PELORUS PROPERTY GROUP

TRAFIC AND ACCESSIBILITY IMPACT STUDY FOR PROPOSED MIXED USE DEVELOPMENT, GEORGE STREET, NORTH STRATHFIELD

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1. INTRODUCTION

1.1 Colston Budd Hunt & Kafes Pty Ltd has been commissioned by Pelorus Property Group to prepare a report on the traffic and accessibility impact assessment for the proposed mixed use development in George Street, North Strathfield. The site is located on the north-eastern corner of the intersection of Parramatta Road and George Street, as shown on Figure 1.

1.2 The site forms part of the Bakehouse Quarter development, which provides a mixed use development including retail, commercial and restaurant/café uses. The site is currently occupied by a vacant industrial style building and at-grade car parking is located on the southern part of the development site. The northern and southern parts are separated by at-grade car parking below the M4 Western Motorway which is leased from the RTA and does not form part of the development site.

1.3 The proposed mixed use development, as shown on plans prepared by WAH Architects, is generally consistent with the approved site masterplan and includes the following:-

- Building F - commercial office building plus drama theatre and retail tenancies with basement and above ground car parking;
- Building G - partial demolition and adaptive re-use of existing building for tavern and al-fresco dining area;
- Building O - single storey restaurant and out-door terrace;
- Building P - theatre building with ancillary facilities; and
- Building Q - 176 room four star hotel with function facilities.

1.4 The Director-General's requirements for the project include:-

"5 Transport and Accessibility (Construction and Operational)

The EA shall provide a Traffic and Accessibility Study prepared in accordance with the RTA's Guide to Traffic Generating Developments, considering traffic generation, any required road/intersection upgrades, access, loading dock(s), car parking arrangements, measures to promote public transport usage and pedestrian and bicycle linkages, an assessment of the implications of the proposed development for non-car travel modes (including public transport, walking and cycling), addressing the importance of bus access and circulation in meeting travel needs in the area, likely associated costs of additional infrastructure or services where not proposed as part of the project, and also identify measures to mitigate potential impacts on public/private transport, pedestrians and cyclists during the construction stage of the project.

The EA must also demonstrate the provision of sufficient on-site car parking for the proposal having regard to local planning controls and RTA guidelines (Note: The Department supports reduced car parking rates in areas well-served by public transport).

The EA shall also review how the development integrates into the existing and future transport system including the proposed West Metro line."

1.5 This report has been prepared with reference to the RTA's "*Guide to Traffic Generating Developments"* and the Director General's requirements. The report forms part of a major project application to the Department of Planning and has been prepared under Part 3A of the Environmental Planning and Assessment Act 1979. Our assessment is set down through the following chapters:-

- Chapter 2 - describing existing conditions; and
- Chapter 3 - assessing the traffic and accessibility impact of the proposed development.

2. EXISTING CONDITIONS

Site Location

2.1 The site of the proposed development is located on the north-eastern corner of the intersection of Parramatta Road and George Street at North Strathfield, as shown on Figure 1. The site forms part of the Bakehouse Quarter development, which provides a mixed use development including retail, commercial and restaurant/café uses.

2.2 The site is currently occupied by a vacant industrial style building and at-grade car parking is located on the southern part of the development site. The northern and southern parts are separated by at-grade car parking below the M4 Western Motorway which is leased from the RTA and does not form part of the development site. Vehicular access to the site is provided from George Street and Railway Street. Surrounding land use is mainly commercial, retail, residential and restaurant/café uses. Educational facilities and some light industrial uses are located to the north.

Regional Transport Network

2.3 The site is located close to the geographic centre of metropolitan Sydney. The site is adjacent to, and can readily access the major east-west routes of the M4 Western Motorway and Parramatta Road (Great Western Highway) and the major north-south ring route (Metroad 3) that runs along Homebush Bay Drive.

2.4 The east-west routes connect east to the City and onto the Eastern Suburbs. This route can be used to access the airport via Southern Cross Drive. The route connects west to Parramatta and on through the Western Suburbs to the Blue Mountains and areas beyond.

2.5 The north-south ring route (Metroad 3) provides a particularly useful regional link. The route crosses all the major radial routes serving the metropolitan area. The route connects to Victoria Road, Epping Road, M2 Motorway and Pacific Highway to the north. These roads provide links to the North Shore and Manly-Warringah. The route also connects, via Blaxland Road or Pacific Highway, to Pennant Hills Road and to the Sydney-Newcastle Freeway. Victoria Road, Blaxland Road and the M2 Motorway provide access to the Hills district.

2.6 The north-south ring route connects to the Hume Highway, M5 Motorway and Princes Highway to the south. The Hume Highway and M5 Motorway provide connections to the south-west to Liverpool, Campbelltown and on to Canberra and Melbourne. The Princes Highway serves the southern suburbs through to Sutherland and onto Wollongong.

2.7 The site is also well located to regional public and private transport networks. The Bakehouse Quarter is within walking distance of three railway stations, including Strathfield, North Strathfield and Homebush Stations. North Strathfield provides direct access to the Northern Line and Homebush to the Western Line. Both stations provide a convenient (one stop) connection to Strathfield Station which is an important interchange with multiple services along the Western, Northern, Inner West and Southern Railway Lines. Strathfield Station also provides a regional bus interchange for a number of bus routes serving the surrounding area.

2.8 The main Northern Line connects north to Hornsby and onto the Central Coast, Newcastle and northern New South Wales. The Western Line connects east to the City and the North Shore and west to Parramatta, Penrith, Blue Mountains and western New South Wales. The Western Line also provides connection to

other metropolitan lines serving the Eastern, Southern and South Western suburbs as well as southern New South Wales, Wollongong and Canberra.

Local Road Network

2.9 The road network in the vicinity of the site includes M4 Motorway, Parramatta Road, George Street, Pomeroy Street, Allen Street, Railway Street and George Lane. The M4 Western Motorway crosses over the site in an elevated flyover. It generally provides a divided carriageway with two through traffic lanes in each direction. The M4 terminates to the east of the site at intersections with Parramatta Road and Concord Road.

2.10 Parramatta Road is located adjacent to the southern boundary of the site and provides a major east-west arterial road within Sydney. It provides connections to and from the motorway either directly or via Concord Road. In the vicinity of the site, Parramatta Road generally provides a four to six lane undivided road with generally two to three traffic lanes in each direction, clear of intersections. Major intersections are signalised with additional lanes for turning traffic. Clearways operate during peak periods and bus stops are located on both sides of Parramatta Road close to the site.

2.11 Parramatta Road passes beneath the Northern Railway Line to the east of the site. At this location Parramatta Road provides two through traffic lanes in each direction and a storage lane for eastbound vehicles to turn right into Leicester Avenue.

2.12 George Street provides the main access road through the Bakehouse Quarter mixed use precinct. Between Parramatta Road and Allen Street, it provides a two-way undivided carriageway with generally one traffic lane in each direction, clear of intersections. Intersections and access to off-street car parking areas

within this zone are generally controlled by roundabouts. On-street parking is typically provided within indented parking bays. At its southern end, George Street intersects with Parramatta Road at a signalised intersection.

2.13 North of Allen Street, George Street generally provides one traffic lane and one parking lane in each direction clear of intersections. Traffic management measures are provided in George Street to improve pedestrian amenity and reduce overall traffic speeds through the area.

2.14 Pomeroy Street is located to the north of the site and intersects with George Street at a signalised intersection. Pomeroy Street extends across the Northern Railway Line between Queen Street in the east to Underwood Road to the west. It provides an undivided carriageway with one traffic lane in each direction and kerbside parking is permitted clear of intersections. Pomeroy Street intersects with Underwood Road at a signalised intersection. Underwood Road connects between Homebush Bay Drive and Parramatta Road.

2.15 Allen Street is located within the Bakehouse Quarter precinct and extends across a large stormwater channel which runs through the area in a north-south direction. It provides a local traffic route between George Street and Ismay Avenue and has an undivided carriageway with one traffic lane in each direction. Allen Street intersects with George Street at a roundabout controlled intersection.

2.16 The location of the Northern Railway Line to the east of, and parallel to George Street, means that there are no road connections east from George Street between Parramatta Road and Pomeroy Street. The stormwater channel has a similar effect to the west of the site. However, there is one connection via Allen Street and Ismay Avenue back to Pomeroy Street.

2.17 Railway Street and George Lane are existing roads located within the subject site. They provide two-way access roads with one traffic lane in each direction. They provide access to existing on-street and off-street parking areas within the site.

Traffic Flows

2.18 Traffic generated by the proposed development will have its greatest effect during weekday morning and afternoon peak periods. In order to gauge traffic conditions, counts were undertaken during these peak periods at the following intersections:-

- Parramatta Road/George Street;
- Parramatta Road/Railway Street;
- George Street/George Lane;
- George Street/Nothern Car Park Access;
- George Street/Central Car Park Access;
- George Street/Southern Car Park Access;
- George Street/Allen Street; and
- George Street/Pomeroy Street.

2.19 The results of the surveys are shown on Figures 2 and 3, and summarised in Table 2.1.

2.20 Table 2.1 shows that Parramatta Road carried some 1800 to 2350 vehicles per hour two-way during the morning peak hour period and some 2650 to 2900 vehicles per hour two-way during the afternoon peak hour period.

2.21 Traffic flows on Pomeroy Street were some 1350 to 2000 vehicles per hour two-way during peak periods.

2.22 George Street was found to carry traffic flows of some 850 to 1200 vehicle per hour two-way during peak periods. Peak period traffic flows north of Pomeroy Street were lower at some 700 to 750 vehicle per hour two-way.

Table 2.1: Existing Two-Way (Sum of Both Directions) Peak Hour Traffic Flows

Road/Location	Morning	Afternoon
Parramatta Road		
-east of George Street	1795	2655
-west of George Street	2325	2905
George Street		
- north of Parramatta Road	1140	1020
- north of George Lane	1145	1005
- north of Northern Car Park Access	1195	915
- north of Allen Street	1150	880
- north of Pomeroy Street	720	690
Pomeroy Street		
- east of George Street	1995	1715
- west of George Street	1415	1340
Allen Street		
- west of George Street	120	75
Railway Street		
- north of Parramatta Road	30	40
George Lane		
- east of George Street	95	65
Northern Car Park Access		
- east of George Street	180	185
Middle Car Park Access		
- west of George Street	105	295
Southern Car Park Access		
- west of George Street	45	70

2.23 Traffic flows on Allen Street, Railway Street and George Lane were some 50 to 150 vehicles per hour two-way during the morning and afternoon peak periods.

2.24 Car park access driveways on George Street carried some 50 to 180 vehicles per our two-way during the morning peak hour period and some 70 to 300 vehicle per hour two-way during the afternoon peak hour period.

Intersection Operation

2.25 The capacity of the road network is largely determined by the capacity of its intersections to cater for peak period traffic flows. The surveyed intersections shown in Figures 2 and 3 have been analysed using the SIDRA program.

2.26 The SIDRA program simulates the operations of intersections to provide a number of performance measures. The mos useful measure provided is average delay per vehicle expressed in seconds per vehicle. Based on average delay per vehicle, SIDRA estimates the following levels of service (LOS):

- For traffic signals, the average delay per vehicle in seconds is calculated as delay/(all vehicles), for roundabouts the average delay per vehicle in seconds is selected for the movement with the highest average delay per vehicle, equivalent to the following LOS:-

0 to 14	=	"A"	Good
15 to 28	=	"B"	Good with minimal delays and spare capacity
29 to 42	=	"C"	Satisfactory with spare capacity
43 to 56	=	"D"	Satisfactory but operating near capacity
57 to 70	=	"E"	At capacity and incidents will cause excessive delays. Roundabouts require other control mode.
>70	=	"F"	Unsatisfactory and requires additional capacity

- For roundabouts, give way and stop signs, the average delay per vehicle in seconds is selected from the movement with the highest average delay per vehicle, equivalent to following LOS:-

0 to 14	=	"A"	Good
15 to 28	=	"B"	Acceptable delays and spare capacity
29 to 42	=	"C"	Satisfactory but accident study required
43 to 56	=	"D"	Near capacity and accident study required
57 to 70	=	"E"	At capacity and requires other control mode
>70	=	"F"	Unsatisfactory and requires other control mode

2.27 It should be noted that for roundabouts, give way and stop signs, in some circumstances, simply examining the highest individual average delay can be misleading. The size of the movement with the highest average delay per vehicle should also be taken into account. Thus, for example, an intersection where all movements are operating at a level of service A, except one which is at level of service E, may not necessarily define the intersection level of service as E if that movement is very small. That is, longer delays to a small number of vehicles may not justify upgrading an intersection unless a safety issue was also involved.

2.28 The SIDRA analysis found that the signalised intersection of Parramatta Road and George Street is operating with average delays of less than 30 seconds per vehicle during the morning and afternoon peak periods. This represents a level of service C, which is a satisfactory level of intersection operation.

2.29 The signalised intersection of Pomeroy Street and George Street is operating with average delays of less than 25 seconds per vehicle during peak periods. This represents a level of service B, which is a good level of intersection operation.

2.30 The roundabout controlled intersection of George Street with Allen Street and the car park access driveways onto George Street are operating with average delays for the movement with the highest average delay of less than 15 seconds per vehicle during peak periods. This represents a level of service A/B, which is a good level of intersection operation.

2.31 The unsignalised intersections of George Street with George Lane and the southern car park access, and of Parramatta Road with Railway Street, are operating with average delays for the highest delayed movement of less than 15 seconds per vehicle during peak periods. This represents a level of service A/B, which is a good level of intersection operation.

Public Transport

2.32 George Street provides the main access road through the Bakehouse Quarter mixed use precinct, which provides a series of traffic management measures between Parramatta Road and Allen Street. These measures are intended to traffic calm the street and improve pedestrian amenity by reducing overall traffic speeds and providing safe and convenient pedestrian facilities at selected locations through the precinct.

2.33 Pedestrian facilities are provided at the signalised intersections of Parramatta Road/George Street and Pomeroy Street/George Street, and convenient pedestrian crossings are also located across George Street at key locations within the precinct. Footpaths are provided on both sides of George Street and all major roads in the area. As resident and workforce population densities increase in the area, the number of pedestrians in the area and the need for public transport will also increase.

2.34 As previously discussed, the site is well located to public and private transport networks. It is located within walking distance of three railway stations including Strathfield, North Strathfield and Homebush stations. North Strathfield Station has direct pedestrian access to George Street, via Hamilton Street East. This places it some 600 metres from the development site.

2.35 Homebush Station is some 400 metres from the site. Pedestrians walking from Homebush Station have to cross Parramatta Road. Whilst the signals at George Street provide a safe crossing point on Parramatta Road, it makes access less convenient than from North Strathfield, which is virtually free of conflict with traffic, other than local traffic along George Street and Hamilton Street East.

2.36 Services on the two main lines through these stations generally operate with headway of some five to 10 minutes in each direction during peak periods and 10 to 15 minutes in each direction outside peaks. Passengers can transfer to and from other parts of the rail system at various locations, notably at Central.

2.37 Local and regional bus services through the area are provided by Sydney Buses. There are bus stops on both sides of Parramatta Road adjacent to George Street. Bus services in the area include routes:-

- Route 408 - Flemington Station or Rookwood Cemetery to Burwood via Homebush and Strathfield;
- Route 458 - Ryde to Burwood via Rhodes, Concord Hospital, North Strathfield and Strathfield;
- Route 459 - Macquarie University to Strathfield via Macquarie Centre and Ryde;

- Route 525 - Sydney Olympic Park and Parramatta to Burwood via Newington and Strathfield;

- Route 526 - Sydney Olympic Park Wharf to Burwood via Newington and Strathfield.

2.38 Strathfield Railway Station also provides a major transport interchange for local and regional bus services operating in the area. Overall, the site has good access to existing public transport services.

3. TRAFFIC AND ACCESSIBILITY IMPACT ASSESSMENT FOR THE PROPOSED DEVELOPMENT

3.1 The proposed mixed use development forms part of the Bakehouse Quarter precinct. It is generally consistent with the approved masterplan for the area and includes the following:-

- Building F - commercial office building of some 22,740m^2, plus drama theatre of some 1,280m^2 (300 seats), plus ground floor retail of some 470m^2;
- Building G - partial demolition and adaptive re-use of existing building for a tavern and al fresco dining of some 800m^2;
- Building O - single storey restaurant and out-door terrace of some 310m^2;
- Building P - theatre of some 1,990m^2 (450 seats) plus ancillary facilities;
- Building Q - 176 room four star hotel plus 350m^2 of function area.

3.2 This chapter examines the implications of the proposed development through the following sections:-

- public transport;
- pedestrian and cyclists;
- work place travel plan;
- parking provision;
- road layout and traffic management;
- access, car park layout and internal circulation;

- traffic generation and effects;
- principles of construction traffic management;
- Director General's requirements; and
- summary.

Public Transport

3.3 As previously discussed, the site is well located to public and private transport services in the area. It is located within walking distance of three railway stations including Strathfield, North Strathfield and Homebush stations. Services through these stations generally operate with headways of some five to 10 minutes in each direction during peak periods and 10 to 15 minutes in each direction outside of peaks. Bus services also link the site to surrounding areas and to local and regional services operating from Strathfield Railway Station interchange.

3.4 The proposed development provides opportunities to strengthen demand for existing public transport service in the area and provide appropriate access to the Bakehouse Quarter precinct by these services. Increasing retail and employment densities close to residential areas and close to existing public transport services is consistent with government policy. A public transport strategy has been developed to encourage the use of public transport and minimise travel by private vehicles as follows:-

- provide a mix use of employment, casual accommodation and entertainment uses with a range of local facilities and services;
- improve the quality of services to minimise the need to travel by private vehicle; and

- contain employee car travel and constrain car usage in accordance with government policy.

3.5 Government policy aims to ensure that urban structure, building forms, land use locations, development designs, subdivision locations and street layouts help achieve the following planning objectives:-

(a) improving accessibility to housing, employment and services by walking, cycling, and public transport;

(b) improving the choice of transport and reducing dependence solely on cars for travel purposes;

(c) moderating growth in the demand for travel and the distances travelled, especially by car; and

(d) supporting the efficient and viable operation of public transport services.

3.6 The proposed development satisfies these aims as follows:-

- the site is located within the Bakehouse Quarter precinct and is highly accessible to public transport services, which offer viable alternatives to travel by car. To support accessibility for cyclists, appropriate parking will be provided for bicycles. The site is also readily accessible for pedestrians, being close to residential areas, public transport nodes and existing pedestrian connections and footpaths around the site. These will be further improved by the development of pedestrian areas, out-door terraces and improved pedestrian facilities along George Street;

- the location of the site within the Bakehouse Quarter precinct and an appropriate level of on-site parking will improve the choice of transport mode and reduce the use of cars for travel purposes;

- the opportunity to moderate demand for travel and distance travelled will be provided by the development being close to existing residential populations and hence providing employment opportunities within a short distance; and

- greater employment densities will provide more potential customers for the existing public transport services and hence support their efficient and viable operation.

Pedestrian and Cyclists

3.7 There are good pedestrian links to and from the site provided by:-

- pedestrian footpaths on both sides of George Street and on all major roads in the area;

- signalised pedestrian crossings at the intersections of Parramatta Road/George Street and Pomeroy Street/George Street;

- traffic management measures and pedestrian crossings at key locations along George Street improving pedestrian amenity and provide safe and convenient pedestrian facilities; and

- a series of off-street pedestrian connections link the commercial, retail and car parking areas to the surrounding pedestrian network.

3.8 Primary and secondary pedestrian connections will be developed, with primary pedestrian routes through the site and public areas linking to George Street and to public transport facilities. Secondary pedestrian routes will be developed adjacent

to the internal road network and via dedicated through site links within existing buildings within the Bakehouse Quarter precinct.

3.9 Protection will be provided to pedestrians and cyclists from vehicles and driveways by providing regular safe crossing points along George Street and through the public area. This encourages walking and cycling for both destinations and recreational movements.

3.10 The pedestrian and cycle network will be integrated with connections to the main pedestrian/cycle path along the stormwater channel located adjacent to the western boundary of the Bakehouse Quarter precinct, and via connections through to Homebush and Strathfield Railway Stations. This will allow cyclists to switch modes from cycle to either bus or train, in order to complete their journeys.

3.11 In time the area will benefit from a comprehensive cycle network allowing cyclists to travel through and within the Bakehouse Quarter precinct, and linking the site to the surrounding areas. A well developed cycle network is likely to be successful in increasing users and therefore making a contribution to sustainable transport for the area.

Work Place Travel Plan

3.12 To encourage travel modes other than private vehicle, it is proposed to adopt a travel demand management approach, through a work place travel plan to meet the specific needs of the site, future tenants and employees. The specific requirements and needs of the future tenants, including number of employees, hours of work, shift times, etc., will be incorporated in the work place travel plan to support the objectives of encouraging the use of public transport.

3.13 The principles of the work place travel plan, to be developed by the future tenants in consultation with Council, RTA and other stakeholders, will include the following:-

- encourage the use of public transport, including rail services through North Strathfield and Homebush Railway Stations through the area;
- work with public transport providers to improve services;
- encourage public transport by employees through the provision of information, maps and timetables;
- raise awareness of health benefits of walking (including maps showing walking routes);
- encourage cycling by providing safe and secure bicycle parking, including the provision of lockers and change facilities;
- provide appropriate on-site parking provision, consistent with Council's controls and the government's objective of reducing traffic generation.

3.14 The travel plan may take a variety of forms including a green transport plan or company travel plan. The work place travel plan will assist in delivering sustainable transport objectives by considering the means available for reducing dependence solely on cars for travel purposes, encouraging the use of public transport and supporting the efficient and viable operation of public transport services.

Parking Provision

3.15 For theatres and three to four star hotels, Canada Bay City Council does not have specific parking rate requirements and suggests parking to be provided on the

basis of a parking study. In regards to the other components of the development, Canada Bay City Council's parking requirements are as follows:-

- Commercial
  - one space per 40m^2 GFA;
- Retail (Shops)
  - one space per 40m^2 GLFA;
- Restaurants and Taverns
  - one space per 6m^2 of serviced area, or one space per four seats.

3.16 For restaurant and tavern uses, we have assumed the licenced service area to be equivalent to some 60% of gross leasable area.

3.17 The Roads and Traffic Authority's "Guide to Traffic Generating Developments" suggests a parking rate for four star hotels of one space per four bedrooms.

3.18 The RTA does not have a specific rate for theatres or function facilities. A commonly applied rate for theatres is one space per 10 seats. Applying a similar rate to the hotel function facility and assuming that 10 seats occupy 20m^2 of function area, the required rate would be one space per 20m^2.

3.19 Application of these rates results in the following parking requirements

- Commercial - 569 spaces;
- Retail - 12 spaces;
- Restaurant - 32 spaces;
- Tavern - 80 spaces;

- Theatre - 75 spaces; and
- Hotel (plus function facility) - 62 spaces.

3.20 Defining an appropriate parking requirement for an integrated development with a range of complementary uses, is not simply a matter of adding together the parking requirements for each of the individual components. Such an approach could result in an over provision of parking as not all elements of the development will have their peak parking demand at the same time and there will be use of multiple facilities in a single visit.

3.21 The total parking requirement for the proposed development if the individual requirements are summed, would be some 830 spaces. However, if reasonable allowance is made for the fact that the commercial, retail and hotel accommodation will have its peak demand earlier in the day than the restaurant, tavern, theatre and hotel function facility, the combined peak parking requirement is likely to be in the order of some 660 spaces.

3.22 The proposed development will provide parking for some 690 vehicles within a combination of above ground and basement parking beneath Building F and is considered appropriate.

3.23 This parking is in addition to at-grade parking provided beneath the M4 Western Motorway (some 60 spaces to be retained) and existing on-street parking in Railway Street and George Lane.

Road Layout and Traffic Management

3.24 In association with the proposed development, access to the site will be maintained via Railway Street and George Lane. A new service road will also be

provided at the north-western corner of the site, between Buildings F and G. The new service road will provide for two-way traffic and will intersect with George Street and the central car park access road at a roundabout controlled intersection.

3.25 The internal road layout and the proposed traffic management measures to manage and control vehicular and pedestrian activity in the vicinity of the site are shown on plans prepared by WAH Architects. The proposed measures include:-

- a new service road, between Buildings F and G, providing additional access to the site and linking between George Street to George Lane;
- the intersection of the new service road with George Street and the central car park access road to be controlled by a roundabout;
- provision of a central median in George Street between Parramatta Road and the new service road, restricting access to/from George Lane at George Street to left in/left out;
- reconfiguration of traffic lane arrangements in George Street, at its intersection with Parramatta Road, to incorporate three southbound lanes (one left turn lane and two right turn lanes)and one northbound lane;
- Railway Street at Parramatta Road to be made one-way eastbound, preventing left turn movements from Railway Street into Parramatta Road;
- provision of a roundabout at the bend in Railway Street, located at the south-eastern corner of the site;
- maintain current traffic arrangements and on-street parking in Railway Street and George Lane.

3.26 The road layout has been designed to improve access arrangements to the proposed development, provide additional traffic capacity and where possible utilise existing road alignments and connections. The road layout will incorporate pedestrian footpaths along the internal roads, which will encourage pedestrian movement and activate pedestrian access through the site.

3.27 The internal road layout and traffic management measures will provide improved vehicular and pedestrian connectivity. The proposed arrangements are considered to be functional and appropriate measures to service the proposed development.

Access, Car Park Layout and Internal Circulation

3.28 Parking for the proposed development will be provided within a combination of above ground and basement parking beneath Building F. Access to this parking area will be provided via a combined entry and exit driveway at the south-eastern corner of Building F on Railway Street. The design will provide for vehicles to enter and exit the site in a forward direction.

3.29 The proposed access arrangements are considered appropriate and will be provided to cater for the swept path of cars in accordance with the Australian Standard for parking facilities (Part 1: Off-street car parking) AS2890.1-2004.

3.30 Car parking will be provided with dimensions of at least 2.5 metres wide by 5.4 metres long, with an additional 0.3 metres width for spaces located adjacent to structure. Access to car parking spaces will be provided from a 5.8 metre wide circulation aisle. Columns will be set back 0.75 metres from the front of spaces. Disabled parking spaces will be 2.4 metres wide, with an additional 2.4 metres adjacent to the space, by 5.4 metres long. Height clearance of 2.5 metres will be provided above disabled parking spaces, with 2.2 metres between disabled spaces

and the car park entry/exit. These dimensions are considered appropriate, being in accordance with AS2890.1-2004 and AS2890.6-2009.

3.31 Access between the parking levels will be provided by two-way ramps. Ramp grades, transitions, widths and height clearance will be provided in accordance with AS2890.1-2004.

3.32 Loading dock facilities will be provided within the upper ground level of Building F and ground level of Building P. The loading docks will provide for a range of service vehicles, including small, medium and large rigid trucks. Two loading bays will be provided within each loading area. Courier and small commercial vehicles will be accommodated within the upper ground level car park of Building F. The proposed access, circulation and manoeuvring areas for service vehicles will be provided in accordance with AS2890.2-2002.

3.33 Loading facilities for tavern and restaurant will be provided for on-street within the development site.

Traffic Generation and Effects

3.34 The traffic generated by the proposed development will have its greatest effects during the morning and afternoon peak periods, when the generation of the commercial and hotel components of the development combine with commuter traffic on the surrounding road network. The peak traffic generation of the retail component will also be during the afternoon period. However, the peak traffic generation of the restaurant, theatre, tavern and hotel function facilities will be later in the evening.

3.35 The estimation of the traffic generation of a mixed use development, such as that proposed is complex. This is because different components of the development

will generate traffic at different times and because it will attract a significant proportion of multi-purpose trips eg. shops/restaurant, office/tavern, restaurant/theatre or hotel/function etc. In addition, the location of the site close to good public transport, the provision of wide range of facilities within the Bakehouse Quarter precinct will encourage the use of public transport. Estimates of the traffic generated by the development have been based on surveys and on generation rates developed by the RTA.

3.36 For the commercial office component of the development, traffic generation has been based on surveys of similar commercial buildings located close to public transport services. The commercial development would generate some 0.4 to 0.5 vehicles per hour per parking space during the morning and afternoon peak periods.

3.37 The RTA's *"Guide to Traffic Generating Developments"* suggests a traffic generation rate of 5 vehicles per hour per 100m^2 for restaurants during the afternoon peak period. For the purpose of our assessment, we have adopted a similar rate for the proposed tavern and al fresco dining facility. Restaurants and taverns will have a minimal traffic generation during the morning peak period.

3.38 In regards to the proposed four star hotel, we have adopted the RTA's traffic generation for motels of 0.4 vehicles per hour per room. We have used this rate for both the morning and afternoon peak periods.

3.39 For the proposed retail area, the RTA's guidelines formula suggests a traffic generation rate of 4.6 to 5.6 vehicles per 100m^2 for specialty retail during the afternoon peak period. During the morning peak period, we have adopted a retail generation of half the afternoon generation.

3.40 The RTA guide does not have a specific rate for theatres or function facilities. In relation to theatres an afternoon peak hour traffic generation of four vehicles per hour per 100 seats has been adopted. It should be noted that theatres are typically very low traffic generators during the afternoon peak periods. Their generation occurs later in the evening. Finally, it has been assumed that the hotel function facility could generate up to some 50 vehicles per hour during the afternoon peak hour.

3.41 Application of these rates to the various components of the development results in a traffic generation of some 370 vehicles per hour during the morning and some 500 vehicles per hour two-way during the afternoon peak period.

3.42 In order to allow for the benefits of the proximity of the site to bus and rail public transport services and to make an allowance for multi-purpose trips, the traffic generation of the proposed mixed use development has been reduced by 20%. Thus the additional traffic generated by the proposed development will be some 300 vehicles per hour two-way during the morning and some 400 vehicles per hour two-way during the afternoon peak period.

3.43 The additional traffic has been assigned to the road network. Existing traffic flows plus the additional traffic from the proposed development are shown on Figures 4 and 5, and summarised in Table 3.1.

3.44 Table 3.1 shows that traffic flow increases on George Street, Parramatta Road and Pomeroy Street would be some 75 to 210 vehicles per hour two-way during the morning and afternoon peak periods. Traffic flows on the new service road would be some 270 to 330 vehicles per hour two-way during the same peak hour periods.

Table 3.1 Existing Two-Way (Sum of Both Directions) Peak Hour Traffic Flows Plus Development Traffic

Road/Location	Morning		Afternoon	
	Existing	Plus Development	Existing	Plus Development
Parramatta Road				
- east of Railway Street	1775	+75	2645	+100
- east of George Street	1795	+125	2655	+140
- west of George Street	2325	+75	2905	+100
George Street				
- north of Parramatta Road	1140	+100	1020	+160
- north of George Lane	1145	+75	1005	+100
- north of New Service Road	1140	+150	995	+210
- north of Northern Car Park Access	1195	+150	915	+210
- north of Allen Street	1150	+150	880	+210
- north of Pomeroy Street	720	-	690	-
Pomeroy Street				
- east of George Street	1995	+75	1715	+105
- west of George Street	1415	+75	1340	+105
Allen Street				
- west of George Street	120	-	75	-
Railway Street				
-north of Parramatta Road	30	+50	40	+40
George Lane				
- east of George Street	95	+25	65	+60
New Service Road				
- east of George Street	-	+270	-	+330
Northern Car Park Access				
- east of George Street	180	-	180	-
Middle Car Park Access				
- west of George Street	105	-	295	-
Southern Car Park Access				
- west of George Street	45	-	70	-

3.45 The intersections previously analysed in Chapter 2 have been re-analysed using the SIDRA computer program for the additional development traffic flows shown in Figures 4 and 5. The analysis found that the signalised intersection of Parramatta Road and George Street would continue to operate with average delays of less than 30 seconds per vehicle during the morning and afternoon peak periods. This represents a level of service C, which is a satisfactory level of intersection operation.

3.46 The signalised intersection of Pomeroy Street and George Street would operate with average delays of 26 seconds per vehicle during peak periods. This represents a level of service B, which is a good level of intersection operation.

3.47 The proposed roundabout controlled intersection of George Street and the new service road would operate with average delays for the highest delayed movement of less than 20 seconds per vehicle during peak periods. This represents a level of service B, which is an acceptable level of intersection operation.

3.48 The remaining intersections along George Street and the intersection of Parramatta Road/Railway Street would continue to operate at a level of service A/B with similar average delays during peak periods. This represents a good level of intersection operation.

Principles of Construction Traffic Management

3.49 At this stage the overall construction methodology, process and staging has not been defined. The builder will be responsible for the preparation of a traffic management plan, which will be prepared prior to the commencement of work, taking into account relevant consent conditions.

3.50 Construction of the development will commence with site preparation works and demolition of the existing building on the site. Construction access will be provided to/from George Street and Railway Street. It is anticipated that work zones will be required along the site frontages on Railway Street and George Lane.

3.51 Pedestrian footpaths adjacent to the site will be maintained during the construction period. Class A construction fencing will be erected around the perimeter of the site, with overhead protection where required.

3.52 Openings in the construction fencing and the construction access driveways will be managed and controlled by traffic controllers. The movement of trucks entering and exiting the site will be managed and controlled by traffic controllers.

3.53 The overall principles for traffic management during construction are:-

- provide a convenient and appropriate environment for pedestrians;
- minimise effects on pedestrian movements and amenity;
- provide appropriate safe fencing/hoardings around the perimeter of the construction site;
- management and control vehicular movements to and from the site;
- provide work zones on Railway Street and George Lane, adjacent to the site;
- maintain other existing on-street parking in the vicinity of the site;
- maintain access to existing facilities in the vicinity of the site;

- restrict construction vehicle activity to designated truck routes through the area (to be identified by the appointed builder);

- construction vehicles to enter and exit the site in a forward direction;

- construction activity to be carried out in accordance with approved hours of construction;

- maintain safety for workers;

- maintain access to public transport and encourage workers to travel to/from the site by these services;

- the preparation of the construction traffic management plan, signage detail, control of pedestrians and control and management of construction activity/vehicles in the vicinity of the site will be the responsibility of the appointed builder.

Director General's Requirements

- ***"The EA shall provide a Traffic and Accessibility Study prepared in accordance with the RTA's Guide to Traffic Generating Developments, considering traffic generation, any required road/intersection upgrades, access, loading dock(s), car parking arrangements, measures to promote public transport usage and pedestrian and bicycle linkages, an assessment of the implications of the proposed development for non-car Travel modes (including public transport, walking and cycling), addressing the importance of bus access and circulation in meeting travel needs in the area, likely associated costs of additional infrastructure or services where not proposed as part of the project, and also identify measures to mitigate potential impacts on public/private transport, pedestrians and cyclists during the construction stage of the project".***

3.54 This report has been prepared with reference to the RTA's *"Guide to Traffic Generating Developments"*. Traffic generation and its effects are discussed in paragraphs 3.34 to 3.48. Road layout and traffic management measures are discussed in paragraphs 3.24 to 3.27. Access, car parking and loading dock arrangements are discussed in paragraphs 3.28 to 3.33.

3.55 Pedestrian, bicycle and public transport are discussed in paragraphs 3.3 to 3.11 and matters relating to the use of non-car travel modes are discussed in 3.12 to 3.14.

3.56 Matters addressing the importance of bus access and circulation in meeting travel needs in the area and discussed in association with the work place travel plan in paragraphs 3.12 to 3.14.

3.57 Matters relating to the principles of construction traffic management are discussed in paragraphs 3.49 to 3.53.

- ***"The EA must also demonstrate the provision of sufficient on-site car parking for the proposal having regard to local planning controls and RTA guidelines (Note: The Department supports reduced car parking rates in areas well-served by public transport)."***

3.58 Parking provision for the proposed mixed use development is discussed in paragraphs 3.15 to 3.23.

- ***"The EA shall also review how the development integrates into the existing and future transport system including the proposed West Metro line."***

3.59 The implications of the proposed development, and its effects on the existing and future transport system have been discussed in paragraphs 3.34 to 3.48. In

regards to the integration of the proposed developments with the West Metro Line, the State government has announced that this public transport service is currently not being pursued.

Summary

3.60 In summary, the main points relating to the traffic and accessibility impact assessment for the proposed development are as follows:-

i) the proposed mix use development includes the following:-

- Building F - commercial office building of some 22,740m^2, plus drama theatre of some 1,280m^2 (300 seats), plus ground floor retail of some 470m^2;
- Building G - partial demolition and adaptive re-use of existing building for a tavern and al fresco dining of some 800m^2;
- Building O - single storey restaurant and out-door terrace of some 310m^2;
- Building P - theatre of some 1,990m^2 (450 seats) plus ancillary facilities;
- Building Q - 176 room four star hotel plus 350m^2 of function area.

ii) the proposed development would increase retail and employment densities close to residential areas and close to existing public transport services and is consistent with government policy objectives to reduce private car travel and encourage public transport use;

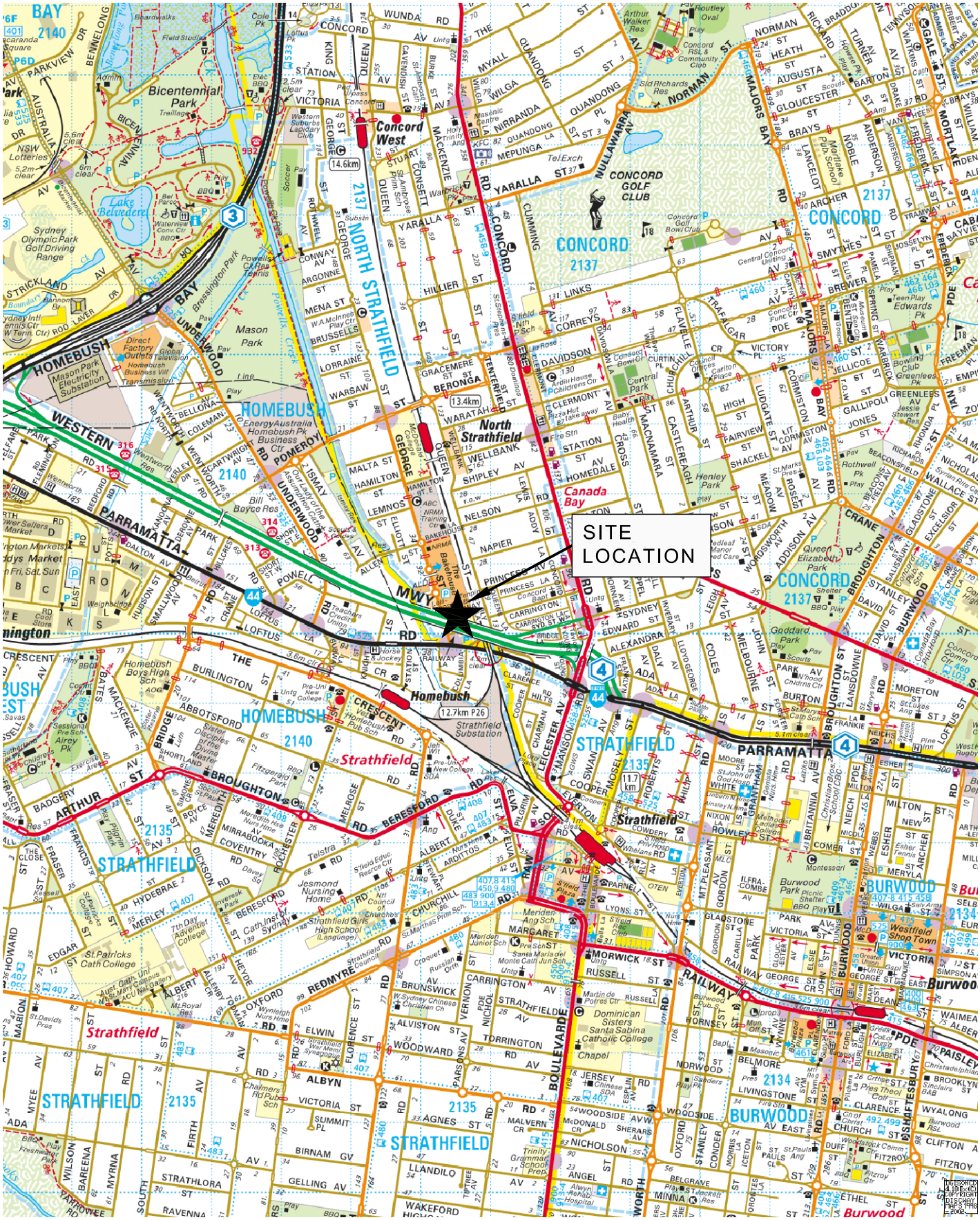
iii) a workplace travel plan will be implemented for the site;

iv) parking provision is considered appropriate;

v) access arrangements, internal circulation, and servicing will be provided in accordance with AS2890.1-2004 and AS2890.2-2002;

vi) the road network including the proposed traffic management measures will be able to cater for the additional traffic from the proposed development;

vii) the Director Generals' requirements are discussed in paragraphs 3.54 to 3.59.



Location Plan

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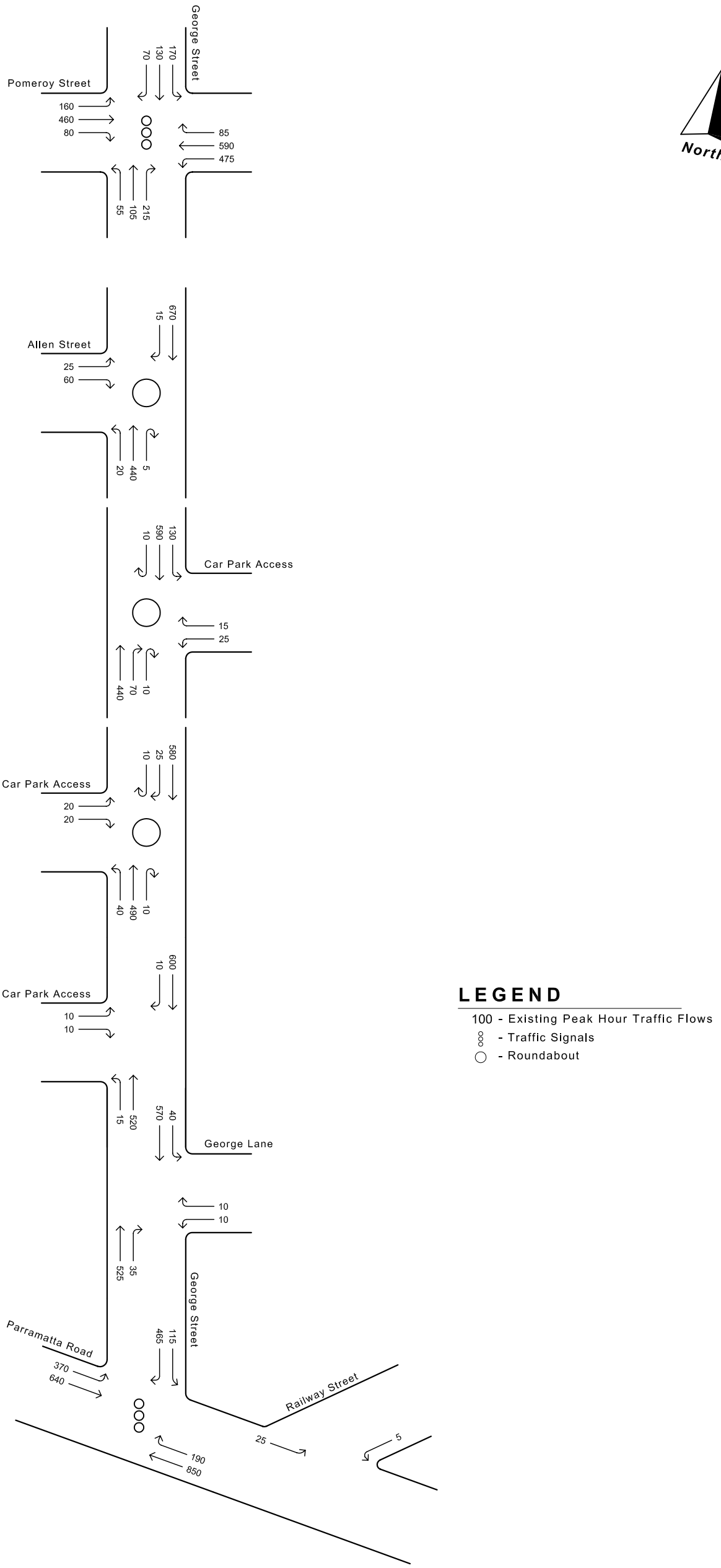
Figure 1



Existing morning peak hour traffic flows

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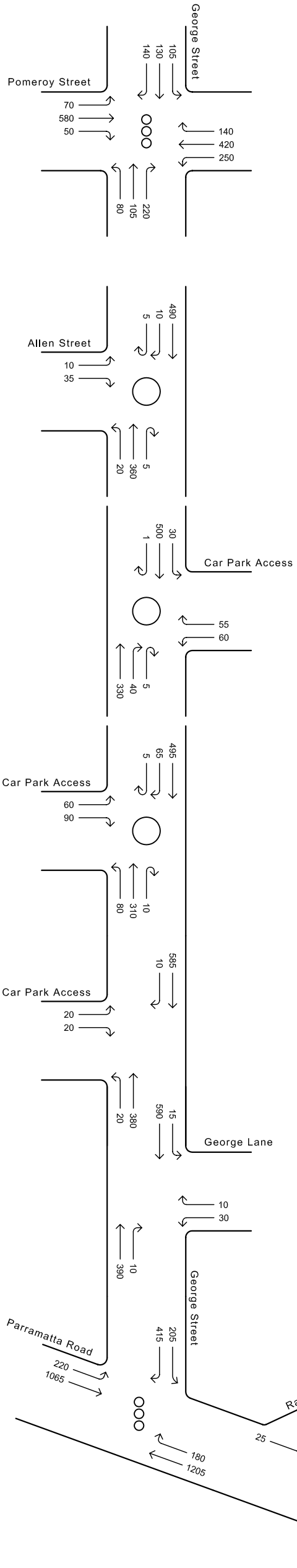
Figure 2



North

LEGEND

100 - Existing Peak Hour Traffic Flows

- Traffic Signals
- Roundabout

Existing afternoon peak hour traffic flows

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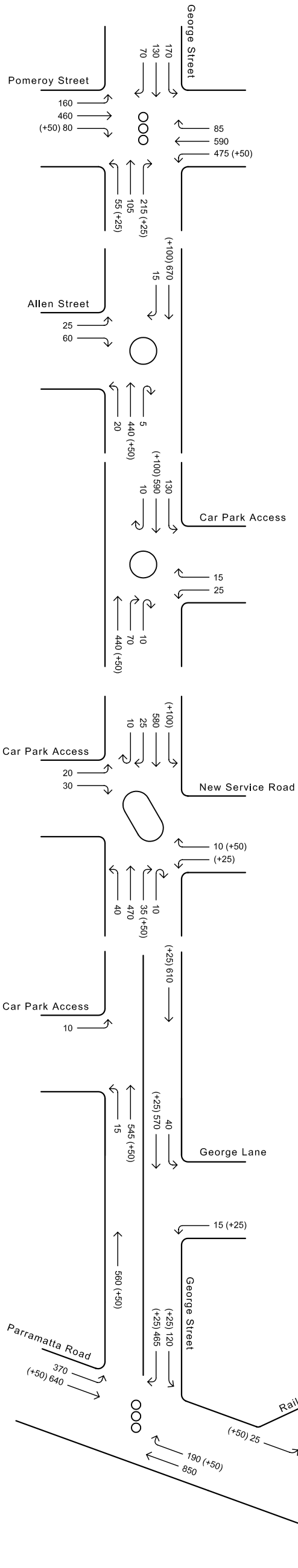
Figure 3



North

LEGEND

100 - Existing Peak Hour Traffic Flows
(+10) - Additional Development Traffic
- Traffic Signals
- Roundabout

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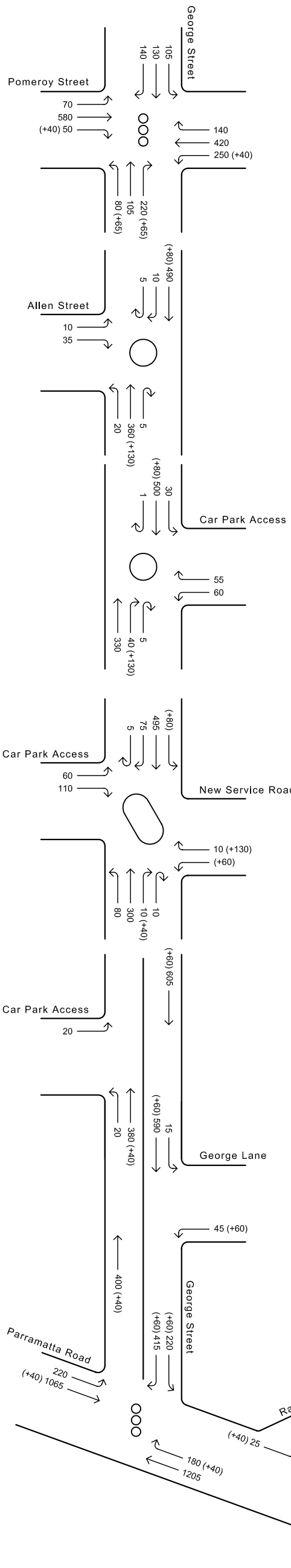
Existing morning peak hour traffic flows plus development traffic

Figure 4



North

LEGEND

100 - Existing Peak Hour Traffic Flows
(+10) - Additional Development Traffic
- Traffic Signals
- Roundabout

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Existing afternoon peak hour traffic flows plus development traffic

Figure 5