Prepared for

CELESTINO DEVELOPMENT PTY LTD

Planning Proposal

Traffic Impact Assessment

The Gables Town Centre, Box Hill North

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1 Introduction

1.1 Overview

Ason Group has been commissioned by Celestino Development Pty Ltd to provide a Traffic Impact Assessment (TIA) report in support of a Planning Proposal for a Town Centre (the Proposal) in the Box Hill North Precinct on the corner of Fontana Drive and Red Gables Road (the Site). The Site is located within the Hills Shire (Council) Local Government Area (LGA). Under Council's Local Environmental Plan (LEP) 2012, the Site is zoned B2 Local Centre, has a Floor pace Ratio (FSR) of 1:1, and Height of Building Control of 16m.

A reference scheme has been prepared by Rothelowman with an indicative development yield adopted to inform the traffic assessment of the Planning Proposal.

1.2 Study Objectives

The key objectives of this Traffic Impact Assessment are as follows:

- Demonstrate the traffic generation associated with the reference scheme could be accommodated within the surrounding road network.
- Confirm that the Proposal would continue to align with the key traffic, parking and transport objectives of the Box Hill North DCP.

The Proposal has been designed with consideration of the key objectives within Council's Development Control Plan (DCP) Part D Section 17 detailed below:

- *To focus business and community activities in and around the Town Centre with a mix of retail, commercial, and community uses.*
- *Create a mixed-use Town Centre which has main street characters, is pedestrian friendly and offers high level amenity for residents, workers, and visitors.*
- *Provide a high quality, integrated and ecologically sustainable urban environment integrated with good public transport accessibility, open space, community facilities and employment opportunities.*
- *Ensure that development will not detrimentally affect the environment by ensuring that satisfactory measures are incorporated to ameliorate any impacts arising from the proposed development.*
- *To create a compact, vibrant, safe and prosperous town centre*
- *To ensure that pedestrian streetscapes are provided through the Town Centre which are of a high amenity and provide effective pedestrian and cycle connections and minimise walking distances.*

This TIA report provides an assessment of the relevant traffic, transport and parking implications of the Proposal with consideration for the above objectives.

1.3 Reference Documentation

In preparing this TIA, Ason Group has referenced key planning documents, these include

- The Hills Shire Development Control Plan 2012 (Council's DCP)
- The Hills Shire Local Environmental Plan 2012 (Council's LEP)
- Box Hill and Box Hill Industrial Precincts – Transport and Access Study prepared by GHD; February 2011 (the GHD Report)
- Box Hill North Planning Proposal – Transport and Access Impact Assessment Addendum Report prepared by GTA; 9 December 2013. (The Addendum Traffic Report)
- Box Hill Master Plan Development Application, Traffic Impact Assessment prepared by GTA; 1 May 2015. (The DA Traffic Report)

This TIA also references general access, traffic, and parking guidelines, including:

- RMS (formerly RTA), *Guide to Traffic Generating Developments* (RMS Guide)
- RMS, *Guide to Traffic Generating Developments: Updated Traffic Surveys*, 2013 (RMS TDT2013/04)
- Traffic Signal Design Guidelines
- Australian Standard 2890.1 (2004): Off-street Car Parking (AS2890.1)
- Australian Standard 2890.2 (2002): Off-street Commercial Vehicle Facilities (AS2890.2)
- Australian Standard 2890.6 (2009): Off-street Parking for People with Disabilities (AS2890.6)

1.4 Report Structure

- Section 2 provides a summary of the proposed development
- Section 3 describes the existing site conditions and land use
- Section 4 details the strategic and planning context of the Site
- Section 5 outlines the parking requirements applicable to the proposed development
- Section 6 assess the traffic impacts of the development including the Site's projected trip generation and forecasted network performance
- Section 7 discusses the site access and internal design of the development
- Section 8 provides a summary of the key conclusions

2 Overview of Proposal

A detailed description of the Proposal is provided in the Planning report and architectural plans prepared by Rothloweman. The key aspects of the concept scheme from a traffic perspective with indicative development yield are summarised below:

Table 1: Planning Proposal Development Yield

Land Use	Yield
High Density Residential	Approximately 570 dwellings
Retail (GFA)	
Supermarket	4,000 m^2
Speciality Retail	3,700 m^2
Mixed Use – Community Space	3,000 m^2
Commercial (GFA)	4,890 m^2
Proposed Education Establishment	
Primary Education Establishment	10,000 m^2 (approximately 1,000 students)
Secondary Education Establishment	10,000 m^2 (approximately 1,000 students)

Figure 1 illustrates the layout of the proposed Town Centre. Detailed plans are also provided in **Appendix A**.

As detailed above, the Proposal provides a number of opportunities for numerous land uses, which will be carefully selected to provide a holistic Town Centre experience while providing employment and residences for the local community as per the objectives detailed in Section 1.2.

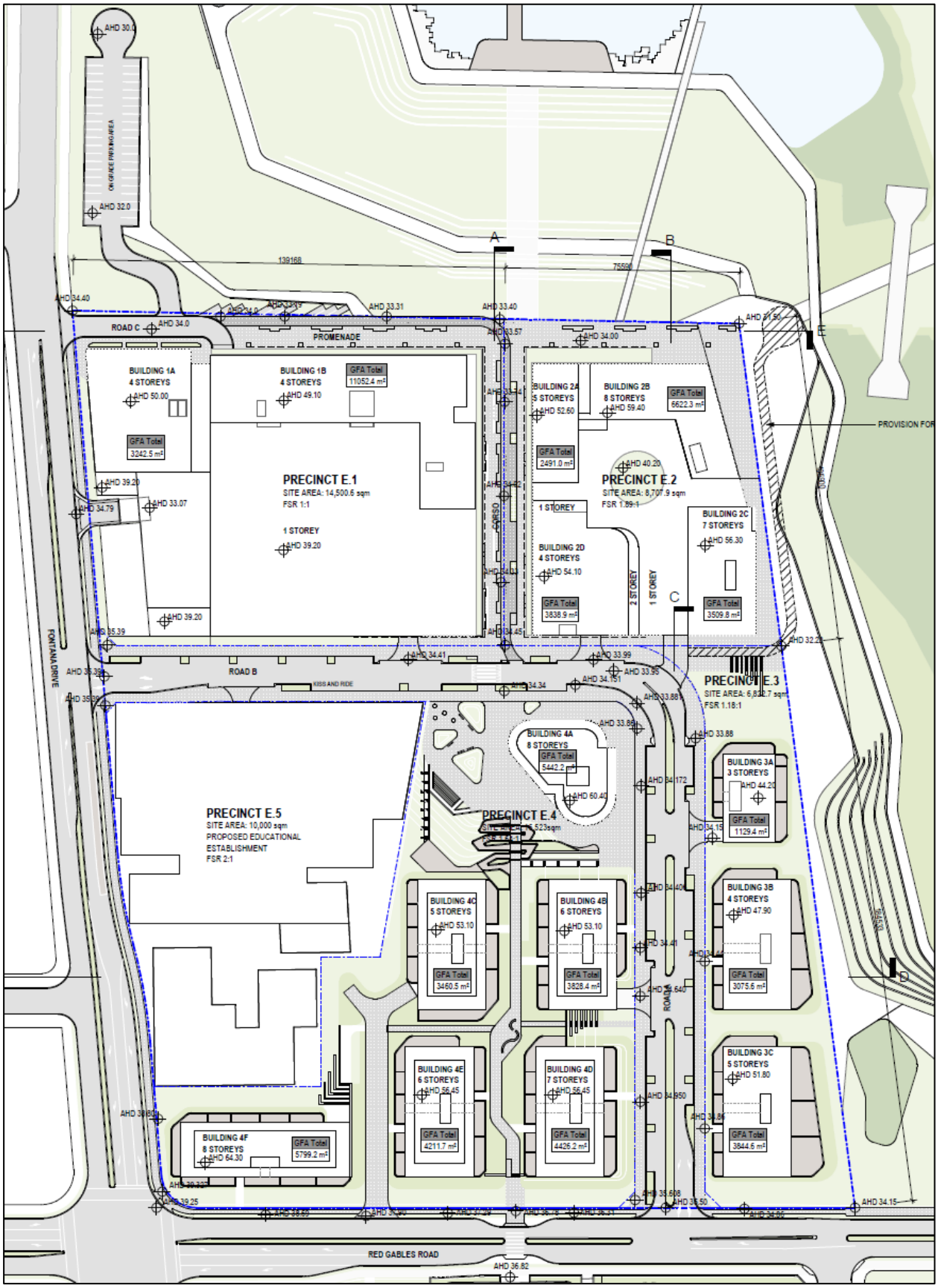


Figure 1: Town Centre Layout

3 Existing Conditions

3.1 Site & Location

The Site is located at 5-7 Red Gables Road, Box Hill North within The Hills Shire LGA in Box Hill North approximately 39 kilometres northwest of Sydney CBD and 23 kilometres northeast of Penrith. The Site has an area of 63,652 m^2 with greenfield sites surrounding the Site in all directions. The Site has a frontage to Red Gables Road to the south. A Site Plan is presented in **Figure 2** which provides an appreciation of the site and the existing conditions.

The Site is currently zoned B2 Local Centre under Council's LEP and is legally known as Lot 26 DP255616. The Site is presently vacant.

3.2 Road Hierarchy

The key roads providing in the vicinity of the site are summarised below:

- Windsor Road – A classified RMS Main Road (MR184) that generally runs in a northwest-southeast direction to the south of the Site. The road has a divided carriageway and is subject to an 80 km/h speed zoning. The road carries approximately 55,000 vehicles per day (vpd) (Station 71024)
- Boundary Road – An unclassified Regional Road (7205) that generally runs in a northeast-southeast direction to the west of the Site. It connects to Windsor Road in the south and Cattai Right Road to the north and carries one lane of traffic in each direction and is subject to a speed limit of 80 km/h.
- Old Pitt Town Road – A local collector road that traverses in an east-west direction to the south of the Site and is subject to a speed limit of 60 km/hr.
- Red Gables Road – A local road that runs parallel to Old Pitt Town Road and connects to Boundary Road in the west and Janpieter Road in the east. It forms the southern frontage of the Site and carries one lane of traffic in both directions with a speed limit of 60 km/hr.
- Fontana Drive – A local road that runs parallel to Boundary Road which generally runs in the north-south direction and forms the western frontage of the Site. The road has a divided carriageway and is subject to a speed limit of 60 km/hr. It should be noted that Fontana Drive is undergoing construction and construction has not yet commenced in vicinity of the Proposal.

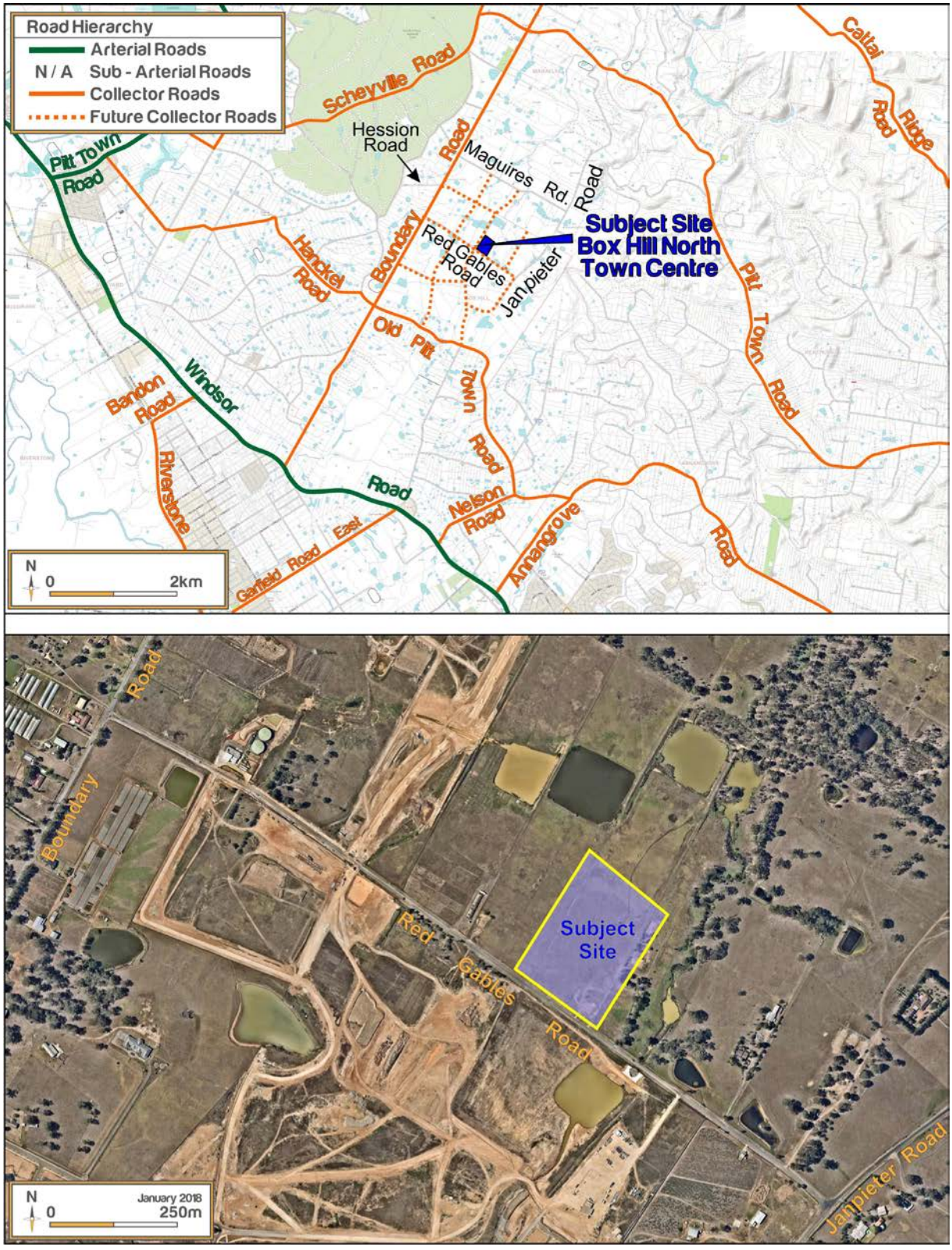


Figure 2: Site and Road Hierarchy

4 Strategic & Planning Context

4.1 North West Priority Growth Area

The Site is located to the north of the North West Growth Area (NWGA), which spreads across The Hills Shire, Blacktown City and Hawksbury City local government areas identified by the NSW State Government for broad urban development. The NWGA is divided into 16 'Precincts' which include the Box Hill Precinct and the Box Hill Industrial Precinct which are located to the south of the site. Over time, it is estimated that the NWGA will accommodate some 33,000 dwellings and 250,000 residents. Fundamentally, the NWGA is supported – and indeed to a large extent made possible – by the future provision of the new Sydney Metro Northwest infrastructure at Tallawong and Rouse Hill, which will be delivered in 2019 along with other regional infrastructure upgrades. The broader NWGA is shown in **Figure 3**.

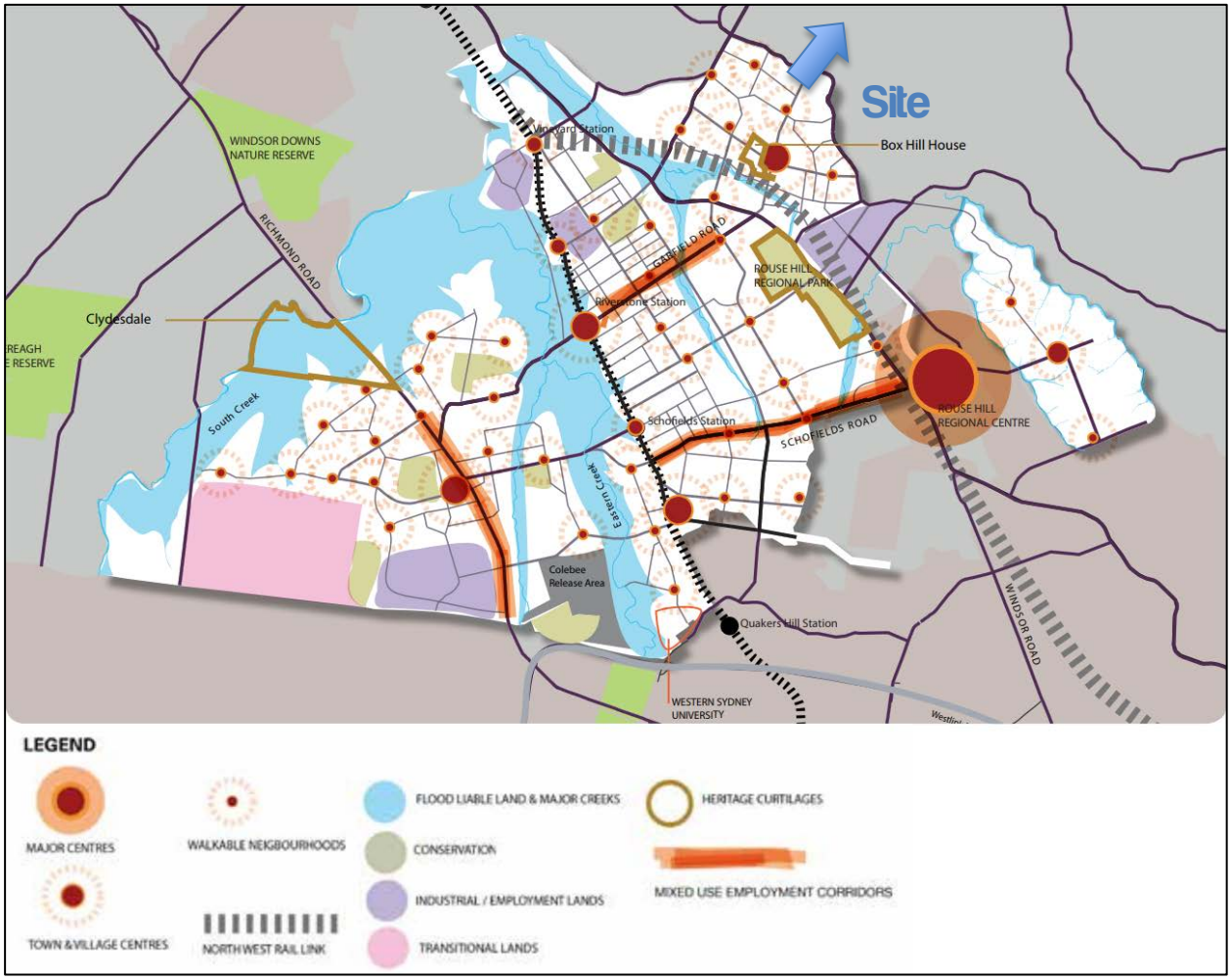


Figure 3: North West Growth Area

As mentioned above, the Box Hill and Box Hill Industrial Precinct, detailed in **Figure 4**, is located to the south of the Box Hill North Precinct and will contain about approximately 9,600 new dwellings and employment for about 16,000 people.

4.2 Box Hill North Precinct

In 2011 the NSW State Government commenced an initiative to invite land owners to submit expressions of interest to develop their land to assist with housing affordability and supply issues. Sites were assessed against infrastructure provision, consistency with local, state and national strategies, plans and policies and the viability of the land to support urban development. Box Hill North was identified as a site suitable for this initiative by the NSW State Government.

The Box Hill North Precinct is located to the north of the Box Hill and Box Hill Industrial Precinct with an approximate area of 380 hectares. Box Hill North is generally bound by Maguires Road to the north, Boundary Road to the west, Janpieter Road to the east and Old Pitt Town Road to the south.

A Planning Proposal was submitted to Council in 2014 to amend The Hills Local Environmental Plan 2012 which sought to amend the RU6 Transition to a range of zones to aid in the development of approximately 4,100 dwellings, a local centre, a primary school, community and sporting facilities. The Indicative Layout Plan of Box Hill North is detailed in **Figure 5**.

This was accompanied by the Addendum Traffic Report which is discussed in further detail below.

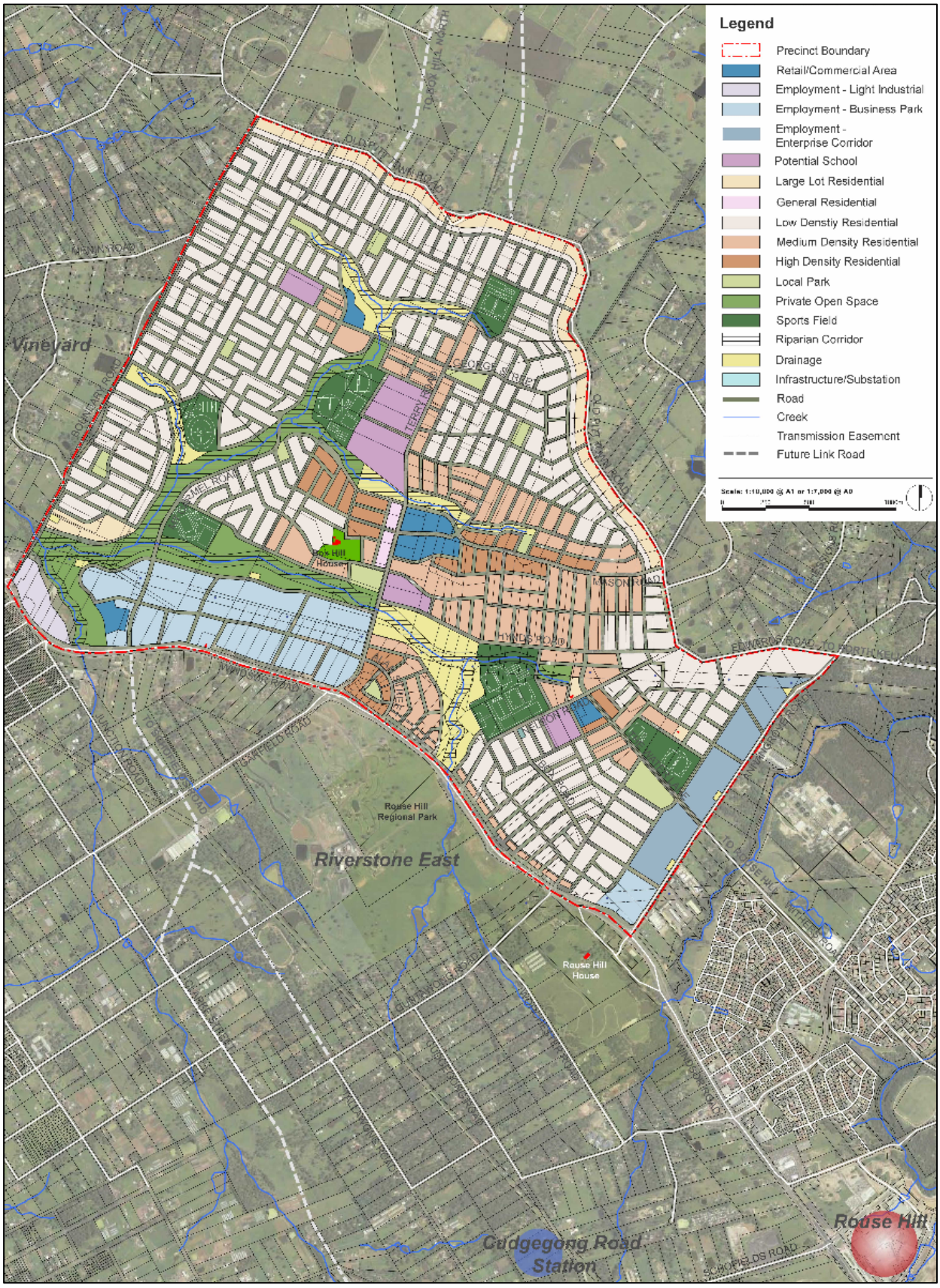


Figure 4: Box Hill and Box Hill Industrial Precinct

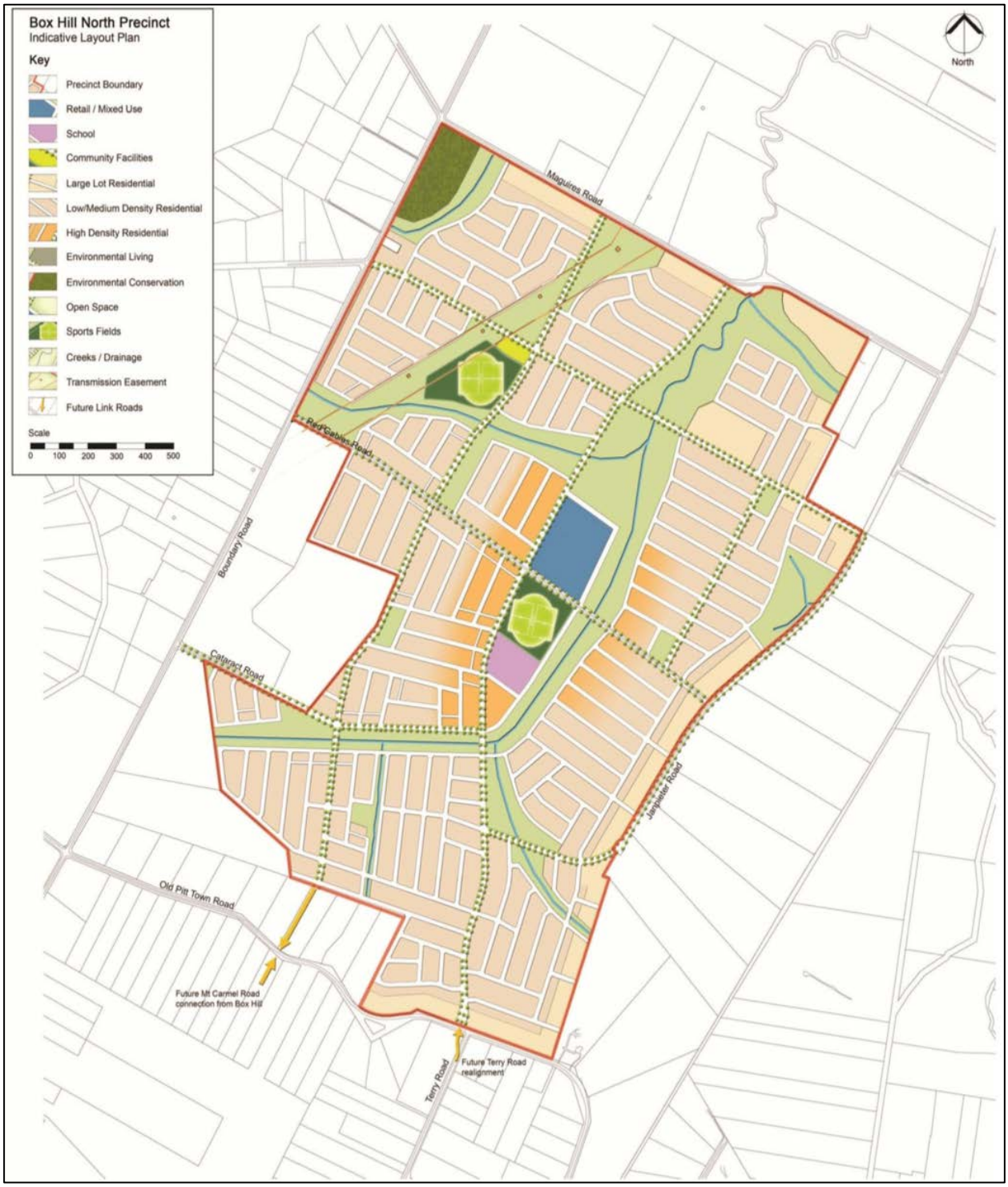


Figure 5: Box Hill North ILP

4.3 Sydney Metro Northwest

The Sydney Metro Northwest forms a key component of the NWGA infrastructure upgrades, delivering 8 new railway stations and 4,000 commuter car parking spaces. The new metro line has a target capacity of 40,000 customers per hour and will provide services every 4 minutes during peak periods. With the delivery of the new metro stations, improved cycling and pedestrian amenities will be provided thereby further improving the Growth Centres provision of amenities directed at encouraging residents and employees to use alternative modes of transport.

The nearest stations to the Site are the Tallawong Railway Station and Rouse Hill Station which are located on the corner of Tallawong Road and Schofields Road, and the corner of Rouse Hill Drive and Windsor Road respectively. **Figure 6** details the location of the stations in relation to the Site. Construction is currently underway at both stations and is due for completion within the first half of 2019.

Upon completion of the Tallawong Railway Station the following amenities will be provided:

- 4 bus bays,
- 9 taxi spaces,
- Parking and storage of 55 bicycles,
- 15 Kiss and Ride Spaces, and
- 1,000 commuter parking spaces.

Upon completion of the Rouse Hill Station the following amenities will be provided:

- 8 bus bays,
- 9 taxi spaces,
- Parking and storage of 45 bicycles, and
- 25 Kiss and Ride Spaces.

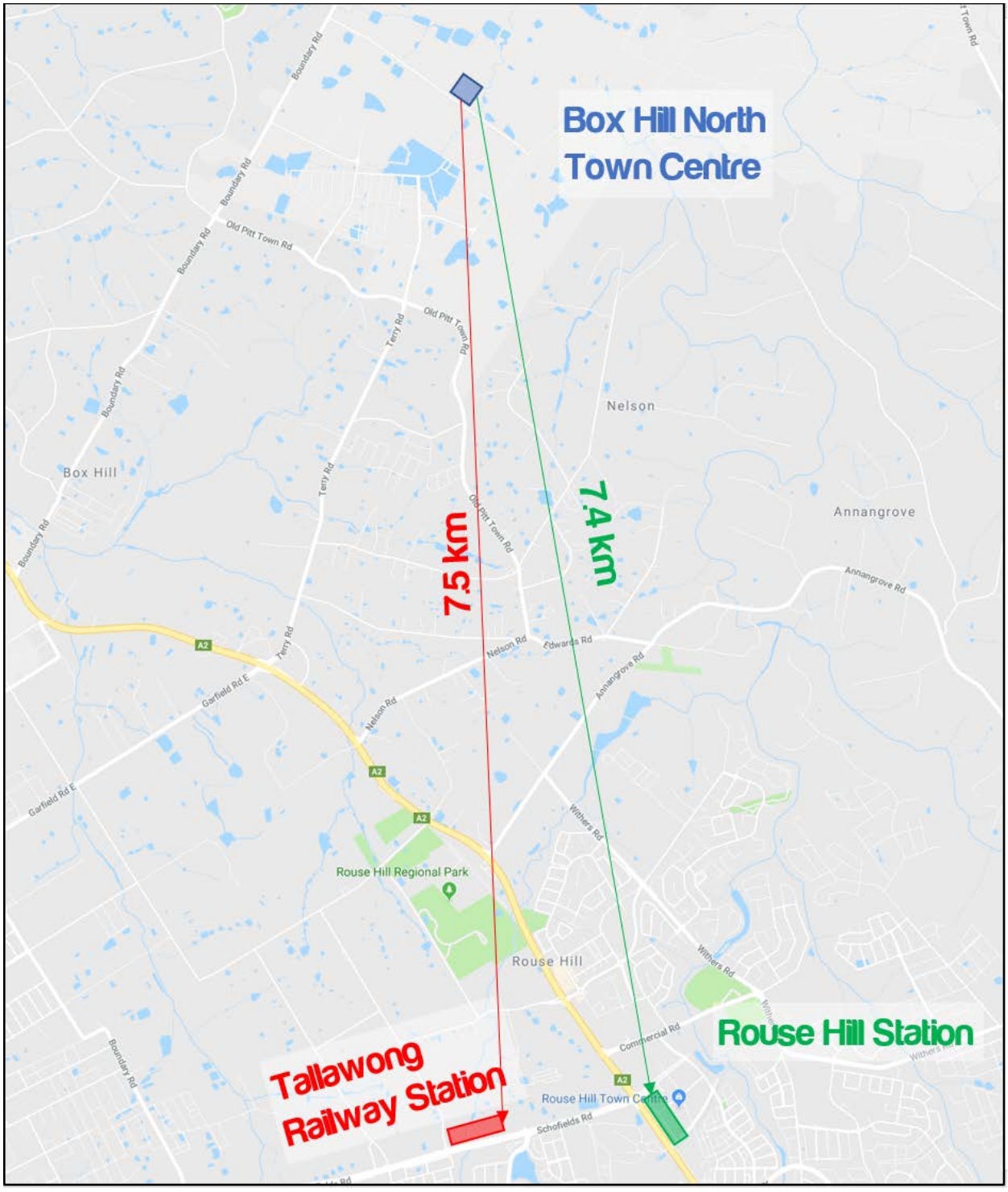


Figure 6: Northwest Metro Station Proximity

4.4 Future Bus Services

To accommodate the future transport demands of the NWGA and the Box Hill North Precinct, the North West Sector Bus Servicing Plan was adopted to increase the level of accessibility of public transport. **Figure 7** details the proposed bus network and routes detailed in the North West Sector Bus Servicing Plan.

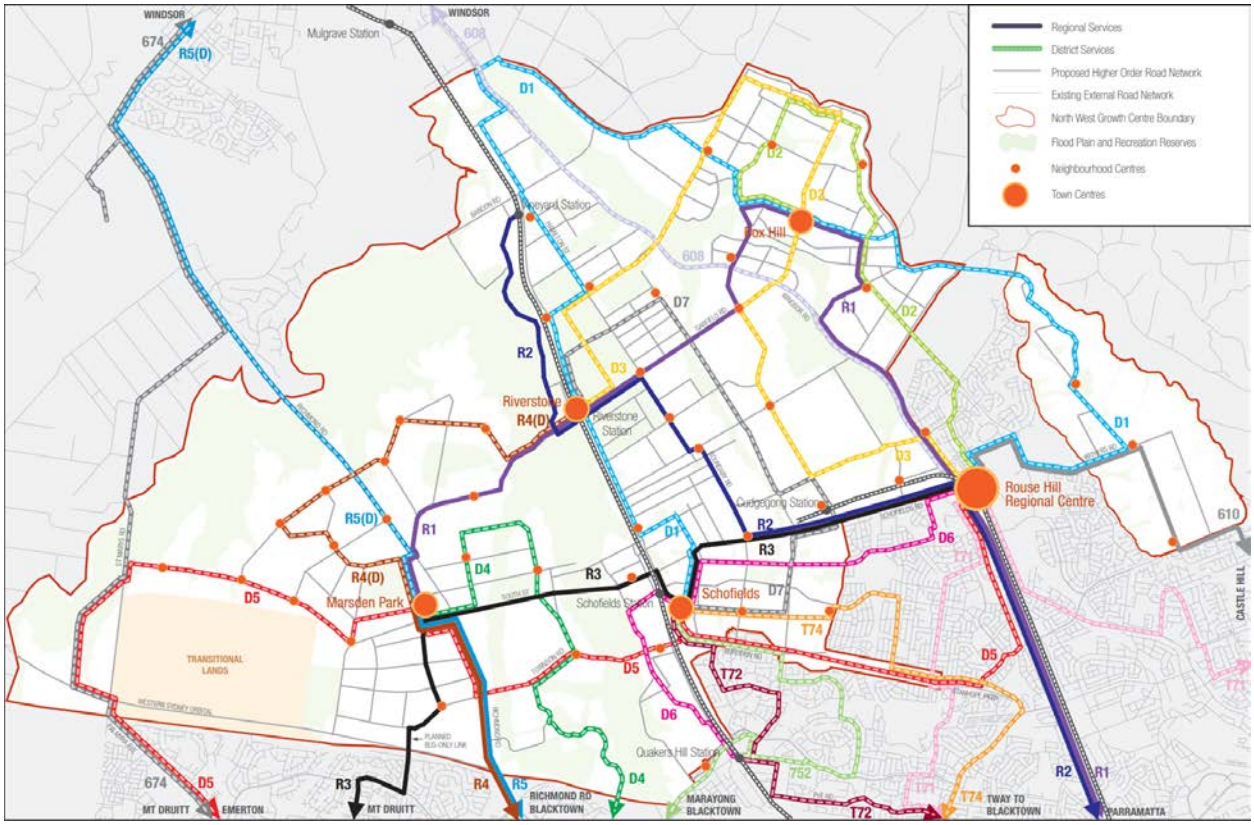


Figure 7: North West Sector Bus Servicing Plan

Council has approved a Development Plan and Transport Plan **Figure 8** which identifies two indicative District Bus Routes within the Precinct Bus Route 1 does not traverse the road network which bounds the Town Centre Precinct requiring public transport patrons to walk to the centre, thereby requiring usage of the Fontana Drive / Red Gables Road intersection. It is acknowledged that the bus routes are indicative and subject to final confirmation by TfNSW however the Transport Plan indicates that pedestrian demands, and desire lines would further be substantiated by the public transport linkages.

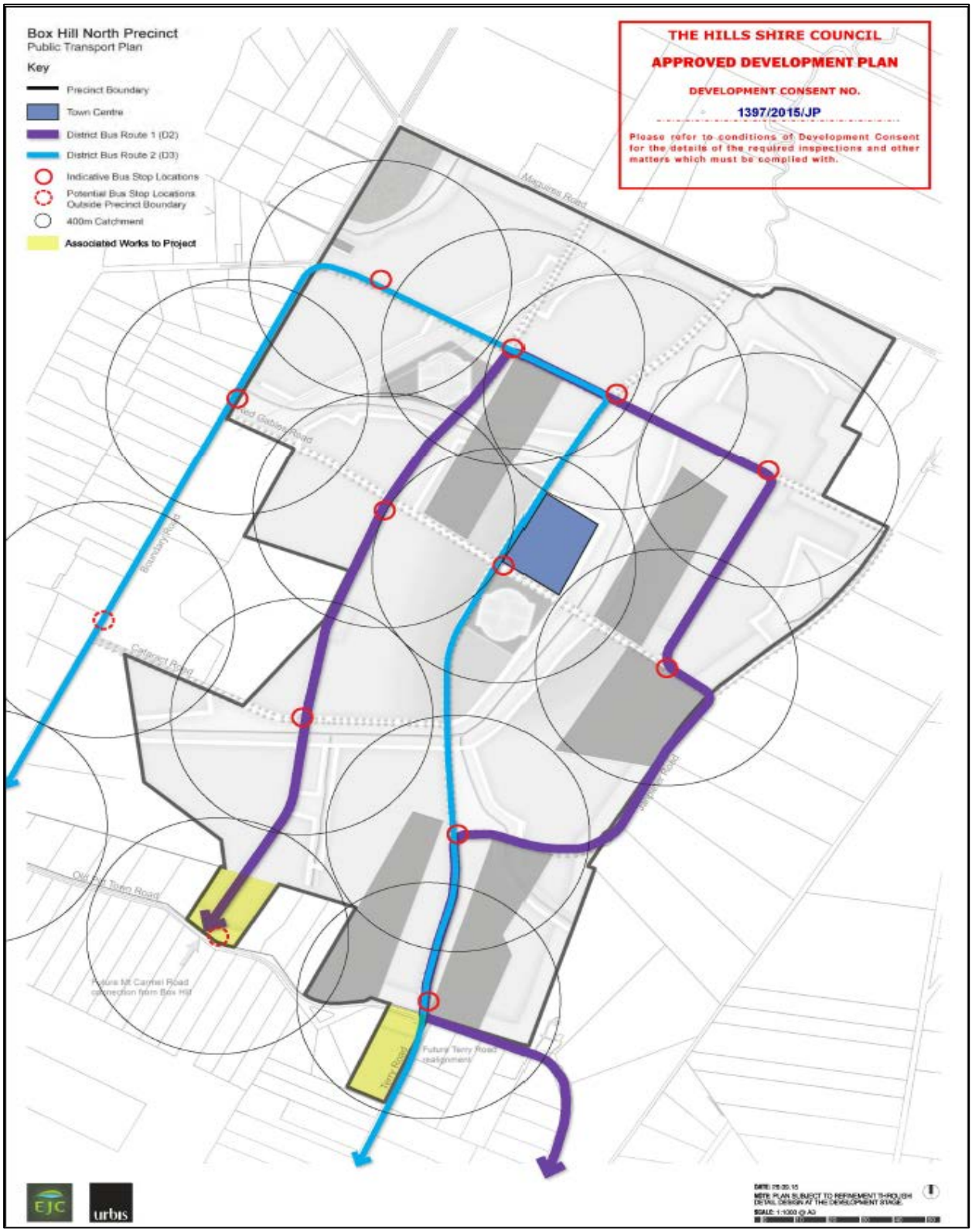


Figure 8: Approved Future Public Transport Plan

4.5 Outer Sydney Orbital

TfNSW is currently investigating the Outer Sydney Orbital (M9) corridor with the intention to preserve land for this key motorway and freight rail spine in the future. **Figure 9** details the proposed route for the Outer Sydney Orbital. This will provide a north-south bypass between northern and southern NSW to avoid the more congested roads of Sydney and alleviate pressure on the existing road networks. The Outer Sydney Orbital corridor will support the growing logistics and freight businesses in Western Sydney and provide additional traffic capacity for the increasing population of Western Sydney. This motorway would provide an important strategic link between the North West and South West Growth Areas.

The motorway would start between Scheyville National Park and Boundary Road and the proposed alignment would then pass along the north-western side of the North West Growth Area, with key interchanges at Windsor Road and Richmond Road. The Gables Town Centre would be approximately 4km from the nearest interchange at Windsor Road. There are ongoing investigations to extend the northern section of the Outer Sydney Orbital corridor to continue towards the Central Coast. **Figure 10** frames the Outer Sydney Orbital motorway in the locality of Box Hill.

The future Outer Sydney Orbital corridor will connect the North West Growth Area to the Western Sydney Parklands, Badgerys Creek Aerotropolis, the South West Growth Area, the Western Sydney Employment Area and Central Coast regions. The improved travel links would decrease transportation time and costs to enhance the freight productivities for the burgeoning Western Sydney industries.

Figure 9: Proposed Outer Sydney Orbital Corridor

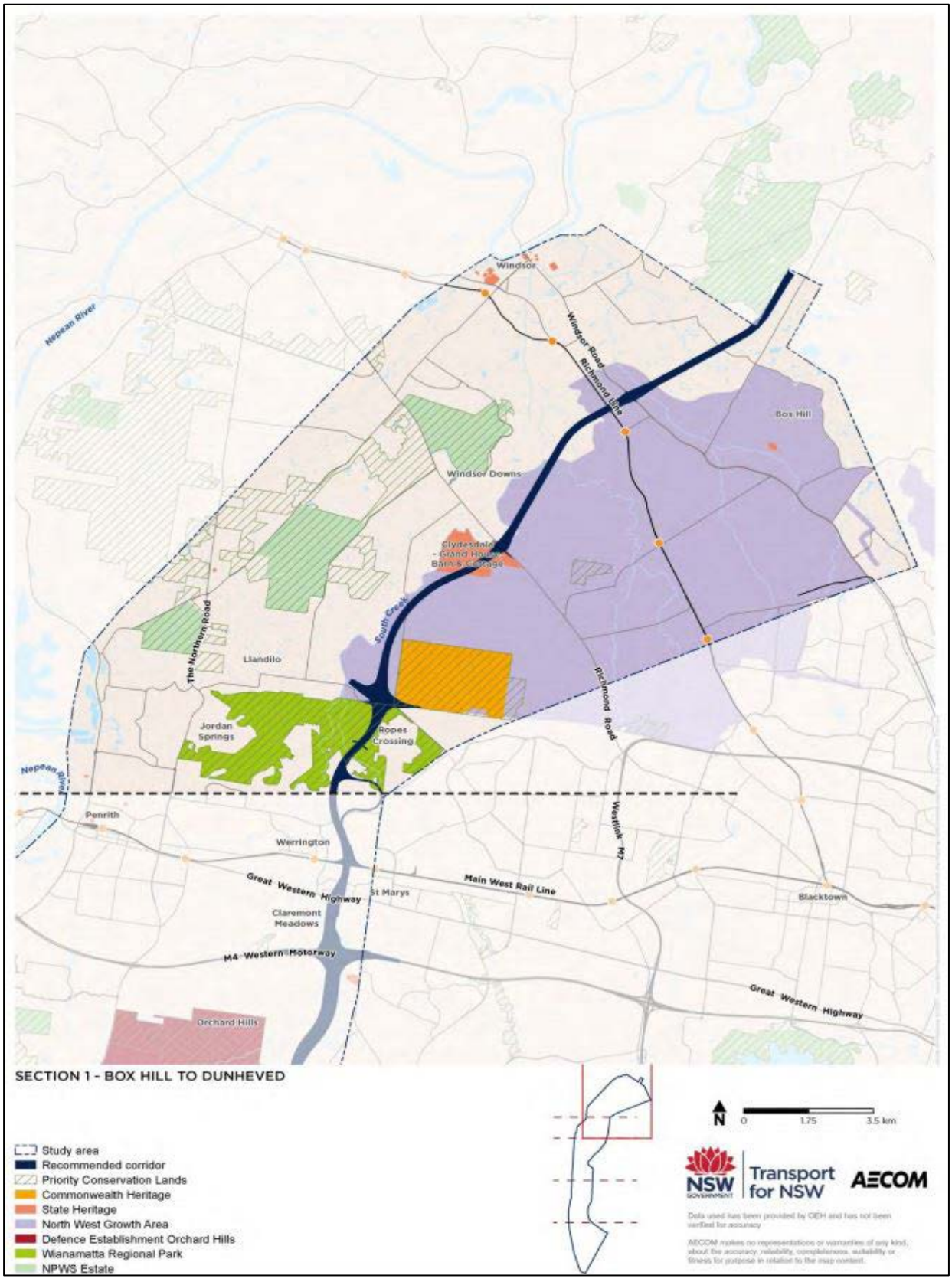


Figure 10: Outer Sydney Orbital Corridor near Box Hill

4.6 Regional Road Network Improvements

The Box Hill and Box Hill Industrial Precincts – Transport and Access Study (GHD, February 2011) (The GHD Report) was prepared for the then Department of Planning and the purpose of the study was to:

- Assess the transport implications of the Box Hill and Box Hill Industrial ILP; and
- Identify transport improvements required to accommodate the future (2036) travel demand requirements of the Box Hill and Box Hill Industrial ILP.

The GHD Report identified several intersection capacity and road widening improvements to the local and regional road network. The regional road network improvements as identified in the GHD Report have been included as part of the State Infrastructure Contribution (SIC) levies for Box Hill and the broader North West Growth Centre or alternative funding arrangements. The works include capacity improvements at key intersections along Windsor Road, namely:

- Boundary Road – conversion to a four-way intersection with re-alignment of Loftus;
- Terry Road / Garfield Road – additional right-turn lane along Windsor Road East, two lanes (one through, one right turn) along Terry Road and Garfield Road;

It is also understood that funding will be available to upgrade the vertical road alignment along Boundary Road between Windsor Road and Old Pitt Town Road with the widening of Boundary Road to 4 lanes. It is noted that these regional and local road network improvements are required to accommodate future growth excluding the Box Hill North Precinct.

4.7 Box Hill North Planning Proposal - Traffic Assessment

To support the Planning Proposal (2014) and subsequent Masterplan Development Application (2015), GTA Consultants provided accompanying traffic reports detailing the anticipated traffic and transport implications of the development of the Box Hill North Precinct. The DA Report assessed a yield of 4,800 units and determined the peak hour traffic generation of the Precinct detailed in **Table 2**.

Table 2: External Traffic Generation

Residential Density	Dwellings	Trip Generation Rate (car trips per dwelling)		Total Traffic Generation	
		AM Peak	PM Peak	AM Peak	PM Peak
Low-density	2,045	0.90	0.99	1841	2025
Medium-density	1,911	0.40	0.48	764	917
High-density	1,289	0.40	0.48	516	619
Total	4,600			3121	3561
Mode shift			0%	-	-
Trip containment			20%	-624	-712
Total external trips				**2,496**	**2,849**
Inbound				499	2279
Outbound				1997	570

As detailed in the above table, a total of 3,121 and 3,561 vehicles during the AM and PM peak periods respectively would be generated by the development of the Precinct. A trip containment of 20% was adopted which corresponds to 624 and 712 trips during the AM and PM peak periods respectively. This trip containment included traffic demand associated with multiple uses within the Box Hill North Precinct, namely education facilities, retail and commercial uses. As such, 2,496 and 2,849 vehicles during the AM and PM peak periods respectively were estimated to impact the external intersections.

To determine the trip distribution of traffic generated by the Box Hill Precinct, a mesoscopic assignment model of the traffic conditions using a Netanal model was developed. The model utilises defined travel demand (both vehicle and persons) between zonal pairs, represented as assimilated traffic movements, throughout the Sydney Metropolitan Area. The program is a logit type, incremental assignment mesoscopic program, consigning vehicular traffic onto a, computer-based road network, developing link demand forecasts on each modelled section of road.

SIDRA intersection analysis of the above intersections was undertaken of the following two development scenarios:

- **Base:** Existing + Background Growth (2036) + Full Development of Box Hill and Box Hill North Industrial Precincts; and
- **Full Development:** Base + Full Development of Box Hill North.

Intersection improvement works were proposed by GTA to accommodate the additional traffic generated by the Box Hill North Precinct. The improvements are detailed in **Table 3** and **Table 4**.

Table 3: Intersection Improvements

Item No. (see Figure 4.6)	Intersection Location	Previous Proposed Improvement Works	Additional Improvement Works (Identified by Revised Assessment)	Comments
Windsor Road Intersections				
1	Windsor Rd / Boundary Rd / Loftus Street	Extension of turning lane lengths: - Windsor Rd westbound right turn lane - Boundary Rd southbound left and right turn lanes	Additional Turn Bay length required on Loftus Road Approach (+220m)	
2	Windsor Rd / Mt Carmel Rd	Extension of turning lane lengths: - Windsor Rd eastbound left turn lane - Mount Carmel Rd southbound right turn lane	Additional Turn Bay length required (+30m)	This is a new intersection proposed as part of the Box Hill and Box Hill Industrial Precincts.
3	Windsor Rd / Terry Rd / Garfield Rd	Extension of turning lane lengths: - Windsor Rd westbound right turn lane - Terry Rd southbound left turn lane	Additional Turn Bay length required (+135m)	
4	Windsor Rd / Box Rd/ Guntawong Rd	Extension of turning lane length: - Guntawong Rd northbound left turn lane	Additional Turn Bay length required (+30m)	Additional storage capacity required on Guntawong Rd to accommodate additional through traffic along Windsor Rd associated with Box Hill North development.
5	Windsor Rd / Annangrove Rd	Extension of turning lane length: - Windsor Rd westbound right turn lane		
Boundary Road Intersections				
6	Boundary Rd / Maguires Rd (BHN Access)	Give Way Control – localised pavement widening to accommodate turn lanes		
7	Boundary Rd / BHN Site Access / Hession Rd	Give Way Control – localised pavement widening to accommodate turn lanes		
8	Boundary Rd / Red Gables Rd (BHN Access)	Give Way Control – localised pavement widening to accommodate turn lanes		
9	Boundary Rd / Cataract Rd / BHN Site Access	Give Way Control – localised pavement widening to accommodate turn lanes		
10	Boundary Rd / Old Pitt Town Rd	Upgrade existing 1 lane roundabout to a dual (2) lane roundabout	Signalisation of Intersection Required	Subject to further discussions with The Hills Shire Council this intersection could be upgraded with traffic signals. However, roundabout provides better operational performance with Box Hill North traffic distribution. A two lane roundabout also would incur a higher cost than traffic signals and thus the recommendation is considered financially.

Table 4: Intersection Improvements cont.

Item No. (see Figure 4.6)	Intersection Location	Previous Proposed Improvement Works	Additional Improvement Works (Identified by Revised Assessment)	Comments
				conservative.
Old Pitt Town Road Intersections				
11	Old Pitt Town Rd / BHN Access Rd (west)	Provide a new dual (2) lane roundabout		Consideration was given to the provision of traffic signals at this location. However roundabout was selected due to proximity to Old Pitt Town Rd / Terry Rd intersection (approx. 150m).
12	Old Pitt Town Rd / Terry Rd	Upgrade existing intersection to a dual (2) lane roundabout		Consideration was given to the provision of traffic signals at this location. However roundabout was selected due to proximity to BHN access roads.
13	Old Pitt Town Rd / BHN Access Rd (east)	Provide a new dual (2) lane roundabout		Consideration was given to the provision of traffic signals at this location. However roundabout was selected due to proximity to Old Pitt Town Rd / Terry Rd intersection (approx. 150m).
Other Intersections				
14	Annangrove Rd / The Water Lane / Withers Rd	Provision of left turn slip lane on Annangrove Road northbound		

With the provision of the above upgrades, the Windsor Road intersections would operate at the same LOS and operating conditions as during the Base development scenario. All other intersections would operate at a LOS of D or better.

Subsequent to the above recommendations, it should be noted that the intersections of Old Pitt Town Road / Box Hill North Access west (herein referred to as Fontana Drive) (11), and Old Pitt Town Road / Terry Road (12) have been combined as one priority-controlled intersection, and Old Pitt Town Road / Box Hill North Access Road (east) (13) has been removed.

5 Parking & Servicing Requirements

5.1 Car & Motorcycle Parking

The parking provision for the proposed Town Centre would be assessed in accordance with Council's DCP Part C Section 1 Table 1 & Table 2 with the relevant parking rates detailed below.

Table 5: Car & Motorcycle Parking Rates

Land Use	Parking Rate
Car Parking	
Residential Flat Buildings	1 space per 1-bedroom unit 2 spaces per 2 or 3-bedroom unit 2 visitor spaces per 5 units 1 car wash bay (can be utilised as a visitor space)
Retail Premises	1 space per 18.5 m^2 Gross Leasable Floor Area (GLFA) A set down area is required
Commercial (Centre Commercial)	1 space per 40 m^2 GFA
Education Establishment (School)	1 space per employee, plus 1 space per 8 Year 12 students, plus 1 space per 30 students enrolled for visitors and / or parent parking. A set down area is required
Accessible Parking	
Retail / Commercial	2% of total car parking
Education Establishment (school)	3% of total car parking
Pram Parking (retail only)	1 space per 100 spaces
Motorcycle Parking	1 motorcycle parking space for every 50 car parking spaces provided or part thereof

5.2 Bicycle Parking

Bicycle parking has been assessed with regard to Council's DCP Part C Section 1 Table 3 with rates detailed below.

Table 6: Bicycle Parking Rates

Land Use	Parking Rate
Commercial premises	2 spaces plus 5% of the total number of parking required where new developments exceed 5,000 m^2 GFA
Retail premises	2 spaces plus 5% of the total number of parking where required new developments exceed 5,000 m^2 GFA
Education Establishment (school)	1 space per 5 pupils over Year 4

Further to the above, all developments that provide bicycle parking are required to provide change and shower facilities.

5.3 Loading Bays

The loading bay requirements would be provided in accordance with Council's DCP Part C Section 1 Table 5 with the rates detailed below.

Table 7: Council's Loading Bay Rates

Land Use	Parking Rate
Supermarket	2 for the first 930 m^2, + 2 for the next 930 m^2, + 1 for each extra 930 m^2
Mixed Small Shops (specialty retail)	2 for the first 465 m^2, + 2 for the next 465 m^2, + 1 for each extra 530 m^2
Commercial	1 for the first 1,860 m^2, + 1 for the next 3,720 m^2, + 1 for the next 3,720 m^2, + 1 for each extra 9,250 m^2

Table 8: RMS Loading Bay Rates

Land Use	Parking Rate
Supermarkets, shops, and restaurants (all spaces adequate for trucks)	1 space per 400 m^2 under 2,000 m^2 OR 5 spaces + 1 per 1,000 m^2 over 2,000 m^2
Commercial premises (50% of spaces adequate for trucks)	1 space per 4,000 m^2 under 20,000 m^2 OR 5 spaces + 1 per 8,000 m^2 over 20,000 m^2
Residential flat building (50% of spaces adequate for trucks)	1 space per 50 units under 200 units OR 4 spaces + 1 per 100 units over 200

5.4 Parking Summary

A key objective of any future Development Application would seek compliance with Council's DCP parking provisions. With regard to the loading bay requirements, both Council and RMS rates have been documented and there would be opportunity to further investigate the service vehicle provisions based on merit through consolidated loading facilities and implementation of detailed Loading Dock Management Plans within the individual Precincts. Adequate provision of parking is important to the delivery of a Town Centre and would promote a vibrant area while preventing excessive on-street parking demand.

This matter will be assessed in greater detail at DA stage in liaison with Council and compliance with Council's parking requirements are proposed.

6 Traffic Assessment

6.1 Traffic Generation

The traffic impacts of the proposed development have been assessed with regard for the RMS Guide and the RMS TDT2013/04a. The adopted residential trip rate maintains the trip rate endorsed for all previous studies within the Box Hill North Precinct.

The Supermarket and Speciality Retail PM trip rates are consistent with the RMS Guide. For the AM trip 40% of the PM trip generation rate has been adopted. A trip rate of 2 trips per 100 m^2 has been adopted for the Mixed-Use Community space. The Mixed-Use Community space would be subject to further detail and assessment at the relevant DA stage.

With regard to the Proposed Education Establishment, a recent RMS study undertook traffic surveys of a total of 22 schools within the greater Sydney metropolitan area and regional NSW to determine traffic generation rates. The study determined that the following trip generation rates for Primary and Secondary schools within the Sydney Metropolitan area:

- Primary School:
  - AM Peak Period: 0.67 trips per student.
  - PM Peak Period: 0.53 trips per student.
- Secondary School:
  - AM Peak Period: 0.51 trips per student.
  - PM Peak Period: 0.28 trips per student.

It was noted within the RMS study, that the PM peak period for schools generally occurred between 2.00-4.00PM, outside of the road network peak period. As such, a reduced PM trip generation rate of 10% the surveyed traffic generation rate has been adopted. It should also be noted that the schools surveyed were selected due to their location in isolated / residential precincts and not adjacent to retail and business precincts. As such, the adopted rates may be considered conservative given that the proposed education establishment is located within a Town Centre that provides retail, commercial, and residential land uses within close proximity. Noting the above, the following tables detail the traffic generation of the Proposal during the AM and PM road network peak periods which would generally occur from 7.00-9.00AM and 4.00-6.00PM.

Finally, the development scenario tested as part of the modelling analysis incorporated 720 units. The Traffic generation analysis and subsequent modelling conclusions could therefore be considered a worst-case assessment.

Table 9: Planning Proposal: Traffic Generation

Land Use	Period	Yield	Trip Rate	Traffic Generation
High Density Residential	AM	720 units*	0.4 trips per unit	288 (58 in, 230 out)
	PM		0.48 trips per unit	346 (277 in, 69 out)
Retail				
Supermarket	AM	4,000 m^2 GFA	6.2 trips per 100 m^2	186 (74 in, 112 out)
	PM		15.5 trips per 100 m^2	465 (279 in, 186 out)
Speciality Retail	AM	3,700 m^2 GFA	1.84 trips per 100 m^2	51 (23 in, 28 out)
	PM		4.6 trips per 100 m^2	128 (70 in, 58 out)
Mixed Use – Community Space	AM	3,000 m^2 GFA	2 trips per 100 m^2	60 (30 in, 30 out)
	PM		2 trips per 100 m^2	60 (30 in, 30 out)
Commercial	AM	4,890 m^2 GFA	1.6 trips per 100 m^2	78 (66 in, 12 out)
	PM		1.2 trips per 100 m^2	59 (9 in, 50 out)
Proposed Education Establishment				
Primary Education Establishment	AM	1,000 students	0.67 trips per student	670 (369 in, 301 out)
	PM		0.053 trips per student	53 (24 in, 29 out)
Secondary Education Establishment	AM	1,000 students	0.51 trips per student	510 (281 in, 229 out)
	PM		0.028 trips per student	28 (13 in 15 out)

This corresponds to the following total trip generation:

- AM Peak Period: 1,843 trips (901 arrival trips, 942 departure trips)
- PM Peak Period: 1,139 trips (702 arrival trips, 437 departure trips)

6.2 Trip Distribution

Ason Group engaged Road Delay Solutions to prepare a mesoscopic assignment model of the traffic conditions pertaining to the proposed Gables Development, Box Hill. The Netanal model utilises defined travel demand (both vehicle and persons) between zonal pairs, represented as assimilated traffic movements, throughout the Sydney Metropolitan Area. The program is a logit type, incremental assignment mesoscopic program, consigning vehicular traffic onto a, computer-based road network, developing link demand forecasts on each modelled section of road. It is noted that Road Delay Solutions has prepared multiple mesoscopic assignment models within the North West Growth Area on behalf of government authorities and this model formed an extension of the endorsed Box Hill model. The purpose of the model was utilised to determine the projected turn movements at Fontana Drive and Red Gables Road under full development of The Gables. The modelling assessment identified the future transport trends within the Gables Development precinct.

Traffic surveys were undertaken on Thursday 19 October 2017, to validate against those produced within the base year 2017 morning (AM) and evening (PM) peak models. The model was validated against the collected travel times on Windsor Road between Schofields Road, to the south, and Brandon Road, to the north.

The development scenario assessed by the Netanal model evaluated the 2026 traffic volumes which assumed full development of Box Hill, Box Hill Industrial Precinct, and the Box Hill North Precinct.

6.3 Traffic Impacts

6.3.1 External Intersections

Traffic volumes were extracted from the Netanal model to assess the following intersections in further detail using SIDRA software:

- Boundary Road / Red Gables Road;
- Boundary Road / Cataract Road;
- Red Gables Road / Janpieter Road;
- Old Pitt Town Road / Boundary Road;
- Old Pitt Town Road / Valletta Drive;
- Old Pitt Town Road / Terry Road / Fontana;
- Windsor Road / Boundary Road / Loftus
- Windsor / Terry Road / Garfield Road East.

The intersection layouts used to assess the traffic impacts have been adopted based on the Addendum Traffic Report and the Box Hill North Precinct S94 Contributions Plan. These intersection layouts are detailed in **Figure 11**, **Figure 12**, and **Figure 13**.

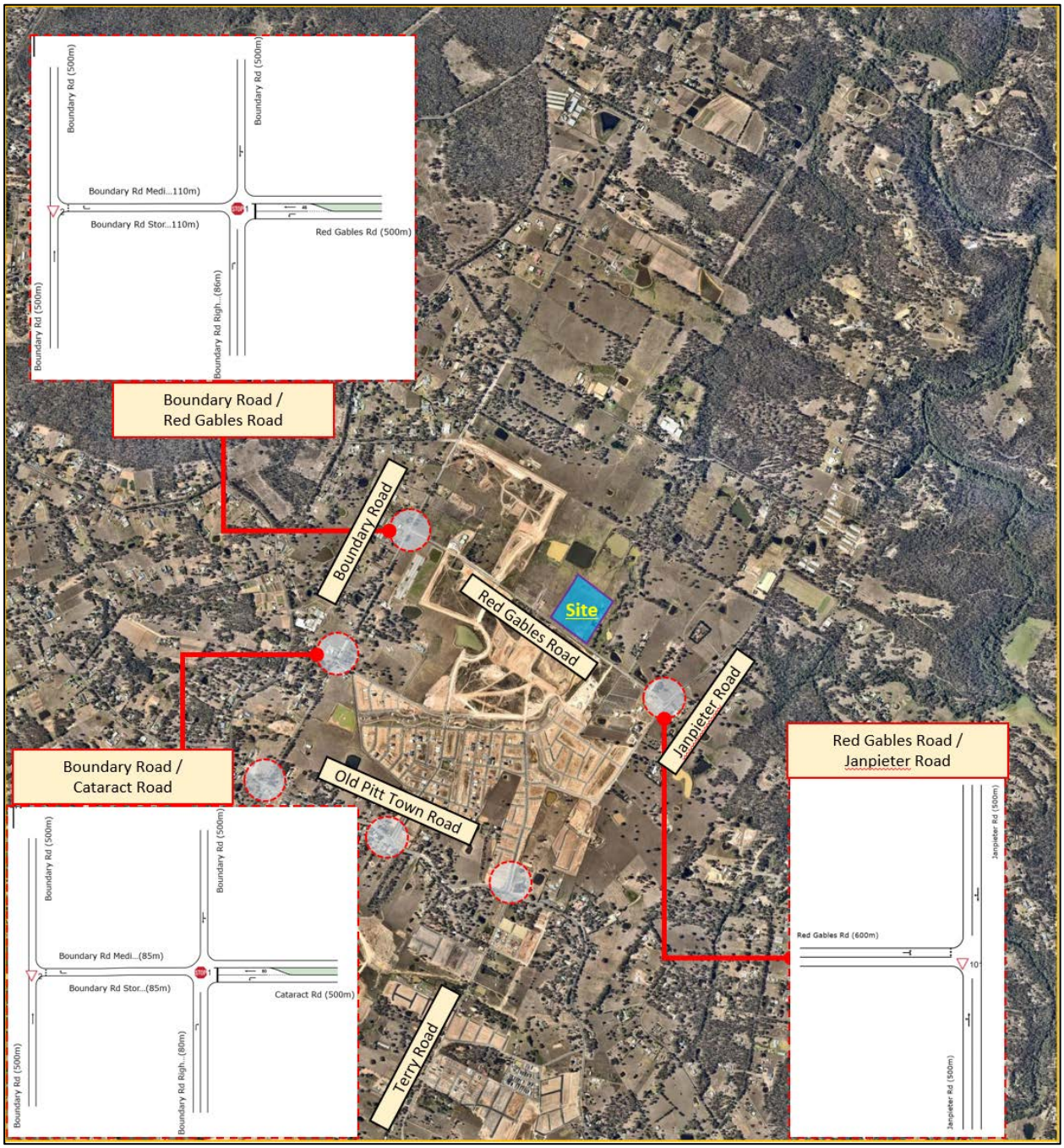


Figure 11: Box Hill North Precinct Intersections

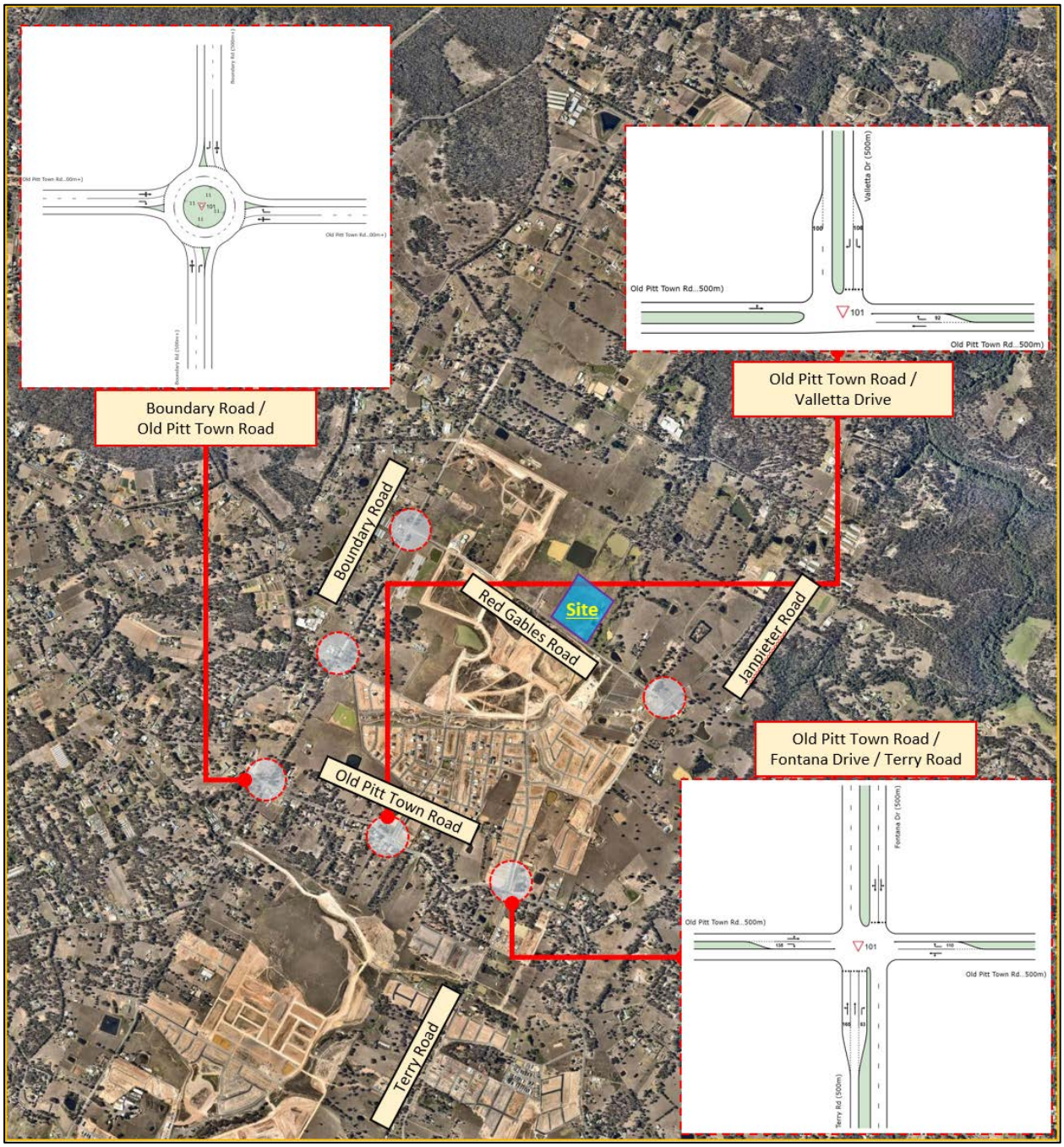


Figure 12: Old Pitt Town Road Intersections

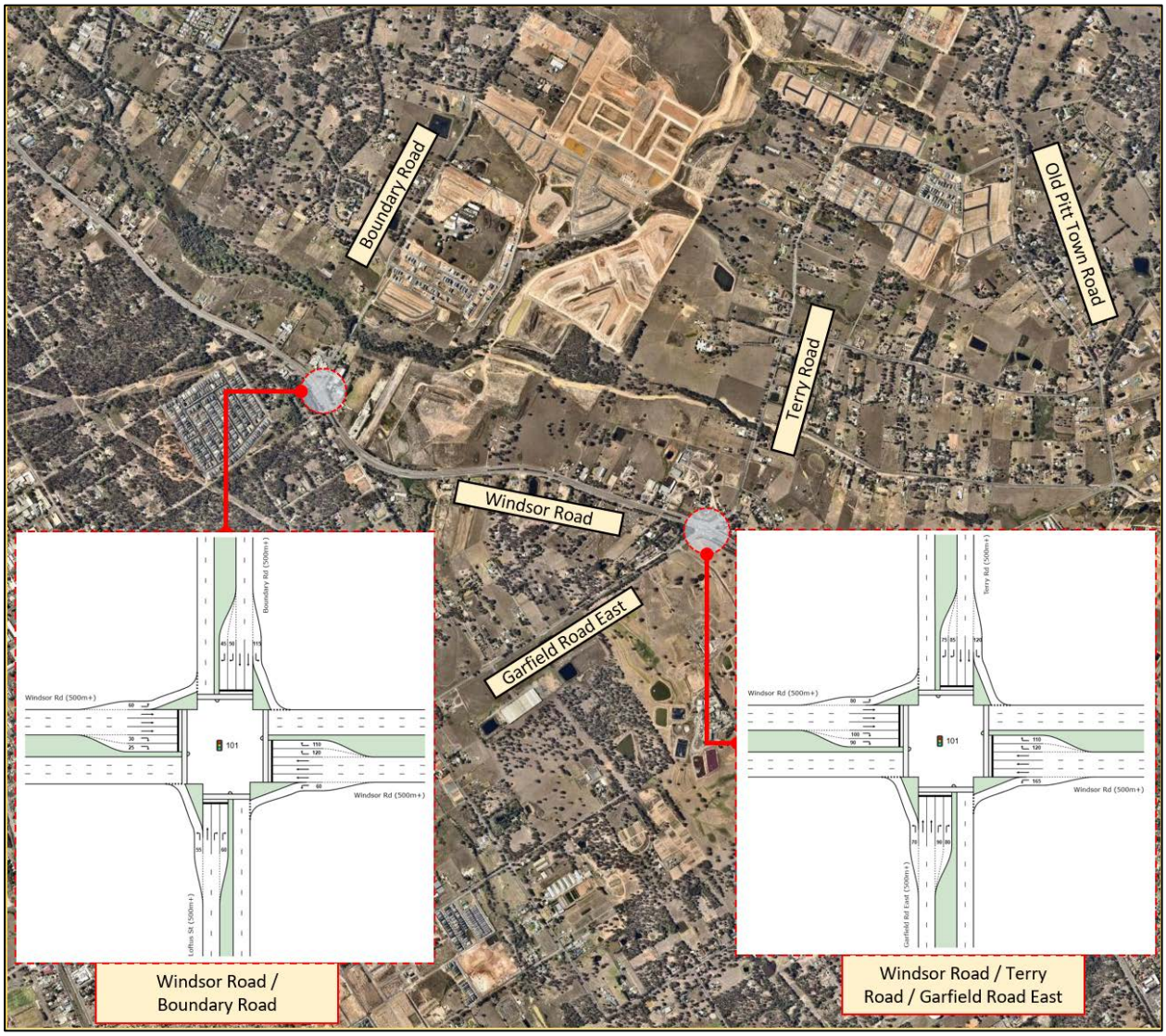


Figure 13: Windsor Road External Intersections

Based on the Netanal results and the using the above intersection layouts, **Table 11** details the results of the traffic assessment.

Table 10: SIDRA Intersection Results – External Intersections

Intersection	Period	Average Vehicle Delay (AVD) (secs)	LOS
Boundary Rd / Red Gables Rd	AM	18.8	B
	PM	15.9	B
Boundary Rd / Cataract Rd	AM	26.3	B
	PM	17.4	B

Red Gables Rd / Janpieter Rd	AM	7.8	A
	PM	7.5	A
Old Pitt Town Rd / Boundary Rd	AM	26.7	B
	PM	35.1	C
Old Pitt Town Rd / Valletta Dr	AM	9.2	A
	PM	9.5	A
Old Pitt Town Rd / Terry Rd / Fontana Dr	AM	33.6	C
	PM	34.9	C
Windsor Rd / Boundary Rd / Loftus Street	AM	83.7	F
	PM	228.5	F
Windsor Rd / Terry Rd / Garfield Road East	AM	43.7	D
	PM	36.0	C

The SIDRA analysis indicates that generally the external intersections would operate within acceptable limits of performance.

While the intersections of Windsor Road / Boundary Road / Loftus Street underperforms, it is noteworthy that the development traffic represents 8% and 5% of the total traffic utilising these intersections during the AM and PM peak periods respectively. Furthermore, the intersection would operate at the same Level of Service as those detailed in the Addendum Traffic Reports accompanying the approved Planning Proposal for the Box Hill North Precinct.

In summary, the traffic impact analysis concludes that the external intersections would generally operate within acceptable limits of performance at a LOS of D or better. The intersection of Windsor Road / Boundary Road / Loftus Street would operate as per the modelling undertaken within the Addendum Traffic Report which would operate at the same LOS and operating conditions identified in the Base development scenario (which included Full Development of Box Hill and Box Hill North Industrial Precincts).

Further analysis of the critical intersections would be undertaken at the DA stage however the development is supported on traffic planning grounds and remains consistent with the modelling conclusions of previous assessments for the entire precinct.

Detailed SIDRA Outputs are attached in **Appendix B**.

6.3.2 Town Centre Intersections

To determine the road layout and geometry adjacent to the Town Centre, a SIDRA Intersection analysis of the following intersections was undertaken:

- Red Gables Road / Fontana Drive;
- Red Gables Road / Road A;
- Fontana Drive / Road B; and
- Fontana Drive / Road C.

For the purpose of this assessment, the signalised intersection of Red Gables Road / Fontana Drive, which is subject to a separate DA, has been adopted. The below figures detail the traffic volumes utilising the above intersections adjacent to the Town Centre during the AM and PM peak periods.

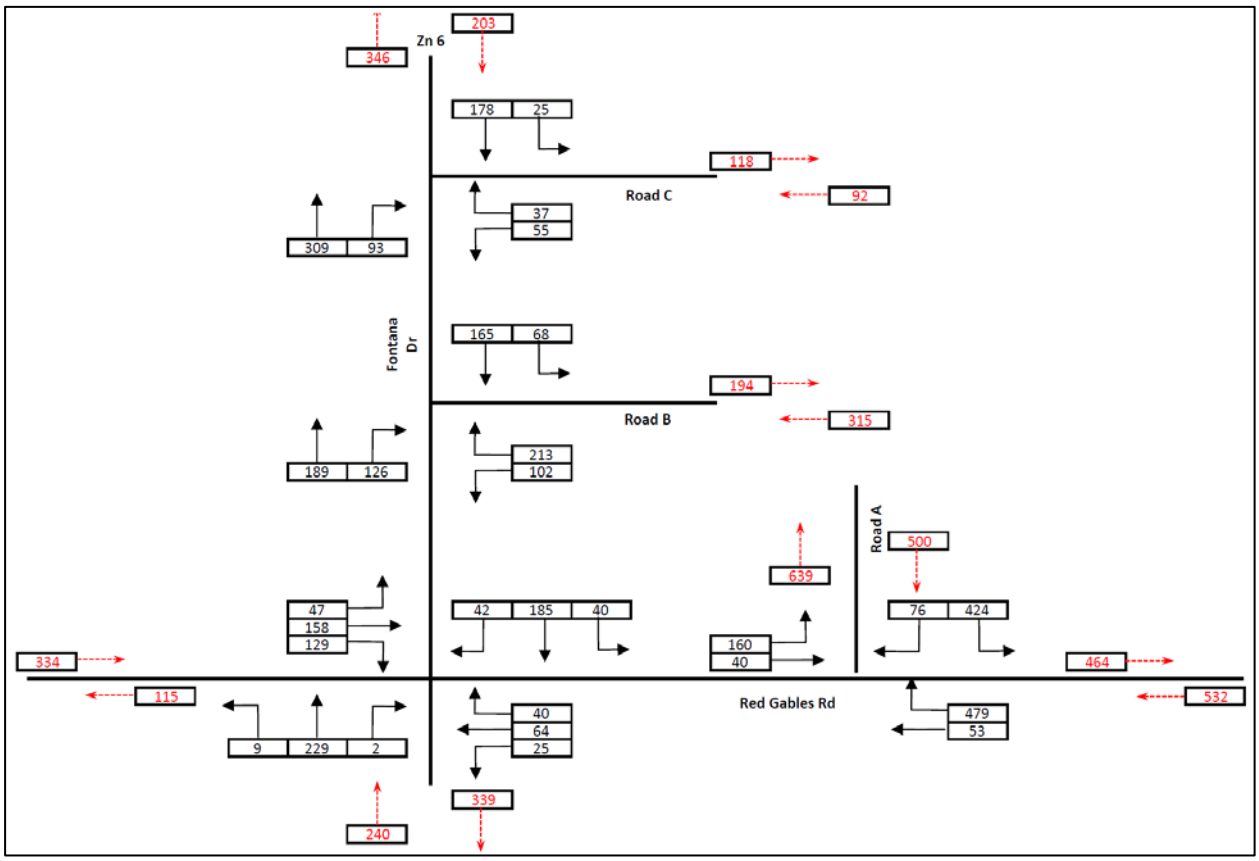


Figure 14: Town Centre Traffic Volumes – AM Peak Period

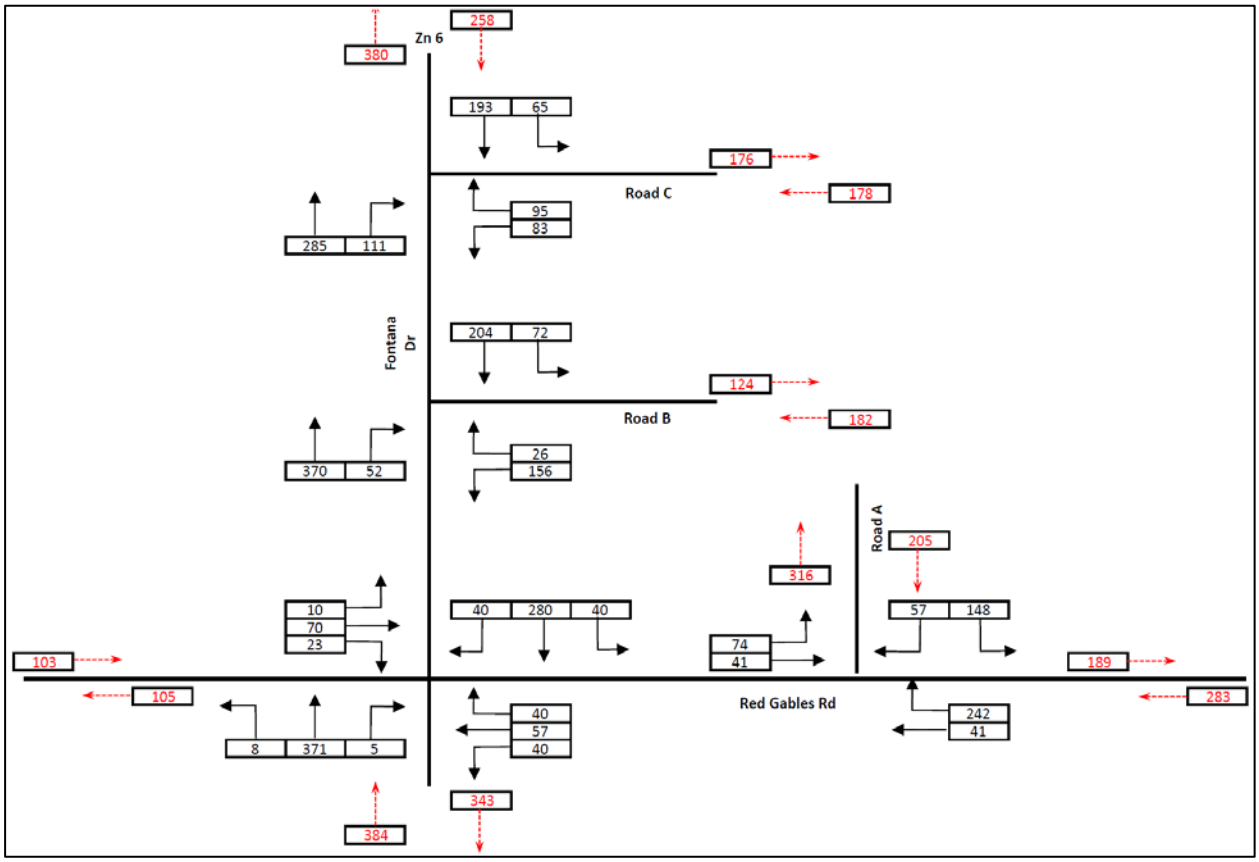


Figure 15: Town Centre Traffic Volumes – PM Peak Period

Based on the above traffic volumes, an iterative traffic modelling assessment was undertaken to determine the layouts and geometric design of the Town Centre intersections. The network layout is detailed in **Figure 16**.

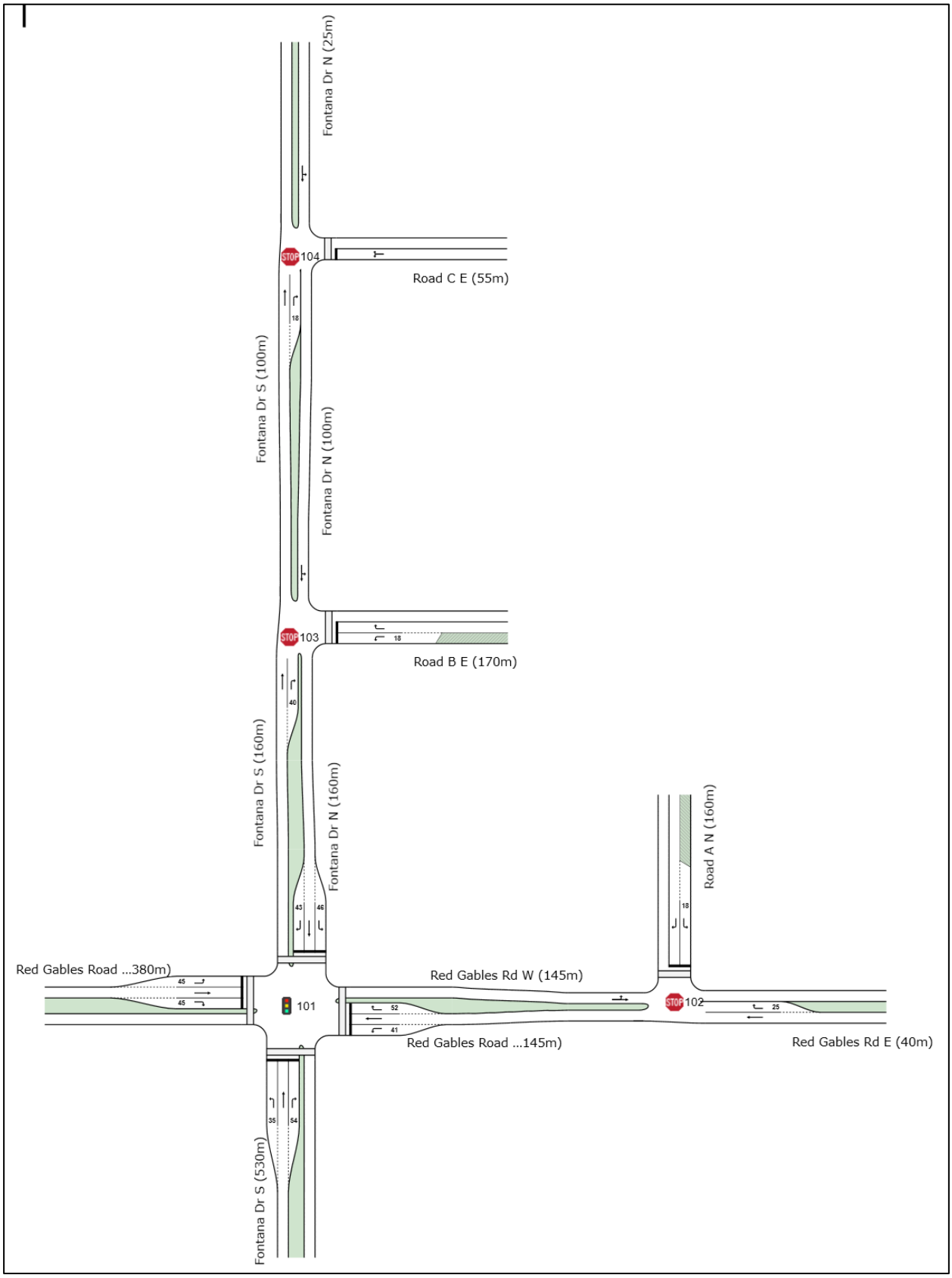


Figure 16: The Gables Town Centre – Network Layout

The following table details the results of the SIDRA intersection assessment using the above Town Centre network layout.

Table 11: SIDRA Intersection Results – Town Centre Intersections

Intersection	Period	Average Vehicle Delay (AVD) (secs)	LOS
Red Gables Rd / Fontana Dr	AM	31.8	C
	PM	37.4	C
Red Gables Rd / Road A	AM	15.5	B
	PM	10.5	A
Fontana Dr / Road B	AM	13.4	A
	PM	12.9	A
Fontana Dr / Road C	AM	12.6	A
	PM	13.8	A

Detailed SIDRA Outputs are attached in **Appendix C**.

As detailed above, the intersection of Red Gables Road / Fontana Drive would operate at a Level of Service C during both peak periods. The intersections of Red Gables Road / Road A, Fontana Drive / Road B, and Fontana Drive / Road C would generally operate at a Level of Service B or better. The geometric design of the intersections is detailed further below.

In summary, the traffic impact analysis concludes that the traffic generation of the Proposal can be accommodated on the external and internal road networks.

7 Design Commentary

7.1 Relevant Design Standards

The site access, car park, and loading areas would be designed to comply with the following relevant Australian Standards:

- AS2890.1 for car parking areas;
- AS2890.2 for commercial vehicle loading areas; and
- AS2890.6 for accessible (disabled) parking.

7.2 Town Centre Access

As detailed in Section 6.2.2, to prevent queuing impacts and achieve a Town Centre with main street character while also prioritising pedestrian movement, turning bay facilities are recommended for the Road A and Road B. In this regard, the turning facilities were designed to accommodate the traffic volumes of vehicles turning and thereby improve traffic flow and alleviate any queues. The SIDRA intersection layouts are detailed in the figures below.

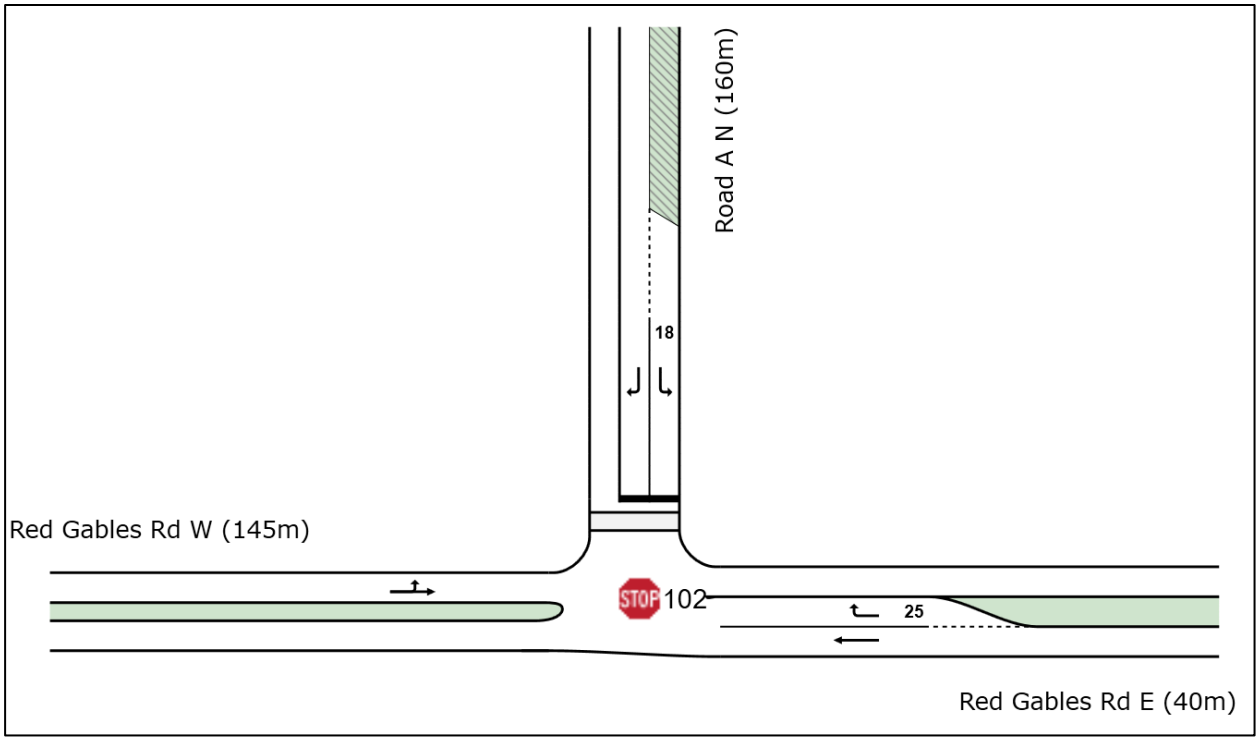


Figure 17: Red Gables Road / Road A Intersection Layout

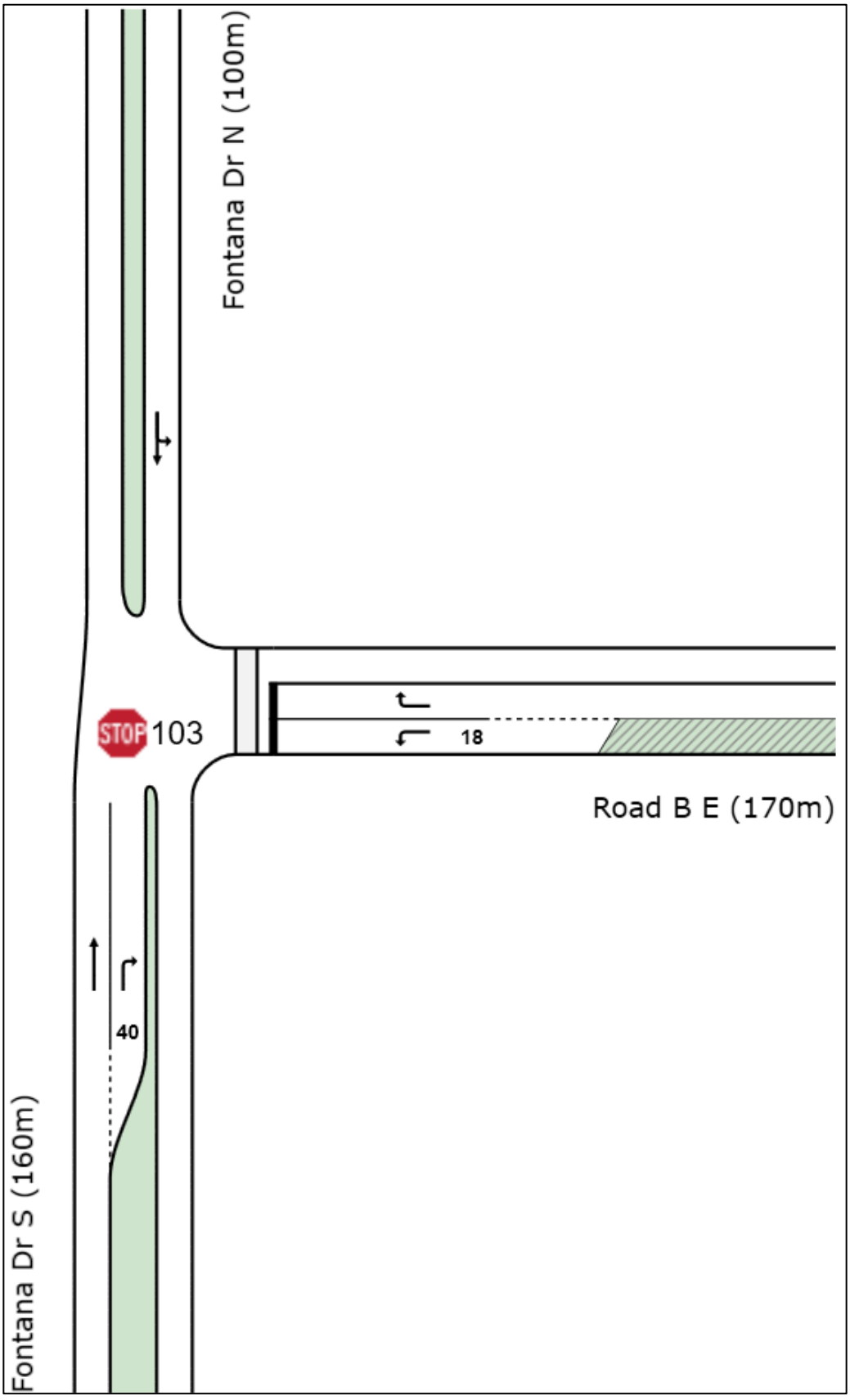


Figure 18: Fontana Drive / Road B Intersection Layout

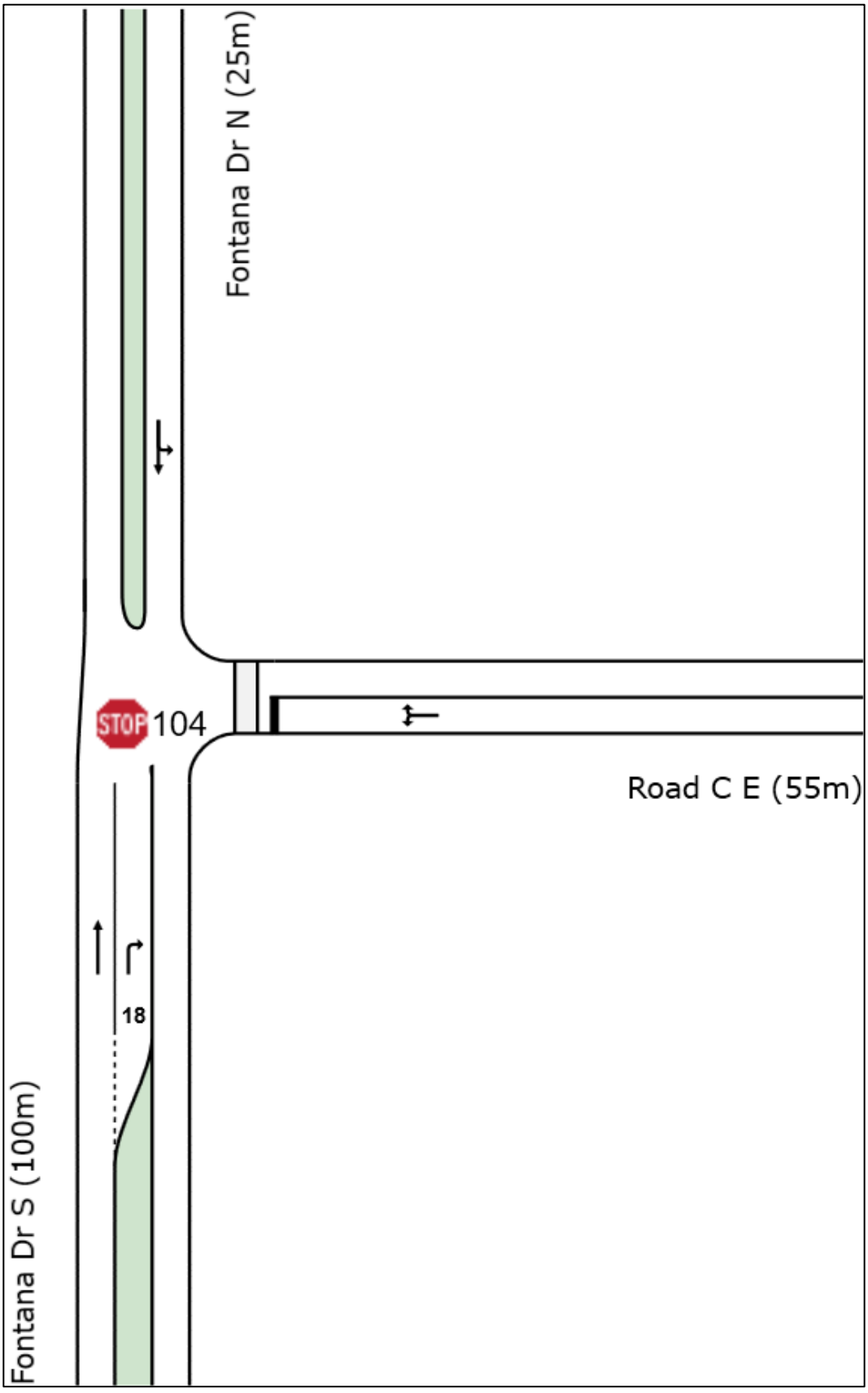


Figure 19: Fontana Drive / Road C Intersection Layout

7.3 Internal Road Design

The layout of the proposed Road A, Road B, Road C, and The Promenade has been designed by Aecom and is detailed in the figures below.

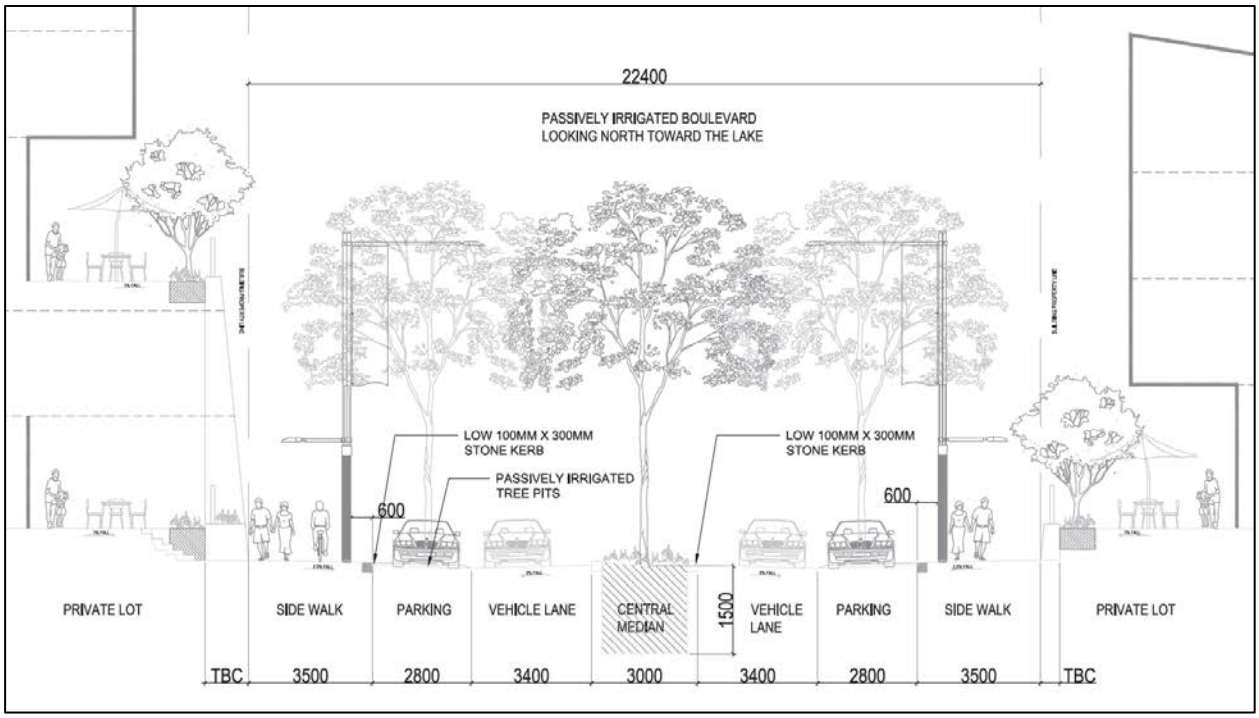


Figure 20: Road A Cross Section

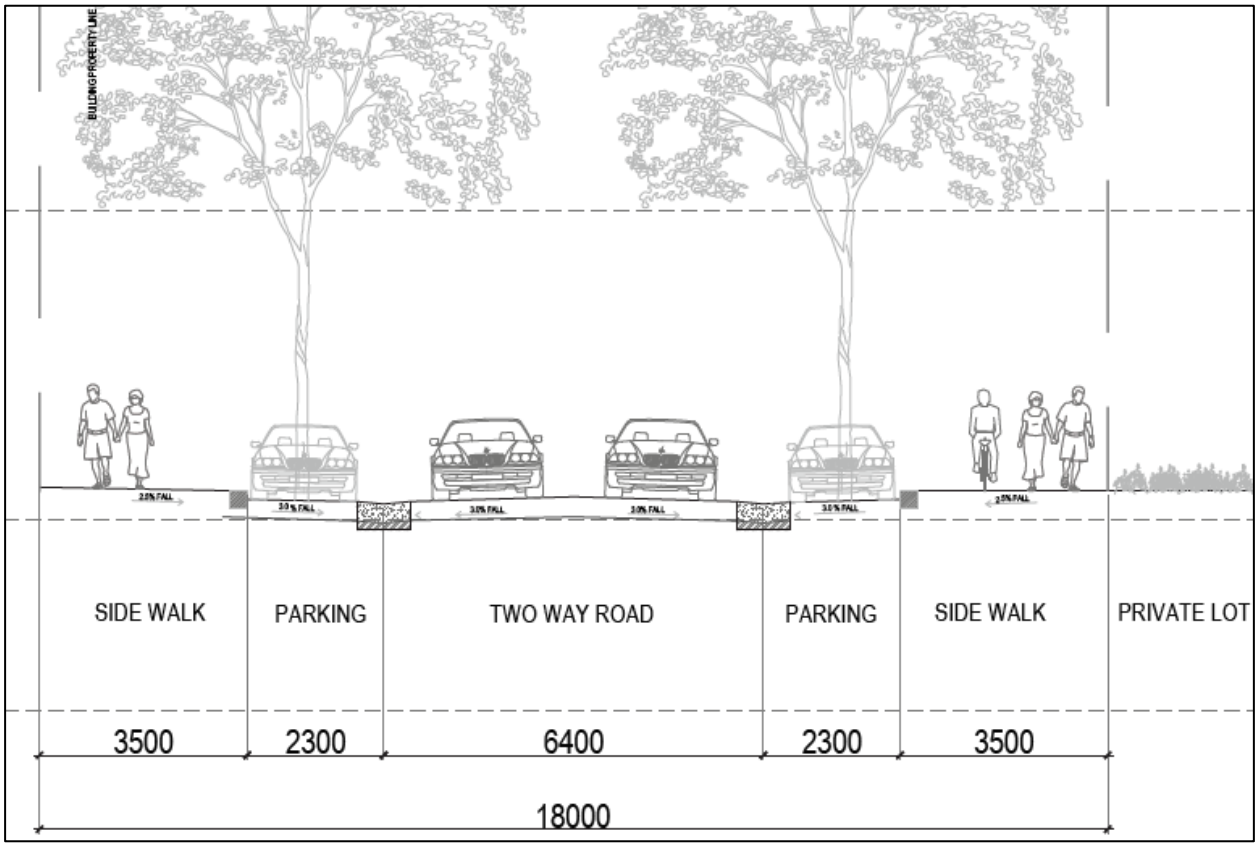


Figure 21: Road B Cross Section

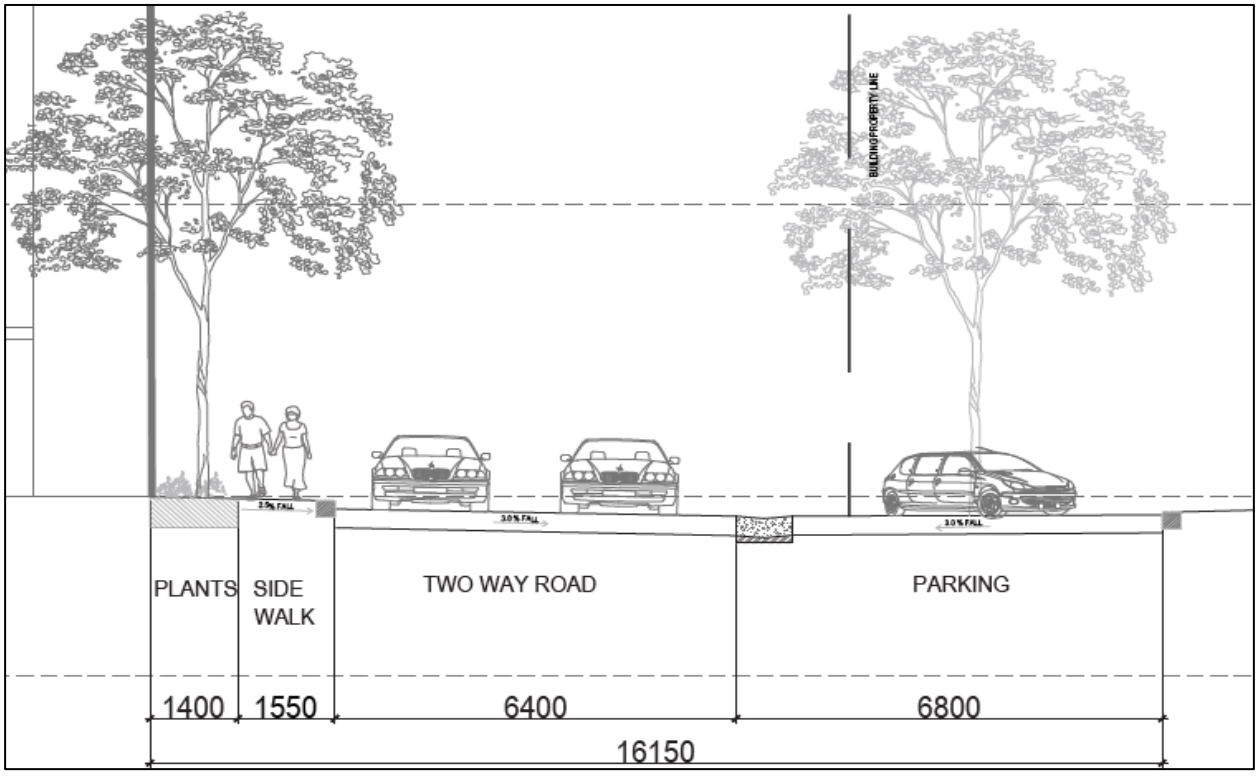


Figure 22: Road C Cross Section

While these cross-sections detail dimensions that differ from those detailed in Council's site specific DCP Box Hill North, the above designs provide a more pedestrian friendly environment while also creating main street character within the Town Centre. These designs are considered favourable and meet the objectives detailed in Council's DCP in Section 1.2.

7.4 Pick Up / Drop Off Area(s)

Council's DCP Part C Section 1 Clause 2.6 requires a set down area be provided in close proximity to busy centres, to provide safe and convenient designated set down areas for passengers to arrive close to their destination. The clause specifically mentions that set down areas are required for Education Establishments (schools) and shopping centres. It is noted however, that no rates are provided for the pick-up /drop-off area for either component.

To determine an appropriate pick-up / drop-off parking facility provision Ason Group undertook a review of recently approved schools within the Hills LGA. The recently approved (November 2017) Kellyville South Public-School is a combined primary and secondary school (K-Y12) that provides pick-up / drop-off facilities at a rate of **1 space per 30 children**. Application of this rate to the proposed 2,000 student education establishment determines a required provision of 66 pick-up / drop-off spaces. Subject to further detailed design analysis at the respective DA stage, it is intended to allocate these pick-up / drop-off facilities both on and off street. This parking strategy is applied in many cases to service differing demands. On street pick up and drop off facilities would generally be used be an older student demographic and internal (off street) provisions would service the younger students. The objective for any future DA associated with the proposed education establishment would seek to achieve a 50/50 balance of off/on street parking for pick up/ drop off facilities and would be subject to further development with the end user.

7.5 Internal Site Access

7.5.1 Car Park Access

Access to the internal car parking for each precinct will be provided via access driveways off the Town Centre internal roads. These driveways would generally be designed in accordance with AS2890.1 which determines the driveway dimensions based on the total number of car parking spaces and the relevant user class of the vehicles accessing the development.

Detailed analysis of the necessary access provisions will be undertaken during the subsequent DA stages. Each Precinct will be assessed on merit with the objective to reduce the design widths where possible based on alternative solutions (including but not limited to swept path analysis and queuing theory analysis) to ensure satisfactory operation. The reduction in access driveway width would promote a more pedestrian friendly environment and meet the study objectives detailed in Section 1.2.

7.6 Car Park Design

Noting the potential land uses within the Town Centre, parking modules with separate User Class designations are required. The design requirements of User Class 1,1A (residential and employees) and 3 (short term, high-turnover) are attached in **Appendix D**. The following characteristics are noteworthy with regard to the design of the carpark:

- A single entry/exit driveway for residential and commercial vehicles that is to be designed in accordance with AS2890.1 and AS2890.2 design standards.
- All resident/employee parking spaces are designed in accordance with a User Class 1A and are to be provided with a minimum space length of 5.4m, a minimum width of 2.4m, and a minimum 5.8m aisle width.
- All short-term parking spaces are designed in accordance with a User Class 3A and are to be provided with a minimum space length of 5.4m, a minimum space width of 2.6m, and a minimum 6.6m aisle width or a minimum space width of 2.7m and a minimum aisle width of 6.2m.
- Dead-end aisles are provided with the required 1.0m aisle extension in accordance with Figure 2.3 of AS2890.1.
- All disabled and adaptable parking spaces are to be provided in accordance with AS2890.6, which requires a space with a clear width of 2.4m and located adjacent to a minimum shared area of 2.4m.

It is expected all future DA architectural plans would be designed to comply with AS2890.1.

7.7 Commercial Vehicle Facilities

The commercial (heavy) vehicle facilities of the development would be designed having regard for the operational requirements of the future tenant and the requirements of AS2890.2. The design of the access and servicing area would be designed in accordance with AS2890.2 and Council's controls. The following characteristics are noteworthy with regard to the design of the commercial vehicle access:

- Service vehicle parking spaces would be located near vehicle entry points and lifts.
- Bays are to be located completely within the boundary of the Site, clear of parked vehicles and through traffic.
- Ramps are to be designed in accordance with AS2890.2 widths, grades, and radius.
- Access and servicing area would be designed to accommodate the largest vehicle entering the Site.

The design requirements for a development to accommodate a 19m AV and a 12.5m Heavy Rigid Vehicle (HRV) in accordance with AS2890.2 are attached in **Appendix E**.

8 Conclusions

The Study objectives of this Traffic Impact Assessment (TIA) seek to:

- Demonstrate the traffic generation associated with the Planning Proposal reference scheme could be accommodated within the surrounding road network.
- Confirm that the Planning Proposal would continue to align with the key traffic, parking and transport objectives of the Box Hill North DCP.

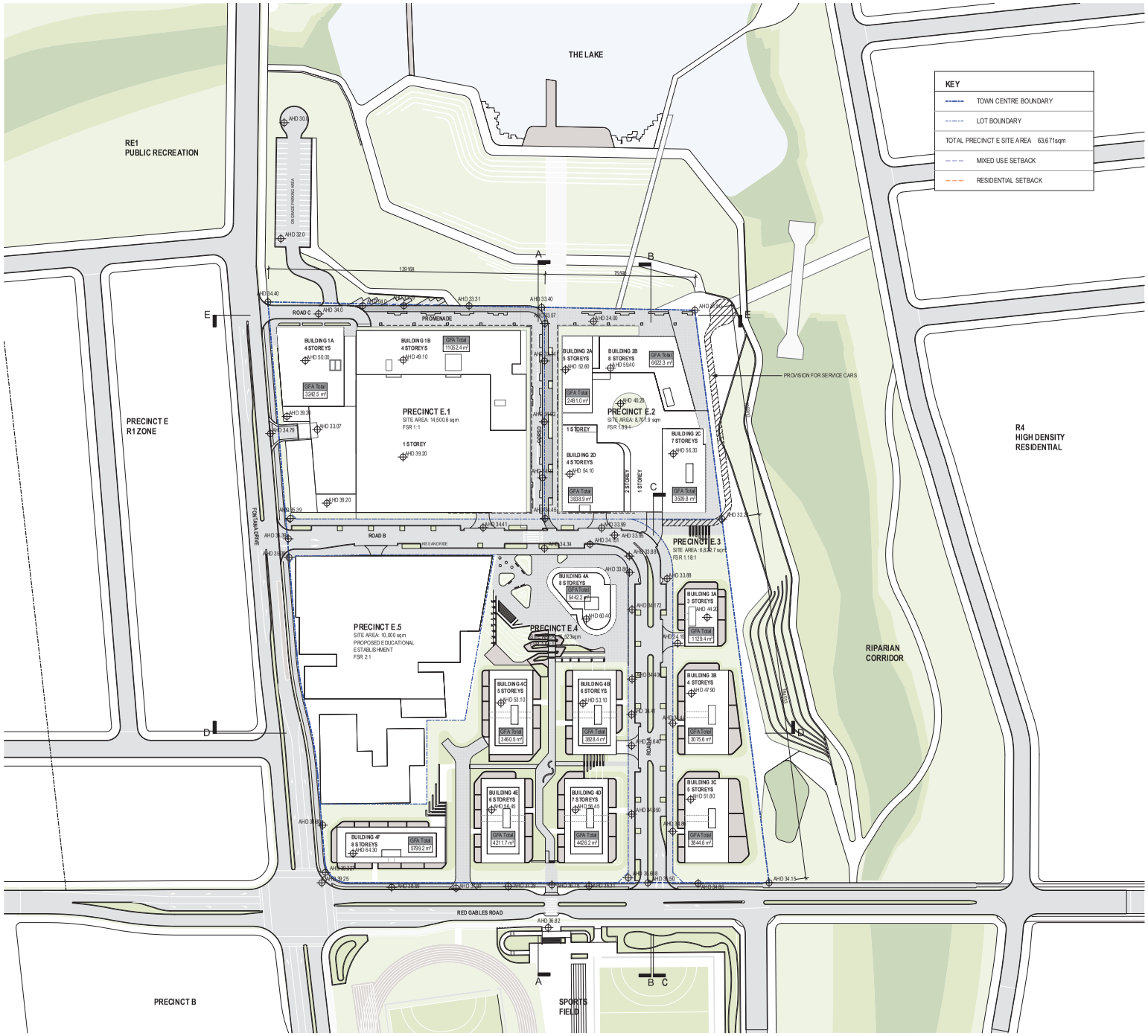
Taking these objectives into account, the key findings of this TIA report are:

- The Site is located within the Box Hill North Precinct, directly to the north of the North West Growth Area which includes the Box Hill and Box Hill Industrial Precincts. The NWGA includes the provision of 33,000 dwellings for 250,000 new residents. The Box Hill North Precinct will deliver 4,800 new dwellings and the Town Centre, which is the Site under consideration as part of this Planning Proposal application.
- The proposed Town Centre includes residential, commercial, retail, and community land uses which will provide a holistic Town Centre experience while also providing a pedestrian and transport orientated area.
- The accessibility of the Box Hill North Precinct would be improved with the extension of bus routes within the Precinct, as well as the delivery of the Sydney Metro Northwest stations in early 2019. Although not yet approved, the Outer Sydney Orbital would provide connections with the South West Growth Area and Badgerys Creek Aerotropolis and allow for improved access to Broader Western Sydney.
- Previous traffic assessments of the Box Hill North Precinct have indicated the requirement for infrastructure upgrades for key intersections along Windsor Road and Boundary Road. Of key importance are infrastructure upgrades to the intersections of Windsor Road / Boundary Road / Loftus Street, Windsor Road / Terry Road / Garfield East, and Boundary Road / Old Pitt Town Road. These upgrades have been subsequently incorporated within the Box Hill North Contributions Plan.
- Parking would be provided in accordance with Council's DCP and could be accommodated on-site. The parking provision of the individual Precincts will be investigated in further detail subject to each Development Application, however compliance with Council's DCP would be the primary objective for car parking.
- The forecast traffic generation of the Town Centre has been determined using the RMS Guide and RMS TDT2013/04a. It was established that 1,843 and 1,139 vehicles trips would be generated during the AM and PM peaks respectively.

- A Netanal modelling assessment was undertaken to establish the traffic volumes of the key external intersections. The assessment assumed full development of Box Hill, Box Hill Industrial, and Box Hill North Precincts.
- SIDRA intersection analysis of the key external intersections determined that they would generally operate within acceptable operating conditions. The intersection of Windsor Road / Boundary Road / Loftus Street is projected to underperform consistent with previous traffic assessments undertaken for the Precinct which considered the full development of the Box Hill, Box Hill Industrial, and Box Hill North Precincts. As such, the Proposal meets the key objective of not having a detrimental impact on the surrounding road network and the traffic generated by the Proposal can be accommodated on the wider road network.
- SIDRA modelling of the Town Centre Local intersections determined that they would operate within acceptable operating conditions. The network design was determined through an iterative process which aimed at mitigating and reducing queuing along the public roadways and within the Precinct. All Town Centre local intersection operate in a satisfactory manner.
- The internal road network has been designed to provide a pedestrian friendly environment by providing cycleways, and pedestrians paths while also reducing the road width and provision of on-street parking.
- The access and basement design would generally be designed having regard for the relevant Australian standards. Detailed assessment of the design ensure compliance with AS2890 and relevant Council controls would be undertaken as part of the DA documentation.

It is therefore concluded that the Planning Proposal meets the Study Objectives where the traffic generation could be accommodated with the surrounding road network consistent with previous assessments and the Proposal would continue to align the with key objectives of Council's DCP.

Appendix A – Reduced Plans



PRELIMINARY

Revisions			
-	08.08.18	FOR PLANNING PROPOSAL	JLi
A	14.08.18	REVISED FOR PLANNING PROPOSAL	JLi

14/08/2018 10:13:58 AM

Project / **THE GABLES TOWN CENTRE, BOX HILL**
121 OLD PITT TOWN ROAD , BOX HILL NSW 2765

Drawing / **MASTER SITE/ ROOF PLAN**

Project No. / **217130**

Date / **23.05.18**

Author / **JLi**

Scale: @ A1 / **1 : 1000**

Drawing No. / **TP00.01 A**

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Appendix B – SIDRA (External)

MOVEMENT SUMMARY

Site: 101 [Boundary Rd x Old Pitt Town Rd_AM]

Boundary Rd x Old Pitt Town Rd
AM Traffic
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Boundary Rd (500m+)												
1	L2	396	3.0	0.982	26.6	LOS B	32.1	230.3	1.00	1.28	2.11	46.0
2	T1	681	3.0	0.982	26.7	LOS B	32.1	230.3	1.00	1.28	2.11	48.4
3	R2	6	3.0	0.011	11.6	LOS A	0.0	0.3	0.42	0.69	0.42	57.9
Approach		1083	3.0	0.982	26.6	LOS B	32.1	230.3	1.00	1.28	2.10	47.6
East: Old Pitt Town Rd (500m+)												
4	L2	5	3.0	0.032	8.1	LOS A	0.1	0.9	0.61	0.72	0.61	59.0
5	T1	18	3.0	0.032	7.9	LOS A	0.1	0.9	0.61	0.72	0.61	58.0
6	R2	5	3.0	0.013	13.5	LOS A	0.0	0.3	0.62	0.80	0.62	55.5
Approach		28	3.0	0.032	9.0	LOS A	0.1	0.9	0.61	0.74	0.61	57.7
North: Boundary Rd (500m+)												
7	L2	81	3.0	0.740	11.1	LOS A	7.0	50.3	0.82	0.97	1.04	57.1
8	T1	596	3.0	0.740	11.2	LOS A	7.0	50.3	0.82	0.97	1.04	60.9
9	R2	300	3.0	0.431	12.7	LOS A	2.3	16.2	0.64	0.90	0.68	57.0
Approach		977	3.0	0.740	11.7	LOS A	7.0	50.3	0.77	0.95	0.93	59.3
West: Old Pitt Town Rd (500m+)												
10	L2	166	3.0	0.781	15.2	LOS B	8.8	63.5	0.98	1.14	1.40	53.4
11	T1	384	3.0	0.781	15.0	LOS B	8.8	63.5	0.98	1.14	1.40	52.6
12	R2	111	3.0	0.277	14.3	LOS A	1.3	9.4	0.72	0.92	0.72	54.9
Approach		661	3.0	0.781	14.9	LOS B	8.8	63.5	0.94	1.10	1.29	53.2
All Vehicles		2749	3.0	0.982	18.3	LOS B	32.1	230.3	0.90	1.11	1.47	52.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

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MOVEMENT SUMMARY

Site: 101 [Old Pitt Town Rd x Terry Rd x Fontana Dr_AM]

Old Pitt Town Rd x Terry Rd x Fontana Dr
AM Traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Terry Rd (500m)												
1	L2	174	3.0	0.499	7.3	LOS A	4.0	28.4	0.04	0.55	0.05	49.8
2	T1	461	3.0	0.499	13.4	LOS A	4.0	28.4	0.42	0.80	0.65	49.1
3	R2	26	3.0	0.099	17.9	LOS B	0.3	2.4	0.74	0.89	0.74	45.4
Approach		661	3.0	0.499	12.0	LOS A	4.0	28.4	0.33	0.74	0.49	49.1
East: Old Pitt Town Rd (500m)												
4	L2	89	3.0	0.050	5.6	LOS A	0.0	0.0	0.00	0.55	0.00	53.7
5	T1	5	3.0	0.050	0.0	LOS A	0.0	0.0	0.00	0.55	0.00	55.2
6	R2	5	3.0	0.003	5.6	LOS A	0.0	0.1	0.10	0.55	0.10	53.0
Approach		100	3.0	0.050	5.3	NA	0.0	0.1	0.01	0.55	0.01	53.8
North: Fontana Dr (500m)												
7	L2	5	3.0	0.303	6.3	LOS A	1.5	10.4	0.51	0.78	0.59	49.3
8	T1	283	3.0	0.303	11.6	LOS A	1.5	10.4	0.58	0.82	0.68	49.3
9	R2	5	3.0	0.303	33.6	LOS C	1.4	10.1	0.66	0.87	0.78	48.7
Approach		294	3.0	0.303	11.9	LOS A	1.5	10.4	0.58	0.82	0.68	49.3
West: Old Pitt Town Rd (500m)												
10	L2	5	3.0	0.016	5.6	LOS A	0.0	0.0	0.00	0.11	0.00	57.3
11	T1	24	3.0	0.016	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	59.0
12	R2	409	3.0	0.251	6.0	LOS A	1.4	9.9	0.24	0.54	0.24	52.9
Approach		439	3.0	0.251	5.6	NA	1.4	9.9	0.22	0.51	0.22	53.2
All Vehicles		1494	3.0	0.499	9.7	NA	4.0	28.4	0.33	0.68	0.42	50.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.
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: 101 [Old Pitt Town Rd x Valletta Dr_AM]

Old Pitt Town Rd x Valletta Dr
AM Traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Old Pitt Town Rd (500m)												
5	T1	18	3.0	0.010	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	39	3.0	0.036	7.4	LOS A	0.1	1.1	0.49	0.65	0.49	51.8
Approach		57	3.0	0.036	5.1	NA	0.1	1.1	0.33	0.45	0.33	54.2
North: Valletta Dr (500m)												
7	L2	136	3.0	0.135	7.6	LOS A	0.5	3.8	0.49	0.71	0.49	52.0
9	R2	1	3.0	0.002	9.2	LOS A	0.0	0.0	0.53	0.60	0.53	50.6
Approach		137	3.0	0.135	7.6	LOS A	0.5	3.8	0.49	0.71	0.49	51.9
West: Old Pitt Town Rd (500m)												
10	L2	1	3.0	0.247	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	58.2
11	T1	471	3.0	0.247	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		472	3.0	0.247	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		665	3.0	0.247	2.0	NA	0.5	3.8	0.13	0.18	0.13	57.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.
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: 101 [Red Gables Rd x Janpieter Rd_AM]

Red Gables Rd x Janpieter Rd
AM Traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Janpieter Rd (500m)												
1	L2	327	3.0	0.223	5.6	LOS A	0.0	0.0	0.00	0.47	0.00	54.8
2	T1	82	3.0	0.223	0.0	LOS A	0.0	0.0	0.00	0.47	0.00	55.9
Approach		409	3.0	0.223	4.5	NA	0.0	0.0	0.00	0.47	0.00	55.0
North: Janpieter Rd (500m)												
8	T1	14	3.0	0.175	1.8	LOS A	0.8	5.9	0.49	0.65	0.49	53.9
9	R2	196	3.0	0.175	7.2	LOS A	0.8	5.9	0.49	0.65	0.49	52.6
Approach		209	3.0	0.175	6.9	NA	0.8	5.9	0.49	0.65	0.49	52.6
West: Red Gables Rd (600m)												
10	L2	4	3.0	0.202	5.9	LOS A	0.7	5.1	0.43	0.73	0.43	52.5
12	R2	164	3.0	0.202	7.8	LOS A	0.7	5.1	0.43	0.73	0.43	52.0
Approach		168	3.0	0.202	7.7	LOS A	0.7	5.1	0.43	0.73	0.43	52.0
All Vehicles		787	3.0	0.223	5.8	NA	0.8	5.9	0.22	0.57	0.22	53.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.
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.

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MOVEMENT SUMMARY

Site: 101 [Windsor Rd x Boundary Rd x Loftus St_AM]

Windsor Rd x Boundary Rd x Loftus St
AM Traffic
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Loftus St (500m+)												
1	L2	122	2.0	0.158	23.6	LOS B	4.4	31.5	0.57	0.71	0.57	42.8
2	T1	329	2.0	0.968	96.3	LOS F	30.1	214.2	1.00	1.16	1.44	23.5
3	R2	208	2.0	0.275	59.5	LOS E	6.4	45.7	0.88	0.77	0.88	30.4
Approach		660	2.0	0.968	71.2	LOS F	30.1	214.2	0.88	0.95	1.10	27.8
East: Windsor Rd (500m+)												
4	L2	67	2.0	0.053	11.3	LOS A	1.3	9.5	0.32	0.62	0.32	50.0
5	T1	1748	8.4	0.985	95.2	LOS F	60.7	455.8	1.00	1.18	1.39	26.1
6	R2	307	26.6	0.984	120.0	LOS F	14.8	126.8	1.00	1.05	1.62	21.0
Approach		2123	10.9	0.985	96.1	LOS F	60.7	455.8	0.98	1.14	1.39	25.6
North: Boundary Rd (500m+)												
7	L2	35	11.8	0.040	20.5	LOS B	1.0	7.9	0.46	0.68	0.46	50.8
8	T1	656	2.0	0.977	101.4	LOS F	34.5	245.3	1.00	1.18	1.46	22.8
9	R2	282	23.5	0.459	66.1	LOS E	9.2	77.7	0.93	0.80	0.93	30.7
Approach		973	8.6	0.977	88.3	LOS F	34.5	245.3	0.96	1.05	1.27	25.1
West: Windsor Rd (500m+)												
10	L2	49	21.1	0.046	15.2	LOS B	1.1	9.1	0.37	0.67	0.37	53.0
11	T1	1704	6.1	0.937	73.1	LOS F	51.3	377.8	1.00	1.07	1.24	31.0
12	R2	121	2.0	0.331	74.9	LOS F	4.2	30.1	0.97	0.76	0.97	26.9
Approach		1875	6.2	0.937	71.7	LOS F	51.3	377.8	0.98	1.04	1.20	31.0
All Vehicles		5631	7.9	0.985	83.7	LOS F	60.7	455.8	0.97	1.07	1.27	27.4

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		211	69.3	LOS F			0.96	0.96

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

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MOVEMENT SUMMARY

Site: 101 [Windsor Rd x Terry Rd x Garfield Rd E_AM]

Windsor Rd x Terry Rd x Garfield Rd E
AM Traffic
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 135 seconds (Site Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Garfield Rd East (500m+)												
1	L2	64	32.8	0.073	9.4	LOS A	0.9	8.3	0.28	0.61	0.28	49.1
2	T1	301	19.6	0.470	53.5	LOS D	9.0	73.3	0.94	0.77	0.94	32.2
3	R2	246	13.7	0.819	55.3	LOS D	6.5	50.8	1.00	0.91	1.33	32.0
Approach		612	18.6	0.819	49.6	LOS D	9.0	73.3	0.90	0.81	1.03	33.3
East: Windsor Rd (500m+)												
4	L2	351	8.8	0.273	9.7	LOS A	4.5	34.1	0.27	0.68	0.27	57.1
5	T1	1192	11.1	0.526	31.5	LOS C	19.4	148.5	0.80	0.70	0.80	47.6
6	R2	571	11.5	0.831	70.3	LOS E	19.7	151.4	1.00	0.91	1.16	29.6
Approach		2113	10.8	0.831	38.4	LOS C	19.7	151.4	0.77	0.76	0.81	41.8
North: Terry Rd (500m+)												
7	L2	906	28.1	0.972	64.4	LOS E	71.0	616.8	0.97	1.07	1.29	28.6
8	T1	380	4.7	0.542	54.2	LOS D	11.5	83.4	0.96	0.79	0.96	32.0
9	R2	63	18.9	0.217	44.3	LOS D	1.5	11.9	0.96	0.72	0.96	35.0
Approach		1349	21.1	0.972	60.6	LOS E	71.0	616.8	0.97	0.97	1.18	29.8
West: Windsor Rd (500m+)												
10	L2	27	9.5	0.026	13.3	LOS A	0.5	3.8	0.35	0.66	0.35	54.1
11	T1	1146	6.5	0.788	29.6	LOS C	15.4	114.0	0.99	0.88	1.05	48.8
12	R2	65	17.7	0.223	71.4	LOS F	2.1	16.7	0.96	0.73	0.96	29.3
Approach		1239	7.1	0.788	31.4	LOS C	15.4	114.0	0.97	0.86	1.03	47.2
All Vehicles		5313	13.5	0.972	43.7	LOS D	71.0	616.8	0.88	0.84	0.98	37.8

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	61.8	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	61.8	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	30.1	LOS D	0.1	0.1	0.91	0.91
P4	West Full Crossing	53	61.8	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		211	53.9	LOS E			0.95	0.95

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

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MOVEMENT SUMMARY

Site: 1 [Boundary Rd x Cataract Rd_AM_Stage 1]

Network: N101 [Boundary Rd x Cataract Rd_AM_Seagull Intersection]

Boundary Rd x Cataract Rd
AM Traffic
Stage 1
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Boundary Rd Right Turn Bay (80m)														
3	R2	126	3.0	126	3.0	0.248	11.2	LOS A	0.4	2.8	0.70	0.89	0.78	19.9
Approach		126	3.0	126	3.0	0.248	11.2	NA	0.4	2.8	0.70	0.89	0.78	19.9
East: Cataract Rd (500m)														
4	L2	195	3.0	195	3.0	0.508	20.3	LOS B	1.0	6.9	0.81	1.12	1.22	37.7
5	T1	5	0.0	5	0.0	0.029	26.3	LOS B	0.0	0.3	0.83	1.02	0.83	33.4
Approach		200	2.9	200	2.9	0.508	20.5	LOS B	1.0	6.9	0.81	1.11	1.21	37.6
North: Boundary Rd (500m)														
7	L2	1	3.0	1	3.0	0.401	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	58.1
8	T1	765	3.0	765	3.0	0.401	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		766	3.0	766	3.0	0.401	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		1093	3.0	1093	3.0	0.508	5.1	NA	1.0	6.9	0.23	0.31	0.31	44.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
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.

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MOVEMENT SUMMARY

Site: 1 [Red Gables Rd x Boundary Rd_AM_Stage 1]

Network: N101 [Red Gables Rd x Boundary Rd_AM_Seagull Intersection]

Red Gables Rd x Boundary Rd
AM Traffic
Stage 1
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Boundary Rd Right Turn Bay (86m)														
3	R2	216	3.0	216	3.0	0.265	7.9	LOS A	0.5	3.3	0.56	0.79	0.58	20.7
Approach		216	3.0	216	3.0	0.265	7.9	NA	0.5	3.3	0.56	0.79	0.58	20.7
East: Red Gables Rd (500m)														
4	L2	80	3.0	80	3.0	0.123	11.6	LOS A	0.2	1.3	0.52	0.97	0.52	44.0
5	T1	37	3.0	37	3.0	0.122	18.8	LOS B	0.2	1.3	0.73	1.03	0.73	38.6
Approach		117	3.0	117	3.0	0.123	13.9	LOS A	0.2	1.3	0.58	0.99	0.58	42.3
North: Boundary Rd (500m)														
7	L2	4	3.0	4	3.0	0.253	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.1
8	T1	479	3.0	479	3.0	0.253	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
Approach		483	3.0	483	3.0	0.253	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles		816	3.0	816	3.0	0.265	4.1	NA	0.5	3.3	0.23	0.35	0.24	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
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: 101 [Boundary Rd x Old Pitt Town Rd_PM]

Boundary Rd x Old Pitt Town Rd
PM Traffic
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Boundary Rd (500m+)												
1	L2	528	3.0	0.957	7.9	LOS A	25.7	184.6	1.00	0.58	1.02	50.3
2	T1	801	3.0	0.957	7.4	LOS A	25.7	184.6	1.00	0.58	1.02	51.5
3	R2	12	3.0	0.016	8.7	LOS A	0.1	0.4	0.23	0.63	0.23	51.6
Approach		1341	3.0	0.957	7.6	LOS A	25.7	184.6	0.99	0.58	1.02	51.0
East: Old Pitt Town Rd (500m+)												
4	L2	1	3.0	0.028	6.4	LOS A	0.1	0.7	0.43	0.58	0.43	52.2
5	T1	25	3.0	0.028	5.9	LOS A	0.1	0.7	0.43	0.58	0.43	53.5
6	R2	5	3.0	0.010	10.9	LOS A	0.0	0.2	0.48	0.71	0.48	50.3
Approach		32	3.0	0.028	6.8	LOS A	0.1	0.7	0.44	0.60	0.44	52.9
North: Boundary Rd (500m+)												
7	L2	208	3.0	0.579	7.6	LOS A	4.1	29.1	0.66	0.78	0.73	51.4
8	T1	351	3.0	0.579	7.1	LOS A	4.1	29.1	0.66	0.78	0.73	52.7
9	R2	74	3.0	0.134	10.8	LOS A	0.5	3.7	0.51	0.79	0.51	50.3
Approach		633	3.0	0.579	7.7	LOS A	4.1	29.1	0.65	0.78	0.70	52.0
West: Old Pitt Town Rd (500m+)												
10	L2	276	3.0	0.950	35.1	LOS C	19.0	136.3	1.00	1.59	2.56	37.3
11	T1	306	3.0	0.950	34.6	LOS C	19.0	136.3	1.00	1.59	2.56	37.9
12	R2	94	3.0	0.271	14.4	LOS A	1.3	9.3	0.76	0.92	0.76	48.0
Approach		676	3.0	0.950	32.0	LOS C	19.0	136.3	0.97	1.49	2.31	38.8
All Vehicles		2681	3.0	0.957	13.8	LOS A	25.7	184.6	0.90	0.86	1.26	47.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

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MOVEMENT SUMMARY

Site: 101 [Old Pitt Town Rd x Terry Rd x Fontana Dr_PM]

Old Pitt Town Rd x Terry Rd x Fontana Dr
AM Traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Terry Rd (500m)												
1	L2	174	3.0	0.511	7.5	LOS A	4.1	29.7	0.10	0.57	0.15	49.6
2	T1	461	3.0	0.511	14.0	LOS A	4.1	29.7	0.46	0.82	0.71	48.8
3	R2	26	3.0	0.101	18.2	LOS B	0.3	2.5	0.75	0.89	0.75	45.2
Approach		661	3.0	0.511	12.4	LOS A	4.1	29.7	0.37	0.76	0.56	48.8
East: Old Pitt Town Rd (500m)												
4	L2	89	3.0	0.055	5.6	LOS A	0.0	0.0	0.00	0.49	0.00	54.2
5	T1	16	3.0	0.055	0.0	LOS A	0.0	0.0	0.00	0.49	0.00	55.7
6	R2	11	3.0	0.006	5.6	LOS A	0.0	0.2	0.12	0.54	0.12	52.9
Approach		116	3.0	0.055	4.8	NA	0.0	0.2	0.01	0.50	0.01	54.2
North: Fontana Dr (500m)												
7	L2	11	3.0	0.346	6.6	LOS A	1.8	12.7	0.45	0.75	0.55	48.9
8	T1	283	3.0	0.346	12.4	LOS A	1.8	12.7	0.55	0.82	0.69	48.4
9	R2	16	3.0	0.346	34.9	LOS C	1.6	11.6	0.70	0.92	0.89	47.0
Approach		309	3.0	0.346	13.3	LOS A	1.8	12.7	0.56	0.82	0.70	48.3
West: Old Pitt Town Rd (500m)												
10	L2	16	3.0	0.022	5.6	LOS A	0.0	0.0	0.00	0.23	0.00	56.3
11	T1	24	3.0	0.022	0.0	LOS A	0.0	0.0	0.00	0.23	0.00	57.9
12	R2	400	3.0	0.248	6.0	LOS A	1.3	9.7	0.25	0.54	0.25	52.8
Approach		440	3.0	0.248	5.7	NA	1.3	9.7	0.23	0.51	0.23	53.2
All Vehicles		1526	3.0	0.511	10.1	NA	4.1	29.7	0.34	0.68	0.45	50.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.
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: 101 [Old Pitt Town Rd x Valletta Dr_PM]

Old Pitt Town Rd x Valletta Dr
AM Traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Old Pitt Town Rd (500m)												
5	T1	25	3.0	0.014	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	148	3.0	0.125	7.1	LOS A	0.6	4.0	0.47	0.67	0.47	51.9
Approach		174	3.0	0.125	6.1	NA	0.6	4.0	0.40	0.57	0.40	52.9
North: Valletta Dr (500m)												
7	L2	35	3.0	0.032	7.0	LOS A	0.1	0.9	0.42	0.62	0.42	52.2
9	R2	1	3.0	0.002	9.5	LOS A	0.0	0.0	0.54	0.61	0.54	50.4
Approach		36	3.0	0.032	7.1	LOS A	0.1	0.9	0.42	0.62	0.42	52.1
West: Old Pitt Town Rd (500m)												
10	L2	5	3.0	0.208	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.1
11	T1	392	3.0	0.208	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
Approach		397	3.0	0.208	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.9
All Vehicles		606	3.0	0.208	2.2	NA	0.6	4.0	0.14	0.20	0.14	57.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.
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.

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MOVEMENT SUMMARY

Site: 101 [Red Gables Rd x Janpieter Rd_PM]

Red Gables Rd x Janpieter Rd
AM Traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Janpieter Rd (500m)												
1	L2	204	3.0	0.244	5.6	LOS A	0.0	0.0	0.00	0.26	0.00	56.3
2	T1	252	3.0	0.244	0.0	LOS A	0.0	0.0	0.00	0.26	0.00	57.6
Approach		456	3.0	0.244	2.5	NA	0.0	0.0	0.00	0.26	0.00	57.0
North: Janpieter Rd (500m)												
8	T1	74	3.0	0.043	0.2	LOS A	0.1	0.4	0.08	0.04	0.08	59.3
9	R2	5	3.0	0.043	7.3	LOS A	0.1	0.4	0.08	0.04	0.08	57.2
Approach		79	3.0	0.043	0.7	NA	0.1	0.4	0.08	0.04	0.08	59.1
West: Red Gables Rd (600m)												
10	L2	12	3.0	0.119	6.5	LOS A	0.4	2.9	0.41	0.70	0.41	52.7
12	R2	92	3.0	0.119	7.5	LOS A	0.4	2.9	0.41	0.70	0.41	52.2
Approach		103	3.0	0.119	7.4	LOS A	0.4	2.9	0.41	0.70	0.41	52.3
All Vehicles		638	3.0	0.244	3.1	NA	0.4	2.9	0.08	0.31	0.08	56.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.
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.

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MOVEMENT SUMMARY

Site: 101 [Windsor Rd x Boundary Rd x Loftus St_PM]

Windsor Rd x Boundary Rd x Loftus St
PM Traffic
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Loftus St (500m+)												
1	L2	129	2.0	0.162	22.2	LOS B	4.6	32.7	0.55	0.70	0.55	43.5
2	T1	657	2.0	1.343	376.5	LOS F	124.7	887.9	1.00	2.25	2.71	8.2
3	R2	203	2.0	0.194	48.6	LOS D	5.6	39.5	0.80	0.75	0.80	33.4
Approach		989	2.0	1.343	262.8	LOS F	124.7	887.9	0.90	1.74	2.03	11.1
East: Windsor Rd (500m+)												
4	L2	124	2.0	0.086	8.0	LOS A	1.6	11.4	0.23	0.61	0.23	52.3
5	T1	2484	0.6	1.322	356.0	LOS F	165.5	1164.1	1.00	2.08	2.63	8.9
6	R2	526	8.8	1.075	133.2	LOS F	24.5	184.2	1.00	1.11	1.85	16.1
Approach		3135	2.0	1.322	304.8	LOS F	165.5	1164.1	0.97	1.86	2.40	10.0
North: Boundary Rd (500m+)												
7	L2	17	14.1	0.016	13.1	LOS A	0.3	2.5	0.32	0.65	0.32	56.1
8	T1	365	12.5	0.617	63.2	LOS E	12.8	98.9	0.98	0.81	0.98	29.7
9	R2	142	18.0	0.259	66.9	LOS E	4.6	36.9	0.91	0.77	0.91	30.8
Approach		524	14.0	0.617	62.6	LOS E	12.8	98.9	0.94	0.79	0.94	30.5
West: Windsor Rd (500m+)												
10	L2	111	9.1	0.125	26.1	LOS B	4.0	30.0	0.57	0.72	0.57	47.6
11	T1	987	3.3	0.900	75.9	LOS F	28.9	208.1	1.00	1.00	1.25	30.3
12	R2	96	2.3	0.655	88.7	LOS F	3.8	26.8	1.00	0.79	1.12	24.4
Approach		1194	3.8	0.900	72.3	LOS F	28.9	208.1	0.96	0.96	1.17	30.7
All Vehicles		5842	3.4	1.343	228.5	LOS F	165.5	1164.1	0.95	1.56	1.96	12.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		211	69.3	LOS F			0.96	0.96

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

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MOVEMENT SUMMARY

Site: 101 [Windsor Rd x Terry Rd x Garfield Rd E_PM]

Windsor Rd x Terry Rd x Garfield Rd E
PM Traffic
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Garfield Rd East (500m+)												
1	L2	89	18.8	0.089	10.9	LOS A	1.4	11.2	0.39	0.64	0.39	50.6
2	T1	642	4.1	0.768	42.7	LOS D	15.7	113.6	1.00	0.91	1.10	35.5
3	R2	307	6.5	0.787	58.1	LOS E	8.1	59.7	1.00	0.92	1.23	31.8
Approach		1039	6.1	0.787	44.5	LOS D	15.7	113.6	0.95	0.89	1.08	35.2
East: Windsor Rd (500m+)												
4	L2	226	6.4	0.163	8.7	LOS A	1.7	12.5	0.23	0.67	0.23	58.1
5	T1	1439	5.5	0.796	36.8	LOS C	22.8	167.4	0.98	0.91	1.06	44.5
6	R2	566	0.0	0.762	33.0	LOS C	9.4	65.6	1.00	0.87	1.10	42.3
Approach		2232	4.2	0.796	33.0	LOS C	22.8	167.4	0.91	0.87	0.99	45.0
North: Terry Rd (500m+)												
7	L2	524	6.5	0.453	11.8	LOS A	10.3	76.2	0.51	0.72	0.51	52.4
8	T1	212	20.0	0.279	35.4	LOS C	4.4	35.7	0.87	0.70	0.87	38.2
9	R2	19	4.1	0.048	49.5	LOS D	0.4	3.1	0.92	0.67	0.92	34.6
Approach		755	10.2	0.453	19.4	LOS B	10.3	76.2	0.63	0.71	0.63	46.9
West: Windsor Rd (500m+)												
10	L2	29	4.8	0.030	14.6	LOS B	0.5	3.8	0.45	0.67	0.45	53.2
11	T1	780	3.7	0.803	48.2	LOS D	13.4	96.5	1.00	0.92	1.18	39.2
12	R2	78	20.3	0.218	53.3	LOS D	1.8	14.9	0.95	0.74	0.95	34.1
Approach		887	5.2	0.803	47.5	LOS D	13.4	96.5	0.98	0.89	1.13	39.0
All Vehicles		4913	5.7	0.803	36.0	LOS C	22.8	167.4	0.88	0.86	0.98	41.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
P2	East Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
P4	West Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		211	44.3	LOS E			0.94	0.94

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

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MOVEMENT SUMMARY

Site: 1 [Boundary Rd x Cataract Rd_PM_Stage 1]

Network: N101 [Boundary Rd x Cataract Rd_PM_Seagull Intersection]

Boundary Rd x Cataract Rd
AM Traffic
Stage 1
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Boundary Rd Right Turn Bay (80m)														
3	R2	20	3.0	20	3.0	0.030	8.1	LOS A	0.0	0.3	0.55	0.72	0.55	20.5
Approach		20	3.0	20	3.0	0.030	8.1	NA	0.0	0.3	0.55	0.72	0.55	20.5
East: Cataract Rd (500m)														
4	L2	77	3.0	77	3.0	0.146	13.2	LOS A	0.2	1.5	0.59	1.00	0.59	42.6
5	T1	5	3.0	5	3.0	0.016	16.9	LOS B	0.0	0.2	0.68	0.95	0.68	40.1
Approach		82	3.0	82	3.0	0.146	13.5	LOS A	0.2	1.5	0.60	1.00	0.60	42.5
North: Boundary Rd (500m)														
7	L2	5	3.0	5	3.0	0.319	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.1
8	T1	604	3.0	604	3.0	0.319	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		609	3.0	609	3.0	0.319	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles		712	3.0	712	3.0	0.319	1.9	NA	0.2	1.5	0.08	0.14	0.08	54.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
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.

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MOVEMENT SUMMARY

Site: 1 [Red Gables Rd x Boundary Rd_PM_Stage 1]

Network: N101 [Red Gables Rd x Boundary Rd_PM_Seagull Intersection]

Red Gables Rd x Boundary Rd
AM Traffic
Stage 1
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Boundary Rd Right Turn Bay (86m)														
3	R2	100	3.0	100	3.0	0.125	7.6	LOS A	0.2	1.4	0.52	0.73	0.52	20.8
Approach		100	3.0	100	3.0	0.125	7.6	NA	0.2	1.4	0.52	0.73	0.52	20.8
East: Red Gables Rd (500m)														
4	L2	56	3.0	56	3.0	0.088	11.6	LOS A	0.1	0.9	0.51	0.96	0.51	44.0
5	T1	18	3.0	18	3.0	0.049	15.9	LOS B	0.1	0.5	0.65	1.00	0.65	41.0
Approach		74	3.0	74	3.0	0.088	12.6	LOS A	0.1	0.9	0.55	0.97	0.55	43.3
North: Boundary Rd (500m)														
7	L2	2	3.0	2	3.0	0.258	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	58.1
8	T1	491	3.0	491	3.0	0.258	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		493	3.0	493	3.0	0.258	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		666	3.0	666	3.0	0.258	2.6	NA	0.2	1.4	0.14	0.22	0.14	45.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
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.

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Appendix C – SIDRA (Town Centre Access)

MOVEMENT SUMMARY

Site: 101 [Red Gables Rd x Fontana Dr_AM]

Network: N101 [Network_AM]

Red Gables Rd x Fontana Dr
AM Traffic
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 80 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Fontana Dr S (530m)														
1	L2	9	3.0	9	3.0	0.016	24.1	LOS B	0.2	1.1	0.70	0.64	0.70	36.4
2	T1	241	3.0	241	3.0	0.593	31.5	LOS C	5.3	38.4	0.95	0.79	0.95	27.8
3	R2	2	3.0	2	3.0	0.015	42.9	LOS D	0.0	0.3	0.94	0.61	0.94	23.9
Approach		253	3.0	253	3.0	0.593	31.3	LOS C	5.3	38.4	0.94	0.78	0.94	28.2
East: Red Gables Road E (145m)														
4	L2	26	3.0	26	3.0	0.040	22.2	LOS B	0.4	2.9	0.67	0.67	0.67	34.2
5	T1	67	3.0	67	3.0	0.108	20.3	LOS B	1.1	8.1	0.73	0.57	0.73	32.9
6	R2	42	3.0	42	3.0	0.265	43.7	LOS D	1.0	7.2	0.97	0.73	0.97	10.5
Approach		136	3.0	136	3.0	0.265	27.9	LOS B	1.1	8.1	0.79	0.64	0.79	26.9
North: Fontana Dr N (160m)														
7	L2	42	3.0	42	3.0	0.074	25.4	LOS B	0.7	5.1	0.73	0.69	0.73	16.6
8	T1	195	3.0	195	3.0	0.479	30.5	LOS C	4.2	30.1	0.93	0.76	0.93	31.2
9	R2	44	3.0	44	3.0	0.324	45.2	LOS D	1.1	7.7	0.98	0.73	0.98	23.3
Approach		281	3.0	281	3.0	0.479	32.1	LOS C	4.2	30.1	0.91	0.74	0.91	28.7
West: Red Gables Road W (380m)														
10	L2	49	3.0	49	3.0	0.075	22.5	LOS B	0.8	5.6	0.68	0.69	0.68	27.9
11	T1	166	3.0	166	3.0	0.268	21.6	LOS B	3.0	21.3	0.78	0.64	0.78	28.4
12	R2	136	3.0	136	3.0	0.853	51.8	LOS D	3.7	26.9	1.00	1.01	1.47	28.0
Approach		352	3.0	352	3.0	0.853	33.4	LOS C	3.7	26.9	0.85	0.79	1.03	28.1
All Vehicles		1021	3.0	1021	3.0	0.853	31.8	LOS C	5.3	38.4	0.88	0.76	0.94	28.2

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	316	26.8	LOS C	0.6	0.6	0.82	0.82
P2	East Full Crossing	632	35.2	LOS D	1.4	1.4	0.95	0.95
P3	North Full Crossing	316	26.8	LOS C	0.6	0.6	0.82	0.82
P4	West Full Crossing	211	34.5	LOS D	0.4	0.4	0.93	0.93

All Pedestrians	1474	31.5	LOS D	0.89	0.89

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

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MOVEMENT SUMMARY

Site: 102 [Red Gables Rd x New Rd A_AM]

Network: N101 [Network_AM]

Red Gables Rd x New Rd A
AM Traffic
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Red Gables Rd E (40m)														
5	T1	56	3.0	56	3.0	0.029	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	504	3.0	504	3.0	0.355	4.7	LOS A	0.9	6.8	0.46	0.57	0.46	33.2
Approach		560	3.0	560	3.0	0.355	4.2	NA	0.9	6.8	0.41	0.52	0.41	33.5
North: New Road A N (160m)														
7	L2	446	3.0	446	3.0	0.341	7.3	LOS A	0.9	6.1	0.26	0.86	0.26	28.6
9	R2	80	3.0	80	3.0	0.216	15.5	LOS B	0.3	2.4	0.71	1.02	0.74	20.9
Approach		526	3.0	526	3.0	0.341	8.6	LOS A	0.9	6.1	0.33	0.88	0.33	27.4
West: Red Gables Rd W (145m)														
10	L2	168	3.0	168	3.0	0.148	4.8	LOS A	0.2	1.7	0.11	0.41	0.11	38.8
11	T1	42	3.0	42	3.0	0.148	0.2	LOS A	0.2	1.7	0.11	0.41	0.11	38.9
Approach		211	3.0	211	3.0	0.148	3.9	NA	0.2	1.7	0.11	0.41	0.11	38.8
All Vehicles		1297	3.0	1297	3.0	0.355	5.9	NA	0.9	6.8	0.33	0.65	0.33	31.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
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: 103 [Fontana Dr x New Rd B_AM]

Network: N101 [Network_AM]

Fontana Dr x New Rd B
AM Traffic
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Fontana Dr S (160m)														
2	T1	199	3.0	199	3.0	0.105	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
3	R2	133	3.0	133	3.0	0.100	5.7	LOS A	0.2	1.1	0.28	0.57	0.28	36.9
Approach		332	3.0	332	3.0	0.105	2.3	NA	0.2	1.1	0.11	0.23	0.11	41.6
East: New Rd B E (170m)														
4	L2	107	3.0	107	3.0	0.095	7.8	LOS A	0.2	1.1	0.34	0.88	0.34	28.2
6	R2	224	3.0	224	3.0	0.410	13.4	LOS A	0.9	6.7	0.65	1.11	0.88	22.9
Approach		332	3.0	332	3.0	0.410	11.6	LOS A	0.9	6.7	0.55	1.03	0.70	24.4
North: Fontana Dr N (100m)														
7	L2	72	3.0	72	3.0	0.145	4.8	LOS A	0.2	1.4	0.09	0.15	0.09	41.0
8	T1	174	3.0	174	3.0	0.145	0.1	LOS A	0.2	1.4	0.09	0.15	0.09	41.3
Approach		245	3.0	245	3.0	0.145	1.5	NA	0.2	1.4	0.09	0.15	0.09	41.2
All Vehicles		908	3.0	908	3.0	0.410	5.5	NA	0.9	6.7	0.27	0.50	0.32	33.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
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.

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MOVEMENT SUMMARY

Site: 104 [Fontana Dr x The Promenade_AM]

Network: N101 [Network_AM]

Fontana Dr x The Promenade
AM Traffic
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Fontana Dr S (100m)														
2	T1	325	3.0	325	3.0	0.171	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
3	R2	98	3.0	98	3.0	0.067	5.3	LOS A	0.1	0.9	0.33	0.56	0.33	31.1
Approach		423	3.0	423	3.0	0.171	1.2	NA	0.1	0.9	0.08	0.13	0.08	42.9
East: The Promenade E (55m)														
4	L2	58	3.0	58	3.0	0.136	7.4	LOS A	0.2	1.5	0.41	0.91	0.41	19.5
6	R2	39	3.0	39	3.0	0.136	12.6	LOS A	0.2	1.5	0.41	0.91	0.41	20.8
Approach		97	3.0	97	3.0	0.136	9.4	LOS A	0.2	1.5	0.41	0.91	0.41	20.1
North: Fontana Dr N (25m)														
7	L2	26	3.0	26	3.0	0.112	2.8	LOS A	0.0	0.0	0.00	0.06	0.00	20.5
8	T1	187	3.0	187	3.0	0.112	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	44.1
Approach		214	3.0	214	3.0	0.112	0.3	NA	0.0	0.0	0.00	0.06	0.00	33.8
All Vehicles		734	3.0	734	3.0	0.171	2.1	NA	0.2	1.5	0.10	0.21	0.10	37.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
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.

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MOVEMENT SUMMARY

Site: 101 [Red Gables Rd x Fontana Dr_PM]

Network: N101 [Network_PM]

Red Gables Rd x Fontana Dr
PM Traffic
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 80 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Fontana Dr S (530m)														
1	L2	8	3.0	8	3.0	0.014	24.1	LOS B	0.1	1.0	0.70	0.64	0.70	36.4
2	T1	391	3.0	391	3.0	0.916	48.4	LOS D	11.7	84.2	1.00	1.18	1.46	22.4
3	R2	5	3.0	5	3.0	0.039	43.3	LOS D	0.1	0.9	0.95	0.64	0.95	23.8
Approach		404	3.0	404	3.0	0.916	47.8	LOS D	11.7	84.2	0.99	1.16	1.44	22.7
East: Red Gables Road E (145m)														
4	L2	42	3.0	42	3.0	0.064	22.4	LOS B	0.7	4.7	0.68	0.68	0.68	34.1
5	T1	60	3.0	60	3.0	0.097	20.2	LOS B	1.0	7.2	0.73	0.56	0.73	32.9
6	R2	42	3.0	42	3.0	0.309	45.1	LOS D	1.0	7.4	0.98	0.73	0.98	10.2
Approach		144	3.0	144	3.0	0.309	28.2	LOS B	1.0	7.4	0.79	0.65	0.79	27.3
North: Fontana Dr N (160m)														
7	L2	42	3.0	42	3.0	0.077	26.2	LOS B	0.7	5.2	0.75	0.70	0.75	16.3
8	T1	295	3.0	295	3.0	0.686	32.2	LOS C	6.8	48.6	0.97	0.85	1.02	30.6
9	R2	42	3.0	42	3.0	0.309	45.1	LOS D	1.0	7.4	0.98	0.73	0.98	23.3
Approach		379	3.0	379	3.0	0.686	32.9	LOS C	6.8	48.6	0.95	0.82	0.98	29.0
West: Red Gables Road W (380m)														
10	L2	11	3.0	11	3.0	0.016	22.0	LOS B	0.2	1.1	0.66	0.64	0.66	28.3
11	T1	74	3.0	74	3.0	0.119	20.4	LOS B	1.2	8.9	0.74	0.57	0.74	29.1
12	R2	24	3.0	24	3.0	0.178	44.4	LOS D	0.6	4.2	0.97	0.70	0.97	29.8
Approach		108	3.0	108	3.0	0.178	25.9	LOS B	1.2	8.9	0.78	0.61	0.78	29.3
All Vehicles		1036	3.0	1036	3.0	0.916	37.4	LOS C	11.7	84.2	0.93	0.91	1.11	26.1

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	316	26.8	LOS C	0.6	0.6	0.82	0.82
P2	East Full Crossing	632	34.2	LOS D	1.3	1.3	0.94	0.94
P3	North Full Crossing	316	26.8	LOS C	0.6	0.6	0.82	0.82
P4	West Full Crossing	211	33.6	LOS D	0.4	0.4	0.92	0.92

All Pedestrians	1474	30.9	LOS D	0.89	0.89

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

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MOVEMENT SUMMARY

Site: 102 [Red Gables Rd x New Rd A_PM]

Network: N101 [Network_PM]

Red Gables Rd x New Rd A
PM Traffic
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Red Gables Rd E (40m)														
5	T1	43	3.0	43	3.0	0.023	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	255	3.0	255	3.0	0.166	4.0	LOS A	0.4	2.8	0.31	0.51	0.31	33.9
Approach		298	3.0	298	3.0	0.166	3.5	NA	0.4	2.8	0.27	0.44	0.27	34.3
North: New Road A N (160m)														
7	L2	60	3.0	60	3.0	0.046	7.1	LOS A	0.1	0.6	0.20	0.88	0.20	28.6
9	R2	156	3.0	156	3.0	0.253	10.5	LOS A	0.4	3.1	0.56	0.98	0.57	24.8
Approach		216	3.0	216	3.0	0.253	9.6	LOS A	0.4	3.1	0.46	0.95	0.46	26.0
West: Red Gables Rd W (145m)														
10	L2	78	3.0	78	3.0	0.081	4.8	LOS A	0.1	0.9	0.11	0.33	0.11	39.8
11	T1	43	3.0	43	3.0	0.081	0.2	LOS A	0.1	0.9	0.11	0.33	0.11	40.5
Approach		121	3.0	121	3.0	0.081	3.1	NA	0.1	0.9	0.11	0.33	0.11	39.9
All Vehicles		635	3.0	635	3.0	0.253	5.5	NA	0.4	3.1	0.30	0.59	0.30	32.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
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.

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MOVEMENT SUMMARY

Site: 103 [Fontana Dr x New Rd B_PM]

Network: N101 [Network_PM]

Fontana Dr x New Rd B
PM Traffic
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Fontana Dr S (160m)														
2	T1	389	3.0	389	3.0	0.205	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
3	R2	55	3.0	55	3.0	0.043	5.8	LOS A	0.1	0.4	0.29	0.57	0.29	36.8
Approach		444	3.0	444	3.0	0.205	0.7	NA	0.1	0.4	0.04	0.07	0.04	46.3
East: New Rd B E (170m)														
4	L2	164	3.0	164	3.0	0.153	8.1	LOS A	0.3	1.8	0.39	0.89	0.39	28.0
6	R2	27	3.0	27	3.0	0.062	12.9	LOS A	0.1	0.7	0.61	0.97	0.61	23.3
Approach		192	3.0	192	3.0	0.153	8.8	LOS A	0.3	1.8	0.42	0.90	0.42	27.2
North: Fontana Dr N (100m)														
7	L2	76	3.0	76	3.0	0.170	4.8	LOS A	0.2	1.6	0.09	0.14	0.09	41.3
8	T1	215	3.0	215	3.0	0.170	0.1	LOS A	0.2	1.6	0.09	0.14	0.09	42.0
Approach		291	3.0	291	3.0	0.170	1.3	NA	0.2	1.6	0.09	0.14	0.09	41.7
All Vehicles		926	3.0	926	3.0	0.205	2.6	NA	0.3	1.8	0.13	0.26	0.13	39.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
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.

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MOVEMENT SUMMARY

Site: 104 [Fontana Dr x The Promenade_PM]

Network: N101 [Network_PM]

Fontana Dr x The Promenade
PM Traffic
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Fontana Dr S (100m)														
2	T1	300	3.0	300	3.0	0.158	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
3	R2	117	3.0	117	3.0	0.085	5.6	LOS A	0.2	1.1	0.38	0.58	0.38	30.8
Approach		417	3.0	417	3.0	0.158	1.6	NA	0.2	1.1	0.11	0.16	0.11	41.6
East: The Promenade E (55m)														
4	L2	87	0.0	87	0.0	0.298	7.8	LOS A	0.5	3.8	0.50	0.94	0.55	17.4
6	R2	100	0.0	100	0.0	0.298	13.8	LOS A	0.5	3.8	0.50	0.94	0.55	19.1
Approach		187	0.0	187	0.0	0.298	11.0	LOS A	0.5	3.8	0.50	0.94	0.55	18.4
North: Fontana Dr N (25m)														
7	L2	68	3.0	68	3.0	0.144	2.8	LOS A	0.0	0.0	0.00	0.13	0.00	20.1
8	T1	203	3.0	203	3.0	0.144	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	39.5
Approach		272	3.0	272	3.0	0.144	0.7	NA	0.0	0.0	0.00	0.13	0.00	27.4
All Vehicles		876	2.4	876	2.4	0.298	3.3	NA	0.5	3.8	0.16	0.32	0.17	32.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
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.

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Appendix D – AS2890.1 Requirements

Car Park Type	Public Car Park
User Class	-
Number of spaces	-
Number of Accesses	-
Access Road	Local
Access Road Speed	40

Basement Parking for Precinct E1&E2

Section	Description	AS2890.1 Requirement	Provided	Compliance
Parking Module Design				
2.4.1	Parking module	Resi / comm (User Class 1,1A): 2.4m x 5.4m Retail (User Class 3,3A): 2.6m x 5.4m OR 2.7m x 5.4m		
2.4.1	Aisle width	Resi / comm (User Class 1,1A): 6.2m OR 5.8m Retail (User Class 3,3A): 6.6m OR 6.2m		
2.4.1(b)	Additional parking module clearence	300mm		
2.4.1 (b) iii	Disabled parking			
2.4.2 (c)	Blind aisle	1.0m Aisle Extension		
2.4.6	Gradients within parking module	Max 1:20 Parallel to angle of parking		
2.4.7	Gradients within parking module	Max 1:16 in any other direction		
2.4.7	Motorcycle parking	Min dimension of 2.5m x 1.2m		
Circulation Roadways				
2.5.2 (a)	Straight - One-way road or ramp	Minimum 3.0m between kerbs		
2.5.2 (a)	Straight - Two-way road or ramp	Minimum 5.5m between kerbs		
2.5.2 (b)	Curved -One-way roadway or ramp	Compliance with Table 2.2		
2.5.2 (c)	Circulation roadway Intersection	Provision for B99 vehicle to pass a B85 Vehicle		
2.5.3 (a) / (b)	Max grade longer than 20m	-		
2.5.3 (c)	Max grade up to 20m	-		
	Max grade curved ramp	-(measured along inside kerb / shortest distance)		
2.5.3 (d)	Changes in grade - summit	1 in 8 (12.5%)		
	Changes in grade - Sag	1 in 6.7 (15%)		
2.5.2 (e)	Grade transition	Grade transition of min 2.0m		
Driveway Width Requirements				
3.2.1	Driveway width (Entry)	#N/A		
3.2.3	Access driveway location	Compliance with Figure 3.1		
3.2.4 (a)	Sightdistances at access driveway	Min. SSD: 35m		
3.2.4 (b)	Minimum sight lines for pedestrian saftey	Visual splay at property boundary (Fig 3.3)		
3.3 (a)	Gradient at property line	Max grade of 1 in 20 (5%) for fist 6.0m		
3.3 (b)	Gradient at vehicle control point	Max grade of 1 in 20 (5%) for fist 6.0m prior to control point		
3.3 (c)	Gradient at queuing area	Max Grade of 1 in 10 for not less than 0.8 of queue length		
Additional Parking Structure Requirements				
5.2	Column location and spacing	Compliance with Figure 5.2		
5.3	Headroom requirements - General	min clearence of 2.2m		
	Headroom requirements - Disabled	min clearence of 2.5m		

TABLE 3.1

SELECTION OF ACCESS FACILITY CATEGORY

Class of parking facility (see Table 1.1)	Frontage road type	Access facility category — Number of parking spaces (Note 1)				
		<25	25 to 100	101 to 300	301 to 600	>600
1,1A	Arterial	1	2	3	4	5
	Local	1	1	2	3	4
2	Arterial	2	2	3	4	5
	Local	1	2	3	4	4
3,3A	Arterial	2	3	4	4	5
	Local	1	2	3	4	4

NOTES:

1 When a car park has multiple access points, each access should be designed for the number of parking spaces effectively served by that access.

2 This Table does not imply that certain types of development are necessarily suitable for location on any particular frontage road type. In particular, access to arterial roads should be limited as far as practicable, and in some circumstances it may be preferable to allow left-turn-only movements into and out of the access driveway.

TABLE 3.2

ACCESS DRIVEWAY WIDTHS

metres

Category	Entry width	Exit width	Separation of driveways
1	3.0 to 5.5	(Combined) (see Note)	N/A
2	6.0 to 9.0	(Combined) (see Note)	N/A
3	6.0	4.0 to 6.0	1 to 3
4	6.0 to 8.0	6.0 to 8.0	1 to 3
5	To be provided as an intersection, not an access driveway, see Clause 3.1.1.		

NOTE: Driveways are normally combined, but if separate, both entry and exit widths should be 3.0 m min.

TABLE 2.2

MINIMUM ROADWAY WIDTHS ON CURVED ROADWAYS AND RAMPS

metres

Turn radius R_o (Note 1)	Single lane		Two-way, no separator All cases (Note 3)
	Public facilities (Note 2)	Domestic property	
7.6 to 11.9	3.9	3.6	—
12.0 to 19.9	3.4	3.1	6.7 (Note 4)
20.0 to 50.0	3.2	3.0	6.3
>50.0	3.0	3.0	5.5

NOTES:

1 See Figure 2.9 for Dimension R_o.

2 In New Zealand only, the widths shown for domestic property shall apply also to public facilities.

3 For parallel roadways with a median or separator, each roadway width shall be determined separately as a single lane.

4 Applies to R_o range 15.0 m to 19.9 m only (see Clause 2.5.2(b)).

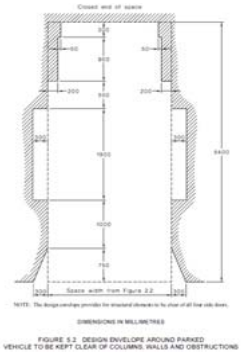

FIGURE 5.2 DESIGN ENVELOPE AROUND PARKED VEHICLE TO BE KEPT CLEAR OF COLUMNS, WALLS AND OBSTRUCTIONS

Appendix E – AS2890.2 Requirements

Largest design vehicle	AV
Access road	Minor
Road frontage speed	50km/hr
Carriageway curve radius (m)	1000

Section	Description	AS2890.2 Requirement	Compliance	Comments
	Design Vehicle			
2.2	**Description and Dimensions**			
	Overall length	19m		
	Design width	2.5m		
	Wheel base	14.5m		
	Clearance height	4.5m		
	Platform height	1.1m to 1.4m		
	Access Driveway and Circulation			
3.3.1	**Minimum circulation width (kerb to kerb)**			
	Single Lane	3.5m		
	Two-way (with intervisibility)	6.5m		
	Two-way (without intervisibility)	6.5m		
3.3.3	**Maximum Gradients**			
	Max forward manoeuvre roadway / ramp grade	1:6.5 (15.4%)		
	Max reverse manoeuvre roadway / ramp grade	1:8 (12.5%)		
	Max rate of change of grade	1:16 (6.25%) in 10.0m of travel		
3.4.3	**Driveway Layout Design Requirements**			
	Access Width	12.5m, see Figure 3.2 (Note 1)		
3.4.4	**Maximum Driveway Gradient**	1:20 (5%) for SRV, MRV and HRV		
3.4.5	**Sight distance**			
3.4.5 (a)	Sight distance to oncoming traffic			
	5 sec gsp	69m		
	8 sec gap	111m		
3.4.5 (b)	Sight distance to pedestrians	2.5m (from property boundary) x 2m (from driveway)		
	Service Areas			
4.2	**Dimensions of Service Bays**			
	Bay Length	19m		
	Bay Width	3.5		
	Platform Height	1.1m to 1.4m		
	Vertical Clearance	4.5m		
	Max service bay gradient	1:25 (4%)		
4.3.2 (e)	Maximum gradient on service areas	1:6.5 (15.4%) Forward manoeuvres 1:8 (12.5%) Reverse manoeuvres		
	Cleaarances			
5.4	**Manoeuvring Clearances**			
5.4 (a)	Low speed e.g service bay access	300mm on both sides of vehicle		
5.4 (b)	Higher speed e.g Site access and circulation	an additional 300mm		
5.4 (c)	Two vehicles passing one another	300mm on both sides of both vehicle plus a further 300mm		