PROPOSED MIXED USE DEVELOPMENT

137-141 WALDRON ROAD, CHESTER HILL

Traffic and Parking Assessment Report

21st April 2017

Ref: 15023

Prepared by

Terraffic Pty Ltd
Traffic and Parking Consultants

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LIST OF ILLUSTRATIONS

1. INTRODUCTION

This report has been prepared to accompany a Development Application (DA) to the Canterbury Bankstown Council for a proposed mixed use development at 137-141 Waldron Road, Chester Hill (Figures 1 and 2).

The proposed consolidated development site is located on the south-eastern corner of the Waldron Road / Campbell Hill Road intersection. The site has a total area of 3,351m^2 with frontages of approximately 85m to Waldron Road and 31m to Campbell Hill Road. A site survey prepared by Structerre Surveying is reproduced in the following pages.

Aerial photograph of the site

Existing Site Development

The existing site development comprises a single storey retail building with a floor area of approximately 1250m^2. The retail shop is currently occupied by Ivan's Butchery & Delicatessen. The site also contains a former Volume Plus service station with a site area of approximately 830m^2 and associated convenience store with an area of approximately 175m^2. The service station has been closed since 2009 and is currently used to store parked cars.

As can be seen on the aerial photograph, the existing retail shop is served by an at-grade Right of Carriageway (ROW) at the rear of the site that can accommodate approximately 30 parked cars. The ROW also provides an egress route for vehicles parking at the rear of the neighbouring retail premises at 129 Waldron Road.

The former Volume Plus Service Station gained vehicular access to Waldron Road via a 12m wide entry driveway and 10m wide exit driveway to Campbell Hill Road. As the proposed development will make these driveways redundant, the on-street parking capacity will increase by up to 4 parked cars along the site frontage.

Looking east along the ROW from Campbell Hill Road

Proposed Site Development

The development proposal involves the demolition of the existing site development and construction of a mixed use development comprising:

- 100 residential units (11 x studios, 31 x 1 bedroom units, 44 x 2 bedroom units and 14 x 3 bedroom units)
- 5 x ground floor retail premises with a combined floor area of 460m^2

The proposed development is served by 2 level basement carpark containing a total of 109 spaces comprising 11 retail tenant spaces, 78 resident spaces and 20 visitor spaces.

Vehicular access to the basement carpark is via a 6.1m wide combined entry/exit driveway to Campbell Hill Road. The basements are connected by an internal ramp that can accommodate two-way flow.

In addition to the 109 spaces located in the basement carpark are 36 surplus parking spaces located on Ground Level. Vehicular access to the ground level parking spaces is via the two-way ROW at the rear of the site. The ROW will continue to provide an egress route for vehicles exiting the neighbouring property to the east.

The 36 surplus spaces comprise 12 retail spaces, 4 resident spaces and 20 visitor spaces and are either located on the ROW or within the site with direct access to the ROW. It should be noted that these 36 spaces are additional to the development and not required to comply with the necessary SEPP and Council parking requirements. The surplus spaces will be utilised until such time that the ROW is no longer available.

In addition to the off-street car parking provision are 43 bicycle racks comprising 30 resident and 13 visitor bicycle racks. These racks are located on the ground level and upper basement level.

The 5 retail shops vary in size from $67m^2$ to $101m^2$ and are located along the Waldron Road frontage. The shops will be served by an off-street loading bay capable of accommodating the Australian Standard 8.8m long Medium Rigid Vehicle (MRV). The loading bay has direct access to the ROW at the rear of the site.

Plans of the development proposal have been prepared by CMT Architects are reproduced in Appendix A.

Public Transport Accessibility

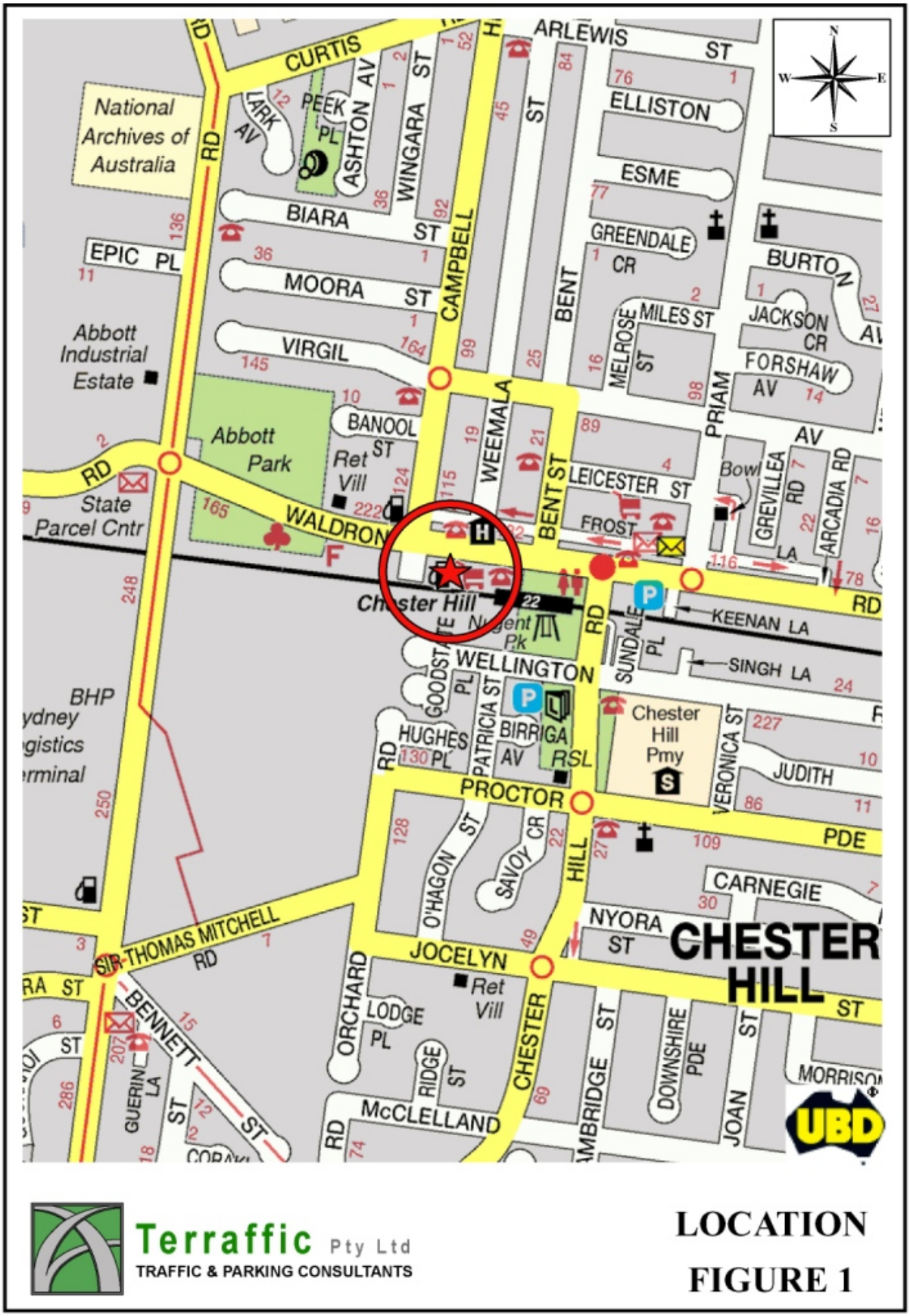
The development site has convenient access to the following bus routes operated by Punchbowl Bus Co:

Route M91	Hurstville to Parramatta
Route 916	Chester Hill to Guildford
Route S2	Sefton to Granville
Route S4	Chester Hill to Fairfield via Villawood Station

Bus Services through Chester Hill

In addition to these bus services, the development site is conveniently located 215m from the entrance to Chester Hill Railway Station on Chester Hill Road.

The purpose of this report is to assess the traffic and parking implications of the proposed development.

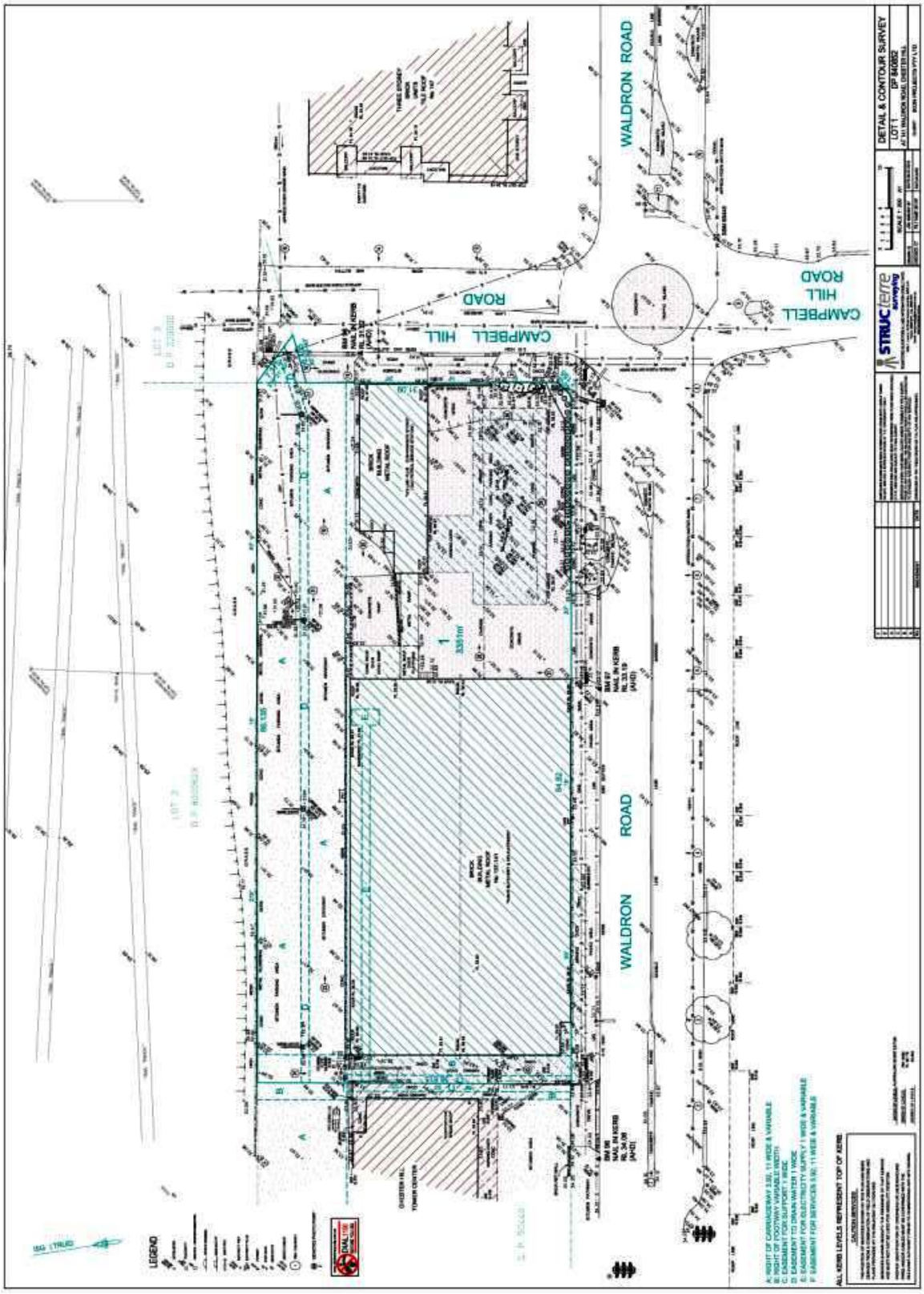


Terraffic Pty Ltd
TRAFFIC & PARKING CONSULTANTS

LOCATION

FIGURE 1


VIRGIL
BANOOL ST
CAMPBELL HILL RD
WEEMALA ST
BENT ST
LEICESTER
FROST LANE
FROST LANE
FROST
WALDRON RD
WALDRON RD
CHESTER HILL RAILWAY STATION
CHESTER HILL RD
WELLINGTON RD
GOODSTATE PL
GOODSTATE PL
HUGHES PL
BIRRIGA AVE
CHESTER HILL RD
N
W
E
S
Terraffic Pty Ltd
TRAFFIC & PARKING CONSULTANTS
SITE
FIGURE 2


WALDRON ROAD
CAMPBELL HILL ROAD
DETAIL & CONTOUR SURVEY
LOT 1
DP 840652
STRUCTERRE surveying
LEGEND
ALL KERB LEVELS REFRESENT TOP OF KERB

Site Survey

2. PARKING ASSESSMENT

SEPP 65 Residential Parking Requirements

The NSW Government has recently adopted the *"Apartment Design Guide"* which is used in conjunction with the State Environmental Planning Policy No.65 – Design Quality of Residential Flat Development (SEPP 65). Objective 3J-1 of the Design Guide states that sites within 800m of a railway station or light rail stop can satisfy the minimum parking requirements specified in the RMS *"Guide to Traffic Generating Developments"* (October 2002).

The RMS parking requirements for high density residential flat buildings in Metropolitan Sub-Regional Centres are as follows:

1 bedroom units	0.6 space per dwelling
2 bedroom units	0.9 spaces per dwelling
3 bedroom units	1.4 spaces per dwelling
Visitor Parking	1 space per 5 dwellings

As the development site has convenient access to Chester Hill Railway Station and numerous bus routes, the proposed development will not be providing off-street car parking for the studio apartments.

Application of those requirements to the proposed development yields a resident parking requirement of 98 car parking spaces as follows:

11 x studios @ 0 spaces per unit	=	0 spaces
31 x 1 bedroom units @ 0.6 space per unit	=	18.6 spaces
44 x 2 bedroom units @ 0.9 spaces per unit	=	39.6 spaces
14 x 3 bedroom units @ 1.4 spaces per unit	=	19.6 spaces
Total resident parking	=	*77.8 spaces (say 78 spaces)*
100 units @ 1 visitor space per 5 units	=	20 spaces
Total	**=**	**97.8 spaces (rounded up to 98 spaces)**

The proposed provision of 78 resident and 20 visitor off-street car parking spaces satisfies the minimum requirement specified by SEPP65. In the circumstances the proposed resident carparking provision is considered adequate.

Council DCP Retail Parking Requirement

Part B5 - Parking of the Bankstown Development Control Plan 2014 specifies the following parking requirements that apply to the retail component of he proposed development:

> **Shops**
> Development of less than 4,000m² gross floor area - 1 car space per 40m² of gross floor area.

It should be noted that Council's parking requirement of 1 car space per 40m^2 GFA for retail shops is identical to the parking requirement specified for office floor space specified in the RMS *"Guide to Traffic Generating Developments"*. It can therefore be assumed that:

1. The Council's parking requirement for retail floor space is to accommodate retail tenants only

2. Council is implementing a *constrained* parking policy that will effectively encourage alternative modes of transport for shoppers (such as public transport, cycling, etc) and ultimately reduce the traffic generated by retail developments

Application of the DCP parking rates to the proposed site development yields a total requirement of 11 spaces calculated as follows:

460m^2 retail @ 1 space per 40m^{2}GFA 11.5 spaces (rounded to 11 spaces)

The proposed development satisfies the DCP requirement with the provision of 11 off-street to serve the retail tenants (ie long-term parking).

As noted in the foregoing, the proposed development is served by 36 surplus parking spaces located on Ground Level comprising 12 retail spaces, 4 resident spaces and 20 visitor spaces. These spaces can be utilised until such time that the ROW is no longer available.

Carpark Compliance

The carpark and access ramps have been designed to satisfy the following requirements of the Australian Standard AS/NZS2890.1-2004 – *"Off-Street Car Parking"*:

- *Class 1A* (long-stay) resident and tenant parking spaces have a minimum length of 5.4m and width of 2.4m
- *Class 3* (short-stay) parking spaces have a minimum length of 5.4m and width of 2.6m
- An additional 0.3m has been provided for spaces adjacent to a wall or obstruction
- Parallel spaces exceed the length requirements specified in Figure 2.5
- The access/manoeuvring aisles satisfy the minimum requirement of 5.8m
- An addition 0.5m in width has been provided to access aisles with parallel spaces parking on one side and angled parking on the other side as per Clause 2.4.4(b)(iii)
- Pavement cross-falls at parking spaces do not exceed 5% (1 in 20) in any direction
- Columns have been located in accordance with Clause 5.2 of the Standard
- The first 6m of the access from the property boundary does not exceed 5% (1 in 20)
- The two way access has a minimum width of 5.5m kerb to kerb
- Maximum ramp grades do not exceed 25% (1 in 4)
- Ramp transitions do not exceed 12.5% (1 in 8) over a distance of 2.0m
- A minimum headroom clearance of 2.2m has been provided throughout the lower basement
- Pedestrian sight lines in accordance with Figure 3.3 of the Standard have been provided

The disabled parking spaces have also been designed in accordance with the Australian Standard AS/NZS2890.6:2009 – *"Off-street parking for people with disabilities"* as follows:

- A 5.4m long x 2.4m wide dedicated *(non-shared)* parking space (Clause 2.2)
- An adjacent *shared* area that is also 5.4m long x 2.4m wide (Clause 2.2)
- A minimum headroom of 2.5m above the disabled spaces (Clause 2.4)
- Pavement cross-falls in disabled spaces do not exceed 2.5% (1 in 40) in any direction (Clause 2.3)

Loading and Unloading Facilities

Section 5 of Council's DCP specifies the following with regard to loading arrangements for mixed use developments:

> 5.2 Mixed use development must provide appropriate loading/unloading or furniture pick–up spaces. If no provision is made for the facilities, development applications must provide justification why they are not necessary.
>
> 5.3 Where rear lane access is not available and the commercial/retail gross floor area of a building is greater than 500m^2, Council requires:
>
> > (a) at least one off–street parking space for delivery/service vehicles; and
> > (b) additional off–street parking spaces or a loading dock depending on the size, number, and frequency of delivery/service vehicles likely to visit the premises.
>
> 5.4 The design of loading docks must:
>
> > (a) be separate from parking circulation or exit lanes to ensure safe pedestrian movement and uninterrupted flow of other vehicles in the circulation roadways;
> >
> > (b) allow vehicles to enter and leave an allotment in a safe manner; and
> >
> > (c) have minimum dimensions of 4 metres by 7 metres per space.

The proposed development satisfies the DCP requirements with the provision of a dedicated loading bay on ground level with direct access to the ROW. The loading bay measures 8.8m x 3.5m and has been designed to accommodate the Australian Standard 8.8m Medium Rigid Vehicle (MRV).

The ability of the MRV to access the proposed loading bay was tested using the Autodesk *Vehicle Tracking* software. The manoeuvring path of the MRV accessing the loading bay is reproduced in Appendix B and illustrates that this delivery vehicle can adequately access the loading bay in a total of three manoeuvres.

In addition to the loading dock path, Appendix B includes the entry and exit swept path between the ROW and Campbell Hill Road. As can be seen this manoeuvre can be carried out satisfactorily.

In the circumstances, it can be concluded that the proposed development has no unacceptable parking or service implications.

3. TRAFFIC ASSESSMENT

Road Hierarchy

The road hierarchy allocated to the road network in the vicinity of the site by the Roads and Maritime Services (RMS) is illustrated on Figure 3 and comprises the following:

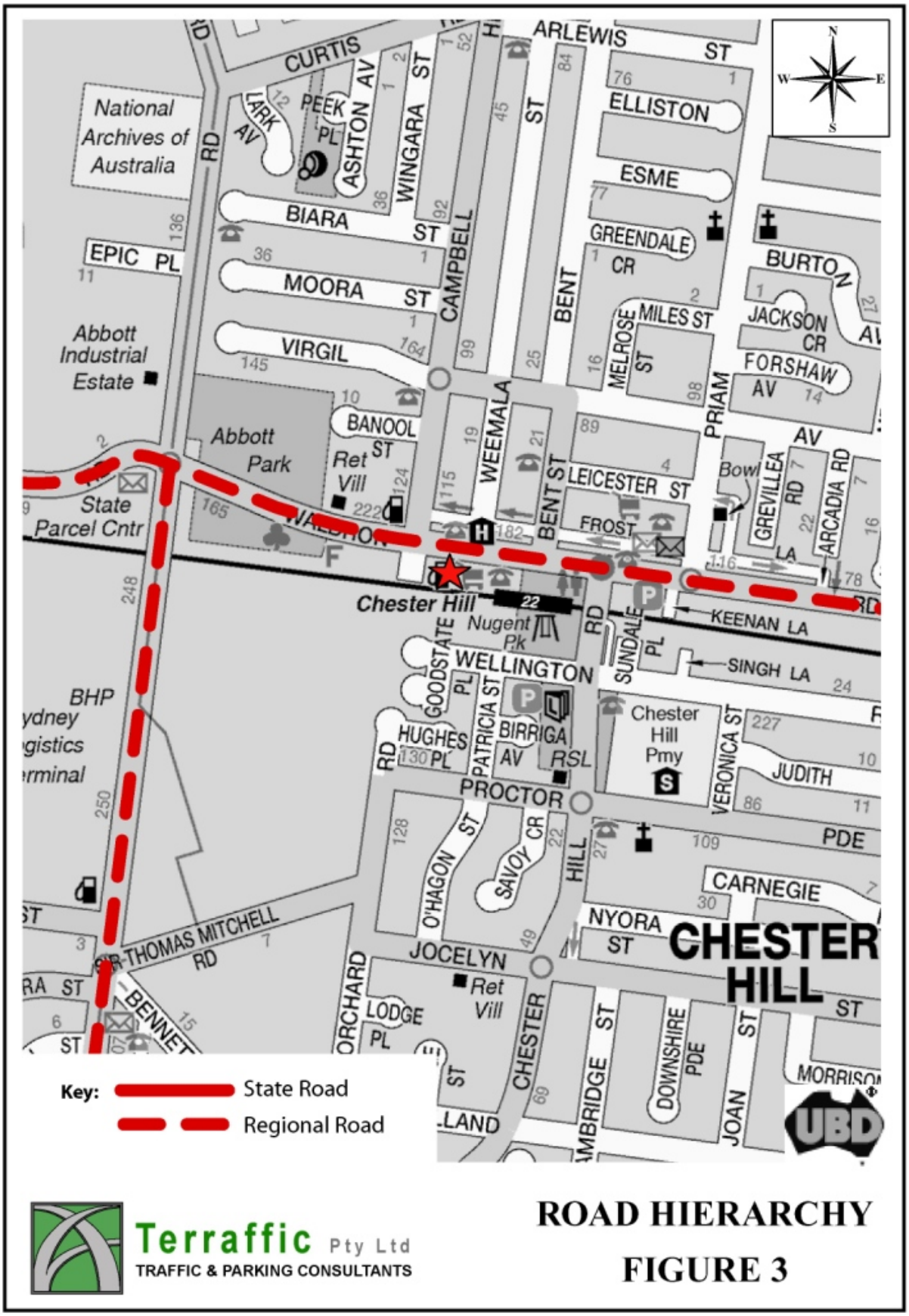
State Roads	**Regional Roads**
Nil	Christina Road - Waldron Road – Carlingford Street
	Miller Road (south of Waldron Road)

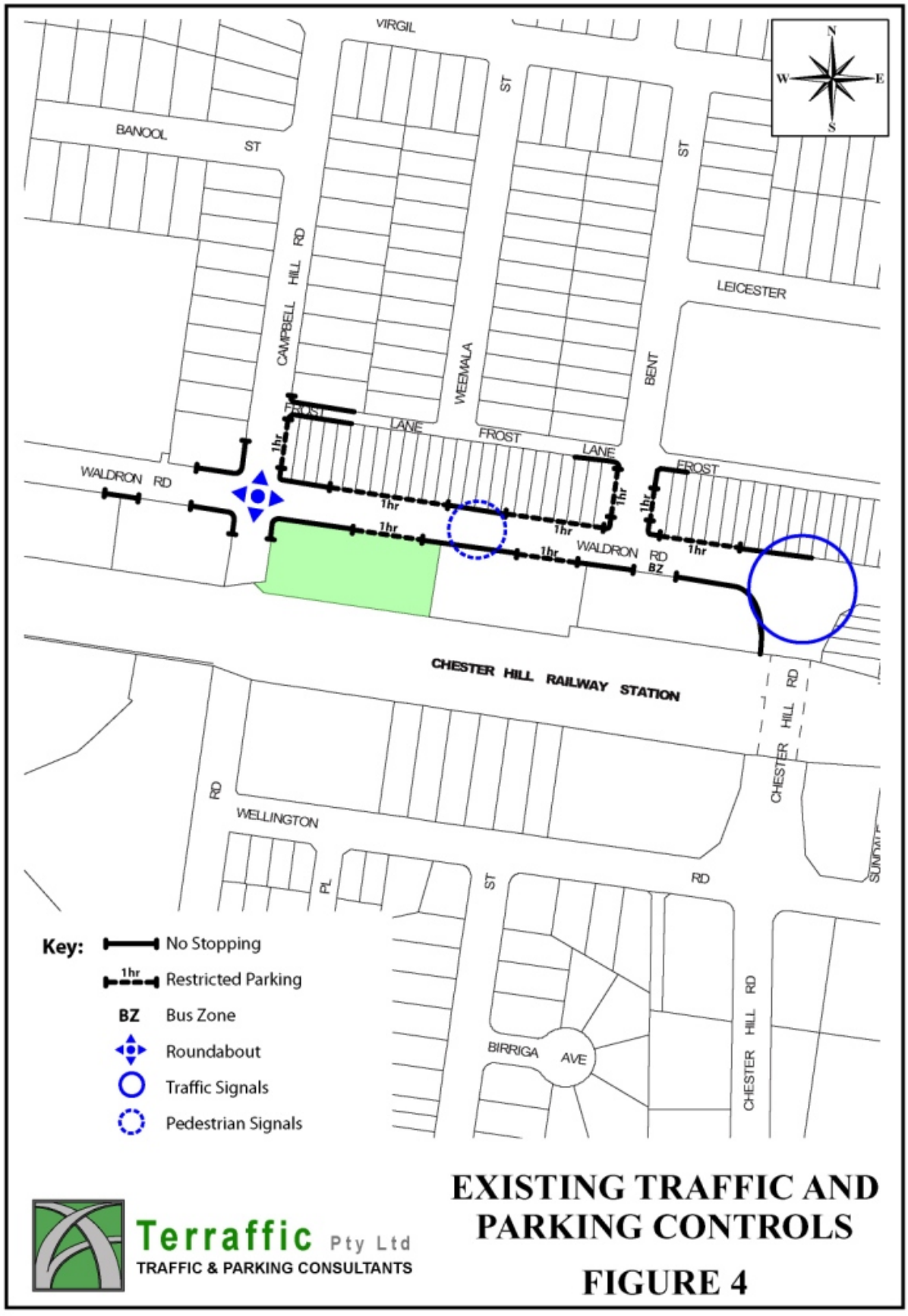
As can be seen, Waldron Road is a classified *Regional Road* performing a sub-arterial road function. It typically carries 4 traffic lanes although the kerbside lanes are generally used for parking. Waldron Road has a pavement width of approximately 13m and is restricted to a speed limit of 50km/h.

The section of Campbell Hill Road fronting the site is an unclassified Local Road with a length of approximately 40m between Waldron Road and the railway corridor. Campbell Hill Road has a pavement width of 10m with unrestricted parking permitted along both alignments. In addition to providing vehicular access to the existing site development and ROW, the residential flat building on the western side of the roadway also gains vehicular access to Campbell Hill Road.

The existing traffic and parking controls on the road network serving the site are illustrated on Figure 4 and comprise:

- The ROUNDABOUT at the intersection of Waldron Road and Campbell Hill Road
- The TRAFFIC SIGNALS at the intersection of Waldron Road and Chester Hill Road
- The PEDESTRIAN SIGNALS on Waldron Road
- The 1 HOUR PARKING restrictions along Waldron Road


ARLEWIS ST
CURTIS
ASHTON AV
WINGARA ST
PEEK PL
LARK AV
National Archives of Australia
BIARA ST
EPIC PL
MOORA ST
VIRGIL
CAMPBELL
BENT ST
ELLISTON
ESME
GREENDALE CR
BURTON
JACKSON CR
FORSHAW AV
MILES ST
MELROSE ST
PRIAM
Abbott Industrial Estate
Abbott Park
BANOOL ST
Ret Vill
WEEMALA
LEICESTER ST
FROST
Bowl
GREVILLEA RD
ARCADIA RD
State Parcel Cntr
Chester Hill
Nugent Pk
KEENAN LA
SINGH LA
WELLINGTON
GOODSTATE PL
SUNDALE PL
HUGHES PL
PATRICIA ST
BIRRIGA AV
RSL
Chester Hill Pmy
VERONICA ST
JUDITH
PROCTOR
O'HAGON ST
SAVOY CR
HILL
PDE
CARNEGIE
NYORA ST
CHESTER HILL
BHP
THOMAS MITCHELL RD
JOCELYN
Ret Vill
LODGE PL
ORCHARD
CHESTER
DOWNSHIRE PDE
JOAN ST
MORRISON
Key:
State Road
Regional Road
UBD
Terraffic Pty Ltd
TRAFFIC & PARKING CONSULTANTS
ROAD HIERARCHY
FIGURE 3


VIRGIL
ST
BANOOL
ST
CAMPBELL HILL RD
WEEMALA
ST
BENT
ST
LEICESTER
FROST
LANE
FROST
LANE
FROST
WALDRON RD
1hr
WALDRON RD
BZ
CHESTER HILL RAILWAY STATION
CHESTER HILL RD
WELLINGTON
RD
PL
ST
RD
BIRRIGA
AVE
CHESTER HILL RD
N
W
E
S
Key:
No Stopping
1hr Restricted Parking
BZ Bus Zone
Roundabout
Traffic Signals
Pedestrian Signals
Terraffic Pty Ltd
TRAFFIC & PARKING CONSULTANTS
EXISTING TRAFFIC AND PARKING CONTROLS
FIGURE 4

Existing Traffic Conditions

An indication of the existing traffic conditions on the road network in the vicinity of the site is provided by peak period traffic surveys undertaken at the Waldron Road/Campbell Hill Road intersection between 7.00-9.00am and 4.00-6.00pm on Wednesday 13th May 2015. In addition, the traffic accessing the ROW at the rear of the subject site off Campbell Hill Road was also counted during the survey periods.

The results of the traffic surveys are reproduced in full in Appendix C and reveal that:

- the morning peak period occurs between 7.45-8.45am. At that time, the two-way traffic flows on Waldron Road past the site were 1,496 vehicles per hour (vph) comprising 818vph heading eastbound and 678vph heading westbound. At that time there were 20vph on Campbell Hill Road comprising 13vph heading northbound and 7vph heading southbound

- during the morning peak, 3 vehicles entered the ROW while 6 vehicles exiting the ROW and turned right onto Campbell Hill Road

- the evening peak period occurs between 4.30-5.30pm. At that time, the two-way traffic flows on Waldron Road past the site were 1,478vph comprising 666vph heading eastbound and 812vph heading westbound. At that time there were 20vph on Campbell Hill Road comprising 13vph heading northbound and 7vph heading southbound

- during the evening peak, 7 vehicles entered the ROW from Campbell Hill Road while 6 vehicles exited the ROW

Projected Traffic Generation Potential

An indication of the traffic generation potential of the proposed development is provided by reference to the Roads and Maritime Services (RMS) *Guide to Traffic Generating Developments – Technical Direction TDT 2013-04a (August 2013).*

The traffic generation rates specified in the updated Guidelines are based on extensive surveys of a wide range of land uses throughout Sydney and regional NSW and nominate the following traffic generation rates for high density residential flat buildings:

AM Peak (1 hour) vehicle trips per unit	0.19
PM Peak (1 hour) vehicle trips per unit	0.15

As noted in Chapter 2 of this report, Bankstown Council's parking requirement of 1 car parking space per 40m^2 GFA for retail floor space is identical to the parking requirement specified for office floor space in the RMS's *"Guide to Traffic Generating Developments"*. While the Council DCP does not specify parking allocations for retail spaces, this report assumes that the 12 spaces required by the DCP will be allocated to retail tenants only. To that end, the traffic generated by the retail floor space will be identical to the traffic generated by a typical office development, ie 2.0vtph per 100m^2 GFA.

Traffic Generating Potential of Proposed Site Development

Application of the above traffic generation rates to the residential and retail components of the development proposal yields a traffic generation potential of approximately 28vtph during morning peak period and 24vtph during the evening peak period as follows:

Morning Peak Period	
100 units @ 0.19vtph per dwelling	19vtph (4 in / 15 out)
460m^2 retail @ 2vtph per 100m^2	9vtph (8 in / 1 out)
Total	**28vtph (12 in / 16 out)**
Evening Peak Period	
100 units @ 0.15vtph per dwelling	15vtph (12 in / 3 out)
460m^2 retail @ 2vtph per 100m^2	9vtph (1 in / 8 out)
Total	**24vtph (13 in / 11 out)**

The traffic generation of the proposed development should be discounted by the traffic generating potential of the existing retail premises and former service station on the site.

Traffic Generating Potential of Existing Site Development

The 2002 version of the RMS Guide to Traffic Generating Developments provides the following rate for service stations with convenience stores:

Evening Peak Hour Vehicle Trips = 0.04 A(S) + 0.3 A(F)

Where A(S) = area of site (m^2)

A(F) = gross floor area of convenience store (m^2)

Based on measurements taken from the site survey, the former service station has a site area of 830m^2 and convenience store area of 175m^2GFA.

In addition, as the RMS Guidelines do not indicate a traffic generation rate for the morning peak, this assessment will assume that the morning peak generates 50% of the traffic generated during the evening peak.

Application of the RMS service station rate and the abovementioned retail shop rates, the existing site development has the potential to generate in the order of 68vtph during the morning peak and 111vtph during the evening peak as follows:

Morning Peak Period		
Service Station	(0.04 x 830) + (0.3 x 175) x 50%	43vtph (22 in / 21 out)
1,250m^2 retail @ 2vtph per 100m^2		25vtph (20 in / 5 out)
Total		**68vtph (42 in / 26 out)**
Evening Peak Period		
Service Station	(0.04 x 830) + (0.3 x 175)	86vtph (43 in / 43 out)
1,250m^2 retail @ 2vtph per 100m^2		25vtph (5 in / 20 out)
Total		**111vtph (48 in / 63 out)**

As can be seen, the traffic generating potential of the existing site development is significantly higher than the proposed traffic generating potential. However, in order to provide a conservative assessment, it has been assumed that the development site currently generates no traffic on the road network.

Based on current traffic flows on the road network, the following assignment of traffic has been adopted for this assessment:

- 40% to/from the west
- 40% to/from the east
- 20% to/from the north

Traffic Implications – Road Network Capacity

The main traffic implication of the proposed development in terms of road network capacity concerns the impact of traffic generated by the proposed development on the operating performance of the Waldron Road/Campbell Hill Road roundabout. That effect can be assessed using the SIDRA traffic model and criteria for interpreting the results of SIDRA analysis are set out on the schedule reproduced in the following pages.

The results of the SIDRA analysis of the operating performance of the Waldron Road/Campbell Hill Road intersection are set out on Table 3.1 and on the SIDRA MOVEMENT SUMMARY SHEETS reproduced in Appendix D revealing that the intersection will continue to operate satisfactorily with a high level of service and minimal delays.

TABLE 3.1 – RESULTS OF SIDRA ANALYSIS OF THE WALDRON ROAD / CAMPBELL HILL ROAD INTERSECTION

	Level of Service	Degree of Saturation	Total Average Vehicle Delay (sec)
Existing AM Peak	A	0.693	7.6
Existing PM Peak	A	0.690	7.2
Proposed AM Peak	A	0.711	7.9
Proposed PM Peak	A	0.713	7.6

In the circumstances, it can be concluded that the proposed development has no unacceptable traffic implications in terms of road network capacity.

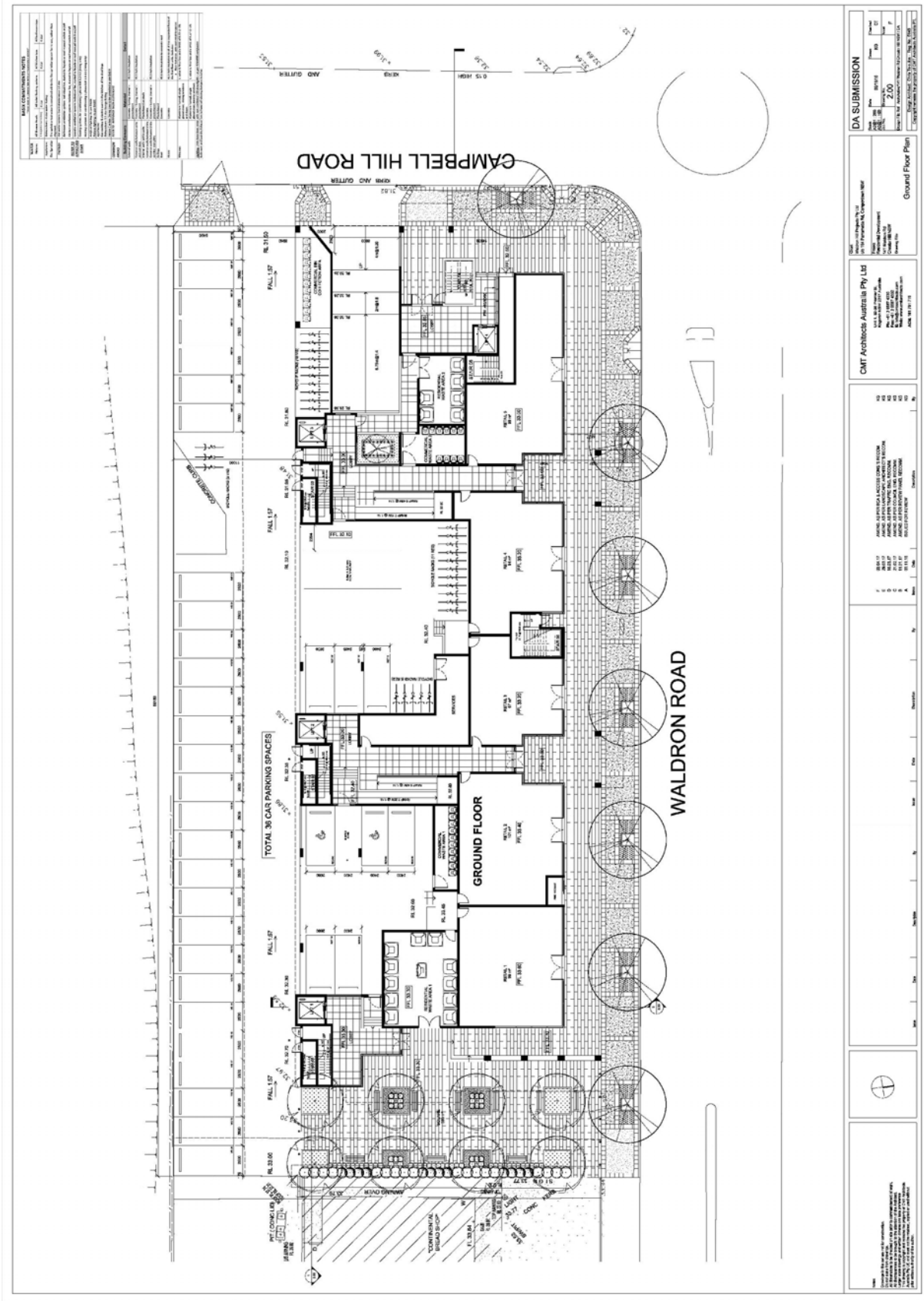
Traffic-related Environmental Effect

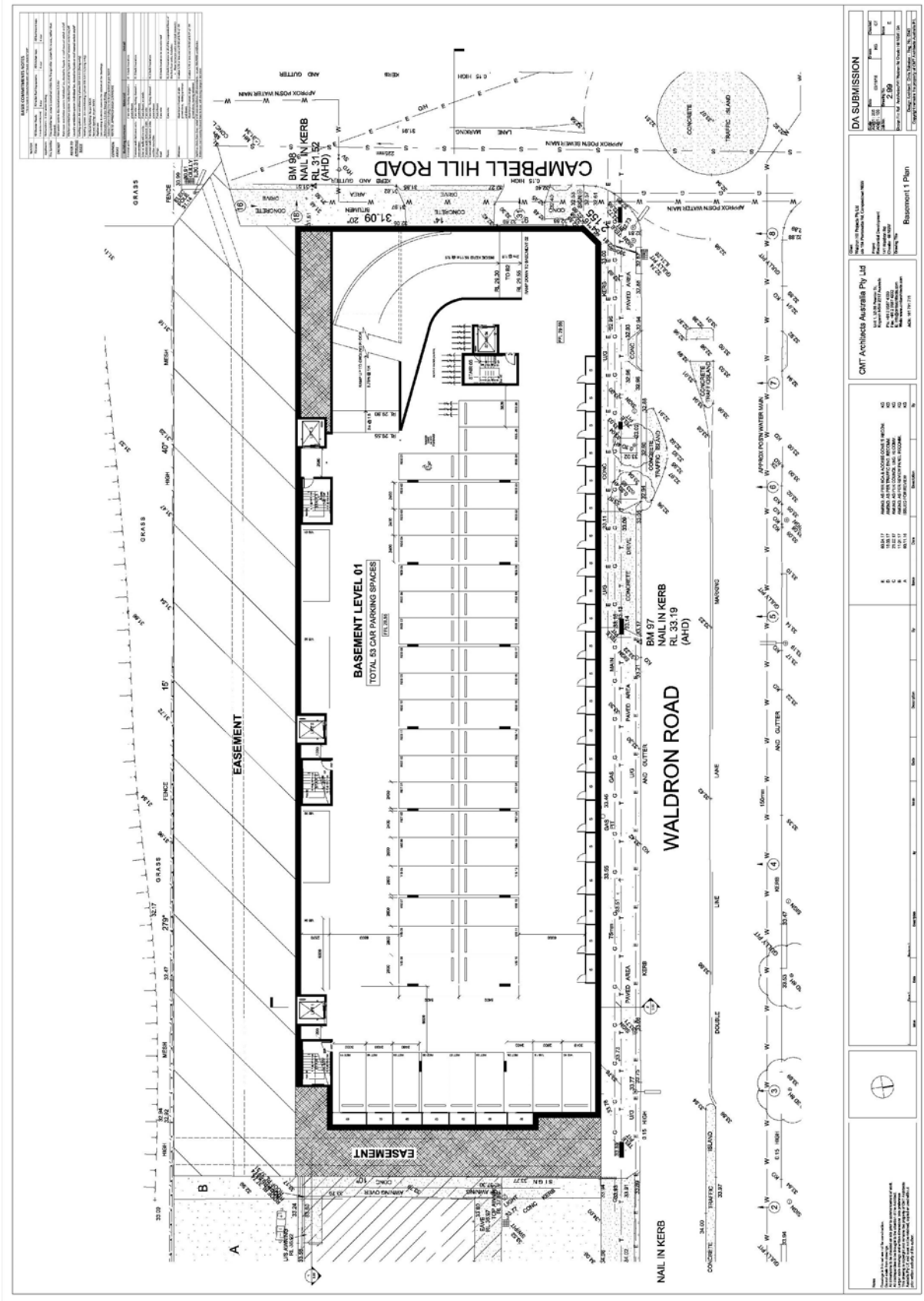
As the development site is located on the higher order road network, there will be minimal impact on residential streets serving the site. Furthermore the traffic generating potential of the proposed development is significantly lower than the existing site development.

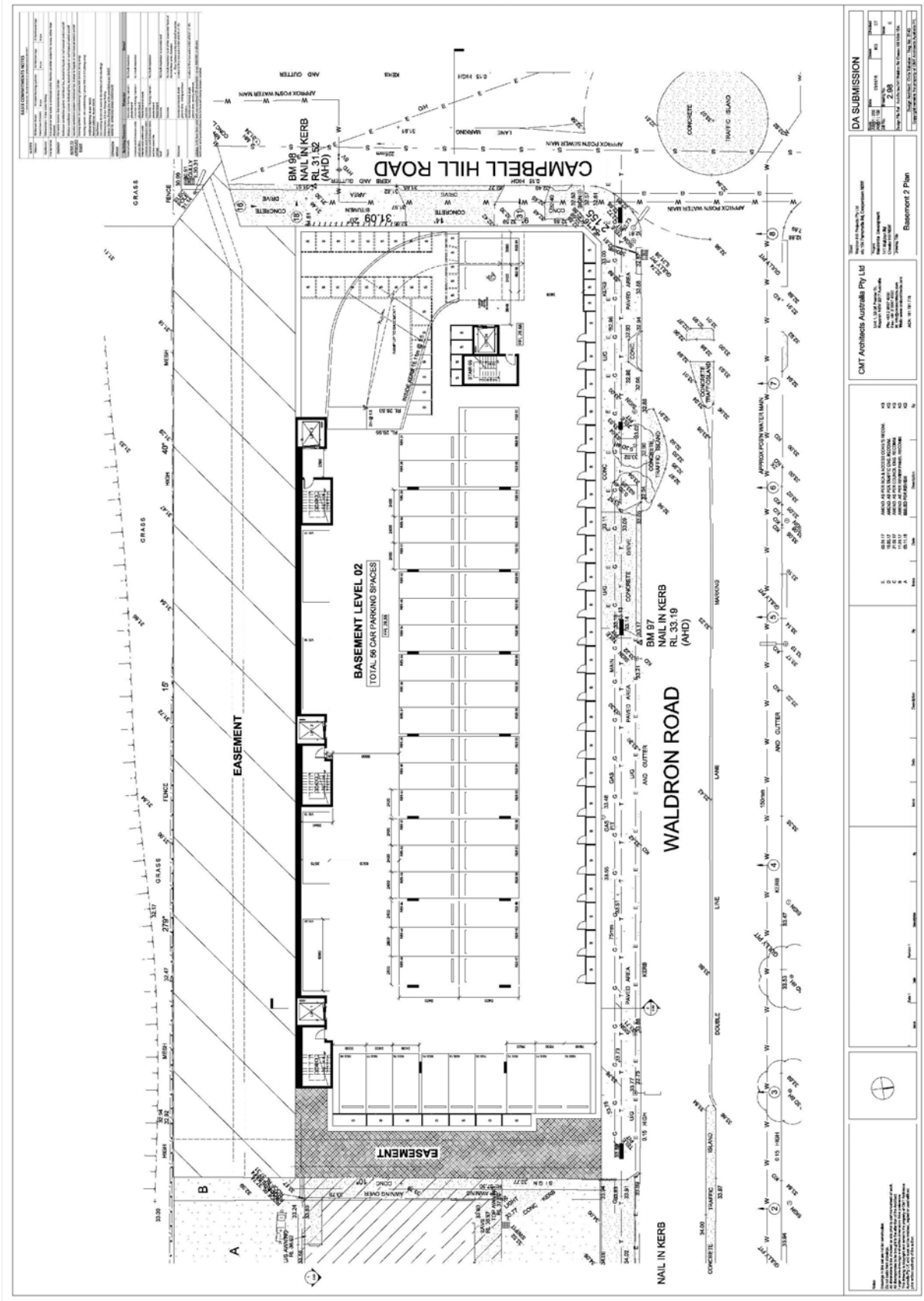
In the circumstances, the proposed development will not have any unacceptable traffic implications in terms of traffic-related environmental effect.

APPENDIX A

PLANS OF PROPOSED DEVELOPMENT
PREPARED BY CMT ARCHITECTS


CAMPBELL HILL ROAD
WALDRON ROAD
GROUND FLOOR
TOTAL 36 CAR PARKING SPACES
DA SUBMISSION
Ground Floor Plan
CMT Architects Australia Pty Ltd


CAMPBELL HILL ROAD
BM 98
NAIL IN KERB
RL 31.52
(AHD)
BASEMENT LEVEL 01
TOTAL 53 CAR PARKING SPACES
EASEMENT
WALDRON ROAD
BM 97
NAIL IN KERB
RL 33.19
(AHD)
NAIL IN KERB
DA SUBMISSION
CMT Architects Australia Pty Ltd
Basement 1 Plan

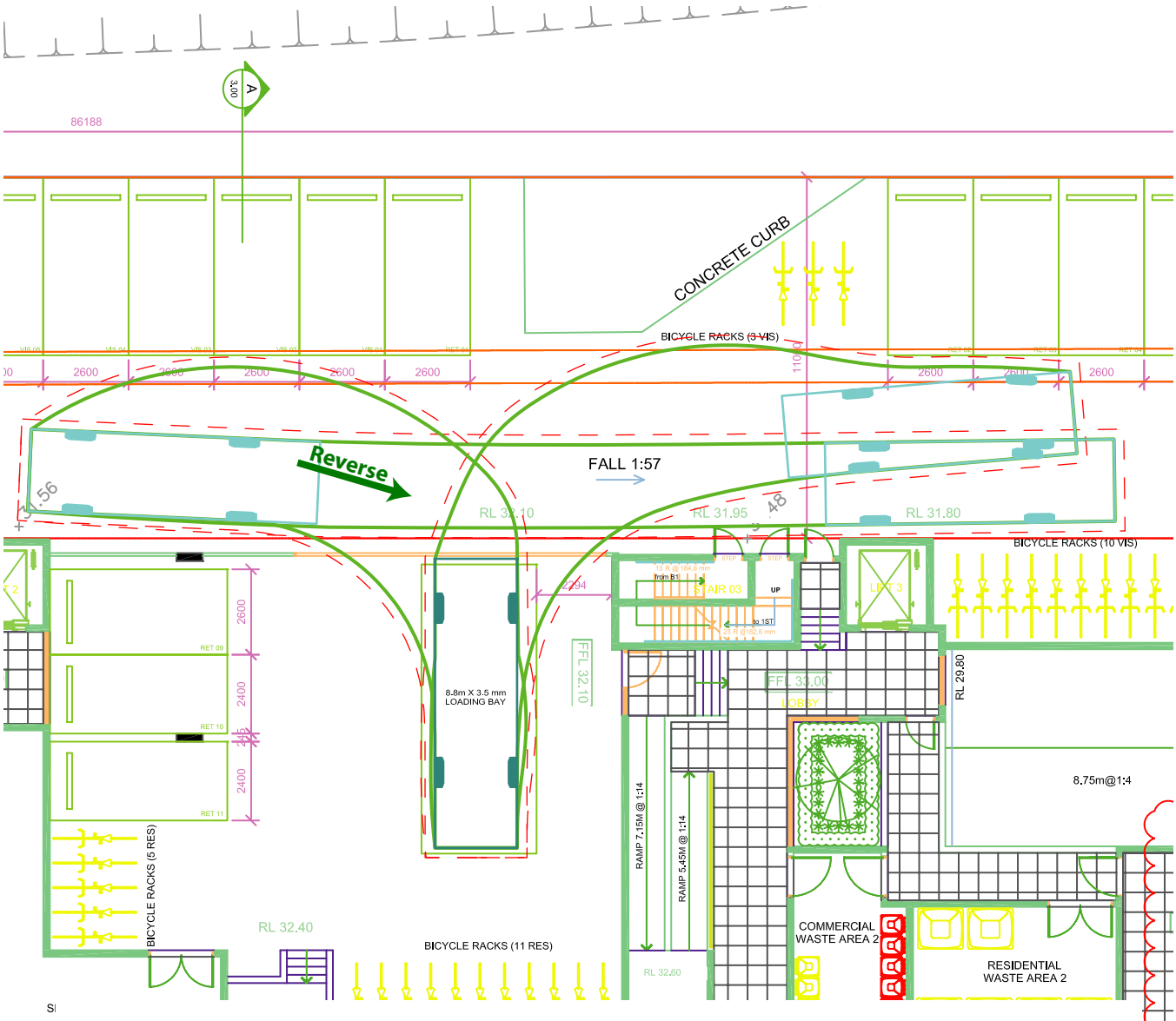

CAMPBELL HILL ROAD
BM 98
NAIL IN KERB
RL 31.52
(AHD)
BASEMENT LEVEL 02
TOTAL 56 CAR PARKING SPACES
EASEMENT
WALDRON ROAD
BM 97
NAIL IN KERB
RL 33.19
(AHD)
NAIL IN KERB
DA SUBMISSION
CMT Architects Australia Pty Ltd
Basement 2 Plan

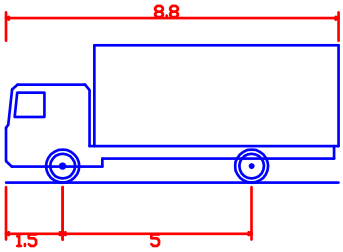
APPENDIX B

MEDIUM RIGID VEHICLE
TURNING PATH DIAGRAM

Path prepared using
Autodesk Vehicle Tracking

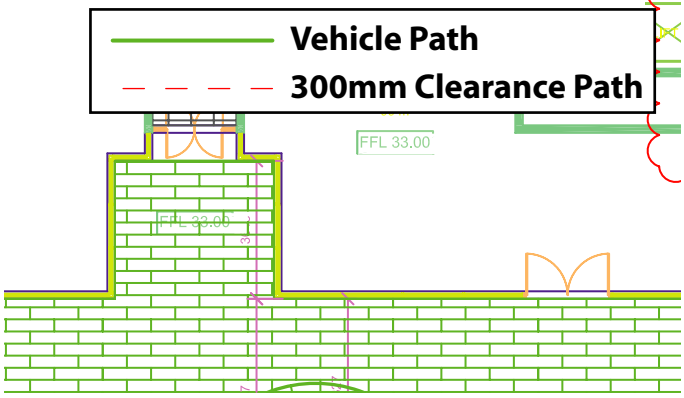
0 2 4 6 8 10 20
METRES
SCALE 1:200





MRV - Medium Rigid Vehicle

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

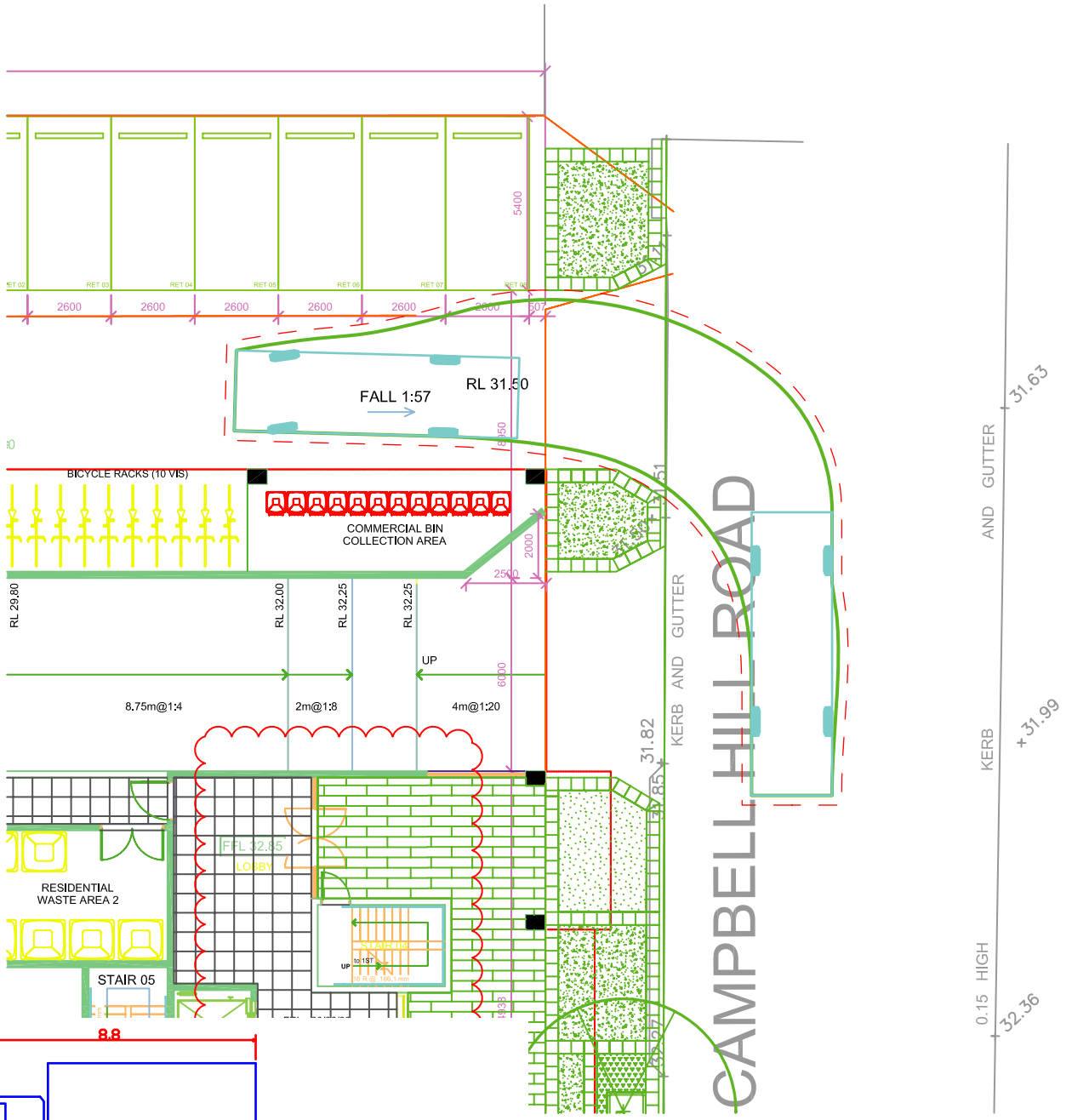


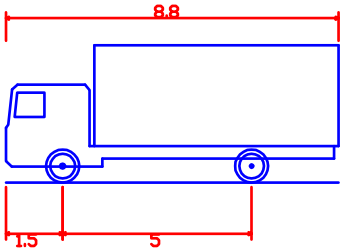
Manoeuvring Path of Australian Standard AS2890.2:2002 8.8m Medium Rigid Vehicle Accessing Loading Dock

Terraffic Pty Ltd
TRAFFIC & PARKING CONSULTANTS

Path prepared using
Autodesk Vehicle Tracking

0 2 4 6 8 10 20
METRES
SCALE 1:200





MRV - Medium Rigid Vehicle

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

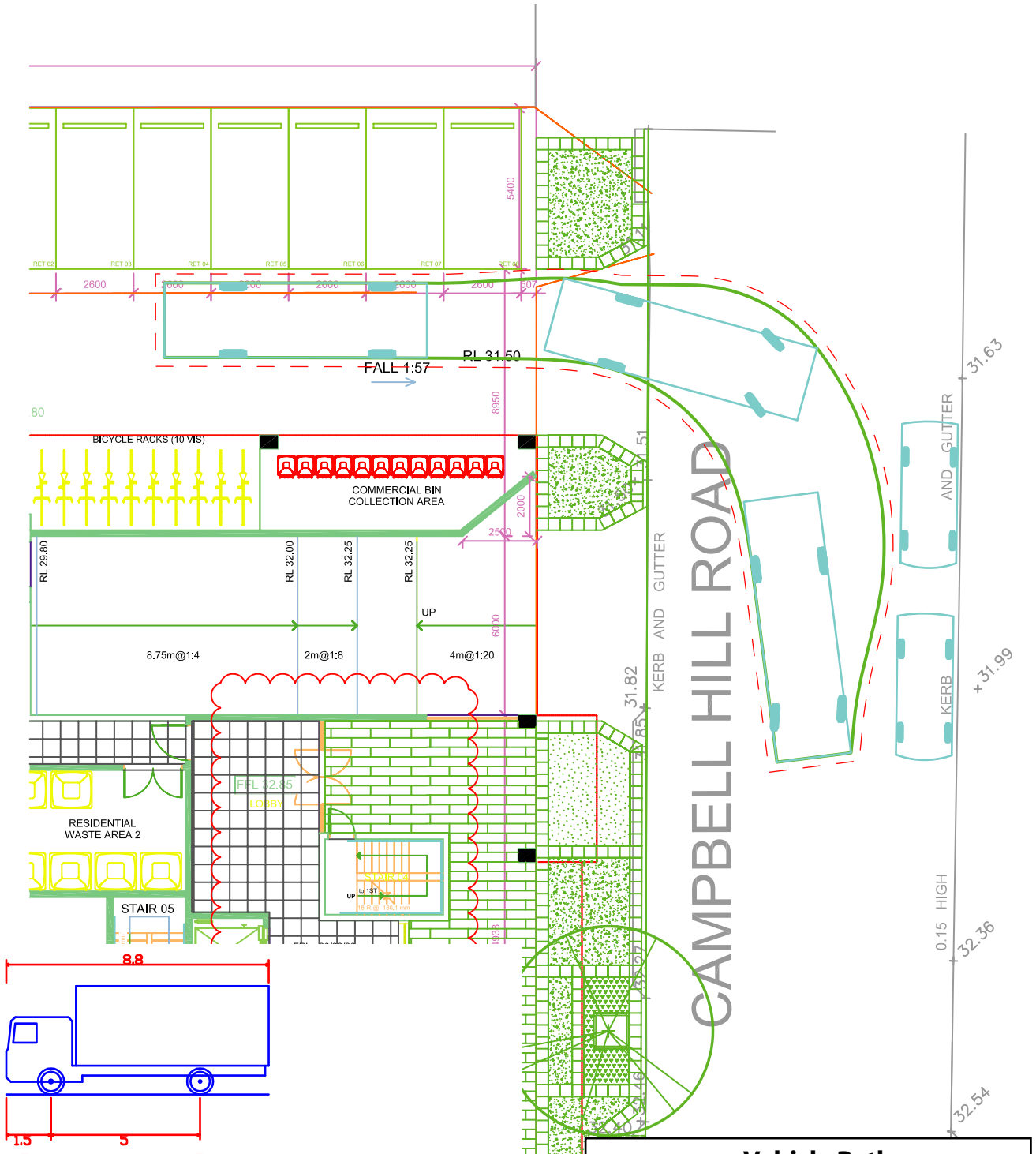
Vehicle Path
300mm Clearance Path

Manoeuvring Path of Australian Standard AS2890.2:2002 8.8m Medium Rigid Vehicle Entering Right of Way

Terraffic Pty Ltd
TRAFFIC & PARKING CONSULTANTS

Path prepared using
Autodesk Vehicle Tracking

0 2 4 6 8 10 20
METRES
SCALE 1:200



MRV - Medium Rigid Vehicle

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

Vehicle Path
300mm Clearance Path

Manoeuvring Path of Australian Standard AS2890.2:2002 8.8m Medium Rigid Vehicle Exitng Right of Way

Terraffic Pty Ltd
TRAFFIC & PARKING CONSULTANTS

APPENDIX C

TRAFFIC COUNT DATA

R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax88196849, Mob. 0418 239019

Client : Terraffic Pty. Ltd.
Job No/Name : 5612 CHESTER HILL Waldron Rd
Day/Date : Wednesday 13th May 2015

Lights

Time Per	NORTH Campbell Hill Rd			WEST Waldron St			SOUTH Campbell Hill Rd			EAST Waldron St			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0700 - 0715	16	0	18	11	199	0	0	0	0	0	99	17	**360**
0715 - 0730	18	0	21	14	192	0	1	0	2	3	108	28	**387**
0730 - 0745	18	0	19	17	164	0	0	1	1	0	111	30	**361**
0745 - 0800	19	1	33	26	188	1	3	0	0	1	131	30	**433**
0800 - 0815	24	1	30	30	194	0	2	1	1	0	122	39	**444**
0815 - 0830	14	0	45	17	184	1	2	0	0	1	130	42	**436**
0830 - 0845	22	1	47	15	168	0	3	0	1	0	135	39	**431**
0845 - 0900	23	2	49	22	157	2	2	1	0	0	115	41	**414**
Period End	**154**	**5**	**262**	**152**	**1446**	**4**	**13**	**3**	**5**	**5**	**951**	**266**	**3266**

Heavies

Time Per	NORTH Campbell Hill Rd			WEST Waldron St			SOUTH Campbell Hill Rd			EAST Waldron St			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0700 - 0715	0	0	0	0	1	0	0	0	0	0	1	2	**4**
0715 - 0730	0	0	0	0	2	0	0	0	0	0	0	3	**5**
0730 - 0745	0	0	0	0	2	0	0	0	0	0	0	1	**3**
0745 - 0800	0	0	1	0	0	0	0	0	0	0	0	2	**3**
0800 - 0815	0	0	1	0	1	0	0	0	0	0	0	1	**3**
0815 - 0830	0	0	0	0	1	0	0	0	0	0	0	2	**3**
0830 - 0845	0	0	1	0	1	0	0	0	0	0	1	2	**5**
0845 - 0900	0	0	2	0	0	0	1	0	0	0	1	2	**6**
Period End	**0**	**0**	**5**	**0**	**8**	**0**	**1**	**0**	**0**	**0**	**3**	**15**	**32**

Lights

Peak Time	NORTH Campbell Hill Rd			WEST Waldron St			SOUTH Campbell Hill Rd			EAST Waldron St			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0700 - 0800	71	1	91	68	743	1	4	1	3	4	449	105	**1541**
0715 - 0815	79	2	103	87	738	1	6	2	4	4	472	127	**1625**
0730 - 0830	75	2	127	90	730	2	7	2	2	2	494	141	**1674**
0745 - 0845	79	3	155	88	734	2	10	1	2	2	518	150	**1744**
0800 - 0900	83	4	171	84	703	3	9	2	2	1	502	161	**1725**
PEAK HOUR	**79**	**3**	**155**	**88**	**734**	**2**	**10**	**1**	**2**	**2**	**518**	**150**	**1744**

Heavies

Peak Time	NORTH Campbell Hill Rd			WEST Waldron St			SOUTH Campbell Hill Rd			EAST Waldron St			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0700 - 0800	0	0	1	0	5	0	0	0	0	0	1	8	**15**
0715 - 0815	0	0	2	0	5	0	0	0	0	0	0	7	**14**
0730 - 0830	0	0	2	0	4	0	0	0	0	0	0	6	**12**
0745 - 0845	0	0	3	0	3	0	0	0	0	0	1	7	**14**
0800 - 0900	0	0	4	0	3	0	1	0	0	0	2	7	**17**
PEAK HOUR	**0**	**0**	**3**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**1**	**7**	**14**

Combined

Time Per	NORTH Campbell Hill Rd			WEST Waldron St			SOUTH Campbell Hill Rd			EAST Waldron St			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0700 - 0715	16	0	18	11	200	0	0	0	0	0	100	19	**364**
0715 - 0730	18	0	21	14	194	0	1	0	2	3	108	31	**392**
0730 - 0745	18	0	19	17	166	0	0	1	1	0	111	31	**364**
0745 - 0800	19	1	34	26	188	1	3	0	0	1	131	32	**436**
0800 - 0815	24	1	31	30	195	0	2	1	1	0	122	40	**447**
0815 - 0830	14	0	45	17	185	1	2	0	0	1	130	44	**439**
0830 - 0845	22	1	48	15	169	0	3	0	1	0	136	41	**436**
0845 - 0900	23	2	51	22	157	2	3	1	0	0	116	43	**420**
Period End	**154**	**5**	**267**	**152**	**1454**	**4**	**14**	**3**	**5**	**5**	**954**	**281**	**3298**

Peds

Time Per	NORTH Campbell Hill Rd UNCLASSIFIED	WEST Waldron St UNCLASSIFIED	SOUTH Campbell Hill Rd UNCLASSIFIED	EAST Waldron St UNCLASSIFIED	TOT
0700 - 0715	1	0	1	2	**4**
0715 - 0730	3	0	3	0	**6**
0730 - 0745	0	0	1	0	**1**
0745 - 0800	2	0	2	2	**6**
0800 - 0815	2	1	2	1	**6**
0815 - 0830	2	0	1	0	**3**
0830 - 0845	1	2	6	0	**9**
0845 - 0900	3	2	4	1	**10**
Period End	**14**	**5**	**20**	**6**	**45**

Combined

Peak Time	NORTH Campbell Hill Rd			WEST Waldron St			SOUTH Campbell Hill Rd			EAST Waldron St			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0700 - 0800	71	1	92	68	748	1	4	1	3	4	450	113	**1556**
0715 - 0815	79	2	105	87	743	1	6	2	4	4	472	134	**1639**
0730 - 0830	75	2	129	90	734	2	7	2	2	2	494	147	**1686**
0745 - 0845	79	3	158	88	737	2	10	1	2	2	519	157	**1758**
0800 - 0900	83	4	175	84	706	3	10	2	2	1	504	168	**1742**
PEAK HOUR	**79**	**3**	**158**	**88**	**737**	**2**	**10**	**1**	**2**	**2**	**519**	**157**	**1758**

Peds

Peak Per	NORTH Campbell Hill Rd UNCLASSIFIED	WEST Waldron St UNCLASSIFIED	SOUTH Campbell Hill Rd UNCLASSIFIED	EAST Waldron St UNCLASSIFIED	TOT
0700 - 0800	6	0	7	4	**17**
0715 - 0815	7	1	8	3	**19**
0730 - 0830	6	1	6	3	**16**
0745 - 0845	7	3	11	3	**24**
0800 - 0900	8	5	13	2	**28**
PEAK HR	**7**	**3**	**11**	**3**	**24**

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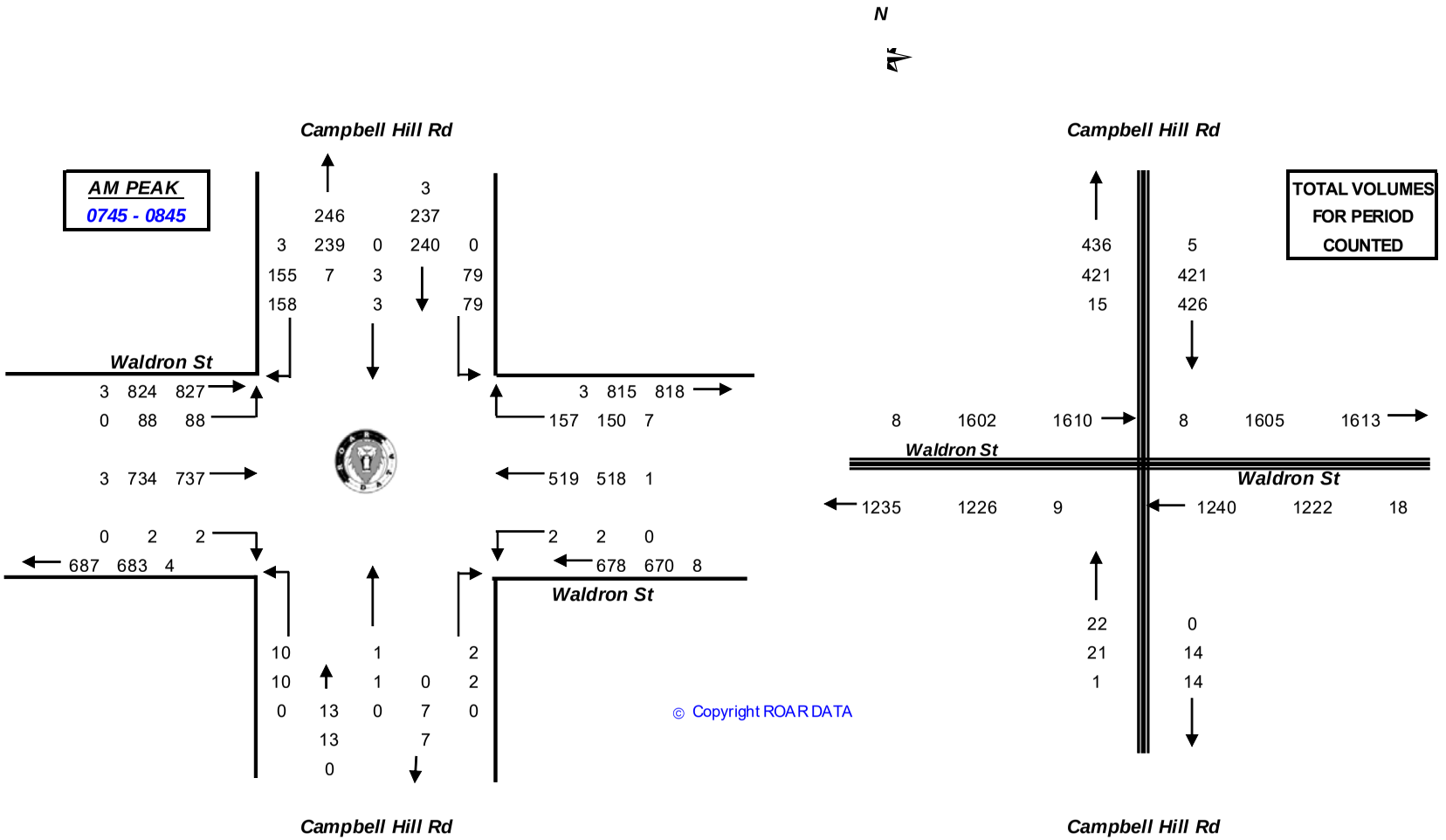

TERRAFFIC PTY LTD

R.O.A.R. DATA

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Client : Terraffic Pty. Ltd.
Job No/Name : 5612 CHESTER HILL Waldron Rd
Day/Date : Wednesday 13th May 2015

Lights

Time Per	NORTH Campbell Hill Rd			WEST Waldron St			SOUTH Campbell Hill Rd			EAST Waldron St			
	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1600 - 1615	25	1	40	21	138	1	2	0	3	1	160	37	**429**
1615 - 1630	14	0	39	23	142	2	0	2	4	1	177	24	**428**
1630 - 1645	28	1	44	24	136	1	1	1	2	0	181	33	**452**
1645 - 1700	27	0	39	14	135	1	0	1	0	1	152	23	**393**
1700 - 1715	24	0	40	24	151	1	4	1	1	1	169	34	**450**
1715 - 1730	26	0	36	20	134	1	0	1	1	0	179	30	**428**
1730 - 1745	22	1	39	22	149	0	1	3	1	4	181	27	**450**
1745 - 1800	23	1	22	16	142	0	3	1	1	2	142	33	**386**
Period End	**189**	**4**	**299**	**164**	**1127**	**7**	**11**	**10**	**13**	**10**	**1341**	**241**	**3416**

Heavies

Time Per	NORTH Campbell Hill Rd			WEST Waldron St			SOUTH Campbell Hill Rd			EAST Waldron St			
	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1600 - 1615	0	0	0	0	0	0	0	0	0	0	0	1	**1**
1615 - 1630	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1630 - 1645	0	0	1	0	1	0	0	0	0	0	0	2	**4**
1645 - 1700	0	0	0	0	0	0	0	0	0	0	1	3	**4**
1700 - 1715	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1715 - 1730	0	0	0	0	0	0	0	0	0	0	0	3	**3**
1730 - 1745	0	0	0	0	0	0	0	0	0	0	0	1	**1**
1745 - 1800	0	0	0	0	2	0	0	0	0	0	2	2	**6**
Period End	**0**	**0**	**1**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**3**	**12**	**19**

Lights

Peak Time	NORTH Campbell Hill Rd			WEST Waldron St			SOUTH Campbell Hill Rd			EAST Waldron St			
	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1600 - 1700	94	2	162	82	551	5	3	4	9	3	670	117	**1702**
1615 - 1715	93	1	162	85	564	5	5	5	7	3	679	114	**1723**
1630 - 1730	105	1	159	82	556	4	5	4	4	2	681	120	**1723**
1645 - 1745	99	1	154	80	569	3	5	6	3	6	681	114	**1721**
1700 - 1800	95	2	137	82	576	2	8	6	4	7	671	124	**1714**
PEAK HOUR	**105**	**1**	**159**	**82**	**556**	**4**	**5**	**4**	**4**	**2**	**681**	**120**	**1723**

Heavies

Peak Time	NORTH Campbell Hill Rd			WEST Waldron St			SOUTH Campbell Hill Rd			EAST Waldron St			
	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1600 - 1700	0	0	1	0	1	0	0	0	0	0	1	6	**9**
1615 - 1715	0	0	1	0	1	0	0	0	0	0	1	5	**8**
1630 - 1730	0	0	1	0	1	0	0	0	0	0	1	8	**11**
1645 - 1745	0	0	0	0	0	0	0	0	0	0	1	7	**8**
1700 - 1800	0	0	0	0	2	0	0	0	0	0	2	6	**10**
PEAK HOUR	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**8**	**11**

Combined

Time Per	NORTH Campbell Hill Rd			WEST Waldron St			SOUTH Campbell Hill Rd			EAST Waldron St			
	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1600 - 1615	25	1	40	21	138	1	2	0	3	1	160	38	**430**
1615 - 1630	14	0	39	23	142	2	0	2	4	1	177	24	**428**
1630 - 1645	28	1	45	24	137	1	1	1	2	0	181	35	**456**
1645 - 1700	27	0	39	14	135	1	0	1	0	1	153	26	**397**
1700 - 1715	24	0	40	24	151	1	4	1	1	1	169	34	**450**
1715 - 1730	26	0	36	20	134	1	0	1	1	0	179	33	**431**
1730 - 1745	22	1	39	22	149	0	1	3	1	4	181	28	**451**
1745 - 1800	23	1	22	16	144	0	3	1	1	2	144	35	**392**
Period End	**189**	**4**	**300**	**164**	**1130**	**7**	**11**	**10**	**13**	**10**	**1344**	**253**	**3435**

Peds

Time Per	NORTH Campbell Hill Rd	WEST Waldron St	SOUTH Campbell Hill Rd	EAST Waldron St	
	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
1600 - 1615	3	0	2	0	**5**
1615 - 1630	0	2	7	0	**9**
1630 - 1645	3	0	2	0	**5**
1645 - 1700	5	0	2	2	**9**
1700 - 1715	0	0	5	0	**5**
1715 - 1730	2	0	1	0	**3**
1730 - 1745	0	0	1	0	**1**
1745 - 1800	1	0	1	0	**2**
Period End	**14**	**2**	**3**	**2**	**39**

Combined

Peak Time	NORTH Campbell Hill Rd			WEST Waldron St			SOUTH Campbell Hill Rd			EAST Waldron St			
	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1600 - 1700	94	2	163	82	552	5	3	4	9	3	671	123	**1711**
1615 - 1715	93	1	163	85	565	5	5	5	7	3	680	119	**1731**
1630 - 1730	105	1	160	82	557	4	5	4	4	2	682	128	**1734**
1645 - 1745	99	1	154	80	569	3	5	6	3	6	682	121	**1729**
1700 - 1800	95	2	137	82	578	2	8	6	4	7	673	130	**1724**
PEAK HOUR	**105**	**1**	**160**	**82**	**557**	**4**	**5**	**4**	**4**	**2**	**682**	**128**	**1734**

Peds

Peak Per	NORTH Campbell Hill Rd	WEST Waldron St	SOUTH Campbell Hill Rd	EAST Waldron St	
	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
1600 - 1700	11	2	13	2	**28**
1615 - 1715	8	2	16	2	**28**
1630 - 1730	10	0	10	2	**22**
1645 - 1745	7	0	9	2	**18**
1700 - 1800	3	0	8	0	**11**
PEAK HR	**10**	**0**	**10**	**2**	**22**

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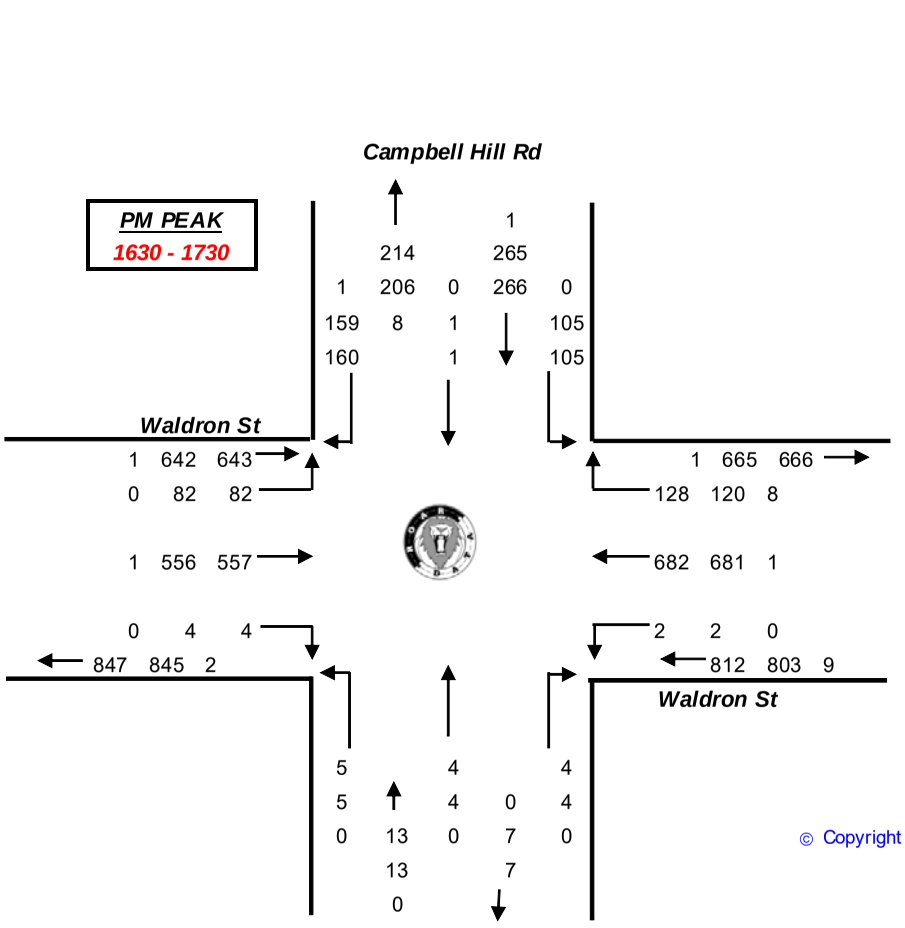

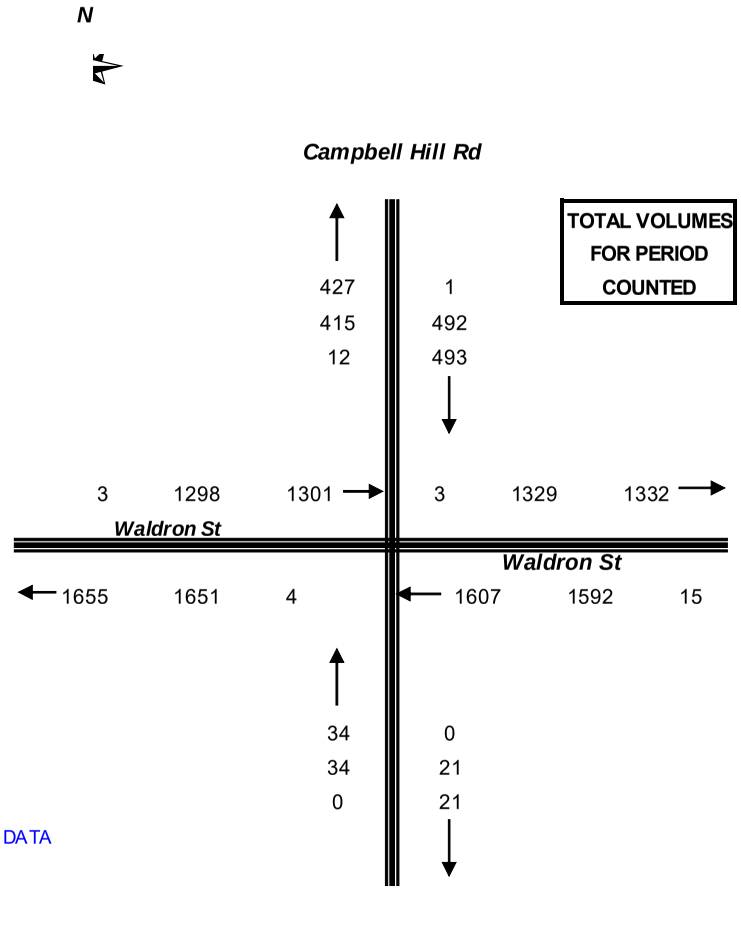

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Client : Terraffic Pty. Ltd.

Job No/Name : 5612 CHESTER HILL Waldron Rd

Day/Date : Wednesday 13th May 2015

Lights

Time Per	NORTH Campbell T	NORTH Campbell L	EAST Car Park R	EAST Car Park L	SOUTH Campbell R	SOUTH Campbell T	TOT
0700 - 0715		0	0				0
0715 - 0730		2	1				3
0730 - 0745		0	0				0
0745 - 0800		3	0				3
0800 - 0815		0	2				2
0815 - 0830		0	2				2
0830 - 0845		0	2				2
0845 - 0900		2	3				5
Per End	**0**	**7**	**10**	**0**	**0**	**0**	**17**

Heavies

Time Per	NORTH Campbell T	NORTH Campbell L	EAST Car Park R	EAST Car Park L	SOUTH Campbell R	SOUTH Campbell T	TOT
0700 - 0715		0	0				0
0715 - 0730		0	0				0
0730 - 0745		0	0				0
0745 - 0800		0	0				0
0800 - 0815		0	0				0
0815 - 0830		0	0				0
0830 - 0845		0	0				0
0845 - 0900		0	1				1
Per End	**0**	**0**	**1**	**0**	**0**	**0**	**1**

Combined

Time Per	NORTH Campbell T	NORTH Campbell L	EAST Car Park R	EAST Car Park L	SOUTH Campbell R	SOUTH Campbell T	TOT
0700 - 0715	0	0	0	0	0	0	0
0715 - 0730	0	2	1	0	0	0	3
0730 - 0745	0	0	0	0	0	0	0
0745 - 0800	0	3	0	0	0	0	3
0800 - 0815	0	0	2	0	0	0	2
0815 - 0830	0	0	2	0	0	0	2
0830 - 0845	0	0	2	0	0	0	2
0845 - 0900	0	2	4	0	0	0	6
Per End	**0**	**7**	**11**	**0**	**0**	**0**	**18**

Lights

Peak Per	NORTH Campbell T	NORTH Campbell L	EAST Car Park R	EAST Car Park L	SOUTH Campbell R	SOUTH Campbell T	TOT
0700 - 0800	0	5	1	0	0	0	6
0715 - 0815	0	5	3	0	0	0	8
0730 - 0830	0	3	4	0	0	0	7
0745 - 0845	0	3	6	0	0	0	9
0800 - 0900	0	2	9	0	0	0	11
PEAK HR	**0**	**2**	**9**	**0**	**0**	**0**	**11**

Heavies

Peak Per	NORTH Campbell T	NORTH Campbell L	EAST Car Park R	EAST Car Park L	SOUTH Campbell R	SOUTH Campbell T	TOT
0700 - 0800	0	0	0	0	0	0	0
0715 - 0815	0	0	0	0	0	0	0
0730 - 0830	0	0	0	0	0	0	0
0745 - 0845	0	0	0	0	0	0	0
0800 - 0900	0	0	1	0	0	0	1
PEAK HR	**0**	**0**	**1**	**0**	**0**	**0**	**1**

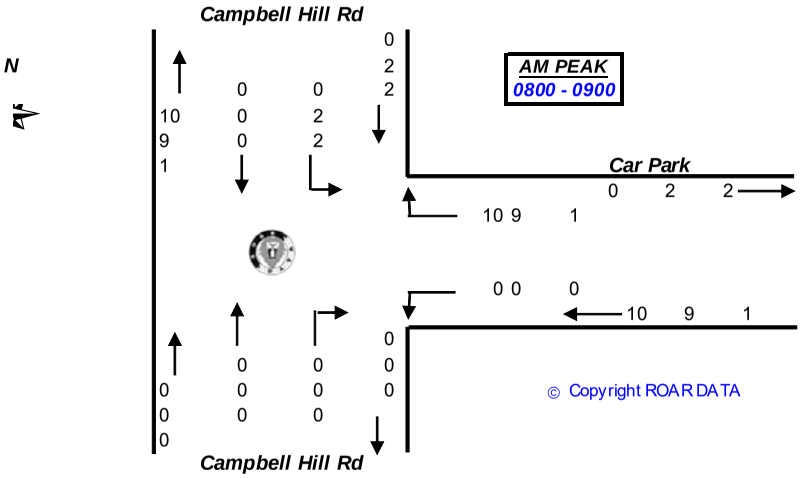
Combined

Peak Per	NORTH Campbell T	NORTH Campbell L	EAST Car Park R	EAST Car Park L	SOUTH Campbell R	SOUTH Campbell T	TOT
0700 - 0800	0	5	1	0	0	0	6
0715 - 0815	0	5	3	0	0	0	8
0730 - 0830	0	3	4	0	0	0	7
0745 - 0845	0	3	6	0	0	0	9
0800 - 0900	0	2	10	0	0	0	12
PEAK HR	**0**	**2**	**10**	**0**	**0**	**0**	**12**

Peds

Time Per	NORTH Campbell	EAST Car Park	SOUTH Campbell	TOT
0700 - 0715				0
0715 - 0730		NOT		0
0730 - 0745		REQUIRED		0
0745 - 0800				0
0800 - 0815				0
0815 - 0830				0
0830 - 0845				0
0845 - 0900				0
Per End	**0**	**0**		**0**

Peak Per	NORTH Campbell	EAST Car Park	SOUTH Campbell	TOT
0700 - 0800	0	0	0	0
0715 - 0815	0	0	0	0
0730 - 0830	0	0	0	0
0745 - 0845	0	0	0	0
0800 - 0900	0	0	0	0
PEAK HR	**0**	**0**	**0**	**0**



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Lights

Time Per	NORTH Campbell T	NORTH Campbell L	EAST Car Park R	EAST Car Park L	SOUTH Campbell R	SOUTH Campbell T	TOT
1600 - 1615		1	3				4
1615 - 1630		1	5				6
1630 - 1645		1	2				3
1645 - 1700		3	1				4
1700 - 1715		3	2				5
1715 - 1730		0	1				1
1730 - 1745		1	2				3
1745 - 1800		0	2				2
Per End	**0**	**10**	**18**	**0**	**0**	**0**	**28**

Heavies

Time Per	NORTH Campbell T	NORTH Campbell L	EAST Car Park R	EAST Car Park L	SOUTH Campbell R	SOUTH Campbell T	TOT
1600 - 1615			0	0			0
1615 - 1630			0	0			0
1630 - 1645			0	0			0
1645 - 1700			0	0			0
1700 - 1715			0	0			0
1715 - 1730			0	0			0
1730 - 1745			0	0			0
1745 - 1800			0	0			0
Per End	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Combined

Time Per	NORTH Campbell T	NORTH Campbell L	EAST Car Park R	EAST Car Park L	SOUTH Campbell R	SOUTH Campbell T	TOT
1600 - 1615	0	1	3	0	0	0	4
1615 - 1630	0	1	5	0	0	0	6
1630 - 1645	0	1	2	0	0	0	3
1645 - 1700	0	3	1	0	0	0	4
1700 - 1715	0	3	2	0	0	0	5
1715 - 1730	0	0	1	0	0	0	1
1730 - 1745	0	1	2	0	0	0	3
1745 - 1800	0	0	2	0	0	0	2
Per End	**0**	**10**	**18**	**0**	**0**	**0**	**28**

Lights

Peak Per	NORTH Campbell T	NORTH Campbell L	EAST Car Park R	EAST Car Park L	SOUTH Campbell R	SOUTH Campbell T	TOT
1600 - 1700	0	6	11	0	0	0	17
1615 - 1715	0	8	10	0	0	0	18
1630 - 1730	0	7	6	0	0	0	13
1645 - 1745	0	7	6	0	0	0	13
1700 - 1800	0	4	7	0	0	0	11
PEAK HR	**0**	**8**	**10**	**0**	**0**	**0**	**18**

Heavies

Peak Per	NORTH Campbell T	NORTH Campbell L	EAST Car Park R	EAST Car Park L	SOUTH Campbell R	SOUTH Campbell T	TOT
1600 - 1700	0	0	0	0	0	0	0
1615 - 1715	0	0	0	0	0	0	0
1630 - 1730	0	0	0	0	0	0	0
1645 - 1745	0	0	0	0	0	0	0
1700 - 1800	0	0	0	0	0	0	0
PEAK HR	**0**	**0**	**0**	**0**	**0**	**0**	**0**

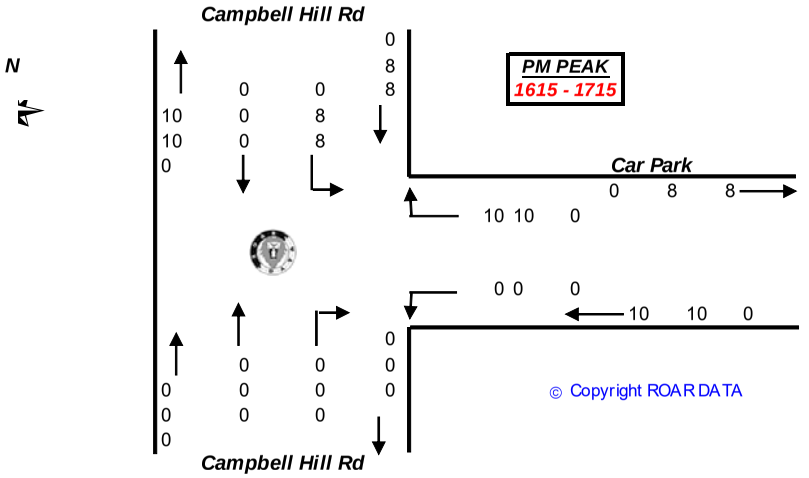
Combined

Peak Per	NORTH Campbell T	NORTH Campbell L	EAST Car Park R	EAST Car Park L	SOUTH Campbell R	SOUTH Campbell T	TOT
1600 - 1700	0	6	11	0	0	0	17
1615 - 1715	0	8	10	0	0	0	18
1630 - 1730	0	7	6	0	0	0	13
1645 - 1745	0	7	6	0	0	0	13
1700 - 1800	0	4	7	0	0	0	11
PEAK HR	**0**	**8**	**10**	**0**	**0**	**0**	**18**

Peds

Time Per	NORTH Campbell	EAST Car Park	SOUTH Campbell	TOT
1600 - 1615				0
1615 - 1630		NOT		0
1630 - 1645		REQUIRED		0
1645 - 1700				0
1700 - 1715				0
1715 - 1730				0
1730 - 1745				0
1745 - 1800				0
Per End	**0**	**0**	**0**	**0**

Peak Per	NORTH Campbell	EAST Car Park	SOUTH Campbell	TOT
1600 - 1700	0	0	0	0
1615 - 1715	0	0	0	0
1630 - 1730	0	0	0	0
1645 - 1745	0	0	0	0
1700 - 1800	0	0	0	0
PEAK HR	**0**	**0**	**0**	**0**



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APPENDIX D

SIDRA MOVEMENT SUMMARY SHEETS

MOVEMENT SUMMARY

Site: Waldron Road and Campbell Hill Road, Chester Hill - Existing AM Peak

Existing AM Peak (7.45-8.45am)
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Campbell Hill Road											
1	L2	10	0.0	0.023	10.2	LOS A	0.1	1.0	0.77	0.70	49.7
2	T1	1	0.0	0.023	10.3	LOS A	0.1	1.0	0.77	0.70	50.5
3	R2	2	0.0	0.023	13.5	LOS A	0.1	1.0	0.77	0.70	50.2
Approach		13	0.0	0.023	10.7	LOS A	0.1	1.0	0.77	0.70	49.8
East: Waldron Road											
4	L2	2	0.0	0.586	6.1	LOS A	5.7	40.1	0.62	0.61	51.6
5	T1	519	0.2	0.586	6.1	LOS A	5.7	40.1	0.62	0.61	52.4
6	R2	157	4.5	0.586	9.4	LOS A	5.7	40.1	0.62	0.61	51.9
Approach		678	1.2	0.586	6.9	LOS A	5.7	40.1	0.62	0.61	52.3
North: Campbell Hill Road											
7	L2	79	0.0	0.407	11.0	LOS A	2.9	20.8	0.87	0.94	48.2
8	T1	3	0.0	0.407	11.1	LOS A	2.9	20.8	0.87	0.94	48.9
9	R2	158	1.9	0.407	14.3	LOS A	2.9	20.8	0.87	0.94	48.6
Approach		240	1.3	0.407	13.2	LOS A	2.9	20.8	0.87	0.94	48.5
West: Waldron Road											
10	L2	88	0.0	0.693	6.4	LOS A	7.6	53.5	0.69	0.60	51.7
11	T1	737	0.4	0.693	6.4	LOS A	7.6	53.5	0.69	0.60	52.5
12	R2	2	0.0	0.693	9.7	LOS A	7.6	53.5	0.69	0.60	52.2
Approach		827	0.4	0.693	6.4	LOS A	7.6	53.5	0.69	0.60	52.4
All Vehicles		1758	0.8	0.693	7.6	LOS A	7.6	53.5	0.69	0.65	51.8

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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 SUMMARY

Site: Waldron Road and Campbell Hill Road, Chester Hill - Existing PM Peak

Existing PM Peak (4.30-5.30pm)
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Campbell Hill Road											
1	L2	5	0.0	0.029	12.1	LOS A	0.2	1.3	0.85	0.75	48.2
2	T1	4	0.0	0.029	12.2	LOS A	0.2	1.3	0.85	0.75	48.9
3	R2	4	0.0	0.029	15.4	LOS B	0.2	1.3	0.85	0.75	48.6
Approach		13	0.0	0.029	13.2	LOS A	0.2	1.3	0.85	0.75	48.5
East: Waldron Road											
4	L2	2	0.0	0.690	6.4	LOS A	7.7	54.1	0.71	0.62	51.4
5	T1	682	0.1	0.690	6.4	LOS A	7.7	54.1	0.71	0.62	52.2
6	R2	128	6.3	0.690	9.8	LOS A	7.7	54.1	0.71	0.62	51.6
Approach		812	1.1	0.690	7.0	LOS A	7.7	54.1	0.71	0.62	52.1
North: Campbell Hill Road											
7	L2	105	0.0	0.354	8.7	LOS A	2.3	16.2	0.75	0.83	49.8
8	T1	1	0.0	0.354	8.8	LOS A	2.3	16.2	0.75	0.83	50.6
9	R2	160	0.6	0.354	12.0	LOS A	2.3	16.2	0.75	0.83	50.2
Approach		266	0.4	0.354	10.7	LOS A	2.3	16.2	0.75	0.83	50.1
West: Waldron Road											
10	L2	82	0.0	0.531	5.8	LOS A	4.7	33.1	0.52	0.55	52.3
11	T1	557	0.2	0.531	5.8	LOS A	4.7	33.1	0.52	0.55	53.1
12	R2	4	0.0	0.531	9.1	LOS A	4.7	33.1	0.52	0.55	52.8
Approach		643	0.2	0.531	5.8	LOS A	4.7	33.1	0.52	0.55	53.0
All Vehicles		1734	0.6	0.690	7.2	LOS A	7.7	54.1	0.65	0.63	52.1

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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 SUMMARY

Site: Waldron Road and Campbell Hill Road, Chester Hill - Proposed AM Peak

Proposed AM Peak (7.45-8.45am)
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Campbell Hill Road											
1	L2	20	0.0	0.068	10.5	LOS A	0.4	2.9	0.79	0.78	49.2
2	T1	6	0.0	0.068	10.5	LOS A	0.4	2.9	0.79	0.78	50.0
3	R2	12	0.0	0.068	13.8	LOS A	0.4	2.9	0.79	0.78	49.7
Approach		38	0.0	0.068	11.5	LOS A	0.4	2.9	0.79	0.78	49.5
East: Waldron Road											
4	L2	8	0.0	0.598	6.2	LOS A	5.8	41.1	0.64	0.62	51.5
5	T1	519	0.2	0.598	6.3	LOS A	5.8	41.1	0.64	0.62	52.3
6	R2	157	4.5	0.598	9.5	LOS A	5.8	41.1	0.64	0.62	51.8
Approach		684	1.2	0.598	7.0	LOS A	5.8	41.1	0.64	0.62	52.2
North: Campbell Hill Road											
7	L2	79	0.0	0.424	11.5	LOS A	3.1	22.3	0.89	0.96	47.9
8	T1	6	0.0	0.424	11.6	LOS A	3.1	22.3	0.89	0.96	48.6
9	R2	158	1.9	0.424	14.8	LOS B	3.1	22.3	0.89	0.96	48.3
Approach		243	1.2	0.424	13.7	LOS A	3.1	22.3	0.89	0.96	48.2
West: Waldron Road											
10	L2	88	0.0	0.711	6.7	LOS A	8.1	56.6	0.73	0.63	51.5
11	T1	737	0.4	0.711	6.8	LOS A	8.1	56.6	0.73	0.63	52.4
12	R2	8	0.0	0.711	10.0	LOS A	8.1	56.6	0.73	0.63	52.0
Approach		833	0.4	0.711	6.8	LOS A	8.1	56.6	0.73	0.63	52.3
All Vehicles		1798	0.8	0.711	7.9	LOS A	8.1	56.6	0.72	0.68	51.6

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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 SUMMARY

Site: Waldron Road and Campbell Hill Road, Chester Hill - Proposed PM Peak

Proposed PM Peak (4.30-5.30pm)
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Campbell Hill Road											
1	L2	14	0.0	0.080	12.4	LOS A	0.5	3.6	0.87	0.82	47.9
2	T1	9	0.0	0.080	12.5	LOS A	0.5	3.6	0.87	0.82	48.6
3	R2	13	0.0	0.080	15.7	LOS B	0.5	3.6	0.87	0.82	48.3
Approach		36	0.0	0.080	13.6	LOS A	0.5	3.6	0.87	0.82	48.2
East: Waldron Road											
4	L2	12	0.0	0.713	6.9	LOS A	8.3	58.8	0.75	0.65	51.2
5	T1	682	0.1	0.713	6.9	LOS A	8.3	58.8	0.75	0.65	52.0
6	R2	128	6.3	0.713	10.2	LOS A	8.3	58.8	0.75	0.65	51.5
Approach		822	1.1	0.713	7.4	LOS A	8.3	58.8	0.75	0.65	51.9
North: Campbell Hill Road											
7	L2	105	0.0	0.371	8.9	LOS A	2.4	17.2	0.77	0.85	49.7
8	T1	7	0.0	0.371	9.0	LOS A	2.4	17.2	0.77	0.85	50.5
9	R2	160	0.6	0.371	12.2	LOS A	2.4	17.2	0.77	0.85	50.1
Approach		272	0.4	0.371	10.9	LOS A	2.4	17.2	0.77	0.85	50.0
West: Waldron Road											
10	L2	82	0.0	0.549	5.9	LOS A	4.9	34.4	0.55	0.57	52.1
11	T1	557	0.2	0.549	6.0	LOS A	4.9	34.4	0.55	0.57	53.0
12	R2	14	0.0	0.549	9.2	LOS A	4.9	34.4	0.55	0.57	52.7
Approach		653	0.2	0.549	6.0	LOS A	4.9	34.4	0.55	0.57	52.9
All Vehicles		1783	0.6	0.713	7.6	LOS A	8.3	58.8	0.68	0.65	51.9

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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.