Concord West Precinct Masterplan

Traffic, Transport, Accessibility and Parking Report

d r a f t

transportation planning, design and delivery

14S1097000 02/05/14

GTAconsultants

Concord West Precinct

Masterplan

Traffic, Transport, Accessibility and Parking Report

Issue: A-Dr 02/05/14

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Executive Summary

From a transport perspective, the study area represents a relatively unique situation, with the neighbourhood area bordered by the railway line to the east, Homebush Bay Drive to the west and the Liberty Grove development to the north. As a result, all vehicle access to the study area is provided via George Street to the south. This "funnel" effect results in periods of congestion (including increased delays and queuing) at the George Street/ Pomeroy Street intersection.

The study area has good public transport accessibility with the Concord West Railway Station located within a short walking distance of the majority of the study area. The frequent rail services are complemented by bus services that operate along Concord Road to the east of the site. In addition the study area is well positioned in relation to the regional bicycle network.

Recently, the Department of Planning and Infrastructure approved the construction of a new primary school facility within the study area. The new school will generate additional traffic onto the surrounding road network and further increase congestion at the George Street/ Pomeroy Street intersection. In order to mitigate the impact of the additional traffic generated by the school, a new left turn slip lane is to be constructed at the George Street/ Pomeroy Street intersection. These works will increase the overall capacity at the intersection.

A sensitivity assessment was undertaken by GTA Consultants using SIDRA INTERSECTION modelling software to determine the level of additional traffic from the study area that could be accommodated at the intersection without compromising its operation. The intersection capacity assessment was based on a number of traffic and road network assumptions agreed with the City of Canada Bay Council prior to the assessment and detailed within the GTA transport report.

In order to undertake this sensitivity assessment, residential traffic generation rates were sourced from relevant RMS guidance (i.e. 0.29 peak hour movements per dwelling). Application of this traffic generation rate indicated that the George Street/ Pomeroy Street intersection was capable of accommodating the additional traffic generated by some 785 dwellings within the rezoned lands. The Table below provides an overview of the anticipated future traffic volumes on George Street following the rezoning of the industrial lands.

Table E1: Future George Street Traffic Volumes (North of Pomeroy Street)

Traffic Source	Vehicles Per Hour	
	AM Peak Hour	PM Peak Hour
Existing Traffic Volumes	730	780
Primary School (under construction)	+356	- [1]
Rezoned Industrial Lands	+228	+228
Total	**1,314**	**1,008**

[1] The afternoon school peak will occur outside the road network peak hour.

Table E1 indicates that post development traffic volumes on George Street are anticipated to increase by approximately 580 and 230 vehicles during the AM and PM peak periods. During the AM peak hour the additional traffic generated by the rezoned lands represents 40% of the additional George Street traffic volumes, with the primary school accounting for 60% of the additional traffic. The primary school is not anticipated to generate any significant additional traffic during the road network PM peak hour.

The modelling indicates that, following full development, the intersection is anticipated to operate at a comparable level of service to its current operation, with typically manageable queues and delays on all approaches.

An overall development yield higher that indicated above would likely require additional mitigating works at the George Street/ Pomeroy Street intersection. Any such works would require land acquisition and significant associated property impacts. The provision of additional vehicle access points into and out of the study area was considered as part of the assessment, however, it was concluded that the cost associated with any potential future access points would be prohibitive.

Broader road network considerations are discussed further within the GTA report.

Traffic generation is closely linked to available car parking. As such, in order to minimise traffic generation into and out of the study area, it is recommended that on-site resident car parking be minimised. In this regard it is recommended that maximum resident car parking rates be imposed on future residential development on the rezoned lands, with a focus on encouraging the use of public transport. This approach to car parking policy would be consistent with the current Rhodes West Development Control Plan which specifies an average maximum of 1 car parking space per dwelling.

In conjunction with the reduced car parking provisions, it is recommended that car parking controls (time and/or permit parking restrictions) are introduced to the existing on-street car parking supply. Any resident parking scheme introduced would be for existing eligible residents within the study area. The provision of a car share service within the study area would cater for the needs of smaller dwelling types that may not be provided with a dedicated on-site car parking space.

The introduction of time restricted car parking within the study area would also reduce the level of non-residential trips to the study area, generated by commuter car parking associated with the Concord West Railway Station.

In conjunction with the lower on-site car parking provisions, it is recommended that appropriate minimum residential bicycle parking requirements are included in the relevant planning controls.

As part of the urban renewal of the industrial zoned lands, there is an opportunity to improve the amenity of the existing pedestrian and cycling environments, particularly along George Street where dedicated on-road or separated bicycle lanes could be provided. Additional bicycle links could also be provided from the site to the existing regional bicycle network that services the broader precinct. Additional pedestrian through-site links increases the permeability of the area and has the potential to reduce walking distances.

The transport assessment prepared by GTA provides further details regarding the above arrangements and has been provided as an attachment to this report.

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1. Introduction

1.1 Background

The City of Canada Bay Council (Council) is seeking to rezone a number of industrial (IN1 General Industrial) land parcels to residential (R3 Medium Density Residential) within Concord West. At the Council meeting (6 August 2013) it was resolved to endorse the future rezoning of the various properties that form the Concord West Industrial Land (subject site). A Masterplan is being prepared by JBA for the study area which details the indicative future built form and public domain of the rezoned lands.

In terms of transport, Council resolved:

"THAT the planning for the precinct occurs on the assumption that new development will prioritise pedestrians, bicycles and the use of public transport and it be noted that the Urban Design and Traffic studies are to include principles and opportunities that seek to minimise traffic and rates of private car parking."

GTA Consultants (GTA) has prepared this Traffic, Transport, Accessibility and Parking Assessment based on the above Council resolution.

GTA was commissioned by JBA and City of Canada Bay Council in October 2013 to undertake the transport impact assessment for the proposed rezoning.

1.2 Purpose of this Report

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

i existing traffic conditions surrounding the study area
ii identification of future residential car parking rates
iii pedestrian and bicycle requirements
iv the traffic generating characteristics of the rezoned lands
v the transport impact of the development proposal on the surrounding road network.

1.3 References

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

- an inspection of the site and its surrounds
- City of Canada Bay Development Control Plan (DCP)
- Rhodes West Development Control Plan
- Ashfield Council Development Control Plan 2007
- Australian Standard, Parking Facilities, Part 5: On-Street Car Parking AS/NZS 2890.5:1993
- traffic and car parking surveys undertaken by SkyHigh Traffic as referenced in the context of this report
- concept plans for the proposed Masterplan prepared by JBA Planning
- other documents and data as referenced in this report.

2. Existing Conditions

2.1 Study Area

The subject site(s) comprise a number of industrial zoned lands located within a study area bound by Homebush Bay Drive and Powells Creek to the west, Liberty Grove to the north, the railway line to the east and Pomeroy Street to the south.

With the exception of the industrial zoned lands, the study area is generally zoned Low Density Residential (R2), with some areas of Medium Density Residential (R3) and Public Recreation (RE1) also provided.

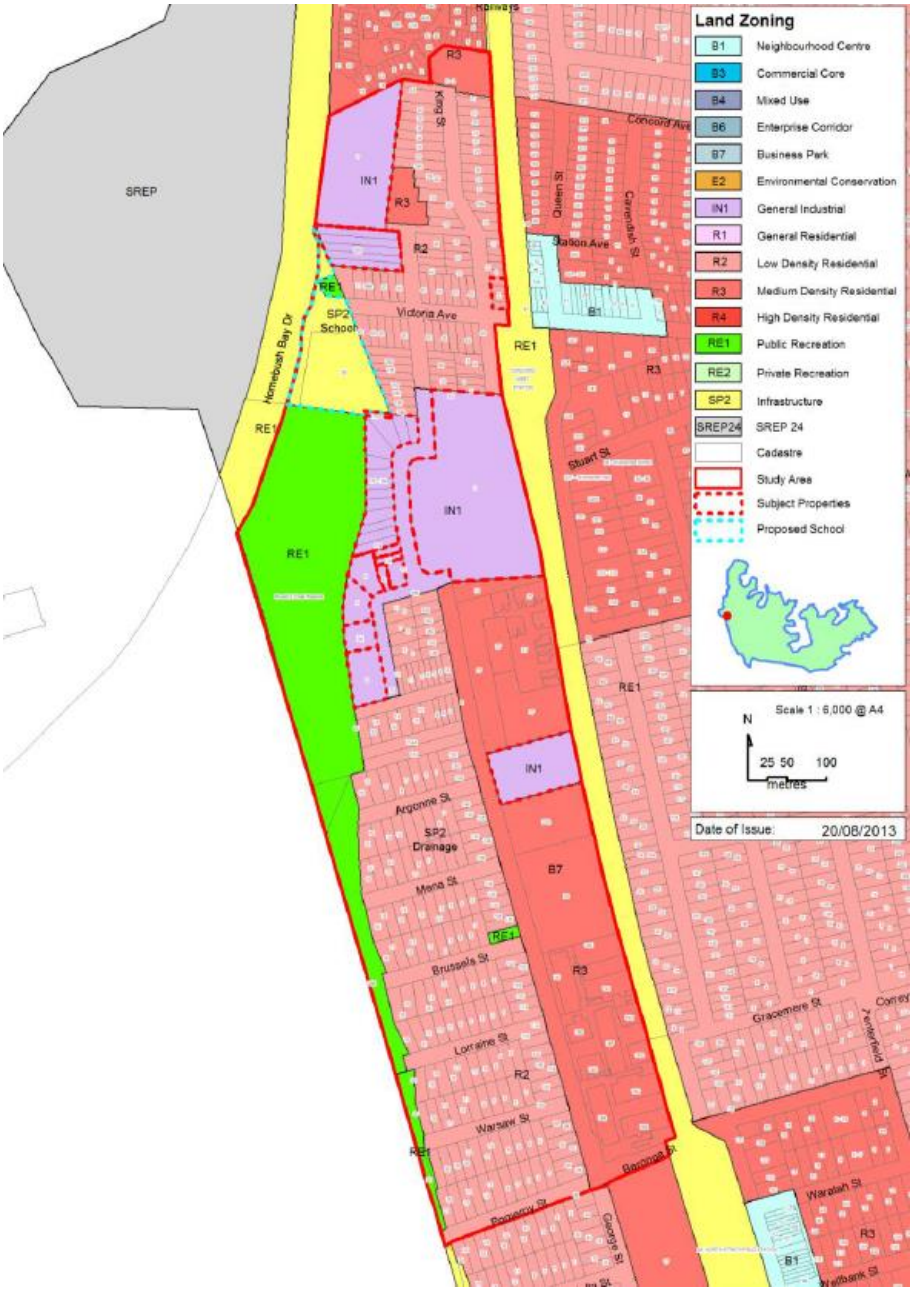
Liberty Grove, a 'gated' residential community is located to the immediate north of the study area. Rhodes West, an area that has undergone significant urban renewal and intensification is located approximately 1.5km north of the site. McDonald College and the Bakehouse Quarter are located to the south of the study area.

The location of the subject site and its surrounding environs is shown in Figure 2.1, with the existing land use zoning provided in Figure 2.2.

Figure 2.1: Subject Site and Its Environs

Basemap source: Reproduced with permission from Sydway Publishing Pty Ltd

Figure 2.2: Existing Zoning Map (City of Canada Bay LEP)



Source: City of Canada Bay

2.2 Road Network

2.2.1 Arterial Road Network

In the vicinity of the study area, Homebush Bay Drive to the west and Concord Rod to the east form the key north-south routes, whilst Parramatta Road and the Western Motorway (M4) to the south of the study area form the key east-west routes. The Concord Road/ Homebush Bay Drive corridor forms a key north-south link providing access across the Parramatta River, whilst the M4 and Parramatta Road provide the main links between Western Sydney and the CBD. The M4 terminates at Parramatta Road immediately east of Concord Road. During peak periods the

surrounding arterial road network experiences significant congestion which results in some rat-running through the local road network to the south of the study area (Pomeroy Road).

2.2.2 Key Study Area Roads

George Street

George Street is classified as a local road and is aligned in a north-south direction connecting with Parramatta Road to the south and Station Avenue to the north and travels the length of the study area. At Rothwell Avenue, George Street 'kinks' to the west for approximately 170m before returning to its original alignment. It is a two-way road generally configured with a 2-lane, 12.5 metre wide carriageway (varies), set within a 20 metre wide road reserve (approx.). A number of Local Area Traffic Management treatments (roundabout and chicanes) are provided along George Street at Conway Avenue, Mena Street and Lorraine Street. Parallel kerbside parking is permitted along the length of George Street in the study area.

George Street is shown in Figure 2.3 and carries approximately 8,000 vehicles per day (north of George Street) and 1,700 vehicles per day (north of Rothwell Avenue)[1] .

Pomeroy Street

Pomeroy Street functions as a collector road, forming part of a broader link between Concord Road and Homebush Bay Drive. It is a two-way road configured with a 2-lane, 11.8 metre wide carriageway, set within a 20 metre wide road reserve (approx.). Parallel kerbside parking is permitted.

Pomeroy Street is shown in Figure 2.4 and carries approximately 18,000 vehicles per day[2].

Figure 2.3: George Street – Looking North

Figure 2.4: Pomeroy Street – Looking East

2.2.3 Surrounding Intersections

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

- George Street/ Pomeroy Street (signalised)
- Pomeroy Street/ Queen Street/ Beronga Street
- Parramatta Road/ George Street (signalised).

In addition to the above a number of lower order intersections exist within the study area.

1 Based on 7-day tube counts on George Street commencing 29 October 2013.
2 Based on the peak hour traffic counts undertaken by SkyHigh Traffic on Tuesday 29 October 2013 and assuming a peak-to-daily ratio of 10%.

2.3 Traffic Volumes

GTA Consultants commissioned Skyhigh Traffic Data to undertake turning movement counts at the George Street/ Pomeroy Street intersection on Tuesday 29 October 2013 during the following peak periods:

- 7:00am and 9:00am
- 4:00pm and 6:00pm.

Peak hour counts were also undertaken of the Pomeroy Street/ Queen Street/ Beronga Street roundabout. However, it is noted that access to Queen Street (north approach) was restricted as a result of road works associated with the Northern Sydney Freight Corridor (North Strathfield Underpass). The results of these surveys are provided in Appendix A.

In addition, 24 hour, 7 day automatic tube count surveys were undertaken on George Street immediately north of Pomeroy Street.

The AM and PM peak hour traffic volumes are summarised in Figure 2.5 and Figure 2.6, with the average weekday daily counts provided in Figure 2.7.

Figure 2.5: AM Peak Hour traffic Volumes

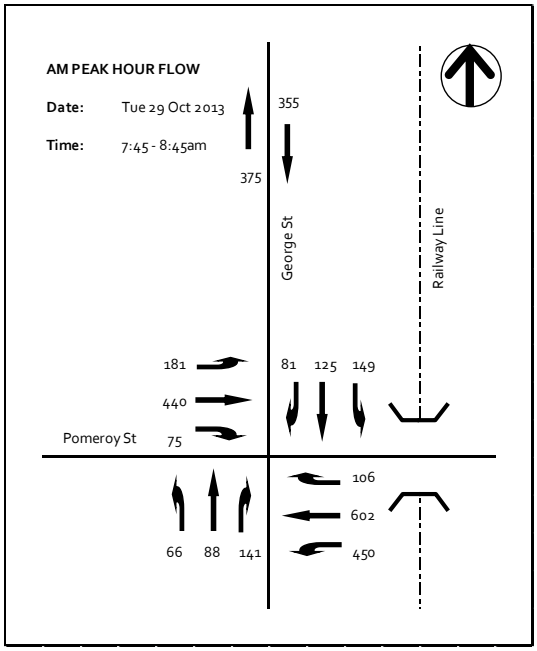


Figure 2.6: PM Peak Hour Traffic Volumes

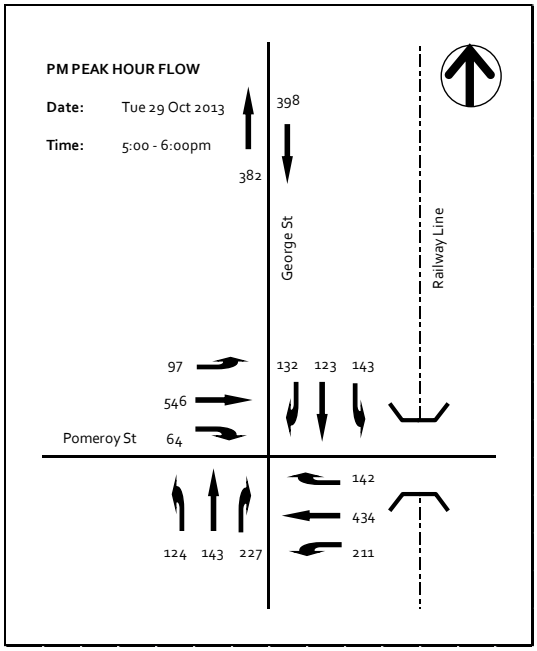


Figure 2.7: Weekday Average Daily Traffic Volumes – George Street (North of Pomeroy Street)

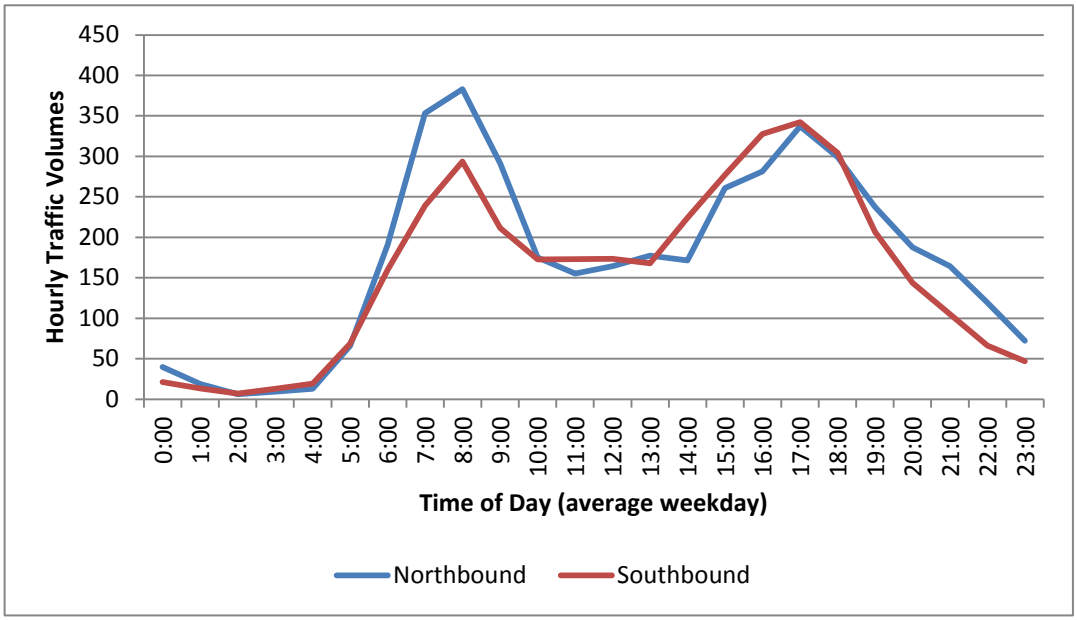


Figure 2.7 indicates that George Street carries greater northbound volumes during the AM peak hour and greater southbound movements during the PM peak hour. These northbound (in)/ southbound (out) splits are more reflective of movements associated with non-residential land uses than residential movements. As such, it can be concluded that there is significant traffic generation from non-residential land uses within the study area. This is potentially made up of a combination of the industrial lands, construction workers associated with the North Strathfield Rail Underpass project and train commuters parking at Concord West Station. In this regard, Table 2.1 has been prepared to provide a summary of the anticipated residential, Westpac Data Centre (based on surveys) and non-residential traffic on George Street.

Table 2.1: Two-way Traffic Volumes – George Street

Anticipated Traffic Type	AM Peak Hour		PM Peak Hour	
	Northbound (IN)	Southbound (OUT)	Northbound (IN)	Southbound (OUT)
Existing Residential	126 [1]	294	337	144 [1]
Westpac Data Centre	140	NA	NA	140
Non-Residential	117	NA	NA	58
TOTAL	**383**	**294**	**337**	**342**

[1] Based on an in/out split of 30:70 (AM) and 70:30 (PM).

Table 2.1 indicates that a significant proportion of northbound traffic during the AM peak hour and southbound traffic during the PM peak hour is non-residential traffic.

2.4 Crash History

The recorded crash history for the George Street/ Pomeroy Street intersection and surrounds for the most recent 5 year period (2008 to 2012) has been sourced from RMS and indicates that there were 4 crashes at the intersection and 4 further crashes the approaches during the 5 year period. The RMS crash data is presented in Figure 2.8.

Figure 2.8: Recorded Crash History (2008 to 2012)

2.5 Intersection Operation

2.5.1 George Street/ Pomeroy Street Intersection

The operation of the George Street/ Pomeroy Street intersection within the study area has been assessed using SIDRA INTERSECTION[3], a computer based modelling package which calculates intersection performance.

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

Table 2.2 shows the criteria that SIDRA INTERSECTION adopts in assessing the level of service.

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

Table 2.2: SIDRA INTERSECTION Level of Service Criteria

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

Table 2.3 presents a summary of the existing operation of the intersection, with full results presented in Appendix B of this report.

Table 2.3: George Street / Pomeroy Street Existing Operating Conditions

Peak	Leg	DOS	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
AM	George Street (South)	0.69	39	43	D
	Pomeroy Street (East)	0.61	13	102	B
	George Street (North)	0.66	32	59	C
	Pomeroy Street (West)	0.89	34	184	C
PM	George Street (South)	0.88	47	100	D
	Pomeroy Street (East)	0.60	18	91	B
	George Street (North)	0.83	43	103	D
	Pomeroy Street (West)	0.90	41	260	D

On the basis of the above assessment and on-site observations, it is evident that the intersection of George Street/ Pomeroy Street currently experiences notable queuing and delays during both the AM and PM peak periods, however still generally operates within acceptable limits (i.e. LOS D or better).

2.5.2 Pomeroy Street/ Queen Street/ Beronga Street

The Pomeroy Street/ Queen Street/ Beronga Street intersection is controlled by an irregular shaped roundabout. At the time of the traffic surveys, there were partial road closures at the intersection as a result of the freight line works.

Given the irregular shape of the roundabout and the partial road closures during the traffic surveys, it is difficult to accurately model the intersection using traditional modelling tools such as SIDRA INTERSECTION. On this basis, the intersection has not been modelled as part of this study.

Notwithstanding, the dominant movements through the intersection are eastbound and westbound through movements, with only localised movements observed to the side streets (Queen Street). In effect, the intersection operates in a manner similar to two separate give-way intersections, with the east-west movements having priority.

Having regard for the above, the intersection was observed to operate satisfactorily during peak periods, with manageable queues and delays observed.

2.5.3 Parramatta Road/ George Street

At its southern end, George Street terminates at Parramatta Road with a signalised T-intersection. Formal traffic surveys have not been undertaken at this intersection as part of this study.

However, observations of this intersection indicate that there is significant congestion during peak periods, consistent with the broader Parramatta Road corridor. As a result, significant queuing and delays are experienced, particularly on George Street.

The majority of traffic on George Street at this intersection is understood to originate from the Bakehouse Quarter precinct, particularly during the PM peak hour when the retail and entertainment uses peak.

2.6 Car Parking

Unrestricted parallel on-street car parking is generally provided on both sides of each of the roads within the study area. It is noted that all car parking within the study area is subject to 2P Special Event parking restrictions. These restrictions are associated with larger events being held at the Sydney Olympic Park precinct to the west of the study area. Permit holders are exempt from the 2P restriction, noting that permits are only available for residents of the precinct.

Whilst not strictly surveyed, observations indicate that car parking demands within the study area are moderate, with increased occupancy observed in the vicinity of the Concord West Railway Station. These demands are understood to be generated by commuter car parking associated with the station, overflow employee parking from the Westpac Data Centre and construction workers associated with the Northern Sydney Freight Corridor (North Strathfield Underpass).

2.7 Public Transport

The study area has good accessibility to surrounding public transport facilities. The Concord West and North Strathfield Railway Stations are located in reasonable walking distance of the study area. Both stations are located on the T1 North Shore, Northern and Western Line, with services provided to Hornsby and Berowra via Central and to Epping. Services generally operate at 15 and 30 minute frequencies for the weekday and weekend periods, respectively.

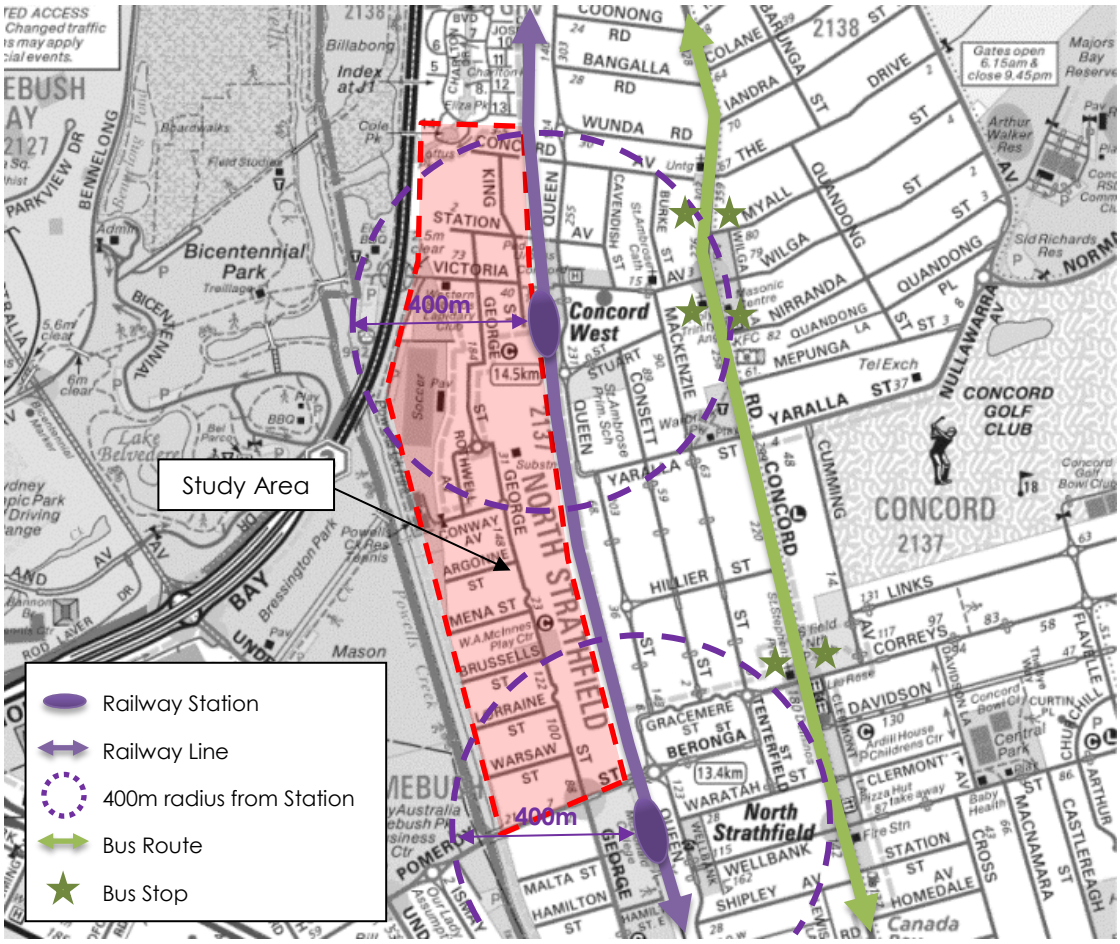
In addition to the rail services, a number of buses operate along Concord Road to the east of the study area, as follows:

- M41: Hurstville to Macquarie Park
- 458: Burwood to Ryde via Rhodes Shopping Centre
- 459: Strathfield Station to Macquarie University

Pedestrian connections across the railway line to Concord Road are provided at Station Avenue, Victoria Avenue and Pomeroy Street.

An overview of the existing public transport network is provided in Figure 2.9.

Figure 2.9: Public Transport Network



2.8 Pedestrian and Cycle Infrastructure

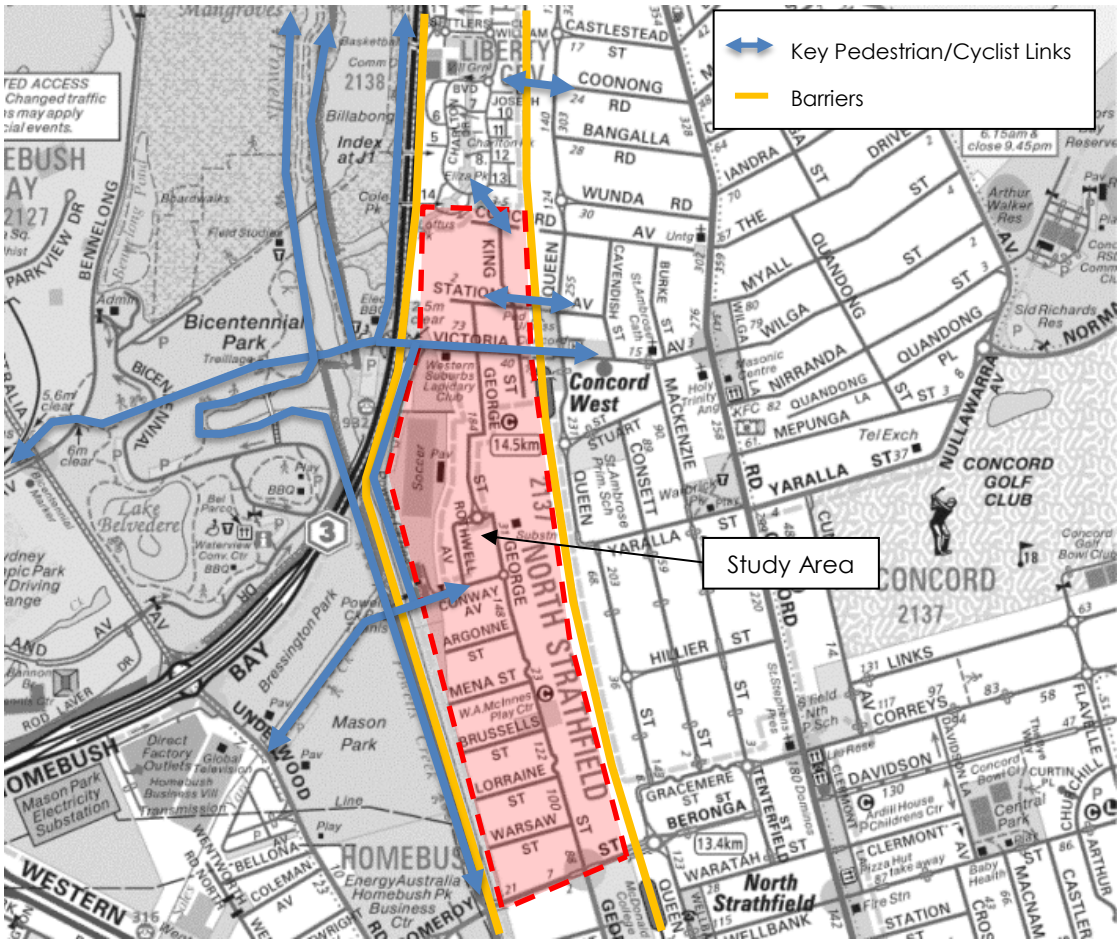
There are a number of barriers (Homebush Bay Drive, the railway line, Powell's Creek and Liberty Grove) that limit the full integration of the local pedestrian/cycle network into the broader network. However, unlike the traffic network there are a number of access points at these key barriers, as follows:

- Homebush Bay Drive at Victoria Avenue
- Powell's Creek crossings at Conway Avenue and Pomeroy Street
- Railway Line at Pomeroy Street, Victoria Avenue (at the station) and Station Avenue
- Liberty Grove at Concord Avenue

In addition to the above links, pedestrian footpaths are generally provided on both sides of each of the roads within the study area. A number of off-road paths are provided to the west of the study area in the vicinity of Bicentennial Park.

The fine grain pedestrian/cycle network is illustrated in Figure 2.10.

Figure 2.10: Pedestrian and Cycle Networks



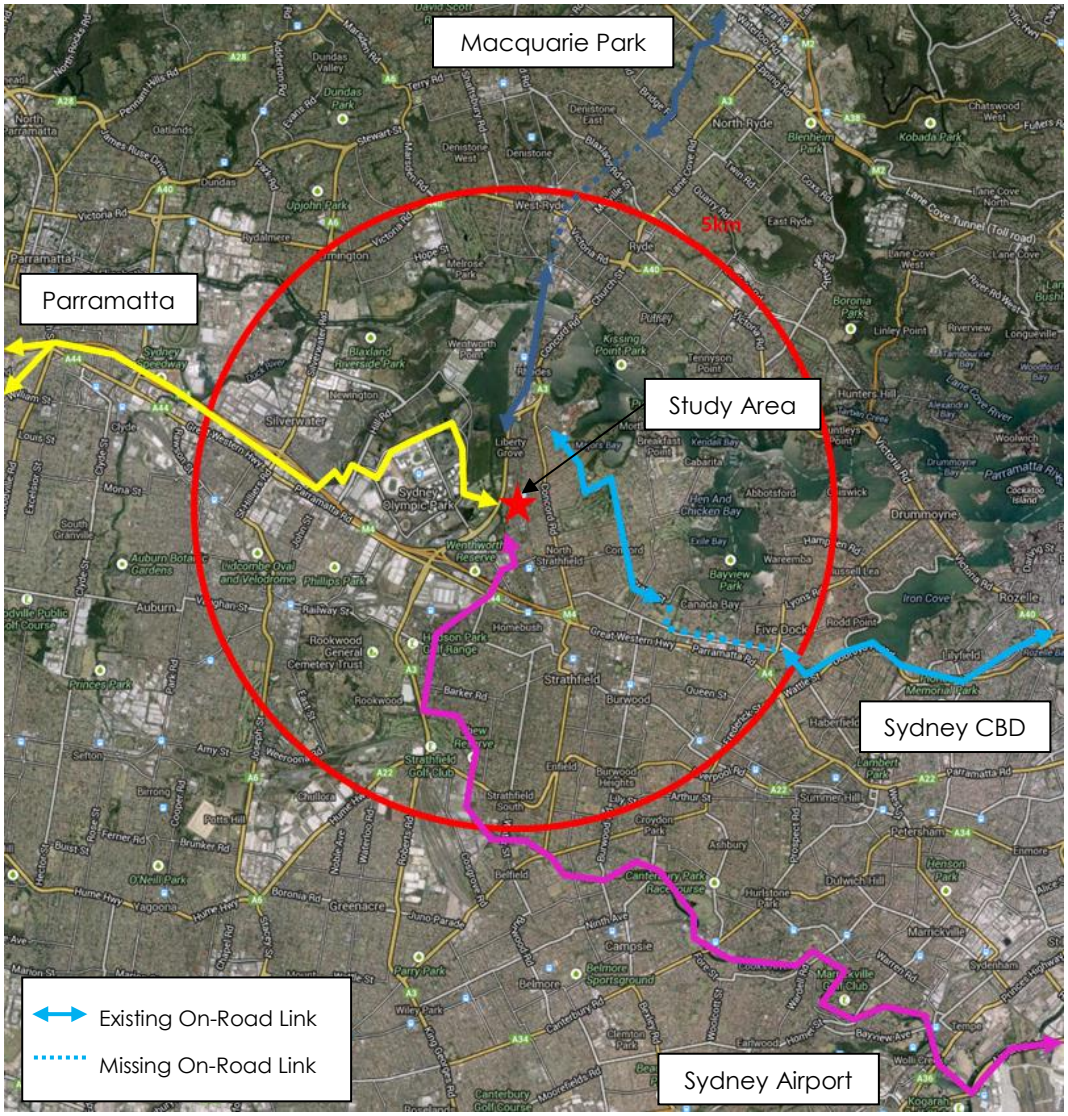
There is an extensive network of the regional cycling links in the vicinity of the study area, including connectivity to the following areas:

- Macquarie Park to the north
- Sydney CBD to the east
- Sydney Airport to the south
- Parramatta to the west

There are some gaps within the above links, particularly to the north and east that are progressively being developed.

Figure 2.11 provides an overview the regional bike network. A typical cyclist commutes up to 10km to work which suggests that accessing Macquarie Park and Parramatta CBD are realistic options for residents of the study area.

Figure 2.11: Regional Cycle Network



2.9 WestConnex

Once completed, the WestConnex project will provide a new continuous 33km link between the M4 and M5 Motorways. The project is to be delivered in 3 stages, commencing in 2015 with anticipated final completion date of 2023.

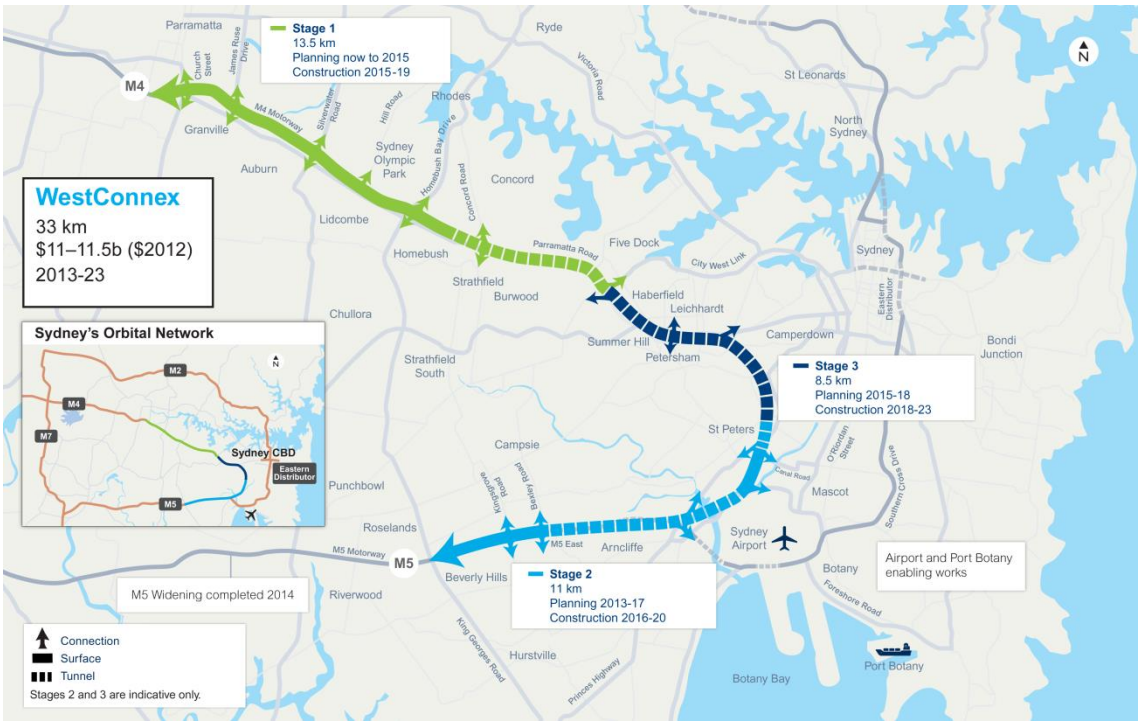
Key benefits of the WestConnex project have been sourced from the WestConnex Delivery Authority website, reproduced below:

- *"Provide quicker, more reliable trips between Western Sydney and the Port Botany/Sydney Airport precinct to support Sydney's urban freight task*
- *Help distribute traffic across the wider road network, removing bottlenecks and relieving congestion for local trips*
- *Provide better connections along the M4 and M5 corridors to cater for the forecast growth in employment and population along these routes*
- *Allow urban revitalisation and increase opportunities for active and public transport along and across Parramatta Road."*

The WestConnex project will increase capacity along the M4 corridor. It is anticipated that the project will reduce existing traffic volumes along the length of Parramatta Road and in turn potentially create additional capacity for lower order streets that intersect Parramatta Road.

An overview of the project is illustrated in Figure 2.12.

Figure 2.12: WestConnex Overview



Source: http://www.westconnex.com.au/

3. Future Land Use Scenario

3.1 Master Plan Overview

An overview of the indicative Master Plan is provided in Figure 3.1.

Figure 3.1: Concord West Master Plan Overview

Source: JBA

3.2 Residential Yield

As previously noted, the study area is divided into seven (7) sites. It is noted that this assessment does not include any future redevelopment of the Westpac Data Centre site (Site 4).

Table 3.1 provides a summary of the indicative development yields for each of the sites. It is noted that no retail or commercial land uses have been anticipated at this stage (i.e. residential land uses only).

Table 3.1: Indicative Development Schedule [1]

Site	Site Name	Site Area	Anticipated Max No. of Storeys	No. of Residential Apartments
1	7 Station Street	14,968sq.m	7	*785 dwellings*
2	204-210 George Street	5,028sq.m	2-6	
3	3 King Street	809sq.m	2-4	
5	George Street	7,806sq.m	2-6	
6	Rothwell Street	9,404sq.m	2-4	
7	25 George Street	7,402sq.m	4-6	

[1] Sourced from JBA Planning Draft Masterplan.

On the basis of the above, an indicative residential yield of 785 apartments has been adopted for the traffic assessment.

4. Car Parking Considerations

4.1 Existing DCP Car Parking Requirements

The car parking requirements for different development types are set out in Part 6 of the City of Canada Bay Council's DCP 'Residential: Controls for detached dual occupancies, multi dwelling housing & residential flat buildings'. In terms of parking and access the DCP states that:

"The provision of car parking should reasonably satisfy the needs of current and future residents. New development should accommodate parking for visitors and residents within the site and minimise excavation."

The minimum car parking requirements for residential uses are set out in Section 6.4.8 of the DCP and are summarised in Table 4.1 below.

Table 4.1: Off-Street Parking Minimum Requirements Residential Buildings

	Resident Parking	Visitor Parking	Disabled Parking
Detached Dual Occupancy	1 per dwelling	Nil	Nil
Multi Dwelling Housing & Residential Flat Buildings	Small – 1 per dwelling Medium – 1.5 per dwelling Large 2.0 per dwelling	≤ 5 dwellings – 1 spaces > 5 dwellings – 0.5 spaces per dwelling	Reference should be made to Adaptable Housing Requirements

The above DCP rates are generally applicable for the entire City of Canada Bay LGA Area, however, there are precincts within the LGA that are subject to specific parking controls that vary from the generic car parking rates presented above. Typically locations subject to site-specific parking controls are located within town centres, urban renewal areas and/or close to public transport nodes.

In this regard, it is considered appropriate that specific residential car parking rates be developed for the study area.

4.2 Reduced Car Parking Rates

As detailed above, the current car parking controls (City of Canada Bay DCP) for the study area recommend a minimum car parking provision be provided for residential land uses. Limiting on-site car parking provisions for future multi-dwelling residential uses in the study area is considered appropriate for the following reasons:

i Study areas accessibility to public transport
ii Reduce traffic generation from the study area
iii Minimise impact on the George Street / Pomeroy Street intersection
iv Existing pedestrian and cycle links in the vicinity of the study area.

In order to determine an appropriate future car parking rate reference has been made to the following sources:

- Other car parking controls in Canada Bay(Rhodes West)
- RMS recommended car parking rates
- ABS car ownership data for existing residents.

4.2.1 Rhodes West Development Control Plan

Rhodes West is located approximately 1.5km to the north of the study area within the City of Canada Bay LGA. It is located adjacent to Rhodes Railway Station, has been identified for significant urban renewal and is subject to specific planning controls. The car parking requirements for residential uses within Rhodes West are set out in Section 4.3.29 of the Rhodes West DCP. The Strategy for on-site car parking is reproduced below:

"The higher residential density and mixed-use envisaged for the Rhodes Peninsula will enhance public transport use and viability and reduce travel demand. This DCP promotes public transport use by minimising car parking requirements whilst providing for on-site service vehicle parking."

Table 4.2 provides a summary of the DCP car parking provisions for Rhodes West. It is noted that a maximum car parking rate is imposed on resident parking provisions.

Table 4.2: Rhodes West Car Parking Controls

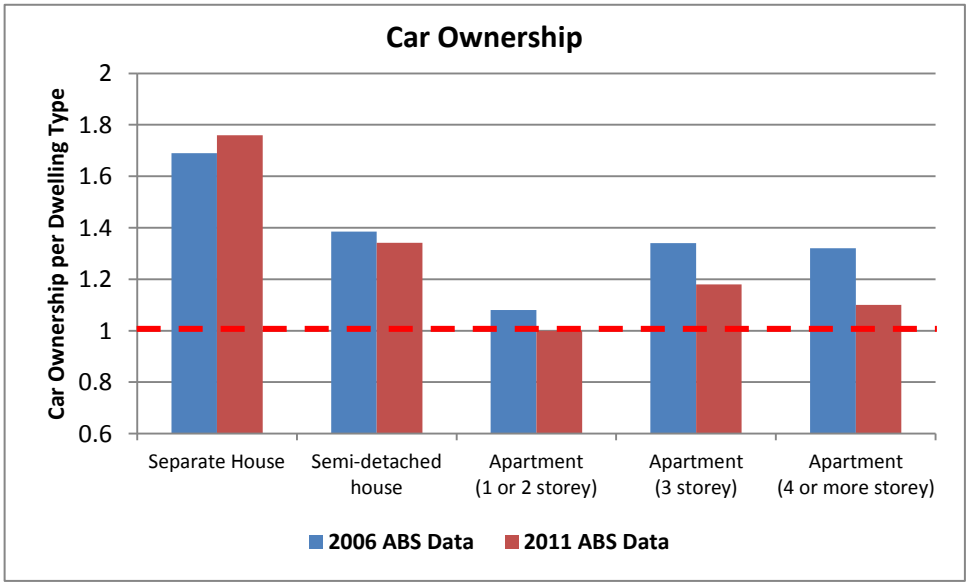
Use	Type	Rate
Residential	All dwelling types	Max 1 space per dwelling (average)
	Visitors	Max 1 space per 10 apartments, min 1 space per 20 apartments
	Service vehicles	Max 1 space per 50 apartments for first 200 apartments plus 1

4.2.2 ABS Car Ownership Data

In order to assess the likely car ownership of the future residents reference has been made to the 2006 and 2011 Census undertaken by the Australian Bureau of Statistics (ABS). The Census collected data on the car ownership levels associated with a variety of dwelling types and in this instance GTA have reviewed the car ownership levels of different housing stock (separate/ detached house, semi-detached house, apartment building etc.) for postcode: 2138 (Concord West, Liberty Grove, Rhodes).

The average car ownership data for the different housing stock in 2006 and 2011 are illustrated in Figure 4.1.

Figure 4.1: Car Ownership Data Comparison 2006 and 2011 (Postcode 2138)



The 2011 ABS data indicates that apartments (all types) have average car ownership rates of between 1.0 and 1.2 cars per dwelling. Of particular note, Figure 4.1 indicates that with the exception of 'separate house' the car ownership for all dwelling types reduced between 2006 and 2011. In addition, the number of dwellings with zero car ownership increased from 290 to 532 between 2006 and 2011 (83% increase).

Based on the above it is concluded that car ownership rates for apartment residents in the vicinity of the site are on the decline.

4.2.3 RMS Guidance

Reference to the RMS *'Guide to Traffic Generating Developments'* (2002) indicates the following resident car parking rates for high density residential uses in Metropolitan Sub-Regional Centres:

- *0.6 spaces per 1 bedroom unit.*
- *0.9 spaces per 2 bedroom unit.*
- *1.4 spaces per 3 bedroom unit.*

4.3 Recommended Future Car Parking Rates

Having regard for the above, it is recommended that multi-dwelling residential developments within the study area are subject to maximum car parking rates, as follows:

- Maximum one resident car parking space per dwelling
- One visitor space per 5 to 10 dwellings (based on block size and parking layout).

In order to ensure the effective implementation of the above car parking rates it is recommended that the following measures are implemented:

- introduction of a resident car parking scheme (details to be confirmed)
- introduction of time restricted on-street car parking in the vicinity of the railway station to discourage commuter car parking as well as at strategic locations within the study area
- provision of appropriate end of trip bicycle facilities (see Section 6).

4.4 Resident Parking Scheme

As detailed above it is recommended that a resident parking scheme be implemented to manage future on-street car parking demands in the vicinity of the development sites. Eligibility for the resident parking scheme would be limited to existing residents of the precinct and would not be available to residents of the rezoned lands. Typically, resident parking schemes are only available to residents of single dwelling properties with access to one or less off-street car parking spaces. If this were to be implemented, existing dwellings with access to two or more off-street spaces would not be eligible for the scheme.

The details of any future resident parking scheme would need to be determined as part of a detailed parking study for the area. The study would identify the following:

- Eligibility criteria for resident parking permits
- Extent of the scheme
- Complementary car parking restrictions.

The resident parking scheme should be implemented prior to resident occupation of the rezoned lands.

It is noted that the study area is already subject to 2P Special Event parking restrictions when large events take place at the adjacent Sydney Olympic Park precinct.

The introduction of a resident parking scheme and time restricted parking would limit non-residential car parking demands within the study area generated by commuter parking associated with the Concord West railway station and employee parking associated with the Sydney Olympic Park precinct.

5. Sustainable Transport Infrastructure

5.1 Preamble

As detailed in the introduction of this report, when Council resolved to endorse the redevelopment of the industrial lands it noted:

"THAT the planning for the precinct occurs on the assumption that new development will prioritise pedestrians, bicycles and the use of public transport"

The rezoned lands have the following attributes and as such are proposed to be developed as transport oriented developments:

- Good accessibility to public transport facilities
- Walkable neighbourhood with access to recreational facilities
- End-of-trip bicycle facilities
- Limited resident car parking provisions (approximately 1 space per dwelling).

In this regard, the following sections identify measures that could be implemented to promote the use of sustainable transport modes (non-private motor vehicle) to access the site.

5.2 Bicycle End-of-Trip Facilities

Part 3.7 of the City of Canada Bay DCP recommends that bicycle parking be provided for residential uses, as follows:

- Resident: 1 space per apartment
- Visitor: 1 space per 12 apartments

It is recommended that the residential bicycle parking rates specified above be applied for future development of the rezoned lands and treated as a minimum provision.

5.3 Walking and Cycling Network

5.3.1 Network Upgrades

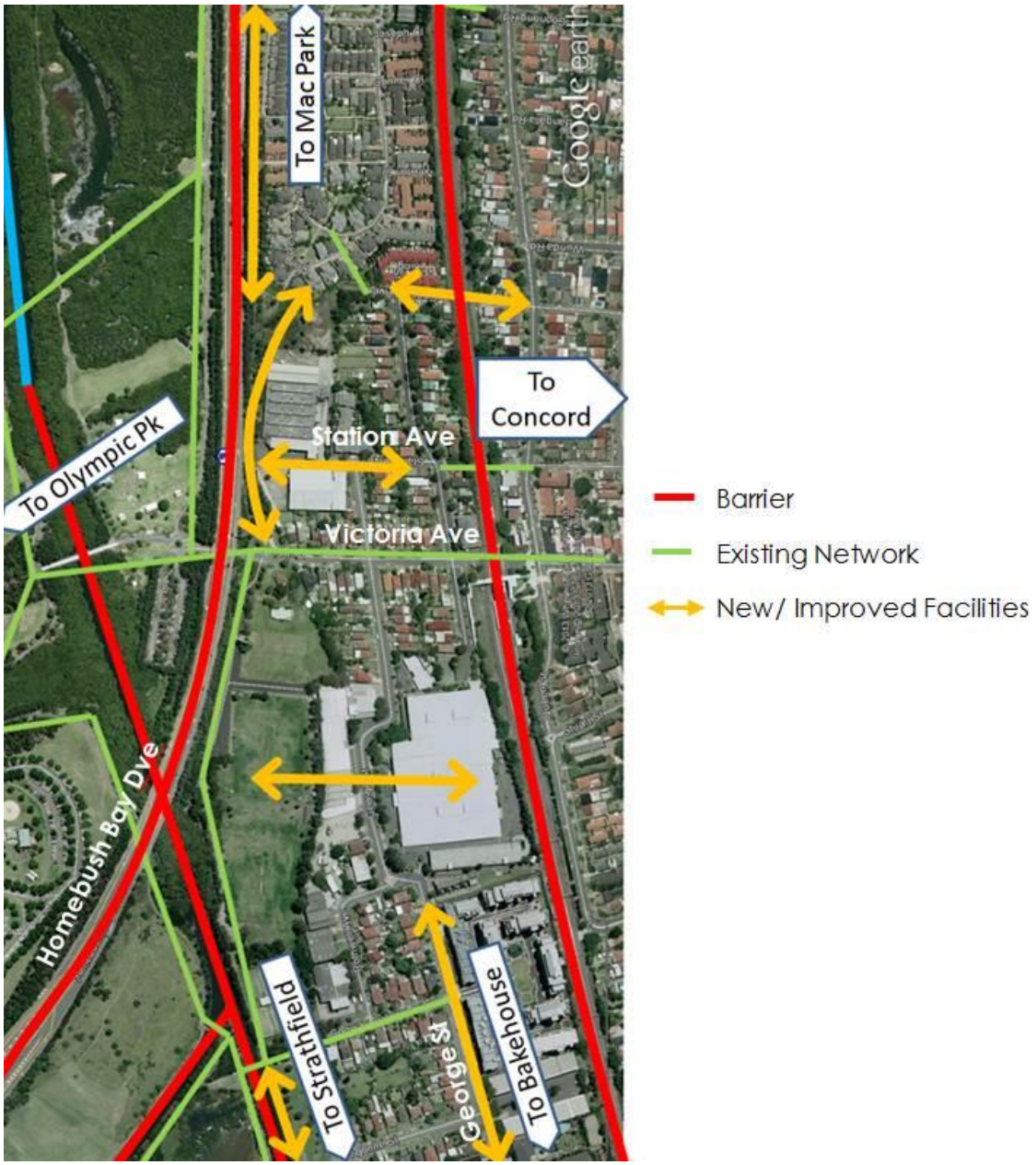
The existing fine grain and regional bicycle and pedestrian networks are presented in Section 2 of this report. A number of opportunities to improve the local pedestrian and cycle network have been identified, as follows:

- improved streetscape (including an upgrade of existing footpaths)
- new off-road link to the west of sites 1 and 2
- new off-road link between Liberty Grove and Homebush Bay Drive
- improved north-south link on George Street (e.g. cycleway, shared path, on-road lanes)
- continuation of above George Street facilities along King Street, should Site 4 (Westpac Data Centre) be redeveloped in the future
- improved east-west link on Victoria Avenue between Homebush Bay and the rail crossing (potential for integration with broader street improvements)
- improved links to Powell's Creek Reserve
- Powell's Creek crossing on the north side of Pomeroy Street
- provision of future formal Shared Zone treatments within rezoned lands to prioritise pedestrian and bicycle movements over vehicles.

Ideally new east-west links would be provided across the railway line; however, they would likely be cost prohibitive.

An overview of the potential upgrades is provided in Figure 5.1.

Figure 5.1: Potential Bicycle Network Upgrades



5.3.2 Bicycle Treatments

As detailed above, there may be an opportunity to improve the existing cyclist facilities along George Street, as follows:

- separated cycleway
- on-road bike lanes
- shared path.

In regards to the potential provision of a separated cycleway, Table 5.1 provides an overview of the dimensional requirements of any potential future facility, should one be pursued on George Street.

Table 5.1: Carriageway Requirements – Cycleway

Component	Cross-Section Requirement	
	Desirable	Minimum
Cycleway	3.0m	2.4m
Separator	1.0m	400mm
Parking Lanes	2.1m	2.1m
Traffic Lane	3.2m	2.8m

Based on the above, there would be an opportunity to provide a separated cycleway and maintain parking on both sides of the carriageway at the northern end of George Street where the existing carriageway exceeds 12.6m wide, without the need to widen the existing kerb alignment.

Where the George Street carriageway is less than 12.6m wide, on-street car parking would only be able to be provided on one side of the carriageway.

It is recommended that the desirable traffic lane widths be provided at the southern end of George Street where traffic volumes are greater. As a result it is likely that on-street car parking could only be provided on one side of the carriageway. This would be feasible on the basis that the existing residential flat buildings have appropriate off-street parking provisions.

5.3.3 Shared Zones

A number of shared zone treatments are earmarked for a number of the development sites within the study area. A shared zone is defined by the Transport for NSW (TfNSW) as:

"A Shared Zone is a road or network of roads where the road space is shared safely by vehicles and pedestrians. The maximum speed limit is always 10 km/h.

There may be no road lines, kerb or gutter in a Shared Zone to show that pedestrians and vehicles are equal. Drivers must give way to pedestrians at all times.

Vehicles can only stop in a Shared Zone if they obey the parking signs and park in marked bays, if they are provided.

Drivers travelling at a lower speed are better able to control their vehicles and safely avoid impact with other road users."

To be considered for a Shared Zone treatment, each location should comply with the TfNSW Policy and Guidelines for Shared Zones. In this regard the following key characteristics should be met:

- the traffic volume in a Shared Zone should be less than 100 vehicles per hour and less than 1000 vehicles per day
- the current speed limit on a road earmarked to be a Shared Zone should be less than 50km/h
- a Shared Zone should be less than 400 metres in length
- the current carriageway should be a minimum of 2.8 metres in width
- the road must not be located along a bus or heavy vehicle route, except for delivery or garbage uses.

A high level review suggests that any Shared Zones provided within the future development sites would meet the above criteria. However, a detailed review of any future Shared Zone treatments would be required at the design stage.

5.4 Public Transport

As detailed earlier the study area has good public transport accessibility with the Concord West Railway Station located within a short walking distance of the majority of the study area. The rail services are complemented by bus services that operate along Concord Road to the east of the site.

The Concord West railway station is being upgraded as part of the Northern Sydney Freight Corridor (North Strathfield Underpass) upgrade works, including upgrades to the existing platforms, a new concourse over the railway lines and four lifts between the platforms and new aerial concourse, and station exterior improvements. The new station facilities will be DDA compliant and offer improved accessibility for future users of the station.

Public transport accessibility would be further enhanced with any public domain upgrades (including the proposed new station square), in addition to the bicycle and pedestrian network improvements identified above.

6. Traffic Impact Assessment

6.1 Intersection Upgrades

The George Street/ Pomeroy Street intersection is to be upgraded (via a consent condition) as part of the primary school (Victoria Avenue) development within the study area. A new left turn slip lane and 30m short auxiliary left turn lane will be provided on George Street (north approach).

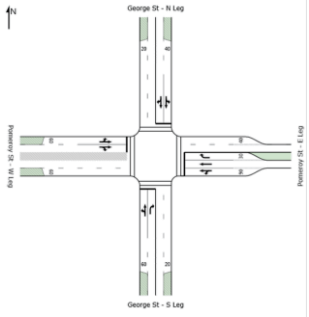
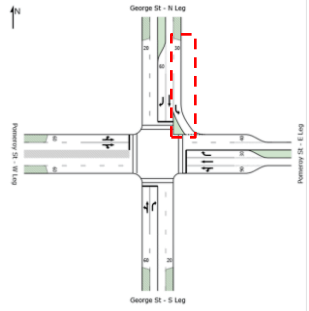
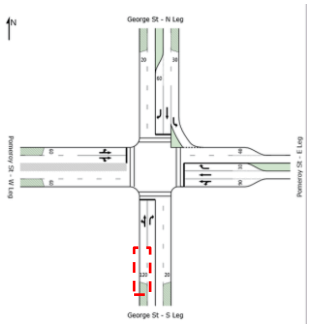
Additional intersection upgrades are recommended based on the likely traffic capacity required for the indicative site yields (i.e. total 785 dwellings).

It is proposed to lengthen the 'No Parking' restriction on the south approach from 40 m to 120m (i.e. to Malta Street) during the AM peak periods, consistent with the existing 'No Parking' restriction during the PM peak periods (3:00 to 7:00pm). The works will increase the capacity of the north (additional intersection approach lane) and south (additional queuing area and more capacity for the right turn) approaches to the intersection during the AM peak hour. The above works are considered satisfactory to cater for the development of 785 dwellings within the study area, as detailed in the following assessment.

Beyond this level of development, additional intersection works would be required to accommodate additional dwelling numbers.

The existing and proposed George Street/ Pomeroy Street intersection works are summarised in Table 6.1.

Table 6.1: George Street / Pomeroy Street Intersection Upgrades

Stage	Intersection Layout	Summary of Intersection Works
Existing Conditions		• No change
Post Primary School		• 30m left turn short lane and slip lane provided on the north approach
Post-Development (+785 dwellings)		• Extension of 'No Parking' restriction from 40m to 120m on the south approach during the AM peak hour

6.2 Traffic Generation

6.2.1 Subject Site

The rezoned lands are proposed to be developed as transit oriented developments. Reference has been made to the RMS *Guide to Traffic Generating Developments (2002)* which indicates a peak hour traffic generation rate of **0.29 movements per dwelling** for high density residential developments in metropolitan subregional centres.

It is noted that the more recent RMS Technical Direction (August 2013) indicates lower traffic generation rates than those quoted in the 2002 document. Figure 6.1 provides a summary of the traffic generation of each of the sites surveyed as part of the update, including a breakdown of the traffic generated by dwelling (unit) and car space.

Figure 6.1: Traffic Generation Summary – RMS Technical Direction

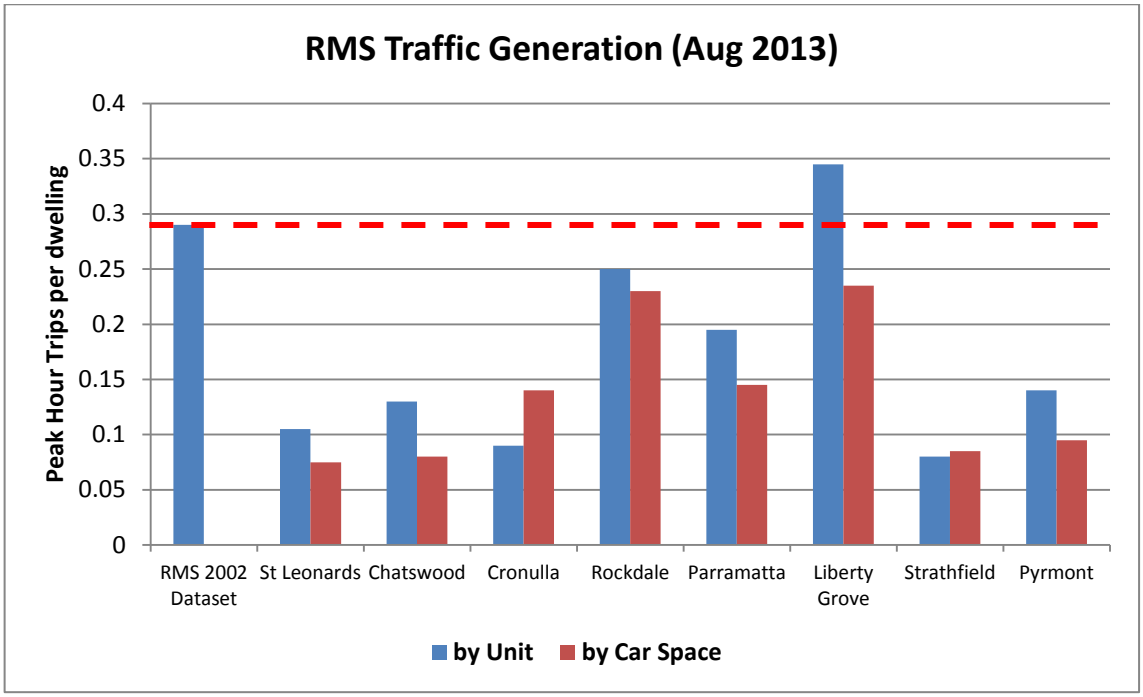


Figure 6.1 indicates that Liberty Grove located to the north of the site, generates traffic at a rate of 0.34 trips per dwelling per peak hour. The relatively high trip generation rate at Liberty Grove is reflective of the high on-site car parking provision at this location. In this regard, the Liberty Grove site generates traffic at a rate of 0.23 trips per car parking space.

Based on the above the traffic generation rate of 0.29 trips per peak hour is considered appropriate. This also confirms that limiting car parking provision (i.e. to 1 space per dwelling) should inturn reduce trip generation to and from the site.

The peak hour and daily traffic volumes for the post-development scenario are set out in Table 6.2.

Table 6.2: Traffic Generation Estimates

Stage	No. of Dwellings	Design Generation Rates		Traffic Generation Estimates	
		Peak Hour [1]	Daily	Peak Hour	Daily
Post Development	785	0.29 vehicle movements / dwelling	2.9 vehicle movements / dwelling	228	2,280

[1] Adopting a peak to daily ratio of 10%.

Table 6.2 indicates that the rezoned lands could be expected to generate some 230 and 2,300 peak hour and daily vehicle movements, respectively.

6.2.2 Other Development

Primary School

A new public primary school is currently under construction at 64-66 Victoria Avenue within the study area. The primary school will have up to 600 enrolments and is anticipated to open for the beginning of the 2015 school year. A transport impact assessment was prepared by McLaren Traffic Engineering (December 2012) on behalf of the Department of Education and Training.

The transport impact assessment includes an estimate of the peak hour traffic generation from the school and an assessment of the existing and post development operation of the George Street/ Pomeroy Street intersection.

The peak hour traffic generation estimates presented in the McLaren Report are reproduced below in Table 6.3.

Table 6.3: Primary School Traffic Generation

Period	Direction	Traffic Generation		
		Student Trips	Staff Trips	Total
AM (8:00 to 9:30am)	In	160	36	196
	Out	160	0	160
PM (2:30 to 4:00pm)	In	160	0	160
	Out	160	36	196

Table 6.3 indicates that the new primary school is anticipated to add some 356 vehicle trips to the road network during the morning and afternoon school peak hours. It is noted that the afternoon school traffic generation will occur prior to the evening road network peak hour, with the primary school not anticipated to generate any traffic during the evening road network peak hour (5:00 to 6:00pm).

As detailed above, an additional short left turn slip lane will be provided on the north approach of the George Street / Pomeroy Street intersection as part of the primary school project. These works will increase the capacity of the north approach to the intersection.

The traffic volumes used to assess the impact of the rezoned lands traffic generation includes both existing traffic as well as the estimated primary school traffic.

McDonald College

It is understood that McDonald College may seek to incorporate a new primary school within part of its existing grounds. However, Council are yet to receive any firm proposal for the site and as such, any change of use for the site has not been captured within the GTA traffic modelling.

Notwithstanding, a high level assessment of the potential traffic impact from the redevelopment of the McDonald College is presented in Appendix C.

In addition to any impacts on the George Street/ Pomeroy Street intersection, the primary school would impact on the midblock operation of George Street south of the intersection. The provision of increased turning movements into the school from George Street and increased pick-up/ drop-off activity on George Street would cause additional delays to through traffic on George Street. The increased congestion around the school could impact on the ability of non-school traffic to access the George Street/ Pomeroy Street intersection, particularly during the morning peak hour when the school peak corresponds with the road network peak.

It is noted that should additional development be provided at the site, it is envisaged that a transport impact assessment would be prepared to assess the impacts of any additional traffic generated by the site. In addition, similar to the primary school on Victoria Avenue and the study area itself, any significant development on the McDonald College site would require mitigation measures for associated traffic impacts on the local road network.

6.3 Distribution and Assignment

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

i configuration of the arterial road network in the immediate vicinity of the site
ii existing operation of intersections providing access between the local and arterial road network
iii distribution of households in the vicinity of the site
iv surrounding employment centres, retail centres and schools in relation to the site
v configuration of access points to the site.

Having consideration for the above, for the purposes of estimating vehicle movements, the existing peak hour directional distributions[4] at the George Street / Pomeroy Street intersection have been adopted.

In addition, the following directional splits of traffic (i.e. the ratio between the inbound and outbound traffic movements) have been adopted:

- AM Peak Hour: 30% in / 70% out
- PM Peak Hour: 70% in / 30% out

The base, additional and post development traffic volume scenarios are presented in Appendix D.

The assessment does not take into account any reduction in existing George Street traffic generated by industrial land uses as a result of the rezoning or a reduction in east-west traffic volumes through the intersection as a result of the WestConnex project. Nor does the assessment include traffic generated by future land uses to the south of the intersection such as the McDonald College expansion detailed above or any further works to the Bakehouse Quarter.

The development scenarios assessed are provided in Table 6.4.

Table 6.4: Development Scenarios Assessed

Assessment Includes	Base Case	Post-Development
Existing Traffic Volumes	✓	✓
Primary School Traffic Volumes (64-66 Victoria Avenue)	✓	✓
Development Traffic (+785 dwellings)	✗	✓
Existing Industrial Lands Traffic Volumes	✗	✗

The assessment does not take into account a reduction in network traffic volumes as a result of rezoning the industrial lands. Therefore the following assessment is considered conservative (higher traffic volumes assumes that may actually eventuate).

[4] The adopted distribution vary for each of the peak hours reflective of the current distributions to George Street.

6.4 Traffic Impact

6.4.1 George Street / Pomeroy Street Intersection

The post development traffic volumes for the base case and post-development scenario have been assessed for the George Street / Pomeroy Street intersection using SIDRA INTERSECTION. Table 6.5 presents a summary of the anticipated operation of the intersection, with full results presented in Appendix B of this report.

Table 6.5: George Street / Pomeroy Street Post Development Operating Conditions

Scenario	Peak	Leg	DOS	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Existing Conditions	AM	George Street (South)	0.69	39	43	D
		Pomeroy Street (East)	0.61	13	102	B
		George Street (North)	0.66	32	59	C
		Pomeroy Street (West)	0.89	34	184	C
	PM	George Street (South)	0.88	47	100	D
		Pomeroy Street (East)	0.60	18	91	B
		George Street (North)	0.83	43	103	D
		Pomeroy Street (West)	**0.90**	41	260	D
Post Primary School Development	AM	George Street (South)	0.61	37	54	D
		Pomeroy Street (East)	0.61	14	102	B
		George Street (North)	0.66	25	42	C
		Pomeroy Street (West)	**0.89**	33	184	C
	PM	George Street (South)	0.82	40	74	D
		Pomeroy Street (East)	0.48	13	67	B
		George Street (North)	0.76	30	43	C
		Pomeroy Street (West)	0.85	29	187	C
Post Development Scenario (+785 dwellings)	AM	George Street (South)	0.72	38	59	D
		Pomeroy Street (East)	0.68	14	102	B
		George Street (North)	0.87	28	56	C
		Pomeroy Street (West)	0.89	33	184	C
	PM	George Street (South)	0.74	39	96	D
		Pomeroy Street (East)	0.77	18	79	B
		George Street (North)	**0.90**	36	63	C
		Pomeroy Street (West)	0.89	36	231	D

Table 6.5 indicates that the George Street/ Pomeroy Street intersection is anticipated to operate with comparable Levels of Service to the existing operation of the intersection. Indeed the modelling indicates that the average queues and 95th percentile queues are anticipated to remain similar to those currently experienced at the intersection.

6.4.2 Pomeroy Street/ Queen Street/ Beronga Street

As detailed in Section 2, the Pomeroy Street / Queen Street / Beronga Street intersection is an irregular shaped roundabout that predominantly caters for east and westbound through movements. It is anticipated that any additional traffic generated by the development to the intersection will also be through movements.

Table 6.6 provides a summary of the existing and anticipated future traffic volumes at the Pomeroy Street/ Queen Street/ Beronga Street intersection.

Table 6.6: Pomeroy Street/ Queen Street/ Beronga Street Intersection Traffic Volumes

Development Scenario	Peak Hour Traffic Volumes	
	AM Peak Hour	PM Peak Hour
Existing	1,888	1,703
Base Case (with Primary School)	2,065	1,703
Post Development	2,164	1,787

Table 6.6 indicates that the additional traffic generated by the rezoned lands could generate some 100 and 80 traffic movements through the roundabout during the AM and PM peak hours, respectively.

It is anticipated that the roundabout would be able to accommodate this level of additional traffic. The additional traffic would add to the already dominant east-west through movements at the intersection. This may result in minor additional delays to traffic entering the roundabout from the side streets (Queen Street). If required these vehicles could use alternate routes to access the broader road network.

6.4.3 Parramatta Road/ George Street

Traffic distributed to the south is anticipated to either access the retail and entertainment land uses provided at the Bakehouse Quarter or continue south to the Parramatta Road/ George Street intersection. The existing intersection currently operates near its capacity.

It is understood that a new fourth leg is to be provided at the intersection as part of an approved mixed use development for lands immediately south of the site. Furthermore, traffic volumes along Parramatta Road are anticipated to change significantly as a result of the WestConnex project (likely a reduction of traffic volumes).

The future operation of this intersection cannot be assessed until the future traffic volumes are determined by the modelling currently being undertaken for the WestConnex project is complete and the long-term layout of the intersection is confirmed.

6.4.4 Pomeroy Street/ Underwood Road

The Pomeroy Street/ Underwood Road intersection located to the west of the study area (in the Strathfield Council LGA) currently limits the capacity of the east-west corridor. A large proportion of vehicles through this intersection undertake the north-west movement between Pomeroy Street and Underwood Road.

The intersection is currently experiences long delays during peak periods, with vehicles required to wait a number of traffic cycles before being able to clear the intersection. The addition of traffic through this intersection will further increase delays and queues.

In order to improve the existing operation of the intersection, increased capacity is required. This could be achieved via the provision of additional lanes; in particular an additional right turn lane on the Pomeroy Street (east) approach to the intersection.

However, in order to do accommodate additional lane(s) at the intersection, some property acquisition would likely be required.

Additional capacity through the intersection could be created by reducing the level of east-west through traffic along the Pomeroy Street-Underwood Road link (see following section).

6.4.5 Summary

Against existing traffic volumes in the vicinity of the site, the additional traffic generated by the proposed rezoned lands, in conjunction with the proposed intersection works, would not compromise the safety or function of the George Street/ Pomeroy Street and Pomeroy Street/ Beronga Street/ Queen Street intersections.

Additional capacity is required at the nearby Pomeroy Street/ Underwood Road intersection to adequately cater for the existing traffic demands as well as the future demands at this intersection. Alternatively, additional future capacity could be provided at the intersection by limiting the amount of through traffic along the Pomeroy Street-Underwood Road corridor. This could be achieved by introducing a number of local area traffic management treatments along the corridor that would slow vehicles and in turn discourage non-local vehicle trips.

Furthermore, the WestConnex project will increase the capacity of the east-west road network and should in turn reduce the number of non-local trips along this corridor.

7. Response to Community Consultation

7.1 Community Workshop #1

In November 2013, two community workshops were held to allow the existing Concord West community to provide their suggestions, concerns and ideas for the future Master Plan. It is noted that the workshops were held prior to a draft Master Plan being considered by the Consultant team.

The workshops provided the community an opportunity to comment on the following key areas:

i Built form
ii Public domain / Open space
iii Traffic and Transport

An overview and a response to each of the suggestions and ideas and concerns and issues from the Community Workshop #1 are provided in Table 7.1.

Table 7.1: Community Workshop #1

Item	Community Comment	Response	Refer to Section in GTA Report
1	*Suggestions and Ideas*		
1.1	Ramp (either entry or exit) to Homebush Bay Drive would help traffic issues in the area	An intersection with Homebush Bay Drive would promote through trips through the precinct and could further compromise the George Street / Pomeroy Street intersection. A link would come at a significant cost	-
1.2	Open an access lane or one/two way street to Liberty Grove to create another connection	Given the existing lot layout in Liberty Grove there is no opportunity to provide a future vehicle link	-
1.3	Remove parking on Pomeroy Street near George Street and the bridge	The proposed intersection works include the extension of existing 'No Parking' restrictions	6.1
1.4	A second underpass should be provided to increase access and safety. A good location is on Queen and Yaralla Streets	The works associated with the freight line will likely prohibit the provision of an additional pedestrian underpass A new underpass of the rail line would be very costly	
1.5	Support for parking permits for existing residents, this ratio must consider residents with more than 1 car	The details of the resident parking scheme would need to be confirmed by Council prior to implementation	4.4
1.6	Support for resident parking permits/schemes	The resident parking scheme would benefit eligible residents	4.4
1.7	Finding a balance between street parking and provision of bicycle paths	The detailed design of any future cycle facilities will need to be determined	5.3
1.8	Upgrades are needed for pedestrian and cycling amenity along George Street	New facilities are recommended	5.3

Item	Community Comment	Response	Refer to Section in GTA Report
2	*Concerns and Issues*		
2.1	Suggestions to open Liberty Grove or build new entry/exit ramps at Homebush Bay Drive will cause traffic to ran run through the area (use George Street)	Agreed	-
2.2	Need roundabouts at the dead end streets to help residents get out when George Street gets busy	Additional roundabouts could be provided on George Street to assist residents exiting side streets and to slow vehicle speeds on George Street	-
2.3	The school will generate additional traffic on top of the proposed residential uses. This will further impact on poor traffic conditions at the Pomeroy Road and George Street intersection	The additional traffic generated by the new primary school has been accounted for in the modelling assessment	6.2
2.4	Street car parking spaces are often occupied by people working at Olympic Park (this was seconded by several people)	The provision of a resident parking scheme and time restricted parking would restrict employee and commuter car parking in the study area	4.4
2.5	How will the existing residents be accommodated in regards to parking? King Street is already occupied with overflow car parking. Existing residents have already raised this issue in a survey	Overflow parking from industrial uses will disappear once these lands are rezoned	-
2.6	There is a need for increased pedestrian access to buses (on Concord Road), the underpass is dangerous and often flooded	Improved access will be provided via the new concourse across Concord West Railway Station which is understood top allow non-ticket holders to cross	5.4
2.7	Commuter parking in the streets will be addressed with 2P,4P parking schemes	New car parking restrictions would restrict employee and commuter car parking	4.4
2.8	Footpaths aren't maintained- 50 to 60 years old	There would be an opportunity to improve the streetscape through the development of the rezoned lands	5.3
2.9	Trains aren't regular enough	TfNSW would need to be lobbied to improve train frequencies	-
2.10	A need for increased pedestrian links along the river and connection with other local pedestrian and cycle networks	New off-road links have been identified	5.3
2.11	Traffic noise is getting worse during the day	The proposed development will have negligible impact on traffic generation on Homebush Bay Drive where the noise is being generated	6.2
2.12	An additional turning lane on George and Pomeroy Streets must consider residents turning into their driveways on George Street, in particular the houses close to the intersection	The proposed intersection changes will have minimal effect on residents entering driveways	
2.13	Traffic on George Street is forced to U-turn due to limited opportunities to turn left and right	The proposed intersection works will increase the capacity of the right turn movement on the south approach to the George Street / Pomeroy Street intersection	6.4
2.14	Some trips from the precinct to Parramatta Road can take in excess of 50 minutes	On-site observations indicate that typical average delays are less than 50 minutes	-

7.2 Community Workshop #2

The draft Masterplan was presented to the Community at a follow up workshop in March 2014. This subsequent workshop gave the community an opportunity to raise any suggestions and ideas or concerns and issues.

An overview and a response to each of the suggestions and ideas and concerns and issues from the Community Workshop #2 are provided in Table 7.2.

Table 7.2: Community Workshop #2

Item	Community Comment	Response	Refer to Section in GTA Report
3	*Suggestions and Ideas*		
3.1	Please don't include speed humps – roundabouts are better. Please don't include speed humps – speed humps are harsh.	Local area traffic management treatments lower vehicle speeds, a preference for roundabouts or speed humps has not been determined as part of this study	-
3.2	Propose staggered hours of operation for new school in order to lessen traffic congestion	Delaying the start time of the new primary school to after the road network peak (say 9am) would spread the peak traffic load and reduce congestion on the network	
3.3	The Powell Creek Bridge should incorporate a pedestrian path as it is almost impossible, and very dangerous, for pedestrians to cross the bridge especially at peak hours	The provision of a pedestrian bridge on the north side of Pomeroy Street has been identified	5.3
3.4	Provide financial incentives for residents who don't own a car (possibly reduced rates or vouchers for local shops)	Apartments without an allocated car parking space would demand a lower market price. Other financial incentives could be investigated at the DA stage	-
3.5	If road upgrades are going to be delayed due to finances, developers should contribute to the funding	Planning controls relating to road network upgrades should be put in place	-
3.6	Permits for residents	Eligible residents would be granted car parking permits under the resident parking scheme	4.4
3.7	Suggestion for an underpass at Station Avenue	The cost associated with an additional rail crossing is prohibitive	-
3.8	Suggestion to make Pomeroy Street 2 lanes in each direction	Additional lanes would increase the midblock capacity of Pomeroy Street but would not increase capacity at the intersections where the delays are caused	-
3.9	The lack of parking provision will decrease the property value of the units, preventing high market prices. The demographics of the area are likely to change along with the unit prices	Comment only	-

Item	Community Comment	Response	Refer to Section in GTA Report
4	Concerns and Issues		
4.1	Traffic concerns – concerned that the school is going to generate more traffic than the proposed development. Concern about the speed limits along Victoria Avenue- cars travel down that street way too fast	The traffic generation from the school has been accounted for in the modelling. Local area traffic management treatments could be introduced if vehicle speeds are determined to be to high	-
4.2	Trains are already over capacity at peak hours	TfNSW would need to be lobbied to improve train capacity	-
4.3	The George/Pomeroy St intersection is already over capacity and the additional left turn slip way will not be significant enough to solve the issue	Modelling indicates that the proposed intersection layout will be able to accommodate the additional traffic forecasts	6.4
4.4	Residents want to be informed about the timing of the delivery of these road upgrades and who will be responsible for them (possibly contact with the local member would be helpful)	RMS would be able to provide details on any road upgrade in the area	-
4.5	Will there be additional roundabouts implemented to improve traffic flow (especially on Victoria Avenue and George Street)?	The anticipated traffic volumes at the George Street / Victoria Avenue intersection do not warrant the provision of a roundabout	-
4.6	How will the quality of roads be dealt with as a result of increased traffic volume?	Ongoing road maintenance will be undertaken by Council	-
4.7	Narrow streets can create potential traffic conflicts and hazards for emergency services vehicles	Designed appropriately narrow streets lower vehicle speeds and cater for design vehicles	5.3
4.8	The school will generate more traffic than apartments	The school is anticipated to generate 356 peak hour movements compared to the rezoned lands 228 movements	6.2
4.9	What about visitor parking?	Visitor parking will be provided on each of the sites and accommodated on-street	-
4.10	There is no provision for commuter car parking	Correct	4.4
4.11	George Street school zone/no parking has existing issues especially within 50 km/hr zone	This would appear to be an existing issues that should be dealt with by Council	-

8. Conclusion

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

i All traffic to and from the study area is required to pass through the George Street/ Pomeroy Street intersection.

ii The study area has good accessibility to nearby public transport services and the surrounding walking and cycling network.

iii There are opportunities to improve the existing pedestrian and cycle networks, for the benefit of future sustainable transport mode choice.

iv In order to minimise traffic generation, a maximum average car parking rate of 1 space per dwelling should be imposed on the rezoned lands.

v On-street parking restrictions should be implemented, with a resident parking scheme to cater for existing resident car parking demands.

vi The rezoned lands are expected to generate up to 228 and 2,280 vehicle movements in any peak hour and daily respectively.

vii A capacity assessment of the George Street/ Pomeroy Street intersection indicates that the study area could accommodate the traffic generation associated with the indicative dwelling yield of 785 dwellings.

viii A number of suggestions, ideas, concerns and issues have been raised by the community as detailed in Section 7. These have either been addressed by this report or can be explored further during the design process.

draft

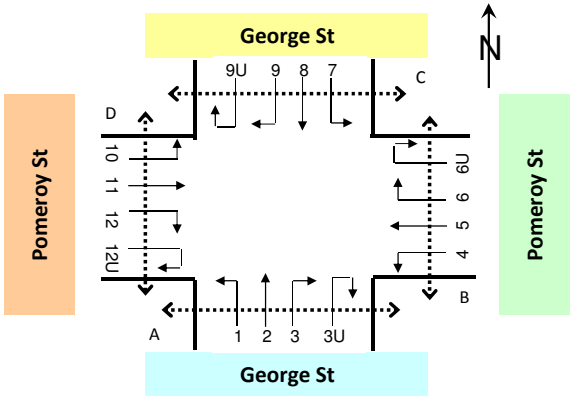
Appendix A

Appendix A

Existing Traffic Volume Survey Results

Job No. : N1236
Client : GTA
Suburb : Concord West
Location : 1. George St / Pomeroy St

Day/Date : Tue, 29th October 2013
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



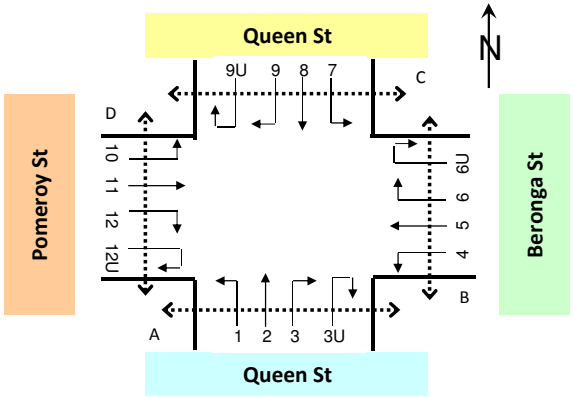
SKYHIGH - THE TRAFFIC SURVEY COMPANY

Approach		George St					Pomeroy St					George St					Pomeroy St					Grand Total
	Time Period	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	
AM	7:45 to 8:45	279	14	1	1	**295**	1,122	23	2	11	**1,158**	337	13	0	5	**355**	661	24	4	7	**696**	**2,504**
PM	17:00 to 18:00	489	1	1	3	**494**	764	17	0	6	**787**	390	3	0	5	**398**	692	13	2	0	**707**	**2,386**

Approach		George St					Pomeroy St					George St					Pomeroy St					Grand Total
	Time Period	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	
	7:00 to 8:00	228	14	0	1	**243**	757	33	3	14	**807**	300	11	0	5	**316**	654	36	2	5	**697**	**2,063**
	7:15 to 8:15	249	13	0	1	**263**	965	35	3	11	**1,014**	309	11	0	6	**326**	658	35	4	7	**704**	**2,307**
	7:30 to 8:30	270	14	1	1	**286**	1,087	31	3	12	**1,133**	326	12	0	6	**344**	678	32	4	8	**722**	**2,485**
	7:45 to 8:45	279	14	1	1	**295**	1,122	23	2	11	**1,158**	337	13	0	5	**355**	661	24	4	7	**696**	**2,504**
	8:00 to 9:00	299	10	1	1	**311**	1,117	22	3	10	**1,152**	349	8	0	3	**360**	633	18	2	7	**660**	**2,483**
	AM Totals	**527**	**24**	**1**	**2**	**554**	**1,874**	**55**	**6**	**24**	**1,959**	**649**	**19**	**0**	**8**	**676**	**1,287**	**54**	**4**	**12**	**1,357**	**4,546**
	16:00 to 17:00	383	9	0	3	**395**	749	34	0	1	**784**	358	7	0	1	**366**	572	17	1	4	**594**	**2,139**
	16:15 to 17:15	422	7	0	4	**433**	793	27	0	1	**821**	351	8	0	0	**359**	603	12	0	3	**618**	**2,231**
	16:30 to 17:30	472	5	0	4	**481**	797	23	0	4	**824**	369	5	0	1	**375**	659	11	0	2	**672**	**2,352**
	16:45 to 17:45	474	3	0	6	**483**	766	19	0	5	**790**	372	4	0	1	**377**	714	14	1	0	**729**	**2,379**
	17:00 to 18:00	489	1	1	3	**494**	764	17	0	6	**787**	390	3	0	5	**398**	692	13	2	0	**707**	**2,386**
	PM Totals	**872**	**10**	**1**	**6**	**889**	**1,513**	**51**	**0**	**7**	**1,571**	**748**	**10**	**0**	**6**	**764**	**1,264**	**30**	**3**	**4**	**1,301**	**4,525**

Job No. : N1236
Client : GTA
Suburb : Concord West
Location : 2. Queen St / Pomeroy St / Beronga St

Day/Date : Tue, 29th October 2013
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



SKYHIGH - THE TRAFFIC SURVEY COMPANY

	Approach	Queen St					Beronga St					Queen St					Pomeroy St					Grand Total
	Time Period	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	
AM	7:45 to 8:45	461	15	2	10	**488**	481	7	0	4	**492**	209	3	2	3	**217**	685	28	6	13	**732**	**1,929**
PM	17:00 to 18:00	384	14	0	2	**400**	312	3	0	2	**317**	100	1	0	2	**103**	899	12	2	3	**916**	**1,736**

Approach	Queen St					Beronga St					Queen St					Pomeroy St					Grand Total
Time Period	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	
7:00 to 8:00	329	23	2	12	**366**	374	12	1	5	**392**	97	6	2	4	**109**	629	35	3	8	**675**	**1,542**
7:15 to 8:15	386	24	2	9	**421**	458	10	1	4	**473**	158	7	2	3	**170**	639	33	5	11	**688**	**1,752**
7:30 to 8:30	436	20	2	10	**468**	494	8	1	3	**506**	192	7	2	4	**205**	667	30	6	12	**715**	**1,894**
7:45 to 8:45	461	15	2	10	**488**	481	7	0	4	**492**	209	3	2	3	**217**	685	28	6	13	**732**	**1,929**
8:00 to 9:00	444	14	3	10	**471**	477	6	0	2	**485**	223	4	0	2	**229**	706	22	3	12	**743**	**1,928**
AM Totals	**773**	**37**	**5**	**22**	**837**	**851**	**18**	**1**	**7**	**877**	**320**	**10**	**2**	**6**	**338**	**1,335**	**57**	**6**	**20**	**1,418**	**3,470**
16:00 to 17:00	392	16	0	0	**408**	304	13	0	1	**318**	98	9	0	0	**107**	758	11	2	8	**779**	**1,612**
16:15 to 17:15	416	8	0	0	**424**	315	12	0	1	**328**	102	8	0	0	**110**	809	12	0	8	**829**	**1,691**
16:30 to 17:30	437	11	0	0	**448**	310	6	0	2	**318**	90	7	0	0	**97**	758	7	0	7	**772**	**1,635**
16:45 to 17:45	400	11	0	1	**412**	312	5	0	2	**319**	93	2	0	2	**97**	800	6	1	4	**811**	**1,639**
17:00 to 18:00	384	14	0	2	**400**	312	3	0	2	**317**	100	1	0	2	**103**	899	12	2	3	**916**	**1,736**
PM Totals	**776**	**30**	**0**	**2**	**808**	**616**	**16**	**0**	**3**	**635**	**198**	**10**	**0**	**2**	**210**	**1,657**	**23**	**4**	**11**	**1,695**	**3,348**

Job No	N1236
Client	GTA
Road	George St - Adj No 37 (north of Child Care Centre)
Location	Concord West
Site No	1
Start Date	29-Oct-13
Description -	Volume Summary
Direction	Combined

Average Weekday	1,649
7 Day Average	1,590

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	4-Nov	29-Oct	30-Oct	31-Oct	1-Nov	2-Nov	3-Nov		
AM Peak	143	152	162	136	172	148	96		
PM Peak	155	134	160	130	140	134	120		
0:00	9	9	8	14	16	21	17	11	13
1:00	5	10	2	2	11	10	16	6	8
2:00	3	1	4	3	2	9	8	3	4
3:00	1	4	2	6	2	3	6	3	3
4:00	6	4	3	4	5	1	9	4	5
5:00	26	33	27	31	34	16	9	30	25
6:00	76	59	80	70	86	33	14	74	60
7:00	127	124	133	119	117	51	30	124	100
8:00	143	152	162	136	172	71	48	153	126
9:00	107	98	100	95	126	108	74	105	101
10:00	81	75	78	74	101	106	81	82	85
11:00	78	76	72	80	87	148	96	79	91
12:00	76	85	84	71	93	123	115	82	92
13:00	63	73	88	80	66	134	108	74	87
14:00	95	92	98	68	98	97	120	90	95
15:00	116	111	125	109	135	100	106	119	115
16:00	120	113	102	102	101	102	68	108	101
17:00	155	122	127	130	140	130	88	135	127
18:00	135	134	160	129	127	109	83	137	125
19:00	78	61	106	99	78	85	75	84	83
20:00	28	40	49	63	71	44	46	50	49
21:00	41	25	37	51	63	38	49	43	43
22:00	20	43	32	27	47	23	22	34	31
23:00	12	10	15	20	35	23	12	18	18
Total	1601	1554	1694	1583	1813	1585	1300	1649	1590
7-19	1296	1255	1329	1193	1363	1279	1017	1287	1247
6-22	1519	1440	1601	1476	1661	1479	1201	1539	1482
6-24	1551	1493	1648	1523	1743	1525	1235	1592	1531
0-24	1601	1554	1694	1583	1813	1585	1300	1649	1590

Job No	N1236
Client	GTA
Road	George St - 30m south of Warsaw St
Location	Concord West
Site No	2
Start Date	29-Oct-13
Description -	Volume Summary
Direction	Combined

Average Weekday	7,949
7 Day Average	7,480

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	4-Nov	29-Oct	30-Oct	31-Oct	1-Nov	2-Nov	3-Nov		
AM Peak	644	671	729	643	696	540	352		
PM Peak	646	726	686	676	662	510	424		
0:00	58	56	50	65	75	126	138	61	81
1:00	33	25	26	28	47	78	81	32	45
2:00	11	12	13	20	9	42	53	13	23
3:00	15	21	27	23	25	28	47	22	27
4:00	39	32	27	27	35	38	30	32	33
5:00	131	128	144	134	135	93	34	134	114
6:00	346	334	364	349	357	163	61	350	282
7:00	555	585	639	594	589	210	95	592	467
8:00	644	671	729	643	696	333	186	677	557
9:00	479	469	541	508	517	464	258	503	462
10:00	323	313	337	367	397	540	352	347	376
11:00	315	292	315	353	366	525	340	328	358
12:00	324	366	318	335	345	494	415	338	371
13:00	326	323	349	333	395	502	353	345	369
14:00	398	394	409	346	432	434	388	396	400
15:00	525	537	542	492	593	412	406	538	501
16:00	595	620	625	633	572	415	316	609	539
17:00	646	726	686	676	662	510	381	679	612
18:00	576	618	642	565	616	469	424	603	559
19:00	428	384	455	455	499	388	340	444	421
20:00	245	315	370	364	363	264	295	331	317
21:00	221	228	301	282	313	230	236	269	259
22:00	135	193	181	180	238	195	150	185	182
23:00	83	73	103	127	209	172	114	119	126
Total	7451	7715	8193	7899	8485	7125	5493	7949	7480
7-19	5706	5914	6132	5845	6180	5308	3914	5955	5571
6-22	6946	7175	7622	7295	7712	6353	4846	7350	6850
6-24	7164	7441	7906	7602	8159	6720	5110	7654	7157
0-24	7451	7715	8193	7899	8485	7125	5493	7949	7480

draft

Appendix B

SIDRA INTERSECTION Results

MOVEMENT SUMMARY

Pomeroy St / George St
EXISTING CONDITIONS
AM PEAK HOUR
Signals - Fixed Time Cycle Time = 80 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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 per veh	Average Speed km/h
South: George St - S Leg											
1	L	69	3.0	0.629	37.0	LOS D	5.5	39.5	0.88	0.84	30.6
2	T	93	3.0	0.629	28.7	LOS C	5.5	39.5	0.88	0.73	31.2
3	R	148	3.0	0.686	46.4	LOS D	6.0	43.1	1.00	0.86	26.4
Approach		311	3.0	0.686	39.0	LOS D	6.0	43.1	0.94	0.82	28.6
East: Pomeroy St - E Leg											
4	L	474	3.0	0.607	17.0	LOS B	9.6	69.2	0.56	0.79	40.9
5	T	634	3.0	0.541	9.6	LOS A	14.3	102.3	0.62	0.56	45.3
6	R	112	3.0	0.341	20.1	LOS C	2.0	14.1	0.77	0.77	38.7
Approach		1219	3.0	0.607	13.4	LOS B	14.3	102.3	0.61	0.67	42.9
North: George St - N Leg											
7	L	157	3.0	0.500	26.0	LOS C	4.1	29.5	0.71	0.77	35.0
8	T	132	3.0	0.662	33.1	LOS C	8.2	59.1	0.97	0.84	29.2
9	R	85	3.0	0.662	41.4	LOS D	8.2	59.1	0.97	0.86	29.0
Approach		374	3.0	0.662	32.0	LOS C	8.2	59.1	0.86	0.81	31.3
West: Pomeroy St - W Leg											
10	L	191	3.0	0.397	22.2	LOS C	4.5	32.0	0.64	0.77	37.3
11	T	463	3.0	0.886	36.7	LOS D	25.6	183.8	0.98	1.09	28.3
12	R	79	3.0	0.886	45.0	LOS D	25.6	183.8	0.98	1.11	28.1
Approach		733	3.0	0.886	33.8	LOS C	25.6	183.8	0.89	1.01	30.1
All Vehicles		2636	3.0	0.886	24.8	LOS C	25.6	183.8	0.76	0.80	34.9

Level of Service (LOS) Method: Delay (HCM 2000).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	10.5	LOS B	0.1	0.1	0.51	0.51
P3	Across E approach	53	34.2	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	17.6	LOS B	0.1	0.1	0.66	0.66
P7	Across W approach	53	31.5	LOS D	0.1	0.1	0.89	0.89
All Pedestrians		212	23.4	LOS C			0.75	0.75

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

MOVEMENT SUMMARY

Pomeroy St / George St
EXISTING CONDITIONS
PM PEAK HOUR
Signals - Fixed Time Cycle Time = 100 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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 per veh	Average Speed km/h
South: George St - S Leg											
1	L	131	3.0	0.470	37.7	LOS D	11.0	79.2	0.85	0.85	30.2
2	T	151	3.0	0.470	29.4	LOS C	11.0	79.2	0.85	0.72	30.9
3	R	239	3.0	0.881	64.1	LOS E	13.9	99.6	1.00	1.01	21.7
Approach		520	3.0	0.881	47.4	LOS D	13.9	99.6	0.92	0.89	25.8
East: Pomeroy St - E Leg											
4	L	222	3.0	0.352	20.0	LOS B	5.4	38.4	0.53	0.76	38.8
5	T	457	3.0	0.427	13.5	LOS B	12.7	91.4	0.62	0.55	41.9
6	R	149	3.0	0.600	28.3	LOS C	3.8	27.6	0.91	0.80	33.8
Approach		828	3.0	0.600	17.9	LOS B	12.7	91.4	0.65	0.65	39.3
North: George St - N Leg											
7	L	151	3.0	0.531	26.5	LOS C	4.4	31.9	0.65	0.76	34.7
8	T	129	3.0	0.831	48.3	LOS D	14.3	102.7	1.00	0.99	24.1
9	R	139	3.0	0.831	56.6	LOS E	14.3	102.7	1.00	0.99	24.0
Approach		419	3.0	0.831	43.2	LOS D	14.3	102.7	0.87	0.90	27.0
West: Pomeroy St - W Leg											
10	L	102	3.0	0.258	26.0	LOS C	2.9	21.0	0.63	0.75	35.0
11	T	575	3.0	0.898	42.8	LOS D	36.2	260.0	1.00	1.08	26.2
12	R	67	3.0	0.898	51.2	LOS D	36.2	260.0	1.00	1.08	26.1
Approach		744	3.0	0.898	41.3	LOS D	36.2	260.0	0.95	1.03	27.1
All Vehicles		2512	3.0	0.898	35.2	LOS D	36.2	260.0	0.83	0.85	29.8

Level of Service (LOS) Method: Delay (HCM 2000).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	14.6	LOS B	0.1	0.1	0.54	0.54
P3	Across E approach	53	32.8	LOS D	0.1	0.1	0.81	0.81
P5	Across N approach	53	21.8	LOS C	0.1	0.1	0.66	0.66
P7	Across W approach	53	30.4	LOS D	0.1	0.1	0.78	0.78
All Pedestrians		212	24.9	LOS C			0.70	0.70

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

MOVEMENT SUMMARY

Site: Existing AM + School

Pomeroy St / George St
EXISTING + SCHOOL
(WITH INTERSECTION UPGRADES)
AM PEAK HOUR
Signals - Fixed Time Cycle Time = 80 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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 per veh	Average Speed km/h
South: George St - S Leg											
1	L	69	3.0	0.603	37.3	LOS D	7.5	53.9	0.91	0.83	30.7
2	T	148	3.0	0.603	29.0	LOS C	7.5	53.9	0.91	0.75	31.2
3	R	148	3.0	0.608	43.9	LOS D	5.7	41.2	0.98	0.82	27.2
Approach		366	3.0	0.608	36.6	LOS D	7.5	53.9	0.94	0.80	29.4
East: Pomeroy St - E Leg											
4	L	474	3.0	0.608	17.0	LOS B	9.6	69.2	0.56	0.79	40.9
5	T	634	3.0	0.541	9.6	LOS A	14.3	102.3	0.62	0.56	45.3
6	R	194	3.0	0.600	21.1	LOS C	3.6	26.0	0.84	0.80	38.1
Approach		1301	3.0	0.608	14.0	LOS B	14.3	102.3	0.63	0.68	42.4
North: George St - N Leg											
7	L	261	3.0	0.660	14.3	LOS B	4.2	30.2	0.53	0.74	43.3
8	T	174	3.0	0.382	28.1	LOS C	5.8	41.7	0.88	0.72	32.3
9	R	107	3.0	0.509	44.1	LOS D	4.1	29.4	0.97	0.79	27.1
Approach		542	3.0	0.660	24.6	LOS C	5.8	41.7	0.73	0.75	35.3
West: Pomeroy St - W Leg											
10	L	259	3.0	0.541	22.8	LOS C	6.3	45.5	0.67	0.78	36.9
11	T	463	3.0	0.886	36.7	LOS D	25.6	183.8	0.98	1.09	28.3
12	R	79	3.0	0.886	45.0	LOS D	25.6	183.8	0.98	1.11	28.1
Approach		801	3.0	0.886	33.0	LOS C	25.6	183.8	0.88	0.99	30.5
All Vehicles		3011	3.0	0.886	23.7	LOS C	25.6	183.8	0.75	0.79	35.5

Level of Service (LOS) Method: Delay (HCM 2000).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	10.5	LOS B	0.1	0.1	0.51	0.51
P3	Across E approach	53	34.2	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	17.6	LOS B	0.1	0.1	0.66	0.66
P7	Across W approach	53	31.5	LOS D	0.1	0.1	0.89	0.89
All Pedestrians		212	23.4	LOS C			0.75	0.75

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

MOVEMENT SUMMARY

Pomeroy St / George St
EXISTING
(WITH INTERSECTION UPGRADES)
PM PEAK HOUR
Signals - Fixed Time Cycle Time = 80 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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 per veh	Average Speed km/h
South: George St - S Leg											
1	L	131	3.0	0.602	37.5	LOS D	9.9	71.2	0.94	0.84	30.4
2	T	151	3.0	0.602	29.2	LOS C	9.9	71.2	0.94	0.79	30.8
3	R	239	3.0	0.816	48.3	LOS D	10.3	74.2	1.00	0.96	25.8
Approach		520	3.0	0.816	40.1	LOS D	10.3	74.2	0.97	0.88	28.2
East: Pomeroy St - E Leg											
4	L	222	3.0	0.290	16.1	LOS B	3.9	28.1	0.48	0.75	41.7
5	T	457	3.0	0.398	9.0	LOS A	9.3	66.8	0.56	0.50	46.1
6	R	149	3.0	0.480	22.1	LOS C	2.8	20.0	0.86	0.79	37.4
Approach		828	3.0	0.480	13.3	LOS B	9.3	66.8	0.60	0.62	43.1
North: George St - N Leg											
7	L	151	3.0	0.417	14.0	LOS B	2.3	16.5	0.55	0.72	43.5
8	T	129	3.0	0.271	26.4	LOS C	4.1	29.7	0.85	0.68	33.2
9	R	139	3.0	0.763	50.3	LOS D	5.9	42.6	1.00	0.91	25.2
Approach		419	3.0	0.763	29.9	LOS C	5.9	42.6	0.79	0.77	32.6
West: Pomeroy St - W Leg											
10	L	102	3.0	0.255	22.2	LOS C	2.8	19.8	0.62	0.77	37.5
11	T	575	3.0	0.852	29.0	LOS C	26.0	186.6	0.95	0.98	31.5
12	R	67	3.0	0.852	37.8	LOS D	26.0	186.6	0.96	1.04	31.0
Approach		744	3.0	0.852	28.9	LOS C	26.0	186.6	0.90	0.96	32.1
All Vehicles		2512	3.0	0.852	26.2	LOS C	26.0	186.6	0.80	0.80	34.1

Level of Service (LOS) Method: Delay (HCM 2000).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	11.0	LOS B	0.1	0.1	0.53	0.53
P3	Across E approach	53	33.3	LOS D	0.1	0.1	0.91	0.91
P5	Across N approach	53	18.2	LOS B	0.1	0.1	0.68	0.68
P7	Across W approach	53	30.6	LOS D	0.1	0.1	0.88	0.88
All Pedestrians		212	23.3	LOS C			0.75	0.75

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

MOVEMENT SUMMARY

Pomeroy St / George St
EXISTING + 785 DWELLINGS
(WITH INTERSECTION UPGRADES)
PM PEAK HOUR
Signals - Fixed Time Cycle Time = 90 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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 per veh	Average Speed km/h
South: George St - S Leg											
1	L	131	3.0	0.635	38.7	LOS D	13.4	95.9	0.93	0.86	30.0
2	T	214	3.0	0.635	30.4	LOS C	13.4	95.9	0.93	0.79	30.4
3	R	239	3.0	0.744	46.7	LOS D	10.7	76.5	0.98	0.90	26.3
Approach		583	3.0	0.744	38.9	LOS D	13.4	95.9	0.95	0.85	28.5
East: Pomeroy St - E Leg											
4	L	222	3.0	0.321	18.0	LOS B	4.6	33.3	0.51	0.76	40.2
5	T	457	3.0	0.413	11.2	LOS B	11.0	79.1	0.60	0.53	43.9
6	R	212	3.0	0.772	30.9	LOS C	5.6	40.5	0.95	0.89	32.5
Approach		891	3.0	0.772	17.6	LOS B	11.0	79.1	0.66	0.67	39.7
North: George St - N Leg											
7	L	177	3.0	0.549	15.2	LOS B	3.2	23.1	0.56	0.72	42.6
8	T	152	3.0	0.274	26.8	LOS C	5.2	37.2	0.81	0.66	33.0
9	R	163	3.0	0.902	65.6	LOS E	8.9	63.6	1.00	1.05	21.4
Approach		492	3.0	0.902	35.5	LOS D	8.9	63.6	0.78	0.81	30.1
West: Pomeroy St - W Leg											
10	L	144	3.0	0.336	24.4	LOS C	3.8	27.3	0.64	0.76	35.9
11	T	575	3.0	0.886	37.5	LOS D	32.2	230.9	0.99	1.06	28.0
12	R	67	3.0	0.886	45.8	LOS D	32.2	230.9	0.99	1.07	27.8
Approach		786	3.0	0.886	35.8	LOS D	32.2	230.9	0.92	1.01	29.2
All Vehicles		2752	3.0	0.902	30.5	LOS C	32.2	230.9	0.82	0.83	31.9

Level of Service (LOS) Method: Delay (HCM 2000).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	12.8	LOS B	0.1	0.1	0.53	0.53
P3	Across E approach	53	32.9	LOS D	0.1	0.1	0.86	0.86
P5	Across N approach	53	20.0	LOS B	0.1	0.1	0.67	0.67
P7	Across W approach	53	30.4	LOS D	0.1	0.1	0.82	0.82
All Pedestrians		212	24.0	LOS C			0.72	0.72

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

MOVEMENT SUMMARY

Pomeroy St / George St
EXISTING + SCHOOL + 785 DWELLINGS
(WITH INTERSECTION UPGRADES)
AM PEAK HOUR
Signals - Fixed Time Cycle Time = 80 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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 per veh	Average Speed km/h
South: George St - S Leg											
1	L	69	3.0	0.527	37.6	LOS D	8.2	59.0	0.92	0.84	30.6
2	T	166	3.0	0.527	29.3	LOS C	8.2	59.0	0.92	0.77	31.1
3	R	148	3.0	0.718	47.9	LOS D	6.1	44.0	1.00	0.88	25.9
Approach		384	3.0	0.718	38.0	LOS D	8.2	59.0	0.95	0.82	28.8
East: Pomeroy St - E Leg											
4	L	474	3.0	0.609	17.0	LOS B	9.6	69.2	0.56	0.79	40.9
5	T	634	3.0	0.541	9.6	LOS A	14.3	102.3	0.62	0.56	45.3
6	R	217	3.0	0.675	22.8	LOS C	4.4	31.5	0.87	0.83	36.9
Approach		1324	3.0	0.675	14.4	LOS B	14.3	102.3	0.64	0.69	42.1
North: George St - N Leg											
7	L	342	3.0	0.865	18.7	LOS B	6.8	49.0	0.57	0.79	39.9
8	T	227	3.0	0.501	29.1	LOS C	7.9	56.4	0.92	0.76	31.8
9	R	141	3.0	0.709	48.0	LOS D	5.8	41.8	1.00	0.87	25.9
Approach		711	3.0	0.865	27.8	LOS C	7.9	56.4	0.77	0.80	33.6
West: Pomeroy St - W Leg											
10	L	289	3.0	0.605	23.1	LOS C	7.2	51.9	0.68	0.79	36.7
11	T	463	3.0	0.886	36.7	LOS D	25.6	183.8	0.98	1.09	28.3
12	R	79	3.0	0.886	45.0	LOS D	25.6	183.8	0.98	1.11	28.1
Approach		832	3.0	0.886	32.7	LOS C	25.6	183.8	0.88	0.99	30.7
All Vehicles		3251	3.0	0.886	24.8	LOS C	25.6	183.8	0.77	0.80	34.9

Level of Service (LOS) Method: Delay (HCM 2000).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	10.5	LOS B	0.1	0.1	0.51	0.51
P3	Across E approach	53	34.2	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	17.6	LOS B	0.1	0.1	0.66	0.66
P7	Across W approach	53	31.5	LOS D	0.1	0.1	0.89	0.89
All Pedestrians		212	23.4	LOS C			0.75	0.75

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.

draft

Appendix C

Assessment of McDonald College Redevelopment

draft

McDonald College Traffic Impact Assessment

McDonald College is located on the southeast corner of the Pomeroy Street / George Street intersection south of the study area. Whilst a formal Development Application has not been lodged with the City of Canada Bay, it is understood that a new primary school facility is proposed. It is unknown as to whether or not the new primary school will replace existing uses within the College or operate in addition to the current uses. It is understood that once complete, the primary school will cater for up to 600 students, the same as the approved primary school within the study area.

A preliminary assessment of the anticipated traffic impact of a potential primary school (600 students) at this location on the George Street/ Pomeroy Street intersection is presented below.

For assessment purposes the following assumptions have been made:

- The new school will generate 356 peak hour movements (consistent with the approved primary school in the study area – McLaren Traffic Engineering Report).
- The school will not generate any significant traffic during the PM road network peak hour (the PM school peak hour would need to be assessed as part of any future DA application for the site).
- The existing McDonald College will continue to generate its current levels of traffic.
- Traffic Distribution:
    - 67% north to the George Street/ Pomeroy Street intersection comprising:
        - 55% east
        - 5% north
        - 40% west
    - 33% south to the Parramatta Road / George Street intersection
- The McDonald College traffic has been added to the base case scenario (existing + approved primary school traffic).
- The George Street/ Pomeroy Street intersection upgrades associated with the approved primary school have taken place prior to opening.

The additional traffic generated by the potential school and the post development traffic volumes are presented in Figures C1 and C2. The post-development traffic volumes do not include any development within the study area.

Figure C1: McDonald College AM Peak Hour Traffic Volume Generation

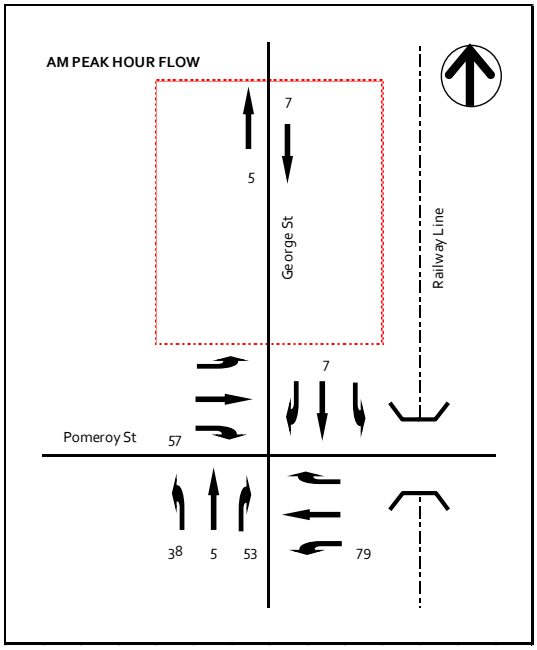
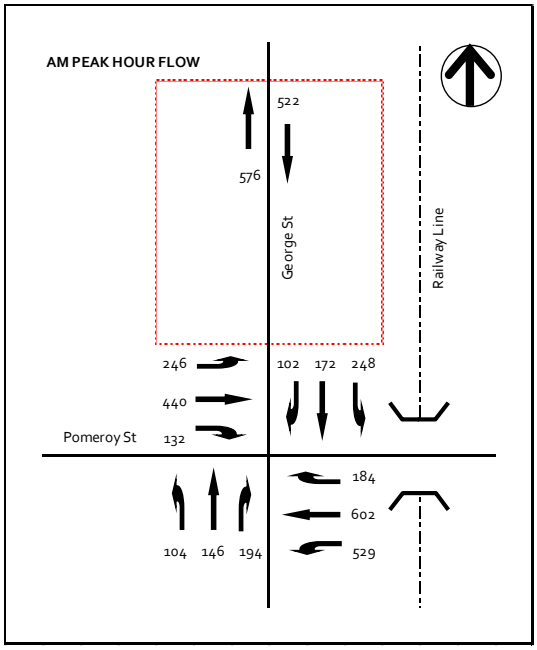


Figure C2: AM Peak Hour Post Development Traffic Volumes



The post development operation of the intersection during the AM Peak hour has been assessed using SIDRA INTERSECTION, with the results presented in Table C1.

Table C1: Intersection Operation (incl. McDonald College Development)

Scenario	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Existing Traffic Volumes + Approved School Development + McDonald College	AM	George Street (south)	1.1	91	131	F
		Pomeroy Street (east)	0.74	15	108	B
		George Street (north)	0.81	35	56	D
		Pomeroy Street (west)	1.1	104	448	F

Table C1 indicates that following the potential development of the McDonald College the George Street/ Pomeroy Street intersection would be operating above its capacity. In particular the south and west approaches to the intersection are anticipated to fail (DOS's greater than 1.0).

Given the above, it is anticipated that any DA application for the McDonald College of a similar intensity to the one assessed above would need to include mitigation works at the George Street/ Pomeroy Street intersection to increase its capacity.

draft

Appendix D

Post Development Traffic Volumes

Figure D.1: AM Peak Hour – Existing Traffic Volumes

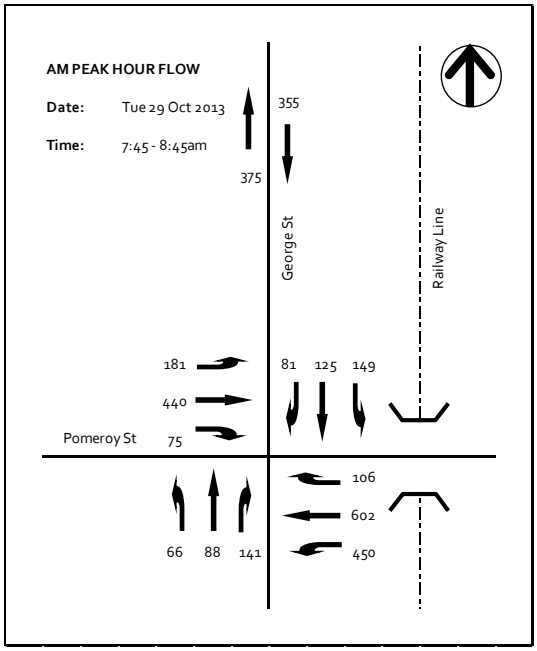


Figure D.2: PM Peak Hour – Existing Traffic Volumes

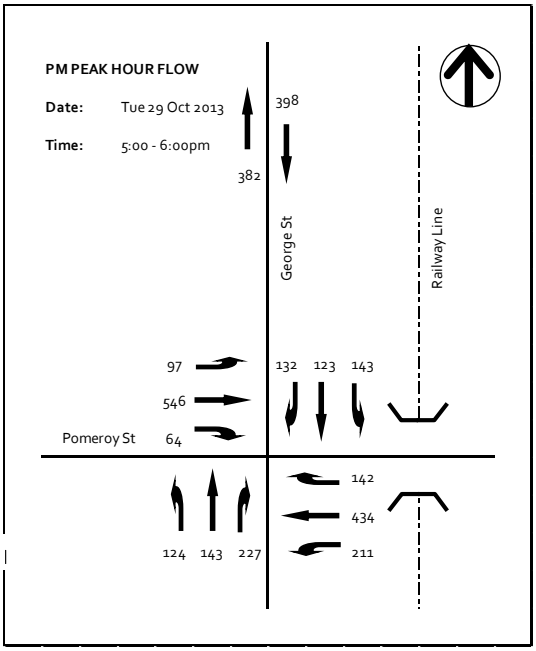


Figure D.3: AM Peak Hour – Additional Traffic Volumes (Approved Primary School)

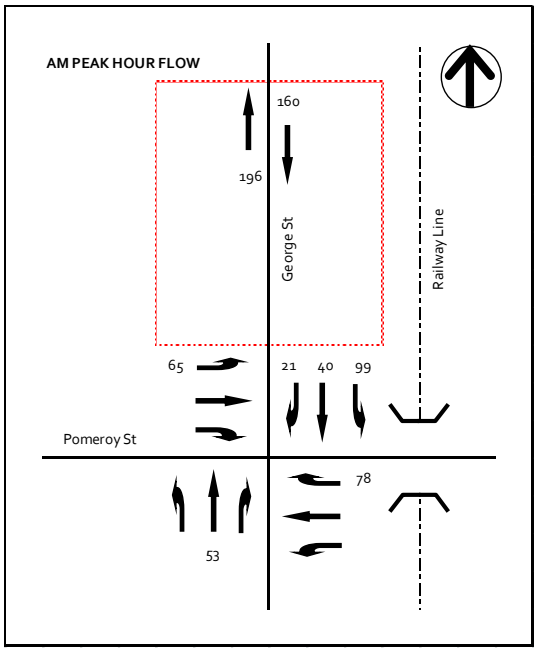


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Figure D.4: AM Peak Hour – Base Traffic Volumes

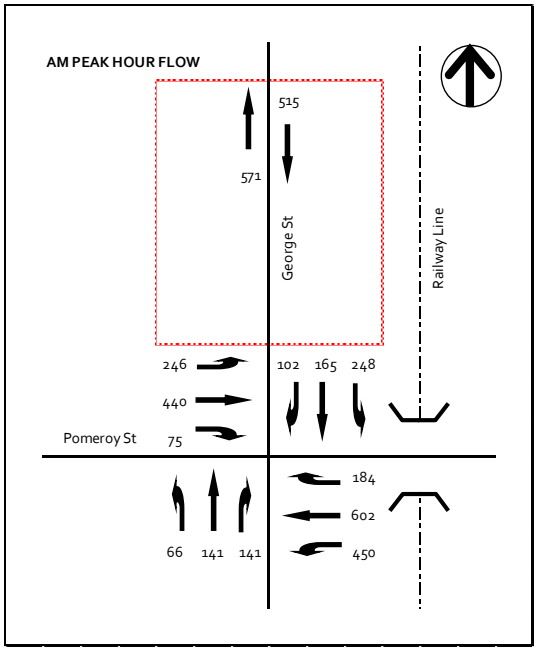


Figure D.5: PM Peak Hour – Base Traffic Volumes

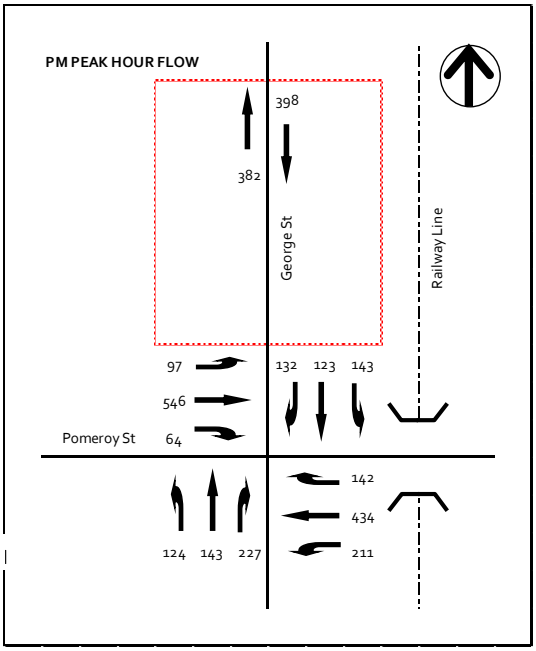


Figure D.6: AM Peak Hour – Post Development Traffic Volumes

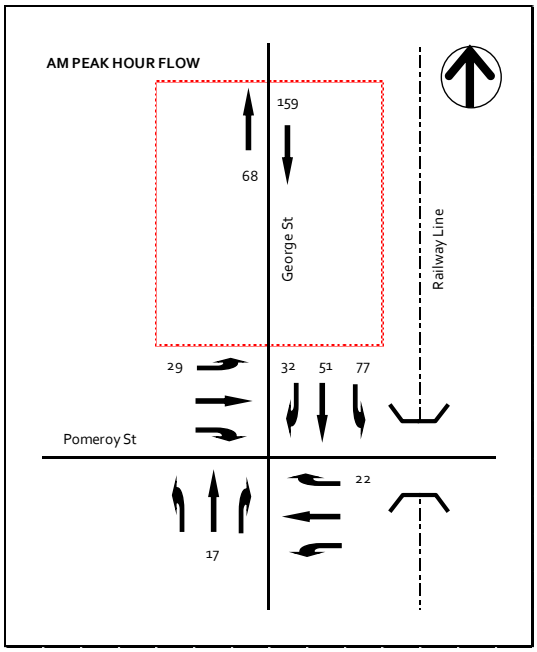
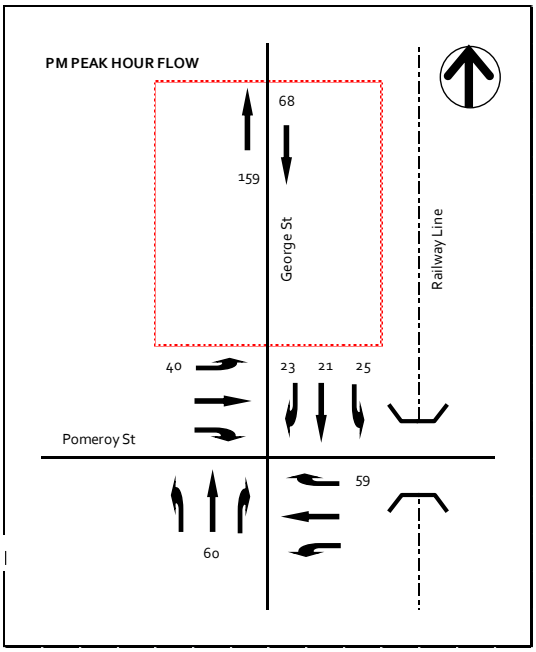


Figure D.7: PM Peak Hour – Post Development Traffic Volumes



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