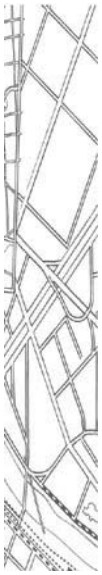

Rezoning Traffic and Transport Report

Illawarra Regional Business Park
Albion Park

23 April 2007

Prepared for

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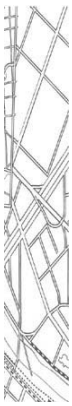

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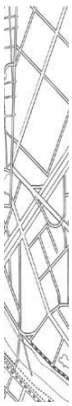
Jason Rudd



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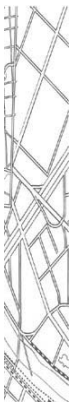


1. Introduction

This report has been prepared on behalf of Delmo Albion Park Pty Ltd to assess the likely traffic and transport implications associated with a proposed rezoning of rural land for business park purposes in Albion Park.

The subject site is situated adjacent to the Albion Park Airport (also known as the Illawarra Regional Airport) with frontages to Tongarra Road and the Illawarra Highway.

The location of the site relative to the regional transport network is shown in Figure 1. Figure 2 shows the site location relative to the surrounding local road network.

This traffic and transport assessment of the proposed rezoning has been undertaken through a process of data collection and analysis and consultation with relevant authorities as set out in the Director General's requirements.

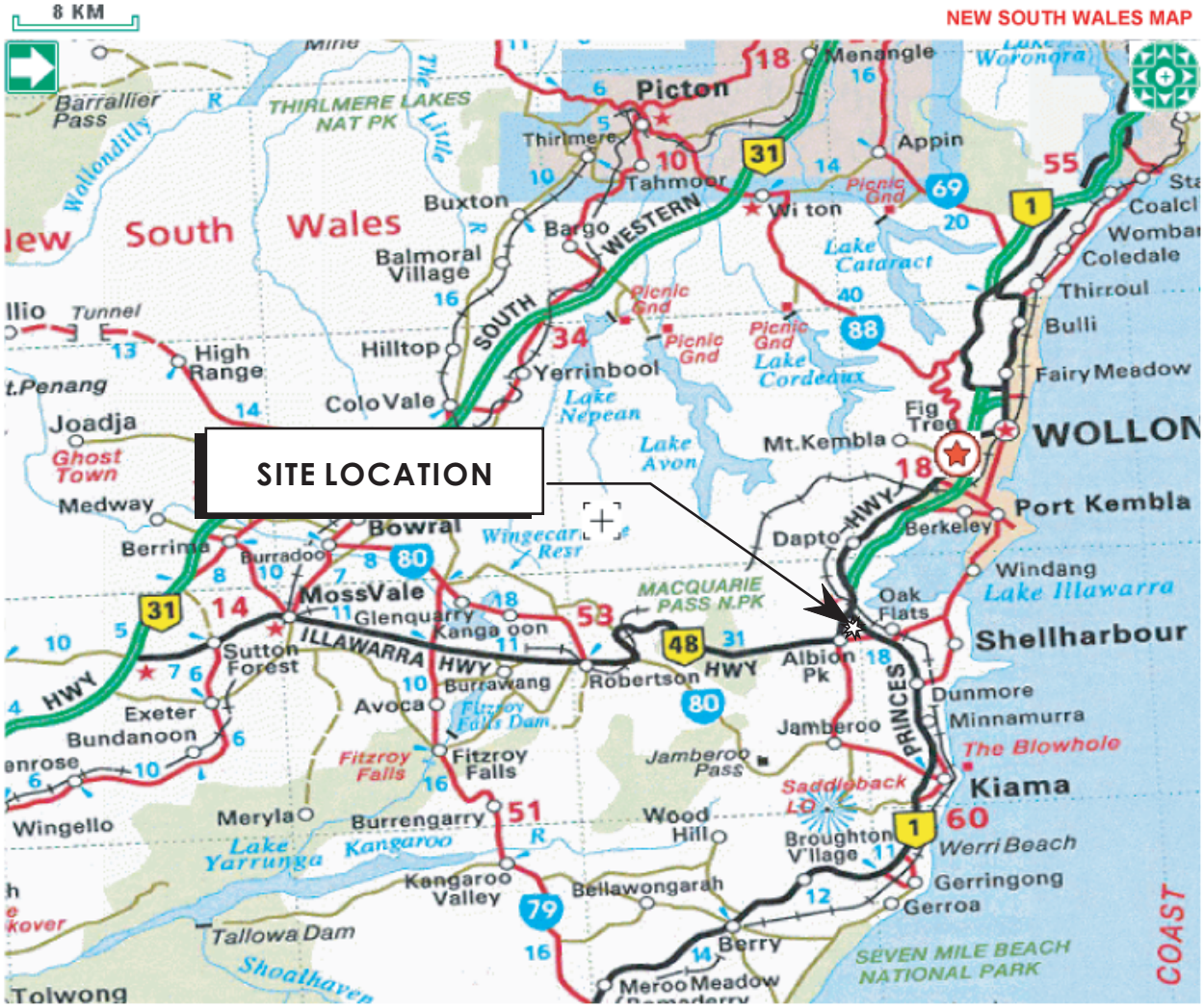
The remainder of this report can be summarised as follows:

- Chapter 2: describes the existing traffic and transport situation surrounding the proposed rezoning site;
- Chapter 3: provides an overview of the proposed rezoning concept development including traffic generation and site access arrangements;
- Chapter 4: considers the proposed rezoning concept development within the strategic context of regional planning and transport infrastructure;
- Chapter 5: provides an assessment of the traffic and transport implications of the proposed rezoning concept; and
- Chapter 6: summarises the findings of the report.

SITE LOCALITY

ILLAWARRA REGIONAL BUSINESS PARK

North



Source: street-directory.com.au

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Figure 1

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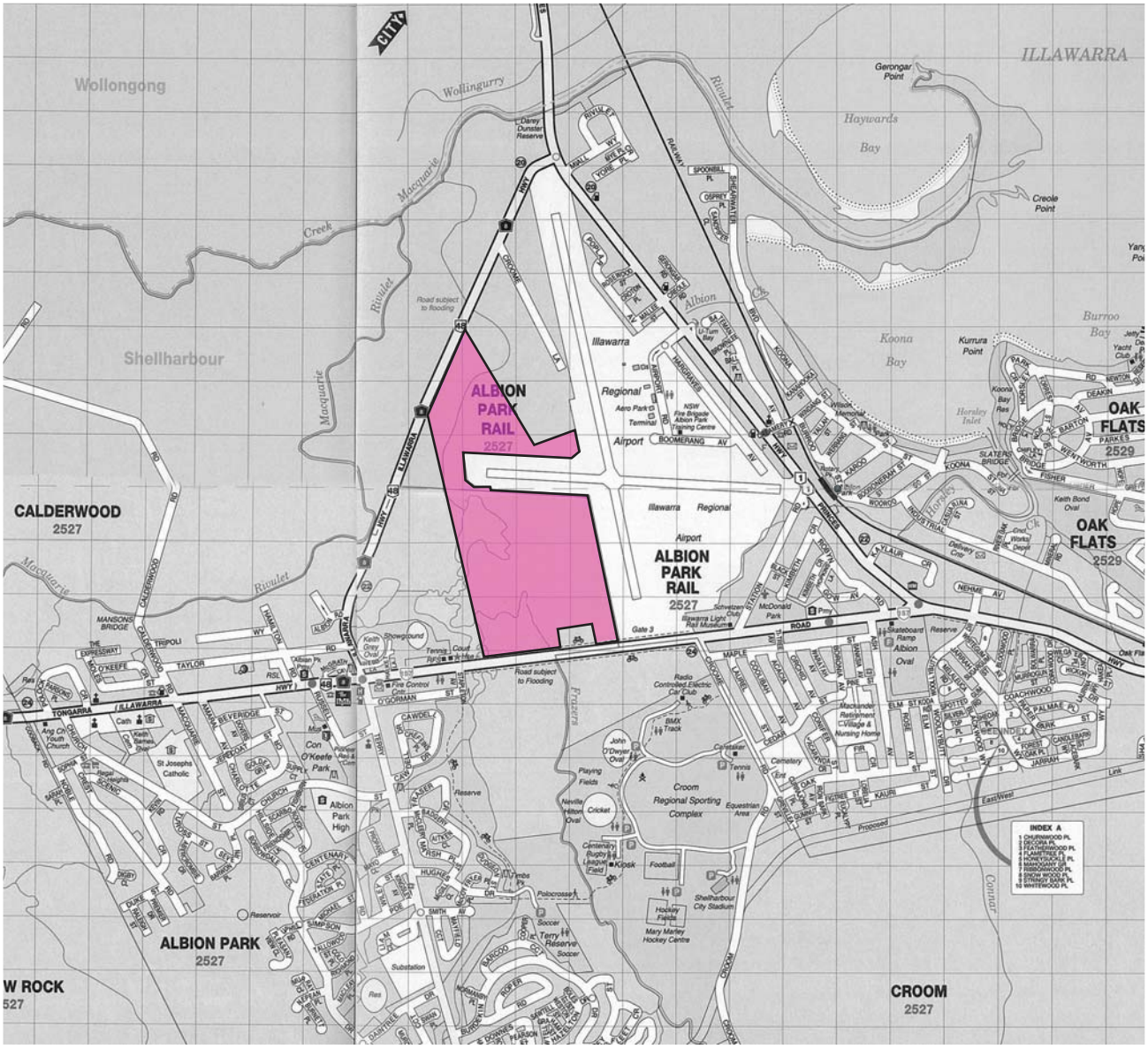
Date: 26 February 2007

SITE LOCATION

ILLAWARRA REGIONAL BUSINESS PARK

North



Key

Proposed Rezoning Site

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Figure 2

Filename: 063273di02.ai

Date: 20 April 2007

2. Existing Conditions

2.1 Locality

The site is located at 78 Tongarra Road Albion Park with property frontages to Tongarra Road and the Illawarra Hwy.

The subject site, which comprises approximately 74 hectares, is located adjacent to the Illawarra Regional Airport and is generally bounded by Tongarra Road, the Princes Highway and the Illawarra Highway. As such the subject site is located within close proximity to the regional road network.

The subject site is surrounded by a number land uses, namely:

- Residential – to the south (Albion Park)
- Employment / industrial – to the east (Oaks Flat / Albion Park Rail)
- Rural – to the west

The subject site has been identified in the Illawarra Regional Strategy as a zone of potential employment lands.

A road reserve exists over the western portion of the site and runs between the existing Illawarra Highway and Tongarra Road. The purpose of the road reserve is to facilitate the future upgrading of the Illawarra Highway.

2.2 Road Network

The key roads in the vicinity of the site are described below.

Princes Highway

The Princes Highway is the principle north south arterial route along the coast. The Princes Highway provides regional links to the major centres of Wollongong and further north to Sydney (via Southern Freeway) and to Shellharbour the south.

Between the Illawarra Highway and Tongarra Road, the Princes Highway provides four travel lanes (two lanes in each direction) which are generally separated by a central

road median. Intersections which permit crossings of the median are traffic signal or roundabout controlled.

The Princes Highway / Illawarra Highway intersection is currently controlled by a two lane roundabout. The roundabout includes a slip lane for southbound traffic along the Princes Highway. Thus southbound traffic does not enter the roundabout circulating flows.

Illawarra Highway

The Illawarra Highway provides an east west arterial road link between the Princes Highway at Albion Park and the Hume Highway.

Between the Princes Highway and Tongarra Road, the Illawarra Highway is of a rural road design with one travel lane in each direction, varying road shoulder widths and limited access road intersections. The road pavement widens on approach to the intersections at the Princes Highway and Tongarra Road to provide a two lanes in each direction.

Tongarra Road

Tongarra Road is the eastern extension of the Illawarra Highway from Albion Park through to the Princes Highway.

Between the Illawarra Highway and Croome Road (ie. along the subject site's frontage), Tongarra Road is of a rural road design with a single travel lane in each direction and varying road shoulder widths. Between Croome Road and the Princes Highway, Tongarra Road is designed as a local collector road and facilitates access to adjacent residential areas.

The following intersection treatments currently exist along Tongarra Road:

- At the Princes Highway: Signalised 3 way intersection
- At Illawarra Highway / Terry Street: Signalised 4 way intersection
- At Station Road : Priority controlled 3 way intersection (give way signage)

Station Road

Station Road provides a local collector road link along the eastern side of the Illawarra Regional Airport between Tongarra Road and the Princes Highway. Station Road provides a more direct route for vehicles travelling southbound along the Princes Highway to Tongarra Road (and vice versa).

The intersection of Station Road with the Princes Highway has recently been upgraded with traffic signals. This includes signalisation of access to Albion Park Rail railway station.

2.3 Existing Traffic Flows

In order to develop an understanding of the existing traffic flows on the surrounding road network, traffic flow data from a number of sources of information was obtained.

These sources include:

- RTA permanent count station data;
- Survey of daily flows on key roads; and
- Surveys of turning movements at key intersections.

The results of these surveys are presented below.

2.3.1 RTA Historical Traffic Volume Data

Historical daily traffic flows on roads surrounding the proposed Illawarra Regional Business Park site have been sourced from the published RTA *Traffic Volume Data* (2003). In addition the RTA has provided more recent count data from their permanent count station on the Princes Highway (07.035V).

The historical traffic flow data is summarised in **Table 2.1**.

The historical traffic flow data indicates that the Princes Highway is the main road within the vicinity of the site, carrying approximately three time the volume of traffic along the Illawarra Highway.

With regard to traffic growth, **Table 2.1** indicates that for the available data:

- Princes Highway - the rate of traffic growth is decreasing.
- Illawarra Highway – traffic growth at the eastern end (at the Princes Highway) is negligible (2000-2003).
- Tongarra Road - both the eastern and western ends have experienced traffic flow decreases between 2000 and 2003.

Table 2.1 – RTA Historical Traffic Volume Data [1.]

Road	Location	Station No.	AADT				
			1994	1997	2000	2003	2005 [2.]
Princes Highway	South of Tongarra Road	07.040	42204	37472	40689	31749	-
Princes Highway	North of Tongarra Rd	07.039	32806	28679	30152	27835	-
Princes Highway	South of Tongarra Road	07.040	42204	37472	40689	31749	-
Princes Highway	South of Illawarra Highway	07.037	33644	34575	37869	41413	-
Princes Highway	North of Illawarra Highway	07.035 V	37781	40752	44635	48648	48850
Illawarra Highway	West of Princes Highway	07.038	11514	11471	13355	13733	-
Illawarra Highway (Tongarra Road)	West of Terry Street	07.293	12124	12329	14124	12061	-
Tongarra Road	East of Illawarra Highway	07.297	11678	13800	15421	11562	-
Tongarra Road	West of Princes Highway	07.298	14614	14937	15368	9472	-

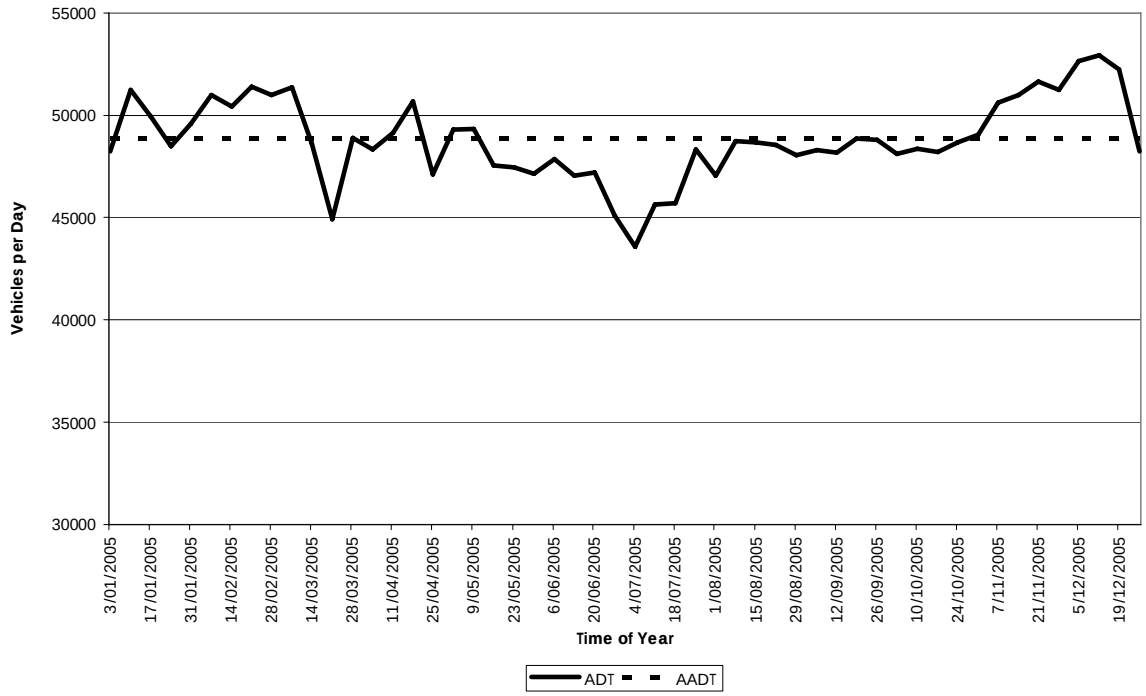
Source: *1. RTA Traffic Volume Data, Southern Region (2003)*

2. RTA, Permanent Count Station Data 07.035V (2005) unpublished data provided by RTA Southern Region Office

Based on discussions with the RTA and our own experience it is known that daily traffic flows along the Princes Highway, and to a lesser degree other roads in the vicinity of the proposed Illawarra Regional Business Park site, experiences a high degree of seasonal variation. This is due in part to recreational trips associated with warmer weather conditions and school / public holidays.

This seasonal variation is shown in Figure 3 which summarises the average daily traffic flows along the Princes Highway throughout the year (2005).

Figure 3 – Princes Highway (North of Illawarra Hwy) Daily Traffic Flows - 2005



Source: RTA (2005) Traffic Volume Data for count station 07.035V
Notes: AADT = Average Annual Daily Traffic Flow
ADT = Average Daily Traffic Flow for each week of the year

Figure 3 clearly indicates higher daily traffic flows along the Princes Highway during summer with December being the month with the highest daily flows.

2.3.2 Surveyed Traffic Flows (2006)

As indicated above, the month of December is considered to be the month with the highest traffic flows along the Princes Highway.

In order undertake an assessment of the implications of the proposed development on the peak traffic conditions, traffic surveys were undertaken on the surrounding road network in December 2006.

The traffic surveys undertaken included:

- Automatic counts (two way volumes):
    - Tongarra Road, at Frazers Creek – 13-20/12/06.
- AM / PM Peak Period Intersection Counts
    - Princes Highway / Illawarra Highway
    - Princes Highway / Station Road
    - Princes Highway / Tongarra Road
    - Tongarra Road / Illawarra Highway / Terry Street

The results of the traffic surveys are discussed below.

Tongarra Road

As specified in the Director General's requirements for this project, an analysis of the implications of the proposed site access on Tongarra Road is required as part of the traffic impact assessment.

The two way traffic flow survey of Tongarra Road was undertaken to assist in this assessment. The detailed survey results are provided in Appendix A.

The surveyed daily traffic flows along Tongarra Road were found to be:

- Average daily traffic flow: 11,273 vehicles per day
- Average weekday daily traffic flow: 11,659 vehicles per day
- Average weekend day traffic flow: 10,273 vehicles per day

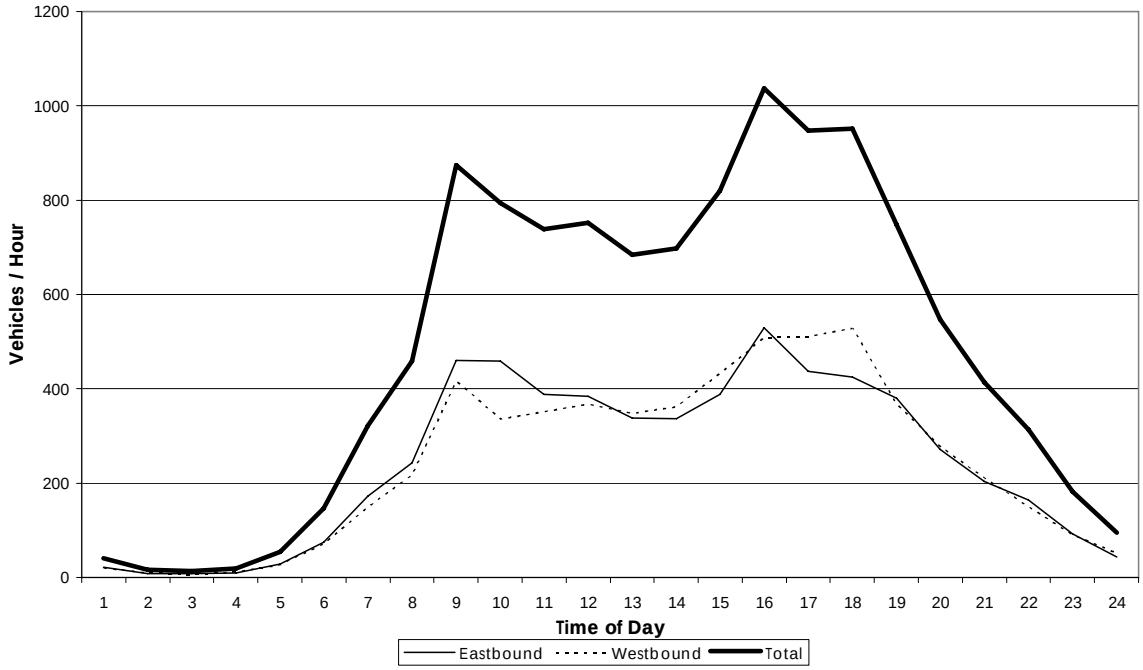
These survey results indicate that daily traffic flows along Tongarra Road (at Frazers Creek) have remained relatively constant between 2003 and 2006.

The surveyed hourly variations in weekday traffic flow along Tongarra Road are summarised in Figure 4.

Figure 4 indicates that Tongarra Road:

- Experiences peak AM (8-9am) and PM (4-5pm) traffic flows;
- AM peak experiences a slight eastbound bias while the PM experiences a slight westbound bias;
- AM peak flows = 875 vehicles per hour (two way); and
- PM Peak flows = 1036 vehicles per hour (two way).

Figure 4 – Tongarra Road (Between Illawarra Hwy and Station Rd) Average Weekday Hourly Traffic Flow (December 2006)



Source: MWT Traffic Count (RTA (2005) Traffic Volume Data for count station 07.035V

Peak Period Intersection Surveys

In order to assess the implications of the proposed development on the operation of the surrounding road network, peak AM and PM traffic surveys were undertaken at key intersections along the Princes Highway, Illawarra Highway and Tongarra Road.

The surveyed intersections reflect the access routes to and from the proposed development site and thus the represent the intersection most likely to be impacted by proposed development traffic generation.

The surveys were undertaken on Friday 15th December 2006 between:

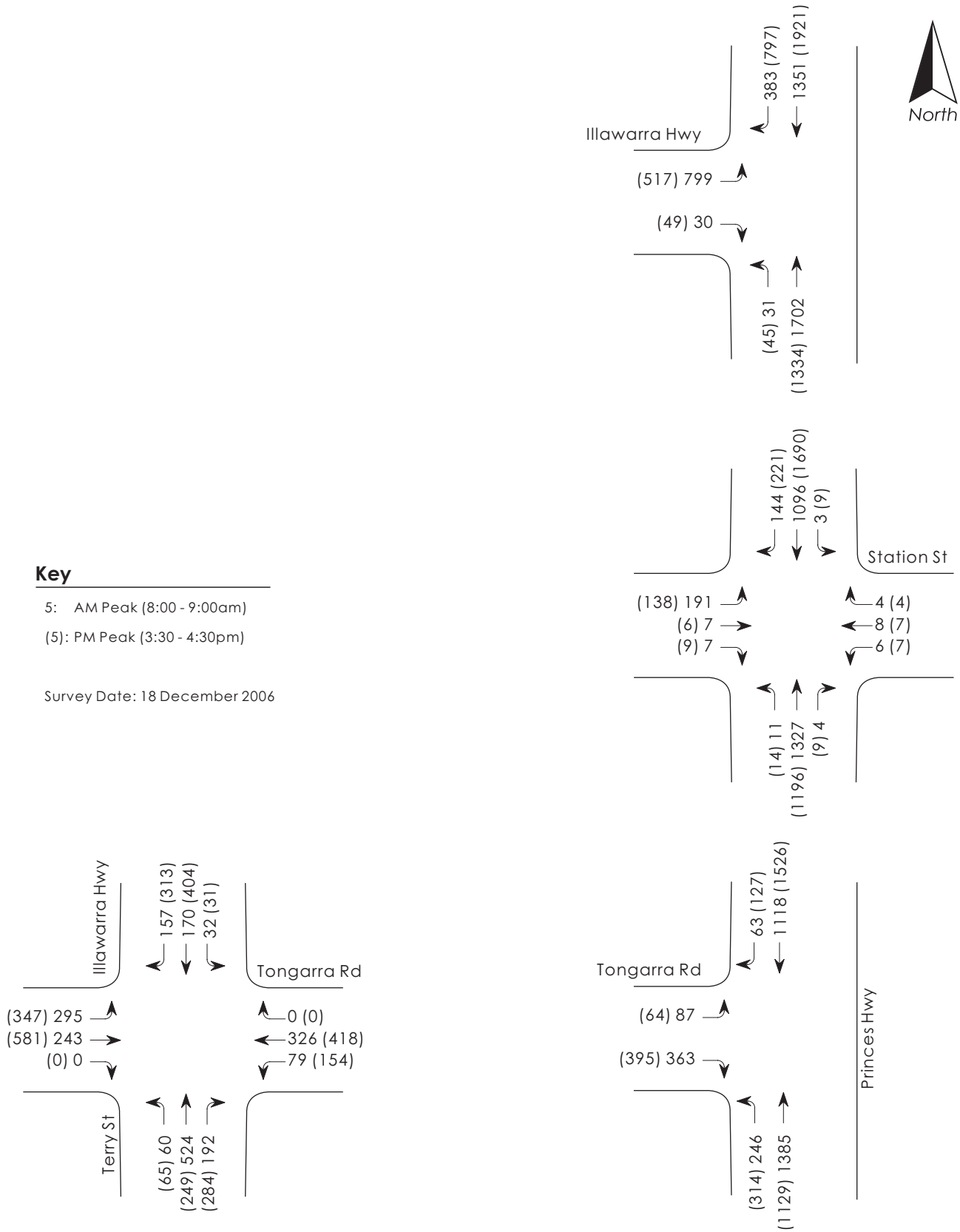
- AM Peak: 7-10am
- PM Peak: 3-6pm

In consultation with the RTA, Friday was determined to be representative of the busiest day of the week as commercial, domestic and recreational trips combine on the same day.

The results of the intersection surveys are summarised in Figure 5.

SURVEYED PEAK HOUR TRAFFIC FLOWS

ILLAWARRA REGIONAL BUSINESS PARK



Key

5: AM Peak (8:00 - 9:00am)

(5): PM Peak (3:30 - 4:30pm)

Survey Date: 18 December 2006

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Figure 5

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Date: 26 February 2007

The survey results indicate:

- Northbound bias of traffic flow along the Princes Highway and Illawarra Highway during the AM peak period (reverse for the PM peak);
- Eastbound bias of traffic flow along Tongarra Road during the AM peak period (reverse for the PM peak);
- Station Road is utilised by the majority of traffic travelling to and from the north when travelling between Tongarra Road and the Princes Highway;
- Tongarra Road (east of Station Road) is utilised by the majority of traffic travelling to and from the south when travelling between Tongarra Road and the Princes Highway;
- The Illawarra Highway is the primary route used by traffic from Albion Park traffic travelling north to the Princes Highway (and vice versa); and
- There are currently unbalanced traffic flows at the Princes Highway / Illawarra Highway roundabout (see Section 2.4).

2.4 Intersection Operation

Intersections are the critical points which control the capacity of the road network. This is due to the need for conflicting traffic movements to share the same road space at these locations.

The existing operation of the key intersections in the vicinity of the proposed development site have been analysed using the aaSidra intersection analysis program as specified by the Director General's requirements.

aaSidra determines the average delay that vehicles encounter, the degree of saturation of the intersection, and the level of service. The degree of saturation is the ratio of the arrival rate of vehicles to the capacity of the approach.

aaSidra provides analysis of the operating conditions which can be compared to the performance criteria set out in **Table 2.2.**

The Director General's requirements identified the need to analysis the proposed site access intersection on Tongarra Road. Following discussions with the RTA and comments by authorities at the Planning Focus Meeting (PFM) the analysis has been extended to key surrounding intersections in order to provide an assessment of the proposed development on the operation of the surrounding road network.

The surveyed traffic flows (see Section 2.3.2) at key intersections have been analysed using aaSIDRA to determine existing intersection operating conditions during peak periods.

The results of the analysis are presented in Table 2.3.

Table 2.2 – Level of Service Criteria

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

Adapted from RTA Guide to Traffic Generating Developments, 2002.

Table 2.3 – Intersection Operating Conditions

		Average Vehicle Delay (sec/veh)		Level of Service	
Intersection	**Control**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Princes Hwy / Illawarra Hwy	Roundabout	131.4	16.2	**F**	B
Princes Hwy / Station Rd	Signals	24.2	25.6	B	B
Princes Hwy / Tongarra Rd	Signals	23.1	23.5	B	B
Illawarra Hwy / Tonagrra Rd / Terry St	Signals	24.9	28.1	B	B

Avg Delay is over all movements at signals, and for the worst movement at priority and roundabouts

From Table 2.3 it can be seen that with the exception of the Princes Highway / Illawarra Highway intersection, each of the analysed intersections currently operate with satisfactory average vehicle delays and good levels of service.

The aaSIDRA analysis indicated that the roundabout controlled Princes Highway / Illawarra Highway intersection currently experiences poor operating conditions in the AM Peak period. Modelling results indicate that the 95th percentile back of queue along the Illawarra Highway approach to the intersection to be approximately 1300 metres. These results support on site observations and discussions with the RTA.

It is considered that the primary cause of the existing poor AM peak period operating conditions at this intersection is the presence of unbalanced circulating traffic flows. It is understood that the RTA is currently investigating opportunities to resolve the existing operation constraint at the Princes Highway / Illawarra Highway intersection.

2.5 Public Transport Services

2.5.1 Rail Services

Rail services in the vicinity of the site are provided via the South Coast Rail Line. The South Coast Rail Line provides rail services between Bomaderry and Central (Sydney).

The closest railway stations to the proposed development site are located at:

- Albion Park Rail Station: 1.4 km
- Oak Flats Station: 3.3 km

Table 2.4 provides a summary of the rail services stopping at Albion Park Rail station during the AM and PM commuter periods.

Table 2.4 – Train Departure Times – Albion Park Rail Station

AM Commuter Peak		PM Commuter Peak	
Northbound	**Southbound**	**Northbound**	**Southbound**
6:05am	6:20am	3:25pm	3:27pm
6:36am	6:54am	4:12pm	4:29pm
7:11am	7:25am	5:52pm	5:26pm
7:43am	8:13am	6:17pm	5:58pm
8:12am	9:21am	6:56pm	6:39pm
8:46am	10:16am	7:29pm	7:12pm
10:00am			

Based on Cityrail timetable information the length of time for a rail trip between Albion Park Rail station and the following stations is estimated to be:

- Bomaderry (Nowra): 1 hour
- Kiama: 22 minutes
- Wollongong: 25 minutes
- Waterfall: 1 hour 20 minutes
- Central: 2 hours

2.5.2 Bus Services

The site is located within a bus service contract area operated by Premier Illawarra Bus Lines. The extent of their scheduled bus services in the vicinity of the site is shown in Appendix B.

As shown in the bus route maps in Appendix B the following bus routes travel past the site along Tongarra Road.

- Route 51: Albion Park to Wollongong University via Wollongong
- Route 70: Albion Park to Shellharbour via Oak Flats and Barrack Point
- Route 73: Albion Park to Shellharbour via Shell cove and Warilla
- Route 76: Albion Park to Shellharbour

Each of the 70, 73 and 76 routes provide access between the site's frontage to Tongarra Road and the railway stations at Albion Park Rail and Oak Flats.
Route 51 runs a bus service every 2 hours during the day between Albion Park and Wollongong University via Wollongong railway station.

Routes 70, 73 and 76 combined provide a bus service between Albion Park and the railway stations via Tongarra Road approximately every 30 minutes during the AM and

PM peak commuter periods. These services are generally co-ordinated with rail services along the South Coast Rail line at Albion Park Rail and Oak Flats stations.

The journey time between Albion Park Public School and Albion Park Rail railway station via Tongarra Road is approximately 10 minutes.

In summary, the current bus services in the vicinity of the proposed business park site are considered to be of a good level of service. Furthermore with multiple routes running along the site's frontage to Tongarra Road the site is considered to be well positioned with regard to bus services.

2.5.3 Air Services – Illawarra Regional Airport

The proposed business park is situated adjacent to the Illawarra Regional Airport and thus would have good access to air services.

QantasLink provides services between the Illawarra Regional Airport and Melbourne, thus providing an alternative to Kingsford Smith Airport at Mascot for people travelling between Melbourne and the Illawarra region.

2.6 Bicycle and Pedestrian Facilities

2.6.1 Bicycle Facilities

The RTA Illawarra Cycleways map (see Appendix C) designates on road cycle facilities along the Princes Highway, the Illawarra Highway and Tongarra Road in the vicinity of the site.

These on road facilities are generally unmarked and comprise sealed road shoulders or a wide shared parking / cycle lane along the kerb side.

Along Tongarra Road, on bicycle facilities are provided via a sealed road shoulder on both sides of the road. It is understood that Council is recouping the costs for implementation of this facility via their Section 94 plan. Other bicycle facilities are also listed in Council's Section 94 Plan.

2.6.2 Pedestrian Facilities

In the built up urban areas surrounding the site, sealed off road pathways are generally provided for pedestrians. Along the rural stretches of road such as Tongarra Road at the site's frontage, the Illawarra Highway and some sections of the Princes Highway, unsealed pedestrian paths are typically provided on one if not both sides of the road.

3. The Development Proposal

3.1 Overview of Proposed Land Use

It is proposed to rezone some 74 hectares of land at Albion Park for the purpose of constructing a business park use named the Illawarra Regional Business Park.

The rezoning will include the following zones:

- Business Park Zone: 47.4 hectares
- Environmental Zone: 21.5 hectares
- Road Reserve: 5.08 hectares

The concept plan for the proposed Illawarra Regional Business Park is shown in Appendix D.

It is noted that development within significant portions of land in the northern and western areas of the site are constrained by an RTA Road Reserve and environmental zones.

A developable area, excluding roads and riparian buffers, of 36.1 hectares is proposed for business park uses.

Based on economic analysis prepared by SRS Economics and Planning Pty Ltd [1] as part of this rezoning assessment, it is anticipated that the proposed business park land use will yield up to approximately 1,650 full time equivalent employees during operation.

3.2 Site Access Arrangements

While the site has road frontages to the Illawarra Highway and Tongarra Road, site access is restricted to Tongarra Road due to an RTA road reserve which runs along the site's frontage to the Illawarra Highway.

[1] 78 Tongarra Road, Albion Park – Industrial Estate Economic Assessment prepared by SGS Economics and Planning Pty Ltd (March 2007)

Furthermore environmental constraints restrict the ability to develop land along parts of the Illawarra Road frontage not affected by the road reserve.

It is noted that the site does not have, due to property ownership restrictions, the ability to provide access to Croome Lane.

Thus vehicle access between the site and the surrounding road network is restricted to Tongarra Road. As shown on the concept plan (see Appendix D) the proposed site access is located on Tongarra Road.

Discussions with the RTA and Council at the PFM indicated that any vehicle access on Tongarra Road should be located as far east as practical so as to provide the maximum possible separation between a potential future road interchange / intersection between an Illawarra Highway upgrade road within the RTA road reserve and Tongarra Road. It is understood from discussions with the RTA that no plans have yet been finalised or funding provided for such a potential upgrade.

Notwithstanding the uncertainty of a future road within the RTA road reserve, the proposed site access has been located as far east as practical along Tongarra Road in accordance with the RTA's request.

It is proposed that the site access intersection would be signalised and include the following design elements:

- left turn and right turn bays along Tongarra Road approaches; and
- pedestrian crossing facilities on all approaches.

The operation and detail design elements of the site access intersection are assessed in Chapter 5 of this report.

3.3 Traffic Generation

3.3.1 Employment Density

The traffic generation of the rezoned land will depend on the nature of the development and of the density of employment on the land.

The Department of Planning's City of Cities document indicates that employment densities for industrial employment land is about 30 employees per hectare of developable land. By comparison warehouse / distribution centres are as low as 10 employees per hectare.

Preliminary investigations for the subject site undertaken in August 2006 indicated the following yields:

- Developable land = 52 hectares
- Total employees = 1,650 employees
- Employee density = 32 employees / hectare

The estimated preliminary employee density of 32 employees per hectare of developable land is consistent with the Department of Planning's average yield for industrial land of 30 employees per hectare as noted above.

Following more detailed site analysis as part of the environmental assessment for the rezoning submission it is now understood that the developable land yield will be reduced from 52 hectares to 36.1 hectares.

A reduced yield of developable land has the potential to reduce the number of employees and hence traffic generation potential of the subject site.

Notwithstanding the above it is still estimated that the developable land within the proposed business park zone of the site has the potential to employ up to 1,650 people.

This represents the following employment yield:

- Developable land = 36.1 hectares
- Total employees = 1,650 employees
- Employee density = 46 employees / hectare

This employment density yield is significantly higher than the Department of Planning's estimated average yield of 30 employees per hectare of developable land.

3.3.2 Traffic Generation Scenarios

In accordance with RTA guidelines[2] the traffic generation potential of the proposed business park rezoning has been based on the number of employees estimated to be generated on the site.

In order to undertake a conservative assessment of potential traffic generation impacts of the proposed rezoning concept, two traffic generation scenarios have been considered. These scenarios are described below.

- **Scenario A** – High Traffic Generation
  - Based on an employee yield of 1,650 employees
  - Equivalent to 46 employees / hectare
- **Scenario B** – Average Traffic Generation
  - Based on an employee yield of 33 employees / hectare
  - Equivalent to 1191 employees

While it is considered unlikely that the proposed rezoning will generate conditions which result in an employee density of 46 employees per hectare as represented in Scenario A (particularly in the short to medium term), Scenario A has been used to assess the likely worst case traffic generation resulting from the proposed rezoning.

[2] Roads and Traffic Authority of New South Wales (1993) *Guide to Traffic Generating Developments,* 2002.

3.3.3 Peak Hour Traffic Generation

Traffic generation potential for the development yields represented by Scenario A and Scenario B have been estimated using Roads and Traffic Authority guidelines[3] which specify the following traffic generation rates for business park land uses:

- AM Peak Hour: 31.8 vehicle trips per 100 employees
- PM Peak Hour: 36.5 vehicle trips per 100 employees

These traffic generation rates were applied to the employee yield scenarios to estimate peak period traffic generation of the proposed rezoning.

The results are summarised in Table 3.1.

Table 3.1 – Estimated Peak Period Site Traffic Generation: Scenario A and B

	Scenario A High Yield	Scenario B Average Yield
Developable Area (ha)	36.1	36.1
Total Employees	1,650	1192
Employee Density (employees / ha)	46	33
RTA Peak Hour Traffic Generation Rate (Vehicle Trips per Employee)		
AM Peak	0.318	0.318
PM Peak	0.365	0.365
Peak Hour Traffic Generation Rate (Vehicle Trips / Hr)		
AM Peak	525	379
PM Peak	602	435

3.3.4 Daily Traffic Generation

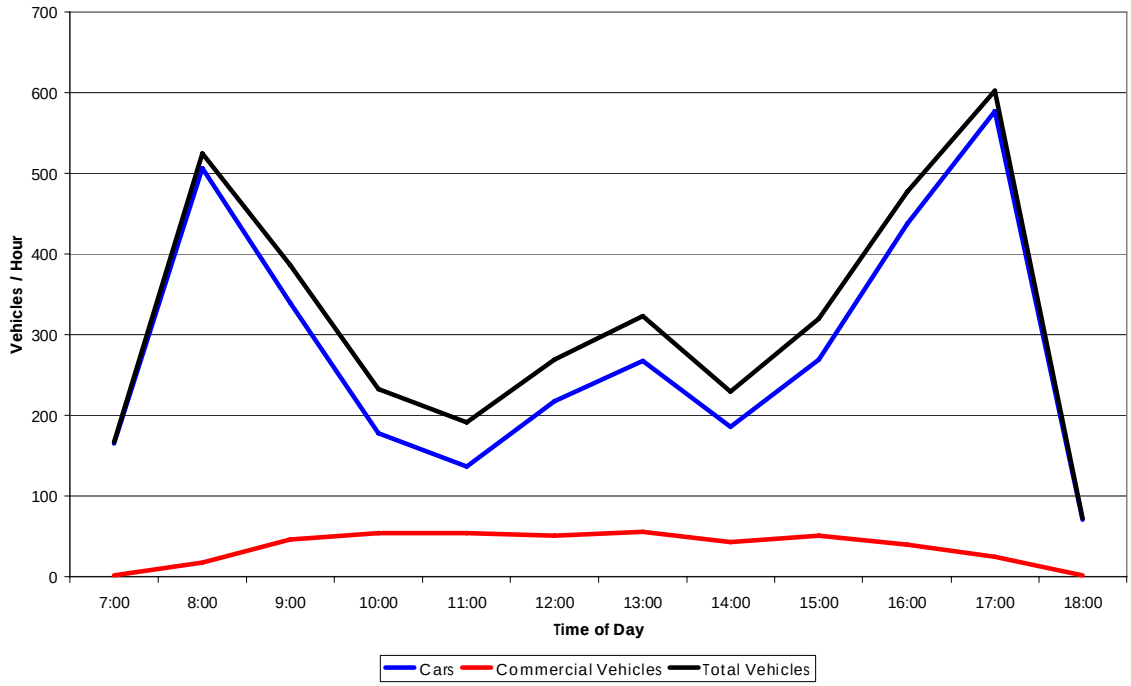
Based on RTA guidelines the daily profile of traffic generation of the proposed business park rezoning has been estimated for Scenario A. The profile includes the estimated proportion of commercial vehicles (ie trucks, delivery vans etc) with the total traffic generation.

The daily profile is shown in Figure 6.

The profile reflects the peak traffic generating periods associated with employee vehicles entry and exiting at the start and end of the working day. Commercial vehicles are expected to be relatively evening spread across the day between 9am and 3pm.

[3] Roads and Traffic Authority of New South Wales (1993) *Guide to Traffic Generating Developments*, 2002.

Figure 6 – Estimated Daily Traffic Generation Profile – Scenario A



3.4 Traffic Distribution of Site Generated Traffic

3.4.1 TRACKS Modelling

As requested by the RTA and Shellharbour Council, the TRACKS traffic modelling software was used to estimate the traffic distribution of estimated traffic generated by the proposed rezoning of the subject site.

The TRACKS model for the south coast is used by the RTA and south coast Councils, including Shellharbour Council, to consider regional road network operations and future planning. The model includes certain assumptions regarding traffic growth associated with land use changes with the modelled area and the influence of background growth from external areas.

Cardno Eppell Olsen was commissioned to provide traffic distribution estimates for site generated traffic for the years 2001 and 2016 for the following scenarios using the WOLSH TRACKS model:

- Base Case (no development); and
- Base Case + High Traffic Generation (Scenario A as described above).

3.4.2 Traffic Distribution

It was assumed that 80% of AM peak period traffic generated by the site would be inbound to the site with 20% outbound from the site. This was assumed to be the reverse for the PM peak period.

The distribution of site generated traffic was estimated based on the TRACKS modelling results by calculating the difference between 'base' and 'with development' modelled scenarios.

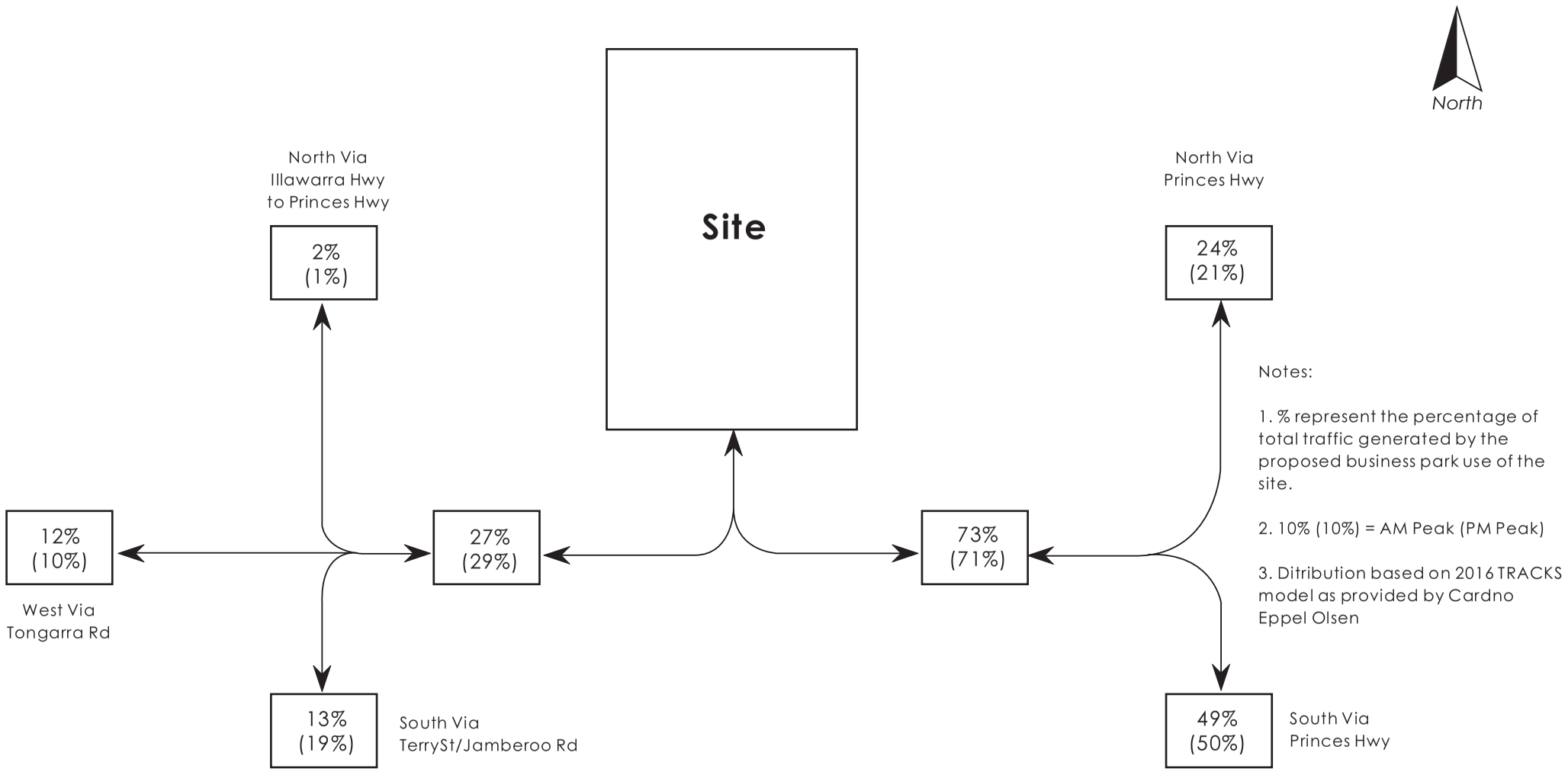
The TRACKS model estimated traffic distribution of the proposed development is shown in Figure 7.

The distributions shown in Figure 7 indicate:

- AM and PM traffic distributions are relatively the same for both peaks;
- A strong bias for access to and from the site via the Princes Highway (approximately 75% of all site generated traffic).
- Minimal traffic accessing the site utilises the Illawarra Highway. This is considered be a result of the longer travel distance, congestion associated with the existing AM operation at the Princes Highway intersection and the right turn bans on Tongarra Road to the Illawarra Highway compared to the alternate route via Tongarra Road, Station Road and Princes Highway.

TRACKS MODEL ESTIMATE PEAK PERIOD SITE GENERATED TRAFFIC DISTRIBUTION

ILLAWARRA REGIONAL BUSINESS PARK



MASSON | WILSON | TWINEY
TRAFFIC AND TRANSPORT CONSULTANTS

Figure 7

Filename: 063273di04.ai

Date: 20 April 2007

4. Strategic Context

The following section of this report provides a strategic context for the proposed rezoning with regard to relevant regional planning strategies and future transport infrastructure.

4.1 Action for Transport – 2010

The State Government's transport strategy is set out in *Action for Transport 2010 – an Integrated Transport Plan*. This plan identifies improvements to transport infrastructure over a ten year period including the construction of new rail and road links and the introduction of new trains, buses and ferries.

The plan targets a number of the challenges faced by seeking in broad terms to:

- Reduce traffic congestion;
- Improve air quality;
- Reduce greenhouse emissions;
- Increase public transport use;
- Expand CityRail capacity;
- Make freight more competitive; and
- Improve road safety.

One of the projects it identifies is a high speed rail link between Sydney and Wollongong.

As with all strategic plans, the underlying priorities and needs change over time. Consequently, Action for Transport has been effectively superseded by:

- the Metropolitan Strategy and its Transport Strategy for Sydney
- Moving Together' prepared by Illawarra's Transport Taskforce; and
- the Illawarra Regional Strategy.

4.2 Illawarra Regional Strategy 2006-2031

As part of the Metropolitan Strategy a series of regional strategies have been prepared including the Illawarra Regional Strategy.

The outcomes and actions of the strategy include:

- Development around major regional centres improves the viability and range of public transport services.
- Need to protect important existing transport corridors within the region including the Princes and Illawarra Highways.
- Land use planning decisions must consider the transport access implications to minimise the need to travel, and encourage energy and resource efficiency.
- Land use planning decisions will protect Illawarra Regional Airport, recognising the link it provides to and from the region.

The proposed rezoning concept application for the Illawarra Regional Business Park is considered to be consistent with each of the above outcomes and actions, namely:

- The site is located along existing bus routes with access to railway stations. Increased demand generated by up to 1,650 employees will increase the viability of existing and potential additional services.
- The concept plan protects the Illawarra Highway road reserve which occurs within the site's boundary.
- The proposed rezoning will provide a significant number of jobs within the local area reducing the need for local residents to travel outside the locality / region to find jobs.
- Business park uses are considered to be compatible with the airport uses and provides opportunities for synergies between the two sites. This would not be achieved with residential development for example.

The strategy identifies the future duplication of the Princes Highway between Oak Flats and Dunmore as a major transport project in the vicinity of the site.

In the meantime, the future of the high speed rail link between Sydney and Wollongong is still uncertain.

4.3 Bus Reforms

The NSW Government commenced a program of bus reform in 2003. The Unsworth Report, released in March 2004, sets the direction for the overall process of bus reform.

Key elements include:

- Contract reform, to consolidate smaller service contract areas into fewer contract regions, including a single contract region for the Illawarra.
- New funding arrangements aimed at making service provision more amenable to competitive bidding at some future stage.

- Removal of pick-up and set-down restrictions that were acting to reduce the effectiveness of the bus kilometres being run.
- Strategic bus corridors to provide a focus for bus priority measures and combining services as they converge on regional centres, including two corridors in the Illawarra.
- New service planning processes, including Metropolitan Service Planning Guidelines for Sydney, with regional guidelines expected to be released in due course.
- Expansion of community transport to cover more of the non-commercial task.

The policy aims can be summarised as:

- Eliminate institutional rigidities that limit the effectiveness and efficiency of bus service provision.
- Provide integrated networks.
- Improve the attractiveness to potential passengers, through faster, more frequent services to a better range of destinations and activities.
- Introduce a transparent service planning process.
- Improve industry viability and reduce the burden on government.

Relevant matters for the proposed Illawarra Regional Business Park are:

- Single contract region for the Illawarra (currently operated by Premier Illawarra bus company); and
- A strategic bus corridor along the Princes Highway between Wollongong and south of Lake Illawarra.

The provision of single bus service provider for the region allows bus services in the Illawarra region to be provided in a co-ordinated manner. As such a single operator is better place to react to additional demands generated future development such as the proposed Illawarra Regional Business Park.

4.4 Draft State Environmental Planning Policy No 66 – Integration of Land Use and Transport

The aim of the policy is to:

- Improve access to housing, employment and services by walking, cycling, and public transport;
- Improve the choice of transport and reducing dependence solely on cars for travel purposes;
- Moderate growth in demand for travel and the distances travelled, especially by car;
- Support the efficient and viable operation of public transport services; and
- Provide for the efficient movement of freight.

The policy applies to various LGAs in the state, including Shellharbour, and to developments with more than 1,000 square metres of floorspace. Therefore it applies (albeit in draft form) to the proposed rezoning site.

It should be noted that this SEPP is still in draft form a number of years after the close of its display period. It had been anticipated that either the review of the NSW planning system, or the development of the Metropolitan Strategy would have resulted in either the scrapping of this SEPP or its gazettal.

Essentially the plan seeks to cluster employment land uses around transport nodes to improve access to public transport.

The proposed rezoning site is considered to be consistent with draft SEPP 66 transport objectives as it is located adjacent to the Illawarra Regional Airport and its associated employment land uses and is well connected by existing bus and rail services to the regional transport network.

4.5 Moving Together

The municipalities of Kiama, Shellharbour and Wollongong are working together to produce a coordinated approach to transport systems to meet the community's needs.

The plan is described in the 'Moving Together' document and the plan aims to:

> *".....create a regional transport system that is safe, reliable, integrated and attractive to use. It encourages residents out of private cars and onto trains, buses and bicycles; aiming to avoid the congestion and pollution problems looming if current transport habits are not changed."*

The plan puts forward 8 transport planning principles. These are described below in relation to the proposed Illawarra Regional Business Park rezoning concept plan.

1. Concentrate on Centres

The proposal is located within the catchment of the Albion Park urban area and adjacent to the Illawarra Regional Airport and associated employment land uses. The site is located on Tongarra Road which provides 4 different bus services providing connections to Albion Park Rail and Oak Flats railway stations.

2. Mix Uses in Centres

The business park land use offers the potential for mixed employment land uses within the site, allowing opportunities for synergies between different land uses and containment of traffic generation. The concept plan for the site provides a mix of employment which will serve regional, district, local and neighbourhood levels.

3. Plan & Design to Support Public Transport

The proposal is located adjacent to existing bus routes with links to railway stations and adjacent to the Illawarra Regional Airport. The increased demand for existing public transport services will increase the viability of existing services rather than requiring additional services or new routes to service the proposed development site. The proposed internal road layout would adequately accommodate a bus loop road system within the business park site should bus operators wish to run bus services into the proposed rezoning site.

4. Provide and Improve Pedestrian Access

The concept plan will provide suitable pedestrian access to employment and environmental areas within the site.

5. Provide and Improve Cycle Access

Bicycle facilities along Tongarra Road have recently been improved by Shellharbour Council. Council also has other cycleway improvements planned for which they are seeking Section 94 contributions. It is considered that development of the proposed rezoning site would be subject to contributions for planned cycle facilities.

6. Manage Parking Supply

On site parking provision would be in accordance with Council's Car Parking Policy DCP for business park uses.

7. Provide Efficient, Low Impact Freight Movement

The site is well situated with regard to access to the regional road network via the Princes and Illawarra Highways thus facilitating local and regional road freight opportunities which minimise implications to local residential areas. The site is also located adjacent to the Illawarra Regional Airport which provides good opportunities for freight movements via air.

8. Provide and Improve Access to Education and Public Facilities

The concept plan includes the dedication of the wetland and riparian areas for public access via a pedestrian path within the site.

4.6 Shellharbour Section 94 Plan

The Shellharbour Section 94 plan seeks contributions from future development for a number of City wide and local area (precinct based) infrastructure projects and services.

With regard to transport infrastructure the Section 94 plan seeks to recoup funds for already constructed projects and planned future projects on a city wide or precinct wide basis. These works include:

- The East West Link Road (cost recoupment) extends from a grade separated interchange over the Princes Highway and the South Coast Railway Line to Albion Park.
- Tongarra Road (cost recoupment) is a two lane carriageway that runs parallel to the East-West Link Road. The road provides a direct route between the Illawarra Highway and the Princes Highway. The Illawarra Highway represents the principal transport route to the area southwest of the Illawarra Escarpment.
- Local road improvements in Albion Park such as intersection improvements at Tongarra Road/Calderwood Road, Tongarra Road/Church Street and Terry Street/Church Street and Albion Park cyclways.

It is anticipated that the proposed business park development would contribute to the provision of Section 94 identified works.

4.7 Future Proposed Road Network Improvements

Following discussions with the RTA it is understood that the RTA is investigating two potential road network improvements in the vicinity of the site, namely the:

- Illawarra Highway upgrade utilising the RTA road reserve across the proposed rezoning site; and
- Princes Highway / Illawarra Highway intersection capacity / operational improvements.

4.7.1 Illawarra Highway Upgrade – Yallah to Oak Flats

Il is understood that preliminary concept investigations have been undertaken by the RTA to provide a dual carriageway road between Yallah and Oak Flats thus providing a continuation of dual carriageway road through the Illawarra. The link would more than likely utilise the road reserve within the proposed development site.

However based on discussions with the RTA it is understood that no detailed designs have been prepared for the upgrade, nor have funding or timing arrangements been allocated to the project. The project was not listed in the Illawarra Regional Strategy 2006-2031 as a future road project.

Thus, while this project has the potential to provide improved regional road access to and from the proposed rezoning site, given the uncertainty regarding the implementation of the project the assessment of the proposed business park development presented in this report has been based on the implications to the existing road network.

4.7.2 Princes Highway / Illawarra Highway Intersection Improvements

It is understood from discussions with the RTA that the RTA are currently investigating options to improve the existing poor operation of the roundabout controlled Princes Highway / Illawarra Highway intersection.

As identified in Section 2 of this report, the Princes Highway / Illawarra Highway intersection currently experiences poor operating conditions (Level of Service F) during the morning peak periods.

No details of the potential improvement options, costs or timing of works are currently available for public information.

5. Assessment of Proposed Rezoning Concept Plan

This section of the report considers the traffic and transport implications of the proposed rezoning of the site for business park uses as set out in the Illawarra Regional Park Business concept plan.

5.1 Road Network Implications

The implications of site generated traffic flows on the surrounding road network have been assessed using the aaSIDRA modelling software to determine the existing and future operation of key intersections.

The assessment of road network implications has been based on the high traffic generation (Scenario A) as discussed in Section 3 of this report. The high traffic generation scenario represents the provision of 1,650 full time equivalent employees within the proposed business park development.

As specified in the Director General's Requirements the implications of site generated traffic on both existing (2006) and future (2016) road network operating conditions has been assessed.

5.1.1 Existing Intersection Operations (2006)

The TRACKS model estimated distributions of site generated traffic have been added to the surveyed traffic flows at key surrounding as presented in Section 2 and reanalysed using the aaSIDRA software.

The analysis results of intersection operation with the proposed business park are summarised in Table 5.1 and Table 5.2.

It is noted that this analysis assumes full development of the proposed business park in Year 1 of the development. While this is unrealistic, full development of the proposed business park at Year 1 has been assumed to provide a conservative (worst case) assessment.

Table 5.1 – Intersection Operating Conditions with Proposed Business Park
Average Vehicle Delay

		Base Case (2006) No Development		With Proposed Development (Scenario A)	
Intersection	**Control**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Princes Hwy / Illawarra Hwy	Roundabout	131.4	12.4	**137.3**	19.9
Princes Hwy / Station Rd	Signals	24.2	25.6	27.0	28.5
Princes Hwy / Tongarra Rd	Signals	23.1	23.5	24.4	23.9
Illawarra Hwy / Tonagrra Rd / Terry St	Signals	24.9	28.1	25.1	28.8

Avg Delay is over all movements at signals, and for the worst movement at priority and roundabouts

Table 5.2 – Intersection Operating Conditions with Proposed Business Park
Level of Service

		Base Case (2006) No Development		With Proposed Development (Scenario A)	
Intersection	**Control**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Princes Hwy / Illawarra Hwy	Roundabout	**F**	B	**F**	B
Princes Hwy / Station Rd	Signals	B	B	B	B
Princes Hwy / Tongarra Rd	Signals	B	B	B	B
Illawarra Hwy / Tonagrra Rd / Terry St	Signals	B	B	B	C

Avg Delay is over all movements at signals, and for the worst movement at priority and roundabouts

The analysis presented in Table 5.1 and Table 5.2 indicates that traffic generated by the proposed business park development would not have a significant impact on the existing (2006) surveyed operating conditions of key intersections surrounding the proposed development site.

It is noted that, with the exception of the Princes Highway / Illawarra Highway intersection, all intersections would operate with satisfactory delays and good levels of service.

As identified in Section 2 of this report the Princes Highway / Illawarra Highway intersection currently experiences poor operation in the AM peak period with the proposed development. This will continue to be the case with additional traffic through this intersection generated by the proposed development.

However, the minor increase in vehicle delays with the proposed development traffic indicates that the operational constraints at this intersection are the result of existing rather than proposed development traffic flows.

5.1.2 Future Intersection Operation (2016)

The TRACKS model has been used to estimate traffic growth at the key surrounding intersections between 2001 and 2016 (modelling years).

It is noted that the TRACKS model intersection flows for the 2001 Base Case (no development) are in the majority of cases significantly higher than the 2006 surveyed traffic flows.

Therefore to estimate traffic flows for the year 2016, the annual traffic growth produced by the TRACKS model for 2001 to 2016 has been added to the surveyed (2006) traffic flows for the 10 year period to 2016 and re-analysed using aaSIDRA.

The results of intersection operation analysis for the year 2016 with full development of the proposed business park (Scenario A) are presented in Table 5.3.

Table 5.3 – Intersection Operating Conditions – 2016 With Proposed Development

		Average Vehicle Delay (sec/veh)		Level of Service	
Intersection	**Control**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Princes Hwy / Illawarra Hwy	Roundabout	> 300	276	**F**	**F**
Princes Hwy / Station Rd	Signals	26.6	27.7	B	B
Princes Hwy / Tongarra Rd	Signals	26.5	27.5	B	B
Illawarra Hwy / Tonagrra Rd / Terry St	Signals	36.2	51.9	C	D

Avg Delay is over all movements at signals, and for the worst movement at priority and roundabouts

The result in Table 5.3 indicate that, with the exception of the Princes Highway / Illawarra Highway intersection, each of the key surrounding intersections will operate satisfactorily in the future (2016) with traffic growth generated by the proposed business park development and other development within the region.

The operation of the Princes Highway / Illawarra Highway intersection will reach a Level of Service F in both the AM and PM peak period.

It is noted that the movement with the excessive delays is restricted to the left turn movement from the Illawarra Highway to the Princes Highway. All other approaches operate with Level of Service B or better.

As discussed above it is understood that the RTA is investigating measures to improve the existing poor operation of the Illawarra Highway approach to the Princes Highway intersection. Resolution of the existing AM peak constraints is likely to improve both the AM and PM future (2016) conditions.

5.2 Site Access Arrangements

5.2.1 Site Access Design

The design of the site access at Tongarra Road has been based on the following traffic assumptions;

- High Traffic Generation (Scenario A) = 1,650 employees;
- TRACKS modelled traffic distribution for site generated traffic.
- 2026 background (non site) traffic flows based on TRACKS outputs adjusted for actual 2006 surveyed flows.

The layout of the Tongarra Road / site access intersection as shown in Appendix E represents the turning lane storage requirements based on an aaSIDRA analysis of intersection operation for the above assumptions.

5.2.2 Site Access Operation (2006)

The operation of the site access intersection on Tongarra Road has been analysed using aaSIDRA and the design and traffic growth assumptions described above.

The results are presented in Table 5.4

Table 5.4 – Site Access Intersection Operating Conditions 2026 With Proposed Development

		Average Vehicle Delay (sec/veh)		Level of Service	
Intersection	**Control**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Site Access / Tonagrra Rd	Signals	33.8	19.7	C	B

Avg Delay is over all movements at signals, and for the worst movement at priority and roundabouts

The intersection analysis indicates that the site access concept design will provide satisfactory vehicular access to and from the proposed development for future long term operating conditions along Tongarra Road.

5.2.3 Access to the Potential Illawarra Highway Upgrade

As discussed previously, environmental constraints are likely to prohibit any direct vehicle access between the site and a potential future freeway road along the RTA road reserve adjacent to the Illawarra Highway.

Access to and from a future freeway road would be via an interchange at Tongarra Road, or other appropriate location. To assist with any future design of a freeway / Tongarra Road interchange, the site access to the proposed business park at Tongarra Road has been set as far east as possible as requested by the RTA. This maximises the separation between the site access and any future potential interchange.

5.3 Access to Public Transport Services

As identified previously the site is serviced by a number of existing bus routes along Tongarra Road between Albion Park and the rail station at Albion Park Rail and Oak Flats and then onto Shellharbour.

Discussions with operators of Premier Illawarra bus services indicated that the proposed development would provide additional demand for existing service and hence improve route viability. The operators indicated interest in running bus services, particularly in peak periods, into the proposed business park.

The proposed internal road network provides a loop road system suitable to accommodate articulated vehicles. This system would be suitable for a loop bus service within the site.

In addition it was suggested by the operators of Premier Illawarra that bus stops be installed on Tongarra Road at the proposed site access. It is recommended that this recommendation be adopted and incorporated into the detail design of business park development.

5.4 Bicycle and Pedestrian Facilities

As identified previously, the Shellharbour Council Section 94 plan identifies a number of bicycle and pedestrian facility improvements for Albion Park and the wider Council area. It is understood that contributions for these facilities would be attributable to the proposed development either as a Section 94 contribution or development agreement.

6. Summary and Conclusions

This report has been prepared to assess the transport implications associated with the proposed rezoning of land for business park uses at Albion Park.

The Illawarra Regional Business Park is located adjacent to the Illawarra Regional Airport with site frontages to Tongarra Road and the Illawarra Highway.

While the site has two road frontages, environmental constraints restrict the provision of road and vehicle access to the site via Tongarra Road. The location of the proposed site access has considered the RTA's recommendations with regard to maximising the separation between the site access and the RTA road reserve.

The traffic analysis presented in this report indicates that the surrounding road network, with the exception of the Princes Highway and Illawarra Highway intersection has adequate capacity to accommodate both proposed business park traffic and other future development traffic (2016).

It is noted that the Princes Highway / Illawarra Highway intersection currently experiences operation constraints. It is understood that the RTA is currently investigating options to address the existing operational constraints at this intersection.

With regard to public transport, the site is well serviced by existing bus routes which provide access via Tongarra Road to the railway stations at Albion Park Rail and Oak Flats. Discussions with the operators of the local bus company indicated that the operators viewed the proposed business park as an important development in improving bus service viability.

The internal road design would adequately accommodate bus routes through the site should they be economically viable.

Appendix A - Tongarra Road Surveyed Traffic Flows

CfeIT bob.white@cfeit.com (02) 9740 8600

Traffic Count Summary Report

Count Number	**2091**	Ref : **MWT**	Directory Ref : **UBD 52 E-3**
Street	**TONGARRA ROAD, ALBION PARK : Between ILLAWARRA HIGHWAY & PRINCES HIGHWAY (bidirectional) :**		
Location	East of Frazers Creek		*Carriageway*

TOTAL COUNT MATRIX

Start Date	13-DEC-06
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	76
Weekly 85th Percentile Speed	86
Five Day AADT	11659
Seven Day AADT	11273

	MON *18TH*	TUE *19TH*	WED *13TH*	THU *14TH*	FRI *15TH*	SAT *16TH*	SUN *17TH*	5 Dav Total	5 Dav Average	7 Dav Total	7 Dav Average
Midnight - 1am	19	33	50	45	55	119	156	**202**	**40**	**477**	**68**
1am - 2am	11	14	14	11	31	82	76	**81**	**16**	**239**	**34**
2am - 3am	16	6	11	18	13	33	42	**64**	**13**	**139**	**20**
3am - 4am	17	23	16	25	14	36	35	**95**	**19**	**166**	**24**
4am - 5am	58	56	44	55	60	42	40	**273**	**55**	**355**	**51**
5am - 6am	158	147	140	146	139	75	66	**730**	**146**	**871**	**124**
6am - 7am	311	316	328	328	321	129	97	**1604**	**321**	**1830**	**261**
7am - 8am	432	451	462	494	454	278	205	**2293**	**459**	**2776**	**397**
8am - 9am	**841**	**813**	**882**	**956**	**881**	562	354	**4373**	**875**	**5289**	**756**
9am - 10am	779	794	813	802	782	737	620	**3970**	**794**	**5327**	**761**
10am - 11am	766	776	670	733	746	922	729	**3691**	**738**	**5342**	**763**
11am - Midday	752	787	700	791	727	**979**	**915**	**3757**	**751**	**5651**	**807**
Midday - 1pm	710	691	635	690	694	825	**792**	**3420**	**684**	**5037**	**720**
1pm - 2pm	715	659	654	700	760	803	731	**3488**	**698**	**5022**	**717**
2pm - 3pm	805	847	785	818	843	782	724	**4098**	**820**	**5604**	**801**
3pm - 4pm	**1028**	**1026**	**1004**	**1046**	**1078**	**858**	668	**5182**	**1036**	**6708**	**958**
4pm - 5pm	1003	870	950	961	950	761	701	**4734**	**947**	**6196**	**885**
5pm - 6pm	862	1010	933	975	978	768	742	**4758**	**952**	**6268**	**895**
6pm - 7pm	726	782	695	775	758	642	558	**3736**	**747**	**4936**	**705**
7pm - 8pm	475	575	549	570	563	431	467	**2732**	**546**	**3630**	**519**
8pm - 9pm	368	361	418	492	429	335	401	**2068**	**414**	**2804**	**401**
9pm - 10pm	290	316	274	351	338	295	331	**1569**	**314**	**2195**	**314**
10pm - 11pm	167	139	191	202	209	243	165	**908**	**182**	**1316**	**188**
11pm - Midnight	62	71	71	96	170	199	66	**470**	**94**	**735**	**105**
Total	**11371**	**11563**	**11289**	**12080**	**11993**	**10936**	**9681**	**58296**	**11659**	**78913**	**11273**

 CFE Information Technologies

Data displayed has been compiled from pneumatic traffic count processes and is subject to the documented limitations

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Traffic Count Summary Report

Count Number	**2091**	Ref : **MWT**	Directory Ref : **UBD 52 E-3**
Street	**TONGARRA ROAD, ALBION PARK : From ILLAWARRA HIGHWAY to PRINCES HIGHWAY : EAST BOUND**		
Location	East of Frazers Creek		*Carriageway*

TOTAL COUNT MATRIX

Start Date	13-DEC-06
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

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Weekly 85th Percentile Speed	88
Five Day AADT	5853
Seven Day AADT	5685

	MON *18TH*	TUE *19TH*	WED *13TH*	THU *14TH*	FRI *15TH*	SAT *16TH*	SUN *17TH*	5 Dav Total	5 Dav Average	7 Dav Total	7 Dav Average
Midnight - 1am	9	18	23	23	31	68	95	**104**	**21**	**267**	**38**
1am - 2am	7	7	9	3	9	46	43	**35**	**7**	**124**	**18**
2am - 3am	8	4	8	9	7	19	22	**36**	**7**	**77**	**11**
3am - 4am	5	12	8	13	5	20	19	**43**	**9**	**82**	**12**
4am - 5am	29	29	24	27	31	23	20	**140**	**28**	**183**	**26**
5am - 6am	74	74	75	80	72	33	30	**375**	**75**	**438**	**63**
6am - 7am	167	172	167	172	182	66	48	**860**	**172**	**974**	**139**
7am - 8am	247	238	231	253	240	159	78	**1209**	**242**	**1446**	**207**
8am - 9am	447	444	460	**505**	**440**	329	203	**2296**	**459**	**2828**	**404**
9am - 10am	**457**	**453**	**496**	465	422	410	326	**2293**	**459**	**3029**	**433**
10am - 11am	404	414	360	382	377	**505**	426	**1937**	**387**	**2868**	**410**
11am - Midday	377	397	361	413	374	495	**492**	**1922**	**384**	**2909**	**416**
Midday - 1pm	379	349	285	323	347	**430**	**403**	**1683**	**337**	**2516**	**359**
1pm - 2pm	327	323	308	341	383	365	378	**1682**	**336**	**2425**	**346**
2pm - 3pm	390	388	380	377	404	367	334	**1939**	**388**	**2640**	**377**
3pm - 4pm	**514**	**516**	**519**	**554**	**542**	389	301	**2645**	**529**	**3335**	**476**
4pm - 5pm	449	414	435	425	462	336	310	**2185**	**437**	**2831**	**404**
5pm - 6pm	379	426	424	467	422	386	339	**2118**	**424**	**2843**	**406**
6pm - 7pm	362	432	352	401	354	339	275	**1901**	**380**	**2515**	**359**
7pm - 8pm	252	304	268	258	270	232	270	**1352**	**270**	**1854**	**265**
8pm - 9pm	188	187	205	202	233	180	217	**1015**	**203**	**1412**	**202**
9pm - 10pm	166	156	153	159	187	152	194	**821**	**164**	**1167**	**167**
10pm - 11pm	79	61	103	107	110	131	95	**460**	**92**	**686**	**98**
11pm - Midnight	31	28	28	46	81	100	33	**214**	**43**	**347**	**50**
Total	**5747**	**5846**	**5682**	**6005**	**5985**	**5580**	**4951**	**29265**	**5853**	**39796**	**5685**

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Traffic Count Summary Report

Count Number	**2091**	Ref : **MWT**	Directory Ref : **UBD 52 E-3**
Street	**TONGARRA ROAD, ALBION PARK : From PRINCES HIGHWAY to ILLAWARRA HIGHWAY : WEST BOUND**		
Location	East of Frazers Creek		*Carriageway*

TOTAL COUNT MATRIX

Start Date	13-DEC-06
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	75
Weekly 85th Percentile Speed	82
Five Day AADT	5806
Seven Day AADT	5588

	MON *18TH*	TUE *19TH*	WED *13TH*	THU *14TH*	FRI *15TH*	SAT *16TH*	SUN *17TH*	5 Dav Total	5 Dav Average	7 Dav Total	7 Dav Average
Midnight - 1am	10	15	27	22	24	51	61	**98**	**20**	**210**	**30**
1am - 2am	4	7	5	8	22	36	33	**46**	**9**	**115**	**16**
2am - 3am	8	2	3	9	6	14	20	**28**	**6**	**62**	**9**
3am - 4am	12	11	8	12	9	16	16	**52**	**10**	**84**	**12**
4am - 5am	29	27	20	28	29	19	20	**133**	**27**	**172**	**25**
5am - 6am	84	73	65	66	67	42	36	**355**	**71**	**433**	**62**
6am - 7am	144	144	161	156	139	63	49	**744**	**149**	**856**	**122**
7am - 8am	185	213	231	241	214	119	127	**1084**	**217**	**1330**	**190**
8am - 9am	**394**	369	**422**	**451**	**441**	233	151	**2077**	**415**	**2461**	**352**
9am - 10am	322	341	317	337	360	327	294	**1677**	**335**	**2298**	**328**
10am - 11am	362	362	310	351	369	417	303	**1754**	**351**	**2474**	**353**
11am - Midday	375	**390**	339	378	353	**484**	**423**	**1835**	**367**	**2742**	**392**
Midday - 1pm	331	342	350	367	347	395	389	**1737**	**347**	**2521**	**360**
1pm - 2pm	388	336	346	359	377	438	353	**1806**	**361**	**2597**	**371**
2pm - 3pm	415	459	405	441	439	415	390	**2159**	**432**	**2964**	**423**
3pm - 4pm	514	510	485	492	536	**469**	367	**2537**	**507**	**3373**	**482**
4pm - 5pm	**554**	456	**515**	**536**	488	425	391	**2549**	**510**	**3365**	**481**
5pm - 6pm	483	**584**	509	508	**556**	382	**403**	**2640**	**528**	**3425**	**489**
6pm - 7pm	364	350	343	374	404	303	283	**1835**	**367**	**2421**	**346**
7pm - 8pm	223	271	281	312	293	199	197	**1380**	**276**	**1776**	**254**
8pm - 9pm	180	174	213	290	196	155	184	**1053**	**211**	**1392**	**199**
9pm - 10pm	124	160	121	192	151	143	137	**748**	**150**	**1028**	**147**
10pm - 11pm	88	78	88	95	99	112	70	**448**	**90**	**630**	**90**
11pm - Midnight	31	43	43	50	89	99	33	**256**	**51**	**388**	**55**
Total	**5624**	**5717**	**5607**	**6075**	**6008**	**5356**	**4730**	**29031**	**5806**	**39117**	**5588**

Data displayed has been compiled from pneumatic traffic count processes and is subject to the documented limitations

Appendix B - Bus Services Network

Appendix C - RTA – Illawarra Cycleway Map


Legend
Cycling Facilities and Stress (Difficulty) Ratings
Freeway/Motorway shoulder facilities
On-Road bicycle lanes with stress ratings
Off-Road shared use Paths
Low difficulty on-road riding environment
Low difficulty on-road riding environment with steep incline
Moderate difficulty on-road riding environment
Moderate difficulty on-road riding environment with steep incline
High difficulty on-road riding environment
High difficulty on-road riding environment with steep incline
Yallah
Duck Creek
MARSHALL MOUNT RD
TALLAWARRA
PRINCES HWY
YALLAH RD
Mount Marshall Creek
ILLAWARRA HWY
PRINCES HWY
KOONA ST
Albion Park Rail
DEAKIN
MOORE
FISHER
INDUSTRIAL RD
Oak
STATION RD
ROBYN RD
PRINCES HWY
CALDERWOOD RD
HAMILTON RD
TAYLOR RD
TONGARRA RD
MAPLE ST
O'GORMAN ST
CAWDELL DR
CROME ST
TERRY ST
MACQUARIE ST
JEFFCOAT ST
CHURCH ST
Albion Park
CENTENARY RD
HUGHES ST
BADGERY'S DR
SIMPSON PD
CREST RD
Frazers Ck
CROME RD
CEDAR ST
PINE ST
ASH AV
ELM ST
OAK ST
JARRAH WY
COACHWOOD DR
BLACKWOOD WY
Hazelton
JAMBEROO

Appendix D - Illawarra Regional Business Park Proposed Concept Plan

GRASSLAND / SEDGELAND

GRASSY MEADOW

NATIVE GRASSLAND & SHRUBS

CASUARINA FOREST

CASUARINAS

PAPERBARK FOREST

SWAMP

Scale

meters 0 25 50 75 100

ROAD RESERVE

ILLAWARRA HIGHWAY

BOUNDARY

CROOME LANE

40m RIPARIAN ZONE

E A-02

40m RIPARIAN ZONE

BOUNDARY

BOUNDARY

ROAD WIDENING TO ACCOMMODATE TURNING CIRCLE

40m RIPARIAN ZONE

BOUNDARY

BOUNDARY

40m RIPARIAN ZONE

ALBION PARK AIRFIELD

BOUNDARY

GROUND-TRUTHED WETLAND BOUNDARY

D A-02

25m RIPARIAN ZONE

BOUNDARY

ROAD RESERVE

E A-02

E A-02

C A-02

25m RIPARIAN ZONE

SPARSE PAPERBARK FOREST

BOUNDARY

25m RIPARIAN ZONE

ALBION PARK AIRFIELD

RL 8.00

B A-02

ROAD RESERVE

BOUNDARY

A A-02

ENTRY / EXIT RL 11.00

BOUNDARY

TONGARRA ROAD

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Illawarra Regional Business Park For Delmo Albion Park Pty Ltd - 78 Tongarra Road, Albion Park

Appendix E - Site Access / Tongarra Road Intersection Concept Design

2026 – Turning Lane Storage Length Requirements

Note: Lane lengths shown in metres.