1 Crescent Street, Holroyd Mixed Use

Transport Impact Assessment for Planning Proposal

Prepared for:

Tiberius

29 October 2019

The Transport Planning Partnership

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Client: Tiberius

Version: 05

Date: 29 October 2019

TTPP Reference: 16241

Quality Record

Version	Date	Prepared by	Reviewed by	Approved by	Signature
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02	30/4/2019	Ken Hollyoak	Ken Hollyoak	Ken Hollyoak	
03	1/5/2019	Ken Hollyoak	Ken Hollyoak	Ken Hollyoak	
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1 Executive Summary

The subject site is located at 1 Crescent Street, Holroyd and is located approximately 1km south of Parramatta city centre and 1km north-east of Merrylands. The site fronts Crescent Street and is enclosed by Parramatta Road/M4 Motorway to the north and Woodville Road to the east. The neighbouring sites directly to the north and west of the site include a recreational sporting field as well as light industrial land uses, respectively.

It is intended that the proposal will seek to rezone the site to deliver a high-density mixed-use development, comprising the following uses:

- Residential dwellings 1,109 – 1,255 units
- Commercial 15,505 m^2 GFA

For traffic modelling purposes, the commercial component has been broken down into 7,752.5m^2 of retail development (supermarket/specialty shop) and 7,752.5m^2 of office development.

The proposal will be complimented with large areas of passive and active open space, and a retail and commercial area to service the local community.

The current proposal is a refinement of previous iterations of the development plan which has had traffic analysis undertaken on it over the period 2015-2018.

TTPP Consultants has been engaged by Tiberius (Holroyd) Pty Ltd to assess the traffic and transport impacts/issues relating to the planning proposal.

An assessment of car parking requirement using the Cumberland Council parking rates (as set out in the former Holroyd City Council's development control plan) indicates that the proposal would need to provide a minimum of 1,570 to 1,736 car parking spaces and a maximum of 2,871 to 3,117 car parking spaces

However, in order to minimise car travel, a number of measures will be incorporated into the proposal. The potential measures include:

- Limited parking ratios
- Cycle parking/facilities
- Car sharing / car club cars
- Green travel plan.

On the basis of all such measures being fully incorporated into the development, it is anticipated that the subject site would generate significantly less traffic than other residential sites in the vicinity, which will have the positive effect of reducing the traffic impact of the proposal.

Using the conventional RMS trip generation rates, the resultant increase in traffic generated by the proposal would be in the order of 701 to 955 vehicles per hour during the weekday AM and PM peak periods.

The existing external intersections such as Parramatta Road/Woodville Road and Crescent Street/Woodville Road intersections are currently operating at capacity with level of service F during the commuter peak periods.

It is proposed to provide additional capacity along Crescent Street by extending the existing left turn bay. A right turn bay on Crescent Street approaching the commercial site access is also proposed (refer to Figure 7.2).

The key external intersections at Parramatta Road/Woodville Road and Crescent Street/Woodville Road are currently the subject of an RMS funded improvement to provide additional capacity to cater for existing traffic demands. Indeed, RMS has recently resumed land from the subject site to facilitate part of these improvements.

The proposed intersection upgrade will significantly improve the intersection operating conditions and TTPP modelling shows that it has sufficient capacity to accommodate the existing and future traffic volumes. The intersections are expected to operate acceptably at LoS D or better taking into account the additional traffic associated with the proposed mixed-use development and future traffic growth. In addition, the outcomes of the potential projects such as the Parramatta Light Rail, Western Sydney Regional ring Road, WestConnex and Rapid Bus Routes are likely to have a beneficial impact on the operating conditions of these strategic roads.

All other local intersections would continue to operate satisfactorily for both AM and PM peak periods even when the development is fully completed.

Finally, it is intended to provide an active travel connection through A'Becketts Creek (a creek proximal to the site) to enhance pedestrian and cycle connectivity between the site and Holroyd Sportsground.

2 Introduction

2.1 Background

Tiberius (Holroyd) Pty Ltd has submitted a Planning Proposal for a mixed-use development at 1 Crescent Street, Holroyd.

It is intended that the proposal will seek to rezone the site to deliver a high-density mixed-use development, comprising some 1,109 – 1,255 residential apartments that will be complimented with large areas of passive and active open space, and a retail and commercial area to service the local community.

TTPP Consultants was commissioned by Tiberius (Holroyd) Pty Ltd to provide traffic advice in relation to the above site.

2.2 Purpose of Report

This report is a compilation of work undertaken in the 2015 report for the site by this author whilst at GTA consultants, an Addendum to that 2015 traffic report and finally an additional traffic analysis report carried out by TTPP in December 2018. This report sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

- Existing traffic and parking conditions surrounding the site
- Suitability of the proposed parking in terms of supply (quantum) and layout
- Pedestrian and bicycle requirements
- The traffic generating characteristics of the proposed development
- Suitability of the proposed access arrangements for the site
- The transport impact of the development proposal on the surrounding road network.

2.3 References

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

- 1 Crescent Street, Holroyd Mixed Use Development Transport Impact Assessment for Planning Proposal 2015 – GTA Consultants, issued 1/06/15
- Addendum to traffic report – GTA Consultants issued 17/03/16
- Traffic Analysis Report produced by TTPP Transport Planning on 20th December 2018
- An inspection of the site and its surrounds
- Holroyd Local Environmental Plan (LEP) 2013

- Holroyd Development Control Plan (DCP) 2013
- Living Holroyd: Community Strategic Plan 2013
- Holroyd Residential Development Strategy 2012
- A Metropolis of Three Cities - the Greater Sydney Region Plan
- Parramatta Road Urban Transformation Strategy
- Sydney's Bus Future 2013
- Holroyd Local Environmental Plan
- Traffic surveys undertaken by SkyHigh as referenced in the context of this report
- Other documents and data as referenced in this report.

3 Existing Conditions

3.1 Site Location

The subject site is located at 1 Crescent Street, Holroyd and is located approximately 1km south of Parramatta city centre. The site fronts Crescent Street and is enclosed by Parramatta Road/M4 Motorway to the north and Woodville Road to the east. The neighbouring sites directly to the north and west of the site include a recreational sporting field, and light industrial land uses, respectively.

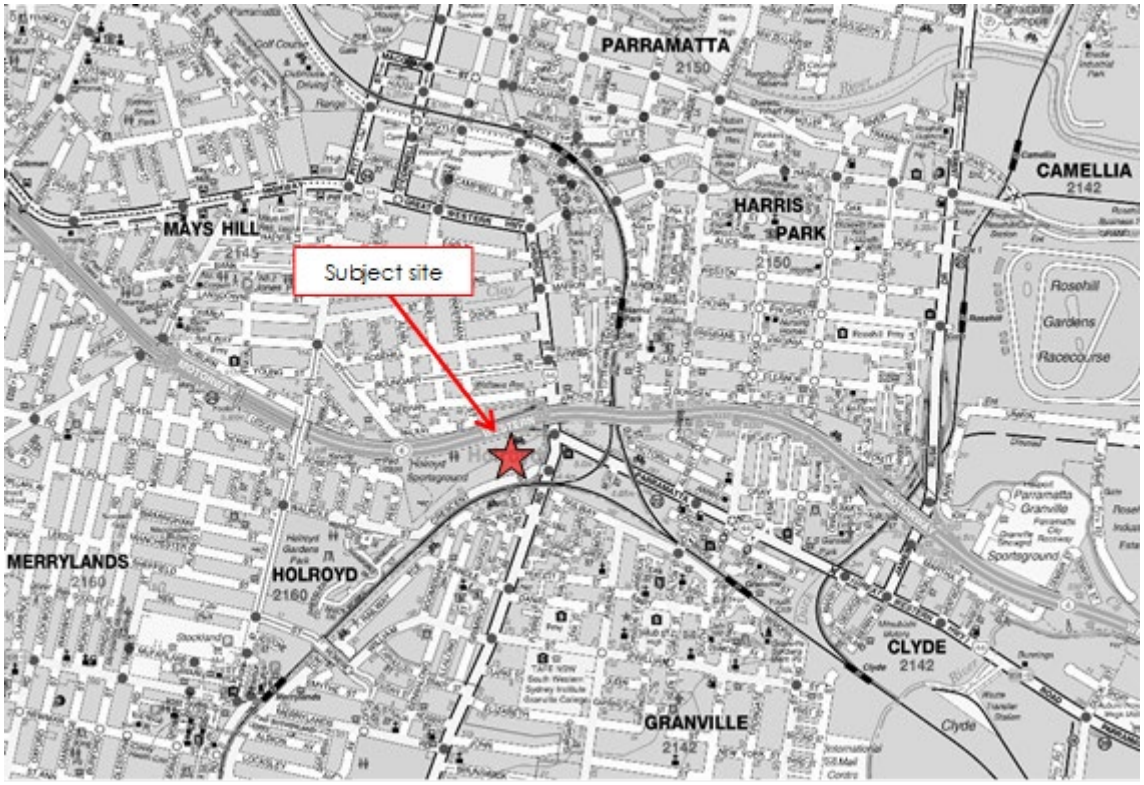
The site was formerly operated by WesTrac as a modern industrial facility providing administration offices, amenities, training facilities, workshops, machine servicing bays, spare parts warehousing, and on-site parking for specialist heavy earthmoving equipment and motor vehicles. The use has now ceased.

Whilst the site historically employed between 400 and 500 people, at the time of the initial traffic counts in 2015, the site employed approximately 125 people. At present the site is vacant.

According to the Cumberland Council (former Holroyd Council) Local Environmental Plan (LEP) 2013 the subject site is zoned as B5 Business Development. The surrounding properties predominately include mixed density housing (low, medium and high density), public recreation, and light industrial uses.

The location of the subject site and its surrounding environs is shown in Figure 3.1. Figure 3.2 shows the aerial map of the subject site.

Figure 3.1 Site Location



Source: UBD Directory (via Report by GTA Consultants, 2015)

Figure 3.2 Site Aerial – Post RMS Resumption

Source: Google Maps (via Report by GTA Consultants, 2015)

3.2 Road Network

3.2.1 Adjoining Roads

Crescent Street

Crescent Street is a local road with an east-west configuration and a 10m wide carriageway. It is a two-way road with one travel lane provided in each direction. Within the vicinity of the site double-line marking divides the opposing traffic lanes. It currently allows access from all directions to/from the site.

The sign-posted speed limit on Crescent Street is 50 km/h. Along the site frontage on-street parking is not provided, however, about 140m in length of unrestricted parking that could accommodate some 20 car spaces is provided south-west of the site.

Woodville Road

Woodville Road is classified as a State road and is aligned in a north-south direction. Proximal to the site, Woodville Road is a six-lane median divided road with a carriage width of approximately 19m. The sign-posted speed limit is 60 km/h.

Up to 300m south of the site, Woodville Road operates as a clearway between Monday and Friday, specifically from 6:00am - 10:00am and 3:00pm - 7:00pm.

Parramatta Road

Parramatta Road is also a State road providing two traffic lanes in each direction. Parramatta Road has a speed limit of 60 km/h and is generally configured in an east-west direction. Proximal to the site, clearways are in operation along Parramatta Road from Monday to Friday during peak times.

The following intersections currently exist in the vicinity of the site:

- Crescent Street / Woodville Road (signalised)
- Church Street / Parramatta Road / Woodville Road (signalised).
- M4 Eastbound Off Ramps

3.3 Traffic Volumes

GTA Consultants commissioned traffic movement counts on the following key roads in the vicinity of the site on Wednesday 25 May 2015 during 7:00am – 9:00am and 4:00pm – 6:00pm:

- Parramatta Road / Woodville Road
- Woodville Road / Crescent Street
- Crescent Street / Existing Site Access
- Pitt Street / Walpole Street.

The AM and PM peak hour traffic volumes are contained in Appendix A.

3.4 Intersection Operation

The operation of the key intersections has been assessed by TTPP using SIDRA Intersection 8, a computer-based modelling package which assesses intersection performance under prevailing traffic conditions.

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

Table 3.1 shows the criteria that SIDRA INTERSECTION adopts in assessing the level of service.

Table 3.1 SIDRA INTERSECTION Level of Service Criteria

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

Intersection analysis was conducted for the key intersections based on the existing peak hour flows and the estimated future peak hour flows, with and without the proposed development traffic. The network cycle time of 110 seconds has been adopted in all assessed scenarios. The analysis results for traffic conditions are presented in Table 3.2.

Table 3.2 Existing Operating Conditions

Intersection	Intersection Control	AM Peak Hour		PM Peak Hour	
		Average Delay (sec)	Level of Service (LOS)	Average Delay (sec)	Level of Service (LOS)
Parramatta Rd / Woodville Rd	Signals	53	D	90	F
Crescent St / Woodville Rd	Signals	101	F	25	B

The above results indicate that the Parramatta Road/Woodville Road intersection currently operates at LoS F during the PM peak period.

The Crescent Street/Woodville Road intersection also currently operates at LoS F during the AM peak period with the queues along Crescent Street extending past the site access intersection. Crescent Street/Woodville Road intersection is currently operating at its capacity during the AM peak period.

3.5 Public Transport

Railway

The site is located close to three train stations, namely, Harris Park in the north, Granville in the east and Merrylands in the south. The distance between the site and the following stations are:

- Harris Park – 750m – the station upgrade was completed in July 2018
- Granville – 1.1km
- Merrylands – 1.6km – A new car park with 98 spaces was completed in August 2018

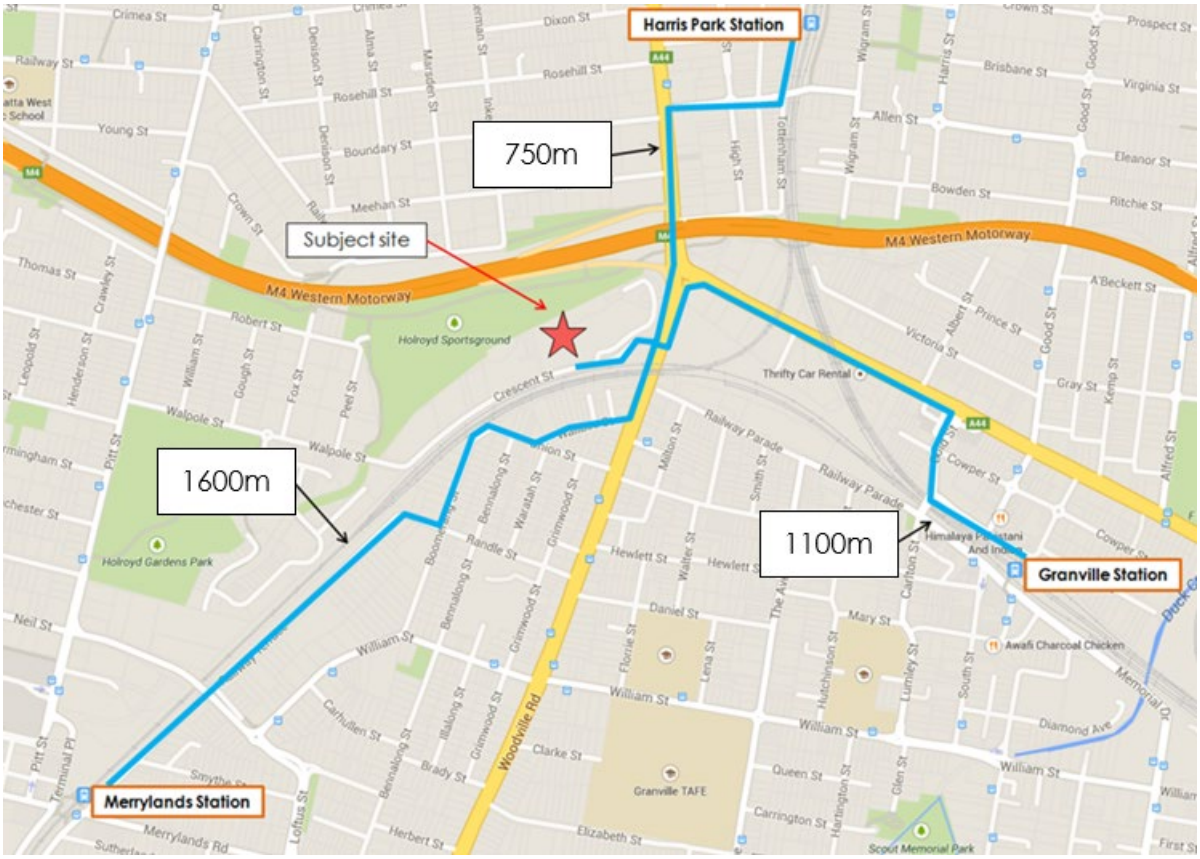
The frequency of current train services at all three stations is summarised in Table 3.3. the proximity of these stations to the site is shown in Figure 3.3.

Table 3.3 Public Transport Provision (Trains)

Station	Route Description	Frequency (to City)		
		Weekday AM Peak (7-9am)	Weekday PM Peak (4-6pm)	Weekday Off-Peak
Granville	T1 Western Line	15 mins	15 mins	30 mins
Harris Park	T1 Western Line T2 Inner West & South Line	15 mins	15 mins	30 mins
Merrylands	T2 Inner West & South Line	5-15 mins	15 mins	15 mins

Table 3.3 indicates that a good level of train services to the City is provided at these train stations.

Figure 3.3 Nearby Railway Stations – Walking Distances



Bus Service

There are bus stops within close walking distance to the site. However, those located in surrounding streets are summarised in Table 3.4.

Table 3.4 Public Transport Provision (Buses)

Location of stop	Route #	Route Description	Distance to Nearest Stop
Woodville Road	907	Bankstown to Parramatta via Bass Hill and Villawood	450m
Halsall Street	M91	Hurstville to Parramatta via Padstow, Bankstown and Chester Hill	350m
Pitt Street	802	Liverpool to Parramatta via Cartwright, Miller, Bonnyrigg, Fairfield, Merrylands	1km
	804	Liverpool to Parramatta via Hinchinbrook, Bonnyrigg, Greenfield Park, Fairfield, Merrylands	
	806	Liverpool to Parramatta via Mt Pritchard, Abbotsbury, Prairiewood, Wetherill Pk, Merrylands	

3.6 Pedestrian and Cyclist Infrastructure

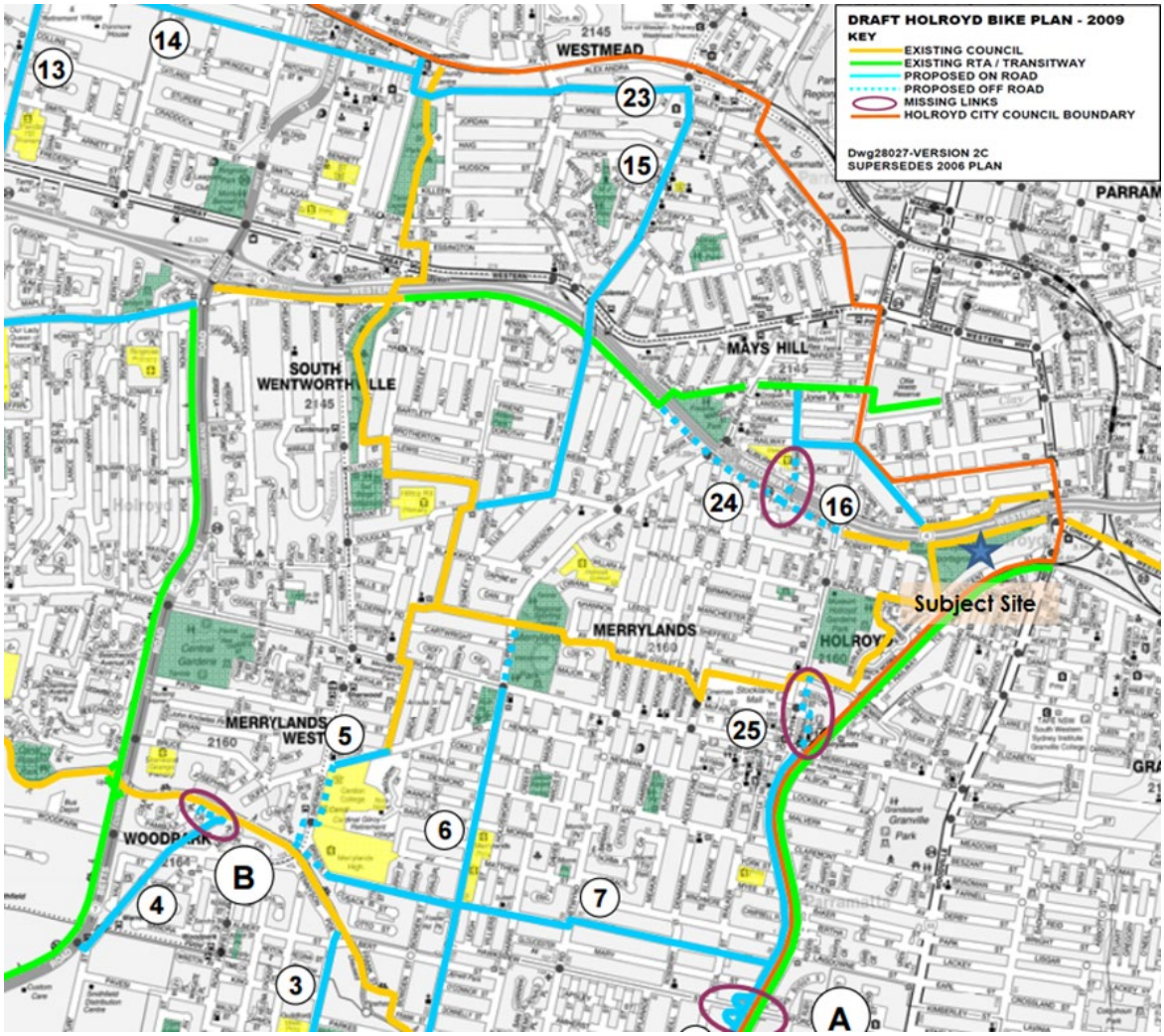
Along the site frontage there is a formal pedestrian paths on the northern side of Crescent Street. Footpaths are located on both sides of Woodville Road.

Nearby signalised crossing points with marked foot crossings include:

- Crescent Street / Woodville Road – western leg
- Church Street / Parramatta Road / Woodville Road – eastern, southern and western legs.

Figure 3.4 shows the cycle network map for the Holroyd area. It can be seen that the off-road bicycle route currently exists along the northern boundary of the Holroyd Sportsground and is therefore very close to the subject site.

Figure 3.4 Map of Planned Bike Paths



Sourced from Holroyd City Council (http://www.holroyd.nsw.gov.au/PDFs/Info%20Hub/Roads%20&%20Transport/Map%20of%20Planned%20Bike%20Paths.pdf)(2015 GTA Report)

4 Existing Context

4.1 Living Holroyd: Community Strategic Plan 2013

The proposed redevelopment of the site will contribute to the following:

- Provide additional jobs to meet forecast of 8,000 new jobs by 2031 for Holroyd
- Aligns with the vision for Holroyd
- Contribute to the provision of an extra 11,000 new homes in the next 20 years
- Meet the vision objectives of providing new pedestrian and cycle pathways
- Meeting community concerns around housing and density, the provision of infrastructure and services and supporting the revitalisation of surrounding centres, including Merrylands and Parramatta
- Contribute to the initiatives of the strategic plan
- Meeting the key community outcomes sought through the Community Strategic Plan.

4.2 Holroyd Residential Development Strategy 2012

The proposed redevelopment of the site will contribute to the following:

- meeting the identified State governments dwelling targets
- ensure that future residential development responds to community needs and expectations
- consideration is given to future resident's safety and amenity, especially adjacent the current light industrial uses to the west of the site where conflict between land uses will need to be minimised
- the site is well connected by bus or pedestrian access to surrounding centres and transit nodes, which would allow the potential development of the site as a high-density mixed-use development.

4.3 A Metropolis of Three Cities - the Greater Sydney Region Plan

The objectives of A Metropolis of Three Cities to ensure planning and land use of the Greater Sydney Region is respectful, equitable and sustainable. The three cities being the Eastern Harbour City, the Central River City and the Western Parkland City.

Of critical importance in the plan are: -

- the integration of the mass transit network with the economic corridors, centres, transit-oriented development, urban renewal and health and education precincts

- the connectivity between the rail freight and strategic road networks and the trade gateways and industrial areas

While each of the three cities will require new infrastructure, the focus will vary according to:

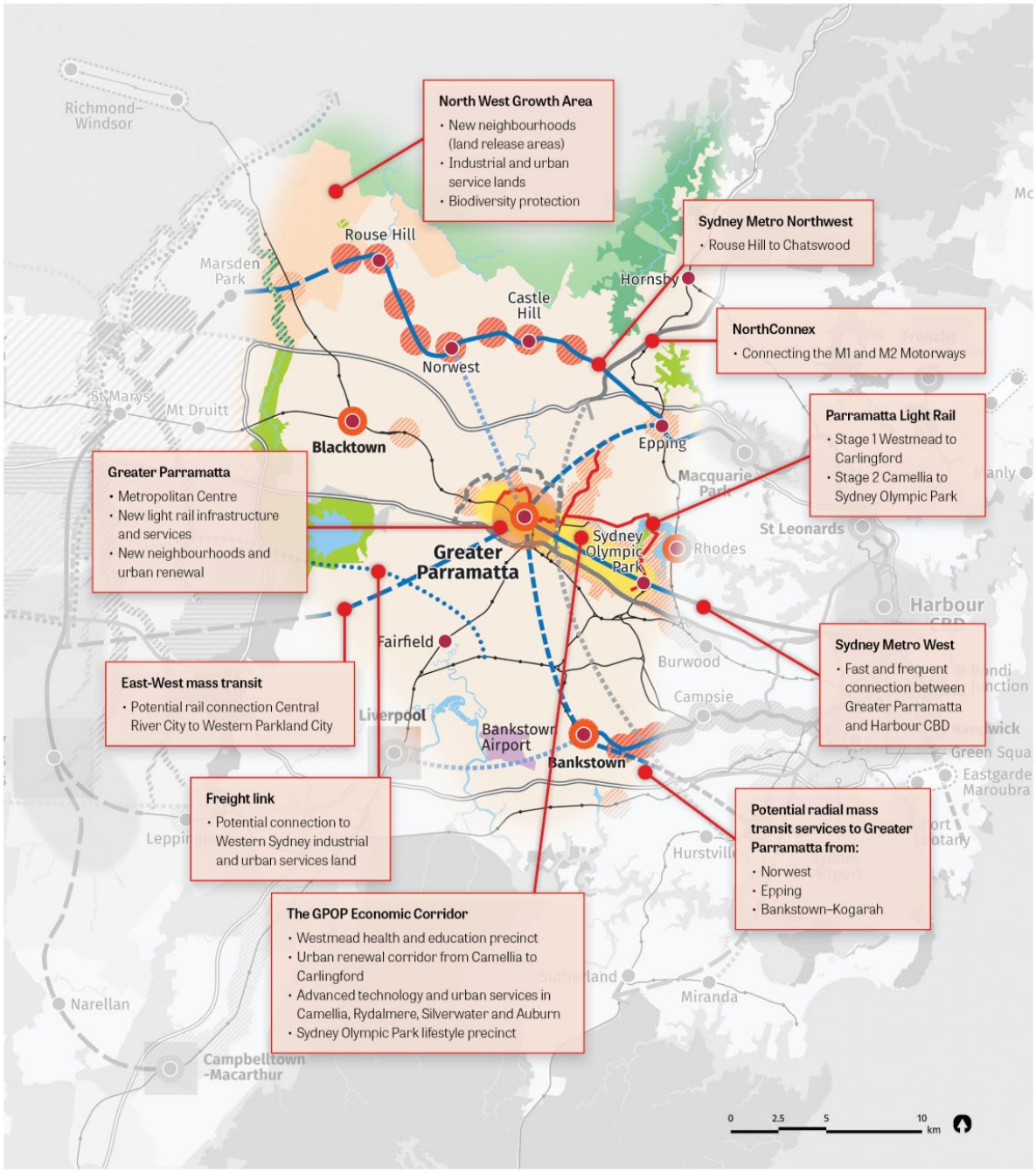
- existing infrastructure and services, capacity and industry and housing activity
- existing levels of committed investment
- the time scale of development.

The Central River City will grow substantially capitalising on its location close to the geographic centre of Greater Sydney. Unprecedented public and private investment is contributing to new transport and other infrastructure leading to a major transformation of the Central River City.

The Sydney Metro West rail link will deliver faster and more efficient transport from the Harbour CBD to Greater Parramatta. Potential radial mass transit/rail services from Greater Parramatta will boost business-to-business connections and provide access to a larger skilled labour force to support the growing metropolitan centre.

The Sydney Metro Northwest rail link will improve the growth prospects for the north-west of the city by increasing the access to jobs.

Figure 4.1 Plans for Central River City



Source: https://www.greater.sydney/portal/metropolis-three-cities/vision-metropolis-three-cities/central-river-city-vision

4.4 Parramatta Light Rail

Parramatta Light Rail is one of the NSW Government's latest major infrastructure projects being delivered to serve a growing Sydney. Light rail will create new communities, connect great places and help both locals and visitors move around and explore what the region has to offer.

Stage 1 will connect Westmead to Carlingford via the Parramatta CBD and Camellia with a two-way track spanning 12 kilometres, and is expected to open in 2023. The route will link Parramatta's CBD and train station to the Westmead Precinct, Parramatta North Growth Centre, the new Bankwest Stadium, the Camellia Town Centre, the new Powerhouse Museum and Riverside Theatres, the private and social housing redevelopment at Telopea, Rosehill Gardens Racecourse and three Western Sydney University campuses.

By 2026, around 28,000 people will use Parramatta Light Rail every day and an estimated 130,000 people will be living within walking distance of light rail stops.

In October 2017, the NSW Government announced the preferred route for Stage 2 which will connect Stage 1 and the Parramatta CBD to Ermington, Melrose Park, Wentworth Point and Sydney Olympic Park along a nine-kilometre route.

4.5 Parramatta Urban Transformation Strategy

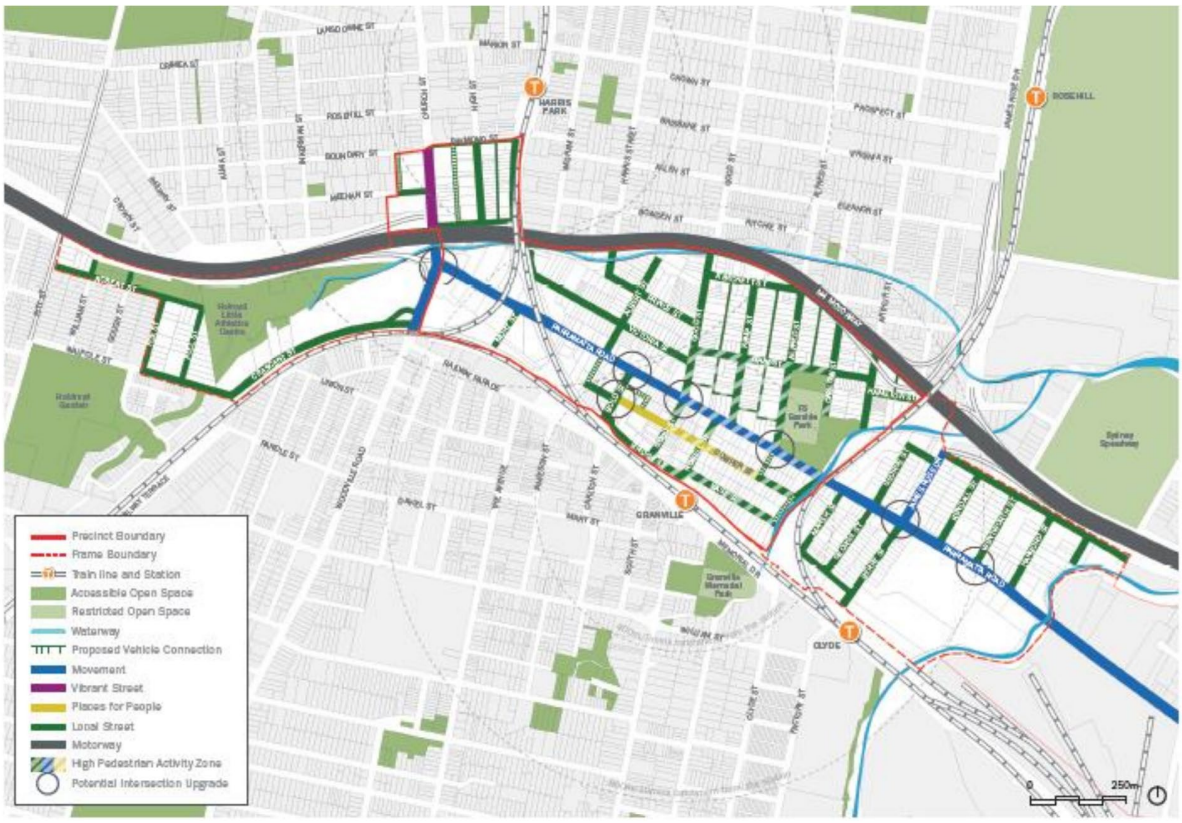
The Parramatta Road Corridor Urban Transformation Strategy seeks to support growth, and make the Parramatta Road Corridor (the Corridor) a better place to live work and visit. The Strategy sets out the vision and land use and transport principles to accommodate 27,000 new homes and 50,000 jobs in a range of industries across the Corridor over the next 30 years.

To realise the Corridor's potential, the Strategy sets out a framework for:

- more efficient and reliable public transport that will connect people and places from east to west and north to south
- housing supply and provision of diverse and affordable housing
- a productive business environment that supports a range of prosperous businesses and a variety of employment opportunities
- a series of well-serviced and well-connected communities where people will want to live
- a diverse range of spaces, places and links for people to visit, connect with and enjoy
- implementation and successful delivery.

Figure 4.2 shows the proposed transport concept.

Figure 4.2 Transport Concept



Source: Parramatta Road Corridor - Urban Transformation Strategy - Precinct Transport Report https://www.landcom.com.au/assets/Projects/Parramatta-Road/Publications-161109/Strategy-Documents/1.-Parramatta-Road-Urban-Transformation-Precinct-Transport-Report-November2016.pdf

4.6 Proposed Western Sydney Regional Ring Road

Parramatta City Council is proposing a regional ring road to address traffic congestion resulting from the entangling of cross regional car and freight flows. The proposed regional ring road would also improve efficiency in the road network so that the population of Western Sydney can access employment and training opportunities close to home. A series of intersection upgrades are proposed along the M4 Motorway, James Ruse Drive and Cumberland Highway to create a free-flowing arterial road network and allow traffic to circumnavigate Parramatta quickly and efficiently. Parramatta Council is also developing a City Ring Road to complement the Regional Ring Road.

Figure 4.3 shows the proposed Regional and City Ring Roads.

Figure 4.3 Proposed Western Sydney Regional Ring Road

Source: https://www.cityofparramatta.nsw.gov.au/sites/council/files/inline-files/pdf%2019%20-%20Parramatta%20CBD%20Strategic%20Transport%20Study.pdf (GTA Report 2015)

In the vicinity of the subject site, Project Number 5 on the plan above was identified as a Stage 2 upgrade to increase access to the M4 from Woodville Road and Church Street at a cost of $4 million.

4.7 WestConnex

WestConnex is a three-stage upgrade of the M4 Western Motorway which encompasses 33km of road upgrades in the form of road widening and tunnelling. The project will use a combination of above and below ground motorways in order to save up to 40 minutes of travel time between Parramatta and Sydney Airport. Stage 1 (Parramatta to Haberfield) of the project will be completed in two sections:

- Widening of the M4 Western Motorway in both directions for 7.5km between Church Street, Parramatta and Homebush Bay Drive
- Widening the M4 (east) and new 5km tunnel (under the Parramatta Road corridor) connecting Homebush Bay Drive with Parramatta Road and City West Link, Haberfield.

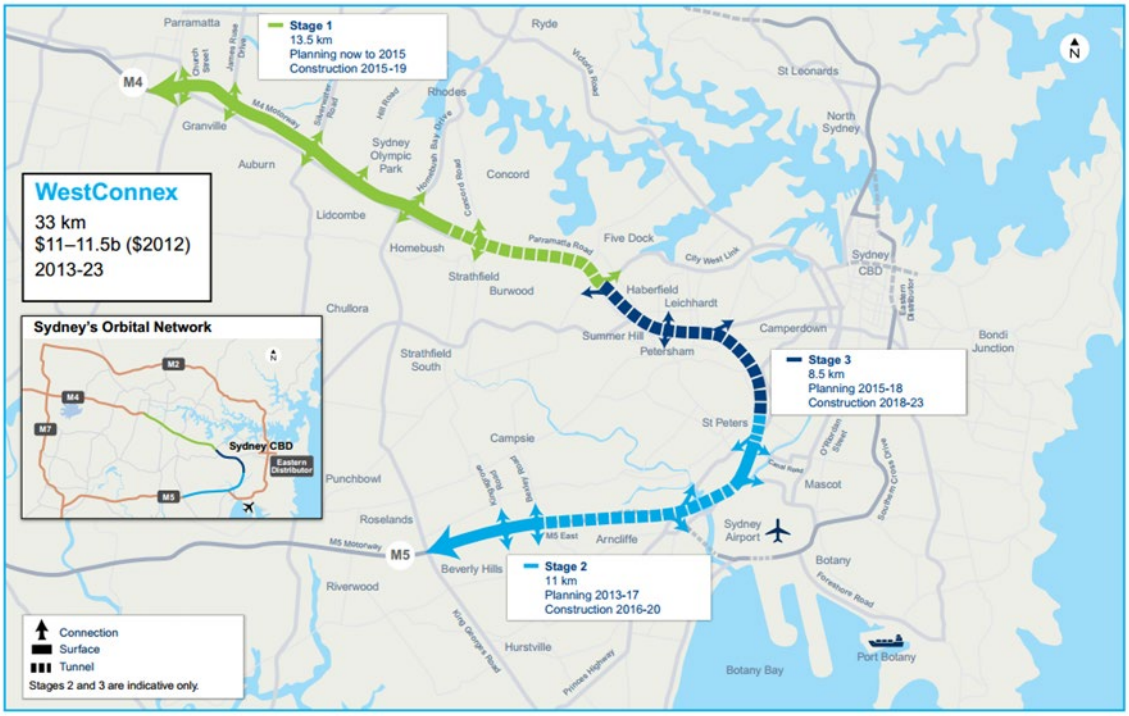
Along with the proposed works for widening and tunnelling, the M4 new motorway access points are to be introduced, including:

- Eastbound access to Westmead and Parramatta from the M4 near Coleman Street

- Westbound access from Parramatta at Church Street to the M4.

The staging of works for WestConnex is shown in Figure 4.4.

Figure 4.4 WestConnex – Stage 1: Parramatta to Haberfield



Source: WestConnex Fact Sheet – Stage 1: Parramatta to Haberfield

Within the context of the WestConnex renewal of the Parramatta Road corridor, these areas will have particular importance and are suitable for transport-oriented development, yield and density. The subject site has the opportunity to be Holroyd's gateway site at the western end of the Stage 1 of the WestConnex Project.

As a result of WestConnex, it is anticipated that there will be reductions in traffic volumes on both Parramatta Road and Woodville Road.

4.8 Sydney's Bus Future: Rapid Bus Routes

Sydney's Bus Future, December 2013 document outlines the NSW Government's long-term plan for the bus network to meet customer needs.

The proposed upgrade for the Sydney bus network will include the addition of new rapid bus routes while maintaining and improving elements of the existing bus network, such as cross-city services on Metro bus routes. The additional rapid bus services are intended to operate every 10 minutes (or more often) during the week, between 6am and 7pm, and every 15 minutes on weekends.

Rapid bus routes will offer faster and more reliable bus travel for commuters between major city centres as extra services are planned to be implemented and bus stops to be further dispersed along routes, generally spaced 800m to1km apart.

Existing suburban and local service routes will remain to provide commuter access to local, neighbourhood destinations. An additional 20 suburban routes are to be introduced.

Proposed network upgrades would fill the gaps in the heavy rail network, strengthening links from the Parramatta region to areas including Norwest, Castle Hill, Macquarie Park, Ryde, Bankstown, and Liverpool.

The proposed rapid bus routes include:

- Castle Hill to Liverpool via Parramatta
- Parramatta to the CBD via Ryde
- Rouse Hill to Hurstville via Parramatta and Bankstown
- Mona Vale to the CBD
- Maroubra Junction to the CBD
- North Bondi to the CBD
- Castle Hill to the CBD.

The proposed rapid bus routes connecting Parramatta to western suburbs is shown in Figure 4.5.

Figure 4.5 Parramatta Rapid and Suburban Bus Routes

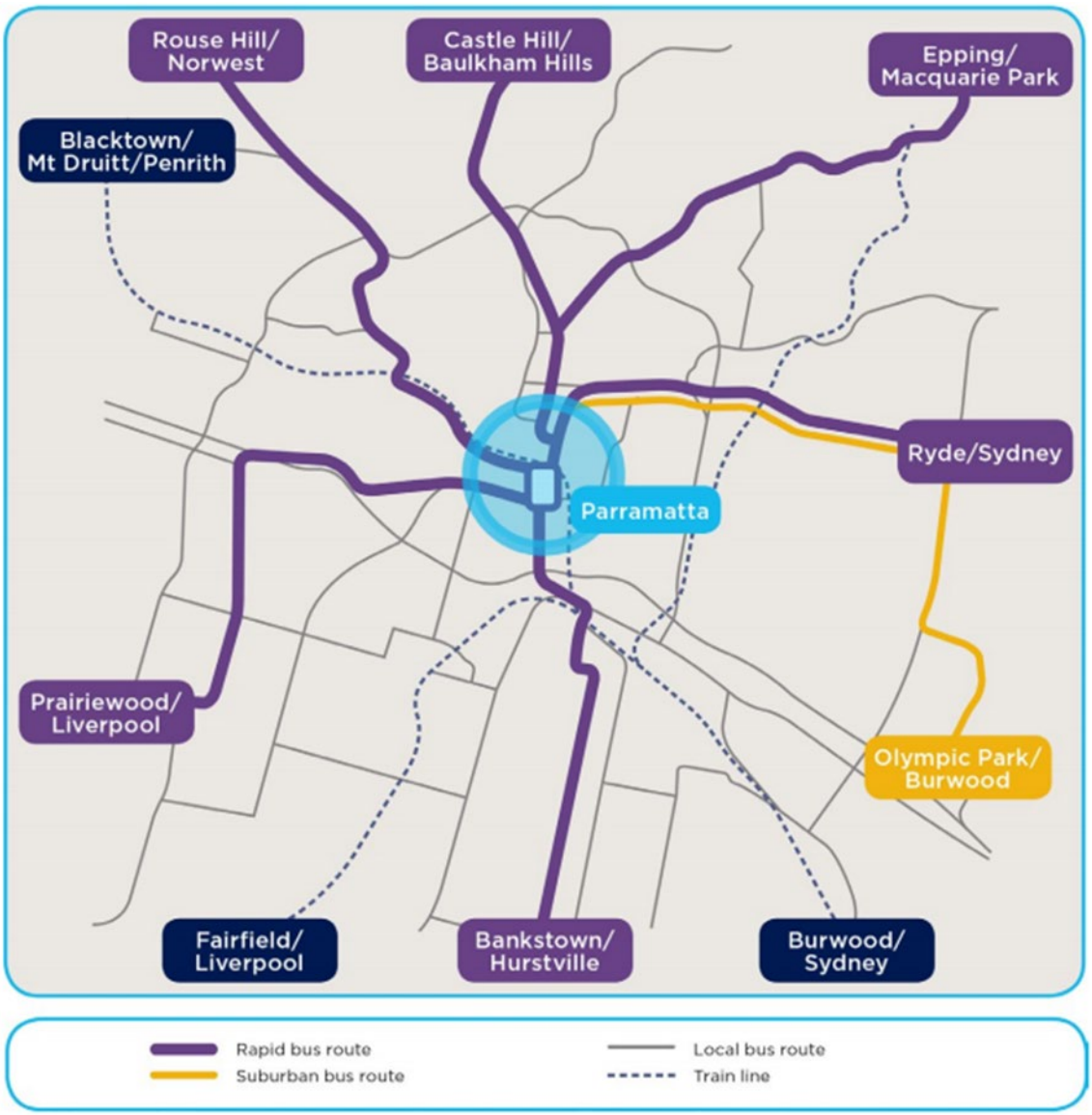


Image source: Sydney's Bus Future 2013 (GTA Report 2015)

5 Planning Proposal

The planning proposal includes the demolition of the existing industrial building and the construction of a new high-density mixed-use development.

It is intended that the proposal will seek to rezone the site to deliver a high-density mixed-use development, as summarised in Table 5.1.

Table 5.1 Development Schedule

Use	Size
Residential	1109 - 1255 units
Retail (shopping centre)	7,752.5 m²
Office	7,752.5 m²

Figure 5.1 presents the indicative masterplan layout of the planning proposal.

Figure 5.1 Indicative Masterplan Layout

As shown in the above figure, three vehicular access points are proposed. The access driveway closest to the Woodville Road intersection would be predominately used by retail development. The remaining two access points will generally be used by residential components. All three access roads will provide two-way vehicular flows.

The proposed car parks would accommodate car parking spaces in accordance with Council's requirements.

It is proposed to enhance pedestrian and cycle connectivity between the site and Holroyd Sportsground by providing a connection through A'Becketts Creek. This link will then be improved, subject to consultation with council and in line with council's own plans to improve these links, to provide better connections to existing railway stations. Pedestrians will effectively follow the existing traffic routes using traffic signals and other facilities to cross the roads. This will result in no deal to traffic but will not prioritise pedestrians as they would have to wait for pedestrian phases to be activated at those traffic signals encountered on their route.

6 Car Parking

The car parking requirements for different development types are set out in Holroyd City Council's *Holroyd Development Control Plan (DCP) 2013*. The following minimum and maximum parking requirements are presented in this DCP:

Residential dwellings in R4 high density residential zone:

- Studio/1-bedroom – 1 (min.) to 1.5 (max.) spaces/ dwelling
- 2-bedroom – 1 (min.) to 2 (max.) spaces/ dwelling
- 3-bedroom – 1.2 (min.) to 2 (max.) spaces/ dwelling
- Visitor parking – 0.2 (min.) to 0.5 (max.) spaces/ dwelling

Residential dwellings in B4 mixed use zone:

- Studio/1-bedroom – 0.8 (min.) to 1.0 (max.) spaces/ dwelling
- 2/3-bedroom – 1 (min.) to 1.2 (max.) spaces/ dwelling
- Visitor parking – 0.2 (min./max.) spaces/ dwelling

Commercial (including retail premises in B4 zone):

- 1 space/50m^2 (min.) to 1 space/15m^2 (max.)

Whilst the exact mix of the residential units has not been developed at the Planning Proposal stage, based on our experience elsewhere, the following residential mix has been assumed:

- 1-bedroom units – 50%
- 2-bedroom units – 45%
- 3-bedroom units – 5%

It is also estimated that approximately 60% of the residential development would be contained within the eastern portion of the site, which would be rezoned to B4 mixed use zone. The remaining 40 % of the residential development is proposed to be R4 high density residential zone.

The proposed development results in the following car parking requirements as summarised in Table 6.1.

Table 6.1 Car Parking Requirements

Use	Size	Parking Rates		Parking Requirements	
		Min.	Max.	Min.	Max.
Residential (R4 zone)					
1-bedroom unit	221-250 units	1 space/unit	1.5 space/unit	221-250	331-375
2-bedroom unit	199-225 units	1 space/unit	2 space/unit	199-225	398-450
3-bedroom unit	22-25 units	1.2 space/unit	2 space/unit	27-30	44-50

Visitor space	-	0.2 space/unit	0.5 space/unit	89-100	221-250
Residential (B4 zone)					
1-bedroom unit	332-376 units	0.8 space/unit	1 space/unit	265-300	331-375
2-bedroom unit	299-339 units	1 space/unit	1.2 space/unit	298-338	357-405
3-bedroom unit	35-39 units	1 space/unit	1.2 space/unit	34-38	40-45
Visitor space	-	0.2 space/unit	0.2 space/unit	132-150	132-150
Commercial					
Retail	7,752.5m^2	1 space/50 m^2	1 space/15 m^2	155	517
Office	7,752.5 m^2	1 space/50 m^2	1 space/15 m^2	155	517
Total				**1,570-1,736**	**2,871-3,117**

Based on the above, the proposed high-density mixed-use development would be required to provide a minimum of 1,570 to 1,736 car parking spaces and a maximum of 2,871 to 3,117 car parking spaces.

The development proposes to provide car parking spaces in accordance with the Council's car parking requirements. Car parking assessment would be reviewed in the DA stage when the exact residential unit number and mix is determined.

7 Traffic Impact Assessment

7.1 Traffic Generation

Traffic generation estimates for the proposed mixed-use development have been sourced from the *Guide to Traffic Generating Developments* (RMS 2002) & its supplementary technical direction (TDT 2013/04a). The following peak hour traffic generation rates have been used:

- High density residential flat buildings – 0.29 trips per unit for AM/PM (N.B. Whilst TDT 13/04a has suggested that traffic generation could be as low as 0.16 peak hours trips when close to a railway line, the trip generation at this site is likely to be slightly higher)
- Retail (supermarket) – 12.3 trips per 100m^2 GFA
- Office – 1.6 trips per 100m^2 GFA

In addition to above RMS traffic generation rates, the following assumptions were adopted:

- 20% reduction factor is applied to the above trip rates for retail and office uses to account for trips, which will be contained within the site boundary.
- 28% of retail generated trips will be "pass-by" trips (i.e. the new development is an intermediate stop on a trip that is made from an origin to a destination). This assumption is adopted from *Guide to Traffic Management Part 12: Traffic Impacts of Development* Commentary 8 – Linked Trips.
- AM traffic generation will be 50% of the PM trips for retail and office uses.

The survey of the site access indicated that the existing industrial site currently generates 35 and 34 vehicles per hour during the AM and PM peak hours, respectively.

Table 7.1 presents the total traffic generation of the proposed development then subtracts the traffic generated by the existing industrial site.

Table 7.1 Resultant Traffic Generation by the Proposal

Development Generated Traffic	Peak Hour Traffic (vehicles per hour)	
	AM Peak Hour	PM Peak Hour
Residential	363	363
Retail	275	549
Office	50	74
Total	+ 688	+ 986
Current Industrial Site Traffic	**- 35**	**- 34**
Resultant Increase	**+ 653**	**+ 952**

It is expected that the net change in traffic volumes would be in the order of 653 in the AM peak hour and 952 vehicles in the PM peak hour. These figures, which are lower than the 2015 GTA figures, have been adopted for the post development traffic modelling purposes.

The traffic directional distribution adopted in this report, which is based on Journey to Work data, is consistent with the earlier transport impact assessment. Similarly, the traffic growth projections used are the same as those in the 2015 GTA report.

7.2 Trip Distribution

The directional distribution for residential traffic was assumed to be 20% inbound and 80% outbound during the AM peak period. These inbound/outbound percentages are reversed in the PM peak period.

For traffic arising from the commercial / retail functions, 80% of the traffic was assumed to be inbound while the remaining 20% would be outbound during the AM peak period. The inbound/outbound percentages are assumed to be 50% each in the PM peak period.

The development traffic was distributed on the local road network based on 2011 journey to work data of the Holroyd area (specifically travel zones 1223 and 1274).

The distribution factors are presented in Table 7.2.

Table 7.2 Development Traffic Distribution Percentages

To/From Directions	Residential	Other Uses
Church St-North	5%	8%
M4-West	10%	25%
Parramatta Rd/M4-East	32%	15%
Walpole St-North	20%	14%
Walpole St-South	33%	20%
Woodville Rd-South	-	18%
Total	100%	100%

Using the above traffic distribution percentages and the resultant increase in traffic generated by the proposal presented in Table 7.1, the development generated traffic is assigned to the key external road network. The post development intersection flow diagrams for the AM and PM peak hours are presented in Appendix A.

In addition, as presented in Table 7.3, the existing external intersections such as Parramatta Road/Woodville Road and Crescent Street/Woodville Road intersections are currently operating at level of service F during the commuter peak period. Hence, it is expected that the background growth along Parramatta Road and Woodville Road would be extremely limited unless significant infrastructure improvements are made to the regional routes and key intersections.

7.3 Proposed Intersection Improvements

Observations from the site visit of the area indicated that during the AM peak hours, the queues along Crescent Street approaching the Woodville Road intersection extend past the existing site access intersection. The Crescent Street/Woodville Road intersection currently operates at LoS F during the AM peak period and the Parramatta Road/Woodville Road intersection currently operates at LoS F during the PM peak period.

In order to improve the existing traffic conditions, it is proposed to upgrade the following key intersections:

- Parramatta Road and Woodville Road (signalised)
- Woodville Road and the Crescent Street intersection (signalised).

Figure 7.1 shows an indicative updated design layout of the Parramatta Road / Woodville Road intersection.

Figure 7.1 Indicative Layout of the Upgraded Parramatta Road & Woodville Road Intersection

Source: TTPP

The key features of the upgrade at the Parramatta Road and the Woodville Road intersection include:

- Provision of an additional westbound right turn lane and an additional westbound through lane in Parramatta Road
- Provision of a short northbound right turn lane in the Woodville Road approach to the intersection
- Conversion of the northbound shared through and right turn lane into a through lane in the Woodville Road approach to the intersection.

Figure 7.2 shows an indicative updated design layout of the Woodville Road/ Crescent Street intersection.

Figure 7.2 Indicative Layout of the Upgraded Woodville Road and Crescent Street Intersection

Source: GTA Consultants

Key features of the upgrade at the Woodville Road and The Crescent intersection include:

- Provision of an additional eastbound left turn lane in The Crescent
- Provision of an additional southbound through lane in the Woodville Road approach and the southbound downstream short lane south of The Crescent
- Provision of an extension to the existing dual left turn bay from 30m to 140m in length on The Crescent
- Provision of a right turn bay on Crescent Street approaching the site from Woodville Road.

7.4 Intersection Operation

The following modelling scenarios were assessed based on the yields given in Table 7.1.

1. **Base case** – this scenario represents the current performance of the network and a starting point for comparative purposes.
2. **Existing year development** – this scenario included future road network and the existing traffic demand, plus the development traffic associated with the proposed mixed development.
3. **Future base case** – this scenario included the future road network and the 2025 traffic demand forecast taking into account the background traffic growth based on the growth data used in the 2015 GTA report.
4. **Future year with development** – this scenario included the future road network and the 2025 traffic demand forecast taken into account the Scenario 2 base case traffic, plus the development traffic associated with the proposed mixed development.

Models based on the scenarios above were run using SIDRA and the results are shown in Table 7.3.

Table 7.3 Intersection Operating Conditions

Scenario	Network	Intersection	AM Peak Hour		PM Peak Hour	
			Avg Delay (sec/veh)	Level of Service	Avg Delay (sec/veh)	Level of Service
1. Base Case	Existing	Parramatta Road/Woodville Road	53	D	90	F
		Woodville Road/The Crescent	101	F	25	B
2. Existing year (with development)	Upgrade	Parramatta Road/Woodville Road	47	D	32	C
		Woodville Road/The Crescent	12	A	19	B
3. Future year (without development)	Upgrade	Parramatta Road/Woodville Road	36	C	28	B
		Woodville Road/The Crescent	9	A	15	B
4. Future year (with development)	Upgrade	Parramatta Road/Woodville Road	55	D	55	D
		Woodville Road/The Crescent	30	C	37	C

The above results indicate that the Parramatta Road/Woodville Road intersection currently operates at LoS F during the PM peak period.

The Crescent Street/Woodville Road intersection also currently operates at LoS F during the AM peak period with the queues along Crescent Street extending past the site access intersection. Crescent Street/Woodville Road intersection is currently operating at its capacity during the AM peak period.

The Scenario 2 results indicate that the proposed intersection upgrades would significantly improve the intersection operating conditions. The intersections would operate at LoS D or better in the existing year, even if the additional traffic associated with the proposed development is included.

The Scenario 3 results indicate that the proposed intersection upgrades would provide sufficient capacity to accommodate the future traffic volumes in the future year, assuming the proposed development is excluded. The intersections would operate at LoS C or better in the future year without the proposed development.

The Scenario 4 results indicate that the assessed intersections would continue to operate acceptably in the future year with the inclusion of the additional traffic volumes associated with the proposed development. The average intersection delay would increase from 36 seconds to 55 seconds in the AM peak period and increase from 28 to 55 seconds in the PM peak period in the future year if the proposed development is included. The intersections would operate at LoS D or better in the future year.

- The existing external intersections such as Parramatta Road/Woodville Road and Crescent Street/Woodville Road intersections are currently operating at its capacity with level of service F during the commuter peak periods.
- The proposed intersection upgrade would significantly improve the intersection operating conditions with sufficient capacity to accommodate the existing and future traffic volumes. The intersections are expected to operate acceptably at LoS D or better taking into account the additional traffic associated with the proposed mixed-use development and future traffic growth.

Refer to Appendix A for traffic flow diagrams of the Parramatta Road/Woodville Road and Crescent Street/Woodville Road intersections.

8 Travel Demand Management

Transport is a necessary part of life which has effects that can be managed. The transport sector is one of the fastest growing emissions sectors in Australia and travel demand management provides an opportunity for reducing greenhouse gases. As well as delivering better environmental outcomes, providing a range of travel choices with a focus on walking, cycling and public transport will have major public health benefits and will ensure a strong and prosperous community at the site and in the surrounding suburbs.

The planning of the new large development will need to accommodate innovative ideas to manage the transport demand of the project. Whilst it will be necessary to manage the traffic impacts of the development, it will be necessary to introduce new measures to ensure that the movement trips generated by the proposed development are not all car based (particularly single occupancy trips).

8.1 Potential Measures

Some of the measures that will be incorporated to minimise single vehicle car travel are:

- Implementing limited parking ratios
- Providing cycle parking/facilities
- Encouraging car sharing/car club cars
- Promoting a green travel plan.

8.1.1 Car Parking Ratios

One of the most effective ways to reduce traffic congestion and pollution, and encourage a shift to sustainable transportation modes, is through parking reform, specifically the provision of minimum approved on-site parking.

Excessive off-street parking requirements can harm the environment by encouraging traffic and its associated pollution, high parking requirements can make housing prohibitively expensive to build, particularly for affordable housing especially where the cost of land is relatively high. Every parking space increases the amount of land that needs to be developed and each parking space can cost up to $40,000 per space.

Any reduction in such parking rates does however require the provision of alternative good quality non-car based transport.

8.1.2 Cycle Parking

Cycling is becoming increasingly recognised for the contribution it can make as being a sustainable and healthy form of transport for trips within and around our towns and cities.

There are two main elements to providing a quality cycle outcome:

- Provision of corridor infrastructure
- Provision of good quality parking facilities.

As described in Section 5 of this report, it is intended to provide a connection through A'Becketts Creek to enhance pedestrian and cycle connectivity between the site and Holroyd Sportsground. This will tie into existing cycle ways.

Cycle parking needs to be allowed for early in the development layout, as space needed to accommodate cycles can be significant. The importance of well thought out design cannot be overstated, as all too often space set aside for cycle parking is left half empty because it is either not possible to manoeuvre cycles into designated spaces, or the location is inconvenient. This in turn leads to cycles being left attached to railings or street furniture nearer entrances. Consequently, cycle parking both for residents and visitors will be incorporated into the design.

8.1.3 Evidence of Less Car Ownership

Whilst over the last 30 years there has been a long-term trend towards higher rates of car ownership in the population, there is evidence that people aged under 35 are becoming less likely to hold a driver's licence.

Papers such as "*Why are young people driving less? Trends in licence-holding and travel behaviour*" presented at the Australasian Transport Research Forum in Canberra in 2010, examined licence-holding trends for young people in NSW and Sydney, explores possible reasons for these trends, and their policy and planning implications.

The report concluded that "*transport modelling and transport planning needs to begin to adjust to this new paradigm of lower levels of licence-holding by young people. The increasing importance of public transport access to jobs, services, and local shopping opportunities are clear, and are already reflected in the NSW State Plan priority of improving public transport access to key major centres in the metropolitan region. There is also an opportunity for cycling and walking to play a much larger role in the transport task for this age group*".

The changes observed in this paper should be viewed as a positive trend for road safety, for the environment, and for more liveable cities. These findings also acknowledge that the transport planner's toolkit is much larger than transport infrastructure and service provision. Education policies, licensing policies and communications developments are all possible contributors to this significant new trend.

8.1.4 Car Share

Car share is a concept by which members join a car ownership club, choose a rate plan and pay an annual fee. The fees cover fuel, insurance, maintenance, and cleaning. The vehicles are mostly sedans, but also include SUVs and station wagons. Each vehicle has a home location, referred to as a "pod", either in a parking lot or on a street, typically in a highly-populated urban neighbourhood. Members reserve a car by web or telephone and use a key card to access the vehicle.

Similarly located councils (i.e. City of Canada Bay Council) have reported that "*each share car replaces between 8 and 23 private car parking spaces, depending on the location of the development*". Consequently, provision of car share in the site should be able to reduce both the parking demand for the site and the traffic generated by it.

There are numerous examples in Sydney, and elsewhere in Australia, where one of the main operators, GoGet, has provided car share cars to reduce the environmental impact of the development (http://www.goget.com.au/developer-partners/) some of which are listed below:

- Central Park Sydney, Chippendale NSW - 2100 apartments, 2000 parking spaces, 44 GoGet on-site pods
- Trio Apartments, Camperdown NSW - 397 apartments, 355 parking spaces, 10 GoGet on-site pods
- Belvedere Apartments, North Sydney NSW, 195 apartments, 140 parking spaces, 3 GoGet on-site pods.

In addition, to minimise car travel, consideration should be given to connecting staff working at the site to carpool together by creating a Carpooling club or registry/forum.

Clearly, the subject site would be an ideal location for the introduction of similar car share spaces.

8.1.5 Green Travel Plan (GTP)

A GTP is a package of measures aimed at promoting and encouraging sustainable travel and reducing reliance on the private car. It is not designed to be 'anti-car', but will make apparent, encourage and support people's aspirations for carrying out their daily business in a more sustainable way. GTPs can provide both:

- measures which encourage reduced car use (disincentives or 'sticks')
- measures which encourage or support sustainable travel (also known as Active Transport), reduce the need to travel or make travelling more efficient (incentives or 'carrots').

Active transport relates to physical activity undertaken as a means of transport. It includes travel by foot, bicycle and other non-motorised vehicles. Use of public transport is also included in the definition as it often involves some walking or cycling to pick-up points, and from drop-off points.

Such travel plans have been implemented by GTA Consultants at sites such as Harold Park in Sydney. At that site, the following measures are provided:

- Compliance with the stringent parking controls applicable to the site.
- Creation of street networks and associated cycle ways, footpaths and links to encourage cycling and walking.
- Provision of a Transport Access Guide which would be given to every new occupant of a dwelling.
- Provision of public transport noticeboards to make residents and visitors more aware of the alternative transport options available to them. The format would be based upon the Transport Access Guide.
- Provision of yearly membership to a GoOccasional car share which would have dedicated cars and dedicated parking spaces reasonably close to the proposed development.
- Provision of free weekly light rail and travel ten bus tickets for the initial occupation of the dwellings so that residents will be encouraged to make public transport their modal choice from the day they occupy the property. The provision of Opal cards with prepaid credits is likely to be the preferred method of ticket for future precincts when the Opal system is fully rolled out.
- All properties will be provided with high quality telecommunication points which will provide residents with the opportunity to work at home and to reduce the need to travel.
- Provision of bicycle parking spaces both for residents and for visitors to the site.
- Provision of a half yearly newsletter to residents to promote local travel initiatives.

Such travel plans have been put in place at residential developments and at Harold Park in Sydney, following the occupation of the site, the peak hour traffic generation per unit has been recorded as being 0.11 trips per unit.

8.2 Summary

On the basis of all such measures being fully incorporated into the development, it is anticipated that the subject site would generate significantly less traffic than other residential sites in the vicinity. This will have the positive effect of reducing traffic impact.

9 Conclusion

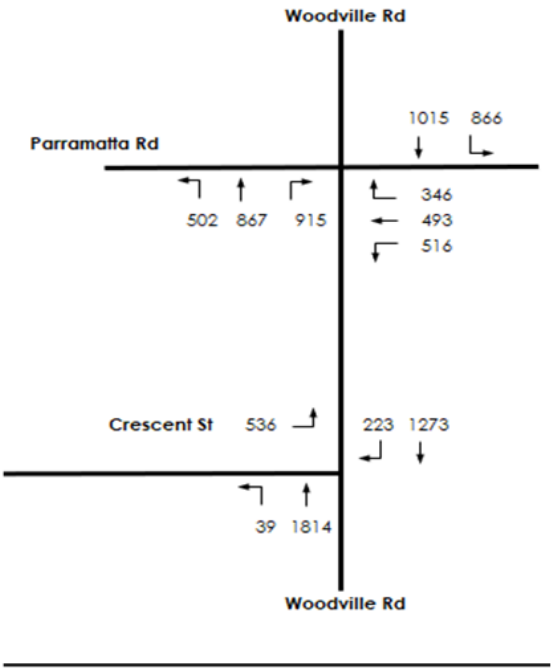
Based on the analysis and discussions presented within this report, the following conclusions are made:

- It is intended that the proposal will seek to rezone the site to deliver a high density mixed use development, comprising approximately 1,109 – 1,255 residential apartments that will be complimented with large areas of passive and active open space, and a retail and commercial area to service the local community.
- Using the current DCP parking rates, the proposal would need to provide a minimum of 1,570 to 1,736 car parking spaces and a maximum of 2,871 to 3,117 car parking spaces.
- A number of measures will be incorporated into the proposal to minimise car travel. The potential measures are:
  - Limited parking ratios - One of the most effective ways to reduce traffic congestion and pollution, and encourage a shift to sustainable transportation modes, is through parking reform.
  - Cycle parking /facilities - It is intended to provide a connection through A'Becketts Creek to enhance pedestrian and cycle connectivity between the site and Holroyd Sportsground. This will tie into existing cycle ways.
  - Car sharing/car club cars - The subject site would be ideal location for the introduction of car share spaces.
  - Green travel plan (GTP) - A GTP is a package of measures aimed at promoting and encouraging sustainable travel and reducing reliance on the private car. GTPs can provide measures which encourage reduced car use and support sustainable travel.
- On the basis of all such measures being fully incorporated into the development, it is anticipated that the subject site would generate significantly less traffic than other residential sites in the vicinity. This will have the positive effect of reducing traffic impact.
- Using the conventional RMS trip generation rates, the resultant increase in traffic generated by the proposal would be in the order of 653 to 952 vehicles per hour during the weekday AM and PM peak periods.
- The existing external intersections such as Parramatta Road/Woodville Road and Crescent Street/Woodville Road intersections are currently operating at its capacity with level of service F during the commuter peak period.
- It is proposed to provide additional capacity along Crescent Street by extending the existing 30m dual left turn bay to 140m in length. A right turn bay on Crescent Street approaching the commercial site access is also proposed. Indicative sketch plan of the proposed modifications along Crescent Street are shown in Figure 7.2.

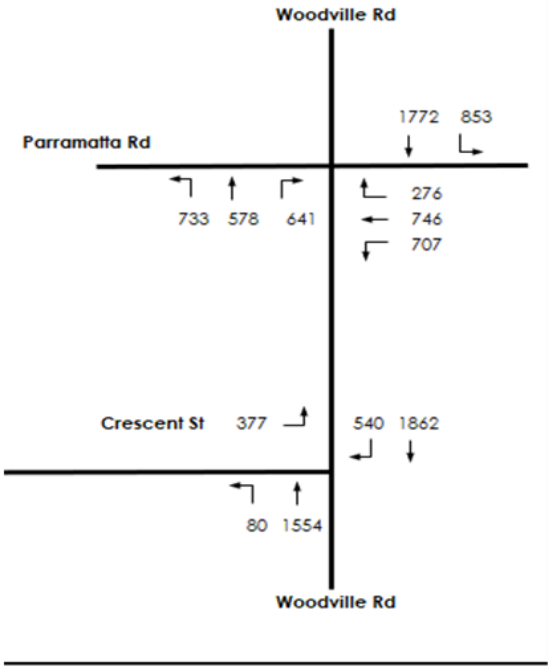
- The post development intersection assessment indicated that the external intersections such as Parramatta Road/Woodville Road and Crescent Street/Woodville Road intersections would require infrastructure improvements to provide additional capacity to cater for the proposed development as well as the existing traffic demand.
- The key external intersections at Parramatta Road/Woodville Road and Crescent Street/Woodville Road are currently the subject of an RMS funded improvement to provide additional capacity to cater for existing traffic demands. Indeed, RMS has recently resumed land from the subject site to facilitate part of these improvements. As mentioned implicitly above, the proposed upgrades are designed to address the current existing congestion in the Parramatta area and do not factor in the proposed traffic generated from the subject Planning Proposal.
- If these measures are taken The Parramatta Road/Woodville Road intersection can expect to improve from LoS F to LoS C in the PM, and remain the same in the AM, while the Woodville Road/The Crescent intersection can expect to improve from a LoS F to LoS A in the AM, and remain the same in the PM.
- All other local intersections such as Walpole Street/Pitt Street and Crescent Street/Site access intersections would continue to operate satisfactorily with LoS C or better for both AM and PM peak periods.

Appendix A

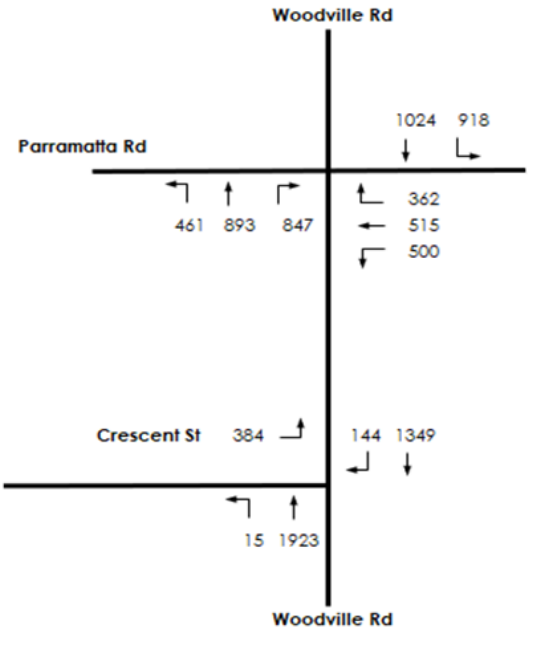
Traffic Flow Diagrams



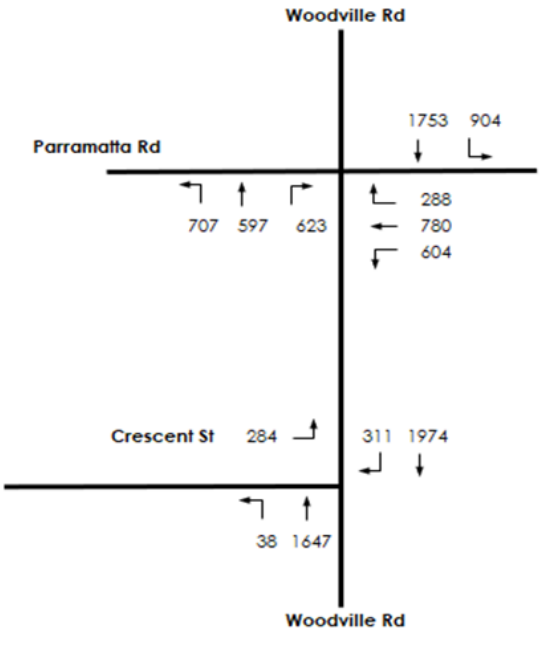
Existing (2015) Post Development AM



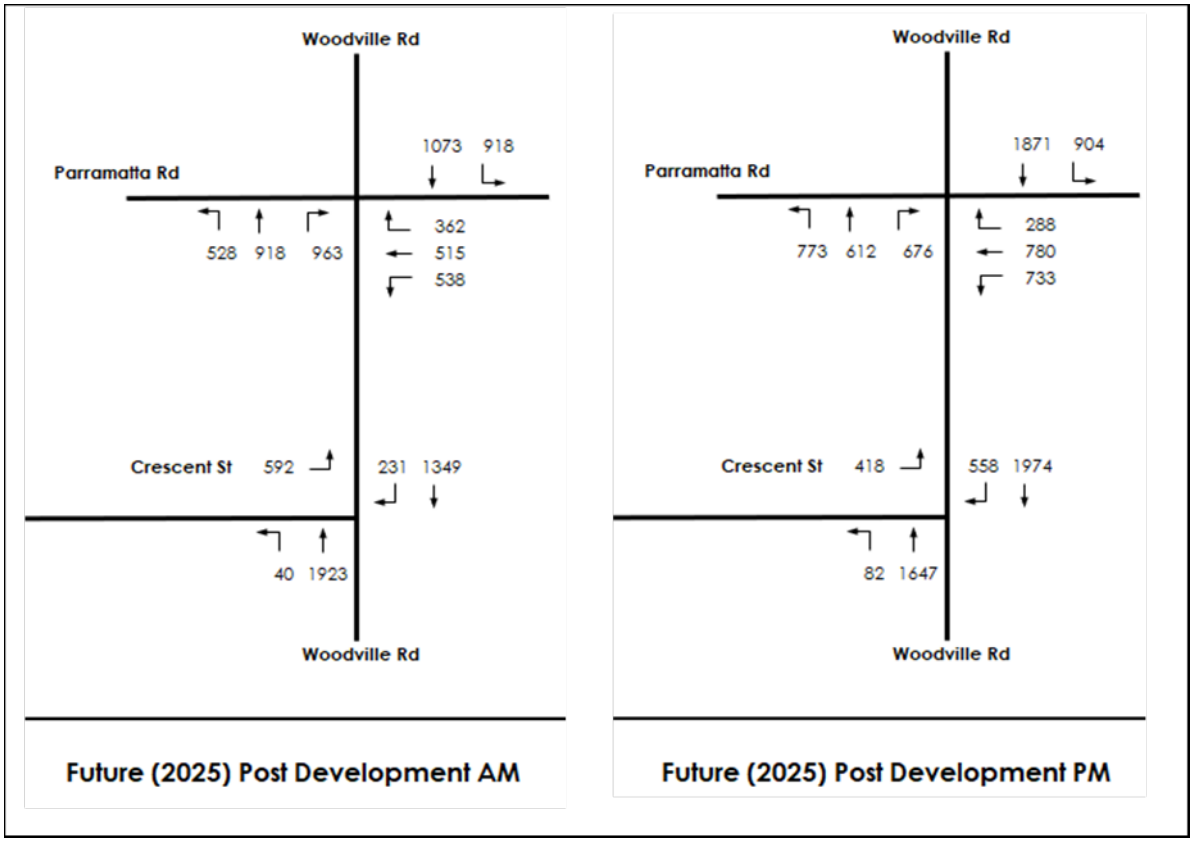
Existing (2015) Post Development PM



Future (2025) Traffic AM



Future (2025) Traffic PM


Woodville Rd
Parramatta Rd
1073 918
528 918 963
362
515
538
Crescent St 592
231 1349
40 1923
Woodville Rd
Future (2025) Post Development AM
Woodville Rd
Parramatta Rd
1871 904
773 612 676
288
780
733
Crescent St 418
558 1974
82 1647
Woodville Rd
Future (2025) Post Development PM

Appendix B

SIDRA Results

MOVEMENT SUMMARY

Site: 1 [Parra Rd/Woodville Rd (Ex-AM)] — **Network: 1 [Existing AM]**

1 Crescent Street, Holroyd Mixed Use TIA
Parramatta Road / Woodville Road
Existing 2015 AM Peak
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Woodville Rd - S														
1	L2	458	14.0	458	14.0	1.013	65.8	LOS E	26.4	195.8	1.00	1.16	1.46	18.0
2	T1	886	2.4	886	2.4	1.013	71.5	LOS F	26.6	195.8	1.00	1.19	1.49	8.1
3	R2	841	8.4	841	8.4	1.013	103.2	LOS F	26.6	195.8	1.00	1.19	1.60	11.0
Approach		2185	7.1	2185	7.1	1.013	82.5	LOS F	26.6	195.8	1.00	1.18	1.53	11.5
East: Parramatta Rd - E														
4	L2	503	11.1	503	11.1	0.414	11.9	LOS A	9.1	69.5	0.45	0.73	0.54	35.0
5	T1	519	11.0	519	11.0	0.861	48.5	LOS D	25.4	185.8	0.99	1.00	1.18	29.2
6	R2	364	4.6	364	4.6	0.861	54.8	LOS D	25.4	185.8	1.00	0.97	1.19	17.2
Approach		1386	9.3	1386	9.3	0.861	36.9	LOS C	25.4	188.6	0.80	0.89	0.95	26.3
North: Church St - N														
7	L2	905	7.0	905	7.0	0.426	18.2	LOS B	12.9	95.5	0.58	0.74	0.58	31.7
8	T1	1017	6.5	1017	6.5	0.738	43.0	LOS D	17.4	128.4	0.98	0.87	1.03	8.8
Approach		1922	6.7	1922	6.7	0.738	31.3	LOS C	17.4	128.4	0.79	0.81	0.82	18.6
All Vehicles		5494	7.5	5494	7.5	1.013	53.1	LOS D	26.6	195.8	0.88	0.98	1.13	16.0

MOVEMENT SUMMARY

Site: 2 [Crescent St/Woodville Rd (Ex-AM)] — **Network: 1 [Existing AM]**

1 Crescent Street, Holroyd Mixed Use TIA
Crescent Street / Woodville Road
Existing 2015 AM Peak
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Woodville Rd - S														
1	L2	15	14.3	15	14.3	1.128	170.2	LOS F	78.7	585.7	1.00	1.89	2.22	3.0
2	T1	1909	7.3	1909	7.3	1.128	164.3	LOS F	78.7	585.7	1.00	1.89	2.22	3.1
Approach		1924	7.3	1924	7.3	1.128	164.4	LOS F	78.7	585.7	1.00	1.89	2.22	3.1
North: Woodville Rd - N														
8	T1	1340	8.2	1340	8.2	0.382	3.0	LOS A	11.5	85.4	0.13	0.10	0.15	49.8
9	R2	143	5.9	143	5.9	0.382	52.6	LOS D	11.5	85.4	1.00	0.94	1.34	8.4
Approach		1483	7.9	1483	7.9	0.382	7.8	LOS A	11.5	85.4	0.21	0.18	0.26	39.7
West: Crescent St - W														
10	L2	345	5.5	345	5.5	1.115	151.9	LOS F	24.5	179.5	0.96	1.27	2.01	2.8
Approach		345	5.5	345	5.5	1.115	151.9	LOS F	24.5	179.5	0.96	1.27	2.01	2.8
All Vehicles		3753	7.4	3753	7.4	1.128	101.3	LOS F	78.7	585.7	0.68	1.16	1.43	6.0

MOVEMENT SUMMARY

Site: 1 [Parra Rd/Woodville Rd (Ex-PM)] — **Network: 1 [Existing PM]**

1 Crescent Street, Holroyd Mixed Use TIA
Parramatta Road / Woodville Road
Existing 2015 PM Peak
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Woodville Rd - S														
1	L2	702	5.7	702	5.7	1.054	95.3	LOS F	27.0	195.8	1.00	1.27	1.72	14.9
2	T1	593	2.1	593	2.1	1.054	94.1	LOS F	27.3	195.8	1.00	1.27	1.73	6.7
3	R2	619	2.9	619	2.9	1.054	124.9	LOS F	27.3	195.8	1.00	1.28	1.85	9.3
Approach		1914	3.7	1914	3.7	1.054	104.5	LOS F	27.3	195.8	1.00	1.27	1.76	10.8
East: Parramatta Rd - E														
4	L2	608	5.5	608	5.5	0.595	22.7	LOS B	16.7	122.7	0.70	0.88	0.98	25.2
5	T1	785	3.6	785	3.6	1.014	98.0	LOS F	45.5	326.2	1.00	1.36	1.67	19.2
6	R2	291	3.6	291	3.6	1.014	104.4	LOS F	44.9	322.8	1.00	1.31	1.68	10.6
Approach		1684	4.3	1684	4.3	1.014	71.9	LOS F	45.5	326.2	0.89	1.18	1.43	18.2
North: Church St - N														
7	L2	898	3.3	898	3.3	0.349	12.1	LOS A	9.1	65.7	0.42	0.69	0.42	37.5
8	T1	1741	3.7	1741	3.7	1.100	131.5	LOS F	56.7	409.7	0.90	1.53	1.88	3.1
Approach		2639	3.6	2639	3.6	1.100	90.9	LOS F	56.7	409.7	0.74	1.24	1.38	7.1
All Vehicles		6237	3.8	6237	3.8	1.100	89.9	LOS F	56.7	409.7	0.86	1.24	1.51	11.2

MOVEMENT SUMMARY

Site: 2 [Crescent St/Woodville Rd (Ex-PM)] — **Network: 1 [Existing PM]**

1 Crescent Street, Holroyd Mixed Use TIA
Crescent Street / Woodville Road
Existing 2015 PM Peak
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Woodville Rd - S														
1	L2	38	5.6	38	5.6	0.974	74.0	LOS F	58.8	426.1	1.00	1.30	1.47	6.9
2	T1	1636	3.9	1636	3.9	0.974	32.6	LOS C	58.8	426.1	0.74	0.84	0.93	12.8
Approach		1674	4.0	1674	4.0	0.974	33.5	LOS C	58.8	426.1	0.75	0.85	0.95	12.6
North: Woodville Rd - N														
8	T1	1960	4.6	1814	4.7	0.538	0.2	LOS A	1.8	12.9	0.07	0.05	0.07	58.9
9	R2	308	1.7	285	1.7	0.836	71.7	LOS F	15.4	109.5	1.00	1.06	1.65	6.2
Approach		2268	4.2	2100[N1]	4.3	0.836	9.9	LOS A	15.4	109.5	0.19	0.18	0.28	36.0
West: Crescent St - W														
10	L2	256	3.3	256	3.3	0.969	96.9	LOS F	9.9	71.3	1.00	1.16	1.82	4.3
Approach		256	3.3	256	3.3	0.969	96.9	LOS F	9.9	71.3	1.00	1.16	1.82	4.3
All Vehicles		4198	4.1	4029[N1]	4.2	0.974	25.3	LOS B	58.8	426.1	0.47	0.52	0.65	19.3

MOVEMENT SUMMARY

Site: 1 [Parra Rd/Woodville Rd (ExYear Dev Upgraded Network-AM)]

Network: 1 [ExYear Dev Upgraded Network (AM)]

1 Crescent Street, Holroyd Mixed Use TIA
Parramatta Road / Woodville Road
Existing Year Future Network AM Peak (with Development)
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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: Woodville Rd - S														
1	L2	528	14.0	528	14.0	0.617	16.5	LOS B	17.8	136.5	0.62	0.78	0.79	42.2
2	T1	913	2.4	913	2.4	0.617	13.2	LOS A	23.9	170.8	0.66	0.64	0.69	30.8
3	R2	963	8.4	963	8.4	1.071	145.8	LOS F	26.1	195.8	1.00	1.38	2.03	8.3
Approach		2404	7.3	2404	7.3	1.071	67.0	LOS E	26.1	195.8	0.79	0.97	1.25	15.4
East: Parramatta Rd - E														
4	L2	543	11.1	543	11.1	0.422	10.3	LOS A	8.4	64.1	0.40	0.71	0.47	37.0
5	T1	519	11.0	519	11.0	0.634	39.4	LOS C	14.2	106.5	0.94	0.80	0.94	32.4
6	R2	364	4.6	364	4.6	0.634	45.3	LOS D	14.2	106.5	0.95	0.83	0.95	19.6
Approach		1426	9.4	1426	9.4	0.634	29.8	LOS C	14.2	106.5	0.73	0.77	0.76	29.4
North: Church St - N														
7	L2	912	7.0	912	7.0	0.489	23.3	LOS B	15.4	114.4	0.68	0.78	0.68	28.3
8	T1	1068	6.5	1068	6.5	0.714	46.1	LOS D	13.9	102.7	0.99	0.86	1.04	8.5
Approach		1980	6.7	1980	6.7	0.714	35.6	LOS C	15.4	114.4	0.85	0.82	0.87	17.0
All Vehicles		5811	7.6	5811	7.6	1.071	47.2	LOS D	26.1	195.8	0.80	0.87	1.00	18.7

MOVEMENT SUMMARY

Site: 2 [Crescent St/Woodville Rd (ExYear Dev Upgraded Network-AM)]

Network: 1 [ExYear Dev Upgraded Network (AM)]

1 Crescent Street, Holroyd Mixed Use TIA
Crescent Street / Woodville Road
Existing Year Future Network AM Peak (with Development)
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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: Woodville Rd - S														
1	L2	41	14.3	41	14.3	0.752	8.4	LOS A	9.3	69.4	0.23	0.24	0.23	45.2
2	T1	1909	7.3	1909	7.3	0.752	2.8	LOS A	9.3	69.4	0.22	0.21	0.22	45.6
Approach		1951	7.4	1951	7.4	0.752	2.9	LOS A	9.3	69.4	0.22	0.21	0.22	45.6
North: Woodville Rd - N														
8	T1	1340	8.2	1340	8.2	0.250	0.2	LOS A	1.6	12.0	0.07	0.05	0.07	58.8
9	R2	235	5.9	235	5.9	0.570	8.7	LOS A	1.3	9.4	0.11	0.73	0.50	29.6
Approach		1575	7.8	1575	7.8	0.570	1.5	LOS A	1.6	12.0	0.08	0.15	0.13	54.3
West: Crescent St - W														
10	L2	564	5.5	564	5.5	0.885	69.2	LOS E	15.0	110.0	1.00	1.01	1.42	5.9
Approach		564	5.5	564	5.5	0.885	69.2	LOS E	15.0	110.0	1.00	1.01	1.42	5.9
All Vehicles		4089	7.3	4089	7.3	0.885	11.5	LOS A	15.0	110.0	0.27	0.30	0.35	29.6

MOVEMENT SUMMARY

Site: 1 [Parra Rd/Woodville Rd (ExYear Dev Upgraded Network-PM)]

Network: 1 [ExYear Dev Upgraded Network (PM)]

1 Crescent Street, Holroyd Mixed Use TIA
Parramatta Road / Woodville Road
Existing Year Future Network PM Peak (with Development)
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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: Woodville Rd - S														
1	L2	772	5.7	772	5.7	0.623	16.4	LOS B	18.8	138.1	0.66	0.85	0.84	41.3
2	T1	608	2.1	608	2.1	0.497	12.3	LOS A	19.2	136.7	0.64	0.58	0.64	32.8
3	R2	675	2.9	675	2.9	0.965	77.0	LOS F	23.2	166.6	1.00	1.09	1.47	14.1
Approach		2055	3.7	2055	3.7	0.965	35.1	LOS C	23.2	166.6	0.77	0.85	0.99	25.7
East: Parramatta Rd - E														
4	L2	744	5.5	744	5.5	0.714	23.5	LOS B	23.5	172.4	0.77	0.93	1.06	24.7
5	T1	785	3.6	785	3.6	0.806	45.5	LOS D	21.3	152.4	1.00	0.94	1.10	30.4
6	R2	291	3.6	291	3.6	0.630	45.3	LOS D	14.0	101.1	0.94	0.83	0.94	19.4
Approach		1820	4.4	1820	4.4	0.806	36.5	LOS C	23.5	172.4	0.89	0.92	1.06	27.2
North: Church St - N														
7	L2	898	3.3	898	3.3	0.373	14.4	LOS A	10.6	76.1	0.48	0.71	0.48	35.3
8	T1	1865	3.7	1865	3.7	0.908	32.0	LOS C	27.0	195.0	0.83	0.86	1.00	11.5
Approach		2763	3.6	2763	3.6	0.908	26.2	LOS B	27.0	195.0	0.72	0.81	0.83	19.0
All Vehicles		6638	3.8	6638	3.8	0.965	31.8	LOS C	27.0	195.0	0.78	0.85	0.94	24.2

MOVEMENT SUMMARY

Site: 2 [Crescent St/Woodville Rd (ExYear Dev Upgraded Network-PM)]

Network: 1 [ExYear Dev Upgraded Network (PM)]

1 Crescent Street, Holroyd Mixed Use TIA
Crescent Street / Woodville Road
Existing Year Future Network PM Peak (with Development)
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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: Woodville Rd - S														
1	L2	84	5.6	84	5.6	0.704	24.8	LOS B	24.2	175.2	0.79	0.73	0.79	18.8
2	T1	1636	3.9	1636	3.9	0.704	19.2	LOS B	24.2	175.2	0.79	0.72	0.79	19.1
Approach		1720	4.0	1720	4.0	0.704	19.5	LOS B	24.2	175.2	0.79	0.72	0.79	19.1
North: Woodville Rd - N														
8	T1	1960	4.6	1960	4.6	0.345	0.3	LOS A	2.5	18.0	0.09	0.06	0.09	58.5
9	R2	568	1.7	568	1.7	0.806	72.8	LOS F	27.6	195.8	1.00	1.07	1.49	6.2
Approach		2528	4.0	2528	4.0	0.806	16.6	LOS B	27.6	195.8	0.29	0.28	0.40	27.9
West: Crescent St - W														
10	L2	397	3.3	397	3.3	0.282	34.6	LOS C	5.7	40.7	0.78	0.77	0.78	10.8
Approach		397	3.3	397	3.3	0.282	34.6	LOS C	5.7	40.7	0.78	0.77	0.78	10.8
All Vehicles		4645	3.9	4645	3.9	0.806	19.2	LOS B	27.6	195.8	0.52	0.49	0.58	22.9

MOVEMENT SUMMARY

Site: 1 [Parra Rd/Woodville Rd (Fu NoDev-AM)] — **Network: 1 [Future Base AM (NoDev)]**

1 Crescent Street, Holroyd Mixed Use TIA
Parramatta Road / Woodville Road
Future Network AM Peak (No Development)
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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: Woodville Rd - S														
1	L2	485	14.0	485	14.0	0.612	17.5	LOS B	19.7	150.0	0.67	0.79	0.85	41.7
2	T1	940	2.4	940	2.4	0.612	13.7	LOS A	25.3	180.7	0.70	0.68	0.74	30.2
3	R2	892	8.4	892	8.4	0.986	81.3	LOS F	26.1	195.8	0.95	1.12	1.47	13.4
Approach		2317	7.1	2317	7.1	0.986	40.5	LOS C	26.1	195.8	0.79	0.87	1.05	21.6
East: Parramatta Rd - E														
4	L2	526	11.1	526	11.1	0.409	10.2	LOS A	8.1	62.1	0.39	0.71	0.46	37.2
5	T1	542	11.0	542	11.0	0.663	39.7	LOS C	15.0	112.4	0.95	0.81	0.95	32.2
6	R2	381	4.6	381	4.6	0.663	45.7	LOS D	15.0	112.4	0.95	0.83	0.95	19.5
Approach		1449	9.3	1449	9.3	0.663	30.6	LOS C	15.0	112.4	0.75	0.78	0.77	29.2
North: Church St - N														
7	L2	966	7.0	966	7.0	0.518	23.6	LOS B	16.7	123.9	0.70	0.79	0.70	28.1
8	T1	1078	6.5	1078	6.5	0.720	46.3	LOS D	14.1	104.0	0.99	0.87	1.04	8.4
Approach		2044	6.7	2044	6.7	0.720	35.6	LOS C	16.7	123.9	0.85	0.83	0.88	17.1
All Vehicles		5811	7.5	5811	7.5	0.986	36.3	LOS C	26.1	195.8	0.80	0.83	0.92	22.2

MOVEMENT SUMMARY

Site: 2 [Crescent St/Woodville Rd (Fu NoDev-AM)] — **Network: 1 [Future Base AM (NoDev)]**

1 Crescent Street, Holroyd Mixed Use TIA
Crescent Street / Woodville Road
Future Network AM Peak (No Development)
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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: Woodville Rd - S														
1	L2	16	14.3	16	14.3	0.796	6.7	LOS A	4.5	33.4	0.11	0.11	0.11	53.6
2	T1	2024	7.3	2024	7.3	0.796	2.5	LOS A	4.5	33.4	0.10	0.12	0.12	46.8
Approach		2040	7.3	2040	7.3	0.796	2.6	LOS A	4.5	33.4	0.10	0.12	0.12	46.8
North: Woodville Rd - N														
8	T1	1420	8.2	1420	8.2	0.265	0.2	LOS A	1.8	13.1	0.07	0.05	0.07	58.8
9	R2	152	5.9	152	5.9	0.459	8.4	LOS A	1.0	7.7	0.13	0.68	0.37	30.2
Approach		1572	7.9	1572	7.9	0.459	1.0	LOS A	1.8	13.1	0.08	0.11	0.10	56.0
West: Crescent St - W														
10	L2	404	5.5	404	5.5	0.910	76.8	LOS F	10.9	79.8	1.00	1.05	1.57	5.4
Approach		404	5.5	404	5.5	0.910	76.8	LOS F	10.9	79.8	1.00	1.05	1.57	5.4
All Vehicles		4016	7.4	4016	7.4	0.910	9.4	LOS A	10.9	79.8	0.18	0.21	0.26	32.9

MOVEMENT SUMMARY

Site: 1 [Parra Rd/Woodville Rd (Fu NoDev-PM)] — **Network: 1 [Future Base PM (NoDev)]**

1 Crescent Street, Holroyd Mixed Use TIA
Parramatta Road / Woodville Road
Future Network PM Peak (No Development)
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Woodville Rd - S														
1	L2	744	5.7	744	5.7	0.605	16.9	LOS B	18.5	136.1	0.67	0.85	0.85	41.0
2	T1	628	2.1	628	2.1	0.513	12.8	LOS A	20.5	145.9	0.67	0.60	0.67	32.1
3	R2	656	2.9	656	2.9	0.916	65.7	LOS E	20.5	146.8	1.00	1.01	1.31	15.9
Approach		2028	3.7	2028	3.7	0.916	31.4	LOS C	20.5	146.8	0.77	0.83	0.94	27.1
East: Parramatta Rd - E														
4	L2	636	5.5	636	5.5	0.598	19.7	LOS B	15.9	116.4	0.68	0.89	0.92	27.3
5	T1	821	3.6	821	3.6	0.843	48.5	LOS D	23.2	166.6	1.00	0.98	1.16	29.5
6	R2	303	3.6	303	3.6	0.658	45.6	LOS D	14.7	106.4	0.95	0.84	0.95	19.3
Approach		1760	4.3	1760	4.3	0.843	37.6	LOS C	23.2	166.6	0.88	0.92	1.04	27.3
North: Church St - N														
7	L2	952	3.3	952	3.3	0.395	14.5	LOS B	11.4	82.3	0.49	0.72	0.49	35.1
8	T1	1845	3.7	1845	3.7	0.735	21.4	LOS B	19.3	139.3	0.78	0.69	0.78	15.7
Approach		2797	3.6	2797	3.6	0.735	19.0	LOS B	19.3	139.3	0.68	0.70	0.68	23.6
All Vehicles		6585	3.8	6585	3.8	0.916	27.8	LOS B	23.2	166.6	0.76	0.80	0.86	26.2

MOVEMENT SUMMARY

Site: 2 [Crescent St/Woodville Rd (Fu NoDev-PM)] — **Network: 1 [Future Base PM (NoDev)]**

1 Crescent Street, Holroyd Mixed Use TIA
Crescent Street / Woodville Road
Future Network PM Peak (No Development)
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Woodville Rd - S														
1	L2	40	5.6	40	5.6	0.706	24.8	LOS B	24.5	177.4	0.79	0.73	0.79	19.0
2	T1	1734	3.9	1734	3.9	0.706	19.2	LOS B	24.5	177.4	0.79	0.72	0.79	19.2
Approach		1774	4.0	1774	4.0	0.706	19.4	LOS B	24.5	177.4	0.79	0.72	0.79	19.2
North: Woodville Rd - N														
8	T1	2078	4.6	2078	4.6	0.366	0.3	LOS A	2.5	18.1	0.09	0.06	0.09	58.5
9	R2	327	1.7	327	1.7	0.465	61.6	LOS E	21.1	150.1	1.00	1.00	1.34	7.2
Approach		2405	4.2	2405	4.2	0.465	8.6	LOS A	21.1	150.1	0.21	0.19	0.26	38.1
West: Crescent St - W														
10	L2	299	3.3	299	3.3	0.206	33.7	LOS C	4.0	29.0	0.75	0.75	0.75	11.0
Approach		299	3.3	299	3.3	0.206	33.7	LOS C	4.0	29.0	0.75	0.75	0.75	11.0
All Vehicles		4478	4.1	4478	4.1	0.706	14.5	LOS B	24.5	177.4	0.48	0.44	0.50	27.4

MOVEMENT SUMMARY

Site: 1 [Parra Rd/Woodville Rd (FuDev-AM)] — **Network: 1 [Future Dev AM (with Dev)]**

1 Crescent Street, Holroyd Mixed Use TIA
Parramatta Road / Woodville Road
Future Network AM Peak (with Development)
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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: Woodville Rd - S														
1	L2	556	14.0	556	14.0	0.652	17.2	LOS B	20.1	154.3	0.65	0.80	0.83	41.6
2	T1	966	2.4	966	2.4	0.652	13.7	LOS A	26.2	187.2	0.68	0.67	0.72	30.3
3	R2	1014	8.4	1014	8.4	1.128	189.1	LOS F	26.1	195.8	1.00	1.53	2.32	6.6
Approach		2536	7.3	2536	7.3	1.128	84.6	LOS F	26.2	195.8	0.80	1.04	1.38	12.8
East: Parramatta Rd - E														
4	L2	566	11.1	566	11.1	0.442	10.8	LOS A	8.8	67.1	0.41	0.72	0.50	36.4
5	T1	542	11.0	542	11.0	0.663	39.7	LOS C	15.0	112.4	0.95	0.81	0.95	32.2
6	R2	381	4.6	381	4.6	0.663	45.7	LOS D	15.0	112.4	0.95	0.83	0.95	19.5
Approach		1489	9.4	1489	9.4	0.663	30.2	LOS C	15.0	112.4	0.74	0.78	0.78	29.2
North: Church St - N														
7	L2	966	7.0	966	7.0	0.518	23.6	LOS B	16.7	123.9	0.70	0.79	0.70	28.1
8	T1	1129	6.5	1129	6.5	0.755	47.6	LOS D	15.1	111.4	1.00	0.90	1.08	8.2
Approach		2096	6.7	2096	6.7	0.755	36.6	LOS C	16.7	123.9	0.86	0.85	0.91	16.7
All Vehicles		6121	7.6	6121	7.6	1.128	54.9	LOS D	26.2	195.8	0.81	0.91	1.07	16.7

MOVEMENT SUMMARY

Site: 2 [Crescent St/Woodville Rd (FuDev-AM)] — **Network: 1 [Future Dev AM (with Dev)]**

1 Crescent Street, Holroyd Mixed Use TIA
Crescent Street / Woodville Road
Future Network AM Peak (with Development)
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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: Woodville Rd - S														
1	L2	42	14.3	42	14.3	0.896	21.7	LOS B	27.3	203.6	0.47	0.54	0.58	21.5
2	T1	2024	7.3	2024	7.3	0.896	19.1	LOS B	27.3	203.6	0.45	0.55	0.60	19.3
Approach		2066	7.4	2066	7.4	0.896	19.1	LOS B	27.3	203.6	0.45	0.55	0.60	19.3
North: Woodville Rd - N														
8	T1	1420	8.2	1420	8.2	0.265	0.2	LOS A	1.7	12.9	0.07	0.05	0.07	58.8
9	R2	243	5.9	243	5.9	0.579	51.5	LOS D	14.3	105.1	1.00	1.02	1.43	8.5
Approach		1663	7.8	1663	7.8	0.579	7.7	LOS A	14.3	105.1	0.21	0.19	0.27	39.6
West: Crescent St - W														
10	L2	623	5.5	623	5.5	1.036	128.6	LOS F	23.2	170.1	1.00	1.26	2.01	3.3
Approach		623	5.5	623	5.5	1.036	128.6	LOS F	23.2	170.1	1.00	1.26	2.01	3.3
All Vehicles		4353	7.3	4353	7.3	1.036	30.4	LOS C	27.3	203.6	0.44	0.51	0.68	16.0

MOVEMENT SUMMARY

Site: 1 [Parra Rd/Woodville Rd (FuDev-PM)] — **Network: 1 [Future Dev PM (with Dev)]**

1 Crescent Street, Holroyd Mixed Use TIA
Parramatta Road / Woodville Road
Future Network PM Peak (with Development)
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Woodville Rd - S														
1	L2	814	5.7	814	5.7	0.661	19.4	LOS B	24.0	176.4	0.76	0.90	0.95	39.2
2	T1	644	2.1	644	2.1	0.526	14.6	LOS B	22.9	163.1	0.73	0.66	0.73	30.2
3	R2	712	2.9	712	2.9	1.035	115.1	LOS F	27.3	195.8	1.00	1.24	1.78	10.2
Approach		2169	3.7	2169	3.7	1.035	49.4	LOS D	27.3	195.8	0.83	0.94	1.16	20.8
East: Parramatta Rd - E														
4	L2	772	5.5	772	5.5	0.743	24.6	LOS B	26.0	190.8	0.80	0.94	1.10	24.0
5	T1	821	3.6	821	3.6	0.843	48.5	LOS D	23.2	166.6	1.00	0.98	1.16	29.5
6	R2	303	3.6	303	3.6	0.658	45.6	LOS D	14.7	106.4	0.95	0.84	0.95	19.3
Approach		1896	4.4	1896	4.4	0.843	38.3	LOS C	26.0	190.8	0.91	0.94	1.10	26.5
North: Church St - N														
7	L2	952	3.3	952	3.3	0.395	14.5	LOS B	11.4	82.3	0.49	0.72	0.49	35.1
8	T1	1969	3.7	1969	3.7	1.053	97.0	LOS F	44.0	317.6	0.92	1.33	1.65	4.3
Approach		2921	3.6	2921	3.6	1.053	70.2	LOS E	44.0	317.6	0.78	1.13	1.27	8.9
All Vehicles		6986	3.8	6986	3.8	1.053	55.1	LOS D	44.0	317.6	0.83	1.02	1.19	16.8

MOVEMENT SUMMARY

Site: 2 [Crescent St/Woodville Rd (FuDev-PM)] — **Network: 1 [Future Dev PM (with Dev)]**

1 Crescent Street, Holroyd Mixed Use TIA
Crescent Street / Woodville Road
Future Network PM Peak (with Development)
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Woodville Rd - S														
1	L2	86	5.6	86	5.6	0.960	72.0	LOS F	49.1	355.9	1.00	1.24	1.43	7.2
2	T1	1734	3.9	1734	3.9	0.960	67.3	LOS E	51.9	375.2	1.00	1.25	1.44	7.1
Approach		1820	4.0	1820	4.0	0.960	67.6	LOS E	51.9	375.2	1.00	1.25	1.44	7.1
North: Woodville Rd - N														
8	T1	2078	4.6	2033	4.6	0.358	0.3	LOS A	2.6	19.0	0.08	0.05	0.08	58.6
9	R2	587	1.7	575	1.7	0.833	66.3	LOS E	27.6	195.8	1.00	1.06	1.53	6.8
Approach		2665	4.0	2608[N1]	4.0	0.833	14.8	LOS B	27.6	195.8	0.29	0.28	0.40	29.6
West: Crescent St - W														
10	L2	440	3.3	440	3.3	0.408	36.4	LOS C	7.0	50.3	0.82	0.79	0.82	10.3
Approach		440	3.3	440	3.3	0.408	36.4	LOS C	7.0	50.3	0.82	0.79	0.82	10.3
All Vehicles		4925	3.9	4868[N1]	4.0	0.960	36.5	LOS C	51.9	375.2	0.60	0.69	0.83	14.7

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