Western Sydney University

Bankstown City Campus

Planning Proposal - Transport Management and Accessibility Plan

Rev B | 17 July 2019

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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1 Introduction

This Transport Management and Accessibility Plan (TMAP) has been prepared by Arup in support of the Planning Proposal for the Bankstown City Campus (BCC). The TMAP supersedes the Traffic and Parking Report submitted with the Planning Proposal in December 2018, incorporating feedback from City of Canterbury Bankstown Council.

The Planning Proposal seeks to amend the Floor Space Ratio (FSR) and height of building standard in the Bankstown Local Environmental Plan (LEP) to accommodate the campus building.

A separate development application for State Significant Development is being submitted concurrently. The project is a transformative project for the Bankstown CBD and from a transport and traffic perspective responds to a modal shift in response to changing travel demands that will respond to improvements in public transport access.

The Bankstown Complete Streets plan is in draft form and it is understood it will evolve in response to the community consultation and more detailed studies. The draft has been taken on board in this TMAP and the project team are working with council on finer details resulting from additional technical studies.

1.1 Project overview

The Bankstown City Campus (BCC) project is a key component of the University of Western Sydney's 'Western Growth Program' and presents an opportunity to contribute to the regeneration and activation in the Bankstown Central Business District. An overview of the development is presented in Figure 1.



Figure 1 Proposed scope of works outline

The site includes 74 Rickard Road (being Lot 5 DP 777510) and a portion of 375 Chapel Street (being part Lot 6 DP 777510), in addition public domain works are proposed to Rickard Road, 70 Rickard Road (being part Lot 7 DP 777510) and access is proposed via 80 Rickard Road (being Lot 12 DP 566924).

The site is located within the 'Civic Precinct' of the Bankstown CBD, situated on the southern side of Rickard Road, between the Bankstown Library & Knowledge Centre (to the west), and Bankstown Civic Tower (to the east). The site currently provides open lawn space and at grade public parking, contiguous with Paul Keating Park and road along The Appian Way, to the south and east of the site.

The project, entailing a stand-alone vertical campus building, will facilitate relocation of teaching, research and staff facilities currently located at the WSU Bankstown Campus at Milperra. The academic program offered at the BCC will reflect its status as a flagship campus for the University, in a region with culturally and linguistically diverse population, strong manufacturing industry and highly connected by public transport. The courses offered will encompass undergraduate and post graduate degrees by coursework and research, as well as Diploma offerings and English Language testing services through The College.

The academic facilities for staff workspaces, research and teaching will be supplemented by other facilities to create a comprehensive University experience for students and foster connections with local business, industry and community. Facilities that will be incorporated into the Campus include basement parking, ground level retail spaces, a branch of the University Library, flexible Conference and Event spaces, facilities for student social engagement and administrative services, and large outdoor terraces.

1.2 Site location

The proposed site is in Bankstown City Centre, north of Bankstown Train Station and west of Bankstown Central Shopping Mall (see Figure 2). The existing use of the site is at-grade car park and green space. It is situated within the Canterbury-Bankstown Local Government Area (LGA) and is bounded by Bankstown Library and Knowledge Centre to the west, Bankstown Civic Tower to the east, Rickard Road to the north and Paul Keating Park to the south. It is well connected to the public transport network, with both a rail and bus interchange located within 400m of the site.



Figure 2 Proposed Bankstown City Campus Development location

1.3 Council feedback

Following the submission of the Traffic and Parking report, Council requested a TMAP be prepared which included additional information and studies. This is summarised in Table 1 along with reference to the location in the report where the additional information is provided.

Table 1 Additional information request

Additional information	Reference
Identify the origin of staff, students and visitors to the university campus based on current trends.	See section 5.1 where an assessment of trip origins for the different cohorts has been undertaken
Quantify the anticipated transport demands by all users of the university campus (i.e. staff, students, commercial tenants and visitors).	Section 5 describes the estimated number of daily and peak period trips to be undertaken by each cohort.
Quantify the anticipated off-street parking demands by all users of the university campus (i.e. staff, students, commercial tenants and visitors). The assessment does not support the appropriation of car parking spaces on other sites to meet the proposal's parking demands.	An assessment of parking demand is presented in Section 5.9.
Quantify the impacts the anticipated demands will have on existing infrastructure including (but not limited to) the adequacy and capacity of the existing local road, public transport, cycle and footpath networks within the vicinity of the site. Traffic modelling should be consistent with the traffic modelling undertaken as part of the draft Bankstown Complete Streets project.	Assessments of the impact of the travel demand are presented in 5.5 (for vehicles), 5.6 (for public transport), 5.7 (for cycling) and 5.8 (for pedestrians).
Identify supporting traffic, transport and public domain infrastructure to meet the anticipated demands and to mitigate the impacts arising from the proposal. Public domain improvements must align with the draft Bankstown Complete Streets project.	The key improvement proposed is the shared zone proposal on the northern section of The Appian Way. This, along with high priority improvement to the southern section as identified in the draft Bankstown Complete Streets project will create a pedestrian friendly link between the BCC and the new train/Metro Station and bus interchange. The footpath on Rickard Road will also be widened, enabling the future provision of a shared path.

2 Existing transport context

2.1 Road network

The state and regional/local road networks are described in the following sections. RMS are the roads authority for state and regional roads, while Council are typically the authority for local roads.

2.1.1 State road network

The state road network near the development is presented in Figure 3.

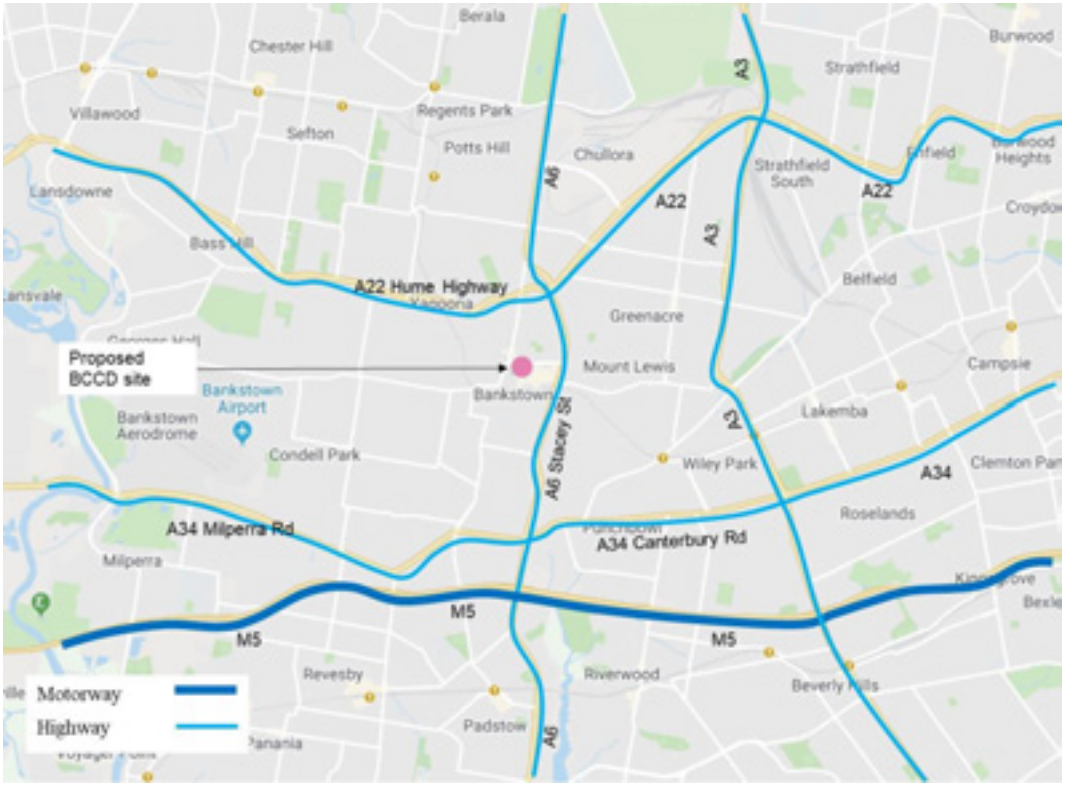


Figure 3 State Road Network

The key state roads are:

- **Stacey Street (A6)** running in a north-south direction which provides interchange opportunities with the Hume Highway to the north and M5 to the south. It directly serves Lidcombe and is also a key route to Parramatta.
- The **Hume Highway (A22)** runs east-west to the north of the site. To the east, it provides access to Sydney Inner West locations such as Enfield and Ashfield while to the west it provides access to Fairfield, Cabramatta and Liverpool.
- The **M5** runs east-west to the south of the site. It connects with the wider motorway network. This connectivity will be furthered by the new works being undertaken as part of WestConnex.

- **Canterbury Road/Milperra Road (A34)** runs parallel to the M5, south of the site. It provides access to areas such as Punchbowl and Marrickville to the east and Milperra, Moorebank and Liverpool to the west.

2.1.2 Regional and local road network

The key regional/local road network near the development is presented in Figure 4.



Figure 4 Regional and local road network

It consists of the following roads/streets

- **Rickard Road** runs in an east-west direction north of the site, between Stacey Street and Meredith Street. Typically, there are two traffic lanes in each direction, with additional turn lanes forming on approach to intersections.

  It has a key role in distributing traffic from the state network around Bankstown. There are a small number of developments accessed directly from Rickard Road, including Bankstown Central.

  Generally, access is restricted to left-in, left-out movements due to the central median. An existing driveway which provides access to the Bankstown Library and Knowledge Centre car park is proposed to be utilised by the development.

- **Chapel Road** runs in a north-south, west of the site. It connects with the Hume Highway to the north and Marion Street to the south.

  South of Rickard Road, there is typically one traffic lane in each direction with on-street parking. North of Rickard Road, on-street parking is also available at certain times of the day (generally outside of peak periods).

- **Jacobs Street** runs in a north-south direction, east of the site between the Mall and the Hume Highway (it does not, however, connect with the Hume Highway). South of Rickard Road, it provides access to Bankstown Central and is well utilised by buses accessing the interchange. It also provides access to the Council car park on a left-in, left-out arrangement.

  North of Rickard Road, Jacobs Street mainly serves residential lands, with unrestricted on-street parking available.

- **The Mall** runs in an east-west direction, south of the site. It is a traffic calmed street with raised pedestrian crossing at the intersections with Featherstone Street, The Appian Way and Jacobs Street.

  The road layout restricts westbound movements, with the section between Featherstone Street and The Appian Way one-way eastbound only. Short-term parking is in place along both sides of the Mall.

- **The Appian Way** runs north-south between Rickard Road and North Terrace, bounding the project site to the east. It is broken into three main segments which are:

  a) A one-way northern section providing access from Rickard Road to the Council car park. It is classed as a shared zone.
  b) A pedestrianised central section between Paul Keating Park and the ground floor retail units
  c) A one-way road southbound between the Mall and North Terrace, with parking and bus zones on both sides of the road.

  Any vehicles which access The Appian Way from Rickard Road must egress via Civic Drive onto Jacob Street.

- **Civic Drive** is a short street, running east-west between Jacob Street and The Appian Way. The driveway to the Civic Tower car park is located on Civic Drive. There is also a dedicated on-street loading zone (approximately 20m in length) just west of the driveway. A small number of short-term parking spaces (1P during normal working hours) are located on the southern side of Civic Drive. At the intersection with Jacob Street, vehicle movements are restricted to left-in, left-out movements.

- An **access road** running along the western boundary of the site in a north-south direction provides access to and egress from the Library and Knowledge Centre car park driveway. Vehicles movements are restricted to left-in, left-out at Rickard Road.



Figure 5 The Appian Way (looking south from Rickard Road)



Figure 6 Library access road (looking north from Library Plaza)



Figure 7 Rickard Road (looking west from The Appian Way)



Figure 8 Rickard Road (looking east)

2.2 Public transport

The public transport network in the local area consists of rail and buses. The Sydenham to Bankstown section of the T3 line (on which Bankstown Station sits) will be upgraded as part of the Sydney Metro works, with services operating from 2024. The conversion was approved in December 2018.

2.2.1 Bus network

Bankstown is serviced by many buses as it is a terminus for many services as well as being the main interchange station on the T3 line. It also provides for regional connectivity. A schematic of the bus routes within Bankstown town centre is presented in Figure 9.

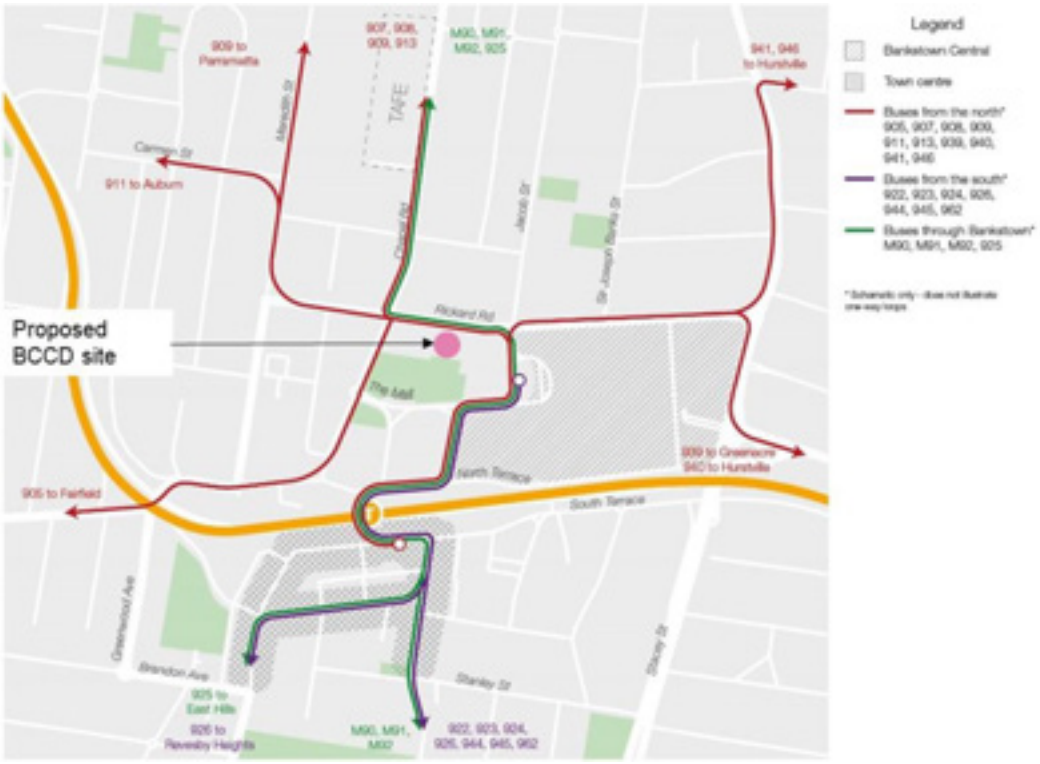


Figure 9 Schematic of Bankstown bus network

The bus interchange at Bankstown Central, to the east of the site, is served by 16 bus routes and connects Bankstown to surrounding centres and suburbs. With the exception of through routes, routes serving areas to the south typically start/terminate from Bankstown Central interchange, while routes serving areas to the north typically start/terminate at Bankstown Station.

It is anticipated that the most utilised bus stops by the future campus users will be

- The Mall (before Jacobs Street) – for users boarding northbound services and alighting services from the south
- Rickard Road (opposite the Library) – for users alighting services from the north

- The Mall (at The Appian Way) – for users boarding southbound services. It may also be used by some passengers alighting from through routes from the north.

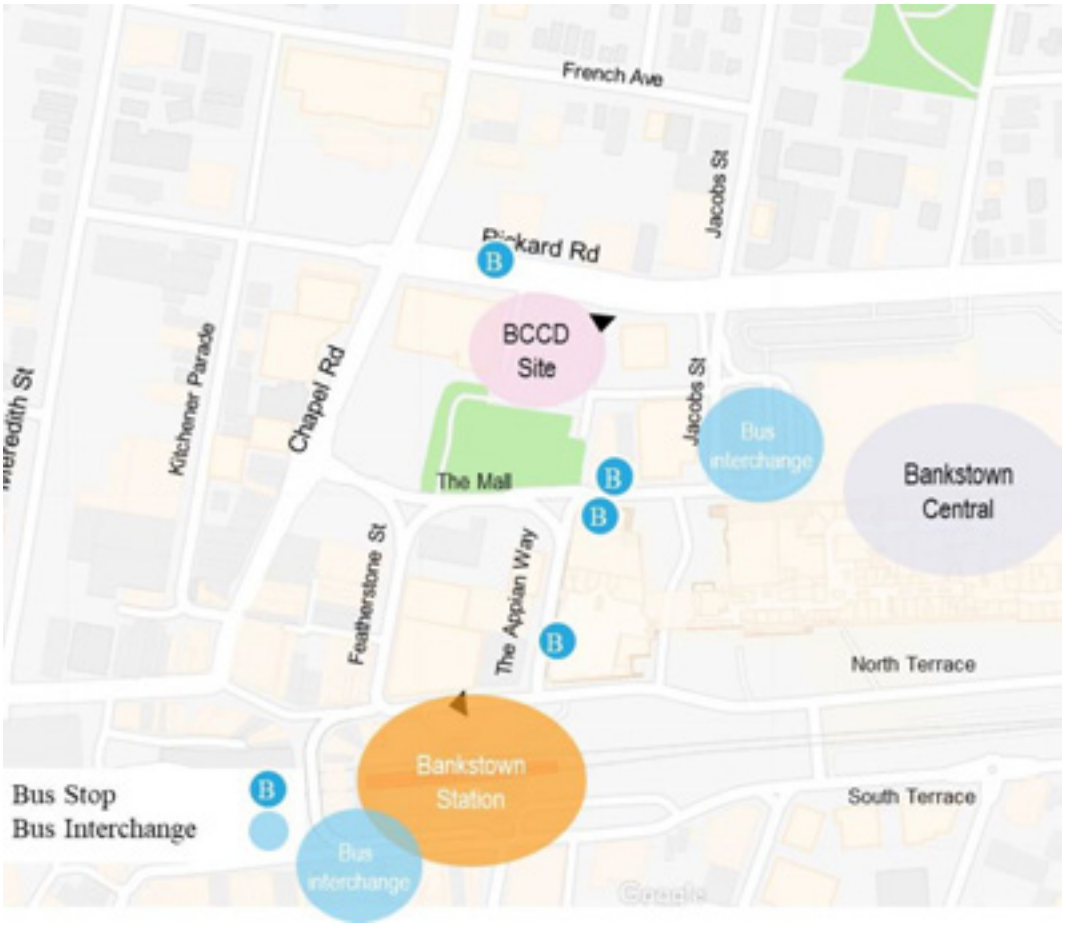


Figure 10 Existing bus stops and interchanges

The bus routes serving the area, along with the associated weekday and weekend frequencies are presented in Table 2.

The M90 (Liverpool to Burwood), M91 (Parramatta to Hurstville) and M92 (Parramatta to Sutherland) are the most frequent bus routes serving Bankstown, with a bus every 10-minutes per direction at peak times.

Table 2 Bankstown bus frequency

Route number	Weekday	Weekday	Weekend
	Frequency (peak)	*Frequency (off-peak)*	*Frequency*
487	30 mins	30 mins	30 mins
905	15mins	30 mins	30mins
907	20 mins	30 mins	30 mins
908	Approx. 60 mins	Approx. 60 mins	Approx. 60 mins
909	Approx. 30 mins	Approx. 30 mins	30 mins – 60 mins
911	Approx. 30 mins	Approx. 30 mins	60 mins
913	Approx. 60 mins	Approx. 60 mins	None
922	60 mins	60 mins	60 mins
923	Approx. 30 mins	Approx. 30 mins	Approx. 60 mins
924	Approx. 30 mins	Approx. 30 mins	Approx. 60 mins
925	Approx. 30 mins	60 mins	60 mins
926	Approx. 35 mins	60 mins	60 mins
939	30 mins	30 mins	60 mins
940	30 mins	30 mins	60 mins
941	30 mins	30 mins	30 mins
944	30 mins	30 mins	60 mins
945	Approx. 15 mins	30 mins	30 mins – 60 mins
946	30 mins	30mins	60 mins
962	Approx. 30 mins	Approx. 30 mins	30 mins – 60 mins
M90	10 mins	Approx. 15 mins	20 mins
M91	10 mins	Approx. 20 mins	Approx. 20 mins
M92	10 mins	Approx. 15 mins	Approx. 20 mins

2.2.2 Bus usage

Analysis of TfNSW bus occupancy data for a typical day[1] has been undertaken. The data categorises the occupancy of buses into the following three categories along any route:

- Many seats available
- Few seats available
- Standing room only

Along routes towards Bankstown during the AM peak period, no capacity issues were noted with most services having ‘many seats available’.

[1] Based on analysis of August 2016 data

For services departing Bankstown during the PM peak, only the M91 (towards Parramatta) was categorised as having ‘standing room only’, with all other services having ‘many seats’ or ‘few seats’ available.

2.2.3 Rail network

Bankstown Station is located on the T2 and T3 rail lines. The T3 line operates between the City and Liverpool or Lidcombe via Bankstown. The Sydenham to Bankstown section of the line will be upgraded as part of the Sydney Metro works, with services operating from 2024.

Sydney Metro services will operate between Bankstown and the City (and beyond to the Northwest) while services to and from Liverpool will continue to be serviced by Sydney Trains.

Sydney Metro will operate at a peak frequency of 15 trains per hour in both directions (1 every 4 minutes). This is in comparison to the existing peak frequency of approximately 8 trains per hour.

2.3 Pedestrian network

The main pedestrian network is presented in Figure 11. Footpaths are provided through the local area, with signalised crossings provided at major intersections.

Raised tables and zebra crossings are provided along the Mall at the intersections with Featherstone Street, The Appian Way and Jacobs Street.

In the future, the key pedestrian routes are expected to be in a north-south direction between the Campus (in the north) and Bankstown train station and future Metro station (to the south).

Civic Drive is also likely to be a popular pedestrian route towards the bus interchange and Bankstown Central. The crossing opportunities are poor at the intersection of Jacobs Street and Civic Drive, and it is expected that pedestrians will cross further south near the Mall.



Figure 11 Pedestrian network

2.4 Cycle network

The cycle infrastructure to and throughout Bankstown is quite limited as shown in Figure 12. Cyclists travelling to and from the site will need to travel along existing roadways with traffic.

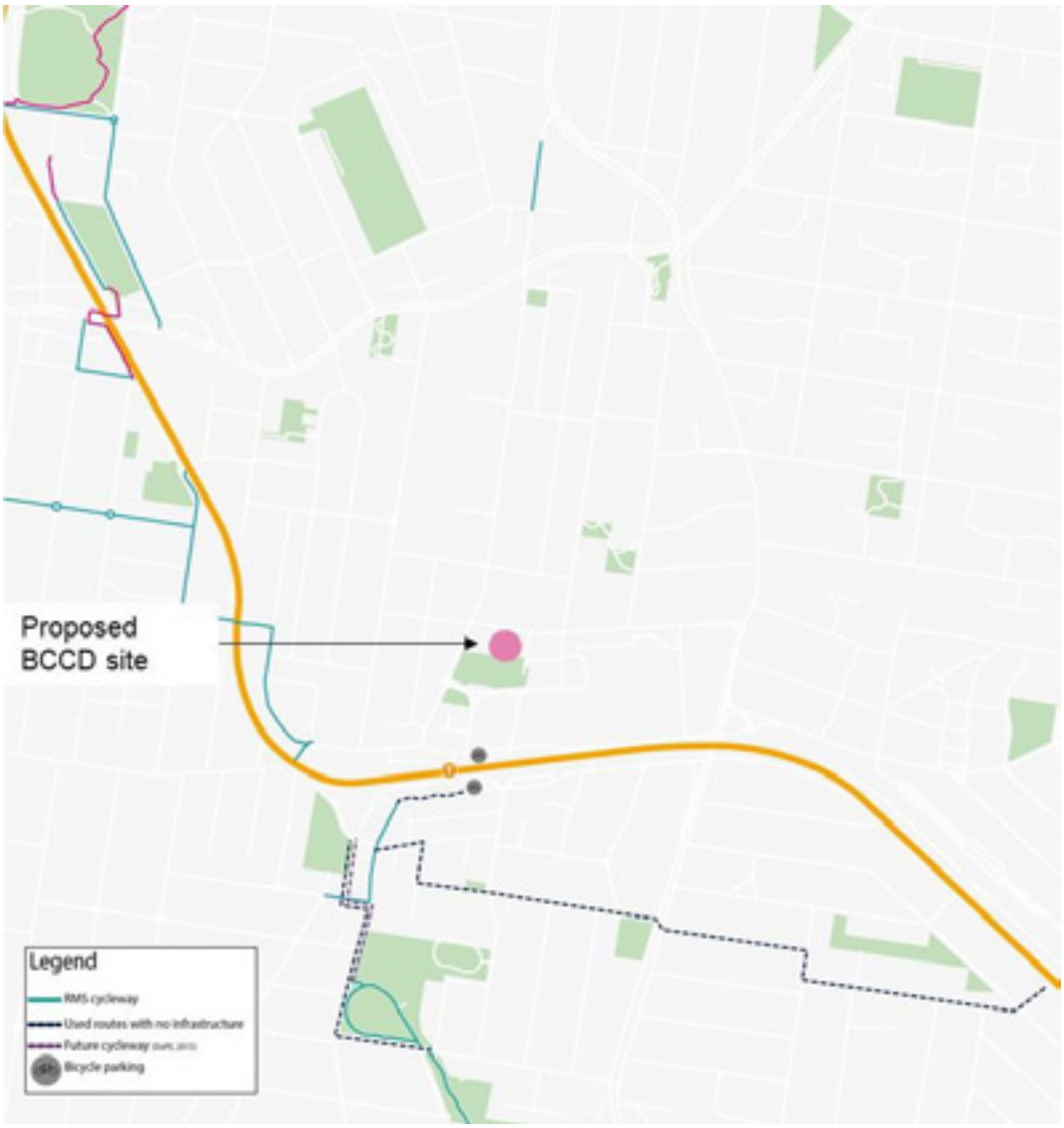


Figure 12 Existing cycling infrastructure

Analysis from the draft Bankstown Complete Streets projects is presented in Figure 13. Surveys undertaken counted a total of 148 cyclists within the CBD during the peak morning period, including 22 along Chapel Road and just 2 along Rickard Road.

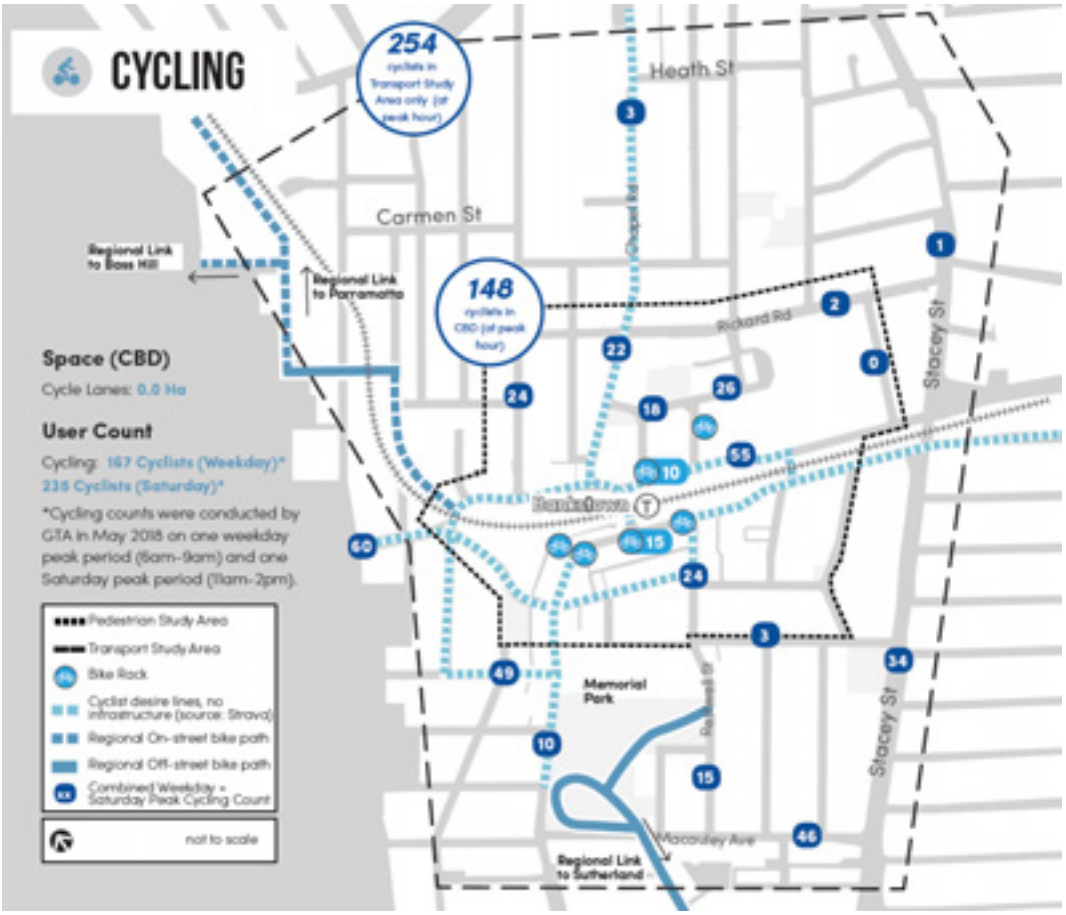


Figure 13 Draft Bankstown Complete Streets Cycling Analysis

2.5 Travel characteristics

2016 Census data was used to gain an understanding of how people currently travel to work in the area surrounding the proposed site. The proposed site is located in ABS Destination Zone (DZN) 115710002, the boundary of which is defined in Figure 14.



Figure 14 ABS DZN 115710002 boundary

The analysis indicates that approximately 5,000 people are employed within this DZN. The mode of travel to work is presented in Figure 15. The majority of workers commute by private vehicle (as a driver or passenger). Public transport accounted for approximately 15% of commuting trips, of which most are by train.

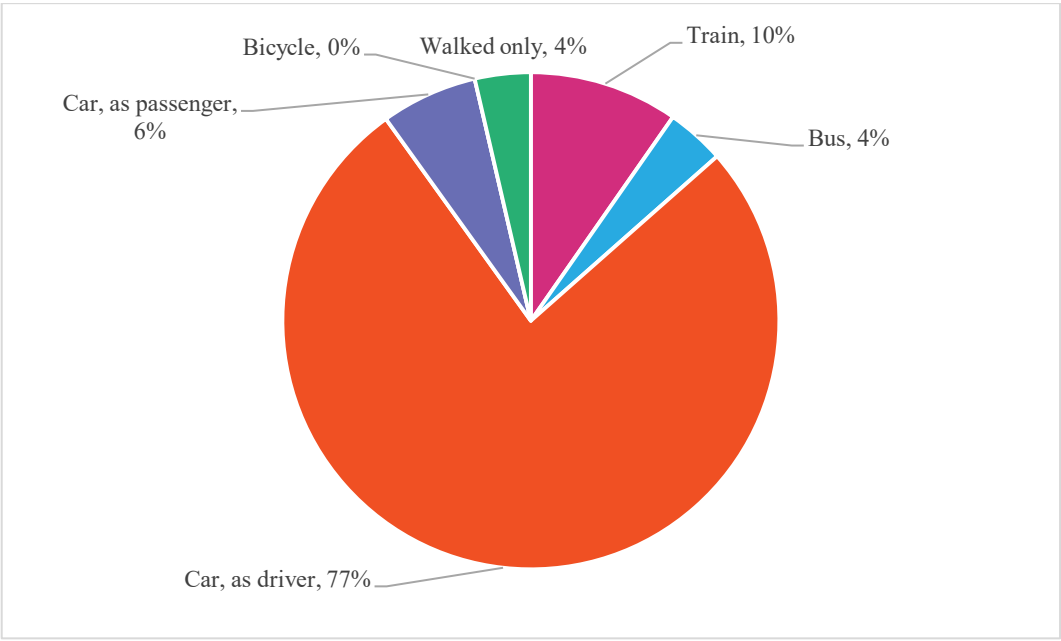


Figure 15 Existing travel to work mode share (DZN 115710002)

2.6 Traffic volumes

Traffic surveys were undertaken on Wednesday September 5th 2018 between 7am and 10am (AM), and between 4pm and 7pm (PM) at the following intersections:

- Rickard Road / Chapel Road; and
- Rickard Road / Jacobs Street.

Analysis of the surveys indicated that traffic volumes are approximately 13% greater in the PM peak hour when compared to the AM peak hour. Total traffic movements at the two intersections are summarised for the AM peak hour (8.30am – 9.30am) and PM peak hour (4.45pm – 5.45pm) in Figure 16 and Figure 17, respectively.

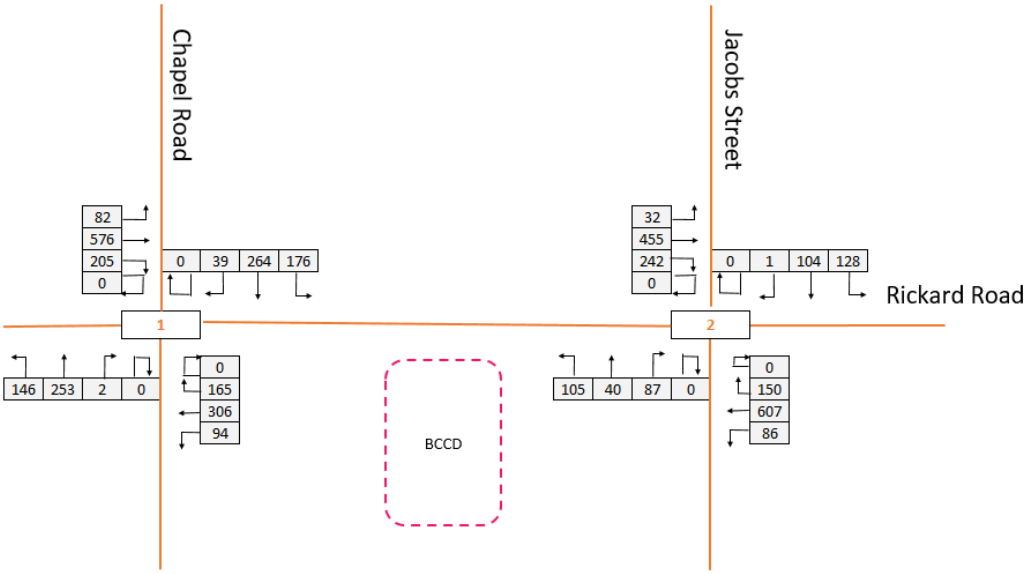


Figure 16 AM peak hour traffic movements

Key traffic movements during the AM peak hour are:

- Eastbound through movements along Rickard Road
- Right-turn movements from Rickard Road to Jacob Street (south)

No congestion or significant queuing was noted during the AM peak hour.

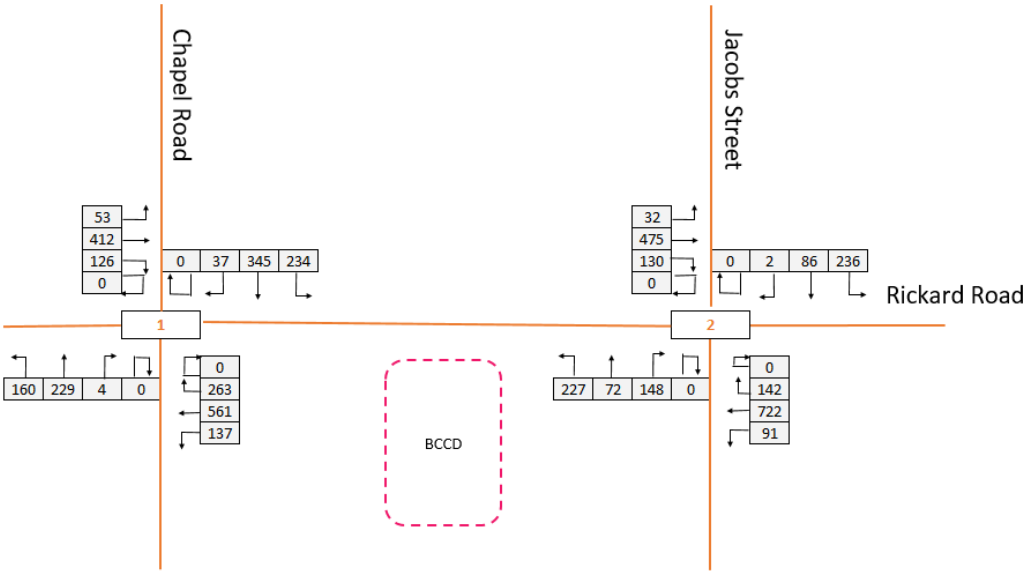


Figure 17 PM peak hour traffic movements

Key traffic movements during the PM peak hour are:

- Westbound through movements along Rickard Road
- Right-turn movements from Rickard Road to Chapel Road (north)
- Southbound movements along Chapel Road

Apart from some queuing along Chapel Road, no significant queuing was noted during the PM peak hour.

To understand the level of activity, spot counts were also undertaken at the following locations on Wednesday September 5th 2018. Table 3 includes the observed traffic counts at both locations. Conservatively, a factor of 4 has been applied to spot counts to estimate the 1-hour volumes at these locations.

- Driveway off Rickard Road (providing access to Bankstown Library car park);
- Driveway off Rickard Road (providing access to the at-grade car park and Bankstown Civic Tower car park).
- Driveway off Jacobs Street (providing access to the at-grade car park and Bankstown Civic Tower car park).

Table 3 Driveway spot traffic surveys

Driveway Location	**Observed 15-minute count**		**Factored 1-hour count***	
	In	**Out**	**In**	**Out**
Bankstown Library underground car park	3	1	12	4
Left-turn from Rickard Road to at-grade car park and Bankstown Civic Tower car park	18	N/A	72	N/A
Driveway from Jacobs Street to Bankstown Civic Tower	21	3	84	12

2.7 Parking

There is a large quantity of both on-street and off-street parking within the Bankstown CBD. Based on analysis in the draft Bankstown Complete Streets project, it is estimated that there is

- 865 on-street parking spaces (see Figure 18)
- 1,666 off-street Council parking spaces (see Figure 19)
- 5,000+ private off-street parking spaces (i.e. Bankstown Central and Sports Club)

There are 43 spaces in the at-grade car park (within the boundary of the proposed site) along with 18 spaces along The Appian Way to the east of the site.



Figure 18 Bankstown on-street parking

Source: Draft Bankstown Complete Streets project



Figure 19 Bankstown off-street parking

Source: Draft Bankstown Complete Streets project

2.8 Other planned initiatives

2.8.1 Sydney Metro

Sydney Metro City and Southwest (Metro) is planned to open in 2024. Metro will convert the Bankstown rail line, between Bankstown and Sydenham, to a high frequency driverless, single-deck Metro service, increasing the frequency of trains on the line to 15 per hour in each direction. Bankstown will be the terminus for the new Metro line and an interchange point with Sydney Trains services between Bankstown and Liverpool and Lidcombe. The project was approved in December 2018.

Transport for NSW (TfNSW) is expected to increase bus service levels for routes linking Bankstown with suburbs to the west and north, to provide an alternative to private car for those train customers wishing to access Metro at Bankstown rather than their local station.

Current planning for the combined Sydney Trains and Sydney Metro City and Southwest Metro station at Bankstown will include a new Metro station entrance opposite The Appian Way. The Appian Way will be one of the main pedestrian routes between the WSU site and the transport interchange.

The Traffic, Transport and Access report (Aecom, 2017) which was submitted as part of the EIS for the project forecasts a reduction in the amount of 'park and ride' occurring at the station as shown in Figure 20, with large increases in travel by walk and bus.

Travel Mode to the Station	Entry			Exit			Mode Share 2016	Mode Share 2026
	2016	2026	Change	2016	2026	Change		
Walking	4,444	6,041	+1,597	4,621	6,041	+1,420	49.4%	50.8%
Cycling	13	18	+5	13	18	+5	0.1%	0.2%
Park and Ride	1,361	754	-607	1,415	754	-661	15.1%	6.3%
Kiss and Ride	1,724	1,751	+27	1,792	1,751	-41	19.2%	14.7%
Bus	1,451	3,337	+1,886	1,509	3,337	+1,828	16.1%	28.0%
Total	8,993	11,900		9,350	11,900		100.0%	100.0%

Figure 20 Current and future volumes of travel to/from Bankstown Station

Source: Sydney Metro City and Southwest Sydenham to Bankstown EIS - Traffic, Transport and Access Report, Table 8.14 (Aecom, 2017)

The report found the following with regard to parking provision at the station and on surrounding streets:

'With the reduction in demand of 607 passengers expected to drive to the station by 2026, there is sufficient spare capacity at Bankstown Station, assuming population growth and intensification do not provide a further demand for these spaces.'

2.8.2 Rapid Bus Routes

TfNSW announced a network of rapid bus routes which will connect major metropolitan centres in Sydney. *Sydney's Bus Future* (TfNSW, 2013) revealed 11 new high frequency bus routes with services at least as often as every 10 minutes. One of these routes is planned to go through Bankstown, connecting Rouse Hill and Hurstville via the T-way, Parramatta and Bankstown.

The report also details 20 suburban routes as the second tier in the cross-regional network. These routes have services every 15 minutes, and every 10 minutes during peak periods. There are three suburban routes planned for Bankstown, two new and one existing route that is to be converted to a suburban route. They are:

- Miranda-Bankstown via Sutherland and Menai
- Bankstown – Blacktown via Fairfield and Wetherill Park
- Liverpool-Burwood via Bankstown

These routes are shown in context of the broader Sydney strategy in Figure 21.



Figure 21 Sydney's Bus Future overview

2.8.3 Draft Bankstown Complete Streets Project

The Bankstown Complete Streets project has been developed in response to growing traffic congestion issues and looks to promote active transport and public transport as a way to move large volumes of people (mass transit) safely to and within the CBD.

It is about balancing the various needs of the people who use these streets, making sure they are inviting places that entice people to enjoy spending time in the town centre and support local businesses.

Key outcomes for the project include:

- Vision and design principles to guide transport and street improvements in Bankstown;
- Traffic network and intersection improvements to improve flow and safety;
- Strategies to optimise parking including demand management, supply capacity, location, restrictions and smart technologies;
- Concept designs for street upgrades to enhance pedestrian safety and amenity; and
- Other recommendations to improve transport and the public domain

The draft of the plan has been issued for public consultation which includes concept designs for a north-south activity spine which incorporates new shared

zones along The Appian Way (north and south segments). This will create a strong link between the BCC and the train / Metro Station.



Figure 22 Draft Bankstown Complete Streets Masterplan

Other proposed changes to the pedestrian and bike network are presented in Figure 23 and Figure 24.

The project is ongoing, with one of the associated studies a CBD Parking Review. The aim of the review is to meet car parking needs for the future CBD for additional incoming population and development.

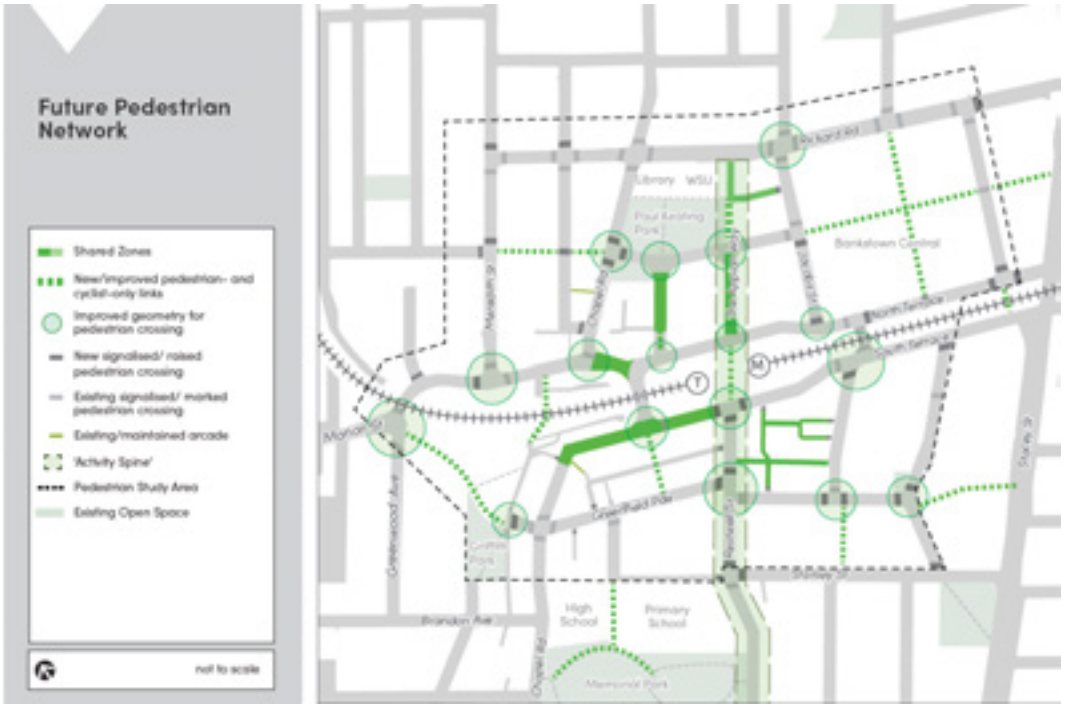


Figure 23 Draft Bankstown Complete Streets - Future Pedestrian Network

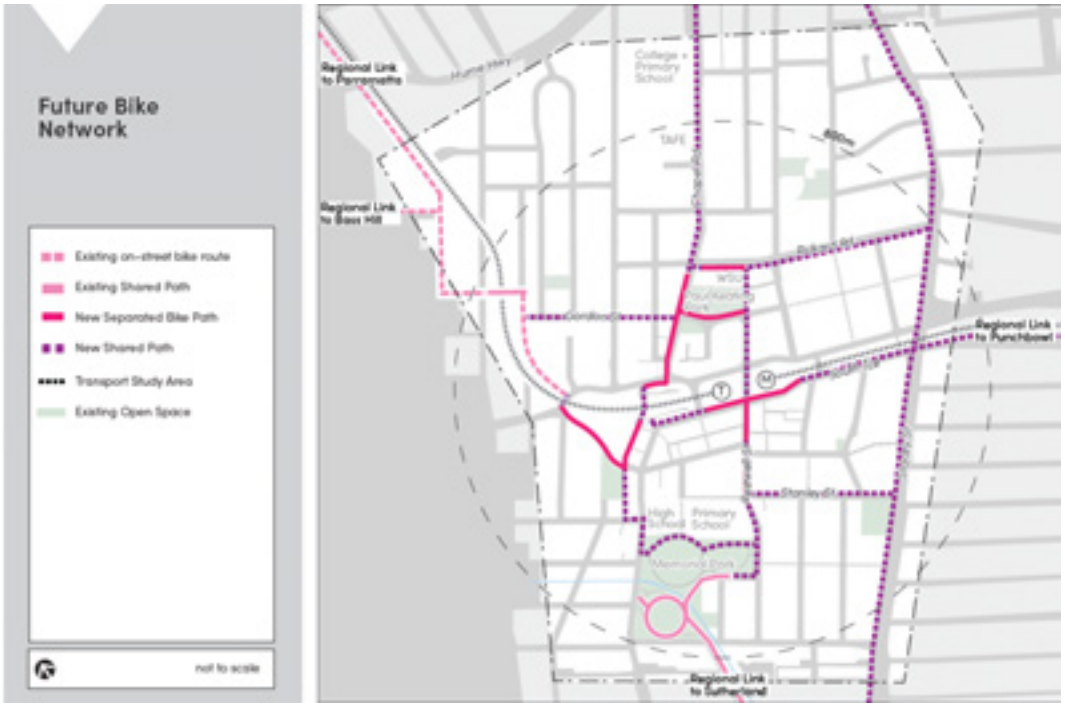


Figure 24 Draft Bankstown Complete Streets - Future Bike Network

3 Proposed Development

The proposed BCC building will have a GFA of approximately 29,266 m^2. The building will have 18 levels above ground (19 storey) with two basement levels. A site plan of the BCC is presented in Figure 25.



Figure 25 BCC Site Plan

The primary use of the building will be for University / Education uses (accommodating the relocation of WSU from their Milperra campus). The campus will also have ancillary retail.

In terms of transport features of the campus, the key elements of the proposal are:

- A new driveway ramp to a basement car park located along the existing Library access road;
- A two-level basement car park with a loading dock with provision for approximately 94 new car parking spaces (including 4 DDA bays);
- A new drop-off and pick-up zone along The Appian Way
- A loading dock within the basement with provision for a MRV sized vehicle spaces and vans (approximately 3 bays in total);
- The loss of 43 existing parking spaces (on the site) and 16 spaces along The Appian Way;
- Converting The Appian Way to a shared zone, with the following modifications:
  - Relocation of driveway on Rickard Road to the east
  - Provision of a set-down area for drop-off and pick-up
  - Associated pavements and realignment works

- Repurposing of redundant section of deceleration lane on Rickard Road (west of the relocated The Appian Way driveway) as a loading zone (capacity for two SRV sized vehicles);
- Widening of the footpath and public domain improvements along Rickard Road, enabling the provision of a future shared path. The draft Bankstown Complete Streets project identifies the southern side of Rickard Road as a future cycle route;
- End of trip facilities and bike parking (32 bike parking spaces within the basement and up to 100 within the public domain);

It is estimated that there will be around 2,000 students, 650 University / Education space staff at any one time, allowing for varying lecture times, external meetings, sick leave and holiday leave.

4 Transport Assessment

4.1 Vehicle access

Vehicles are proposed to enter and exit the site using the existing access driveway off Rickard Road (see Figure 26). This driveway is currently used to access the Bankstown Library underground car park which was observed to have relatively low volumes of traffic during peak periods.

The access driveway is approximately 80m east of Chapel Road and approximately 130m west of Jacobs Street. Access to the BCC basement car park is provided approximately 20m south of the intersection with Rickard Road.

The Appian Way, which runs along the eastern boundary of the site, will continue to provide access to the Bankstown Civic Tower car park in a one-way direction. The intention is for The Appian Way to be a shared zone, with drop-off and pick-up facilitated on the eastern side of the road.



Figure 26 Vehicle access

4.2 Pedestrian access

The campus can be accessed by pedestrians from the southern, northern and eastern perimeter. The proposed access points are highlighted in Figure 27.



Figure 27 Pedestrian access points

High quality pedestrian amenity is provided throughout, with significant pedestrian space provided along The Appian Way (shared zone) and the widened footpaths along Rickard Road. From the south, The Appian Way and Paul Keating Park can be used by pedestrians. The building also allows for a north-south through site pedestrian link.

Given the location of bus stops and the train/Metro station, the southern access point is expected to be most utilised.

4.3 Cycle access

The proposed access route to the basement bicycle parking is highlighted in Figure 28. Cyclists will also be able to access the basement from the south. As part of the proposed layout, there is provision for approximately 32 bike spaces within the basement. It is also proposed to provide up to 100 spaces within the public domain of the site.

The design of the bike parking is in accordance with AS2890.3 (2015). The Bankstown DCP 2015 does not specify a bicycle parking rate.



Figure 28 Proposed staff bike parking

4.4 Car parking

4.4.1 On-site provision

As part of the proposed layout, there is provision for approximately 94 car parking spaces, including 4 DDA compliant spaces, across two basement levels as shown in Figure 29 and Figure 30. No parking will be provided for students.

This is similar to the arrangement at the WSU Parramatta City Campus, where 80 parking spaces are provided, none of which are for students. The WSU Parramatta City Campus has many similar features to the development, including GFA, staff and student population, and proximity to public transport.

The parking requirements for 'educational establishments' as set out in the DCP are not considered appropriate for the development and are more aligned to primary and secondary school sites.

The City of Sydney LEP 2012 only permits parking to be provided at a rate of 2% site area for a development with a floor space ratio (FSR) in excess of 3.5:1 in a similar proximity to a major railway station. Application of this rate to the subject development would result in a total permissible car parking of 74 spaces for a site with a total area of 3,678 m^2.

The provision of 94 spaces is equivalent to approximately 2.5% of the site area (or 1 per 311m^2 GFA), and it is recommended this rate is applied for the following reasons:

- The excellent accessibility of the site by public transport, including the step-change in provision as a result of the Metro;
- The anticipated growth in dwellings in the CBD, 80% of which is targeted to be within the walking catchment of the CBD[2] and, therefore within the walking catchment of the campus;
- Providing limited on-site car parking is a key travel demand measure which encourages travel by sustainable modes while mitigating the impacts of the development on the surrounding road network;
- The WSU Parramatta and Liverpool City Campuses are excellent examples of similar developments. Based on the University's recent experience of relocating to those campuses, public transport becomes the primary modes of transport for users, with limited demand for parking;
- The proposed retail is of a relatively small size and therefore future businesses are expected to be of a nature that will service staff and visitors of the proposed development and other surrounding land uses. As such, the ground floor retail uses are unlikely to generate significant visitor parking demands; and
- The reduced demand for parking that students generate when compared to staff in a typical commercial development.

Table 4 summarises the proposed provision in comparison with DCP rates. With the introduction of Metro, and the CBD car parking review being undertaken by Council as part of the draft Bankstown Complete Streets Project, the provision of additional public parking in the city centre is not aligned with the future vision for the CBD.

The proposed parking provision for the University / Education space is considered adequate in the context of the broader transport objectives for the Bankstown CBD.

Table 4 DCP Parking Provision

Use	Parking Rate	Spaces Permitted	Spaces Provided
University / Educational space	No relevant rate in the DCP	n/a	94

The design of the car park (including ramps, spaces and circulation) is in accordance with AS 2890.1 (2004) and Bankstown Development Control Plan (2015).

[2] Bankstown DCP 2015 – Part 1A Centres

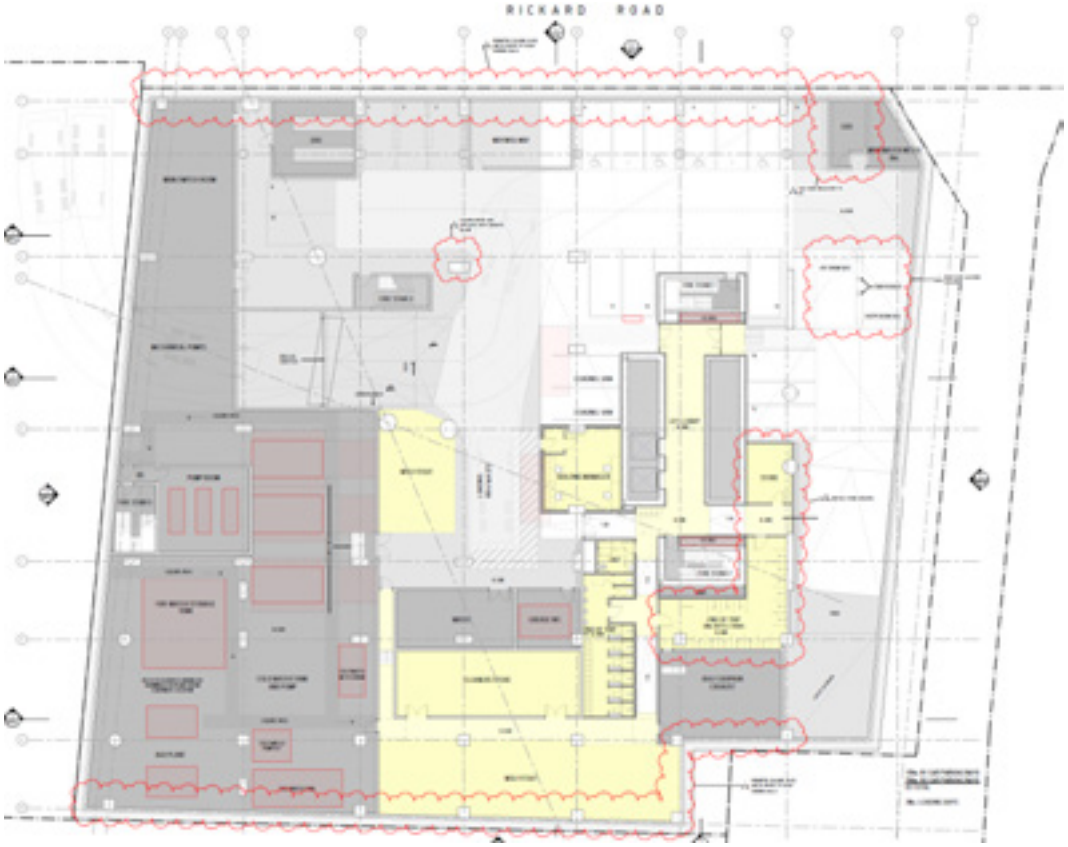


Figure 29 Basement level 1 car park

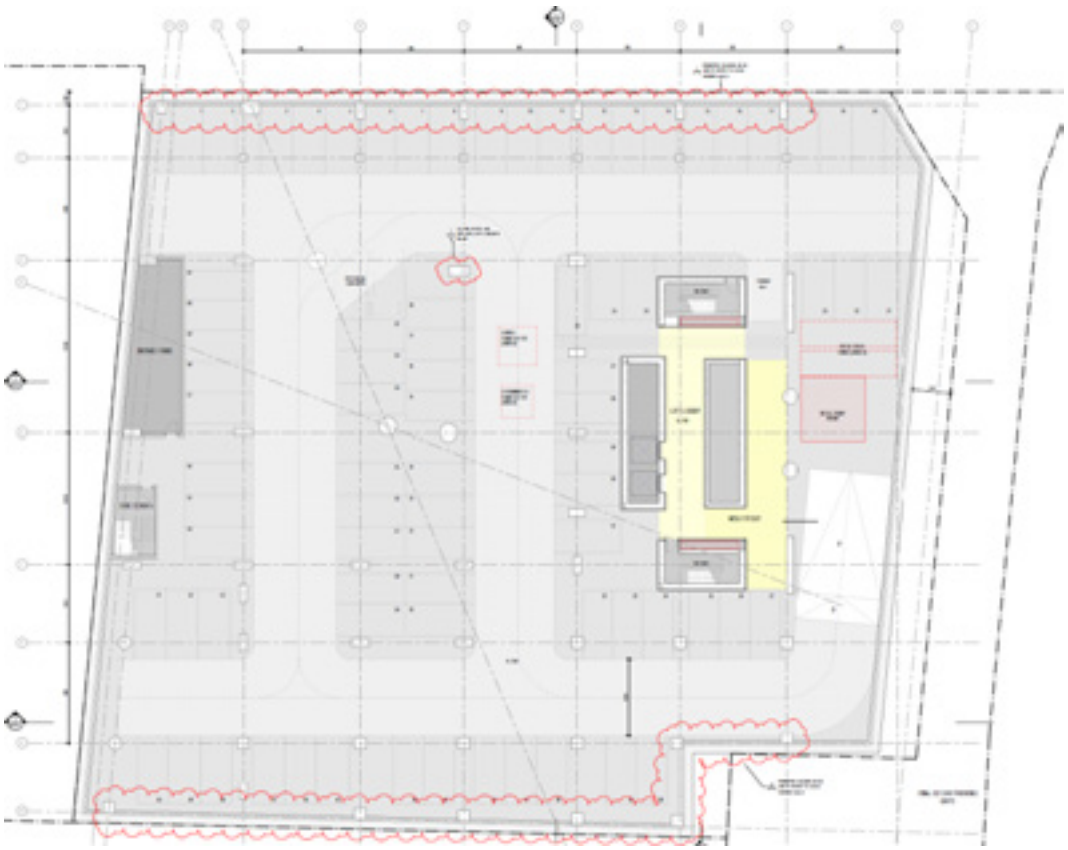


Figure 30 Basement level 2 car park

As noted in Section 3, there will be approximately 59 existing parking spaces removed as part of the proposed development. This strategy is consistent with the aspiration of the draft Bankstown Complete Streets project which seeks to reduce traffic volumes within the CBD through the relocation/reduction in parking spaces.

4.5 Loading and servicing

As part of the proposed layout, there is provision for loading and servicing within the basement. The design of the dock allows for one medium rigid vehicle (MRV)/waste vehicle and two courier vans (see Figure 29 basement level 1 layout).

A potential loading zone for two SRV's on Rickard Road has also been identified by repurposing the redundant segment of the deceleration lane.

The design of the loading dock areas is in accordance with AS 2890.2, with the driveway ramp having a maximum grade of 1 in 6.5. Swept path analysis of a MRV accessing and egressing the dock is provided in **Appendix A**.

4.6 Public transport access

The site is well serviced by both rail and bus networks as described earlier. Given the limited number of parking spaces being provided on-site, travel by public transport is expected to be the main mode of travel.

With the improvements in the pedestrian route between the development and the Train / Metro Station due to the works to The Appian Way and pedestrian crossing of The Mall, the proposed development will be well integrated with the public transport network.

The draft Bankstown Complete Streets project has also proposed a future public transport network (see Figure 31) which identifies a potential new bus station on Jacob Street. The BCC is well placed to integrate with a future bus station at this location given the improvements outlined above.

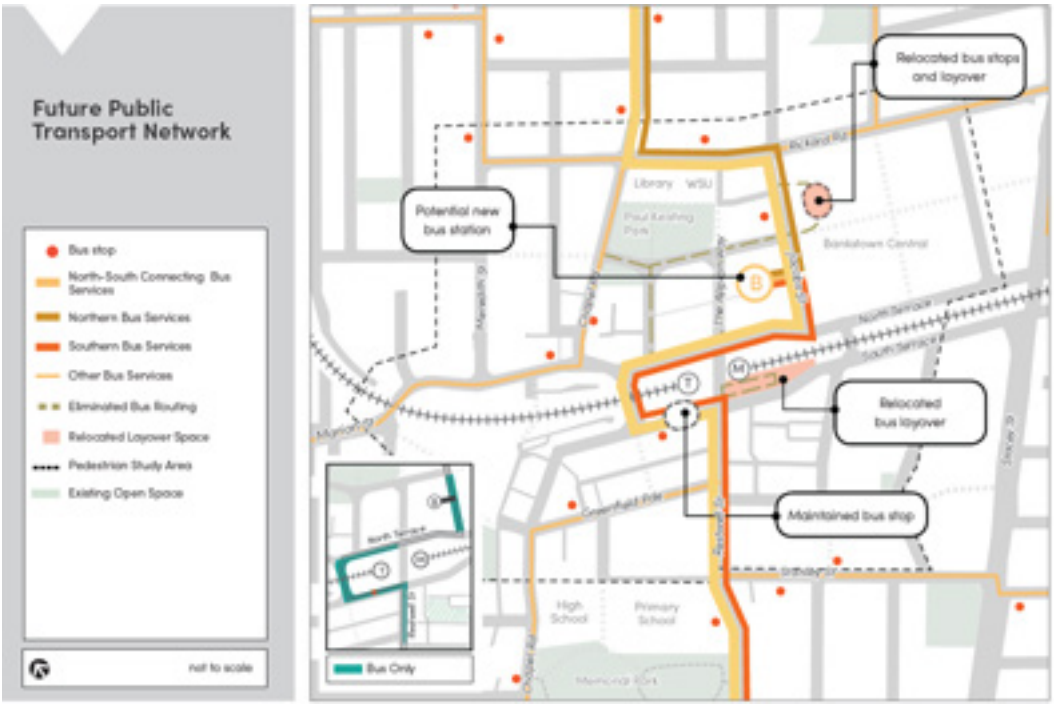


Figure 31 Draft Bankstown Complete Streets - Future Public Transport Network

5 Traffic assessment

5.1 Trip origins

5.1.1 Students

Existing catchments

The catchment of students attending the existing WSU Bankstown Campus in Milperra is presented in Figure 32, highlighting the suburbs with the highest concentration of students. Many of these students live within the 2km and 5km catchment of the future campus, commuting from suburbs such as

- Bankstown
- Greenacre
- Punchbowl
- Yagoona
- Condell Park

These suburbs are within a 20-minute walk or cycle of the BCC as well as being served by bus services. Other suburbs with larger student populations such as Liverpool and Auburn are outside of the walk catchment but are well served by bus and rail and may also be within a reasonable cycle catchment for some students.

Future catchments

Overtime, locations along the Metro line will become attractive locations for students to live given the levels of accessibility to Bankstown it affords. As shown in Table 5 and Figure 33, Sydney Metro will result in journey times of 30 minutes or less between Bankstown and Pitt Street station in Sydney CBD and less than 45 minutes to locations such as Chatswood. These journey time savings, along with the frequency and reliability of service, are expected to attract students from suburbs located along the Metro line, including Lakemba, Campsie and Marrickville.

Table 5 Sydney Metro journey times

Bankstown to:	Existing journey time (mins)	Sydney Metro (mins)	Saving (mins)
Central	34	28	Up to 6
Pitt Street	45	30	Up to 15
Barangaroo	59	34	Up to 24
Victoria Cross	52	37	Up to 15
Chatswood	68	43	Up to 25
Macquarie University	79	54	Up to 25

Source: Sydney Metro

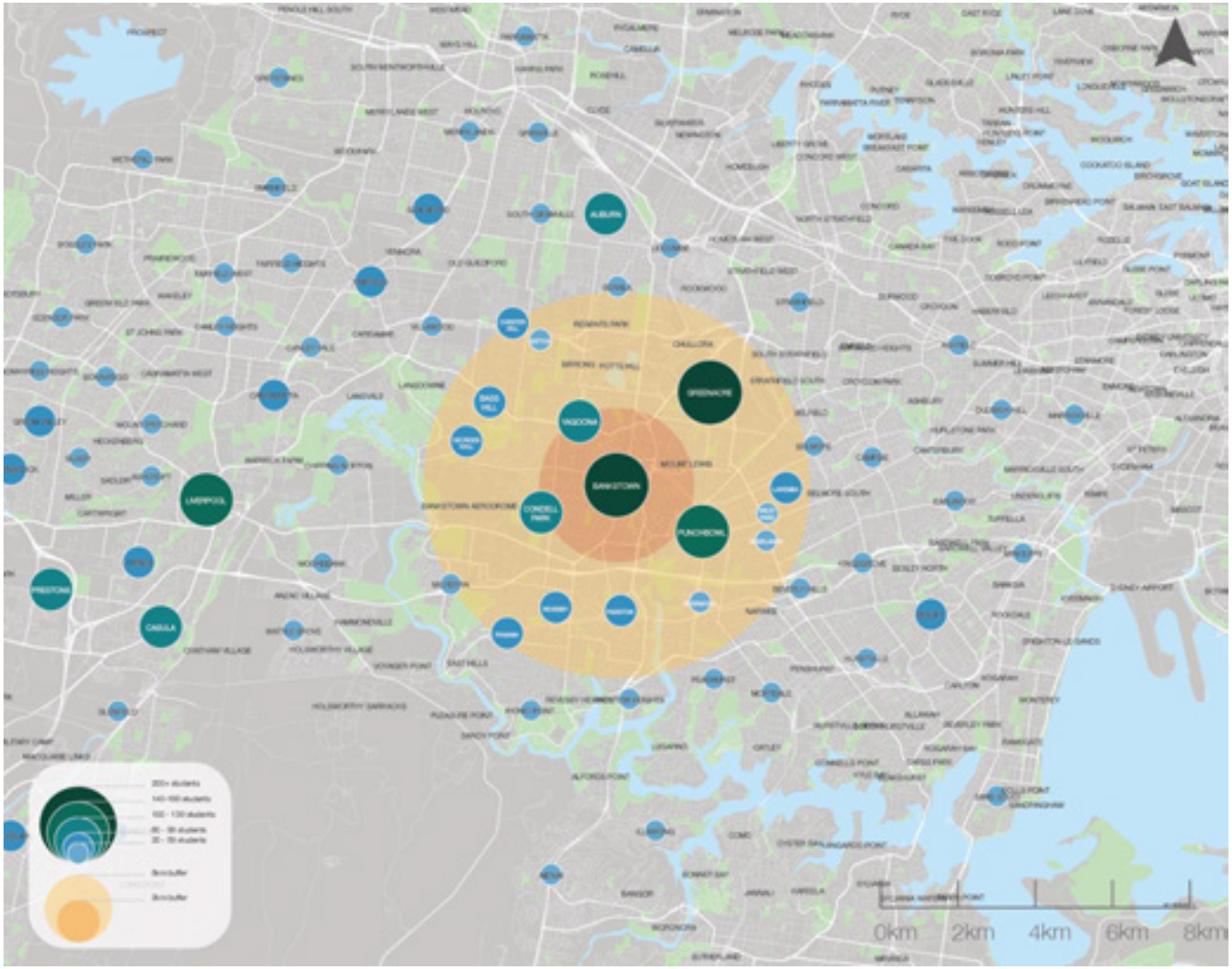


Figure 32 Existing student trip origins (Milperra Campus)

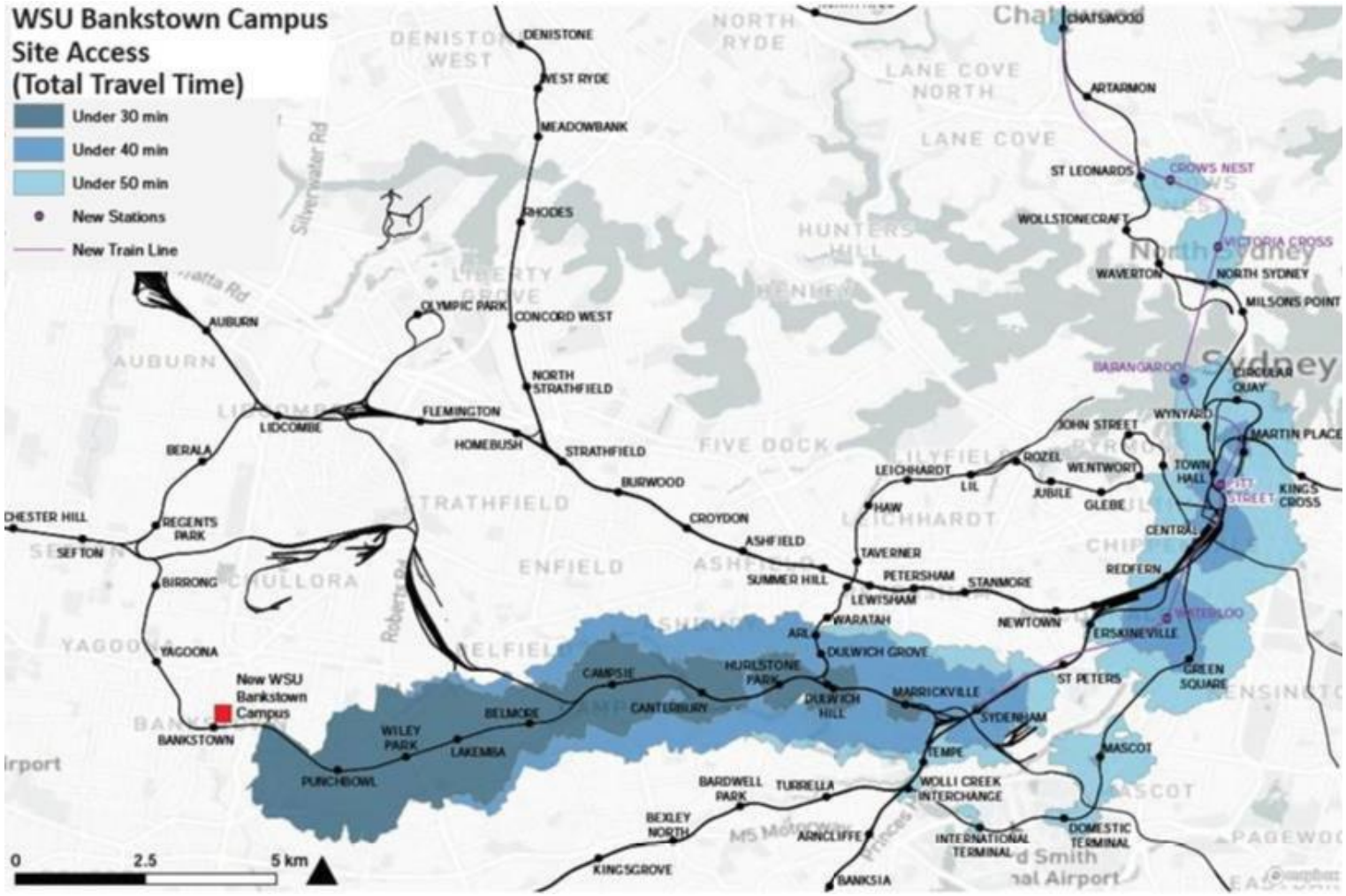


Figure 33 Future travel time along Sydney Metro line

Source: Hale Report

5.1.2 University / Education space staff

Existing catchment

2016 Census data has been used to identify the locations from which people working in Bankstown commute. This is likely to be the locations that both University / Education space staff trips will originate from.

Analysis at census SA2 level shows that people are expected to commute from the following areas (see Figure 34):

- Bankstown (e.g. Bankstown, Greenacre, Condell Park, Revesby and Yagoona) – 60%
- Canterbury (e.g. Punchbowl, Campsie, Roselands) – 10%
- Liverpool (e.g. Liverpool, Casula, Moorebank, Prestons)– 10%
- Merrylands – Guildford (e.g. Chester Hill, Fairfield, Merrylands) – 5%
- Hurstville – 5%
- Other – 10%



Figure 34 Existing staff trip origins

Many of the suburbs are within a 20-minute walk or cycle of the BCC as well as being served by bus and rail services. Suburbs outside of these catchments are generally well served by bus and rail while also being within a reasonable cycle catchment for some staff.

Future catchment

As mentioned in 5.1.1, locations along the Metro line will become attractive locations for University / Education space staff to live given the levels of

accessibility to Bankstown it affords, with quick, frequent and reliable journey times. Suburbs such as Lakemba, Campsie and Marrickville are expected to popular.

5.2 Mode share

WSU encourages and promotes the use of public transport and active modes by staff and students as a mode of travel to the campus. The relocation from a car dependent location (i.e. Milperra) to Bankstown city centre provides more equitable access to staff and students. It enables staff and students to commute by cheaper, more sustainable modes of transport which often are quicker also.

Lessons learned from the opening of the WSU Parramatta CBD campus show that students and staff will choose public transport when parking provision is limited and the alternative option of quick and frequent public transport is available, as would be the case at Bankstown.

The future users of the development have been split into two main cohorts, students and University / Education space staff. A target mode split for the two cohorts has been set (see Table 6) which considers the following factors:

- Existing and anticipated future trip origins
- Existing and future travel patterns
- Future public transport provision
- Trends at other universities/campuses
- Availability of on-site car parking spaces
- Access to a car
- Local changes in transport policy and infrastructure

Table 6 Mode share targets

Mode	University / Education space staff	Students
Walk	10%	15%
Cycle	5%	5%
Car Driver	15%	5%
Car Passenger (incl.drop-off)	3%	5%
Bus	30%	33%
Train/Metro	32%	32%
Other	5%	5%
Total	**100%**	**100%**

With consideration of the above factors, the following findings have shaped the mode share targets

- Based on the trip origin data, it is expected that more students will live closer and therefore within the walk and cycle catchment of the BCC;

- Staff are more likely to drive than students given greater access to a car as well as having access to the on-site parking spaces;
- Metro to be an attractive mode of travel for both staff and students once operational, influencing where people commute from;
- Changes to parking policy in the CBD and new cycling infrastructure as part of the draft Bankstown Complete Streets project should reduce driving and encourage other, more sustainable forms of transport; and
- Students are more likely to be dropped-off or car share with other students

Travel surveys undertaken once the BCC is operational, will allow for an accurate baseline mode split to be established and a review of the mode share targets.

5.3 Trip profile

The anticipated staff and student arrival and departure profiles to the BCC are presented in Figure 35 and Figure 36 based on a typical University trip profile.

The profile shows a peak arrival between 8am and 9am, with almost 50% of staff arriving in that time. Approximately one-third of students arrive during this time.

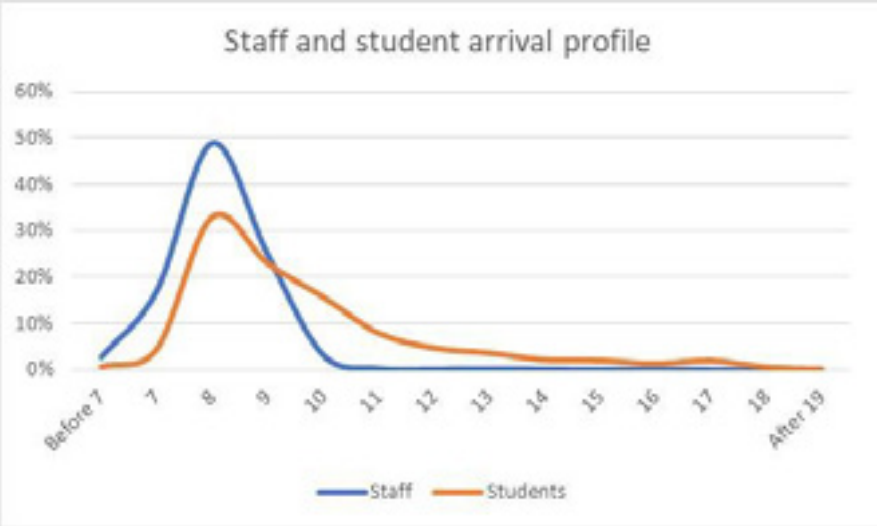


Figure 35 Staff and student arrival profile

In terms of departure times, there is a peak between 5pm and 6pm for staff (45% departing at this time). The peak is less pronounced for students, with departures occurring consistently over a four-hour period between 3pm and 7pm.

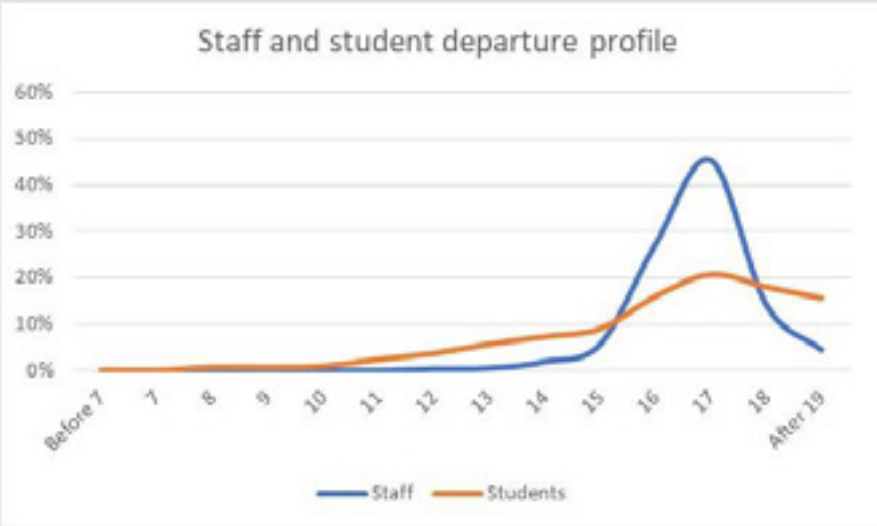


Figure 36 Staff and student arrival profile

The estimated overall travel demand (person trips) generated throughout the day is presented in Table 7. The profile has been developed based on the staff and student arrival and departure profiles along with anticipated populations and attendance on a typical day.

Table 7 BCC person trip arrival and departures

Time	**Arrivals**			**Departures**			**Accumulation** ***(students only)***
	Staff	Students	**Total**	Staff	Students	**Total**	***Total***
Before 7	19	14	**33**	0	0	**0**	*14*
7-8	111	110	**221**	0	0	**0**	*125*
8-9 (AM Peak)	317	828	**1145**	0	18	**18**	*935*
9-10	162	576	**737**	1	16	**17**	*1494*
10-11	22	393	**415**	0	23	**23**	*1864*
11-12	3	197	**200**	0	60	**60**	*2001*
12-13	2	116	**118**	2	92	**95**	*2025*
13-14	2	89	**91**	3	143	**146**	*1970*
14-15	2	52	**54**	13	183	**195**	*1839*
15-16	1	49	**49**	37	225	**262**	*1663*
16-17	1	31	**32**	176	400	**575**	*1294*
17-18 (PM Peak)	1	48	**49**	294	519	**812**	*823*
18-19	0	12	**12**	92	451	**543**	*384*
After 19	4	5	**9**	29	390	**419**	*0*

Based on the above analysis, it is anticipated that there will be approximately 1,145 people arriving during the AM peak (8am-9am) and 812 departing during the PM peak (5pm-6pm). At any one time, there is approximately 2,000 students on campus (i.e. from 12:00-13:00).

5.4 Peak hour trips

Based on the mode share targets listed in Table 6, the number of peak hour trips generated are anticipated as follows:

Table 8 Peak hour trips

Mode	Arrivals			Departures		
	Staff	Students	**Total**	Staff	Students	**Total**
Walk	32	124	**156**	29	78	**107**
Cycle	16	41	**57**	15	26	**41**
Car Driver	48	41	**89**	44	26	**70**
Car Passenger (incl.drop-off)	10	41	**51**	9	26	**35**
Bus	95	273	**368**	88	171	**259**
Train/Metro	101	265	**367**	94	166	**260**
Other	16	41	**57**	15	26	**41**
Total	**317**	**828**	**1145**	**294**	**519**	**812**

5.5 Vehicle trip generation

5.5.1 BCC car park

As noted in the description of the development, approximately 94 car parking spaces are proposed to be provided on site. These spaces will be available for use by University / Education space staff only.

The car driver trips associated with those two user groups calculated in Table 8 have been used to estimate the amount of development traffic generated by the proposed new car park. Allowance has been made for a small number of departure trips in the AM peak and arrival trips in the PM peak (see Table 9).

Table 9 BCC car park vehicular trip generation

	AM Peak		PM Peak	
	In	**Out**	**In**	**Out**
Vehicle trips	48	5	5	44
Total	**53**		**49**	

It is estimated that the development car park will generate a total of 53 vehicular trips in the AM peak hour and 49 vehicular trips in the PM peak hour.

5.5.2 The Appian Way drop-off activity

In the morning peak hour, it is estimated that 51 people will travel to the BCC as a car passenger, the majority of which will be students. This includes people dropped-off as well as people travelling with someone going to the same destination or other destinations in Bankstown.

For assessment purposes, it is assumed that all car passengers will be dropped-off along The Appian Way given the proposed facility to be provided there, however it is likely that drop-off will occur at other locations in the CBD also.

Table 10 The Appian Way drop-off activity

Location	AM Peak	PM Peak
The Appian Way	51	35

In order to drop-off on The Appian Way, vehicles will need to turn left from Rickard Road and egress via Civic Drive onto Jacobs Street.

5.5.3 Traffic distribution

Car park distribution

All access to the BCC car park will be via a left turn from Rickard Road and all exits will be via a left turn onto Rickard Road. The distribution of traffic shown in Figure 37 is based on likely routes to the state road network.

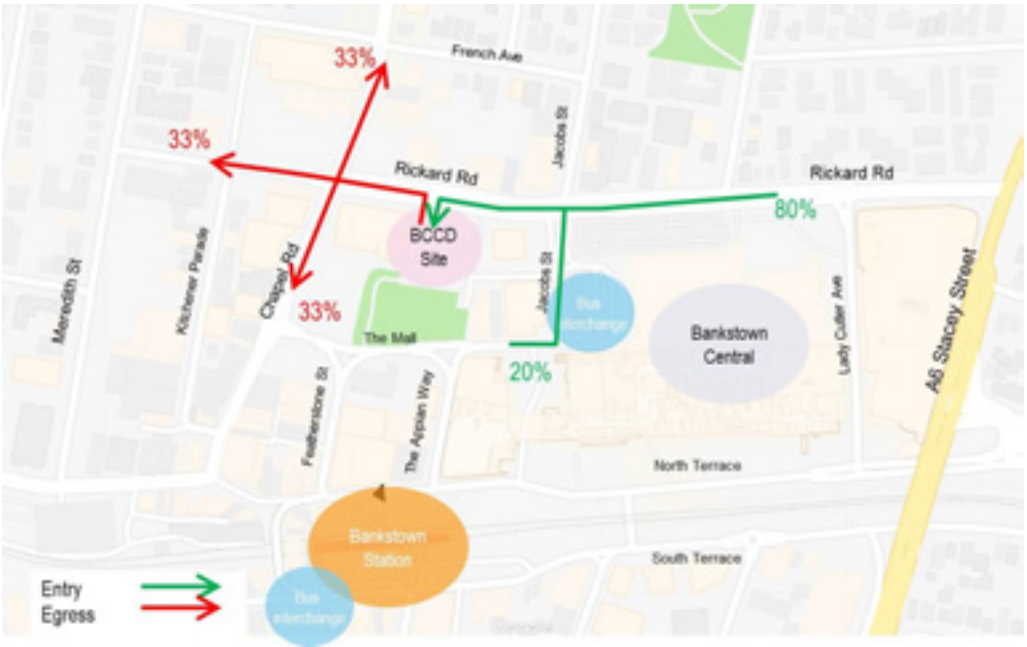


Figure 37 Car park access and egress routes and distribution

In terms of accessing the development, it is assumed the majority (80%) will arrive via Stacey Street and Rickard Road with the remainder arriving via Jacobs Street and Rickard Road.

When egressing the site at the intersection of Rickard Road and Chapel Road, the distribution is expected to be evenly split in all directions. Right-turns will facilitate trips to the north and west (via Hume Highway and Stacey Street), while straight-ahead and left-turns will facilitate trips to all other directions.

Set-down distribution

For the set-down, it has been assumed all arrivals will be from Rickard Road (i.e. a westbound through movement at the intersection with Jacob Street).

When egressing all vehicles must turn left onto Jacob Street (via Civic Drive). A 50/50 split has been assumed at the in terms of eastbound and westbound movements on Rickard Road.

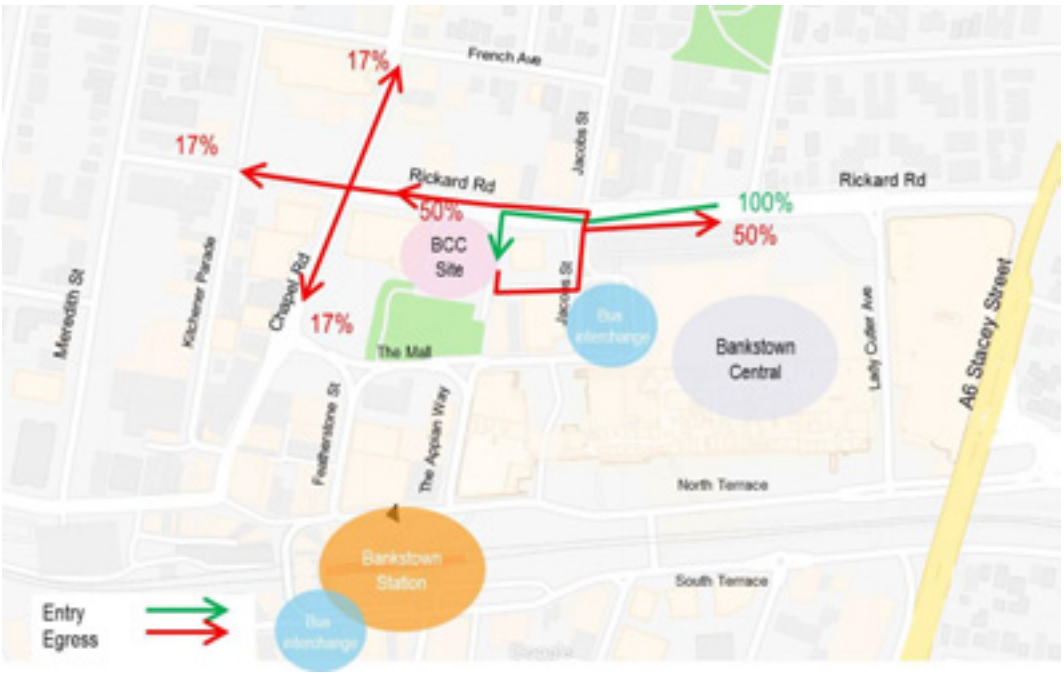


Figure 38 Set-down access and egress routes and distribution

5.5.4 Traffic modelling

The surveyed intersections were assessed using SIDRA 8 Isolated Intersection software. The performance of the identified intersections is important to understand the traffic capacity of the intersections adjacent to the site as well as the wider road network. This performance has been assessed in terms of the following three factors for each intersection:

- Degree of Saturation (DoS)
- Average Delay (seconds per vehicle)
- Level of Service (LoS)

In urban areas, the traffic capacity of the major road network is generally a function of the performance of key intersections. This performance is quantified in terms of Level of Service (LoS) and is based on the average delay per vehicle. LoS ranges from A = very good to F = unsatisfactory (see Table 11).

Table 11 Level of service criteria for intersections

Level of Service	Average delay (seconds)	Description
A	Less than 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity. At signals, incidents will cause excessive delays. Roundabouts require other control mode
F	Greater than 71	Unsatisfactory with excessive queuing

Another common measure of intersection performance is the degree of saturation (DoS), which provides an overall measure of the capability of the intersection to accommodate additional traffic. A DoS of 1.0 indicates that an intersection is operating at capacity. The desirable maximum degree of saturation for an intersection is 0.9.

The following peak time periods have been modelled:

- Morning peak (AM): 8:30am to 9:30am
- Evening peak (PM) 4:45pm to 5:45pm

To estimate what level of traffic growth should be applied, traffic modelling undertaken as part of the draft Bankstown Complete Streets project has been considered. The modelling report provides existing and future mid-block volumes at key locations in the CBD. The location nearest the BCC for which traffic volumes are provided is along Rickard Road (50m west of Chapel Road), the results of which are presented in Table 12.

Table 12 Future mid-block traffic volumes (Rickard Road)

Time period	Existing			Future			Growth
	EB	WB	**Total**	EB	WB	**Total**	
AM Peak	916	480	**1,396**	993	439	**1,432**	+2.5%
PM Peak	928	1144	**2,072**	787	1000	**1,787**	-13%

As seen in Table 12, modest traffic growth in the AM peak is estimated on Rickard Road (eastbound) while a reduction in traffic volumes is estimated in the PM peak. For assessment purposes, a 2.5% growth rate has been applied to the AM peak while no change has been applied to the PM peak.

The traffic modelling has therefore considered the following scenarios:

- Existing conditions; and
- Future traffic conditions – including the full development of the site and traffic growth.

A summary of the modelling results are presented in Table 13, with more detailed SIDRA results appended to this report as **Appendix B**. Traffic signal timing was based on observed cycle times during peak periods.

Table 13 Traffic modelling results

Intersection	Peak Hour	Modelled year	Level of service	Average Delay (sec)	Degree of Saturation
Rickard Road and Chapel Road	AM Peak	Existing	C	21	0.72
		Future	B	20	0.79
	PM Peak	Existing	C	25	1.02
		Future	C	25	1.02
Rickard Road and Jacobs Street	AM Peak	Existing	C	22	0.92
		Future	C	34	1.12
	PM Peak	Existing	C	25	0.83
		Future	C	26	0.87

The modelling indicates that, overall, the intersections will continue to operate with a satisfactory Level of Service as a result of the development and no road network upgrades are required.

While certain movements such as the right-turn from Rickard Road to Chapel Road are at capacity in the existing PM peak, this is not the result of additional development traffic.

Movements into the right-turn lane on Rickard Road (to Chapel Road) from the development driveway may be difficult in the PM peak hour due to queuing, however development traffic attempting that movement are low (approximately 8 vehicles in the PM peak hour), with alternative routes also available via Meredith Street to the west also.

Based on the above analysis and findings from the traffic modelling, the impact of the development on the surrounding road network is relatively low and manageable and can be expected to improve with the draft Bankstown Complete Streets project proposals.

5.6 Public transport assessment

As noted in Section 5.2, it is anticipated that most University / Education space staff and students will travel by public transport to the BCC. A summary of the peak period demand for bus and train/metro services is provided in Table 14.

Table 14 Anticipated public transport usage

Mode	AM Peak	PM Peak
Bus	368	259
Train/Metro	367	260

5.6.1 Bus capacity

A summary of the number of buses serving Bankstown during peak periods is presented in Table 15. For assessment purposes, the capacity of inbound services (in the AM peak) and outbound services (in the PM peak) only have been considered.

Table 15 Estimated bus capacity

Terminus	Buses per hour per direction	Capacity per direction[3]	Capacity of AM inbound and PM outbound services only
Bankstown Station	21	1,449	1,449
Bankstown Central	15	1,035	1,035
Through Routes	22	1,518	3,036
Total	**58**	-	**5,520**

The anticipated demand for bus services is approximately 7% of capacity during the AM peak and 5% during the PM peak.

Analysis of TfNSW bus occupancy data for a typical day[4] has been undertaken. The data categorises the occupancy of buses into the following three categories along any route:

- Many seats available
- Few seats available
- Standing room only

Along routes towards Bankstown during the AM peak period, no capacity issues were noted with most services having 'many seats available'.

For services departing Bankstown during the PM peak, only the M91 (towards Parramatta) was categorised as having 'standing room only', with all other services having 'many seats' or 'few seats' available.

Based on the above analysis, there is sufficient capacity on the bus network to accommodate demand from the BCC.

5.6.2 Train/Metro

Metro services will operate every 4 minutes during peak periods. With each metro train having a capacity for 1,100 passengers, there will be a significant amount of capacity available.

In addition to Metro services, train services will continue to operate regularly during peak times to and from Lidcombe and Liverpool.

[3] Assumed capacity of 69 people per bus
[4] Based on analysis of August 2016 data

5.7 Cycling assessment

As noted in Section 5.2, it is targeted that 5% of tenants, staff and students will travel by bike to the BCC. This would result in 57 bicycle trips during the AM peak period.

The draft Bankstown Complete Streets project identifies a future bike network that will result in the provision of a bike paths along the main arteries leading into Bankstown, along with new separated bikes paths within the CBD. This new, convenient and safe cycling infrastructure along with the proposed end of trip facilities at the BCC will be the most significant factors in achieving the target cycling mode share.

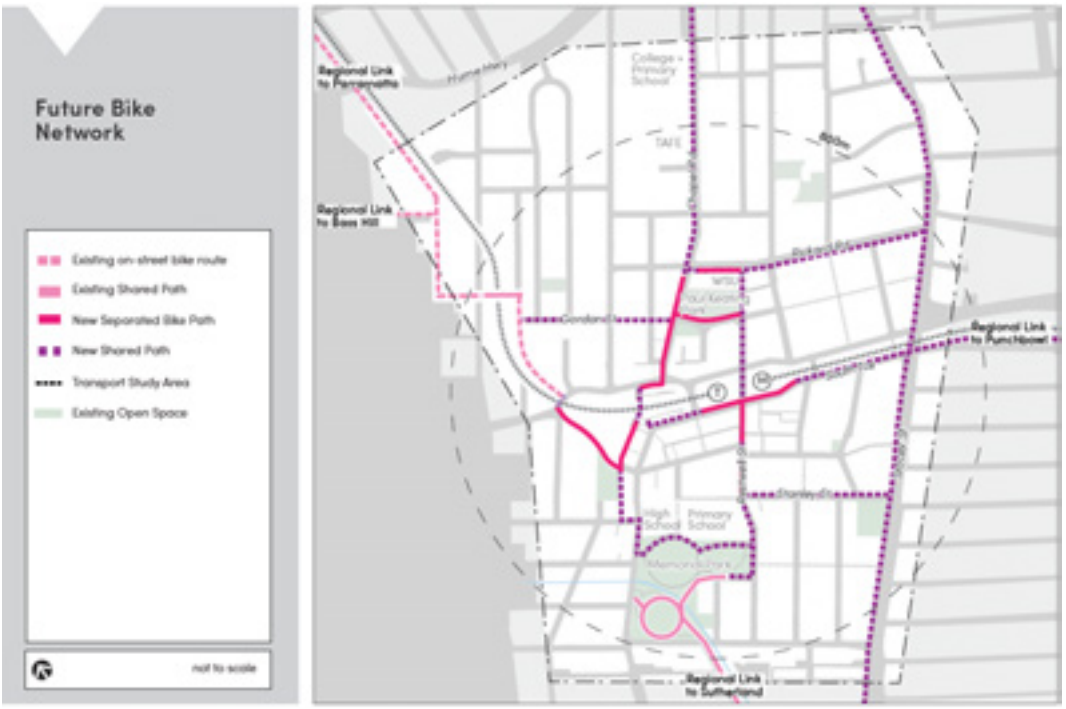


Figure 39 Draft Bankstown Complete Streets project – Future Bike Network

The provision of approximately 32 bicycle parking spaces in the Level 1 basement along with approximately 100 spaces in the surrounding public domain will meet the demand for cycle parking for the staff and students over the course of the day.

5.8 Pedestrian assessment

As noted in Section 5.2, it is estimated that there will be 156 trips by foot during the AM peak hour. In addition to trips where the primary mode of travel is by foot, trips from the Metro/train station (367 trips) and bus services (368 trips) will also result in increased activity on the surrounding footpaths.

The draft Bankstown Complete Streets project identifies a north-south activity spine which creates a pedestrian friendly environment between the new Metro station and the BCC.

By converting The Appian Way to a low speed, shared zone and by improving the pedestrian crossings at the North Terrace and The Mall, the pedestrian route between the Metro/train station and southern bus interchange will be of a high quality and be able to accommodate the anticipated demand.

Pedestrian trips between the BCC and the northern bus interchange will also benefit from the above improvements along with the proposed changes to Jacob Street.

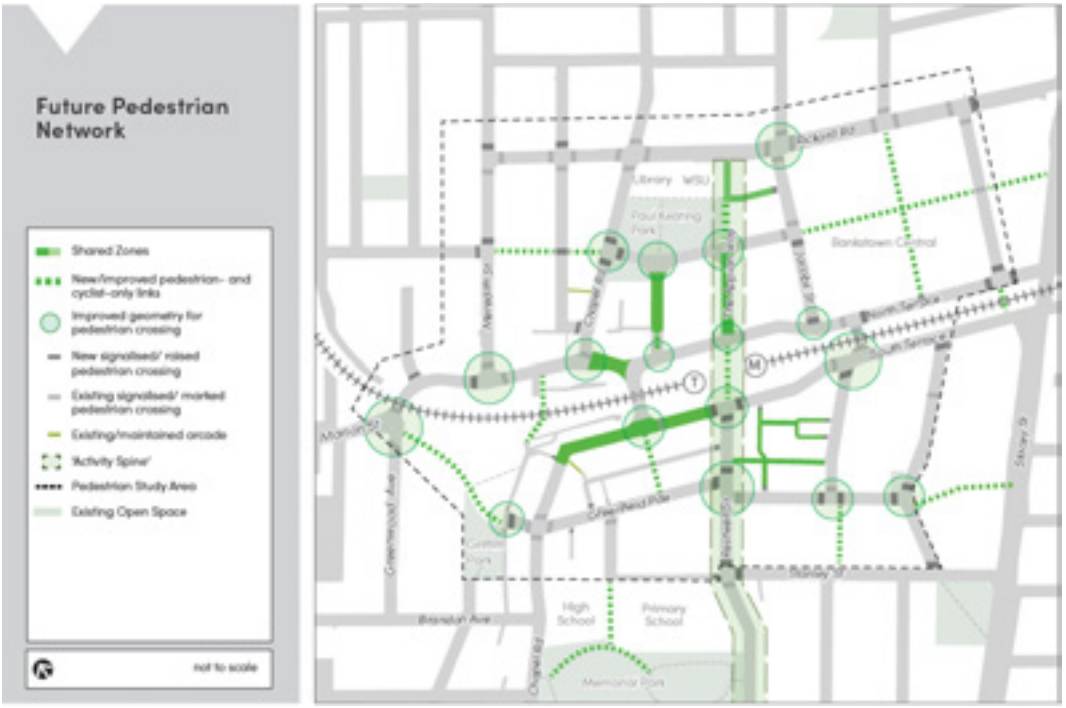


Figure 40 Draft Bankstown Complete Streets project – Future Pedestrian Network

The pedestrian network improvements identified as part of the draft Bankstown Complete Streets project will ensure there is sufficient space for pedestrian along the key routes between the BCC and the Metro/train station and the bus interchanges.

5.9 Parking assessment

5.9.1 BCC Car Park

A profile of vehicles entering and exiting the proposed BCC car park is provided in Table 16. It shows there is demand for 94 parking spaces during the day which aligns with the proposed capacity of the car park.

Table 16 BCC car park profile

Time	Arrival	Departure	Accumulation
Before 7	3	0	3
7-8	17	0	19
8-9 (AM Peak)	48	0	67
9-10	24	0	91
10-11	3	0	94
11-12	0	0	94
12-13	0	0	94
13-14	0	0	94
14-15	0	2	92
15-16	0	5	87
16-17	0	26	61
17-18 (PM Peak)	0	44	17
18-19	0	14	3
After 19	1	4	0

5.9.2 Other parking

No parking is proposed to be provided on-site for students. Any students wishing to drive will need to utilise existing on-street or off-street public or private parking spaces within Bankstown. The draft Bankstown Complete Streets project estimates that there are 7,500 – 8,000 such spaces in the CBD.

Based on a 5% student car driver mode share and a maximum student population of 2,000 at any one time, demand for parking is not expected to exceed 100 spaces, representing less than 1.5% of the parking provision in the Bankstown CBD.

Limiting access to car parking as a way of encouraging people to travel by other modes is a key feature of the draft Bankstown Complete Streets project. Key parking management features of the draft Bankstown Complete Streets project include:

- minimizing private development parking in the CBD (especially those within 400m of the train station); and
- the introduction of parking controls which encourage a higher turnover of public parking spaces (e.g. 4hr time limits)

In this context, it is appropriate (and consistent with the draft Bankstown Complete Streets project) to not provide on-site parking for students as way to encourage students to use more sustainable modes of travel.

Any initial demand can be accommodated for in the public and private parking spaces in the CBD.

6 Sustainable transport initiatives

6.1 Workplace and green travel plan

The University is committed to encouraging more equitable and sustainable modes of transport. Limiting the amount of on-site parking is an important strategy in terms of encouraging University / Education space staff and students to use sustainable modes of travel. This is consistent with the draft Bankstown Complete Streets project which seeks to reduce the car dependency of the CBD.

The Sydney Metro will provide a step-change in service provision, with faster and more reliable journey times, with trains every 4-minutes in both directions. It is expected that majority of trips will be taken by public transport, with the Metro having a significant role in serving the anticipated travel demand. It is also expected to influence where people, especially students, choose to live. Locations within walking distance of high quality mass transit are far more desirable than car dependent locations.

A comprehensive Green Travel Plan will be prepared for the BCC. Key measures that will be put in place to support sustainable transport initiatives include:

- The appointment of a travel plan co-ordinator to promote the uptake of public transport, walking and cycling by staff and students travelling to and from BCC;
- Limited provision of on-site parking;
- The provision of high-quality and secure bike parking and end of trip facilities; and
- Undertaking travel surveys

As previously set out, the limited provision of on-site parking is recommended for the BCC owing to:

- The excellent accessibility of the site by public transport, with the Metro operational from 2024;
- The vision for the CBD as set out in the draft Bankstown Complete Streets project
- The anticipated growth in dwellings in the CBD;
- The recent WSU experience of relocating to CBD campuses at Parramatta and Liverpool which resulted in users mainly travelling by public transport; and
- The reduced demand for parking that students generate when compared to staff in a typical commercial development.

It is noted that while some staff and students may decide to drive and use existing public parking spaces in the surrounding Bankstown area, the majority will travel by sustainable travel modes.

It should be noted that WSU is part of the Councils Transport Advisory Committee and would welcome the opportunity to provide further input into a

CBD Car Parking Strategy (potentially monitoring student travel habits once the campus is open) and the finalisation of the draft Bankstown Complete Streets plan, focusing on pedestrian connectivity from the new campus to public transport stops and more broadly throughout the Bankstown CBD.

Additionally, WSU would welcome the opportunity to provide ongoing contributions into DCP updates, the Public Domain Technical Manual and Street Design Manual, and the Transport Working Group and Active Transport Program

7 Summary

This Transport Management and Accessibility Plan has prepared in support of the Planning Proposal for the Bankstown City Campus Development. It provides a description of the transport features of the proposed development and assesses the associated impacts.

Key findings from the report are:

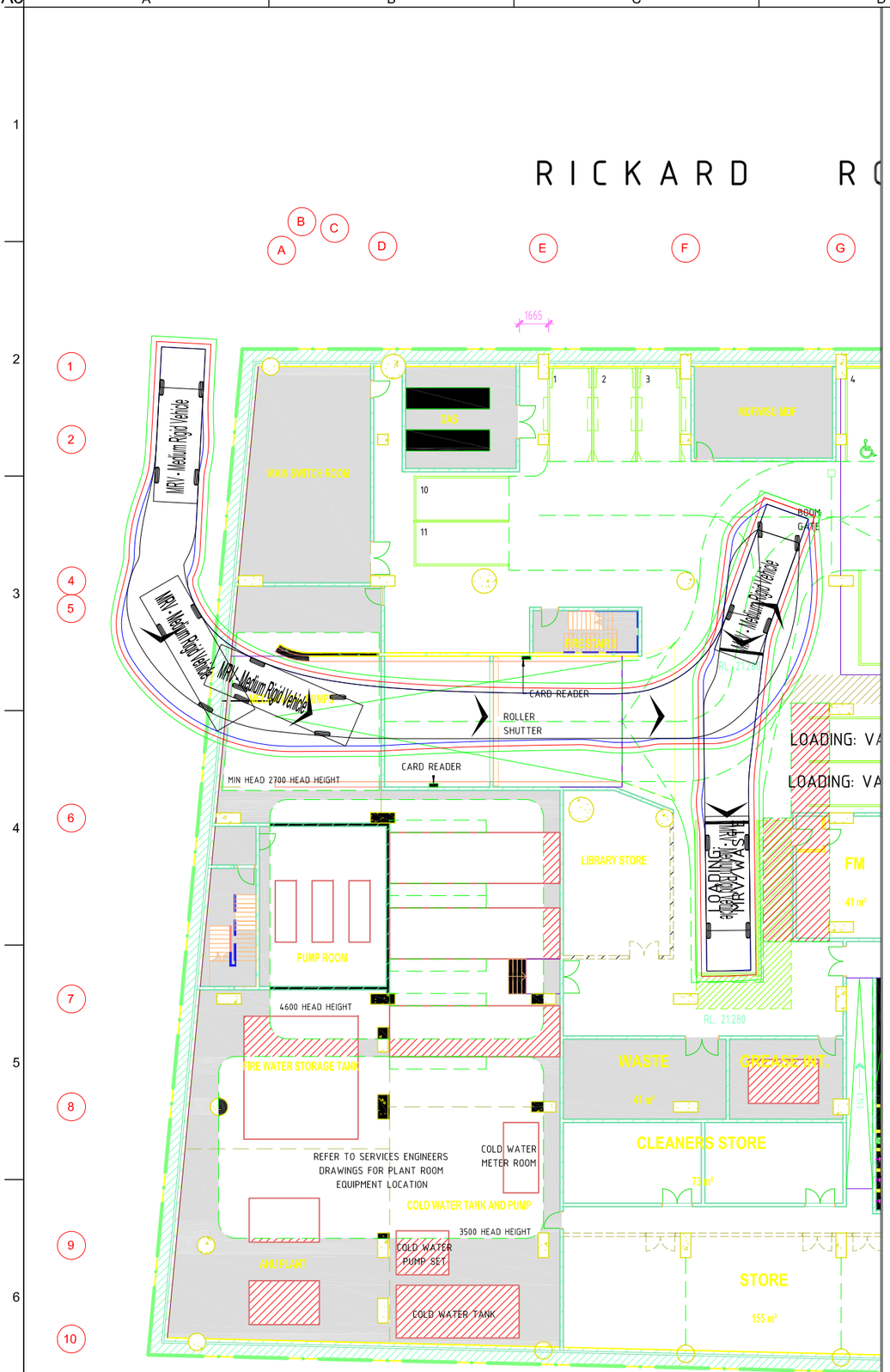
- The area is well serviced by public transport with significant capacity available on existing and planned public transport services;
- Bankstown is a bus hub and is served by up to 58 services per direction during peak times. The train station is within 400m of the site, with the Sydney Metro becoming operational from 2024;
- The Sydney Metro will be a step-change in terms of public transport provision, with faster and more reliable services every 4 minutes per direction during peak times. This will increase the accessibility of the BCC by public transport and significantly reduce its car dependency. It will also allow sustainable and equitable travel habits to form from day one as envisioned in the draft Bankstown Complete Streets project;
- The draft Bankstown Complete Streets project has been developed in response to growing traffic congestion issues and looks to promote active transport and public transport as a way to move large volumes of people (by mass transit) safely to and within the CBD. The BCC will be aligned with this strategy through the provision of a limited amount of on-site car parking and encouraging other sustainable forms of travel;
- The Appian Way is to be redesigned as a shared zone with provision for short-term drop-off and pick-up. This is consistent with the draft Bankstown Complete Streets project which identified The Appian Way as a shared zone. Approximately 16 existing parking spaces on The Appian Way will be lost, however the impact will be negligible considering other spaces are available in the CBD in addition to the upcoming improvements to the public transport, pedestrian and bicycle network;
- Public domain improvements on Rickard Road are also proposed, including a widened footpath that enables the provision of a shared path on the southern side of the road in the future;
- Potential to provide a loading zone on Rickard Road following the relocation of the Appian Way driveway to the east;
- The BCC will have 94 car parking spaces (including 4 DDA bays) and a loading dock (3 bays) located in a basement car park. Access to the basement car park will be off the existing access road along the western boundary, also used by the Bankstown Library and Knowledge Centre.
- End of trip facilities and bike parking will be provided within the basement. Approximately 32 bike spaces will be provided within the basement, with up to 100 bike spaces placed within the public domain of the site.

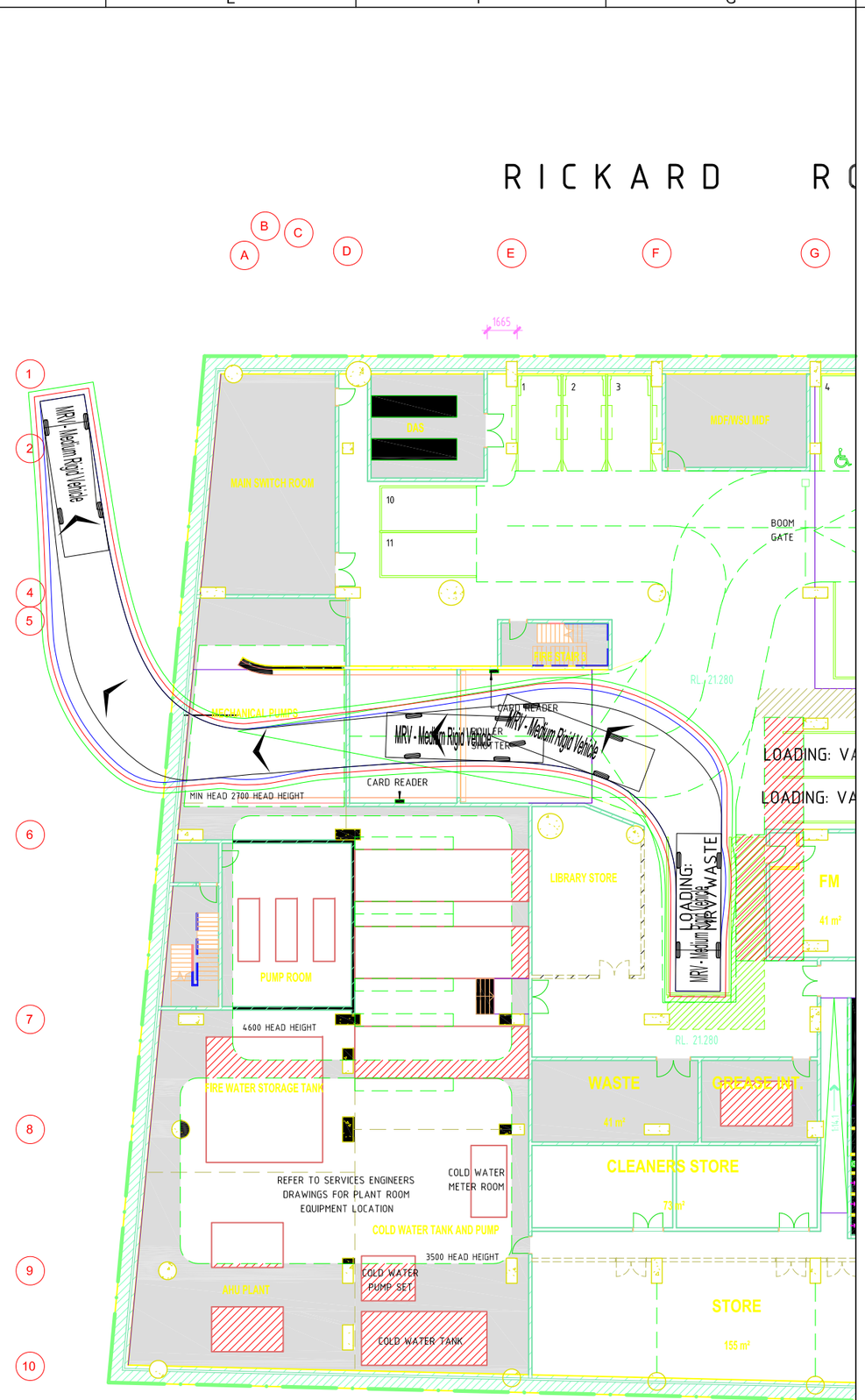
- The assessment found that the development car park is likely to generate 53 vehicle trips in the AM peak hour and 49 vehicle trips in the PM peak hour. The Appian Way drop-off was assumed to generate 51 movements in the AM peak period and 35 in the PM peak period;
- The impact of this to the surrounding intersections at peak times was found to be manageable, with the SIDRA traffic modelling finding they will continue to operate at a satisfactory level of service; and
- WSU will prepare a Sustainable Travel Plan for the campus and would welcome the opportunity to provide contributions to the various transport and planning strategies being prepared for the Bankstown CBD.

Appendix A

Swept path analysis

A3

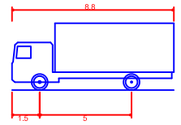




Legend

- Body Envelope
- 300mm Envelope
- 600mm Envelope
- Wheel Envelope

Design Vehicle(s)



MRV - Medium Rigid Vehicle

Overall Length	8.800m
Overall Width	2.500m
Overall Body Height	3.633m
Min Body Ground Clearance	0.428m
Track Width	2.500m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	10.000m

Issue	Date	By	Chkd	Appd
B	15/03/19	JF	JF	JF
A	3 /12/18	JF	JF	JF

For Information

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Client
WSU

Job Title
WSU Bankstown Campus

Drawing Title
MRV Turning Paths

Scale at A3
1:300

Discipline
Transport

Drawing Status
For Information

Job No	Drawing No	Issue
263785-00	**SKT0014**	**B**

Do not scale

© Arup

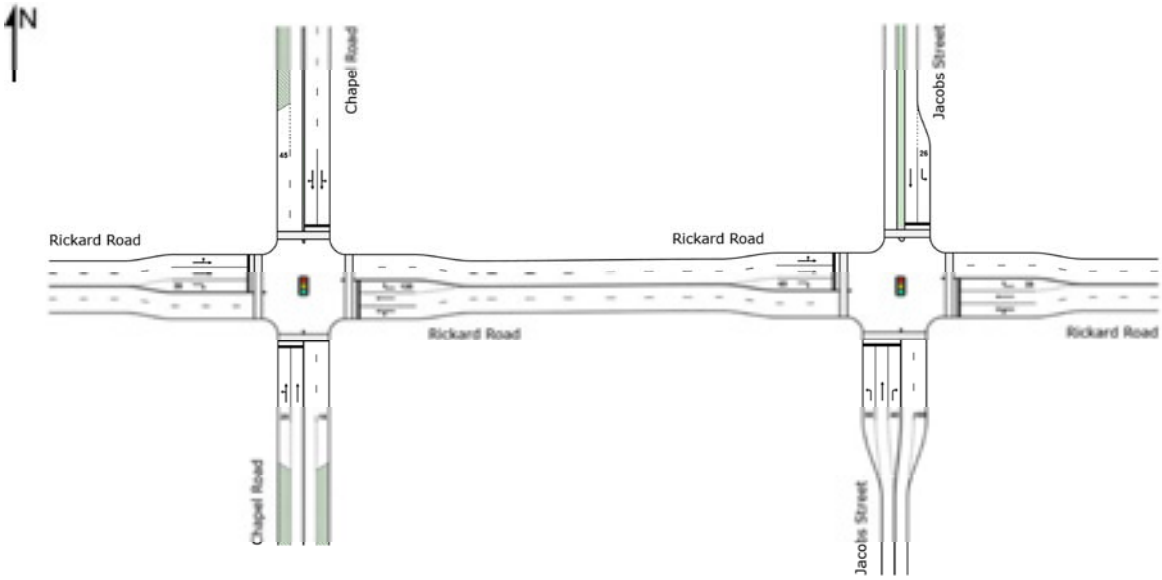
Appendix B

SIDRA Results

NETWORK LAYOUT

Network: N101 [AM_Ex]

New Network
Network Category: (None)



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
	NA	AM_Ex_Rickard Rd_Chapel Rd
	NA	AM_Ex_Rickard Rd_Jacobs St

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MOVEMENT SUMMARY

Site: [AM_Ex_Rickard Rd_Chapel Rd] **Network: N101 [AM_Ex]**

AM Existing
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 50 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chapel Road														
1	L2	146	0.0	146	0.0	0.158	22.1	LOS C	1.9	13.0	0.84	0.78	0.84	17.9
2	T1	253	0.8	253	0.8	0.494	17.6	LOS B	3.3	23.3	0.90	0.74	0.90	28.4
Approach		399	0.5	399	0.5	0.494	19.3	LOS B	3.3	23.3	0.88	0.75	0.88	23.8
East: Rickard Road														
4	L2	94	1.1	94	1.1	0.443	23.8	LOS C	2.4	16.9	0.83	0.72	0.83	28.9
5	T1	306	1.3	306	1.3	0.443	15.5	LOS B	2.4	16.9	0.78	0.66	0.78	32.0
6	R2	165	13.9	165	13.9	0.698	33.8	LOS C	2.7	21.4	1.00	0.84	1.10	21.9
Approach		565	5.0	565	5.0	0.698	22.2	LOS C	2.7	21.4	0.85	0.72	0.88	27.5
North: Chapel Road														
7	L2	176	13.6	176	13.6	0.200	12.7	LOS B	1.4	11.2	0.57	0.72	0.57	23.6
8	T1	264	1.1	264	1.1	0.705	21.1	LOS C	4.6	32.4	0.97	0.88	1.10	25.3
9	R2	39	0.0	39	0.0	0.705	26.7	LOS C	4.6	32.4	0.97	0.88	1.10	17.8
Approach		479	5.6	479	5.6	0.705	18.5	LOS B	4.6	32.4	0.82	0.82	0.90	24.0
West: Rickard Road														
10	L2	82	0.0	82	0.0	0.715	26.5	LOS C	4.9	34.6	0.97	0.89	1.11	21.2
11	T1	576	0.5	576	0.5	0.715	21.1	LOS C	5.0	35.5	0.97	0.88	1.10	13.1
12	R2	205	0.5	205	0.5	0.405	17.2	LOS B	2.2	15.7	0.85	0.78	0.85	24.9
Approach		863	0.5	863	0.5	0.715	20.7	LOS C	5.0	35.5	0.94	0.86	1.04	17.2
All Vehicles		2306	2.6	2306	2.6	0.715	20.4	LOS C	5.0	35.5	0.88	0.80	0.95	22.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P2	East Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P3	North Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P4	West Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		200	19.4	LOS B			0.88	0.88

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

MOVEMENT SUMMARY

Site: [AM_Fu_Rickard Rd_Chapel Rd] **Network: N101 [AM_Fu]**

AM Future
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 50 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chapel Road														
1	L2	159	0.0	159	0.0	0.192	12.4	LOS B	1.3	8.8	0.55	0.71	0.55	28.4
2	T1	259	0.8	259	0.8	0.556	18.8	LOS B	3.6	25.1	0.93	0.77	0.93	27.5
Approach		418	0.5	418	0.5	0.556	16.4	LOS B	3.6	25.1	0.78	0.74	0.78	27.8
East: Rickard Road														
4	L2	107	0.9	107	0.9	0.479	19.6	LOS B	2.4	16.8	0.76	0.70	0.76	31.9
5	T1	325	1.2	325	1.2	0.479	12.2	LOS B	2.4	16.8	0.70	0.59	0.70	35.3
6	R2	180	12.8	180	12.8	0.661	32.9	LOS C	2.9	22.8	1.00	0.84	1.07	22.2
Approach		612	4.6	612	4.6	0.661	19.6	LOS B	2.9	22.8	0.80	0.68	0.82	29.4
North: Chapel Road														
7	L2	180	13.3	180	13.3	0.204	12.7	LOS B	1.5	11.4	0.57	0.72	0.57	23.6
8	T1	270	1.1	270	1.1	0.789	24.4	LOS C	5.1	36.1	1.00	0.97	1.28	23.3
9	R2	40	0.0	40	0.0	0.789	29.9	LOS C	5.1	36.1	1.00	0.97	1.28	16.7
Approach		490	5.5	490	5.5	0.789	20.5	LOS C	5.1	36.1	0.84	0.88	1.02	22.6
West: Rickard Road														
10	L2	84	0.0	84	0.0	0.740	27.2	LOS C	5.2	36.5	0.98	0.91	1.15	20.9
11	T1	590	0.5	590	0.5	0.740	21.7	LOS C	5.2	36.6	0.98	0.91	1.14	12.9
12	R2	210	0.5	210	0.5	0.388	16.5	LOS B	2.2	15.7	0.83	0.78	0.83	25.5
Approach		884	0.5	884	0.5	0.740	21.0	LOS C	5.2	36.6	0.94	0.88	1.07	17.0
All Vehicles		2404	2.5	2404	2.5	0.789	19.7	LOS B	5.2	36.6	0.86	0.80	0.94	23.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P2	East Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P3	North Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P4	West Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		200	19.4	LOS B			0.88	0.88

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

MOVEMENT SUMMARY

Site: [AM_Ex_Rickard Rd_Jacobs St] **Network: N101 [AM_Ex]**

AM Existing
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 50 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Jacobs Street														
1	L2	105	26.7	105	26.7	0.561	30.8	LOS C	1.7	14.2	0.99	0.80	1.06	12.6
2	T1	40	0.0	40	0.0	0.171	22.7	LOS C	0.6	4.0	0.93	0.68	0.93	37.7
3	R2	87	14.9	87	14.9	0.432	29.8	LOS C	1.3	10.4	0.97	0.76	0.97	20.7
Approach		232	17.7	232	17.7	0.561	29.0	LOS C	1.7	14.2	0.97	0.77	1.00	21.5
East: Rickard Road														
4	L2	86	10.5	86	10.5	0.477	18.7	LOS B	4.0	28.3	0.80	0.71	0.80	30.4
5	T1	607	0.0	607	0.0	0.477	13.0	LOS B	4.1	28.8	0.80	0.70	0.80	25.3
6	R2	150	0.0	150	0.0	0.454	22.6	LOS C	2.0	13.9	0.87	0.79	0.87	37.2
Approach		843	1.1	843	1.1	0.477	15.3	LOS B	4.1	28.8	0.82	0.71	0.82	30.1
North: Jacobs Street														
7	L2	128	0.8	128	0.8	0.578	30.2	LOS C	2.0	14.0	0.99	0.81	1.06	33.2
8	T1	104	0.0	104	0.0	0.381	22.5	LOS C	1.5	10.6	0.95	0.74	0.95	37.8
Approach		232	0.4	232	0.4	0.578	26.8	LOS C	2.0	14.0	0.97	0.78	1.01	35.1
West: Rickard Road														
10	L2	32	0.0	32	0.0	0.331	17.9	LOS B	2.8	19.8	0.81	0.69	0.81	44.8
11	T1	455	0.0	455	0.0	0.331	15.2	LOS B	3.5	24.5	0.90	0.76	0.90	35.4
12	R2	242	10.7	242	10.7	0.924	44.1	LOS D	4.9	37.5	1.00	1.08	1.57	18.8
Approach		729	3.6	729	3.6	0.924	24.9	LOS C	4.9	37.5	0.93	0.86	1.12	28.3
All Vehicles		2036	3.8	2036	3.8	0.924	21.6	LOS C	4.9	37.5	0.89	0.78	0.97	29.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P2	East Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P3	North Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P4	West Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		200	19.4	LOS B			0.88	0.88

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

MOVEMENT SUMMARY

Site: [AM_Fu_Rickard Rd_Jacobs St] **Network: N101 [AM_Fu]**

AM Future
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 50 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Jacobs Street														
1	L2	142	19.7	142	19.7	0.623	30.1	LOS C	2.2	18.2	0.99	0.84	1.10	12.8
2	T1	41	0.0	41	0.0	0.150	21.5	LOS C	0.6	4.0	0.91	0.67	0.91	38.4
3	R2	114	11.4	114	11.4	0.474	28.8	LOS C	1.7	13.1	0.96	0.78	0.96	21.3
Approach		297	13.8	297	13.8	0.623	28.4	LOS C	2.2	18.2	0.97	0.79	1.02	21.0
East: Rickard Road														
4	L2	88	10.2	88	10.2	0.580	20.0	LOS C	4.9	34.9	0.86	0.76	0.86	29.3
5	T1	711	0.0	711	0.0	0.580	14.4	LOS B	5.1	35.5	0.86	0.75	0.86	23.9
6	R2	154	0.0	154	0.0	0.501	24.5	LOS C	2.1	15.0	0.91	0.79	0.91	36.1
Approach		953	0.9	953	0.9	0.580	16.5	LOS B	5.1	35.5	0.87	0.75	0.87	28.5
North: Jacobs Street														
7	L2	131	0.8	131	0.8	0.591	30.4	LOS C	2.0	14.4	0.99	0.81	1.07	33.1
8	T1	107	0.0	107	0.0	0.392	22.6	LOS C	1.6	10.9	0.95	0.74	0.95	37.8
Approach		238	0.4	238	0.4	0.591	26.9	LOS C	2.0	14.4	0.97	0.78	1.02	35.0
West: Rickard Road														
10	L2	33	0.0	33	0.0	0.358	19.5	LOS B	3.1	21.7	0.86	0.73	0.86	43.7
11	T1	466	0.0	466	0.0	0.358	16.5	LOS B	3.6	25.5	0.94	0.78	0.94	34.3
12	R2	247	10.5	247	10.5	1.120	149.9	LOS F	11.5	87.6	1.00	1.78	3.44	7.1
Approach		746	3.5	746	3.5	1.120	60.8	LOS E	11.5	87.6	0.95	1.11	1.76	16.1
All Vehicles		2234	3.4	2234	3.4	1.120	34.0	LOS C	11.5	87.6	0.92	0.88	1.20	22.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P2	East Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P3	North Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P4	West Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		200	19.4	LOS B			0.88	0.88

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

MOVEMENT SUMMARY

Site: [PM_Ex_Rickard Rd_Chapel Rd] **Network: N101 [PM_Ex]**

PM Existing
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 50 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chapel Road														
1	L2	160	0.6	160	0.6	0.361	23.4	LOS C	2.1	14.7	0.87	0.78	0.87	20.5
2	T1	229	0.0	229	0.0	0.452	17.4	LOS B	3.0	20.9	0.88	0.73	0.88	28.6
Approach		389	0.3	389	0.3	0.452	19.8	LOS B	3.0	20.9	0.88	0.75	0.88	25.0
East: Rickard Road														
4	L2	137	2.9	137	2.9	0.710	25.4	LOS C	4.8	34.3	0.93	0.84	1.00	28.1
5	T1	561	0.9	561	0.9	0.710	16.2	LOS B	4.8	34.3	0.87	0.78	0.94	31.4
6	R2	263	10.3	263	10.3	1.017	74.4	LOS E	7.8	59.8	1.00	1.44	2.47	12.7
Approach		961	3.7	961	3.7	1.017	33.5	LOS C	7.8	59.8	0.92	0.97	1.36	21.8
North: Chapel Road														
7	L2	234	12.8	234	12.8	0.573	24.8	LOS C	3.3	25.4	0.93	0.81	0.94	14.9
8	T1	345	0.0	345	0.0	0.840	25.8	LOS C	6.7	46.8	1.00	1.04	1.37	22.6
9	R2	37	0.0	37	0.0	0.840	31.4	LOS C	6.7	46.8	1.00	1.04	1.37	16.2
Approach		616	4.9	616	4.9	0.840	25.8	LOS C	6.7	46.8	0.97	0.95	1.21	19.6
West: Rickard Road														
10	L2	53	0.0	53	0.0	0.242	13.1	LOS B	2.0	13.9	0.60	0.56	0.60	33.3
11	T1	412	0.7	412	0.7	0.242	7.7	LOS A	2.0	14.2	0.60	0.53	0.60	25.4
12	R2	126	0.0	126	0.0	0.565	29.9	LOS C	2.0	13.7	0.99	0.80	1.05	18.0
Approach		591	0.5	591	0.5	0.565	13.0	LOS B	2.0	14.2	0.68	0.59	0.70	22.9
All Vehicles		2557	2.7	2557	2.7	1.017	24.8	LOS C	7.8	59.8	0.87	0.84	1.10	21.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P2	East Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P3	North Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P4	West Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		200	19.4	LOS B			0.88	0.88

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

MOVEMENT SUMMARY

Site: [PM_Fu_Rickard Rd_Chapel Rd] **Network: N101 [PM_Fu]**

PM Future
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 50 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chapel Road														
1	L2	160	0.6	160	0.6	0.393	24.4	LOS C	2.1	15.1	0.90	0.78	0.90	20.0
2	T1	229	0.0	229	0.0	0.489	18.4	LOS B	3.1	21.6	0.91	0.75	0.91	27.8
Approach		389	0.3	389	0.3	0.489	20.9	LOS C	3.1	21.6	0.90	0.76	0.90	24.3
East: Rickard Road														
4	L2	158	2.5	158	2.5	0.699	23.8	LOS C	4.8	34.4	0.89	0.81	0.95	29.0
5	T1	582	0.9	582	0.9	0.699	13.9	LOS B	4.8	34.4	0.81	0.72	0.86	33.6
6	R2	284	9.5	284	9.5	1.022	67.2	LOS E	8.2	62.0	1.00	1.36	2.27	13.8
Approach		1024	3.5	1024	3.5	1.022	30.2	LOS C	8.2	62.0	0.87	0.91	1.26	23.2
North: Chapel Road														
7	L2	234	12.8	234	12.8	0.625	26.3	LOS C	3.4	26.6	0.95	0.84	1.02	14.2
8	T1	345	0.0	345	0.0	0.918	35.2	LOS D	7.9	55.6	1.00	1.19	1.71	18.4
9	R2	37	0.0	37	0.0	0.918	40.8	LOS D	7.9	55.6	1.00	1.19	1.71	13.7
Approach		616	4.9	616	4.9	0.918	32.2	LOS C	7.9	55.6	0.98	1.06	1.45	16.9
West: Rickard Road														
10	L2	53	0.0	53	0.0	0.232	12.5	LOS B	1.9	13.4	0.58	0.54	0.58	34.1
11	T1	412	0.7	412	0.7	0.232	7.1	LOS A	1.9	13.6	0.58	0.51	0.58	26.6
12	R2	126	0.0	126	0.0	0.565	29.9	LOS C	2.0	13.7	0.99	0.80	1.05	18.0
Approach		591	0.5	591	0.5	0.565	12.5	LOS B	2.0	13.7	0.67	0.57	0.68	23.4
All Vehicles		2620	2.7	2620	2.7	1.022	25.3	LOS C	8.2	62.0	0.86	0.85	1.12	21.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P2	East Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P3	North Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P4	West Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		200	19.4	LOS B			0.88	0.88

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

MOVEMENT SUMMARY

Site: [PM_Ex_Rickard Rd_Jacobs St] **Network: N101 [PM_Ex]**

PM Existing
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 50 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Jacobs Street														
1	L2	227	15.4	227	15.4	0.754	30.6	LOS C	3.7	29.4	1.00	0.93	1.26	12.7
2	T1	72	0.0	72	0.0	0.205	19.7	LOS B	1.0	6.7	0.89	0.68	0.89	39.6
3	R2	148	6.1	148	6.1	0.462	26.7	LOS C	2.1	15.5	0.94	0.78	0.94	22.4
Approach		447	9.8	447	9.8	0.754	27.5	LOS C	3.7	29.4	0.96	0.84	1.09	21.7
East: Rickard Road														
4	L2	91	9.9	91	9.9	0.773	27.1	LOS C	6.4	45.5	0.98	0.94	1.17	24.4
5	T1	722	0.0	722	0.0	0.773	21.3	LOS C	6.4	45.5	0.97	0.93	1.17	18.7
6	R2	142	0.0	142	0.0	0.599	28.9	LOS C	2.2	15.3	0.97	0.83	1.06	33.9
Approach		955	0.9	955	0.9	0.773	23.0	LOS C	6.4	45.5	0.97	0.92	1.15	23.4
North: Jacobs Street														
7	L2	236	0.0	236	0.0	0.794	32.1	LOS C	4.0	27.8	1.00	0.96	1.34	32.4
8	T1	86	0.0	86	0.0	0.245	19.9	LOS B	1.2	8.1	0.90	0.69	0.90	39.5
Approach		322	0.0	322	0.0	0.794	28.8	LOS C	4.0	27.8	0.97	0.88	1.22	34.0
West: Rickard Road														
10	L2	32	0.0	32	0.0	0.469	26.6	LOS C	3.7	26.1	1.00	0.83	1.00	39.1
11	T1	475	0.6	475	0.6	0.469	19.6	LOS B	3.7	26.1	0.98	0.82	0.98	31.8
12	R2	130	24.6	130	24.6	0.830	37.0	LOS D	2.3	19.3	1.00	0.90	1.32	20.8
Approach		637	5.5	637	5.5	0.830	23.5	LOS C	3.7	26.1	0.99	0.83	1.05	29.4
All Vehicles		2361	3.7	2361	3.7	0.830	24.8	LOS C	6.4	45.5	0.97	0.88	1.12	27.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P2	East Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P3	North Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P4	West Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		200	19.4	LOS B			0.88	0.88

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

MOVEMENT SUMMARY

Site: [PM_Fu_Rickard Rd_Jacobs St] **Network: N101 [PM_Fu]**

PM Future
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 50 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Jacobs Street														
1	L2	246	14.2	246	14.2	0.811	32.5	LOS C	4.2	33.2	1.00	0.98	1.38	12.1
2	T1	72	0.0	72	0.0	0.205	19.7	LOS B	1.0	6.7	0.89	0.68	0.89	39.6
3	R2	165	5.5	165	5.5	0.513	26.9	LOS C	2.4	17.4	0.95	0.79	0.95	22.3
Approach		483	9.1	483	9.1	0.811	28.7	LOS C	4.2	33.2	0.97	0.87	1.16	20.9
East: Rickard Road														
4	L2	91	9.9	91	9.9	0.821	29.3	LOS C	7.2	51.6	0.99	1.01	1.28	23.2
5	T1	761	0.0	761	0.0	0.821	23.5	LOS C	7.2	51.6	0.98	1.00	1.28	17.5
6	R2	142	0.0	142	0.0	0.599	28.9	LOS C	2.2	15.3	0.97	0.83	1.06	33.9
Approach		994	0.9	994	0.9	0.821	24.8	LOS C	7.2	51.6	0.98	0.97	1.25	22.2
North: Jacobs Street														
7	L2	236	0.0	236	0.0	0.794	32.1	LOS C	4.0	27.8	1.00	0.96	1.34	32.4
8	T1	86	0.0	86	0.0	0.245	19.9	LOS B	1.2	8.1	0.90	0.69	0.90	39.5
Approach		322	0.0	322	0.0	0.794	28.8	LOS C	4.0	27.8	0.97	0.88	1.22	34.0
West: Rickard Road														
10	L2	32	0.0	32	0.0	0.469	26.6	LOS C	3.7	26.1	1.00	0.83	1.00	39.1
11	T1	475	0.6	475	0.6	0.469	19.6	LOS B	3.7	26.1	0.98	0.82	0.98	31.8
12	R2	130	24.6	130	24.6	0.872	37.8	LOS D	2.3	19.5	1.00	0.92	1.42	20.5
Approach		637	5.5	637	5.5	0.872	23.7	LOS C	3.7	26.1	0.99	0.84	1.07	29.3
All Vehicles		2436	3.6	2436	3.6	0.872	25.8	LOS C	7.2	51.6	0.98	0.91	1.18	26.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P2	East Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P3	North Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
P4	West Full Crossing	50	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		200	19.4	LOS B			0.88	0.88

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