

## **Attachment 2.3**

### *Traffic and Transport Report*

# Glenfield Waste Services Rezoning

Traffic and Transport Review



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## Traffic and Transport Review

Prepared for

L.A Kennett Enterprises

Prepared by

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## Quality Information

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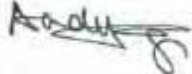
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Prepared by Riley Dayhew

Reviewed by Dan Riley

### Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
1	25-May-2012	Draft Traffic and Transport Review	Andy Yung Principal Transport Planner	

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## 1.0 Introduction

AECOM has been engaged by L.A Kennett Enterprises to undertake a traffic and transport review of a 60ha site within the Glenfield Waste Services operational land area in support of a rezoning submission report for Campbelltown City Council (Council). This will form part of Council's preparation of a Standard Instrument Local Environmental Plan (SILEP) for the Campbelltown LGA.

This report will review existing traffic and transport conditions surrounding the site, as well as provide detail on the likely future traffic conditions of the local road network, including impacts arising from surrounding development. The potential traffic and transport impacts of rezoning land on the site will be considered, and potential use of public and active transport discussed.

This report has been prepared in advance of collecting traffic data or undertaking quantitative analysis. A detailed traffic impact assessment will be required at the development application stage.

## 1.1 Study Area

### 1.1.1 Description of subject site

The Glenfield Waste Services land is 100ha overall and includes a licenced non-putrescible waste facility which was first granted consent for use in 1979. The facility includes recycling operations, a quarry, weigh bridge and site offices. The land is divided by a local government area boundary, with 40ha of land to the north located within the Liverpool City Council LGA and the remaining 60ha (the site) within the Campbelltown City Council LGA.

Note that "the site" that this report considers only includes the 60ha southern portion of Glenfield Waste Services land and this is highlighted in **Figure 1**. The site is bordered to the west by the Southern railway line, to the north by the Liverpool City Council LGA boundary, to the east by the Georges River, and to the south by residential housing around Goodenough Street.

In terms of operations, the recycling and administration element of Glenfield Waste Services is located on the 60ha site (the current land fill area is located in the remaining 40ha area north of the site in the Liverpool City Council LGA). The site also includes an area adjacent to Georges River currently zoned "6 (b) Regional Open Space". Under the SILEP, a portion of the area will be re-zoned "RE1 Public Recreation" (the extent of which is not known and has been estimated at 3.0ha). A large residential property also exists on the site, as well as transmission lines, which run through the site south of Cambridge Avenue.

Primary access to all 100ha of land (including the site) is provided from Cambridge Avenue, a main road linking Glenfield with Holsworthy and Moorebank. A secondary access is located off Railway Parade, which is not used to access Glenfield Waste Services, but to provide service access to the rail line for Railcorp and access to the single residential property.

**Figure 1: Site Area**

Source: EPS, 2012

### 1.1.2 Surrounding land uses

The site is fairly isolated from surrounding land uses by natural vegetation around the Georges River and Leacock Regional Park, which adjoins the main southern railway line. Further past these natural buffers, army barracks are located to the east, with residential development in the west and south. Glenfield railway station and a small retail area are located approximately 1 km from the site. The site is bordered to the south by the Glenfield residential area. A buffer separating future development from the residential area will likely be retained in the form of the transmission lines easement.

## 1.2 Report structure

The report has been structured as follows:

- **Chapter 2** provides a summary of the existing traffic and transport conditions on the surrounding road network.
- **Chapter 3** details planned land uses and infrastructure in the surrounding area.
- **Chapter 4** outlines the rezoning proposal and the likely traffic generated as a result of the rezoning of the site.
- **Chapter 5** summarises the potential impacts arising from future traffic generation.
- **Chapter 6** provides the conclusions and recommendations of the study.

## 2.0 Existing Traffic and Transport Conditions

This chapter of the report summarises the existing travel behaviour and transport conditions in the vicinity of the study area based on background documents and site visits.

### 2.1 Existing travel behaviour

Journey to work (JTW) data includes details of the origin and destination of trips, together with characteristics of the journey such as mode of travel. JTW data from the 2006 census has been analysed to determine the current distribution of trips from the area and the proportion of mode of travel usage.

Given the use of the site is likely to be industrial uses, the mode splits for Travel zone 1261 (Minto) and North Campbelltown SLA (as a destination) have been considered to understand the likely travel behaviour should the rezoning take place at this site.

Analysis of the 2006 JTW destination data for Travel zone 1261 (Minto) and North Campbelltown SLA is summarised in **Table 1**.

**Table 1: 2006 JTW mode split data for TZ 1261 and North Campbelltown SLA**

Area	Total trips	Vehicle driver	Vehicle passenger	Bus	Train	Others *
TZ 1261	2,327	78%	8%	1%	5%	8%
North Campbelltown SLA	18,536	72%	8%	1%	4%	15%

\*- including 'other modes', 'modes not stated' and 'worked at home or did not go to work'.

Source: BTS Journey-to-work data, 2006

According to the 2006 Census data, travel to both Minto and North Campbelltown SLA (as a journey to work destination) is characterised by the private motor vehicle, with over 80% of those trips are made by car as a driver or a passenger. Public transport use is low, which is especially the case for buses, although this could be attributed to low levels of public transport service frequency in many suburbs of Campbelltown and may not accurately reflect the existing travel behaviour at the site.

The South West Sub-regional Strategy identifies that on an average weekday 79 per cent of trips by South West residents are made by private vehicle, 8.1 per cent by public transport and 12.3 per cent by walking or cycling, which is consistent with the JTW data presented above.

## 2.2 Existing site access and operations

### 2.2.1 Site access

The site currently has two accesses at the following locations:

- Cambridge Avenue approximately 200m west of the Georges River Causeway.
- Railway Parade approximately 60m north of the Glenfield Road/Canterbury Road/Cambridge Avenue/Railway Parade Roundabout.

The location of both access points is shown in **Figure 2**. The access at Cambridge Avenue serves as the main access to the Glenfield Waste Services site and receives all staff and visitor traffic.

The Railway Parade access is not used by visitors or staff. This access is used to access the residential property and has been gazetted by RailCorp for rail maintenance and construction activities.



Figure 2: Site Access Location



Source: AECOM, 2012

### 2.2.2 Site operations

A visual audit undertaken by site operators in November 2010 determined that an average of approximately 84 trips per day were made by visitors in a normal operating year. During a busy year it has been observed that the number of visitor trips can rise to 129 trips per day. The nature of operations at the Glenfield Waste Services site shows that visitor trips are spread out across the day, rather than focused on any particular peak period.

The type of vehicles accessing the site range from small cars to articulated trucks. The site is B-Double access approved to the west only via Cambridge Avenue and Glenfield Road (RMS, November 2011). Based on Austroads vehicle classifications, approximately 36% of vehicles accessing the site on weekdays are small vehicles or vans, while the remaining 64% are trucks and heavy vehicles (visual audit Nov 2010). This equates to an average of 49 heavy vehicles per day during an average operating year and approximately 75 heavy vehicles per day during a busy year. Note that on the weekend, the majority of vehicles accessing the site are small private vehicles.

Approximately 54% of vehicles accessing the Glenfield Waste Services site during the week arrive from the east via Moorebank Avenue and approximately 46% of vehicles accessing the Glenfield Waste Services site arrive from the west via Glenfield Road. The origin trip distribution on the neighbouring road network is shown in **Table 2**.

Table 2: Existing average trip distribution onto the adjacent road network

Road Network	Average number of customer trips to the site each weekday	Percentage of total customer trips to the site each weekday
M5 Highway	20	25%
M7 Highway	5	6%
Campbelltown Road	2	2%
Canterbury Road	7	9%
Glenfield Road	16	20%
Hume Highway	13	17%
Moorebank Avenue	43	54%
Railway Parade	13	16%

Source: Glenfield Waste Services, November 2011

The site has approximately 15 employees arriving at 6:00am and departing at 5:00pm. This represents a minimal overall impact upon the existing traffic network. Car parking is provided on-site for employees and customers visiting the site offices.

## 2.3 Road network

The site is located close to the intersection of the M5 Motorway and M7 Motorway and has good connectivity to the sub-regional road network (including the Hume Highway, Campbelltown Road and Camden Valley Way). These roads are classified as RMS State Roads. The site accesses the wider road network via Moorebank Avenue, Glenfield Road, Canterbury Road and Railway Parade. The surrounding road network context is highlighted in **Figure 3**.

### 2.3.1 The Motorway network

The M5 Motorway provides access to the Sydney CBD and the airport to the north of the site and to Campbelltown, the Southern Highlands and Canberra to the south. The nearest interchange to the M5 Motorway from the site is located at Camden Valley Way for traffic to and from all directions, except the southbound on-ramp at Campbelltown Road. Another interchange to the M5 Motorway is located at Moorebank Avenue.

The M7 Motorway provides access to Sydney's north and west. Vehicles can access the M7 Motorway via the interchange at Camden Valley Way.

### 2.3.2 Sub-regional road network

The Hume Highway, Camden Valley Way and Campbelltown Road form the sub-regional road network in the vicinity of the site that provides direct connections to the Sydney Motorway network described above. These roads also connect the site to major centres in Sydney's South West including Liverpool and Campbelltown / Macarthur.

### 2.3.3 Local road network

Moorebank Avenue provides connectivity from Cambridge Avenue to the M5 Motorway and Holsworthy. It is a Commonwealth owned, two lane road with a posted speed limit of 60km/h.

Glenfield Road is a two lane road with a posted speed limit of 60km/h, which provides connectivity from the Hume Highway and Campbelltown Road to the site via Cambridge Avenue. Glenfield Road also connects to the local road network on its eastern end via an overpass above the Southern railway line, feeding into a roundabout which provides access to Cambridge Avenue, Railway Parade and Canterbury Road. The roundabout has two lanes, giving it enough capacity to manage continued traffic growth in the local area.

Canterbury Road is a four lane road in the vicinity of the site, providing access from the intersection of Cambridge Avenue, Railway Parade and Glenfield Road, south through the residential area of Glenfield to Macquarie Fields.

Railway Parade provides local access to Glenfield railway station and the Glenfield local shops. It runs from the intersection of Glenfield Road, Cambridge Avenue and Canterbury Road in the north, to Macquarie Fields in a south westerly direction. It is a two lane collector road with a posted speed limit of 50 km/h.

Cambridge Avenue provides primary access to the site, and provides an important linkage between Glenfield and the Holsworthy/Moorebank area. It is a two lane road with a posted speed limit of 60 km/h. The causeway section of Cambridge Avenue over the Georges River, to the east of the site could act as a potential capacity constraint to this road if traffic continues to grow in the local area.

Figure 3 Road network context



Source: AECOM, 2012

### 2.3.4 Traffic volumes

The most recent available Annual Average Daily Traffic (AADT) data (2005) collected by the Roads and Maritime Services (RMS) at two locations near the site are described below:

- 15,903 vehicles per day - Moorebank Avenue adjacent to the railway crossing.
- 12,232 vehicles per day - Glenfield Road immediately to the north of the bridge.

Vehicle flows along Cambridge Avenue are likely to be similar to those on Moorebank Avenue, as the data collection point on Moorebank Avenue is located only 700m north of the intersection with Cambridge Avenue. These levels of traffic observed at Moorebank Avenue, Glenfield Road (and likely on Cambridge Avenue) are typical of a two lane road with some reserved road capacity to cater for additional traffic.

Traffic volume data has also been obtained from a Traffic and Transport Report for Glenfield Junction TA300 (prepared by Global Arc for Transport Infrastructure Development Corporation, 2009). **Table 3** shows 2008 AM and PM peak hour traffic flows along Railway Parade, Cambridge Avenue and Canterbury Road in both directions.

Table 3: Peak hour traffic flows (2008)

Location	AM peak (vehs/hr)		PM peak (vehs/hr)	
	NB / EB	SB / WB	NB / EB	SB / WB
Railway Parade (north of Trafalgar Street)	427	253	272	483
Cambridge Avenue (east of Canterbury Road)	1,240	209	310	1,022
Glenfield Road (west of Canterbury Road)	426	604	537	477
Canterbury Road (south of Cambridge Street)	1,332	285	457	1,068

Source: Global Arc, 2009

The traffic data shows a large amount of traffic on Cambridge Avenue in the peak hours, however the hourly traffic volumes still fall within the general capacity of a two-way two-lane road (approximately 1,500 vehs/hr per lane, Austroads Standards). Significant spare capacity is experienced on Canterbury Road as this is a four lane road (with two lanes in each direction).

The report also highlights that the intersection of Glenfield Road / Canterbury Road / Cambridge Avenue performs acceptably at LoS B and A in the AM and PM peak hours respectively. The intersection also operates with spare capacity in both peak hours; approximately 28 per cent in the AM peak hour and 56 per cent in the PM peak hour.

Traffic in the area was observed as free flowing during the morning peak hour in May 2012, with the majority of vehicles travelling in an easterly direction along Cambridge Avenue toward Moorebank Avenue. It was also noted during site visits that traffic outside the peak hours was relatively light.

## 2.4 Public transport

### 2.4.1 Train services

Glenfield railway station is located approximately 1km from the site (1.9km from the Cambridge Avenue site access), providing connectivity to the wider Cityrail network. As illustrated in **Figure 4**, the station is located at the interchange of three railway lines, including:

- The South Line (Campbelltown to City Circle via Granville).
- The Cumberland Line (Campbelltown to Blacktown).
- The Airport and East Hills Line (Macarthur to City Circle via East Hills and Sydney Airport).

These lines provide access from Glenfield to the wider rail network including Campbelltown / Macarthur, Liverpool, Cabramatta, Parramatta, Strathfield, the Airport and the CBD.

Glenfield is regularly serviced by trains during peak hours, with approximately 35 city bound services between 6 am and 9am. Services on the South and Airport/East Hills lines operate with a 10 minute frequency in each direction. Services on the Cumberland line generally operate with a 30 minute frequency in each direction.

Figure 4: Glenfield Station on the Cityrail network



Source: CityRail website, 2012

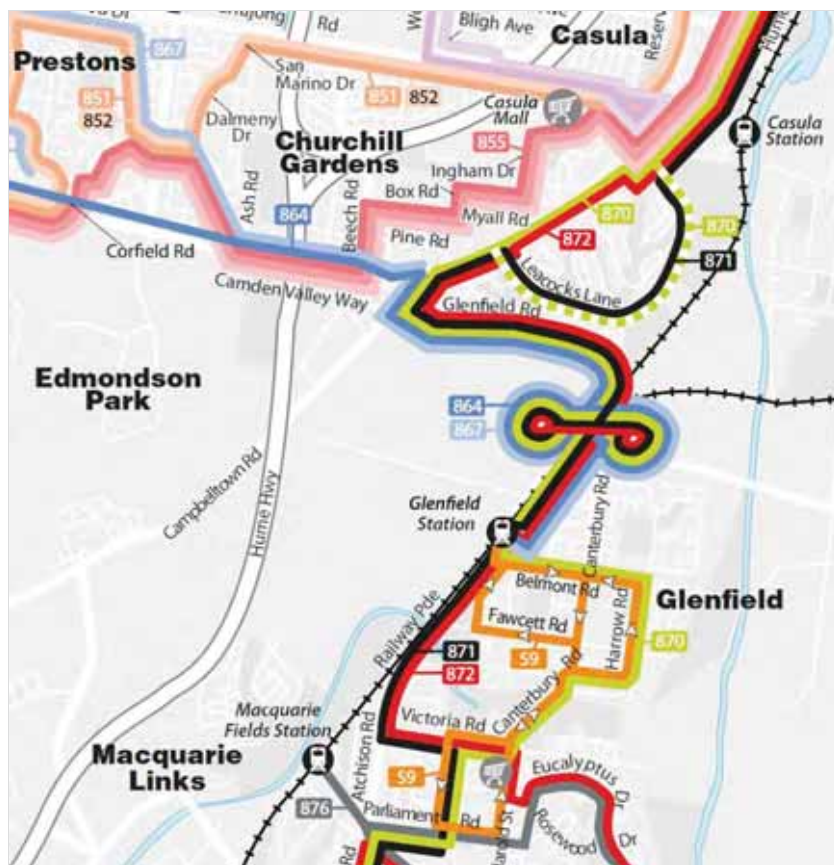
#### 2.4.2 Bus services

Bus services in the Glenfield area are provided by Busabout and Interline and are shown in **Figure 5**. There are no bus routes operating along Cambridge Avenue. The five bus routes currently serving the site operate from Railway Parade, with bus stops located approximately 300m south of the site's Railway Parade access. These services are shown below:

- Route 864 Carnes Hill – Glenfield via Horingsea Park.
- Route 867 Prestons – Glenfield via Prestons.
- Route 870 Campbelltown – Ingleburn – Liverpool via Harrow Road and Glenfield.
- Route 871 Campbelltown – Ingleburn – Liverpool via Glenfield and Leacocks Lane.
- Route 872 Campbelltown – Ingleburn – Glenfield – Liverpool via Macquarie Fields .

In general, these bus routes are providing half hourly services during the peak hours to Campbelltown, Liverpool, Ingleburn, Prestons and Carnes Hill.

Figure 5: Bus services in the Glenfield area



Source: Busabout, 2012

## 2.5 Pedestrian and cycle facilities

### 2.5.1 Pedestrian

There is a low provision of pedestrian facilities in the vicinity of the site. Georges River and the Holsworthy Barracks act as a natural barrier to walking at the eastern end of the site. However, Glenfield Station and the local shops are located within an approximately 15 to 20 minute walk from the site.

Footpaths are located along parts of nearby roads, including Railway Parade and Canterbury Road, providing access to the railway station, retail and other residential areas. There is currently an underpass leading from the site travelling beneath Cambridge Avenue that connects north of Cambridge Avenue to south of Cambridge Avenue. Pedestrian connectivity from the site to Glenfield Rail Station would need to be improved to meet the needs of any intensified land use on the site.

### 2.5.2 Cycle

The site is well located in terms of opportunities for cycling, being located close to the Liverpool-Parramatta Rail Trail and the M7 Motorway Cycleway. Together these cycleways provide approximately 60km of cycleways through Western Sydney.

Observations from site visits indicate that there are limited cycling activities in the local area. A low provision of cycle facilities in the Glenfield area means cyclists either share footpaths with pedestrians or cycle on-road. According to Council's Bike Plan, an on-road route exists along Glenfield Road from its intersection with Campbelltown Road, although no road markings exist along the route. An off-road route does exist at the southern end of Glenfield near Canterbury Road, running to Macquarie Fields. Other more informal routes also exist to the east of the Glenfield residential area, adjacent to the Georges River.

## 2.6 Summary

Based on a desktop review of available information and site observations, the following traffic and transport opportunities and constraints in the vicinity of the site are observed:

- Heavy reliance on cars in the North Campbelltown area, especially trips made to this area as a destination. This is consistent with the Draft South West Sub-regional Strategy in which it is identified that 79 per cent of trips are made by private vehicle in the South West.
- Good connectivity and direct access to Sydney's Motorway Network and the surrounding sub-arterial road network.
- Spare capacity on the surrounding local road network with flexibility of upgrading the local road network such as Cambridge Avenue to cater for some future traffic growth.
- Spare capacity at the key intersection of Glenfield Road / Canterbury Road / Cambridge Avenue / Railway Parade to cater for future traffic growth in the area.
- Good access to rail and bus services at Glenfield Station.
- Access to regional cycleway infrastructure that provides a more sustainable alternative mode of travel.
- Low provision of walking facilities in the area.

## 3.0 Planned Land Use & Infrastructure

This section of the report considers the strategic employment, land use and transport direction for the South West, planned development and potential infrastructure upgrades in the vicinity of the site and how these planned activities would affect / benefit the proposed rezoning of the site.

### 3.1 Strategic direction for the South West

#### 3.1.1 Draft South West Sub-regional Strategy

The Draft South West Sub-regional Strategy identifies an employment capacity target of 89,000 additional jobs by 2031 in the South West Sub-region. This target is broken down for the four main LGAs within the South West; Liverpool LGA (35,000 additional jobs), **Campbelltown LGA (26,000 additional jobs)**, Camden LGA (26,000 additional jobs) and Wollondilly LGA (2,000 additional jobs).

The Draft Strategy also identifies that the South West is one of two sub-regions with strongly growing industrial activities. It identifies that the Glenfield Waste Centre on Cambridge Avenue could provide Employment Land for light manufacturing, local industry and urban services.

The Draft Strategy has also identified the need to encourage growth in jobs and services in or around existing or proposed centres within the South West sub-region in order to reduce the need for cross regional trips and to reduce the need to travel by private vehicle.

In response to this, key directions for transport in the South West Sub-region have been developed including improving transport between Sydney's Centres. This includes the planned South West Rail Link (SWRL) that will connect the South West Growth Centre (SWGCC) to the existing rail network at Glenfield. This connection to Glenfield will reinforce the role of this station as an important transport interchange and gateway in the South West Sub-region and will aim to achieve an increase in public transport mode share in the sub-region.

Another key direction of the Strategy is to implement Strategic Bus Corridors that provide fast, frequent, direct and convenient bus services between Sydney's Strategic Centres. The Strategy states that the Strategic Bus Corridor services will target a 25km/hr average bus speed on each corridor and be supported by new integrated bus networks linking into the Strategic Corridors. The Strategy identifies four Strategic Bus Corridors in the South West namely; Liverpool to Parramatta Transitway (Corridor 11), Liverpool to Campbelltown (Corridor 31), Liverpool to Bankstown (Corridor 32) and Campbelltown to Camden (Corridor 32) as shown in **Figure 6**. Corridor 31 that travels between Liverpool and Campbelltown travels along Glenfield Road and Canterbury Road in the vicinity of the site. These strategic bus corridors will also aim to achieve an increase in public transport mode share in the South West.

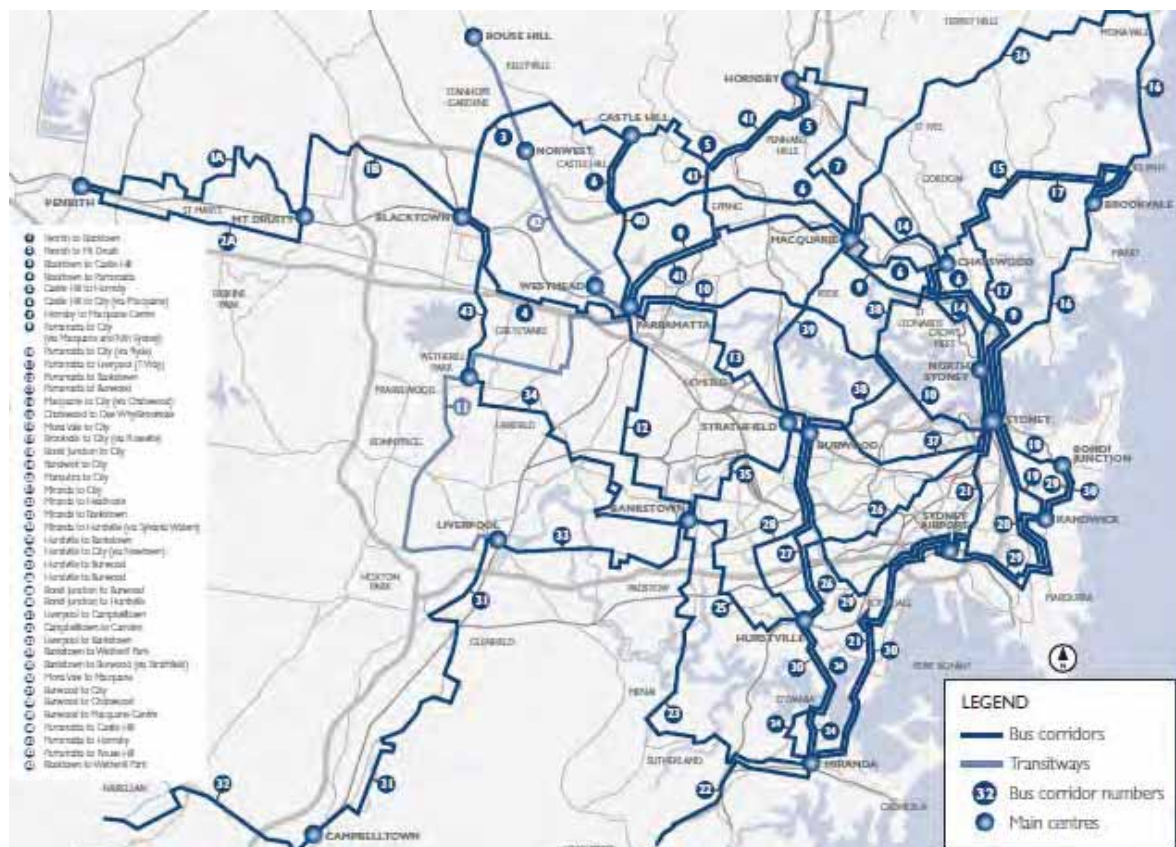
Improvements to the existing transport system have been identified including; improving reliability and increasing capacity of rail services, improving the integration of public transport and improving the operational management of existing transport networks.

The Draft South West Sub-regional Strategy also highlights that due to the low proportion of trips made by walking or cycling in the South West (12 per cent), improvement to local and regional walking and cycling networks is required by providing better facilities and a better alignment of the local walking and cycling networks with public transport routes.

This strategy sets the direction for future development at this site, supported by significant public transport network investment, aiming to improve accessibility to this site and reduce car reliance in the area.



Figure 6: Strategic bus corridors



Source: RMS, 2012

### 3.1.2 South West Sector Bus Servicing Plan

The South West Sector Bus Servicing Plan identifies a short term and long term bus route that will travel in the vicinity of the site. The short term proposed bus service (route 858) will travel between Glenfield Station and Ingleburn via Canterbury Road and Glenfield Road. The long term bus route (P2) will also travel along Canterbury Road and Glenfield Road between Glenfield Station and Leppington every 15 minutes in the peak periods. These bus routes will provide a additional connections between the site and Glenfield Station.

## 3.2 Planned development

### 3.2.1 Moorebank Intermodal Terminal Facilities

Two intermodal terminal facilities have been proposed on Department of Defence land and privately owned land in Moorebank. The proposed facility to the east of Moorebank Avenue is privately owned by the SIMTA alliance, while the Commonwealth Government is planning to develop a larger intermodal terminal to the west of Moorebank Avenue. The Commonwealth intermodal terminal facility site is proposed to be located on a 220 hectare parcel of land currently occupied by the School of Military Engineering (SME) and other Department of Defence uses, to the west of Moorebank Avenue.

The location of the Moorebank Intermodal Terminal Facilities is shown in **Figure 7**.

The SIMTA intermodal proposal would have a capacity of 1 million containers per year (twenty foot equivalent), while the Commonwealth proposal would be expected to have a capacity of 1.5 million per year.

The Moorebank area is well positioned for intermodal terminal facility development due to its positioning near the proposed Southern Sydney Freight Line, as well as the regional road network including the M5 and M7 Motorways. High industry growth rates in Western Sydney will see greater demand for these facilities, and will serve to take truck movements off Sydney's roads.

It is anticipated that the Moorebank Intermodal Terminal will have the effect of reducing the number of truck movements between Port Botany and Moorebank along the M5 corridor in the order of 2,700 movements per day.

Figure 7: Planned development in the vicinity of the site



Source: AECOM, 2012

A new rail link is proposed to connect the new terminal facility site with the Southern Sydney Freight Line, taking a significant number of trucks currently travelling to Port Botany off inner Sydney roads. The SIMTA facility would accommodate 300,000 square metres of offices and warehousing space, as well as 8,000 square metres of driver facilities. Approximately 2,260 employees would work on site at full development (Hyder, 2011).

The Environmental Impact Assessment prepared for the SIMTA intermodal proposal highlights that there will be a number of potential traffic and transport impacts, including truck traffic generation and employee trip generation. The site could generate up to approximately 2,600 daily truck movements at full development, with approximately 3,600 daily car movements to the site during a 24 hour average weekday. The Traffic Assessment for the SIMTA intermodal proposal details that the traffic distribution will result in 98% of traffic travelling north along Moorebank Avenue to the M5, while two percent would travel south, past the Glenfield Waste Services site.

Using the daily truck and car movement figures provided in the Traffic Assessment, it can be estimated that there could be 124 movements per day past the site as a result of the development of the SIMTA Intermodal Terminal Facility. Taking into consideration current traffic levels along Cambridge Avenue, these additional movements would not be expected to have significant adverse impacts to the road near Glenfield Waste Services, preserving the majority of the existing reserved capacity on the surrounding road network between the site and Campbelltown Road.

On the other hand, the cumulative impacts of SIMTA and the Commonwealth intermodal terminal facility on the surrounding area may represent a significant traffic impact. The impacts of the Commonwealth Intermodal Terminal Facility are currently being quantified with an Environmental Impact Statement (EIS), including the investigation of traffic, transport and access issues. Once the EIS is completed, more details will be available in relation to traffic impacts on the surrounding road network. Note that given the constraint of the Georges River causeway, it is expected the majority of the traffic generated by the Commonwealth intermodal terminal facility will be directed toward the M5 Motorway.

### 3.2.2 Glenfield Road residential development area

The Glenfield Road residential development area lies south of Glenfield Road between the railway corridor and Campbelltown Road, as shown in **Figure 7**.

It provides for low density and town house residential development, and is one of the largest urban release areas in the Campbelltown Local Government Area. As part of the precinct's Development Control Plan (DCP), the development must increase opportunities for choice in mode of transport by ensuring all lots are within 400 metres of a serviced bus stop. The development must also encourage walking and cycling by providing safe, convenient and legible movement networks within and beyond the development, resulting in a developed network of pathways west of the site towards Campbelltown Road.

## 3.3 Planned infrastructure

### 3.3.1 Campbelltown Road upgrade

Roads and Maritime Services (RMS) are currently planning to upgrade Campbelltown Road between Camden Valley Way (at the Cross Roads) and Denham Court Road. The upgrade is 5.1km in length, and is aimed at improving road safety and operational efficiency as well as meeting the future land use and traffic demands of the South West Growth Centre (SWGCG).

Campbelltown Road is a 13.5km corridor running north-south between Camden Valley Way to the north and Moore Street to the south. The road functions as an arterial road linking major urban and rural areas and is an integral component of the transport network in the south-west region of Sydney. The corridor is the main road through the suburbs of Edmondson Park, Denham Court, St Andrews, Raby and Woodbine.

The concept design for the proposal would include the following key features:

- General widening to four lanes (two lanes in each direction) with a wide central median.
- The wide central median will allow for future widening to six lanes, when required in the future.
- Three new signalised intersections for improved access with the Edmondson Park precinct and town centre including a new railway station and bus interchange.
- The existing roundabout at Denham Court Road would be replaced with a signalised intersection.
- Duplication of a bridge over F5 Freeway/Hume Highway for widening Campbelltown Road.
- Improved safety by providing a divided carriageway, shared path and pedestrian crossings at signalised intersections.
- Improved public transport by providing improved access to the Edmondson Park station on the South West Rail Link.
- Urban design, including landscaping, an off-road shared pedestrian and bicycle path, integrated with the planning of the Edmondson Park development.

This road upgrade will provide additional capacity to the Campbelltown Road corridor (particularly at the intersection at Glenfield Road) required to cater for the likely traffic generated by the South West Growth Centre. The proposed shared path facilities and pedestrian crossings at signalised intersections proposed as part of this upgrade will improve pedestrian and cycle accessibility to the wider network.

### 3.3.2 South West Rail Link (SWRL)

In 2009, the NSW Government announced the construction of a new 11 kilometre rail line – South West Rail Link (SWRL) from Glenfield to Leppington in South West Sydney. The project includes upgrades to Glenfield Rail Station and the line itself as it passes through the Glenfield Waste site.

The SWRL will enhance opportunities for public transport travel to and from Glenfield, as such the planning of the site should maximise the opportunity presented by this new infrastructure to minimise the need for car travel.

Upon completion, the total number of services through Glenfield Station during the weekday peak hour will increase from eight to a maximum of 12. By the year 2020 the number of services is forecast to rise to 20 during the weekday peak hour. This improved rail accessibility will enhance public transport opportunities for the site and likely result in an increase in mode share for rail users.

### 3.3.3 Glenfield Transport Interchange upgrade

The Glenfield Transport Interchange comprises an upgrade to Glenfield Station to accommodate the introduction of the planned South West Rail Link, as well as the construction of a multi-storey commuter car park. The project is currently under construction, with completion due in 2013. The improvements to Glenfield Station aim to enhance interchange facilities including a new station building and enhanced bicycle facilities (Global Arc, 2009).

The upgrade includes changes to Railway Parade to offer enhanced interchange opportunities. This will be achieved through:

- Enhanced bus facilities, including priority bus measures.
- Increased provision for kiss and ride.
- Improved pedestrian crossing opportunities.
- Widening of the Railway Parade cycle lanes to 1.5 metres.

The provision of additional commuter parking will result in an overall increase from 720 to 1,254 spaces located in Roy Watts Road, Railway Parade and Seddon Park.

The Glenfield Transport Interchange upgrade aims to increase the attractiveness of public transport services to meet expectations of regular users, as well as increase its mode share of travel to and from the area. Any increase of public transport mode share to the site would reduce private vehicle trips, and reduce any subsequent traffic impact on the local road network.

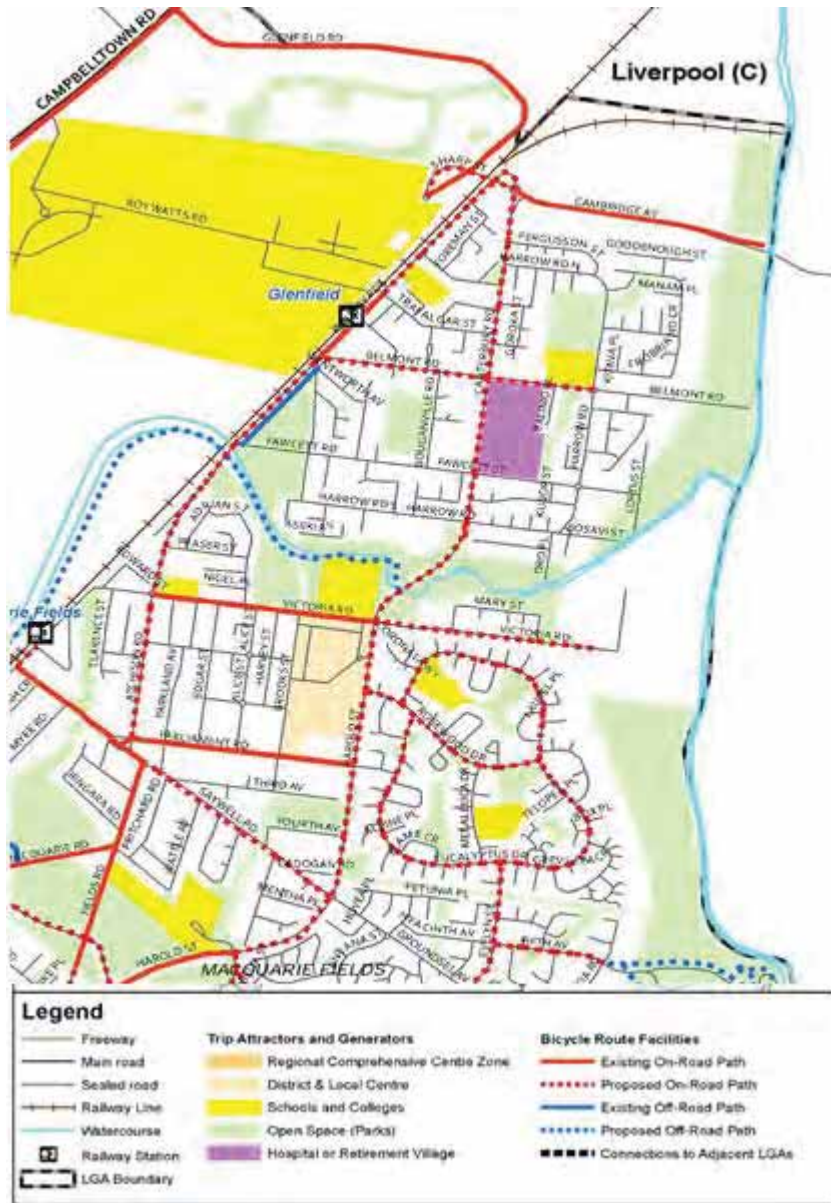
The Draft South West Sub-regional Strategy identifies that the planned South West Rail Link (SWRL) will connect the South West Growth Centre (SWGC) to the existing rail network at Glenfield. This connection to Glenfield will reinforce the role of this station as an important transport interchange in the South West Sub-region facilitating transfers between services on the East Hills Line, the Main South Line and the Cumberland line and will help to achieve an increase in public transport mode share in the South West.

### 3.3.4 Planned walking and cycling infrastructure

Campbelltown City Council has a footpath improvement program in place to identify areas of path which need to be replaced, as well as determine where new footpaths could be provided to achieve maximum use. Council uses a weighting system to assess which areas of footpath to upgrade, as well as where new footpaths should be situated.

Campbelltown City Council's Bike Plan provides details of where cycle facility upgrades are planned to be located in the vicinity of the study area, as shown in **Figure 8**. The on-road bicycle lane along Railway Parade is planned to be extended further north to the site, as well as south to Macquarie Fields. An on-road route is also planned to extend down Canterbury Road, from the intersection with Cambridge Avenue in the north, connecting to the wider network in Macquarie Fields and Ingleburn. These new cycle routes will provide enhanced connectivity to the site for cycle commuters, and provide greater incentive for workers to shift from private car to bicycle travel.

Figure 8: Cycleway network, current and planned facilities



Source: Campbelltown City Council, 2012

The NSW Bike Plan also identifies a regional proposed cycle route between Liverpool and Campbelltown as shown in **Figure 9**. The proposal along the Hume Highway and the M5 Motorway will improve general attractiveness and accessibility to cycle to the proposed site.

Figure 9: NSW Bike Plan



Source: TfNSW, 2010

## 4.0 Proposed site use

The current proposal is to rezone the 60ha site within the Campbelltown City Council LGA from its current 1(a) Rural A Zone to a 'IN1 General Industrial' Zone, which permits the site to be used for industrial purposes.

The existing operations at Glenfield Waste Services are to be retained at the existing level. Services and facilities within the site will be shifted to Glenfield Waste Services land immediately to the north (within the Liverpool City Council LGA) of the site where operations will be consolidated.

The proposed land use would also help to achieve the State Government's employment targets as outlined in the Draft South West Sub-regional Strategy and as discussed in **Section 3.1.1**.

### 4.1 Proposed development yield

Of the 60ha site considered, certain areas are considered not appropriate for future development including:

- Approximately 12ha of land south of Cambridge Avenue (due to the transmission easement).
- Approximately 3ha of land adjoining the Georges River.
- Approximately 15 hectares of land fill that includes the area between the East Hills Railway Line and Council's LGA boundary.
- Approximately 2 hectares for setbacks, buffers, open space and infrastructure including required setbacks to existing rail lines.

Therefore, the total amount of developable area on this site is approximately 28 ha. The land considered for rezoning is shown in **Figure 10**. The proposed land uses include large scale industrial warehouses, which are intended to capitalise on the excellent accessibility of the site to the regional transport network and its proximity to the proposed Moorebank Intermodal Terminal Facilities.

**Figure 10** Indicative site layout (yet to be confirmed)



Source: EPS, 2012

The anticipated number of employees forecast to occupy the site depends upon the refined developable area, the final Floor Space Ratio approved in the master plan and the specific type of businesses operating on site. Since these are not yet known, the following lower and upper estimates of potential employment numbers have been made:

- Lower estimate: 780 employees. This is based upon 28 employees per developable hectare (RTA Guide to Traffic Generating Development 2002).
- Upper estimate: 1,250 employees. This is based upon an estimate of GFA and FSR on the site whereby:
  - The estimated GFA is approximately 200,000sqm with estimated FSR of 1:1 (other than 15ha which is 0.3:1).
  - The estimate of employee density at the site is 1 employee per 160sqm GFA (based on the typical warehouse employment densities expected at the site).

## 4.2 Proposed site access

The number and nature of vehicles entering the site in the future will result in additional access requirements, particularly as the number of heavy vehicles accessing the Glenfield Waste Site will be maintained at existing levels. In addition, it is unlikely that the secondary access from Railway Parade will be able to accommodate any significant increase in additional movements.

Therefore, it is proposed that an additional access to be provided at Cambridge Avenue (to the west of the existing access), as shown in **Figure 7**. This new access will be the primary access to the new industrial and warehouse site, which segregates from the existing heavy vehicle access to the Glenfield Waste Site. A new access point at Cambridge Avenue should be feasible given its straight horizontal alignment. The exact location and form of the access will be subject to further assessment and detailed design once the final land uses and development areas are confirmed at the development application stage.

## 4.3 Proposed car parking

Car parking spaces for future employees and visitors of the new industrial and warehouse development will be provided on-site based on the car parking requirements of the relevant Development Control Plan (DCP).

To provide an indicative assessment, it is currently estimated that on site car parking requirements will be in the order of 1,300 total spaces. This is based upon an assumed floor area of 200,000 square metres with a ratio of 10% office use and 90% warehouse use.



## 5.0 Potential Impacts

This section provides a summary of potential impacts that may stem from the rezoning of the site for industrial type employment uses. At this preliminary stage, the assessment is strategic in nature and the findings of this section will require further analysis at the development application stage to determine detailed traffic impacts of the site.

### 5.1 Potential trip generation

The RTA (RMS) Guide to Traffic Generating Developments (2002) notes that the amount of trips generated by industrial land use is highly variable depending upon the specific number and type of business operating on site. As the specific type of business is not known, general industrial land use trip generation guidelines have been followed as outlined within the document.

For the purpose of this review, the likely employment numbers of the site has been assumed to be ranging between 780 and 1,250.

Trip generation estimates have been determined based upon the number of employees as outlined above and Table 3.4 in the RTA Guide for Traffic Generating Developments (2002). Based on the trip generation distribution of industrial estates for a situation of 1000 employees in a wide range of factory types, the indicative trip generation rates are as follows:

- 0.318 total trips per employee during the AM peak hour of (8-9am).
- 0.365 total trips per employee during the PM peak hour of (5-6pm).
- 2.3 total trips per employee during a typical day (7am to 7pm).

The indicative trip rates suggested that approximately 14 per cent of the expected daily trips will be generated during the AM peak hour and approximately 16 per cent of the expected daily trips will be generated during the PM peak hour, with the rest of the trips spread out throughout the rest of the day.

The total likely trip generation for the overall (proposed industrial and existing use) use of the site is summarised below (**Table 4**):

**Table 4: Likely Trip Generation**

Time Period	Estimated Employment Number	Indicative Industrial Trip Rates	Additional Industrial Trips (Range)	Retained Waste Site Trips	Likely Total Trips (Range)
AM Peak (hr)	780 – 1,250	0.318	250 - 400	7*	260 - 410
PM Peak (hr)		0.365	280 - 460	15*	300 - 470
Standard Weekday (7am-7pm)		2.3	1,800 - 2,880	126*	1,920 – 2,880

\*- Includes recorded visitor trips to the Glenfield Waste Site as well as staff trips.

Source: RTA (RMS) Guide to Traffic Generating Developments 2002

Based on the potential employment level of the site, it is estimated that the site could generate up to an additional 470 trips in the PM peak hour and 2,880 trips in a typical weekday.

## 5.2 Potential impacts and mitigation

### 5.2.1 Car

Given the estimated future trip generation represents an increase on the existing situation, there is likely to be some impact upon the local traffic network. Further work will be required to assess intersections at key locations likely to be impacted by the additional traffic generated under proposed future conditions. This includes traffic generated by both the site and neighbouring developments such as the Moorebank Intermodal Terminal Facilities.

However, intersection analysis undertaken in 2008 on the Cambridge Avenue / Canterbury Road / Glenfield Road intersection indicates that the intersection performs acceptably and with spare capacity in both peak hours. Further assessments are needed to ensure the road network and other transport infrastructure is able to accommodate future traffic demands.

Based on the potential employment level of the site, it is estimated that the site could generate up to an additional 470 trips in the PM peak hour and 2,880 trips in a typical weekday. It should be noted that the trip generation could be varied based on the refined developable area, the final Floor Space Ratio approved in the master plan and the specific type of businesses operating on site.

Of these likely additional trips to the future site, some of the key routes leading to the site would include:

- M5 / M7 Motorway – Camden Valley Way / Hume Highway – Campbelltown Road – Glenfield Road – Cambridge Avenue.
- Pembroke Road – Minto Road – Collins Promenade – Harold Street – Canterbury Road – Cambridge Avenue.
- Moorebank Avenue – Cambridge Avenue.

Considering the level of existing vehicle flows and the likely trip generation, further study will be required into the ability of Cambridge Avenue to accommodate future traffic demands expected to be generated by both the site and neighbouring developments such as the two proposed Moorebank Intermodal Terminal Facilities. Other potential constraints that should be further investigated include:

- Campbelltown Road / Glenfield Road signalised intersection.
- Glenfield Road roundabouts and railway bridge.
- Glenfield Road / Canterbury Road / Cambridge Avenue roundabout.
- Cambridge Avenue causeway over Georges River.

However, the trip generation for private vehicles is based on proposed floor area and number of employees. It does not take into full account the proximity of the site to Glenfield Station and frequent train and bus services that would service the station, which would potentially reduce the number of trips by private vehicle, as outlined in the Draft South West Sub-regional Strategy and South West Sector Bus Servicing Plan. These public transport infrastructure upgrades combined with improvements to the walking and cycling network in the study area would also help to reduce the amount of private vehicle trips, thus reducing the impact to the local road network.

Travel Demand Management (TDM) measures could also be implemented at the site including preparation of a Work Place Travel Plan for employees at the site. A Work Place Travel Plan includes initiatives and measures aimed at reducing the need to travel by private vehicle and encouraging travel by public and active transport, which in turn would also reduce the impact to the local road network.

### 5.2.2 Walking

Assuming (on the basis of current journey to work mode split proportions) that between two and five per cent of the employment population of the site would walk to work, this would be between 20 and 60 pedestrians. There will also be an additional five to eight per cent train commuters that could also walk between Glenfield Station and the proposed site. This could add up to another 100 pedestrians on the surrounding network.

Footpaths should be provided along Cambridge Avenue to provide connectivity between the site and the surrounding residential areas within the walking catchment of the site. A safe and efficient pedestrian connection to Glenfield Station should be encouraged to maximise the walking population to the site.

A pedestrian connection should be considered between Goodenough Street and Cambridge Avenue (connecting to the existing underpass beneath Cambridge Avenue that could link to the site) to reduce walking distances to Macquarie Fields and to provide an alternative route to Glenfield Station. The opportunity to create a pedestrian connection along Georges River adjacent to the site should also be considered. This may in future assist in the development of a leisure trail to connect adjacent communities.

The layout of the site should include footpaths on all roads, in accordance with relevant guidance including Planning Guidelines for Walking & Cycling Guidelines (Department of Planning, 2004) and Guide to Traffic Engineering Practice Part 13: Pedestrians (Austroads, 1995).

### **5.2.3 Cycling**

As with walking trips, cycle access to the site would likely be in the order of two to five percent. This would equate to between 20 and 60 trips. All cycle facilities should be provided in accordance with the NSW Bicycle Guidelines (RTA, 2003).

Within the site, consideration should be given to cyclists. Due to the likely high proportion of heavy goods vehicles, off-street shared paths may be appropriate. Cycle connections would be required to connect local communities. This would likely include a cycleway on Cambridge Avenue, the form of which (on-street or off-street) would need to be confirmed when likely vehicle numbers on Cambridge Avenue are known.

Further from the site, the opportunity exists to link the site to other regional cycleway including the M7 Cycleway. This will improve the attractiveness of future workers to cycle to and from work in a safe environment.

### **5.2.4 Bus**

At current mode splits, bus use to the site would be minimal with some 10 to 20 passengers in the morning peak hour (or 6 passengers per bus at a 30 minute frequency).

A number of opportunities exist to improve bus mode share from current levels such as:

- Improving bus services (frequencies to existing bus routes) to Glenfield Station to match the potential increase in train patronage due to the completion of Glenfield Transport Interchange and the South West Rail Link (consistent with the South West Bus Servicing Plan).
- Extending / diverting existing bus services to operate along Cambridge Avenue and Moorebank Avenue to service significant increase in employment population of the site and the Moorebank Intermodal Terminal Facilities, linking these new employment areas with Campbelltown, Liverpool and Glenfield.

These opportunities should be further discussed with Transport for NSW and local bus operators. They would encourage people working within the site to take public transport as an alternative to the private car, serving to alleviate trips generated by the site.

The internal road network should also be designed to accommodate bus operation such that a shuttle bus service can be operated between Glenfield Station and the site, prior to the warrant of the extension of a local public bus service.

### **5.2.5 Rail**

Rail is likely to account for around five to eight percent of journeys to the site. These levels are similar to those for walking and cycling modes and could equate to up to 100 people travelling by train during the peak hours, depending on the employment projections.

This level of demand is likely to be accommodated within existing rail services as well as the expected service / capacity improvements due to the completion of South West Rail Link. Connectivity between the site and Glenfield Station will be important to maximise the rail potential of the site.

It should also be noted that the commission of the SWRL can potentially increase the amount of employees that live in the SWGC to travel to work by train. This will further reduce the amount of vehicular trips generated on the surrounding road network.

## 6.0 Summary and Recommendations

AECOM has been engaged by L.A Kennett Enterprises to undertake a traffic and transport review of a 60ha site within the Glenfield Waste Services operational land area in support of a rezoning submission report for Campbelltown City Council (Council). This will form part of Council's preparation of a Standard Instrument Local Environmental Plan (SILEP) for the Campbelltown LGA.

Based on a desktop review of available information and site observations, a number of traffic and transport opportunities and constraints in the vicinity of the site are observed:

- Heavy reliance on cars in the North Campbelltown area, especially trips made to this area as a destination.
- Good connectivity and direct access to Sydney's Motorway Network and the surrounding sub-arterial road network.
- Capacity on the local road network with flexibility of upgrading the local road network such as Cambridge Avenue to cater for some future traffic growth.
- Spare capacity at the key intersection of Glenfield Road / Canterbury Road / Cambridge Avenue to cater for future traffic growth in the area.
- Good access to rail and bus services at Glenfield Station.
- Access to regional cycleway infrastructure that provides a sustainable alternative mode of travel.
- Low provision of walking facilities in the area.

The site occupies an area with good public transport access, with the Glenfield Rail Station and bus stops within practical walking distance of the site. It is also likely that public transport services will be enhanced in the future as SWRL is completed and a number of other major developments are being considered in the vicinity of the site, including the two Moorebank Intermodal Facilities that should be developed with a package of infrastructure upgrades and public and active transport measures to minimise the reliance of car trips and to reduce the impacts on the surrounding road network.

Based on assumptions regarding building densities and employment ratios, the site is likely to employ between 780 and 1,250 employees. This is expected to generate between 280 and 460 private vehicle trips during the evening peak hour. However this number is likely to be less in reality as it does not take into full account the site's high level of accessibility to public transport including the SWRL and improvements to bus services as Glenfield Station. The number of private vehicle trips is also likely to be reduced further due to the planned future public and active transport infrastructure and initiatives.

On the basis of the preliminary review, the site would appear to be appropriate for "IN1 General Industrial" from a transport perspective, subject to further detailed traffic impact assessment to determine the capacity of the existing road network and identify the extent of required infrastructure improvements. This includes:

- Obtaining detailed traffic data to ascertain the level of spare capacity on the existing road network.
- Refining detailed land uses and projections for site occupancy (employment, floor area).
- Focusing on improving public transport infrastructure to encourage a shift away from private car use.
- Reviewing bus operations in the vicinity of the site in conjunction with Transport for NSW and bus operators.
- An investigation into the opportunities for linking the site to walking and cycling networks in the area, particularly to Glenfield Rail Station.
- Detailed trip generation and trip distribution by all modes of transport.
- Understanding likely impacts of Moorebank Intermodal Facilities.
- An assessment of the intersections likely to be impacted by future traffic volumes.
- A detailed assessment of site access requirements.
- Consultation with all relevant transport stakeholders.

Aside from the potential impacts to the local road network the site might produce, it should be noted that the site would be contributing to the State Government's employment targets as outlined in the Draft South West Sub-regional Strategy. The fact that the site is located close to public transport and has the opportunity to increase active transport to and from the site strengthens its appropriateness for "IN1 General Industrial" land use.