PROPOSED RESIDENTIAL PLANNING PROPOSAL

130 KILLEATON STREET, ST IVES

TRAFFIC, TRANSPORT AND PARKING ASSESSMENT REPORT

6TH MAY 2022

REF 22013

Prepared by

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Traffic and Parking Consultants

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1. INTRODUCTION

This report has been prepared to accompany a Planning Proposal to Ku-ring-gai Council for a residential development to be located at 130 Killeaton Street, St Ives (Figures 1 and 2).

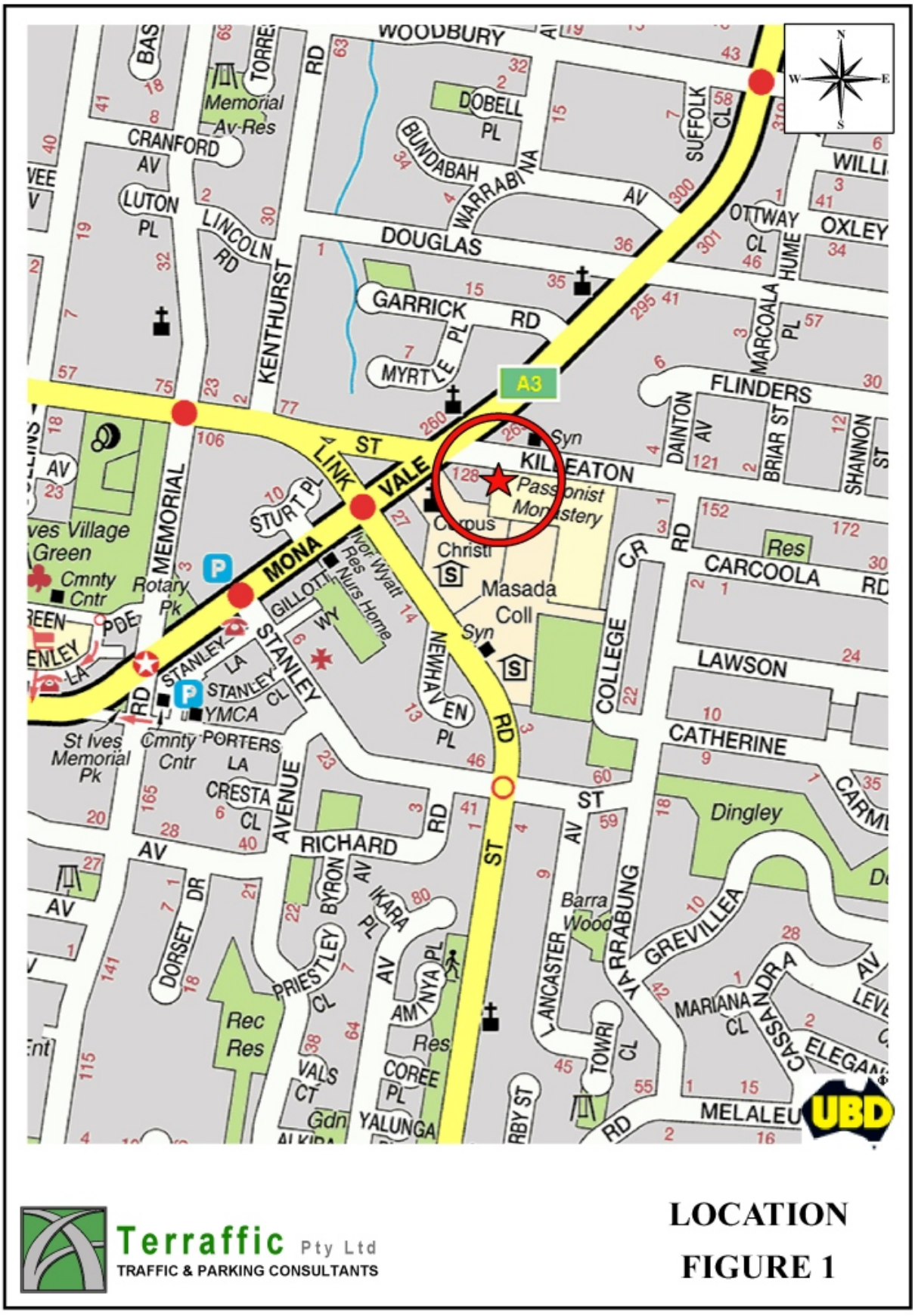
The development site is located on the southern side of Killeaton Street approximately 80m east of Mona Vale Road. The development site has an area of 2,803m^2 and a frontage of 34.6m to Killeaton Street. The site is currently zoned *SP2 - Infrastructure (Education Establishments)* and is improved by a large freestanding residence that gains vehicular access to Killeaton Street via a single width access driveway.

Photograph of the site frontage

The Urban Design Study prepared by The Planning Hub for the Planning Proposal supports a high density residential flat building containing approximately 40 dwellings. The development would be served by a basement carpark in compliance with Council's requirements. Provision would also be made for on-site waste collection by Council's waste collection vehicle.

Vehicular access to the development would be via a 6.0m wide combined entry/exit driveway off Killeaton Street.

The purpose of this report is to assess the traffic, transport and parking implications of the Planning Proposal.



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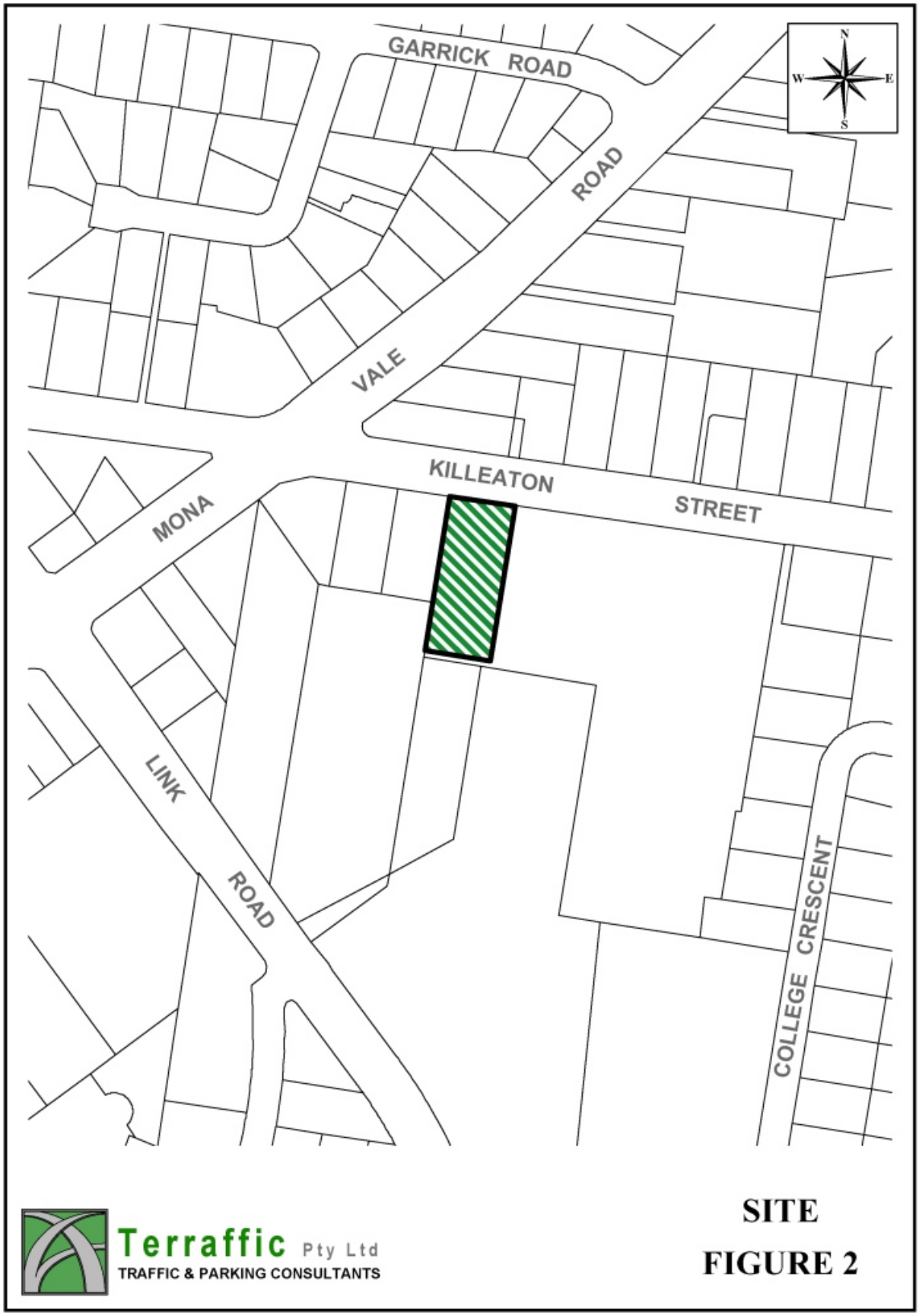
LOCATION
FIGURE 1


GARRICK ROAD
VALE ROAD
KILLEATON STREET
MONA
LINK ROAD
COLLEGE CRESCENT
N
W
E
S
Terraffic Pty Ltd
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SITE
FIGURE 2

2. PARKING IMPLICATIONS

Off-Street Parking Requirements

Part 22R.1 of Council's Local Centres DCP (effective 1st October 2021) specifies the following parking rates that apply to residential flat buildings located further than 400m from a railway station:

Dwelling Size	Minimum number of parking spaces per dwelling
Studio Unit	0.5 space per unit
One bedroom	1.0 space per unit
Two bedrooms	1.25 spaces per unit
Three bedrooms	2.0 spaces per unit
Visitor parking	1 space per 4 units

In the calculation of the parking spaces, overall requirement figures are to be rounded up to the nearest integer.

For the purposes of this assessment, it will be assumed that the development would comprise 40 x 2 bedroom units.

Application of these requirements to a development containing 40 x 2 bedroom units would yield a minimum parking provision of 60 car spaces as follows:

40 x 2 bedroom dwellings @ 1.25 spaces per dwelling	50.0 spaces
40 dwellings @ 1 visitor space per 4 dwellings	10.0 spaces
Total	**60.0 spaces**

Carpark Compliance

The car parking areas and access ramps would need to be designed in accordance with the following requirements of the Australian Standard AS/NZS2890.1:2004 – *"Off-street car parking":*

- Parking spaces must have a minimum length of 5.4m and width of 2.4m
- An additional 0.3m width is to be provided for spaces adjacent to a wall or obstruction

- A minimum access/manoeuvring aisle width of 5.8m
- 1.0m wide blind aisle extensions are to be provided where required
- Pavement cross-falls at parking spaces must not exceed 5% (1 in 20) in any direction
- Columns are to be located in accordance with Clause 5.2 of the Standard
- The first 6m of the access ramp from the property boundary cannot exceed 5% (1 in 20)
- The maximum gradient of access ramps will not exceed 25%
- Crest ramp transitions must not exceed 12.5% (1 in 8) over a distance of 2.0m
- Sag ramp transitions must not exceed 15% (1 in 6.7) over a distance of 2.0m
- Two-way access roads and ramps require a minimum width of 6.1m comprising a 5.5m roadway and 2 x300mm wide kerbs on both sides of the ramp
- Single width roads and ramps require a minimum roadway width of 3.6m comprising a 3.0m roadway and 2 x 300mm wide kerbs
- Curved ramps are to satisfy Table 2.2 and Figure 2.9
- A minimum headroom clearance of 2.6m is to be provided to facilitate access by Council's waste collection vehicle
- A minimum headroom clearance of 2.2m applies to the remaining carpark
- Pedestrian sight lines are required in accordance with Figure 3.3

The disabled parking spaces would also need to satisfy 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
- An adjacent shared area that is also 5.4m long x 2.4m wide
- A minimum headroom of 2.5m above the disabled spaces
- Pavement cross-falls in disabled spaces do not exceed 2.5% (1 in 40) in any direction

Bicycle Parking

Part 7B.2 of Council's DCP specifies the following bicycle parking rates that apply to residential flat buildings:

1 Provide on-site, secure bicycle parking spaces and storage at the following rates:
i) 1 bicycle parking space per 5 units or part thereof for residents within the residential car park area; and
ii) 1 bicycle parking space (in the form of a bicycle rail) per 10 units for visitors in the visitor car park area.

2 All on-site bicycle parking spaces and storage are to be designed to AS2890.3.

Application of those requirements to the Planning Proposal yields a bicycle parking requirement of 12 secure bicycle spaces calculated as follows:

40 dwellings @ 1 bike space per 5 dwellings	8 bike spaces for residents
40 dwellings @ 1 bike space per 10 dwellings	4 bike spaces for visitors
Total	**12 bike spaces**

3. TRAFFIC IMPLICATIONS

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 shows the following State and Regional Roads:

STATE ROADS	**REGIONAL ROADS**
Mona Vale Road	Killeaton Street – Link Road

As can be seen, Mona Vale Road is a classified *State Road* performing an arterial road function. Mona Vale Road typically carries three traffic lanes in each direction with opposing traffic flows separated by a centre median island.

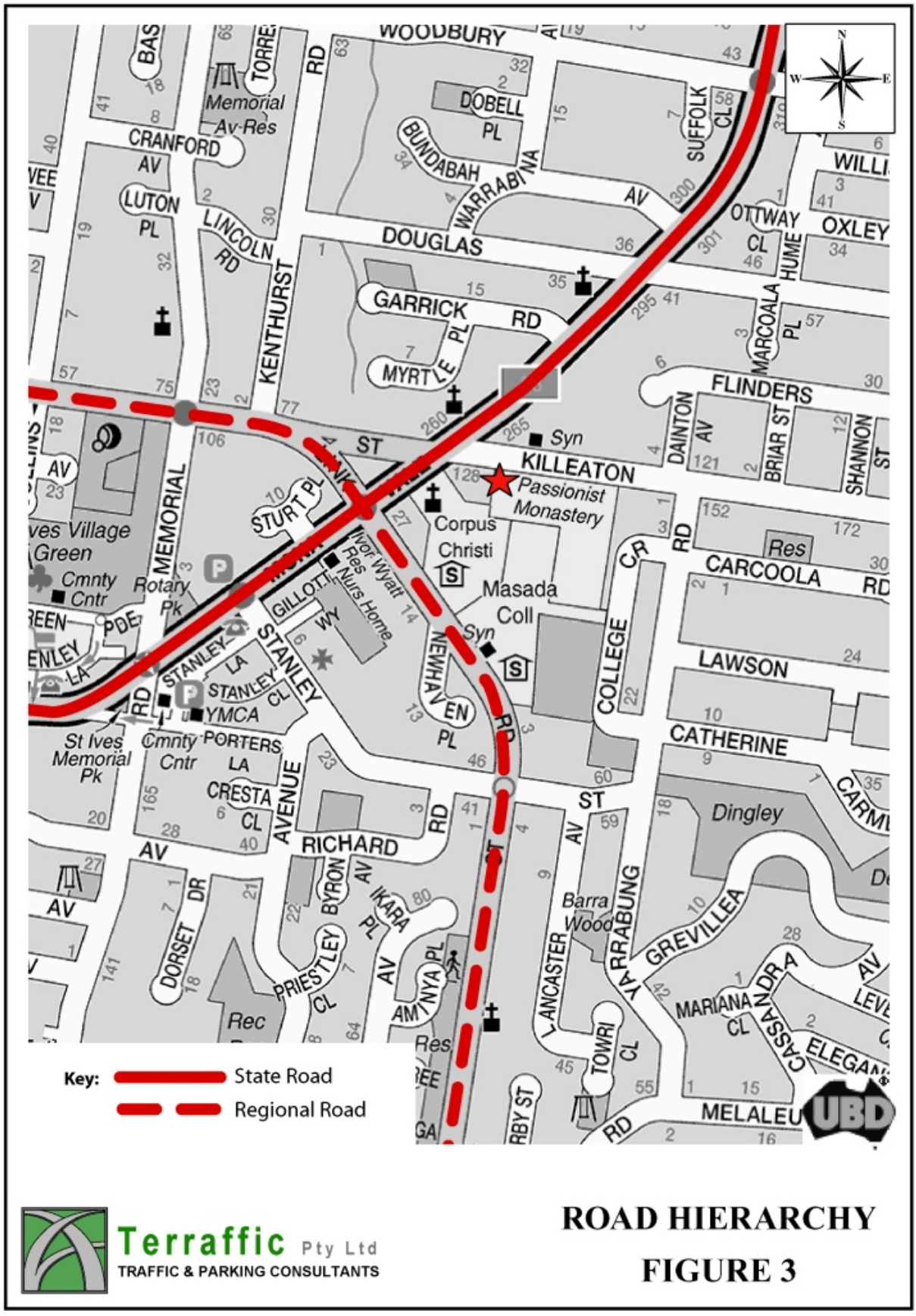
The section of Killeaton Street to the east of Mona Vale Road is an unclassified *Local Road* performing a collector road function. It has a pavement width of approximately 9.8m with unrestricted parking along both sides of the road.

The existing traffic controls in the vicinity of the site are illustrated on Figure 4 and includes the ALL TRAFFIC LEFT restriction when exiting Killeaton Street onto Mona Vale Road.

Existing Traffic Conditions

An indication of existing traffic conditions on the road network serving the site is provided from a count of traffic activity at the intersection of the Mona vale Road and Killeaton Street conducted between 7.00am - 9.00am and 4.00pm - 6.00pm on Thursday 24th February 2022. The result of the count of traffic activity is reproduced in Appendix A revealing that:

- the AM peak period occurred between 7.30 – 8.30am. At that time, two-way traffic flows on Killeaton Street past the site were in the order of 28 vehicles per hour (vph) comprising 11vph heading eastbound and 17vph heading westbound towards Mona Vale Road



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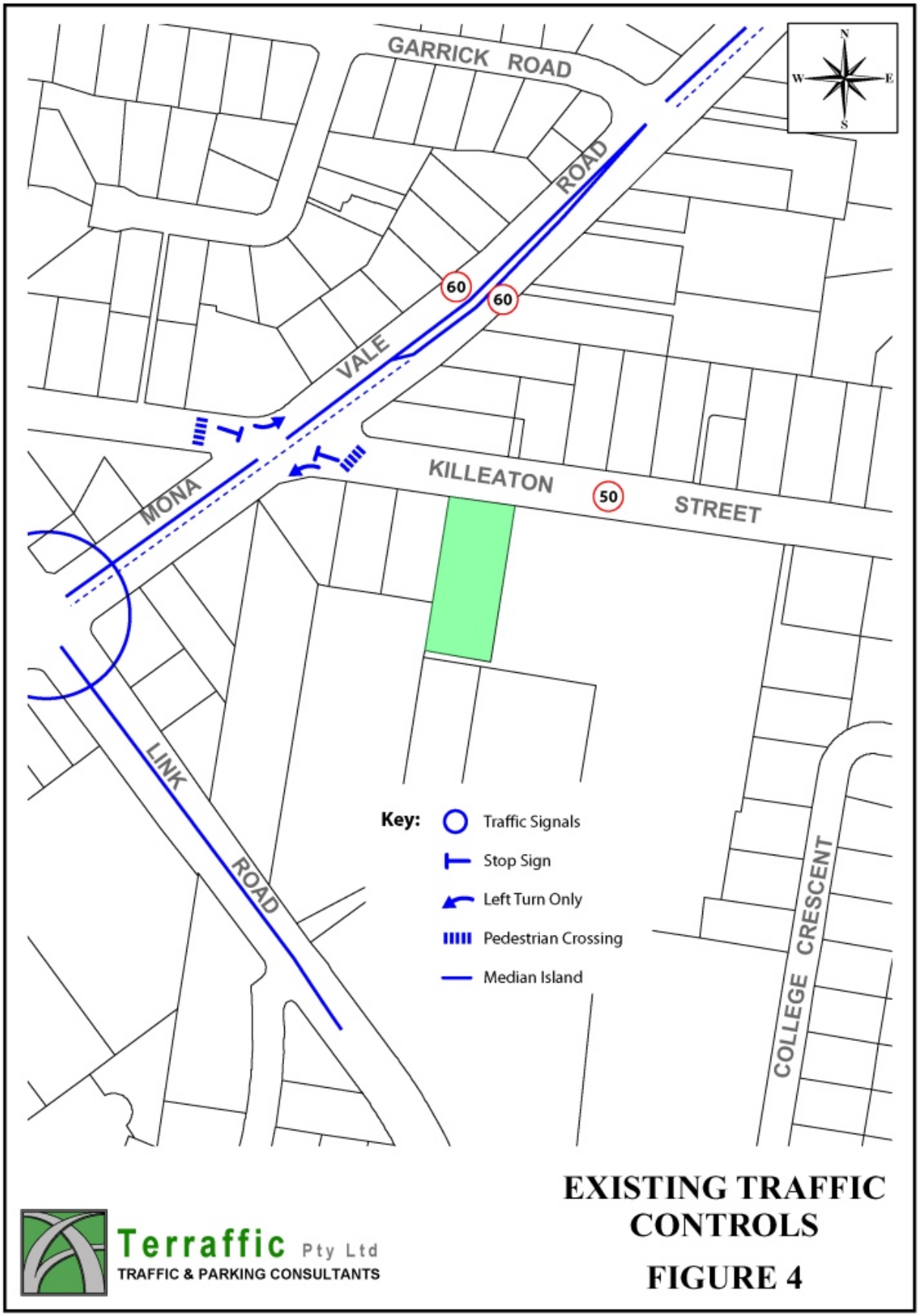
ROAD HIERARCHY

FIGURE 3


GARRICK ROAD
VALE ROAD
60
60
KILLEATON STREET
50
MONA
LINK ROAD
COLLEGE CRESCENT
N
W
E
S
Key:
Traffic Signals
Stop Sign
Left Turn Only
Pedestrian Crossing
Median Island
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EXISTING TRAFFIC CONTROLS
FIGURE 4

- the PM peak period occurred between 4.15 – 5.15pm. At that time, two-way traffic flows on Killeaton Street past the site were in the order of 32vph comprising 7vph heading eastbound and 25vph heading westbound towards Mona Vale Road

Projected Traffic Generation

An indication of the traffic generation potential of the proposed development is provided by reference to the RMS *Guide to Traffic Generating Developments* (October 2002). The traffic generation rates specified in the Guidelines are based on extensive surveys of a wide range of land uses throughout Sydney and regional NSW.

The 2002 Guidelines nominate a traffic generation rate of 0.29 vehicle trips per hour (vtph) per unit for high density residential flat buildings in Metropolitan Sib-Regional Centres. While the 2002 Guidelines do not provide a generation rate for weekend peak periods, this assessment will adopt the weekday peak generation rate for this purpose.

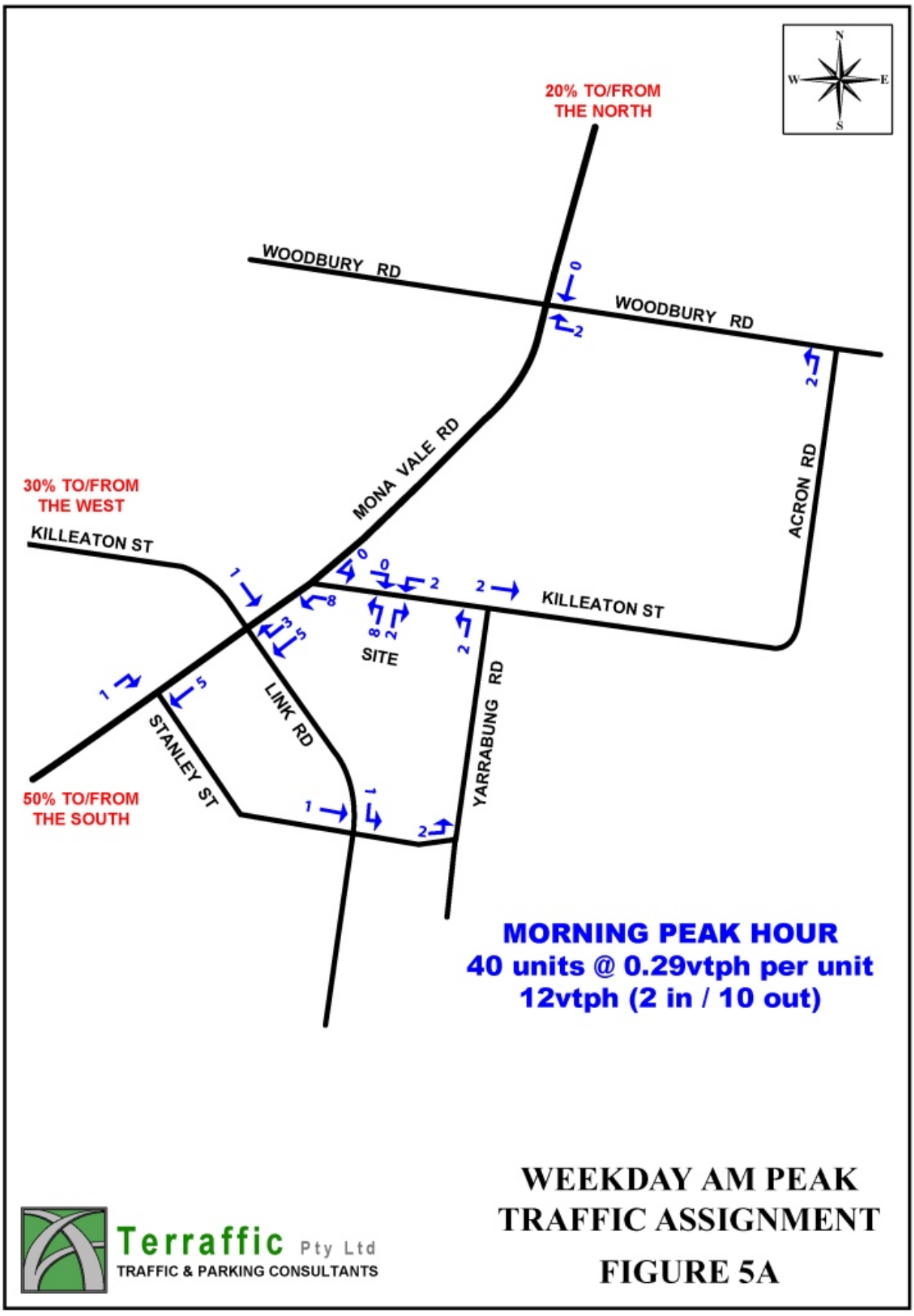
Application of this traffic generation rate to the Planning Proposal yields a traffic generation potential of approximately 12vtph during peak periods as set out below:

Weekday Morning Peak Period	40 units @ 0.29vtph per unit	12vtph (2 in / 10 out)
Weekday Evening Peak Period	40 units @ 0.29vtph per unit	12vtph (10 in / 2 out)
Weekend Midday Peak Period	40 units @ 0.29vtph per unit	12vtph (6 in / 6 out)

While there is no way of accurately predicting the origin and destination of residents, this assessment will assume the following:

50% of traffic will approach/depart to the south (Chatswood, Macquarie Park)
30% of traffic will approach/depart to the west (Hornsby, Thornleigh)
20% of traffic will approach/depart to the north (Terrey Hills, Mona Vale)

The assignment of traffic is illustrated on Figure 5A for the weekday morning peak. Figure 5B for the weekday evening peak and Figure 5C for the weekend midday peak.


20% TO/FROM
THE NORTH
WOODBURY RD
WOODBURY RD
MONA VALE RD
ACRON RD
30% TO/FROM
THE WEST
KILLEATON ST
KILLEATON ST
SITE
LINK RD
STANLEY ST
YARRABUNG RD
50% TO/FROM
THE SOUTH
MORNING PEAK HOUR
40 units @ 0.29vtph per unit
12vtph (2 in / 10 out)
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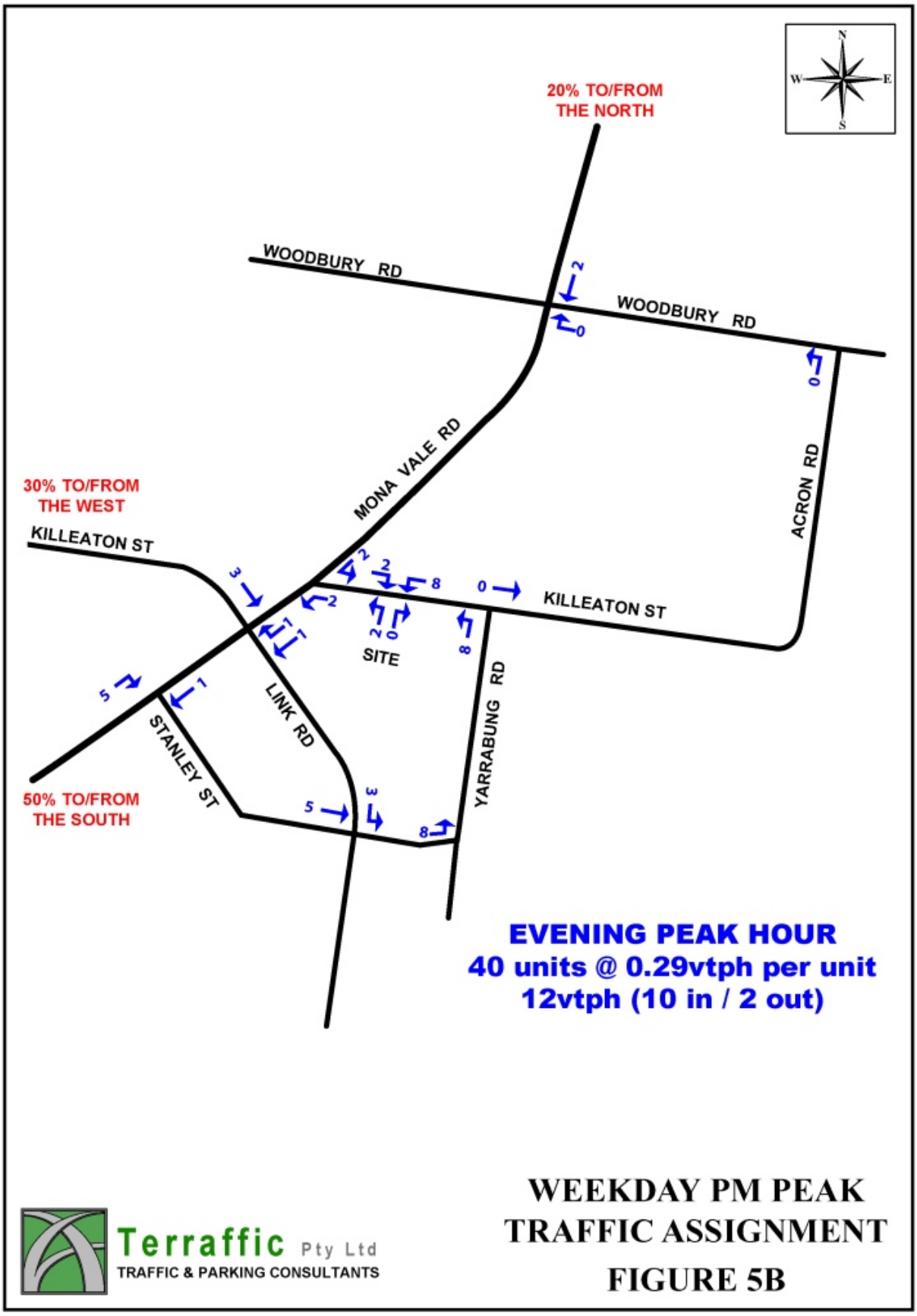
WEEKDAY AM PEAK
TRAFFIC ASSIGNMENT
FIGURE 5A


20% TO/FROM
THE NORTH
WOODBURY RD
WOODBURY RD
MONA VALE RD
ACRON RD
30% TO/FROM
THE WEST
KILLEATON ST
KILLEATON ST
SITE
LINK RD
STANLEY ST
YARRABUNG RD
50% TO/FROM
THE SOUTH
EVENING PEAK HOUR
40 units @ 0.29vtph per unit
12vtph (10 in / 2 out)
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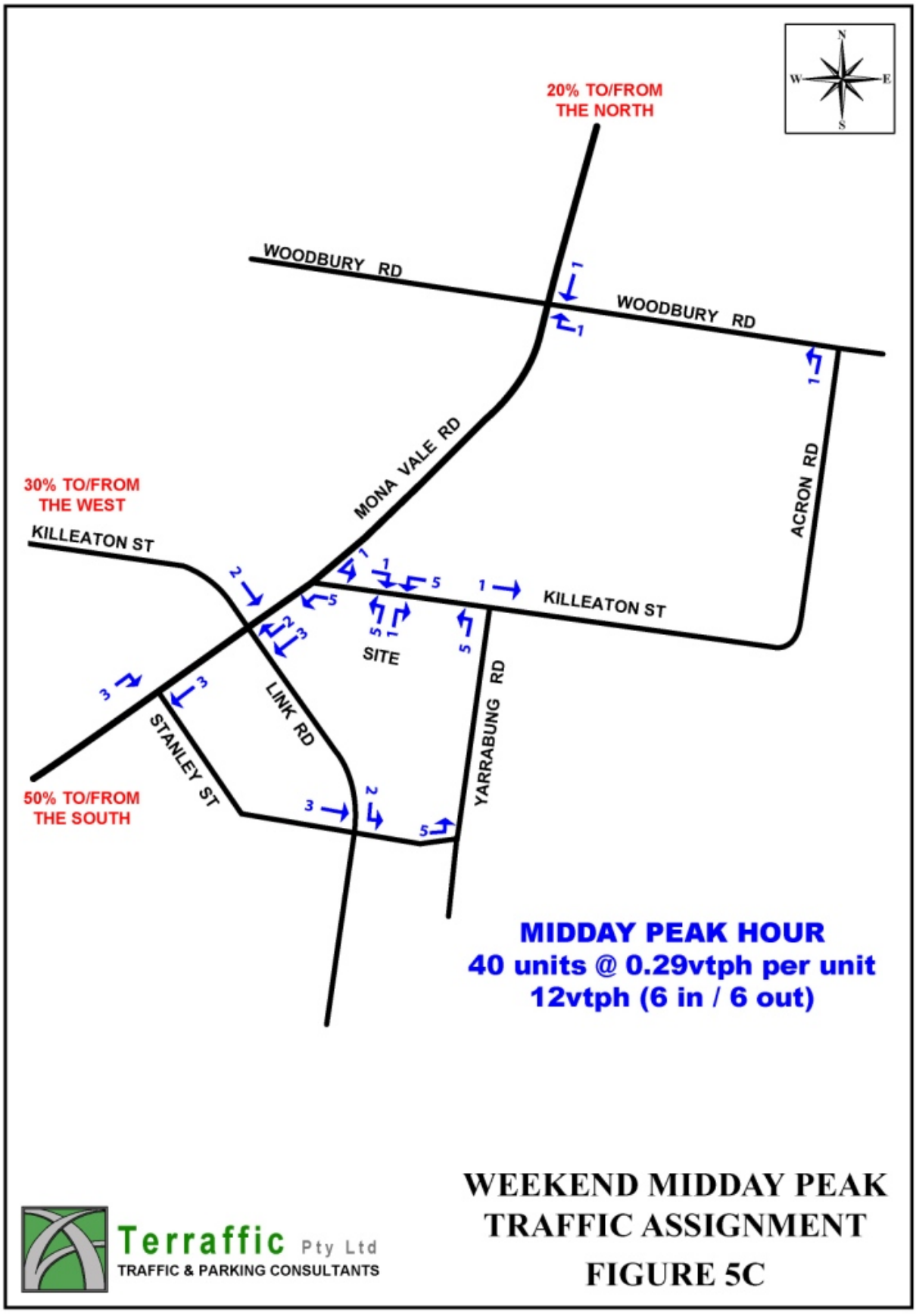
WEEKDAY PM PEAK
TRAFFIC ASSIGNMENT
FIGURE 5B


20% TO/FROM
THE NORTH
WOODBURY RD
WOODBURY RD
MONA VALE RD
ACRON RD
30% TO/FROM
THE WEST
KILLEATON ST
KILLEATON ST
SITE
LINK RD
STANLEY ST
YARRABUNG RD
50% TO/FROM
THE SOUTH
MIDDAY PEAK HOUR
40 units @ 0.29vtph per unit
12vtph (6 in / 6 out)
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WEEKEND MIDDAY PEAK
TRAFFIC ASSIGNMENT
FIGURE 5C

Traffic Impacts of Proposed Planning Proposal – Road Network Capacity

The main traffic implication of the proposed development in terms of road network capacity concerns the impacts on the Mona Vale Road/Killeaton Street intersection. 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 Mona Vale Road/Killeaton Street intersection are set out in the SIDRA MOVEMENT SUMMARY SHEETS reproduced in Appendix B revealing that the intersection will continue to operate with a high level of service and minimal delays.

The Level of Service, Degree of Saturation and Average Vehicle Delay for traffic turning left from Killeaton Street onto Mona Vale Road to head south is reproduced in Table 3.1 showing that the movement will continue to operate with a high level service and minimal delays.

TABLE 3.1 – RESULTS OF SIDRA ANALYSIS OF THE KILLEATON STREET LEFT TURN ONTO MONA VALE ROAD

	Level of Service	Degree of Saturation	Average Vehicle Delay (sec)
Existing AM Peak	B	0.025	10.4
Projected AM Peak	B	0.037	10.4
Existing PM Peak	B	0.041	11.0
Projected PM Peak	B	0.044	11.0

By reference to the assignment of traffic on Figures 5A-5C, it can be seen that the intersection of Mona Vale Road and Stanley Street will only accommodate 6 additional vehicle trips throughout the entire 60 minute period. This equates to approximately 1 additional vehicle movement every 10 minutes. While traffic counts and a SIDRA analysis have not been carried out at this intersection, it is clear that these 6 additional movements will not have any noticeable or unacceptable effect in terms of road network capacity.

Criteria for Interpreting Results of SIDRA Analysis

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good operation.	Good operation.
'B'	Good with acceptable delays and spare capacity.	Acceptable delays and spare capacity.
'C'	Satisfactory.	Satisfactory but accident study required.
'D'	Operating near capacity.	Near capacity and accident study required.
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode.	At capacity and requires other control mode.
'F'	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode.

2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (ie inner city conditions) and on some roads (ie minor side street intersecting with a major arterial route).

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
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	Operating near capacity.	Near capacity and accident study required.
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode.	At capacity and requires other control mode.

3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

For intersections controlled by traffic signals both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a roundabout or GIVE WAY or STOP signs, satisfactory intersection operation is indicated by a DS of 0.8 or less.

As can be seen on Figures 5A-5C, the additional northbound traffic flows on Yarrabung Road are as follows:

Weekday Morning Peak Period	2vtph
Weekday Evening Peak Period	8vtph
Weekend Midday Peak Period	5vtph

Section 4 of the RMS Guidelines defines *'environmental capacity performance standards on residential streets'* as indicated on the following table:

Road Class	**Road Type**	**Maximum Speed (km/h)**	**Maximum peak hour volume (veh/hr)**
Local	Access Way	25	100
	Street	40	200 environmental goal
			300 maximum
Collector	Street	50	300 environmental goal
			500 maximum

Council's Traffic and Transport Plan 2011-2021 classifies Yarrabung Road as a collector road between Killeaton Street and Stanley Street. Based on the RMS Guidelines, Yarrabung Road can accommodate a maximum of 500 vehicles per hour.

It will be readily appreciated that traffic generated by the planning proposal on Yarrabung Road is very minor (between 2vph and 8vph) which will not have any noticeable or unacceptable effect on the road in terms of traffic-related environmental effect.

In the circumstances, it can be concluded that the Planning Proposal would have no unacceptable traffic implications.

4. TRANSPORT ASSESSMENT

Following a Pre-Planning Proposal Meeting on the 15th December 2021, Ku-ring-gai Council has requested an assessment on the following strategic transport related impacts:

1. Productivity / Integration of land use and transport theme
2. Liveability Theme
3. Sustainability Theme

These aspects of the Planning Proposal have been addressed as follows:

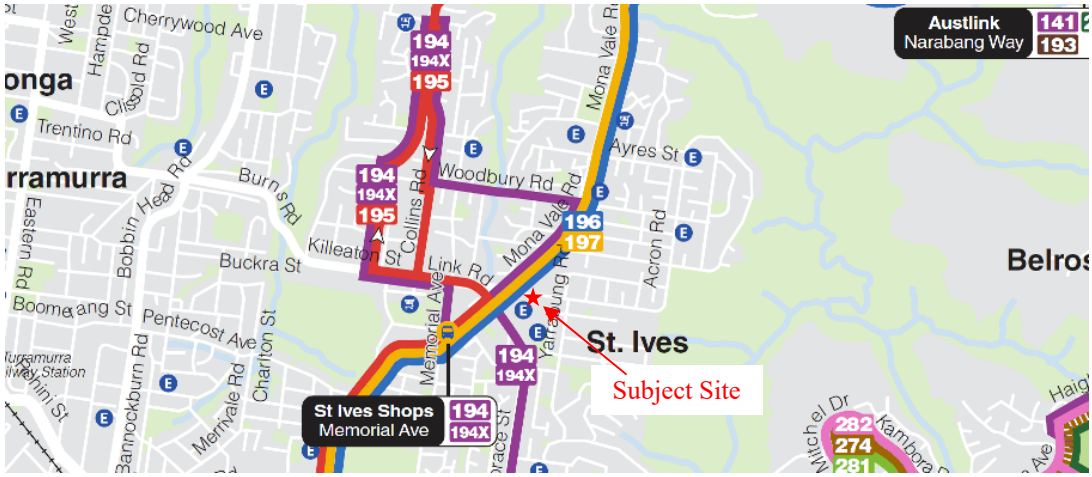
- ***Productivity / Integration of land use and transport theme:***
    - *Provide analysis of journey to work characteristics of where residents travel to work, mode of travel etc;*
    - *Carry out assessment of level of access to public transport from the site;*
    - *Assess degree of access to/number of nearest employment/strategic centres (noting Greater Sydney Commission goal of 30 minute city by public transport);*
    - *How the proposal responds to changes in the freight/logistics sector and retail business models, and supports the growing demand for parcel/home deliveries and on-demand freight.*

The Australian Bureau of Statistics "Census of Population and Housing 2016" data was accessed using the TableBuilder software to analyse the journey to work characteristics of residents in the suburb of St Ives. The data reveals the following:

Travel Mode									**No Travel**	
Train	**Bus**	**Taxi**	**Car (as driver)**	**Car (as passenger)**	**Motor cycle / scooter**	**Bicycle**	**Walked only**	**Other mode**	**Worked at home**	**Did not go to work**
1,464	382	22	4,318	280	46	23	166	44	658	607
18.3%	4.8%	0.3%	53.9%	3.5%	0.6%	0.3%	2.1%	0.5%	8.2%	7.6%

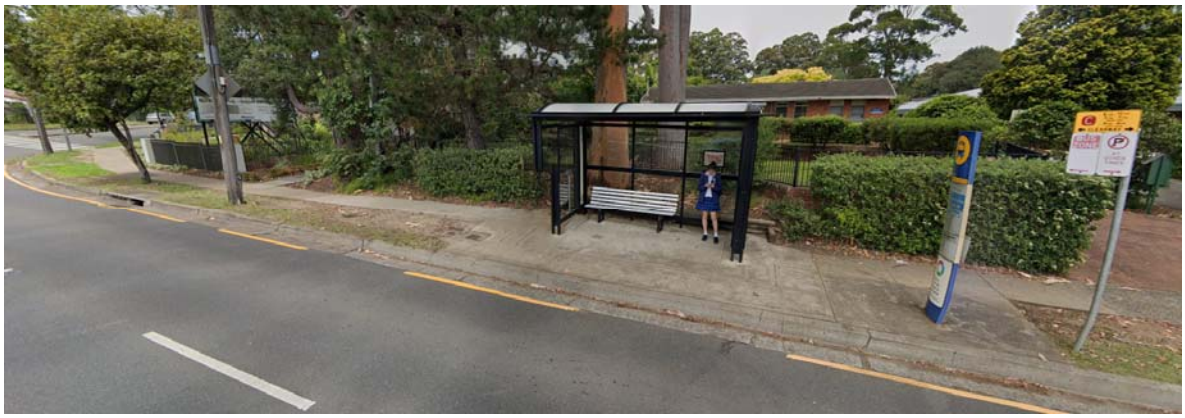
The subject site has convenient access to the following bus services:

Route 194	St Ives to City QVB via Killara, Roseville, Chatswood, Willoughby East, Cammeray and Wynyard Station (service operates daily)
Route 194X	St Ives to City QVB via Killara, Roseville, Chatswood and Wynyard Station (express service operates weekday peaks)
Route 195	Gordon Station to St Ives Chase (Loop Service operates daily)
Route 196	Mona Vale to Gordon Station via Ingleside, Terrey Hills, Belrose and St Ives (service operates daily)
Route 197	Mona Vale to Macquarie University via Ingleside, Terrey Hills, Belrose, St Ives, Gordon Station, Pymble and Macquarie Park Station (service operates daily)
Route 582	St Ives Shopping Centre to Gordon (service operates daily by Transdev)



Local Bus Routes operated by Forest Coach Lines

The BUS ZONE for the southbound services is located approximately 50m south of Killeaton Street on Mona Vale Road. This represents a walk of approximately 120m from the site to the southbound BUS ZONE and is made along a standard concrete footpath. As can be seen below, the bus stop is sheltered with a seating capacity of 3 adults.



Southbound bus stop

The BUS ZONE for the northbound services is located approximately 20m north of Link Road on Mona Vale Road. This represents a walk of approximately 265m from the site to the northbound BUS ZONE via the traffic signals at the Mona Vale Road/Link Road intersection. Access is along a standard concrete footpath with a relatively flat grade. As can be seen below, the bus stop is not sheltered and contains a seat capable of accommodating 3 adults.

Southbound bus stop

The BUS ZONES for the Transdev service (Route 582) are located on Yarrabung Road to the south of Killeaton Street. This represents a walk of approximately 300m from the site to the northbound BUS ZONE and 340m to the southbound BUS ZONE. Both BUS ZONES are unsheltered and do not contain seating.

The Strategic/Metropolitan Centres within 30 minutes of the site on public transport are as follows:

1. Macquarie Park (via Route 197)

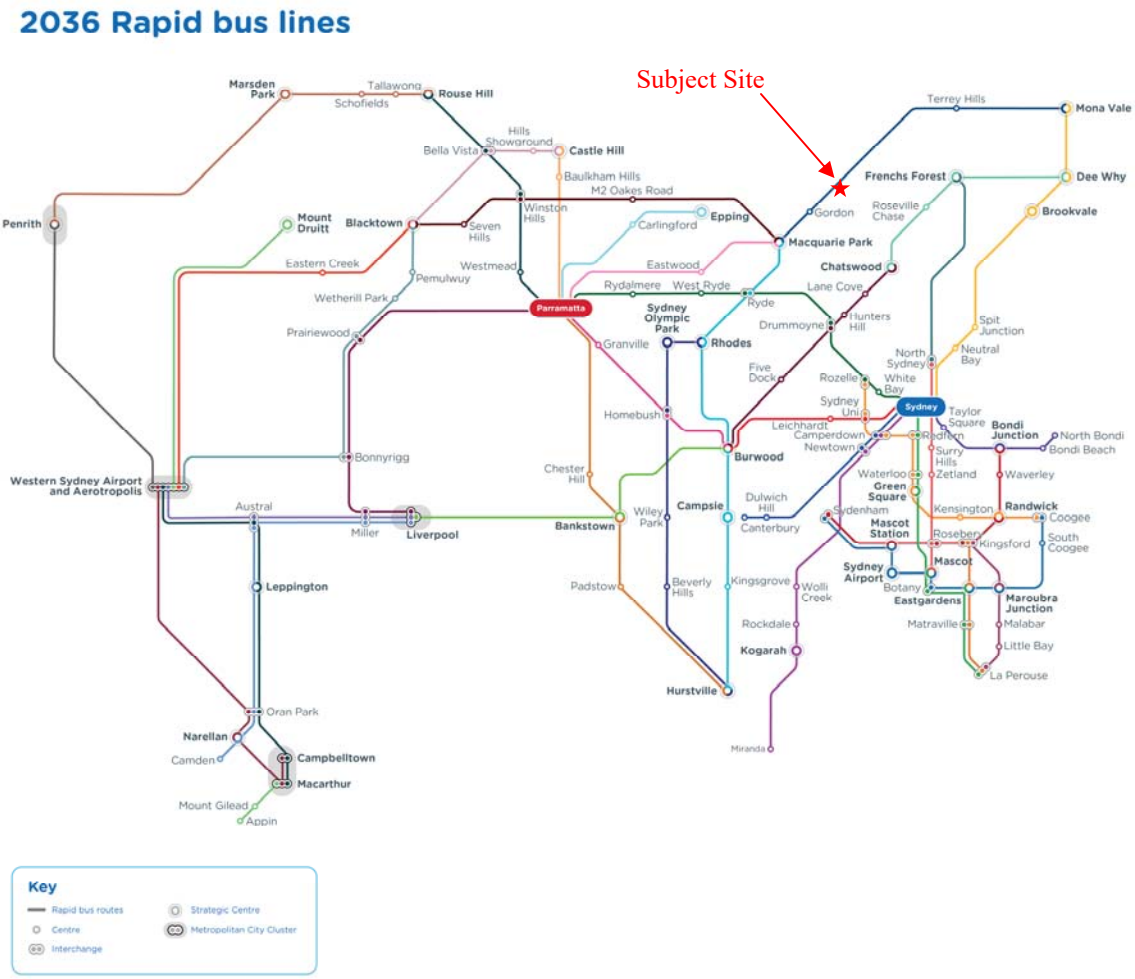
2. Hornsby (via Route 591 that departs from St Ives Community Hall on Memorial Avenue)

Being a residential development, the Planning Proposal will have no impacts on the freight/logistics sector and/or retail business models. Furthermore, the proposal will provide very minor support for the growing demand for parcel/home deliveries and on-demand freight.

The NSW Governments *"Future Transport 2056"* was released in 2018 and is an overarching strategy, supported by a suite of plans to achieve a 40 year vision for the NSW transport system. The strategy considers:

- the future road network throughout Sydney
- future light and heavy rail networks
- a future rapid bus and ferry network
- bicycle network, and
- freight network

The most relevant of these to the subject site is the 2036 rapid bus network that includes an east-west route connecting Mona Vale to Macquarie Park. As can be seen below, the route will travel along Mona Vale Road through St Ives.



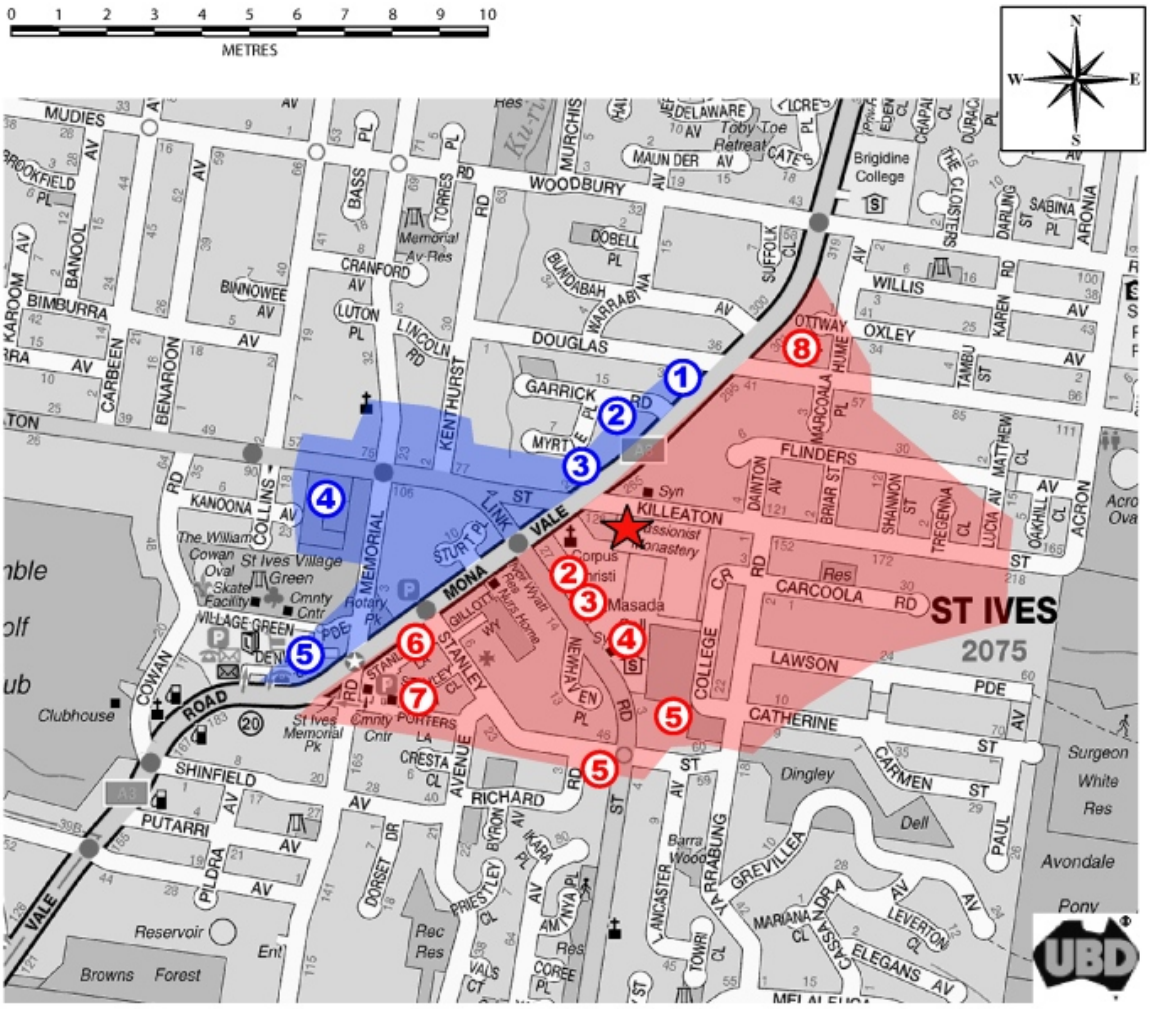
- ***Liveability theme***
    - *Undertake assessment of access to local services (retail/supermarket, medical, educational) within 10 minutes/800m walking distance.*
    - *Provide an assessment of access to recreational, leisure, cultural and community facilities within 10 minutes/800m walking distance;*
    - *Assess the level of access to active transport networks (walking and cycling links);*
    - *Assess the strategic fit of surrounding roads in the Movement and Place framework, and assessment of opportunities to review Movement and Place classification and road user space allocation/hierarchy adjacent to/around the site in relation to pedestrians, cyclists, public transport, freight and private vehicles, to enhance the place function of the proposal.*

The local services within an 800m walk of the site are illustrated on Figure 5 and include:

- St Ives Shopping Village
- St Ives-Pymble Presbyterian Church
- St Ives Bowling and Recreation Club
- St Ives Anglican Church
- Corpus Christi Catholic Church and Primary School
- Masada College and Synagogue
- St Ives YMCA

Pedestrian access to all services is achieved via standard concrete pedestrian paths. The local services on the western side of Mona Vale Road must be accessed via the pedestrian crossings incorporated into the Mona Vale Road/Link Road traffic signals.

Council's Traffic and Transport Plan 2011-2021 locates the existing pedestrian crossings and pedestrian refuges throughout the LGA. A copy of Figures 8 and 9 from the Transport Plan are reproduced in Appendix C. It should be noted the Figures in the Council Transport Report do not show any future crossings or refuges in the vicinity of the site.



EAST OF MONA VALE ROAD

1. Corpus Christi Catholic Church
2. Child Care Centre
3. Corpus Christi Primary School
4. Masada College and Synagogue
5. Long Day Care / Preschool
6. Retail / Commercial Strip
7. YMCA
8. Landscape Gardeners

WEST OF MONA VALE ROAD

1. St Ives Uniting Church
2. Family Day Care
3. St Ives-Pymble Presbyterian Church
4. St Ives Bowling and Recreation Club
5. St Ives Shopping Village

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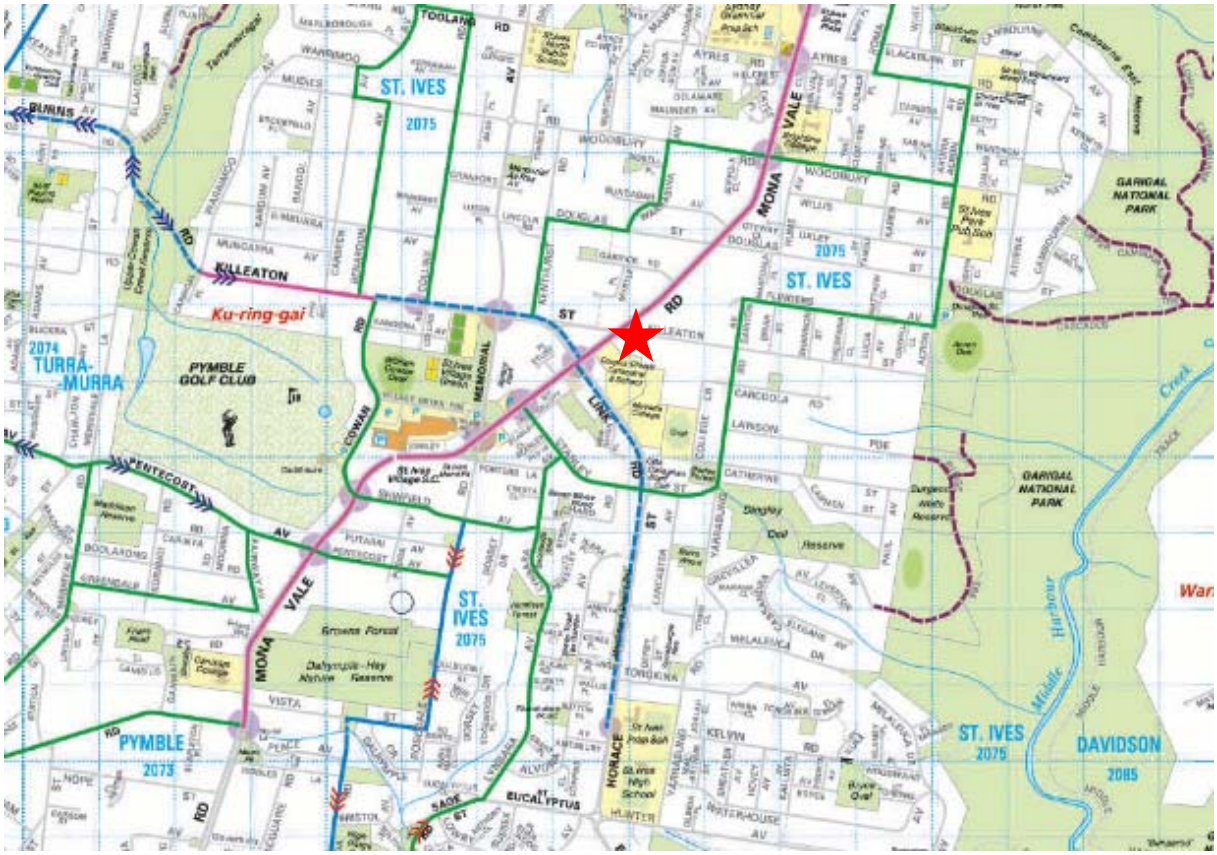
800m WALKING DISTANCE TO LOCAL SERVICES

FIGURE 6

An extract from Council's Cycling Map is reproduced below showing the designated routes in the vicinity of the site. As can be seen, both Killeaton Street (west of Mona Vale Road) and Link Road are classified *"off-road bicycle routes"*. The site is also in close proximity to the mountain bike trails in Garigal National Park.



A copy of the entire Cycling Map is reproduced in Appendix D.

All future cycleways have been illustrated on Figure 5 of Council's Traffic and Transport Plan 2011-2021. A copy of Figure 5 is also reproduced in Appendix D and reveals proposed cycleways along Mona Vale Road and Killeaton Street east of Mona Vale Road past the subject site.

The Proposed Cycle Network from the Ku-ring-gai Bike Plan (2012) is also reproduced in Appendix D. The proposal shows an on-road cycleway along Mona Vale Road and off-road cycleway along Killeaton St-Link Rd-Horace St.

- ***Sustainability theme***
    - *Provisions to minimise private vehicle use / emissions and parking impacts (e.g. potential on-site car share vehicles, EV charging, reduced parking provision etc);*
    - *Strategies to further reduce vehicle trip generation/vehicle kilometres travelled and parking demand from those forecast in Transport for NSW/RMS guidelines for the relevant land use, with a goal to containing to or even bettering the forecast demands generated from the current controls;*
    - *Potential for adaptability of car parking structures to suit different/future uses.*

Travel Demand Management is intervention (excluding provision of major infrastructure) to modify travel decisions so that more desirable transport, social, economic and/or environmental objectives can be achieved, and the adverse impacts of travel can be reduced. The purpose of Travel Demand Management is to:

1. reduce the total amount of travel,
2. minimise the need to expand road systems,
3. reduce the incidents of vehicle crashes,
4. prevent further congestion,
5. reduce air pollution,
6. conserve scarce resources, and
7. increase the share of non-car based transport

Increasing the supply of parking can induce a greater number of vehicular trips which increases congestion, impacting negatively on the city environment.

As noted in Chapter 2 of this assessment, Council's DCP sets a minimum parking requirement based on the size of the dwelling. It is common for most inner city Sydney Councils to adopt maximum parking requirements in order to adopt the principles of Travel Demand Management.

In the circumstances, it can be concluded that the development site is ideally located in close proximity to existing and future pedestrian and cycling facilities in the area including liveability destinations (recreational, leisure and community facilities). Furthermore, the results of the census data analysis reveals that existing residents in the vicinity of the site have convenient access to productivity destinations (strategic centres).

APPENDIX A

TRAFFIC COUNT DATA

R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph. Mob.0418-239019

Client : Terraffic Pty. Ltd.

Job No/Name : 7617 ST IVES Killeaton St

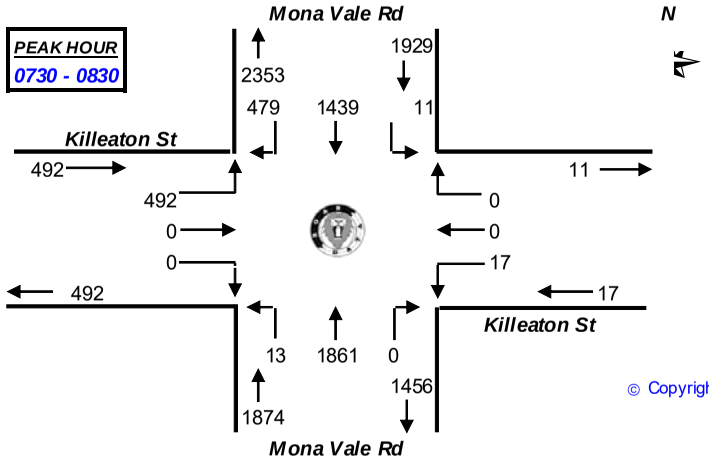
Day/Date : Thursday 24th February 2022

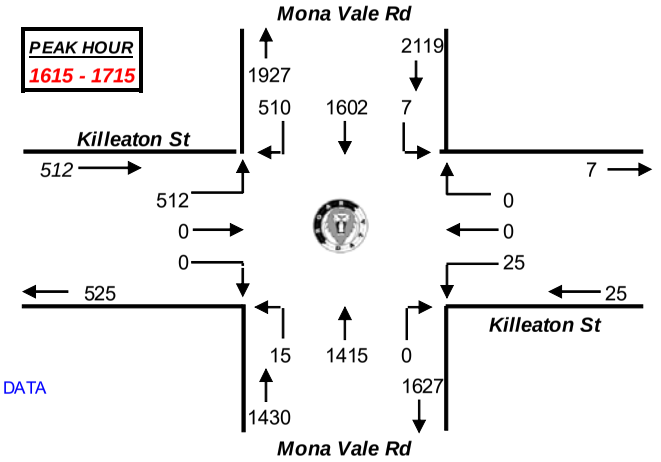
All Vehicles	NORTH Mona Vale Rd			WEST Killeaton St			SOUTH Mona Vale Rd			EAST Killeaton St			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0700 - 0715	5	278	126	119	0	0	3	403	0	6	0	0	**940**
0715 - 0730	3	233	140	109	0	0	2	359	0	7	0	0	**853**
0730 - 0745	3	356	158	127	0	0	5	537	0	5	0	0	**1191**
0745 - 0800	2	381	140	115	0	0	1	419	0	5	0	0	**1063**
0800 - 0815	3	346	95	121	0	0	4	427	0	0	0	0	**996**
0815 - 0830	3	356	86	129	0	0	3	478	0	7	0	0	**1062**
0830 - 0845	5	422	120	89	0	0	5	428	0	10	0	0	**1079**
0845 - 0900	3	320	89	93	0	0	9	376	0	17	0	0	**907**
Period End	**27**	**2692**	**954**	**902**	**0**	**0**	**32**	**3427**	**0**	**57**	**0**	**0**	**8091**

All Vehicles	NORTH Mona Vale Rd			WEST Killeaton St			SOUTH Mona Vale Rd			EAST Killeaton St			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1600 - 1615	1	339	104	141	0	0	2	359	0	3	0	0	**949**
1615 - 1630	1	392	113	124	0	0	2	368	0	5	0	0	**1005**
1630 - 1645	2	463	149	134	0	0	5	430	0	9	0	0	**1192**
1645 - 1700	2	352	113	138	0	0	4	293	0	3	0	0	**905**
1700 - 1715	2	395	135	116	0	0	4	324	0	8	0	0	**984**
1715 - 1730	8	367	140	104	0	0	3	346	0	7	0	0	**975**
1730 - 1745	5	421	180	95	0	0	2	328	0	5	0	0	**1036**
1745 - 1800	5	365	167	98	0	0	1	269	0	7	0	0	**912**
Period End	**26**	**3094**	**1101**	**950**	**0**	**0**	**23**	**2717**	**0**	**47**	**0**	**0**	**7958**

Peak Time	NORTH Mona Vale Rd			WEST Killeaton St			SOUTH Mona Vale Rd			EAST Killeaton St			
	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0700 - 0800	13	1248	564	470	0	0	11	1718	0	23	0	0	**4047**
0715 - 0815	11	1316	533	472	0	0	12	1742	0	17	0	0	**4103**
0730 - 0830	11	1439	479	492	0	0	13	1861	0	17	0	0	**4312**
0745 - 0845	13	1505	441	454	0	0	13	1752	0	22	0	0	**4200**
0800 - 0900	14	1444	390	432	0	0	21	1709	0	34	0	0	**4044**
PEAK HOUR	**11**	**1439**	**479**	**492**	**0**	**0**	**13**	**1861**	**0**	**17**	**0**	**0**	**4312**

Peak Time	NORTH Mona Vale Rd			WEST Killeaton St			SOUTH Mona Vale Rd			EAST Killeaton St			
	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1600 - 1700	6	1546	479	537	0	0	13	1450	0	20	0	0	**4051**
1615 - 1715	7	1602	510	512	0	0	15	1415	0	25	0	0	**4086**
1630 - 1730	14	1577	537	492	0	0	16	1393	0	27	0	0	**4056**
1645 - 1745	17	1535	568	453	0	0	13	1291	0	23	0	0	**3900**
1700 - 1800	20	1548	622	413	0	0	10	1267	0	27	0	0	**3907**
PEAK HOUR	**7**	**1602**	**510**	**512**	**0**	**0**	**15**	**1415**	**0**	**25**	**0**	**0**	**4086**





TERRAFFIC PTY LTD

APPENDIX B

SIDRA MOVEMENT SUMMARY SHEETS

MOVEMENT SUMMARY

Site: [Mona Vale Road and Killeaton Street, St Ives - Existing AM Peak (Site Folder: General)]

Existing AM Peak
Site Category: -
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Mona Vale Road														
1	L2	13	0.0	13	0.0	0.327	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.1
2	T1	1861	3.0	1861	3.0	0.327	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		1874	3.0	1874	3.0	0.327	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
East: Killeaton Street														
4	L2	17	0.0	17	0.0	0.025	10.4	LOS B	0.1	0.6	0.48	0.89	0.48	46.8
Approach		17	0.0	17	0.0	0.025	10.4	LOS B	0.1	0.6	0.48	0.89	0.48	46.8
North: Mona Vale Road														
7	L2	11	0.0	11	0.0	0.253	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.1
8	T1	1439	3.0	1439	3.0	0.253	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
9	R2	479	0.0	479	0.0	0.859	20.5	LOS C	7.0	48.9	0.92	1.49	2.88	41.5
Approach		1929	2.2	1929	2.2	0.859	5.2	NA	7.0	48.9	0.23	0.37	0.72	53.9
West: Killeaton Street														
10	L2	492	0.0	492	0.0	0.758	21.8	LOS C	10.9	76.0	0.85	1.50	2.03	41.1
Approach		492	0.0	492	0.0	0.758	21.8	LOS C	10.9	76.0	0.85	1.50	2.03	41.1
All Vehicles		4312	2.3	4312	2.3	0.859	4.9	NA	10.9	76.0	0.20	0.34	0.55	54.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Mona Vale Road and Killeaton Street, St Ives - Projected AM Peak (Site Folder: General)]

Existing AM Peak + Site traffic
Site Category: -
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Mona Vale Road														
1	L2	13	0.0	13	0.0	0.327	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.1
2	T1	1861	3.0	1861	3.0	0.327	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		1874	3.0	1874	3.0	0.327	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
East: Killeaton Street														
4	L2	25	0.0	25	0.0	0.037	10.4	LOS B	0.1	0.9	0.49	0.91	0.49	46.7
Approach		25	0.0	25	0.0	0.037	10.4	LOS B	0.1	0.9	0.49	0.91	0.49	46.7
North: Mona Vale Road														
7	L2	11	0.0	11	0.0	0.253	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.1
8	T1	1439	3.0	1439	3.0	0.253	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
9	R2	479	0.0	479	0.0	0.859	20.5	LOS C	7.0	48.9	0.92	1.49	2.88	41.5
Approach		1929	2.2	1929	2.2	0.859	5.2	NA	7.0	48.9	0.23	0.37	0.72	53.9
West: Killeaton Street														
10	L2	492	0.0	492	0.0	0.758	21.8	LOS C	10.9	76.0	0.85	1.50	2.03	41.1
Approach		492	0.0	492	0.0	0.758	21.8	LOS C	10.9	76.0	0.85	1.50	2.03	41.1
All Vehicles		4320	2.3	4320	2.3	0.859	4.9	NA	10.9	76.0	0.20	0.35	0.55	54.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Mona Vale Road and Killeaton Street, St Ives - Existing PM Peak (Site Folder: General)]

Existing PM Peak
Site Category: -
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Mona Vale Road														
1	L2	15	0.0	15	0.0	0.249	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	58.1
2	T1	1415	3.0	1415	3.0	0.249	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		1430	3.0	1430	3.0	0.249	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
East: Killeaton Street														
4	L2	25	0.0	25	0.0	0.041	11.0	LOS B	0.1	1.0	0.52	0.93	0.52	46.4
Approach		25	0.0	25	0.0	0.041	11.0	LOS B	0.1	1.0	0.52	0.93	0.52	46.4
North: Mona Vale Road														
7	L2	7	0.0	7	0.0	0.281	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.2
8	T1	1602	3.0	1602	3.0	0.281	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
9	R2	510	0.0	510	0.0	0.697	12.5	LOS B	4.3	30.3	0.76	1.12	1.52	45.7
Approach		2119	2.3	2119	2.3	0.697	3.1	NA	4.3	30.3	0.18	0.27	0.36	55.7
West: Killeaton Street														
10	L2	512	0.0	512	0.0	0.662	16.0	LOS C	8.5	59.8	0.76	1.21	1.35	43.9
Approach		512	0.0	512	0.0	0.662	16.0	LOS C	8.5	59.8	0.76	1.21	1.35	43.9
All Vehicles		4086	2.2	4086	2.2	0.697	3.7	NA	8.5	59.8	0.19	0.30	0.36	55.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Mona Vale Road and Killeaton Street, St Ives - Projected PM Peak (Site Folder: General)]

Existing PM Peak + Site Traffic
Site Category: -
Stop (Two-Way)

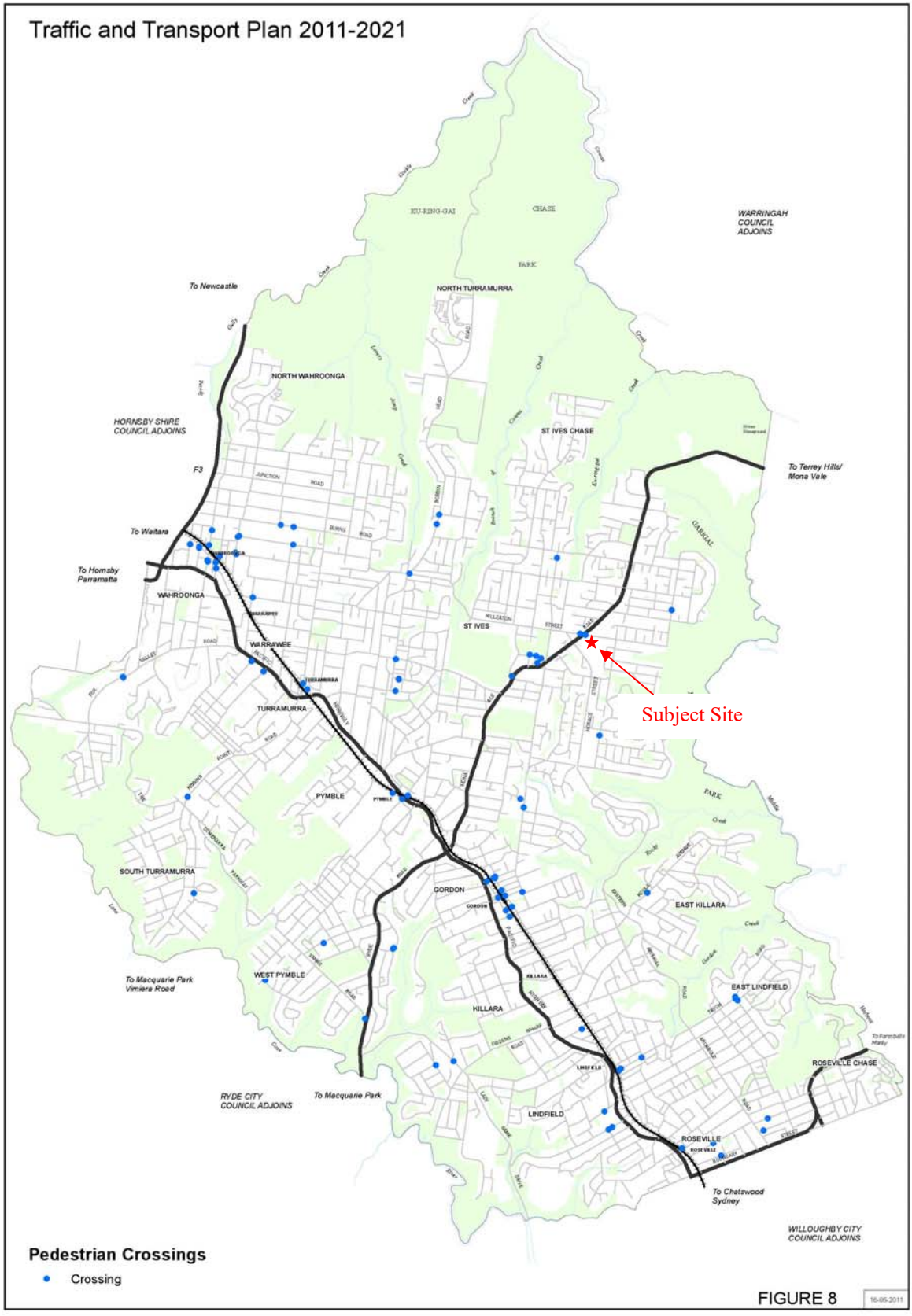
Vehicle Movement Performance

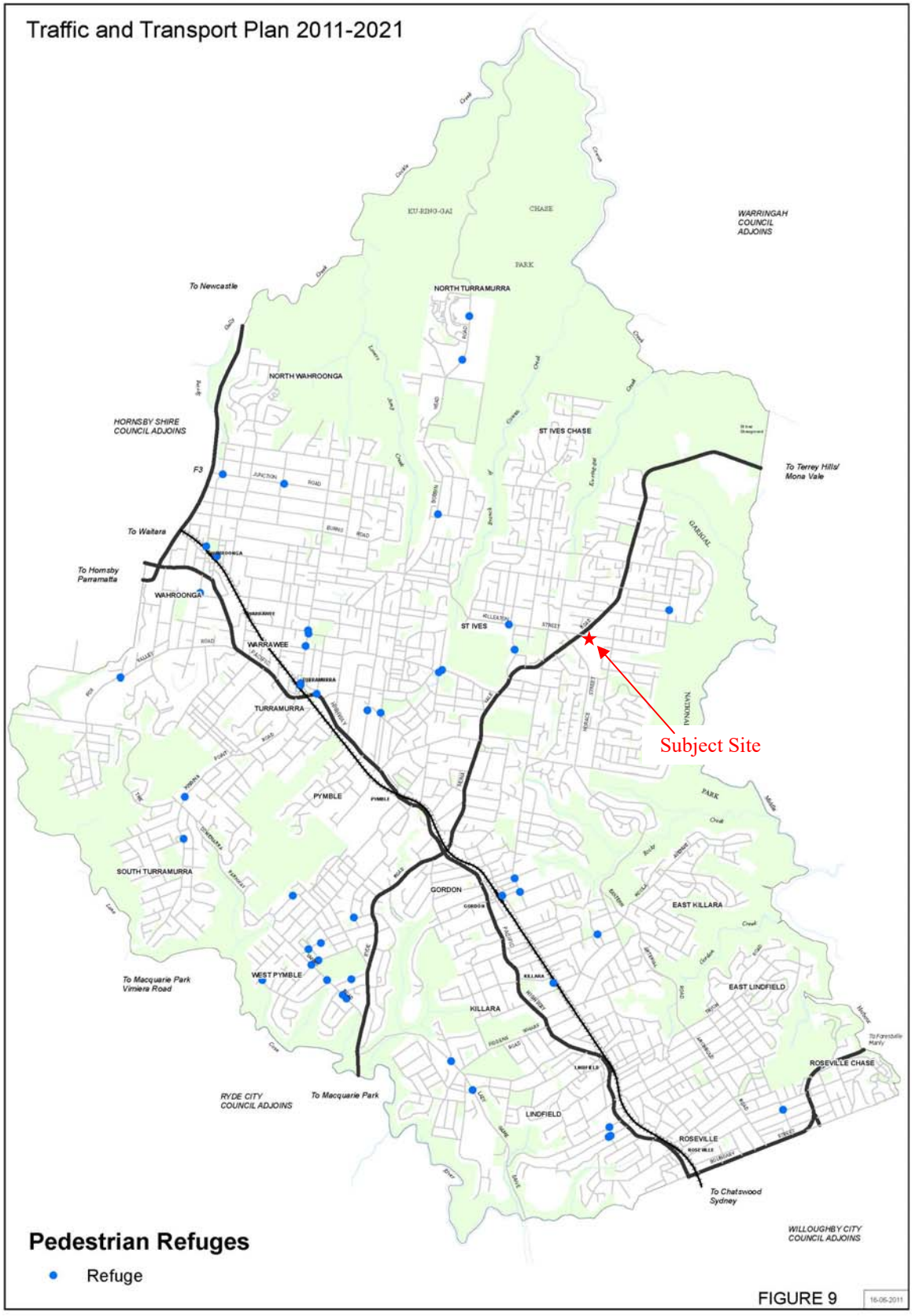
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Mona Vale Road														
1	L2	15	0.0	15	0.0	0.249	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	58.1
2	T1	1415	3.0	1415	3.0	0.249	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		1430	3.0	1430	3.0	0.249	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
East: Killeaton Street														
4	L2	27	0.0	27	0.0	0.044	11.0	LOS B	0.1	1.0	0.52	0.93	0.52	46.4
Approach		27	0.0	27	0.0	0.044	11.0	LOS B	0.1	1.0	0.52	0.93	0.52	46.4
North: Mona Vale Road														
7	L2	9	0.0	9	0.0	0.282	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.1
8	T1	1602	3.0	1602	3.0	0.282	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
9	R2	510	0.0	510	0.0	0.697	12.5	LOS B	4.3	30.3	0.76	1.12	1.52	45.7
Approach		2121	2.3	2121	2.3	0.697	3.1	NA	4.3	30.3	0.18	0.27	0.36	55.6
West: Killeaton Street														
10	L2	512	0.0	512	0.0	0.662	16.0	LOS C	8.5	59.8	0.76	1.21	1.35	43.9
Approach		512	0.0	512	0.0	0.662	16.0	LOS C	8.5	59.8	0.76	1.21	1.35	43.9
All Vehicles		4090	2.2	4090	2.2	0.697	3.7	NA	8.5	59.8	0.19	0.30	0.36	55.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX C

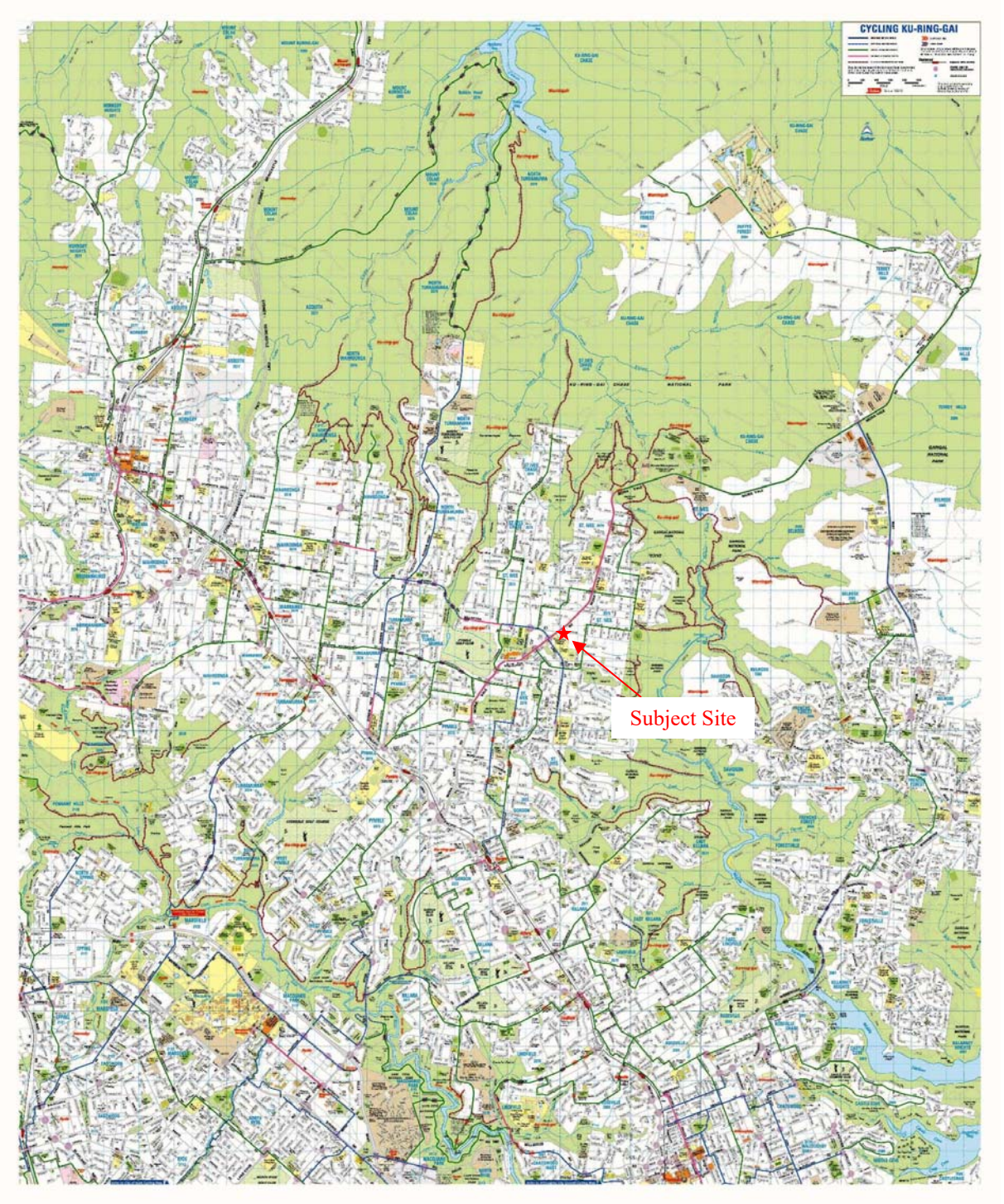
COUNCIL'S PEDESTRIAN FACILITIES

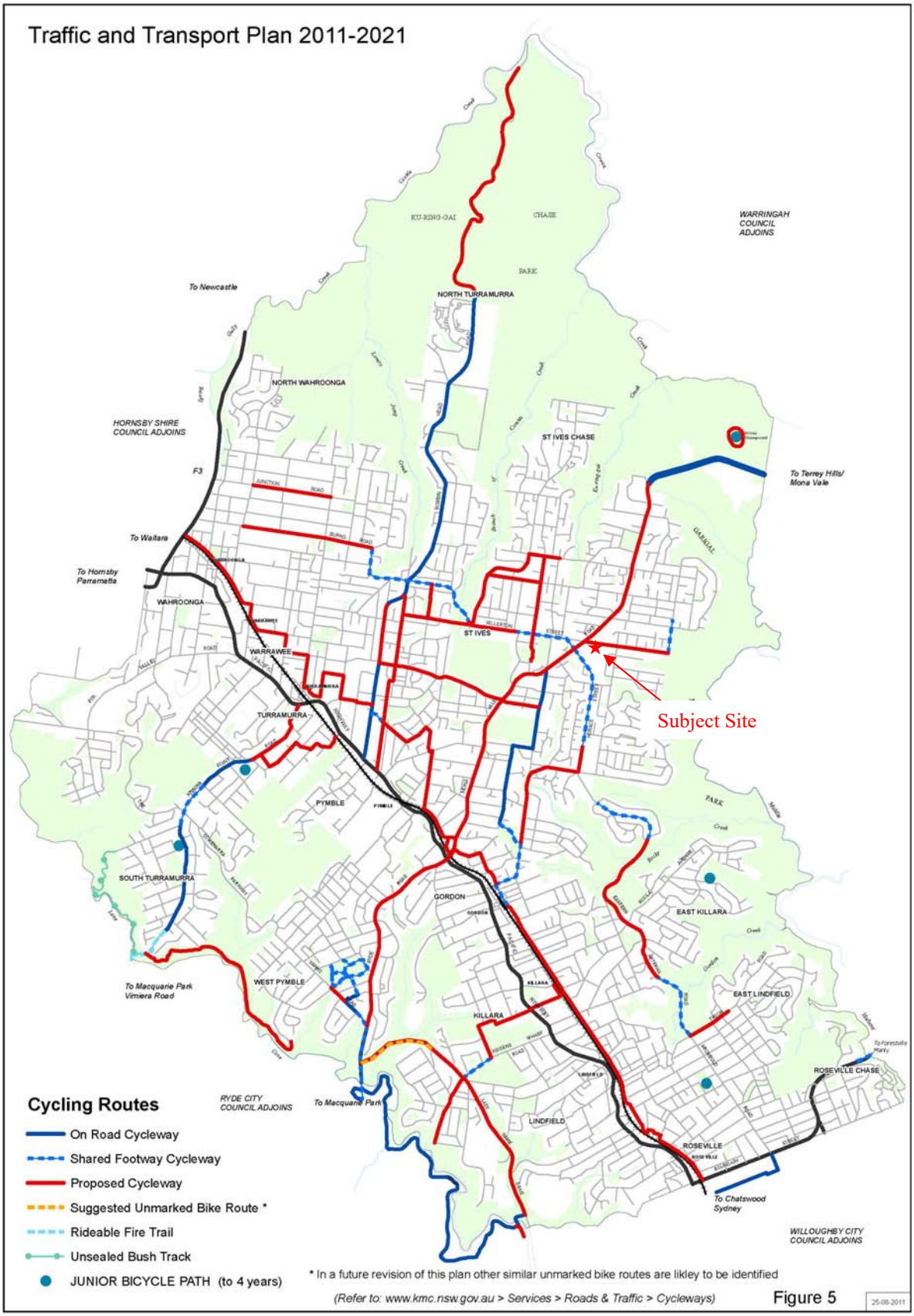

Traffic and Transport Plan 2011-2021
WARRINGAH COUNCIL ADJOINS
To Newcastle
NORTH TURRAMURRA
NORTH WAHROONGA
HORNSBY SHIRE COUNCIL ADJOINS
ST IVES CHASE
To Terrey Hills/ Mona Vale
To Waitara
To Hornsby Parramatta
WAHROONGA
ST IVES
WARRAWEE
TURRAMURRA
Subject Site
PYMBLE
SOUTH TURRAMURRA
GORDON
EAST KILLARA
WEST PYMBLE
To Macquarie Park Vimiera Road
KILLARA
EAST LINDFIELD
ROSEVILLE CHASE
RYDE CITY COUNCIL ADJOINS
To Macquarie Park
LINDFIELD
ROSEVILLE
To Chatswood Sydney
WILLOUGHBY CITY COUNCIL ADJOINS
Pedestrian Crossings
Crossing
FIGURE 8

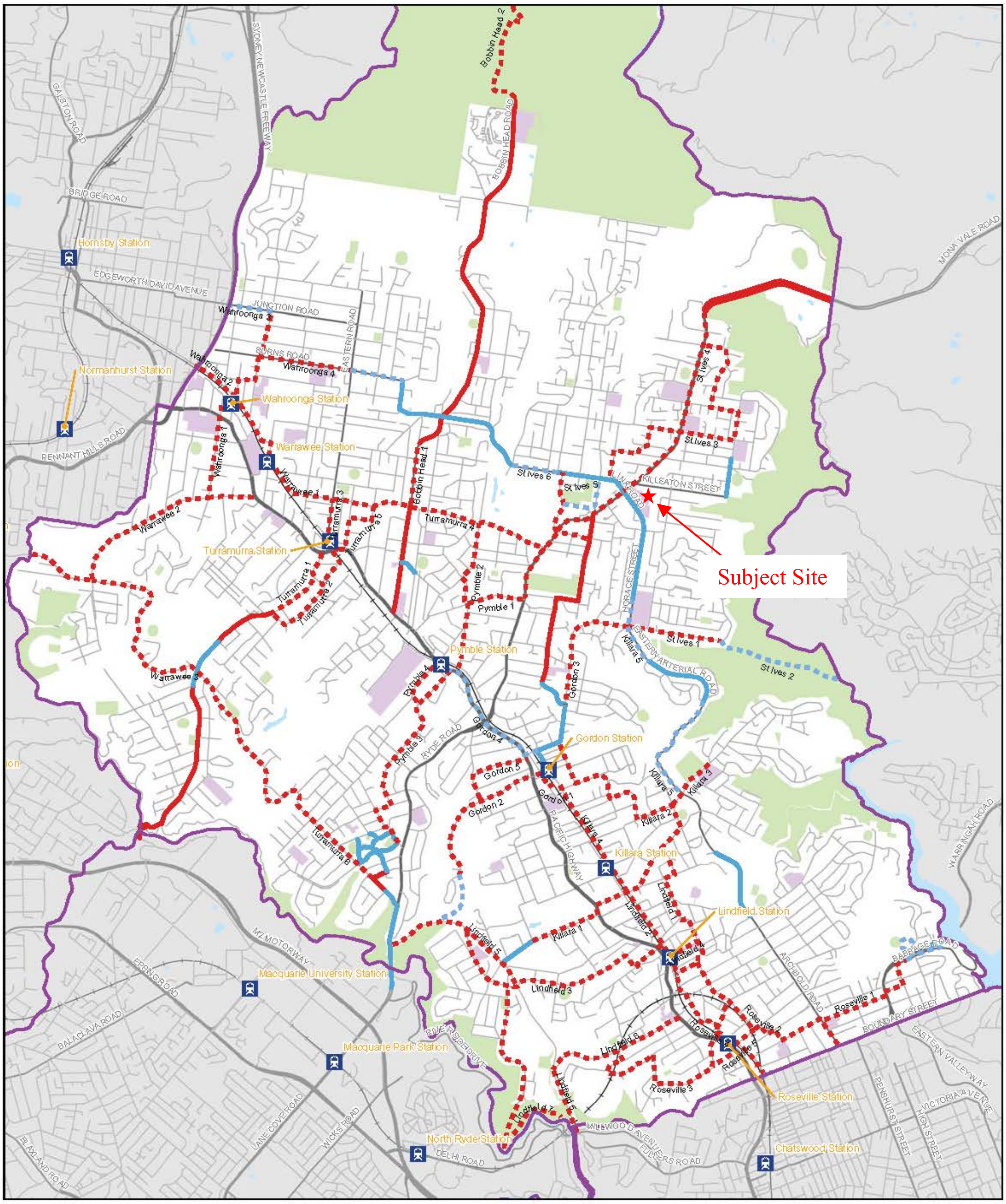

Traffic and Transport Plan 2011-2021
WARRINGAH COUNCIL ADJOINS
To Newcastle
NORTH TURRAMURRA
NORTH WAHROONGA
HORNSBY SHIRE COUNCIL ADJOINS
ST IVES CHASE
To Terrey Hills/ Mona Vale
F3
To Waitara
To Hornsby Parramatta
WAHROONGA
WARRAWEE
ST IVES
Subject Site
TURRAMURRA
PYMBLE
SOUTH TURRAMURRA
GORDON
EAST KILLARA
To Macquarie Park Vimiera Road
WEST PYMBLE
KILLARA
EAST LINDFIELD
ROSEVILLE CHASE
RYDE CITY COUNCIL ADJOINS
To Macquarie Park
LINDFIELD
ROSEVILLE
To Chatswood Sydney
WILLOUGHBY CITY COUNCIL ADJOINS
Pedestrian Refuges
Refuge
FIGURE 9

APPENDIX D

COUNCIL'S CYCLING MAPS


CYCLING KU-RING-GAI
Subject Site


Traffic and Transport Plan 2011-2021
Subject Site
To Newcastle
NORTH TURRAMURRA
NORTH WAHROONGA
HORNSBY SHIRE COUNCIL ADJOINS
F3
To Waitara
To Hornsby Parramatta
WAHROONGA
WARRAWEE
TURRAMURRA
ST IVES CHASE
ST IVES
To Terrey Hills/ Mona Vale
WARRINGAH COUNCIL ADJOINS
PYMBLE
SOUTH TURRAMURRA
GORDON
EAST KILLARA
EAST LINDFIELD
WEST PYMBLE
To Macquarie Park Vimiera Road
KILLARA
LINDFIELD
ROSEVILLE
ROSEVILLE CHASE
To Chatswood Sydney
RYDE CITY COUNCIL ADJOINS
To Macquarie Park
WILLOUGHBY CITY COUNCIL ADJOINS
Cycling Routes
On Road Cycleway
Shared Footway Cycleway
Proposed Cycleway
Suggested Unmarked Bike Route *
Rideable Fire Trail
Unsealed Bush Track
JUNIOR BICYCLE PATH (to 4 years)
* In a future revision of this plan other similar unmarked bike routes are likley to be identified
(Refer to: www.kmc.nsw.gov.au > Services > Roads & Traffic > Cycleways)
Figure 5
25-08-2011



LEGEND

On Road (Proposed)
Off Road (Proposed)
On Road Cycleway
Off Road Cycleway
Parks
Schools
Waterways
Highways
Major Roads
Secondary Roads
Other Roads
Commuter Rail Station
Railway

1:40,000 (at A3)
0 250 500 1,000 1,500
Metres
Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

GHD

Ku-ring-gai Council
Ku-ring-gai Bike Plan

Job Number 21-21240
Revision A
Date 19 Nov 2012

Proposed Cycle Network

G:\21\21240\GIS\Maps\MXD\2121240_Z002_ProposedCycleNetwork_V2_RevD.mxd

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Data Source: NSW LPMA: Roads, Railway, 2012; Ku-ring-gai Council, 2012. Created by: sjduce