References

Technical Reports

Casey & Lowe (2002) — Archaeological Assessment 180-180a George Street and 30-32 Charles Street Parramatta (Meriton Apartments)

Casey & Lowe (2002) — Archaeological Assessment and Testing Report 180-180A George Street and 30-32 Charles Street Parramatta (Meriton Apartments)

Jo McDonald Cultural Heritage Management Pty Ltd (2005) — Archaeological Salvage Excavation of Site CG1 at the Corner of Charles and George Streets Parramatta NSW (Meriton Apartments)

Appendix 3 Traffic and Parking Report

Traffic Impact Assessment

180 George Street, Parramatta
Planning Proposal

Ref: 15.105r01v02 TRAFFIX 180 George Street, Parramatta

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Document Verification

Job Number:	15.105			
Project:	180 George Street Parramatta			
Client:	Meriton Group			
Revision	**Date**	**Prepared By**	**Checked By**	**Signed**
v01 - Draft	20/11/2015	Geoff Higgins	Geoff Higgins	
v02	23/11/2015	Geoff Higgins	Geoff Higgins	

Contents

1. Introduction

TRAFFIX has been commissioned by Meriton Group to provide a Traffic Impact Statement (TIS) in support of a planning proposal for the proposed rezoning of 180 George Street, Parramatta. The planning proposal seeks to rezone the land to provide an uplift in height from 36m to 180m and an uplift in FSR from 4:1 to 10:1. It is noted that the development primarily relates to a residential land use with ancillary retail at ground level.

The site is located within the Parramatta City Council LGA and has been assessed under the relevant Council controls. This report documents the findings of our investigations and should be read in the context of the Planning Proposal, prepared separately by Meriton.

The objective of this report is to assess the traffic impacts of the concept plan that has been adopted for assessment purposes. In this regard, further detailed investigations will be undertaken at the future development application stage, at which time changes to the land use mix and intensity would be reasonably expected.

The report is structured as follows:

- Section 2: Describes the site and its location;
- Section 3: Documents existing traffic conditions;
- Section 4: Describes the proposed development;
- Section 5: Discusses the parking requirements;
- Section 6: Assesses traffic impacts;
- Section 7: Discusses access and internal design aspects; and
- Section 8: Presents the overall study conclusions.

2. Location and Site

The site currently accommodates a mix of retail and residential land use. It is located to the south of the Parramatta River and is bound by the external road network of Charles Street to the west and George Street to the south. The site currently comprises mixed use retail/residential uses with an approximate GFA of 7,977m^2.

The site has a western frontage of approximately 95 metres to Charles Street, a southern frontage of approximately 75 metres to George Street, an eastern border of 60 metres to a neighbouring commercial development and a northern boundary of 110 metres to Queens Wharf Park. There is currently a driveway crossing of 6.5 metres serving the site with access from George Street. The access driveway facilitate access to basement parking associated with the residential tenants

A Location Plan is presented in **Figure 1**, with a Site Plan presented in **Figure 2**. Reference should also be made to the Photographic Record presented in **Appendix A**, which provides an appreciation of the general character of roads and other key attributes in proximity to the site.

Figure 1: Location Plan

Figure 2 : Site Plan

3. Existing Traffic Conditions

3.1 Road Hierarchy

The road hierarchy surrounding the site is shown in **Figure 3**, with the following roads in proximity to the site being of particular interest:

- Victoria Road — an RMS State Road (MR 165) that traverses in an east-west direction between City West Link in the east and O'Connell Street in the west. It carries in the order of 60,000vpd and is subject to 60km/hr speed zoning. Located to the north of the site, it carries two through lanes of traffic and a single designated Bus Lane in both directions, within a divided carriageway of width 18 metres.

- George Street: — a local collector road which runs in an east-west direction between Arthur Street in the east and O'Connell Street in the west. For the majority of its length, that is west of Alfred Street, George Street runs one way in an eastbound direction and generally accommodates four lanes of traffic with outer lanes acting as auxiliary lanes in the vicinity of the site. It has a posted speed limit of 50 km/h and restricted parking is permitted along sections on kerbside lanes.

- Charles Street: — a local road which runs in a north-south direction on the western site frontage. Charles Street commences at the Parramatta River to the north of site and terminates to the south at the intersection with Parkes Street. It generally has a two-lane, two-way cross-section with kerbside parking along its length. Charles Street is posted at 40km/hr in the vicinity of the site.

It can be seen from **Figure 3** that the site is conveniently located with respect to the local road systems serving the region. It is therefore able to effectively distribute traffic onto the wider road network, minimising traffic impacts.

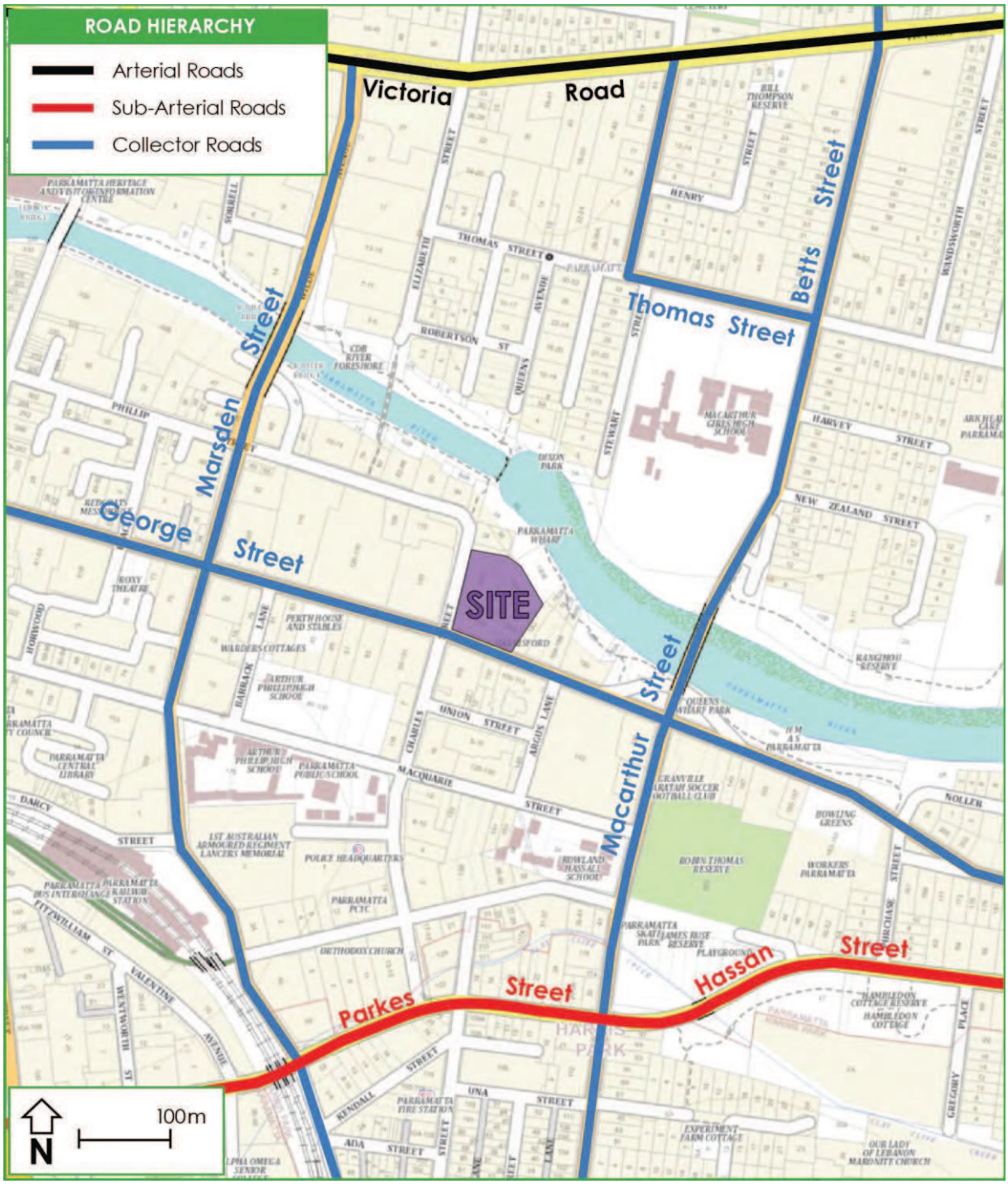


Figure 3: Surrounding Road Hierarchy

3.2 Key Intersections

The key intersection in the vicinity of the site is shown below and provides an understanding of the existing road geometry and alignment:

3.2.1 George Street / Charles Street Intersection

The George Street / Charles Street Intersection (provided in **Figure 4** below) is located to the immediate south west of the subject site and forms a signal-controlled intersection. All vehicle traffic accessing site must utilise the George Street / Charles Street intersection. The intersection provides pedestrian facilities on all approach arms whilst kerb side parking is restricted for 15 metres on the southern and western approaches and 30 metres on the northern approach.

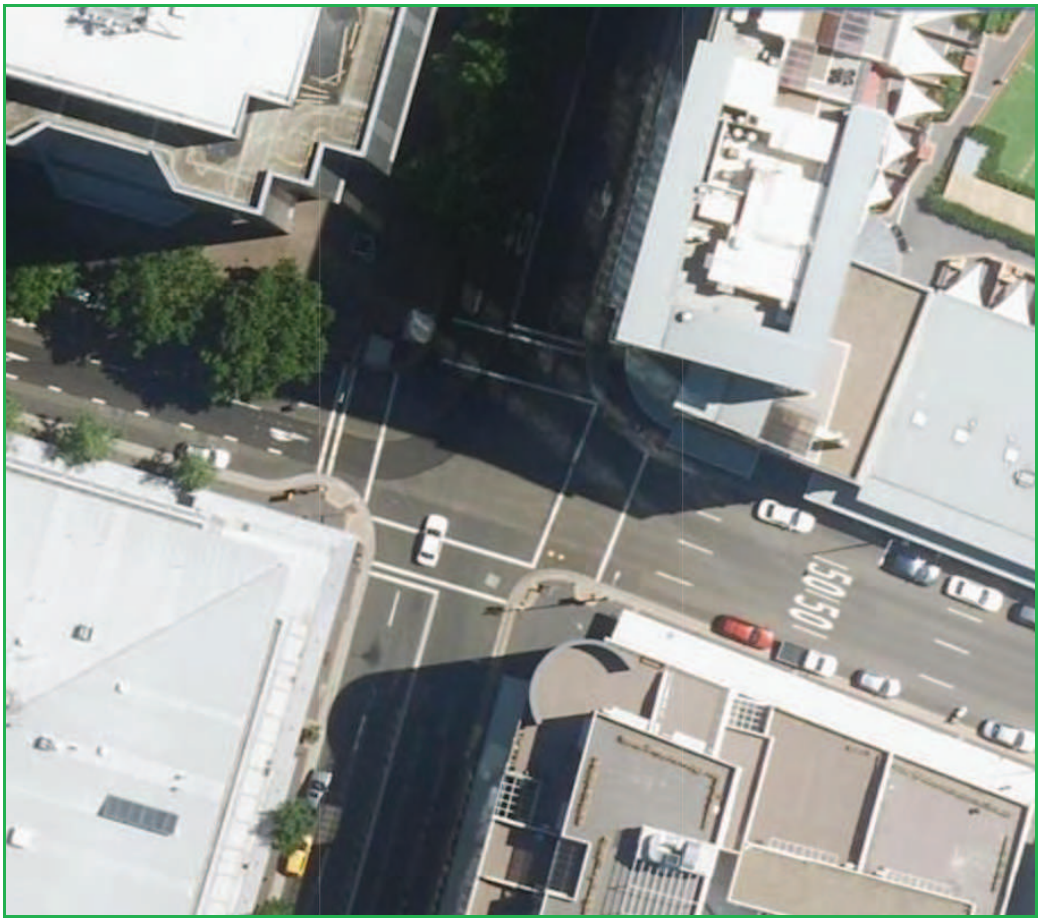


Figure 4: George Street / Charles Street Intersection

3.3 Public Transport

3.3.1 Existing Services

The subject site is within Parramatta City Centre and is therefore well serviced by public transport. It is approximately a 500m (or a 6 min walk) to/from Parramatta Railway Station, which is situated to the south-west of the site. The public bus services on the local road network are as shown in **Figure 5,** and include both local and regional services. There are several bus stops within a 400m radius of the site, on Church Street, Phillip Street, George Street and Macquarie Street.

In addition, the Parramatta Rivercat Wharf is located adjacent to the site, providing ferry services along the river towards Circular Quay.

Figure 5: Existing Public Transport Services

3.3.2 Future Light Rail

Parramatta City Council (Council) proposes a Western Sydney Light Rail Network centred on Parramatta, linking key activity centres in the region. The network stretches from Macquarie Park and Strathfield in the east to Rouse Hill in the north, Bankstown and Liverpool in the south and Wetherill Park and Blacktown in the west. The potential light rail routes identified included:

- Parramatta to Macquarie Park via Carlingford
- Parramatta to Castle Hill via Old Northern Road
- Parramatta to Liverpool via the T-way
- Parramatta to Bankstown
- Parramatta to Sydney Olympic Park
- Parramatta to Rouse Hill
- Parramatta to Ryde via Victoria Road
- Parramatta to Sydney CBD via Parramatta Road
- Parramatta to Macquarie Park via Eastwood
- Parramatta to Castle Hill via Windsor Road

Figure 6: Light Rail Alignment Options Considered

It is understood that the state government has recently allocated funding to accelerate work on the project, with the first task to identify the highest priority corridor from Parramatta and carry out a detailed feasibility study. Once the first stage of work to identify the best light rail route is completed, a number of viable options will be taken forward for detailed design and feasibility.

Whilst this study is in its early stages and the delivery of the light rail network is not likely to commence for several years, ultimately once delivered, it will further improve accessibility between the subject site and the key activity centres in the region.

3.4 Existing Site Traffic Generation

The existing site accommodates 248 serviced apartments and 250 parking spaces in addition to 21 retail units with an approximate combined GFA of 2500m^2.

The RMS document entitled Guide to Traffic Generating Developments (2002) does not provide a traffic generation rate for the serviced apartments, however an update to the guide (Technical Direction TDT 2013/04a) provides data from surveys undertaken in 2012 of various types of developments, including high density residential apartments. For the purposes of the assessment it can be assumed that the residential apartment generation rate shall be used to estimate the generation of the serviced apartments.

The average trip rates for high density residential units located on site with good access to public transport is an AM peak hour generation rate of 0.19 trips per unit and a PM peak generation rate of 0.15 trips per unit. The application of these rates to the existing 248 serviced apartments gives a predicted rate of 47 trips in the AM Peak and 37 trips in the PM peak. Applying an 80:20 directional split gives the following traffic generation:

- 38 out, 9 in during the AM peak; and
- 7 out and 30 in during the PM peak.

The Guide to Traffic Generating Developments does not provide a trip rate for street front retail units, instead suggesting a trip rate of 4.6 trips/100m^2 GLFA in the PM peak for specialty retail units located within shopping centres, with a negligible trip rate recorded in the AM peak.

As there is no onsite parking provided for the retail component and the site has high public transport accessibility it can be assumed that the retail trip generation of the existing site is in the order of 30% of the proposed shopping centre specialty retail trip rate. In addition, the guide recommends applying a GLFA of 75% of GFA when undertaking a retail assessment. The application of these rates gives the following estimated traffic generation attracted by the existing retail component in the Thursday PM peak period:

- 26 trips per hour (13 out and 13 in)

As such, the combined trip generation of the existing site can be estimated as follows:

- 38 trips per hour in the AM Peak (38 out and 9in)
- 63 trips per hour in the PM Peak (20 out and 43 in)

These estimations will be used to assess the change in traffic generation from the subject site resulting from the potential rezoning.

4. Description of Proposed Development

Approval from Parramatta City Council is sought for the rezoning of the subject site. A detailed description of the proposal is provided in the Planning Proposal prepared separately by Meriton Group. The key aspects from a traffic perspective are summarised below:

- The demolition of 104 serviced apartments and removal of 70 of the 250 existing basement parking spaces;
- The demolition of 21 retail units totalling approximately 1,800m^2;
- The establishment of a mixed use development comprising:
  - A maximum residential yield of 753 units;
  - Retail Gross Floor Area (GFA) of approximately 670m^2
  - A childcare facility totalling 1215m^2

It is noted that the above indicative yield has been adopted as a maximum to identify the traffic implications of the land rezoning and in turn represents a sensitivity type analysis. Reference should also be made to the architectural plans issued separately by 'Crone Partners'.

5. Parking Requirement

5.1 Planning Controls

All car parking is to be provided in accordance with the Parramatta City Centre Local Environmental Plan 2007, Part 2c – Car Parking. It is noted that the rates identified in this LEP are maximum rates. In this regard, **Table 1** below provides an overview of the maximum car parking requirement permitted on site based on the indicative development yields that have been provided to TRAFFIX.

Table 1: 'Planning Proposal' Council Parking Rates

Type	GFA/Number	Council Parking Rates	Maximum Spaces Permitted
Residential			
All bedrooms	753	1 space per unit	753
Visitor	753	1 spaces per 5 units	151
Commercial			
Serviced Apartments**	144	0.5 spaces per unit + 1 space per 3 employees	79
Retail	2005m^2	1 space per 30m^2	67
Childcare	1215m^2	1 space per 4 children	38*
		Total	1,088

*Assumes 7.8m^2 per child as per RMS guidelines

** LEP motel rates applied

It is evident from the above that with 753 units a total retail component of 2005m^2 GFA (existing and proposed), a childcare centre of 1215m^2 and the 144 serviced apartments remaining on site, the proposed development and indicative yield identified above is permitted to provide a maximum of 1,088 parking spaces. Whilst it is intended that the development will comply with the relevant residential parking component, it is considered that a lower level of parking provision would be appropriate for the retail and childcare components of the development, on the basis that it would benefit from extremely convenient access to public transport and the retail area would primarily attract walk by trips within the precinct.

Whilst detailed site layout plans have not yet been prepared, the proposed residential parking provisions are expected to be consistent with the requirements of Council's DCP and other relevant provisions.

Any departure from the retail rates (if sought) would be subject to review during the Development Application process. Compliance with relevant car parking controls will be confirmed as part of any subsequent development application(s), following approval of this Planning Proposal.

5.2 Bicycle Parking

Council's DCP stipulates the following requirements for bicycle parking:

- Bicycle parking for business and retail premises is to be provided at a rate of 1 bicycle space per 200 sqm of floor space.
- Bicycle parking for residential flat buildings is to be provided at a rate of 1 bicycle space per 2 dwellings.
- Bicycle parking is to be provided in the form of Class 2 compounds, as specified in AS 2890.3 – Bicycle Parking Facilities. These facilities may be located in storage areas if good access is provided.
- All bicycle parking should be located in a safe and secure location that is under cover and convenient for users.
- Trip end facilities including showers and lockers must be provided to adequately service the number of bicycle parking spaces required in business and retail premises.
- Bicycle parking in the public domain must be located as close as possible to the main entrance of the building at ground level.

Based upon the above requirements, a total of 449 bicycle parking spaces for residents and 10 bicycle parking spaces to service the retail components of the development should be provided. It is proposed

that compliance with Council bicycle parking controls will be provided and can be further detailed during relevant Development Applications.

5.3 Car Share

Council's DCP stipulates the following controls with regards to car share parking:

- 1 car share parking space is to be provided for any residential development containing more than 50 residential units and is located within an 800m radial catchment of a railway station (which this development is) or 400m radial catchment of a bus stop with a service frequency of an average of 15 minutes or less during the morning peak (7 am - 9 am) in either direction.

- Carshare parking spaces must be publicly accessible at all times, adequately lit and sign posted and located off street.

Provided the proposed car park is to be "publicly accessible at all times" the development is required to provide 1 car share space. However, if the carpark is to be secure and not accessible to the public for periods it would be appropriate to provide a dedicated bay (or bays) in lieu of on-street parking in order to service the entire local catchment. As noted in Section 5.2, this is a matter that can be addressed at during future detailed investigations which will be undertaken at the future development application staging.

5.4 Servicing

Council's DCP attracts a rate of 1 loading bay per 400m^2 of Gross Floor Area for retail use. Application of this rate to the 2005m^2 range would require 5 spaces. The residential component of the development will ultimately operate as a typical residential development with servicing expected to primarily be associated with waste collection (by private contractor) and occasional attendance at site by revivalist vehicles. In this regard, it is proposed that a loading area capable of accommodating two 8.8m MRV's are provided at grade within the property boundary, supplemented by the on street loading bays surrounding the development.

The 8.8m MRV is typically adopted as the design vehicle where there is significant movement of goods but provision of more than the occasional HRV or AV is not necessary (AUSTROADS Guidelines). It is therefore considered that the provision of two loading spaces for 8.8m MRV's is an appropriate amenity noting the site constraints which are discussed in further detail below. TRAFFIX has been involved in numerous mixed use developments where the MRV is the design vehicle utilised in these situation. It is common to accept a condition of consent that limits the development to this size of truck and this approach recognises site constraints apply in this and many other circumstances

6. Traffic Impacts

6.1 Trip Generation

The impacts of the proposed development on the external road network have been assessed having regard for the indicative yield scenarios as summarised in Section 4. This assessment has been undertaken in accordance with the requirements of the RMS Guideline and as such, the traffic generation rates published in the RMS Guide have been adopted. The result of this assessment is summarised below:

6.1.1 Residential

As identified in Section 3.4 the RMS Technical Direction 2013/04a (TD 2013/04a) provides data from surveys undertaken in 2012 of high density residential flats located in close proximity to public transport. These trip generation rates have been adopted for the subject site to assess the traffic generation of the proposed residential component of the development.

The technical direction recommends an AM peak hour generation rate of 0.19 trips per unit and a PM peak generation rate of 0.15 trips per unit.

Application of these rates to the 753 units result in 143 vehicles trips during the AM peak and 113 vehicle trips during the PM peak. The resulting split of 80/20 during the peak periods provides the following generation and directional split:

- 29 in, 114 out during the AM peak
- 90 in, 23 out during the PM peak

The impacts of these additional volumes are discussed in the following sections.

6.1.2 Retail

To assess the impacts of the retail land use, it has been assumed that the future retail component of the development will operate in a manner similar to that presently on the site. The RMS traffic generation rates for speciality retail are applicable to speciality retail developments based on the assumption that the full complement of parking would be provided for public users. As mentioned in

Section 5.1, it is intended to provide parking for tenants only with patrons primarily associated with walk-by trips and residents/employees within the local catchment. This is consistent with the existing retail/commercial use on site which it is noted provides a total area of 2,500m^2 GFA. As such, the traffic generation associated with the retail development will be negligible and a worst case assessment would see all retail tenants (assumed as 5 tenancies) arrive during a peak hour, and generate approximately 6 veh/hr during the peak periods.

6.1.3 Childcare

The traffic generation relating to the childcare centre has been assessed using the long day-care rates identified in the RMS Guide. The guide recommends a rate of 0.8 vehicle trips per child in the AM peak and 0.7 vehicle trips in the PM peak. Due to the excellent public transport provided and the expected use of the centre by residents of the subject development it is expected many parents will access the centre to pick up and drop off children without the requirement of a private vehicle trip. Nevertheless the RMS rates have been adopted in order to undertake a conservative assessment.

With a GFA of 1215m^2 the childcare centre can accommodate a maximum of 155 children at the rate of 1 child per 7.8m^2 stipulated in the guide. Applying the rates above, the childcare centre will generate a maximum of 124 trips in the AM and 108 trips in the PM with the following split:

- 62 in, 62 out during the AM peak
- 54 in, 54 out during the PM peak

6.1.4 Combined Generation

Based on the above assumptions the proposal would generate approximately 267 veh/hr during the AM peak and 227 veh/hr during the PM peak period with the following directional split:

- 91 in, 176 out during the AM peak
- 147 in, 80 out during the PM peak

6.1.5 Net Traffic Generation

As the proposal is to reduce the existing provision of retail and serviced apartments on site the existing traffic generation from these components must be subtracted from the predicted traffic

generation identified in Section 6.1.4 to arrive at the predicted additional traffic generation for the site following full development.

The demolition of 104 serviced apartments is associated with a reduction in traffic generation of 20 vehicle trips in the AM peak and 16 trips in the PM peak whilst the reduction in retail predicts a reduction in traffic generation of 15 vehicles per hour in the PM peak.

Subtracting these rates from the predicted traffic generation identified in Section 6.1.4 yields the following expected net change in traffic generation for the subject development:

- 247 trips (87 in, 160 out) during the AM peak hour; and
- 212 trips (135 in, 77 out) during the PM peak

6.2 Traffic Distribution

The intersection of George Street and Charles Street will accommodate all vehicle movements travelling to the subject site. Vehicles exiting site will travel eastbound on George Street and will be distributed across the local network at the intersections of Argus Lane, Macarther Street and beyond. In this regard, the George Street / Charles Street intersection is the critical intersection for assessment as identified in Section 3.2.

The trip distribution splits have taken account of the existing turning volumes of George Street and Charles Street giving the following results:

- AM Peak
  - Vehicles entering the site: 19% from Charles Street (north), 60% from George Street (west) and 21% from Charles Street (south);
  - Vehicles exiting the site: 100% to George Street (east) and distributed across the wider network;
- PM Peak
  - Vehicles entering the site: 35% from Charles Street (north), 51% from George Street (west) and 14% from Charles Street (south);

- Vehicles exiting the site: 100% to George Street (east) and distributed across the wider network;

Application of this traffic distribution to the traffic generation above, results in the development traffic network demand flows presented in **Appendix C.**

6.3 Intersection Analysis

SIDRA modelling has been undertaken on the key intersection of Charles Street / George Street adjacent to site. In order to facilitate the model traffic surveys were undertaken during the AM and PM periods on Wednesday the 11th of November, these survey results can be viewed in **Appendix D** attached. The surveys identified the critical network AM and PM peak hours occur between 8.00 – 9.00 and 16.45 - 17.45 respectively in this precinct.

The SIDRA intersection model produces a range of outputs, the most useful of which are the Degree of Saturation (DOS) and Average Vehicle Delay per vehicle (AVD). The AVD is in turn related to a level of service (LOS) criteria. These performance measures can be interpreted using the following explanations:

DOS - the DOS is a measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DOS approaches 1, it is usual to attempt to keep DOS to less than 0.9. When DOS exceeds 0.9 residual queues can be anticipated, as occurs at many major intersections throughout the metropolitan area during peak periods. In this regard, a practical limit at 1.1 can be assumed. For intersections controlled by roundabout or give way/stop control, satisfactory intersection operation is generally indicated by a DOS of 0.8 or less.

AVD - the AVD for individual intersections provides a measure of the operational performance of an intersection. In general, levels of acceptability of AVD for individual intersections depend on the time of day (motorists generally accept higher delays during peak commuter periods) and the road system being modelled (motorists are more likely to accept longer delays on side streets than on the main road system).

LOS - this is a comparative measure which provides an indication of the operating performance of an intersection as shown in **Table 2**:

Table 2: Intersection Performance Indicators

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

A summary of the modelled results are provided below. Reference should also be made to the SIDRA outputs provided in **Appendix E** which provide detailed results for individual lanes and approaches. For priority intersections, the highest delays are reported for the most disadvantaged movement in **Table 3**, which is not representative of the overall intersection performance.

Table 3: Intersection Performance: Network PM Peak Hour

Intersection Description	Control Type	Period	Scenario	Degree of Saturation	Intersection Delay	Level of Service
George Street / Charles Street	Signals	AM Peak	Existing	0.325	15.0	B
			Future	0.371	15.1	B
George Street / Charles Street	Signals	PM Peak	Existing	0.447	15.8	B
			Future	0.516	16.4	B

It can be seen from **Table 3** that the development traffic has only a moderate impact on the performance of this intersection with a slight increase in the degree of saturation and predicted

intersection delay recorded in both peak periods. As such the intersection is predicted to continue to operate with a level of service ‘B’ in the future network AM and PM peak periods.

Accordingly, the traffic impacts of the potential planning proposal considered acceptable and can be comfortably accommodated with no external improvements to the local network required. It is anticipated further detailed assessments will be undertaken at future development application stages, incorporating the finalised land use and area schedules.

7. Access & Internal Design

7.1 Access Requirements

7.1.1 Car Park Basement Access Driveway

The development is to provide a driveway with access to George Street from the existing basement carpark which would satisfy the minimum requirements of AS2890.1 (2004) *Part 1: Off-street car parking*. Further assessment of the access arrangements are to be undertaken at a future development application stage(s).

7.1.2 Podium and Loading Access Driveway

The loading access to be provide at-grade noting that AS 2890.2 *Part 2: Off-street commercial vehicle facilities* requires a 3.5 metre wide bay for an MRV. In response, the development will provide a separate driveway with access to George Street for the loading bay and podium parking which would satisfy the minimum requirements of AS2890.1 and AS2890.2.

7.2 Internal Road Design

7.2.1 Relevant Australian Standards

The internal basement car park will be designed in accordance with the Australian Standard requirements of AS2890.1 (2004), AS2890.2 (2002), AS2890.6 (2009) *Part 6: Off-street parking for people with disabilities* and AS4299 (1995) *Adaptable housing*. The following characteristics are noteworthy:

7.2.2 Parking Modules

- All residential and retail tenant parking spaces would be designed in accordance with a Class 1A user and provided with a minimum space length of 5.4m a minimum width of 2.4m and a minimum aisle width of 5.8m

- All childcare pick up and drop off parking spaces would be designed in accordance with a Class 3A user and provided with a minimum space length of 5.4m a minimum width of 2.6m and a minimum aisle width of 6.6m

- All spaces located adjacent to obstructions of greater than 150mm in height would be provided with an additional width of 300mm;

- Dead-end aisles would be provided with the required 1.0m aisle extension in accordance with Figure 2.3 of AS2890.1;

- All disabled parking spaces would be designed in accordance with AS2890.6. Spaces would be provided with a clear width of 2.4m and located adjacent to a minimum shared area of 2.4m;

- All adaptable parking spaces would be designed in accordance with AS4299. Spaces would be provided with a minimum space length of 5.4m a minimum width of 3.8m.

7.2.3 Ramps

- All ramps would have a maximum gradient of 25% (1 in 4) with transitions that satisfy AS2890.1.

7.2.4 Clear Head heights

- A minimum clear head height of 2.2m would be provided for all areas within the basement car park as required by AS2890.1.

- A clear head height of 2.5m would be provided above all disabled spaces as required by AS2890.6 and AS4299.

- Strict application of AS 2890.2 would require a 4.5m head height clearance for an 8.8m MRV. This is however considered onerous and unnecessary noting that all servicing will be undertaken by a private contractor. It is therefore recommended that an operation head height clearance of between 3.5 - 4.0 metres is provided and this could be addressed at further DA stages.

7.2.5 Other Considerations

- All columns are required to be located outside of the parking space design envelope shown in Figure 5.2 of AS2890.1;

- Appropriate visual splays are to be provided in accordance with the requirements of Figure 3.3 of AS2890.1 at all accesses;

7.2.6 Summary of Internal Design

In summary, the internal configuration of the basement car park and loading areas will be designed in accordance with AS2890.1, AS2890.2, AS2890.6 and AS4299, the details of which will be provided at subsequent development application stages.

8. Conclusions

The following conclusions are noteworthy:

- Parking
  - The proposed development with a maximum residential yield of 753 units, 144 serviced apartments, a childcare centre of 1215m^2 and retail GFA of 670m^2 is permitted to provide a maximum of 1,044 parking spaces. In response, it has been demonstrated through concept development undertaken by Crone Architects that the existing basement and five levels of podium parking can be provided and will not exceed the maximum parking rates identified in the Parramatta City Centre Local Environmental Plan 2007. The allocation of parking will of course be subject to further analysis at DA stage however it would be proposed that the majority of parking be dedicated the residential land use.
- Traffic Generation
  - Based on the latest RMS Guidance, the development is forecast to generate an additional 247 trips in the AM peak and 212 trips in the PM peak on the surrounding road network. As discussed in Section 6 of this report, the proposed development is a moderate traffic generator.
- Intersection Analysis
  - Intersection Analysis undertaken within section 6 of this report has identified that the key intersection of George Street / Charles Street operates at Level of Service B in the existing scenario and a post development scenario.
- Access and Internal Design
  - The access and internal design arrangements, including car parking ,will be designed in accordance with the Australian Standard requirements of AS2890.1 (2004) *Part 1: Off-street car parking*, AS2890.2 (2002) *Part 2: Off-street commercial vehicle facilities,* AS2890.6 (2009) *Part 6: Off-street parking for people with disabilities* and AS4299 (1995) *Adaptable housing*.

This report demonstrates that the proposed rezoning is supportable on traffic planning grounds, based on the concept plan that has been adopted for assessment purposes, recognising that further detailed investigations will be undertaken at the future development application stage.

Appendix A

Photographic Record

Site frontage as viewed from intersection of George St / Charles St

George Street looking west

Charles Street looking south

Existing Site Access on George Street

Appendix B

Reduced Plans

03 — Indicative Concept Design
Ground Floor Plan

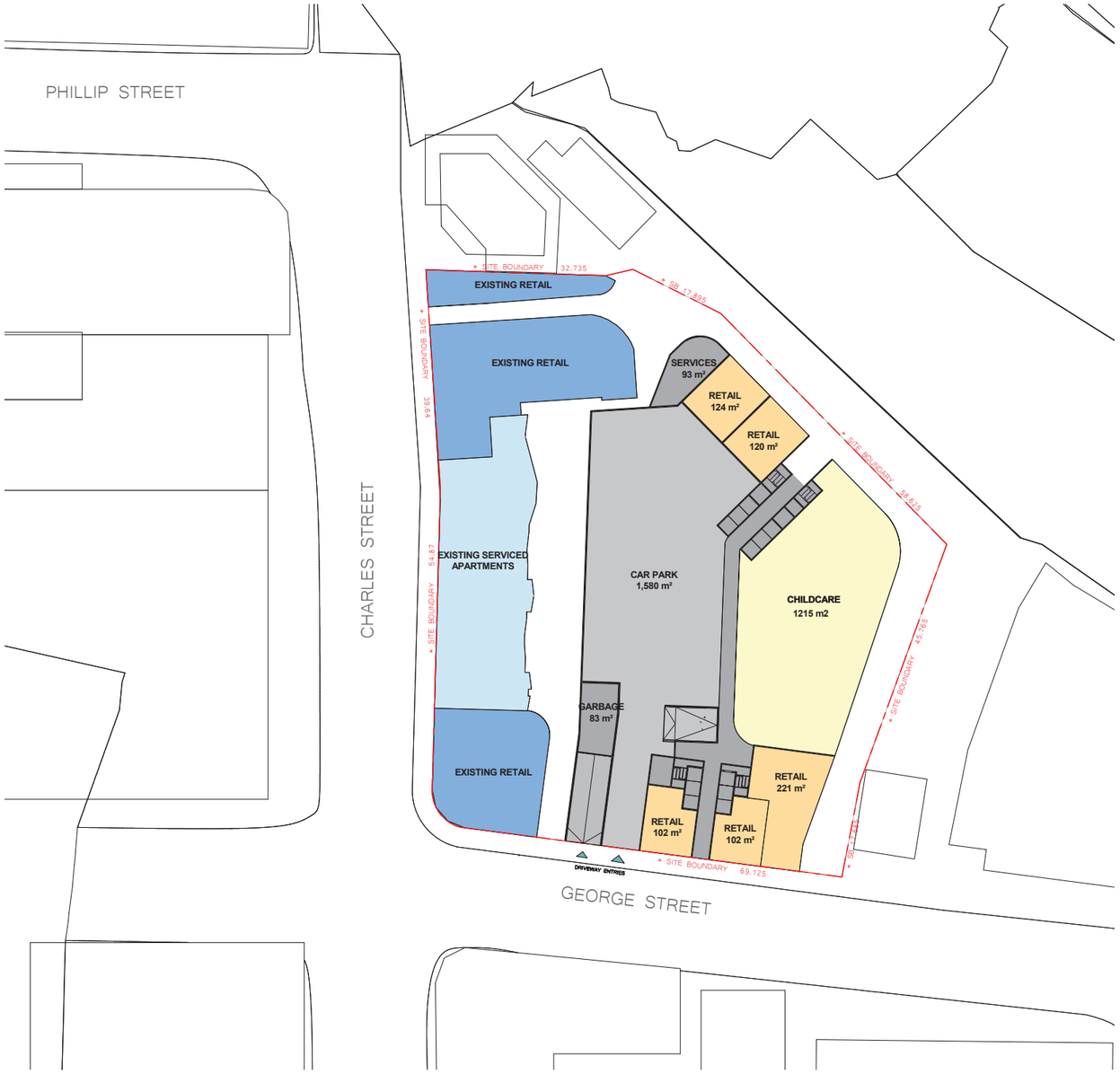
- Maximise exposure to major frontages
- Encourage retail variety
- Promote connectivity through and around the site
- Reduce the visible impact of service areas
- incorporate existing Charles street building and retail arcade

Existing Building

Retail
Serviced Apartments

New Proposed

Childcare
Carpark
Retail
Common + Services



0 5 15

Scale
1:1000 @ A3

03 — Indicative Concept Design
Typical Podium Plan

- Sleeve service areas and carpark program with articulated facade that reads as one with the entire podium volume
- Maximise outlook and solar amenity for podium apartments
- Provide appropriate separation to existing apartments on site

Existing Building

Serviced Apartments

New Proposed

1 Bed
2 Bed
3 Bed
Carpark
Common + Services

0 5 15

Scale
1:1000 @ A3

03 — Indicative Concept Design
Typical Tower Plan

- Apartment sizes that adhere to market and ADG recommendations
- Maximise apartment amenity, such as sunlight and cross-ventilation, that adheres to market and SEPP 65 recommendations
- Floorplate size and orientation that encourages a tall, slender tower with minimal Parramatta Square impact

Existing Building

Roof

New Proposed

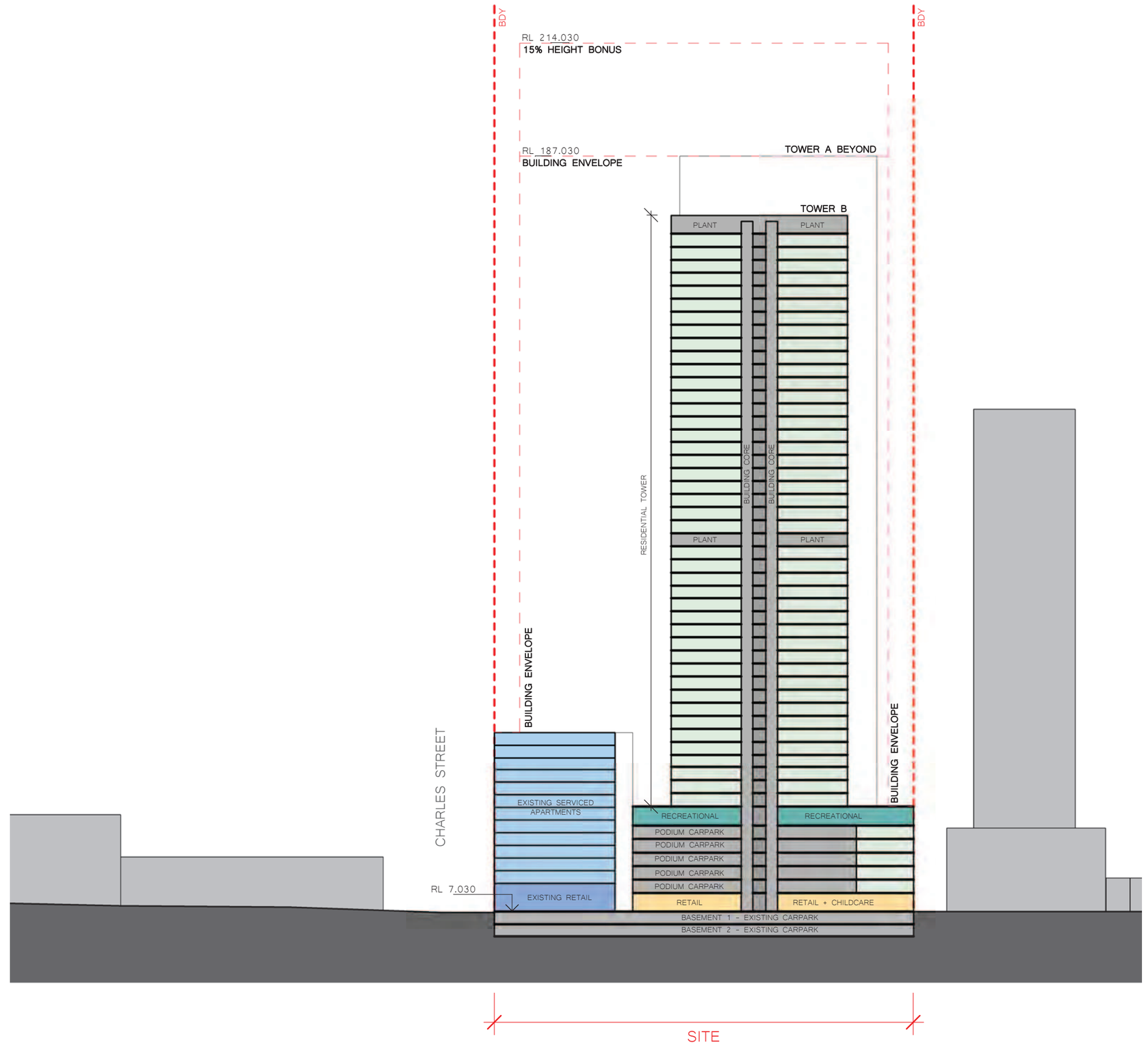
1 Bed
2 Bed
3 Bed
Common + Services

0 5 15

Scale
1:1000 @ A3

03 — Indicative Concept Design
Section AA

Whilst there is a consistent elliptical language between the two towers in the reference design which provides an identity for the precinct, there is an intentional offset in the tower heights and footprints to also provide a level of variation.



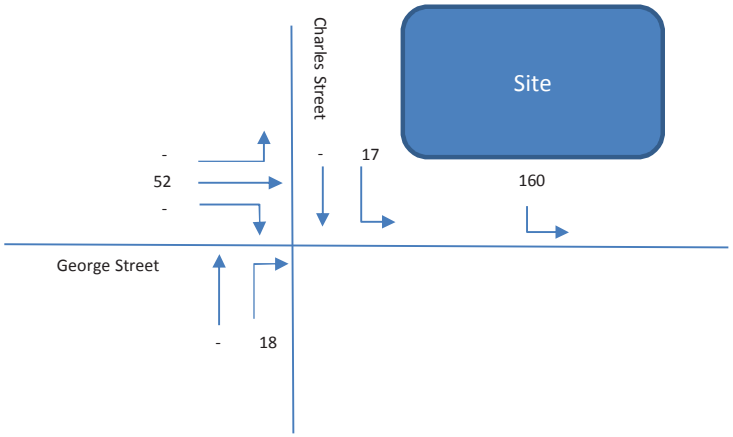
0 5 15

Scale
1:1000 @ A3

Appendix C

Traffic Distribution

George Street / Charles Street Net Additional Traffic Flows



traffix
traffic & transport planners

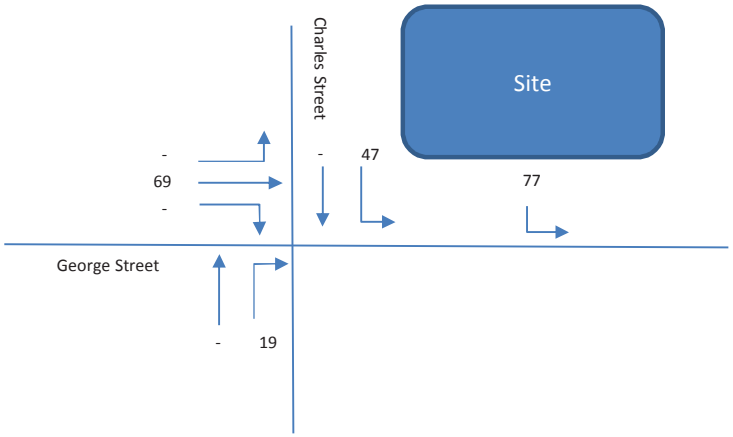
PERIOD:

Morning Peak

SCENARIO:

TOTAL Additional Trips (vph)

George Street / Charles Street Net Additional Traffic Flows



traffix
traffic & transport planners

PERIOD:

Evening Peak

SCENARIO:

TOTAL Additional Trips (vph)

Appendix D

Traffic Surveys

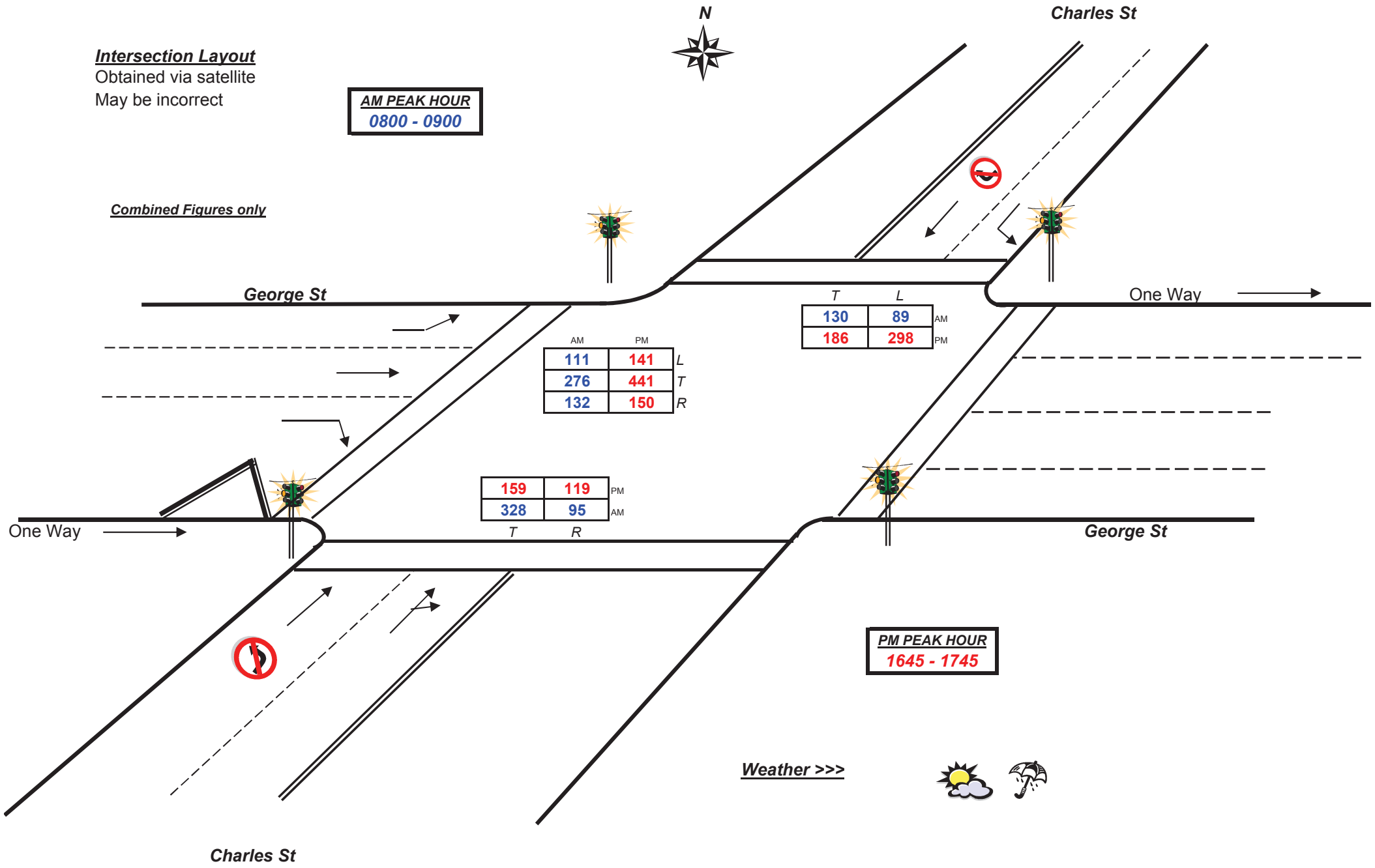
R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Traffix
Job No/Name : 5855 PARRAMATTA Charles St
Day/Date : Wednesday 11th November 2015

Intersection Layout
Obtained via satellite
May be incorrect

AM PEAK HOUR
0800 - 0900

Combined Figures only



AM	PM	
111	141	L
276	441	T
132	150	R

T	L	
130	89	AM
186	298	PM

159	119	PM
328	95	AM
T	R	

PM PEAK HOUR
1645 - 1745

Weather >>>

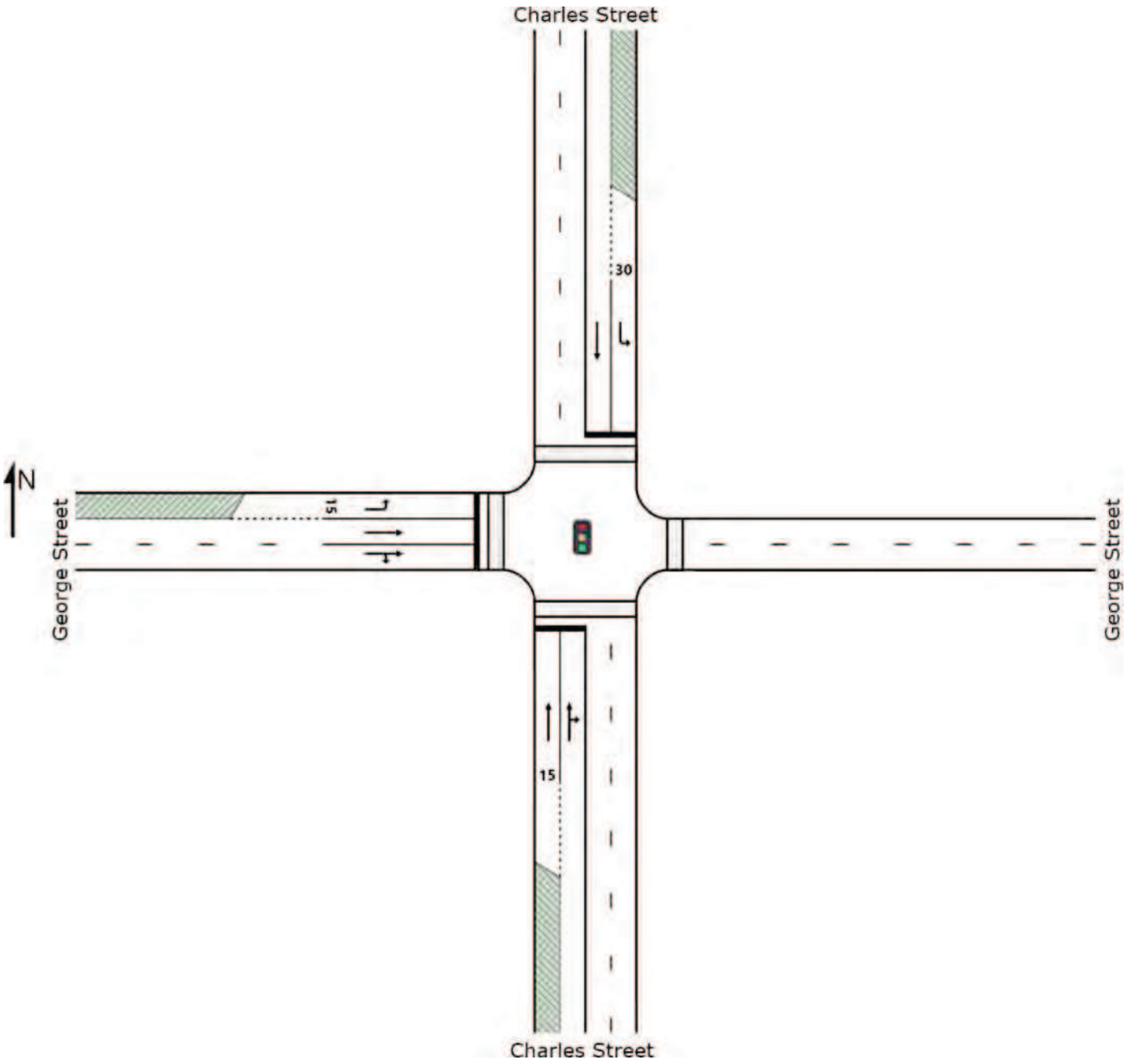
Appendix E

SIDRA Modelling

SITE LAYOUT

Site: George Street / Charles Street AM - Existing

George Street / Charles Street AM - Existing
Signals - Fixed Time Isolated



Organisation: TRAFFIX | Created: Thursday, 19 November 2015 11:06:50 AM
Project: T:\Synergy\Projects\15\15.105\Modelling\15.105m01v01 180 George Street, Parramatta - EXISTING.sip6

MOVEMENT SUMMARY

Site: George Street / Charles Street PM - Existing

George Street / Charles Street PM - Existing
Signals - Fixed Time Isolated Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Charles Street											
2	T1	167	2.0	0.203	14.7	LOS B	3.0	21.1	0.70	0.65	30.2
3	R2	125	2.0	0.203	18.1	LOS B	2.8	20.2	0.70	0.72	30.5
Approach		293	2.0	0.203	16.1	LOS B	3.0	21.1	0.70	0.68	30.3
North: Charles Street											
7	L2	314	2.0	0.447	18.5	LOS B	7.0	49.6	0.79	0.77	30.3
8	T1	196	2.0	0.265	13.9	LOS A	4.0	28.4	0.73	0.60	31.2
Approach		509	2.0	0.447	16.7	LOS B	7.0	49.6	0.77	0.70	30.6
West: George Street											
10	L2	148	2.0	0.195	16.7	LOS B	2.8	19.8	0.67	0.72	32.0
11	T1	464	5.0	0.436	13.3	LOS A	7.2	51.8	0.74	0.65	36.2
12	R2	158	2.0	0.436	18.2	LOS B	7.2	51.8	0.76	0.71	31.6
Approach		771	3.8	0.436	15.0	LOS B	7.2	51.8	0.73	0.68	34.4
All Vehicles		1573	2.9	0.447	15.8	LOS B	7.2	51.8	0.74	0.69	32.4

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	16.9	LOS B	0.1	0.1	0.75	0.75
P2	East Full Crossing	53	14.7	LOS B	0.1	0.1	0.70	0.70
P3	North Full Crossing	53	16.9	LOS B	0.1	0.1	0.75	0.75
P4	West Full Crossing	53	16.2	LOS B	0.1	0.1	0.73	0.73
All Pedestrians		211	16.2	LOS B			0.73	0.73

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: George Street / Charles Street AM - Existing

George Street / Charles Street AM - Existing
Signals - Fixed Time Isolated Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Charles Street											
2	T1	345	2.0	0.325	13.8	LOS A	4.4	31.2	0.70	0.66	30.6
3	R2	100	2.0	0.325	17.2	LOS B	4.3	30.9	0.70	0.69	32.0
Approach		445	2.0	0.325	14.6	LOS B	4.4	31.2	0.70	0.67	30.9
North: Charles Street											
7	L2	94	2.0	0.123	15.1	LOS B	1.7	12.1	0.65	0.67	32.2
8	T1	137	2.0	0.171	11.9	LOS A	2.5	18.0	0.66	0.54	32.5
Approach		231	2.0	0.171	13.2	LOS A	2.5	18.0	0.65	0.59	32.4
West: George Street											
10	L2	117	2.0	0.166	17.8	LOS B	2.3	16.2	0.69	0.72	33.3
11	T1	291	5.0	0.312	14.1	LOS A	4.6	33.2	0.74	0.64	35.7
12	R2	139	2.0	0.312	18.8	LOS B	4.6	33.2	0.74	0.71	30.8
Approach		546	3.6	0.312	16.1	LOS B	4.6	33.2	0.73	0.67	34.0
All Vehicles		1222	2.7	0.325	15.0	LOS B	4.6	33.2	0.70	0.66	32.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	18.4	LOS B	0.1	0.1	0.79	0.79
P2	East Full Crossing	53	13.4	LOS B	0.1	0.1	0.67	0.67
P3	North Full Crossing	53	18.4	LOS B	0.1	0.1	0.79	0.79
P4	West Full Crossing	53	14.7	LOS B	0.1	0.1	0.70	0.70
All Pedestrians		211	16.2	LOS B			0.73	0.73

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: George Street / Charles Street AM - Proposed

George Street / Charles Street AM - Proposed
Signals - Fixed Time Isolated Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Charles Street											
2	T1	345	2.0	0.353	12.7	LOS A	4.6	32.7	0.70	0.61	29.5
3	R2	119	2.0	0.353	16.2	LOS B	4.5	32.4	0.70	0.66	28.6
Approach		464	2.0	0.353	13.6	LOS A	4.6	32.7	0.70	0.62	29.3
North: Charles Street											
7	L2	112	2.0	0.146	17.4	LOS B	2.0	14.6	0.65	0.72	36.9
8	T1	137	2.0	0.171	11.9	LOS A	2.5	18.0	0.66	0.54	40.5
Approach		248	2.0	0.171	14.4	LOS A	2.5	18.0	0.66	0.62	38.6
West: George Street											
10	L2	117	2.0	0.166	18.8	LOS B	2.3	16.2	0.69	0.73	35.9
11	T1	361	5.0	0.371	14.4	LOS A	5.7	40.8	0.75	0.65	40.1
12	R2	139	2.0	0.371	20.1	LOS B	5.7	40.8	0.76	0.72	33.3
Approach		617	3.8	0.371	16.5	LOS B	5.7	40.8	0.74	0.68	37.7
All Vehicles		1329	2.8	0.371	15.1	LOS B	5.7	40.8	0.71	0.65	34.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	18.4	LOS B	0.1	0.1	0.79	0.79
P2	East Full Crossing	53	13.4	LOS B	0.1	0.1	0.67	0.67
P3	North Full Crossing	53	18.4	LOS B	0.1	0.1	0.79	0.79
P4	West Full Crossing	53	14.7	LOS B	0.1	0.1	0.70	0.70
All Pedestrians		211	16.2	LOS B			0.73	0.73

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: George Street / Charles Street PM - Proposed

George Street / Charles Street PM - Proposed
Signals - Fixed Time Isolated Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Charles Street											
2	T1	167	2.0	0.208	12.8	LOS A	3.1	22.0	0.69	0.57	29.7
3	R2	145	2.0	0.208	16.4	LOS B	3.0	21.1	0.69	0.71	27.7
Approach		313	2.0	0.208	14.5	LOS A	3.1	22.0	0.69	0.63	28.7
North: Charles Street											
7	L2	363	2.0	0.516	20.3	LOS B	8.1	57.8	0.80	0.80	34.8
8	T1	196	2.0	0.254	13.1	LOS A	3.9	27.6	0.71	0.58	39.3
Approach		559	2.0	0.516	17.8	LOS B	8.1	57.8	0.77	0.72	36.1
West: George Street											
10	L2	148	2.0	0.203	18.4	LOS B	2.9	20.4	0.69	0.74	36.2
11	T1	537	5.0	0.512	14.5	LOS A	8.6	62.0	0.78	0.69	40.0
12	R2	158	2.0	0.512	20.4	LOS B	8.6	62.0	0.80	0.74	33.5
Approach		843	3.9	0.512	16.3	LOS B	8.6	62.0	0.77	0.71	38.1
All Vehicles		1715	2.9	0.516	16.4	LOS B	8.6	62.0	0.75	0.70	35.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	17.7	LOS B	0.1	0.1	0.77	0.77
P2	East Full Crossing	53	14.0	LOS B	0.1	0.1	0.68	0.68
P3	North Full Crossing	53	17.7	LOS B	0.1	0.1	0.77	0.77
P4	West Full Crossing	53	15.4	LOS B	0.1	0.1	0.72	0.72
All Pedestrians		211	16.2	LOS B			0.73	0.73

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.