shows that the intersection of Military Road with Waters Road and Rangers Road forms a 'Giveaway' controlled intersection. Military Road provides three lanes of through traffic on its eastern and western approaches with right-turn movements banned on both approaches. Conversely Waters Road and Rangers Road permit one lane of traffic with 'No Right Turn' and 'Left Only' signs restricting both approaches to a left out movement only.

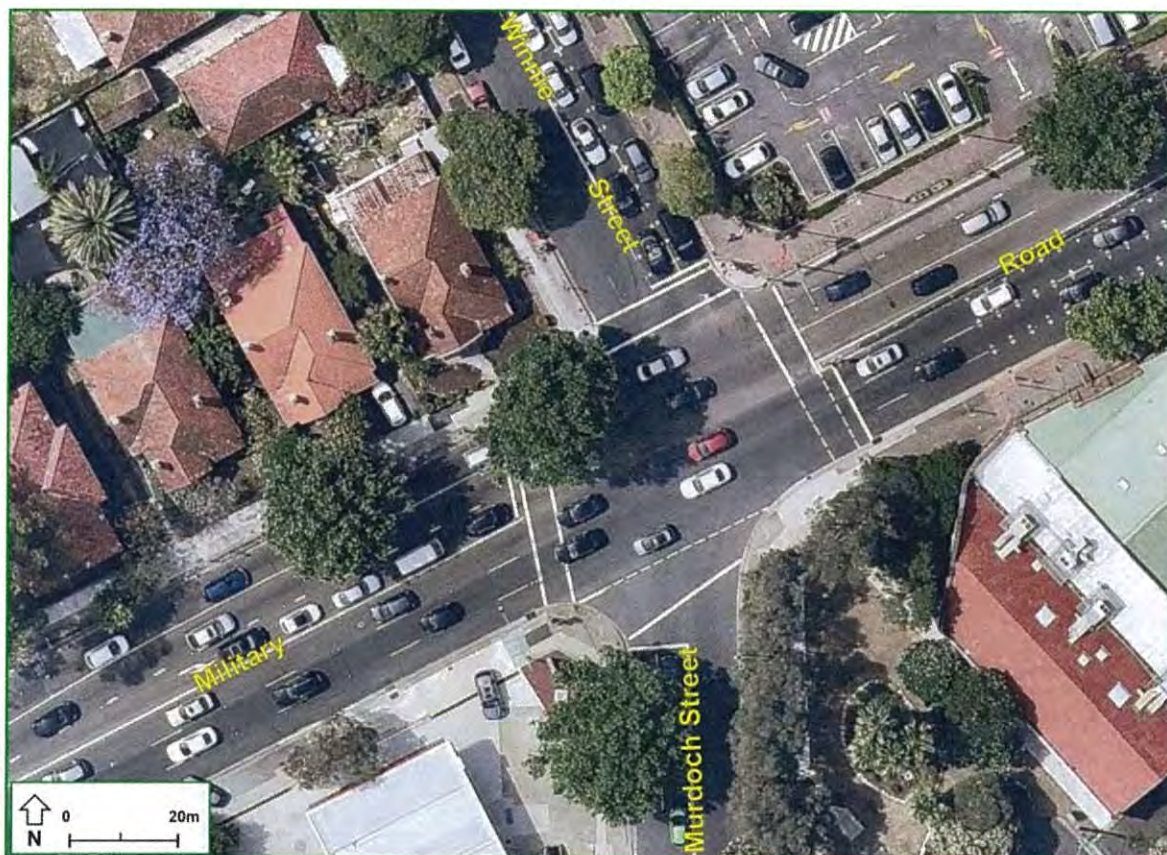


Figure 10: Intersection of Military Road with Winnie Street and Murdoch Street

Figure 10 identifies the intersection of Military Road with Winnie Street and Murdoch Street forms a four-way signalised intersection. The western approach of Military Road provides two through lanes and a single right-turn lane for traffic. The eastern approach of Military Road provides two through lanes of traffic, with 'No Right Turn – Buses Excepted' signs banning right-turn movements for regular traffic. Conversely the southern approach of Winnie Street provides two through lanes, with right-turn movements subject to 'No Right Turn - 6am-10am, 3pm-7pm, Mon-Fri, Buses Excepted' restrictions. The northern approach of Murdoch Street provides two through lanes, with 'No Right Turn – Buses Excepted' signage restriction right-turn movements for regular traffic.



Figure 11: Intersection of Winnie Road with Parraween Street

Figure 11 shows that the intersection of Winnie Street with Parraween Street forms a 'Giveway' controlled 'T' junction styled intersection. Winnie Street provides single through lanes on its northern and southern approaches whilst Parraween Street provides a single right turn lane and left turn lane.



3.3 Existing Intersection Performance

3.3.1 Weekday Peak Periods

The assessment of impacts associated with the proposed development has been assessed against a 'base case' being the existing traffic conditions. Accordingly, traffic count surveys during the weekday AM peak period (7-9am) and the weekday PM peak period (2-6pm) were undertaken to assess the performance of the surrounding road network at the following intersections:

- Winnie Street with Gerard Street;
- Winnie Street with Military Road;
- Winnie Street with Parraween Street.
- Waters Road with Belgrave Street/Gerard Street;
- Waters Road with Grosvenor Street; and
- Waters Road with Military Road;

A summary of the weekday traffic count surveys for the respective AM and PM peak periods are provided in **Figure 12** and **Figure 13** below.

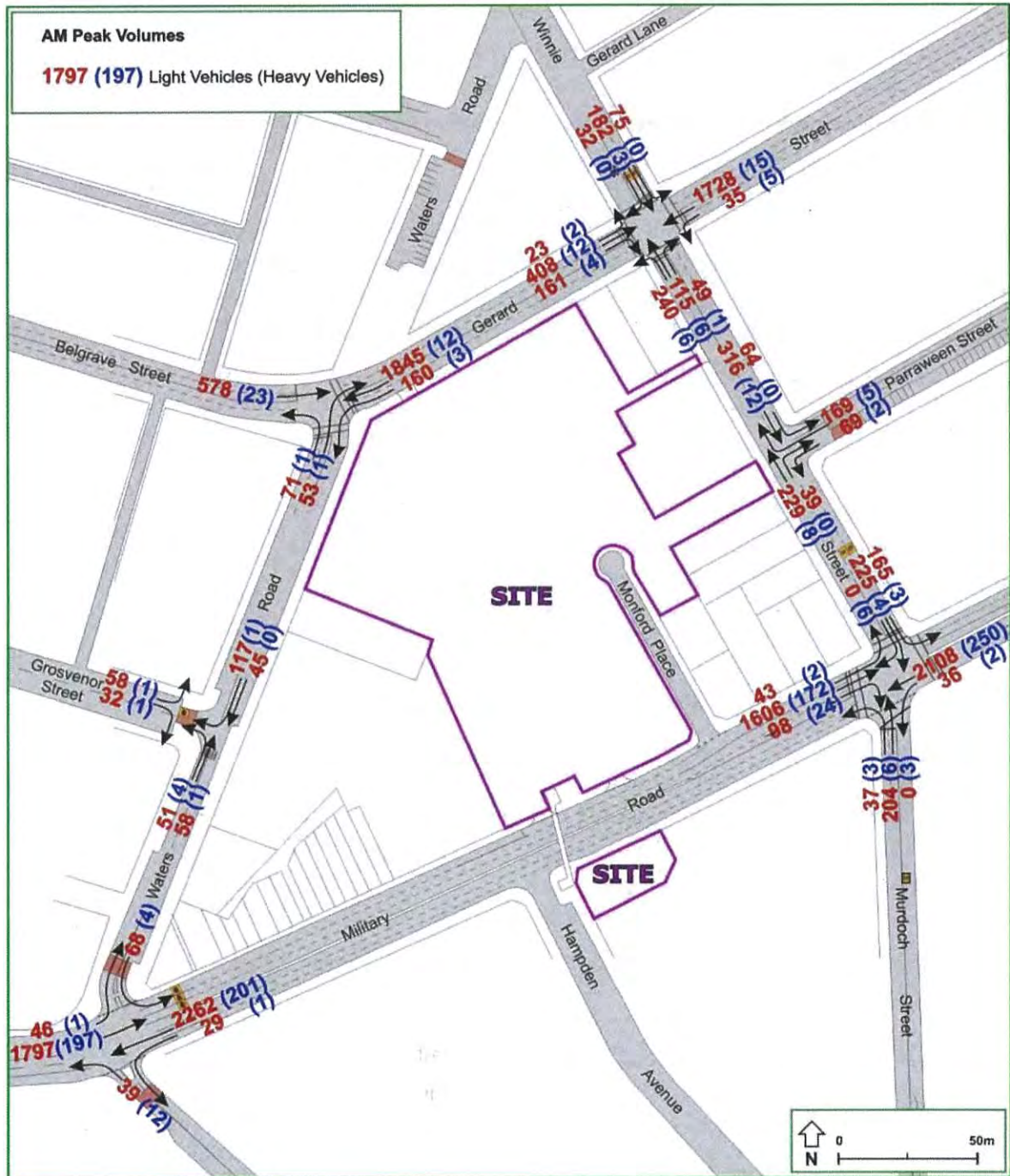


Figure 12: Existing Weekday AM Peak Turning Counts

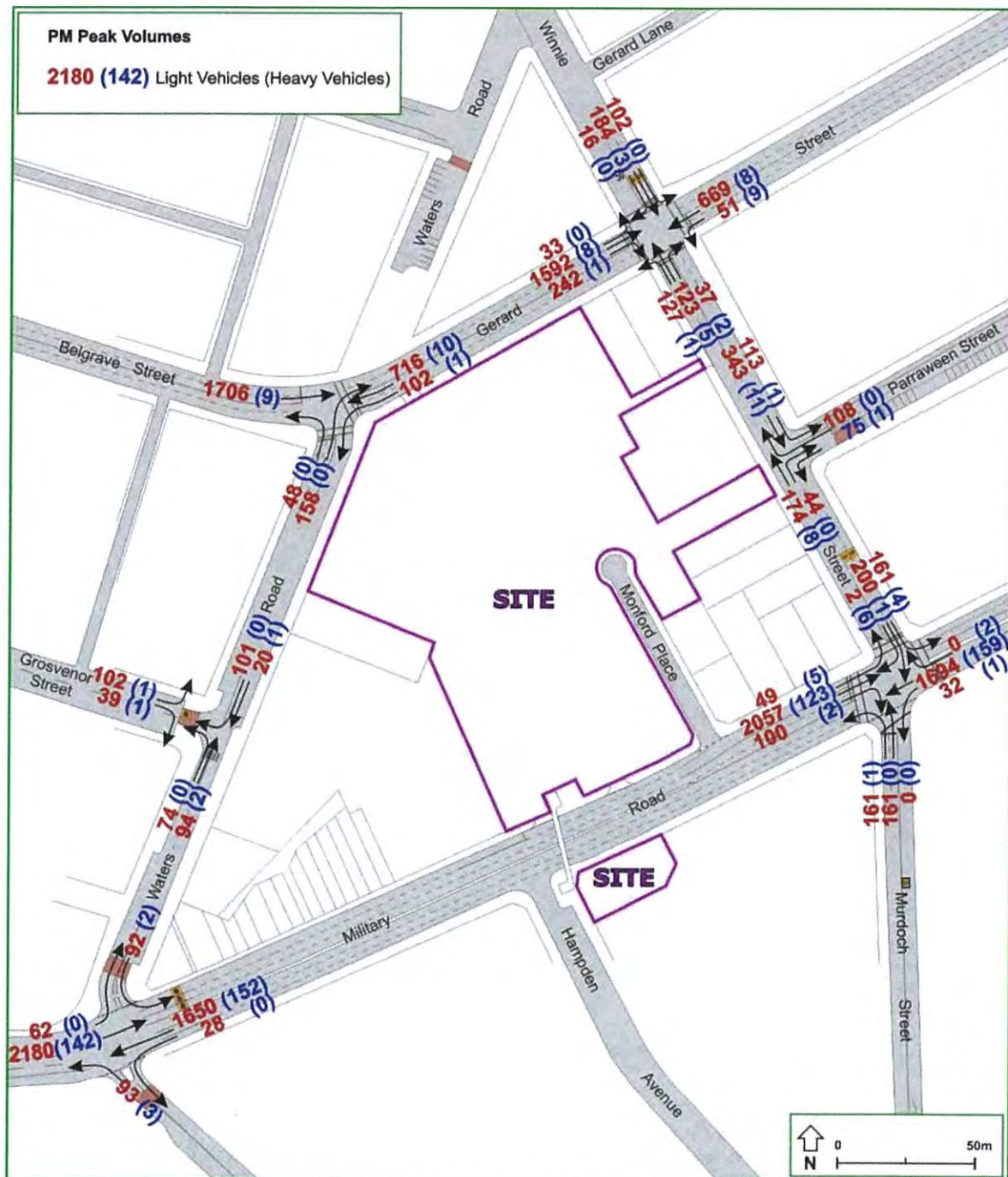


Figure 13: Existing Weekday PM Peak Turning Counts



These surveys were taken on a typical school day in November 2014 from 7:00-9:00am during the morning period and 2:00-6:00pm during the afternoon/evening period. The PM surveyed period of 2pm-6pm was surveyed to encompass the school peak departure times (2-4pm) and the road network peak periods (4-6pm). The intersection count results are provided in **Appendix B**. The results of these surveys were analysed using the SIDRA computer program to determine their performance characteristics under existing traffic conditions. The SIDRA model produces a range of outputs, the most useful of which are the Degree of Saturation (DOS) and Average Vehicle Delay per vehicle (AVD). The AVD is in turn related to a level of service (LOS) criteria. These performance measures can be interpreted using the following explanations:

Degree of Saturation (DOS) - a measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DOS approaches 1, it is usual to attempt to keep DOS to less than 0.9. When DOS exceeds 0.9 residual queues can be anticipated, as occurs at many major intersections throughout the metropolitan area during peak periods. In this regard, a practical limit at 1.1 can be assumed. For intersections controlled by roundabout or give way/stop control, satisfactory intersection operation is generally indicated by a DOS of 0.8 or less.

Average Vehicle Delay (AVD) - the AVD for individual intersections provides a measure of the operational performance of an intersection. In general, levels of acceptability of AVD for individual intersections depend on the time of day (motorists generally accept higher delays during peak commuter periods) and the road system being modelled (motorists are more likely to accept longer delays on side streets than on the main road system).

Level of Service (LOS) - this is a comparative measure which provides an indication of the operating performance of an intersection as shown in **Table 1** below

Table 1: Intersection Performance – Operational Characteristics

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals	Give Way and Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required



E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

A summary of the modelled results are provided in **Table 2** below. Reference should also be made to the detailed SIDRA Intersection Movement Summary outputs included in **Appendix C**.

Table 2: Weekday Intersection Performance - Existing

Intersection Description	Control Type	Period	Degree of Saturation	Intersection Delay	Level of Service
Winnie Street / Gerard Street	Signals	AM	1.023	38.3	C
		PM	0.938	40.3	C
Waters Road / Belgrave Street/Gerard Street	Signals	AM	0.764	9.5	A
		PM	0.645	9.7	A
Waters Road / Grosvenor Street	Giveway	AM	0.104	4.6	A
		PM	0.155	4.4	A
Winnie Street / Murdoch Street / Military Road	Signals	AM	1.038	40.5	C
		PM	0.998	48.1	D
Waters Road / Military Road	Stop	AM	0.141	14.4	A
		PM	0.212	15.1	B
Winnie Street / Parraween Street	Giveway	AM	0.251	6.9	A
		PM	0.154	6.6	A

It can be seen from Table 2 that all intersections operate satisfactorily under existing conditions. It is noted that the intersection of Winnie Street, Murdoch Street with Military Road operates at near capacity during the PM peak period. Notwithstanding this, it is stressed that the purpose of the existing analysis is to compare the relative change in the performance parameters as a result of the proposed development. This is discussed further in Section 7.



3.3.2 Weekend Peak Periods

Further to the weekday traffic volume data collection, the intersections of Winnie Street / Gerard Street and Waters Road / Gerard Street were surveyed during the weekend (Saturday) peak period of 10am-1pm as these two intersection would accommodate all traffic associated with the weekend school sporting activities. Additional intersection counts were not undertaken due to the substantial reduction of traffic in the locality during the weekend periods. This is demonstrated by a review of the RMS traffic volume data of Military Road (Station I.D 22001). The Average Daily Traffic Volume Map indicates that daily flows reduce from 56,100 vpd during a typical weekday to 51,200vpd during a typical weekend period in the locality (on Military Road representing an 8.73% reduction in traffic). The weekend counts are considered more than appropriated taking into consideration the favourable overall intersection operations (LoS A-C) during the weekday peak periods and the overall network reduction in traffic.

A summary of the weekend traffic count surveys for the peak period is provided in **Figure 14**.

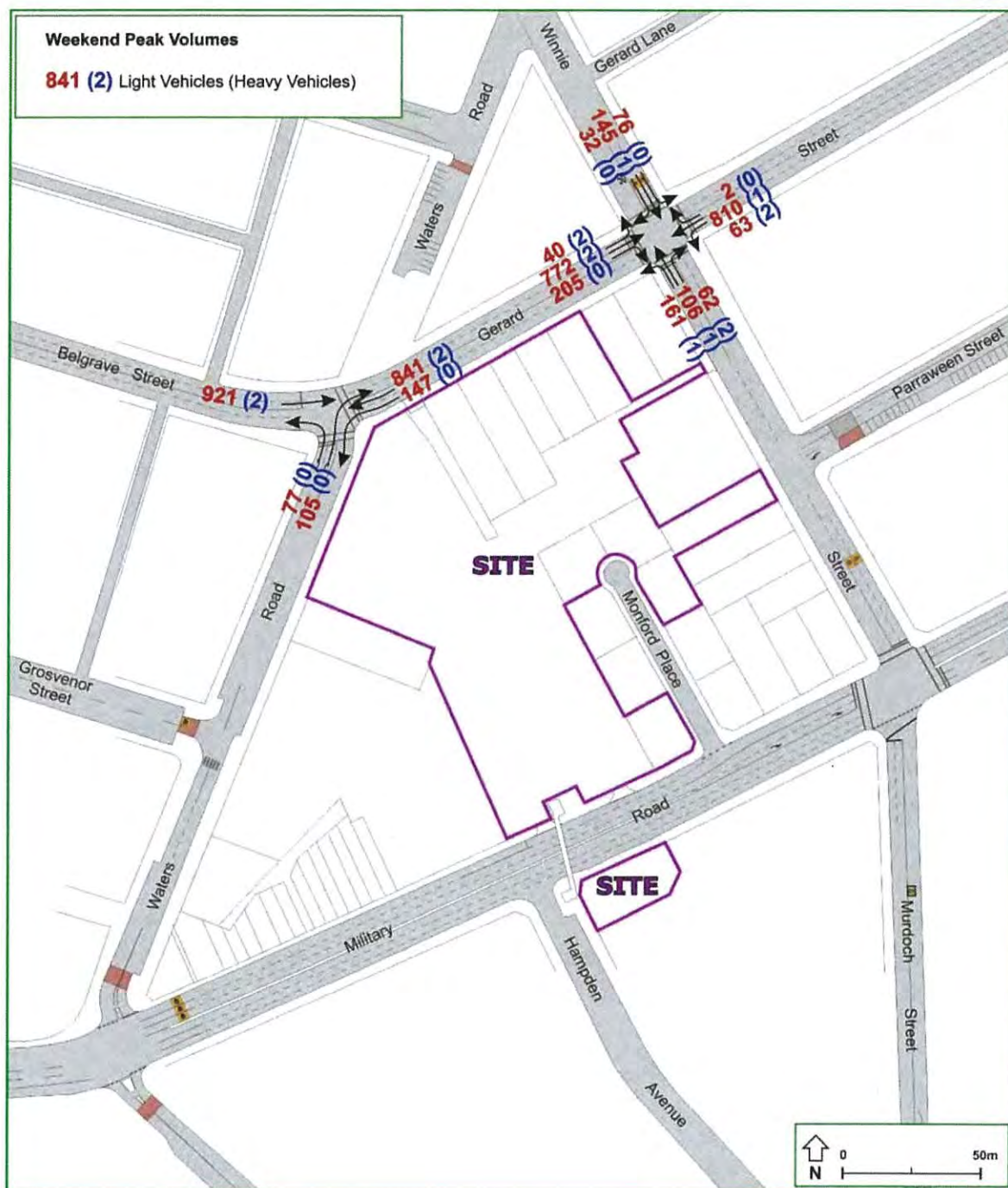


Figure 14: Existing Weekend (Saturday) Peak Turning Counts

A summary of the modelled results are provided in **Table 3** below. Reference should also be made to the detailed SIDRA Intersection Movement Summary outputs included in Appendix C.



Table 3: Weekend Intersection Performance - Existing

Intersection Description	Control Type	Period	Degree of Saturation	Intersection Delay	Level of Service
Winnie Street / Gerard Street	Signals	Saturday 12-1pm	0.847	32.9	C
Waters Road / Belgrave Street/Gerard Street		Saturday 12-1pm	0.624	8.2	A

It can be seen from Table 3 that all intersections operate satisfactorily under existing conditions. As identified in Section 3.3.1 (existing weekday analysis), it is reiterated that the purpose of the existing analysis is to compare the relative change in the performance parameters as a result of the proposed development. This is discussed further in Section 7.

3.4 Parking Demands

Parking accumulation surveys were performed by Lyle Marshall and Associates in March 2014 to determine the operation of the pick-up & drop-off spaces surrounding the site and the existing capacities of on-street parking occupancy. The on-street parking provision on the surrounding roads is generally time restricted parking. The purpose of the Lyle Marshall & Associates study was to determine the availability and existing utilisation of parking spaces on-street within 5 to 7 minutes walking distance of Redlands' Senior Campus. It is also to determine the general operational characteristics of students being 'dropped off' and 'picked up' by vehicles in three drop off zones listed in the section below.



3.4.1 Drop Off and Pick Up Zones

A total of 20 drop-off and pick-up parking spaces are available within the vicinity of the site. **Figure 15** shows the location of the drop off and pick up zones.

- ➊ Zone 1 – Winnie Street which is north of Gerard Street near the Neutral Bay Kindergarten (7 spaces). This zone is signposted "5 Minute Parking" during the 8:00am-9:30am and 3:30pm-4:30pm periods and is unrestricted at all other times. Surveys were conducted during the morning (8:00am-9:15am) and afternoon (2:15pm-3:45pm) of vehicles and length of stays. The survey demonstrated that a total of 25 and 13 vehicles utilised this area during the morning and afternoon periods, respectively. It is noted that the length of stay 5 minutes or less is approximately 52% of vehicles during the morning and 31% during the afternoon. TRAFFIX notes that this facility appears to be provided mainly for the Kindergarten development and is not overly utilised by Redlands' Senior Campus.
- ➋ Zone 2 – Winnie Street south of Gerard Street (5 spaces). This zone is signposted "2 Minute Parking" during the 8:00am-9:30am and 2:30pm-4:00pm periods and 1P Parking 9:30am-2:30pm Monday to Friday at all other times. Surveys were conducted during the morning from 8:00am to 9:30am and afternoon from 2:30pm to 3:00pm. It was noted that a vehicle was parked illegally for more than over an hour which caused the survey results to be skewed. The survey identified that a total of 5 vehicles during both the morning and afternoon periods utilised this area. It is noted that the length of stay 2 minutes or less is approximately 60% of vehicles during the morning and 20% during the afternoon. TRAFFIX noted that on-site observations during both AM and PM school periods indicated that this pick up and drop off facility is not adequately utilised to its capacity.
- ➌ Zone 3 – Waters Road south of Belgrave Street (8 space) signposted "2 Minute Parking" during the 8:00am-9:30am and 2:30pm-4:00pm periods and 1P Parking at all other times. Surveys were conducted during the morning (8:00am-9:30am) and afternoon (2:30pm-4:00pm) of vehicles length of stays. The surveys shows that a total of 28 and 33 vehicles utilised this area during the morning and afternoon periods, respectively. It is noted that the length of stay 2 minutes or less is approximately 89% vehicles during the morning and 45% during the afternoon.

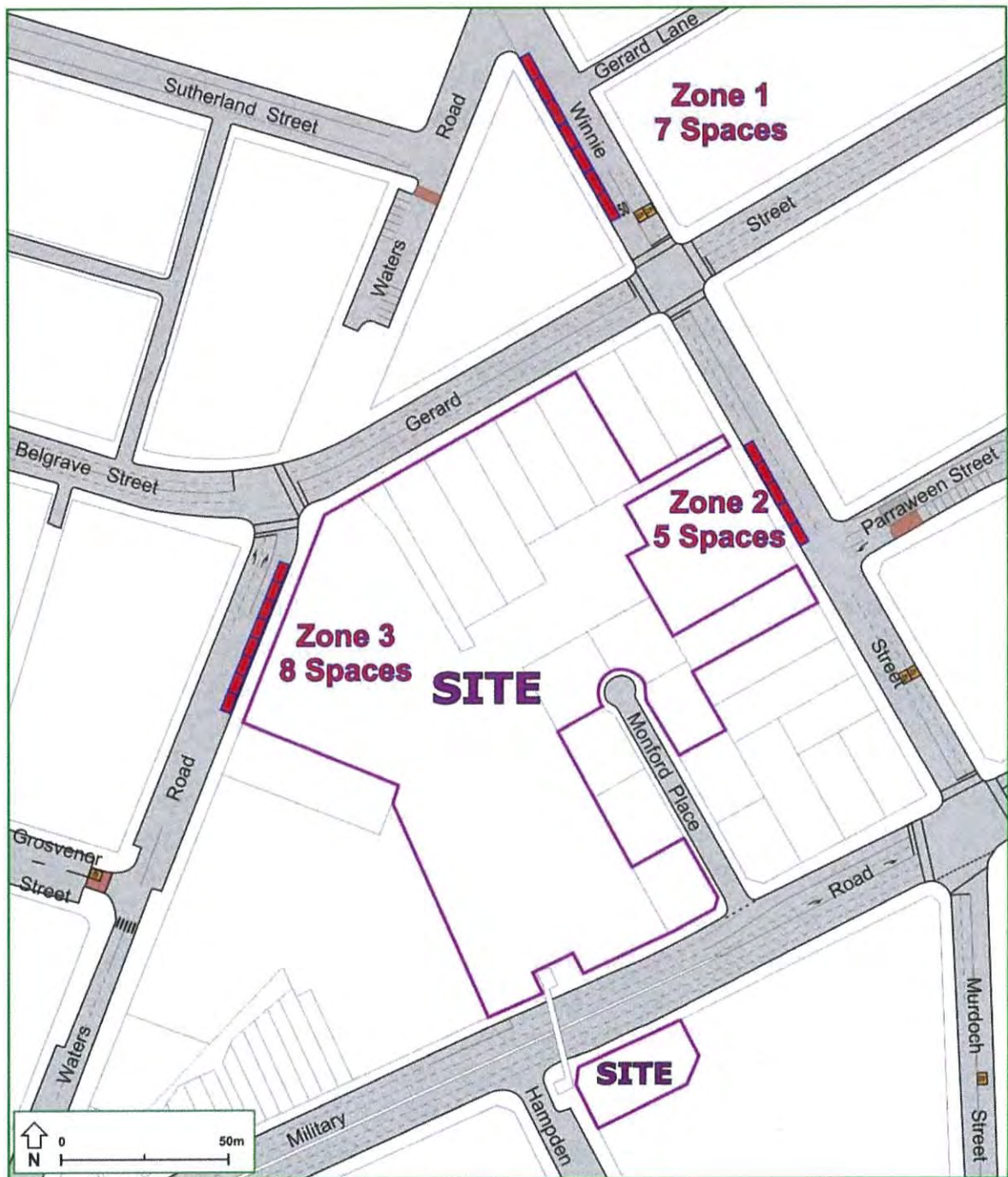


Figure 15: Drop off and Pick up Zones



3.4.2 Existing On-Street Parking

The on-street parking capacity study undertaken by Lyle Marshall & Associates is summarised below. The results provided information relating to the parking availability within 5 to 7 minutes walking distance of the school which is highlighted in **Table 4** and **Table 5**.

Table 4: Total On-Street Parking Utilisation (Morning and Afternoon)

Parking Characteristics		No of Spaces	10am	11am	12pm	1pm	2pm
Overall Total	Total Occupancy	543	400	415	442	434	433
	Percentage	-	74%	76%	81%	80%	80%
Restricted Parking Spaces	Occupancy Rate Restricted	450	315	332	355	347	346
	Percentage	-	70%	74%	79%	77%	77%
Unrestricted Parking Spaces	Occupancy Rate Unrestricted	93	85	83	87	87	87
	Percentage	-	91%	89%	94%	94%	94%

Source: Lyle Marshall and Associates

Table 5: Total On-Street Parking Utilisation (Evening)

Parking Characteristics		No of Spaces	5pm	6pm	7pm	8pm	9pm
Overall Total	Total Occupancy	543	369	332	397	357	282
	Percentage	-	68%	61%	73%	66%	52%
Restricted Parking Spaces	Occupancy Rate Restricted	450	285	256	312	281	209
	Percentage	-	63%	57%	69%	62%	46%
Unrestricted Parking Spaces	Occupancy Rate Unrestricted	93	84	76	85	76	73
	Percentage	-	90%	82%	91%	82%	78%

Source: Lyle Marshall and Associates

Table 4 and Table 5 identify that there are a total of 543 on-street parking spaces within the vicinity of the site, of which, 450 are restricted and 93 are unrestricted. Unrestricted parking spaces are heavily utilised, with the lowest percentage recorded at 9pm of 78% and highest of 94% during 12pm to 2pm.



3.5 Redlands' Senior Campus Parking Demands

Questionnaire surveys undertaken identified that there is an existing parking demand on-street for staff. The survey demonstrated that 80% of private vehicle drivers parked on street in the vicinity of the site in unrestricted parking locations. This represented 45 survey staff members (or 54.9%) who however a first principles approach provides a conservative assessment into the actual demand on street on a typical day. In this regard, the school employs 100 full time staff and 50 support staff. Noting that 54.9% of staff travel via private vehicles and park on street, a pro-rata assessment provides a worst case scenario of 82 vehicles being parking on street within the locality of the site.

The above does not incorporate the actual parking demand of the school however as it only accounts for the vehicles that are parked on-street. In this regard, 11% of staff park on site and this represents a current demand of 17 parked vehicles.

In conclusion, the school has a demonstrated existing parking demand of 99 vehicles which represents a private vehicle usage profile of 65.8%,

3.6 Public Transport

A pedestrian overpass located on Military Road provides convenient and direct pedestrian access route to/from north and south of Military Road. The public bus services on the local road network are shown in **Figure 16**, and those which travel within approximately 400m of the subject site are as follows:

- ➡ Route M30: Metrobus Spit Junction to Sydenham
- ➡ Route 225: Neutral Bay Wharf to Cremorne Wharf
- ➡ Route 243: Spit Junction to City via North Cremorne
- ➡ Route 257: Balmoral Beach to Chatswood
- ➡ Route 263: Crows Nest to City via Neutral Bay and Kirribilli
- ➡ Route 169,173: Narraweena to city and Milsons Point
- ➡ Route 227-230: Mosman Junction, Clifton Gardens, Beauty Point and Mosman Wharf to Milsons Point
- ➡ Route 244-249: Chowder Bay, Balmoral, Taronga Zoo and Spit to City
- ➡ Route 140,143,145: Epping and Chatswood to Mainly
- ➡ Route 160s,170s,180s: Northern Beaches Services as far as Palm Beach.



It is clear from the above that there are a multitude of public transport options for school patrons. Section 4 discusses the travel mode characteristics of the site in particular the utilisation of public transport by students and staff.

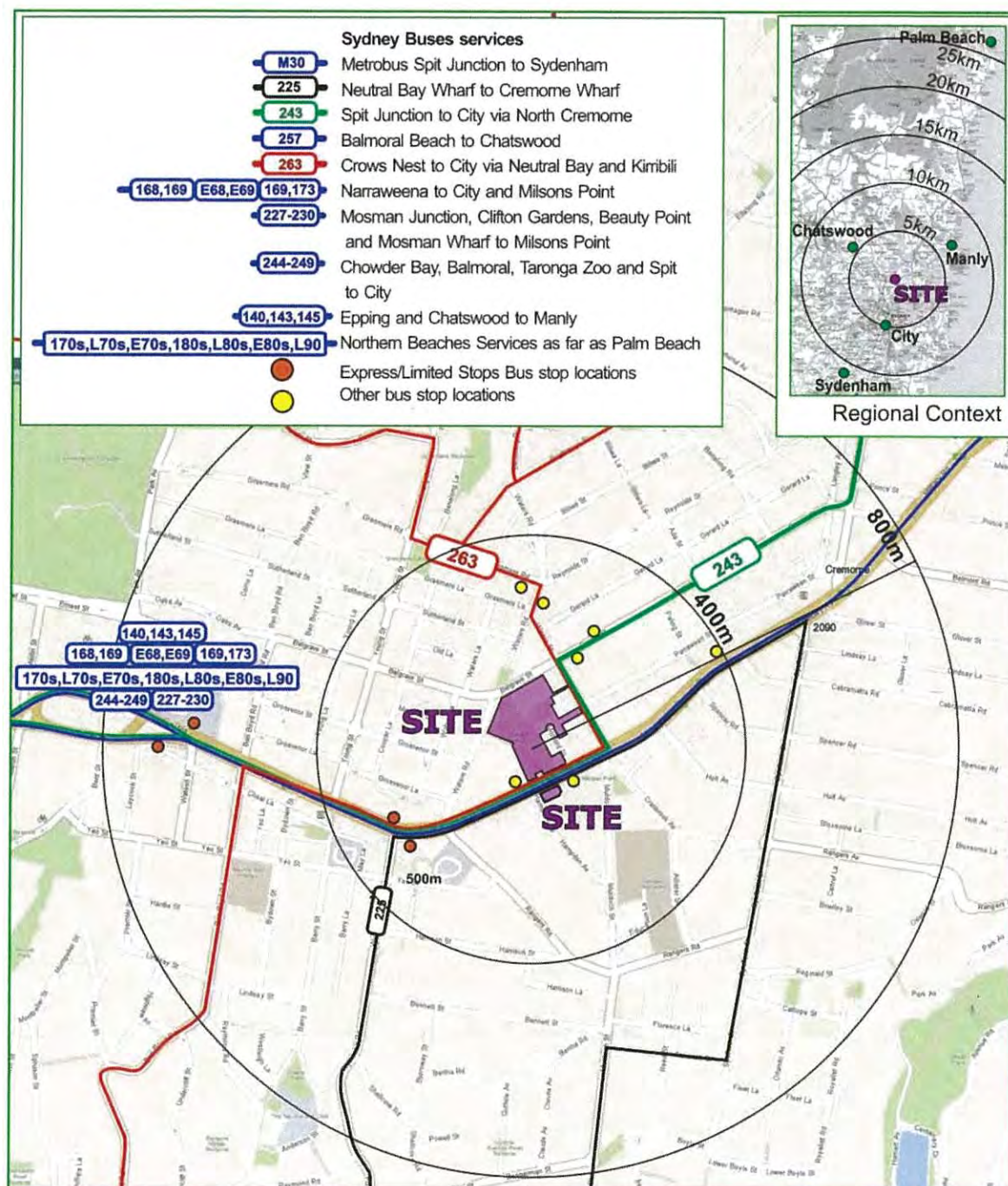


Figure 16: Public Transport



3.7 Bicycle Routes

The bicycle routes located in the vicinity of the site are shown in **Figure 17** below.

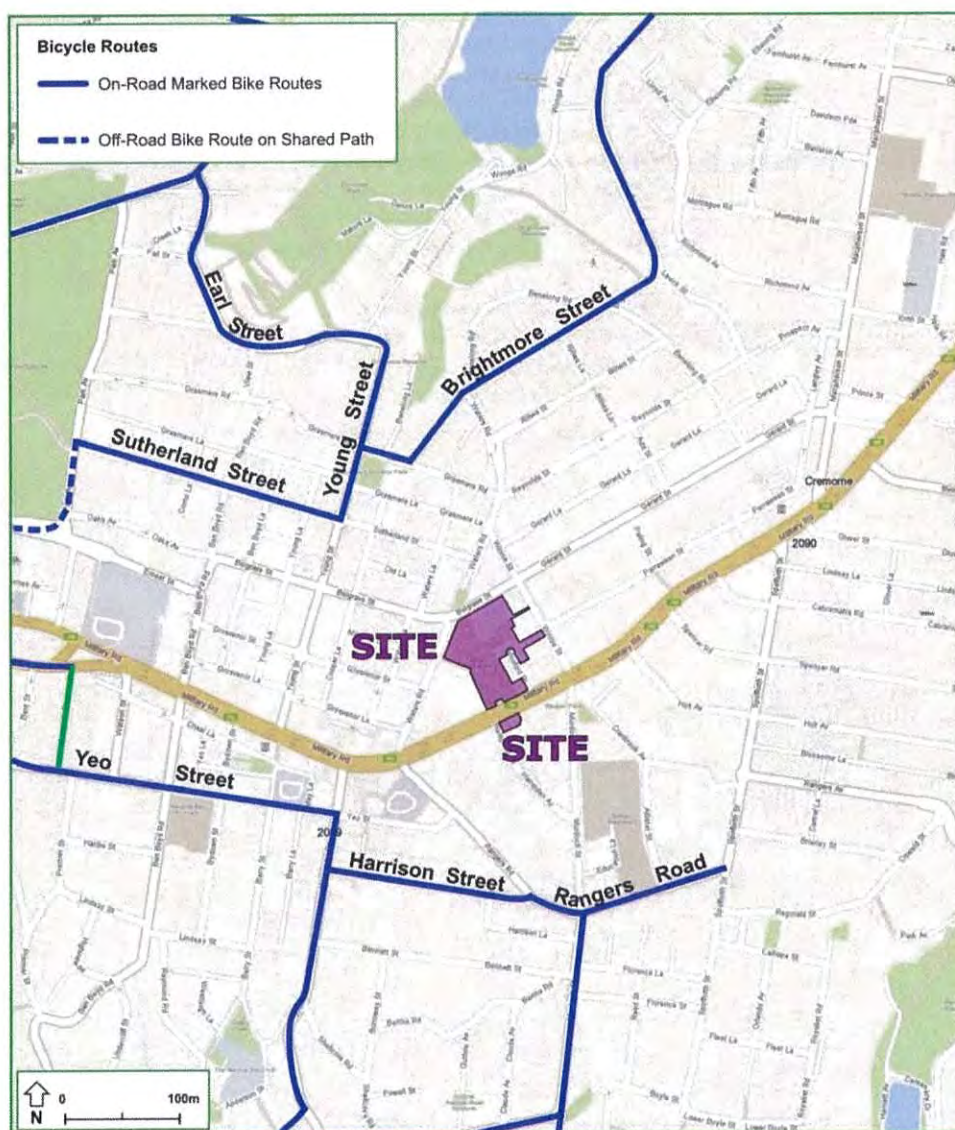


Figure 17: Bicycle Routes

Figure 17 demonstrates that there are a number of on road and off road shared paths for bicycles in the vicinity of the site however there are no dedicated bicycle paths located on the roads which bound the site (Gerrard Street, Waters Road, Military Road and Winnie Street). This is to be expected along Military Road and Gerard Street accommodated high traffic volumes along arterial routes.



3.8 Private Chartered Bus Services

In addition to the public transport facilities identified in Section 3.6, the school operates three chartered bus services to and from the Military Road Campus each day, as outlined following:

- ✱ The Pittwater Express Bus, which runs from Palm Beach, through to Mona Vale and Warringah Mall, to Cremorne;
- ✱ The Inner West Express Bus, which runs from East Ryde, through to Hunters Hill and Rozelle, to Cremorne; and
- ✱ The Eastern Suburbs Express Bus, which runs from Maroubra, through to Bellevue Hill and Darlinghurst, to Cremorne.

Overall, the school is well serviced by public transport as well as private school chartered bus services.

3.9 Minibuses

The school has a fleet of 6 minibuses which are all loaded and unloaded from the existing internal area accessed via Military Road (two access driveways). Three of these buses are stored on the main campus with the additional three buses stored within the Adams Centre site (accessed via Hampden Avenue). The movement of the buses are sporadic with the use of the buses generally in the AM peak and PM peak and infrequently throughout the day for school excursions. The buses are generally used to transport students to external sporting venues.



4. Current Travel Behaviour

With a view to understanding the current travel behaviour of staff and students, online travel questionnaires were issued and completed by a large sample of both staff and students. The online survey was open for response from Friday 28 November 2014 to 4 December 2014. A sample rate of approximately 35% of students and 55% of staff was collected and completed. These sought to establish arrival time, mode of travel, and car occupancy in order to understand the existing development characteristics and inform the future impacts of the development. The key results of these surveys are discussed in the following sections.

4.1 Proportion of Staff

The results of the travel questionnaires completed by a sample of the staff at Redlands Senior Campus are outlined in the tables below.

Table 6: Surveyed Mode Share – Sample of Staff, Redlands Senior Campus

Travel Mode	Number of Staff (Average - To / From School)	Proportion of Staff
Car (as driver) on-street	45	55%
Car (as driver) on-site	9	11%
Walk	9	11%
Bus	8	10%
Bus & Train	5	6%
Cycle	3	4%
Motorcycle	2	2%
Car share	1	1%
TOTAL	82	100%



Table 7: Private Vehicle Occupancy - Sample of Staff, Redlands Senior Campus

Private Vehicle Occupancy	Number of Staff (Arrivals)	Proportion
1	46	90%
2	3	6%
3	2	4%
TOTAL	51*	100%

* 31 staff members skipped this question

Table 8: Arrival Time - Sample of Staff, Redlands Senior Campus

Arrival Time	Number of Staff (Arrivals)	Proportion
Before 7:00am	9	11%
7:00am – 8:00am	59	73%
8:00am – 9:00am	13	16%
9:00am – 10:00am	0	0%
TOTAL	81*	100%

* 1 staff member skipped this question

Table 9: Departure Time - Sample of Staff, Redlands Senior Campus

Arrival Time	Number of Staff (Arrivals)	Proportion
Before 3:00pm	1	1%
3:00pm – 4:00pm	12	15%
4:00pm – 5:00pm	42	53%
5:00pm – 6:00pm	19	24%
6:00pm – 8:00pm	6	7%
TOTAL	80	100%

* 1 staff member skipped this question and 1 staff answered variable

The key findings are summarised below as follows:

- ➡ 66% of staff at the school (including permanent and casual staff) travel via car as a driver.
- ➡ Approximately 17% of staff parked on school site, and 83% staff parked on street within the locality of the school.



- Staff that travel via car to school generally travel alone. This is shown in Table 5 which suggests 90% of staff have a private vehicle occupancy of 1.
- The average car occupancy for staff arriving at the school was 1.14 people.
- The remaining staff used alternate travel modes, with most of these travelling by walking (11%) or public transport (16%).
- For the purpose of reviewing trip arrival patterns, 73% of staff arrived at the school between the hours of 7:00am and 8:00am and 53% of staff leave the school between the hours of 4:00pm and 5:00pm.

4.2 Students

The results of the travel questionnaires completed by a sample of the students at Redlands Senior Campus are outlined in the tables below.

Table 10: Surveyed Mode Share - Sample of Students, Redlands Senior Campus

Travel Mode	AM - Arrivals		PM - Departures	
	Number of Students	Proportion of Students	Number of Students	Proportion of Students
Car passenger	132	44%	78	26%
Public Transport Bus	90	30%	125	42%
School Bus	37	12%	43	14%
Walk	28	9%	45	15%
Car (as driver)	11	4%	7	2%
Cycle	2	1%	2	1%
Motorcycle	1	0%	1	0%
TOTAL	301	100%	301	100%



Table 11: Private Vehicle Occupancy - Sample of Students, Redlands Senior Campus

Private Vehicle Occupancy	AM - Arrivals		PM - Departures	
	Number of Students	Proportion of Students	Number of Students	Proportion of Students
1	40	20%	29	19%
2	80	41%	62	41%
3	63	32%	48	32%
4	13	7%	12	8%
5	1	0%	0	0%
TOTAL	197	100%	151	100%

Table 12: Arrival Time - Sample of Students, Redlands Senior Campus

Arrival Time	Number of Students (Arrivals)	Proportion
Before 7:00am	4	1%
7:00am – 8:00am	114	38%
8:00am – 9:00am	186	61%
9:00am – 10:00am	1	0%
TOTAL	305	100%

Table 13: Departure Time - Sample of Students, Redlands Senior Campus

Arrival Time	Number of Students (Arrivals)	Proportion
Before 3:00pm	0	0%
3:00pm – 4:00pm	254	85%
4:00pm – 5:00pm	29	10%
5:00pm – 6:00pm	12	4%
After 6:00pm	5	1%
TOTAL	300	100%



The key findings are as follows:

- The highest mode of travel for students travelling to school in the morning is via private car, with 48% of students are either a car passenger or as a car driver. However during the afternoon, the majority of students use public transport, with 56% of students using either school or public buses.
- The remaining proportion of student travel is via bus, with 42% using public school buses in the morning and 56% using public or school buses in the afternoon;
- Reliance on private car for travel is significant during the morning, with 48% of students travelling by private car. It is noted that it is a substantial decrease to 28% when exiting the school during the afternoon.
- In the morning, the average car occupancy for students arriving at the school was 2.26 persons.
- Of these students that arrived at the school by car, 57% arrived between the hours of 8:00am and 9:00am, which equates to 105 car arrivals for the full student population during the peak hour period, prior to the start of school in the morning.
- In the afternoon, the average car occupancy for students departing the school was 2.28 persons.
- Of these students that departed the school by car, 73% departed between the hours of 3:00pm and 4:00pm, which equates to 75 car departures for the full student population during the peak hour period in the afternoon.



4.3 Journey to Work

The Journey to Work (JTW) census data 2011 has been reviewed for the Travel Zone (1935 & 1933) containing the school, which provides an indication of the mode share for staff. Shown in **Figure 18** are the modes of travel. It can be seen from JTW data that approximately 66% drove to work, with additional 6% being vehicle passengers. Public transport usage is approximately 5% for buses and 13% for trains. The results of vehicle usage are relatively in fact higher than the travel characteristics of the school as identified by the questionnaire surveys undertaken and shown in Table 4.

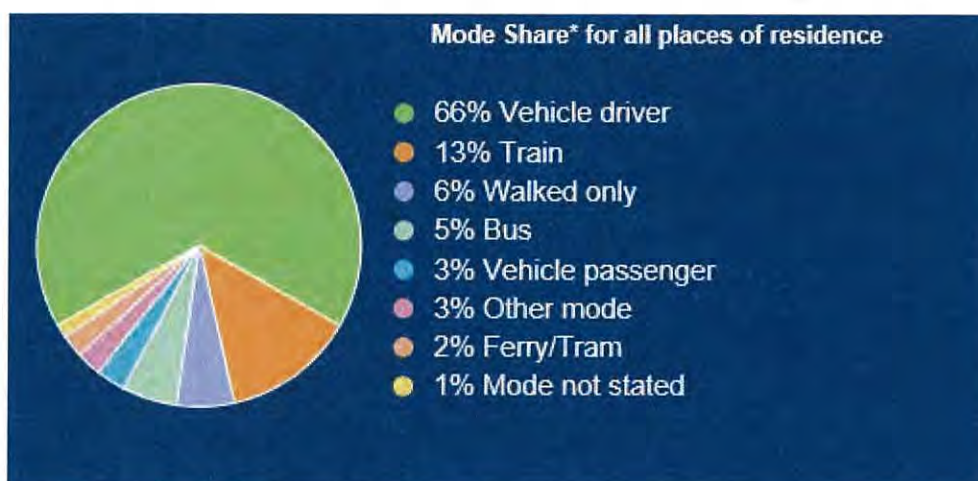


Figure 18: JTW Census data, 2011



5. Description of Proposed Development

5.1 Overview

A detailed description of the proposed development is provided in the Statement of Environmental Effects provided separately by Urbis. The Concept Proposal will be delivered in five stages and will generally involve the following buildings and works:

- Stage 1 – New Learning Hub:
 - Demolition of existing buildings and structures
 - Construction of a new multi-purpose education building with basement car park and associated vehicular entry off Gerard St
 - Creation of a new internal vehicular link between Waters Rd and Military Rd
- Stage 2 - Sports and Performing Arts Centre:
 - Demolition of existing buildings and structures
 - Construction of a new sports and performing arts centre
- Stage 3 - Redlands Hall, Roseby Building and Liggins Building Refurbishment:
 - Internal alterations and additions of existing buildings
- Stage 4 - Humphery Learning Hub and Resource Centre:
 - Construction of a new multi-purpose education building with swimming pool and associated facilities at roof top level
- Stage 5 – Dance Centre
 - Construction of a three storey extension to the eastern elevation of the Adams Centre to accommodate dance studios

Reference should be made to the plans which are presented at a reduced scale in **Appendix D**.



5.2 Proposed Access Driveway

Vehicular access to the new car park is proposed onto Gerard Street, approximately 38m to the west of the Winnie Street intersection, and 70m to the east of the Waters Road intersection. This access location on Gerard Street has been selected for the following reasons:

- Access options have been investigated from Winnie Street (directly opposite Parraween Street). Although, it had been identified as a prohibited location under AS 2890.1, TRAFFIX reviewed the potential to construct a public intersection (roundabout controlled). For various safety reasons and road geometric constraints, this option was not considered acceptable or supportable. In addition to the extensive compliance reasoning, North Sydney Council had also previously raised concern regarding access via this intersection.
- Monford Place was considered unsuitable for use due to its narrow width which permits one-way flow only (with parking on both sides) and the fact that this cul-de-sac road primarily only accommodates residential traffic.
- Having considered the above primary options and noting that the school must maintain the day to day operation of the school during the various stages, the only remaining viable option for access to the car park is via Gerard Street.

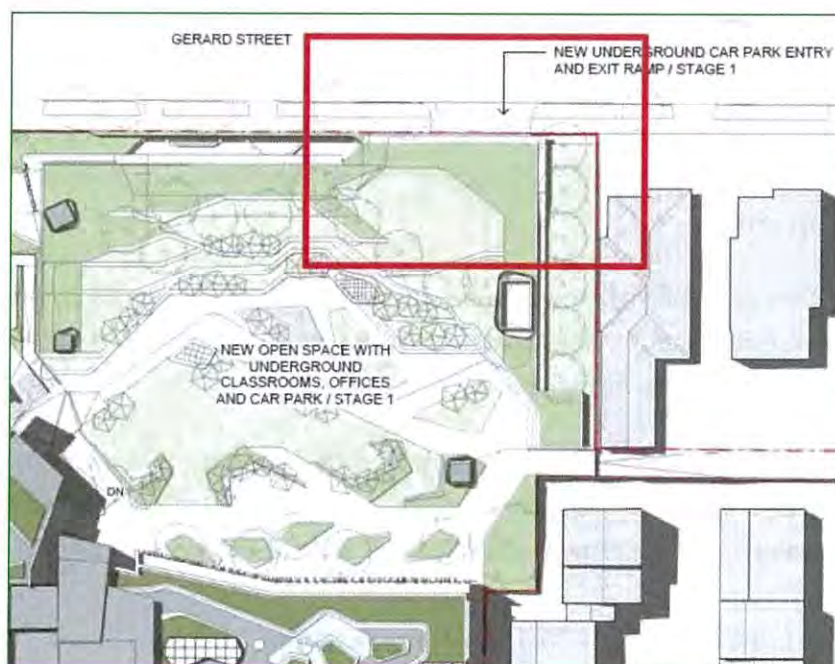


Figure 19: Proposed Access Location



Discussions have been held with RMS regarding the proposed new access driveway onto Gerard Street, and RMS has advised that it is generally supportive of the proposed driveway, subject to the following correspondence received from RMS Senior Land Use Planner, Angela Malloch on the 2nd February 2015.

"Roads and Maritime Services (Roads and Maritime) provides the following advice and information for your review prior to lodging a formal application with the Department of Planning and Environment:

- 1) *Roads and Maritime provides in-principle agreement to a vehicle access from Gerard Street. At the meeting the restriction of movements to left in left out at this new access point were discussed, however, due to the road corridor width, a median of sufficient width may not be feasible and may impact on adjacent properties existing access. Roads and Maritime suggested the applicant investigate lengthening the 'No Stopping' signs on Gerard Street to allow a vehicle to pass a vehicle turning right into the site.*
- 2) *Roads and Maritime requires the proposed gate to the car park be located within the site to allow for vehicles to queue within the property to reduce impact on through traffic on Gerard Street.*
- 3) *Roads and Maritime suggested the applicant investigate the current pick up and drop off zones to determine if the current provision is adequate to cater for the additional students and additional facilities on site.*
- 4) *It is understood the existing exit (most eastern driveway) on Military Road will be closed in stage 2, as a vehicular connection will be provided from Waters Road to the existing entry on Military Road.*
- 5) *Roads and Maritime requested a Construction Traffic Management Plan be completed and a Demolition Traffic Management Plan for all construction and demolition works, these requirements may form part of the conditions of consent.*
- 6) *Roads and Maritime requested consideration be given to the relocation of the bus stop on Military Road on the western boundary of the site to the eastern side of the entry (existing) driveway. This would avoid students crossing the proposed new road through the site. "*

In response to the above, TRAFFIX now advises as follows:

Item 1 has been addressed and is provided in **Appendix E**. The "No Stopping" restrictions will need to be extended approximately 18 metres on the northern side of Gerard Street to permit vehicles to pass right turning vehicles into the site. In addition, "No Stopping" restrictions will need to increase by



approximately 44 metres on the southern side of Gerard Street to allow safe sightlines to be provided in accordance with AS 2890.1 (2004).

In relation to Item 2, the roller shutter door is to be located 18 metres within the property boundary which provides queuing area for approximately 3 vehicles. This is more than sufficient for weekday operation when only staff will utilise the car park. During weekend operation, the roller shutter door will be open during sporting activities so that no queuing will occur.

Item 3 requests the utilisation of the pick-up & drop-off areas has been reviewed and is discussed in Section 3.4.1 and Section 11 Recommendations.

The internal vehicular link (as discussed in RMS Item 4) will now be provided in Stage 1 and this link will service bus related trips only and infrequent servicing of the site (deliveries and waste collection) as discussed in the RMS meeting.

RMS requested a Construction Traffic Management Plan be completed and a Demolition Traffic Management Plan for all construction and demolition works. This is addressed in the accompanying Traffic Impact Assessment (TIA) report for the Stage 1 DA.

Item 6 requested consideration for the relocation of the bus stop to accommodate the exit access driveway onto Military Road. It is considered that the bus stop be relocated to the west resulting in the loss of 1-2 parking spaces. This however is an item for discussion with STA and liaison would be required as to the most appropriate location during the Detailed Design CC stage.



6. Parking Assessment

6.1 Introduction

The parking assessment that has been undertaken for the concept proposal takes into consideration the two key primary parking demand aspects of the site redevelopment. These are:

- The completion of the overall site redevelopment and ability to accommodate the future demand of the Sports and Performing Arts Centre (Stage 2) and the swimming pool proposed within Stage 4, both of which would reach peak utilisation during weekend periods (Saturday); and
- Acknowledging the direct consequential benefit of the parking provided for this weekend demand being available to serve the needs of staff who presently park on-street on weekdays. This will release on-street parking for the use of the general public and residents in particular, which is a significant public amenity benefit.

In addition to the above, there are a number of performing arts, creative arts and school community events that are currently held on school grounds which are shown in **Appendix F**, being an indicative Redlands Senior Campus Facilities Usage profile. It is clear from the existing and forecasted profiles that no increase is proposed in either the frequency or capacity of these events. In fact, it is particularly noteworthy that all of these existing events accommodate all parking demands on-street and the proposed 115 space car park (in its final form) will therefore provide a significant net improvement in on-street parking conditions in the locality. This is discussed in further detail below, concerning firstly weekend demands, then secondly weekday demands.

All other works are primarily related to internal additions and alterations, which generate no increase in parking demands.

6.2 Masterplan Parking Requirement – Weekend Demand

6.2.1 Stage 2 – Sports & Performing Arts Centre

The Sports and Performing Arts Centre will accommodate a total of four (4) courts (for netball and basketball) and two (2) tennis courts. These are not expected to generate significant additional parking demands during normal weekday operation as all students are already in attendance. The



weekend operation does however present a more critical design scenario, based on assessment as a recreational building. In this regard, Council's DCP requires parking for recreational facilities at a rate of 1 space per 100m². Application of this rate to the sports facility GFA of 6,906m² results in a maximum parking requirement of 69 parking spaces. In response, it is proposed that the parking layout provides a total of 68 parking spaces including 2 accessible spaces and 4 small car spaces (upon the completion of Stage 1). This is less than the maximum and is therefore compliant with Council's controls.

6.2.2 Stage 3 – Redlands Hall, Roseby Building & Liggins Building Refurbishment

The proposed works are associated with internal alterations and additions of existing buildings and will not result in any additional parking demand.

6.2.3 Stage 4 – Humphery Learning Hub & Resource Centre

Similar to the above, the proposed works generally relate to improved and upgraded educational facilities which will not contribute to the weekend (or weekday) parking demand. Stage 4 does however result in the provision of a swimming pool which will create an associated weekend parking demand. Application of Council's DCP (Recreational Facilities Parking Rate of 1 space per 100m²) to the swimming pool GFA of 1,082m² results in a requirement of 11 parking spaces.

The DCP rate is however considered an underestimate based on the operational needs of the school. Specifically, the peak usage of the swimming pool will attract high usage during weekend periods for water polo events and an expected demand of up to 80 people per hour (students, staff and spectators) from 8am to 2pm would be generated on a typical hosting Saturday, based on advice provided by the school administration. Hence, there would be an expected demand 160 person trips per hour (i.e. 80 arrivals and 80 departures). With an assumed travel mode split of 80% private vehicle and an average vehicle occupancy of 3.0 (including car driver and making allowance for spectators), a parking demand of 43 spaces arises based on this 'first principles' assessment.

Stage 4 will also result in the completion and extension of the car park which will result in a total of 115 parking spaces including 3 accessible car spaces and 6 small car spaces. Reference should be made to **Table 14** which provides an overview and comparison of the weekend parking requirement and the delivery of the car parking quantum over the development stages.

6.2.4 Stage 5 – Dance Centre

The proposed works are associated with construction of a new dance centre. The dance centre will primarily be used during the weekdays and is not expected to generate any additional parking



demands during normal weekday operation as all students generally arrive and depart during the respected peak periods and are already in attendance on-site. Finally, it is not anticipated that the dance centre will be utilised for the weekend period.

6.2.5 Summary of Weekend Parking Demand

Table 14 provides an overview and comparison of the weekend parking requirement and the delivery of the car parking quantum over the development stages.

Table 14: Weekend Parking Demand Assessment

Stage	Parking Assessment	Assessment Basis	Parking Provision
Stage 2	69	Council DCP	68
Stage 3	69	No increase in weekend demand	68
Stage 4	112	First Principle Assessment	115
Stage 5	112	N/A	115

It is clear from Table 14 that an overall parking requirement of 112 spaces is derived from the parking assessment and upon the completion of the overall site re-development, the car park layout will provide a total of 115 parking spaces generally satisfying this demand. Any provision below this level would introduce a potential for unfavourable on-street parking impacts and the provision of 115 spaces is considered an appropriate balance, having regard for Council's objective to minimise parking as far as practicable. This will ensure that there is reduced reliance upon on-street parking during the weekend peak periods once the facility is fully operational.

In conclusion, it is evident from the above analysis that the demand can be accommodated on site at all times and is generally compliant with Council's DCP.



6.3 Masterplan Parking Requirement – Weekday Demand

6.3.1 Existing Parking Demand

The parking assessment for weekday operation has been undertaken with consideration for the requirements of North Sydney Development Control Plan 'Section 10 Car Parking & Transport'. The controls for car parking are MAXIMUM parking rates for all land uses. In this regard, it is noted that Table B-10-10.3 of Council's DCP requires parking to be provided at a rate of 1 space per 6 staff for 'Educational Establishments'. Application of this rate to the existing 150 staff (100 full time staff & 50 support staff) would nominally require 25 parking spaces.

In order to provide context, the Local Environmental Plan (LEP) definition of an Educational Establishment is as follows:

"Educational establishment means a building or place used for education (including teaching), being:

(a) a school, or

(b) a tertiary institution, including a university or a TAFE establishment, that provides formal education and is constituted by or under an Act."

It is considered that adoption of this 'generic' parking rate should not be a mandatory requirement because the LEP rate does not contemplate a situation where the development is an existing school with existing parking demands and travel characteristics, which reflect established practices. Indeed, assessment based on RMS Guidelines recommends surveys of these existing demands as the preferred methodology. Similarly, the LEP does not therefore consider the adverse amenity impacts on local residents caused by on-street parking demands and the benefits that may be available to local residents if this parking overspill is dealt with on-site, as now proposed. In this regard, reference should be made to Section 3.5 which summarises the existing parking demand of Redlands' Senior Campus. This analysis has shown that a maximum demand of 82 staff spaces are presently accommodated on-street at any one time on a typical weekday, which should ideally be accommodated on-site within the proposed car park, even in the absence of any redevelopment proposal. The proposed relocation of the current parking demand to the on-site car park (Monday-Friday) will thus significantly improve on-street parking conditions and provide a direct benefit to the local community. In this regard, 82 staff car spaces represents some 600 metres of on-street kerbspace (when account is taken of driveways) and the 'release' of this parking back to residents and others will improve parking conditions on weekdays very substantially. In addition, the existing parking demand of 17 spaces on site would also be relocated within the car park, thereby accommodating the total demonstrated demand of 99 parking spaces wholly on site.



This approach is also consistent with North Sydney Council's DCP Quantity Requirements Objective to ensure that sufficient car parking is provided on site for the users of the development, taking into account the travel mode characteristics of the site. Again, this supports the benefit of relocating known external on-street demands to within the site, even absent any redevelopment; as recommended by the RMS Guideline.

In summary, it is proposed that these 99 cars be relocated within the basement car park for general staff use only Monday to Friday. In addition to this staff parking, it is considered appropriate to provide an additional 14 spaces for parents/visitors for normal weekday demands, based on experience and the existing provision of parking for visitor use. This results in an overall requirement of 113 parking spaces for the existing typical weekday peak operational requirements.

6.3.2 School Parking Requirement – Staff Increase

Application of the 1 space per 6 staff parking rate for 'Educational Establishments' to the increase of 10 staff results in a maximum requirement of 2 parking spaces..

6.3.3 Weekday Parking Requirement Summary

The total resultant demands (existing plus expansion) will be 115 parking spaces on weekdays. The ultimate provision of 115 parking spaces (required for weekend conditions) will accommodate this and also provide some level of spare capacity to accommodate occasional (non design) peaks. Importantly, the removal of extensive existing kerbside parking in the locality will improve the amenity of area, most notably for local residents. This on-street parking capacity improvement will occur progressively over time, with 68 parking spaces delivered upon completion of Stage 1 and 115 parking spaces on the completion of Stage 4.

6.4 Bus Parking

A through link is provided on site and will generally accommodate school's bus and 14.5m private bus movements during off peak periods. The proposed facility can accommodate a maximum of 4 mini buses (parked) and can be concurrently passed by larger buses during peak periods which would generally occur on a Thursday afternoon. This is further discussed in Section 10.5.



6.5 Parking for People with Disabilities

North Sydney Council's Parking DCP specifies a requirement of 1-2% of all non-residential parking spaces to be designated for use by the disabled. Contrary to the above, Council's Access DCP also states that disabled spaces must be provided in accordance with Table D3.5 of the BCA and results in a requirement of 1 accessible space per 100 spaces for a school.

Application of the accessible parking rate included in Council's DCP suggests an accessible parking requirement ranging from 2-3 spaces within the new car park. In response, the development proposes a total of 3 accessible parking spaces for the ultimate master plan which complies with Council DCP requirements.

As shown in the reduced plans included in Appendix D, the accessible parking spaces provide 3.6m wide parking spaces. It is noted that the accessible parking spaces are required to be designed in accordance with the requirements of AS2890.6 with minimum 2.4m wide parking spaces and 2.4m wide adjacent shared zones. An assessment of the architectural plans indicates that the parking layout for the disabled spaces accommodates a 7.6m width and therefore is fully capable of accommodating the necessary 7.2m width to comply with AS 2890.6 (2.4m space, 2.4m shared area and 2.4m space).

These spaces are located within close proximity to the car park lift core for ease of access. A minimum of 2.5m headroom will be required over the parking spaces and adjacent clear zones. The path of vehicular travel from the car park entrance to the accessible parking spaces and from those spaces to the car park exit will be required to have a minimum headroom of 2.2m.

It is envisaged that any detailed design matters relating to the accessible parking spaces can be addressed and finalised at construction certificate stage.

6.6 Motorcycle Parking

Motorcycle parking is required to be provided at a "*minimum*" rate of 1 space per 10 cars or part thereof. This requires 12 motorcycle parking spaces for the ultimate master plan based on 115 spaces.

Council's DCP also requires the motorcycle spaces to be designed with minimum dimension of 1.2m x 3m opposed to AS 2890.1 design requirement of 1.2m x 2.5m. These spatial requirements have been provided within the car park for the ultimate scenario.

The development proposes a total of 12 motorcycle parking spaces which complies with Council's DCP requirements.



6.7 Bicycle Parking

Council's DCP does not specify bicycle parking requirements for a secondary school. It does refer to Tertiary Educational Institution which requires minimums of 1 per 10 staff and 1 space per 10 students.

The DCP specifically states for 'Other' types of development that "On merit", Council will give consideration to the rates contained within the Planning guidelines for walking and cycling 2004 which requires:

- Long Term Use: 3-5% Staff (5-8 spaces)
- Short Term Use: 5-10% Staff (8-16 spaces)

In this regard, the development is required to provide 13-24 bicycle parking spaces. In response, the development proposes to provide 20 bicycle parking spaces within the basement car park suitable for use by staff.

6.8 Service Vehicles

Waste Collection is currently undertaken with access onto Gerard Street by a private contractor. The waste collection vehicle currently enters the site in a forward direction, collects the waste, undertakes a reverse manoeuvre on site and exits the site in a forward direction.

The proposed site through link will accommodate entry manoeuvres from Waters Road and exit manoeuvres onto Military Road upon completion of Stage 1 works. This facility is fully capable of accommodating the school's waste collection vehicle which typically range from 10-12metres in length. The through site link is considered suitable for use and will ensure that forward entry and exit manoeuvres will be maintained. The ultimate access locations are shown in **Figure 20** below. Finally, it is noted that servicing of the site during Stage 1 is addressed on the accompanying TIA report for the Stage 1 DA.

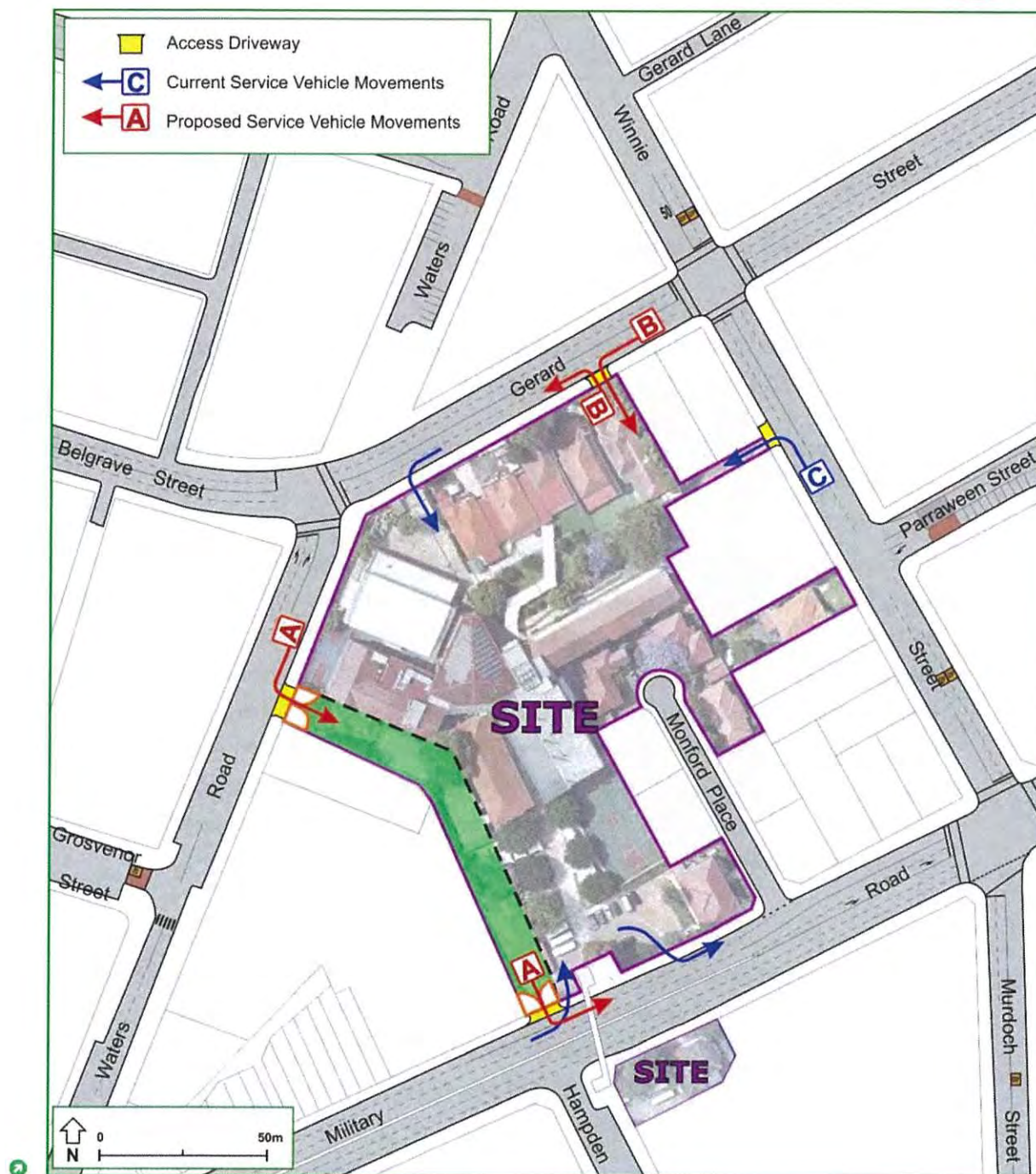


Figure 20: Proposed Access Locations – Completion of Site Redevelopment



7. Traffic Impacts

7.1 Introduction

The traffic impacts of the Redlands' Senior Campus redevelopment are primarily related to two specific scenarios. These are

- the impacts associated with the general school weekday operation and in particular the ultimate increase of 30 students and 10 staff, and
- the impacts associated with the proposed sports facilities during the weekend periods of 8am until 2pm.

It can be said that the proposed modifications are intended to largely cater more efficiently and more safely for the existing requirements of the college. It is expected that the car park will generally cater for traffic that is currently experienced by the school during the typical weekday (with only very minor increases in staff and student numbers now proposed), and most significantly the current parking demands of the school are accommodated in the local streets surrounding the college due to a limited parking supply within the site itself. Therefore, the overall impact on the surrounding road network could theoretically be reduced, in that staff members will now have a guaranteed destination (this being the car park) compared to the existing scenario where staff members may be forced to recirculate the road network in search of a parking space.

Furthermore, the existing sports facilities accommodated on-site do not meet the college's current demands or requirements, so that external leased sporting facilities are currently required, with staff and students transported to these external facilities by private bus. The improved sports facilities on-site will substantially reduce the need to use external facilities, thereby reducing the external traffic impacts associated with the transfer of staff and students by bus, whilst also improving the efficiency and convenience of college operations.

In summary, the impacts of the proposal on the surrounding road network are generally expected to be positive. Notwithstanding this, the estimated trip generation is discussed below.



7.2 Trip Generation – Existing & Proposed

7.2.1 Existing Trip Generation

In order to understand the existing and proposed travel mode arrival and departure characteristics, questionnaire surveys of both students and staff were undertaken and analysed. A summary of the existing and proposed arrival characteristics is provided below in **Table 15**. The analysis indicates that with the existing 920 students and 150 staff members, the development generates a total of 283 vehicle trips with 196 students' related vehicular trips (arrivals) and 87 vehicle arrivals associated with staff. The questionnaire survey data demonstrated that there is a student vehicle occupancy of 2.26 students in the AM peak period and up to 48% of students attend the site by private vehicle. The travel mode data indicates that the second highest travel mode is public transport with 30% of students attending the site by this mode.

Table 16 provides travel mode patterns for a typical afternoon peak period. It is clear from the questionnaire analysis that private vehicle trips associated with students is further reduced from the AM peak modal split of 48% to a PM peak modal split of 28% with increased trips associated with public transport, walking and school bus usage. The analysis indicates that with the existing 920 students and 150 staff members, the development generates a total of 200 vehicle departures with 113 vehicle departures associated with students and 87 vehicle departures associated with staff. The questionnaire survey data demonstrated that there is a student vehicle occupancy of 2.28 students in the PM peak period. The travel mode data indicates that the second highest travel mode is public transport with 42% of students departing the site by this mode.

To summarise, the existing Redlands' Senior Campus generates:

- ➊ 283 vehicle arrivals with 196 students' related arrivals and 87 vehicle arrivals associated with staff during the morning peak period which occurs between 6-9am.
- ➋ 200 vehicle departures with 113 vehicle departures associated with students and 87 vehicle departures associated with staff which occurs from 3-6pm.
- ➌ It is assumed that an additional 20% of vehicular trips would be associated with general visitor attendance to the site and also include service vehicles. It is therefore estimated that daily traffic volumes of 950 vehicles are generated by the existing school on a typical weekday. This includes student peak morning arrivals and peak afternoon departures factored to account for pick up and drop off movements and an additional 20% for visitor/delivery generation.



7.2.2 Proposed Trip Generation

The proposed trip generation has been estimated based on the findings of the travel mode questionnaires and the analysis undertaken and summarised in Table 15 and Table 16 below. The travel mode characteristics have been applied to the ultimate increase of 30 students and 10 staff. The analysis demonstrates that during the peak morning arrival period an additional 12 vehicle arrivals will be generated with 6 vehicle trips associated with student drop off and 6 vehicle trips associated with staff arrivals. Table 16 identifies that an additional 10 vehicle departures will be generated during the peak afternoon period with 4 vehicle departures resultant student pick-up and 6 trips associated with staff departures.

It is clear from the above that the additional trips generated by the school development during weekday operation is not a significant increase and will be a minimal impact on the nearby intersections.

7.2.3 Weekend Sports and Performing Arts Centre – Trip Generation

The RMS Guide to Traffic Generating Developments supports a first principle assessment for such recreational type developments. In this regard, based on the operational requirements of the school, the overall development may generate a turnover of up to 550 people per hour including 150 people (75in, 75 out) for the swimming pool weekend operations and 400 people (200in, 200 out) for the sport facilities building weekend operations. Application of the adopted 80% private vehicle modal split and the vehicle occupancy of 3.0 results in the following trip generation:

➡ 146 veh/hr: 73 in, and 73 out

The development may therefore generate 138 veh/hr from 8am-2pm. Table 15 and Table 16 identifies weekday vehicle occupancies of 2.26 (AM) and 2.28 (PM) which would naturally be expected to increase for weekend operations. The potential impacts of the 146veh/hr is discussed in Section 7.3.3