3.0 Local Traffic and Transport context

This chapter presents information related to the local transport context for the study area, including the station precincts, defined as an area located within a 10 minute walk and up to a 2.5 km cycling distance from the relevant station. It provides a snapshot of the local transport context of all stations with a focus on the local characteristics, the station interchange and the area's role and function, the current modes of travel used to access the station, and the infrastructure and services that currently facilitate access to the station. The transport choices of the resident populations adjacent to each of the stations is described along with current parking provision and the walking, cycling and public transport connections to and from stations. Details of the current traffic flows on the network and intersection functionality are presented later in this Technical Paper (Chapter 5 and Chapter 6).

Parking surveys conducted in October 2016 followed by verification inspections in November 2016 were used for the analysis on the existing parking capacity and utilisation for the area surrounding each station. Parking at each station was inspected after the AM peak on two typical weekdays and within a 400m radius to reflect an appropriate walking distance to the station. Parking was analysed according to the following four categories:

- all day, unrestricted off-street car parking areas
- time restricted off-street car parking areas
- all day, unrestricted on-street car parking areas
- time restricted on-street car parking areas.

It is assumed that unrestricted parking would be used by people who intend to park and ride. A subset of unrestricted parking is "dedicated" commuter parking which refers to unrestricted parking on RailCorp land, or parking which is signed as commuter parking such as the commuter car park on Floss Street at Hurlstone Park Station.

Table 3.1 provides a summary of the existing overall parking capacity, average utilisation, the number of formal and informal bike parking, taxi, kiss and ride and dedicated commuter spaces at each station.

Table 3.1 Parking Analysis Summary

	Marrickville	Dulwich Hill	Hurlstone Park	Canterbury	Campsie	Belmore	Lakemba	Wiley Park	Punchbowl	Bankstown
Existing formal bike parking capacity (bikes)	8	10	12	4	10	5	8	4	12	32
Demand (cycles)[4]	4	10	2	5	28	4	8	6	3	13
Bike parking utilisation	50%	100%	17%	125%	280%	80%	100%	150%	25%	41%
Existing Dedicated Commuter spaces	0	55	23	32	138	56	138	0	137	147

[4] Cycle demand was assessed based on the observed usage of bike parking at stations provided by TfNSW.

	Marrickville	Dulwich Hill	Hurlstone Park	Canterbury	Campsie	Belmore	Lakemba	Wiley Park	Punchbowl	Bankstown
Existing Kiss & Ride spaces	3	3	0	0	4	0	1	0	0	4
Existing Taxi Bays	1	0	0	0	6	4	3	0	2	10
On and off-street parking capacity	1519	1332	1208	849	1539	1220	1498	746	1123	1696
Parking Utilisation (%)	81%	74%	55%	68%	90%	78%	85%	63%	84%	98%

3.1 Study area overview

3.1.1 Local rail network

The T2 Inner West and South Line and the T3 Bankstown Line facilitate travel from the inner and outer suburbs of southwest Sydney to and from the CBD. These rail lines call at Sydenham Station and share tracks through to the Sydney CBD. This increases the strategic importance of Sydenham Station as a local hub but downstream capacity places a constraint on the frequency and timing of train movements from the west and southwest.

The stations within the study area are located in high activity areas and are located in the middle of local centres. The areas away from the stations are comprised of low and medium density residential housing.

While network demand across Sydney is expected to increase by 41 per cent by 2026, the growth in demand for rail travel into the CBD alone is expected to increase by 31 per cent by 2026. The T2 and T3 lines are forecast to experience significant growth in passenger demand into the CBD by 2026:

- T2 Inner West and South Line – Increase of 5,200 passengers per hour (36 per cent)
- T3 Bankstown Line – Increase of 4,900 passengers per hour (58 per cent).

Added pressure is expected on Sydenham station as a result of the improved frequency and quality of service for connecting services after the opening of the Sydney Metro Northwest and the Chatswood to Sydenham portion of Sydney Metro City & Southwest. Additional capacity would be enabled through the Sydenham to Chatswood component of Metro, and this project would enable the utilisation of the capacity provided.

The existing service details for the T3 Bankstown Line for stations within the project area are provided in **Table 3.2**, with the temporal span for each station in

Table 3.3.

Table 3.2 Service Details for the T3 Bankstown Line (Sydney Trains 2016)

Direction	Service Frequency[5, 6]	
	Weekday	Weekend
T3 Bankstown Line towards the CBD	Peak≈8 mins Late PM= 30 mins Other= 15 mins	0800-22:30= 15 mins Other= 30 mins
T3 Bankstown Line towards Bankstown	Peak≈9 mins Late PM= 30 mins Other =15 mins	07:15-22:15= 15 mins Other= 30 mins

Table 3.3 Temporal span for stations on T3 Bankstown Line (Sydney Trains 2016)

Station	Temporal Span[7]	
	Weekday	Weekend
Marrickville (towards City)	5:03am to 23:36pm	5:28am to 00:28am
Marrickville (towards Bankstown)	4:49am to 00:38am	4:51am to 01:21am
Dulwich Hill (towards City)	5:00am to 23:33pm	5:26am to 00:26am
Dulwich Hill (towards Bankstown)	4:52am to 00:40am	4:53am to 01:23am
Hurlstone Park (towards City)	4:58am to 23:31pm	5:24am to 00:24am
Hurlstone Park (towards Bankstown)	4:54am to 00:42am	4:55am to 01:25am
Canterbury (towards City)	4:56am to 23:29pm	5:21am to 00:21am
Canterbury (towards Bankstown)	4:56am to 00:44am	4:57am to 01:27am
Campsie (towards City)	4:53am to 23:26pm	5:19am to 00:19am
Campsie (towards Bankstown)	4:59am to 00:47am	5:00am to 01:30am
Belmore (towards City)	4:51am to 23:24pm	5:16am to 00:16am
Belmore (towards Bankstown)	5:01am to 00:49am	5:02am to 01:32am
Lakemba (towards City)	4:49am to 23:22pm	5:14am to 00:14am
Lakemba (towards Bankstown)	5:04am to 00:52am	5:05am to 01:35am
Wiley Park (towards City)	4:47am to 23:20pm	5:12am to 00:12am
Wiley Park (towards Bankstown)	5:06am to 00:54am	5:07am to 01:37am
Punchbowl (towards City)	4:45am to 23:18pm	5:10am to 00:10am
Punchbowl (towards Bankstown)	5:08am to 00:56am	5:09am to 01:39am
Bankstown (towards City)	4:42am to 23:59pm	4:47am to 01:17am
Bankstown (towards Bankstown)	5:14am to 01:07am	4:59am to 01:44am

[5] Times at station (up line): AM=before 07:15, AM Peak= 07:16-09:45, IP=09:46-16:45, PM Peak= 16:46-19:00, PM=19:01-22:00, Late PM= 22:01 onwards
[6] Times at Station (down line): AM=before 06:30, AM Peak=06:31-09:45, IP=09:46-17:00, PM Peak=17:01-18:30, PM=18:31-21:30, Late PM=21:31 onwards
[7] Taken as the time of the first and last train leaving the Station.

Peak hour entry and exit barrier counts for T3 Bankstown Line stations within the project area are shown in **Table 3.4** below:

Table 3.4 Peak hour barrier counts (Parsons Brinckerhoff 2016)

Station	Peak Hour	AM Peak customers/hour	PM Peak customers/hour
Marrickville	Entry	953 (07:30-8:30)	313 (15:30-16:30)
	Exit	305 (07:45-08:45)	726 (17:30-18:30)
Dulwich Hill Station	Entry	688 (07:30-8:30)	251 (15:00-16:00)
	Exit	298 (08:45-09:45)	369 (17:30-18:30)
Hurlstone Park	Entry	458 (07:30-8:30)	39 (15:00-16:00)
	Exit	51 (07:45-08:45)	306 (17:30-18:30)
Canterbury	Entry	366 (07:30-8:30)	446 (15:15-16:15)
	Exit	407 (07:45-08:45)	260 (17:30-18:30)
Campsie	Entry	1499 (07:30-8:30)	432 (15:00-16:00)
	Exit	332 (08:15-09:15)	1251 (17:15-18:15)
Belmore	Entry	721 (07:30-8:30)	250 (15:00-16:00)
	Exit	175 (08:00-09:00)	518 (17:30-18:30)
Lakemba	Entry	949 (07:30-8:30)	547 (15:00-16:00)
	Exit	365 (07:30-08:30)	727 (17:30-18:30)
Wiley Park	Entry	471 (07:30-8:30)	206 (15:00-16:00)
	Exit	151 (08:00-09:00)	337 (17:30-18:30)
Punchbowl	Entry	799 (07:30-8:30)	192 (15:15-16:15)
	Exit	159 (08:00-09:00)	624 (15:00-16:00)
Bankstown	Entry	1503 (07:15-8:15)	994 (15:45-16:45)
	Exit	917 (8:00-09:00)	1099 (17:30-18:30)

3.1.2 Land use

The study area traverses well-established urban areas. The main land uses within the study area include a mix of residential and commercial land uses.

Residential land uses are the most common land use, with low to medium density residential areas located in the surrounding area, particularly between stations. Higher density residential areas are concentrated around Campsie, Lakemba and Bankstown stations.

Commercial development is generally focused within local and neighbourhood centres, located near Marrickville Dulwich Hill, Canterbury, Hurlstone Park, and Punchbowl stations. Bankstown Station is located within a larger regional centre.

Other land uses adjacent to the project area include education, recreation, and industrial uses.

The Department of Planning and Environment has prepared a Draft Urban Renewal Corridor Strategy, and supporting Land Use and Infrastructure Analysis for the Sydenham to Bankstown corridor to identify opportunities for development uplift and renewal around station precincts over the next 20 years. Consultation on this draft occurred in 2016 and an amended draft was released for comment, taking feedback received into account, in mid 2017.

Refer to the EIS Chapter 16 - Land Use and Property for further information about the land use characteristics of the study area as well as future land use planning considerations.

3.1.3 Bus network

The bus network in the study area plays an important role in the overall public transport network. As well as providing connections between the walking, cycling, light rail and Sydney Trains networks, the bus network also delivers east-west connections that would otherwise require trips through the CBD.

Consideration of bus network in this paper is limited to the day-time service bus network. Infrequent services such as private buses and night rider services have not been included in this paper, as these services as they tend to be very minor contributors in terms of overall passenger movements. In addition, school bus services have not been considered as the majority of works would be undertaken during school holiday periods. Consideration of impacts on all of these services and appropriate mitigation measures would be included in individual Construction Traffic Management Plans (CTMPs).

3.1.4 Public Transport Interchange

Opal data has been used to assess the number of people transferring from train to other modes of public transport at stations within the project area. This primarily relates to interchange between Sydney Train and bus services, but at Dulwich this interchange includes Light Rail Transport (LRT). As shown below in **Table 3.5**. Bankstown Station has the highest total transferring patronage of passengers, although Dulwich has a higher proportion of transfer as a result of the LRT.

Table 3.5 Annual interchanges at stations

Station	Board/Alight (Passengers)	Interchange (%)
Marrickville	2,250,000	3.60%
Dulwich Hill	1,430,000	15.28%
Hurlstone Park	740,000	1.55%
Canterbury	1,140,000	4.28%
Campsie	4,500,000	5.58%
Belmore	1,490,000	1.91%
Lakemba	2,110,000	1.95%
Wiley Park	1,020,000	0.21%
Punchbowl	1,420,000	2.21%
Bankstown	4,830,000	12.44%

Source: TfNSW, March 2017

The table above shows that there are significant differences in the proportion of interchange at stations, and this is a function of the amenity of that interchange, and also the connections to the bus network. Dulwich Hill and Bankstown stations stand out as having high proportions of interchanging passengers (greater than 10%), followed by Campsie station. Bankstown is also the busiest station in terms of total passengers, followed by Campsie. In contrast, Dulwich Hill is one of the less busy stations. These specific aspects are discussed in greater detail in the sections below for each station.

3.1.5 Existing Traffic Flows

Table 3.6 overleaf outlines the existing Average Daily Traffic (ADT) for roads within the area surrounding the station precincts. The two-way ADTs were calculated by combining data from the Public Transport Project Model (PTPM) with existing Roads and Maritime Services (RMS) traffic count data to determine an estimated ADT. The PTPM is a strategic model that has all major routes, but does not include all minor roads within the study area. The model used was only available for the AM peak period and therefore local factors were applied to convert the modelled peak hour flows to the ADT.

Table 3.6 Station Precinct - Existing ADT

Station Precinct	Road	Existing ADT (Vehicles per day)		
		Total	LV	HV
Marrickville	Myrtle Street	1,100	1,000	100
	Carrington Road (Between Schwebel Street and Myrtle Street)	8,800	8,000	800
	Richardson Crescent	18,600	17,400	1,200
	Illawarra Road (Between Marrickville Road and Calvert Street)	11,900	11,100	800
	Marrickville Road (Between Illawarra Road and Silver Street)	16,200	14,100	2,100
	Victoria Road (Between Marrickville Road and Fernbank Street)	7,900	7,400	500
	Warren Road (Between Illawarra Road and Moyes Street)	11,000	9,600	1,400
Dulwich Hill	Livingstone Road (Between Warren Road and Jersey Street)	12,200	11,800	400
	Marrickville Road (Between Darley Street and Wardell Road)	12,600	11,200	1,400
	Dudley Street (Between School Parade and Wardell Road)	4,300	4,100	200
	Bayley Street (Between Ewart Street and Dudley Street)	800	700	100
	Ewart Street (Between Bayley Street and Wicks Avenue)	7,500	7,100	400
	Beauchamp Street (Between School Parade and Ewart Street)	7,500	7,100	400
	Wardell Road (Between Marrickville Road and Pine Street)	14,400	14,000	400
	Terrace Road (Between New Canterbury Road and Consett Street)	1,300	1,300	0
	New Canterbury Road (Between Kintore Street and Terrace Road)	28,800	27,800	1,000

Station Precinct	Road	Existing ADT (Vehicles per day)		
		Total	LV	HV
Hurlstone Park	Garnet Street (Between Canterbury Road and Hampden Street)	2,200	2,200	0
	New Canterbury Road (Between Wattle Lane and Old Canterbury Road)	25,100	24,000	1,100
	Duntroon Street	2,000	1,900	100
	Crinan Street (Between Floss Street and Fernhil Street)	8,500	7,800	700
	Canterbury Road (Between Queen Street and Wattle Lane)	25,400	23,500	1,900
	Dunstaffenage Street (Between Crinan Street and Floss Street)	300	300	0
	Crinan Street (Between Melford Street and Dunstaffenage Street)	6,700	6,000	700
	Canterbury Road (Between Queen Street and Princess Street)	29,800	27,600	2,200
Canterbury	Crinan Street (Between Melford Street and Dunstaffenage Street)	6,700	6,000	700
	Canterbury Road (Between Close Street and Broughton Street)	51,300	47,800	3,500
	Broughton Street (Between Canterbury Road and Robert Street)	3,600	3,200	400
	Canterbury Road (Between Jeffrey Street and Minter Street)	35,800	33,000	2,800
	Charles Street	1,000	800	200
	Canterbury Road (Between Charles Street and Close Street)	51,300	47,800	3,500
	Wairoa Street (Between Wonga Street and Nowra Street)	10,100	10,000	100
	Close Street	800	630	170
	Wonga Street	13,000	12,800	200
	Canterbury Road (Between Wonga Street and Cooks Avenue)	38,600	35,400	3,200
	Canterbury Road (Between Fore Street and Charles Street)	51,600	48,100	3,500
	Canterbury Road (Between Wonga St and Fore Street)	44,500	41,200	3,300

Station Precinct	Road	Existing ADT (Vehicles per day)		
		Total	LV	HV
Campsie	South Parade (Between Beamish Street and Harold Street)	6,900	6,500	400
	Canterbury Road (Between Beamish Street and Scahill Street)	41,200	38,200	3,000
	Beamish Street (Between Ninth Avenue and Campsie Street)	14,500	14,100	400
	North Parade (Between Browning Street and Beamish Street)	2,400	2,400	0
	Beamish Street (Between South Parade and Amy Street)	18,900	18,500	400
	Brighton Avenue (Between Browning Street and Shakespeare Street)	12,700	12,600	100
	Ninth Avenue (Between Beamish Street and Fifth Avenue)	16,300	15,900	400
	Loch Street (Between Evaline Street and Lillian Street)	15,600	14,300	1,300
	Evaline Street (Between Loch Street and Beamish Street)	5,500	5,300	200
	Thorncraft Parade (Between Canterbury Road and Claremont Street)	8,200	7,600	600
	Palmer Street	10,300	9,600	700
Belmore	Redman Parade (Between Burwood Road and Sudbury Street)	6,200	6,100	100
	Burwood Road (Between Redman Parade and Bridge Road)	19,700	17,600	2,100
	Bridge Road (Between Marie Lane and Burwood Avenue)	10,500	10,000	500
	Burwood Road (Between Bridge Road and Collins Street)	21,500	19,300	2,200

Station Precinct	Road	Existing ADT (Vehicles per day)		
		Total	LV	HV
Lakemba	The Boulevarde (Between Haldon Street and Croydon Street)	8,100	7,900	200
	Moreton Street (Between Lakemba Street and The Boulevarde)	16,800	15,600	1,200
	Lakemba Street (Between King Georges Road and Shadforth Street)	3,600	3,500	100
	Burwood Road (Between Redman Parade and Bridge Road)	19,700	17,600	2,100
	Railway Parade (Between Haldon Street and Croydon Street)	4,500	4,400	100
	Haldon Street (Between Railway Parade and The Boulevarde)	15,000	14,100	900
	The Boulevarde (Between Haldon Street and Croyden Street)	8,100	7,900	200
	Haldon Street (Between The Boulevarde and Oneata Street)	9,800	8,900	900
	Canterbury Road (Between Haldon Street and Legge Street)	43,900	40,000	3,900
Wiley Park	The Boulevarde (Between Renown Avenue and King Georges Road)	13,900	13,500	400
	King Georges Road (Between The Boulevarde and Mary Street)	88,000	78,100	9,900
	Lakemba Street (Between King Georges Road and Shadforth Street)	3,600	3,500	100
	King Georges Road (Between Lakemba Street and The Boulevarde)	96,800	86,700	10,100
Punchbowl	Punchbowl Road (Between The Boulevarde and Acacia Avenue)	50,500	47,000	3,500
	The Boulevarde (Between Punchbowl Road and Arthur Street)	24,800	23,400	1,400
	South Terrace (Between Loder Lane and Punchbowl Road)	14,000	13,600	400
	Punchbowl Road (Between South Terrace and The Boulevarde)	60,700	56,600	4,100
	Wattle Street (Between Highclere Avenue and Acacia Avenue)	18,400	18,100	300
	South Terrace (Between West Terrace and East Terrace)	12,000	11,800	200

Station Precinct	Road	Existing ADT (Vehicles per day)		
		Total	LV	HV
Bankstown	Stacey Street (Between Verbena Avenue and Stanley Street)	66,000	56,300	9,700
	Restwell Street (Between Stewart Lane and Raymond Street)	8,800	8,500	300
	Raymond Street (Between Restwell Street and West Terrace)	3,200	3,000	200
	South Terrace (Between West Terrace and Restwell Street)	6,300	6,000	300
	North Terrace (Between The Appian Way and Fetherstone Street)	9,000	9,000	0
	Wattle Street (Between Stacey Street and North Terrace)	12,400	12,100	300
	Marion Street (Between Bungalow Cres and Meredith Street)	34,800	30,700	4,100
	Meredith Street (Between Marion Street and Gordan Street)	24,600	21,100	3,500
	Rickard Road (Between Jacobs Street and Chapel Road)	6,100	5,700	400

3.1.6 School Break Travel Patterns

Based on the potential customer impacts that closures of the T3 Bankstown Line would have, it was determined to focus construction and rail possessions during school holiday periods for the following reasons:

- lower demand on the Bankstown Line due to the number of people taking holidays during these periods and the lack of school student travel
- reduced traffic volumes on the road network due to the removal of school-based traffic, potentially delivering faster and more reliable journeys on replacement buses
- increased available capacity on parallel rail lines to accommodate T3 Bankstown Line customers who are diverted to these lines
- increased bus fleet and driver availability to operate replacement services as school bus operations cease during holidays.

Traffic data from the following four different traffic count sites in Southwest Sydney has been analysed to develop an understanding of the impact of school breaks on traffic flows:

- Princes Highway, 200m east of Brodie Spark Drive (28/01/2015 – 01/01/2016)
- King Georges Road, 40m north of The Boulevarde (19/10/2015 – 08/10/2016)
- Stacey Street, 70m south of Aster Avenue (29/01/2014 – 02/01/2015)
- Canterbury Road, 90m west of Charles Street (27/01/2012 – 04/01/2013).

School Break periods analysed included:

- Break 1 (09/04/2014 – 20/04/2014) (~1 Week)
- Break 2 (02/07/2012 – 13/07/2012) (~1 Week)
- Break 3 (24/09/2012 – 05/10/2012) (~ 2 Weeks)
- Break 4 (24/12/2012 04/01/2013) (~ 2 Weeks).

These school break periods were compared with "normal" periods to identify trends in traffic volumes.

The impacts of different school break periods vary across the sites. The count site on King Georges Road experienced an increase in average traffic volume during the term 1 and 2 PM peaks, however the average traffic volume reduced during the peaks at all other sites and breaks. The traffic variation between the terms and breaks across all four sites ranged from a 1.5% increase to a 32% reduction. In all breaks and sites, the AM peak had a greater reduction in traffic than the PM Peak.

The term four break experiences a much greater reduction in traffic than the other school breaks. **Table 3.7** shows the average reduction in traffic when comparing the term and break volumes.

Table 3.7 Impacts of School Breaks on Traffic Volumes

Breaks	AM Peak Reduction		PM Peak Reduction	
	Average	Range	Average	Range
Break 1 vs. Term 1	5.6% reduction	1.5 to 12.8%	2.0% reduction	-1.46% to 5.3%
Break 2 vs. Term 2	6.1% reduction	0.6% to 14.5%	0.9% reduction	-1.5% to 2.5%
Break 3 vs. Term 3	5.4% reduction	2.0% to 8.5%	1.3% reduction	0.6% to 1.8%
Break 4 vs. Term 4	34.1% reduction	25.8% to 49.5%	15.7% reduction	7.5% to 27.2%

It should be noted that this analysis only considers four sites across Southwest Sydney. This may not be representative of the average reductions when considering Sydney as a whole.

3.1.7 Existing Mode Share (Station entries and exits)

Table 3.8 provides an overview of the mode shares for travel to and from stations. It is evident that, with the exception of Bankstown, walking is the predominate mode for station access. Cycling mode shares are generally low. Bus mode share is generally between 3-7%, with the exception of Bankstown where bus accounts for 16% of travel to / from the station.

Table 3.8 Station Mode Share (entries and exits)

Station	Walking	Cycling	Vehicle (parked)	Vehicle (dropped off)	Bus	Total Entries
Marrickville	86%	0.3%	5%	4%	5%	8,950
Dulwich Hill	76%	0.4%	14%	6%	3%	5,170
Hurlstone Park	81%	0.1%	10%	6%	3%	2,844
Canterbury	84%	0.2%	9%	4%	3%	4,590
Campsie	73%	0.3%	9%	11%	7%	16,276
Belmore	65%	0.1%	21%	11%	3%	5,872
Lakemba	72%	0.2%	15%	10%	3%	8,432
Wiley Park	90%	0.3%	6%	4%	0%	3,812
Punchbowl	56%	0.1%	23%	17%	3%	5,741
Bankstown	49%	0.1%	15%	19%	16%	18,343

3.2 Marrickville

Marrickville is approximately 6.6km from Sydney's CBD within the Inner West Council local government area.

Marrickville had 13,700 residents in 2011 and provided 2891 jobs (according to the 2011 census). 39% of jobs are in the health, education and public services sector, while 29% are in retail and hospitality.

The rail line divides Marrickville precinct into two distinct sections by limiting north-south movement, as shown in **Figure 3.2** overleaf.

3.2.1 Modes of Travel

Of 525 surveyed passengers using Marrickville Railway Station, the majority of people walked to the station (TfNSW, 2014). The remaining passengers connect to the station by bike or bus, with just 9% travelling by car, either to be of dropped off (4%) or parking around the station (5%). The travel modes are shown in **Figure 3.1.**

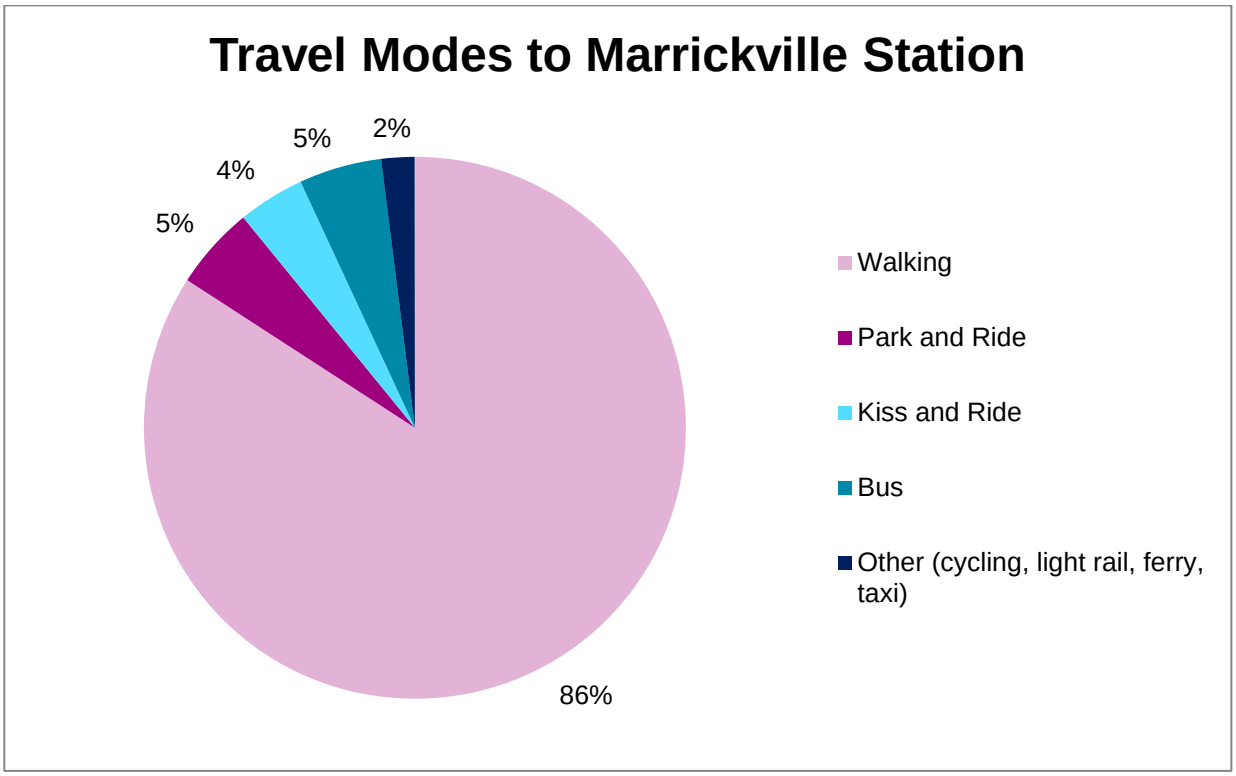
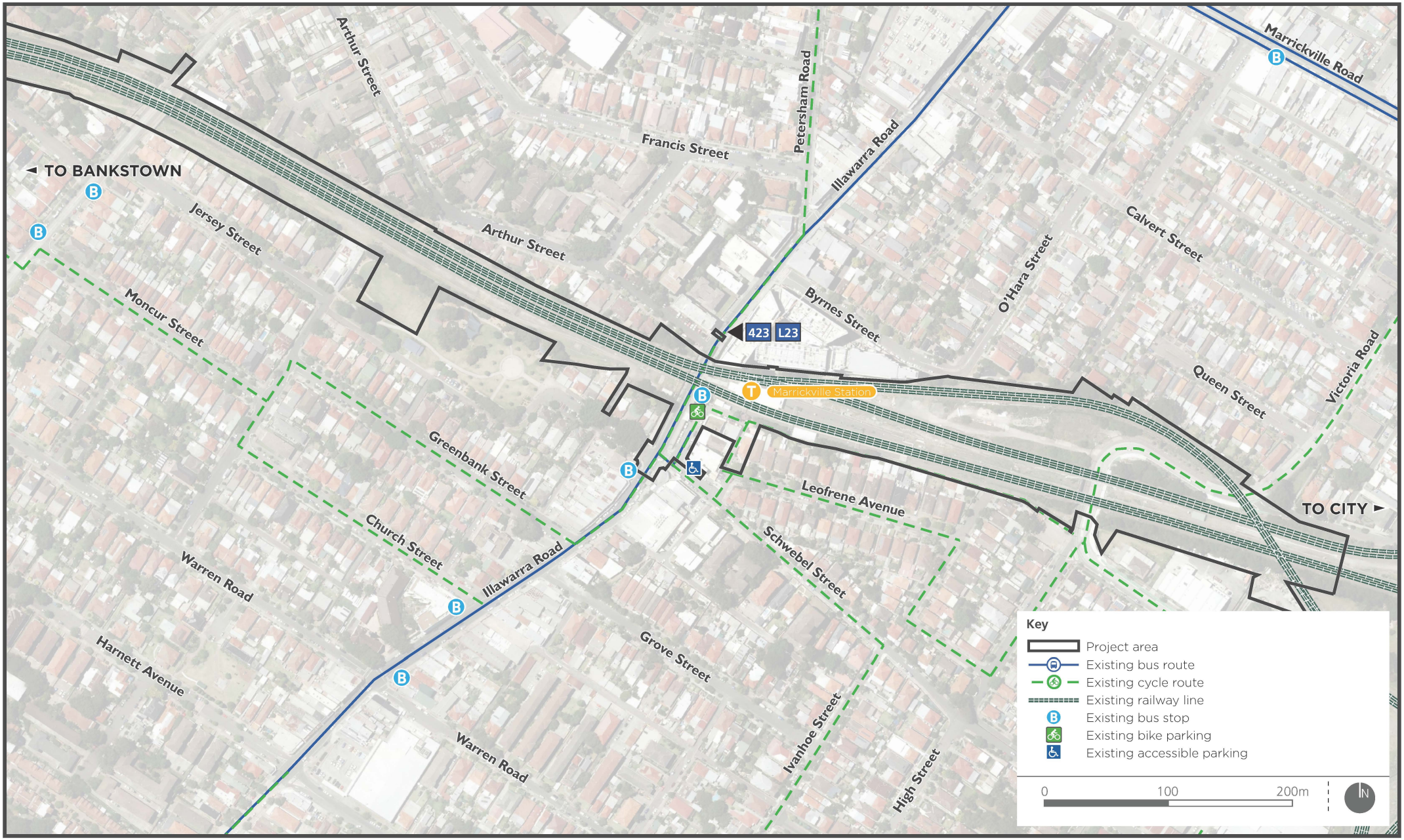


Figure 3.1 Travel modes to the station- Marrickville (TfNSW, 2014)

3.2.2 Walking

There is a relatively large walking catchment in the Marrickville precinct with linear, intersecting primary roads and a few perpendicular secondary streets within a predominantly residential area (NSW Govt. 2015), resulting in a high proportion of rail users walking to the station. The Local and Regional roads have footpaths on either side of the road to cater for pedestrians.

The 10-minute walking catchment extends to include Marrickville Road, the entry to Marrickville Library and St Brigid's School. Marrickville West Public School falls just outside the 10-minute catchment (TfNSW. 2017).



Station location, railway lines, cycle routes and existing bus routes in the Marrickville area

FIGURE 3.2

3.2.3 Cycling

The Cooks River cycleway runs along the southern boundary of Marrickville precinct (NSW Govt. 2015). The demand for the cycleway is particularly high in the early morning, evening and on Sundays (NSW Govt. 2011). This cycleway is a key part of the regional cycle network.

There are a number of roads in the area which have on road cycle lanes/road shoulders/mixed traffic lanes which are suitable for both less experienced riders and confident bikers (RMS NSW Gov 2016). The cycle routes in the Marrickville areas are shown on **Figure 3.2**. This includes the key north-south route on Illawarra Road which is part of the Regional Cycle Network and which connects to Marrickville Station allowing interchange to Sydney Trains services for those cyclists wishing to travel longer distances.

Inverted u-rails are provided on the southern corner of Arthur Street and on the western side of Station Street providing eight bike parking spaces.

3.2.4 Bus

Marrickville is serviced by two bus routes, the 423 and L23, that travel along Illawarra Road and turn to/from Marrickville Road. These bus routes connect Kingsgrove to the city centre.

A bus stop on Illawarra Road immediately south of Marrickville Station services both the 423 and L23 southbound journeys and provides direct access to Marrickville station. Bus passengers interchanging with Marrickville station do not need to make any road crossings to access the station. The distance from the bus stop to the station is approximately 30m.

There is also another bus stop on Illawarra Road providing service to bus passengers travelling north on the 423 bus wanting to interchange with the train station. They use the two pedestrian crossings to the north of the bus stop which is approximately 120m to the station entry.

A 2016 survey by Parsons Brinkerhoff for TfNSW found that of 525 people only 6% of rail passengers used the bus to travel to the train station. This low percentage may be a consequence of the general walkability of the suburb, as well as the multiple public transport options available for direct travel from the suburb into Sydney CBD including several bus routes and walkability to Petersham and Stanmore train stations on the T2 Airport, Inner West and South railway line.

The bus frequency is shown in **Table 3.9**.

Table 3.9 Bus frequency - Marrickville Station (Sydney Buses 2016)

Route Number	Weekday		Weekend
	Frequency (Peak)	Frequency (Off peak)	Frequency
423	Approx. 10 mins	Approx. 15 - 20 mins	Approx. 20 - 30 mins
L23	Approx. 10 mins	None	None

3.2.5 Road Network

The existing road network in the Marrickville precinct contains the following State, Regional and Local roads, as described below.

State Roads:

- Sydenham Road.

Regional Roads

- Illawarra Road south of Marrickville Road
- Marrickville Road east of Illawarra Road
- Marrickville Road west of Illawarra Road.

Local roads include:

- Illawarra Road north of Marrickville Road.
- Petersham Road
- Victoria Road
- Leofrene Avenue
- Moncur Street
- Greenbank Street
- Church Street
- Warren Road
- Ivanhoe Street
- High Street.

3.2.6 Traffic data

Traffic turning counts and queue length surveys were undertaken during three separate surveys between April and December 2016 to provide data for this assessment.

The existing approach traffic volumes for the intersections assessed are provided in **Table 3.10**.

All intersections surrounding Marrickville Station currently operate at a level of service C or above. Refer to Chapter 5 for details of intersection performance and a map showing the location of the intersections modelled.

Table 3.10 Marrickville Existing Traffic Volumes

Intersection	Road	Approach Arm	AM Peak (Veh per hour)	PM Peak (Veh per hour)
B.16 Illawarra Road/Warren Road	Illawarra Road	North	289	715
	Warren Road	East	310	287
	Illawarra Road	South	621	357
	Warren Road	West	187	279
B.17 Marrickville Road/Illawarra Road	Illawarra Road	North	108	286
	Marrickville Road	East	404	766
	Illawarra Road	South	460	281
	Marrickville Road	West	755	473
B.18 Marrickville Road/Victoria Road	Victoria Road	North	296	613
	Marrickville Road	East	700	453
	Victoria Road	South	661	390
	Marrickville Road	West	357	826
H.19 Petersham Road/Illawarra Road	Illawarra Road	North	659	417
	Illawarra Road	South	210	598
	Petersham Road	Northwest	254	210

Intersection	Road	Approach Arm	AM Peak (Veh per hour)	PM Peak (Veh per hour)
Marrickville Bridge Pedestrian Crossing	Illawarra Road	North	370	704
	Illawarra Road	South	648	411

Further details of these counts are provided in **Appendix A**.

3.2.7 Commuter Parking

Marrickville Station has approximately 1500 spaces in the area surrounding the station with no commuter spaces falling within the rail corridor as shown in **Table 3.11** below. There are currently three kiss and ride parking spaces and one taxi parking bay at Marrickville Station.

Table 3.12 below outlines the total capacity and utilisation of the parking spaces available to commuters. Demand for the unrestricted on-street parking is generally high as a result of residents in the areas close to the station parking on-street in addition to commuters and visitors to the area.

Despite having no dedicated commuter parking spaces, 6% of the users of the station choose to park and ride (Arup 2015).

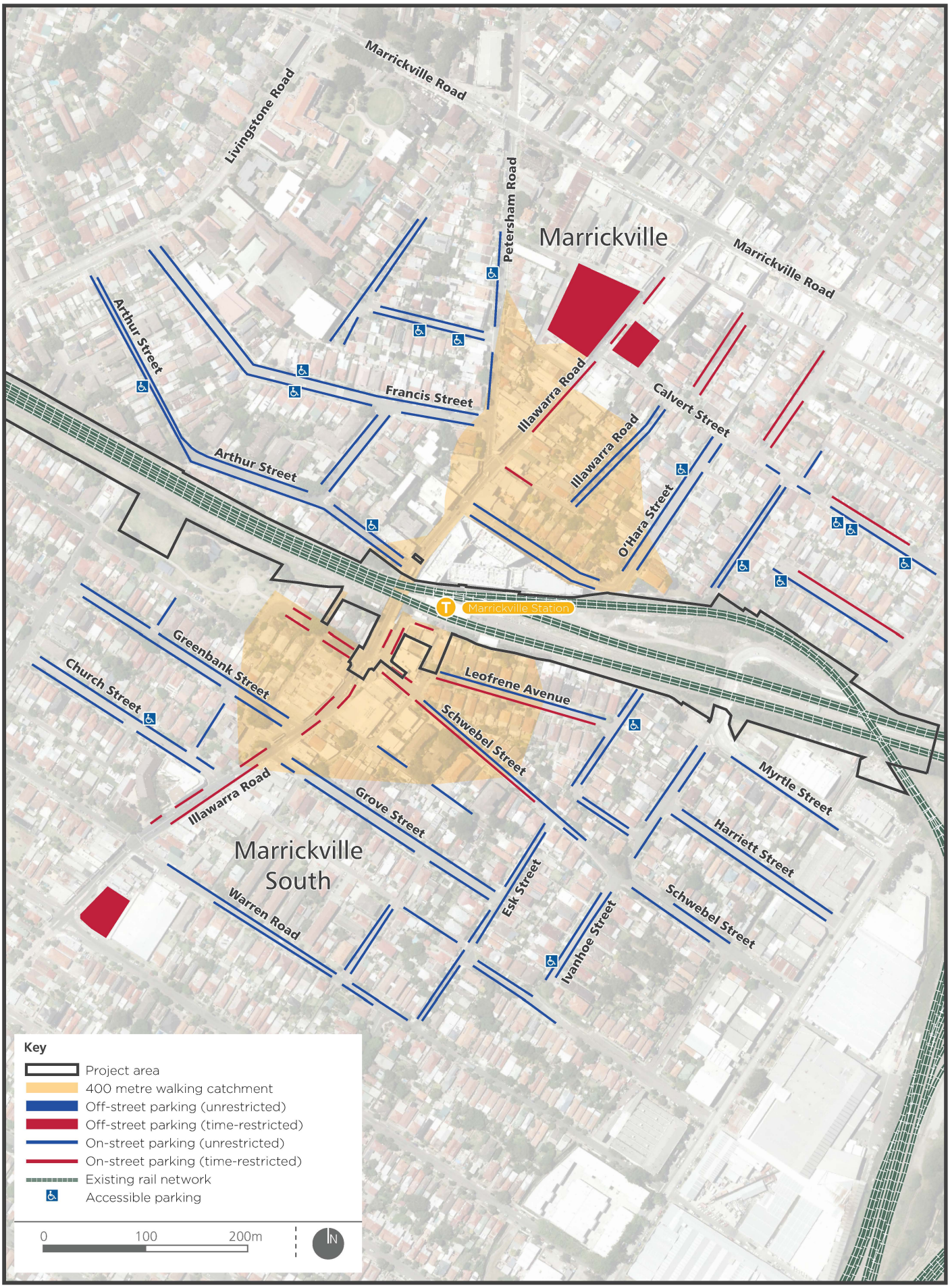
Table 3.11 Marrickville Station Parking Summary

Dedicated Commuter spaces	Kiss and Ride spaces	Total Parking Capacity
0	3	1519

Table 3.12 Marrickville Station Parking Capacity and Utilisation within 400m Radius

	On-street		Off-street	
Time Restriction	Capacity	Utilisation (%)	Capacity	Utilisation (%)
Unrestricted	1257	82%	-	-
Time restricted	262	76%	-	-
Overall	**1519**	**81%**	**-**	**-**

Figure 3.3 shows the type and location of parking spaces available in the vicinity of Marrickville Station.



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Parking restrictions around Marrickville Station

FIGURE 3.3

3.3 Dulwich Hill

Dulwich Hill is 7.9km from Sydney's CBD and within the Inner West local government area. The area has excellent public transport, with rail, light rail and frequent bus services. Dulwich Hill Station is at the centre of the precinct as shown in **Figure 3.5** overleaf.

Dulwich Hill had 9116 residents and 1266 jobs in 2011 (according to the 2011 census). Of the jobs in Dulwich Hill, 27% are in education, healthcare and public services and 23% in business.

3.3.1 Modes of Transport

Of 285 surveyed passengers using Dulwich Hill Railway Station, the majority of people walked to the station (TfNSW, 2014). The remaining passengers connect to the station by bike, bus or LRT, with 20% travelling by car, either to be being dropped off (6%) or parking around the station (14%). The travel modes are shown in **Figure 3.4**.

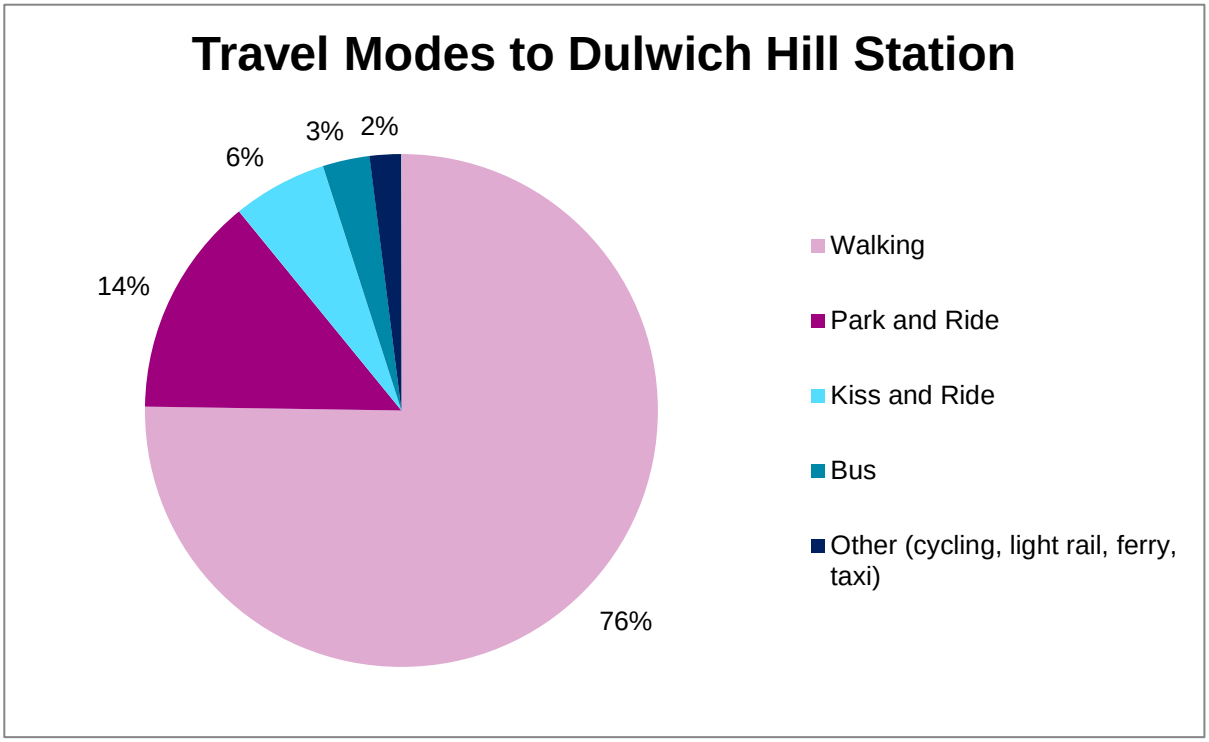
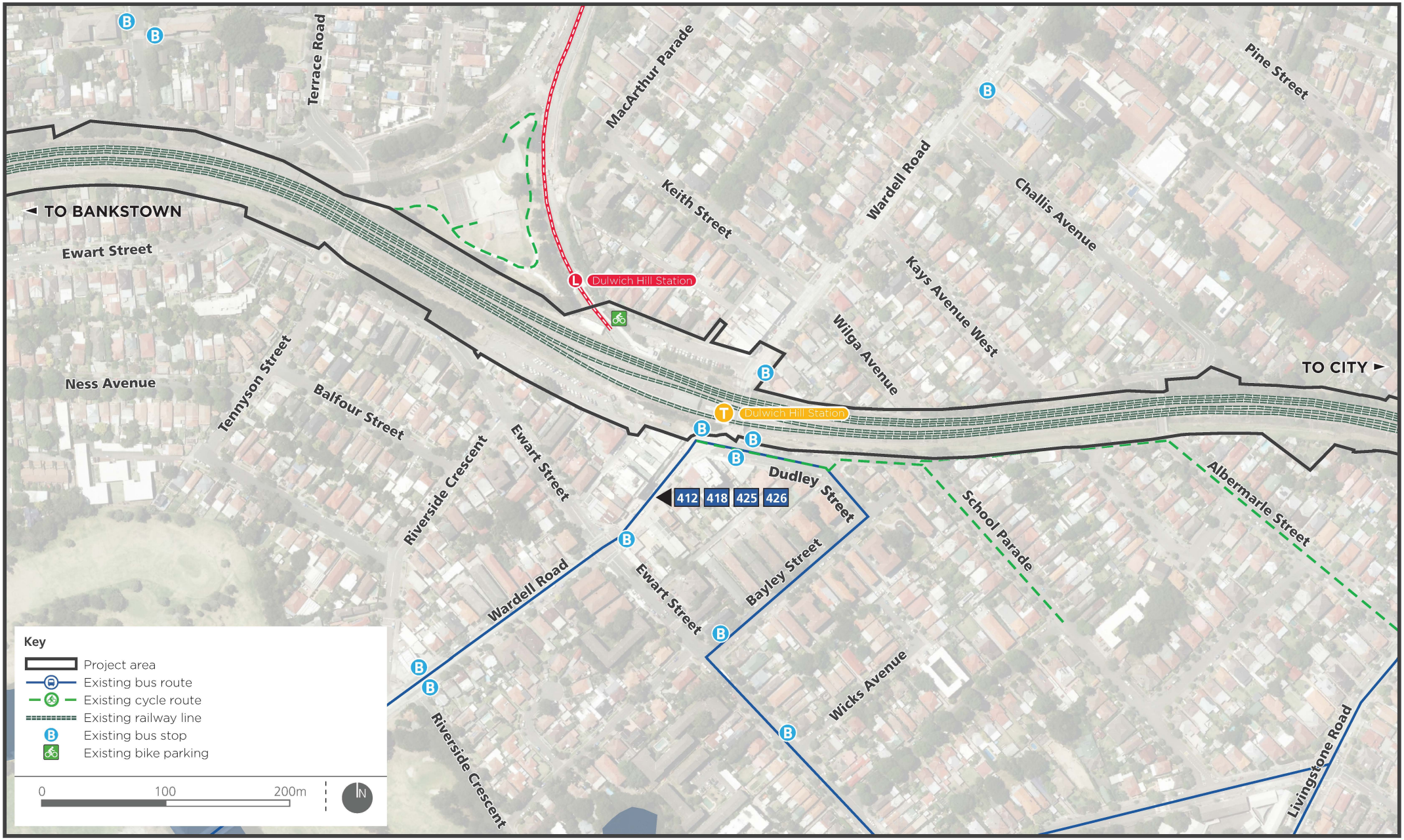


Figure 3.4 Travel modes to the station- Dulwich Hill (TfNSW, 2014)

The L1 Dulwich Hill Line terminates near the project area at the Dulwich Hill light rail stop, located about 130 metres to the north-west of Dulwich Hill Station. This extension of the line was opened in 2014 and is now referred to as the 'L1 Dulwich Hill Line'. As shown below in **,** the Opal data for 2016 shows there were a total of 194,319 trips where there was an interchange between LRT and trains out of a total 218,634. This shows that since the introduction of the LRT in 2014 there has been a significant change to the proportion of people using bus versus light rail to access the station.

Table 3.13 Dulwich Hill Station Transfers

From mode	To mode	Opal Trips
Train	LRT	100,719
LRT	Train	93,600
Bus	Train	14,439
Train	Bus	9,876
Total		**218,634**



Station location, railway lines, cycle routes and existing bus routes in the Dulwich Hill area

FIGURE 3.5

LRT passengers travelling further out of the city on the Bankstown train line are likely to transfer to trains. Passengers travelling from the city bound adjacent suburbs (Marrickville and Sydenham) to the bay side suburbs are likely to transfer from train to LRT. The LRT line also stops more frequently compared to the train line making it a more attractive option for passengers wanting to reach specific destinations.

Overall, Trains and LRT are the preferred mode of transport over buses and passengers are more likely to transfer to LRT as it services more areas.

3.3.2 Walking

Pedestrian accessibility in Dulwich Hill is generally good with footpaths on either side of the road; however movements are constrained by the rail and light rail corridor (NSW Govt. 2015).

Wardell Road is a Regional road travelling from the north to the south of the Station. The road travels through Dulwich Hill Station, connecting both sides of Dulwich Hill village and residential areas further afield. Low vehicle speeds and relatively narrow carriageways along this road make it attractive for pedestrians.

3.3.3 Cycling

There are several cycle routes in close proximity to the station. Routes on both Albermarle Street and School Parade running parallel to the rail corridor have on road bike lanes/road shoulders/mixed traffic lanes which are suitable for riders of varying experience and confidence. Along with the other cycle routes, these are shown on **Figure 3.5**.

In addition, the Cooks River cycleway runs to the south of Dulwich Hill Station. The demand for the cycleway is particularly high in the early morning, evening and on Sundays (NSW Govt. 2011). This cycleway is a key part of the regional cycle network.

Currently there are provisions for bike parking spaces on the southern side of Bedford Crescent and the northern side of Wardell Road at the station. The types of bike parking are outlined in **Table 3.14**.

Table 3.14 Dulwich Hill Bike Facilities

Location	Type of Parking	Bike Parking Supply
Bedford Crescent	Inverted u-rails	10 spaces
Wardell Road	Inverted u-rails	4 spaces
Wardell Road	Multi bike rack	6 spaces

The demand is for 10 bike spaces in total across the three locations meaning there is sufficient supply to cater for the demand. Specifically the bike spaces on Bedford Crescent are operating at 60% capacity and are primarily used by light rail customers.

3.3.4 Bus

Dulwich Hill centre is only served by one bus route that travels from Campsie to the CBD (412). A number of other bus routes (418, 425 and 426) serve the northern section of the precinct, as shown in **Figure 3.5**.

A bus stop on Dudley Street immediately south of Dulwich Hill Station services the 412 bus route and provides direct access to Dulwich Hill station. Bus passengers interchanging with Dulwich Hill station need to cross a pedestrian crossing to the west of the bus stop on Wardell Road in order to get to the station. This is approximately 50m to the station entry.

There is another bus stop on Dudley Street servicing bus passengers travelling north on the 412 bus wanting to interchange with the train station. They use a pedestrian refuge island on Dudley Street and the pedestrian crossing on Wardell Road in order to get to the station. This is approximately 80m to the station entry.

The local bus route frequency is shown in **Table 3.15** below.

Table 3.15 Bus frequency - Dulwich Hill Station (Sydney Buses 2016)

Route Number	Weekday		Weekend
	Frequency (Peak)	Frequency (Off peak)	Frequency
412	Approx. 15 mins	Approx. 20 mins	Approx. 20 mins

3.3.5 Road network

The existing road network at the Dulwich Hill precinct contains a number of State, Regional and Local roads, as described below

State

- New Canterbury Road.

Regional

- Wardell Road
- Marrickville Road.

Local

- Ewart Street
- Beauchamp Road
- Livingstone Road
- Bayley Street
- School Parade
- Albermarle Street
- Wilga Avenue
- Challis Avenue
- Kays Avenue West
- Dudley Street.

3.3.6 Traffic data

Traffic turning counts and queue length surveys were undertaken during three separate surveys between April and December 2016 to provide data for this assessment.

The existing approach traffic volumes for the intersections assessed are provided in **Table 3.16**.

All intersections surrounding Dulwich Hill Station currently operate at a level of service C or above. Refer to Chapter 5 for details of intersection performance and a map showing the location of the intersections modelled.

Table 3.16 Dulwich Hill Existing Traffic Volumes

Intersection	Road	Approach Arm	AM Peak (Veh per hour)	PM Peak (Veh per hour)
B.15 Wardell Road/Ewart Street	Ewart Street	North	447	379
	Wardell Road	East	385	860
	Ewart Street	South	208	414
	Wardell Road	West	591	355

Intersection	Road	Approach Arm	AM Peak (Veh per hour)	PM Peak (Veh per hour)
H.16 Wardell Road/Dudley Street	Wardell Road	Northeast	403	775
	Dudley Street	East	72	94
	Wardell Road	Southwest	681	499
B.28 New Canterbury Road/Marrickville Road	New Canterbury Road	North	437	1050
	Marrickville Road	East	288	411
	New Canterbury Road	South	1496	786
	Marrickville Road	West	139	82
H.25 Ewart Street/Bayley Street	Ewart Street	Northeast	39	61
	Bayley Street	Southeast	539	432
	Ewart Street	Southwest	20	22
	Dibble Avenue	Northwest	303	265
H.36 New Canterbury Road/Terrace Road	New Canterbury Road	East	620	1344
	Terrace Road	Southwest	78	74
	New Canterbury Road	West	1528	747
H.37 Wardell Road/Marrickville Road	Marrickville Road	North	671	354
	Wardell Road	East	251	556
	Marrickville Road	South	426	773
	Wardell Road	West	566	396

Further details of these counts are provided in **Appendix A**.

3.3.7 Commuter Parking

Dulwich Hill Station has approximately 1300 parking spaces in the area surrounding the station with 55 dedicated commuter spaces as shown in **Table 3.17** below.

The 55 dedicated commuter spaces at or near Dulwich Hill Station cater for the (approximately) 14% of the users of the station who choose to park and ride (Arup 2015). In addition to these spaces there are three accessible parking bays available (two on-street, one off-street). There are currently three kiss and ride parking spaces but no taxi parking bays at Dulwich Hill Station.

Table 3.18 below outlines the total capacity and utilisation of the parking spaces available to commuters.

Table 3.17 Dulwich Hill Station Parking Summary

Dedicated Commuter spaces	Kiss and Ride spaces	Total Parking Capacity
55	3	1332

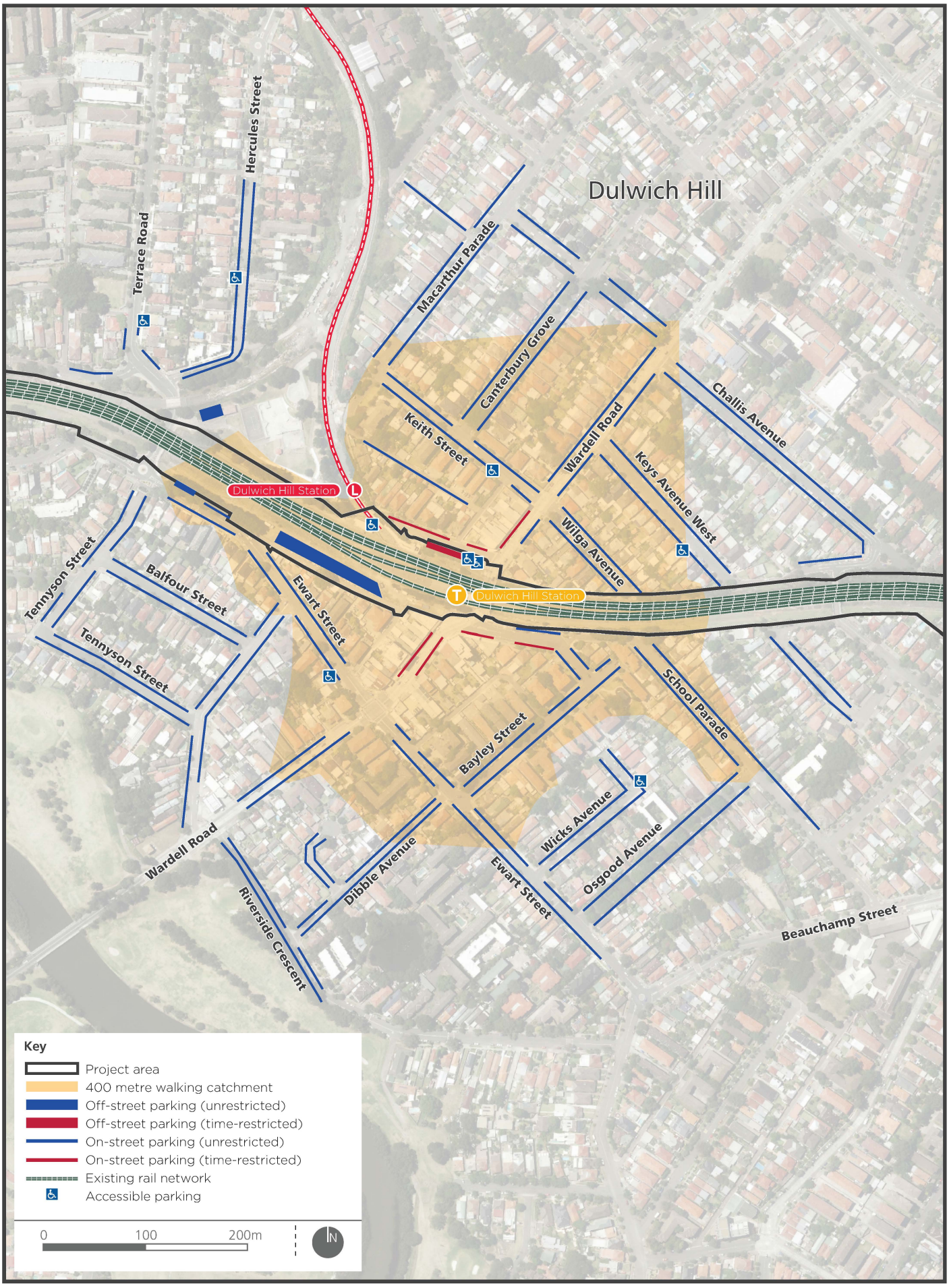
Table 3.18 Dulwich Hill Station Parking Capacity and Utilisation within 400m Radius

	On-street		Off-street	
Time Restriction	Capacity	Utilisation (%)	Capacity	Utilisation (%)
Unrestricted	1202	72%	57[8]	100%

[8] The car park has 56 marked spaces (including one accessible space) and has been observed to regularly hold 57 vehicles, with one vehicle parking over yellow lines.

	On-street		Off-street	
Time Restriction	**Capacity**	**Utilisation (%)**	**Capacity**	**Utilisation (%)**
Time restricted	73	86%	-	-
Overall	**1275**	**74%**	**57**	**100%**

Figure 3.6 shows the type and location of parking spaces available in the vicinity of Dulwich Hill Station.



Parking restrictions around Dulwich Hill station

FIGURE 3.6

3.4 Hurlstone Park

Hurlstone Park is approximately 8.5km from Sydney's CBD, falling under the City of Canterbury-Bankstown local government area.

Hurlstone Park Station had 6045 residents in 2011 and 466 jobs (according to the 2011 census). Over a third (37%) of jobs are in retail and hospitality, 21% in education, healthcare and public services and 20% in business services. **Figure 3.8** overleaf, illustrates the proximity of the station to Hurlstone Park village.

3.4.1 Modes of Travel

Of 207 surveyed passengers using Hurlstone Park Station, the majority of people walked to the station (TfNSW, 2014). The remaining passengers connect to the station by bike or bus, with 16% travelling by car, either to be dropped off (6%) or parking around the station (10%). The travel modes are shown in **Figure 3.7**.

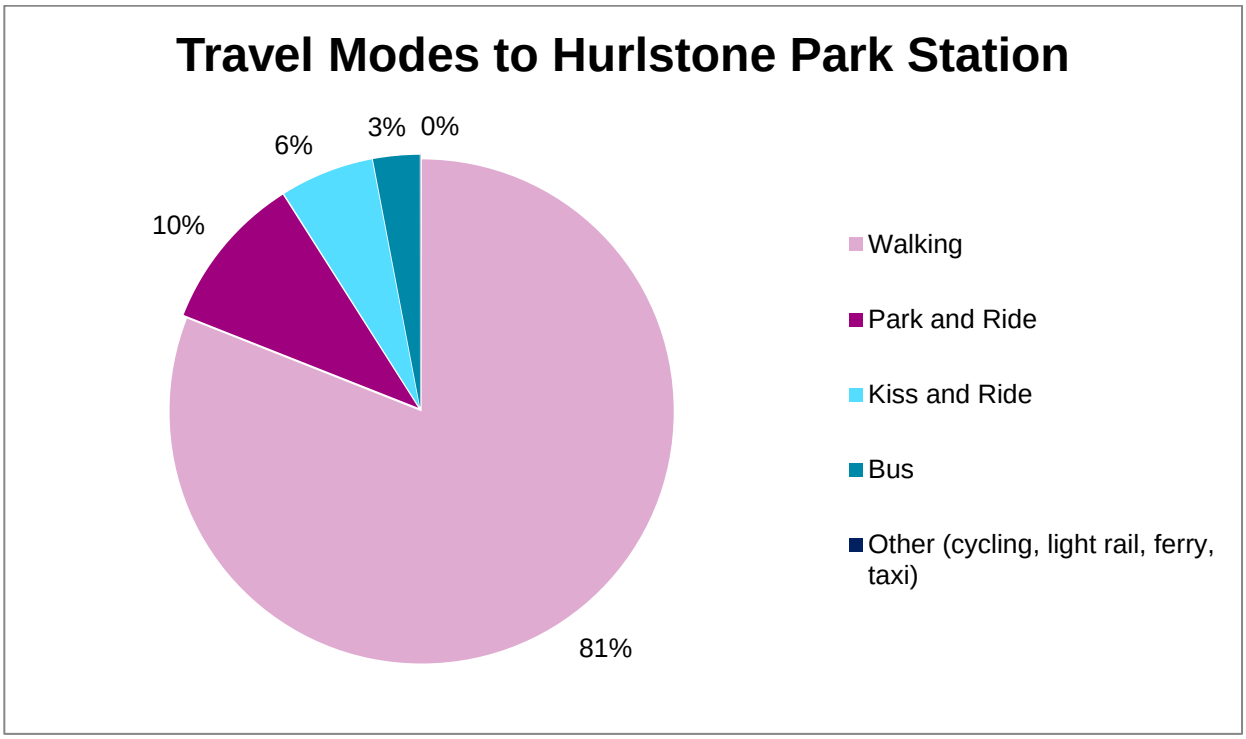


Figure 3.7 Travel modes to the station- Hurlstone Park (TfNSW, 2014)

3.4.2 Walking

Pedestrian access in the precinct is generally good due to radiating and intersecting roads (NSW Govt. 2015). Crinan Street in Hurlstone Park village is attractive to pedestrians due to a narrow carriageway and low vehicular speeds. The key roads have footpaths on either side of the road to cater for pedestrians.

3.4.3 Cycling

Hurlstone Park has good on-road cycle routes connecting cyclists from Canterbury Road in the north west, Floss Street in the east, and Foord Avenue in the south to the Railway Station (NSW Govt. 2015). A section of Floss Street (between Garnet Street and Duntroon Street) cycle route connects to Cooks River cycleway which runs along the southern boundary of Hurlstone Park precinct.

There are a number of roads in the area which have on road cycle lanes/road shoulders/mixed traffic lanes which are suitable for confident bikers and connect from Canterbury Road to Floss Street (RMS NSW Gov 2016).

Currently there are 12 bike racks which supply 12 spaces on Crinan Street outside the station entrance. There is a demand of two bike spaces meaning there is sufficient supply to cater for the current demand.

Station location, railway lines, cycle routes and existing bus routes in the Hurlstone Park area

FIGURE 3.8

3.4.4 Bus

Hurlstone Park is serviced by two bus routes, the 406 and 418, that provide access to surrounding suburbs including Five Dock, Burwood, Mascot and Bondi Junction. The local bus routes are shown on **Figure 3.8** and the frequency is shown in **Table 3.19** below.

A bus stop on the Crinan Street overpass bridge services both the 406 and 418 northbound journeys and provides direct access to Hurlstone Park Station. Bus passengers interchanging with Hurlstone Park station do not need to make any road crossings to access the station. The distance from the bus stop to the station is approximately 10m.

There is also another bus stop on Crinan Street providing service to bus passengers travelling south on the 406 and 418 buses wanting to interchange with the train station. They use the pedestrian crossing to the north of the bus stop. This is approximately 50m to the station entry.

The 2016 survey of 207 people found that only 3% of rail passengers used the bus to travel to the train station. The bus frequency is shown in **Table 3.19** overleaf.

Table 3.19 Bus frequency - Hurlstone Park Station (Sydney Buses 2016)

Route Number	Weekday	Weekday	Weekend
	Frequency (Peak)	Frequency (Off peak)	Frequency
406	30 mins	1 hour	1 hour
418	Approx. 20 mins	Approx. 30 mins	Approx. 30 mins

3.4.5 Road Network

The existing road network in the Hurlstone Park precinct contains a number of State and Local roads as described below.

State

- Canterbury Road
- New Canterbury Road.

Local

- Crinan Street
- Floss Street
- Dunstaffenage Street
- Keir Avenue
- Foord Avenue
- Burnett Street
- Hopetoun Street
- Duntroon Street
- Garnet Street
- Ewart Street
- Hampden Street
- Myra Road.

3.4.6 Traffic data

Traffic turning counts and queue length surveys were undertaken during three separate surveys between April and December 2016 to provide data for this assessment.

The existing approach traffic volumes for the intersections assessed are provided in **Table 3.20**.

All intersections surrounding Hurlstone Park Station currently operate at a level of service C or above. Refer to Chapter 5 for details of intersection performance and a map showing the location of the intersections modelled.

Table 3.20 Hurlstone Park Existing Traffic Volumes

Intersection	Road	Approach Arm	AM Peak (Veh per hour)	PM Peak (Veh per hour)
B.14 Canterbury Road/ Crinan Street	Canterbury Road	North	800	1436
	Crinan Street	East	313	315
	Canterbury Road	South	1696	1197
	Queen Street	Northwest	216	272
B.27 Old Canterbury Road/New Canterbury Road	Old Canterbury Road	North	448	790
	New Canterbury Road	East	644	1111
	Canterbury Road	South	1606	1074
	Griffiths Street	West	323	336
H.17 Crinan Street/ Floss Street	Crinan Street	North	319	274
	Floss Street	East	243	277
	Floss Street	West	99	86
H.18. Crinan Street/ Duntroon Street	Crinan Street	North	396	316
	Duntroon Street	East	70	88
	Crinan Street	South	255	279
	Floss Street	West	3	27

Further details of these counts are provided in **Appendix A**.

3.4.7 Commuter Parking

Hurlstone Park Station has approximately 1200 spaces in the area surrounding the station with 23 dedicated commuter spaces as shown in **Table 3.21** below. **Table 3.22** below outlines the total capacity and utilisation of the parking spaces available to commuters.

The 23 dedicated commuter spaces at Hurlstone Park cater for the (approximately) 10% of the users of the station who choose to park and ride (Arup 2015).

There are currently no kiss and ride or taxi parking bays at Hurlstone Park Station.

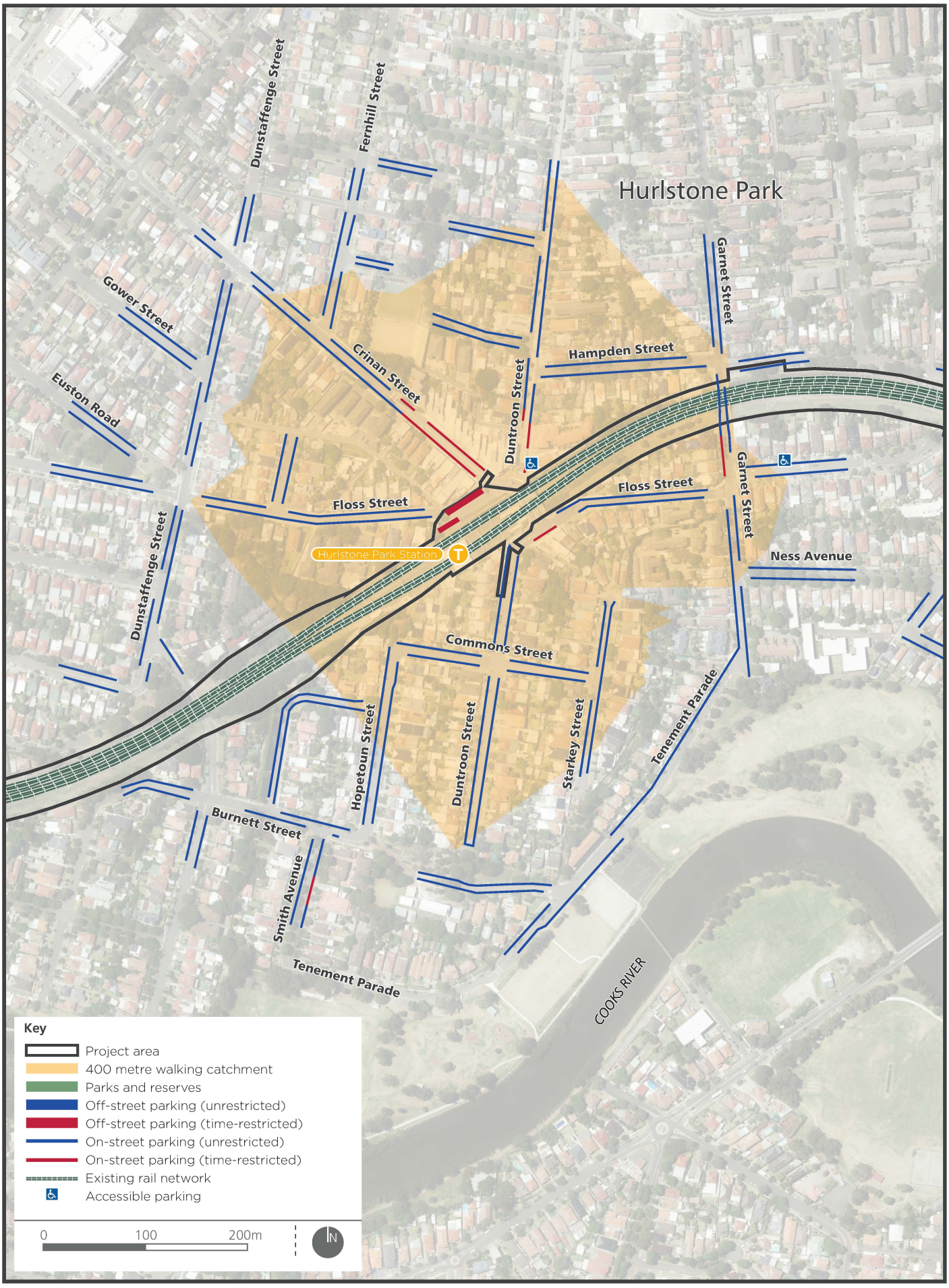
Table 3.21 Hurlstone Park Station Parking Summary

Dedicated Commuter spaces	Kiss and Ride spaces	Total Parking Capacity
23	0	1208

Table 3.22 Hurlstone Park Station Parking Capacity and Utilisation within 400m Radius

	On-street		Off-street	
Time Restriction	Capacity	Utilisation (%)	Capacity	Utilisation (%)
Unrestricted	1135	53%	-	-
Time restricted	50	74%	23	100%
Overall	**1185**	**54%**	**23**	**100%**

Figure 3.9 overleaf shows the type and location of parking spaces available in the vicinity of Hurlstone Park Station.



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Parking restrictions around Hurlstone Park station

FIGURE 3.9

3.5 Canterbury

Canterbury Station is approximately 10km from Sydney's CBD, falling under the City of Canterbury-Bankstown local government area.

Canterbury had 6320 residents in 2011 and provided 1434 jobs (according to the 2011 census). Almost half (45%) of jobs were in education, healthcare and public services, while 20% were in retail and hospitality.

The T3 Bankstown Line and Cooks River divide Canterbury precinct from the areas located in the south of the precinct as shown in **Figure 3.11** overleaf.

3.5.1 Modes of Travel

Of 182 surveyed passengers using Canterbury Station, the majority of people walked to the station (TfNSW, 2014). The remaining passengers connect to the station by bike or bus, with 13% travelling by car, either to be dropped off (4%) or parking around the station (9%). Travel modes are shown in **Figure 3.10**.

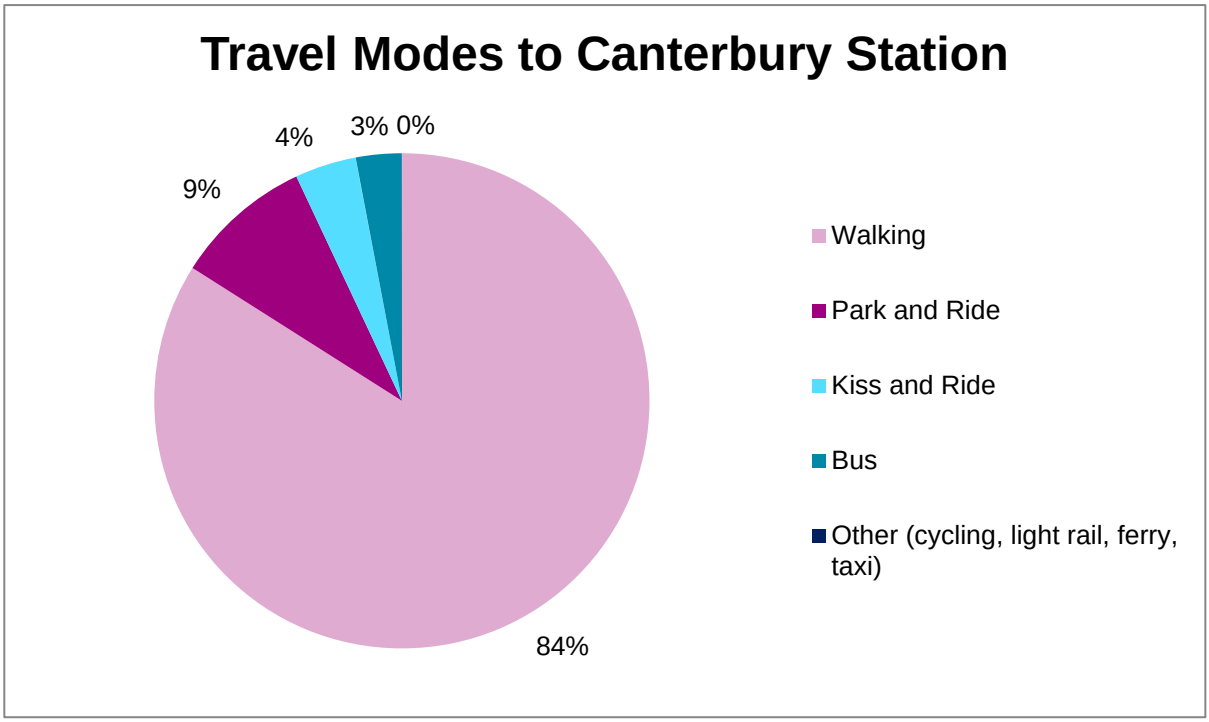
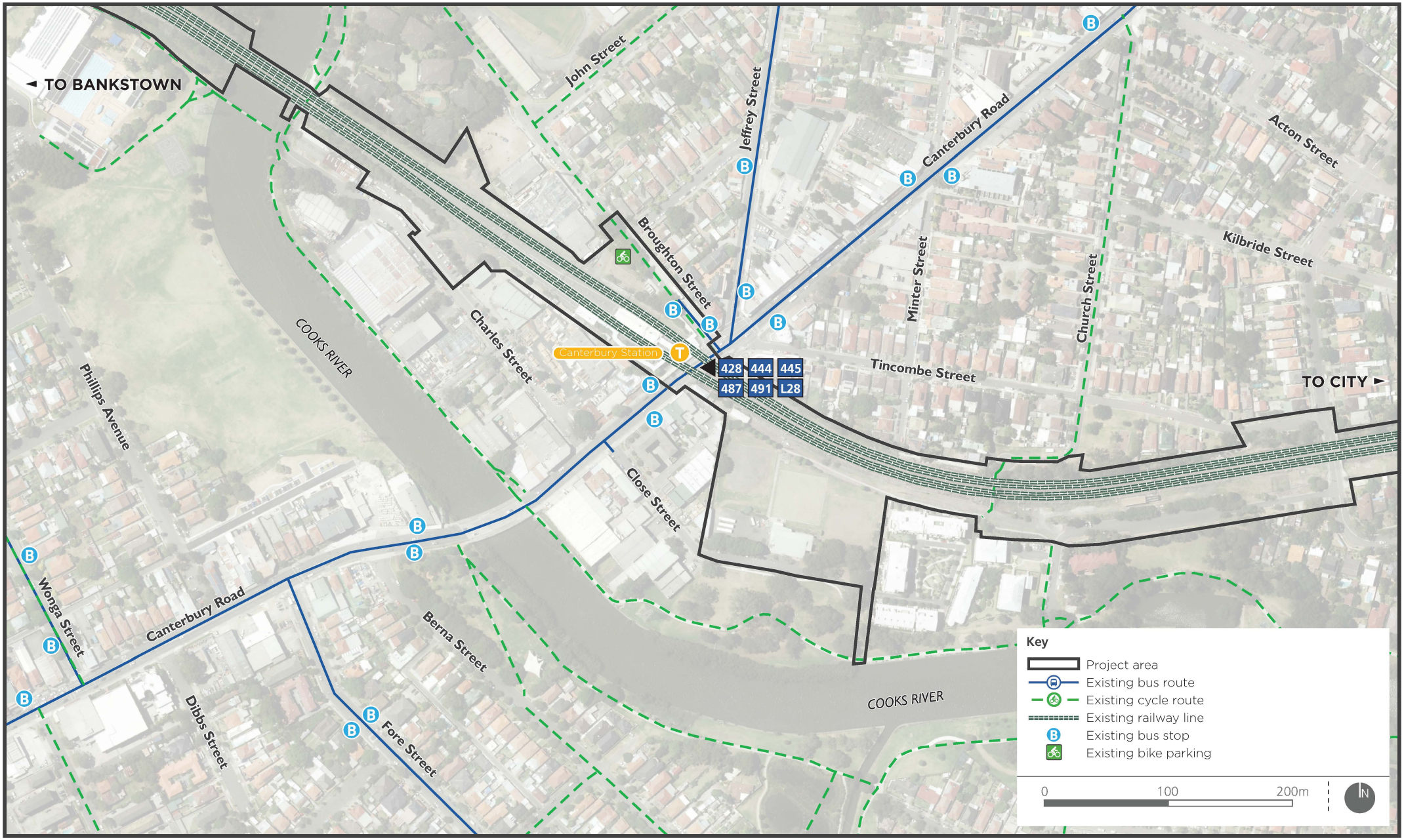


Figure 3.10 Travel modes to the station- Canterbury (TfNSW, 2014)

3.5.2 Walking

There is a relatively good pedestrian accessibility in the precinct for those living in the east and the north. The Cooks River, railway corridor and the busy Canterbury Road (regional) limits movement from the south (NSW Govt. 2015). The Regional roads have footpaths on either side to facilitate pedestrian movement.



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Station location, railway lines, cycle routes and existing bus routes in the Canterbury area

FIGURE 3.11

3.5.3 Cycling

The Cooks River cycleway runs along the northern and southern side of the river, as shown in **Figure 3.11**.

There are a very limited number of roads in the area which have on road cycle lanes/road shoulders/mixed traffic lanes which are suitable for less experienced riders and on road cycle lanes/shoulders /mixed traffic lanes which are suitable for confident bikers (RMS NSW Gov 2016).

Canterbury Station has bike lockers providing four formal bike spaces. Despite the bike locker acting at 25% capacity, bikers are choosing to park along fences outside the station on Canterbury Road and northwest of the station on Broughton Street. The parking demand is for one bike space on Canterbury Road and three bike spaces on Broughton Street.

3.5.4 Bus

Canterbury Station is serviced by six bus routes, including high frequency routes from Sydney CBD, Campsie and Hurstville. All six routes serve bus stops on Canterbury Road at the entrance to the station as shown in **Figure 3.11**.

A bus stop on Canterbury Road immediately south of Canterbury Station services the 444, 445, 487 and 491 northbound bus routes and provides direct access to the Canterbury station. Bus passengers interchanging with Canterbury station do not need to make any road crossings to access the station. The distance from the bus stop to the station is approximately 50m. Bus passengers on the northbound 428 service wanting to interchange with Canterbury station are able to use the signalised crossing to cross Broughton Street and access the station. The distance from the bus stop to the station is approximately 40m.

There is also another bus stop on Canterbury Road providing service to the bus passengers travelling south on all six routes wanting to interchange with the train station. They use the signalised crossings at the intersection of Canterbury Road and Broughton Street which is approximately 60m to the station entry. A bus layover facility is provided on Broughton Street adjacent to the bus stops.

The survey in 2016 of 182 people found that only 3% of rail passengers used the bus to travel to the train station.

The bus frequency is shown in **Table 3.23**.

Table 3.23 Bus frequency - Canterbury Station (Sydney Buses 2016)

Route Number	Weekday	Weekday	Weekend
	Frequency (Peak)	Frequency (Off peak)	Frequency
428	Approx. 5 mins	Approx. 20 mins	Approx. 20 mins
444	Approx. 20 mins	None	Approx. 30 mins
445	None	Approx. 20 mins	Approx. 20 mins
487	Approx. 30 mins	30 mins	Approx. 35 mins
491	Approx. 30 mins	Approx. 30 mins	30 mins
L28	10 mins	None	None

3.5.5 Road Network

The existing road network in the Canterbury precinct contains a number of State, Regional roads and Local roads, as described below.

State

- Canterbury Road.

Regional

- Jeffrey Street.

Local

- Wairoa Street
- Fore Street
- Wonga Street
- Berna Street
- Close Street
- Charles Street
- Broughton Street
- John Street
- Tincombe Street
- Church Street.

3.5.6 Traffic data

Traffic turning counts and queue length surveys were undertaken during three separate surveys between April and December 2016 to provide data for this assessment.

The existing approach traffic volumes for the intersections assessed are provided in **Table 3.24**.

All intersections surrounding Canterbury Station currently operate at a level of service B or above. Refer to Chapter 5 for details of intersection performance and a map showing the location of the intersections modelled.

Table 3.24 Canterbury Existing Traffic Volumes

Intersection	Road	Approach Arm	AM Peak (Veh per hour)	PM Peak (Veh per hour)
B.13 Canterbury Road/Wonga Street	Wonga Street	North	383	409
	Canterbury Road	East	1279	2013
	Canterbury Road	West	1697	1283
H.14 Canterbury Road/Charles Street	Charles Street	North	25	25
	Canterbury Road	East	1186	1302
	Canterbury Road	West	1924	1500
H.15 Canterbury Road /Jeffrey Street	Broughton Street	North	170	212
	Jeffrey Street	Northeast	252	338
	Canterbury Road	East	863	1548
	Tincombe Street	Southeast	0 – Tincombe Street is a one way street	0 – Tincombe Street is a one way street
	Canterbury Road	West	1932	1465
H.14 Canterbury Road/Close Street	Canterbury Road	East	1176	1975
	Close Street	South	20	18
	Canterbury Road	West	1905	1475

Further of these counts are provided in **Appendix A**.

3.5.7 Commuter Parking

Canterbury Station has approximately 850 parking spaces in the area surrounding the station with 32 dedicated commuter spaces on the southern side of the station on Charles Street[9], as shown in **Table 3.25** below. There is currently no formalised kiss and ride or taxi parking bays at Canterbury Station. However, there is a section of Broughton Street which has a no parking restriction which is recognised as facilitating kiss and ride trips. **Table 3.26** below outlines the total capacity and utilisation of the parking spaces available to commuters.

The 32 dedicated commuter spaces are used to cater for the (approximately) 9% of the users of the station who choose to park and ride (Arup 2015). It was observed that Broughton Street and Robert Street have high volumes of parked vehicles during standard work hours and therefore, it is assumed that commuters are using these streets for on-street informal park and ride parking.

Time restricted carparks are available on Pierson Lane and a time restricted carpark containing approximately 100 spaces operated by Aldi is available adjacent to this.

There is currently no kiss and ride or taxi parking bays at Canterbury Station.

Table 3.25 Canterbury Station Parking Summary

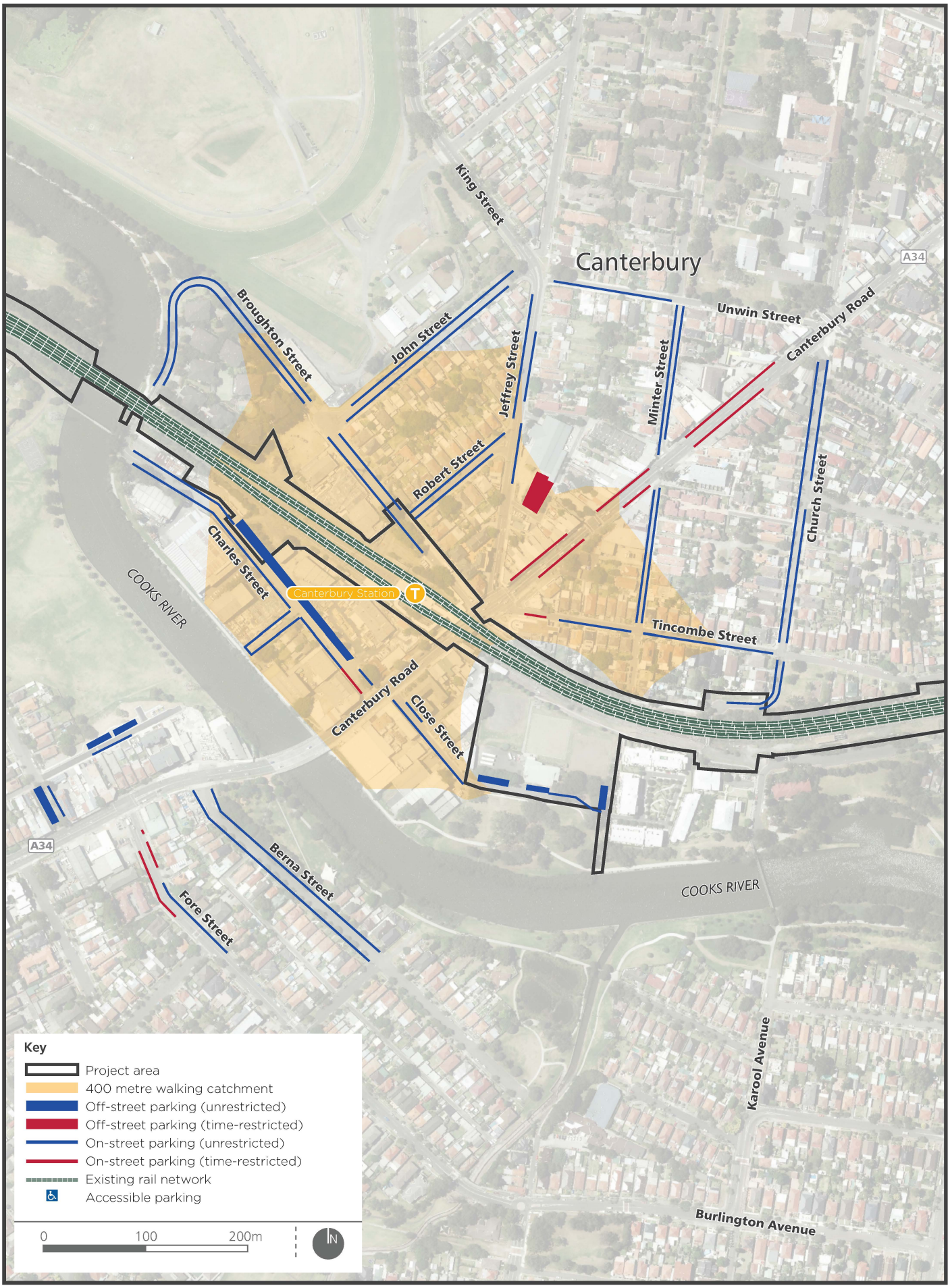
Dedicated Commuter Spaces	Kiss and Ride spaces	Total Parking Capacity
32	0	849

Table 3.26 Canterbury Station Parking Capacity and Utilisation within 400m Radius

	On-street		Off-street	
Time Restriction	Capacity	Utilisation (%)	Capacity	Utilisation (%)
Unrestricted	597	60%	107	84%
Time restricted	19	26%	126	100%
Overall	**616**	**59%**	**233**	**84%**

Figure 3.12 shows the type and location of parking spaces available in the vicinity of Canterbury Station.

[9] The number of available spaces is currently reduced due to construction works on adjacent properties.



Parking restrictions around Canterbury station

FIGURE 3.12

3.6 Campsie

Campsie is approximately 12km from Sydney's CBD, falling under the City of Canterbury-Bankstown local government area.

Campsie had 19582 residents in 2011 and provided 5092 jobs (according to the 2011 census). Almost half (47%) of jobs were in education, healthcare and public services, while 29% were in retail and hospitality.

The station location, railway lines, cycle routes and existing bus routes in the Campsie area are shown in overleaf.

3.6.1 Modes of Travel

Of 592 surveyed passengers using Campsie Station, the majority of people walked to the station (TfNSW, 2014). The remaining passengers connect to the station by bike or bus, with 20% travelling by car, either to be dropped off (11%) or parking around the station (9%). Travel modes are shown in **Figure 3.13**.

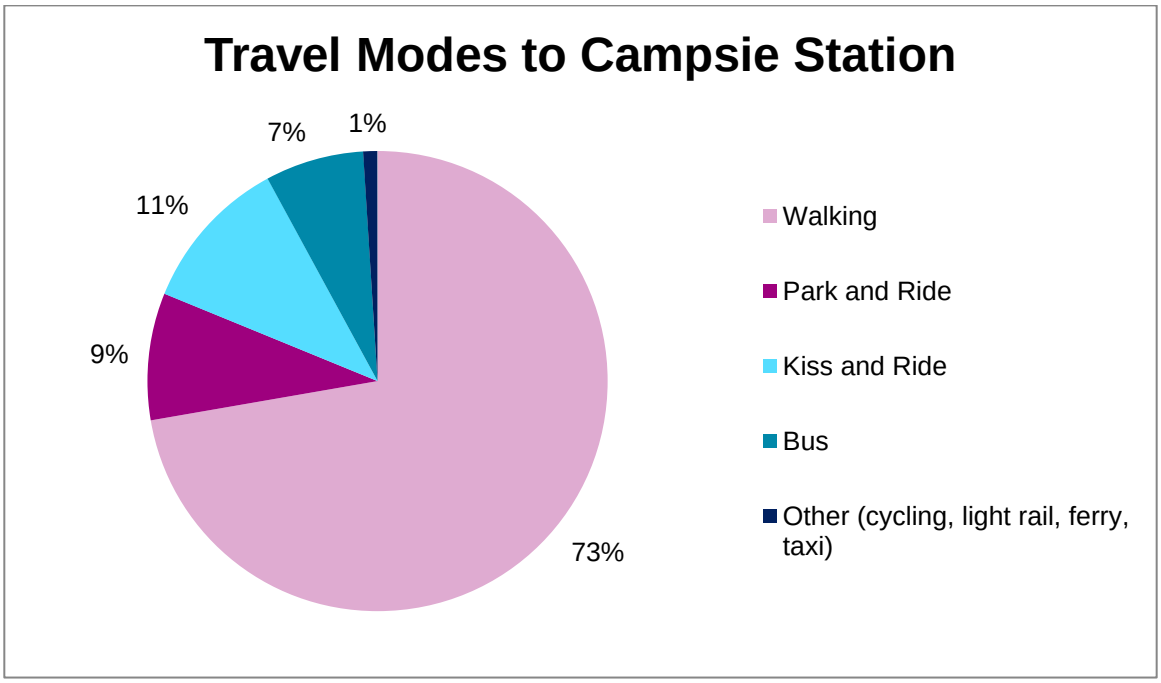


Figure 3.13 Travel modes to the station- Campsie (TfNSW, 2014)

3.6.2 Walking

There is a good walking catchment in the Campsie precinct, with linear intersecting Regional roads and perpendicular Local roads (NSW Govt. 2015), resulting in a high proportion of rail users walking to the station. The Regional and Local roads have footpaths on either side of the road to cater for pedestrians.

3.6.3 Cycling

The Cooks River cycleway runs along the northern boundary of Campsie precinct (NSW Govt. 2015) as shown in **Figure 3.14**. It should be noted that there is no direct cycle path on or off road which connects to Campsie Station.

However, as shown in the figure there are some roads in the area which have on road cycle lanes/road shoulders/mixed traffic lanes to provide some amenity to cyclists (RMS NSW Gov 2016).

Currently there are 10 multi bike racks which supply 10 bike spaces on Beamish Street outside the station. There is a demand of 28 bike spaces meaning there is a shortfall in supply, with additional bikes parked along the guard rail in front of the main station entrance.

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Station location, railway lines, cycle routes and existing bus routes in the Campsie area

FIGURE 3.14

3.6.4 Bus

Campsie is a major hub for bus and rail interchange. The precinct is serviced by nine bus routes including a frequent service providing north-south connections to Macquarie Park shown in **Figure 3.14**.

Bus stops on Beamish Street and South Parade provide access to the station. A bus stop on Beamish Street south of the Campsie station provides service to bus passengers travelling north on the 412, 415, 487 and 473 services wanting to interchange with the train station. They use the signalised crossing at the intersection of Lilian Lane and Beamish Street. This is approximately 90m to the station entry. Bus passengers travelling north on the 400, 490 and 492 services use the bus stop on Beamish Street north of the train station. They cross one pedestrian crossing on North Parade in order to interchange with the station which is approximately 70m to the station entry.

There is also another bus stop on Beamish Street providing service to bus passengers travelling south on the 400, 490 and 492 services. Bus passengers travelling south on the 412, 415, 473 and 487 services use the bus stop on South Parade. Passengers disembarking at both of these stops use the signalised crossings at the intersection of South Parade and Beamish Street which is approximately 70m to the station entry.

The 2016 survey of 592 people found that 7% of rail passengers used the bus to travel to the train station.

The bus frequency is shown in **Table 3.27**

Table 3.27 Bus frequency - Campsie Station (Sydney Buses 2016)

Route Number	Weekday	Weekday	Weekend
	Frequency (Peak)	Frequency (Off peak)	Frequency
400	Approx. 20 mins	Approx. 20 mins	Approx. 20 mins
412	Approx. 15 mins	Approx. 20 mins	Approx. 20 mins
415	Approx. 30 mins	Approx. 30 mins	Approx. 30 mins
444	Approx. 20 mins	None	Approx. 30 mins
445	None	Approx. 20 mins	Approx. 20 mins
473	30 mins	30 mins	1 hour
487	Approx. 30 mins	30 mins	Approx. 35 mins
490	30 mins	30 mins	30 mins
492	30 mins	30 mins	30 mins

3.6.5 Road Network

The existing road network in the Campsie precinct contains a number of State, Regional roads and Local roads, as described below.

State

- Canterbury Road.

Regional

- Beamish Street
- Brighton Avenue
- Fifth Avenue
- Ninth Avenue.

Local

- Bellombi Street
- Evaline Street
- Loch Street
- Campsie Street
- Carrington Square
- Amy Street
- Wilfred Avenue
- Duke Street
- Browning Street
- Clissold Parade
- South Parade
- North Parade.

3.6.6 Traffic Data

Traffic turning counts and queue length surveys were undertaken during three separate surveys between April and December 2016 to provide data for this assessment.

The existing approach traffic volumes for the intersections assessed are provided in **Table 3.28**.

All intersections surrounding Campsie Station currently operate at a level of service C or above. Refer to Chapter 5 for details of intersection performance and a map showing the location of the intersections modelled.

Table 3.28 Campsie Existing Traffic Volumes

Intersection	Road	Approach Arm	AM Peak (Veh per hour)	PM Peak (Veh per hour)
B.10 Beamish Street/Ninth Avenue	Beamish Street	North	404	612
	Beamish Street	South	741	706
	Ninth Avenue	West	608	550
B.11 Beamish Street/Clissold Parade	Beamish Street	North	648	708
	Clissold Parade	West	85	164
	Beamish Street	South	713	692
B.12 Beamish Street/South Parade	Beamish Street	North	649	735
	South Parade	East	168	142
	Beamish Street	South	571	518
	Lillian Street	West	83	74
H.11 Beamish Street/North Parade	Beamish Street	North	663	655
	North Parade	East	34	34
	Beamish Street	South	654	704
	North Parade	West	54	43

Intersection	Road	Approach Arm	AM Peak (Veh per hour)	PM Peak (Veh per hour)
H.12 Beamish Street/Amy Street	Beamish Street	North	522	585
	Beamish Street	South	564	589
	Amy Street	West	36	40
H.13 Canterbury Road/Beamish Street	Beamish Street	North	467	544
	Canterbury Road	East	910	1197
	Bexley Road	South	971	846
	Canterbury Road	West	1585	1184
Ninth Avenue/Loch Street	Ninth Avenue	East	613	854
	Loch Street	South	754	805
	Ninth Avenue	West	638	574

Further details of these counts are provided in **Appendix A**.

3.6.7 Commuter Parking

Campsie has approximately 1550 parking spaces in the area surrounding the station with 138 dedicated commuter spaces falling within the rail corridor as shown in **Table 3.29** overleaf.

The 138 dedicated commuter spaces at or near Campsie Station cater for the (approximately) nine percent of the users of the station who choose to park and ride (Arup 2015).

There are currently four kiss and ride parking spaces and six taxi parking bays at Campsie Station.

Table 3.29 Campsie Station Parking Summary

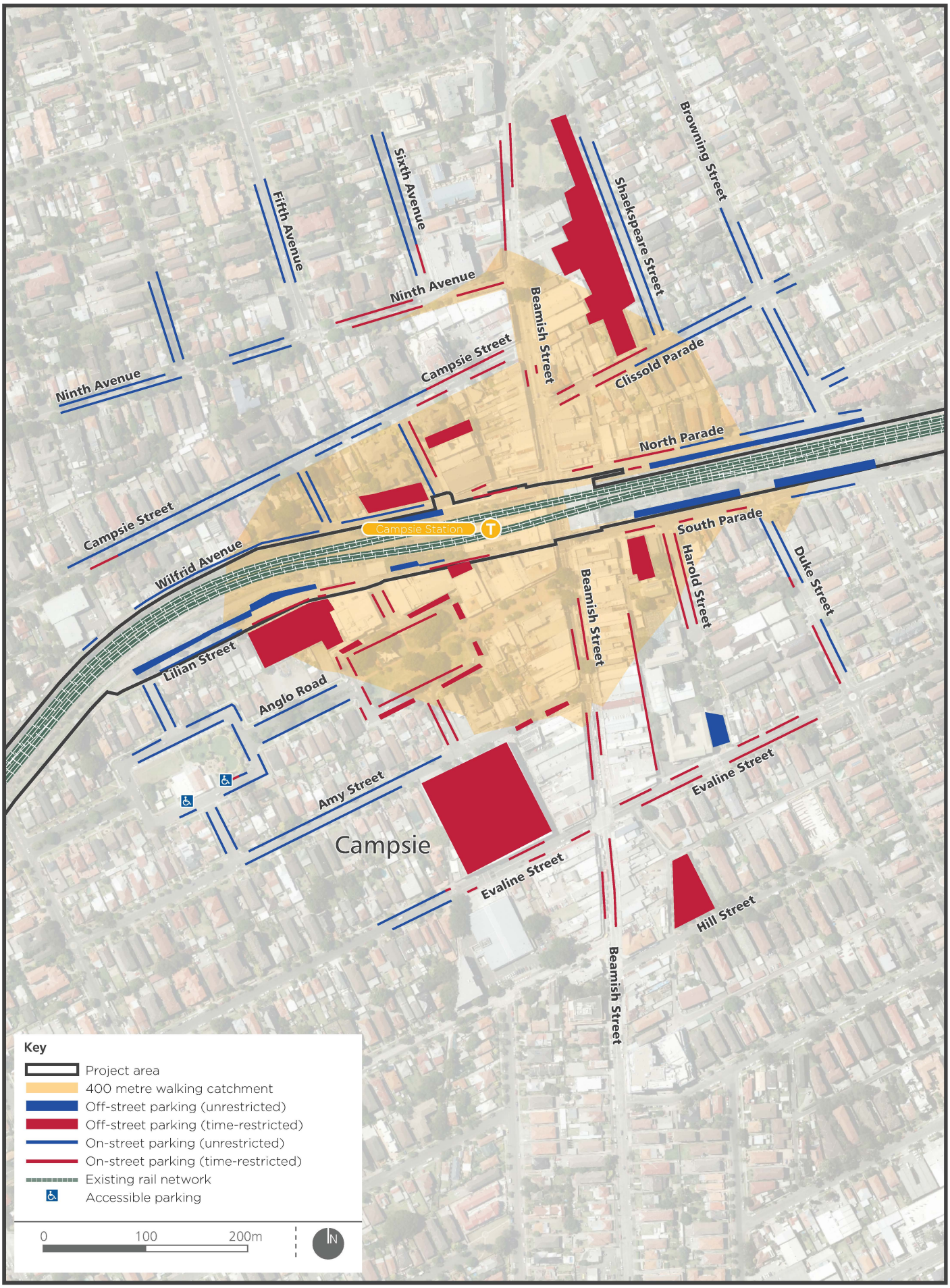
Dedicated Commuter spaces	Kiss and Ride spaces	Total Parking Capacity
138	4	1539

Table 3.30 below outlines the total capacity and utilisation of the parking spaces available to commuters, and highlights that both on and off-street parking spaces are highly utilised at present.

Table 3.30 Campsie Station Parking Capacity and Utilisation within 400m Radius

	On-street		Off-street	
Time Restriction	Capacity	Utilisation (%)	Capacity	Utilisation (%)
Unrestricted	759	87%	166	100%
Time restricted	286	81%	328	100%
Overall	**1045**	**85%**	**494**	**100%**

Figure 3.15 shows the type and location of parking spaces available in the vicinity of Campsie Station.



Parking restrictions around Campsie station

FIGURE 3.15

3.7 Belmore

Belmore is approximately 13.3km from Sydney's CBD, falling under the City of Canterbury-Bankstown local government area.

Belmore had 9720 residents in 2011 and provided 3018 jobs (according to the 2011 census). The majority of jobs are in retail and hospitality (37%).

North-south movement is limited by the presence of the T3 Bankstown Line, as shown in **Figure 3.17** overleaf**.**

3.7.1 Modes of Travel

Of 310 passengers using Belmore Railway Station, almost two thirds of people walk to the station (TfNSW, 2014). The remaining passengers connect to the station by bike or bus, with a third travelling by car, either to be dropped off (11%) or park around the station (21%). The percentages for different modes are shown in **Figure 3.16**.

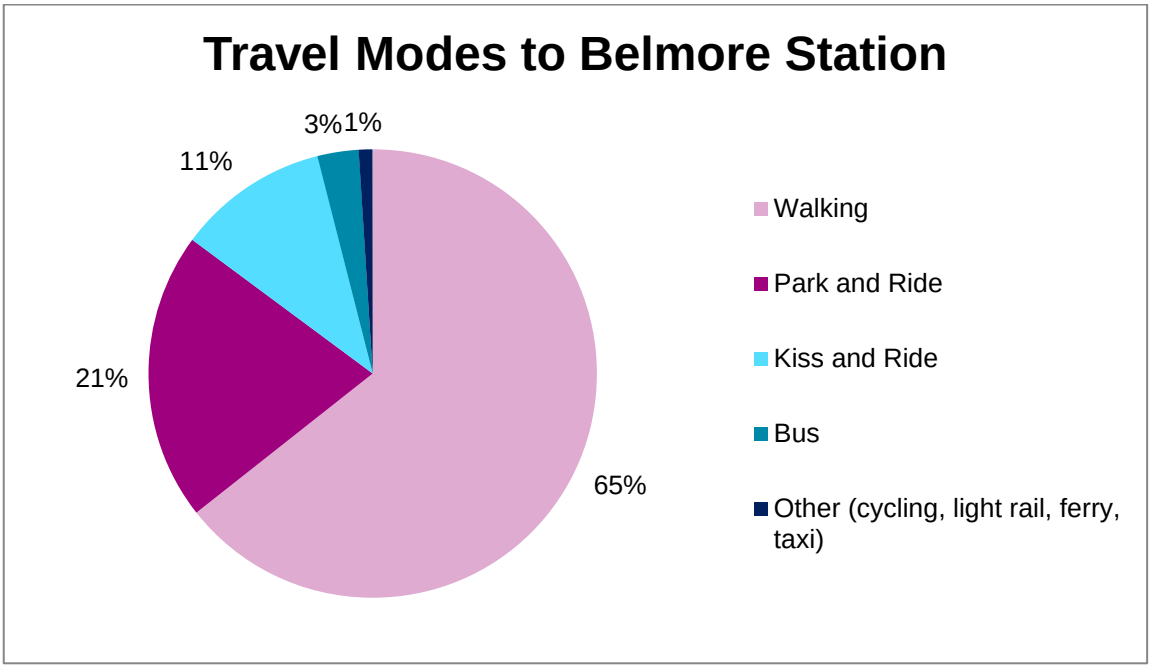


Figure 3.16 Travel modes to the station- Belmore (TfNSW, 2014)

3.7.2 Walking

There is a good walking catchment in the Belmore precinct, with linear intersecting primary roads and perpendicular secondary streets within a predominantly residential area (NSW Govt. 2015), resulting in a high proportion of rail users walking to the station. The primary and secondary roads have footpaths on either side of the road to cater for pedestrians.

However, the railway limits north south pedestrian movement between the two commercial sides of the Belmore precinct.

3.7.3 Cycling

An off street shared path links the station to the east of the precinct and to Belmore Sports Ground (NSW Govt. 2015) as shown **in Figure 3.17**.

The remainder of the local road network offers relatively low amenity for cyclists in the form of on or off road facilities.

Currently there are five multi bike racks which supply five bike spaces on Burwood Road 20m north of the station entrance. There is a demand of four bike spaces meaning that supply is sufficient to accommodate the demand. Despite the extra available bike parking spaces, one cyclist chose to park along the fence.

Station location, railway lines, cycle routes and existing bus routes in the Belmore area

FIGURE 3.17

3.7.4 Bus

Belmore is serviced by two bus routes that travel along Burwood Road, as shown in **Figure 3.17**. These routes connect the precinct to Haberfield, Burwood, Strathfield, Campsie and Roselands.

A bus stop on Burwood Road immediately south of the Belmore Station services both the 415 and 942 southbound routes providing direct access to Belmore station. Bus passengers interchanging with Belmore station do not need to make any road crossings to access the station. This distance from the bus stop is approximately 40m to the station entry.

There is also another bus stop on Burwood Road providing service to bus passengers travelling north on the 415 and 942 buses wanting to interchange with the train station. They use pedestrian refuge island on Bridge Road and the signalised pedestrian crossing on Burwood Road in order to get to the station. This is approximately 90m to the station entry.

The 2016 survey of 310 people found that only 3% of rail passengers used the bus to travel to the station.

The frequency of service is shown in **Table 3.31**.

Table 3.31 Bus frequency - Belmore Station (Sydney Buses 2016)

Route Number	Weekday	Weekday	Weekend
	Frequency (Peak)	Frequency (Off peak)	Frequency
415	Approx. 30 mins	Approx. 30 mins	Approx. 30 mins
942	Approx. 30 mins	Approx. 30 mins	Approx. 30 mins

3.7.5 Road Network

The existing road network in the Belmore precinct contains a number of State, Regional roads and Local roads as described below.

State

- Canterbury Road.

Regional

- Burwood Road
- Lakemba Street.

Local

- Leylands Parade
- Bridge Road
- Peel Street
- Redman Parade
- Acacia Lane.

3.7.6 Traffic data

Traffic turning counts and queue length surveys were undertaken during three separate surveys between April and December 2016 to provide data for this assessment.

The existing approach traffic volumes for the intersections assessed are provided in **Table 3.32**.

All intersections surrounding Belmore Station currently operate at a level of service B or above. Refer to Chapter 5 for details of intersection performance and a map showing the location of the intersections modelled.

Table 3.32 Belmore Existing Traffic Volumes

Intersection	Road	Approach Arm	AM Peak (Veh per hour)	PM Peak (Veh per hour)
B.08 Burwood Road / Bridge Road	Burwood Road	North	733	759
	Tobruk Avenue	East	14	24
	Burwood Road	South	742	653
	Bridge Road	West	212	180
B.09 Burwood Road / Redman Parade	Burwood Road	North	701	753
	Redman Parade	East	150	183
	Burwood Road	South	768	672
H.20 Burwood Road / Lakemba Street	Burwood Road	North	555	680
	Lakemba Street	East	382	499
	Burwood Road	South	572	633
	Lakemba Street	West	576	480
H.33 Canterbury Road / Burwood Road	Burwood Road	North	199	271
	Canterbury Road	East	812	1419
	Canterbury Road	West	1515	1008
Burwood Road at Belmore Station[10]	Burwood Road	North	780	864
	Burwood Road	South	812	674

Further details of these counts are provided in **Appendix A**.

3.7.7 Commuter Parking

Belmore has approximately 1200 parking spaces in the area surrounding the station with 56 dedicated commuter spaces as shown in **Table 3.33** below. **Table 3.34** below outlines the total capacity and utilisation of the parking spaces available to commuters.

The 56 dedicated commuter spaces at or near Belmore Station cater for the (approximately) 21% of the users of the station who choose to park and ride (Arup 2015).

There is currently no kiss and ride parking spaces but there are four taxi parking bays at Belmore Station.

Table 3.33 Belmore Station Parking Summary

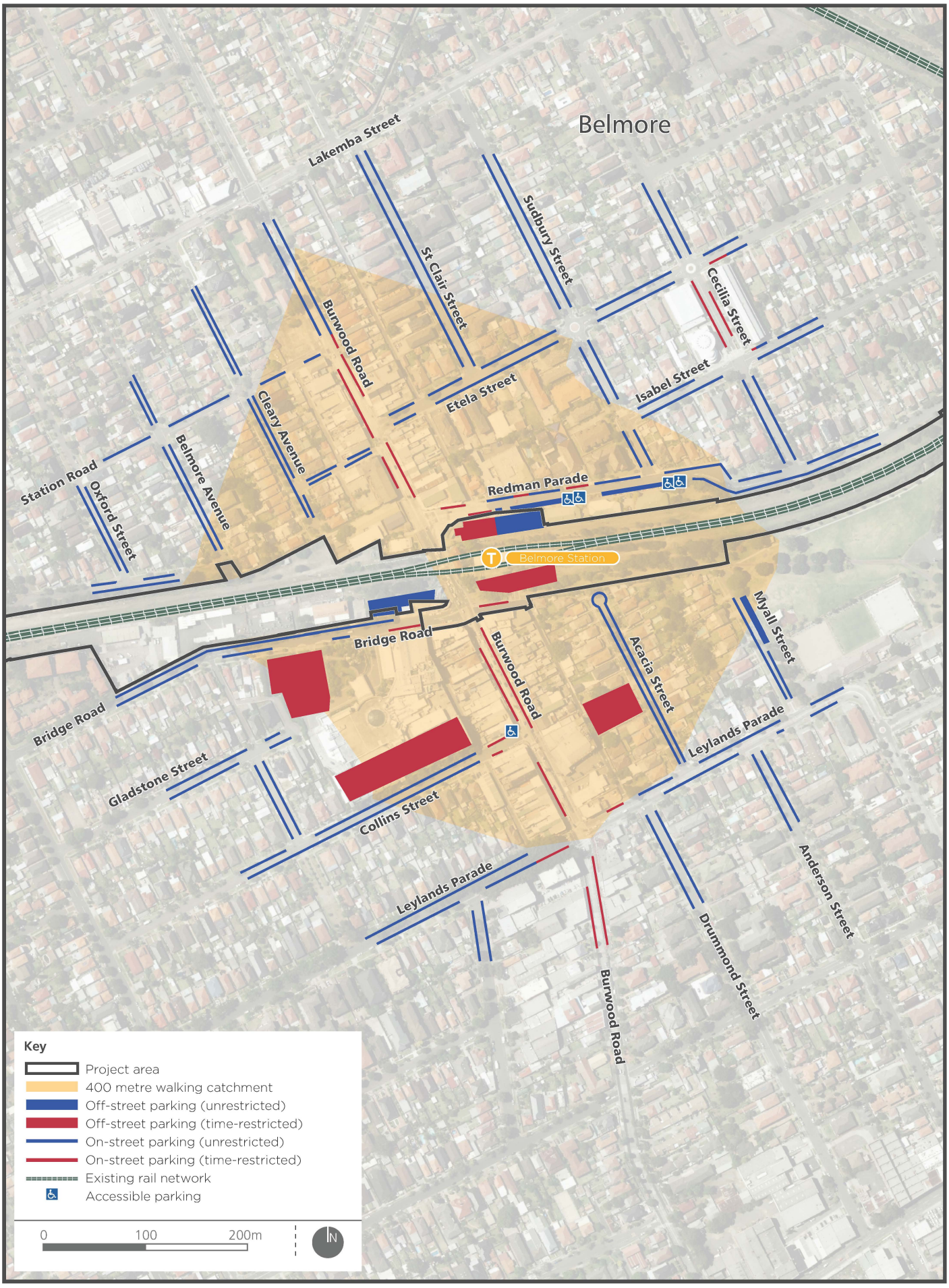
Dedicated Commuter spaces	Kiss and Ride spaces	Total Parking Capacity
56	0	1220

Table 3.34 Belmore Station Parking Capacity and Utilisation within 400m Radius

	On-street		Off-street	
Time Restriction	Capacity	Utilisation (%)	Capacity	Utilisation (%)
Unrestricted	914	75%	63	82%
Time restricted	164	84%	79	100%
Overall	**1078**	**76%**	**142**	**92%**

Figure 3.18 shows the type and location of parking spaces available in the vicinity of Belmore Station.

[10] Traffic flows on Burwood Road have been included in this table as there is a mid-block pedestrian crossing which may be impacted by TTS. This is assessed in Chapter 5.



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Parking restrictions around Belmore station

FIGURE 3.18

3.8 Lakemba

Lakemba is approximately 16km from Sydney's CBD falling under the City of Canterbury-Bankstown local government area.

Lakemba had 14590 residents in 2011 and provided 2565 jobs (according to the 2011 census). A total of 41% of jobs are in education, health care and public services, while 27% are in retail and hospitality. Lakemba Station is at the centre of the precinct as shown in **Figure 3.20** overleaf.

3.8.1 Modes of Travel

Of 446 surveyed passengers using Lakemba Station, the majority of people (73%) walked to the station (TfNSW, 2014). The remaining passengers connect to the station by bike or bus, with one quarter travelling by car, either to be dropped off (10%) or parking around the station (15%). Travel modes are shown in **Figure 3.19**.

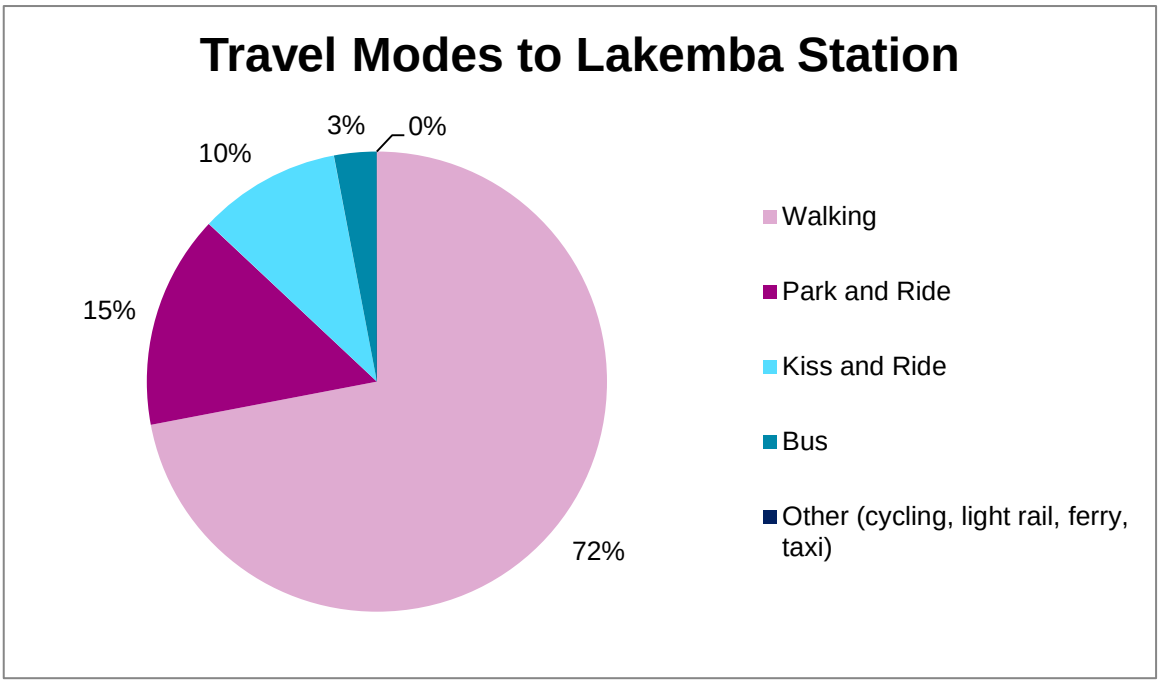


Figure 3.19 Travel modes to the station- Lakemba (TfNSW, 2014)

3.8.2 Walking

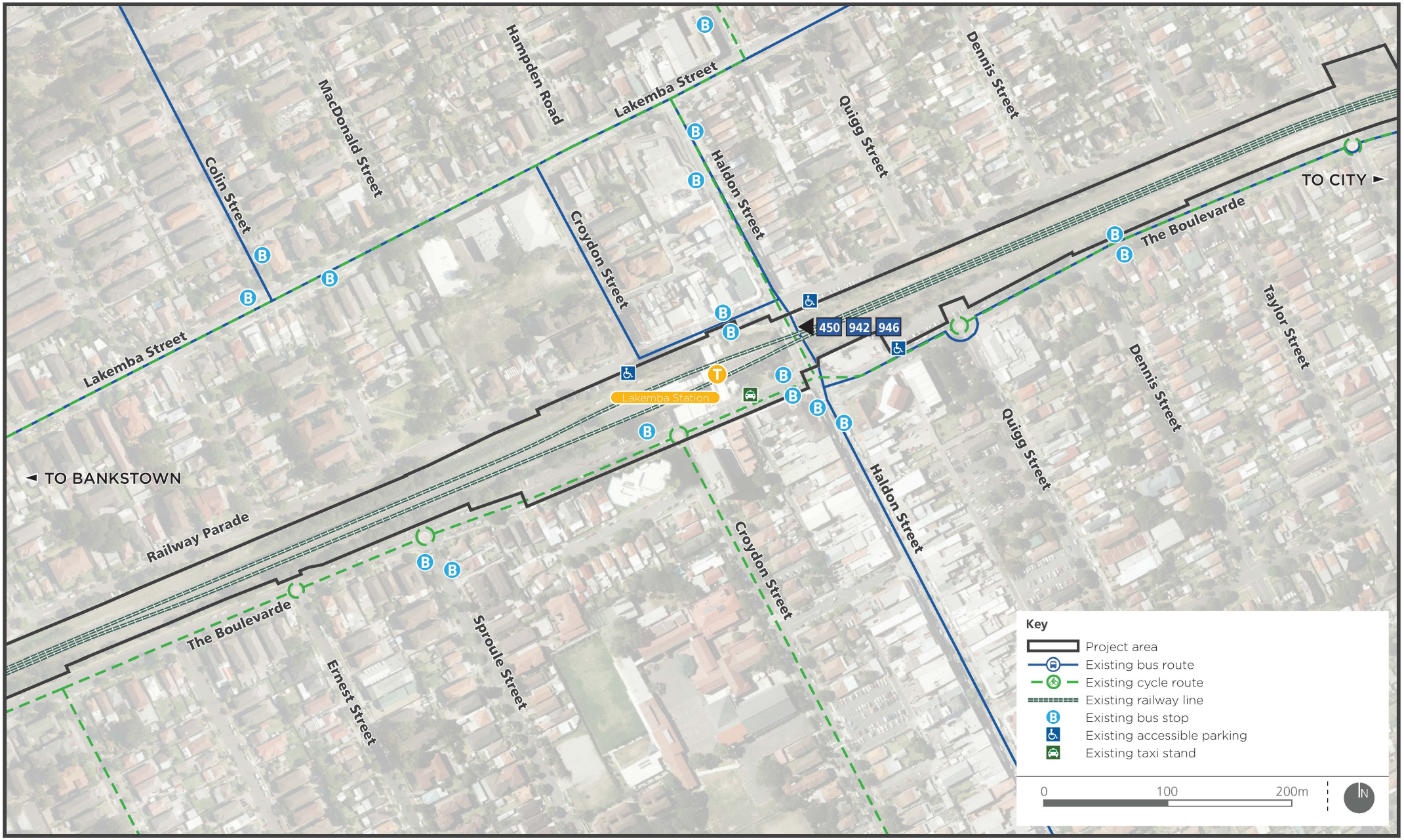
There is a good walking catchment in the Lakemba precinct, with linear intersecting primary roads and perpendicular secondary streets in a predominantly residential area (NSW Govt. 2015), resulting in a high proportion of rail users walking to the station. The primary and secondary roads have footpaths on either side of the road to cater for pedestrians.

The centre of Lakemba precinct (Haldon Street) has low vehicle speeds and narrow carriageways which make it an attractive area for pedestrians as reflected in the high modal share for walking in.

3.8.3 Cycling

Lakemba does not have any off-street cycleways in the precinct; however there are some roads which have on road facilities as illustrated in **Figure 3.20**. These roads include Lakemba Street, Haldon Street, and Wangee Street (RMS NSW Gov 2016).

Currently there are provisions for bike parking on the northern side of The Boulevarde and the southern side of Railway Parade. The types of bike parking are outlined in **Table 3.35**.



Station location, railway lines, cycle routes and existing bus routes in the Lakemba area

FIGURE 3.20

Table 3.35 Lakemba Bike Facilities

Location	Type of Parking	Bike Parking Supply
The Boulevarde	Multi bike rack	4 spaces
Railway Parade	Multi bike rack	4 spaces

The demand is for eight bike spaces in total across the two locations meaning the supply matches the current demand.

3.8.4 Bus

Lakemba has relatively good bus access with three services travelling through the precinct, as shown in **Figure 3.20.** Frequent services are provided to Roselands, Greenacre, Bankstown, Hurstville, Burwood and Strathfield.

A bus stop on Railway Parade immediately north of the Lakemba Station services the 942 northbound route providing direct access to Lakemba Station. Bus passengers interchanging with Lakemba Station do not need to make any road crossings to access the station. This distance from the bus stop is approximately 20m to the station entry. Bus passengers travelling south on the 942 service use the bus stop on the northern side of Railway Parade. They cross one pedestrian crossing in order to interchange with the station which is approximately 40m to the station entry.

There is also another bus stop on Haldon Street providing service to bus passengers travelling north on the 450 and 946 buses wanting to interchange with the train station. They use signalised pedestrian crossing on The Boulevarde in order to get to the station. This is approximately 110m to the station entry. Bus passengers travelling south on the 450 and 946 services use the bus stop on the eastern side of Haldon Street. They use the signalised crossing at the intersection of Haldon Street and The Boulevarde and the signalised pedestrian crossing on The Boulevarde in order to get to the station. This is approximately 130m to the station entry.

The 2016 survey of 446 people found that only 3% of rail passengers used the bus to travel to the station.

The bus frequency is shown in **Table 3.36**.

Table 3.36 Bus frequency- Lakemba Station (Sydney Buses 2016)

Route Number	Weekday	Weekday	Weekend
	Frequency (Peak)	Frequency (Off peak)	Frequency
450	Approx. 15 mins	Unknown	Unknown
942	Approx. 30 mins	Unknown	Unknown
946	Approx. 30 mins	Unknown	Unknown

3.8.5 Road Network

The existing road network in the Lakemba precinct contains a number of State, Regional and Local roads, as described below.

State

- Punchbowl Road
- Canterbury Road.

Regional

- Lakemba Street.

Local

- Moreton Street
- The Boulevarde
- Wangee Road
- Haldon Street
- Sproule Street
- Croydon Street
- Railway Parade
- Colin Street.

3.8.6 Traffic data

Traffic turning counts and queue length surveys were undertaken during three separate surveys between April and December 2016 to provide data for this assessment.

The existing approach traffic volumes for the intersections assessed are provided in **Table 3.37**.

All intersections surrounding Lakemba Station currently operate at a level of service C or above. Refer to Chapter 5 for details of intersection performance and a map showing the location of the intersections modelled.

Table 3.37 Lakemba Existing Traffic Volumes

Intersection	Road	Approach Arm	AM Peak (Veh per hour)	PM Peak (Veh per hour)
B.07 The Boulevarde / Haldon Street	Haldon Street	North	658	675
	The Boulevarde	East	250	393
	Haldon Street	South	404	366
	The Boulevarde	West	554	454
H.07 Lakemba Street / Wangee Road	Wangee Road	North	397	490
	Lakemba Street	East	304	513
	Lakemba Street	West	801	648
H.08 Haldon Street / Railway Parade	Haldon Street	North	520	541
	Railway Parade	East	77	128
	Haldon Street	South	556	585
	Railway Parade	West	113	127
H.09 Lakemba Street / Haldon Street	Lakemba Street	East	592	840
	Haldon Street	South	428	406
	Lakemba Street	West	702	602
The Boulevarde Ped Crossing	The Boulevarde	East	407	548
	The Boulevarde	West	554	454
H.21 Canterbury Road / Haldon Street	Haldon Street	North	290	331
	Canterbury Road	East	806	1347
	Canterbury Road	West	1655	1220

Further details of these counts are provided in **Appendix A**.

3.8.7 Commuter Parking

Lakemba Station has approximately 1500 parking spaces in the area surrounding the station with 138 dedicated commuter spaces, as shown in **Table 3.38** below.

Table 3.39 below outlines the total capacity and level of utilisation of the parking spaces available to commuters.

The 138 dedicated commuter spaces at or near Lakemba Station cater for the approximately 15% of the users of the station who choose to park and ride (Arup 2015).

There is one kiss and ride parking space and three taxi parking bays at Lakemba Station.

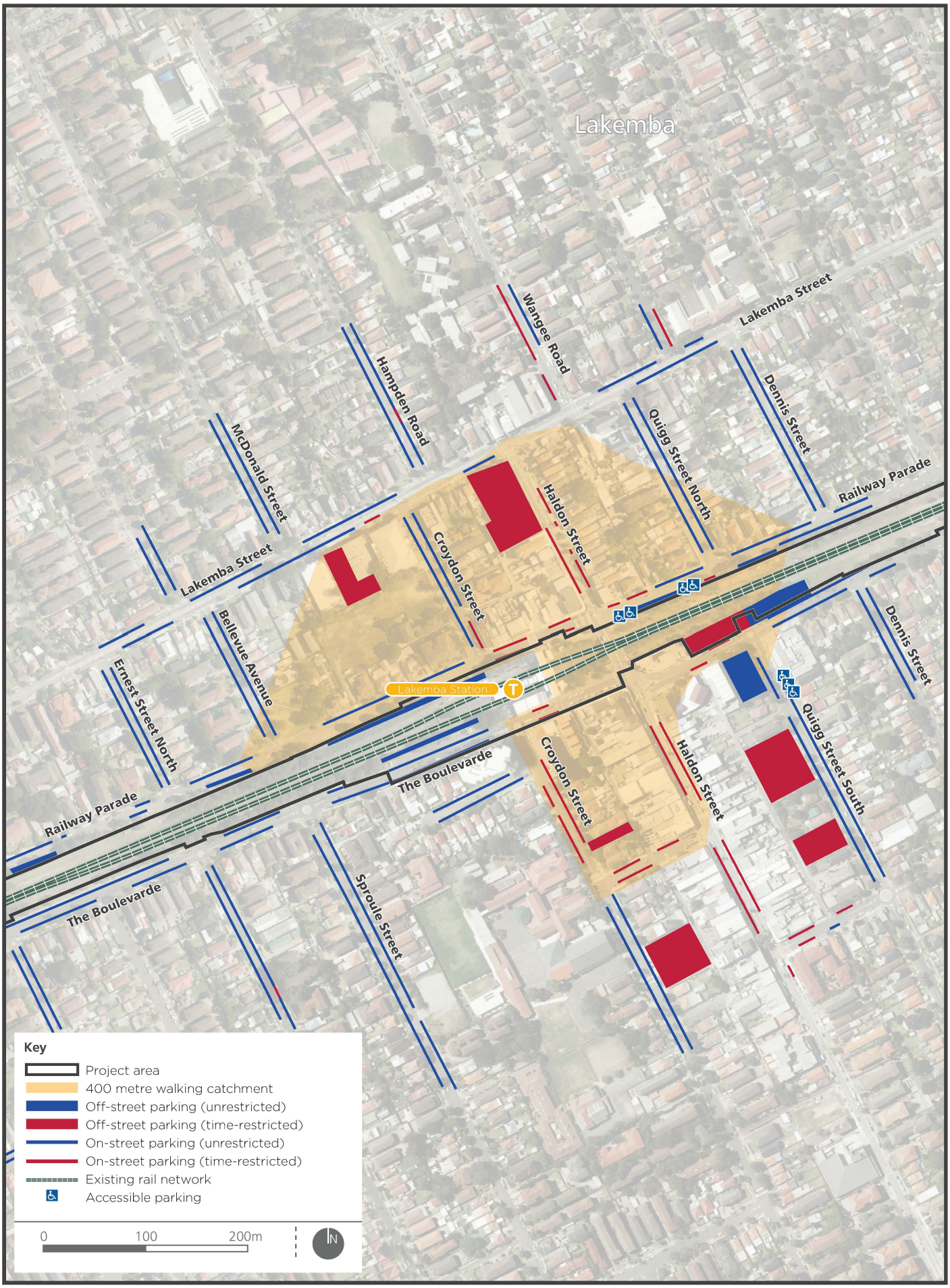
Table 3.38 Lakemba Station Parking Summary

Dedicated Commuter spaces	Kiss and Ride spaces	Total Parking Capacity
138	1	1498

Table 3.39 Lakemba Station Parking Capacity and Utilisation within 400m Radius

	On-street		Off-street	
Time Restriction	Capacity	Utilisation (%)	Capacity	Utilisation (%)
Unrestricted	775	86%	190	100%
Time restricted	186	83%	347	77%
Overall	**961**	**85%**	**537**	**86%**

Figure 3.21 shows the type and location of parking spaces available in the vicinity of Lakemba Station.



Parking restrictions around Lakemba station

FIGURE 3.21

3.9 Wiley Park

Wiley Park is approximately 15km from Sydney's CBD, falling within the City of Canterbury-Bankstown local government area.

Wiley Park had 9081 residents in 2011 and provided 786 jobs (according to the 2011 census). In all 40% of jobs were in retail and hospitality and 39% were in education, health care and public services.

King Georges Road in a north-south direction and the T3 Bankstown Line in an east-west direction limits connectivity in the area as shown on **Figure 3.23** overleaf.

3.9.1 Modes of Travel

Of the 245 surveyed passengers using Wiley Park Station, the majority of people (90%) walked to the station (TfNSW, 2014). No bus use was identified for passengers travelling to this station. The remaining passengers travelled to the station by car, either to be dropped off (4%) or parking around the station (6%). Travel modes are shown in **Figure 3.22**.

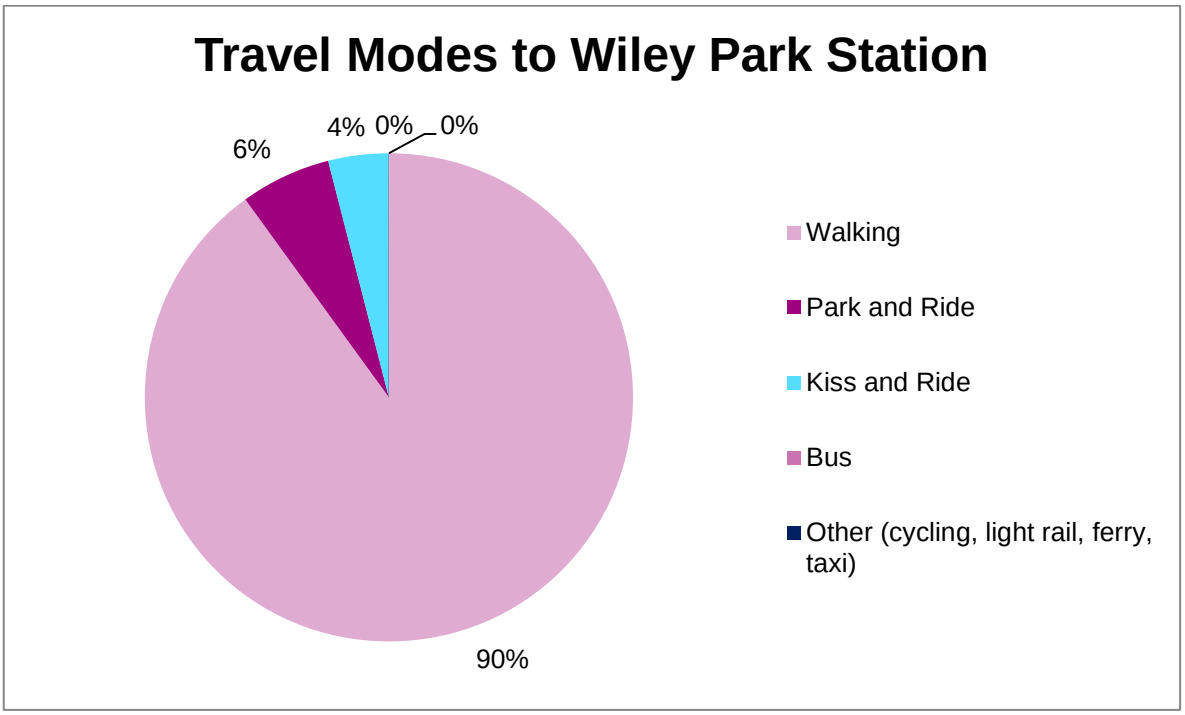


Figure 3.22 Travel modes to the station - Wiley Park (TfNSW, 2014)

3.9.2 Walking

There is a good walking catchment in the Wiley Park precinct, with linear, intersecting primary roads and perpendicular secondary streets in a predominantly residential area (NSW Govt. 2015), resulting in a high proportion of rail users walking to the station. The primary and secondary roads have footpaths on either side.

King Georges Road runs in a north-south direction and is a six lane Regional road with heavy traffic flows. This limits movements from one side of the precinct to the other. The railway line acts as a barrier in an east-west direction also limiting pedestrian connectivity in the area.

3.9.3 Cycling

As shown in **Figure 3.23**, only Urunga Parade and Lakemba Street provide specific infrastructure to support cyclists accessing Wiley Park Station (RMS NSW Gov 2016). Bike friendly roads are also depicted in **Figure 3.23**.

Currently there are four multi bike racks which supply four bike spaces on King Georges Road outside the station. There is a demand of six bike spaces meaning there is a shortfall in supply.

Station location, railway lines, cycle routes and existing bus routes in the Wiley Park area

FIGURE 3.23

3.9.4 Bus

Wiley Park is serviced by two local bus routes (bus 942 and bus 487) which provide access to Campsie, Roselands and Riverwood. Although bus route 942 travels directly past Wiley Park Station and there is a bus stop near the station on King Georges Road, a 2015 survey found that no commuters used the bus to connect to the station.

Figure 3.23 shows the path of bus route 942 as it travels through the centre of the precinct. Bus 487 travels along the border of the precinct on Canterbury Road.

A bus stop on King George Road south of the Wiley Park station services the 942 northbound route providing access to Wiley Park station. Bus passengers interchanging with Wiley Park station use the signalised crossing at the intersection of The Boulevarde and King Georges Road in order to get to the station. This is approximately 80m to the station entry.

There is also another bus stop on King Georges Road providing service to bus passengers travelling south on the 942 route wanting to interchange with the train station. They use the signalised pedestrian crossing on King Georges Road in order to get to the station. This is approximately 150m to the station entry.

The bus frequency is shown in **Table 3.40**.

Table 3.40 Bus frequency - Wiley Park Station (Sydney Buses 2016)

Route Number	Weekday	Weekday	Weekend
	Frequency (Peak)	Frequency (Off peak)	Frequency
487	Approx. 30 mins	30 mins	Approx. 35 mins
942	Approx. 30 mins	Approx. 30 mins	Approx. 30 mins

3.9.5 Road Network

The existing road network in the Wiley Park precinct contains a number of State, Regional and Local roads, as described below.

State

- King Georges Road
- Canterbury Road
- Punchbowl Road.

Regional

- Lakemba Street.

Local

- The Boulevarde
- Hillcrest Street
- Alice Street
- Railway Parade
- Cornelia Street
- Urunga Parade.

3.9.6 Traffic data

Traffic turning counts and queue length surveys were undertaken during three separate surveys between April and December 2016 to provide data for this this assessment.

The existing approach traffic volumes for the intersections assessed are provided in **Table 3.41**.

All intersections surrounding Wiley Park Station currently operate at a level of service C. Refer to Chapter 5 for details of intersection performance and a map showing the location of the intersections modelled.

Table 3.41 Wiley Park Existing Traffic Volumes

Intersection	Road	Approach Arm	AM Peak (Veh per hour)	PM Peak (Veh per hour)
H.06 King Georges Road / Lakemba Street	King Georges Road	North	2170	2335
	Lakemba Street	East	275	515
	King Georges Road	South	2675	2215
	Lakemba Street	West	326	191
B.06 King Georges Road / The Boulevarde	King Georges Road	North	2285	2961
	The Boulevarde	East	341	533
	King Georges Road	South	2573	2069
	The Boulevarde	West	411	377

Further details of these counts are provided in **Appendix A**.

3.9.7 Commuter Parking

Wiley Park Station has approximately 750 parking spaces in the area surrounding the station with no dedicated commuter spaces, as shown in **Table 3.42**. No kiss and ride or taxi parking bays are located at Wiley Park Station.

Table 3.43 below outlines the total capacity and utilisation of the parking spaces available to commuters.

Despite having no dedicated commuter parking spaces, approximately 6% of the users of the station choose to park and ride (Arup 2015). It was observed that The Boulevarde had high volumes of parked vehicles during standard work hours. It is therefore assumed that commuters are using these streets for on-street informal park and ride parking.

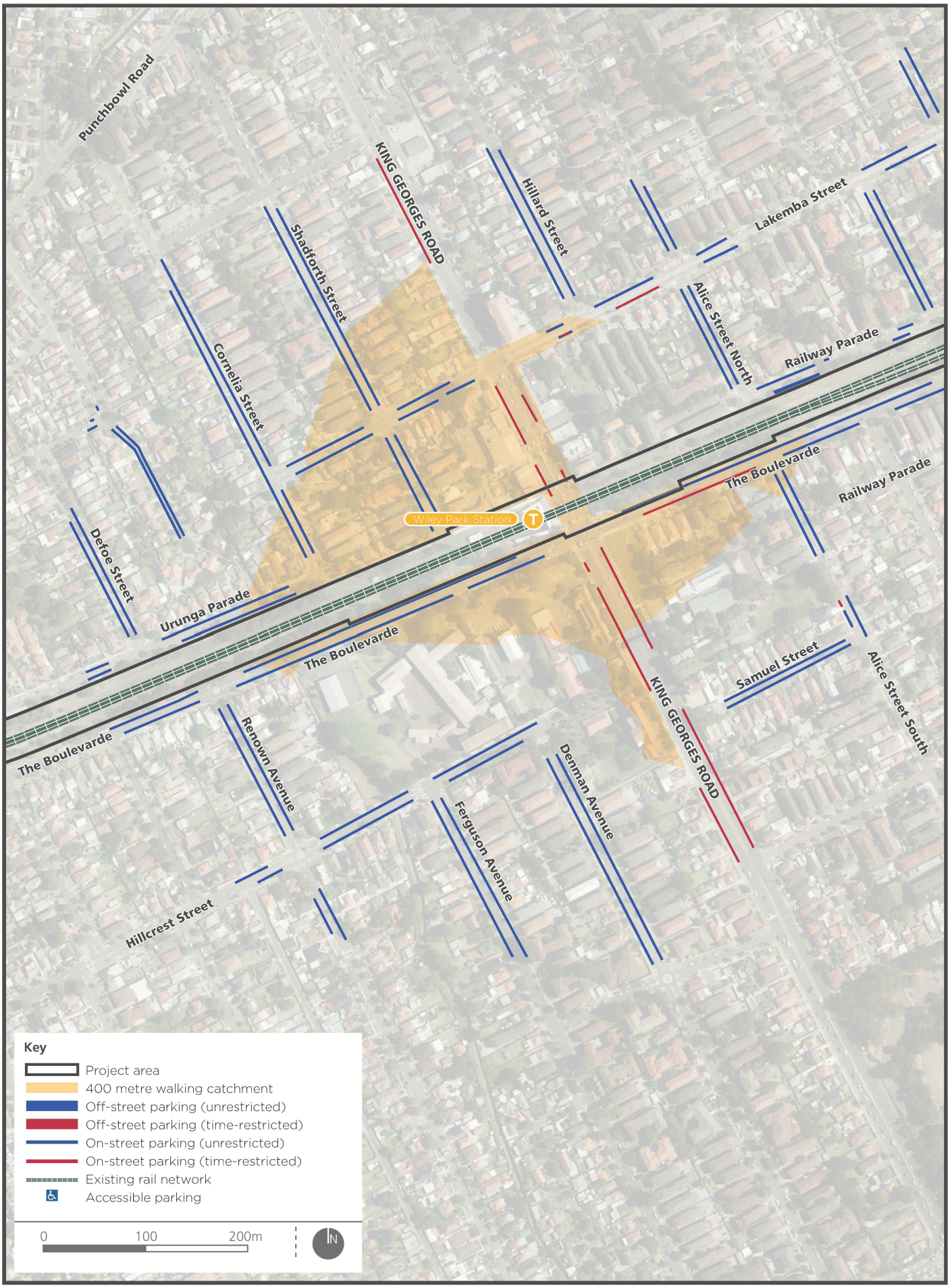
Table 3.42 Wiley Park Station Parking Summary

Dedicated Commuter spaces	Kiss and Ride spaces	Total Parking Capacity
0	0	746

Table 3.43 Wiley Park Station Parking Capacity and Utilisation within 400m Radius

	On-street		Off-street	
Time Restriction	Capacity	Utilisation (%)	Capacity	Utilisation (%)
Unrestricted	693	64%	25	60%
Time restricted	28	32%	-	-
Overall	**721**	**63%**	**25**	**60%**

Figure 3.24 shows the type and location of parking spaces available in the vicinity of Wiley Park Station.



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Parking Restrictions around Wiley Park station

FIGURE 3.24

3.10 Punchbowl

Punchbowl is approximately 16.5km from Sydney's CBD. The precinct is within the City of Canterbury-Bankstown Council local government area.

Punchbowl had 12,476 residents in 2011 and provided 1668 jobs (according to the 2011 census) with almost half the jobs in education, health care and public services (46%), while over a quarter (26%) are in retail and hospitality.

Punchbowl Road and the T3 Bankstown Line limit north-south connectivity as shown in **Figure 3.26** overleaf.

3.10.1 Modes of Travel

Of the 350 surveyed passengers using Punchbowl Station, only half of the people walked to the station (TfNSW, 2014) which is less than the majority of other stations. A small percentage used the bus to connect to the railway station. The remaining passengers connect to the station by bike, or are part of the much higher proportion being dropped off at kiss and ride facility or parking around the station. Travel modes are shown in **Figure 3.25**.

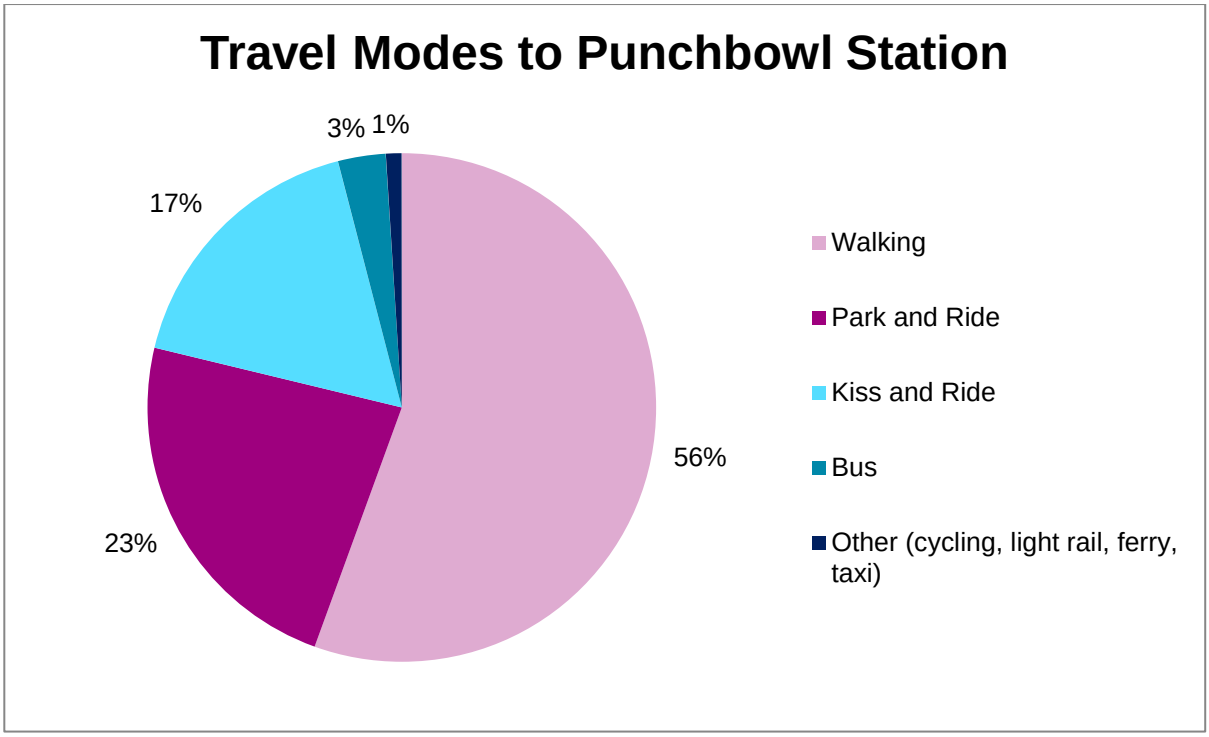


Figure 3.25 Travel modes to the station - Punchbowl (TfNSW, 2014)

3.10.2 Cycling

There are no off road cycle lanes in Punchbowl. This limits cyclist activity in the precinct (NSW Govt. 2015).

Urunga Parade is the only road in the area which has on road cycle lanes/road shoulders/mixed traffic lanes which are suitable for less experienced riders as shown in **Figure 3.26** (RMS NSW Gov 2016). The remaining roads in the area are not considered suitable for confident or experienced riders.

Station location, railway lines, cycle routes and existing bus routes in the Punchbowl area

FIGURE 3.26

Currently there are provisions for bike spaces on the northern side of The Boulevarde and the southern side of Punchbowl Road. The types of bike parking are outlined in **Table 3.44**.

Table 3.44 Punchbowl Bike Facilities

Location	Type of Parking	Bike Parking Supply
The Boulevarde	Multi bike rack	6 spaces
Punchbowl Road	Multi bike rack	6 spaces

The demand is for three bike spaces in total across the two locations meaning that the supply is sufficient to accommodate the demand.

3.10.3 Bus

Punchbowl is serviced by five bus routes that travel through the precinct. These routes connect Punchbowl to Bankstown, Roselands, Riverwood and Hurstville.

Bus stops on Punchbowl Road and The Boulevarde provide access to the station. A bus stop on Punchbowl Road north of the Punchbowl station provides service to bus passengers travelling north on the 940 service wanting to interchange with the train station. They use the signalised crossing at the intersection of Punchbowl Road and The Boulevarde. This is approximately 180m to the station entry. Bus passengers travelling south on the 940 service use the bus stop on Punchbowl Road north of the train station. They do not need to make any road crossing to access the station and need to walk approximately 190m to the station entry.

There is also another bus stop on The Boulevarde providing service to bus passengers travelling north on the 941, 944 and S14 services. They would use the signalised crossing at the intersection of The Boulevarde and Arthur Street in order to get to the station. This is approximately 70m to the station entry. Bus passengers travelling south on the 941, 944 and S14 services use the bus stop on The Boulevarde immediately south of the Punchbowl Station, they have direct access to the station. Bus passengers interchanging with Punchbowl Station do not need to make any road crossings to access the station. This distance from the bus stop is approximately 40m to the station entry.

The 2016 survey of 350 people found that only 3% of rail passengers used the bus to travel to the train station.

Figure 3.26 shows the path of four bus routes that travel through the centre of the precinct. Bus 487 travels along the border of the precinct on Canterbury Road and bus S14 operates outside of peak hours.

The bus frequency is shown in **Table 3.45**.

Table 3.45 Bus frequency - Punchbowl Station (Sydney Buses 2016)

Route Number	Weekday	Weekday	Weekend
	Frequency (Peak)	Frequency (Off peak)	Frequency
487	Approx. 30 mins	30 mins	Approx. 35 mins
940	30 mins	30 mins	60 mins
941	30 mins	30 mins	30 mins – 60 mins
944	Approx. 20 mins	30 mins	60 mins
S14	Once per day	None	None

3.10.4 Road Network

The existing road network in the Punchbowl precinct contains a number of State, Regional and Local roads, as described below.

State

- Punchbowl Road
- Canterbury Road.

Regional

- Wattle Street.

Local

- South Terrace
- Rossmore Avenue
- The Boulevarde
- Kelly Street
- Arthur Street
- Urunga Parade
- Highclere Avenue.

3.10.5 Traffic data

Traffic turning counts and queue length surveys were undertaken during three separate surveys between April and December 2016 to provide data for this assessment.

The existing approach traffic volumes for the intersections assessed are provided in **Table 3.46**.

All intersections surrounding Punchbowl Station currently operate at a level of service C or above. Refer to Chapter 5 for details of intersection performance and a map showing the location of the intersections modelled.

Table 3.46 Punchbowl Existing Traffic Volumes

Intersection	Road	Approach Arm	AM Peak (Veh per hour)	PM Peak (Veh per hour)
B.04 Punchbowl Road / South Terrace	Punchbowl Road	Northeast	769	1138
	Punchbowl Road	Southwest	797	502
	South Terrace	Northwest	621	684
B.05 Punchbowl Road / The Boulevarde	Punchbowl Road	Northeast	692	830
	The Boulevarde	Southeast	584	765
	Punchbowl Road	Southwest	1291	1001
H.05 Punchbowl Road / Rossmore Road	Punchbowl Road	Northeast	1012	1271
	Rossmore Road	Southeast	0 – Rossmore Road is a one way road	0 – Rossmore Road is a one way road
	Punchbowl Road	Southwest	1229	971
H.22 The Boulevarde / Arthur Street	The Boulevarde	East	551	676
	Arthur Street	South	277	225
	The Boulevarde	West	421	496

Further details of these counts are provided in **Appendix A**.

3.10.6 Commuter Parking

Punchbowl Station has approximately 1100 parking spaces in the area surrounding the station with dedicated 137 commuter spaces.

Table 3.48 below outlines the total capacity and utilisation of the parking spaces available to commuters.

As shown in **Table 3.47,** there are currently 137 dedicated commuter spaces at or near Punchbowl Station to cater for the approximately 23% of users of the station choosing to park and ride (Arup 2015).

There are no kiss and ride parking spaces. The precinct has two taxi parking bays located in proximity to Punchbowl Station.

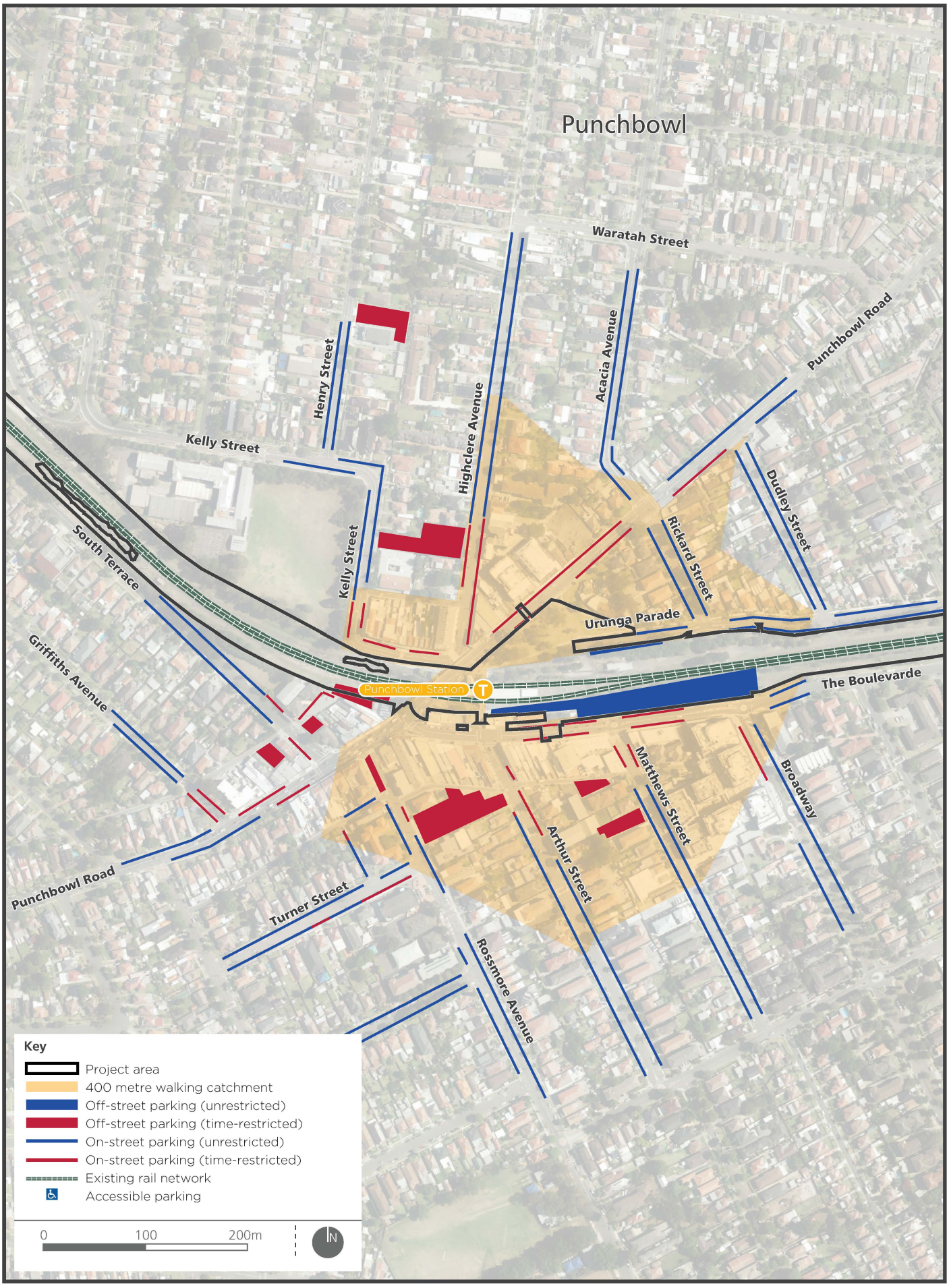
Table 3.47 Punchbowl Station Parking Summary

Dedicated Commuter spaces	Kiss and Ride spaces	Total Parking Capacity
137	0	1123

Table 3.48 Punchbowl Station Parking Capacity and Utilisation within 400m Radius

	On-street		Off-street	
Time Restriction	Capacity	Utilisation (%)	Capacity	Utilisation (%)
Unrestricted	626	79%	197	100%
Time restricted	212	78%	88	100%
Overall	**838**	**79%**	**285**	**100%**

Figure 3.27 shows the type and location of parking spaces available in the vicinity of Punchbowl Station.



Parking Restrictions around Punchbowl station

3.11 Bankstown

Bankstown Station is approximately 17km from Sydney's CBD, falling under the City of Canterbury-Bankstown Council local government area.

Bankstown had approximately 17,957 residents in 2011 and provided 10,090 jobs (according to the 2011 census). The majority of jobs are in education, healthcare and public services (40%).

Bankstown Station is at the centre of the precinct as shown on **Figure 3.29** overleaf.

3.11.1 Modes of Travel

Bankstown has the lowest sustainable travel mode share of all stations between Bankstown and Sydenham. Of the 608 surveyed passengers using Bankstown Station, around half of the people chose to walk to the station (TfNSW, 2014). Around one third of passengers travel to the station by car, either to be dropped off (19%), or parking around the station (15%). The remaining passengers travel to the station by bike or bus. Travel modes are shown in **Figure 3.28**.

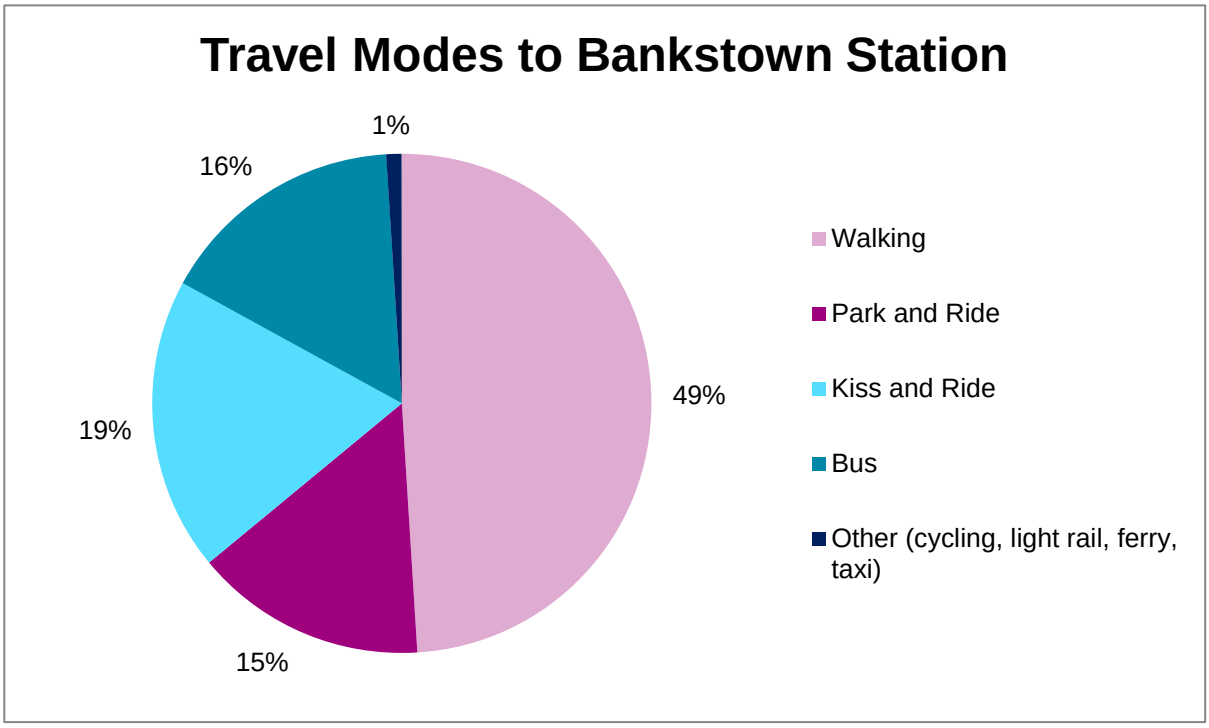


Figure 3.28 Travel modes to the station- Bankstown (TfNSW, 2014)

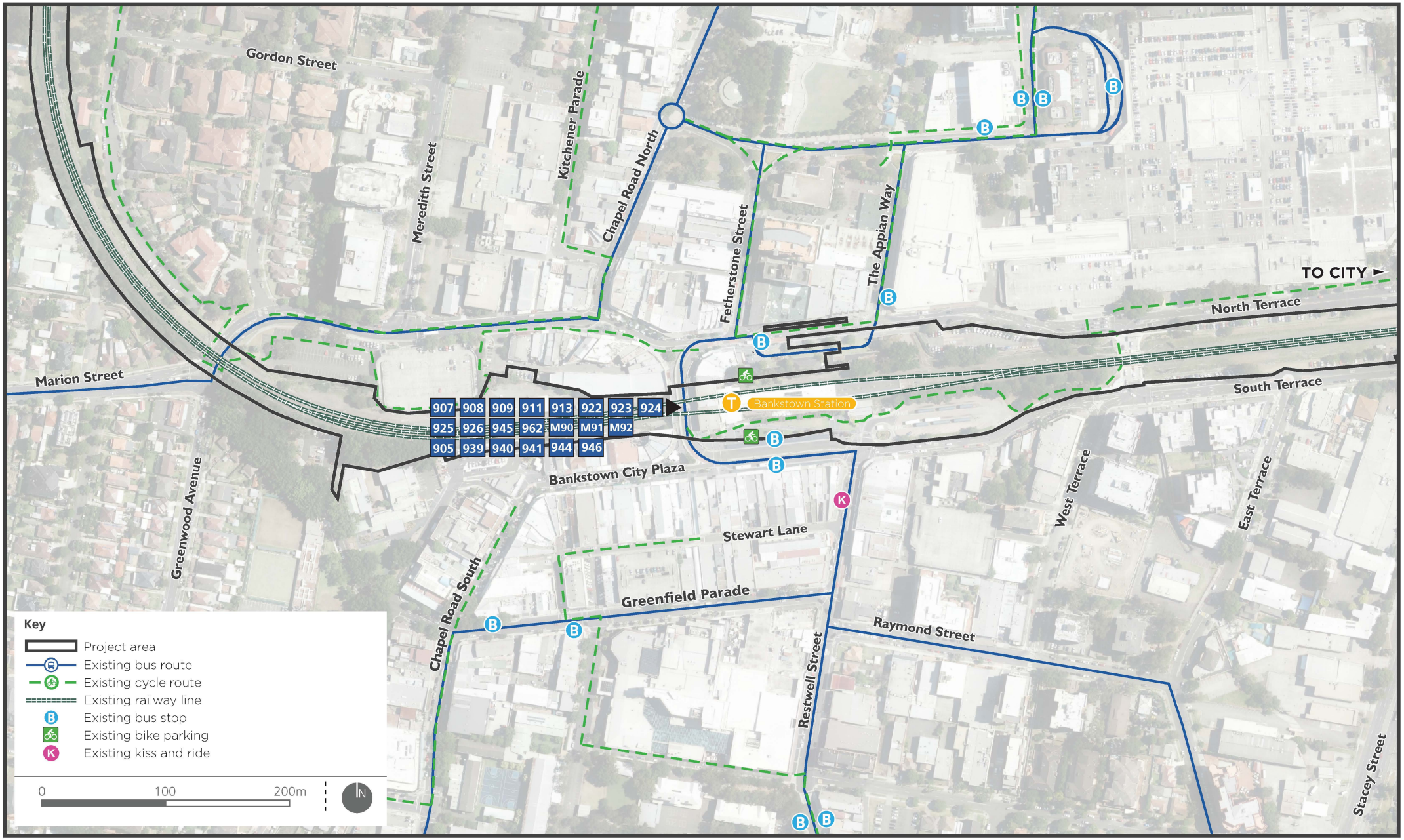
3.11.2 Walking

The walking catchment in Bankstown is mostly limited to the central area. This is a result of the railway line, major roads and large street blocks (NSW Govt. 2015). Most of the roads in the precinct have footpaths on either side.

3.11.3 Cycling

Bankstown has a number of cycleways in the precinct as shown on **Figure 3.29**. The Salt Pan Creek Cycleway connects from the south to Bankstown Memorial Park. There is also a cycleway from East Hills railway line towards Bankstown Station (NSW Govt. 2015).

There are a number of roads in the area which have on road cycle lanes/road shoulders/mixed traffic lanes which are suitable for less experienced riders (RMS NSW Gov 2016) and provide a direct connection to Bankstown Station.



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Station location, railway lines, cycle routes and existing bus routes in the Bankstown area

FIGURE 3.29

Currently there is provision for bike spaces at the Southern Terrace bus interchange, Bankstown City Plaza and Northern Terrace. The types of bike parking are outlined in **Table 3.49**.

Table 3.49 Bankstown Bike Facilities

Location	Type of Parking	Bike Parking Supply
Southern Terrace Bus Interchange	Bike Lockers	2 spaces
Bankstown City Plaza (under bus shelter)	Bespoke bike rack	6 spaces
Bankstown City Plaza (40m from station entry)	Multi bike rack	12 spaces
North Terrace	Multi bike rack	12 spaces

The demand is for 13 bike spaces in total across the four locations meaning that the supply is sufficient to accommodate the demand. Despite having sufficient supply overall, the bike spaces at Bankstown City Plaza (under bus shelter) are operating at capacity, with two bikes parking on an adjacent pole.

3.11.4 Bus

Bankstown is serviced by a large number of buses as it is the main hub for buses serving the station on the Bankstown Line, as well as providing key regional connectivity. Bankstown is a key employment, administrative and retail centre due to its location on a well-connected public transport network. Bus routes connect Bankstown to Parramatta, Lidcombe, Burwood, Liverpool, Fairfield, Hurstville and Sutherland. The bus routes are shown in **Figure 3.29**.

The main bus hub is to the south of the train station on Bankstown City Plaza with seven bus stands within approximately 160m of each other, and to the north of the train station on North Terrace with one bus stand. The bus hub is serviced by five different bus routes.

Three bus stops in Bankstown City Plaza (Bankstown Station Stand A, B and C) to the south of the station service the 905, 907, 908, 909, 911, 913, 922, 923, 924, 925, 926, 939, 940, 941, 944, 945, 946, 962, M90, M91,M92 and M30 for southbound journeys providing direct access to Bankstown Station. Bus passengers interchanging with Bankstown Station do not need to make any road crossings to access the station. The distance from Stand C is approximately 20m, 40m from Stand B and 80m from Stand A.

Three bus stops in Bankstown City Plaza (Bankstown Station Stand D, E and F) to the south of the station service the 905, 907, 908, 909, 911, 913, 922, 923, 924, 925, 926, 945, 962, M90, M91, M92 and M30 for northbound journeys providing direct access to Sydenham Station. Bus passengers interchanging with Sydenham Station use the signalised pedestrian crossing to access the station. The distance from Stand D is approximately 50m, 80m from Stand E and 110m from Stand F.

There is also another bus stop to the north of the station on North Terrace providing service to bus passengers travelling north on the 939, 940, 941, 944 and 946 services. They have direct access to Bankstown Station. Bus passengers interchanging with Bankstown Station do not need to make any road crossings to access the station. The distance from the bus stop is approximately 50m to the station entry.

The bus frequency is shown in **Table 3.50**.

Table 3.50 Bus frequency - Bankstown Station (Sydney Buses 2016)

Route Number	Weekday	Weekday	Weekend
	Frequency (Peak)	Frequency (Off peak)	Frequency
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

3.11.5 Road Network

The existing road network in the Bankstown precinct contains a number of State, Regional and Local roads as described below.

State

- Stacey Street

Regional

- Rickard Road
- Greenwood Avenue
- Wattle Street
- Marion Street (west end only)
- Meredith Street
- Chapel Road (north of Rickard Road).

Local

- North Terrace
- South Terrace
- Brandon Avenue
- Greenfield Parade
- Bankstown City Plaza
- Stewart Lane
- Restwell Street
- Raymond Street
- East Terrace
- Fetherstone Street
- The Appian Way.

3.11.6 Traffic data

Traffic turning counts and queue length surveys were undertaken during three separate surveys between April and December 2016 to provide data for this assessment.

The existing approach traffic volumes for the intersections assessed are provided in **Table 3.51**.

All modelled intersections surrounding Bankstown Station currently operate at a level of service C or above. Refer to Chapter 5 for details of intersection performance and a map showing the location of the intersections modelled.

Table 3.51 Bankstown Existing Traffic Volumes

Intersection	Road	Approach Arm	AM Peak (Veh per hour)	PM Peak (Veh per hour)
B.01 South Terrace / Restwell Street	Local Access Road	North	20	24
	South Terrace	East	0 – South Terrace is one way	0 – South Terrace is one way
	Restwell Street	South	1082	909
	Bankstown City Plaza	West	57	58
B.02 Restwell Street / Raymond Street	Restwell Street	North	35	39
	Raymond Street	East	692	852
	Restwell Street	South	469	386
	Greenfield Parade	West	163	1
B.03 South Terrace / West Terrace	Underpass	North	651	873
	South Terrace	East	693	610
	West Terrace	South	0 – West Terrace is one way	0 – West Terrace is one way
	South Terrace	West	909	784

Intersection	Road	Approach Arm	AM Peak (Veh per hour)	PM Peak (Veh per hour)
H.01 Meredith Street / Marion Street	Meredith Street	North	497	968
	Marion Street	East	449	626
	Meredith Street	South	30	153
	Marion Street	West	1643	989
H.03 Stacey Street / Wattle Street	Stacey Street	North	1889	2820
	Wattle Street	East	422	761
	Stacey Street	South	2152	1892
	Car Park	West	43	291
H.04 Stanley Street / Stacey Street	Stacey Street	North	1943	3121
	Salvia Avenue	East	228	197
	Stacey Street	South	1922	1861
	Stanley Street	West	267	258
H.30 The Appian Way / North Terrace	The Appian Way	North	648	903
	North Terrace	East	527	437
	North Terrace	West	0 – North Terrace is one way	0 – North Terrace is one way
H.31 Marion Street / Oxford Avenue	Marion Street	East	762	1290
	Oxford Avenue	South	362	383
	Marion Street	West	1524	917
H.32 Marion Street / Greenwood Avenue	Marion Street	North	769	1419
	Olympic Parade	East	404	620
	Greenwood Avenue	South	525	465
	Marion Street	West	1641	975

Further details of these counts are provided in **Appendix A**.

3.11.7 Commuter Parking

Bankstown Station has approximately 1700 parking spaces in the area surrounding the station with 147 dedicated commuter spaces. **Table 3.53** below outlines the total capacity and utilisation of the parking spaces available to commuters.

As shown in **Table 3.52** there are currently 147 dedicated commuter spaces at or near Bankstown Station to cater for the (approximately) 15% of the users of the station choosing to park and ride (Arup 2015). Noting from **Table 3.4** that some 1500 passengers enter Bankstown Station in the hour from 7:15 to 8:15, this shows that the commuter parking spaces in the vicinity are only providing a small proportion of the total commuter demand. Whilst not explicitly recorded, it is likely that the park and ride commuters are walking more than 400m between parking and the station.

The precinct also has four kiss and ride parking spaces and ten taxi parking bays.

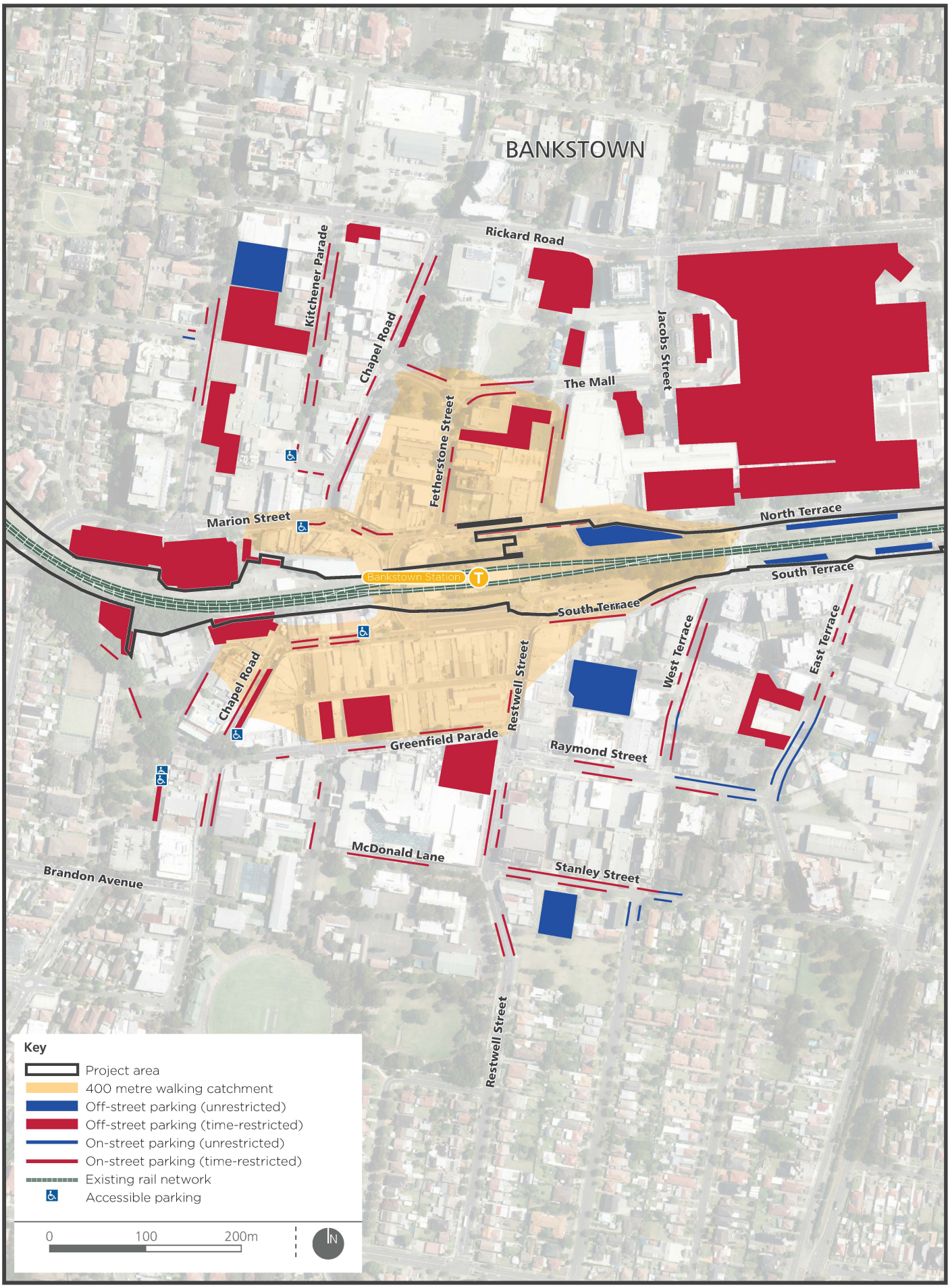
Table 3.52 Bankstown Station Parking Summary

Dedicated Commuter spaces	Kiss and Ride spaces	Total Parking Capacity
147	4	1696

Table 3.53 Bankstown Station Parking Capacity and Utilisation within 400m Radius

	On-street		Off-street	
Parking type	**Capacity**	**Utilisation (%)**	**Capacity**	**Utilisation (%)**
Unrestricted	58	98%	20	100%
Time restricted	530	93%	1088	100%
Overall	**588**	**93%**	**1108**	**100%**

Figure 3.30 overleaf shows the types and locations of parking spaces available near Bankstown Station.



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Parking restrictions around Bankstown station

FIGURE 3.30