

Potts Hill Residential Estate Project Application
Sydney Water Reservoir, Potts Hill
Traffic and Transport Report

18 November 2009

Prepared for
Landcom

Potts Hill Residential Estate Sydney Water Reservoir, Potts Hill

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Landcom

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1 Introduction

This traffic and transport report has been prepared on behalf of Landcom to present the findings of traffic and transport investigations undertaken by Halcrow MWT (formerly Masson Wilson Twiney) for the proposed residential development within the Western Residential Precinct of Sydney Water's Potts Hill Reservoir site.

The traffic report has been prepared taking into consideration the Director General's requirements for the Part 3A Project Application.

The site of the proposed new residential development is part of a larger area of surplus Sydney Water Corporation (SWC) land at Potts Hill for which a Concept Application has been lodged and approved for the redevelopment as employment and residential land uses.

The location of the residential development site within the larger SWC and the site's surroundings are shown in Figure 1.

1.1 *Overview of Concept Application Plan for SWC Land at Potts Hill*

Landcom, on behalf of SWC, are proposing to redevelop 40 hectares of surplus SWC land at Potts Hill for a combination of employment land, residential land and proposed public open space.

The Concept Application plan (Appendix A) clearly defines two distinct precincts for potential redevelopment of SWC land on the Potts Hill site, namely:

- Eastern Precinct = Employment Uses
- Western Precinct = Residential Uses and Public Open Space.

The reservoirs and associated activities will be retained by SWC as part of the potential redevelopment.

SITE LOCATION & SYDNEY WATER SURPLUS LAND

POTTS HILL RESERVOIR RESIDENTIAL (WESTERN) PRECINCT



Key



Surplus Land - Potts Hill
Redevelopment Site (Approx Area)



Residential (Western) Precinct

The Concept Application plan has been approved by the Minister of Planning on 27 April 2009 under Part 3A. Separate project applications have been lodged and approved for the eastern employment and construction work is underway.

The Concept Application plan proposed the provision of three separate vehicle access roads to service the residential estate to be located at:

- 1 x Brunker Road (roundabout); and
- 2 x Cooper Road (roundabouts).

These locations are shown in Figure 2 and Appendix A.

The approval for the Concept Application plan allows for the development of up to 450 residential dwellings within the western precinct. The residential development was approved with a mix of low and medium density housing forms.

1.2 Overview of Project Application for the Residential (Western) Precinct

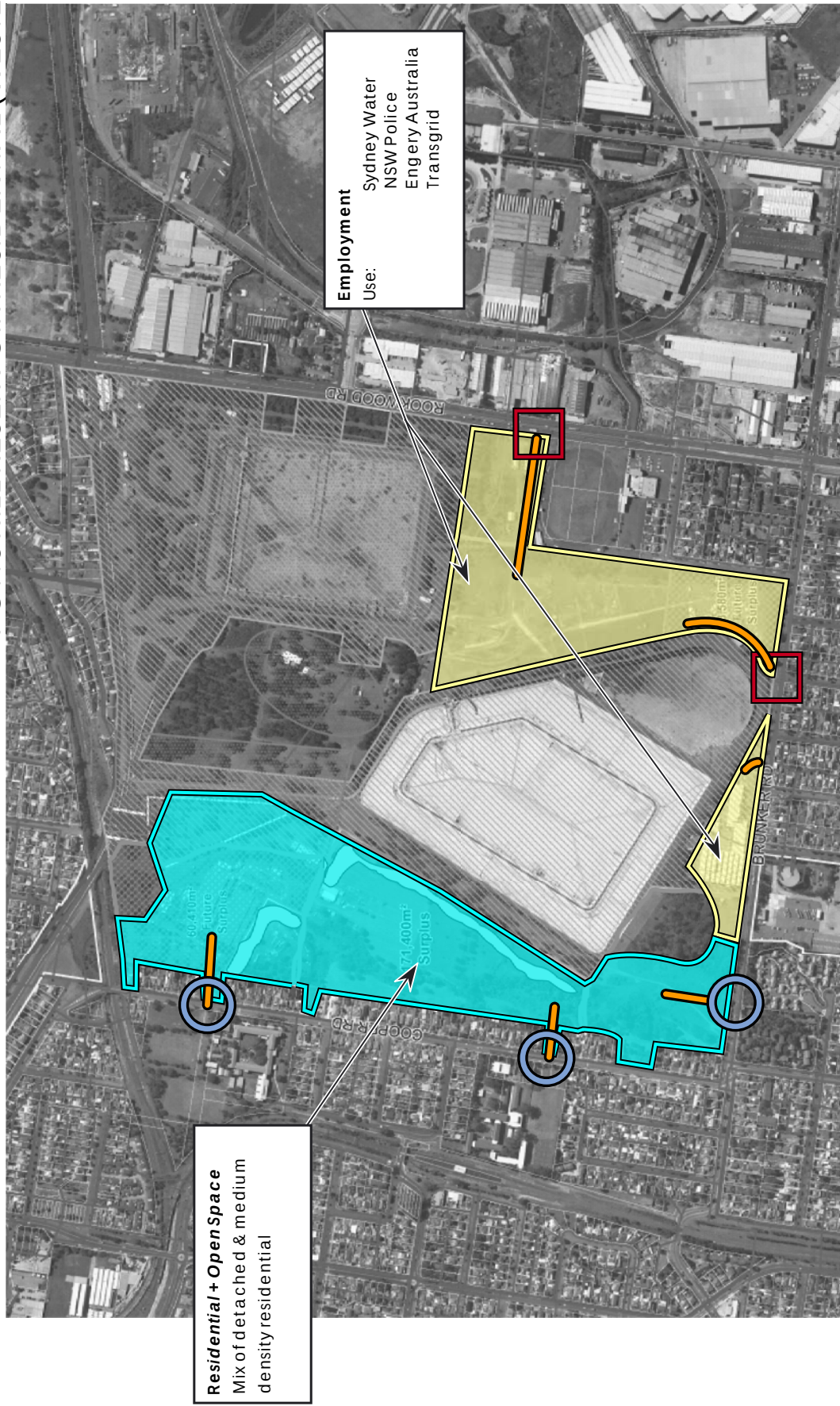
Landcom proposes to construct a new residential subdivision providing up to 450 residential dwellings with a mix of low and medium density housing and public open space within the western precinct of the SWC surplus lands.

The residential lot and internal road layout are shown in Figure 3.

The residential estate would have vehicle accesses at both Cooper Road and Brunker at the locations proposed within the Concept Plan. The intersection treatments at the site accesses has been reviewed and discussed with Bankstown City Council and as a result have been modified compared with the Concept Plan application. The site access arrangements are discussed in Section 3 of this report.

CONCEPT PLAN & SITE ACCESS ARRANGEMENTS

POTTS HILL RESERVOIR RESIDENTIAL (WESTERN) PRECINCT



1.3 Background to Traffic and Transport Assessments

A detailed traffic and transport assessment has been undertaken as part of the Concept Application assessment for the Potts Hill site.

The assessment considered the traffic and transport implications of redevelopment of surplus land for the employment and residential uses as set out in the Concept Plan application.

The assessment identified transport infrastructure improvements and site access arrangements necessary to facilitate redevelopment of the site.

The assessment considered the development potential, and thus traffic generation potential, of the new residential development as part of the broader redevelopment of the SWC surplus lands at Potts Hill.

The findings of the Concept Application plan traffic and parking assessment are summarised in Section 2 of this report.

2 Overview of Concept Application Plan Traffic and Transport Assessment

2.1 *Concept Application Plan Redevelopment*

The location of the SWC surplus land is shown in Figure 1. The potential redevelopment site is directly surrounded by:

- Rookwood Road to the east;
- Brunker Road to the south;
- Cooper Road to the west; and
- Freight rail line and a water pipeline to the north.

Concept planning for the Potts Hill redevelopment site identified the potential for the following land uses:

- Retention / consolidation of Sydney Water operations;
- Employment area; and
- Residential development.

The proposed residential development in the western precinct was ultimately approved for a mix of low and medium density dwellings with a yield of up to 450 dwellings.

For the traffic assessment it was assumed that the residential yield would include a mix of detached dwellings, attached / town house dwellings and medium density uses with a yield of approximately 693 dwellings.

This was revised to 410 dwellings for the Concept Application submission but the traffic analysis (ie. road network intersection operation – SIDRA analysis) remained at 693 dwellings as a worst case scenario.

The employment land is proposed to be located to east of the site with residential uses to west separated by the existing reservoir (Reservoir No.2).

It was proposed that the eastern employment precinct will be utilised by the following uses:

- Sydney Water Corporation;
- NSW Police;
- Energy Australia; and
- Transgrid.

Each of the proposed uses would involve a relocation of existing facilities elsewhere in Sydney to the Eastern Precinct site.

Based on information provided by representatives of the proposed users the following employee numbers for the Eastern Employment Precinct are estimated to be:

- Sydney Water Corporation: 450 employees;
- NSW Police: 400 employees
- Energy Australia: 50 employees; and
- Transgrid: No permanent employees on site.

2.2 *Traffic Generation Potential*

2.2.1 *Existing SWC Traffic Generation*

It is noted that based on information provided by SWC, the existing traffic generation characteristics of the Sydney Water land uses of the site are likely to change (decrease) as a result of the proposed redevelopment.

It is estimated that SWC currently generates in the order of 1,000 vehicle trips per day, including staff trips for approximately 300 employees. Traffic generation also include a small proportion of heavy vehicles (approximately 5%). Traffic generation is distributed to and from three site access driveways (1 x Cooper Road + 2 x Brunker Road).

For the purposes of the Concept Application traffic assessment the estimated future residential and employment population within the surplus lands have been added to surveyed traffic flows.

However, as noted above, the site currently employs approximately 300 staff. A proportion of the existing staff is likely to be included in the estimated 450 staff for the proposed SWC site in the employment precinct.

Thus the estimated peak hour traffic generation as assessed in the Concept Application is likely to have over estimated the likely future site traffic generation. As such it is considered that the traffic assessment of the concept plan represents a 'worst case' scenario.

With regard to the residential precinct, the existing Cooper Road SWC access was surveyed (2007) to generate approximately 40 vehicles per hour in the peak AM and PM periods. The existing Cooper Road SWC access will be utilised as an access for the proposed residential development.

2.2.2 Concept Plan Traffic Generation

Based on information provided by representatives of the proposed employment precinct users and RTA guidelines the traffic generation potential of the Concept Plan as assessed is summarised in Table 2-1.

Table 2-1 – Concept Plan Traffic Generation

Use	No. of Dwellings / Employees	Estimated Daily Traffic Flows (vehicles /hr)	Estimated Peak Hour Traffic Flows (vehicles / hr)
Residential			
- Detached Houses	185	1305	157
- Attached Houses	45	293	29
- Apartments	180	900	90
<i>Total Residential</i>	<i>410</i>	<i>2,498</i>	<i>276 ^{1.}</i>
Employment	900	2,725	400
<i>Total Precinct</i>	-	<i>5,223</i>	<i>676</i>

Notes: 1. Intersection analysis based on residential yield of 693 dwellings (432 vehicles / hr).

It is noted that the intersection analysis presented in the Concept Plan traffic assessment was based on a higher residential yield for the site (ie. 693 dwellings generating 432

vehicles per peak hour). This yield reflected the inclusion of a dedicated aged care facility within the residential precinct.

The estimated peak hour traffic generation assumes that for the Sydney Water, NSW Police and Energy Australia sites, 40% of all employees arrive or depart the site in the peak hour period. This rate is consistent with RTA guidelines and reflects staggered start and finish times and shift workers associated with proposed site uses.

Additional peak hour generation assumes visitor and service vehicle movement to each of the potential uses.

2.3 Summary of Concept Plan Assessment Findings

2.3.1 Road Network Improvements

The concept plan traffic assessment concluded that the surrounding road network can accommodate the estimated traffic generation of the SWC surplus land redevelopment as envisaged in the concept plan with:

- Intersection capacity improvements; and
- Amenity / traffic calming improvements along Cooper Road.

The concept plan traffic assessment identified a number of existing capacity constraints within the surrounding road network. These constraints will continue to occur with or without redevelopment of SWC land on the Potts Hill site.

In addition to the site access treatments several intersection improvements are considered necessary to address both existing constraints and the potential traffic generation of the redevelopment site (Concept Plan).

These intersection improvements include:

- Rookwood Road / Brunker Road – additional turning capacity (potentially double right turn lanes on either Rookwood Road and / or Brunker Road subject to detail design).

It is noted that the RTA is currently considering the operation of the Brunner Road / Rookwood Road intersection as part of broader regional road network planning.

Council has noted that the Brunner Road / Cooper Road intersection is currently operating satisfactorily albeit with some delays. The proposed Concept Plan redevelopment will generate additional traffic through the intersection however the existing layout is considered acceptable.

The Brunner Road / Graf Avenue intersection currently experiences congestion and capacity constraints primarily as a result of rat running activities. The provision of an intersection treatment to improve capacity such as a roundabout or traffic signals will increase the attractiveness of this route as a rat run and result in further degradation of residential amenity along Graf Avenue and Boardman Street. As such no intersection improvement work were proposed for this intersection.

2.3.2 Site Access Arrangements – Residential Precinct

i. Principles of Site Access Arrangements

The Concept Plan proposed that existing site access driveways will be retained and utilised for the proposed redevelopment. This strategy will reduce potential adverse implications on the surrounding road network. However, access driveways will need to be designed to accommodate development traffic flows.

Furthermore, multiple site access points have the potential to reduce the effects of site generated traffic at any one location. In this regard, upgrading existing access driveways will assist in reducing traffic pressure on any new site access locations.

It is noted that the extent of road frontage of the site along Cooper Road and to a lesser extent Brunner Road is limited. This limits the potential alternatives for site access.

ii. Proposed Site Access Arrangements and Intersection Treatments

The concept plan shown in Figure 2 indicates the proposed locations of the connections between the internal and external road networks.

The proposed access arrangements to the residential precinct were as follows:

- Cooper Road – 2 accesses
- Brunker Road – 1 access

The Concept Plan proposed that each of the above site access intersections would be treated with a roundabout intersection.

Each of the proposed site access intersection treatments (roundabouts) will need to be designed to accommodate bus movements which travel along Cooper Road to access the high schools and Brunker Road for general public services.

The operation of the site access arrangements have been assessed using the aaSIDRA modelling software. The results of the analysis are presented in Table 2 -2.

Table 2 -2 – Site Access Intersection Performance

		Weekday AM Peak		Weekday PM Peak	
Intersection	Control	Delay (secs)	Level of Service	Delay (secs)	Level of Service
Residential Precinct					
Cooper Road North	Roundabout	13	A	12	A
Cooper Road South	Roundabout	13	A	12	A
Brunker Road	Roundabout	22	B	14	A

Notes: For roundabouts and sign posted intersections, the intersection delay is the delay for the worst movement at the intersection.

Traffic assessment based on a higher than proposed residential yield (ie. 432 vph)

The analysis indicates that the proposed intersection treatments would provide satisfactory operation at each of the site accesses.

2.3.3 *Parking and Loading Provisions*

All on site parking and loading / service vehicle provisions will need to be provided and designed in accordance with relevant planning (DCP) controls, Landcom guidelines and / or Australian Standard requirements.

2.3.4 Public Transport Accessibility

The residential precinct is located within close proximity to the Birrong and Regents Park railway stations.

Bus services currently travel along Brunker Road for the residential precinct. These services provide access to the Bankstown town centre and railway station.

2.3.5 Construction Traffic Impacts

Construction Traffic Management Plans will be prepared for each stage of construction activity on the proposed development site.

Such plans will need to consider traffic generation, site access arrangements and implications on the operation and safety of the surrounding road network.

3 Overview of Proposed Residential Precinct Development

3.1 *Overview of Project Application Development Proposal*

With regard to traffic and transport the proposed residential development of the site will include the following key features:

- Residential Dwellings
 - Detached Housing Lots 165 dwellings
 - Duplex Housing Lots 43 dwellings
 - Attached Housing Lots (eg. townhouses) 31 dwellings
 - Medium Density Apartments up to 211 dwellings
 - Total Dwellings up to 450 dwellings
- Site Access (Vehicle)
 - Cooper Road (north) 1 lane roundabout
 - Cooper Road (south) Priority Controlled T-intersection
 - Brunker Road Partial Seagull intersection (right turns out of the site banned)
- Pedestrian / Cycle Facilities
 - Pedestrian paths to be provided on internal site roads including site access roads to Cooper Road and Brunker Road;
 - Additional pedestrian only links to be provided from the site to Cooper Road;
 - Facilitation of pedestrian access from the employment precinct to Birrong Station via residential precinct and Cooper Road;
 - Provision of pedestrian path along the eastern side of Cooper Road between Brunker Road and the freight railway line;
 - Provision of a combined pedestrian / cycle path along the northern side of Brunker Road (ie. along the site's road frontage); and
 - Internal road network traffic calming and pedestrian facilities to enhance pedestrian amenity.

The proposed residential lot layout, internal road network and site access locations are shown in Figure 3. It is noted that detailed design of the potential medium density apartments will be the subject of separate project applications.

The proposed residential dwelling yields and the locations of the site's vehicle and pedestrian access arrangements are consistent with the approved Concept Plan.

Through consultation with Council, the treatments of the site access intersections has been reviewed and modified from the Concept Plan.

3.2 *Authority Consultation and Key Issue Identification*

3.2.1 *Consultations*

As part of the Project Application traffic and transport assessment for the residential precinct, consultation was undertaken with the following authorities / stakeholders:

- Bankstown City Council (Council);
- NSW Roads and Traffic Authority (RTA); and
- Birrong High Schools.

In addition the consultations undertaken with the Ministry of Transport (MoT) and local bus operators during the Concept Application stage were reviewed with regard to the proposed residential development as represented by the Project Application.

A summary of the key traffic and transport issues identified through the consultation process is provided in Section 3.2.2.

3.2.2 *Key Traffic and Transport Issues*

The following is a summary of the key traffic and transport issues identified through the consultation stages of the Project Application for the residential precinct.

i. Consistency with Concept Plan Approval

The RTA noted that formal comments would be provided through the SEPP Infrastructure referral process following submission of the Project Application.

POTTS HILL RESERVOIR RESIDENTIAL (WESTERN) PRECINCT



APARTMENTS (211)

Figure 3

Notwithstanding the RTA commented that detailed consideration of the project was undertaken as part of the Concept Plan approval. As such provided that the Project Application was generally consistent with the Concept Plan, the RTA's comments and approval of the Concept Plan remain valid for the Project Application for the residential precinct.

ii. Site Access Intersection Treatments

Council requested that the type of intersection treatments for the proposed site access roads be reviewed, in particular the proposed roundabout treatments at Brunker Road and the Cooper Road (south) intersections.

It was suggested that alternate intersection treatments may provide similar operational performance but better accommodate geometric design issues and pedestrian / vehicle safety.

iii. Implications of Site Generated Traffic on Cooper Road Amenity and Safety

In particular the interaction and potential conflicts between existing traffic flows along Cooper Road, future site generated flows and the pedestrians generated by the Birrong Boys and Girls High Schools was identified as a key issue for consideration.

iv. Pedestrian and Cycle Linkages and Facilities

Providing improved pedestrian and cycle linkages and facilities in and around the residential precinct was seen as a good measure for encouraging the use of public transport services and facilitating good, safe access around the site.

v. Internal Site Road Layout and Traffic Calming

The implementation of local traffic calming within the residential precinct identified as a necessary measure to address:

- potential rat running through the residential precinct;
- control vehicle speeds along straight sections of the proposed internal road network; and
- promote a pedestrian friendly environment.

vi. Traffic Impact on Amy Street / Auburn Road

It is acknowledged that residential development will increase traffic volumes on the surrounding local road network. Amy Street and Auburn Road through Regents Park to the north of the site were identified to currently experience road capacity constraints. The traffic assessment has considered the extent of potential site generated traffic flows likely to use these roads and its impact on local road operational performance.

vii. Brunker Road / Cooper Road Intersection Safety and Operation

Both Council and the RTA have commented that there are no current plans to upgrade the existing roundabout at Brunker Road / Copper Road intersection to traffic signals as a result of the redevelopment of the SWC site or other developments. It is considered that the existing roundabout intersection generally provides adequate operation performance.

However, it was requested that the safety implications of the additional site generated traffic and changed network conditions at the proposed site access intersections on the Brunker Road / Cooper Road intersection be considered.

Each of the above key issues has been considered as part of the traffic and transport assessment of for the Project Application. The findings of the assessment are presented in Section 4 of this report.

4 Assessment of Proposed Development

4.1 *Traffic Generation and Distribution*

4.1.1 *Traffic Generation of Proposed Residential Development*

As per the Concept Plan traffic assessment, RTA guidelines¹ have been used to estimate the traffic generation potential of the residential uses in the western precinct.

The estimated traffic generation is summarised in Table 4-1.

Table 4-1 Estimated Residential Traffic Generation (450 Dwelling Yield)

Dwelling Type	Yield	Peak Hour Traffic Generation Rate (vehicles / hr)	Peak Hour Traffic Generation (vehicles / hr)
Detached	165 houses	0.85 trips / dwelling	140
Attached / Duplex	74 dwellings	0.65 trips / dwelling	48
Apartments (up to)	211 dwellings	0.5 trips / dwelling	105
Total (up to)	450		293

The estimated traffic generation of the proposed residential precinct of 293 vehicles per peak hour is significantly less than the traffic generation potential of the residential precinct used in the Concept Plan traffic assessment and intersection analysis (ie. 432 vehicles / hour).

4.1.2 *Distribution of Proposed Residential Development*

The distribution of site generated traffic has been reviewed since the Concept Plan traffic assessment to take into account a number of factors:

- Modified site access intersection treatments, particularly the proposed banned movement of the right turn exits from the site to Brunker Road (see Section 4.3);
- Updated Journey to Work Data (ABS);
- Observed travel time on key routes around the site.

¹ RTA Guide To Traffic Generating Developments (2002)

A summary of the Journey to Work data is provided in Figure 4. The data shows that the dominant destinations for the Potts Hill area are to the south and east.

The Journey to Work distribution and observed travel times have been applied to the key routes surrounding the proposed residential development as shown in Figure 4 to provide an estimated distribution of site generated traffic flows.

The traffic distribution shown in Figure 4 has been applied to the estimated traffic generation for the Potts Hill site.

These distributions are relatively consistent with the assumptions used in the Concept Plan traffic analysis. However it is noted that a higher proportion of site generated residential traffic (not necessarily total traffic) is estimated to travel north via Auburn Road / Amy Street than was considered in the Concept Plan traffic report. This issue is discussed further in Section 4.2.3.

4.2 Road Network Operation

4.2.1 Regional Road Network Intersection Operation

As described above, the estimated traffic generation of the residential precinct at Potts Hill as represented in this Project Application, is significantly less than was assessed for the residential precinct as part of the Project Application.

Given that the distribution of traffic to and from the site remains relatively consistent it is considered that the conclusions regarding the operation of the regional road network as presented in the Concept Plan traffic report remain valid. These conclusions included the retention of the existing roundabout at Brunner Road / Cooper Road intersection and consideration of Cooper Road local amenity.

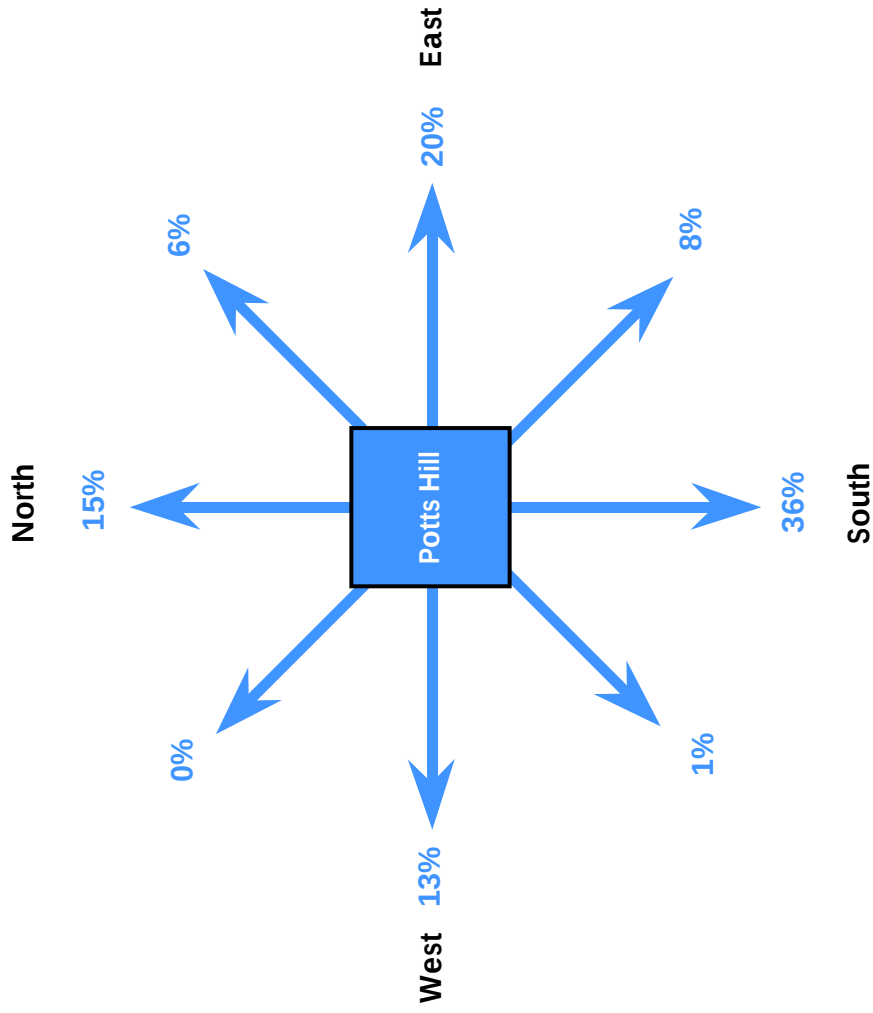
4.2.2 Cooper Road

i. Local Road Amenity

Supplementary traffic and pedestrian surveys were undertaken as part of this assessment to determine existing pedestrian activity associated with the adjacent High Schools and

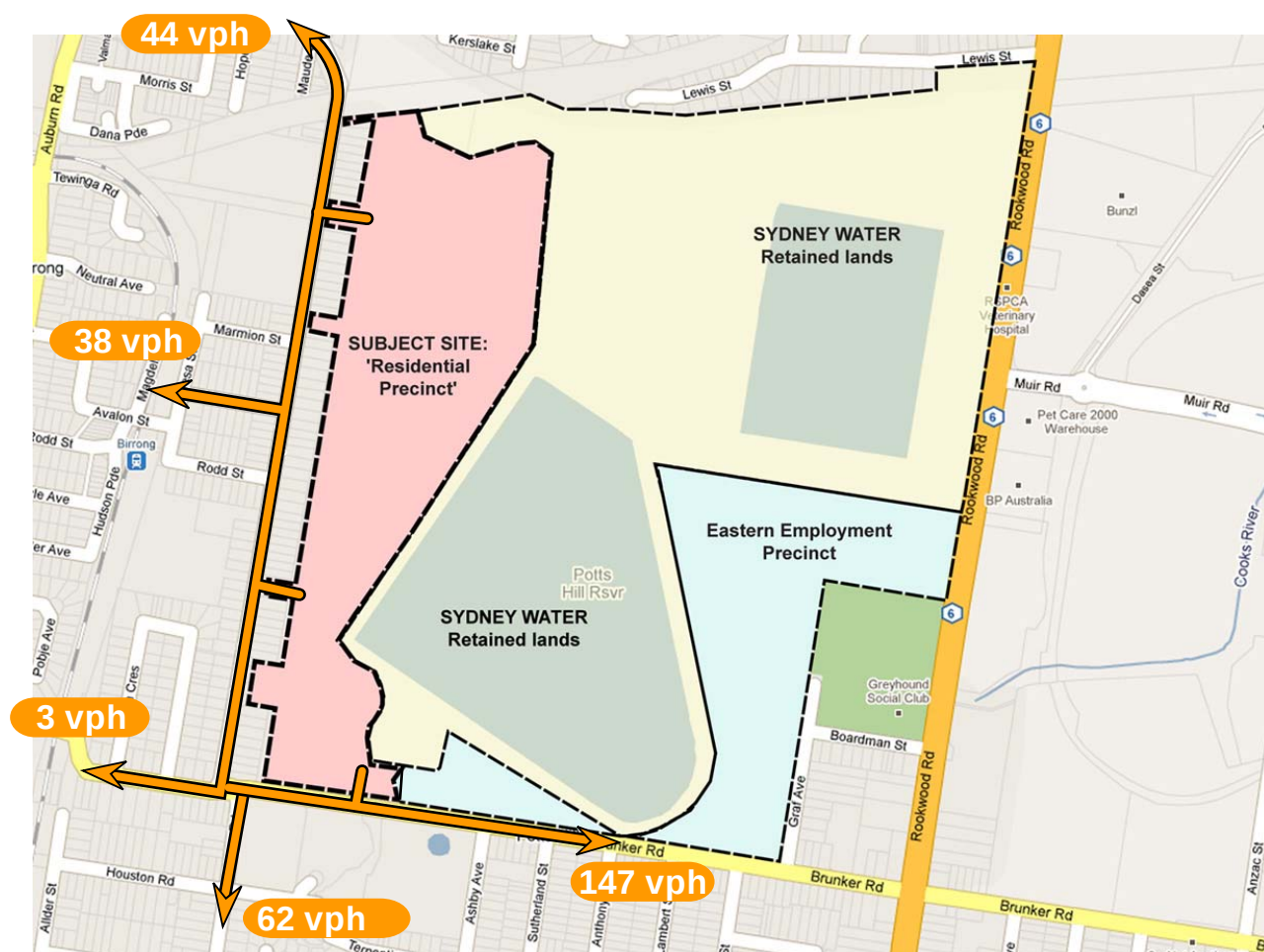
SUMMARY OF JOURNEY TO WORK (ABS) DISTRIBUTION DATA

POTTS HILL RESERVOIR RESIDENTIAL (WESTERN) PRECINCT



ESTIMATED SITE GENERATED PEAK HOUR TRAFFIC FLOW

POTTS HILL RESERVOIR RESIDENTIAL (WESTERN) PRECINCT



potential local amenity implications of additional traffic flows along Cooper Road associated with the proposed residential development.

Traffic and pedestrian counts at the following locations:

- traffic counts:
 - Cooper Road-Marmion Street intersection flows;
 - Cooper Road-Rodd Street intersection flows;
 - Cooper Road mid block flows between Marmion Street and Holland Street;
 - Teresa Street mid block flows between Avalon Street and Holland Street;
- pedestrian counts:
 - Cooper Road pedestrian crossings adjacent to Birrong Boys and Girls High Schools;
 - Cooper Road mid block flows between Marmion Street and Holland Street;
 - Cooper Road-Marmion Street; and
 - Cooper Road-Rodd Street.

The surveys were conducted on Thursday 10 September 2009 from 2:00pm and 5:00pm. Traffic and pedestrian activities generally peaked in hour between 2:15pm to 3:15pm. This coincides with schools' finishing time.

The peak hour traffic and pedestrian flows from the surveys are summarised in Appendix B.

From the survey results and on-site observations, it appears that the volume of pedestrians crossing Copper Road is low. Any pedestrian crossing Copper Road, the vast majority of these occurred at the pedestrian crossing outside the girls' school. A total of 153 pedestrians were observed to cross at this location during the peak hour. The majority of these were students from the school crossing Copper Street to get on waiting cars on the eastern side of Copper Road.

At other surveyed locations, including the pedestrian crossing adjacent to the boys' school, pedestrians crossing Copper Road and other nearby streets was negligible. A

total of six pedestrians were observed crossing Copper Street at the pedestrian crossing outside the Boys' School.

Pedestrian movement demands in the area are predominately generated by the two nearby high schools, that is, to and from Birrong Railway Station located on Avalon Street.

The primary pedestrian desire line from the Boys' school is from the school gate at the corner of Rodd Street and Teresa Street, to the station along the western side of Teresa Street and southern side of Avalon Street.

Similarly from the Girls' School, students generally walk along the western side of Teresa Street and cross Avalon Street using the existing pedestrian crossing adjacent to the station.

There is also some moderate pedestrian demand at the intersection of Copper Street with Marmion Street. The majority of these walk around the corner from Copper Road (north) to Marmion Street (west).

In relation to peak hour traffic flows, Copper Street was recorded carrying approximately 490 vehicles per hour north of Marmion Street, while south of Rodd Street it was approximately 560 vehicles per hour. The other streets had peak hour flows less than 200 vehicles per hour.

Intersection analysis was undertaken at the two Copper Street intersections with Rodd Street and Marmion Street using the surveyed peak hour flows. The results indicate that both intersections operate satisfactorily at level of service A with minimal delays. The worst movements at either intersection are expected to experience average delay in the order of 11 seconds or less. This is consistent with site observations.

With regard to the proposed residential development it is considered that Cooper Road will continue to operate as local collector street within the local road network.

The interaction of school related traffic and pedestrian flows with existing and future traffic flows along Cooper Road is and will continue to be a key issue in the provision and management of a safe road environment for all users.

In this regard, Landcom are working closely with the schools to develop a Travel Plan for the schools which will include issues such as provision of drop off / pick up areas, bus stop locations and pedestrian facilities and management.

ii. Brunker Road / Cooper Road Intersection Safety

The recorded accident statistics for the Brunker Road / Cooper Road intersection were reviewed with regard to potential safety issues associated with the proposed residential development.

A summary of the results are:

- A total of 14 crashes were recorded at the intersection in just over 5 years (Jan 2003 – May 2008 inclusive);
- There were 10 tow away crashes and 4 injury accidents;
- There were 5 rear end crashes (4 of which were on Brunker Street (E)) – 2 of the 5 were injury crashes;
- There were 5 collisions with parked cars (the descriptions are limited so it is difficult to locate two of these but they seem to be on the roundabout – more likely on the immediate approach to / exit from the roundabout); and
- There were 4 circulatory crashes on the roundabout (3 involving vehicles from the west crashing with southbound traffic from Cooper Street).

It is considered that that speed / loss of control is a major factor at this intersection. Rear end crashes typically caused by people being too close to the car in front and travelling too fast and being unable to brake if the preceding car stops. Crashing into parked cars is a loss of control issue and this often occurs if vehicles are going too fast.

As the existing roundabout is a traffic calming feature, it probably helps slow vehicles down more than traffic signals would in this location.

The proposed site access arrangements to the residential precinct along both Brunner Road and Cooper Road would not adversely impact on the geometric or behavioural aspects of the approach to the Brunner Road / Cooper Road roundabout.

The effective narrowing of the westbound through lanes on Brunner Road to accommodate the right turn bay into the site access road is likely to have a beneficial impact on vehicle speeds approaching the Brunner Road / Cooper Road roundabout.

Based on this review it is considered that intersection improvements to provide additional capacity (ie. traffic signals) or address existing geometric deficiencies are not warranted at the Brunner Road / Cooper Road intersection as speed is considered to be the critical factor in recorded accidents.

4.2.3 Auburn Road / Amy Street Traffic Flows

Supplement traffic surveys were undertaken along Amy Street, Auburn consider the potential implications to the Auburn Road / Amy Street route by the proposed residential development.

The traffic surveys were undertaken during peak AM and PM periods at the following intersections:

- Amy Street / Bridge Street; and
- Amy Street / Kingsland Road.

The operation of both these intersections was modelled using SIDRA. Both roundabouts were found to operate well at present with a Level of Service A.

Based on the estimated generation and distribution of proposed development related traffic, it is estimated that in the order of 40 -45 vehicles per peak hour would potentially use the Auburn Road / Amy Street route.

It is noted that the existing Sydney Water development at Potts Hill has a primary vehicle access at the northern end of Cooper Road which generates some 40 vehicles in the peak hour. While not all these access Amy Street there is a proportion that do including heavy vehicles.

The traffic counts recently undertaken on Amy Street show that in the AM and PM peak hour, the two way flow is around 1100 vehicles per hour.

The percentage increase in traffic as result of the Potts Hill development would therefore be less than 4%. This would have an insignificant effect on the existing operation of the roundabouts on Amy Street and the general operation of the Auburn Road / Amy Street route.

4.3 Site Access Arrangements

As part of the Project Application traffic assessment, consultation with Council (as the Road Authority) was undertaken with regard to the intersection treatments at the proposed site accesses.

Council identified potential issues with the installation of roundabout treatments as proposed in Concept Plan. This prompted a review of the proposed access arrangements and the development (in consultation with Council) of alternative site access treatments. These are described below.

4.3.1 Brunker Road Site Access

Council identified several potential issues associate with the proposed roundabout, namely:

- Encourage rat-running through the residential development;
- Proximity to Brunker Road / Cooper Road roundabout; and
- Reduced eastbound capacity along Brunker Road with single lane roundabout.

An analysis of potential intersection operation for different intersection treatments was undertaken using SIDRA.

The alternatives considered were:

- A simple left in / left out access
- The left in / left out access with a facility to allow right turners into the site.
- Dual lane roundabout access

Each of these alternatives was analysed and the results are presented in Table 4-2.

Table 4-2 Brunker Rd Access Intersection Treatment Alternatives

Access Options	AM Peak		PM Peak	
	Level of Service	Ave. Vehicle Delay (sec/veh)	Level of Service	Ave. Vehicle Delay (sec/veh)
Left-in/Left Out (LILO)	C	33	A	11
LILO + Right Turn In	C	33	A	12
Dual Lane Roundabout	B	22	A	14

The SIDRA analysis indicates that each of the alternative treatments would provide satisfactory operation during both AM and PM peak periods.

Geometrically the implementation of a dual lane roundabout would be difficult to achieve and would not address Council's issue of proximity to the Brunker Road / Cooper Road roundabout.

Furthermore, the implementation of a restricted left in / left out arrangement would deny access from Brunker Road for a significant proportion of the site's generated traffic which accesses the site from the east and north east. This would increase traffic flows along Cooper Road and through the Brunker Road / Cooper Road intersection than would be the case with right turn movements permitted into the site at Brunker.

Therefore the preferred alternative treatment was the provision of priority controlled intersection with a right turn facility in Brunker Road and left out only restriction on the site exit.

The concept layout of the proposed access treatment is shown in Figure 6.

The length of the right turn bay has been designed to accommodate anticipated demand for the turning movement and to provide spare capacity such as to minimise potential impacts on through vehicle movements.