

Charing Square, Waverley

Corner of Carrington Road and Bronte Road
Transport Impact Assessment



Prepared by: GTA Consultants (NSW) Pty Ltd for Barbary Coast Investments Pty Ltd
on 6/04/2020
Reference: N151212
Issue #: D

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Quality Record

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1. INTRODUCTION

01

1.1. Introduction

1.1.1. Background

The Regional Planning Panel refused a planning proposal for a proposed mixed-use development at 94 Carrington Road and 223-227 Bronte Road, Waverley, known as 'Charing Square'. The applicant was advised to consider a planning proposal for rezoning of a broader area to include the sites adjacent, specifically:

- 229-231 Bronte Road and 98 Carrington Road (Reece Plumbing site)
- 211-213 Bronte Road (Eastern Suburbs Legion Club)
- 203-209 Bronte Road (Robin Hood Hotel).

The collective sites are hereby referred to as 'the site' and have a total area of approximately 3,437 square metres. A revised scheme has now been developed as part of a revised planning proposal, and includes assumptions associated with the development potential of the adjacent land holdings.

For the purposes of the planning proposal, an indicative scheme of 61 residential apartments, 1,564 square metres of retail space, 655 square metres commercial and retention of the Robin Hood Hotel has been considered.

Rayda Investments Pty Ltd and Barbary Coast Investments Pty Ltd engaged GTA Consultants (GTA) to complete a transport assessment as part of the planning proposal, which seeks to amend the zoning controls.

1.2. Purpose of this report

This report sets out an assessment of the anticipated transport implications of the planning proposal, including consideration of the following:

- existing traffic and parking conditions surrounding the site
- suitability of the proposed parking in terms of supply (quantum)
- service vehicle requirements
- pedestrian and bicycle requirements
- the traffic generating characteristics of the planning proposal
- suitability of the proposed access arrangements for the site
- initiatives to reduce the reliance on private vehicle travel to the site
- the transport impact of the development proposal on the surrounding road network.

1.3. References

In preparing this report, reference has been made to the following:

- inspections of the site and its surrounds
- Waverley Council's Development Control Plan (DCP) 2012
- Waverley Council's Local Environment Plan (LEP) 2012
- Australian Standard/ New Zealand Standard, Parking Facilities, Part 1: Off-Street Car Parking AS/NZS 2890.1:2004

- Australian Standard, parking facilities, Part 2: Off-Street Commercial Vehicle Facilities AS/NZS 2890.2:2002
- Australian Standard/ New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009
- plans for the planning proposal prepared by H&E Architects, 94 Carrington Road, Project Number 2327, received by GTA in March 2020
- Charing Square Urban Design Report prepared by Roberts Day, dated March 2020
- traffic surveys undertaken by Matrix as referenced in the context of this report
- other documents and data as referenced in this report.

2. EXISTING CONDITIONS

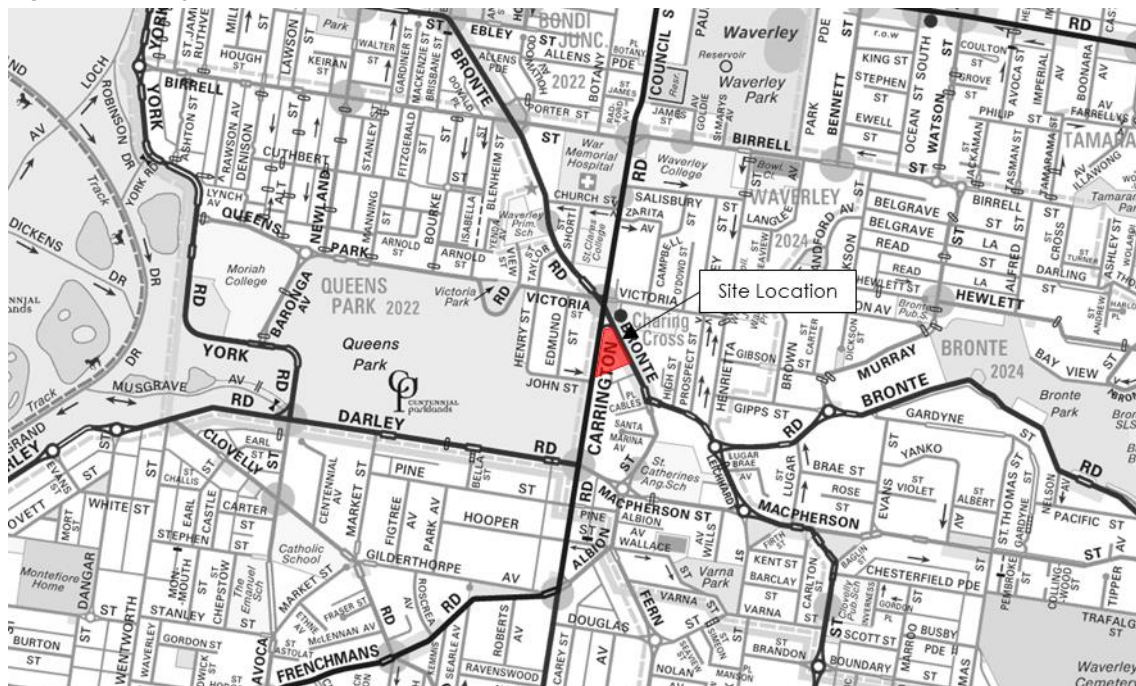
02

2.1. Site Location

The total site has an area of 3,473 square metres (2,940 square metres excluding Robin Hood Hotel) with frontages to Carrington Road to the west and Bronte Road to the east. The site currently has a land use classification as B4 Mixed Use and is occupied by the Robin Hood Hotel (which is to be retained), a drive-thru bottle shop, a bistro and gym, various retail tenancies (wholesale and showroom) and some minor shop-top housing.

The surrounding properties include retail and commercial uses and medium density residential dwellings, together with educational and religious uses. The location of the site and its surrounding environs is shown in Figure 2.1.

Figure 2.1: Subject site and its environs



Base image source: Sydney

2.1.1. Existing Site Operation

The site currently provides five driveway crossovers along Carrington Road, some consolidated into wide crossovers. The drive thru bottle shop has a separate entry and exit, allowing forward direction movements to and from the site. The remaining sites have a single driveway and due to spatial constraints are not all suitable for all vehicles to enter and exit in a forward direction, which can impact the operation of Carrington Road.

The peak operation of the drive thru bottle shop is mostly on Friday and Saturday evenings and does not typically coincide with the surrounding road network commuter peak periods. It generates around 75 vehicle trips per hour on a Friday night¹, which is 150 per cent higher than during a typical weekday PM commuter peak (48 vehicle trips per hour).

¹ Traffic movements of the drive thru bottle shop on Friday 18 May 2018 between 5:45pm and 6:45pm.

Peak operation for the Reece site is in the weekday AM peak period, with up to 21 vehicle trips per hour, representing almost all vehicle trips from the collective sites during this peak period.

The remaining collective sites generate low traffic volumes given the small amount of on-site parking, and general availability of on-street parking in the local area. This is reflected in further surveys completed for the collective site accesses as discussed in Section 6.1.1.

2.2. Road Network

2.2.1. Road Hierarchy

Roads are classified according to the functions they perform. The main purpose of defining a road's functional class is to provide a basis for establishing the policies which guide the management of the road according to their intended service or qualities.

In terms of functional road classification, State roads are strategically important as they form the primary network used for the movement of people and goods between regions, and throughout the State. Transport for NSW (formally Roads and Maritime Services) is responsible for funding, prioritising and carrying out works on State roads. State roads generally include roads classified as freeways, state highways, and main roads under the Roads Act 1993, and the regulation to manage the road system is stated in the Australian Road Rules, most recently amended on 19 March 2018.

Transport for NSW defines four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

Arterial Roads – Controlled by Transport for NSW, typically no limit in flow and designed to carry vehicles long distance between regional centres.

Sub-Arterial Roads – Managed by either Council or Transport for NSW under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region or provide connectivity from arterial road routes (regional links).

Collector Roads – Provide connectivity between local sites and the sub-arterial road network, and typically carry between 2,000 and 10,000 vehicles per day.

Local Roads – Provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

2.2.2. Surrounding Road Network

Carrington Road

Carrington Road functions as an arterial road and is aligned in a north-south direction along the western boundary of the site. It is a two-way road generally configured with two lanes in each direction, set within a carriageway of around 12-metres-wide.

Kerbside unrestricted parking is permitted on both sides of the road outside peak weekday periods (7:30am to 9:30am on the western side only, and 4:00pm to 6:30pm on both sides). Carrington Road has a posted speed limit of 60 kilometres per hour.

Bronte Road

Bronte Road functions as a sub-arterial road and is aligned in a north-south direction along the site's eastern boundary. It is a two-way road with generally one traffic lane and one parking lane in each direction set within a carriageway of around 14-metres-wide.

Adjacent to the site, parking is restricted to 30-minute time restrictions on the eastern side of the road between 8:30 and 6:00pm on weekdays and 8:30am and 12:30pm on Saturdays. On the western side of the road, one-hour time restricted parking is available from 9:00am to 6:00pm on weekdays and from 8:30am to 12:30pm on Saturdays. There are also bus and loading zones on both sides of the road, with no stopping restrictions on the western side of the road between 7:00am and 9:00am on weekdays. Bronte Road has a posted speed limit of 50 kilometres per hour.

Victoria Street

Victoria Street functions as a collector road and is aligned in an east-west direction to the north of the site. It is a two-way road with one lane in each direction set within a carriageway of around 12-metres-wide. A marked cycleway is provided on both sides of the road between the parking and traffic lanes.

Kerbside parking is permitted along the both sides of the road, with no stopping restrictions in place from 7:30am to 9:00am and 3:00pm to 4:00pm on weekdays on the southern side of the road near the Bronte Road/ Carrington Road intersection.

West of Bronte Road, two-hour time restricted parking is available along the northern side of the road between 8:30am and 6:00pm, while parking on the southern side of the road remains unrestricted. East of Bronte Road, one-hour parking restrictions are in place on both sides of the road between 8:30am and 6:00pm on weekdays and between 8:30am and 12:30pm on Saturdays. Victoria Street has a posted speed limit of 50 kilometres per hour.

2.3. Car Parking

A summary of publicly available car parking near the site, which is all on-street, is presented in Table 2.1.

Table 2.1: Publicly available car parking

Road	Location	Type of parking	Restrictions	Time in effect
Carrington Road	Both sides	Parallel on both sides	Unrestricted	East: Outside of 4pm-6:30pm (M-F) West: Outside of 7:30am-9:30am and 4pm-6:30pm (M-F)
Bronte Road	Both sides	Parallel on both sides	½ P	East: 8:30am-6pm (M-F), 8:30am-12:30pm (Sat) West: 9am-6pm (M-F), 8:30am-12:30pm (Sat)
Victoria Street	Both sides	Parallel on both sides	East of Bronte Road: Unrestricted West of Bronte Road: 1P	East of Bronte Road: Unrestricted West of Bronte Road: 8:30am-6:00pm (M-F), 8:30am-12:30pm (Sat)

2.4. Public Transport

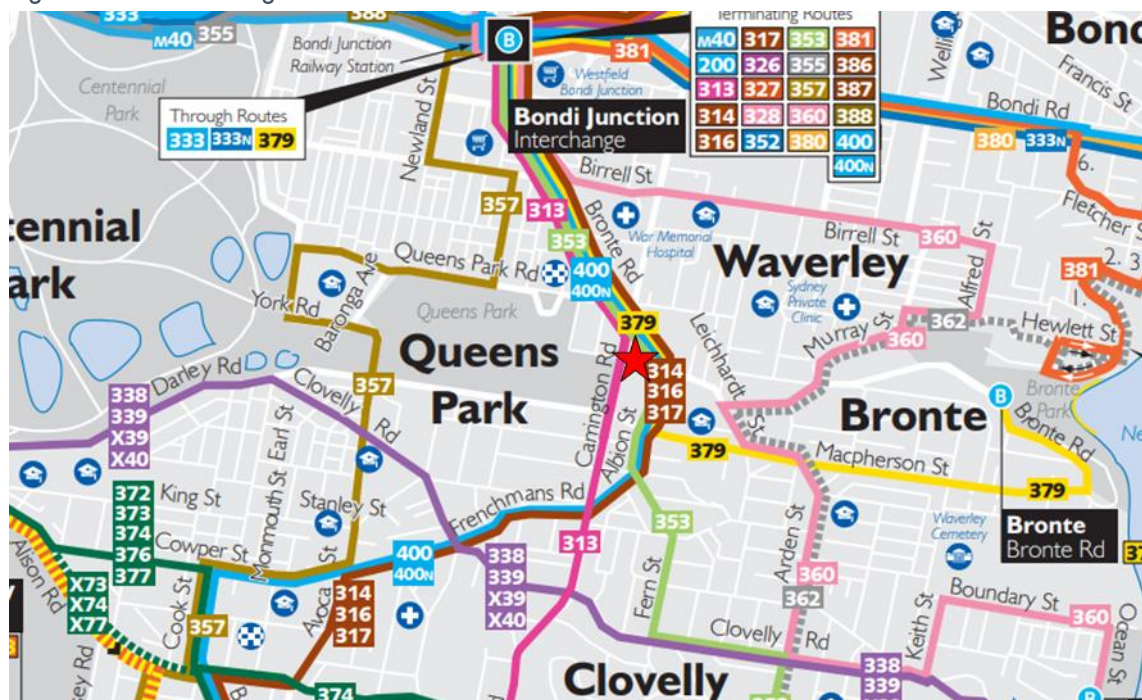
The site is well serviced by frequent bus services directly outside the site along Bronte Road and Carrington Road, linking the site with Bondi Junction to the north and various beach areas to the south and east. Bondi Junction Railway Station is within a 15-20 minute (approximately 1.2 kilometres) walk, linking the area with Sydney CBD and broader rail network.

A review of the public transport available near the site is summarised in Table 2.2 and shown in Figure 2.2.

Table 2.2: Public transport provision

Service	Route #	Route Description	Location of Stop	Distance to Nearest Stop	Frequency On/ Off Peak
Bus	313	Bondi Junction to Coogee via Carrington Rd	Carrington Road	Adjacent to the site	30 mins peak and off peak
	314	Coogee to Bondi Junction via Randwick Junction	Bronte Road		30 mins peak and off peak
	316	Eastgardens to Bondi Junction via Randwick Junction			20-60 mins peak/ 30 mins off peak
	317	Eastgardens to Bondi Junction via Randwick Junction & Beauchamp Rd			30-60 mins peak/ 30 mins off peak
	348	Wolli Creek to Bondi Junction			15-20 mins peak/ 30 mins off peak
	353	Eastgardens to Bondi Junction			5-30 mins peak/ 30 mins off peak
	379	North Bondi to Bronte			10 mins peak/ 10-20 mins off peak
Train	T4, South Coast Line	Eastern Suburbs & Illawarra Line, South Coast Line	Bondi Junction Station	1.2km	3-5 mins peak/ 10 mins off peak

Figure 2.2: Surrounding bus network



Base image source: https://transportnsw.info/document/4248/state_transit_eastern_suburbs_network_map.pdf, accessed January 2020

2.5. Pedestrian and Cycle Infrastructure

Footpath facilities are provided on both sides of Carrington Road, Bronte Road and Victoria Street near the site, with crossing points as follows:

- Signalised crossings on all approaches of the Bronte Road/ Carrington Road/ Victoria Street intersection.
- Pedestrian crossing south of the site across Bronte Road near Albion Street.
- Pedestrian crossing north of the site across the Bronte Road slip lane to Carrington Road.

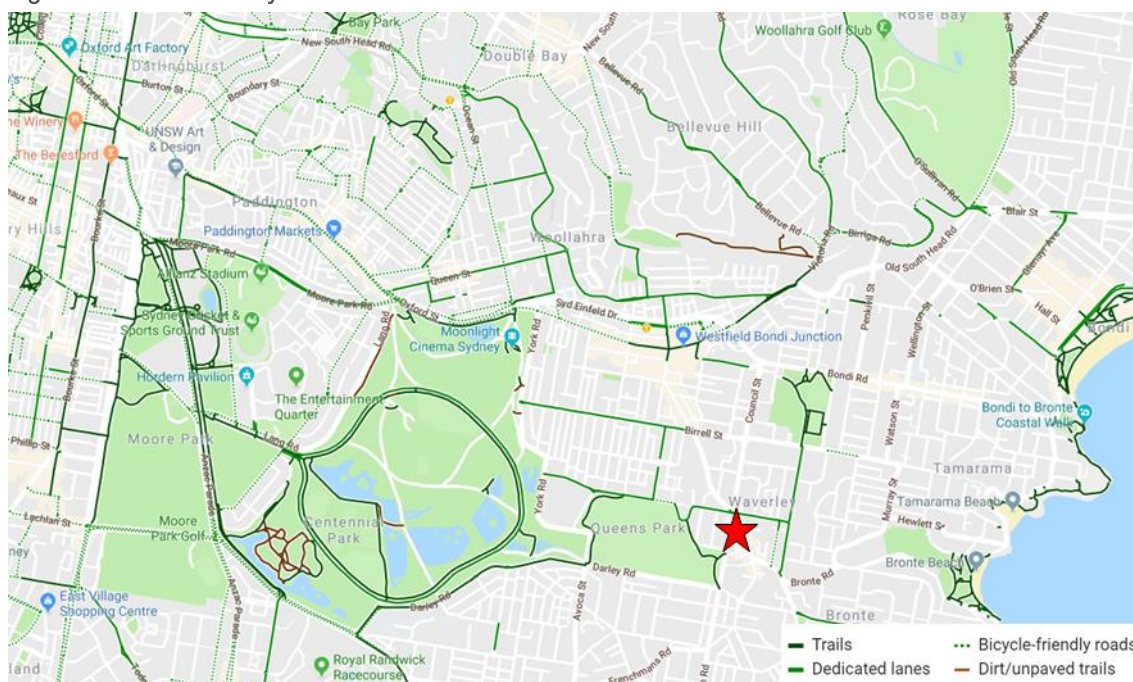
In addition to the surrounding pedestrian infrastructure, a mixture of designated cycleways and bicycle friendly roads surround the site. Onsite observations confirm a high cyclist presence, particularly along Bronte Road and Carrington Road running to and from Bondi Junction Railway Station. Victoria Street to the north of the site provides dedicated on-road bicycle lanes for cyclists adjacent to the parking lanes both east and west of Carrington Road/ Bronte Road. Further roads such as Henrietta Street, Bourke Street and Birrell Street provide connections to key destinations including Centennial Park, Bondi Junction, The Entertainment Quarter and cycle paths into Sydney CBD as shown in Figure 2.3 and Figure 2.4.

Figure 2.3: Surrounding bicycle network



Source: Waverley Bike Plan 2013

Figure 2.4: Broader bicycle network



Source: Google Maps, accessed January 2020

The Complete Streets project is part of Council's plan to enhance the vibrancy of Bondi Junction and its surrounding streets. It involves streetscaping the footpaths and public areas, making meeting places more vibrant and appealing, and improving connections for cycling, walking and access to public transport.

The Complete Streets Report outlines Council's public domain improvements plan for the coming 20 years, with improvements to Bronte Road up to Birrell Street further north of the site.

EXISTING CONDITIONS

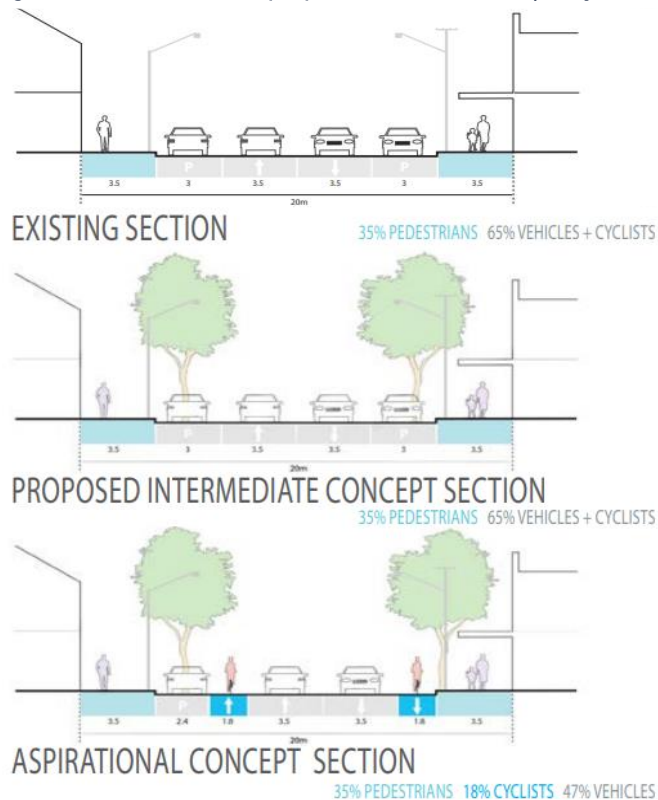
The Complete Streets project scope and proposed works for Bronte Road include separated on-road cycleway facilities on both sides at the expense of one parking lane as shown in Figure 2.5 to Figure 2.6.

Figure 2.5: Complete Streets project scope



Source: Waverley Council's Complete Streets Report

Figure 2.6: Bronte Road proposed cross section (Ebley Street to Birrell Street)



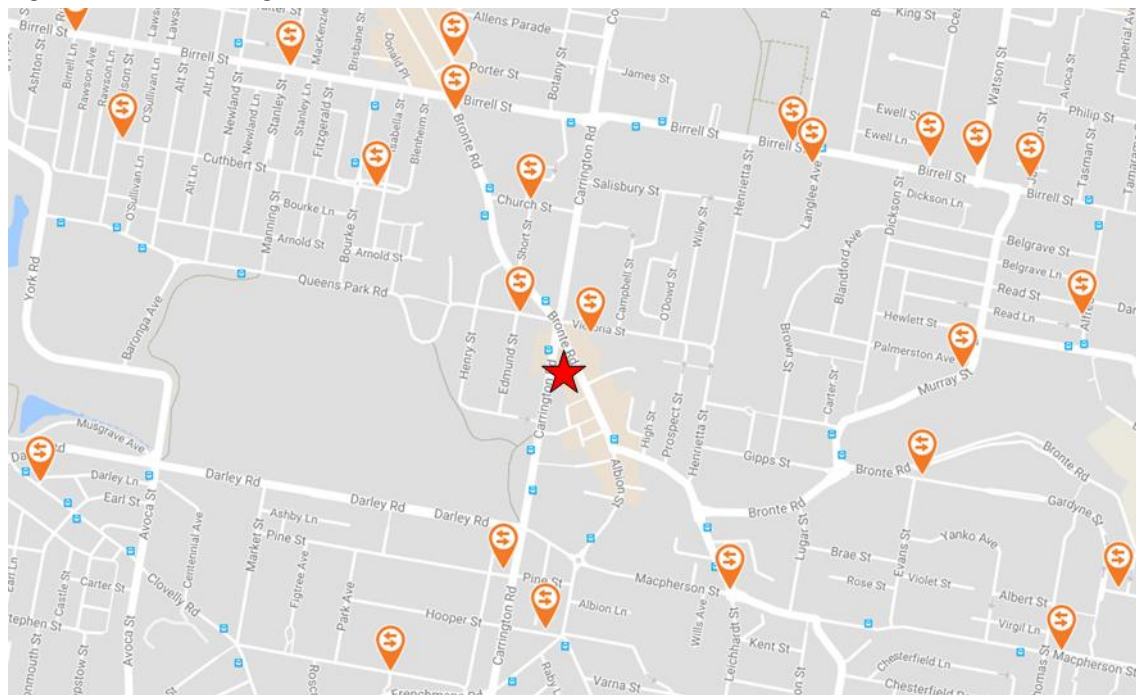
Source: Waverley Council's Complete Streets Report

2.6. Local Car Sharing Initiatives

GoGet (along with other car share schemes) has become increasingly common throughout Sydney and is now recognised as a viable transport option for drivers throughout Sydney. They are now a well-utilised service especially in the inner ring suburbs due to limited parking availability and the expense involved in parking close to the Sydney CBD. GoGet offer a viable alternative to the private car for trips where distances are short and are likely to be of benefit to future tenants and commercial residents.

GoGet car share pods located close to the site are shown in Figure 2.7.

Figure 2.7: Surrounding GoGet locations



Source: GoGet accessed January 2020

3. PLANNING PROPOSAL

03

3.1. Overview

The planning proposal contemplates a future mixed-use development across the three landholdings and comprises residential apartments located above a mix of retail and commercial space. Robin Hood Hotel located at the northern end of the site is expected to be retained in its current form.

The three sites immediately south of Robin Hood Hotel are generally referred to as Whitten (i.e. Charing Square), Legion and Reece, as indicated in Figure 3.1. These three sites have a collective area of 2,940 square metres and occupy the 'wedge' at the northern end of the block bounded by Bronte Road to the east and Carrington Road to the west.

Figure 3.1: Site Plan



An indicative scheme for the purposes of this planning proposal is provided in Table 3.1. It is noted that this may not be the final outcome for the individual sites.

Table 3.1: Development Schedule

Use	Description	Whitten site	Legion site	Reece site	Total
Residential apartments	1-bed	16	9	6	31
	2-bed	7	14	9	30
	Total	23	23	15	61 apartments
Retail (sqm GFA)		594	330	640	1,564 sqm
Commercial (sqm GFA)		655	-	-	644 sqm

3.2. Access and Parking

The architectural plans provide a two-way site access on Carrington Road, south of Robin Hood Hotel, that would provide access to a proposed basement car park within the Whitten site. This proposed access would be in the same location as the existing drive-thru bottle shop entry.

The architectural plans suggest that there would be one basement level within the Whitten site that would have a theoretical capacity of at least 17 car spaces. There is opportunity to provide a consolidated basement car park using the two-way site access driveway proposed within the Whitten site. This is subject to the staging of any development of the three sites and ability to expand and integrate the car park across the three sites. Overall, there are currently five driveways on Carrington Road across all the sites. Consolidation of car parking and access arrangements would provide significant benefits with respect to improving vehicle conflicts and the streetscape, with the opportunity to provide additional on-street parking for up to seven vehicles in a constrained urban environment.

The architectural plans confirm the benefits of a consolidated basement car park across the three sites. With up to 20 car spaces achievable per level within the Whitten Site, a theoretical capacity of up to 50 car spaces per level could be realised across the three sites, or up to 100 spaces if two basement levels were considered.

Site layout plans for the basement car park and any such on-site loading facilities will be further developed as part of future development applications.

3.3. Pedestrian Amenity

The planning proposal indicates potential for generous public domain space and through site links to improve pedestrian amenity both internal to the site and connectivity to the surrounding local environment. These connections would facilitate connections with other surrounding sites.

The suitability of the potential pedestrian facilities and connectivity is discussed in Section 5 of this report.

4. PARKING ASSESSMENT

04

4.1. Car Parking Requirements

The car parking requirements for different land use types are set out in Waverley Council DCP 2012 (Amendment 6) with the minimum and maximum parking rates applicable to the proposal summarised in Table 4.1. These rates illustrate Council's intention to limit parking requirements, reduce car ownership generally and further encourage use of public and active modes of travel.

Table 4.1: Waverley DCP 2012 parking rates

Description	Use/ Size	Waverley DCP 2012 Parking Rate	
High density residential flat building (more than 20 dwellings)	1-bedroom	Min. 0	Max. 0.6 space/ apartment
	2-bedroom	Min. 0	Max. 0.9 space/ apartment
	Visitor	1 per 5 apartments	1 per 5 apartments
Retail		Min = 0	Max = 3.3 space/ 100 sqm GFA
Commercial		Min = 0	Max = 1 space/ 100 sqm GFA

Based on Table 4.1, the maximum DCP 2012 car parking requirements as they relate to the planning proposal are shown in Table 4.2.

Table 4.2: Maximum Waverley DCP 2012 parking requirements

Description	Use/ size	Whitten site	Reece site	Legion site	Total
High density residential flat building (more than 20 dwellings)	1-bedroom	11	4	6	21
	2-bedroom	8	10	15	33
	Visitors	5	5	3	13
Sub-total		24	19	24	67
Retail		19	21	10	50
Commercial		6	0	0	6
Total		49	40	34	123 spaces

As outlined in Table 4.2, the indicative scheme generates a maximum requirement of 123 parking spaces across the three sites, in accordance with Waverley DCP 2012; noting that a minimum requirement is essentially zero spaces. On this basis, the planning proposal would be able to provide an appropriate quantum of on-site parking for the proposed land uses.

The provision and allocation of parking within the site would be developed as part of each Development Application, however it is recommended that any on-site parking be prioritised for residents. Any remaining balance of on-site parking could be distributed for retail and commercial staff and/ or residential visitors.

This would satisfy future resident needs while encouraging public transport use and active travel in a well-connected urban environment; which aligns with Waverley Council's transport vision documented in the 'Waverley's People, Movement and Places'² plan to reduce car travel overall by increasing transport choices and improving accessibility to centres and across the local area. Site layout plans will naturally be further developed as part of future development applications. Bicycle parking, accessible parking and motorcycle parking would all form part of this. Demand for parking for the retail space could be accommodated on-street, as is typical in the local and regional area.

A shared basement with a single access driveway also presents opportunities to return on-street parking given the removal of existing driveway crossovers. This would likely amount to about seven parking spaces that could be used for short-term parking associated with the retail uses.

4.1.1. Accessible Parking

DCP 2012 states that for developments with 10 or more apartments, 20 per cent must comply with the provisions of an adaptable apartment as specified by Australian Standards. One accessible parking space is to be provided for every adaptable residential apartment. Based on a potential of 61 apartments, seven apartments would be required to be adaptable.

Should any non-residential on-site parking be provided, 10 per cent would also need to be accessible.

These requirements would be considered as part of any future development applications.

4.1.2. Motorcycle Parking

Motorcycle parking is required at a rate of one motorcycle space for every three car parking spaces, and would be detailed as part of any future development application.

4.2. Loading Requirements

The loading requirements for different development types are set out in DCP 2012, with the planning proposal generating demand for the loading requirements as summarised in Table 4.3.

Table 4.3: Waverley DCP 2012 loading requirements

Use	Size/ no.	Loading rate	Loading requirement
Residential	61 apartments	1 per 50+ dwellings	1
Retail	1,564 sqm GFA	1 per 400 sqm GFA	4
Commercial	482 sqm GFA	1 per 4,000 sqm GFA	0
Total			5 bays

Based on these rates, the planning proposal would be required to provide up to five loading bays across the three sites. This requirement is considered excessive having regard to first principles assessment and the size of the development.

GTA's database of loading demand associated with the proposed uses indicates that specialty retail stores typically receive an average of 0.5 deliveries per day per tenant. Based on approximately 10 specialty retail tenancies, the planning proposal could generate five deliveries per day.

² Waverley Council, 'Waverley's People, Movement and Places', 2017

With cafes for example tending to generate more loading activity, applying a 100 per cent contingency results in up to 10 deliveries per day for the retail tenancies.

The average residential apartment turnover rate is approximately 0.2 per cent of all apartments in any given week. Conservatively assuming a rate of 0.5 per cent to account for seasonal variations and given the proposed 61 apartments, there would likely be an average of one apartment moving in or out in any given two to three week period. Waste collection for the residential apartments is likely to be two vehicles per week.

Overall, the proposal is expected to generate low demand for loading activity given the minor retail and commercial space and moderate number of residential apartments.

There is an existing 18-metre long on-street loading zone on Bronte Road adjacent to the site frontage. This zone can accommodate three cars/ vans (or one to two rigid trucks) and is active between 10:00am and 4:00pm weekdays. This loading zone would be suitable for use by the proposed uses, as well as continuing to cater for other existing demand in the immediate vicinity.

In addition, it is recommended that provision of a single on-site loading bay be considered within any potential consolidated basement car park as part of any future development applications, subject to achievable height clearance and spatial availability. Any on-site loading bay would mostly be used for the purposes of waste collection and by removalist trucks when residents move in or out.

5. SUSTAINABLE TRANSPORT INFRASTRUCTURE

05

5.1. Bicycle End-of-Trip Facilities

The bicycle parking requirements for different development types are set out in DCP 2012. A review of the parking rates relevant to the planning proposal is detailed in Table 5.1 and a summary for the indicative scheme included in Table 5.2.

Table 5.1: Waverley DCP 2012 bicycle parking rates

Use	Bicycle parking rate	
	Resident/ staff	Visitor
Residential	1 space/ apartment	1 space/ 10 apartments
Retail	0.1 spaces/ 100 sqm GFA	0.4 spaces/ 100 sqm GFA
Commercial	0.45 spaces/ 100 sqm GFA	1 space/ 2,000 sqm GFA

Table 5.2: Waverley DCP 2012 bicycle parking requirements

Use	Whitten site	Reece site	Legion site	Total
Residential	26	17	26	69
Retail	4	4	3	11
Commercial	4	0	0	4
Total	34	21	29	84 spaces

Table 5.2 indicates that the indicative scheme would require 84 bicycle spaces across the three sites. All resident bicycle parking should be provided in Class 1 bicycle lockers, while commercial and retail bicycle parking should be Class 1 or Class 2 enclosures for staff/ employees. Visitor bicycle parking should be Class 3 bicycle racks/ rails located in publicly accessible areas to encourage use.

One locker is required for each non-residential bicycle parking space and two shower/ change cubicles are required for between 11 and 20 non-residential bicycle parking spaces. As such, 15 lockers and two showers should be provided for the retail and commercial space.

It is recommended that the above requirements be accommodated across the combined sites, with visitor provision at-grade as part of the public domain, or in the basement for use by residents.

These details will be further developed as part of any future development applications.

5.2. Walking and Cycling Network

The proposal aims to improve links between the adjacent properties, Queens Park and buses on Bronte Road and Carrington Road. Ground level retail will front the both frontage streets and/ or the generous internal public domain space. Visitor bicycle parking would be provided as part of the public domain and highly visible to encourage use and offer convenience.

As discussed, Council is proposing to improve the streetscape on streets around Bondi Junction. With regards to the site, Bronte Road north of Birrell Street is proposed to be upgraded to improve cyclist amenity as well as improving the streetscape to encourage other active travel modes. This presents an opportunity to extend such amenity south of Birrell Street to Victoria Street to provide a continuous connection from the site and surrounds to Bondi Junction.

5.3. Public transport

The proposal will maintain the current public transport level of service, with bus routes along Bronte Road and Carrington Road, and the site being within walking and cycling distance of Bondi Junction railway station. The proposed site access and pedestrian links would allow for good connections to existing bus stops along Bronte Road and Carrington Road.

6. TRANSPORT IMPACT ASSESSMENT

06

6.1. Traffic Generation

6.1.1. Existing Traffic Generation

Traffic counts were completed at the five existing accesses on Carrington Road, that primarily service the drive thru bottle stop and the wholesale/ showroom premises on the Reece site. The Legion site does not have any accesses or on-site parking. The counts occurred on Thursday 13 and Saturday 15 February 2020 during the road network peak periods, with the peak hour traffic volumes summarised in Table 6.1.

Table 6.1: Existing site traffic generation

Peak Period	Weekday AM	Weekday PM	Saturday Midday
Whitten Site driveways			
In	2	25	19
Out	0	26	22
Reece Site driveway			
In	9	0	0
Out	12	3	0
Total			
In	11	25	19
Out	12	29	22
Two-way	23	54	41

In addition to the drive thru bottle shop and wholesale/ showroom premises on the Reece site, the site also has existing retail space and the Eastern Suburbs Legion Club along Carrington Road, which do not have on-site parking with visitors required to use available on-street parking. The following subsections review the likely traffic generating characteristics of these land uses.

Retail Uses

There is approximately 150 square metres GFA of existing retail space on the Whitten site. To determine the expected traffic generation associated with the retail premises, the traffic generation rates applicable to speciality retail sourced from Roads and Maritime Guide 2002 has been used to calculate the likely existing traffic generation.

The traffic generation rate for speciality retail is generally much less in the weekday AM peak hour and as such, a 50 per cent reduction factor on the weekday PM peak rate has been assumed for the weekday AM peak. The type of retail space currently provided on site is not expected to generate traffic consistent with the Roads and Maritime Guide 2002 for a Saturday. As such, the weekday PM peak rate has been adopted for the Saturday midday peak.

The adopted traffic generation rates are summarised below:

- Weekday AM – 2.3 vehicle trips per 100 square metres of gross leasable floor area (GLFA)
- Weekday PM – 4.6 vehicle trips per 100 square metres of GLFA
- Saturday Midday – 4.6 vehicle trips per 100 square metres of GLFA.

Bistro and Gym

The Eastern Suburbs Legion Club includes 1,118 square metres GFA, assumed to be split evenly between bistro and gym uses. The following traffic generate rates have been adopted for these uses that consider rates in the Roads and Maritime Guide 2002 and the fact on-site parking is not currently provided:

- Bistro: 2.5 vehicle trips per 100 square metres GFA (PM peak and Saturday peak)
- Gym: 1.5 vehicle trips per 100 square metres GFA.

Summary

Table 6.2 summarises the estimated traffic generated by the existing land uses across the site.

Table 6.2: Summary of existing site traffic generation

Use	Peak hour traffic generation estimates (vehicle trips per hour)		
	Weekday AM	Weekday PM	Saturday Midday
Whitten Site driveways	2	51	41
Reece Site driveway	21	3	0
Retail	3	5	5
Bistro and Gym	9	22	22
Total	35	81	68

Table 6.2 indicates that the existing uses are estimated to generate the following during the surrounding road network commuter peak periods:

- Weekday AM – 35 vehicle trips
- Weekday PM – 81 vehicle trips
- Saturday Midday – 68 vehicle trips.

As noted in Section 2.1.1, the peak operation of the drive thru bottle shop occurs on Friday and Saturday nights being approximately 150 per cent higher than on typical weekday evenings.

6.1.2. Proposed Traffic Generation

Traffic generation estimates for the planning proposal have been sourced from Roads and Maritime Guide 2002 and Technical Direction (TDT 2013/ 04).

Residential

TDT 2013/ 04 provides updated rates for high density residential flat dwellings that are close to public transport services and indicates the following:

- Weekday AM – 0.19 vehicle trips per apartment
- Weekday PM – 0.15 vehicle trips per apartment
- Saturday Midday – 0.3 vehicle trips per apartment.

For the purpose of this assessment the residential component has been defined as high density residential flat dwellings. This is due to the mix of uses, residential density and height and the sites location close to key bus routes that provide frequent services during all times of the day.

Retail

The proposed ground level retail would likely include specialty retail shops and restaurant/ cafes that primarily attract local visitors and more walk-up trips compared to a traditional speciality store. On this basis, the same rates used to estimate traffic generation for the existing retail area has been adopted for the future retail area.

Commercial

The commercial traffic generation rates have been sourced from the TDT 2013/ 04 which result in a rate of 1.6 and 1.2 vehicle trips per 100 square metres GFA. It is assumed that the commercial area would not be operating on a Saturday.

Summary

Having consideration to the potential different uses and the sites location, Table 6.3 sets out traffic generation estimates during the peak hour periods. It is noted that should parking spaces reduce as part of individual development applications that a potential discount rate could be applied to the traffic generation rates for the associated developments.

Table 6.3: Estimated development traffic generation

Use	Whitten site			Other sites			Total		
	AM	PM	Sat	AM	PM	Sat	AM	PM	Sat
Residential	4	3	7	7	5	11	11	8	18
Retail	14	27	27	23	46	45	37	73	72
Commercial	10	8	0	-	-	-	10	8	0
Total	28	38	34	30	51	56	58	89	90

Table 6.3 indicates that the indicative scheme could generate about 60 vehicle trips in the weekday AM peak and 90 trips in the weekday PM and Saturday midday peaks.

As highlighted, this is considered a conservative estimation noting that the anticipated traffic generation will be influenced by the final supply of car parking supply provided on-site. The Waverley DCP car parking requirements are maximums and minimums, with the minimum being essentially zero. Therefore, the calculated traffic generation is considered representative of a car parking supply near the maximum requirement (i.e. 123 spaces), such as two levels of car parking (i.e. 100 spaces). Should car parking supply be for example only provided across a single level (i.e. 50 spaces) then traffic generation would be expected to reduce accordingly. This will be confirmed as part of any future development applications.

6.1.3. Net Change in Traffic Generation

Based on the traffic generation of the existing uses across the three sites, the planning proposal is expected to generate the following net increases during the surrounding road network commuter peak periods:

- Weekday AM – 23 vehicle trips per hour
- Weekday PM – eight vehicle trips per hour
- Saturday Midday – 22 vehicle trips per hour.

These additional traffic volumes are minimal, with approximately one additional vehicle every two minutes. This potentially would be even less depending on the ultimate provision of car parking on site as the above considers the Waverley DCP maximum car parking requirement.

The existing traffic volumes relating to the drive thru bottle shop on peak nights such as Fridays and Saturdays are significantly higher than on typical weekday evenings (75 vehicle trips per hour verses 48 trips per hour) which were surveyed to understand typical conditions. As such, the existing traffic impact that currently occurs on Friday and Saturday nights would be removed as a result of the proposal.

6.2. Distribution and Assignment

The directional distribution and assignment of traffic generated by the planning proposal will be influenced by a number of factors, including the:

- configuration of the arterial road network near the site
- existing operation of intersections providing access between the local and arterial road network
- distribution of households near the site
- surrounding employment centres, retail centres and schools in relation to the site
- likely distribution of employee's residences in relation to the site
- configuration of access points.

Having consideration to the above, for the purposes of estimating vehicle movements, the following directional distributions have been assumed:

- Carrington Road (south) – 10 per cent
- Carrington Road (north) – 70 per cent
- Bronte Road (north) – 20 per cent.

In addition, the directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) has been assumed to be 50 per cent inbound and 50 per cent outbound given the mix of land uses. Based on the above, the additional traffic generated by the planning proposal is expected to add less than eight vehicles to any movement at the Carrington Road/ Bronte Road/ Victoria Street intersection during the peak periods.

6.3. Intersection Operation

6.3.1. Existing Conditions

GTA commissioned traffic movement counts at the Carrington Road/ Bronte Road/ Victoria Street intersection during the following peak periods:

- Tuesday 3 March 2020 - 6:00am to 9:00am and 4:00pm to 7:00pm
- Saturday 29 February 2020 - 11:00am to 2:00pm.

The peak hours were found to occur as follows:

- Weekday AM – 7:30am to 8:30am
- Weekday PM – 5:00pm to 6:00pm
- Saturday Middyay - 11:30am to 12:30pm.

Full survey results are contained in Appendix A of this report.

The operation of the key intersection within the study area have been assessed using SIDRA INTERSECTION³ (SIDRA), a computer based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the Transport for NSW, is vehicle delay. SIDRA determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 6.4 shows the criteria that SIDRA adopts in assessing the level of service.

Table 6.4: SIDRA INTERSECTION level of service criteria

Level of Service (LOS)	Average Delay per vehicle (secs/ veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Table 6.5 presents a summary of the existing operation of the intersection, with full results presented in Appendix B of this report.

Table 6.5: Existing operating conditions

Peak	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
AM	1.00 ¹	48	197	D
PM	0.97	46	241	D
Sat	1.05 ¹	61	234	E

[1] Victoria Road eastern leg

Table 6.5 illustrates that the intersection currently operates near or at capacity during the road network peak periods assessed. These results are consistent with observations from site inspections completed during the weekday peak periods; specifically relating to:

- the complex nature of the intersection, having six legs with up to six movements permitted on each approach
- the weekday peak direction tidal traffic flows given the proximity to Bondi Junction and key arterial roads providing access to the Sydney CBD

³ Program used under license from Akcelik & Associates Pty Ltd.

- only one continuous traffic lane on each approach (except Carrington Road during weekday peak period clearway restrictions)
- high allocation of green time for Carrington Road (a state road), 40 to 50 per cent of total cycle time
- right turns being filtered through opposing traffic reducing the capacity of the approach (except Bronte Road north approach which has a separate phase)
- frequent activation of pedestrian signals delaying turn movements and any other vehicle movements sharing the lane.

6.3.2. Development Traffic Impacts

The study intersection has been reassessed to include the additional traffic generated by the proposal. The SIDRA modelling results are summarised in Table 6.6, with full results presented in Appendix B of this report.

Table 6.6: Intersection operating conditions – Existing plus Proposal

Peak	Existing Level of Service (LOS)	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
AM	D	1.00 ¹	48	198	D
PM	D	0.97	46	241	D
Sat	E	1.05 ¹	62	240	E

[1] Victoria Road eastern leg

Table 6.6 illustrates that against existing traffic volumes near the site, the anticipated additional traffic generated by the planning proposal in the respective peak periods are not expected to compromise the function of the surrounding road network, with overall level of service remaining the same as existing conditions. As such, any significantly lower car parking supply compared to the Waverley DCP maximum will further minimise any impacts.

6.4. Site Access

Site observations and the modelling results indicate that northbound vehicles generally queue on Carrington Road south of Victoria Street. These queues typically extend beyond the existing driveways during peak periods with each traffic signal phase allowing the queue to clear. Given the proposed driveway location on Carrington Road there would likely be some degree of delay for vehicles exiting the site as they find safe gaps in the traffic flow. A queue of no more than two vehicles is expected during peak periods, with this considered appropriate having regard for the site location and traffic generation.

The potential for a consolidated basement car park and corresponding single access driveway would improve amenity by removing four existing crossovers. This would likely amount to about seven parking spaces that could be used for short-term parking associated with the retail uses. Furthermore, a consolidated basement car park can be appropriately designed to ensure all vehicles, including service vehicles, can enter and exit the site in a forward direction. This will improve on existing conditions whereby some of the existing crossovers and car parks are not suitable for all vehicles to enter or exit in the forward direction given the smaller spatial areas.

7. OVERVIEW GREEN TRAVEL PLAN

07

7.1. Overview Green Travel Plan

7.1.1. Introduction

As specified in DCP 2012, Council requires a green travel plan (GTP) be prepared as part of any future development applications to promote and encourage active and public transport travel and reduce car dependency and ownership. This is driven by Waverley Council's transport vision to increase transport choices and reduce car travels. As such, a GTP applicable to residents and staff would be prepared prior to occupation. The sections below provide a framework for the implementation of such a travel plan.

7.1.2. Travel plan framework

Transport is a necessary part of life, but it has economic, public health and environmental consequences. The transport sector is one of the fastest growing emissions sectors in Australia, and therefore is one of the key opportunities for reducing greenhouse gases. As well as delivering better environmental outcomes, providing a range of travel choices with a focus on walking, cycling and public transport will have major public health benefits and will ensure a strong and prosperous community.

The physical infrastructure being provided as part of the development is only part of the solution. A green travel plan will ensure that the transport infrastructure, services and policies both within and external to the site are tailored to the users and co-ordinated to achieve the most sustainable outcome possible.

7.1.3. What is a Green Travel Plan?

A green travel plan is a package of measures aimed at promoting sustainable travel and reducing reliance on the private car. It is not designed to be 'anti-car' however will encourage and support people's aspirations for carrying out their daily business in a more sustainable way. Travel plans can provide both:

- measures which restrict car use (disincentives or 'sticks')
- measures which encourage or support sustainable travel, reduce the need to travel or make travelling more efficient (incentives or 'carrots').

The travel plan would promote the use of transport, other than the private car, provide choice for staff to travel to and from the site, which is more sustainable and environmentally friendly.

Indeed, there are a range of 'non-car' transport options that are available at the site which have been described in this report. Given the proposal aims to reduce private vehicle travel to the site, the implementation of a green travel plan would be beneficial.

7.2. Key Objectives

The aim of the green travel plan is to bring about better transport arrangements for living and working at the site. The key objectives of the Travel Plan are:

- to encourage walking
- to encourage cycling
- to encourage the use of public transport
- to reduce the use of the car, in particular single car occupancy
- where it is necessary to use the car, encourage more efficient use.

It is the intention therefore that the travel plan will deliver the following benefits:

- enable higher public and active travel mode share targets to be achieved
- contribute to greenhouse gas emission reductions and carbon footprint minimisation
- contribute to healthy living for all
- contribute to social equity and reduction in social exclusion
- improve knowledge and contribute to learning.

7.3. Site Specific Measures

The location of the site, in terms of its proximity to a wide range of sustainable transport including Bondi Junction Station and the bus routes along Bronte Road and Carrington Road, is a key attribute in the justification of the development. The GTP will then put in place measures to raise awareness and further influence the travel patterns of those people living, working or visiting the development with a view to encouraging modal shift away from cars.

The following potential measures and initiatives could be implemented to encourage more sustainable travel modes:

- Limiting on-site parking provision to residential uses and retail/ commercial staff.
- Creating internal pedestrian and cyclist connections to the broader area to further encourage cycling and walking.
- Providing a Travel Access Guide (TAG) which would be made available to all residents and staff, and visitors. This document would be based on facilities available at the site would detail surrounding public transport services and active transport facilities. The TAG would be updated as the surrounding transport environment changes.
- Providing public transport information boards to make residents, staff and visitors more aware of the alternative transport options available (the format of such information boards would be based upon the TAG).
- Providing an on-site car share space (or on-street nearby) and promoting the availability of car share services for trips that require use of a private vehicle.
- Providing bicycle facilities including secure bicycle parking for staff, bicycle racks/ rails for visitors and shower and change room facilities.
- Creating a carpool club or registry/ forum to encourage staff that would typically drive to work and park on-street in the local area to carpool.
- Promoting regular ride/ walk to work days.
- Providing a regular newsletter to all residents and staff bringing the latest news on sustainable travel initiatives in the area.

7.3.1. Travel Access Guide

A TAG provides information to residents, staff and visitors on how to travel to the site using sustainable transport modes such as walking and public transport. The information is presented visually in the format of a map showing the site location and nearby transport modes highlighting available pedestrian and cycle routes. The information is usually presented as a brochure to be included in a welcome pack or on the back of company stationery and business cards.

7.3.2. Information and communication

Several opportunities exist to provide residents, staff and visitors with information about nearby transport options. Connecting residents, staff and visitors with information would help to facilitate journey planning and increase their awareness of convenient and inexpensive transport options which support change in travel behaviour. These include:

- Transport NSW provides bus, train and ferry routes, timetables and journey planning through their Transport Info website: <http://www.transportnsw.info>.
- Council provides a number of services and a range of information and events to encourage people of all levels of experience to travel by bicycle: http://www.waverley.nsw.gov.au/environment/sustainable_transport/cycling.

In addition, connecting residents, staff and visitors via social media may provide a platform to informally pilot new programs or create travel-buddy networks and communication.

7.3.3. Monitoring of the GTP

There is no standard methodology for monitoring the GTP, but it is suggested that it be monitored to ensure that it is achieving the desired benefits and modify it if required. It will not be possible at this stage to state what additional modifications might be made as this will be dependent upon the particular circumstances prevailing at that time.

The GTP should be monitored on a regular basis, e.g. yearly, by carrying out travel surveys. Travel surveys will allow the most effective initiatives of the GTP to be identified, and conversely less effective initiatives can be modified or replaced to ensure the best outcomes are achieved. It will clearly be important to understand people's reasons for travelling the way they do: - any barriers to changing their behaviour, and their propensity to change.

To ensure the successful implementation of the GTP, a Travel Plan Coordinator (TPC) should be appointed to ensure the successful implementation of the GTP. This could be the building manager or a member of the body corporate.

7.4. Summary

A travel plan should be developed as part of any future development applications to increase the use of sustainable transport and reduce car dependency and ownership. Although it is difficult to predict what measures might be achievable until occupation, the above measures provide a framework for the developments and implementation of future travel plans for the development sites.

8. CONCLUSION

08

8.1. Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

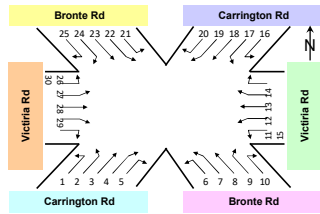
- The planning proposal considers a potential indicative mixed-use development across three landholdings incorporating 61 residential apartments, 1,564 square metres of retail space, 655 square metres commercial and retention of the Robin Hood Hotel.
- It is expected that any basement car park(s) across the three sites could achieve a theoretical capacity of up to 50 parking spaces per level.
- The indicative scheme generates a maximum DCP 2012 parking requirement of 123 car parking spaces, with the minimum parking requirement being essentially zero. Therefore, the proposal would be able to provide an appropriate quantum of on-site parking for the proposed land uses.
- The indicative scheme would require 84 bicycle spaces, with 69 spaces for residents and visitors, 11 for retail and four for the commercial uses. This is expected to be achieved across a consolidated basement car park and generous ground level public domain.
- Loading is likely best accommodated on-street within the existing loading zones, with opportunity for one shared on-site loading zone recommended to be considered as part of any future development applications.
- The planning proposal would result in a significant reduction in site traffic generation on Friday and Saturday evenings, further improving the amenity of the area.
- Based on an assumption that car parking supply is provided near the Waverley DCP maximum, the indicative scheme could generate between 60 and 90 vehicle trips in the surrounding road network peak hours, or a net increase of five to 25 vehicle trips when considered against the existing land uses. This would reduce based on the final car parking supply provided on-site as part of any future development applications, especially if a single basement level (i.e. 50 spaces) is considered.
- The potential additional traffic generated by the planning proposal amounts to less than one vehicle every two minutes, therefore is not expected to compromise the operation of the surrounding road network.
- Furthermore, the proposal would result in the removal of existing traffic generation from the drive-thru bottle shop that currently occurs on Friday and Saturday nights.
- The potential to consolidate the basement car park and use a single vehicular access would remove four existing driveways on Carrington Road south of Robin Hood Hotel. This would improve amenity, limit conflict and ensure all vehicles can enter and exit the site in a forward direction (not currently possible for all sites), while also providing around seven on-street parking spaces for short-term parking use.
- A framework and potential measures and initiatives for future green travel plans are included to encourage more sustainable travel modes and reduce car dependency and ownership. This is consistent with Waverley Council's transport vision for the local area.

A.SURVEY RESULTS



Job No. : N5607
Client : GTA
Suburb : Waverly
Location : 1. Carrington Rd / Victoria Rd / Bronte St

Day/Date : Tue, 3rd March 2020
Weather : Fine
Description : Classified Intersection Count
: Hourly Summary

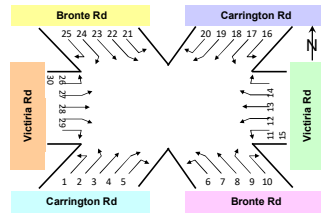


Approach	Carrington Rd															Bronte Rd															Victoria Rd																							
Direction	Direction 1			Direction 2			Direction 3			Direction 4			Direction 5			Direction 5U			Direction 6			Direction 7			Direction 8			Direction 9			Direction 10			Direction 10U			Direction 11			Direction 12			Direction 13			Direction 14			Direction 15			Direction 15U		
Time Period	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total						
6:00 to 7:00	2	0	2	93	8	101	514	26	540	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	2	13	65	1	66	25	0	25	24	0	24	28	0	28	0	0	0		
6:15 to 7:15	7	0	7	97	9	106	639	35	674	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	1	17	100	1	101	23	0	23	27	0	27	45	0	45	0	0	0			
6:30 to 7:30	8	0	8	109	11	120	672	39	711	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	1	33	132	0	132	26	0	26	34	0	34	59	0	59	0	0	0			
6:45 to 7:45	11	0	11	152	11	163	723	43	766	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	1	43	169	0	169	34	0	34	58	1	59	60	0	60	0	0	0			
7:00 to 8:00	11	0	11	183	11	194	755	39	794	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	1	45	164	0	164	37	0	37	79	1	80	57	0	57	0	0	0			
7:15 to 8:15	12	0	12	213	13	226	746	34	780	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	2	46	147	0	147	52	0	52	102	1	103	58	0	58	0	0	0			
7:30 to 8:30	19	0	19	231	11	242	768	31	799	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	2	47	161	0	161	58	0	58	109	1	110	55	0	55	0	0	0			
7:45 to 8:45	23	0	23	239	9	248	756	30	786	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	2	55	147	0	147	55	0	55	97	0	97	53	0	53	0	0	0			
8:00 to 9:00	22	0	22	235	7	242	701	30	733	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	1	62	147	0	147	51	0	51	81	0	81	62	0	62	0	0	0			
AM Totals	35	0	35	511	26	537	1,972	95	2,067	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	116	4	120	376	1	377	113	0	113	184	1	185	147	0	147	0	0	0			
16:00 to 17:00	14	0	14	153	4	157	415	7	422	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77	0	77	117	1	118	39	0	39	41	0	41	37	1	38	0	0	0			
16:15 to 17:15	15	0	15	167	4	171	463	7	470	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	69	0	69	108	1	109	38	0	38	41	0	41	45	1	46	0	0	0			
16:30 to 17:30	13	0	13	171	5	176	497	6	503	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71	0	71	91	1	92	39	0	39	34	0	34	50	2	52	0	0	0			
16:45 to 17:45	11	0	11	146	4	150	521	4	525	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74	0	74	81	2	83	36	0	36	37	0	37	44	2	46	0	0	0			
17:00 to 18:00	9	0	9	150	5	155	560	4	564	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64	0	64	76	1	77	38	0	38	37	0	37	35	1	36	0	0	0			
17:15 to 18:15	9	0	9	135	2	137	530	5	535	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	0	75	111	2	113	37	0	37	33	0	33	32	1	33	0	0	0			
17:30 to 18:30	14	0	14	130	1	131	534	5	539	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	0	73	116	2	118	27	1	28	30	0	30	32	0	32	0	0	0			
17:45 to 18:45	15	0	15	133	2	135	511	6	517	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	0	66	117	2	119	29	1	30	29	0	29	31	0	31	0	0	0			
18:00 to 19:00	15	0	15	114	1	115	444	6	450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64	0	64	126	2	128	31	1	32	26	0	26	37	0	37	0	0	0			
PM Totals	38	0	38	417	10	427	1,419	17	1,436	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	205	0	205	319	4	323	108	1	109	104	0	104	109	2	111	0	0	0			

Approach	Carrington Rd															Bronte Rd															Victoria Rd																							
Direction	Direction 16			Direction 17			Direction 18			Direction 19			Direction 20			Direction 20U			Direction 21			Direction 22			Direction 23			Direction 24			Direction 25			Direction 25U			Direction 26			Direction 27			Direction 28			Direction 29			Direction 30			Direction 30U		
Time Period	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total						
6:00 to 7:00	3	0	3	107	9	116	284	15	299	1	0	1	7	0	7	0	0	0	8	0	8	7	1	8	80	19	99	22	1	23	2	0	2	0	0	0	1	0	1	11	1	12	3	0	3	0	0	0	0	0	0	0		
6:15 to 7:15	4	0	4	112	9	121	329	19	348	1	0	1	4	0	4	0	0	0	11	0	11	9	1	10	104	25	129	32	0	32	1	0	1	0	0	0	2	0	2	25	1	26	9	0	9	0	0	0	2	0	2	0	0	
6:30 to 7:30	5	0	5	100	8	108	345	19	364	0	0	0	6	0	6	0	0	0	11	0	11	7	0	7	115	29	144	38	0	38	1	0	1	0	0	0	2	0	2	34	1	35	14	0	14	0	0	0	7	0	7	0	0	
6:45 to 7:45	7	0	7	96	9	105	333	19	352	0	0	0	5	0	5	0	0	0	19	0	19	4	0	4	139	31	170	51	1	52	1	0	1	0	0	0	1	0	1	51	1	52	18	0	18	0	0	0	9	0	9	0	0	
7:00 to 8:00	7	0	7	72	9	81	300	14	314	0	0	0	3	0	3	0	0	0	22	0	22	5	0	5	142	34	176	58	2	60	1	0	1	0	0	0	2	0	2	55	0	55	22	0	22	0	0	0	9	0	9	0	0	
7:15 to 8:15	10	0	10	79	14	93	306	15	321	0	0	0	8	0	8	0	0	0	27	0	27	4	0	4	136	35	171	62	3	65	1	0	1	0	0	0	3	0	3	66	0	66	21	0	21	0	0	0	7	0	7	0	0	
7:30 to 8:30	12	0	12	88	15	103	285	15	300	0	0	0	6	1	7	0	0	0	43	0	43	8	0	8	148	42	190	75	3	78	1	0	1	0	0	0	6	0	6	83	0	83	19	0	19	0	0	0	2	0	2	0	0	
7:45 to 8:45	16	0	16	84	15	99	292	21	313	0	0	0	6	1	7	0	0	0	48	0	48	10	0	10	113	44	157	72	2	74	2	0	2	0	0	0	15	0	15	92	0	92	18	0	18	0	0	0	0	0	0	0		
8:00 to 9:00	16	0	16	96	16	112	309	23	332	0	0	0	6	1	7	0	0	0	52	0	52	12	0	12	128	46	174	77	1	78	3	0	3	0	0	0	19	0	19	93	0	93	13	0	13	0	0	0	0	0	0	0		
AM Totals	26	0	26	275	34	309	893	52	945	1	0	1	16	1	17	0	0	0	82	0	82	24	1	25	350	99	449	157	4	161	6	0	6	0	0	0	22	0	22	159	1	160	38	0	38	0	0	0	9	0	9	0	0	
16:00 to 17:00	11	0	11	196	2	198	560	3	563	0	0	0	0	0	0	0	0	0	17	0	17	10	0	10	296	42	338	158	1	159	0	0	0	0	0	18	1	19	51	0	51	31	0	31	18	0	18	0	0	0	0	0		
16:15 to 17:15	11	0	11	207	3	210	561	3	564	0	0	0	0	0	0	0	0	0	10	0	10	10	0	10	288	34	322	147	1	148	0	0	0	0	0	0	8	1	8	57	0	57	15	1	16	0	0	0	0	0	0	0		
16:30 to 17:30	11	0	11	203	4	207	513	3	516	0	0	0	0	0	0	0	0	0	9	0	9	11	0	11	291	33	324	171	0	171	0	0	0	0	0	8	1	9	60	0	60	20	1	21	0	0	0	0	0	0	0	0		
16:45 to 17:45	9	0	9	196	6	202	510	3	513	0	0	0	0	0	0	0	0	0	13	0	13	10	0	10	289	29	318	183	0	183	1	0	1	0	0	0	14	1	15	59	0	59	34	2	36	0	0	0	0	0	0	0		
17:00 to 18:00	4	0	4	232	4	236	523	2	525	0	0	0	0	0	0	0	0	0	10	0	10	12	0	12	294	30	324	168	0	168	1	0	1	0	0	0	13	0	13	64	0	64	39	2	41	0	0	0	0	0	0	0	0	
17:15 to 18:15	8	0	8	215	3	218	486	3	489	2	0	2	0	0	0	0	0	0	10	0	10	10	0	10	318	28	346	155	0	155	1	0	1	0	0	0	12	0	12	56	0	56	43	1	44	0	0	0	0	0	0	0	0	
17:30 to 18:30	9	0	9	210	2	212	483	4	487	5	0	5	0	0	0	0	0	0	10	0	10	9	0	9	343	34	377	154	1	155	1	0	1	0	0	0	11	0	11	53	0	53	39	1	40	0	0	0	0	0	0	0	0	
17:45 to 18:45	14	0	14	229	0	229	483	4	487	6	0	6	0	0	0	0	0	0	10	0	10	8	0	8	332	32	364	129	1	130	1	0	1	0	0	0	5	0	5	48	0	48	26	0	26	0	0	0	0	0	0	0	0	
18:00 to 19:00	21	0	21	213	0	213	467	4	471	8	0	8	0	0	0	0	0	0	9	0	9	7	0	7	310	25	335	134	3	137	1	0	1	0	0	0	6	0	6	40	0	40	25	0	25	0	0	0	0	0	0	0	0	0
PM Totals	36	0	36	641	6	647	1,550	9	1,559	8	0	8	0	0	0	0	0	0	36	0	36	29	0	29	900	97	997	460	4	464	2	0	2	0	0	0	37	1	38	155	0	155	82	2	84	0	0	0	0	0	0	0	0	

Job No. : N5607
 Client : GTA
 Suburb : Waverly
 Location : 1. Carrington Rd / Victoria Rd / Bronte Rd

Day/Date : Sat, 29th February 2020
 Weather : Fine
 Description : Classified Intersection Count
 : Hourly Summary



Approach	Carrington Rd															Bronte Rd															Victoria Rd																							
Direction	Direction 1			Direction 2			Direction 3			Direction 4			Direction 5			Direction 5U			Direction 6			Direction 7			Direction 8			Direction 9			Direction 10			Direction 10U			Direction 11			Direction 12			Direction 13			Direction 14			Direction 15			Direction 15U		
Time Period	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total	Lights	Heavy	Total						
11:00 to 12:00	11	0	11	190	3	193	467	4	471	0	0	0	1	0	1	0	0	0	29	1	30	12	0	12	285	24	309	0	0	0	0	0	0	0	0	92	2	94	184	0	184	72	1	73	54	0	54	39	1	40	0	0	0	
11:15 to 12:15	11	0	11	190	1	191	477	6	483	0	0	0	0	1	0	1	0	0	0	23	1	24	9	0	9	272	23	295	0	0	0	0	0	0	0	93	1	94	192	3	195	69	2	71	61	0	61	48	1	49	0	0	0	
11:30 to 12:30	10	0	10	187	4	191	458	5	463	0	0	0	1	0	1	0	0	0	19	1	20	7	0	7	279	25	304	0	0	0	0	0	0	0	101	0	101	212	3	215	67	2	69	58	0	58	53	1	54	0	0	0		
11:45 to 12:45	10	0	10	189	4	193	441	5	446	0	0	0	0	0	0	0	0	0	17	1	18	8	0	8	268	27	295	0	0	0	0	0	0	0	120	0	120	218	5	223	53	1	54	57	1	58	46	0	46	0	0	0		
12:00 to 13:00	14	0	14	203	6	209	438	4	442	0	0	0	0	0	0	0	0	0	24	0	24	10	0	10	271	28	299	0	0	0	0	0	0	0	99	0	99	183	5	188	55	1	56	61	1	62	35	0	35	0	0	0		
12:15 to 13:15	15	0	15	205	6	211	429	1	430	0	0	0	0	0	0	0	0	0	27	0	27	12	0	12	264	29	293	0	0	0	0	0	0	0	93	0	93	197	2	199	48	0	48	61	2	63	31	0	31	0	0	0		
12:30 to 13:30	19	0	19	206	5	211	443	3	446	0	0	0	0	0	0	0	0	0	28	0	28	12	0	12	261	27	288	0	0	0	0	0	0	0	77	0	77	163	2	165	47	0	47	57	2	59	34	0	34	0	0	0		
12:45 to 13:45	25	0	25	208	5	213	449	4	453	0	0	0	0	0	0	0	0	0	29	0	29	9	0	9	267	24	291	0	0	0	0	0	0	0	62	0	62	168	0	168	51	0	51	47	1	48	32	0	32	0	0	0		
13:00 to 14:00	24	0	24	198	3	201	452	5	457	0	0	0	0	0	0	0	0	0	25	0	25	11	0	11	246	26	272	0	0	0	0	0	0	0	63	0	63	167	0	167	37	0	37	44	2	46	33	1	34	0	0	0		
3hr Totals	49	0	49	591	12	603	1,357	13	1,370	0	0	0	1	0	1	0	0	0	78	1	79	33	0	33	802	78	880	0	0	0	0	0	0	0	254	2	256	534	5	539	164	2	166	159	3	162	107	2	109	0	0	0		

Approach	Carrington Rd																		Bronte Rd																		Victoria Rd																	
Direction	Direction 16			Direction 17			Direction 18			Direction 19			Direction 20			Direction 20U			Direction 21			Direction 22			Direction 23			Direction 24			Direction 25			Direction 25U			Direction 26			Direction 27			Direction 28			Direction 29			Direction 30			Direction 30U		
Time Period	Lights	Heaves	Total	Lights	Heaves	Total	Lights	Heaves	Total	Lights	Heaves	Total	Lights	Heaves	Total	Lights	Heaves	Total	Lights	Heaves	Total	Lights	Heaves	Total	Lights	Heaves	Total	Lights	Heaves	Total	Lights	Heaves	Total	Lights	Heaves	Total	Lights	Heaves	Total	Lights	Heaves	Total	Lights	Heaves	Total	Lights	Heaves	Total						
11:00 to 12:00	20	0	20	212	0	212	437	5	442	3	0	3	0	0	0	0	0	0	8	0	8	11	1	12	373	30	403	143	7	150	4	1	5	0	0	0	17	0	17	53	0	53	35	0	35	1	0	1	0	0	0	0	0	
11:15 to 12:15	25	0	25	230	0	230	469	4	473	4	1	5	0	0	0	0	0	0	9	0	9	8	1	9	372	25	397	145	7	152	5	1	6	0	0	0	24	0	24	56	0	56	31	0	31	1	0	1	0	0	0	0	0	
11:30 to 12:30	24	0	24	228	0	228	468	1	469	5	1	6	3	0	3	0	0	0	6	0	6	10	1	11	367	28	395	158	7	168	6	1	7	0	0	0	21	0	21	56	0	56	34	0	34	1	0	1	0	0	0	0	0	
11:45 to 12:45	20	1	21	207	0	207	517	1	518	3	1	4	3	0	3	0	0	0	7	0	7	8	1	9	351	29	380	151	6	157	5	0	5	0	0	0	25	0	25	57	0	57	29	0	29	1	0	1	0	0	0	0	0	
12:00 to 13:00	20	1	21	194	1	195	509	0	509	6	1	7	4	2	6	0	0	0	7	0	7	10	2	12	352	28	380	143	4	147	4	0	4	0	0	0	27	0	27	46	0	46	29	0	29	1	0	1	0	0	0	0	0	
12:15 to 13:15	15	2	17	179	1	180	484	1	485	6	0	6	5	2	7	0	0	0	6	0	6	9	2	11	353	33	386	149	4	153	2	0	2	0	0	0	27	0	27	43	0	43	34	0	34	1	0	1	0	0	0	0	0	
12:30 to 13:30	8	2	10	169	2	171	468	2	470	6	0	6	2	2	4	0	0	0	9	0	9	7	1	8	340	31	371	138	5	143	0	0	0	0	0	0	31	0	31	41	0	41	34	0	34	1	0	1	0	0	0	0	0	
12:45 to 13:45	11	2	13	171	3	174	442	3	445	8	0	8	2	2	4	0	0	0	8	0	8	6	1	7	344	27	371	145	5	150	0	0	0	0	0	0	29	0	29	39	0	39	36	0	36	1	0	1	0	0	0	0	0	
13:00 to 14:00	10	2	12	173	2	175	481	3	484	6	0	6	1	0	1	0	0	0	7	0	7	3	0	3	355	24	379	159	5	164	4	0	4	0	0	0	26	0	26	34	0	34	30	0	30	0	0	0	0	0	0	0		
3hr Totals	50	3	53	579	3	582	1,435	8	1,438	15	1	16	5	2	7	0	0	0	22	0	22	24	3	27	1,080	82	1,162	445	16	461	12	1	13	0	0	0	70	0	70	133	0	133	94	0	94	2	0	2	0	0	0	0	0	

B.SIDRA RESULTS

B

MOVEMENT SUMMARY

 **Site: 101 [CR-BR-VS-Ex AM]**

Carrington Road, Bronte Road and Victoria Street
Waverley

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carrington Road												
1	L2	20	0.0	0.675	33.0	LOS C	25.4	183.7	0.86	0.80	0.86	35.2
2	L1	255	4.5	0.675	31.8	LOS C	25.4	183.7	0.86	0.80	0.86	35.4
3	T1	841	3.9	0.675	28.4	LOS B	26.2	189.4	0.86	0.78	0.86	35.9
Approach		1116	4.0	0.675	29.3	LOS C	26.2	189.4	0.86	0.78	0.86	35.7
SouthEast: Bronte Road												
4	L3	18	0.0	0.494	56.4	LOS D	6.8	50.7	0.95	0.81	1.22	29.4
5	L1	32	0.0	0.494	54.4	LOS D	6.8	50.7	0.95	0.81	1.22	29.0
6	T1	395	11.5	0.988	85.0	LOS F	25.7	197.4	0.99	1.21	1.54	23.1
Approach		444	10.2	0.988	81.7	LOS F	25.7	197.4	0.99	1.16	1.50	23.7
East: Victoria Street												
7	L3	49	4.3	0.731	59.4	LOS E	12.8	90.1	1.00	0.87	1.08	27.7
8	L2	169	0.0	0.731	58.5	LOS E	12.8	90.1	1.00	0.87	1.08	27.6
9	T1	61	0.0	1.003	104.7	LOS F	20.2	141.7	1.00	1.30	1.75	20.5
10	R1	116	0.9	1.003	107.6	LOS F	20.2	141.7	1.00	1.30	1.75	20.6
6	R2	58	0.0	1.003	110.2	LOS F	20.2	141.7	1.00	1.30	1.75	20.9
Approach		454	0.7	1.003	83.9	LOS F	20.2	141.7	1.00	1.09	1.42	23.5
North: Carrington Road												
11	L2	13	0.0	0.160	25.9	LOS B	4.2	32.7	0.63	0.68	0.63	37.0
12	L1	108	14.6	0.160	24.8	LOS B	4.2	32.7	0.63	0.68	0.63	37.1
13	T1	316	5.0	0.402	24.2	LOS B	12.7	92.9	0.73	0.63	0.73	37.6
15	R3	7	14.3	0.402	29.7	LOS C	12.7	92.9	0.73	0.63	0.73	37.1
Approach		444	7.3	0.402	24.5	LOS B	12.7	92.9	0.70	0.65	0.70	37.4
NorthWest: Bronte Road												
16	L3	45	0.0	0.143	42.4	LOS C	2.6	18.0	0.81	0.73	0.81	31.8
17	L1	8	0.0	0.143	40.4	LOS C	2.6	18.0	0.81	0.73	0.81	31.8
18	T1	200	22.1	0.714	46.9	LOS D	15.6	125.1	0.97	0.84	1.01	30.2
19	R1	82	3.8	0.714	50.3	LOS D	15.6	125.1	0.97	0.84	1.01	30.3
Approach		336	14.1	0.714	47.0	LOS D	15.6	125.1	0.95	0.83	0.98	30.5
West: Victoria Street												
21	L3	6	0.0	0.333	53.3	LOS D	4.9	34.2	0.92	0.77	0.92	29.1
22	L2	87	0.0	0.333	52.5	LOS D	4.9	34.2	0.92	0.77	0.92	28.9
23	T1	20	0.0	0.062	45.3	LOS D	1.0	6.9	0.87	0.63	0.87	31.0
Approach		114	0.0	0.333	51.3	LOS D	4.9	34.2	0.91	0.74	0.91	29.3
All Vehicles		2907	5.9	1.003	48.0	LOS D	26.2	197.4	0.89	0.87	1.04	30.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P5	SouthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P7	NorthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		316	54.3	LOS E			0.95	0.95

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

MOVEMENT SUMMARY

 **Site: 101 [CR-BR-VS-Ex PM]**

Carrington Road, Bronte Road and Victoria Street

Waverley

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carrington Road												
1	L2	9	0.0	0.246	31.4	LOS C	6.8	48.9	0.72	0.72	0.72	35.1
2	L1	163	3.2	0.246	30.2	LOS C	6.8	48.9	0.72	0.72	0.72	35.3
3	T1	594	0.7	0.798	36.9	LOS C	31.6	222.9	0.96	0.88	0.99	33.3
Approach		766	1.2	0.798	35.4	LOS C	31.6	222.9	0.90	0.84	0.93	33.7
SouthEast: Bronte Road												
4	L3	19	0.0	0.142	31.9	LOS C	1.3	9.1	0.88	0.71	0.88	35.6
5	L1	19	0.0	0.142	29.9	LOS C	1.3	9.1	0.88	0.71	0.88	35.2
6	T1	244	12.9	0.709	49.5	LOS D	13.6	106.0	0.98	0.85	1.02	29.8
Approach		282	11.2	0.709	47.0	LOS D	13.6	106.0	0.97	0.84	1.00	30.5
East: Victoria Street												
7	L3	67	0.0	0.484	54.4	LOS D	8.0	56.3	0.95	0.80	0.95	28.8
8	L2	81	1.3	0.484	53.6	LOS D	8.0	56.3	0.95	0.80	0.95	28.7
9	T1	40	0.0	0.454	49.8	LOS D	6.3	44.7	0.95	0.78	0.95	29.6
10	R1	39	0.0	0.454	52.7	LOS D	6.3	44.7	0.95	0.78	0.95	29.9
6	R2	38	2.8	0.454	55.4	LOS D	6.3	44.7	0.95	0.78	0.95	30.6
Approach		265	0.8	0.484	53.3	LOS D	8.0	56.3	0.95	0.79	0.95	29.3
North: Carrington Road												
11	L2	4	0.0	0.472	34.3	LOS C	15.0	106.5	0.80	0.76	0.80	34.5
12	L1	248	1.7	0.472	33.2	LOS C	15.0	106.5	0.80	0.76	0.80	34.7
13	T1	553	0.4	0.619	31.6	LOS C	21.7	152.4	0.86	0.76	0.86	34.8
Approach		805	0.8	0.619	32.1	LOS C	21.7	152.4	0.84	0.76	0.84	34.8
NorthWest: Bronte Road												
16	L3	11	0.0	0.193	38.1	LOS C	4.3	32.2	0.77	0.65	0.77	34.2
17	L1	13	0.0	0.193	36.2	LOS C	4.3	32.2	0.77	0.65	0.77	34.1
18	T1	341	9.3	0.966	70.7	LOS F	32.8	240.8	0.95	1.20	1.52	25.2
19	R1	177	0.0	0.966	85.1	LOS F	32.8	240.8	1.00	1.36	1.74	23.5
Approach		541	5.8	0.966	74.0	LOS F	32.8	240.8	0.96	1.23	1.56	24.9
West: Victoria Street												
21	L3	14	0.0	0.330	53.2	LOS D	4.2	29.5	0.91	0.76	0.91	29.1
22	L2	67	0.0	0.330	52.3	LOS D	4.2	29.5	0.91	0.76	0.91	29.0
23	T1	43	4.9	0.130	45.2	LOS D	2.1	15.6	0.88	0.66	0.88	31.0
Approach		124	1.7	0.330	50.0	LOS D	4.2	29.5	0.90	0.73	0.90	29.7
All Vehicles		2784	3.0	0.966	45.5	LOS D	32.8	240.8	0.91	0.88	1.03	30.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P5	SouthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P7	NorthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		316	54.3	LOS E			0.95	0.95

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

MOVEMENT SUMMARY

 **Site: 101 [CR-BR-VS-Ex Sat]**

Carrington Road, Bronte Road and Victoria Street

Waverley

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carrington Road												
1	L2	11	0.0	0.373	37.9	LOS C	10.2	72.3	0.82	0.76	0.82	33.1
2	L1	201	2.1	0.373	36.7	LOS C	10.2	72.3	0.82	0.76	0.82	33.3
3	T1	487	1.1	0.933	62.0	LOS E	32.3	227.9	0.95	1.10	1.28	27.1
Approach		699	1.4	0.933	54.3	LOS D	32.3	227.9	0.91	0.99	1.14	28.7
SouthEast: Bronte Road												
4	L3	21	5.0	0.563	63.0	LOS E	6.9	51.5	0.98	0.84	1.35	28.0
5	L1	7	0.0	0.563	61.0	LOS E	6.9	51.5	0.98	0.84	1.35	27.7
6	T1	320	8.2	0.938	70.6	LOS F	15.7	118.0	0.99	1.05	1.45	25.4
Approach		348	7.9	0.938	70.0	LOS E	15.7	118.0	0.99	1.04	1.44	25.6
East: Victoria Street												
7	L3	106	0.0	1.047	135.6	LOS F	33.1	233.6	1.00	1.27	1.89	17.4
8	L2	226	1.4	1.047	134.8	LOS F	33.1	233.6	1.00	1.27	1.89	17.3
9	T1	73	2.9	0.607	47.1	LOS D	10.3	72.9	0.95	0.81	0.95	30.3
10	R1	61	1.7	0.607	49.9	LOS D	10.3	72.9	0.95	0.81	0.95	30.6
6	R2	57	0.0	0.607	52.6	LOS D	10.3	72.9	0.95	0.81	0.95	31.3
Approach		523	1.2	1.047	104.0	LOS F	33.1	233.6	0.98	1.10	1.55	20.6
North: Carrington Road												
11	L2	25	0.0	0.520	39.9	LOS C	15.2	106.5	0.87	0.79	0.87	32.6
12	L1	240	0.0	0.520	38.7	LOS C	15.2	106.5	0.87	0.79	0.87	32.8
13	T1	494	0.2	0.866	46.9	LOS D	26.5	186.3	0.93	0.94	1.09	30.4
14	R2	6	16.7	0.866	53.0	LOS D	26.5	186.3	0.94	0.96	1.12	29.9
15	R3	3	0.0	0.866	53.7	LOS D	26.5	186.3	0.94	0.96	1.12	30.0
Approach		768	0.3	0.866	44.2	LOS D	26.5	186.3	0.91	0.89	1.01	31.2
NorthWest: Bronte Road												
16	L3	6	0.0	0.515	43.7	LOS D	12.8	94.8	0.89	0.76	0.89	32.7
17	L1	12	9.1	0.515	41.8	LOS C	12.8	94.8	0.89	0.76	0.89	32.6
18	T1	416	7.1	0.858	46.8	LOS D	20.9	153.4	0.93	0.94	1.20	30.3
19	R1	174	4.2	0.858	61.9	LOS E	20.9	153.4	1.00	1.20	1.63	27.5
20	R3	7	14.3	0.858	64.2	LOS E	20.9	153.4	1.00	1.20	1.63	27.2
Approach		615	6.3	0.858	51.1	LOS D	20.9	153.4	0.95	1.01	1.32	29.5
West: Victoria Street												
21	L3	22	0.0	0.260	49.0	LOS D	4.0	28.1	0.88	0.75	0.88	30.1
22	L2	59	0.0	0.260	48.2	LOS D	4.0	28.1	0.88	0.75	0.88	29.9
23	T1	36	0.0	0.079	38.4	LOS C	1.6	11.4	0.81	0.61	0.81	32.9
Approach		117	0.0	0.260	45.4	LOS D	4.0	28.1	0.86	0.71	0.86	30.8
All Vehicles		3071	2.7	1.047	61.0	LOS E	33.1	233.6	0.94	0.98	1.24	27.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P5	SouthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P7	NorthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		316	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 101 [CR-BR-VS-PD AM]**

Carrington Road, Bronte Road and Victoria Street

Waverley

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carrington Road												
1	L2	20	0.0	0.681	33.1	LOS C	25.7	186.1	0.86	0.80	0.86	35.1
2	L1	257	4.5	0.681	32.0	LOS C	25.7	186.1	0.86	0.80	0.86	35.3
3	T1	849	3.8	0.681	28.6	LOS C	26.5	191.9	0.86	0.78	0.86	35.8
Approach		1126	3.9	0.681	29.4	LOS C	26.5	191.9	0.86	0.78	0.86	35.7
SouthEast: Bronte Road												
4	L3	18	0.0	0.494	55.0	LOS D	6.8	50.7	0.95	0.81	1.17	29.7
5	L1	32	0.0	0.494	53.0	LOS D	6.8	50.7	0.95	0.81	1.17	29.4
6	T1	395	11.5	0.988	84.9	LOS F	25.7	197.6	0.99	1.21	1.53	23.1
Approach		444	10.2	0.988	81.4	LOS F	25.7	197.6	0.99	1.16	1.49	23.7
East: Victoria Street												
7	L3	49	4.3	0.731	59.4	LOS E	12.8	90.1	1.00	0.87	1.08	27.7
8	L2	169	0.0	0.731	58.5	LOS E	12.8	90.1	1.00	0.87	1.08	27.6
9	T1	61	0.0	1.003	104.7	LOS F	20.2	141.7	1.00	1.30	1.75	20.5
10	R1	116	0.9	1.003	107.6	LOS F	20.2	141.7	1.00	1.30	1.75	20.6
6	R2	58	0.0	1.003	110.2	LOS F	20.2	141.7	1.00	1.30	1.75	20.9
Approach		454	0.7	1.003	83.9	LOS F	20.2	141.7	1.00	1.09	1.42	23.5
North: Carrington Road												
11	L2	13	0.0	0.161	25.9	LOS B	4.2	32.9	0.64	0.68	0.64	37.0
12	L1	108	14.6	0.161	24.9	LOS B	4.2	32.9	0.64	0.68	0.64	37.2
13	T1	324	4.9	0.411	24.3	LOS B	13.1	95.5	0.73	0.64	0.73	37.5
15	R3	7	14.3	0.411	29.8	LOS C	13.1	95.5	0.73	0.64	0.73	37.1
Approach		453	7.2	0.411	24.6	LOS B	13.1	95.5	0.70	0.65	0.70	37.4
NorthWest: Bronte Road												
16	L3	45	0.0	0.144	42.4	LOS C	2.6	18.3	0.81	0.73	0.81	31.8
17	L1	8	0.0	0.144	40.4	LOS C	2.6	18.3	0.81	0.73	0.81	31.8
18	T1	200	22.1	0.721	47.3	LOS D	15.8	126.1	0.97	0.85	1.03	30.1
19	R1	84	3.8	0.721	50.6	LOS D	15.8	126.1	0.98	0.86	1.04	30.2
Approach		338	14.0	0.721	47.3	LOS D	15.8	126.1	0.95	0.84	1.00	30.4
West: Victoria Street												
21	L3	6	0.0	0.333	53.3	LOS D	4.9	34.2	0.92	0.77	0.92	29.1
22	L2	87	0.0	0.333	52.5	LOS D	4.9	34.2	0.92	0.77	0.92	28.9
23	T1	20	0.0	0.062	45.3	LOS D	1.0	6.9	0.87	0.63	0.87	31.0
Approach		114	0.0	0.333	51.3	LOS D	4.9	34.2	0.91	0.74	0.91	29.3
All Vehicles		2928	5.9	1.003	47.9	LOS D	26.5	197.6	0.89	0.87	1.04	30.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P5	SouthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P7	NorthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		316	54.3	LOS E			0.95	0.95

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

MOVEMENT SUMMARY

 **Site: 101 [CR-BR-VS-PD PM]**

Carrington Road, Bronte Road and Victoria Street

Waverley

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carrington Road												
1	L2	9	0.0	0.246	31.4	LOS C	6.8	48.9	0.72	0.72	0.72	35.1
2	L1	163	3.2	0.246	30.2	LOS C	6.8	48.9	0.72	0.72	0.72	35.3
3	T1	596	0.7	0.801	37.1	LOS C	31.9	224.6	0.96	0.88	0.99	33.2
Approach		768	1.2	0.801	35.6	LOS C	31.9	224.6	0.90	0.85	0.93	33.7
SouthEast: Bronte Road												
4	L3	19	0.0	0.142	31.9	LOS C	1.3	9.1	0.88	0.71	0.88	35.6
5	L1	19	0.0	0.142	29.9	LOS C	1.3	9.1	0.88	0.71	0.88	35.2
6	T1	244	12.9	0.709	49.5	LOS D	13.6	106.0	0.98	0.85	1.02	29.8
Approach		282	11.2	0.709	47.0	LOS D	13.6	106.0	0.97	0.84	1.00	30.5
East: Victoria Street												
7	L3	67	0.0	0.484	54.4	LOS D	8.0	56.3	0.95	0.80	0.95	28.8
8	L2	81	1.3	0.484	53.6	LOS D	8.0	56.3	0.95	0.80	0.95	28.7
9	T1	40	0.0	0.454	49.8	LOS D	6.3	44.7	0.95	0.78	0.95	29.6
10	R1	39	0.0	0.454	52.7	LOS D	6.3	44.7	0.95	0.78	0.95	29.9
6	R2	38	2.8	0.454	55.4	LOS D	6.3	44.7	0.95	0.78	0.95	30.6
Approach		265	0.8	0.484	53.3	LOS D	8.0	56.3	0.95	0.79	0.95	29.3
North: Carrington Road												
11	L2	4	0.0	0.473	34.3	LOS C	15.1	106.8	0.80	0.76	0.80	34.5
12	L1	248	1.7	0.473	33.2	LOS C	15.1	106.8	0.80	0.76	0.80	34.6
13	T1	555	0.4	0.620	31.6	LOS C	21.8	152.9	0.86	0.76	0.86	34.8
Approach		807	0.8	0.620	32.1	LOS C	21.8	152.9	0.84	0.76	0.84	34.8
NorthWest: Bronte Road												
16	L3	11	0.0	0.193	38.1	LOS C	4.3	32.2	0.77	0.65	0.77	34.2
17	L1	13	0.0	0.193	36.2	LOS C	4.3	32.2	0.77	0.65	0.77	34.1
18	T1	341	9.3	0.966	70.7	LOS F	32.8	240.8	0.95	1.20	1.52	25.2
19	R1	177	0.0	0.966	85.1	LOS F	32.8	240.8	1.00	1.36	1.74	23.5
Approach		541	5.8	0.966	74.0	LOS F	32.8	240.8	0.96	1.23	1.56	24.9
West: Victoria Street												
21	L3	14	0.0	0.330	53.2	LOS D	4.2	29.5	0.91	0.76	0.91	29.1
22	L2	67	0.0	0.330	52.3	LOS D	4.2	29.5	0.91	0.76	0.91	29.0
23	T1	43	4.9	0.130	45.2	LOS D	2.1	15.6	0.88	0.66	0.88	31.0
Approach		124	1.7	0.330	50.0	LOS D	4.2	29.5	0.90	0.73	0.90	29.7
All Vehicles		2788	3.0	0.966	45.5	LOS D	32.8	240.8	0.91	0.88	1.03	30.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P5	SouthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P7	NorthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		316	54.3	LOS E			0.95	0.95

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

MOVEMENT SUMMARY

 **Site: 101 [CR-BR-VS-PD Sat]**

Carrington Road, Bronte Road and Victoria Street

Waverley

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carrington Road												
1	L2	11	0.0	0.379	38.0	LOS C	10.4	73.7	0.82	0.76	0.82	33.1
2	L1	203	2.1	0.379	36.8	LOS C	10.4	73.7	0.82	0.76	0.82	33.3
3	T1	495	1.1	0.948	67.0	LOS E	34.0	240.4	0.96	1.14	1.33	26.1
Approach		708	1.3	0.948	57.9	LOS E	34.0	240.4	0.91	1.02	1.18	27.9
SouthEast: Bronte Road												
4	L3	21	5.0	0.563	63.3	LOS E	6.9	51.5	0.98	0.84	1.35	27.9
5	L1	7	0.0	0.563	61.3	LOS E	6.9	51.5	0.98	0.84	1.35	27.7
6	T1	320	8.2	0.938	70.8	LOS F	15.8	118.1	0.99	1.05	1.45	25.4
Approach		348	7.9	0.938	70.1	LOS E	15.8	118.1	0.99	1.04	1.45	25.6
East: Victoria Street												
7	L3	106	0.0	1.047	135.6	LOS F	33.1	233.6	1.00	1.27	1.89	17.4
8	L2	226	1.4	1.047	134.8	LOS F	33.1	233.6	1.00	1.27	1.89	17.3
9	T1	73	2.9	0.607	47.1	LOS D	10.3	72.9	0.95	0.81	0.95	30.3
10	R1	61	1.7	0.607	49.9	LOS D	10.3	72.9	0.95	0.81	0.95	30.6
6	R2	57	0.0	0.607	52.6	LOS D	10.3	72.9	0.95	0.81	0.95	31.3
Approach		523	1.2	1.047	104.0	LOS F	33.1	233.6	0.98	1.10	1.55	20.6
North: Carrington Road												
11	L2	25	0.0	0.527	40.0	LOS C	15.5	108.3	0.87	0.79	0.87	32.6
12	L1	240	0.0	0.527	38.8	LOS C	15.5	108.3	0.87	0.79	0.87	32.8
13	T1	501	0.2	0.878	48.4	LOS D	27.3	191.5	0.94	0.96	1.11	30.0
14	R2	6	16.7	0.878	54.9	LOS D	27.3	191.5	0.94	0.98	1.15	29.4
15	R3	3	0.0	0.878	55.5	LOS D	27.3	191.5	0.94	0.98	1.15	29.5
Approach		776	0.3	0.878	45.2	LOS D	27.3	191.5	0.91	0.90	1.03	30.9
NorthWest: Bronte Road												
16	L3	6	0.0	0.519	43.7	LOS D	12.9	95.6	0.89	0.76	0.89	32.7
17	L1	12	9.1	0.519	41.8	LOS C	12.9	95.6	0.89	0.76	0.89	32.6
18	T1	416	7.1	0.864	47.1	LOS D	21.1	154.8	0.93	0.94	1.20	30.2
19	R1	176	4.2	0.864	62.7	LOS E	21.1	154.8	1.00	1.21	1.65	27.3
20	R3	7	14.3	0.864	65.0	LOS E	21.1	154.8	1.00	1.21	1.65	27.0
Approach		617	6.3	0.864	51.6	LOS D	21.1	154.8	0.95	1.02	1.33	29.4
West: Victoria Street												
21	L3	22	0.0	0.260	49.0	LOS D	4.0	28.1	0.88	0.75	0.88	30.1
22	L2	59	0.0	0.260	48.2	LOS D	4.0	28.1	0.88	0.75	0.88	29.9
23	T1	36	0.0	0.079	38.4	LOS C	1.6	11.4	0.81	0.61	0.81	32.9
Approach		117	0.0	0.260	45.4	LOS D	4.0	28.1	0.86	0.71	0.86	30.8
All Vehicles		3089	2.7	1.047	62.2	LOS E	34.0	240.4	0.94	1.00	1.25	27.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P5	SouthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P7	NorthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		316	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

