SMEC

Member of the Surbana Jurong Group

Darlington Road Terraces

Traffic Impact Assessment

Prepared for: University of Sydney

Reference No: 30011636

06/04/2018

Document/Report Control Form

File Location Name:	\\AUSYFP01\Group\projects\30011636 - Darlington Rd Terraces Rear Development\009 FinalReport
Project Name:	Darlington Road Terraces – Traffic Impact Assessment
Project Number:	30011636
Revision Number:	Original

Revision History

Revision #	Date	Prepared by	Reviewed by	Approved for Issue by
Original	20/06/16	Federico Ramos	Jason Van Paassen	Federico Ramos
Rev A	28/07/16			
Rev B	19/09/16			
Rev C	21/11/16			
Rev D	20/03/18			Colin Henson

Issue Register

Distribution List	Date Issued	Number of Copies
Trent Scrivener	20/06/16	1
Trent Scrivener	28/07/16	1
Trent Scrivener	19/09/16	1
Trent Scrivener	21/11/16	1
Peter Mellows	20/03/18	1
Office Library Level 5, 20 Berry Street, North Sydney, NSW 2060	20/06/16	1

SMEC Company Details

Adam Watts, Area Manager NSW

Tel:	+61 2 9925 5555	Fax:	+61 2 9925 5566
Email:	Colin.Henson@smec.com	Website:	www.smec.com

This report is confidential and is provided solely for the purposes of State Significant Development Application (SSD). This report is provided pursuant to a Consultancy Agreement between SMEC Australia Pty Limited ("SMEC") and the University of Sydney Campus Infrastructure and Services under which SMEC undertook to perform a specific and limited task for University of Sydney Campus Infrastructure and Services. This report is strictly limited to the matters stated in it and subject to the various assumptions, qualifications and limitations in it and does not apply by implication to other matters. SMEC makes no representation that the scope, assumptions, qualifications and exclusions set out in this report will be suitable or sufficient for other purposes nor that the content of the report covers all matters which you may regard as material for your purposes.

This report must be read as a whole. The executive summary is not a substitute for this. Any subsequent report must be read in conjunction with this report.

The report supersedes all previous draft or interim reports, whether written or presented orally, before the date of this report. This report has not and will not be updated for events or transactions occurring after the date of the report or any other matters which might have a material effect on its contents or which come to light after the date of the report. SMEC is not obliged to inform you of any such event, transaction or matter nor to update the report for anything that occurs, or of which SMEC becomes aware, after the date of this report.

Unless expressly agreed otherwise in writing, SMEC does not accept a duty of care or any other legal responsibility whatsoever in relation to this report, or any related enquiries, advice or other work, nor does SMEC make any representation in connection with this report, to any person other than University of Sydney Campus Infrastructure and Services. Any other person who receives a draft or a copy of this report (or any part of it) or discusses it (or any part of it) or any related matter with SMEC, does so on the basis that he or she acknowledges and accepts that he or she may not rely on this report nor on any related information or advice given by SMEC for any purpose whatsoever.

Table of Contents

Table of Figures

List of Tables

Appendices

Executive Summary

The University of Sydney is currently proposing to construct on-campus mixed-use development comprising student accommodation for 317 rooms as well as ancillary land uses such as laundries, kitchens, lounge areas, recreational zones, study rooms and a lecture theatre. The proposed development incorporates the conversion of Darlington lane. This report provides a summary of the traffic impact assessment to be provided as supporting documentation to the Development Application.

The Environmental Assessment Requirements issued by the Secretary for development approval for the SSD application (SSD 13_66123) provides a list of items to be addressed from a traffic and road safety perspective each of which are addressed throughout this report.

This assessment included a review of the current transport characteristics of the subject site and the surrounding road network. The assessment includes a review of the existing travel patterns and road network performance within close proximity to the site, particularly during peak periods. The assessment was undertaken by interrogating the Bureau of Transport Statics (BTS) data and assessing key intersections using Sidra Software.

A review of the public transport infrastructure (including bus and train services) and pedestrian and bicycle infrastructure within close proximity to the site was also undertaken to determine the extent of road network improvements required to cater for the proposed development.

It is understood that the proposed development will not result in an increase of student or employee numbers on campus. Instead, its primary purpose is to provide additional on-campus accommodation to cater for the current high demand among existing students. As such, the proposed development is anticipated to result in a shift in travel mode away from vehicles (i.e. a reduction in traffic generation).

The proposed development does not include any car parking spaces. This is to take the site's location which is within close proximity to student classes and public transport. The LEP does not stipulate a minimum parking requirement. The site, lying within the University Darlington Campus, is well serviced by trains; given its close proximity to Redfern Station and Macdonaldtown Station located within walking distance as well as Central Station which is also commonly used by students. The site is well serviced by buses with bus stops located on City Road within relatively close proximity and is serviced by several routes including a connection to Central Station. In addition, the University provides a shuttle bus service, primarily transporting students throughout the campus as well as between other campuses.

The campus does not include formal bicycle routes. However, the internal road network is a slow speed environment which is conducive to bicycle and pedestrian movements. There are several bicycle parking areas located throughout the campus including adjacent to the proposed development. Walking is anticipated to be the primary, given that most trips by the students, particularly during peak periods, will occur within the campus, as well as to and from public transport nodes.

All intersections within close proximity to the site are currently operating well within their notional capacity with a Level of Service (LoS) A and are anticipated to continue operating well post-development. This is because the proposed development is anticipated to actually result in a reduction in vehicular trips.

Darlington Lane is proposed to provide a primary pedestrian access to the new building, noting that it currently does not include a footpath. The Lane currently operates as a two-way laneway. As a consequence, the completion of the adjoining Abercrombie Business Precinct development, RMS has approved the conversion of the laneway to one-way movements, travelling west to east. This SSD

Application proposes to introduce a “shared-zone” on Darlington Lane in order to improve pedestrian safety along the laneway. A schematic plan has been prepared for assessment by Council and RMS noting that a Category 2 shared zone is proposed. The kerbs need to be retained for drainage purposes. The proposed shared-zone meets all of the necessary warrants and is proposed to be designed in accordance with the TfNSW Safer Speeds Policy and Guidelines (SS/12/01) and is anticipated to improve pedestrian safety given the current inadequate pedestrian infrastructure on Darlington Lane.

The proposed development’s trip generation along the laneway will to consist primarily of waste collection vehicles and service vehicles along Darlington Lane. Waste collection currently occurs in the same manner such that the proposed development is not anticipated to increase the number of waste collection vehicles.

A Construction Traffic Management Plan (CTMP) has been prepared for the proposed development (to be submitted as a separate document). This demonstrates that construction will not have any adverse impact on the surrounding road network in terms of traffic efficiency or road safety.

Given that the proposed development is not expected to have any adverse impact on the surrounding road network in terms of traffic efficiency or road safety, it is therefore recommended that the proposed development be supported on these grounds. In addition, it is recommended that the proposed Category 2 Shared Zone be introduced on Darlington Lane as part of the proposed development. The Shared Zone will predominantly improve pedestrian safety and with adequate lighting it is envisaged that the Shared Zone will enhance passive surveillance along the laneway, particularly at the building accesses. The Shared Zone is to be supported subject to detailed design in the future.

1. Introduction

This report supports a State Significant Development (SSD 16_7539) application submitted to the Minister for Planning pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

The SSD application follows the approval of the University's Concept Campus Improvement Plan (approved on 16 February 2015 (SSD 13_6123)). The proposed mixed-use building additions and alterations to the Darlington Road terraces and associated public domain improvements along Darlington Lane supports the University's strategic direction to provide an integrated mixed use solution, contributing to the holistic student campus living experience and environment whilst promoting greater use of existing and new University educational facilities.

1.1. Background

Street activation along Darlington Road and Darlington Lane are seen as essential in enhancing the existing urban streetscape. The long row of Terraces fronting Darlington road provide an important and well preserved Late-Victorian urban streetscape staggered in elevation from west to east and terraced into the natural slope of the ground surface. Of primary importance is the retention of the Terraces along Darlington Road because of its local heritage significance. Their adaptive reuse will comprise of building additions to the rear of the Terraces with height envelopes that will not be readily visible from Darlington Road, thus preserving the Terraces' heritage and residential visual presentation along Darlington Road. The architecture of the new building additions to the rear of the Terraces will provide the University campus with the necessary educational establishment land uses and facilities, while responding sensitively to the surrounding built, natural and heritage environment.

1.2. Purpose of this report

This report is submitted to support the development application of the Darlington Road Terraces Mixed Use development comprising of building alterations and additions and associated public domain works.

This report addresses the general requirements for the project relating to Transport and Accessibility, as outlined in the SEARs (The Environmental Assessment Requirements issued by the Secretary for development approval for the SSD application (SSD 16_7539)).

1.2.1. Secretariat's environmental assessment requirements (SEARS)

In accordance with the SEARs it is necessary to include a transport and accessibility impact assessment that provides, but is not limited to, the following:

Details on surveys;

- The existing traffic, public transport, pedestrian and cycle movements within the vicinity of the site;
- An estimate of the total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and cycle trips;
- Future traffic, pedestrian and cycle movements with the proposed development within the vicinity of the site;
- The adequacy of public transport, pedestrian and bicycle infrastructure to meet the likely future demand of the proposed development;

- Measures to promote travel choices for students, staff and visitors that support the achievement of State targets, such as a location-specific sustainable travel plan, development of wayfinding strategies and end of trip facilities for pedestrians and bicycle riders;
- The daily and peak vehicle movements impact on nearby intersections, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/associated funding for upgrading or road improvement works (if required);
- The proposed access arrangements and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and cycle networks;
- Proposed car and bicycle parking provision, including consideration of the availability of public transport and the requirements of the relevant parking codes and Australian Standards and end of trip facilities;
- Proposed location of pedestrian and bicycle facilities in secure, convenient, accessible areas close to main entrances that incorporate lighting and passive surveillance;
- Service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times);
- An assessment of traffic and transport impacts during construction and how these impacts will be mitigated for any associated traffic, pedestrian, cyclist, parking and public transport, including the preparation of a draft; and
- Construction Traffic Management Plan to demonstrate the proposed management of the impact.

1.3. Overview of proposed development

The Darlington Road Terraces are located within the City of Sydney on Darlington Road, Darlington. The site is bounded by Darlington Road to the north, Golden Grove Street to the west, Darlington Lane to the south and Codrington Street to the East. Thirty-eight (38) of the terraces are owned by the University of Sydney.

The proposed Darlington Road Terraces SSD project occupies 5,765 m2 of area within the University of Sydney's Darlington campus. The University owned terraces form four parcels of land, separated by privately owned terraces. The SSD application proposes a mixed-use development including student accommodation combined with educational establishment teaching/learning/student support facilities. The project also includes public domain upgrade works to Darlington Lane in converting the lane to a Shared Zone as well as on-site bicycle parking. The subject site is shown in the figure below.

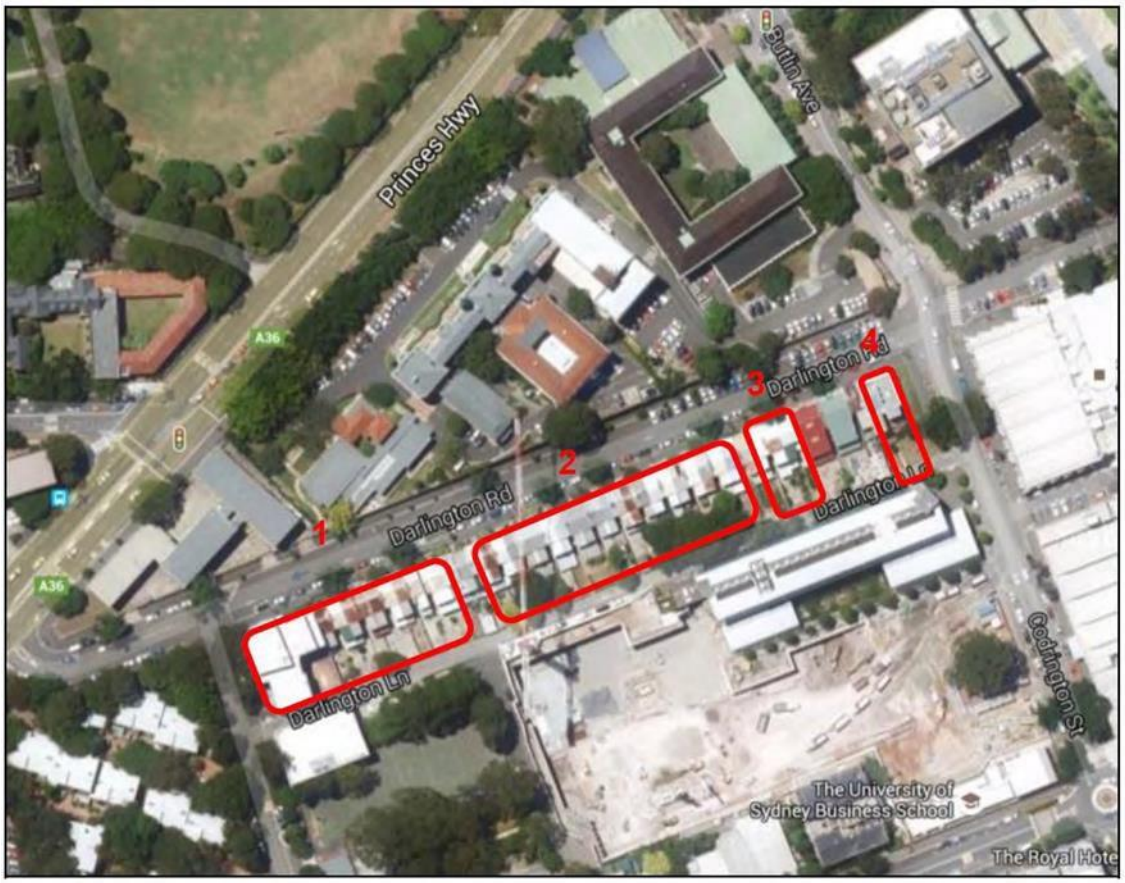


Figure 1-1 Subject site

1.4. Report structure

This report presents the findings of the traffic and transport assessment in the following sections:

- Chapter 1: Introduction – provides a background to the study include the purpose of the report and an overview of the proposed development;
- Chapter 2: Existing transport Conditions - overview of the existing conditions regarding the road network, public transport, Journey to Work data and pedestrian and cycle network. The results from traffic surveys are summarised in this section;
- Chapter 3: Development Components - provides an overview of the development components;
- Chapter 4: Traffic Impact Assessment - outlines the traffic generating potential of the development proposal, identifies access to and from the site, describes its impact to the road network and outlines mitigation measures on the surrounding road network;
- Chapter 5: Construction Traffic Impact Assessment - provides an overview of the construction traffic impact assessment; and
- Chapter 6: Summary of Findings - presents the summary of findings from the traffic investigations and the conclusions of the study.

2. Existing transport conditions

2.1. Location of the Proposed Development

The site is located within the University of Sydney's Darlington Campus. The subject site consists of a narrow block bounded by Darlington Road to the north-west, Darlington Lane to the south-west, Codrington Street to the east and Golden Grove Street to the west. The development is proposed on the entire block with the exception of a few lots that are not owned by the University.

2.2. Site Description

The existing Darlington Road Terraces are currently used as a combination of student accommodation as well as temporary decant space for University faculty, teaching, and office purposes. The rear yards of the Terraces back onto Darlington Lane and are opposite the University's new Abercrombie Business School. The rear of the terraces consists of dilapidated backyards filled with concrete pathways, bitumen footpaths, grassed areas and battered fencing along the laneway and neighbouring properties. These rear yards are currently underutilised by students and staff.

At the northwest corner of the project site (junction of Darlington Lane, Golden Grove Street and Darlington Road) is the H66 Darlington House this includes an existing University Student Accommodation Residence. It currently provides approximately 54 beds with an underutilised dedicated car parking facility. The development proposes to utilise the unused space in the basement car park as bike storage for the overall project development.

2.3. Road Hierarchy and Network

The study area is mainly accessible via City Road which forms the northeast-southwest spine north of the study area. City Road is a State Road leading to and from the Sydney CBD. City Road carries approximately 38,500 vehicles a day. Access to the University's Darlington Campus is provided from this major arterial road. Carillon Avenue is a regional road that provides a road link between City Road and Parramatta Road via Missenden Road.

The surrounding road network surrounding the site is governed by the City of Sydney Council and provides for local access. Roads are generally characterised by posted speed limits of 50km/h with parking on either side. The road network surrounding the site is shown in Figure 2-1.

Abercrombie Street

Abercrombie Street is a City of Sydney Council owned two-way road operating as a collector road running approximately east west between Golden Grove Street and Cleveland Street. On- street parking is provided on either side of the street as well as several pedestrian crossings along its length.

Codrington Street / Butlin Avenue

Codrington Street / Butlin Avenue is a two-way road between City Road and Wilson Street. The Road is named Butlin Avenue north of Darlington Road and is owned by the University.

Codrington Street / Butlin Avenue serves as a collector road connecting to City Road for local traffic and provides a pedestrian/cyclist route for access to the Darlington campus.

Darlington Road

Darlington Road is a City of Sydney Council road with one-way flow from Codrington Street to Garden Grove Street. West of Golden Grove Street, the road is two-way and provides unrestricted movement to King Street operating as a local road. There is perpendicular parking on the northern

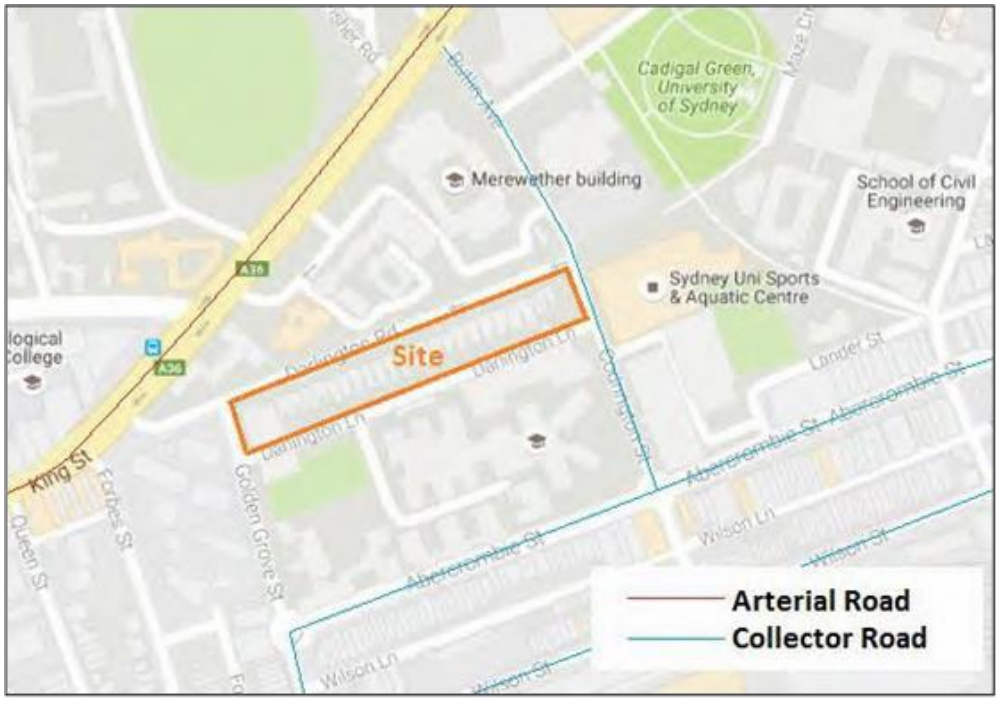
side of Darlington Road and parallel parking on the southern side of Darlington Road along the Terraces.

Golden Grove Street

Golden Grove Street is a City of Sydney Council two-way road connecting Wilson Street to the south and also to King Street to the north via the short two-way link of Darlington Road. Golden Grove Street operates as a local road.

Darlington Lane

Darlington Lane is a City of Sydney Council road, currently operating as a narrow, two-way laneway. Council is currently in the process of converting Darlington Lane into a one-way road running west to east. It is envisaged that the change to a one-way road will have been completed prior to construction work commencing on the proposed development.



Source: Sixmaps

Figure 2-1 Road network hierarchy

It is noted that Darlington Lane consists of a number of vehicular accesses and indented parking bays including:

- Access to a garage of the cottage on the northern side of Darlington Lane at the rear of existing terrace number 88;
- Access to off-street parking on the northern side of Darlington Lane at the rear of existing terrace number 89;
- Three indented 90-degree angle parking spaces for university owned vehicles, on the southern side of Darlington Lane, opposite existing terrace numbers 104 and 105;
- New access to a driveway to approximately 82 off-street parking spaces provided for the Abercrombie Precinct Redevelopment, on the southern side of Darlington Lane, opposite existing terrace at address 120 Darlington Road;
- Redundant access to off-street parking for existing terrace at address 120 Darlington Road on the northern side of Darlington Lane;

- Seven 90-degree angle indented parking spaces and three service vehicle spaces on the southern side of Darlington Lane, east of the university building on the corner of Golden Grove Street and Darlington Lane; and
- A retaining wall with a height of about 1.2 metres located along the southern side of Darlington Lane, east of terrace number 104.

2.4. Existing land use adjoining the site

At the northwest corner of the project site (junction of Darlington Lane, Golden Grove Street and Darlington Road) is the H66 Darlington House that includes an existing University Student Accommodation Residence. It currently provides approximate 54 beds with an under-utilised dedicated car parking facility. The development proposes to utilise the unused space in the basement car park as bike storage for the overall project development.

To the south of Darlington Lane lies the recently constructed Abercrombie Business School which consists of approximately 9,100m2 of teaching and learning space. The school was officially opened in July 2016 and primarily generates pedestrian movements associated with the approximate 4,500 students using the building. On the northern side of Darlington Road lies several University buildings used by students and staff including the Merewether building, the Regiment building, The Darlington Centre and the Storie Dixon wing which all generate significant pedestrian movements. To the east of the site lies the head of the University of Sydney Darlington Campus in the Service Building as well as the Sydney University Sports and Aquatic Centre. The site therefore lies in the heart of the University of Sydney Darlington Campus.

2.5. Travel mode analysis

In order to observe current travel patterns, the following two sets of data were assessed:

- Journey to Work Data for Employees working nearby; and
- Student surveys undertaken as listed in a study titled Travel Mode and Physical Activity at Sydney University.

The findings of the assessment are summarised below.

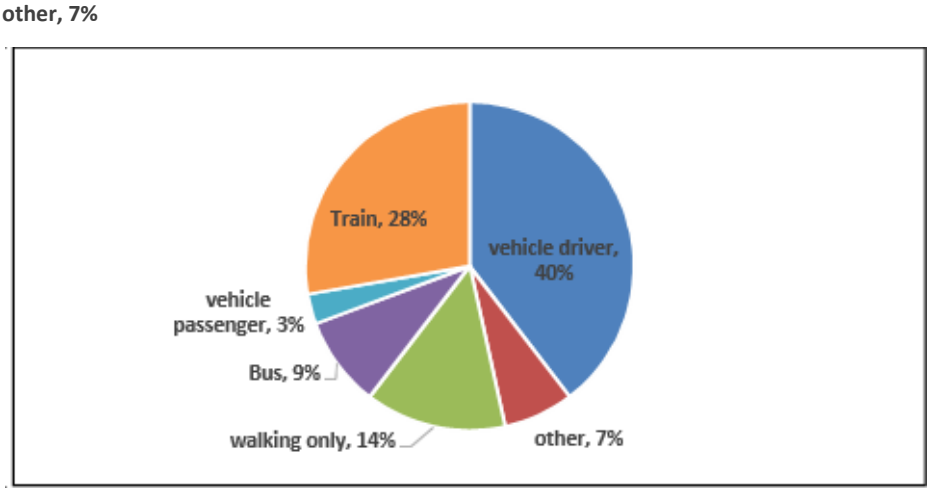
2.5.1. Employee travel mode

The study area is contained within travel zone 243 as defined in the 2011 Census Journey to Work (JTW) data. The study area is shown in the figure below.

Source: Bureau of transport statistics

Figure 2-2 2011 JTW travel zone

The site lies in travel zone 243. The travel mode split for this travel zone as a destination shows that 43% of people working in the study area use car (as driver or as passenger) as the mode of travel. It should be noted that the proposed development's primary purpose is to provide a mixed educational establishment development including student accommodation whereby peak hour trips for students residing in the proposed student accommodation are anticipated to occur solely within the University Campus. The data above provides an indication of the transport mode for employees working in the study area only. It is assumed that vast majority of the "other" travel mode involves cycling. The existing travel mode split for employees is shown in the figure below.



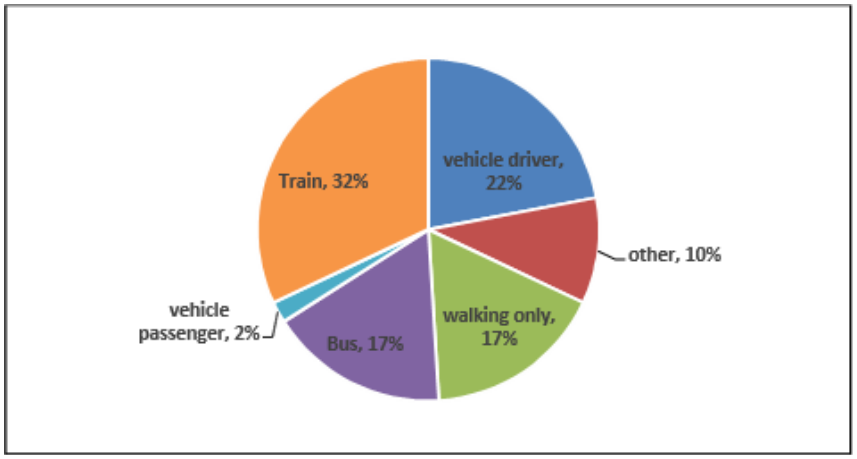
Source: Bureau of transport statistics, JTW 2011

Figure 2-3 Travel mode split for employees (JTW for travel zone 243 as a destination)

2.5.2. Student travel mode

A study undertaken in 2013 titled "Travel Mode and Physical Activity at Sydney University" incorporated a survey of students to determine the current travel mode split. The survey provided 3,737 responses and revealed the following travel mode split for students. The survey results indicate that the proportion of students travelling by car (24%) is significantly lower than employees travelling to the University by car (43%). As a result, students are currently more likely to use a more sustainable travel mode including walking, cycling and public transport.

It should be noted that the survey was undertaken for all students including the vast majority of students who do not live on site in student accommodation. It is envisaged that due to the proximity of classes, the most convenient travel mode for students residing in on-campus accommodation will be walking, cycling and occasionally via the campus shuttle bus particularly given that they will not be provided with a parking space. Nevertheless, this data has been used to estimate the potential shift in student's travel mode.



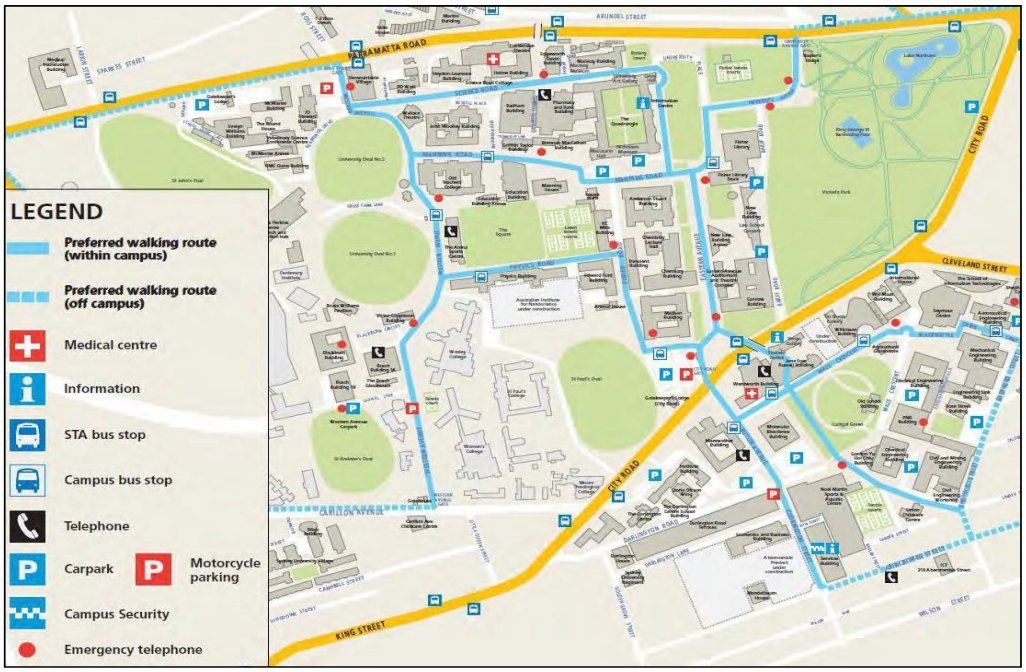
Source: Travel mode and physical activity at Sydney University, 2013

Figure 2-4 Travel mode split for students (student survey)

2.6. Pedestrian and cycle network

The road network within the University campus consist of extensive provisions for pedestrians and cyclists with ample connectivity provided throughout. The precinct is characterised with high pedestrian activity accommodated with wide footpaths and pedestrian facilities including pedestrian crossings throughout. The connectivity provided allows for permeability through the site and connectivity to the surrounding roads and public transport services.

The following figure highlights the key pedestrian routes throughout the campus and within close proximity to the site. The key routes include Codrington Street, running along the site's eastern boundary.

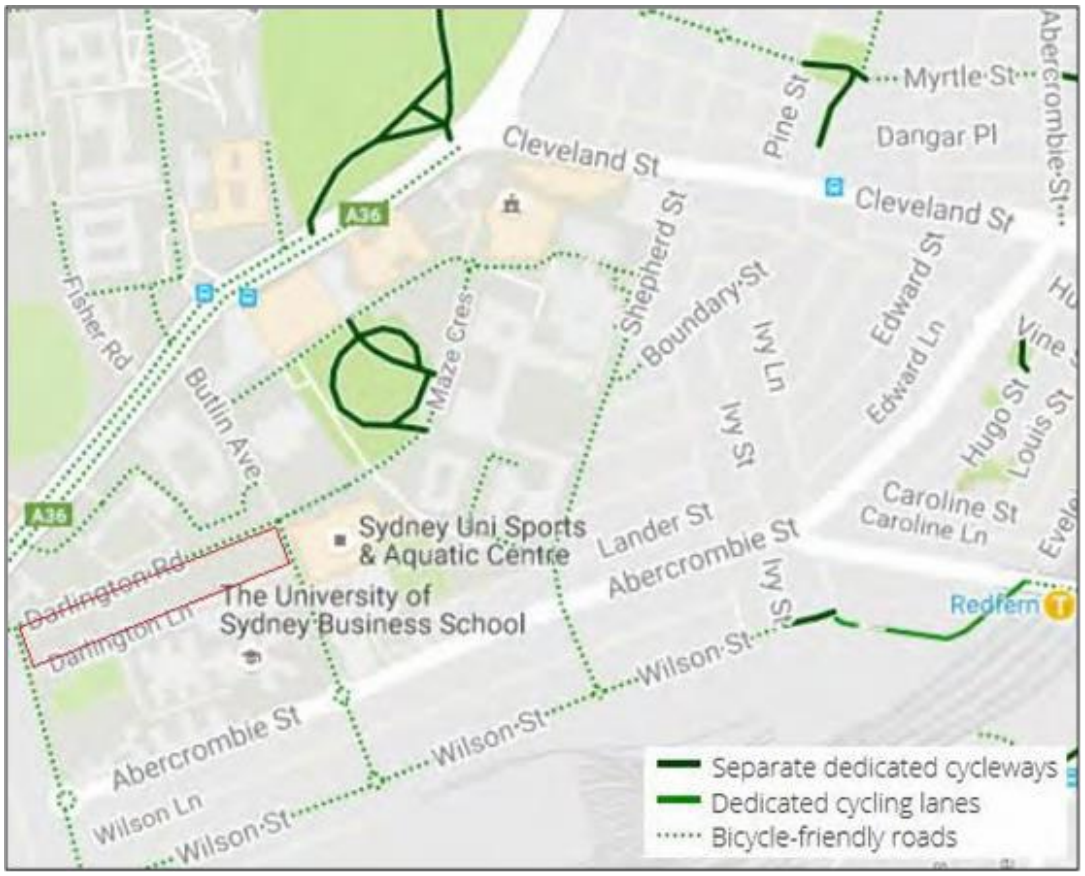


Source: Sydney.edu.au

Figure 2-5 Sydney University - preferred pedestrian routes

The following figure shows the Sydney University preferred Cycle Routes. The University does not include formal bicycle paths or lanes. However, the road network provides an extensive network of

routes throughout the precinct as well as several bicycle parking facilities. The following figure presents the bicycle-friendly roads running near the subject site.



Source: Sydneycycleways

Figure 2-6 Sydney University cycle network

2.6.1. Campus improvement program 2014-2020 – pedestrian & cycle strategy

The Pedestrian and Cycling Strategy outlined in the Campus Improvement Program (CIP) aims to result in a travel mode shift away from passenger vehicles as the preferred travel mode. Walking is already of high importance and the CIP aims to increase pedestrian priority within the Campus. The strategy also involves enhancing current bicycle facilities within the Campus and improving links to the existing bicycle network on the surrounding road network. The combined strategy identifies the potential to introduce on and off-road bicycle routes, shared paths and shared zones. The following figures present the Pedestrian and Cycle Strategies.

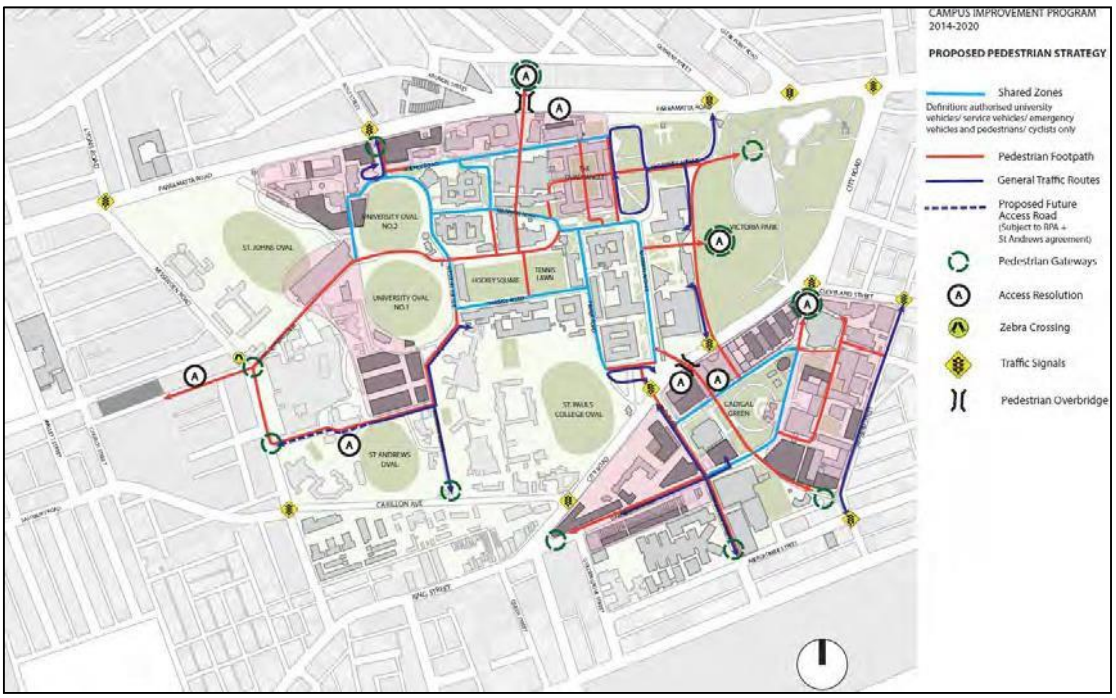
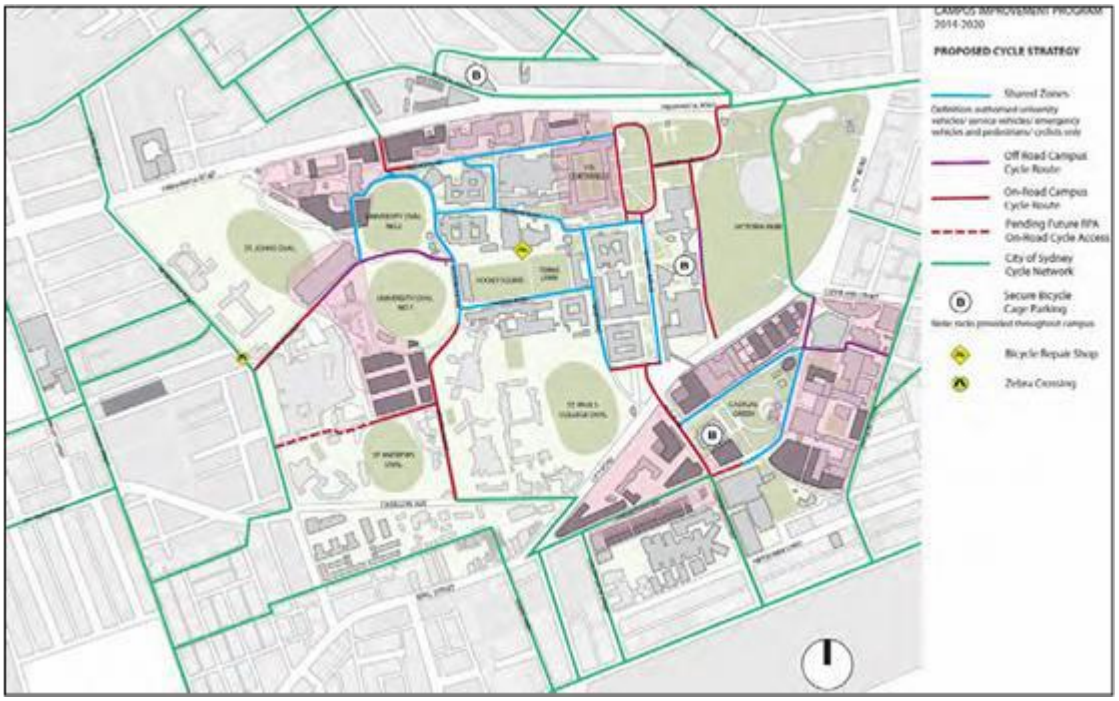


Figure 2-7 Campus improvement program - pedestrian strategy



Source: Campus improvement program

Figure 2-8 Campus improvement program - cycle strategy

2.7. Existing public transport network

The subject site is well served by high quality and high capacity public transport due to its inner- city location. It is envisaged that the availability of public transport facilities within relatively close proximity to the site are more than adequate to meet the future demand of the proposed development and the potential growth of the University in general. The public transport infrastructure within close proximity is summarised below.

2.7.1. Bus Services

Darlington precinct is accessible by public bus services. There are four (4) bus stops (two on each side) along City Road between Sydenham Road and King Street. Except for the bus stop near Chapel Street in the southbound direction, the three other bus stops are sheltered. A summary of existing services is provided in Table 2-1. The table shows all bus services that run along City Road including route number, route description, operating hours and service frequency during the AM and PM peak hour.

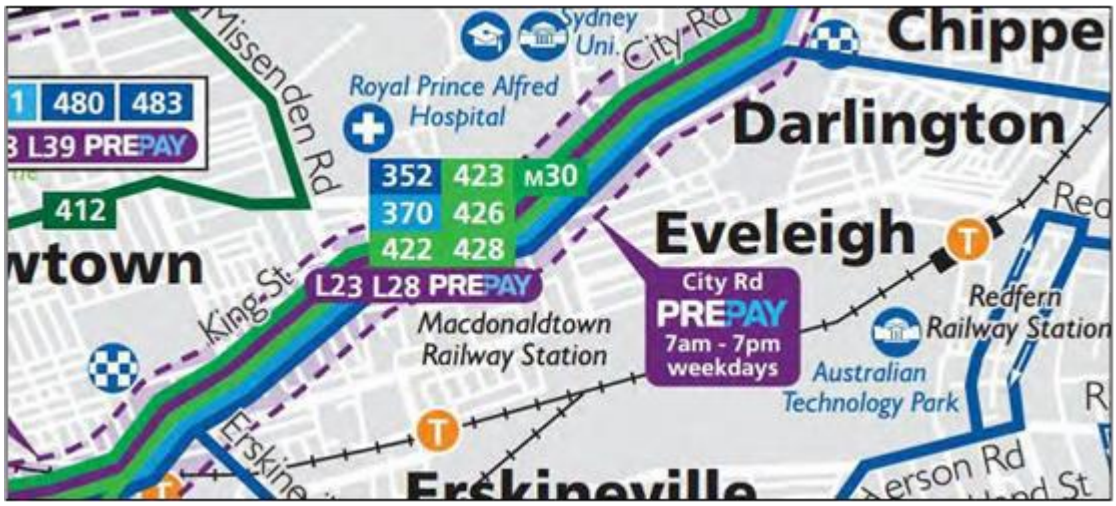


Figure 2-9 Bus network (Inner West & South West suburbs region)

Table 2-1 Current bus services, 2016

Route Number	Operator	Route Description	Total Buses per Weekday	Service Frequency (Peak Periods)
Metrobus 30	Sydney Buses	Sydenham Station to Spit Junction	128	12
352	Sydney Buses	Marrickville Metro to Bondi Junction	60	6
370	Sydney Buses	Leichhardt to Coogee	118	10
422	Sydney Buses	Kogarah to City – Martin Place via Newtown	156	10
423	Sydney Buses	Kings Grove (Depot) to City – Martin Place	148	11
426	Sydney Buses		136	12
428 / L28	Sydney Buses	Dulwich to Circular Quay	161	11
L23	Sydney Buses	Kingsgrove to Circular Quay	17	5

Source: Transport info, TfNSW

The following figure provides the location of the bus stops throughout the campus as well as the location of 7 outlets to purchase tickets.

Source: University of Sydney transport guide

Figure 2-10 Campus bus stop locations

The University also provides a free shuttle bus service every 15-20 minutes, operating throughout the precinct extending from Parramatta Road through to Redfern Station. The figure below presents the shuttle bus route passing within close proximity to the site.

Figure 2-11 Shuttle bus route

2.7.2. Train network

The closest rail stations to the site are Redfern and Macdonaldtown Railway Station. Each are within approximately 900 metres of the site.

Redfern Station is located on the Illawarra Line, serving all Sydney Train lines except the airport branch of the Airport, Inner West and South Line and the Cumberland line. Some NSW TrainLink Intercity services also call at the station. In addition, a bus stop near the Stations entrance on Gibbons Street provides additional connectivity providing transport via the following routes:

- Route 305: Railway Square to Mascot;
- Route 308: Millers Point to Marrickville Metro Shopping Centre;
- Route 309: Port Botany to Circular Quay;
- Route 210: Westfield Eastgardens to Circular Quay;
- Route L09: to Port Botany Bus Depot;
- Route X09: Banksmeadow to Central Station; and
- Route X10: Westfield Eastgardens to Central Station.

Macdonaldtown Station is located on the Main Suburban line, served by the T2 Inner West and South Line services. Redfern Station is more widely used by students given the greater connectivity it provides. Both railway stations are readily accessible by walking as highlighted in the figure below.

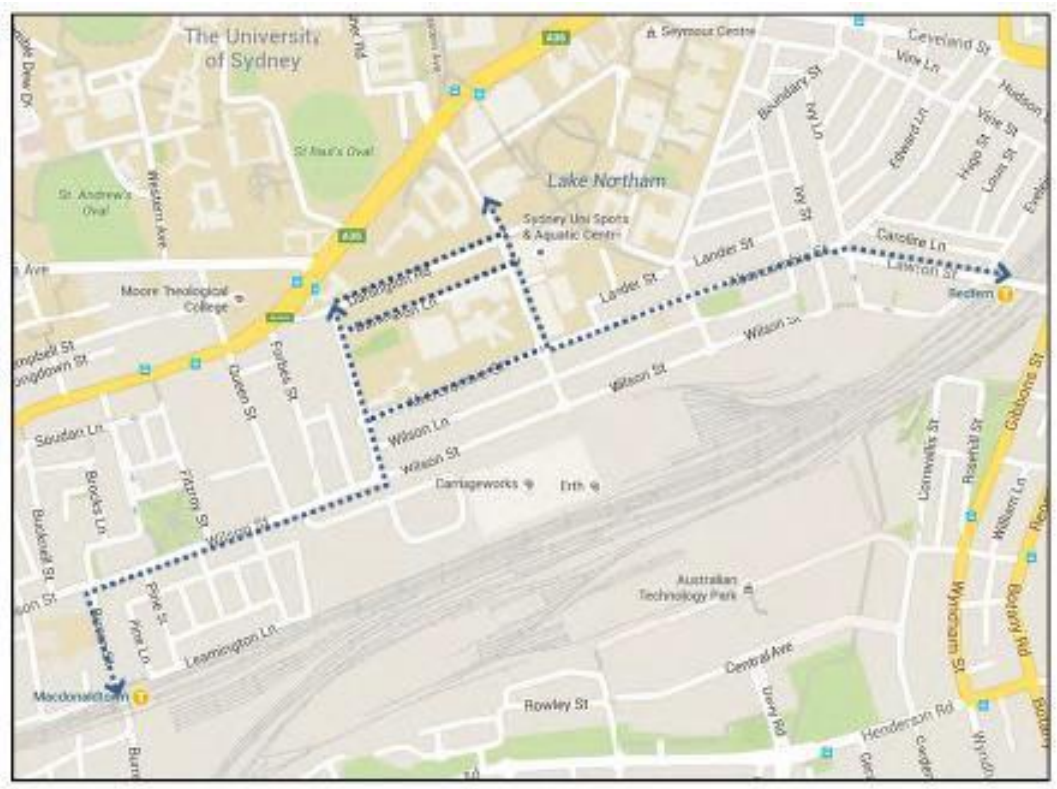


Figure 2-12 Pedestrian connectivity to railway stations

2.8. Existing traffic

2.8.1. Traffic surveys

Traffic surveys were conducted at key intersections in the study area. Traffic data was collected for four intersections for both the morning peak period (06:00-10:00) and afternoon peak period (15:00-19:00) in October 2014. The results from the intersection count surveys were analysed to identify the critical one-hour peak periods across the study area network. The morning and afternoon one-hour peak periods were determined to be between 8:15-9:15 in the AM peak and 5:15-6:15 in the PM peak. Additional 24-hour intersection counts were conducted in April/May 2016 for a seven-day period at the intersections of Golden Grove Street/Darlington Lane and Codrington Street/Darlington Lane.

2.9. Existing Intersection Performance

Network performance is best described by the indicators of Level of Service (LoS), Average Vehicle Delay (AVD) and the Degree of Saturation (DS) during peak hours. The intersection performance indicators adopted in this assessment are presented below. The Level of Service criteria set by the Roads and Maritime Services (RMS)1 is outlined in Table 2-2 Level of Service (LoS criteria). In analysing intersection performance, LoS “D” or better is considered to be acceptable to the RMS.

Table 2-2 Level of Service (LoS criteria)

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	<14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory
D	43 to 56	Operating near capacity	Near capacity
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts to require other control mode	At capacity, requires other control mode
F	>70	Unsatisfactory with excessive queuing	Unsatisfactory with excessive queuing

Source: RMS guide to traffic generating developments, 2002

The RMS's guideline recommends that with Roundabout, Stop and Give Way sign control intersections, the LoS value is determined by the critical movement with the highest delay per vehicle. With this type of intersection control, some movements suffer high levels of delay while other movements have minimal delay.

Average Vehicle Delay (AVD)

AVD is a measure of the operational performance of a road network or an intersection. AVD is determined globally over a road network or within a cordon during an assignment model run. The AVD exhibited on comparable network models, for analogous peak periods, forms the basis of comparing the operational performance of the road network.

AVD is used in the determination of an intersection's Level of Service. Generally, the total delay incurred by vehicles through an intersection, is averaged to give an indicative delay on any specific approach. Longer delays do occur but only the average over the peak hour period is reported.

Degree of Saturation (DOS)

The Degree of Saturation (DOS) of an intersection is usually taken as the highest ratio of traffic volume on an approach to the intersection, compared with its theoretical capacity and is also a measure of the utilisation of available green time. The DOS reported is generally of a critical movement through the intersection, rather than the DOS of the intersection, unless equal saturation occurs on all approaches.

For intersections controlled by traffic signals, generally both queue lengths and delays increase rapidly as DOS approaches 1.0. An intersection operates satisfactorily when its DOS is kept below 0.9. Degrees of saturation above 1.0 represent oversaturated conditions when demand exceeds capacity. When the DOS exceeds 0.9, extensive queues can be expected.

Four key intersections were assessed for existing operational performance using SIDRA Intersection Analysis. SIDRA Intersection calculates the amount of delay experienced by vehicles using an intersection, and gives a Level of Service rating which indicates the relative performance of that intersection with regard to the average delay (in seconds per vehicle) experienced by vehicles at the intersection. The results are summarised in Table 2-3.

Table 2-3 Intersection level of service

AM Peak Period				PM Peak Period			
Queue length (m)	**Average delay (s)**	**Degree of saturation**	**Level of service**	**Queue length (m)**	**Average delay (s)**	**Degree of saturation**	**Level of service**
Codrington Street - Abercrombie Street (Roundabout)							
14	8	0.36	A	15	7	0.34	A
Abercrombie Street - Golden Grove Street (Roundabout)							
5	3	0.24	A	4	4	0.19	A
Golden Grove Street - Darlington Road (Give Way)							
0	5	0.12	A	0	5	0.10	A
Butlin Avenue - Maze Crescent - Codrington Street - Darlington Road (Give Way)							
1	6	0.20	A	1	6	0.21	A

Conclusion

The results of the analysis indicate that all intersections are currently performing well within their notional capacity and will continue to operate well into the future. The proposed development will not have any significant impact and should therefore be supported on traffic grounds.

3. Development components

3.1. Development potential

The overall development will comprise approximately 7,400m2 GFA. This will include alterations of the existing terraces and building additions to the rear and also the adaptive reuse of the existing Darlington Road Terraces and proposed rear building additions for mixed-use student accommodation, teaching, learning and student support facilities. The refurbishment of the existing Terraces will comprise approximately 3,500 m2.

The new building additions will comprise approximately 3,900 m2 of Gross Floor Area (GFA) for a range of mixed educational establishment uses including student accommodation. On completion the new development will accommodate the following key areas:

- 317 student accommodations rooms of which 29 rooms will be accessible rooms
- Lecture/ theatre space
- Study rooms
- Laundries, kitchens, lounge areas and recreation zones; and
- External areas

It should be noted that the proposed development aims to provide additional facilities for existing students as well as catering for the high demand in student accommodation for current students. The proposed development will not result in an increase in student or employee numbers to the university as a whole. The development is anticipated to predominantly increase student movements locally within close proximity to the site. The localised trips are discussed in further detail in Section 3.5.

3.1.1. Sydney DCP 2012 Section 3.11 – Transport & Parking

The DCP stipulates the objective of managing transport referring specifically to the measures taken which minimise the need to travel and the length of trips, particularly by car, and encourages travel by the most sustainable mode of transport. The proposed development is in line with these objectives as outlined below.

3.2. Car Parking Provision

3.2.1. Student Accommodation – Car Parking Provision

The proposed development does not include any parking. The omission of parking supply is supported by the proposed land use of student accommodation and takes advantage of its location by placing students within walking distances to their classes, as well as by the ample availability of public transport including the bus stops and railway line located within walking distance and existing provision of surrounding campus car parks. Bicycle parking is proposed on site for student residents and visitors. In addition, there are bicycle facilities provided within close proximity to the building as well as throughout the Campus.

The proposed omission of car parking is in line with several similar student accommodations throughout Sydney by taking into consideration the availability of public transport. In addition, Council's DCP as well as the Sydney Local Environmental Plan (LEP) does not stipulate a parking requirement for student accommodation. It is therefore recommended that the proposed parking supply (no additional parking) for the student accommodation be supported.

3.2.2. Educational Establishment Uses – Parking Provision

The Sydney Local Environment Plan (LEP) 2012 Section 7.9(3) stipulates the following:

"the maximum number of car parking spaces for a building used for the purposes of information and education facilities is 1 space for every 200 square metres of the gross floor area of the building used for those purposes".

The maximum rate stipulated is intended to encourage use of both active and public transport, particularly in locations relatively well served by public transport. The proposed educational establishment uses are not intended to increase student or employee numbers but merely provide additional facilities for the existing student and employee population. The additional land uses are not anticipated to increase the University's parking demand and as such, no additional parking is proposed to be provided. Given that the LEP does not specify a minimum requirement, it is recommended that the omission of additional parking be supported.

There is ample on-street parking available on the surrounding road network including 105 spaces on Darlington Road. However, the available on-street parking within close proximity to the site is intended to be used as short-term parking and has time limit restrictions imposed including 2P and 4P. These spaces are currently being used primarily by students attending classes as well as by visitors of students residing in student accommodation or visiting the head of the university.

While it is envisaged that the proposed development will increase demand for the short-term parking due associated with the number of visitors to the residential accommodation, it is also envisaged that there will be a reduction in the number of trips made by students attending classes given the number of students who will now be residing within the campus.

3.2.3. Accessible Parking

There is no requirement for parking for people with mobility impairment under the Sydney LEP and Council's DCP states that 2% of all parking should be provided for the mobility impaired. In light of these requirements and taking into account that no parking is being proposed, it is considered unnecessary to provide additional accessible parking.

3.2.4. Service Vehicle Parking

Sydney DCP 2012 Schedule 7 does not provide a minimum service vehicle requirement specifically for the proposed land use. Nevertheless, it is proposed to convert a parking space located on the southern side of Darlington Lane towards Golden Grove Street, to a "loading zone" bay. This is considered sufficient to cater for service vehicles which are anticipated to generate trips associated with maintenance or deliveries.

3.3. Bicycle Parking Requirements

Sydney DCP 2012 Section 3.11.3 Table 3.5 stipulates that bicycle parking for tertiary educational institutions is to be provided at a rate of 1 space / 10 staff and 1 space per 10 residents. The proposed development will accommodate 317 students. The number of teachers

/ lecturers on site is unclear, however, for the purpose of this assessment it is conservatively assumed to be 10. On this basis, the minimum number of bicycle parking spaces required is 32

spaces for student residents and 1 space for teachers / lecturers. The DCP indicates that there is no minimum requirement for visitors.

The DCP also stipulates the following types of bicycle spaces are to be provided:

- Class 1 spaces for occupants of residential buildings;
- Class 2 bike facilities for staff / employees; and

- Class 3 bike rails for visitors.

The proposed bicycle parking supply includes 78 Class 1 spaces to be used by student residents as well as teachers / lecturers and 64 Class 3 spaces to be used by visitors. The proposed bicycle parking supply exceeds the minimum requirement. The spaces are located internally on the ground floor with access provided in accordance with Council Requirements including a minimum width of 1.8m, accessible ramps, adequate signage and security.

3.4. Pedestrian Access

Adequate pedestrian facilities are provided on the surrounding footpath network within close proximity to the site. The only location requiring a revision of facilities is Darlington Lane, which runs along the site's southern boundary. Darlington Lane is between 3.8 metres wide on the eastern end and 4.5 metres wide on the western end. Darlington Lane does not have any pedestrian facilities and pedestrians are currently required to share the space with two-way vehicular traffic; noting that it will be converted to a one-way road prior to commencement of any construction works. The proposed development includes the introduction of a category 2 shared zone on Darlington Lane to provide sufficient pedestrian safety. This is discussed in further detail in Section 3.6 below.

3.5. Travel Mode Shift

Given that the proposed development will not result in an increase of student or employee numbers, but is intended to cater for the high demand for on-campus accommodation, it is envisaged that the proposed development will ultimately result in a shift in travel mode towards public / active transport for students. This shift is envisaged to further reduce the dependency on cars and to a lesser extent public transport, while shifting more towards walking and cycling.

For the purpose of estimating the extent of change in travel mode during peak periods, it is assumed that the vast majority of trips taken by students during peak periods are associated with travelling to and from classes which are located within the campus. It is also conservatively assumed that 60% of 317 students (i.e. 190 students) generate trips during peak periods, given that not all students will need to travel to a class during peak periods. Given that the most convenient travel mode based on this scenario is walking or cycling, the estimated change in travel mode is estimated in the table below.

Table 3-1 Anticipated travel mode shift

Travel Mode	Existing Travel Mode		Anticipated Travel Mode		Trips Generated
Vehicle driver	22%	42	1%	2	-40
Other	10%	19	24%	46	27
Walking only	17%	32	73%	139	10 7
Bus	17%	32	1%	2	-30
Vehicle passenger	2%	4	0%	0	-4
Train	32%	61	1%	2	-59
Total	**100%**	**190**	**100%**	**191**	

3.6. Darlington lane shared zone

3.6.1. Background

The Darlington Lane corridor is narrow (between 3.8 and 4.5 metres) with no formal pedestrian facilities along its length. It is considered appropriate to provide a shared zone along Darlington Lane since there are likely to be large numbers of pedestrians using the corridor to access the Abercrombie Precinct; presenting a need to provide pedestrians priority over a relatively long section of street. It is considered that the implementation of one or more isolated pedestrian crossings would be ineffective to provide safe pedestrian access along Darlington Lane due to the dispersed nature of students entering / exiting the terraces accommodation and because of the many access points along the length of Darlington Lane.

The new buildings backing onto Darlington Lane are proposed to be set-back about 300 millimetres from the existing kerb face. Pedestrian access to the new buildings would be via indented landings about one metre from Darlington Lane. Accessible access to the new terraces is to be provided via the terraces located at Nos 124, 125, 102, 103, 104 and 94 Darlington Road. Pedestrian access from Darlington Lane to the refurbished terraces and common areas would be consolidated into five access points as follows:

- Two access points via Building A; and
- Single access points via Building B, Building C and Building D.

A 10 km/h Shared Zone would be implemented with the installation of Shared Zone signage and construction of a raised threshold treatment at the entry and exit to Darlington Lane; this is anticipated to be operating as a one-way road prior to the commencement of construction associated with the proposed development. The entry and exit raised thresholds will encourage lower speeds while clearly indicating to motorists the start and end points of the zone.

Given the drainage requirements associated with Darlington Lane, it is proposed to retain the existing kerbs, such that a Category 2 Shared Zone would be provided. It is also proposed to introduce a contrasting pavement by stencilling Darlington Lane red for its entire length.

3.6.2. Shared Zone Criteria Assessment & Design

To gain an appreciation of the current traffic movements along Darlington Lane traffic counts were undertaken during the university semester and at the commencement of the second school term. Traffic counts were conducted at the intersections at both ends of Darlington Lane in April and May 2016.

The survey data revealed that the vehicle volumes observed through Darlington Lane are within limits stipulated in TTD 2016/001 and as such support the provision of a Shared Zone. The observed traffic volumes at the intersection of Golden Grove Street indicate that the total volume entering and exiting Darlington Lane at the intersection on a weekday is approximately between 190-240 vehicles a day. At the intersection of Codrington Street and Darlington Lane, the total vehicles entering and exiting Darlington Lane on a weekday is approximately between 210-240 vehicles per day. On an hourly basis, the average traffic volumes on Darlington Lane on a weekday could be between 10 to 35 vehicles per hour. This low traffic volume is considered appropriate for the implementation of a Shared Zone as they are within the limits of no more than 100 vehicles per hour and 1,000 vehicles per day as defined in the Guidelines.

The Shared Zone relevant to the preferred option proposed for Darlington Lane is categorised as a “Category 2” Shared Zone in accordance with Design and implementation of Shared Zones including provision for parking TTD 2016/001 (Roads and Maritime Services, February 2016). A Category 2 Shared Zone is provided on a road related area using clearly different coloured and textured surface treatments from the surrounding roads while retaining kerbs. For Category 2 Shared Zones,

prominent features such as signs, architectural or landscape features must be provided to indicate a change in the street environment and highlight the start / end of the Shared Zone. In addition, "Give Way to Pedestrians" pavement marking must be installed.

Regulatory Shared Zone signage will be implemented at the start of the Shared Zone in accordance with Roads and Maritime Services guidelines. The proposed signage upon entry to and exit from the Shared Zone are shown in the figure below.

Figure 3-1 Proposed signage on entry/exit to shared zone

Given that the warrants for a Shared Zone on Darlington Lane are met and that the proposed design can be provided in accordance with the TfNSW Safer Speeds Policy and Guidelines (SS/12/01) it is recommended that the proposed Shared Zone on Darlington Lane be supported in principle subject to detailed design. In this regard it should also be noted that the authorisation of a Shared Zone is not delegated to Councils. Shared Zones are speed zones and approval to install them must be obtained from the RMS.

The table below provides a summary of the warrants for the implementation of a Shared Zone and provides commentary relating to compliance.

Table 3-2 Site criteria for shared zones

Warrant	Criteria	Complies	Comments
Current speed limits ≤ 50 km/h	≤ 50 km/h	✓	Speed limit is 50 km/h
Current traffic flow	≤ 100 veh/h & ≤ 1000 veh/day	✓	Traffic volumes are below the maximum stipulated in TTD 2016/001.
Speed limits on approaching road	≤ 50 km/h	✓	Speed limit is 50 km/h on Golden Grove Street and Codrington Street
Length of proposed scheme	≤ 400 m	✓	Length is approximately 250 m
Not along a bus route / heavy vehicle route except delivery vans		✓	No bus routes

Warrant	Criteria	Complies	Comments
Min trafficable width	2.8 m	✓	Darlington Lane is between 3.8 meters wide on the eastern end and 4.5 meters wide on the western end
Does the scheme involve removal of kerb and gutter		✓	Kerbs are proposed to be retained. This is acceptable subject to RMS approval

A schematic layout of the Shared Zone is presented in Appendix A.

The design and consultation process with City of Sydney took account of feedback from Council officers. An email from Emma Thorburn of City of Sydney to Federico Ramos of SMEC of 10/11/16 refers to AJC architectural planter drawings dated 19/10/16, and stated that: 1) separated island planters are not supported by council; 2) design innovation is invited by Council; and 3) a drainage solution is required.

The schematic layout redesign in the public domain plan by Oculus in this report Appendix A responds to this Council feedback. It shows a balance of innovative wide planters/traffic islands along the north side of the shared way incorporating historic items of existing trees and the existing sandstone kerb and channel.

4. Traffic impact assessment

4.1. Traffic impact

Given that the proposed development does not provide any parking spaces, it is envisaged that the proposed development will generally not generate traffic during peak periods. The proposed development has been designed to take advantage of its location that allows students to rely primarily on walking and cycling to and from classes as the travel mode as well as quality links to the extensive public transport services located within relatively close proximity.

No car parking spaces are being proposed as part of the student accommodation building. Hence, vehicle trips for this land use are expected to be minimal and are anticipated to be minimal particularly during peak periods. Table 4 provides an estimate of the anticipated travel mode shift and indicates that the proposed development will in fact reduce the university's overall peak hour vehicular trips given the travel mode shift associated with the 317 students residing on campus. The overall reduction is anticipated to be approximately 44 trips. Within close proximity to the site, it is envisaged that there will be no change to the number of vehicular trips during peak periods. This includes traffic in and out of the campus as well as within close proximity to the site. As such, a detailed assessment involving intersection modelling is not required and it is recommended that the proposed development be supported in terms of traffic impact.

4.1.1. Logistical Student Trips

Upon moving in or out of the student accommodation, it is envisaged that students will be required to transport some of their belongings. Nevertheless, it should be noted that the accommodation to be provided will consist of bedrooms that are completely furnished with the exception of small items including bed linen, towels and personal items, thereby significantly removing the need for removalist vans. In addition, students moving in or out of the accommodation typically occurs seasonally, before or after semesters when vehicular and pedestrian activity are significantly lower. These logistical trips are also typically dispersed throughout the day and occur outside of peak periods. These trips generally resemble pick up / drop off trips rather than service vehicle trips such as removalist vans. The use of public transport is also envisaged to be the preferred travel mode for these logistical student trips as well. Short term parking is available on Darlington Road with approximately 105 spaces that are generally under-utilised out of the teaching terms and with "2P" and "4P" parking restrictions imposed. This is considered sufficient to cater for logistical trips providing ample convenient parking.

4.1.2. Service Vehicles

The proposed development is anticipated to generate two types of service vehicle trips including waste collection vehicles and building maintenance vehicles. These types of vehicles already service the site and the proposed development will not require any significant change in service vehicle trip frequency or route.

The current waste collection vehicle route which is proposed to be retained involves waste collection vehicles entering Darlington Lane from Golden Grove Street, collecting waste along

Darlington Lane, and continuing along Codrington Street. Given that Darlington Lane does not provide sufficient width to allow a waste collection vehicle and a standard vehicle simultaneously, motorists experience a delay in travelling along Darlington Lane.

It is envisaged that waste collection trips will continue to take place once per week. Should additional trips be required, it is envisaged that the number of trips will not increase significantly, (perhaps 1 or

2 extra trips / week). Nevertheless, waste collection trips will continue to take place outside of peak periods and not result in any significant adverse impact.

It is envisaged that maintenance / delivery vehicles are likely to be as large as a van and is estimated to be required on site at a rate of up to 1 to 2 days per week and therefore considered to be relatively insignificant. It is currently proposed to convert an existing bay on the southern side of Darlington Lane to a "loading bay". The maintenance / delivery vehicles trips are anticipated to occur at any time of the day.

4.1.3. Pedestrian Movements

The most significant increase in student movements within close proximity to the site is anticipated to be pedestrian movements. Based on a broad conservative estimate which assumes the following:

- Each of the rooms are fully occupied with a total of 317 student residents;
- Each of the 317 student residents will make an average of 3 inbound or outbound trips per day (951 trips / day);
- 20% of student's residents receive a visitor who makes 1 trip in and 1 trip out (127 trips / day); and
- The lecture and tutorial rooms are occupied throughout the day with 4 sessions daily with a total of 40 additional students / teaching staff generating 1 trip in and 1 trip out per session (320 trips / day).

In light of the above, the proposed development has the potential to generate up to 1,400 pedestrian movements / day. The surrounding road network, particularly along Codrington lane, provides significant pedestrian infrastructure including 3.5m footpaths, and two pedestrian crossings at the Codrington Street / Abercrombie Street intersection and two pedestrian crossings at the Codrington Street / Darlington Road intersection. The surrounding road network in combination with the proposed Shared Zone on Darlington Lane provides a high-quality pedestrian infrastructure to allow pedestrians to move throughout the campus safely and accommodate any additional pedestrian movements generated by the proposed development.

4.2. SEPP (Infrastructure) 2007 – REG 104

The proposed development which includes educational facilities falls under the State Environmental Planning Policy (Infrastructure) given that it includes an educational establishment catering to more than 50 students with direct pedestrian access to a road. Clause 3 stipulates that before determining a development application for development the consent authority must take into consideration accessibility to the site including the following relevant items:

- The efficiency of movement of people to and from the site and the extent of multi-purpose trips;
- The potential to minimise the need for travel by car; and
- Any potential traffic safety, road congestion or parking implications of the development.

The proposed development has been assessed from a traffic impact and road safety perspective with details provided throughout the report. This includes the assessment of pedestrian and cyclist movements, traffic generation and traffic impact, road safety, the likely travel mode shift and parking implications.

The findings indicate that the proposed development will result in a travel mode shift of existing students to walking and cycling as a preferred travel mode given that this provides the most convenient and efficient travel mode throughout the campus. As such the number of vehicular trips as well as trips involving public transport will be significantly reduced, particularly during peak periods. Furthermore, it is envisaged that the proposed development will reduce the number of trips

generated by the university and improve traffic conditions from traffic efficiency perspective on the surrounding road network particularly during peak periods.

It is envisaged that student movements to and from the site during peak periods will be predominantly within the University Campus, with external trips to and from the University predominantly occurring outside of peak periods. External trips made by students residing in the student accommodation will likely use public transport, given that they are not allocated a parking space combined with the proximity to Redfern Railway Station.

From a safety perspective, the proposed Shared Zone on Darlington Lane is aimed at addressing safety concerns which already exist along Darlington Lane, by providing a safe low speed pedestrian friendly environment as well as allowing for passive surveillance along the laneway.

In light of the above and with respect to the items being considered under SEPP (infrastructure) 2007, the proposed development including its anticipated travel mode shift is anticipated to:

- Provide an efficient movement of people to and from the site;
- Reduce the need to travel by car as well as reducing the University's overall parking demand;
- Reduce vehicular traffic generated by the university and therefore alleviate traffic conditions within close proximity; and
- Improve road safety along Darlington Lane given the proposed Shared Zone, with no adverse safety impacts on the surrounding road network.

4.3. Summary

The proposed development will result in a reduction in vehicular traffic, particularly during peak periods. This includes traffic in and out of the University as well as throughout the campus including within close proximity to the site. The most significant increase in student movements is anticipated to be pedestrian movements. The surrounding road network which provides high quality pedestrian infrastructure, combined with the proposed Shared Zone, will activate and enhance Darlington Lane will allow pedestrian movements to and from the site and throughout the campus to continue to be undertaken safely. As such, it is anticipated that the proposed development will not have any adverse impact on the surrounding road network in terms of traffic efficiency. It is therefore recommended that it be supported on these grounds.

5. Construction traffic impact assessment

A Construction Traffic Management Plan (CTMP) has been prepared for the proposed development. The CTMP will be submitted as a separate document in support of the DA. The plan details the anticipated traffic volumes as well as providing details of heavy vehicle movements to and from the site. It is envisaged that construction vehicle movements will not have any significant adverse impact to the surrounding road network including pedestrians.

6. Summary of findings

The proposed development has been assessed from a traffic and road safety perspective. The following summarises the key points for assessment:

- The proposed development will not increase of student or employee numbers. Its primary purpose is to provide additional on-campus accommodation to cater for the current high demand among existing students. As such, the proposed development is anticipated to result in a shift in travel mode away from vehicles thereby reducing vehicular traffic generation in and out of the campus as well as within close proximity to the site;
- The proposed development does not include any car parking spaces, noting that the site is located within close proximity to student classes, and public transport. The LEP does not stipulate a minimum car parking requirement;
- It is proposed to convert an existing parking space on the southern side of Darlington Lane to a "Loading Zone" bay to accommodate maintenance and delivery vehicles;
- The site, lying within the University Campus, is well serviced by trains, given its close proximity to Redfern Station and Macdonaldtown Station located within walking distance as well as Central Station which is also commonly used by students;
- The site is well serviced by buses with bus stops located on City Road within relatively close proximity and is serviced by several routes including a connection to Central Station. In addition, the University provides a shuttle bus service;
- The CIP includes enhancing the current bicycle facilities within the Campus and improving connections with the City of Sydney Council Cycle Network;
- Walking is anticipated to be the primary travel mode, particularly during peak periods, including to and from public transport and on campus;
- All intersections within close proximity to the site are currently operating well within their notional capacity and are anticipated to continue operating well post-development (given that the proposed development is anticipated to reduce vehicular traffic generation);
- Darlington Lane is proposed to provide a primary pedestrian access to the building, noting that it currently does not include a footpath. It is currently operating as a two-way laneway, however, it is anticipated that by completion of the development, it will have been converted into a one-way lane travelling west to east;
- It is proposed to introduce a Shared Zone on Darlington Lane in order to improve pedestrian safety along the laneway. A schematic plan has been prepared for assessment by Council and RMS noting that a Category 2 shared zone is proposed given the kerbs need to be retained for drainage purposes;
- The proposed Shared Zone meets all of the necessary warrants and is proposed to be designed in accordance with the TfNSW Safer Speeds Policy and Guidelines (SS/12/01) and is anticipated to improve pedestrian safety given the current inadequate pedestrian infrastructure on Darlington Lane;
- The proposed development is anticipated to significantly increase the number of pedestrian movements generated by the site. The surrounding road network provides high quality pedestrian infrastructure which, combined with the proposed Shared Zone, will allow all pedestrians to continue moving throughout the campus safely;
- It is envisaged that waste collection trips will continue to take place once per week. Should additional trips be required, it is envisaged that the number of trips will not increase significantly, (perhaps 1 or 2 extra trips / week). Nevertheless, these trips are anticipated to occur outside of peak periods with no significant additional adverse impact.; and

- A Construction Traffic Management Plan (CTMP) has been prepared for the proposed development (to be submitted as a separate document) which demonstrates that construction will not have any adverse impact on the surrounding road network in terms of traffic efficiency or road safety.

6.1. Conclusions

The proposed development will not have any adverse impact on the surrounding road network in terms of traffic efficiency or road safety. It is envisaged that it will result in a travel mode shift away from vehicles, thereby slightly reducing traffic generation.

The subject site is well serviced by public transport and pedestrian and cyclist infrastructure and can therefore cater for the travel demands of students residing in the on-campus accommodation.

The proposed category 2 Shared Zone on Darlington Lane will enhance road safety.

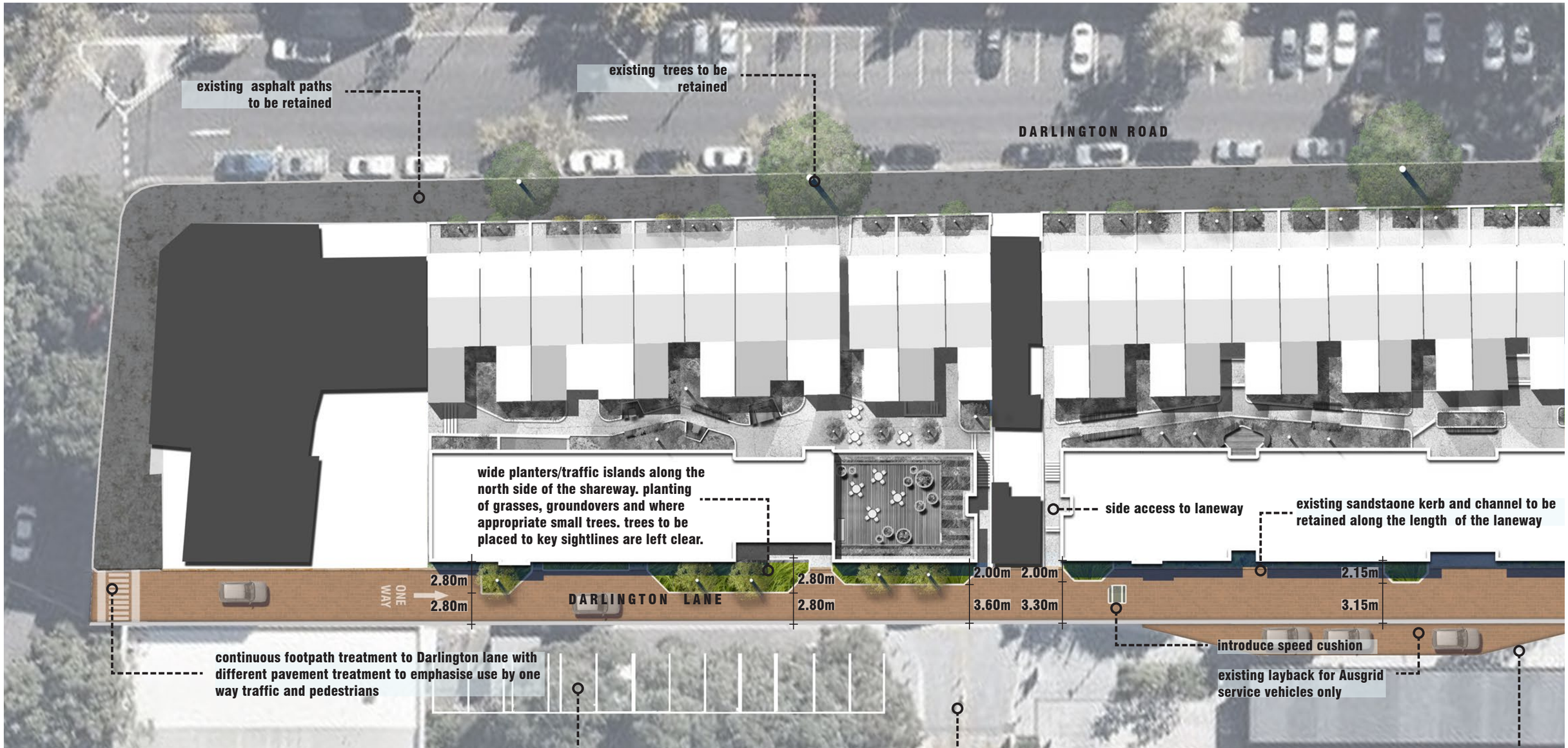
A CTMP has been prepared which demonstrates that construction vehicles will be managed such that they will not have any significant impact on the surrounding road network in terms of traffic efficiency or road safety.

6.2. Recommendations

It is recommended that the proposed development be supported from a traffic efficiency and road safety perspective. In addition, it is recommended that the proposed category 2 Shared Zone be supported in principle subject to detailed design, which includes the approval of Council and the RMS, as well as undertaking independent Road Safety Audits during both the design and construction stages.

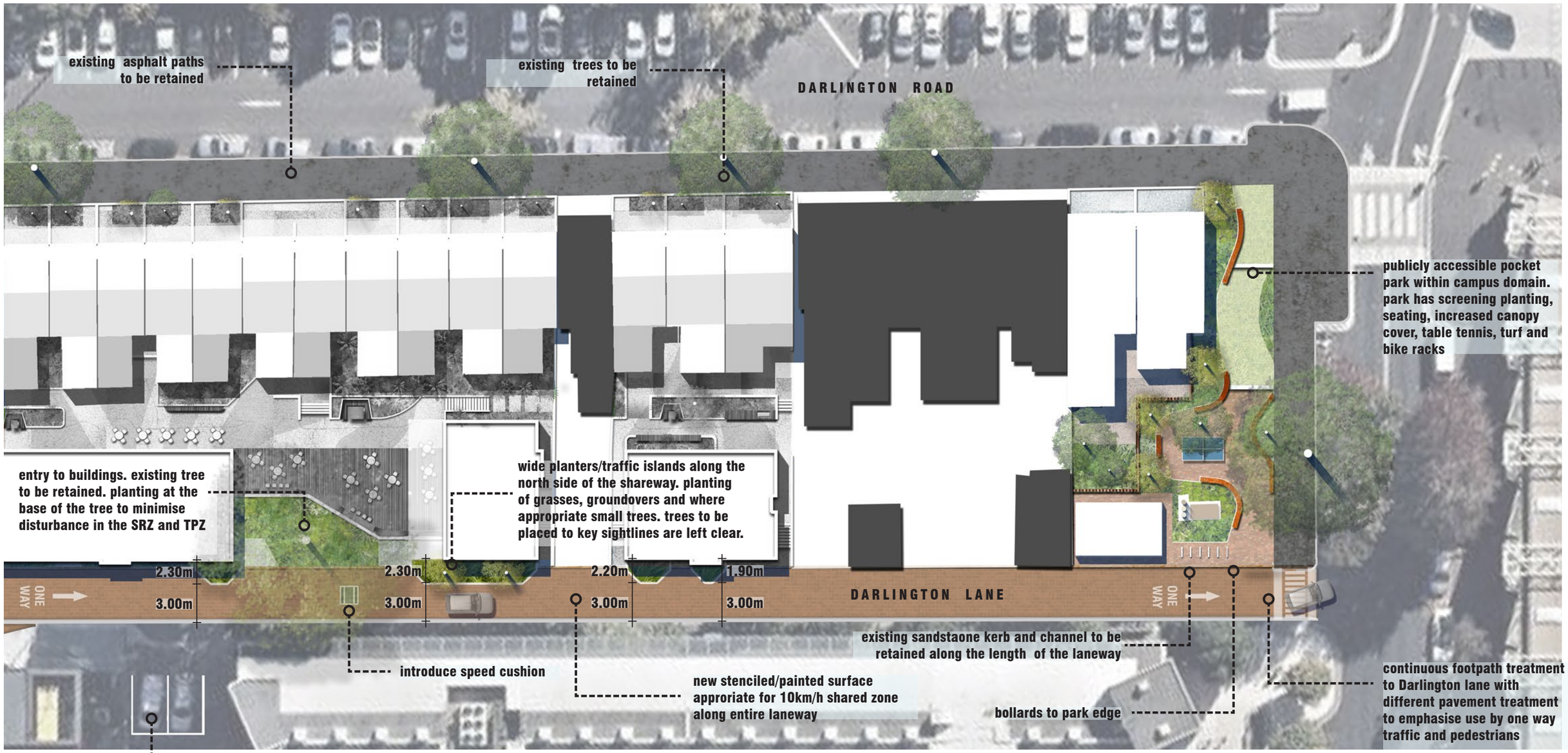
Appendix A Darlington ln shared zone – schematic layout

PUBLIC DOMAIN PLAN



NORTH

SCALE 1:350


existing asphalt paths to be retained
existing trees to be retained
DARLINGTON ROAD
publicly accessible pocket park within campus domain. park has screening planting, seating, increased canopy cover, table tennis, turf and bike racks
entry to buildings. existing tree to be retained. planting at the base of the tree to minimise disturbance in the SRZ and TPZ
wide planters/traffic islands along the north side of the shareway. planting of grasses, groundovers and where appropriate small trees. trees to be placed to key sightlines are left clear.
2.30m
3.00m
2.30m
3.00m
2.20m
3.00m
1.90m
3.00m
ONE WAY
DARLINGTON LANE
ONE WAY
existing sandstaone kerb and channel to be retained along the length of the laneway
introduce speed cushion
new stenciled/painted surface approriate for 10km/h shared zone along entire laneway
bollards to park edge
continuous footpath treatment to Darlington lane with different pavement treatment to emphasise use by one way traffic and pedestrians
existing parking bays on private property to be retained (5.4m x 2.5m plus approximately 1m to carriageway)

Member of the Surbana Jurong Group

SMEC Australia Pty Ltd

Level 5, 20 Berry Street
North Sydney, NSW, 2060

T +61 2 9925 5555
F +61 2 9925 5566

w ww.smec.com