

**TRAFFIC IMPACT ASSESSMENT REPORT**

**FOR**

**GLASS RECOVERY SERVICES  
PREMISES**

**AT**

**126 ANDREWS ROAD  
PENRITH**

Ref. 14146r2

July 2015

Prepared By

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## 1.0 INTRODUCTION

Transport and Urban Planning has been engaged by Langford Environmental on behalf of Glass Recovery Services Pty Ltd to undertake a traffic impact assessment for the planned increased production of their glass recycling facility located at 126 Andrews Road, Penrith.

Approval has previously been granted to operate a glass resource recovery facility for up to 150,000 tonnes of glass per year. This report assesses the traffic impact of increasing the maximum throughput to 200,000 tonnes per year.

This report has been prepared in accordance with the RMS Guide to Traffic Generating Developments (2002), Austroads Guide to Road Design and takes into account the previous consent conditions for the current plant operations. The report is structured as follows;

- Section 2 describes the existing site and access arrangements;
- Section 3 identifies the nearby road network;
- Section 4 details the proposed development upgrade and identifies the expected future traffic generation and parking requirements;
- Section 5 assesses the traffic impact of the proposed increased throughput of the plant;
- Section 6 presents conclusions.

## 2.0 THE SITE AND ACCESS

The site is located on the southern side of Andrews Road approximately midway between Castlereagh Road and Richmond Road within the Penrith Local Government Area. See **Figure 1** and **2**.

The site is described as Lot 1 in DP 747153 and is occupied by an existing industrial building and on site car parking.

There is a large existing industrial building on the site, of approximately 7,200m<sup>2</sup>. Access doorways are along the two sides and rear. Stockpiles of processed cullet surround the building.

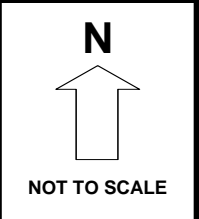
The site has good access from Andrews Road (see photographs below) via an 8.0 metre wide 2 way access road which is 60 metres in length, before entering the site via an 8 metre wide gate.

Sight distances to and from Andrews Road are good and comply with Austroad/RMS requirements for a 70km/h speed limit.

The current approval includes a condition requiring the access at Andrews Road to be upgraded, by widening Andrews Road to create a basic right turn facility (BAR treatment as per Austroads Guide to Road Design – Part 4A). A concept plan of this facility is included in **Appendix 1**. Provision of a widened road and right turn facility will ensure safe and efficient access.



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**FIGURE 1**  
 126 ANDREWS ROAD,  
 PENRITH  
**SITE LOCATION**  
 JOB NO. 14146R2



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**N**



NOT TO SCALE

**FIGURE 2**

126 ANDREWS ROAD,  
PENRITH

**SITE LOCATION**

JOB NO. 14146R2



1. Existing 8.0 metre access to Andrews Road



2. Existing 8.0 metre two way access from Andrews Road

### 3.0 ADJOINING ROAD SYSTEM

#### 3.1 Andrews Road

Andrews Road adjoining the site is currently an undivided 2 lane road with a 7.0 metre pavement between painted edge lines and 1 to 2 metre sealed shoulders. The road alignment is generally level with good sight lines and a 70km/h speed zone applies. As mentioned in Section 2, a road widening proposal is planned to create a BAR treatment at the subject site access.

The intersection of Andrews Road and Laycock Street is 160 metres east of the subject site's driveway. It has recently been widened to provide protected left and right turn lanes on Andrews Road, significantly improving the safety and efficiency of the intersection.

Andrews Road is a regional road whilst Castlereagh Road (to the west) and Richmond Road (to the east) are both classified main roads. The intersection of Andrews Roads with Castlereagh Road is controlled by a large multilane roundabout, while Andrews Road at Richmond Road is controlled by traffic signals.

#### 3.2 Daily Traffic Volumes

A one week traffic count was undertaken in March 2012 on Andrews Road near the site. As three years have passed, a growth factor of 3% has been applied to the results, which are summarised in the following table.

**TABLE 3.1**

#### **ANDREWS ROAD 2015 TRAFFIC VOLUMES**

Period	Eastbound	Westbound	Combined
<b>AM Peak Hour 8am – 9am</b>	284	394	678
<b>PM Pea Hour 5pm – 6pm</b>	416	316	732
<b>Average Weekday (5 day)</b>	4,424	4,669	9,093
<b>Average Daily (7 day)</b>	4,150	4,424	8,574

In addition the daily tube counts indicate that up to 16% of all vehicles utilising Andrews Road are heavy vehicles.

#### 3.3 Existing Road Capacity

The RMS Guide to Traffic Generating Developments (October 2002) (page 4-5) provides Levels of Service (LOS) measures on urban roads as follows:

**TABLE 3.2****URBAN ROAD PEAK HOUR FLOWS PER DIRECTION**

Level of Service (LOS)	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

Directional hourly volumes shown in Table 3.1 indicate LOS C applies to Andrews Road from 8am – 9am and from 5pm to 6pm, and LOS B applies for all other business hours. This is generally accepted as a satisfactory level of service for traffic operations.

The tables also show that there is a considerable amount of spare capacity on Andrews Road, with LOS D not reached until 600 vehicles per hour, while the peak one way flow currently is 416 vehicles per hour.

### 3.4 Public Transport

The site is within 4.0km by road from Penrith Railway Station. Route bus services in the area link to Penrith railway station. Bus routes 678, 783 and 786 have stops in Laycock Street or Greygums Road near the subject site, while route 673 buses pass the subject site along Andrews Road, between Penrith and Cranebrook.

## 4.0 DEVELOPMENT PROPOSAL

The proposed development will involve the following:

### 4.1 Proposal/Use

The continued use of the site as a glass beneficiation plant.

The glass beneficiation plant will have its maximum throughput increased from 150,000 tonnes per annum to 200,000tpa.

The number of employees will typically be 26 persons over a 24 hour cycle, with three shifts. The existing facility operates 24 hours per day, Monday to Sunday.

The glass for recycling is received by trucks and stored inside the building. Colour separated and crushed glass (cullet) is then stored externally in aboveground bunkers and stockpiles. The cullet will be transported to an adjoining glass bottling plant using trucks travelling the short distance along Andrews Road between the two sites.

Trucks use a weighbridge located on the western side of the building as they enter and leave the site.

### 4.2 Truck Access

All truck traffic to and from the site is via Andrews Road, and utilises the state road network, Richmond Road to the east with some limited use of Castlereagh Road to the west. Both these roads link directly to the M4 Motorway and/or Great Western Highway.

### 4.3 Proposed Truck Movements

Glass bottles are brought to the site using a variety of truck types up to and including B doubles and enter via the weighbridge. The trucks will travel to the rear of the building and enter, unloading the bottles into ground level hoppers.

The glass bottles are processed to achieve the following:

- Separation by colour; and
- Size reduced down to cullet, which has the appearance of coarse sand.

Information regarding the types, frequency and hourly distribution of trucks has been provided by company management based on their records of current operations. Note that the actual recorded hourly distribution of truck movements differs from the forecasts in the traffic impact report prepared for the original plant D.A., producing different peak hour truck volumes. Average incoming delivery truck trips based on a projected capacity of 200,000 tonnes p.a. follow:

- 8t Trucks: 10% of total tonnage
- Articulated 29t Trucks : 75% of total tonnage
- B-double 42t Trucks: 15% of total tonnage

The following hourly distribution applies:

- 45% of trucks arrive between 6am and 8am
- 45% between 8am and 4pm
- 10% between 4pm and 5pm

An annual tonnage of 200,000 indicates an average of 548 tonnes of glass material will be processed per day. The forecast truck trips are shown in Table 4.1.

**TABLE 4.1****TRUCK FREQUENCY DATA – INCOMING MATERIAL**

Truck Type	% of Total Annual Tonnage	Annual Tonnage	Daily Tonnage	Truck Capacity (T)	Truck/Day	6am - 8am	8am - 4pm	4pm - 5pm
8t Truck	10	20,000	55	8	7	3	3	1
Truck & Dog	75	150,000	411	29	14	6	6	1
B-double	15	30,000	82	42	2	1	1	0
Total	100	200,000	548		23	10	10	2

This table shows an average of 23 delivery truck trips per day is expected, with peak hour trips of 5 in the AM and 2 in the PM. Note that each trip is one movement in and one movement out.

- **Outgoing Material**

All of the recycled product (cullet) will be transported out of the subject site in articulated trucks or B-doubles to the Owen Illinois site approximately 400 metres to the west of the subject property. All these trips will involve laden trucks making a left turn out of the driveway from 126 Andrews Road, then a left turn into the adjoining property. The return journey will be made unladen.

As these trucks have an average capacity of 35t, the average number of trips per day will be 16. These trips are expected to be evenly distributed across each day between 6am and 5pm, giving an average volume of 1.5 trips per hour.

The daily operation of the plant is quite even with little variation in day to day throughput, and hence the above average truck volumes and times of arrival and departure are typical of most days.

#### 4.4 Hours of Operation and Staffing

The facility operates 24 hours a day and 7 days a week. The staffing levels are 26 full time positions dispersed over 24 hours as follows:

- Office Staff – Business hours Monday – Friday (2 persons)
- Plant Staff – 3 x shifts, 7 days a week (8 staff per shift)
  - Day shift 7.00am to 3.00pm
  - Afternoon shift 3.00pm to 11.00pm
  - Night shift 11.00pm to 7.00am

The proposed increased throughput to 200,000tpa does not require any increase in staff numbers.

Daily staff movements over 24 hours are expected to be up to a maximum of 52 vehicle trips per day. In the AM peak hour, the 7.00am shift change plus arriving office staff will produce a maximum of 8 car movements out of the site and 10 in. In the PM peak hour, the reverse will apply, with 10 car movements out of the site and 8 in. While the shift changes do not coincide with the highest peak activity on Andrews Road, intersection modelling will use these volumes to model a worst case scenario.

## 4.5 Car Parking

The existing site layout includes a large car parking area at the front of the site for about 106 cars. This number of spaces exceeds Council's code requirements which indicate 96 parking spaces are required at a rate of 1 per 75m<sup>2</sup> GFA.

However as detailed in the previous section the peak staff number during office hours is 10 people, and even if it is assumed that all staff drive individual cars to the site and at shift change time both shifts are on site, the maximum parking demand is 2 office staff plus 2 x 8 person shifts = 18 cars. This number is higher than what usually occurs due to car sharing or alternate transport modes used by some staff.

Consequently the car parking supply is much higher than the operation requires and some of the car parking is occasionally used for ancillary business purposes. However, the full amount of car parking will remain available for any future alternate use of the site.

## 5.0 TRAFFIC IMPACT ASSESSMENT

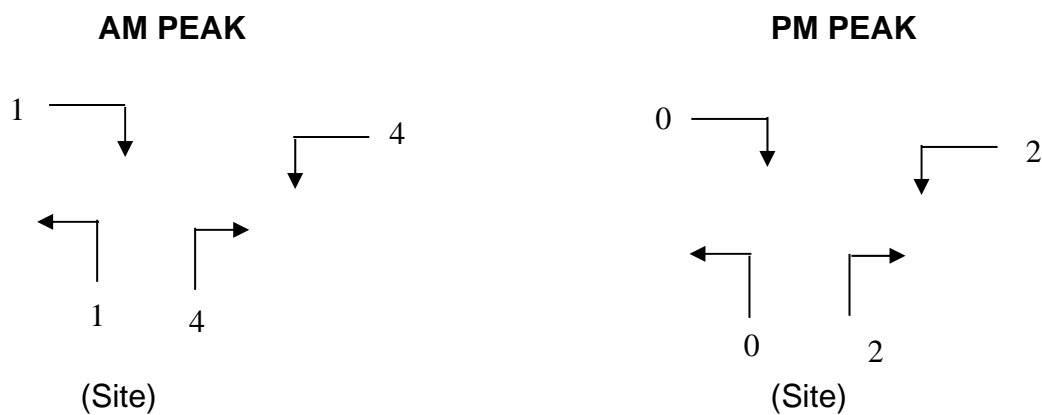
### 5.1 Traffic Distribution

Product transportation information provided by company management indicates the following:

#### 5.1.1 Glass Origin

Incoming glass to be recycled will arrive via the M4 and Richmond Road. **Figure 3** shows the main sources of the glass and the usual routes taken by delivery trucks. At the site's driveway it is assumed for modelling purposes that 90% of incoming loads will be from the east and 10% from the west.

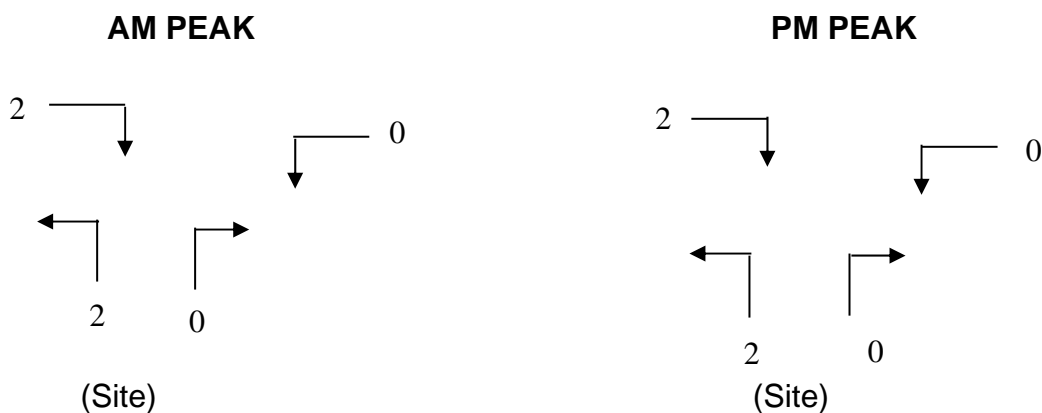
Using the projected peak hour truck trips for modelling purposes from Section 4.3, the peak hour truck movements for incoming material at the site's driveway will be:

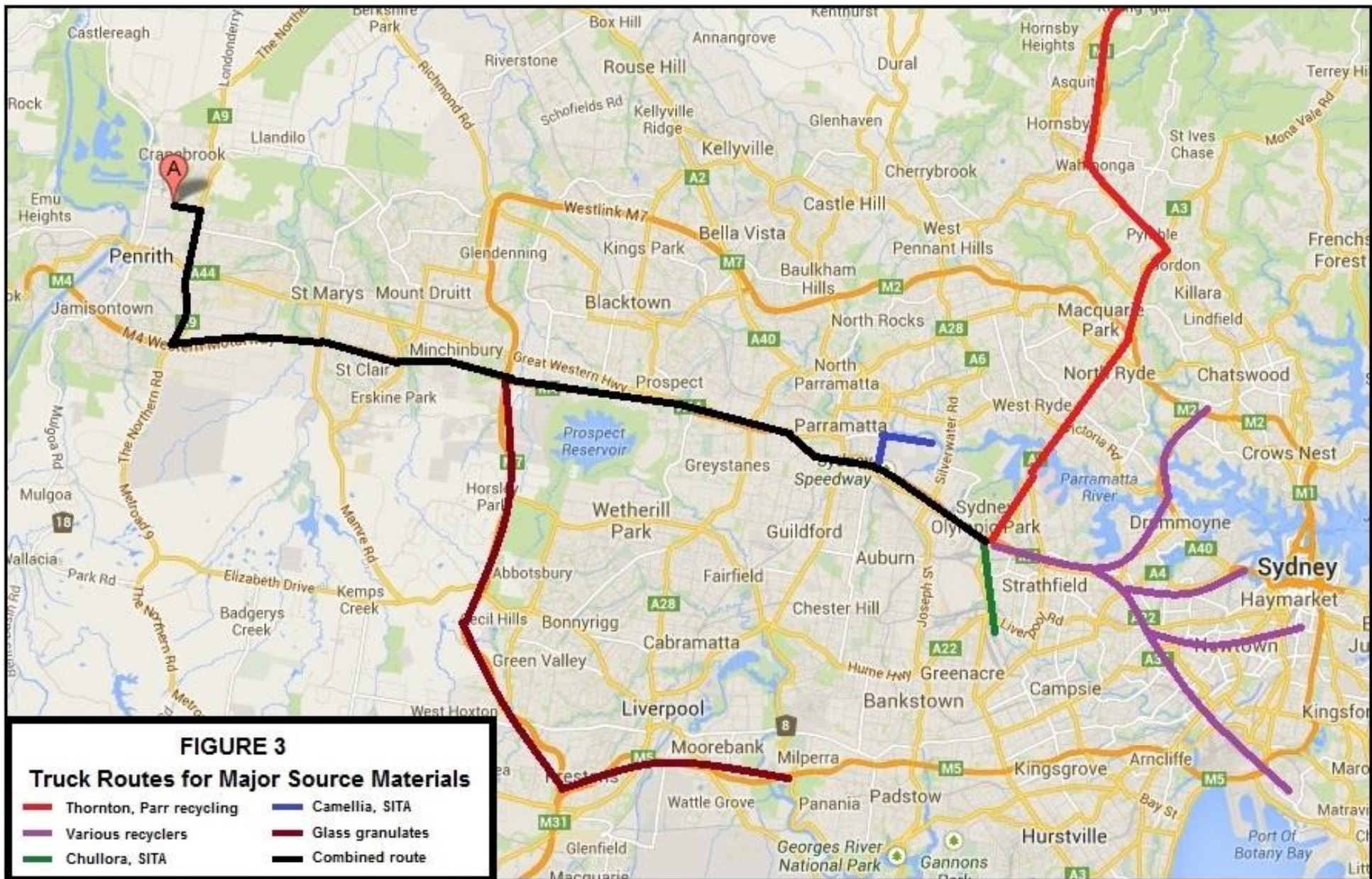


#### 5.1.2 Recycled Product Destination

All of the cullet produced will be transported in larger articulated or B Double trucks to the Owens Illinois site which is located immediately west of the subject site. The driveways to the two sites are 400 metres apart on the southern side of Andrews Road.

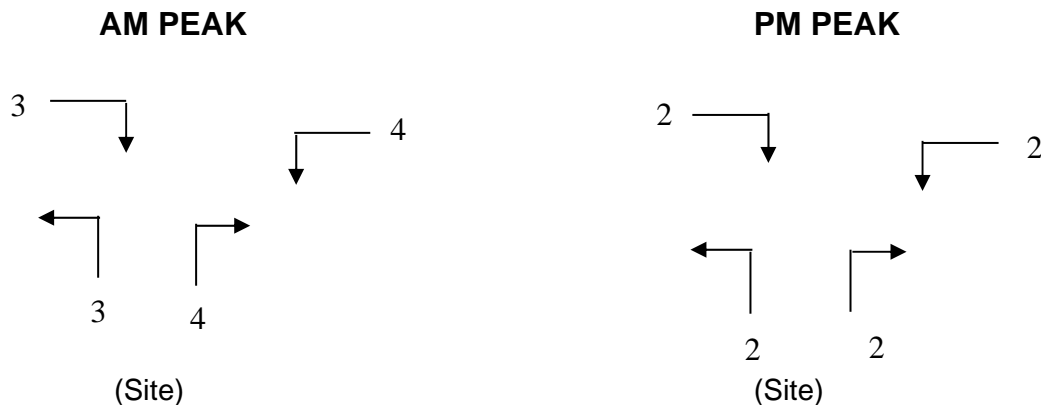
The projected peak hour truck trips from Section 4.3 are 1.5 trips per hour, rounded up to 2, as follows:





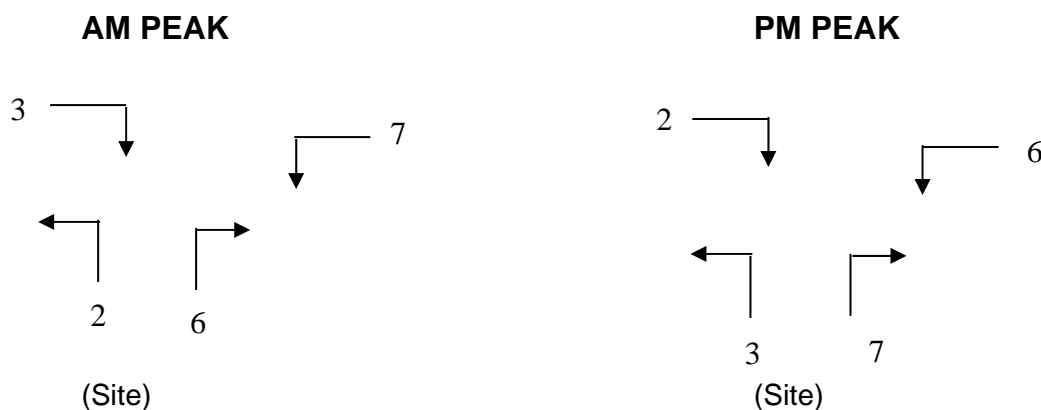
### 5.1.3 Combined Truck Generation

The combined projected peak hour truck movements from Sections 5.1.1 and 5.1.2 will therefore be:



### 5.1.4 Light Vehicles

Light vehicles in the peak hours will be the staff vehicle volumes identified in Section 4.4. The projected origins and destinations of these vehicles are 70% from the east and 30% from the west, producing the following:



The projected peak day truck and car volumes in and out of the subject site have been combined with existing peak hour flows along Andrews Road from Table 3.1, to produce the following movement data at the intersection of Andrews Road and the site's driveway.

**TABLE 5.1**  
**PEAK DAY, PEAK HOUR VOLUMES POST DEVELOPMENT**

Period	Vehicle Type	Andrews Road (west)		Development Driveway		Andrews Road (east)	
		Through	Right	Left	Right	Left	Through
AM Peak Hour 8am-9am	Light	239	3	2	6	7	331
	Heavy	45	3	3	4	4	63
	Combined	284	6	5	10	11	394
PM Peak Hour 5pm-6pm	Light	349	2	3	7	6	265
	Heavy	67	2	2	2	9	51
	Combined	416	4	5	9	15	316

## 5.2 SIDRA Modelling

SIDRA is an acronym for Signalised & unsignalised Intersection Design and Research Aid. SIDRA was initially developed by the Australian Road and Research Board during the 1970's. It has continued to be developed and used for traffic analysis throughout Australia and internationally. SIDRA is endorsed in the RTA Guide to Traffic Generating Developments (Section 4.2.2, page 4-3) to determine measures of effectiveness of intersection operation.

SIDRA modelling calculates the intersection's operation and produces outputs to assess intersection capacity and efficiency. The key SIDRA outputs are Degree of Saturation, Average Delay, Level of Service (LoS) and Queue Distance. Table 5.3 shows for each Level of Service, the range of Average Delay to vehicles using the intersection and a description of operational efficiency. Levels of Service range from "A" (Good Operation) to "E" (at capacity).

**TABLE 5.2**

### LEVEL OF SERVICE CRITERIA FOR INTERSECTIONS

Level of Service	Average Delay (seconds/vehicle)	Give Way and Stop Signs
A	<14	Good operation
B	15 to 28	Acceptable delays and spare capacity
C	29 to 42	Satisfactory, but accident study required
D	43 to 56	Near capacity and accident study required
E	57 to 70	At capacity, requires other control mode

Source: Table 4.2 RTA Guide to Traffic Generating Developments October 2002

Degree of Saturation (DoS) is the ratio of demand flow to capacity, or volume/capacity (v/c). Full saturation is 1, and any number greater than 1 means the site is oversaturated and unstable queuing will occur. In practice, a DoS above 0.85 indicates unsatisfactory capacity. Queue Distance is the 95<sup>th</sup> percentile maximum back of queue length in metres; and is an indication of congestion.

The modelling has initially been done for the future AM and PM peak hour volumes on the existing driveway and Andrews Road layout. (i.e. without widening on Andrews Road).

**TABLE 5.4**

**SIDRA RESULTS – FUTURE AM PEAK HOUR  
ANDREWS ROAD/SITE DRIVEWAY – EXISTING LAYOUT**

Movement		DoS (v/c)	Average Vehicle Delay (sec)	LoS	Queue Distance (m)
<b>Andrews Road West</b>	Through	0.177	3.6	A	14.5
	Right	0.177	10.5	A	14.5
<b>Andrews Road East</b>	Left	0.241	6.9	A	0.0
	Through	0.241	0.0	A	0.0
<b>Site Driveway</b>	Left	0.034	10.4	A	1.1
	Right	0.034	10.2	A	1.1

**TABLE 5.5**

**SIDRA RESULTS – FUTURE PM PEAK HOUR  
ANDREWS ROAD/SITE DRIVEWAY – EXISTING LAYOUT**

Movement		DoS (v/c)	Average Vehicle Delay (sec)	LoS	Queue Distance (m)
<b>Andrews Road West</b>	Through	0.252	3.0	A	20.5
	Right	0.252	10.0	A	20.5
<b>Andrews Road East</b>	Left	0.200	7.2	A	0.0
	Through	0.200	0.0	A	0.0
<b>Site Driveway</b>	Left	0.028	9.4	A	0.8
	Right	0.028	9.3	A	0.8

The results show the intersection operates very well with low delays and spare capacity. The average delay for traffic exiting the subject property is LOS A which means good operation.

The results show a queuing issue for traffic from Andrews Road west. Queue lengths of 14.5m and 20.5m are not excessive, however because Andrews Road is one lane in each direction, the cause is delayed right turning traffic into the subject site blocking eastbound traffic. This has both traffic flow and road safety implications.

It is proposed to manage this issue by providing road widening along Andrews Road providing a passing lane for traffic delayed by right turns into the site. This improvement measure has been designed for B-double trucks to enter the subject site, in accordance with Austroads and RMS road design guidelines. A copy of the Concept Intersection Treatment is shown in **Appendix 1**.

SIDRA intersection modelling has been carried out for the widened design layout using the same AM and PM projected peak day traffic volumes.

**TABLE 5.6**

**SIDRA RESULTS – FUTURE AM PEAK HOUR  
ANDREWS ROAD/SITE DRIVEWAY – FUTURE LAYOUT**

Movement		DoS (v/c)	Average Vehicle Delay (sec)	LoS	Queue Distance (m)
<b>Andrews Road West</b>	Through	0.167	0.0	A	0.0
	Right	0.010	10.4	A	0.4
<b>Andrews Road East</b>	Left	0.008	6.9	A	0.0
	Through	0.239	0.0	A	0.0
<b>Site Driveway</b>	Left	0.055	15.8	B	1.8
	Right	0.055	15.6	B	1.8

**TABLE 5.7**

**SIDRA RESULTS – FUTURE PM PEAK HOUR  
ANDREWS ROAD/SITE DRIVEWAY – FUTURE LAYOUT**

Movement		DoS (v/c)	Average Vehicle Delay (sec)	LoS	Queue Distance (m)
<b>Andrews Road West</b>	Through	0.246	0.0	A	0.0
	Right	0.006	9.5	A	0.2
<b>Andrews Road East</b>	Left	0.012	7.2	A	0.0
	Through	0.191	0.0	A	0.0
<b>Site Driveway</b>	Left	0.046	14.2	A	1.3
	Right	0.046	14.0	A	1.3

These results show a slight deterioration in delay for traffic exiting the subject site, but this is still in the acceptable range and with a very low Degree of Saturation. However significant improvement to conditions along Andrews Road have been produced. The results show virtually no queuing will occur for any traffic movement on Andrews Road, due to the separate turning lanes provided by the proposed road widening.

SIDRA modelling has not been undertaken at the adjoining Andrews Road/Castlereagh Road or Richmond Road intersections, because the projected peak hour traffic generation arising from the proposal is only 8 truck trips and 13 car trips to the east, meaning an average of one additional vehicle at Richmond Road every 3 minutes. Even fewer vehicles impact Castlereagh Road to the west. These volumes would not create any measurable impacts on the existing satisfactory service levels observed at these two junctions in peak times.

### **5.3 Impacts on Traffic Safety**

Road safety within the vicinity of the site is not expected to be adversely affected by the development. The proposal will result in only a relatively small increase in traffic which will not influence the operation of the major routes or intersections near the site. There is good sight distance in all directions at the property driveway, meeting Austroads and RMS requirements.

The proposed road widening and protected right and left turning lanes detailed in the previous section will significantly enhance road safety.

## 6.0 CONCLUSIONS

This Traffic Impact Assessment Report is for a proposed increase in production capacity of an existing glass beneficiation plant and recycling facility located at 126 Andrews Road, Penrith.

The glass beneficiation plant is planned to have a maximum capacity of 200,000 tonnes per annum, a 50,000 tonne per annum increase. The building houses the glass beneficiation processing plant and the cullet produced is stored in bunkers and stockpiles surrounding the site. It will then be transported to a glass bottle manufacturing factory on an adjoining property.

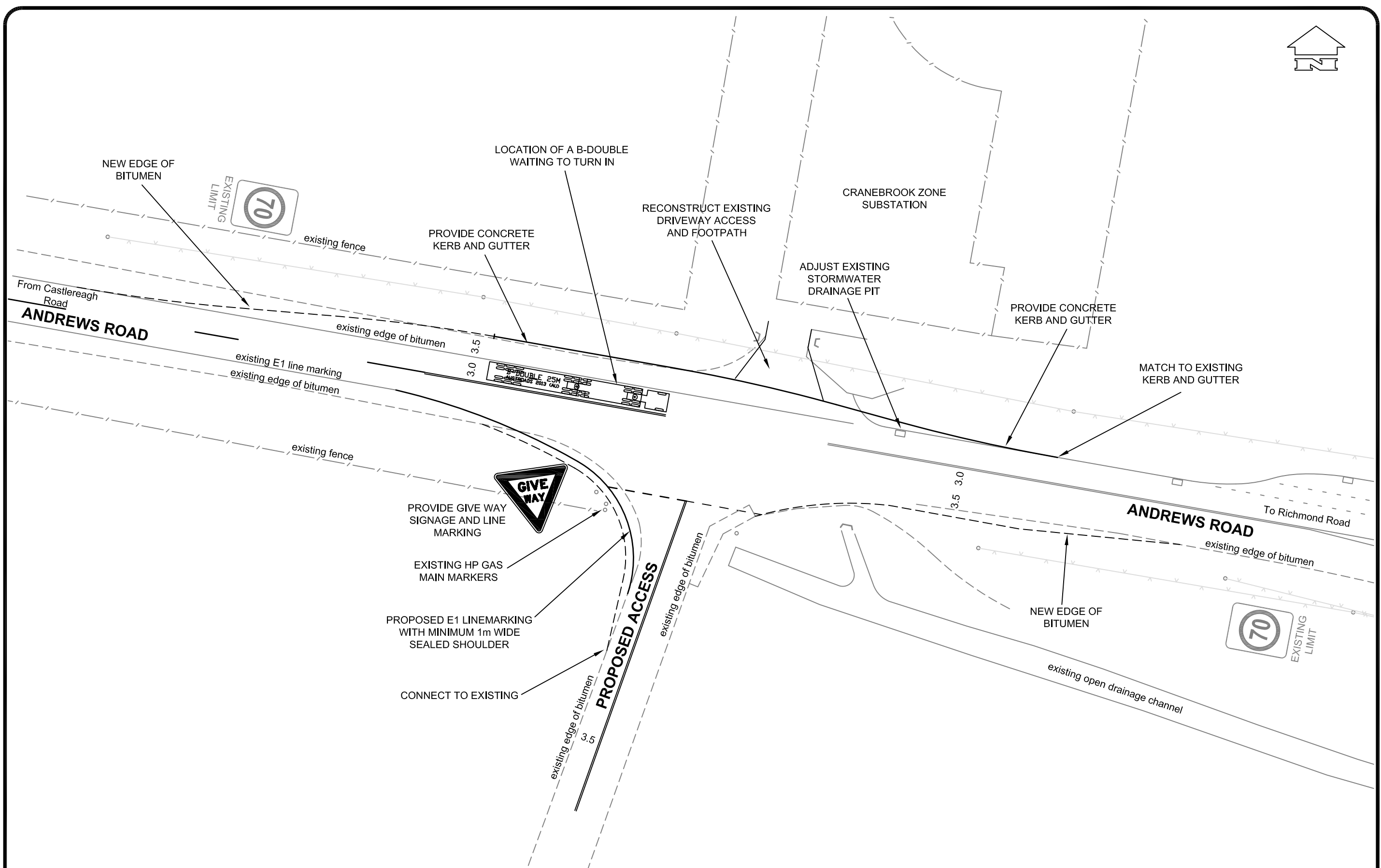
It is proposed that the increased capacity will not alter the 24 hour/7 day operation, which generates 26 full time employment positions over three shifts including:

- Site administration and management (2 persons);
- Material processing and handling (3 x 8 person shifts per day).

The main findings of this assessment follow.

- The proposal involves a 24 hour 7 day a week operation and is planned to process up to 200,000 tonnes of recycled glass each year.
- The material to be recycled will be transported to the site by trucks up to B-double in size from a wide ranging area in the greater Sydney basin. Most trucks will arrive via the M4 Motorway and Richmond Road.
- The recycled glass product will be transported by B-double or articulated truck and dogs to a glass bottling factory on an adjacent property.
- An average of 23 trucks per day will bring material to the site and 16 trucks per day will take the material away. Peak hour truck volumes have been projected for a peak day. These will be 14 trips in the AM peak hour (7 in, 7 out) and 8 trips in the PM peak hour (4 in, 4 out).
- Employee car traffic has been projected at a peak of 18 trips per hour.
- It is proposed to widen Andrews Road to allow passing of trucks turning into the development. This will ensure a safe and efficient intersection.
- SIDRA intersection modelling has been carried out and shows that the development will have minimal impact on through traffic on Andrews Road and the driveway operation will be acceptable.
- Adequate on-site parking and manoeuvring is provided for all vehicles needing to access the site, meeting the requirements of Council and in accordance with AS2890.1, AS2890.2 and AS2890.6.

In concluding, the proposal is expected to be a moderate traffic generating land use, producing up to 18 car and 14 truck trips in the peak hour on Andrews Road. The projected traffic impacts of the proposal with the improved site access provisions in place will be minor, with acceptable traffic service levels. The proposed upgrade to the driveway intersection will be a significant enhancement to traffic safety and efficiency on Andrews Road.



REV.	DETAILS OF REVISIONS	DATE

CAD FILE:	12027
JOB NO.	12027
DESIGNED:	GM
DRAWN:	KAS
DATE:	26.05.15

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PROPOSED DEVELOPMENT  
 126 ANDREWS ROAD, PENRITH  
 Associated Intersection Works  
**CONCEPT INTERSECTION TREATMENT**

DRAWING NO.	REV.
<b>14146_CO_Fig1</b>	
SCALE: 1:500@A3	